



# Terminal Services Commands

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# absolute-timeout

To set the interval for closing the connection, use the **absolute-timeout** command in line configuration mode. To restore the default, use the **no** form of this command.

**absolute-timeout** *minutes*

**no absolute-timeout**

Syntax Description	<i>minutes</i>	Number of minutes after which the user session will be terminated.
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Defaults	No timeout interval is automatically set.
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Command Modes	Line configuration
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Command History	Release	Modification
	11.0	This command was introduced.

Usage Guidelines	Use the <b>absolute-timeout</b> command line configuration command to configure the EXEC to terminate when the configured number of minutes occurs on the virtual terminal (vty) line. The <b>absolute-timeout</b> command terminates the connection after the specified time period has elapsed, regardless of whether the connection is being used at the time of termination. You can specify an absolute-timeout value for each port. The user is given 20 seconds notice before the session is terminated. You can use this command along with the <b>logout-warning</b> command to notify users of an impending logout.
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Cisco IOS software also provides the **session-timeout** and **exec-timeout** line configuration commands for releasing lines when they have been idle for too long.

You can set the **absolute-timeout** command and an AppleTalk Remote Access Protocol (ARAP) timeout for the same line; however, this command supersedes any timeouts set in ARAP. Additionally, ARAP users will receive no notice of any impending termination if you use this command.

Examples	The following example sets an interval of 60 minutes on line 5:
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```
line 5
 absolute-timeout 60
```

Related Commands	Command	Description
	<b>exec-timeout</b>	Sets the interval that the EXEC command interpreter waits until user input is detected.
	<b>logout-warning</b>	Sets and displays a warning for users about an impending forced timeout.
	<b>session-timeout</b>	Sets the interval for closing the connection on a console or terminal line.

## access-class (LAT)

To define restrictions on incoming and outgoing connections, use the **access-class** command in line configuration mode. To remove the access list number, use the **no** form of this command.

```
access-class access-list-number {in [vrf-also] | out}
```

```
no access-class access-list-number {in | out}
```

Syntax Description		
	<i>access-list-number</i>	Specifies an integer from 1 to 199 that defines the access list.
	<b>in</b>	Controls which nodes can make local-area transport (LAT) connections into the server.
	<b>vrf-also</b>	Accepts incoming connections from interfaces that belong to a VRF.
	<b>out</b>	Defines the access checks made on outgoing connections. (A user who types a node name at the system prompt to initiate a LAT connection is making an outgoing connection.)

**Defaults** Disabled

**Command Modes** Line configuration

Command History	Release	Modification
	10.0	This command was introduced.
	12.2	The <b>vrf-also</b> keyword was added.

**Usage Guidelines** This command defines access list numbers that will then be used with the **lat access-list** command to specify the access conditions.

The value supplied for the *access-list-number* argument is used for all protocols supported by the Cisco IOS software. If you are already using an IP access list, you must define LAT and possibly X.25 access lists permitting connections to all devices, to emulate the behavior of previous software versions.

When both IP and LAT connections are allowed from a terminal line and an IP access list is applied to that line with the **access-class** line configuration command, you must also create a LAT access list with the same number if you want to allow any LAT connections from that terminal. You can specify only one incoming and one outgoing access list number for each terminal line. When checking LAT access lists, if the specified list does not exist, the system denies all LAT connections.

If you do not specify the **vrf-also** keyword, incoming Telnet connections from interfaces that are part of a VRF are rejected.

**Examples** The following example configures an incoming access class on vty line 4:

```
line vty 4
 access-class 4 in
```

## ■ access-class (LAT)

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Related Commands

Command	Description
<b>lat access-list</b>	Specifies access conditions to nodes on the LAT network.

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# arap dedicated

To configure a line to be used only as an AppleTalk Remote Access (ARA) connection, use the **arap dedicated** command in line configuration mode. To return the line to interactive mode, use the **no** form of this command.

**arap dedicated**

**no arap dedicated**

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**Syntax Description** This command has no arguments or keywords.

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**Defaults** Disabled

---

**Command Modes** Line configuration

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Release	Modification
10.0	This command was introduced.

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**Examples** The following example configures line 3 to be used only for ARA connections:

```
line 3
 arap dedicated
```

# arap enable

To enable AppleTalk Remote Access (ARA) for a line, use the **arap enable** command in line configuration mode. To disable ARA, use the **no** form of this command.

**arap enable**

**no arap enable**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** Disabled

---

**Command Modes** Line configuration

---

Command History	Release	Modification
	10.0	This command was introduced.

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**Examples** The following example enables ARA on line 3:

```
line 3
 arap enable
```

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Related Commands	Command	Description
	<b>appletalk routing</b>	Enables AppleTalk routing.
	<b>autoselect</b>	Configures a line to start an ARA, PPP, or SLIP session.

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# arap net-access-list

To control Apple Macintosh access to networks, use the **arap net-access-list** command in line configuration mode. To return to the default setting, use the **no** form of this command.

**arap net-access-list** *net-access-list-number*

**no arap net-access-list** *net-access-list-number*

<b>Syntax Description</b>	<i>net-access-list-number</i> One of the <i>list</i> values configured using the AppleTalk <b>access-list cable-range</b> , <b>access-list includes</b> , <b>access-list network</b> , <b>access-list other-access</b> , or <b>access-list within</b> commands.
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<b>Defaults</b>	Disabled. The Macintosh has access to all networks.
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<b>Command Modes</b>	Line configuration
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<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>10.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	10.0	This command was introduced.
Release	Modification				
10.0	This command was introduced.				

<b>Usage Guidelines</b>	<p>You can use the <b>arap net-access-list</b> command to apply access lists defined by the <b>access-list cable-range</b>, <b>access-list includes</b>, <b>access-list network</b>, <b>access-list other-access</b>, or <b>access-list within</b> commands.</p> <p>You cannot use the <b>arap net-access-list</b> command to apply access lists defined by the <b>access-list zone</b> or <b>access-list additional-zones</b> commands.</p>
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<b>Examples</b>	In the following example, ARA is enabled on line 3 and the Macintosh will have access to the AppleTalk access list numbered 650:
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```
line 3
 arap enable
 arap net-access-list 650
```

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>access-list cable-range</b>	Defines an AppleTalk access list for a cable range (for extended networks only).
<b>access-list includes</b>	Defines an AppleTalk access list that overlaps any part of a range of network numbers or cable ranges (for both extended and nonextended networks).
<b>access-list network</b>	Defines an AppleTalk access list for a single network number (that is, for a nonextended network).
<b>access-list other-access</b>	Defines the default action to take for subsequent access checks that apply to networks or cable ranges.
<b>access-list within</b>	Defines an AppleTalk access list for an extended or a nonextended network whose network number or cable range is included entirely within the specified cable range.
<b>arap zonelist</b>	Controls which zones the Apple Macintosh client sees.

# arap network

To create a new network or zone and cause it to be advertised, use the **arap network** command in global configuration mode. To prevent a new network or zone from being advertised, use the **no** form of this command.

**arap network** [*network-number*] [*zone-name*]

**no arap network**

Syntax Description	
<i>network-number</i>	(Optional) AppleTalk network number. The network number must be unique on your AppleTalk network. This network is where all AppleTalk Remote Access (ARAP) users appear when they dial in to the network.
<i>zone-name</i>	(Optional) AppleTalk zone name.

**Defaults** A new network or zone is not created.

**Command Modes** Global configuration

Command History	Release	Modification
	10.0	This command was introduced.

**Usage Guidelines** This is a required command. ARAP does not run without it in Cisco IOS Release 10.2 and later.

**Examples** The following example creates a new zone named test zone:

```
arap network 400 test zone
```

# arap nognest

To prevent Apple Macintosh guests from logging in to the router, use the **arap nognest** command in line configuration mode. To remove this restriction, use the **no** form of this command.

**arap nognest [if-needed]**

**no arap nognest**

<b>Syntax Description</b>	<b>if-needed</b> (Optional) Does not authenticate if the user already provided authentication. This allows users to log in as guests if they have already been authenticated through a username or password.
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<b>Defaults</b>	Disabled
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<b>Command Modes</b>	Line configuration
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<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>10.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	10.0	This command was introduced.
Release	Modification				
10.0	This command was introduced.				

<b>Usage Guidelines</b>	A guest is a person who connects to the network without needing to give a name or a password.
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**Note**

You should not use the **arap nognest** command if you are using modified Common Command Language (CCL) scripts and the **login tacacs** command.

<b>Examples</b>	The following example prohibits guests from logging in to the router:
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```
line 3
 arap enable
 arap nognest
```

<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><b>enable password</b></td> <td>Sets a local password to control access to various privilege levels.</td> </tr> <tr> <td><b>login (line)</b></td> <td>Enables password checking at login and defines the method (local or TACACS+).</td> </tr> <tr> <td><b>peer default ip address</b></td> <td>Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.</td> </tr> </tbody> </table>	Command	Description	<b>enable password</b>	Sets a local password to control access to various privilege levels.	<b>login (line)</b>	Enables password checking at login and defines the method (local or TACACS+).	<b>peer default ip address</b>	Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.
Command	Description								
<b>enable password</b>	Sets a local password to control access to various privilege levels.								
<b>login (line)</b>	Enables password checking at login and defines the method (local or TACACS+).								
<b>peer default ip address</b>	Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.								

# arap require-manual-password

To require users to enter their password manually at the time they log in, use the **arap require-manual-password** command in line configuration mode. To disable the manual password-entry requirement, use the **no** form of this command.

**arap require-manual-password**

**no arap require-manual-password**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Disabled

**Command Modes** Line configuration

Command History	Release	Modification
	11.1	This command was introduced.

**Usage Guidelines** This command only works for AppleTalk Remote Access Protocol (ARAP) 2.0 connections.

**Examples** The following example forces users to enter their passwords manually at the time they log in, rather than use a saved password:

```
arap require-manual-password
```

Related Commands	Command	Description
	<b>enable password</b>	Sets a local password to control access to various privilege levels.
	<b>login (line)</b>	Enables password checking at login and defines the method (local or TACACS+).
	<b>peer default ip address</b>	Specifies an IP address, an address from a specific IP address pool, or an address from the DHCP mechanism to be returned to a remote peer connecting to this interface.

# arap timelimit

To set the maximum length of an AppleTalk Remote Access (ARA) session for a line, use the **arap timelimit** command in line configuration mode. To return to the default of unlimited session length, use the **no** form of this command.

**arap timelimit** [*minutes*]

**no arap timelimit**

<b>Syntax Description</b>	<i>minutes</i> (Optional) Maximum length of time, in minutes, for a session.				
<b>Defaults</b>	Unlimited session length				
<b>Command Modes</b>	Line configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>10.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	10.0	This command was introduced.
Release	Modification				
10.0	This command was introduced.				
<b>Usage Guidelines</b>	After the specified length of time, the session will be terminated.				
<b>Examples</b>	<p>The following example specifies a maximum length of 20 minutes for ARA sessions:</p> <pre>line 3  arap enable  arap timelimit 20</pre>				
<b>Related Commands</b>	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><b>arap warningtime</b></td> <td>Sets when a disconnect warning message is displayed.</td> </tr> </tbody> </table>	Command	Description	<b>arap warningtime</b>	Sets when a disconnect warning message is displayed.
Command	Description				
<b>arap warningtime</b>	Sets when a disconnect warning message is displayed.				

# arap warningtime

To set when a disconnect warning message is displayed, use the **arap warningtime** command in line configuration mode. To disable this function, use the **no** form of this command.

**arap warningtime** [*minutes*]

**no arap warningtime**

<b>Syntax Description</b>	<i>minutes</i>	(Optional) Amount of time, in minutes, before the configured session time limit. At the configured amount of time before a session is to be disconnected, the router sends a message to the Apple Macintosh client, which causes a warning message to appear on the user screen.
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<b>Defaults</b>	Disabled
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<b>Command Modes</b>	Line configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	This command can only be used if a session time limit has been configured on the line.
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**Examples** The following example shows a line configured for 20-minute AppleTalk Remote Access (ARA) sessions, with a warning 17 minutes after the session is started:

```
line 3
 arap enable
 arap dedicated
 arap timelimit 20
 arap warningtime 3
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>arap timelimit</b>	Sets the maximum length of an ARA session for a line.

# arap zonelist

To control which zones the Apple Macintosh client sees, use the **arap zonelist** command in line configuration mode. To disable the default setting, use the **no** form of this command.

**arap zonelist** *zone-access-list-number*

**no arap zonelist** *zone-access-list-number*

<b>Syntax Description</b>	<i>zone-access-list-number</i> One of the <i>list</i> values configured using the AppleTalk <b>access-list zone</b> or <b>access-list additional-zones</b> command.
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<b>Defaults</b>	Disabled. The Macintosh will see all defined zones.
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<b>Command Modes</b>	Line configuration
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<b>Command History</b>	<table border="1"> <thead> <tr> <th style="border: none;">Release</th> <th style="border: none;">Modification</th> </tr> </thead> <tbody> <tr> <td style="border: none;">10.0</td> <td style="border: none;">This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	10.0	This command was introduced.
Release	Modification				
10.0	This command was introduced.				

<b>Usage Guidelines</b>	<p>You can use the <b>arap zonelist</b> command to apply access lists defined by the <b>access-list zone</b> and <b>access-list additional-zones</b> commands.</p> <p>You cannot use the <b>arap zonelist</b> command to apply access lists defined by the <b>access-list network</b> command.</p> <p>Hiding a zone from users is not the same as preventing them from sending and receiving packets from the networks that make up that zone. For true security, an <b>arap net-access-list</b> command must be issued to prevent traffic to and from those networks.</p>
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<b>Examples</b>	<p>The following example enables AppleTalk Remote Access (ARA) on line 3; the Macintosh will see only zones permitted by access list 650.</p>
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```
line 3
 arap enable
 arap zonelist 650
```

<b>Related Commands</b>	<table border="1"> <thead> <tr> <th style="border: none;">Command</th> <th style="border: none;">Description</th> </tr> </thead> <tbody> <tr> <td style="border: none;"><b>access-list additional-zones</b></td> <td style="border: none;">Defines the default action to take for access checks that apply to zones.</td> </tr> <tr> <td style="border: none;"><b>access-list zone</b></td> <td style="border: none;">Defines an AppleTalk access list that applies to a zone.</td> </tr> <tr> <td style="border: none;"><b>arap net-access-list</b></td> <td style="border: none;">Controls Apple Macintosh access to networks.</td> </tr> </tbody> </table>	Command	Description	<b>access-list additional-zones</b>	Defines the default action to take for access checks that apply to zones.	<b>access-list zone</b>	Defines an AppleTalk access list that applies to a zone.	<b>arap net-access-list</b>	Controls Apple Macintosh access to networks.
Command	Description								
<b>access-list additional-zones</b>	Defines the default action to take for access checks that apply to zones.								
<b>access-list zone</b>	Defines an AppleTalk access list that applies to a zone.								
<b>arap net-access-list</b>	Controls Apple Macintosh access to networks.								

## async default ip address

The **async default ip address** command is replaced by the **peer default ip address** command. See the **peer default ip address** command for more information.

# autocommand

To automatically execute a command when a user connects to a particular line, use the **autocommand** command in line configuration mode. To disable the automatic execution, use the **no** form of this command.

**autocommand** *command*

**no autocommand** *command*

<b>Syntax Description</b>	<i>command</i>	Any appropriate EXEC command, including the host name and any switches that occur with the EXEC command.
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**Defaults** No commands are configured to automatically execute.

**Command Modes** Line configuration

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

**Usage Guidelines** This command enables you to automatically execute an EXEC command when a user connects to a line.

**Examples** The following example forces an automatic connection to a host named host21 (which could be an IP address):

```
line vty 4
  autocommand connect host21
```

# busy-message

To create a “host failed” message that displays when a connection fails, use the **busy-message** command in global configuration mode. To disable the “host failed” message from displaying on the specified host, use the **no** form of this command.

```
busy-message host-name d message d
```

```
no busy-message host-name
```

Syntax Description		
	<i>host-name</i>	Name of the host that cannot be reached.
	<i>d</i>	Delimiting character of your choice—a pound sign (#), for example. You cannot use the delimiting character in the message.
	<i>message</i>	Message text.

**Defaults** No message is displayed.

**Command Modes** Global configuration

Command History	Release	Modification
	10.0	This command was introduced.

**Usage Guidelines** This command applies only to Telnet connections.

Follow the **busy-message** command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character.

Defining a “host failed” message for a host prevents all Cisco IOS software-initiated user messages, including the initial message that indicates the connection is “Trying....” The **busy-message** command can be used in the **autocommand** command to suppress these messages.

**Examples** The following example sets a message that will be displayed on the terminal whenever an attempt to connect to the host named dross fails. The pound sign (#) is used as a delimiting character.

```
busy-message dross #
Cannot connect to host. Contact the computer center.
#
```

Related Commands	Command	Description
	<b>autocommand</b>	Automatically execute a command when a user connects to a particular line.

# clear entry

To delete an entry from the list of queued host-initiated connections, use the **clear entry** command in EXEC mode.

**clear entry** *number*

<b>Syntax Description</b>	<i>number</i>	An entry number obtained from the <b>show entry</b> EXEC command.
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<b>Command Modes</b>	EXEC
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Examples</b>	The following example deletes pending entry number 3 from the queue:
	Router# <b>clear entry 3</b>

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>show entry</b>	Displays the list of queued host-initiated connections to a router.

# connect

To log in to a host that supports Telnet, rlogin, or local-area transport (LAT), use the **connect** command in EXEC mode.

```
connect host [port] [keyword]
```

Syntax Description	<i>host</i>	A host name or an IP address.
	<i>port</i>	(Optional) A decimal TCP port number; the default is the Telnet router port (decimal 23) on the host.
	<i>keyword</i>	(Optional) One of the keywords listed in <a href="#">Table 1</a> .

**Command Modes** EXEC

Command History	Release	Modification
	10.0	This command was introduced in a release prior to Cisco IOS Release 10.0.
	12.0(21)ST	The <b>/ipv4</b> and <b>/ipv6</b> keywords were added.
	12.1	The <b>/quiet</b> keyword was added.
	12.2(2)T	Support for the <b>/ipv4</b> and <b>/ipv6</b> keywords was integrated into Cisco IOS Release 12.2(2)T.

**Usage Guidelines** [Table 1](#) lists the optional **connect** command keywords.

**Table 1** *connect* Keyword Options

Option	Description
<b>/debug</b>	Enables Telnet debugging mode.
<b>/encrypt kerberos</b>	Enables an encrypted Telnet session. This keyword is available only if you have the Kerberized Telnet subsystem.  If you authenticate using Kerberos Credentials, the use of this keyword initiates an encryption negotiation with the remote server. If the encryption negotiation fails, the Telnet connection will be reset. If the encryption negotiation is successful, the Telnet connection will be established, and the Telnet session will continue in encrypted mode (all Telnet traffic for the session will be encrypted).
<b>/ipv4</b>	Forces the use of IP version 4.
<b>/ipv6</b>	Forces the use of IP version 6.
<b>/line</b>	Enables Telnet line mode. In this mode, the Cisco IOS software sends no data to the host until you press the Enter key. You can edit the line using the standard Cisco IOS software command editing characters. The <b>/line</b> keyword is a local switch; the remote router is not notified of the mode change.
<b>/noecho</b>	Disables local echo.

Table 1 *connect* Keyword Options (continued)

Option	Description
<b>/quiet</b>	Prevents onscreen display of all messages from the Cisco IOS software.
<b>/route path</b>	Specifies loose source routing. The <i>path</i> argument is a list of host names or IP addresses that specify network nodes and ends with the final destination.
<b>/source-interface</b>	Specifies the source interface.
<b>/stream</b>	Turns on stream processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does not process Telnet options and can be appropriate for connections to ports running UNIX-to-UNIX Copy Program (UUCP) and other non-Telnet protocols.
<b>port-number</b>	Port number.
<b>bgp</b>	Border Gateway Protocol.
<b>chargen</b>	Character generator.
<b>cmd rcmd</b>	Remote commands.
<b>daytime</b>	Daytime.
<b>discard</b>	Discard.
<b>domain</b>	Domain Naming Service.
<b>echo</b>	Echo.
<b>exec</b>	EXEC.
<b>finger</b>	Finger.
<b>ftp</b>	File Transfer Protocol.
<b>ftp-data</b>	FTP data connections (used infrequently).
<b>gopher</b>	Gopher.
<b>hostname</b>	Host name server.
<b>ident</b>	Ident Protocol.
<b>irc</b>	Internet Relay Chat.
<b>klogin</b>	Kerberos login.
<b>kshell</b>	Kerberos shell.
<b>login</b>	Login (rlogin).
<b>lpd</b>	Printer service.
<b>nntp</b>	Network News Transport Protocol.
<b>node</b>	Connect to a specific LAT node.
<b>pop2</b>	Post Office Protocol v2.
<b>pop3</b>	Post Office Protocol v3.
<b>port</b>	Destination LAT port name.
<b>smtp</b>	Simple Mail Transport Protocol.
<b>sunrpc</b>	Sun Remote Procedure Call.
<b>syslog</b>	Syslog.
<b>tacacs</b>	Specify TACACS security.

**Table 1** *connect Keyword Options (continued)*

Option	Description
<b>talk</b>	Talk.
<b>telnet</b>	Telnet.
<b>time</b>	Time.
<b>uucp</b>	UNIX-to-UNIX Copy Program.
<b>whois</b>	Nickname.
<b>www</b>	World Wide Web.

With the Cisco IOS software implementation of TCP/IP, you are not required to enter the **connect**, **telnet**, **lat**, or **rlogin** commands to establish a terminal connection. You can enter only the learned host name—as long as the host name is different from a command word in the Cisco IOS software. The Cisco IOS software assigns a logical name to each connection, and several commands use these names to identify connections. The logical name is the same as the host name, unless that name is already in use, or you change the connection name with the **name-connection EXEC** command. If the name is already in use, the Cisco IOS software assigns a null name to the connection. To display a list of the available hosts, use the **show hosts** command. To display the status of all TCP connections, use the **show tcp** command.

## Examples

The following example establishes an encrypted Telnet session from a router to a remote host named host1:

```
Router> connect host1 /encrypt kerberos
```

The following example routes packets from the source system named host1 to kl.sri.com, then to 10.1.0.11, and finally back to host1:

```
Router> connect host1 /route:kl.sri.com 10.1.0.11 host1
```

The following example connects to a host with logical name host1:

```
Router> host1
```

The following example suppresses all onscreen messages from the Cisco IOS software during login and logout:

```
Router> connect host2 /quiet
```

The following example shows the limited messages displayed when connection is done using the optional **/quiet** keyword:

```
login:User2
Password:
      Welcome to OpenVMS VAX version V6.1 on node CRAW
      Last interactive login on Tuesday, 15-DEC-1998 11:01
      Last non-interactive login on Sunday, 3-JAN-1999 22:32

Server3)logout

User2          logged out at 16-FEB-2000 09:38:27.85
```

Related Commands	Command	Description
	<b>kerberos clients mandatory</b>	Causes the <b>rsh</b> , <b>rcp</b> , <b>rlogin</b> , and <b>telnet</b> commands to fail if they cannot negotiate the Kerberos Protocol with the remote server.
	<b>l2f ignore-mid-sequence</b>	Specifies a connection to a particular LAT node that offers LAT services.
	<b>lat</b>	Connects to a LAT host.
	<b>name-connection</b>	Assigns a logical name to a connection.
	<b>rlogin</b>	Logs in to a UNIX host using rlogin.
	<b>show hosts</b>	Displays the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of host names and addresses.
	<b>show tcp</b>	Displays the status of TCP connections.
	<b>telnet</b>	Logs in to a host that supports Telnet.

# description (ruleset)

To add a description about a translation ruleset, use the **description** command in translate ruleset configuration mode. To remove the description, use the **no** form of this command.

**description** *text*

**no description** *text*

Syntax Description	<i>text</i>	One-line description of the ruleset, up to 240 characters.
--------------------	-------------	--

Defaults	No default behavior or values
----------	-------------------------------

Command Modes	Translate ruleset configuration
---------------	---------------------------------

Command History	Release	Modification
	12.3(8)T	This command was introduced.

Usage Guidelines	Only one description line is accepted. If you reenter this command, the new description replaces the existing description.
------------------	--

Examples	The following example shows how to add a description to a ruleset:
----------	--

```
translate ruleset A from pad to telnet
description Template A for site 101
skip dest-addr ^55554$ source-addr ^4444$
match dest-addr ^5555.$ source-addr ^4444$
set telnet dest-addr 10.2.2.1
substitute pad dest-addr ^5555(.) into telnet dest-port 23
```

Related Commands	Command	Description
	<b>match (ruleset)</b>	Identifies a connection for processing by the translation ruleset.
	<b>options (ruleset)</b>	Specifies protocol translation options in a translation ruleset.
	<b>set (ruleset)</b>	Unconditionally sets one or more connection parameters to a fixed value for a translation ruleset.
	<b>show translate ruleset</b>	Displays a summary of a specific or of all configured translation rulesets, behavioral parameters, and usage statistic.
	<b>skip (ruleset)</b>	Identifies a connection for omission by the translation ruleset.
	<b>substitute (ruleset)</b>	Matches an available protocol and substitutes another in a translation ruleset.
	<b>test (ruleset)</b>	Tests parameter values in a translation ruleset using regular expressions.
	<b>test translate</b>	Displays a trace of protocol translation behavior for a connection attempt.

■ description (ruleset)

Command	Description
<b>translate ruleset</b>	Defines a unique name for a translation ruleset, specifies translated protocols, and enters translate ruleset configuration mode.
<b>x25 pvc translate ruleset</b>	Configures PVCs that are valid for protocol translation rule set handling.

# flush-at-activation

To discard any data or noise characters that are sitting in the input buffer of the asynchronous line before the line is activated, use the **flush-at-activation** command in line configuration mode. To keep any data or noise characters that are sitting in the input buffer of the asynchronous line before the line is activated, use the **no** form of this command.

**flush-at-activation**

**no flush-at-activation**

---

**Syntax Description** This command has no keywords or arguments.

---

**Defaults** Enabled by default.

---

**Command Modes** Line configuration

---

Command History	Release	Modification
	11.1(5)	This command was introduced.

---



---

**Usage Guidelines** For an incoming call on a line configured with modem control (using the **modem inout** and **modem dialin** commands), the line will be activated when the data set ready (DSR) signal goes high and will be dropped when the DSR signal goes low. While the line is idle, its input buffer may receive characters; for example, modem result codes such as “NO CARRIER” or “RING” or line noise. Such characters are not useful to the line application. Flushing the line input buffer when the DSR goes high using the **flush-at-activation** command is the preferred behavior.




---

**Note** To know whether the DSR signal is going high or low, use the **debug modem** command or the **show line** command. Output of these commands displays the status of DSR signal.

---

On most Cisco IOS platforms, there may be up to a one-second delay between when the DSR signal goes high and Cisco IOS activates the line. Therefore, some valid data received from the line may be discarded when you issue the **flush-at-activation** command. If it is important to process this valid data rather than discarding it and the application is tolerant of receiving bad data, configure the **no flush-at-activation** command.

The application that is used determines whether the system can differentiate the valid data from the bad data or the system is tolerant of receiving any data. For example, consider that the application used is TCP over IP over PPP. PPP uses a Frame Check Sequence (FCS) in a data frame format to verify the integrity of the received data. If an invalid data pattern is delivered to a PPP receiver, PPP will discard it as a framing or FCS error. So the bad data will not be delivered to the higher layers. Even if some data is delivered up to IP and TCP, TCP has its own FCS which will reject bad data. Therefore, the application is tolerant of receiving the bad data that the line delivers.

Consider another application where incoming character data received from the line is delivered as TCP payload to a server running a pager application. Unless the pager application has implemented its own protocol to verify data integrity, this bad data may cause the pager not to be delivered, or to deliver bad data within the message payload to the receiving pager. So the bad data should not be delivered as payload to the line.

Where an upper-layer framed protocol such as PPP or Serial Line Internet Protocol (SLIP) is always used (asynchronous mode dedicated), the framed protocol may reach link status more quickly when you issue the **no flush-at-activation** command. Since the framed protocol discards any erroneous data received, you do not have to use the **flush-at-activation** command.

If the line application is not tolerant of receiving bad data; for example, when you are using character-mode username/password authentication, always use the **flush-at-activation** command. Otherwise, the bad data may trigger an application failure.



#### Note

Prior to Cisco IOS Release 12.2, the **no flush-at-activation** command was the default on AS5000 platforms with modem ISDN channel aggregation (MICA) and NextPort modems. However, from Cisco IOS Release 12.3 and later, there is no longer any significant delay between when the modem link reaches steady state (DSR high) and when the line is activated so you do not need to use the **no flush-at-activation** command.

The modem state STEADY\_STATE is mapped to DSR high and TERMINATING is mapped to DSR low when asynchronous lines are the internal digital modem ports.

#### Examples

The following example shows how to configure lines 1/0 through 1/59 to flush any data in their input buffers when the lines are activated:

```
Router(config)# line 1/0 1/59
Router(config-line)# flush-at-activation
```

#### Related Commands

Command	Description
<b>activation-character</b>	Defines the character entered at a vacant terminal to begin a terminal session.
<b>debug modem</b>	Observes modem line activity on an access server.
<b>modem dialin</b>	Configures a line to enable a modem attached to the router to accept incoming calls only.
<b>modem inout</b>	Configures a line for both incoming and outgoing calls.
<b>show line</b>	Displays parameters of a terminal line.

# ip alias

To assign an IP address to the service provided on a TCP port, use the **ip alias** command in interface configuration mode. To remove the specified address for the router, use the **no** form of this command.

**ip alias** *ip-address tcp-port*

**no ip alias** *ip-address*

Syntax Description	
<i>ip-address</i>	Specifies the IP address for the service.
<i>tcp-port</i>	Specifies the number of the TCP port.

**Defaults** No default behavior or values.

**Command Modes** Interface configuration

Command History	Release	Modification
	10.0	This command was introduced.

**Usage Guidelines** A user attempting to establish a connection is connected to the first free line in a rotary group using the Telnet protocol.

The IP address must be on the same network or subnet as the main address of the terminal server, and must not be used by another host on that network or subnet. Connecting to the IP address has the same effect as connecting to the main address of the router, using the argument *tcp-port* as the TCP port.

You can use the **ip alias** command to assign multiple IP addresses to the router. For example, in addition to the primary alias address, you can specify addresses that correspond to lines or rotary groups. Using the **ip alias** command in this way makes connection to a specific rotary group transparent to the user.

When asynchronous mode is implemented, the Cisco IOS software creates the appropriate IP aliases, which map the asynchronous addresses for the lines to which they are connected. This process is automatic and does not require configuration.

**Examples** The following example configures connections to IP address 172.30.42.42 to act identically to connections made to the primary IP address of the server on TCP port 3001. In other words, a user is connected to the first free line on port 1 of the rotary group that uses the Telnet protocol.

```
ip alias 172.30.42.42 3001
```

# ipx nasi-server enable



## Note

Effective with release 12.2(15)T, the **ipx nasi-server enable** command is no longer available in Cisco IOS software.

To enable NetWare Access Server Interface (NASI) clients to connect to asynchronous devices attached to your router, use the **ipx nasi-server enable** command in global configuration mode. To prevent NASI clients from connecting through a router, use the **no** form of this command.

**ipx nasi-server enable**

**no ipx nasi-server enable**

## Syntax Description

This command has no arguments or keywords.

## Defaults

NASI is not enabled.

## Command Modes

Global configuration

## Command History

Release	Modification
11.1	This command was introduced.
12.2(15)T	This command was removed and is no longer available in Cisco IOS software.

## Usage Guidelines

When you issue this command, NASI clients can connect to any port on the router other than the console port to access network resources. When the user on the NASI client uses the Windows or DOS application to connect to the router, a list of available TTY and vty lines appears, beginning with TTY1. The user selects the desired outgoing TTY or vty port.

You can configure TACACS+ security on the router so that after the user selects a tty or vty port, a username and password prompt appear for authentication, authorization, and accounting purposes.

## Examples

The following example shows a minimum configuration to enable NASI client dial-in access with TACACS+ authentication:

```
ipx routing
ipx internal-network ncs001
interface ethernet 0
 ipx network 1
ipx nasi-server enable
! Enable TACACS+ authentication for NASI clients using the list name swami.
aaa authentication nasi swami tacacs+
line 1 8
 modem inout
```

Related Commands	Command	Description
	<b>aaa authentication nasi</b>	Specifies AAA authentication for NASI clients connecting through the access server.
	<b>nasi authentication</b>	Enables AAA authentication for NASI clients connecting to a router.
	<b>show ipx nasi connections</b>	Displays the status of NASI connections.
	<b>show ipx spx-protocol</b>	Displays the status of the SPX protocol stack and related counters.

# keymap

To define specific characteristics of keyboard mappings, use the **keymap** command in global configuration mode. To remove the named keymap from the current image of the configuration file, use the **no keymap** form of this command.

**keymap** *keymap-name keymap-entry*

**no keymap** *keymap-name*

## Syntax Description

*keymap-name* Name of the file containing the keyboard mappings. The name can be up to 32 characters long and must be unique.

*keymap-entry* Commands that define the keymap.

## Defaults

VT100 keyboard emulation

## Command Modes

Global configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

The **keymap** command maps individual keys on a non-TN3270 keyboard to perform the function defined for the TN3270 keyboard. Use the **show keymap EXEC** command to test for the availability of a keymap.

Do not use the name “default” for a ttycap entry filename or the Cisco IOS software will adopt the newly defined entry as the default.

The guidelines for creating a keymap follow.

### The Keymap Entry Structure

A keymap is a keyboard map file. A keymap consists of an entry for a keyboard. The first part of a keymap lists the names of the keyboards that use that entry. These names will often be the same as in the ttycaps (terminal emulation) file, and often the terminals from various ttycap entries will use the same keymap entry. For example, both 925 and 925vb (for 925 with visual bells) terminals would probably use the same keymap entry. There are other circumstances in which it is necessary to specify a keyboard name as the name of the entry (for example, if a user requires a custom key layout).

After the names, which are separated by vertical bars (|), comes an open brace ({), the text that forms the definitions, the a close brace (}), as follows:

```
ciscodefault{
clear = '^z';\
flinp = '^x';\
enter = '^m';\
delete = '^d' | '^?';\
synch = '^r';\
```

```

ebcdic_xx='string'
reshow = '^v';
eof = '^e';\
tab = '^i';\
btab = '^b';\
nl = '^n';\
left = '^h';\
right = '^l';\
up = '^k';\
down = '^j';\
einp = '^w';\
reset = '^t';\
ferase = '^u';\
insrt = '\E ';\
pa1 = '^p1'; pa2 = '^p2'; pa3 = '^p3';\
pfk1 = '\E1'; pfk2 = '\E2'; pfk3 = '\E3'; pfk4 = '\E4';\
pfk5 = '\E5'; pfk6 = '\E6'; pfk7 = '\E7'; pfk8 = '\E8';\
pfk9 = '\E9'; pfk10 = '\E0'; pfk11 = '\E-'; pfk12 = '\E=';\
pfk13 = '\E!'; pfk14 = '\E@'; pfk15 = '\E#'; pfk16 = '\E$';\
pfk17 = '\E%'; pfk18 = '\E'; pfk19 = '\E&'; pfk20 = '\E*';\
pfk21 = '\E('; pfk22 = '\E)'; pfk23 = '\E_'; pfk24 = '\E+';\
}

```

Each definition consists of a reserved keyword, which identifies the TN3270 function, followed by an equal sign (=), followed by the various ways to generate this particular function, followed by a semicolon (;), as follows:

```
pa1 = '^p1'; pa2 = '^p2'; pa3 = '^p3';\
```

Each alternative way to generate the function is a sequence of ASCII characters enclosed inside single quotes (' '); the alternatives are separated by vertical bars (|), as follows:

```
delete = '^d' | '^?';\
```

Inside the single quotes, a few characters are special. A caret (^) specifies that the next character is a control (Ctrl) character. The two-character string caret-a (^a) represents Ctrl-a. The caret-A sequence (^A) generates the same code as caret-a (^a). To generate Delete (or DEL), enter the caret-question mark (^?) sequence.



#### Note

The Ctrl-caret combination (Ctrl-^), used to generate a hexadecimal 1E, is represented as two caret symbols in sequence (^ ^)—not as a caret-backslash-caret combination (^ \ ^).

In addition to the caret, a letter can be preceded by a backslash (\). Because this sequence has little effect for most characters, its use is usually not recommended. In the case of a single quote ('), the backslash prevents that single quote from terminating the string. In the case of a caret (^), the backslash prevents the caret from having its special meaning. To include the backslash in the string, place two backslashes (\\) in the keymap. [Table 2](#) lists other supported special characters.

**Table 2** Special Characters Supported by TN3270 Keymap Capability

Character	Description
\E	Escape character
\n	Newline
\t	Tab
\r	Carriage return

Each character in a string needs not be enclosed within single quotes. For example, `\E\E\E` means three escape characters.

To enter a keymap, provide a unique name for it and explicitly define all special keys you intend to include in it within open and close braces. Also, except for the last line, each line must be terminated with a backslash symbol (`\`). The last line ends with the closing bracket (`}`) symbol and an end-of-line character.

### Keymap Restrictions

When IBM-style TN3270 terminals are emulated, a mapping must be performed between sequences of keys pressed at an ASCII keyboard and the keys available on a TN3270 keyboard. For example, a TN3270 keyboard has a key labeled EEOF that erases the contents of the current field from the location of the cursor to the end. To accomplish this function, the terminal user and a program emulating a TN3270 keyboard must agree on which keys will be typed to invoke the function. The requirements for these sequences follow:

- The first character of the sequence must be outside of the standard ASCII printable characters.
- No sequence can be a complete subset of another sequence (although sequences can share partial elements).

Following are examples of acceptable keymap entries:

```
pfk1 = '\E1';
pfk2 = '\E2';
```

Following are examples of unacceptable keymap entries:

```
pfk1 = '\E1';
pfk11 = '\E11';
```

In the acceptable example, the keymap entry for `pfk1` is not completely included in the keymap entry for `pfk2`. By contrast, in the unacceptable, or conflicting keymap pair, the sequence used to represent `pfk1` is a complete subset of the sequence used to represent `pfk11`. See the keymap entry provided later in the Examples section of how various keys can be represented to avoid this kind of conflict.

[Table 3](#) lists TN3270 key names that are supported in this keymap. Note that some of the keys do not exist on a TN3270 keyboard. An unsupported function will cause the Cisco IOS software to send a (possibly visual) bell sequence to the terminal.

**Table 3** TN3270 Key Names Supported by Defaults Keymap

TN3270 Key Name	Functional Description
LPRT	Local print <sup>1</sup>
DP	Duplicate character
FM	Field mark character
CURSEL	Cursor select
CENTSIGN	EBCDIC cent sign
RESHOW	Redisplay the screen
EINP	Erase input
EEOF	Erase end of field
DELETE	Delete character
INSRT	Toggle insert mode

**Table 3** TN3270 Key Names Supported by Defaults Keymap (continued)

TN3270 Key Name	Functional Description
TAB	Field tab
BTAB	Field back tab
COLTAB	Column tab
COLBAK	Column back tab
INDENT	Indent one tab stop
UNDENT	Undent one tab stop
NL	New line
HOME	Home the cursor
UP	Up cursor
DOWN	Down cursor
RIGHT	Right cursor
LEFT	Left cursor
SETTAB	Set a column tab
DELTAB	Delete a column tab
SETMRG	Set left margin
SETHOM	Set home position
CLRTAB	Clear all column tabs
APLON	Apl on <sup>1</sup>
APLOFF	Apl off <sup>1</sup>
APLEND <sup>1</sup>	Treat input as ASCII
PCON	Xon/xoff on <sup>1</sup>
PCOFF	Xon/xoff off <sup>1</sup>
DISC	Disconnect (suspend) <sup>1</sup>
INIT	New terminal type <sup>1</sup>
ALTK	Alternate keyboard dvorak <sup>1</sup>
FLINP	Flush input
ERASE	Erase last character
WERASE	Erase last word <sup>1</sup>
FERASE	Erase field
SYNCH	In synchronization with the user
RESET	Reset key—unlock keyboard
MASTER_RESET	Reset, unlock, and redisplay
XOFF	Please hold output <sup>1</sup>
XON	Please give me output <sup>1</sup>
WORDTAB	Tab to beginning of next word <sup>1</sup>
WORDBACKTAB	Tab to beginning of current or last word <sup>1</sup>

**Table 3** TN3270 Key Names Supported by Defaults Keymap (continued)

TN3270 Key Name	Functional Description
WORDEND	Tab to end of current or next word <sup>1</sup>
FIELDEND	Tab to last nonblank of current or next unprotected (writable) field <sup>1</sup>
PA1	Program attention 1
PA2	Program attention 2
PA3	Program attention 3
CLEAR	Local clear of the TN3270 screen
TREQ	Test request
ENTER	Enter key
PFK1 to PFK30	Program function key 1 program function key 30
ATTN	Attention
SYSREQ	System request

1. Not supported by the Cisco TN3270 implementation.

[Table 4](#) lists the proper keys used to emulate each TN3270 function when default key mappings are used.

**Table 4** Keys Used to Emulate Each TN3270 Function with Defaults Keymap

Key Types	IBM TN3270 Key	Defaults Keys
Cursor movement keys	New Line	Ctrl-n or Home
	Tab	Ctrl-i
	Back Tab	Ctrl-b
	Back Tab	Ctrl-b
	Cursor Left	Ctrl-h
	Cursor Right	Ctrl-l
	Cursor Up	Ctrl-k
	Cursor Down	Ctrl-j or LINE FEED
Edit control keys	Delete Char	Ctrl-d or RUB
	Erase EOF	Ctrl-e
	Erase Input	Ctrl-w
	Insert Mode	ESC-Space <sup>1</sup>
	End Insert	ESC-Space

**Table 4** Keys Used to Emulate Each TN3270 Function with Defaults Keymap (continued)

Key Types	IBM TN3270 Key	Defaults Keys
Program function keys	PF1	ESC 1
	PF2	ESC 2
	...	...
	PF10	ESC 0
	PF11	ESC -
	PF12	ESC =
	PF13	ESC !
	PF14	ESC @
	...	...
	PF24	ESC +
Program attention keys	PA1	Ctrl-p 1
	PA2	Ctrl-p 2
	PA3	Ctrl-p 3
Local control keys	Reset After Error	Ctrl-r
	Purge Input Buffer	Ctrl-x
	Keyboard Unlock	Ctrl-t
	Redisplay Screen	Ctrl-v
Other keys	Enter	Return
	Clear	Ctrl-z
	Erase current field	Ctrl-u

1. ESC refers to the Escape key.

### Examples

The following example is the default entry used by the TN3270 emulation software when it is unable to locate a valid keymap in the active configuration image. [Table 3](#) lists the key names supported by the default Cisco TN3270 keymap.

```

ciscodefault{
clear = '^z';\
flinp = '^x';\
enter = '^m';\
delete = '^d' | '^?';\
synch = '^r';\
reshow = '^v';\
ebcdic_xx='string'
eof = '^e';\
tab = '^i';\
btabs = '^b';\
nl = '^n';\
left = '^h';\
right = '^l';\
up = '^k';\
down = '^j';\
einp = '^w';\

```

```

reset = '^t';\
ferase = '^u';\
insrt = '\E '; \
pa1 = '^p1'; pa2 = '^p2'; pa3 = '^p3';\
pfk1 = '\E1'; pfk2 = '\E2'; pfk3 = '\E3'; pfk4 = '\E4';\
pfk5 = '\E5'; pfk6 = '\E6'; pfk7 = '\E7'; pfk8 = '\E8';\
pfk9 = '\E9'; pfk10 = '\E0'; pfk11 = '\E-'; pfk12 = '\E=';\
pfk13 = '\E!'; pfk14 = '\E@'; pfk15 = '\E#'; pfk16 = '\E$';\
pfk17 = '\E%'; pfk18 = '\E'; pfk19 = '\E&'; pfk20 = '\E*';\
pfk21 = '\E('; pfk22 = '\E)'; pfk23 = '\E_'; pfk24 = '\E+';\
}

```

The following keymap statement maps the “|” character to send EBCDIC 0x6A:

```
ebcdic_6f='|'
```

#### Related Commands

Command	Description
<b>keymap-type</b>	Specifies the keyboard map for a terminal connected to the line.
<b>show keymap</b>	Tests the availability of a keymap after a connection on a router takes place.
<b>terminal-type</b>	Specifies the type of terminal connected to a line.

# keymap-type

To specify the keyboard map for a terminal connected to the line, use the **keymap-type** command in line configuration mode. To reset the keyboard type for the line to the default, use the **no** form of this command.

**keymap-type** *keymap-name*

**no keymap-type**

<b>Syntax Description</b>	<i>keymap-name</i>	Name of a keymap defined within the configuration file of the router. The TN3270 terminal-type negotiations use the specified keymap type when setting up a connection with the remote host.
---------------------------	--------------------	--

<b>Defaults</b>	VT100
-----------------	-------

<b>Command Modes</b>	Line configuration
----------------------	--------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

**Usage Guidelines** This command must follow the corresponding **keymap** global configuration entry in the configuration file. The TN3270 terminal-type negotiations use the specified keymap type when setting up a connection with the remote host.

Setting the keyboard to a different keymap requires that a keymap be defined with the Cisco IOS software configuration either by obtaining a configuration file over the network that includes the keymap definition or by defining the keyboard mapping using the **keymap** global configuration command.

Use the command **show keymap EXEC** command to test for the availability of a keymap.

**Examples** The following example sets the keyboard mapping to a keymap named vt100map:

```
line 3
 keymap-type vt100map
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>keymap</b>	Defines specific characteristics of keyboard mappings.
	<b>show keymap</b>	Tests the availability of a keymap after a connection on a router takes place.
	<b>ttycap</b>	Defines characteristics of a terminal emulation file.

# lat

To connect to a local-area transport (LAT) host, use the **lat** command in EXEC mode.

**lat** *name* [**node** *nodename* | **port** *portname* | **/debug**]

## Syntax Description

<i>name</i>	LAT-learned service name.
<b>node</b> <i>nodename</i>	(Optional) Specifies a connection to a particular LAT node that offers a service. If you do not include the node name option, the node with the highest rating offering the service is used. Use the <b>show lat nodes</b> EXEC command to display information about all known LAT nodes.
<b>port</b> <i>portname</i>	(Optional) Specifies a destination LAT port name. This keyword is ignored in most time-sharing systems, but is used by routers and network access servers offering <i>reverse LAT</i> services. Reverse LAT involves connecting to one router from another, so that the target router runs the host portion of the protocol. Enter the port name in the format of the remote system as the <i>portname</i> argument.
<b>/debug</b>	(Optional) Enables a switch to display parameter changes and other special messages.

## Command Modes

EXEC

## Command History

Release	Modification
11.0	This command was introduced.

## Usage Guidelines

After entering the **lat** command, you can quit the connection by pressing Ctrl-C, or complete the connection by entering the password for a given service.

You can have several concurrent LAT sessions open and switch between them. To open a subsequent session, first enter the escape sequence (**Ctrl-Shift-6** then **x** [**Ctrl^x**] by default) to suspend the current session. Then open a new session.

To list the available LAT services, use the **show lat services** EXEC command.

You can temporarily define the list of services to which you or another user can connect. To do so, use the **terminal lat out-group** command to define the group code lists used for connections from specific lines.

To exit a session, simply log off the remote system. Then terminate an active LAT session by entering the **exit** command.

If your preferred transport is set to **lat**, you can use the **connect** command in place of the **lat** command. Refer to the chapter “Configuring Terminal Operating Characteristics for Dial-In Sessions” in the *Cisco IOS Terminal Services Configuration Guide* for more information about configuring a preferred transport type. When your preferred transport is set to **none** or to another protocol, you must use the **lat** command to connect to a LAT host.

**Examples**

The following sample command and output shows a LAT connection from the router named Router\_A to host eng2:

```
Router_A> lat eng2
Trying ENG2...Open
      ENG2 - VAX/VMS V5.2
Username: User1
Password:
      Welcome to VAX/VMS version V5.2 on node ENG2
      Last interactive login on Friday, 1-APR-1994 19:46
```

The system informs you of its progress by displaying the messages “Trying <system>...” and then “Open.” If the connection attempt is not successful, you receive a failure message.

The following sample command establishes a LAT connection from the router named Router\_B to a device named our-modems and specifies port 24, which is a special modem:

```
Router_B> lat our-modems port 24
```

The following sample command establishes a LAT connection from the router named Router\_C to a device named our-modems and specifies a node named eng:

```
Router_C> lat our-modems node eng
```

The following sample command and output shows the LAT session debugging capability:

```
Router_D> lat Eng2 /debug
Trying ENG2...Open
      ENG2 - VAX/VMS V5.2
Username: User1
Password:
      Welcome to VAX/VMS version V5.2 on node ENG2
      Last interactive login on Tuesday, 5-APR-1994 19:02
[Set Flow out off, Flow in on, Format 8:none, Speed 9600/9600]
[Set Flow out off, Flow in on, Format 8:none, Speed 9600/9600]
$ set ter/speed=2400
[Set Flow out off, Flow in on, Format 8:none, Speed 2400/2400]
```

A variety of LAT events are reported, including all requests by the remote system to set local line parameters. The messages within brackets ([ ]) are the messages produced by the remote system setting line characteristics to operating system defaults.

**Related Commands**

Command	Description
<b>connect</b>	Logs in to a host that supports Telnet, rlogin, or LAT.
<b>ip alias</b>	Assigns an IP address to the service provided on a TCP port.
<b>show lat services</b>	Displays information about learned LAT services in the Cisco IOS software.
<b>terminal lat out-group</b>	Temporarily defines the list of services to which you or another user can connect.

# lat access-list

To specify access conditions to nodes on the local-area transport (LAT) network, use the **lat access-list** command in global configuration mode. To remove a specified access list number, use the **no** form of this command.

**lat access-list** *number* {**permit** | **deny**} *nodename*

**no lat access-list** *number*

## Syntax Description

<i>number</i>	Specifies a number ranging from 1 to 199 assigned to the line using the <b>access-class</b> line configuration command.
<b>permit</b>	Allows any matching node name to access the line.
<b>deny</b>	Denies access to any matching node name.
<i>nodename</i>	Specifies the name of the LAT node, with or without regular expression pattern matching characters, with which to compare for access. The UNIX-style regular expression characters allow for pattern matching of characters and character strings in the node name.

## Defaults

No access conditions are defined.

## Command Modes

Global configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

Regular expressions are case sensitive. Because LAT node names are always in all uppercase letters, make sure you use only all uppercase regular expressions.

[Table 5](#) and [Table 6](#) list pattern and character matching symbols and their use. A more complete description of the pattern matching characters is found in the “Regular Expressions” appendix in the *Cisco IOS Terminal Services Configuration Guide*.

**Table 5** *Pattern Matching*

Character	Description
\0	Replaces the entire original address.
\1..9	Replaces the strings that match the first through ninth parenthesized part of X.121 address.
*	Matches 0 or more sequences of the regular expressions.
+	Matches 1 or more sequences of the regular expressions.
?	Matches the regular expression of the null string.

**Table 6** Character Matching

Character	Description
^	Matches the null string at the beginning of the input string.
\$	Matches the null string at the end of the input string.
\char	Matches <i>char</i> .
.	Matches any single character.

**Examples**

The following example permits all packets destined for any LAT node named WHEEL:

```
lat access-list 1 permit WHEEL
```

The following example denies all packets destined for any LAT node name beginning with the BLDG1-prefix:

```
lat access-list 2 deny ^BLDG1-
```

**Related Commands**

Command	Description
<b>accept dialin</b>	Defines access list restrictions on incoming and outgoing connections.

# lat enabled

To enable local-area transport (LAT), use the **lat enabled** command in interface configuration mode. To disable LAT, use the **no** form of this command.

**lat enabled**

**no lat enabled**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** Enabled

---

**Command Modes** Interface configuration

---

Command History	Release	Modification
	10.0	This command was introduced.

---



---

**Examples** The following example enables LAT on Ethernet interface 0:

```
interface ethernet 0
  lat enabled
```

The following example disables LAT on Ethernet interface 0:

```
interface ethernet 0
  no lat enabled
```

# lat group-list

To allow a name to be assigned to the group list, use the **lat group-list** command in global configuration mode. To remove the specified group list, use the **no** form of this command.

**lat group-list** *groupname* { *number* | *range* | **all** } [**enabled** | **disabled**]

**no lat group-list** *groupname* { *number* | *range* | **all** } [**enabled** | **disabled**]

Syntax Description		
	<i>groupname</i>	Specifies a group code name.
	<i>number</i>	Specifies a group code number. You can enter both a group code name and group code numbers.
	<i>range</i>	Specifies a hyphenated range of numbers.
	<b>all</b>	Specifies the range from 0 to 255.
	<b>enabled</b>	(Optional) Allows incremental changes to the list; that is, you can add a group code without retyping the entire command.
	<b>disabled</b>	(Optional) Allows selective removal of a group code from the list.

**Defaults** None. A group list is any combination of group names, numbers, or ranges. No group names are assigned to the list by default.

**Command Modes** Global configuration

Command History	Release	Modification
	11.1	This command was introduced.

**Usage Guidelines** Specifying a name for a group list simplifies the task of entering individual group codes. In other words, a name makes it easier to refer to a long list of group code numbers. The group list must already exist. Use the **show lat groups EXEC** command to see a list of existing groups.

**Examples** The following example creates the new group named stockroom and defines it to include the group numbers 71 and 99:

```
lat group-list stockroom 71 99
```

The following example adds group code 101 to the group named stockroom:

```
lat group-list stockroom 101 enabled
```

The following example deletes the group named Bldg-2:

```
no lat group-list Bldg-2
```

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>lat out-group</b>	Defines a group list for the outgoing user-initiated connections for a line.
<b>lat service-group</b>	Specifies a group code mask to use when advertising all services for this node and to control incoming services.
<b>show lat groups</b>	Displays the groups that were defined in the Cisco IOS software.

# lat host-buffers

To set the number of receive buffers that will be negotiated when the router is acting as a local-area transport (LAT) host, use the **lat host-buffers** command in global configuration mode. To return to the default of one receive buffer, use the **no** form of this command.

**lat host-buffers** *receive-buffers*

**no lat host-buffers** *receive-buffers*

<b>Syntax Description</b>	<i>receive-buffers</i>	Specifies the number of receive buffers that will be negotiated. Valid values range from 1 to 128.
---------------------------	------------------------	--

<b>Defaults</b>	One receive buffer
-----------------	--------------------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	Before LAT Version 5.2, LAT allowed only one outstanding message at a time on a virtual circuit. This restriction could limit the performance of large routers. For example, only one Ethernet packet of data could be in transit at a time. With LAT Version 5.2, nodes can indicate that they are willing to receive more than one message at a time. During virtual circuit startup, each side communicates to the other how many outstanding messages it is willing to accept.
-------------------------	--

<b>Examples</b>	The following example enables LAT and configures the LAT host to negotiate 100 receive buffers:
-----------------	---

```
lat enabled
lat host-buffers 100
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>lat server-buffers</b>	Sets the number of receive buffers that will be negotiated when the router is acting as a LAT server.

# lat ka-timer

To set the rate of the keepalive timer, use the **lat ka-timer** command in global configuration mode. To restore the default, use the **no** form of this command.

**lat ka-timer** *seconds*

**no lat ka-timer**

Syntax Description	<i>seconds</i>	Timer rate, in seconds. Valid values for the timer rate range from 10 to 255 seconds.
--------------------	----------------	---

Defaults	20 seconds
----------	------------

Command Modes	Global configuration
---------------	----------------------

Command History	Release	Modification
	10.0	This command was introduced.

Usage Guidelines	The keepalive timer sets the rate that messages are sent in the absence of actual traffic between the router and the remote node. The server uses keepalive messages to detect when communication with a remote node is disrupted or when the remote node has crashed.
------------------	--

Examples	The following example sets the keepalive timer rate to 5 seconds:
----------	---

```
lat ka-timer 5
```

# lat node

To change the local-area transport (LAT) node name without changing the system host name, use the **lat node** command in global configuration mode.

**lat node** *node-name*

<b>Syntax Description</b>	<i>node-name</i> Name of the LAT node.
---------------------------	--

<b>Defaults</b>	No default LAT node name
-----------------	--------------------------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	This command allows you to give the server a node name that is different from the host name. Use the <b>show entry</b> EXEC command to determine which LAT hosts have queue entries for printers on the servers. Use the <b>clear entry</b> EXEC command to delete entries from the queue.
-------------------------	--

<b>Examples</b>	The following example specifies the LAT node name as DEC2: <pre>lat node DEC2</pre>
-----------------	--

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>clear entry</b>	Deletes an entry from the list of queued host-initiated connections.
	<b>hostname</b>	Specifies or modifies the host name for the network server.
	<b>show entry</b>	Displays the list of queued host-initiated connections to a router.

# lat out-group

To define a group list for outgoing user-initiated connections on a line, use the **lat out-group** command in line configuration mode. To return to the default value, use the **lat out-group 0** command.

**lat out-group** { *group-name number* | *range* | **all** }

## Syntax Description

<i>group-name</i>	Group code name.
<i>number</i>	Group code number. You can also enter both a group code name and group code numbers.
<i>range</i>	Hyphenated range of numbers.
<b>all</b>	Range from 0 to 255.

## Defaults

The default group code number is 0.

## Command Modes

Line configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

You can have values for one, two, or all three arguments. If the **all** keyword is specified, no arguments can be used. You can enter the *group-name*, *number*, and *range* values in any order.

Use the **show lat groups EXEC** command to display group numbers. If the host node and router do not share a common group number, the host services will not be displayed.

## Examples

The following example defines the services for lines 1 through 7, 10 through 17, and 20 through 24. Access to systems on the first set of lines is limited to groups 12 and 18 through 23; the second set is limited to group 12; the third set is limited to group codes 12, 18 through 23, and 44. All other lines use the default of group 0.

```
line 1 7
  lat out-group 12 18-23
line 10 17
  lat out-group 12
line 20 24
  lat out-group 12 18-23 44
```

Related Commands	Command	Description
	<b>lat group-list</b>	Allows a name to be assigned to the group list, which is any combination of group names, numbers, or ranges.
	<b>show lat groups</b>	Displays the groups that were defined in the Cisco IOS software with the <b>lat group-list</b> command.

# lat remote-modification

To enable remote local-area transport (LAT) modification of line characteristics (for example, baud rate), use the **lat remote-modification** command in line configuration mode. To disable remote LAT modification of line characteristics, use the **no** form of this command.

**lat remote-modification**

**no lat remote-modification**

---

**Syntax Description** This command has no arguments or keywords.

---

**Defaults** Remote modification is disabled.

---

**Command Modes** Line configuration

---

Release	Modification
10.0	This command was introduced.

---

---

**Usage Guidelines** Enabling the line for remote modification allows the remote LAT node to change line characteristics (for example, baud rate, parity, and so on).

---

**Examples** The following example enables remote LAT modification on line 4:

```
line 4
  lat remote-modification
```

# lat retransmit-limit

To set the number of times that local-area transport (LAT) resends a message before declaring the remote system unreachable, use the **lat retransmit-limit** command in global configuration mode. To restore the default retry value, use the **no** form of this command.

**lat retransmit-limit** *number*

**no lat retransmit-limit**

Syntax Description	<i>number</i>	Number of retries. Valid values range from 4 to 255 retries.
--------------------	---------------	--

Defaults	8 retries
----------	-----------

Command Modes	Global configuration
---------------	----------------------

Command History	Release	Modification
	10.0	This command was introduced.

Usage Guidelines	Assigning larger values to the number of tries increases the robustness of the LAT service at the cost of longer delays when communications are disrupted. Because LAT generally resends messages once per second, the value is approximately the number of seconds that LAT connections will survive connection disruption.
------------------	--

If you bridge LAT, the retransmission limit should be set to at least 20 tries for LAT sessions to survive a worst-case spanning-tree reconfiguration, because the time for bridging spanning-tree reconfiguration to be completed can be up to 15 seconds.

Examples	The following example sets the retransmission limit to 30 tries, enough time to sustain the downtime incurred when the system must reconfigure a spanning-tree topology:
----------	--

```
lat retransmit-limit 30
```

# lat server-buffers

To set the number of receive buffers that will be negotiated when the router is acting as a local-area transport (LAT) server, use the **lat server-buffers** command in global configuration mode. To return to the default of one receive buffer, use the **no** form of this command.

**lat server-buffers** *receive-buffers*

**no lat server-buffers** *receive-buffers*

<b>Syntax Description</b>	<i>receive-buffers</i> Specifies the number of receive buffers that will be negotiated. Valid values range from 1 to 128 receive buffers. The default value is 1 receive buffer.
---------------------------	--

<b>Defaults</b>	1 receive buffer
-----------------	------------------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	Before LAT Version 5.2, LAT allowed only one outstanding message on a virtual circuit at a time. This restriction could limit the performance of large routers because only one Ethernet packet of data could be in transit at a time. With LAT Version 5.2, nodes can indicate that they are willing to receive more than one message at a time. During virtual circuit startup, each side communicates to the other how many outstanding messages it is willing to accept.
-------------------------	--

<b>Examples</b>	The following example enables LAT and configures the server to negotiate 25 receive buffers:
-----------------	--

```
lat enabled
lat server-buffers 25
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>lat host-buffers</b>	Sets the number of receive buffers that will be negotiated when the router is acting as a LAT host.

# lat service-announcements

To reenables local-area transport (LAT) broadcast service announcements, use the **lat service-announcements** command in global configuration mode. To disable the sending of LAT service announcements, use the **no** form of this command.

**lat service-announcements**

**no lat service-announcements**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Enabled

**Command Modes** Global configuration

Command History	Release	Modification
	10.0	This command was introduced.

**Usage Guidelines** If this command is enabled, the LAT code will periodically broadcast service advertisements. If the command is disabled, the LAT code will not send service announcements, so solicit information messages must be used to look up node information.



**Note** You should only disable service announcements if all of the nodes on the LAN support the service responder feature.

**Examples** The following example reenables the sending of broadcast service announcements:

```
lat service-announcements
```

Related Commands	Command	Description
	<b>lat service-responder</b>	Configures a node to act as proxy for other nodes when a solicit-information multicast message is received.

# lat service enabled

To enable inbound connections to the specified service and enable the advertisement of this service to routers on the network, use the **lat service enabled** command in global configuration mode. To delete the named service, use the **no** form of this command.

**lat service** *service-name* **enabled**

**no lat service** *service-name* **enabled**

---

## Syntax Description

*service-name* Name of the service.

---



---

## Defaults

No services are enabled.

---

## Command Modes

Global configuration

---

## Command History

Release	Modification
10.0	This command was introduced.

---



---

## Usage Guidelines

In the simplest form, this command creates a service that gives connecting users access to a vty port on the server.

Use the **lat service enabled** command after commands that define a service so that users do not connect to a service before all the parameters are set.

Deleting a service does not disconnect existing connections.

---

## Examples

The following example enables inbound connections to the service named WHEEL:

```
lat service WHEEL enabled
```

# lat service-group

To specify a group code mask to use when advertising all services for this node and to control incoming services, use the **lat service-group** command in global configuration mode. To remove the group code mask specified, use the **no** form of this command.

**lat service-group** { *groupname* | *number* | *range* | **all** } [**enabled** | **disabled**]

**no lat service-group** { *groupname* | *number* | *range* | **all** } [**enabled** | **disabled**]

## Syntax Description

<i>groupname</i>	Specifies a group code name.
<i>number</i>	Specifies a group code number.
<i>range</i>	Specifies a hyphenated range of numbers from 0 to 255.
<b>all</b>	Specifies the range from 0 to 255.
<b>enabled</b>	(Optional) Allows incremental changes to the list; you can add a group code without retyping the entire command.
<b>disabled</b>	(Optional) Allows selective removal of a group code from the list.

## Defaults

If no service group is specified, the Cisco IOS software defaults to advertising to group 0.

## Command Modes

Global configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

When this command is written to NVRAM (using the **write memory EXEC** command), the system looks for an exact match on a group code name. If it finds one, it uses that name in the command. Otherwise, it writes out a list of numbers, using the range syntax whenever possible.

## Examples

The following example specifies groups 100 through 103, then defines engineering as the group code list to advertise:

```
lat group-list engineering 100-103
lat service-group engineering enabled
```

The following example specifies the groups 1, 5, 20 through 36, and 52:

```
lat service-group 1 5 20-36 52
```

## Related Commands

Command	Description
<b>lat group-list</b>	Allows a name to be assigned to the group list, which is any combination of group names, numbers, or ranges.

# lat service ident

To set the local-area transport (LAT) service identification for a specified service, use the **lat service ident** command in global configuration mode. To remove the identification, use the **no** form of this command.

**lat service** *service-name* **ident** *identification*

**no lat service** *service-name* **ident**

## Syntax Description

<i>service-name</i>	Name of the service.
<i>identification</i>	Descriptive name (text only) that identifies the service.

## Defaults

No LAT service identification is set for specific services.

## Command Modes

Global configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

The identification is advertised to other servers on the network and is displayed along with the list of name services on the LAN.

## Examples

The following example specifies the identification “Welcome to Gateway-A” on the service named STELLA:

```
lat service STELLA ident Welcome to Gateway-A
```

# lat service password

To set up a local-area transport (LAT) password for a service, use the **lat service password** command in global configuration mode. To remove the password, use the **no** form of this command.

**lat service** *service-name* **password** *password*

**no lat service** *service-name* **password**

---

## Syntax Description

---

<i>service-name</i>	Name of the service.
<i>password</i>	Password used to gain access to the service.

---

---

## Defaults

No default LAT service passwords

---

## Command Modes

Global configuration

---

## Command History

---

Release	Modification
10.0	This command was introduced.

---

---

## Usage Guidelines

The connecting user will be required to enter the password to complete the connection. The password is obtained through the LAT password mechanism.

---

## Examples

The following example specifies a service named BLUE and the password secret:

```
lat service BLUE password secret
```

# lat service rating

To set a static service rating for the specified service, use the **lat service rating** command in global configuration mode. To remove the service rating, use the **no** form of this command.

**lat service** *service-name* **rating** *static-rating*

**no lat service** *service-name* **rating**

## Syntax Description

<i>service-name</i>	Name of the service.
<i>static-rating</i>	Static service rating. The rating must be in the range from 1 to 255.

## Defaults

Dynamic rating

## Command Modes

Global configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

If this command is not entered, the Cisco IOS software calculates a dynamic rating based on the number of free ports that can handle connections to the service. Setting a static rating overrides this calculation and causes the specified value to be used.

## Examples

The following example specifies a service rating of 84 on the service named WHEEL:

```
lat service WHEEL rating 84
```

# lat service-responder

To configure a node to act as proxy for other nodes when a solicit-information multicast message is received, use the **lat service-responder** command in global configuration mode. To remove any proxy definition set up using the **lat service-responder** command, use the **no** form of this command.

**lat service-responder**

**no lat service-responder**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Disabled

**Command Modes** Global configuration

Command History	Release	Modification
	10.0	This command was introduced.

**Usage Guidelines** The Cisco IOS software can be configured to support the service responder feature that is part of the latest LAT Version 5.2 specification.

Specifically, the DECserver90L+, which has less memory than other Digital Equipment Corporation servers, does not maintain a cache of learned services. Instead, the DECserver90L+ solicits information about services as they are needed.

LAT Version 5.2 nodes can respond for themselves; however LAT Version 5.1 nodes, for example, VMS Version 5.4 or earlier nodes, cannot respond for themselves. Instead, a LAT Version 5.2 node configured as a service responder must respond in proxy for the LAT Version 5.1 nodes.

The Cisco IOS software can be configured as a LAT service responder. If all your nodes are LAT Version 5.2 nodes, you need not enable the service responder features.

**Examples** The following example configures a node to act as a proxy for a node when a solicit-information multicast message is received. The node configured with this command will respond to solicit messages.

```
lat service-responder
```

Related Commands	Command	Description
	<b>lat service-announcements</b>	Reenables LAT broadcast service announcements.

# lat service rotary

To associate a rotary group with a service, use the **lat service rotary** command in global configuration mode. To remove the association, use the **no** form of this command.

**lat service** *service-name* **rotary** *group-number*

**no lat service** *service-name* **rotary**

## Syntax Description

<i>service-name</i>	Name of the service.
<i>group-number</i>	Rotary group number.

## Defaults

Disabled

## Command Modes

Global configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

Establish rotary groups using the **rotary** line configuration command.

When an inbound connection is received for this service, the router establishes a reverse local-area transport (LAT) connection to a terminal in that rotary group.

If the rotary option is not set, the connection will be to a virtual terminal session on the router.

## Examples

The following example creates a service named MODEM to establish a rotary group:

```
lat services MODEM rotary 1
```

## Related Commands

Command	Description
<b>rotary</b>	Defines a group of lines consisting of one or more lines.

# lat service-timer

To adjust the time between local-area transport (LAT) service advertisements, use the **lat service-timer** command in global configuration mode. To return to the default setting, use the **no** form of this command.

**lat service-timer** *interval*

**no lat service-timer**

<b>Syntax Description</b>	<i>interval</i>	Number of seconds between service announcements. Note that the granularity offered by this command is 10-second intervals, and the <i>interval</i> value is rounded up.
---------------------------	-----------------	---

<b>Defaults</b>	20 seconds
-----------------	------------

<b>Command Modes</b>	Global configuration
----------------------	----------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.1	This command was introduced.

<b>Usage Guidelines</b>	This command adjusts the time, in seconds, between LAT service announcements for services offered by the router. This function is useful in large networks with many LAT services and limited bandwidth.
-------------------------	--

<b>Examples</b>	The following example sets the interval between LAT service advertisements to 11, and it illustrates the rough granularity of the <b>lat service-timer</b> command:
-----------------	---

```
! The time between LAT service advertisements is set to 11. Because the
! granularity is in ten-second intervals, the actual time between advertisement
! is 20 seconds.
lat service-timer 11
! 20 seconds between updates.
lat service-timer 19
! 120 seconds between updates.
lat service-timer 120
```

# lat vc-sessions

To set the maximum number of sessions to be multiplexed onto a single local-area transport (LAT) virtual circuit, use the **lat vc-sessions** command in global configuration mode. To remove the definition of a prior session, use the **no** form of this command.

**lat vc-sessions** *maximum-number*

**no lat vc-sessions** *maximum-number*

---

## Syntax Description

*maximum-number* Specifies the number of sessions that will be multiplexed onto a single LAT virtual circuit. This number cannot be greater than 255.

---



---

## Defaults

255 sessions per virtual circuit

---

## Command Modes

Global configuration

---

## Command History

Release	Modification
10.0	This command was introduced.

---



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## Usage Guidelines

Setting the number of sessions to a lower number can increase throughput if many sessions are running on one host, especially with routers with many physical ports. It can also increase overhead if the same host has little traffic but a large number of sessions.

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## Examples

The following example sets the maximum number of sessions to be multiplexed onto a single LAT virtual circuit at 100:

```
lat vc-sessions 100
```

# lat vc-timer

To set the interval of time local-area transport (LAT) waits before sending any traffic, use the **lat vc-timer** command in global configuration mode. To remove a timer definition, use the **no** form of this command.

**lat vc-timer** *milliseconds*

**no lat vc-timer** *milliseconds*

<b>Syntax Description</b>	<i>milliseconds</i> Specifies the amount of time LAT will wait before sending traffic. Acceptable values range from 10 to 1000 milliseconds.
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<b>Defaults</b>	80 milliseconds
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<b>Command Modes</b>	Global configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	Smaller timer values increase the overhead on both the router and the host. However, you can use smaller values to correct buffer overflows, which happen when the router receives more data than it can buffer during a virtual circuit timer interval.
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Larger values increase the need for buffering and can cause noticeable echoing delay. However, increased values can reduce traffic. In environments with slow bridging, retransmissions can be reduced if you increase the value to at least three times the worst-case, round-trip interval.

<b>Examples</b>	The following example sets the time between sending messages to 500 milliseconds:
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```
lat vc-timer 500
```