

## Chapter 1

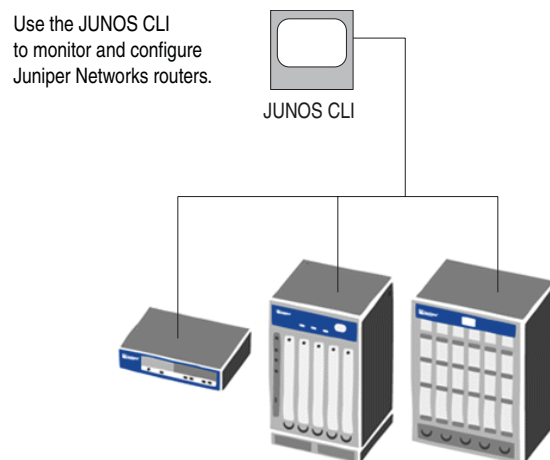
# Introducing the CLI

The JUNOS command-line interface (CLI) is the software interface you use to access the router—whether from the console or through a network connection. This chapter provides an overview of the JUNOS CLI.

The JUNOS CLI is a Juniper Networks-specific command shell that runs on top of a UNIX-based operating system kernel. By leveraging industry-standard tools and utilities, the CLI provides a powerful set of commands you can use to monitor and configure a router. (See Figure 1.)

The CLI is a straightforward command interface. You type commands on a single line, and the commands are executed when you press the Enter key. The CLI provides command help and command completion, and it also provides Emacs-style keyboard sequences that allow you to move around on a command line and scroll through recently executed commands.

**Figure 1: Monitoring and Configuring Routers**



Topics in this chapter include:

- Understanding CLI Command Modes on page 4
- Understanding Command and Statement Hierarchies on page 5
- Key Features of the CLI on page 6
- Leveraging Industry-Standard Technologies on page 7
- Other Tools to Configure and Monitor JUNOS Routers on page 7
- Commands and Configuration Statements for JUNOS-FIPS on page 8

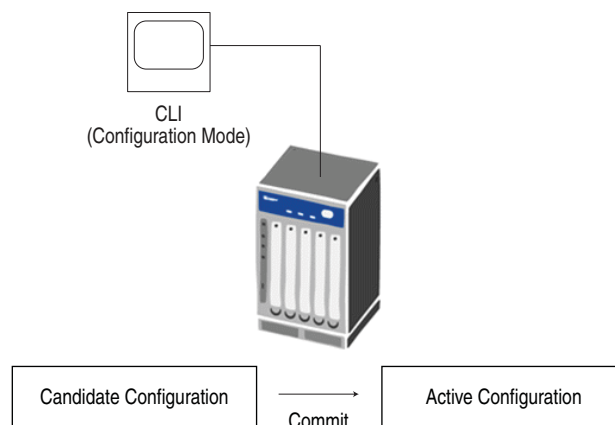
## Understanding CLI Command Modes

The CLI has two modes:

- Operational mode—This mode displays the current router status. In operational mode, you enter commands to monitor and troubleshoot the software, network connectivity, and router.
- Configuration mode—A router configuration is stored as a hierarchy of statements. In configuration mode, you enter these statements to define all properties of the JUNOS software, including interfaces, general routing information, routing protocols, user access, and several system hardware properties.

When you enter configuration mode, you are actually viewing and changing a file called the *candidate configuration*. The candidate configuration allows you to make configuration changes without causing operational changes to the current operating configuration, called the *active configuration*. The router does not implement the changes you added to the candidate configuration until you commit them, which activates the configuration on the router. (See Figure 2.) Candidate configurations enable you to alter your configuration without causing potential damage to your current network operations.

**Figure 2: Committing a Configuration**



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## Understanding Command and Statement Hierarchies

The CLI provides numerous commands and statements and organizes them in a hierarchical fashion.

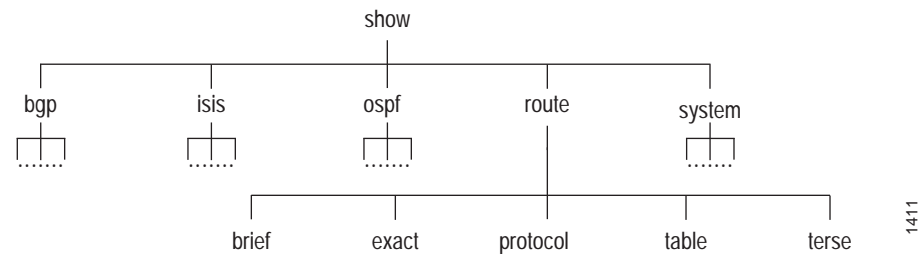
Topics in this section include:

- CLI Command Hierarchy on page 5
- Configuration Statement Hierarchy on page 5

### CLI Command Hierarchy

CLI commands are organized in a hierarchy. Commands that perform a similar function are grouped together under the same level of the hierarchy. For example, all commands that display information about the system and the system software are grouped under the **show system** command, and all commands that display information about the routing table are grouped under the **show route** command. Figure 3 illustrates a portion of the **show** command hierarchy.

**Figure 3: CLI Command Hierarchy Example**



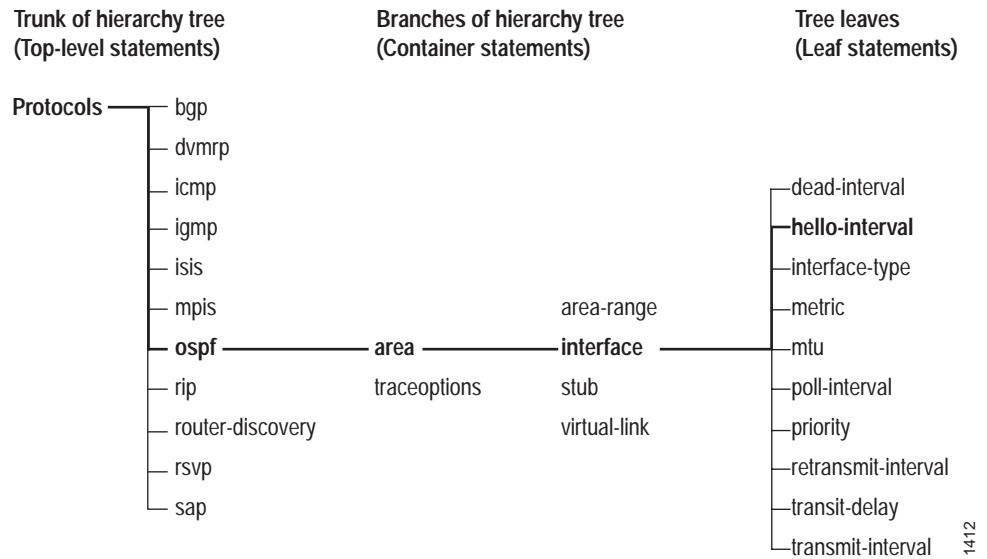
To execute a command, you enter the full command name, starting at the top level of the hierarchy. For example, to display a brief view of the routes in the router table, use the command **show route brief**.

### Configuration Statement Hierarchy

The configuration statement hierarchy has two types of statements: *container statements*, which are statements that contain other statements, and *leaf statements*, which do not contain other statements. All of the container and leaf statements together form the *configuration hierarchy*.

Figure 4 on page 6 illustrates a part of the hierarchy tree. The **protocols** statement is a top-level statement at the trunk of the configuration tree. The **ospf**, **area**, and **interface** statements are all subordinate container statements of a higher statement (they are branches of the hierarchy tree), and the **hello-interval** statement is a leaf on the tree.

**Figure 4: Configuration Statement Hierarchy Example**



## Key Features of the CLI

The hierarchical organization results in commands that have a regular syntax and provides several features that simplify CLI use:

- Consistent command names—Commands that provide the same type of function have the same name, regardless of the portion of the software on which they are operating. As examples, all **show** commands display software information and statistics, and all **clear** commands erase various types of system information.
- Lists and short descriptions of available commands—Information about available commands is provided at each level of the CLI command hierarchy. If you type a question mark (?) at any level, you see a list of the available commands along with a short description of each command. This means that if you already are familiar with the JUNOS software or with other routing software, you can use many of the CLI commands without referring to the documentation.
- Command completion—Command completion for command names (keywords) and for command options is also available at each level of the hierarchy. To complete a command or option that you have partially typed, press the Tab key or the Spacebar. If the partially typed letters begin a string that uniquely identifies a command, the complete command name appears. Otherwise, a beep indicates that you have entered an ambiguous command, and the possible completions are displayed. Completion also applies to other strings, such as filenames, interface names, usernames, and configuration statements.

## Leveraging Industry-Standard Technologies

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The Juniper Networks operating system is based on a FreeBSD UNIX kernel, with a special shell called the CLI (command-line interface). With FreeBSD UNIX as the kernel, a variety of UNIX utilities are available on the router. For example, you can:

- Use regular expression matching to locate and replace values and identifiers in a configuration, filter command output, or examine log file entries.
- Use Emacs-based key sequences to scroll through command output or edit the command line,
- Store and archive router files on a UNIX-based file system.
  - You can use standard UNIX conventions to specify filenames and paths.
  - You can exit from the CLI environment and create a UNIX C shell or Bourne shell to navigate the file system, manage router processes, and so on.

## Other Tools to Configure and Monitor JUNOS Routers

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The JUNOS software also supports the following applications, scripts, and utilities you can use to configure and monitor JUNOS routers:

- J-Web graphical user interface (GUI)—Allows you to monitor, configure, troubleshoot, and manage the router on a client by means of a Web browser with Hypertext Transfer Protocol (HTTP) or HTTP over Secure Sockets Layer (HTTPS) enabled. For more information, see the *J-Web Interface User Guide*.
- JUNOScript Application Programming Interface (API)—Application programmers can use the JUNOScript API to monitor and configure Juniper Networks routing platforms. Juniper Networks provides a Perl module with the API to help you more quickly and easily develop custom Perl scripts for configuring and monitoring routing platforms. For more information, see the *JUNOScript API Guide*.
- NETCONF Application Programming Interface (API)—Application programmers can also use the NETCONF API to monitor and configure Juniper Networks routing platforms. For more information, see the *NETCONF API Guide*.
- JUNOS commit scripts and self-diagnosis features—You can define scripts to enforce custom configuration rules, use commit script macros to provide simplified aliases for frequently used configuration statements, and configure diagnostic event policies and actions associated with each policy. For more information, see the *JUNOS Configuration and Diagnostic Automation Guide*.
- Management Information Bases (MIBs)—You can use enterprise-specific and standard MIBS to retrieve information about the hardware and software components on a Juniper Networks router. For more information about MIBs, see the *JUNOS Network Management Configuration Guide*.

## Commands and Configuration Statements for JUNOS-FIPS

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JUNOS-FIPS enables you to configure a network of Juniper Networks routers in a Federal Information Processing Standards (FIPS) 140-2 environment.

The JUNOS-FIPS software environment requires the installation of FIPS software by a crypto officer. In JUNOS-FIPS, some JUNOS commands and statements have restrictions and some additional configuration statements are available. For more information, see the *Secure Configuration Guide for Common Criteria and JUNOS-FIPS*.