Asynchronous Call Queueing by Role

The Asynchronous Call Queueing by Role feature allows priority users making Telnet connection requests to busy asynchronous rotary groups to be placed at the head of the queue when asynchronous rotary line queueing is enabled. If a second priority user makes a Telnet connection request, they will be placed behind the first priority user at the head of the queue. This feature allows a priority user to access the first available line.

Feature Specifications for Asynchronous Rotary Line Queueing

Feature History	
Release	**Modification**
12.2(15)T	This feature was introduced.
Supported Platforms	
The Asynchronous Call Queueing by Role feature is supported on any Cisco router that has an asynchronous port, but has been tested on the following platforms: • Cisco 2500 series routers • Cisco 2600 series routers • Cisco 3600 series routers The Asynchronous Call Queueing by Role feature was designed to operate on routers with software that contains the communications server subsystem and that have multiple asynchronous interfaces. See the section "Prerequisites for Asynchronous Call Queueing by Role" for more information about system prerequisites.	

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

- Prerequisites for Asynchronous Call Queueing by Role, page 2
- Restrictions for Asynchronous Call Queueing by Role, page 2
- Information About Asynchronous Call Queueing by Role, page 2

- How to Configure Asynchronous Call Queueing by Role, page 3
- Configuration Examples for Asynchronous Call Queueing by Role, page 5
- Additional References, page 6
- Command Reference, page 7
- Glossary, page 11

Prerequisites for Asynchronous Call Queueing by Role

The router must have operational and successfully configured asynchronous interfaces, and asynchronous rotary groups must be enabled.

Restrictions for Asynchronous Call Queueing by Role

To configure the Asynchronous Call Queueing by Role feature, you must also configure asynchronous rotary line queueing. Make sure you comply with the following requirements when configuring asynchronous rotary line queueing:

- You must configure more virtual terminal lines than will ever be used by waiting asynchronous rotary connection attempts. Even when the queue is at its maximum, there must be at least one virtual terminal line available so that system operators or network administrators can use Telnet to access the router to show, debug, or configure system performance.
- When adding lines to a rotary group, all lines must be either queued or not queued. A mixture of queued and nonqueued lines in the same rotary group is not supported and can result in unexpected behavior.
- All lines within a queued rotary group need to use the same authentication method. Using different authentication methods within the same rotary group can result in unexpected behavior.

Additional information about configuring asynchronous lines and rotary groups can be found in the *Cisco IOS Dial Technologies Configuration Guide*, Release 12.2; refer to the part “Preparing for Dial Access.”

Information About Asynchronous Call Queueing by Role

To configure asynchronous rotary line queueing and the Asynchronous Call Queueing by Role feature, you must understand the following concepts:

- Authentication of Connections, page 2
- Benefits of Asynchronous Call Queueing by Role, page 3

Authentication of Connections

Connections are authenticated using the method specified for the line configurations for the asynchronous rotary group. If a connection is queued, authentication is done prior to queueing and no authentication is done when the connection is later established.

Benefits of Asynchronous Call Queueing by Role

Cisco IOS Release 12.2(15)T introduces the ability to queue calls by role. This functionality allows priority users to bypass the queue and access the first available line, enabling the priority user to complete necessary administrative tasks more quickly.

Note Priority users must have the privilege level of administrator(PRIV_ROOT) to take advantage of the Asynchronous Call Queueing by Role feature.

How to Configure Asynchronous Call Queueing by Role

This section contains the following procedures:

- Configuring Asynchronous Call Queueing by Role, page 3 (required)
- Monitoring and Maintaining Asynchronous Rotary Line Queues, page 4 (optional)

Configuring Asynchronous Call Queueing by Role

This task configures asynchronous rotary line queueing and the Asynchronous Call Queueing by Role feature.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **line** [**aux** | **console** | **tty** | **vty**] *line-number* [*ending-line-number*]
4. **rotary** *group* [**queued** [**by-role**]]

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.

	Command or Action	Purpose
Step 3	**line** [**aux** | **console** | **tty** | **vty**] *line-number* [*ending-line-number*] **Example:** `Router(config)# line 1 2`	Identifies a specific line or group of lines for configuration and enters line configuration mode.
Step 4	**rotary** *group* [**queued** [**by-role**]] **Example:** `Router(config-line)# rotary 1 queued by-role`	Enables asynchronous rotary line queueing on the designated line or group of lines. • The optional **by-role** keyword enables asynchronous call queueing by role.

Troubleshooting Tips

In the event that asynchronous rotary line queueing is not operating correctly, use the following **debug** commands in privileged EXEC mode to determine the source of the problem:

- **debug async async-queue**
- **debug ip tcp transactions**
- **debug modem**

Refer to the *Cisco IOS Debug Command Reference* publication for information about the **debug modem**, **debug ip tcp transactions**, and the **debug async async-queue** commands.

Monitoring and Maintaining Asynchronous Rotary Line Queues

This task displays queued lines and removes lines from the queue:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **show line async-queue** *rotary-group*
4. **clear line async-queue** *rotary-group*

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.

	Command or Action	Purpose
Step 3	**show line async-queue** *rotary-group* **Example:** `Router# show line async-queue 1`	Displays which lines are queued.
Step 4	**clear line async-queue** *rotary-group* **Example:** `Router# clear line async-queue 1`	Clears all rotary queues or the specified rotary queue. • If the *rotary-group* argument is not specified, all rotary queues are removed.

Configuration Examples for Asynchronous Call Queueing by Role

This section provides the following configuration examples:

- Configuring Asynchronous Call Queueing by Role Example, page 5
- Verifying Asynchronous Call Queueing by Role Example, page 5

Configuring Asynchronous Call Queueing by Role Example

The following example enables asynchronous rotary line queueing and by-role queueing on lines 1 and 2 on rotary group 1:

```
line 1 2
  rotary 1 queued by-role
```

Verifying Asynchronous Call Queueing by Role Example

The following example shows the output of the **show line async-queue** command when by-role queueing is enabled on lines tty35 and tty38:

```
Router# show line async-queue

Showing async-queue for ALL rotary groups

Queue for Rotary Group 1:
Pos Waiting TTY Dest Port Source Host Waiting Time
1 tty66 3001 10.2.72.13 00:01:32
2 tty67 3001 10.2.72.13 00:01:23

Lines which have queuing enabled [tty (group)]:
tty33 (2) tty34 (2)

Lines which have queuing by role enabled [tty (group)]:
tty35 (1) tty38 (1)
```

Additional References

The following sections provide additional references related to the Asynchronous Call Queueing by Role feature:

- Related Documents, page 6
- Standards, page 6
- MIBs, page 6
- RFCs, page 7
- Technical Assistance, page 7

Related Documents

Related Topic	Document Title
Additional information about the Asynchronous Rotary Line Queuing feature	*Asynchronous Rotary Line Queueing*, Release 12.1(1)T
Additional information about configuring asynchronous lines and rotary groups	*Cisco IOS Dial Technologies Configuration Guide*, Release 12.2
Additional information about **debug** commands	*Cisco IOS Debug Command Reference*, Release 12.2

Standards

Standards	Title
None	—

MIBs

MIBs	MIBs Link
None	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

http://www.cisco.com/register

RFCs

RFCs	Title
None	—

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, tools, and lots more. 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 **rotary** command. All other commands used with this feature are documented in the Cisco IOS Release 12.2 T command reference publications.

rotary

To define a group of lines consisting of one or more virtual terminal lines or one auxiliary port line, use the **rotary** command in line configuration mode. To remove a group of lines from a rotary group, use the **no** form of this command.

rotary *group* [**queued** [**by-role**]] [**round-robin**]

no rotary *group* [**queued** [**by-role**]] [**round-robin**]

Syntax Description

group	Rotary group number.
queued	(Optional) Specifies queueing a connection request to a rotary group.
by-role	(Optional) Enables priority users to move to the head of the queue.
round-robin	(Optional) Selects a round-robin port selection algorithm instead of the default linear port selection algorithm.

Defaults

No group of lines is defined.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.1(1)T	The **queued** keyword was added.
12.1(2)T	The **round-robin** keyword was added.
12.2(15)T	The **by-role** keyword was added.

Usage Guidelines

Connections to a rotary group can take advantage of the following features:

- Clear To Send (CTS)—If a line in a rotary group is configured to require CTS, the Cisco IOS software ignores that line if CTS from the attached device is low. This feature enables the software to avoid inactive host ports automatically. To enable this feature, use the **modem bad** line configuration command.
- EIA/TIA-232 handshaking—Rotary groups are often associated with large terminal switches that require an EIA/TIA-232 handshake before forming a connection. In this case, use the **modem callout** line configuration command to configure the lines in the group. If the EIA/TIA-232 handshake fails on a line, the Cisco IOS software steps to the next free line in the rotary group and restarts the negotiation.
- Access control—You can use access lists for groups of virtual terminal lines.
- Session timeout—Use the **session-timeout** line configuration command to set an interval for a line so that if no activity occurs on a remotely initiated connection for that interval the Cisco IOS software closes the connection. The software assumes that the host has crashed or is otherwise inaccessible.

Typically, rotary groups are used on devices with multiple modem connections to allow connection to the next free line in a hunt group. In the event that there are no free asynchronous ports, the **queued** keyword enables outgoing connection requests to be queued until a free port becomes available. Periodic messages are sent to users to update them on the status of their connection request.

For a nonqueued connection request, the remote host must specify a particular TCP port on the router to connect to a rotary group with connections to an individual line. The available services are the same, but the TCP port numbers are different. Table 1 lists the services and port numbers for both rotary groups and individual lines.

Table 1 Services and Port Numbers for Rotary Groups and Lines

Services Provided	Base TCP Port for Rotaries	Base TCP Port for Individual Lines
Telnet protocol	3000	2000
Raw TCP protocol (no Telnet protocol)	5000	4000
Telnet protocol, binary mode	7000	6000
XRemote protocol	10000	9000

For example, if Telnet protocols are required, the remote host connects to the TCP port numbered 3000 (decimal) plus the rotary group number. If the rotary group identifier is 13, the corresponding TCP port is 3013.

If a raw TCP stream is required, the port is 5000 (decimal) plus the rotary group number. If rotary group 5 includes a raw TCP (printer) line, the user connects to port 5005 and is connected to one of the raw printers in the group.

If Telnet binary mode is required, the port is 7000 (decimal) plus the rotary group number.

The **by-role** keyword enables priority users to bypass the queue and access the first available line.

Note Priority users must have the privilege level of administrator(PRIV_ROOT) to take advantage of this option.

The round-robin selection algorithm enabled by the **round-robin** keyword improves the utilization of tty ports. When looking for the next available port, the default linear hunting algorithm will not roll over to the next port if the first port it finds is bad. This failure to roll over to the next port results in an unequitable utilization of the tty ports on a router. The round-robin hunting algorithm will roll over bad ports instead of retrying them.

Note The **round-robin** option must be configured for all the lines in a rotary group.

Examples

The following example establishes a rotary group consisting of virtual terminal lines 2 through 4 and defines a password on those lines. By using Telnet to connect to TCP port 3001, the user gets the next free line in the rotary group. The user need not remember the range of line numbers associated with the password.

```
line vty 2 4
 rotary 1
 password letmein
login
```

The following example enables asynchronous rotary line queueing:

```
line 1 2
 rotary 1 queued
```

The following example enables asynchronous rotary line queueing using the round-robin algorithm:

```
line 1 2
 rotary 1 queued round-robin
```

Related Commands

Command	Description
login (line)	Enables password checking at login and defines the method (local or TACACS+).
modem bad	Removes an integrated modem from service and indicates it as suspect or proven to be inoperable.
modem callout	Configures a line for reverse connections.
modem dialin	Configures a line to enable a modem attached to the router to accept incoming calls only.
session-timeout	Sets the interval for closing the connection when there is no input or output traffic.

Glossary

asynchronous transmission—Term describing digital signals that are sent without precise clocking. Such signals generally have different frequencies and phase relationships. Asynchronous transmissions usually encapsulate individual characters in control bits (called start and stop bits) that designate the beginning and end of each character.

EIA/TIA-232—Common physical layer interface standard, developed by the Electronic Industries Association and Telecommunications Industry Association, that supports unbalanced circuits at signal speeds of up to 64 kbps. Closely resembles the V.24 specification. Formerly called RS-232.

rotary groups—Several contiguous lines that allow a connection to be made to the next free line in the group. Also called a hunt group.

TCP—Transmission Control Protocol. Connection-oriented transport layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack.

Telnet—Standard terminal emulation protocol in the TCP/IP protocol stack. Telnet is used for remote terminal connection, enabling users to log in to remote systems and use resources as if they were connected to a local system. Telnet is defined in RFC 854.

Transmission Connection Protocol—See TCP.

TTY—terminal line.

VTY—virtual terminal line.

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