



Using Cisco IOS XE Software

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Using Cisco IOS XE Software

This chapter provides information about the Cisco IOS XE software used to configure the Cisco CSR 1000v and Cisco Cisco ISRV. The software for the Cisco CSR 1000v and Cisco ISRV uses standard Cisco IOS XE CLI commands and conventions.

Commands are not case sensitive. You can abbreviate commands and parameters if the abbreviations contain enough letters to be different from any other currently available commands or parameters.

The table below lists the keyboard shortcuts for entering and editing commands.

Table 1: Keyboard Shortcuts

Keystrokes	Purpose
Ctrl-B or the Left Arrow key	Move the cursor back one character.
Ctrl-F or the Right Arrow key	Move the cursor forward one character.
Ctrl-A	Move the cursor to the beginning of the command line.
Ctrl-E	Move the cursor to the end of the command line.
Esc B	Move the cursor back one word.
Esc F	Move the cursor forward one word.

The history buffer stores the last 10 commands you entered. History substitution allows you to access these commands without retyping them, by using special abbreviated commands.

Table 2: History Substitution Commands

Command	Purpose
Ctrl-P or the Up Arrow key	Recall commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Ctrl-N or the Down Arrow key	Return to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow key.
Router# show history	While in EXEC mode, list the last several commands you have just entered.

The command modes available in the traditional Cisco IOS CLI are exactly the same as the command modes available in Cisco IOS XE.

Use the CLI to access Cisco IOS XE software. Because the CLI is divided into many different modes, the commands available to you at any given time depend on the mode that you are currently in. Entering a question mark (?) at the CLI prompt allows you to obtain a list of commands available for each command mode.

When you log in to the CLI, you are in user EXEC mode. User EXEC mode contains only a limited subset of commands. To have access to all commands, enter privileged EXEC mode, normally by using a password. From privileged EXEC mode, you can issue any EXEC command—user or privileged mode—or you can enter global configuration mode. Most EXEC commands are one-time commands. For example, **show** commands show important status information, and **clear** commands clear counters or interfaces. The EXEC commands are not saved when the software reboots.

Configuration modes allow you to make changes to the running configuration. If you later save the running configuration to the startup configuration, these changed commands are stored when the software is rebooted. To enter specific configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and a variety of other modes, such as protocol-specific modes.

The table below describes how to access and exit various common command modes of the Cisco IOS XE software. It also shows examples of the prompts displayed for each mode.

Table 3: Accessing and Exiting Command Modes

Command Mode	Access Method	Prompt	Exit Method
User EXEC	Log in.	Router>	Use the logout command.
Privileged EXEC	From user EXEC mode, use the enable EXEC command.	Router#	To return to user EXEC mode, use the disable command.
Global configuration	From privileged EXEC mode, use the configure terminal privileged EXEC command.	Router(config)#	To return to privileged EXEC mode from global configuration mode, use the exit or end command.

Command Mode	Access Method	Prompt	Exit Method
Interface configuration	From global configuration mode, specify an interface using an interface command.	Router (config-if) #	To return to global configuration mode, use the exit command. To return to privileged EXEC mode, use the end command.

Entering a question mark (?) at the CLI prompt displays a list of commands available for each command mode. You can also get a list of keywords and arguments associated with any command by using the context-sensitive help feature.

To get help specific to a command mode, a command, a keyword, or an argument, use one of the commands listed in the table below.

Table 4: Help Commands and Purpose

Command	Purpose
help	Provides a brief description of the help system in any command mode.
abbreviated-command-entry?	Provides a list of commands that begin with a particular character string. (No space between command and question mark.)
abbreviated-command-entry<Tab>	Completes a partial command name.
?	Lists all commands available for a particular command mode.
command ?	Lists the keywords or arguments that you must enter next on the command line. (Space between command and question mark.)

Finding Command Options

This section provides an example of how to display syntax for a command. The syntax can consist of optional or required keywords and arguments. To display keywords and arguments for a command, enter a question mark (?) at the configuration prompt or after entering part of a command followed by a space. The Cisco IOS XE software displays a list and brief description of available keywords and arguments. For example, if you were in global configuration mode and wanted to see all the keywords or arguments for the **arap** command, you would type **arap ?**.

The <cr> symbol in command help output stands for “carriage return.” On older keyboards, the carriage return key is the Return key. On most modern keyboards, the carriage return key is the Enter key. The <cr> symbol at the end of command help output indicates that you have the option to press **Enter** to complete the command and that the arguments and keywords in the list preceding the <cr> symbol are optional. The <cr> symbol by itself indicates that no more arguments or keywords are available and that you must press **Enter** to complete the command.

The following examples show how you can use the question mark (?) to assist you in entering commands.

Table 5: Finding Command Options

Command	Comment
Router> enable Password: <password> Router#	Enter the enable command and password to access privileged EXEC commands. You are in privileged EXEC mode when the prompt changes to a “#” from the “>”; for example, Router> to Router# .
Router# configure terminal Enter configuration commands, one per line. End with CNTL/Z. Router(config)#	Enter the configure terminal privileged EXEC command to enter global configuration mode. You are in global configuration mode when the prompt changes to Router(config)# .
Router(config)# interface GigabitEthernet ? <0-6> GigabitEthernet interface number Router(config)# interface GigabitEthernet 1 Router(config-if)#	Enter interface configuration mode by specifying the serial Gigabit Ethernet interface that you want to configure using the interface GigabitEthernet number global configuration command. Enter ? to display what you must enter next on the command line. When the <cr> symbol is displayed, you can press Enter to complete the command. You are in interface configuration mode when the prompt changes to Router(config-if)# . Note The Cisco CSR 1000v and Cisco ISRV support only Gigabit Ethernet interfaces.

Command	Comment
Router(config-if)# ? Interface configuration commands: . . . ip Interface Internet Protocol config commands keepalive Enable keepalive lan-name LAN Name command llc2 LLC2 Interface Subcommands load-interval Specify interval for load calculation for an interface locaddr-priority Assign a priority group logging Configure logging for interface loopback Configure internal loopback on an interface mac-address Manually set interface MAC address mls mls router sub/interface commands mpoa MPOA interface configuration commands mtu Set the interface Maximum Transmission Unit (MTU) netbios Use a defined NETBIOS access list or enable name-caching no Negate a command or set its defaults nrzi-encoding Enable use of NRZI encoding ntp Configure NTP . . . Router(config-if)#	Enter ? to display a list of all the interface configuration commands available for the Gigabit Ethernet interface. This example shows only some of the available interface configuration commands.

Command	Comment
<pre>Router(config-if)# ip ? Interface IP configuration subcommands: access-group Specify access control for packets accounting Enable IP accounting on this interface address Set the IP address of an interface authentication authentication subcommands bandwidth-percent Set EIGRP bandwidth limit bgp BGP interface commands..<snipped for brevity> . . . Router(config-if)# ip</pre>	<p>Enter the command that you want to configure for the interface. This example uses the ip command.</p> <p>Enter ? to display what you must enter next on the command line. This example shows only some of the available interface IP configuration commands.</p>
<pre>Router(config-if)# ip address ? A.B.C.D IP address dhcp IP Address negotiated via DHCP pool IP Address autoconfigured from a local DHCP pool Router(config-if)# ip address</pre>	<p>Enter the command that you want to configure for the interface. This example uses the ip address command.</p> <p>Enter ? to display what you must enter next on the command line. In this example, you must enter an IP address or the negotiated keyword.</p> <p>A carriage return (<cr>) is not displayed; therefore, you must enter additional keywords or arguments to complete the command.</p>
<pre>Router(config-if)# ip address 172.16.0.1 ? A.B.C.D IP subnet mask Router(config-if)# ip address 172.16.0.1</pre>	<p>Enter the keyword or argument that you want to use. This example uses the 172.16.0.1 IP address.</p> <p>Enter ? to display what you must enter next on the command line. In this example, you must enter an IP subnet mask.</p> <p>A <cr> is not displayed; therefore, you must enter additional keywords or arguments to complete the command.</p>
Command	Comment
<pre>Router(config-if)# ip address 172.16.0.1 255.255.255.0 ? secondary Make this IP address a secondary address <cr> Router(config-if)# ip address 172.16.0.1 255.255.255.0</pre>	<p>Enter the IP subnet mask. This example uses the 255.255.255.0 IP subnet mask.</p> <p>Enter ? to display what you must enter next on the command line. In this example, you can enter the secondary keyword, or you can press Enter.</p> <p>A <cr> is displayed; you can press Enter to complete the command, or you can enter another keyword.</p>
<pre>Router(config-if)# ip address 172.16.0.1 255.255.255.0 Router(config-if)#</pre>	<p>In this example, Enter is pressed to complete the command.</p>

Almost every configuration command has a **no** form. In general, use the **no** form to disable a function. Use the command without the **no** keyword to re-enable a disabled function or to enable a function that is disabled by default. For example, IP routing is enabled by default. To disable IP routing, use the **no ip routing** command;

to re-enable IP routing, use the **ip routing** command. The Cisco IOS XE software command reference publications provide the complete syntax for the configuration commands and describe what the **no** form of a command does.

Many CLI commands also have a **default** form. By issuing the command **default command-name**, you can configure the command to its default setting. The Cisco IOS XE software command reference publications describe the function of the **default** form of the command when the **default** form performs a different function than the plain and **no** forms of the command. To see what default commands are available on your system, enter **default ?** in the appropriate command mode.

Use the **copy running-config startup-config** command to save your configuration changes to the startup configuration so that the changes will not be lost if the software reloads or a power outage occurs. For example:

```
Router# copy running-config startup-config
Building configuration...
```

It might take a minute or two to save the configuration. After the configuration has been saved, the following output appears:

```
[OK]
Router#
```

This task saves the configuration to NVRAM.

On the Cisco CSR 1000v and ISRv, the startup configuration file is stored in the NVRAM partition. As a matter of routine maintenance on any Cisco router, users should backup the startup configuration file by copying the startup configuration file from NVRAM onto one of the router's other file systems and, additionally, onto a network server. Backing up the startup configuration file provides an easy method of recovering the startup configuration file in the event the startup configuration file in NVRAM becomes unusable for any reason.

The **copy** command can be used to backup startup configuration files. The following examples show the startup configuration file in NVRAM being backed up:

Example 1: Copying a Startup Configuration File to Bootflash

```
Router# dir bootflash:
Directory of bootflash:/
 11   drwx   16384   Jan 24 2012 04:53:55 -05:00   lost+found
 12   -rw-   289243620 Jan 24 2012 04:54:55 -05:00
308257 drwx   4096   Jan 24 2012 04:57:06 -05:00   core
876097 drwx   4096   Jan 24 2012 04:57:07 -05:00   .prst_sync
63277  drwx   4096   Jan 24 2012 04:57:10 -05:00 .rollback_timer  13
  -rw-    0       Jan 24 2012 04:57:19 -05:00   tracelogs.
csr1000v-adventerprisek9.2012-01-23_12.39.SSA.bin
Router# copy nvram:startup-config bootflash:
Destination filename [startup-config]?
3517 bytes copied in 0.647 secs (5436 bytes/sec)
Directory of bootflash:/
 11   drwx   16384   Jan 24 2012 04:53:55 -05:00   lost+found
 12   -rw-   289243620 Jan 24 2012 04:54:55 -05:00
308257 drwx   4096   Jan 24 2012 04:57:06 -05:00   core
876097 drwx   4096   Jan 24 2012 04:57:07 -05:00   .prst_sync
632737 drwx   4096   Jan 24 2012 04:57:10 -05:00 .rollback_timer  13
  -rw-    0       Jan 24 2012 04:57:19 -05:00   tracelogs.
csr1000v-adventerprisek9.2012-01-23_12.39.SSA.bin
 14  -rw-   7516     Jul 2 2012 15:01:39 -07:00   startup-config
```

Example 2: Copying a Startup Configuration File to a TFTP Server

```
Router# copy bootflash:startup-config tftp:
Address or name of remote host []? 172.17.16.81
Destination filename [pe24_asr-1002-config]? /auto/tftp-users/user/startup-config
!!
3517 bytes copied in 0.122 secs (28828 bytes/sec)
```

For more detailed information on managing configuration files, see the “Managing Configuration Files” section in the [see

["http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/fundamentals/configuration/xs-3s/fundamentals-xe-3s-book.html"](http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/fundamentals/configuration/xs-3s/fundamentals-xe-3s-book.html)>Configuration Fundamentals Configuration Guide, Cisco IOS XE Release 3S].

NVRAM File Security

The Cisco CSR 1000v and ISRv encrypt some of the disk partitions internal to the VM to provide extra security around sensitive data that may be stored on the routers. For example, information in NVRAM is encrypted so that it is not visible to administrative entities with access to the physical hard disk upon which the Cisco CSR 1000v is stored.

You can search and filter the output of **show** and **more** commands. This functionality is useful if you need to sort through large amounts of output or if you want to exclude output that you need not see.

To use this functionality, enter a **show** or **more** command followed by the “pipe” character (|); one of the keywords **begin**, **include**, or **exclude**; and a regular expression on which you want to search or filter (the expression is case sensitive):

```
show command {append | begin | exclude | exclude | include | redirect | section | tee} regular-expression
```

```
show command | {append | begin | exclude | include | redirect | section | tee} regular-expression
```

The output matches certain lines of information in the configuration file.

To power off a Cisco CSR 1000v, you must power off the VM upon which the router is installed. For information about powering off the VM, see your VM vendor documentation.

