

Command Line Interface

2

This chapter provides information about your ERX system's command line interface (CLI).

Topic	Page
Overview	2-1
Accessing the CLI	2-21
Using Help	2-22
Using Command Line Editing	2-26
Accessing Command Modes	2-29

Overview

Managing your system using the CLI gives you access to thousands of commands. The system's CLI uses an industry *de facto* standard look and feel, which may be familiar to you. If you are new to this CLI, it is helpful to read this entire chapter, where you can learn about CLI shortcuts and other helpful information.

Command Modes

Command modes set a context for the CLI. Each command in the CLI is available from one or more command modes. From some command modes you can only view router information; from others you can perform configuration tasks. For example, you can access User Exec mode to display information and then access Global Configuration mode to set parameters or enable a particular feature. By recognizing the command line prompt, you can identify where you are in the CLI at any

given point. When you can easily identify where you are, it is easy to get to where you want to be.

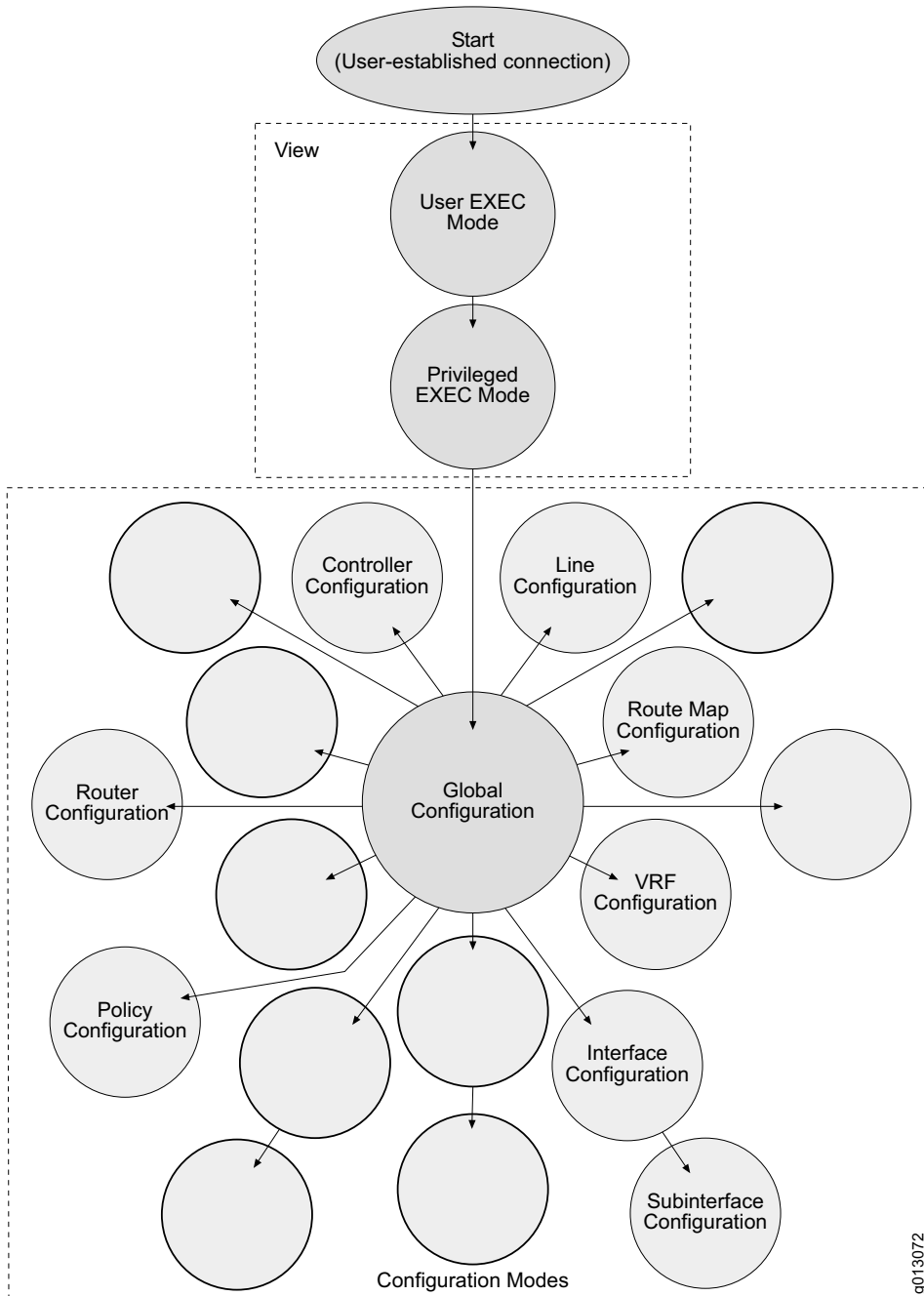


Figure 2-1 Command mode architecture

g013072

Figure 2-1 illustrates the command mode architecture. Only some of the many Global Configuration modes are shown.

Command modes are discussed in greater detail in the section *Accessing Command Modes*. See the *ERX Command Reference Guide* to find a command's related command mode.

Command Line Prompts

Within the CLI, the command line prompt identifies both the *hostname* and the *command mode*. The hostname is the name of your system; the command mode indicates your location within the CLI system.

For example:

 hostname command mode
 └──────────┬──────────┘
 RX-01-01-01(config-router) #

Keywords and Parameters

CLI commands are made up of two primary elements: *keywords* and *parameters*.

Keywords

Every command requires at least one keyword; however, a command can contain other optional keywords. The keyword(s) must be typed into the CLI accurately for it to be recognized. These are examples of keywords:

```
reload
run
router
map-class
map-list
clear ip isis redistribution
show vlan subinterface
qos-port-type-profile
no rtr reset
radius calling-station-delimiter
```

You can abbreviate keywords; however, you must enter enough initial characters to unambiguously identify the command. For example, if the keyword you want to specify is **map-class** and you enter only **map-**,

an error appears. The error indicates that one or more possible keywords begin with **map-**, thus making your entry ambiguous.

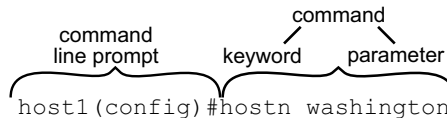
Parameters

Parameters are often required elements of a command; however, for some commands, parameters are not required. A parameter is most often a value that you specify after the keyword. There are different types of parameters, such as strings, integers, or IP addresses. The CLI indicates the type of parameter that you must enter. When you see a range of numbers or uppercase letters, it indicates that you must specify a value. For example:

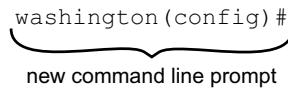
CLI Parameter Placeholder or Range	Sample Parameter User Input
ROUTER[:VRF]	charlie:1234
INTERFACE	3/2:20/15
WORD	windtunnel
<0-4294967295>	5600
A.B.C.D	192.56.32.2

Keywords and Parameters Together

By combining keywords and parameters in the correct sequence, you can begin using the CLI to configure and monitor your system. For example, you could specify the command **hostname** to change the name of your system by entering a keyword and a parameter. You need to type only the portion of the keyword that makes it unambiguous, such as **hostn**. Here, the value of the parameter, which is the name you assign to the host, is a string of up to 64 characters.



When you enter this command, the new hostname appears in the prompt.



Another example is a command that requires you to enter a number from within a given range. The command **ip http port** requires that a value be entered for the *portNumber* parameter. The value of this parameter is a number in the range of 0–65535. For example, you could enter:

```
juniper(config)#ip http port 56789
```



Note: You can find detailed information about command syntax, with parameter values defined, in the *ERX Command Reference Guide*.

Using CLI Commands

This section introduces some useful shortcuts and command-related highlights. These include:

- Abbreviated Commands
- The ? Key
- <Backspace> or <Delete>
- <Enter>
- <Tab>
- Arrow Keys
- The **no** Version (**no** Commands)
- **run** Commands
- **show** Commands
- The - - More - - Prompt
- Responding to Prompts

Abbreviated Commands

Remember, you can abbreviate keywords to save time if you enter at least enough leading characters to uniquely identify the desired keyword. For example:

```
host1(config-if)#ip re
```

This abbreviation is for the command **ip redirects**. The string **ip re** is enough information for the system CLI to identify the command you are using. See the section *Using Help* for additional information.

The ? Key

Use the ? key at any time to see all the choices you can enter next. For example:

```
host1(config)#router ?
  bgpConfigure the Border-Gateway Protocol (BGP)
  isisConfigure ISO IS-IS
  ospfConfigure the Open Shortest Path First protocol (OSPF)
  ripConfigure the Routing Information Protocol
host1(config)#router
```

When you enter the ? character, all available choices are displayed. The system again displays the command you typed. You then only have to type in the choice you want and press the <Enter> key.

A <cr> in the list of choices means that you can press the <Enter> key to execute the command. For example:

```
host1(config-if)#isis metric 40 level-2 ?
  <cr>

host1(config-if)#isis metric 40 level-2
```



Note: If the list of options extends beyond one screen, the last line on your screen displays the --More-- prompt.



Note: If you want to use the ? character as part of a string, such as a hostname or a regular expression, you must enter the following key sequence: <Ctrl+V+?>. Otherwise, the CLI considers the ? to be a request for assistance in completing the command.

<Backspace> or <Delete>

Use either key to delete the character immediately preceding the cursor.

<Enter>

Always use this key to execute the command you entered.

<Tab>

Use this key to complete the current keyword. For example, if you entered a portion of a lengthy command, such as

```
host1(config)#class
```

and press the <Tab> key, the full name of the command appears:

```
host1(config)#classifier-list
```

Arrow Keys

Some terminals have arrow (or cursor) keys on their keyboards. These arrow keys are very useful; however, to use them you must have an ANSI/VT100 emulating terminal.

The <Up Arrow> and <Down Arrow> keys display command history. The <Up Arrow> key displays the previous command; you can also use <Ctrl +P>. The <Down Arrow> key displays the next command; you can also use <Ctrl+N>.

The <Left Arrow> and <Right Arrow> keys allow the user to move the cursor back and forth in the command line.

The no Version

With very few exceptions, every system configuration command has a **no** version, which you can use to negate a command (or a portion of it as specified by an optional keyword) or to restore its default setting. When you use a command *without* the keyword **no**, you can reenable a disabled feature or override a default setting.

You have the option of using the **default** keyword whenever the **no** keyword is also a choice; simply enter the keyword **default** instead of **no**.

In most cases, when you execute the **default** version of a command, it produces the exact results as the **no** version. There are some commands for which the **default** version yields a different result from the **no** version.

Commands for which the **default** behavior differs from the **no** behavior are clearly identified in the *ERX Command Reference Guide*. Unless otherwise specified, therefore, the **default** command is identical to the **no** command and will neither be documented nor discussed.

The syntax for each **no** command is described in the *ERX Command Reference Guide*. The few system configuration commands that do not have a **no** version are indicated in the individual command description.

Because **show** commands are for the purpose of monitoring your configurations, they do not have **no** versions. Most User Exec and Privileged Exec commands do not have **no** versions.

The CLI can act on **no** versions of commands when you have entered sufficient information to distinguish the command syntactically; the CLI ignores all subsequent input on that line.

To be compatible with some non-Juniper Networks implementations, the **no** versions of commands will accept the same options as the affirmative version of the commands. The CLI ignores the optional input if it has no effect on the command behavior. If using the option changes the behavior

of the **no** version, the individual command entry in this guide describes the difference in behavior.

run Command

You can run User Exec mode commands while in any Configuration mode by preceding the command with the keyword **run**. For example:

```
host1(config)#run show users
```

By using the **run** command in this way, you can obtain **show** command information without leaving Configuration mode.

The only commands that cannot be preceded by **run** are the **config** command and those commands that are already available in all modes, such as **sleep** or **exit**.

Example 1

```
host1(config)#run show config | begin interface
interface null 0
!
interface fastEthernet 0/0
  ip address 10.6.129.41 255.255.128.0
!
interface gigabitEthernet 5/0
!

interface atm 6/0
interface atm 6/0.1 point-to-point
  encapsulation pppoe
!
interface atm 6/0.1.7
!
interface atm 6/0.1.5
!
interface atm 6/0.1.2
!
interface atm 6/0.1.9
!
interface atm 6/0.1.11
!
interface atm 6/0.1.15
!
interface atm 6/0.1.18
!
ip route 0.0.0.0 0.0.0.0 10.6.128.1
ip route 10.10.121.72 255.255.255.255 10.6.128.1
!
```

```

!
route-map adsf permit 10
router dvmrp
!
router igmp
!
snmp-server community private view everything rw
snmp-server contact Mary
snmp-server
!
! End of generated configuration script.
host 1(config)#int fa 0/0

```

Example 2

```
host1(config-if)#run dir
```

Please wait...

file	size	unshared size	date (UTC)	in use
reboot.hty	31040	31040	10/30/2001 15:31:10	
system.log	20481	20481	10/26/2001 17:24:16	
soft_clear_in.mac	8578	8578	10/24/2001 14:39:02	
erx_3-3-1.rel	71082105	71082105	10/25/2001 13:02:50	!
erx_3-3-1.rel	70502991	70502991	10/24/2001 19:58:08	
autocfg.scr	355	355	09/28/2001 13:33:04	
Capacity = 224133120, Bytes Free = 44986177, Reserved = 36700160				

```
host1(config-if)#
```

show Commands

You have access to a variety of **show** commands that display system and protocol information. You can filter the output of a **show** command by specifying | (the UNIX pipe symbol), one of the following keywords, and either a case-sensitive text string or a regular expression.

- **begin** – displays output beginning with the first line that contains the text string or regular expression
- **include** – displays output lines that contain the text string or regular expression and excludes lines that do not contain the text string or regular expression
- **exclude** – displays output lines that do not contain the text string or regular expression and excludes lines that do contain the text string or regular expression

For a list of regular expressions, see *ERX Routing Protocols Configuration Guide, Vol. 1, Chapter 1, Configuring Routing Policy*. You can press <Ctrl+C> to interrupt the **show** command output.



Note: *The system does not recognize beginning spaces of the text string. For example, if you enter **include IP** as the text string on which to filter, the system ignores the space and displays lines that include words such as RIP.*

Example 1 In the following example, the output display starts with the first line that contains the string *inter*. The system omits all the preceding lines of the output from the display because none of them contains the string *inter*.

```
host1#show config include-defaults | begin inter
Please wait...log verbosity low internalNetwork
log verbosity low ipEngine
log verbosity low ipProfileMgr
log verbosity low ipProfileMgrEngineering
no log engineering
log fields timestamp instance no-calling-task
!
timing select primary
timing source primary internal
timing source secondary internal
timing source tertiary internal
!
no disable-autosync
no disable-switch-on-error
no redundancy lockout 0
!
virtual-router default
ip domain-lookup
ip name-server 10.2.0.3
ip domain-name 789df
!
host f 10.10.133.11 ftp anonymous null
interface null 0
interface ip 0/0
  arp timeout 21600
!
interface ip 2/0
  arp timeout 21600
!
interface ip s10
  arp timeout 21600
!
interface atm 2/0
  no shutdown
```

```
atm sonet stm-1
loopback line
atm uni-version 3.0
atm oam loopback-location 0xFFFFFFFF
atm vc-per-vp 32768
atm vp-tunnel 1 10
load-interval 300
no atm snmp trap link-status
no atm shutdown
!
no atm aal5 snmp trap link-status
no atm aal5 shutdown
!
interface atm 2/0.1 point-to-point
no shutdown
no atm atm1483 shutdown
no atm atm1483 snmp trap link-status
!
ip route 0.0.0.0 0.0.0.0 10.13.5.1
ip debounce-time 0
ip source-route
!
router ospf 5
no ospf shutdown
ip route-type both
timers spf 3
maximum-paths 4
ospf auto-cost reference-bandwidth 100
distance ospf intra-area 110
distance ospf inter-area 112
distance ospf external 114
! Area 0.0.0.0
!
! Trap Source: <not configured>
! Note: SNMP server not running.
!
host1#
```

Example 2 In the following example, the output display consists only of lines that contain the string *ip*. The system omits all other lines of the output from the display because none of them contains the string *ip*.

```
host1#show config include-defaults | include ip
! Configuration script generated on WED JUN 06 2001 02:17:00
  UTC
strip-domain disable
Please wait...log verbosity low ipEngine
```

```
log verbosity low ipEngineering
log verbosity low ipGeneral
log verbosity low ipInterface
log verbosity low ipNhopTrackerEngineering
log verbosity low ipNhopTrackerGeneral
log verbosity low ipProfileMgr
log verbosity low ipProfileMgrEngineering
!
bandwidth oversubscription
ip domain-lookup
ip name-server 10.2.0.3
ip domain-name 789df
interface ip 0/0
interface ip 2/0
interface ip s10
  ip address 10.13.5.61 255.255.255.0
  no ip proxy-arp
  no ip directed-broadcast
  ip redirects
ip route 0.0.0.0 0.0.0.0 10.13.5.1
ip debounce-time 0
ip source-route
no ip ftp source-address
  type echo protocol ipIcmpEcho 10.5.0.200 source
    fastEthernet0/0
  type pathEcho protocol ipIcmpEcho 10.2.0.3
  type echo protocol ipIcmpEcho 10.5.0.11 source-ipaddr 10.13.5.61
!
controller t1 6/0
  framing esf
  lineCoding b8zs
  clock source line
  cablelength short 0
  no remote-loopback
!
log engineering
log verbosity low
no log severity
log verbosity low NameResolverLog
log verbosity low atm
log verbosity low atm1483
log verbosity low atmAa15
log verbosity low bgpConnections
log verbosity low bgpDampening
!
host1#
```

Example 3 In the following example, the output display consists only of lines that do not contain the string `!`. The system omits all other lines of the output from the display because each line contains the string `!`.

```
host1#show config include-defaults | exclude !
boot config running-configuration
boot system 3-3-1.rel
no boot backup
no boot subsystem
no boot backup subsystem
boot revert-tolerance 3 1800
no boot force-backup
no boot slot
aaa domain-map jacksonville
    virtual-router miami
    strip-domain disable
aaa domain-map jak
    virtual-router default
    strip-domain disable
aaa domain-map northeast
    virtual-router default
    strip-domain disable
aaa delimiter realmName "/"
hostname host1
no aaa new-model
no service ctrl-x-reboot
no service password-encryption
no baseline show-delta-counts
clock timezone UTC 0 0
no exception dump
exception protocol ftp anonymous null
controller sonet 2/0
    sdh
    loopback network
    clock source line
    no shutdown
    path 0 overhead j1 msg hello
    path 0 overhead j1 exp-msg
ftp-server enable
no login
log engineering
log verbosity low
no log severity
log verbosity low NameResolverLog
log verbosity low aaaAtm1483Cfg
log verbosity low atm1483
```

```

log verbosity low atmAal5
log verbosity low bgpConnections
log verbosity low bgpDampening
log verbosity low bgpEng1
log verbosity low bgpEngineering
log verbosity low bgpEvents
log verbosity low bgpKeepAlives
no log engineering
log fields timestamp instance no-calling-task
timing select primary
timing source primary internal
timing source secondary internal
timing source tertiary internal
no atm aal5 snmp trap link-status
no atm aal5 shutdown
interface atm 2/0.1 point-to-point
no shutdown
no atm atm1483 shutdown
no atm atm1483 snmp trap link-status
ip route 0.0.0.0 0.0.0.0 10.13.5.1
ip debounce-time 0
ip source-route

```

Redirection of `show` Command Output You can redirect the output of **show** commands to network files or local files (in NVS memory) using the redirection operators described in the following table:

Redirect Operator	Use
>	Redirects output to the specified file, overwriting the file if it already exists, creating the file if it does not.
>>	Appends output to the end of the specified file, creating the file if it does not exist.
&>	Redirects output to the specified file, overwriting the file if it already exists, and displays the output on the screen. The redirection is synchronized with the screen display; for example, if a --More-- prompt appears, the redirection halts until you take further action.
&>>	Appends output to the end of the specified file and displays the output to the screen. The redirection is synchronized with the screen display; for example, if a --More-- prompt appears, the redirection halts until you take further action.

For example, you can redirect the output of the **show config** command to a script file and later run that script:

```

host1#show config > showconfig.scr

```

The following command *writes* the output to a text file, version.txt, on a remote system:

```
host1#show hardware > pc:/erxfiles/version.txt
```

The following command *appends* the output to version.txt:

```
host1#show hardware >> version.txt
```

You can use redirection with output filtering. The general syntax is:

```
show options [ { > | >> | &> | &>> } filename ]
[ | { begin | include | exclude } filterstring ]
```

The filtering is performed before redirection. In the following example, the cnfgfltr.txt file will contain the output of **show config include-defaults** beginning with the first occurrence of the string *inter*.

```
host1#show config include-defaults &> cnfgfltr.txt | begin inter
```

The -- More -- Prompt

When command output continues beyond the available space on your monitor screen, the system displays the `--More--` prompt. If you press `<Return>`, the system displays the next line of output. If you press the space bar, the system displays the next screen of output.

You can begin filtering the output from the `--More--` prompt, or change a filter that is already in effect, by entering one of the following characters and a text string:

+ (plus)	displays all output lines that contain the text string
- (minus)	displays all output lines that do not contain the text string
/ (forward slash)	displays all output lines starting at the first line that contains the text string

Initial spaces are not ignored when you filter at the `--More--` prompt.

Example 1 In the following example, the output is displayed until the screen is filled and the `--More--` prompt appears. By entering the filter `/interf`, the user forces the system to filter out all output lines until the first occurrence of the string *interf*. The system displays that line and all following lines of the output.

```
host1#show config include-defaults
! Juniper Networks Edge Routing Switch ERX-700
! Version: 3.3.1 (Nov 16, 2001 12:07)
! Copyright (c) 1999-2001 Juniper Networks, Inc. All rights
reserved.
!
```

```
! Configuration script generated on THU JUN 07 2001 04:40:04
  UTC
boot config running-configuration
boot system 3-3-1.rel
no boot backup
no boot subsystem
no boot backup subsystem
boot revert-tolerance 3 1800
no boot force-backup
no boot slot
!
aaa domain-map jacksonville
  virtual-router miami
  strip-domain disable
!
aaa domain-map jak
  virtual-router default
  strip-domain disable
!
aaa domain-map northeast
  virtual-router default

/interf
(Suppressing output until 'interf' is found, press ^C to
 end...)
interface null 0
interface ip 0/0
  arp timeout 21600
!
interface ip 2/0
  arp timeout 21600
!
interface ip s10
  arp timeout 21600
!
interface atm 2/0
  no shutdown
  atm sonet stm-1
  loopback line
  atm uni-version 3.0
  atm oam loopback-location 0xFFFFFFFF
--More--
```

Example 2 In the following example, the output is displayed until the screen is filled and the `--More--` prompt appears. By entering the filter `+ip`, the user forces the system to filter out all lines from the remainder of the output

that do not contain the string *ip*. The system displays only lines that contain the string *ip*.

```

host1#show config include-defaults
! Juniper Networks Edge Routing Switch ERX-700
! Version: 3.3.1 (Nov 16, 2001 12:07)
! Copyright (c) 1999-2001 Juniper Networks, Inc. All rights
  reserved.
!
! Configuration script generated on THU JUN 07 2001 04:43:26
  UTC
boot config running-configuration
boot system 3-3.1.rel
no boot backup
no boot subsystem
no boot backup subsystem
boot revert-tolerance 3 1800
no boot force-backup
no boot slot
!
aaa domain-map jacksonville
  virtual-router miami
  strip-domain disable
!
aaa domain-map jak
  virtual-router default
  strip-domain disable
!
aaa domain-map northeast
  virtual-router default
--More--
+ip
(Displaying only lines that include 'ip', press ^C to
  end...)
  strip-domain disable
log verbosity low ipEngine
log verbosity low ipEngineering
log verbosity low ipGeneral
log verbosity low ipInterface
log verbosity low ipNhopTrackerEngineering
log verbosity low ipNhopTrackerGeneral
log verbosity low ipProfileMgr
log verbosity low ipProfileMgrEngineering
log verbosity low ipRoutePolicy
log verbosity low ipRoute
log verbosity low ipTraffic
log verbosity low ipTunnel

```

```
log verbosity low ripEngineering
log verbosity low ripGeneral
log verbosity low ripRoute
log verbosity low ripRtTable
bandwidth oversubscription
ip domain-lookup
ip name-server 10.2.0.3
ip domain-name 789df
ip explicit-path name xyz disable
interface ip 0/0
interface ip 2/0
--More--
```

Example 3 In the following example, the output is displayed until the screen is filled and the `--More--` prompt appears. By entering the filter `!`, the user forces the system to filter out all comments from the remainder of the output; that is, output lines that contain the string `!`. The system displays only lines that do not contain the string `!`.

```
host1#show config include-defaults
! Juniper Networks Edge Routing Switch ERX-700
! Version: 3.3.1 (Nov 16, 2001 12:07)
! Copyright (c) 1999-2001 Juniper Networks, Inc. All rights
  reserved.
!
! Configuration script generated on THU JUN 07 2001 04:46:00
  UTC
boot config running-configuration
boot system 3-3.1.rel
no boot backup
no boot subsystem
no boot backup subsystem
boot revert-tolerance 3 1800
no boot force-backup
no boot slot
!
aaa domain-map jacksonville
  virtual-router miami
  strip-domain disable
!
aaa domain-map jak
  virtual-router default
  strip-domain disable
!
aaa domain-map northeast
  virtual-router default
--More--
```

```
-!  
(Displaying only lines that exclude '!'. press ^C to end...)  
strip-domain disable  
aaa delimiter realmName "/"  
hostname host1  
no aaa new-model  
no service ctrl-x-reboot  
no service password-encryption  
no baseline show-delta-counts  
clock timezone UTC 0 0  
no exception dump  
exception protocol ftp anonymous null  
line vty 4  
  exec-timeout 0 0  
  exec-banner  
  motd-banner  
  timeout login response 30  
  data-character-bits 8  
  no login  
log engineering  
log verbosity low  
no log severity  
log verbosity low NameResolverLog  
log verbosity low aaaAtm1483Cfg  
log verbosity low aaaEngineGeneral  
log verbosity low aaaServerGeneral  
log verbosity low aaaUserAccess  
log verbosity low addressServerGeneral  
log verbosity low atm  
log verbosity low atm1483  
log verbosity low atmAa15  
log verbosity low bgpConnections  
log verbosity low bgpDampening  
log verbosity low bgpEng1  
--More--
```

Responding to Prompts

For some actions, the system prompts you for a response. The acceptable default responses are the following:

- You can press <y> or <Enter> to agree with the prompt and continue.
- You can press any other key to disagree with the prompt and cancel the action.

You can use the **confirmations explicit** command to require a more explicit response to CLI prompts.

confirmations explicit

- Use to require an explicit response to a CLI prompt, as follows:
 - › To agree with the prompt and continue, you must type **y** and press <Enter>, type **ye** and press <Enter>, or type **yes** and press <Enter>.
 - › To disagree with the prompt and cancel the action, you must type **n** and press <Enter> or type **no** and press <Enter>.
 - › Pressing <Enter> alone, or entering any other characters, is not an acceptable response, and the CLI will repeat the prompt.
- Acceptable responses to a prompt are not case sensitive.
- Use the **no** version to restore the default state, where pressing <y> or <Enter> alone will respond in the affirmative, and any other entry is accepted as a negative response.



Note: The system's CLI supports a powerful command line editor, enabling you to easily correct, edit, and recall previously entered commands. See the section *Using Command Line Editing* in this chapter.



Note: For a description of the commands that you use to get around the CLI, see *Chapter 5, Managing the System*.

Levels of Access

The CLI has two levels of access: *user* and *privileged*.

User Level

User level allows you only to view a router's status. This level restricts you to User Exec mode.

Privileged Level

Privileged level allows you to view a router configuration, change a configuration, and run debugging commands. You need a password to access this level. This level gives you full CLI privileges. Passwords are covered in more detail in *Chapter 6, Passwords and Security*.

Initialization Sequence

Each system line module is initialized independently. As a result, the CLI on the SRP module may become available before the line modules have completed initialization. Commands relating to a line module may fail if the module has not completed initialization. The **show version** command can be used to display line module status. Do not enter commands for a line module until its state is "online."

Accessing the CLI

This section describes logging in to and exiting from the router.

Logging In

The system supports a local console session and up to 20 virtual terminal (vty) sessions simultaneously. A virtual terminal session can be a Telnet session or a Secure Shell Server (SSH) protocol session.



Note: The vty session factory default is 5. Use the **line** command to configure up to a maximum of 20 vtys.

To access the system via a local console, attach a terminal to the system console port. To access the system via Telnet, Telnet client software must be installed on your host system. To access the system via SSH, SSH version 2.0 client software must be installed on your host system.

You can configure Telnet to validate login requests. See *Vty Line Authentication in Chapter 6, Passwords and Security*, for more information. Once Telnet is running on your host system, type in the ERX system's name or its IP address and press <Enter>. To use a name, your network must have a name server.

For example, for Microsoft Windows 95/Windows NT enter:

```
telnet 192.168.1.13
```

or

```
telnet westford2
```

You are connected to your ERX system when the following prompt appears:

```
Logging in.  
host1>
```



Note: At this point, you have access only to User Exec commands.

To connect via SSH, refer to your SSH client documentation.

Privileged-Level Access

To access Privileged Exec mode:

- 1 At the prompt, type **enable** and press <Enter>.

```
host1>enable  
Password:
```



Note: You will be prompted for a password only if your system has been configured with one. Refer to the **enable secret** and **enable password** Global Configuration commands described in Chapter 6, *Passwords and Security*.

2 Type your password and press <Enter>.

```
Password:*****<Enter>  
host1#
```

You can tell that you have access to Privileged Exec mode when the command prompt changes from a > character to a # character.

Exiting Modes

You can exit from any command mode at any time by entering the **exit** command.

```
host1#exit  
host1>
```

Using Help

The system CLI provides a variety of useful context-sensitive help features. An important thing to remember about using the help features is that the use of a space or the lack of a space before the ? gives different results. Table 2-1 describes the help system.

Table 2-1 Help commands

Command	Description
?	Lists all keywords applicable to the current command mode.
help	Displays a brief description of the help system (available in all command modes).
partial-keyword?	Lists the keywords that begin with a certain character string.
partial-keyword <Tab>	Completes the partial keyword you entered, if you have provided an unambiguous abbreviation.
command <Space>?	Lists the set of all valid next available choices.

Commands listed in the left column of Table 2-1 are further described with examples in the following sections.

? (Question Mark Key)

You can use the question mark (?) key whenever you need additional information. When you enter ?, all available choices are displayed. The CLI then redisplay the command you typed. The following examples show different ways you can use the ?.

When you use ? on a line by itself or when it is preceded by one or more spaces, a list of all next available choices is displayed.

Example 1

```
host1(config)#?  
  aaa                               Configure authentication, authorization, and  
                                     accounting characteristics  
  access-list                       Configure an access list entry  
  arp                               Configure a static ARP entry  
  bandwidth                         Configure slot-group bandwidth control  
  banner                            Define a banner line  
  baseline                          Configure baseline operations  
  boot                              Configure boot time behavior  
  bulkstats                         Configure bulkstats parameters  
  cbf                               Configure connection-based forwarding  
  classifier-list                   Configure a classifier list entry  
  clns                              Configure CLNS characteristics  
  clock                             Set the system's clock  
  confirmations                    Configure confirmation mode  
  controller                        Configure controller parameters  
  crypto                            Configure cryptographic parameters  
  default                           Set a command to its default(s)  
  disable-autosync                 Disable automatic synchronization of redundant  
                                     system controller file system  
  disable-switch-on-error          Disable automatic switch to redundant system  
                                     controller upon software/hardware error  
  enable                            Configure security related options  
  end                               Exit Global Configuration mode  
  exception                         Configure core dump  
  exclude-subsystem                Exclude copying a subsystem from the release  
  exit                              Exit from the current command mode  
  ftp-server                       Configure FTP Server characteristics  
  help                              Describe the interactive help system  
  host                              Add/modify an entry to the host table  
  hostname                          Set the host (system) name  
  interface                        Enter Interface Configuration mode  
  ip                               Configure IP characteristics  
  l2f                               Configure L2F parameters  
  l2tp                              Configure L2TP parameters  
  license                           Configure licenses
```

line	Enter Line Configuration mode
log	Configure logging settings
macro	Run a CLI macro
map-list	Create an NBMA static map
memory	Configure and administer memory operations
mpls	Configure MPLS global parameters
no	Negate a command or set its default(s)
ntp	Configure the Network Time Protocol
policy-list	Enter Policy Configuration mode
pppoe	Configure PPPoE
profile	Specify a profile
radius	Configure RADIUS server
rate-limit-profile	Enter rate limit profile configuration mode
redundancy	Perform a redundancy configuration
route-map	Configure a route map
router	Configure a routing protocol
rtr	Configure rtr parameters
run	Run an exec mode command
service	Configure system-level services
set	Configure
sleep	Make the Command Interface pause for a specified duration
slot	Configure and administer slot operation
snmp-server	Configure SNMP parameters
sscc	The SSC Client telnet
telnet	telnet daemon configuration
timing	Configure network timing
traffic-shape-profile	Enter traffic shape profile configuration mode
virtual-router	Specify a virtual router

host1(config)#

Example 2

host1(config)#ip ?

address-pool	Configure address pool for PPP Broadband RAS clients
as-path	Configure a path filter for AS-Paths in BGP
bgp-community	Format for BGP community
community-list	Configure an entry in a community list
debounce-time	Specify the minimum amount of time that an event needs to be in same state before being reported
dhcp-local	The DHCP Local Server protocol
dhcp-server	DHCP Server for Proxy Client
domain-lookup	Enable DNS lookup
domain-name	Specify local Domain name
dvmrp	configure dvmrp parameters

dynamic-interface-prefix	Specify name prefix for dynamic Ip shared interfaces
explicit-path	Configure an explicit path
extcommunity-list	The extended community list
ftp	Configure FTP characteristics
http	Configure http server
local	Local IP address assignment
multicast-routing	Enable IP multicast forwarding
name-server	Configure DNS server
pim	Configure PIM Protocol
prefix-list	Configure a prefix list entry
prefix-tree	Configure a prefix tree entry
route	Define a static IP route
router-id	Configure the router-id to be used
rpf-route	Define a static IP route for mcast RPF check
source-route	Configure source-routing capabilities
ssh	Configure SSH characteristics
ttl	Configure the default value to be used by IP for Time-To-Live
tunnel	Configure tunnel parameter
vpn-id	Configure the VPN ID associated with this router
vrf	Specify a VRF

```
host1(config)#ip
```

Example 3 `host1(config)#ip community-list ?`
 <1 - 99> The community list

```
host1(config)#ip community-list
```

When you want to see a list of commands that begin with a particular set of characters, type a question mark **?** immediately after the last letter. Do not use a space between the partial keyword and the **?**. For example:

```
host1#sh?
show shutdown
host1#sh
```



Note: If you want to use the **?** character as part of a string, such as a hostname or a regular expression, you must enter the following key sequence: <Ctrl+V+?>. Otherwise, the CLI considers the **?** to be a request for assistance in completing the command.

help Command

Use the **help** command when you want to see a brief description of the context-sensitive help system.

```
host1>help
```

Use the help options as follows:

```
?, or command<Space>? - Lists the set of all valid next keywords or arguments  
partial-keyword?      - Lists the keywords that begin with a certain character  
                        string  
partial-keyword<Tab> - Completes the partial keyword  
host1>
```

Partial-keyword <Tab>

When you cannot recall a complete command name or keyword, type in the first few letters, press <Tab>, and the system completes your partial entry. You must type enough characters to provide a unique abbreviation. If you type a few letters, press <Tab>, and your terminal beeps, then you have not typed enough characters to be unambiguous.

```
host1(config)#int<Tab>  
host1(config)#interface
```

Using Command Line Editing

This section provides information about the command line editor.

Basic Editing

Here are a few basic command line editing notes:

- **Case** – Keywords are not case sensitive; that is, they can be entered in uppercase, lowercase, or a mix of both. Filenames may be case sensitive. Local filenames are case sensitive; remote filenames are case sensitive if the host system treats filenames as case sensitive. Passwords are case sensitive.
- **Abbreviating keywords** – You may abbreviate keywords using as few characters as you want, as long as the characters provide a unique abbreviation.
- **Executing a command** – Always use the <Enter> key.

Command Line Editing Keys

You can use several keys to edit the command line. Table 2-2 defines the keys for editing the command line.

Table 2-2 Command line editing keys

Key(s)	Function
Delete or Backspace	Removes characters to left of cursor.
Left Arrow ^a	Moves cursor one character to left.
Right Arrow ^a	Moves cursor one character to right.
Ctrl+A	Moves cursor to beginning of command line.
Ctrl+B	Moves cursor back one character.
Ctrl+D	Deletes character at cursor.
Ctrl+E	Moves cursor to end of command line.
Ctrl+F	Moves cursor forward one character.
Ctrl+H	Deletes character to left of cursor.
Ctrl+K	Deletes all characters from cursor to end of command line.
Ctrl+L	Redisplays system prompt and command line.
Ctrl+O	Toggles overwrite/insert mode.
Ctrl+T	Transposes character to left of cursor with character located at cursor.
Ctrl+U	Deletes entire command line.
Ctrl+V	Allows the “?” character to be used as a character instead of as a request for help.
Ctrl+W	Deletes the previous word.
Ctrl+X	In all modes, reboots the system. This feature is useful if a command is taking a prolonged time to complete and hangs the console. The command has no effect if you access the system via Telnet. Set the boot option flag using the service ctrl-x-reboot command from Global Configuration mode.
Ctrl+Y	Recalls most recent entry from delete buffer; recalled characters overwrite or are inserted in current line depending on overwrite/insert toggle.
Ctrl+Z	In all modes, except User Exec mode, returns you to Privileged Exec mode.
Esc+B	Moves cursor back one word.
Esc+Backspace	Deletes previous word.
Esc+D	Deletes current or next word.

a. Arrow keys function only on ANSI-compatible terminals, such as VT100s.

Command History Keys

The CLI maintains two separate command histories. The first command history maintains only User Exec and Privileged Exec mode commands. The second history maintains all commands entered in any of the configuration modes. The appropriate history will automatically be restored as you transition between Global Configuration mode and Privileged Exec mode.

Table 2-3 defines the keys related to command history.

Table 2-3 Command history keys

Key	Function
Up Arrow ^a or Ctrl+P	Recalls commands in history buffer, starting with most recent command. Repeat key sequence to recall successively older commands.
Down Arrow ^a or Ctrl+N	Returns to more recent commands in history buffer after recalling commands with Up Arrow or Ctrl+P. Repeat key sequence to recall successively more recent commands.
Ctrl+R	Begin a <i>reverse search</i> for a previously entered string in the history buffer by providing a character string when prompted. Enter <Ctrl+R> to continue searching. <Ctrl+H> or deletes the last character in the string and starts a search on the new string.

a. Arrow keys function only on ANSI-compatible terminals, such as VT100s.

Pagination Keys

If the system needs to display more text than you can fit on the screen, the output pauses and the `--More--` prompt appears. Table 2-4 defines the pagination keys that you can use when the `--More--` prompt appears. See *The - - More - - Prompt* section earlier in this chapter for more information.

Table 2-4 Pagination keys

Key	Function
Enter	Scrolls down one more line
Space bar	Displays one more screen
+	Displays all output lines that contain the text string
-	Displays all output lines that do not contain the text string
/	Displays all output lines starting at the first line that contains the text string
Any other key	Aborts output and returns you to command prompt

Accessing Command Modes

Table 2-5 describes the command modes available in the CLI.

Table 2-5 Command mode overview

Mode name	Use this mode to . . .	To access this mode . . .	To exit this mode . . .
AAA Profile Configuration	<ul style="list-style-type: none"> Configure new AAA profiles. 	<ul style="list-style-type: none"> From Global Configuration mode, use aaa-profile command. Prompt: host1(config-aaa-profile)# 	<ul style="list-style-type: none"> Use the exit command twice to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Address Family Configuration	<ul style="list-style-type: none"> Configure BGP address family parameters. 	<ul style="list-style-type: none"> From Global Configuration mode, use router bgp to enter Router Configuration mode. From Router Configuration, use the address-family command. Prompt: host1(config-router-af)# 	<ul style="list-style-type: none"> Use the exit command twice to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Controller Configuration	<ul style="list-style-type: none"> Configure physical interfaces (for example, T3). 	<ul style="list-style-type: none"> From Global Configuration mode, use the controller command. Prompt: host1(config-controll)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
DHCP Pool Configuration	<ul style="list-style-type: none"> Configure DHCP local pools. 	<ul style="list-style-type: none"> From Global Configuration mode, use the ip dhcp-local pool command. Prompt: host1(config-dhcp-local)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Domain Map Configuration	<ul style="list-style-type: none"> Configure domain maps. 	<ul style="list-style-type: none"> From Global Configuration mode, use the aaa domain-map command. Prompt: host1(config-domain-map)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Domain Map Tunnel Configuration	<ul style="list-style-type: none"> Configure tunnel parameters. 	<ul style="list-style-type: none"> From Domain-Map Configuration mode, use the tunnel command. Prompt: host1(config-domain-map-tunnel)# 	<ul style="list-style-type: none"> Use the exit command twice to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Explicit Path Configuration	<ul style="list-style-type: none"> Configure MPLS explicit path parameters. 	<ul style="list-style-type: none"> From Global Configuration mode, specify the mpls explicit-path name command. Prompt: host1(config-expl-path)# 	<ul style="list-style-type: none"> Use the exit command twice to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.

Table 2-5 Command mode overview (continued)

Mode name	Use this mode to . . .	To access this mode . . .	To exit this mode . . .
Global Configuration	<ul style="list-style-type: none"> • Enable a feature or function. • Disable a feature or function. • Configure a feature or function. 	<ul style="list-style-type: none"> • From Privileged Exec mode, use the configure command. • Prompt: host1(config)# 	<ul style="list-style-type: none"> • Use the exit command, or press <Ctrl+Z> to return to Privileged Exec mode. • Use the interface command to enter Interface Configuration mode.
Interface Configuration	<ul style="list-style-type: none"> • Create an interface. • Modify the operation of an interface, such as bandwidth or clock rate. 	<ul style="list-style-type: none"> • From Global Configuration mode, use the interface command and identify the interface by slot/port. • Prompt: host1(config-if)# 	<ul style="list-style-type: none"> • Use the exit command once to return to Global Configuration mode. • Press <Ctrl+Z> to return to Privileged Exec mode.
IPSec Manual Key Configuration	<ul style="list-style-type: none"> • Enter manual keys. 	<ul style="list-style-type: none"> • From the Global Configuration mode, use the ipsec key manual command. • Prompt: host1(config-manual-key)# 	<ul style="list-style-type: none"> • Use the exit command once to return to Global Configuration mode. • Press <Ctrl+Z> to return to Privileged Exec mode.
ISAKMP Policy Configuration	<ul style="list-style-type: none"> • Define an ISAKMP/IKE policy. 	<ul style="list-style-type: none"> • From the Global Configuration mode, use the ipsec isakmp-policy-rule command. • Prompt: host1(config-isakmp-policy)# 	<ul style="list-style-type: none"> • Use the exit command once to return to Global Configuration mode. • Press <Ctrl+Z> to return to Privileged Exec mode.
L2TP Destination Profile Configuration	<ul style="list-style-type: none"> • Define the location of an LAC. 	<ul style="list-style-type: none"> • From Global Configuration mode, use the l2tp destination profile command. • Prompt: host1(config-l2tp-dest-profile)# 	<ul style="list-style-type: none"> • Use the exit command once to return to Global Configuration mode. • Press <Ctrl+Z> to return to Privileged Exec mode.
L2TP Destination Profile Host Configuration	<ul style="list-style-type: none"> • Configure host profile attributes. 	<ul style="list-style-type: none"> • From L2TP Destination Profile Configuration mode, use the remote host command. • Prompt: host1(config-l2tp-dest-profile-host)# 	<ul style="list-style-type: none"> • Use the exit command twice to return to Global Configuration mode. • Press <Ctrl+Z> to return to Privileged Exec mode.
LDP Configuration	<ul style="list-style-type: none"> • Configure MPLS LDP profile parameters. 	<ul style="list-style-type: none"> • From Global Configuration mode, specify the mpls ldp profile command. • Prompt: host1(config-ldp)# 	<ul style="list-style-type: none"> • Use the exit command once to return to Global Configuration mode. • Press <Ctrl+Z> to return to Privileged Exec mode.
Line Configuration	<ul style="list-style-type: none"> • Modify a virtual terminal line. 	<ul style="list-style-type: none"> • From Global Configuration mode, use the line command. • Prompt: host1(config-line)# 	<ul style="list-style-type: none"> • Use the exit command once to return to Global Configuration mode. • Press <Ctrl+Z> to return to Privileged Exec mode.

Table 2-5 Command mode overview (continued)

Mode name	Use this mode to . . .	To access this mode . . .	To exit this mode . . .
Map Class Configuration	<ul style="list-style-type: none"> Specify fragmentation for a map class. 	<ul style="list-style-type: none"> From Global Configuration mode, specify the map-class frame-relay command. Prompt: host1(config-map-class)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Map List Configuration	<ul style="list-style-type: none"> Configure map list parameters. 	<ul style="list-style-type: none"> From Global Configuration mode, use the map-list command. Prompt: host1(config-maplist)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Policy Configuration	<ul style="list-style-type: none"> Configure a policy. 	<ul style="list-style-type: none"> From Global Configuration mode, use the policy-list command. Prompt: host1(config-policy)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Privileged Exec	<ul style="list-style-type: none"> Show system information. Set operating parameters. Access Global Configuration mode. 	<ul style="list-style-type: none"> From User Exec mode, use the enable command. Prompt: host1# 	<ul style="list-style-type: none"> Use the disable or exit command to return to User Exec mode. Use the configure command to enter Global Configuration mode.
Profile Configuration	<ul style="list-style-type: none"> Configure profiles. 	<ul style="list-style-type: none"> From Global Configuration mode, use the profile command. Prompt: host1(config-profile)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
QoS Profile Configuration	<ul style="list-style-type: none"> Configure QoS profiles. 	<ul style="list-style-type: none"> From Global Configuration mode, use the qos-profile command. Prompt: host1(config-qos-profile)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Queue Configuration	<ul style="list-style-type: none"> Configure queue profiles. 	<ul style="list-style-type: none"> From Global Configuration mode, use the queue-profile command. Prompt: host1(config-queue)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
RADIUS Configuration	<ul style="list-style-type: none"> Configure Broadband Remote Access Server (B-RAS) parameters. 	<ul style="list-style-type: none"> From Global Configuration mode, use the radius server command. Prompt: host1(config-radius)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.

Table 2-5 Command mode overview (continued)

Mode name	Use this mode to . . .	To access this mode . . .	To exit this mode . . .
Rate Limit Profile Configuration	<ul style="list-style-type: none"> Configure rate limit parameters. 	<ul style="list-style-type: none"> From Global Configuration mode, use the rate-limit-profile command. Prompt: host1(config-rate-limit-profile)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Remote Neighbor Configuration	<ul style="list-style-type: none"> Configure remote neighbor parameters for OSPF, PIM, or RIP. 	<ul style="list-style-type: none"> From Router Configuration mode, use the remote-neighbor command. Prompt: host1(config-router-rn)# 	<ul style="list-style-type: none"> Use the exit command twice to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Route Map Configuration	<ul style="list-style-type: none"> Configure routing tables and source and destination information. 	<ul style="list-style-type: none"> From Global Configuration mode, use the route-map command. Prompt: host1(config-route-map)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Router Configuration	<ul style="list-style-type: none"> Configure a routing protocol. 	<ul style="list-style-type: none"> From Global Configuration mode, specify a routing protocol with the router command. Prompt: host1(config-router)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
RSVP Configuration	<ul style="list-style-type: none"> Configure an RSVP profile. 	<ul style="list-style-type: none"> From Global Configuration mode, use the mpls RSVP profile command. Prompt: host1(config-rsvp)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
RTR Configuration	<ul style="list-style-type: none"> Configure RTR parameters. 	<ul style="list-style-type: none"> From Global Configuration mode, use the rtr command. Prompt: host1(config-rtr)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Scheduler Profile Configuration	<ul style="list-style-type: none"> Configure shaping parameters. Configure scheduler profile. 	<ul style="list-style-type: none"> From Global Configuration mode, use the scheduler-profile command. Prompt: host1(config-scheduler-profile)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec menu.
Subinterface Configuration	<ul style="list-style-type: none"> Configure multiple virtual interfaces on a single physical interface. 	<ul style="list-style-type: none"> From Global Configuration mode, use the interface command and identify the interface (slot/port.subinterface). Prompt: host1(config-subif)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.

Table 2-5 Command mode overview (continued)

Mode name	Use this mode to . . .	To access this mode . . .	To exit this mode . . .
Traffic Class Configuration	<ul style="list-style-type: none"> Configure a traffic class. 	<ul style="list-style-type: none"> From Global Configuration mode, use the traffic-class command. Prompt: host1(config-traffic-class)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Traffic Class Group Configuration	<ul style="list-style-type: none"> Configure a traffic class group. 	<ul style="list-style-type: none"> From Global Configuration mode, use the traffic-class-group command. Prompt: host1(config-traffic-class-group) 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
Tunnel Profile Configuration	<ul style="list-style-type: none"> Configure tunnel profile parameters. 	<ul style="list-style-type: none"> From Global Configuration, specify the mpls tunnels profile command. Prompt: host1(config-tunnelprofile)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
VRF Configuration	<ul style="list-style-type: none"> Configure VRF parameters for BGP/MPLS VPNs. 	<ul style="list-style-type: none"> From Global Configuration mode, use the ip vrf command. Prompt: host1(config-vrf)# 	<ul style="list-style-type: none"> Use the exit command once to return to Global Configuration mode. Press <Ctrl+Z> to return to Privileged Exec mode.
User Exec	<ul style="list-style-type: none"> Change terminal settings on a temporary basis. Show system information. Access Privileged Exec mode. 	<ul style="list-style-type: none"> Log into system. Prompt: host1> 	<ul style="list-style-type: none"> Use the enable command to enter Privileged Exec mode.



Note: Within any configuration mode, the commands that are available to the user include the commands defined for that configuration mode and all commands defined for Global Configuration mode. See Figure 2-1. For example, from Router Configuration mode, you could use the **interface** Global Configuration mode command without first explicitly going back to Global Configuration mode.

```
host1(router-config)# interface atm 4/0.3
host1(config-if)#
```

User Exec Mode

After you log in to the system, the CLI is in User Exec mode. The commands you can execute from User Exec mode provide only user-level access. The User Exec commands allow you to perform such functions as:

- Change terminal settings on a temporary basis.
- Perform **ping** and **trace** commands.
- Display system information.

```
host1>?
baseline    Set a baseline for statistics
clear       Clear active state
default     Set a command to its default(s)
dir         Display a list of local files
disable     Reduce the command privilege level
enable      Enable access to privileged commands
erase       Erase configuration settings
exit        Exit from the current command mode
help        Describe the interactive help system
ip          Configure IP attributes on an interface
log         Configure logging setting
macro       Run a CLI macro
mpls        Execute MPLS commands
mtrace      Trace the path that packets will traverse from source to
            destination for a given group
no          Negate a command or set its default(s)
ping        Send echo request to remote host
show        Display system information
sleep       Make the Command Interface pause for a specified duration
terminal    Configure the terminal line settings
traceroute  Trace the path that packets traverse to their destination

host1>
```

Privileged Exec Mode

Privileged Exec mode provides privileged-level access and therefore should be password protected to prevent unauthorized use. Privileged Exec commands allow you to perform such functions as:

- Display system information.
- Set operating parameters.
- Gain access to Global Configuration mode.

In addition, you can execute a script file (.scr), which is simply a file containing a sequence of CLI commands, via the **configure** command.

```

host1#?
  PolicyRoutingTestPolicyRoutingTest information
baseline      Set a baseline for statistics
clear         Clear a state
clock         Set the system's clock
configure     Enter Global Configuration mode
copy          Copy files
debug         Configure debugging functions
default       Set a command to its default(s)
delete        Delete a local file
dir           Display a list of local files
disable       Reduce the command privilege level
disconnect    Disconnect remote CLI session
enable        Enable access to privileged commands
exit          Exit from the current command mode
halt          Halt the system in preparation for power down
help          Describe the interactive help system
ip            Configure IP attributes on an interface
log           Configure logging settings
logout        Logout Subscribers
macro         Run a CLI macro
mpls          Execute MPLS commands
mtrace        Trace the path that packets will traverse from source to
              destination for a given group
no            Negate a command or set its default(s)
ping          Send echo request to remote host
pppoe        Set PPPoE information
redundancy    Perform a redundancy action
reload        Halt and perform a cold restart
rename        Rename a local file
send          Send a message to specified lines
show          Display system information
sleep         Make the Command Interface pause for a specified duration
srp           Perform SRP operations
synchronize   Manually synchronize redundant system controller file system
telnet        Access a remote system via telnet
terminal      Configure the terminal line settings
test          Test a feature
traceroute    Trace the path that packets traverse to their destination
undebg        Disable debug logging functions
virtual-router Specify a virtual router
write         Write the system's running configuration to a destination
  
```

```
host1#
```

Password Protection

If the system administrator has configured the system to have a password, the CLI prompts you to enter that password before you receive access to Privileged Exec mode. The password is case sensitive and appears as asterisks on the screen.

To access Privileged Exec mode:

- 1 At the prompt, type **enable** and press <Enter>.

```
host1>enable  
Password:
```

- 2 At the password prompt, type your password and press <Enter>.

```
Password:*****  
host1#
```



Note: The > character in the command line prompt changes to the # character.

Global Configuration Mode

Within Global Configuration mode, you can:

- Apply features globally to a router.
- Enable a feature or function.
- Disable a feature or function.
- Configure a feature or function.
- Access all Configuration modes.

To access Global Configuration mode, you begin in Privileged Exec mode. Type **configure terminal** and press <Enter>.

```
host1#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
host1(config)#
```

The system is now in Global Configuration mode.

Executing a Script File

To execute a script file:

- 1 From Privileged Exec mode, type **configure** and the filename you want to execute, and press <Enter>.

```
host1#configure file  
File name:/myFile.scr  
Proceed with configure? [confirm]
```



Note: The filename must end with an `.scr` extension, and the file must contain a series of valid CLI commands. The file can be a local file on the router or a remote file on a host system.

- 2 Press <y> or <Enter> to confirm; pressing any other key aborts the procedure.

```
host1#
```

For more information, see the section *Managing Files* in *Chapter 5, Managing the System*.

AAA Profile Configuration Mode

From this mode, you can restrict or allow the use of domain names, translate an original domain name to a new domain name, or create domain name aliases.

From Global Configuration mode, type the **aaa profile** command and a *profileName*, and then press <Enter>.

```
host1(config)#aaa profile charlie
host1(config-aaa-profile)#?
  allow      Configure the authorization domain name
  default    Set a command to its default(s)
  deny       Configure the authorization domain name
  exit       Exit from the current command mode
  help       Describe the interactive help system
  log        Configure logging settings
  macro      Run a CLI macro
  no         Negate a command or set its default(s)
  run        Run an exec mode command
  sleep      Make the Command Interface pause for a specified duration
  translate  Configure the translation map for domain name

host1(config-aaa-profile)#
```

Address Family Configuration Mode

From this mode, you can configure address family parameters for BGP VPN services.

From Global Configuration mode, type the **router bgp** command to enter Router Configuration mode. Type either the **address-family ipv4** or **address-family vpnv4** command, and then press <Enter>.

```

host1(config)#router bgp 100
host1(config-router)#address-family ?
  ipv4    Configure IPv4 address family
  vpnv4   Configure VPN-IPv4 address family

host1(config-router)#address-family

```

Controller Configuration Mode

You can configure physical interfaces such as a T3 in Controller Configuration mode.

From Global Configuration mode, type the appropriate **controller** command and its attributes, and then press <Enter>.

```

host1(config)#controller t3 9/1
host1(config-controll)#

host1(config)#controller ?
  e1      Configure a channelized E1 controller
  e3      Configure a E3 controller
  sonet   Configure a Sonet controller
  t1      Configure a channelized T1 controller
  t3      Configure a T3 controller

host1(config)#controller

```

DHCP Pool Configuration Mode

In this mode, you can configure DHCP local pools. For example, you can specify a DNS or Net-Bios server.

From Global Configuration mode, type the command **ip dhcp-local pool** and a *poolName*, and then press <Enter>.

```

host1(config)#ip dhcp-local pool charlie
host1(config-dhcp-local)#?
  default          Set a command to its default(s)
  default-router   The default-router to use for this pool
  dns-server       The dns-server to use for this pool
  domain-name      The domain name for the pool
  exit             Exit from the current command mode
  help             Describe the interactive help system
  lease            The lease time for addresses from this pool
  link             Link to another DHCP Pool
  log              Configure logging settings
  macro            Run a CLI macro
  netbios-name-server The netbios-name-server to use for this pool

```

netbios-node-type	The netbios-node-type to use for this pool
network	The network specified for this pool
no	Negate a command or set its default(s)
reserve	Reserve an ip address for a specific Mac Address
run	Run an exec mode command
server-address	The DHCP Server address to send to clients
sleep	Make the Command Interface pause for a specified duration

```
host1(config-dhcp-local)#
```

Domain Map Configuration Mode

In this mode, you can map a user domain name to a virtual router and loopback interface.

From Global Configuration mode, type the **aaa domain-map** command and the domain name value as found in the client's login name. Then press <Enter>.

```
host1(config)#aaa domain-map charlie76
host1(config-domain-map)#?
  atm          Configure ATM parameters
  default      Set a command to its default(s)
  exit         Exit from the current command mode
  help         Describe the interactive help system
  ip-hint      Configure the IP hint feature for the domain
  log          Configure logging settings
  loopback     Configure the loopback interface to use when RX has an
              unnumbered interface to the PPP client
  macro        Run a CLI macro
  no           Negate a command or set its default(s)
  override-user Configure the username and password values to use instead of
              the values from the remote client
  sleep        Make the Command Interface pause for a specified duration
  strip-domain Configure the domain name stripping feature for the domain
  tunnel       Configure tunnel tag
  virtual-router Configure the virtual-router for the domain name

host1(config-domain-map)#
```

Domain Map Tunnel Configuration Mode

In this mode, you can configure tunnel parameters such as the tunnel's endpoint.

From Domain-Map Configuration mode, type **tunnel** and a *tunnelNumber*, and press <Enter>.

```
host1(config-domain-map)#tunnel 17
host1(config-domain-map-tunnel)#?
  address          Configure tunnel endpoint address
  exit             Exit from the current command mode
  help            Describe the interactive help system
  hostname        Configure hostname of tunnel
  identification   Configure tunnel identification
  log             Configure logging settings
  macro           Run a CLI macro
  medium          Configure tunnel medium
  no              Negate a command or set its default(s)
  password        Configure tunnel password
  preference      Configure tunnel preference
  server-name     Configure the hostname of the tunnel server
  sleep          Make the Command Interface pause for a specified duration
  source-address  Configure tunnel source address
  type           Configure tunnel type

host1(config-domain-map-tunnel)#
```

Explicit Path Configuration Mode

From this mode, you can name and configure an explicit path within MPLS.

From Global Configuration mode, type **mpls explicit-path name** and the *explicitPathName*, and press <Enter>.

```
host1(config)#mpls explicit-path name xyz
host1(config-expl-path)#?
  append-after    Add an entry after a specified index
  default        Set a command to its default(s)
  exit          Exit from the current command mode
  help         Describe the interactive help system
  index       Specify the index of the entry to be added or edited
  list       List part or all of the entries in current explicit path
  log       Configure logging settings
  macro     Run a CLI macro
  next-address Configure an IP address at the last hop of the explicit path
  no       Negate a command or set its default(s)
  sleep   Make the Command Interface pause for a specified duration

host1(config-expl-path)#
```

Interface Configuration Mode

From Interface Configuration mode, you can enable many system features for each interface you create. Interface Configuration commands allow you to:

- Create an interface.
- Modify the operation of an interface.
- Access Subinterface mode.

From Global Configuration mode, type **interface** and identify the interface you want to configure.

```
host1(config)#interface atm 0/1  
host1(config-if)#
```

The CLI is now in Interface Configuration mode.

```
host1(config)#interface ?  
atm                ATM interface  
fastEthernet       IEEE 802.3 fastEthernet interface  
gigabitEthernet    IEEE 802.3 gigabitEthernet interface  
hssi               High Speed Serial interface  
ip                 Ip shared interface  
loopback           Loopback interface  
mlframe-relay      Multilink frame-relay interface  
mlppp              Multilink PPP interface  
null               Null interface  
pos                Packet over SONET interface  
serial             Serial interface  
sonet              SONET interface  
tunnel             Tunnel interface  
  
host1(config)#interface
```

Some Interface Configuration commands can affect general interface parameters, such as bandwidth and clock rate. For interface-specific commands, such as for ATM interfaces, see the appropriate chapter in this guide.

IPSec Manual Key Configuration Mode

In this mode, you can enter the manual key that a peer uses for authentication during the tunnel establishment phase.

From the Global Configuration mode, type **ipsec key manual pre-share** and the *peerIPaddress*, and press <Enter>.

```

host1(config)#ipsec key manual pre-share 10.10.1.1
host1(config-manual-key)#?
  default  Set a command to its default(s)
  exit     Exit from the current command mode
  help     Describe the interactive help system
  key      Manually specify a key
  log      Configure logging settings
  macro    Run a CLI macro
  no       Negate a command or set its default(s)
  run      Run an exec mode command
  sleep    Make the Command Interface pause for a specified duration

```

ISAKMP Policy Configuration Mode

In this mode, you can create an ISAKMP/IKE policy, which is used during ISAKMP/IKE phase 1 negotiation.

From the Global Configuration mode, type **ipsec isakmp-policy-rule** and the *policyNumber*, and press <Enter>.

```

host1(config)#ipsec isakmp-policy-rule 10
host1(config-isakmp-policy)#?
  aggressive-mode  Allows aggressive mode negotiation for the tunnel
  authentication   Configure the authentication method
  default          Set a command to its default(s)
  encryption       Configure the encryption algorithm within an IKE policy
  exit             Exit from the current command mode
  group            Configure the Diffie-Hellman group identifier
  hash             Configure the hash algorithm within an IKE policy
  help             Describe the interactive help system
  lifetime         Configure the time an SA will live before expiration
  log              Configure logging settings
  macro            Run a CLI macro
  no               Negate a command or set its default(s)
  run              Run an exec mode command
  sleep            Make the Command Interface pause for a specified duration

host1(config-isakmp-policy)#

```

L2TP Destination Profile Configuration Mode

In this mode, you can create the destination profile that defines the location of an L2TP Access Concentrator (LAC) and define the attributes used when an L2TP Network Server (LNS) communicates with an LAC. The destination is necessary to enable an LAC to connect to the LNS.

From Global Configuration mode, type **l2tp destination profile**, the *profileName*, an *ipAddress*, and press <Enter>.

```

host1(config)#l2tp destination profile augusta ip address 123.45.76.16
host1(config-l2tp-dest-profile)#?
    default  Set a command to its default(s)
    exit     Exit from the current command mode
    help     Describe the interactive help system
    log      Configure logging settings
    macro    Run a CLI macro
    no       Negate a command or set its default(s)
    remote   Configure L2TP remote parameters
    sleep    Make the Command Interface pause for a specified duration

host1(config-l2tp-dest-profile)#
    
```

L2TP Destination Profile Host Configuration Mode

In this mode, you can set and modify L2TP host profile attributes, such as the proxy Link Control Protocol (LCP), the local hostname, the local IP address, or the interface profile.

From Global Configuration mode, enter L2TP Destination Profile mode (see above), and type **remote host** and a *hostName*, and press <Enter>.

```

host1(config-l2tp-dest-profile)#remote host george
host1(config-l2tp-dest-profile-host)#?
    default  Set a command to its default(s)
    disable  Disable L2TP parameter for remote host
    enable   Enable L2TP parameter for remote host
    exit     Exit from the current command mode
    help     Describe the interactive help system
    local    Configure L2TP local parameters for remote host
    log      Configure logging settings
    macro    Run a CLI macro
    no       Negate a command or set its default(s)
    profile  Assign a profile for remote host
    sleep    Make the Command Interface pause for a specified duration
    tunnel   Configure L2TP tunnel parameters for remote host

host1(config-l2tp-dest-profile-host)
    
```

LDP Configuration Mode

In this mode, you can create and configure MPLS Label Distribution Protocol (LDP) profile parameters.

From Global Configuration mode, type **mpls ldp profile** and the *profileName*, and press <Enter>.

```

host1(config)#mpls ldp profile shell
host1(config-ldp)#?
  cr-ldp  Enable CR-LDP at interface level
  default Set a command to its default(s)
  exit    Exit from the current command mode
  hello   Configure hello parameters
  help    Describe the interactive help system
  log     Configure logging settings
  macro   Run a CLI macro
  no      Negate a command or set its default(s)
  sleep   Make the Command Interface pause for a specified duration

host1(config-ldp)#

```

Line Configuration Mode

In this mode, you can modify the operation of a virtual terminal (vty) line.

From Global Configuration mode, type the **line vty** command and either the *lineNumber* or the *rangeOfLineNumbers* you want to configure, and press <Enter>.



Note: The system defaults to 5 vty lines at factory default. You can increase the number of vty lines available by typing the start number and end number of the vty line range. Once you execute the **line vty** command, you will have access to line numbers up to the ending line number.

```

host1(config)#line vty 0 19
host1(config-line)#?
  data-character-bits Set the number of bits per character used by the
  display
  default             Set a command to its default(s)
  dsr-detect          Enable data-set-ready detection
  exec-banner         Enable the exec banner
  exec-timeout        Set the inactivity timeout
  exit                Exit from the current command mode
  help                Describe the interactive help system
  log                 Configure logging settings
  login               Require the use of passwords for vty logins
  macro               Run a CLI macro
  motd-banner         Enable the message of the day banner
  no                  Negate a command or set its default(s)
  password            Configure the password for line access
  sleep               Make the Command Interface pause for a specified
  duration
  speed               Set the console baud rate in bits per second
  timeout             Specify the login timeout value for the selected line(s)

host1(config-line)#

```

Map Class Configuration Mode

In this mode, you can specify Frame Relay End-to-End fragmentation and reassembly for a map class. Optionally, you can specify the maximum payload size of a fragment or specify fragmentation only or reassembly only.

From Global Configuration mode, type **map-class frame-relay** command and the *mapClassName* you want to configure, and press <Enter>.

```
host1(config)#map-class frame-relay testmapclass
host1(config-map-class)#?
  default      Set a command to its default(s)
  exit         Exit from the current command mode
  frame-relay  Configure frame relay parameters
  help        Describe the interactive help system
  log         Configure logging settings
  macro       Run a CLI macro
  no         Negate a command or set its default(s)
  run        Run an exec mode command
  sleep      Make the Command Interface pause for a specified duration

host1(config-map-class)#
```

Map List Configuration Mode

In this mode, you can configure map list parameters. In Map List Configuration mode, commands such as **map-list** and **ip atm-vc** are used to configure ATM NBMA interfaces.

From Global Configuration mode, type **map-list** and a *mapListName*, and press <Enter>.

```
host1(config)#map-list mjt3330
host1(config-map-list)#?
  default  Set a command to its default(s)
  exit    Exit from the current command mode
  help   Describe the interactive help system
  ip     Add IP address to the map
  log    Configure logging settings
  macro  Run a CLI macro
  no     Negate a command or set its default(s)
  sleep  Make the Command Interface pause for a specified duration

host1(config-map-list)#
```

Policy Configuration Mode

In this mode, you can configure a policy, or set of rules, that you can attach to an interface. You can modify a policy and update it wherever the policy is used on the configuration.

From Global Configuration mode, type **policy-list** and press <Enter>.

```

host1(config)#policy-list tswells923
host1(config-policy)#?
  color          Create a color policy
  default        Set a command to its default(s)
  exit           Exit from the current command mode
  filter         Create a filter policy
  forward        Create a forward policy
  help           Describe the interactive help system
  log            Configure logging settings
  macro          Run a CLI macro
  mark           Create a set TOS byte policy
  next-hop       Create a next-hop policy
  next-interface Create a next-interface policy
  no             Negate a command or set its default(s)
  rate-limit-profile Create a rate-limit policy
  sleep          Make the Command Interface pause for a specified duration
  suspend        Suspend a policy rule
  traffic-shape-profile Create a traffic-shape policy

host1(config-policy)#

```

Profile Configuration Mode

In this mode, you can configure a profile to subsequently configure dynamic IP interfaces.

From Global Configuration mode, type the **profile** command followed by a profile name of up to 80 characters, and press <Enter>.

```

host1(config)#profile germany78
host1(config-profile)#?
  default      Set a command to its default(s)
  exit         Exit from the current command mode
  help         Describe the interactive help system
  ip           Configure IP characteristics
  log          Configure logging settings
  macro        Run a CLI macro
  no           Negate a command or set its default(s)
  ppp          Configure PPP parameters
  pppoe        Configure pppoe parameters
  sleep        Make the Command Interface pause for a specified duration

host1(config-profile)#

```

QoS Profile Configuration Mode

In this mode, you can specify queue profiles and scheduler profiles in combination with interface types.

From Global Configuration mode, type the **qos-profile** command followed by a *QosProfileName*, and press <Enter>.

```

host1(config)#qos-profile testabc
host1(config-qos-profile)#?
  atm          ATM interface
  atm-vc       ATM 1483 subinterface
  cbf          Cbf interface
  default      Set a command to its default(s)
  ethernet     Ethernet interface
  exit         Exit from the current command mode
  fr-vc        Frame relay subinterface
  help         Describe the interactive help system
  ip           IP interface
  ip-tunnel    IP tunnel interface
  l2tp-tunnel  L2tp tunnel interface
  log          Configure logging settings
  macro        Run a CLI macro
  no           Negate a command or set its default(s)
  run          Run an exec mode command
  serial       Serial interface
  server-port  Server Port interface
  sleep        Make the Command Interface pause for a specified duration
  vlan         Ethernet subinterface

host1(config-qos-profile)#

```

Queue Configuration Mode

In this mode, you can configure queue profiles and various queue profile parameters, such as constraints on queue lengths or queue buffer weights.

From Global Configuration mode, type the **queue-profile** command followed by a *queueProfileName*, and press <Enter>.

```

host1(config)#queue-profile testabcd1234
host1(config-queue)#?
  buffer-weight  Set the buffer length of the queue as relative to other
                 queues
  committed-length  Set the queue length for committed traffic
  conformed-fraction  Set the maximum percentage of queue occupied by conformed
                     traffic
  conformed-length  Set the queue length for conformed traffic
  default        Set a command to its default(s)

```

exceeded-fraction	Set the maximum percentage of queue occupied by exceeded traffic
exceeded-length	Set the queue length for exceeded traffic
exit	Exit from the current command mode
help	Describe the interactive help system
log	Configure logging settings
macro	Run a CLI macro
no	Negate a command or set its default(s)
run	Run an exec mode command
sleep	Make the Command Interface pause for a specified duration

host1(config-queue)#

RADIUS Configuration Mode

In this mode, you can configure various parameters of your RADIUS authentication and accounting servers.

From Global Configuration mode, type either the **radius authentication server** or **radius accounting server** command with the server *ipAddress*, and press <Enter>.

host1(config)#**radius authentication server 1.2.1.3**

host1(config-radius)#?

deadtime	Configure the amount of time a timed-out server is dropped for usage
default	Set a command to its default(s)
exit	Exit from the current command mode
help	Describe the interactive help system
key	Configure the secret used in RADIUS client to server exchange
log	Configure logging settings
macro	Run a CLI macro
max-sessions	Configure the number of outstanding requests allowed to the server
no	Negate a command or set its default(s)
retransmit	Configure number of times to retransmit RADIUS request before failing
run	Run an exec mode command
sleep	Make the Command Interface pause for a specified duration
timeout	Configure the number of seconds to wait for a RADIUS response before retransmitting
udp-port	Configure the RADIUS server's UDP port

host1(config-radius)#

Rate Limit Profile Configuration Mode

In this mode, you can set parameters for a rate limit profile, which is a set of bandwidth attributes and associated actions that become part of a policy list. The policy list is then applied to the ingress or egress of an interface.

From Global Configuration mode, type **rate-limit-profile** and a *profileName*, and press <Enter>.

```

host1(config)#rate-limit-profile fm78930
host1(config-rate-limit-profile)#?
  committed-action  Set the committed access rate action
  committed-burst   Set the committed access rate burst size
  committed-rate    Set the committed access rate value
  conformed-action  Set the conformed access rate action
  default           Set a command to its default(s)
  exceeded-action   Set the exceeded action
  exit             Exit from the current command mode
  help            Describe the interactive help system
  log             Configure logging settings
  macro           Run a CLI macro
  mask-val        Set mask to be applied with mark values
  no             Negate a command or set its default(s)
  peak-burst      Set the peak burst size
  peak-rate       Set the peak access rate
  sleep          Make the Command Interface pause for a specified duration

host1(config-rate-limit-profile)#
    
```

Remote Neighbor Configuration Mode

In this mode, you can configure remote neighbor parameters for Routing Information Protocol (RIP), Protocol Independent Multicast (PIM), and Open Shortest Path First (OSPF).

From Global Configuration mode, type either **router rip**, **router pim**, or **router ospf** and the *processID*. Press <Enter>. You are now in Router Configuration mode.

From Router Configuration mode, type the **remote-neighbor** command and the appropriate attributes, and press <Enter>.

```

host1(config-router)#remote-neighbor 10.13.5.61 area 34534
host1(config-router-rn)#?
  authentication      Specify authentication type to be used for the OSPF
                    interface
  authentication-key  Configure an authentication key
  authentication-none Specify to use no authentication
    
```

cost	Specify the interface cost for OSPF
dead-interval	Specify the interval (in seconds) until a silent neighbor is declared dead
default	Set a command to its default(s)
exit	Exit from the current command mode
hello-interval	Configure the interval between sending hello packets
help	Describe the interactive help system
log	Configure logging settings
macro	Run a CLI macro
message-digest-key	Specify an authentication password/key
no	Negate a command or set its default(s)
retransmit-interval	Configure the time between retransmissions of lost LSAs
run	Run an exec mode command
sleep	Make the Command Interface pause for a specified duration
transmit-delay	Configure the transmit delay interval for link state updates
ttl	Specify the TTL value for OSPF unicast packet
update-source	Specify the local source address for OSPF connection

```
host1(config-router-rn)#
```

Route Map Configuration Mode

In this mode, you can create and modify route maps.

From Global Configuration mode, type the **route-map** command and the appropriate *routeMapNumber*, and press <Enter>.

```
host1(config)#route-map unis889
host1(config-route-map)#?
default    Set a command to its default(s)
exit       Exit from the current command mode
help       Describe the interactive help system
log        Configure logging settings
macro      Run a CLI macro
match      Identify this entry as requiring an attribute match
match-set  Identify this entry to match and set attributes
no         Negate a command or set its default(s)
set        Configure this entry to set attributes
sleep      Make the Command Interface pause for a specified duration

host1(config-route-map)#
```

Router Configuration Mode

In this mode, you can configure a routing protocol using **router** commands.

From Global Configuration mode, type the **router** command and the appropriate router attributes, and press <Enter>.

```
host1(config)#router bgp 2378
host1(config-router)#

host1(config)#router ?
  bgp      Configure the Border-Gateway Protocol (BGP)
  dvmrp    Configure the Distance Vector Multicast Routing Protocol
  igmp     Configure the Internet Group Membership Protocol (IGMP)
  isis     Configure ISO IS-IS
  ospf     Configure the Open Shortest Path First protocol (OSPF)
  pim      Configure PIM
  rip      Configure the Routing Information Protocol

host1(config)#router
```

RSVP Configuration Mode

In this mode, you can create and configure MPLS Resource Reservation Protocol (RSVP) parameters.

From Configuration mode, type **mpls rsvp profile** and the *profileName*, and press <Enter>.

```
host1(config)#mpls rsvp profile sprint
host1(config-rsvp)#?
  cleanup-timeout-factor  Configure the timeout factor
  default                 Set a command to its default(s)
  exit                   Exit from the current command mode
  help                   Describe the interactive help system
  log                    Configure logging settings
  macro                  Run a CLI macro
  no                     Negate a command or set its default(s)
  refresh-period         Configure refresh period
  sleep                  Make the Command Interface pause for a specified
  duration

host1(config-rsvp)
```

RTR Configuration Mode

In this mode, you can configure Response Time Reporter (RTR) parameters. The RTR feature allows you to monitor your network's performance and its resources by measuring response times and the availability of your network devices.

From Configuration mode, type **rtr** and the *mapNumber*, and press **<Enter>**.

```

host1(config)#rtr 784078348
host1(config-rtr)#?
  default          Set a command to its default(s)
  exit             Exit from the current command mode
  frequency        Specify the frequency interval
  help             Describe the interactive help system
  hops-of-statistics-kept Specify the hops capture
  log              Configure logging settings
  macro            Run a CLI macro
  max-response-failure Specify the maximum number of consecutive failures
  no               Negate a command or set its default(s)
  operations-per-hop Specify a number of operations per hop
  owner            Specify the owner of entry
  request-data-size Specify the request payload size
  samples-of-history-kept Specify the maximum history samples
  sleep            Make the Command Interface pause for a specified
                  duration
  tag              Specify the user defined tag
  timeout          Specify the operation timeout
  tos              Specify a value for the ToS byte
  type             Specify the type of the entry

host1(config-rtr)#

```

Scheduler Profile Configuration Mode

In this mode, you can configure a scheduler profile. You can then set the shaping rate value, enable the strict-priority scheduling for the scheduler node, or set the weighted-round-robin (WRR) value of the scheduler node or queue.

From Global Configuration mode, type **scheduler-profile** and the *scheduleProfileName* that you want to create or configure, and press **<Enter>**.

```

host1(config)#scheduler-profile A990
host1(config-scheduler-profile)#?
  default          Set a command to its default(s)
  exit             Exit from the current command mode

```

help	Describe the interactive help system
log	Configure logging settings
macro	Run a CLI macro
no	Negate a command or set its default(s)
run	Run an exec mode command
shaping-rate	Shape the node or queue to the specified rate
sleep	Make the Command Interface pause for a specified duration
strict-priority	Dequeue strict priority packets ahead of other packets
weight	Set the relative weight of the node or queue

```
host1(config-scheduler-profile)#
```

Subinterface Configuration Mode

In this mode, you can configure one or more virtual interfaces called *subinterfaces* on a single physical interface. The system supports this feature with ATM and Frame Relay.

Both ATM and Frame Relay provides permanent virtual circuits (PVCs) that can be grouped under separate subinterfaces configured on a single physical interface. Subinterfaces allow multiple encapsulations for a protocol on a single interface.

From Interface Configuration mode, indicate a subinterface by typing the **interface** command and an *interfaceSpecifier* in *slot/port.subinterface* format, and then press <Enter>. For example:

```
host1(config-if)#interface atm 3/2.6
host1(config-subif)#
```

Traffic Class Configuration Mode

In this mode, you can create a traffic class and configure the level of service to packets assigned to the traffic class.

From Configuration mode, type the **traffic-class** command followed by a *trafficClassName*, and then press <Enter>.

```
host1(config)#traffic-class test123
host1(config-traffic-class)#?
  default          Set a command to its default(s)
  exit             Exit from the current command mode
  fabric-strict-priority Allow packets in this class to be dequeued out of the
                  fabric ahead of other traffic classes
  fabric-weight    Set the relative weight for fabric queue in this
                  traffic class
  help            Describe the interactive help system
  log             Configure logging settings
  macro           Run a CLI macro
```

no	Negate a command or set its default(s)
run	Run an exec mode command
sleep	Make the Command Interface pause for a specified duration

```
host1(config-traffic-class)#
```

Traffic Class Group Configuration Mode

In this mode, you can create and configure traffic class groups, which can contain multiple traffic classes.

From Global Configuration mode, type **traffic-class-group** command and a *trafficClassName*, and press <Enter>.

```
host1(config)#traffic-class-group trafclassnameabcd
host1(config-traffic-class-group)#?
  default      Set a command to its default(s)
  exit         Exit from the current command mode
  help         Describe the interactive help system
  log          Configure logging settings
  macro        Run a CLI macro
  no           Negate a command or set its default(s)
  run          Run an exec mode command
  sleep        Make the Command Interface pause for a specified duration
  traffic-class Set the traffic class belong to this group

host1(config-traffic-class-group)#
```

Tunnel Profile Configuration Mode

In this mode, you can create and configure MPLS tunnel profiles.

From Global Configuration mode, type **mpls tunnels profile** and the *profileName*, and press <Enter>.

```
host1(config)#mpls tunnels profile storm
host1(config-tunnelprofile)#?
  default      Set a command to its default(s)
  exit         Exit from the current command mode
  help         Describe the interactive help system
  log          Configure logging settings
  macro        Run a CLI macro
  no           Negate a command or set its default(s)
  sleep        Make the Command Interface pause for a specified duration
  tunnel       Configure tunnel interface parameters

host1(config-tunnelprofile)#
```

VRF Configuration Mode

In this mode, you can create and configure VRF parameters for BGP/MPLS VPNs.

From Global Configuration mode, type **ip vrf** and the *vrfName*, and press <Enter>. Confirm the new VRF by pressing <Return>.

```
host1(config)#ip vrf yankee
Proceed with new vrf creation? [confirm]
host1(config-vrf)#?
  default      Set a command to its default(s)
  description  Configure VRF specific description
  exit        Exit from the current command mode
  export      Specify VRF export characteristics
  help        Describe the interactive help system
  import      Specify VRF import characteristics
  log         Configure logging settings
  macro       Run a CLI macro
  no          Negate a command or set its default(s)
  rd          Specify route distinguisher
  route-target Specify VPN extended community Target
  run         Run an exec mode command
  sleep       Make the Command Interface pause for a specified duration
host1(config-vrf)#
```

