The CLI is a text-based interface for configuring and monitoring HP Routing Switches. You can access the CLI through either a direct serial connection to the device or through a Telnet session.

The commands in the CLI are organized into the following levels:

- User EXEC – Lets you display information and perform basic tasks such as pings and trace routes.
- Privileged EXEC – Lets you use the same commands as those at the User EXEC level plus configuration commands that do not require saving the changes to the system-config file.
- CONFIG – Lets you make configuration changes to the device. To save the changes across reboots, you need to save them to the system-config file. The CONFIG level contains sub-levels for individual ports, for VLANs, for routing protocols, and other configuration areas.

**NOTE:** By default, any user who can open a serial or Telnet connection to the HP device can access all these CLI levels. To secure access, you can configure Enable passwords or local user accounts, or you can configure the device to use Access Control Lists (ACLs), a RADIUS server, or a TACACS/TACACS+ server for authentication. See the Security Guide.

To display a list of available commands or command options, enter “?” or press Tab. If you have not entered part of a command at the command prompt, all the commands supported at the current CLI level are listed. If you enter part of a command, then enter “?” or press Tab, the CLI lists the options you can enter at the point in the command string.

The CLI supports command completion, so you do not need to enter the entire name of a command or option. As long as you enter enough characters of the command or option name to avoid ambiguity with other commands or options, the CLI understands what you are typing.

The CLI supports the following line editing commands. To enter a line-editing command, use the CTRL-key combination for the command by pressing and holding the CTRL key, then pressing the letter associated with the command.

<table>
<thead>
<tr>
<th>Ctrl-Key Combination</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ctrl-A</td>
<td>Moves to the first character on the command line.</td>
</tr>
<tr>
<td>Ctrl-B</td>
<td>Moves the cursor back one character.</td>
</tr>
</tbody>
</table>
EXEC Commands

There are two different levels of EXEC commands, the **User Level** and the **Privileged Level**. The User level commands are at the top of the CLI hierarchy. These are the first commands that you have access to when connected to the device through the CLI. At this level, you can view basic system information and verify connectivity but cannot make any changes to the device configuration. To make changes to the configuration, you must move to other levels of the CLI hierarchy. This is accomplished by the User EXEC level command **enable** at initial log-on. This command takes you to the Privileged EXEC level, from which you can reach the configuration command levels.

Privileged Level

The Privileged EXEC level commands primarily enable you to transfer and store software images and configuration files between the network and the system, and review the configuration. You reach this level by entering **enable** [<password>] or **enable** <username> <password> at the User EXEC level.

CONFIG Commands

CONFIG commands modify the configuration of an HP Routing Switch. This reference describes the following CONFIG CLI levels.

Global Level

The global CONFIG level allows you to globally apply or modify parameters for ports on the device. You reach this level by entering **configure terminal** at the privileged EXEC level.
**Redundancy Level**
This redundancy level allows you to configure redundancy parameters for redundant management modules. You reach this level by entering the `redundancy` command at the global CONFIG level.

**Interface Level**
The interface level allows you to assign or modify specific port parameters on a port-by-port basis. You reach this level by entering `interface ethernet <portnum>`, `interface loopback <num>`, or `interface ve <num>` at the global CONFIG level.

**Trunk Level**
The trunk level allows you to change parameters for statically-configured trunk groups. You reach this level by entering a `trunk` command with the appropriate port parameters.

**Router RIP Level**
The RIP level allows you to configure parameters for the RIP routing protocol. You reach this level by entering the `router rip` command at the global CONFIG level.

**Router OSPF Level**
The OSPF level allows you to configure parameters for the OSPF routing protocol. You reach this level by entering the `router ospf` command at the global CONFIG level.

**BGP Level**
The BGP level allows you to configure Routing Switches for Border Gateway Protocol version 4 (BGP4). You reach this level by entering the `router bgp` command at the global CONFIG level.

**IP Tunnel Level**
The IP tunnel level allows you to define parameters for IP-in-IP tunnels to pass data through non-DVMRP and non-PIM IP multicast routers. You reach this level by entering the `ip tunnel` command at the interface CONFIG level.

**Router MSDP Level**
The MSDP level allows you to configure details for the Multicast Source Discovery Protocol (MSDP). You reach this level by entering the `router msdp` command at the global CONFIG level.

**Router DVMRP Level**
The DVMRP level allows you to configure details for the DVMRP multicast protocol. You reach this level by entering the `router dvmrp` command at the global CONFIG level.

**Router PIM Level**
The PIM level allows you to configure parameters for the Protocol Independent Multicast (PIM) routing protocol. You reach this level by entering the `router pim` command at the global CONFIG level.

**Broadcast Filter Level**
The broadcast filter level allows you to assign broadcast filters to specific ports. You reach this level by entering `broadcast filter`... at the global CONFIG level.

**Multicast Filter Level**
The multicast filter level allows you to assign multicast filters to specific ports. You reach this level by entering `multicast filter`... at the global CONFIG level.
Route Map Level
The Route Map level allows you to configure parameters for a BGP4 route map. You reach this level by entering the `route-map <name>` command at the global CONFIG level.

Router VRRP Level
The VRRP level allows you to configure parameters for the Virtual Router Redundancy Protocol (VRRP). You reach this level by entering the `router vrrp` command at the global CONFIG level.

Router VRRPE Level
The VRRPE level allows you to configure parameters for VRRP Extended. You reach this level by entering the `router vrrp-extended` command at the global CONFIG level.

VLAN Level
Policy-based VLANs allow you to assign VLANs on a protocol (IP, IPX, Decnet, AppleTalk, NetBIOS, Others), sub-net (IP sub-net and IPX network), AppleTalk cable, port, or 802.1q tagged basis.

You reach this level by entering the `vlan <vlan-id> by port` command at the Global CONFIG Level.

STP Group Level
STP groups enable you to manage multiple port-based VLANs using the same spanning tree.

You reach this level by entering the `stp-group <num>` command at the Global CONFIG Level.

GVRP Level
GARP VLAN Registration Protocol (GVRP) is a Generic Attribute Registration Protocol (GARP) application that provides VLAN registration service by means of dynamic configuration (registration) and distribution of VLAN membership information.

You reach the GVRP level by entering the `gvrp-enable` command at the Global CONFIG Level.

Real Server Level
The Real Server level allows you to configure router-based health check parameters for a Routing Switch to assist with Globally-distributed Server Load Balancing (SLB). See the “Route Health Injection” chapter of the Advanced Configuration and Management Guide. You reach this level by entering the `server real...` command at the global CONFIG level.

Application Port Level
The Application Port level allows you to configure health check parameters for a TCP HTTP port. The commands at this level apply only when you are configuring a Routing Switch to assist third-party SLBs or web servers with globally-distributed SLB. See the “Route Health Injection” chapter of the Advanced Configuration and Management Guide. You reach this level by entering the `server port http | <tcp/udp-portnum>` command at the global CONFIG level.

**NOTE:** If you enter `server port ?`, numerous well-known port names are listed. The current software release supports only HTTP ports.

Accessing the CLI
The CLI can be accessed through both serial and Telnet connections. For initial log on, you must use a serial connection. Once an IP address is assigned, you can access the CLI through Telnet.
NOTE: When accessing the CLI through Telnet, you are prompted for a password. By default, the password required is the password you enter for general access at initial setup. You also have the option of assigning a separate password for Telnet access with the `enable telnet password <password>` command, found at the Global Level.

NOTE: At initial log on, all you need to do is type `enable` at the prompt, then press Return. You only need to enter a password after a permanent password is entered at the Global CONFIG Level of the CLI.

Once connectivity to the device is established, you will see one of the following prompts:

HP9304>
HP9308>
HP9315>

At this prompt ( > ), you are at the user EXEC level of the CLI command structure.

To reach the Global CONFIG Level, the uppermost level of the CONFIG commands, enter the following commands:

HP9300> enable  User Level-EXEC commands
HP9300# configure terminal  Privileged Level-EXEC commands
HP9300(config)#  Global Level-CONFIG commands

You can then reach all other levels of the CONFIG command structure from this point.
NOTE: The CLI prompt will change at each level of the CONFIG command structure, to easily identify the current level:

```
HP9300>                      User Level EXEC Command
HP9300#                     Privileged Level EXEC Command
HP9300(config)#            Global Level CONFIG Command
HP9300(config-if-5/1)#      Interface Level CONFIG Command
HP9300(config-lbif-1)#     Loopback Interface CONFIG Command
HP9300(config-ve-1)#       Virtual Interface CONFIG Command
HP9300(config-trunk-4/1-4/8)# Trunk group CONFIG Command
HP9300(config-if-tunnel)#  IP Tunnel Level CONFIG Command
HP9300(config-bcast-filter-id-1)# Broadcast Filter Level CONFIG Command
HP9300(config-mcast-filter-id-1)# Multicast Filter Level CONFIG Command
HP9300(config-bgp-router)# BGP Level CONFIG Command
HP9300(config-dvmrp-router)# DVMRP Level CONFIG Command
HP9300(config-ospf-router)# OSPF Level CONFIG Command
HP9300(config-pim-router)# PIM Level CONFIG Command
HP9300(config-msdp-router)# MSDP Level CONFIG Command
HP9300(config-redundancy)# Redundant Management Module CONFIG Command
HP9300(config-rip-router)#  RIP Level CONFIG Command
HP9300(config-rs-realservername)# Real Server Level CONFIG Command
HP9300(config-port-80)#    Application Port CONFIG Command
HP9300(config-bgp-routemap Map_Name)# Route Map Level CONFIG Command
HP9300(config-vlan-1)#     VLAN Port-based Level CONFIG Command
HP9300(config-vlan-atalk-proto)# VLAN Protocol Level CONFIG Command
HP9300(config-stp-group-1)# STP Group CONFIG Command
HP9300(config-gvrp)#       GVRP CONFIG Command
```

NOTE: The CLI prompt at the interface level includes the port speed. The speed is one of the following:

- **e100** – The interface is a 10/100 port.
- **e1000** – The interface is a Gigabit port.

For simplicity, the port speeds sometimes are not shown in example Interface level prompts in this manual.

**Navigating Among Command Levels**

To reach other CLI command levels, you need to enter certain commands. At each level there is a launch command that allows you to move either up or down to the next level.
**CLI Command Structure**

Many CLI commands may require textual or numeral input as part of the command. These fields are either required or optional depending on how the information is bracketed. For clarity, a few CLI command examples are explained below.

**EXAMPLE:**

*Syntax:* deny redistribute <value> all | bgp | rip | static address <ip-addr> <ip-mask>  
[match-metric <value> | set-metric <value>]

When an item is bracketed with "< >" symbols, the information requested is a variable and required.

When an item is not enclosed by "< >" or "[ ]" symbols, the item is a required keyword.

When an item is bracketed with "[ ]" symbols, the information requested is optional.

When two or more options are separated by a vertical bar, " | ", you must enter one of the options as part of the command.

**EXAMPLE:**

*Syntax:* priority normal | high means enter either priority normal or priority high

For example, the command syntax above requires that either normal or high be entered as part of the command.

To get a quick display of available options at a CLI level or for the next option in a command string, enter a question mark (?) at the prompt or press TAB.

**EXAMPLE:**

To view all available commands at the user EXEC level, enter the following or press TAB at the User EXEC CLI level:

```
HP9300> ? <return>
enable
exit
fastboot
ping
show
stop-trace-route
traceroute
```

You also can use the question mark (?) with an individual command, to see all available options or to check context.

**EXAMPLE:**

To view possible copy command options, enter the following:

```
HP9300# copy ?
flash
    running-config
    startup-config
tftp
```

**Searching and Filtering Output**

You can filter CLI output from show commands and at the --More-- prompt. You can search for individual characters, strings, or construct complex regular expressions to filter the output.

**Searching and Filtering Output from show commands**

You can filter output from show commands to display lines containing a specified string, lines that do not contain a specified string, or output starting with a line containing a specified string. The search string is a regular expression consisting of a single character or string of characters. You can use special characters to construct
complex regular expressions. See “Using Special Characters in Regular Expressions” on page 2-10 for information on special characters used with regular expressions.

Displaying Lines Containing a Specified String

The following command filters the output of the `show interface` command for port 3/11 so it displays only lines containing the word “Internet”. This command can be used to display the IP address of the interface.

```
HP9300# show interface e 3/11 | include Internet
  Internet address is 192.168.1.11/24, MTU 1500 bytes, encapsulation ethernet
```

**Syntax:** `<show-command> | include <regular-expression>`

**NOTE:** The vertical bar (|) is part of the command.

Note that the regular expression specified as the search string is case sensitive. In the example above, a search string of “Internet” would match the line containing the IP address, but a search string of “internet” would not.

Displaying Lines That Do Not Contain a Specified String

The following command filters the output of the `show who` command so it displays only lines that do not contain the word “closed”. This command can be used to display open connections to the HP device.

```
HP9300# show who | exclude closed
Console connections:
  established
  you are connecting to this session
  2 seconds in idle
Telnet connections (inbound):
  1  established, client ip address 192.168.9.37
    27 seconds in idle
Telnet connection (outbound):
SSH connections:
```

**Syntax:** `<show-command> | exclude <regular-expression>`

Displaying Lines Starting with a Specified String

The following command filters the output of the `show who` command so it displays output starting with the first line that contains the word “SSH”. This command can be used to display information about SSH connections to the HP device.

```
HP9300# show who | begin SSH
SSH connections:
  1  established, client ip address 192.168.9.210
    7 seconds in idle
  2  closed
  3  closed
  4  closed
  5  closed
```

**Syntax:** `<show-command> | begin <regular-expression>`

Searching and Filtering Output at the --More-- Prompt

The --More-- prompt is displayed when output extends beyond a single page. From this prompt, you can press the Space bar to display the next page, the Return or Enter key to display the next line, or Ctrl-C or Q to cancel the display. You can also search and filter output from this prompt. For example:
Using the Command Line Interface

HP9300# ?
append Append one file to another
appletalk-ping Ping AppleTalk node
attrib Change flash card file attribute
boot Boot system from bootp/tftp server/flash image
cd Change flash card working slot or current directory
chdir Change flash card working slot or current directory
clear Clear table/statistics/keys
clock Set clock
configure Enter configuration mode
copy Copy between flash, flash card, tftp, config/code
debug Enable debugging functions (see also 'undebug')
delete Delete flash card files
dir List flash card files
disable Disable a module before removing it
enable Enable a disabled module
erase Erase image/configuration from flash
exit Exit Privileged mode
fastboot Select fast-reload option
format Format flash card
gignpa Gigabit processor commands
hd Display hex dump of flash card file
kill Kill active CLI session
--More--, next page: Space, next line: Return key, quit: Control-c

At the --More-- prompt, you can press the forward slash key (/) and then enter a search string. The HP device displays output starting from the first line that contains the search string, similar to the begin option for show commands. For example:

--More--, next page: Space, next line: Return key, quit: Control-c
/telnet

The results of the search are displayed:

searching...
telnet Telnet by name or IP address
temperature temperature sensor commands
terminal display syslog
traceroute TraceRoute to IP node
undebug Disable debugging functions (see also 'debug')
undelete Undelete flash card files
whois WHOIS lookup
write Write running configuration to flash or terminal

To display lines containing only a specified search string (similar to the include option for show commands) press the plus sign key (+) at the --More-- prompt and then enter the search string.

--More--, next page: Space, next line: Return key, quit: Control-c
+telnet
The filtered results are displayed:

```
folding...
  telnet  Telnet by name or IP address
```

To display lines that do not contain a specified search string (similar to the `exclude` option for `show` commands) press the minus sign key ( - ) at the `--More--` prompt and then enter the search string.

```
--More--, next page: Space, next line: Return key, quit: Control-c
t-ete
```

The filtered results are displayed:

```
folding...
  sync-standby Synchronize active and standby module
  temperature temperature sensor commands
  terminal display syslog
  traceroute TraceRoute to IP node
  undebug Disable debugging functions (see also 'debug')
  undelete Undelete flash card files
  whois WHOIS lookup
  write Write running configuration to flash or terminal
```

As with the commands for filtering output from `show` commands, the search string is a regular expression consisting of a single character or string of characters. You can use special characters to construct complex regular expressions. See the next section for information on special characters used with regular expressions.

**Using Special Characters in Regular Expressions**

You use a regular expression to specify a single character or multiple characters as a search string. In addition, you can include special characters that influence the way the software matches the output against the search string. These special characters are listed in the following table.

<table>
<thead>
<tr>
<th>Character</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>The period matches on any single character, including a blank space. For example, the following regular expression matches “aa”, “ab”, “acz”, and so on, but not just “az”: a.z</td>
</tr>
<tr>
<td>*</td>
<td>The asterisk matches on zero or more sequential instances of a pattern. For example, the following regular expression matches output that contains the string “abc”, followed by zero or more Xs: abcX*</td>
</tr>
<tr>
<td>+</td>
<td>The plus sign matches on one or more sequential instances of a pattern. For example, the following regular expression matches output that contains “de”, followed by a sequence of “g”s, such as “deg”, “degg”, “deggg”, and so on: deg+</td>
</tr>
</tbody>
</table>
### Table 2.2: Special Characters for Regular Expressions (Continued)

<table>
<thead>
<tr>
<th>Character</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>?</td>
<td>The question mark matches on zero occurrences or one occurrence of a pattern. For example, the following regular expression matches output that contains &quot;dg&quot; or &quot;deg&quot;: de?g. <strong>Note:</strong> Normally when you type a question mark, the CLI lists the commands or options at that CLI level that begin with the character or string you entered. However, if you enter Ctrl-V and then type a question mark, the question mark is inserted into the command line, allowing you to use it as part of a regular expression.</td>
</tr>
<tr>
<td>^</td>
<td>A caret (when not used within brackets) matches on the beginning of an input string. For example, the following regular expression matches output that begins with &quot;deg&quot;: ^deg</td>
</tr>
<tr>
<td>$</td>
<td>A dollar sign matches on the end of an input string. For example, the following regular expression matches output that ends with “deg”: deg$</td>
</tr>
<tr>
<td>_</td>
<td>An underscore matches on one or more of the following: • , (comma) • { (left curly brace) • } (right curly brace) • ( (left parenthesis) • ) (right parenthesis) • The beginning of the input string • The end of the input string • A blank space For example, the following regular expression matches on “100” but not on “1002”, “2100”, and so on. <em>100</em></td>
</tr>
<tr>
<td>[ ]</td>
<td>Square brackets enclose a range of single-character patterns. For example, the following regular expression matches output that contains “1”, “2”, “3”, “4”, or “5”: [1-5] You can use the following expression symbols within the brackets. These symbols are allowed only inside the brackets. • ^ – The caret matches on any characters except the ones in the brackets. For example, the following regular expression matches output that does not contain “1”, “2”, “3”, “4”, or “5”: [^1-5] • - The hyphen separates the beginning and ending of a range of characters. A match occurs if any of the characters within the range is present. See the example above.</td>
</tr>
</tbody>
</table>
If you want to filter for a special character instead of using the special character as described in the table above, enter "\" (backslash) in front of the character. For example, to filter on output containing an asterisk, enter the asterisk portion of the regular expression as "\*".

HP9300# show ip route bgp | include \*

**Syntax Shortcuts**

A command or parameter can be abbreviated as long as enough text is entered to distinguish it from other commands at that level. For example, given the possible commands `copy tftp` and `config tftp`, possible shortcuts are `cop tftp` and `con tftp` respectively. In this case, `co` does not properly distinguish the two commands.

**Saving Configuration Changes**

You can make configuration changes while the device is running. The type of configuration change determines whether or not it becomes effective immediately or requires a save to flash (write memory) and reset of the system (reload), before it becomes active.

This approach in adopting configuration changes:

- Allows you to make configuration changes to the operating or running configuration of the device to address a short-term requirement or validate a configuration without overwriting the permanent configuration file, the startup configuration, that is saved in the system flash, and;
- Ensures that dependent or related configuration changes are all cut in at the same time.

In all cases, if you want to make the changes permanent, you need to save the changes to flash using the write memory command. When you save the configuration changes to flash, this will become the configuration that is initiated and run at system boot.

**NOTE:** Most configuration changes are dynamic and thus do not require a software reload. If a command requires a software reload to take effect, the documentation states this.