Private Line Automatic Ringdown for Trading Turrets

The Private Line Automatic Ringdown for Trading Turrets feature improves connection service for turrets in the financial industry—primarily for corporations and enterprises that use turrets and POTS telephones for trading. Implementation of this feature ensures that a call between traders on a private line automatic ringdown (PLAR) connection will be maintained if one of the traders goes on-hook or on-hold. This new capability also ensures that bandwidth is used only when needed.

Feature History for Private LIne Automatic Ringdown for Trading Turrets

Feature History	
Release	**Modification**
12.2(15)ZJ	This feature was introduced.
12.3(4)T	This feature was integrated into Cisco IOS Release 12.3(4)T.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

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Restrictions for Private Line Automatic Ringdown for Trading Turrets

The following restrictions apply to the Private Line Automatic Ringdown for Trading Turrets:

Minimum Cisco IOS Release

Before you can run the Private Line Automatic Ringdown for Trading Turrets feature, you must install an IP Plus image (minimum) of Cisco IOS Release 12.2(15)ZJ or a later release.

Configuration Information

This feature is supported only for FXS loop-start ports and digital ear & mouth (E&M) immediate-start ports. When a voice port is configured with an incorrect destination number that may or may not be a valid number, the call may not perform as expected. There is no cross-checking for turret PLAR from the origination voice port, but there is a check on the terminating voice port to prevent accepting a call from a calling party that is not preconfigured.

Configuration of Both Endpoints

To work properly, this feature must be configured at both endpoints in the connection (either FXS loopstart port or digital E&M immediate-start port).

Information About Private Line Automatic Ringdown for Trading Turrets

To use this feature, you should understand the following concepts:

Private-Line Automatic Ringdown

Private-line automatic ringdown (PLAR) circuits have statically configured endpoints and do not require dialing to connect calls. The **connection plar** command provides a mechanism to create a switched Voice over IP (VoIP) call without digit dialing. PLAR connections are useful where a telephone (or DS0) goes off-hook and a remote telephone rings (or remote DS0 goes off-hook) without digits being dialed. This feature is useful for:

- Providing an Off-Premises eXtension (OPX) from a private branch exchange (PBX). Connection PLAR would allow Foreign Exchange Station (FXS) ports to look to a central PBX like physical extensions.
- Providing dial-tone from a remote PBX. This provides toll-bypass VoIP services without having the routers providing dial-tone or changing the existing dialplan. Stations at remote sites look like they are physically connected stations to a PBX.

Connection Modes: PLAR vs Trunk

The following are the main similarities and differences between connection PLAR mode and connection trunk mode:

- Connection trunk mode is a permanent connection, the VoIP call is always connected independent of the plain old telephone service (POTS) port being on-hook or off-hook.
- Connection PLAR mode is a switched VoIP call, the call is set up on an as-needed basis. With connection PLAR, no bandwidth is consumed while the phone is on hook. When a phone connected to a POTS dial peer is taken off-hook, the call is automatically connected and the remote phone begins to ring.
- Both connection trunk and connection PLAR modes have statically configured endpoints and do not require dialing to connect calls.
- Connection trunk mode allows supplemental call signaling such as hookflash or point-to-point hoot-n-holler to be passed over the IP network between the two telephony devices.

Note Connection PLAR can now support hookflash signaling by configuring hookflash relay.

A hookflash indication is a brief on-hook condition that occurs during a call. It is created by quickly pressing and releasing the hook on your telephone. PBXs and telephone switches are frequently programmed to intercept hookflash indications and use them as a means to invoke supplemental services.

How to Configure Private Line Automatic Ringdown for Trading Turrets

This section describes the following tasks used to configure the Private Line Automatic Ringdown for Trading Turrets feature:

- Configuring Private Line Automatic Ringdown for Trading Turrets

Configuring Private Line Automatic Ringdown for Trading Turrets

Perform this task to enable the Private Line Automatic Ringdown for Trading Turrets.

SUMMARY STEPS

1. **enable**
2. **configure terminal**

3. **controller t1** *slot*/*port*
4. **framing** {**sf** | **esf**}
5. **clock source** {**line** | **internal**}
6. **linecode** {**ami** | **b8zs**}
7. **ds0-group** *ds0-group-number* **timeslots** *timeslot-list* **type** {**e&m-delay-dial** | **e&m-fgd** | **e&m-immediate-start** | **e&m-wink-start** | **ext-sig** | **fgd-eana** | **fgd-os** | **fxo-ground-start** | **fxo-loop-start** | **fxs-ground-start** | **fxs-loop-start** | **none**}
8. **voice-port** *slot*/*port*:*ds0-group-number*
9. **timeouts wait-release** {*seconds* | **infinity**}
10. **timing hookflash-input** *milliseconds*
11. **connection** {{**plar** [**tied**] | **tie-line** | **plar-opx**} *digits* | **trunk** *digits* [**answer-mode**]}
12. **exit**
13. **dial-peer voice** *tag* {**pots** | **vofr** | **voip**}
14. **destination-pattern** [**+**] *string* [**T**]
15. **session target ipv4:** *destination-ip-address*
16. **no vad**
17. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**controller t1** *slot*/*port* **Example:** `Router(config)# controller t1 1/0`	Enters controller configuration mode and identifies the controller type as T1, and specifies a slot and port for configuration commands that apply to the T1 interface.
Step 4	**framing** {**sf** | **esf**} **Example:** `Router(config-controller)# framing esf`	Specifies a frame type. • The **controller** command must be entered before this command can be used. • The frame type can be specified as **sf** for super frame or **esf** for Extended Superframe for T1 controllers.

	Command or Action	Purpose
Step 5	**clock source** {**line** | **internal**} **Example:** `Router(config-controller)# clock source internal`	Sets the clock source for the T1 controller. • The clock source can have a value of **line** or **internal**. – A value of **line** means the source is the loop. – A value of **internal** means the source is the local oscillator if the card is not participating in the backplane timing domain.
Step 6	**linecode** {**ami** | **b8zs**} **Example:** `Router(config-controller)# linecode b8zs`	Specifies a line encoding for a controller. • The **controller** command must be entered before this command can be used. • Line-code value for T1 can be **ami** or **b8zs**.
Step 7	**ds0-group** *ds0-group-number* **timeslots** *timeslot-list* **type** {**e&m-delay-dial** | **e&m-fgd** | **e&m-immediate-start** | **e&m-wink-start** | **ext-sig** | **fgd-eana** | **fgd-os** | **fxo-ground-start** | **fxo-loop-start** | **fxs-ground-start** | **fxs-loop-start** | **none**} **Example:** `Router(config-controller)# ds0-group 1 timeslots 1 type e&m-immediate-start`	Defines the T1 channels for use by compressed voice calls and the signaling method the router uses to connect to the PBX or CO. **Note** If you modify the **codec complexity** command parameters, you must first remove any existing DS0 groups, then reinstate them after the change to the codec complexity. • The **ds0-group** command automatically creates a logical voice port. • *ds0-group-number*—Value from 0 to 23 that identifies the DS0 group. • *timeslot-list*—Single number, numbers separated by commas, or a pair of numbers separated by a hyphen to indicate a range of time slots. For T1, allowable values are from 1 to 24. • The signaling method selection for **type** depends on the connection that you are making: – E&M—Connects PBX trunk lines (tie lines) and telephone equipment. The wink and delay settings both specify confirming signals between the sending and receiving ends, whereas the immediate setting stipulates no special off-hook or on-hook signals. – FXO—Connects a CO to a standard PBX interface where permitted by local regulations. – FXS—Connects basic telephone equipment and PBXs.

	Command or Action	Purpose
Step 8	**voice-port** *slot*/*port*:*ds0-group-number* **Example:** `Router(config-controller)# voice-port 1/0:0`	Enters voice-port configuration mode. • *slot*—Router location where the voice module is installed. Valid entries are from 0 to 3. • *port*—VIC location. Valid entries are 0 or 1. • Each defined DS0 group number is represented on a separate voice port, which allows you to define individual DS0s on the digital T1 card.
Step 9	**timeouts wait-release** {*seconds* | **infinity**} **Example:** `Router(config-voiceport)# timeouts wait-release 3`	Configures the delay timeout before the system starts the process for releasing voice ports. • *seconds*—Specifies the duration, in seconds, for which a voice port stays in the call-failure state while the Cisco router or concentrator sends a busy tone, reorder tone, or out-of-service tone to the port. – Range is from 3 to 3600. – Default is 30. • **infinity**—Specifies that the voice port is never released as long as the call-failure state remains.
Step 10	**timing hookflash-input** *milliseconds* **Example:** `Router(config-voiceport)# timing hookflash-input 150`	Specifies the maximum duration of a hookflash for an FXS interface. • *milliseconds*—Duration of the hookflash. – Values are from 50 through 1550. – Default is 600.
Step 11	**connection** {{**plar** [**tied**] | **tie-line** | **plar-opx**} *digits* | **trunk** *digits* [**answer-mode**]} **Example:** `Router(config-voiceport)# connection plar tied 2000`	Sets up a connection mode for the voice port. • **plar**—Specifies a PLAR connection, which rings a remote telephone when the dial peer goes off hook. • **tied**—Enables the Private Line Automatic Ringdown for Trading Turrets feature. • **tie-line**—Specifies a temporary tie-line trunk to a PBX. • **plar-opx**—Specifies a PLAR OPX connection. • **trunk**—Specifies a straight tie-line connection to a PBX. • *digits*—Specifies the remote telephone number or significant start digits of the number.
Step 12	**exit** **Example:** `Router(config-voiceport)# exit`	Exits voice-port configuration mode and returns the router to global configuration mode.

	Command or Action	Purpose
Step 13	**dial-peer voice** *tag* {**pots** | **vofr** | **voip**} **Example:** `Router(config)# dial-peer voice 1000 voip`	Enters dial peer voice configuration mode (and specifies the method of voice encapsulation). • *tag*—Digits that define a particular dial peer. Valid entries are from 1 to 2147483647. • **pots**—Specifies POTS peer using Voice over IP (VoIP) encapsulation on the IP backbone. • **vofr**—Specifies a Voice over Frame Relay dial peer using FRF.11 encapsulation on the Frame Relay backbone network. • **voip**—Specifies that this is a VoIP peer using voice encapsulation on the POTS network.

	Command or Action	Purpose
Step 14	**destination-pattern** [**+**] *string* [**T**] **Example:** `Router(config-dialpeer)# destination-pattern 100`	Specifies either the prefix or the full E.164 telephone number (depending on your dial plan) to be used for a dial peer. • **+** (Optional)—Character indicating an E.164 standard number. • *string*—Specifies the E.164 or private dialing plan telephone number. Valid entries are the digits 0 through 9, the letters A through D, and the following special characters: – The asterisk (*) and pound sign (#) that appear on standard touch-tone dial pads. – Comma (,), which inserts a pause between digits. – Period (.), which matches any entered digit (this character is used as a wildcard). – Percent sign (%), which indicates that the preceding digit occurred zero or more times; similar to the wildcard usage. – Plus sign (+), which indicates that the preceding digit occurred one or more times. – Circumflex (^), which indicates a match to the beginning of the string. – Dollar sign ($), which matches the null string at the end of the input string. – Backslash symbol (\), which is followed by a single character, and matches that character. Can be used with a single character with no other significance (matching that character). – Question mark (?), which indicates that the preceding digit occurred zero or one time. – Brackets ([ ]), which indicate a range. A range is a sequence of characters enclosed in the brackets; only numeric characters from 0 to 9 are allowed in the range. – Parentheses (( )), which indicate a pattern and are the same as the regular expression rule.
Step 15	**session target ipv4:** *destination-ip-address* **Example:** `Router(config-dialpeer)# session target ipv4: 10.1.1.1`	Specifies a network-specific address for a specified dial peer. • *destination-ip-address*—IP address of the dial peer.

	Command or Action	Purpose
Step 16	**no vad** **Example:** `Router(config-dialpeer)# no vad`	Disables voice activity detection (VAD) for the calls using a particular dial peer.
Step 17	**exit** **Example:** `Router(config-dialpeer)# exit`	Exits dialpeer voice configuration mode and returns the router to global configuration mode.

Configuration Examples for Private Line Automatic Ringdown for Trading Turrets

This section provides samples for three types of configuration:

- T1 E&M to T1 E&M PLAR Connection: Example, page 9
- Analog FXS to Analog FXS PLAR Connection: Example, page 10
- T1 E&M to Analog FXS PLAR Connection: Example, page 10

T1 E&M to T1 E&M PLAR Connection: Example

This section provides a sample configuration for a PLAR connection between two T1 E&M voice ports. Note that this is a sample configuration only, provided for references purposes.

This sample configuration is for the first router (endpoint):

```
enable
configure terminal
controller t1 1/0
framing esf
clock source internal
linecode b8zs
ds0-group 0 timeslots 1 type e&m-immediate-start
!
voice-port 1/0:0
timeouts wait-release 3
timing hookflash-in 150
connection plar tied 2000
!
dial-peer voice 1000 pots
destination-pattern 1000
port 1/0:0
!
dial-peer voice 2000 voip
destination-pattern 200
session target ipv4: 10.1.1.2
```

This sample configuration is for the second router (endpoint):

```
enable
configure terminal
controller t1 2/0
```

```
framing esf
clock source internal
linecode b8zs
ds0-group 0 timeslots 1 type e&m-immediate-start
!
voice-port 2/0:0
timeouts wait-release 3
timing hookflash-in 150
connection plar tied 1000
!
dial-peer voice 2000 pots
destination-pattern 2000
port 2/0:0
!
dial-peer voice 1000 voip
destination-pattern 100
session target ipv4: 10.1.1.1
no vad
```

Analog FXS to Analog FXS PLAR Connection: Example

This section describes a sample configuration for an analog FXS to analog FXS PLAR connection.

This sample configuration is for the first router (endpoint):

```
enable
configure terminal
voice-port 1/0/0
timeouts wait-release 3
connection plar tied 1000
!
dial-peer voice 2000 pots
destination-pattern 2000
port 1/0/0
!
dial-peer voice 1000 voip
destination-pattern 100
session target ipv4: 10.1.1.1
no vad
```

This sample configuration is for the second router (endpoint):

```
enable
configure terminal
voice-port 1/0/0
timeouts wait-release 3
connection plar tied 2000
!
dial-peer voice 1000 pots
destination-pattern 1000
port 1/0/0
dial-peer voice 2000 voip
destination-pattern 200
session target ipv4: 10.1.1.2
```

T1 E&M to Analog FXS PLAR Connection: Example

This section describes a sample configuration for a T1 E&M to analog FXS PLAR connection.

This sample configuration is for the first router (endpoint):

```
enable
configure terminal
voice-port 1/0/0
timeouts wait-release 3
connection plar tied 2000
!
dial-peer voice 1000 pots
destination-pattern 1000
port 1/0/0
!
dial-peer voice 2000 voip
destination-pattern 200
session target ipv4: 10.1.1.2
```

This sample configuration is for the second router (endpoint):

```
enable
configure terminal
controller t1 2/0
framing esf
clock source internal
linecode b8zs
ds0-group 0 timeslots 1 type e&m-immediate-start
!
voice-port 2/0:0
timeouts wait-release 3
timing hookflash-in 150
connection plar tied 1000
!
dial-peer voice 2000 pots
destination-pattern 2000
port 2/0:0
!
dial-peer voice 1000 voip
destination-pattern 100
session target ipv4: 10.1.1.1
no vad
!
```

Additional References

The following sections provide references related to the Private Line Automatic Ringdown for Trading Turrets feature.

Related Documents

Related Topic	Document Title
General information about Voice over IP	*Cisco IOS Voice over IP Overview*
Information about Cisco IOS commands	*Cisco IOS Voice Command Reference*

Standards

Standards	Title
No new or modified standards are supported by this feature.	—

RFCs

RFCs	Title
No new or modified RFCs are supported by this feature.	—

MIBs

MIBs	MIBs Link
• No new or modified MIBs are supported by this feature.	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

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents the modified **connection** command. All other commands used with this feature are documented in the Cisco IOS Release 12.3 T command reference publications.

connection

To specify a connection mode for a voice port, use the **connection** command in voice-port configuration mode. To disable the selected connection mode, use the **no** form of this command.

connection {{**plar** [**tied**] | **tie-line** | **plar-opx**} *digits* | **trunk** *digits* [**answer-mode**]}

no connection {{**plar** | **tie-line** | **plar-opx**} *digits* | **trunk** *digits* [**answer-mode**]}

Syntax Description

plar	Specifies a PLAR connection. PLAR is an autodialing mechanism that permanently associates a voice interface with a far-end voice interface, allowing call completion to a specific telephone number or PBX without dialing. When the calling telephone goes off-hook, a predefined network dial peer is automatically matched, which sets up a call to the destination telephone or PBX.
tied	(Optional) Specifies the activation of the Private Line Automatic Ringdown for Trading Turrets feature. Using this feature: • The calling number of an incoming call is matched to the preconfigured number: – If the numbers match, the call is connected. – If the numbers do not match, the call is rejected. • The configured voice port can accept an incoming call when the voice port is already off hook.
tie-line	Specifies a connection that emulates a temporary tie-line trunk to a PBX. A tie-line connection is automatically set up for each call and torn down when the call ends.
plar-opx	Specifies a PLAR off-premises extension (OPX) connection. Using this option, the local voice port provides a local response before the remote voice port receives an answer. On Foreign Exchange Office (FXO) interfaces, the voice port will not answer until the remote side has answered.
digits	Specifies the destination telephone number. Valid entries are any series of digits that specify the E.164 telephone number.
trunk	Specifies a connection that emulates a permanent trunk connection to a PBX. A trunk connection remains permanent in the absence of any active calls.
answer-mode	(Optional) Specifies that the router should not attempt to initiate a trunk connection but should wait for an incoming call before establishing the trunk. Used only with the **trunk** keyword.

Defaults

No connection mode is specified.

Command Modes

Voice-port configuration

Command History

Release	Modification
11.3(1)T	This command was introduced on the Cisco 3600 series router.
11.3(1)MA1	This command was first supported on the Cisco MC3810 multiservice concentrator, and the **tie-line** keyword was first made available on the Cisco MC3810 multiservice concentrator.
11.3(1)MA5	The **plar-opx** keyword was first made available on the Cisco MC3810 multiservice concentrator as the **plar-opx-ringrelay** keyword.
12.0(2)T	This command was integrated into Cisco IOS Release 12.0(2)T.
12.0(3)XG	The **trunk** keyword was made available on the Cisco MC3810 multiservice concentrator. The **trunk answer-mode** keyword was added.
12.0(4)T	The **trunk** and **trunk answer-mode** keywords were integrated into Cisco IOS Release 12.0(4)T.
12.0(7)XK	This command was implemented on the Cisco 2600, 3600, and MC3810 multiservice concentrator platforms.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.2(15)ZJ	This command was integrated into Cisco IOS Release 12.2(15)ZJ and the **tied** keyword was added.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.

Usage Guidelines

Use the **connection** command to specify a connection mode for a specific interface. For example, use the **connection plar** command to specify a PLAR interface. The string you configure for this command is used as the called number for all incoming calls over this connection. The destination peer is determined by the called number.

Use the **connection trunk** command to specify a permanent tie-line connection to a PBX. VoIP simulates a trunk connection by creating virtual trunk tie lines between PBXs connected to Cisco devices on each side of a VoIP connection. In configuring virtual trunk connections in Voice over IP, the following restrictions apply:

- Use only the following voice port combinations:
  - Ear and mouth (E&M) to E&M (same type)
  - Foreign Exchange Station (FXS) to FXO
  - FXS to FXS (with no signaling)
- Do not perform number expansion on the destination pattern telephone numbers configured for trunk connection.
- Configure both end routers for trunk connections.
- Connect Cisco routers that are Cisco 2600 or Cisco 3600 series routers only.

To configure one of the devices in the trunk connection to act as slave and only receive calls, use the **answer-mode** keyword with the **connection trunk** command when configuring that device.

Note Because virtual trunk connections do not support number expansion, the destination patterns on each side of the trunk connection must match exactly.

Note When using the **connection trunk** command, you must enter the **shutdown** command followed by the **no shutdown** command on the voice port.

VoIP establishes the trunk connection immediately after it is configured. Both ports on either end of the connection are dedicated until you disable trunking for that connection. If for some reason the link between the two switching systems goes down, the virtual trunk reestablishes itself after the link comes back up.

Use the **connection tie-line** command when the dial plan requires that digits be added before any digits dialed by the PBX and that the combined set of digits be used to route the call onto the network. The operation is similar to the **connection plar** command operation, but in this case the tie-line port waits to collect digits from the PBX. The tie-line digits are automatically stripped by a terminating port.

If the **connection** command is not configured, the standard session application outputs a dial tone when the interface goes off-hook until enough digits are collected to match a dial peer and complete the call.

Examples

The following example shows PLAR selected as the connection mode on a Cisco 3600 series router, with a destination telephone number of 555-0100:

```
voice-port 1/0/0
connection trunk 5550100
```

The following example shows the tie-line selected as the connection mode on a Cisco MC3810, with a destination telephone number of 555-0100:

```
voice-port 1/1
connection tie-line 5550100
```

The following example specifies a PLAR OPX connection on a Cisco 3600 series router, with a destination telephone number of 555-0100:

```
voice-port 1/0/0
connection plar-opx 5550100
```

The following example shows configuration of a Cisco 3600 series router for a trunk connection and specifies that it will establish the trunk only when it receives an incoming call:

```
voice-port 1/0/0
connection trunk 5550100 answer-mode
```

The following examples show configuration of the routers on both sides of a VoIP connection to support trunk connections:

Router A Configuration

```
voice-port 1/0/0
connection trunk +15105550100
dial-peer voice 10 pots
destination-pattern +13085550101
port 1/0/0
dial-peer voice 100 voip
session-target ipv4: 172.20.10.10
destination-pattern +15105550100
```

Router B Configuration

```
voice-port 1/0/0
connection trunk +13085551000
dial-peer voice 20 pots
destination-pattern +15105554001
port 1/0/0
dial-peer voice 200 voip
session-target ipv4: 172.19.10.10
destination-pattern +13085550500
```

Related Commands

Command	Description
destination-pattern	Specifies the prefix or the full E.164 telephone number for a dial peer.
dial-peer voice	Enters dialpeer voiceconfiguration mode and specifies the voice encapsulation type.
session-protocol	Establishes a session protocol for calls between the local and remote routers via the packet network.
session-target	Configures a network-specific address for a dial peer.
voice-port	Enters voice-port configuration mode.

Glossary

CAS—channel-associated signaling.

CSU—channel service unit.

DSP—digital signal processor.

DSU—data service unit.

E&M—ear and mouth. Connection to a PBX or key system trunk line.

E1—European equivalent of T1, 32 channels of 64 kHz each, 1 for framing, 1 for signaling.

ESF—Extended Superframe, 24 frames per ESF, includes additional signaling.

FAS—frame align signal.

FDL—facilities data link.

FXO—Foreign Exchange Office.

FXS—Foreign Exchange Station.

H.323—ITU-T standard that defines a set of call control, channel setup, and codec specifications for sending real-time voice and video over networks that do not offer guaranteed quality of service.

HDLC—High-Level Data Link Control protocol.

MIB—Management Information Base.

PLAR—private line automatic ringdown.

POTS—plain old telephone service.

PRI—Primary Rate Interface.

SF—superframe, or D4 framing, 12 frames per super frame for in-band signaling extraction.

T1—North American channelized TDM with 24 channels of 64 kHz each plus 8 kHz frame.

VAD—voice activity detection.

Note Refer to the *Internetworking Terms and Acronyms* for terms not included in this glossary.