Cisco IOS CLI Modes

CLI Modes

To aid in the configuration of Cisco devices, the Cisco IOS command-line interface is divided into different command modes. Each command mode has its own set of commands available for the configuration, maintenance, and monitoring of router and network operations. The commands available to you at any given time depend on the mode you are in. Entering a question mark (**?**) at the system prompt (router prompt) allows you to obtain a list of commands available for each command mode.

The use of specific commands allows you to navigate from one command mode to another. The standard order in which a user would access the modes is as follows:

user EXEC mode
privileged EXEC mode
global configuration mode
specific configuration modes
configuration submodes
configuration subsubmodes

User EXEC Mode

Most EXEC mode commands are one-time commands, such as **show** or **more** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. EXEC mode commands are not saved across reboots of the router.

When you start a session on a router, you generally begin in *user EXEC mode*, which is one of two access levels of the EXEC mode. For security purposes, only a limited subset of EXEC commands are available in user EXEC mode. This level of access is reserved for tasks that do not change the configuration of the router, such as determining the router status.

User EXEC mode is set by default to privilege level 1. In general, the user EXEC commands allow you to connect to remote devices, change terminal line settings on a temporary basis, perform basic tests, and list system information.

The user EXEC mode prompt consists of the host name of the device followed by an angle bracket (>) This prompt is present in privilege level 0 and 1 (user EXEC).

User EXEC Mode

```
r1>show privilege
Current privilege level is 1
r1>?
Exec commands:
  access-enable         Create a temporary Access-List entry
  access-profile        Apply user-profile to interface
  clear                 Reset functions
  connect               Open a terminal connection
  disable               Turn off privileged commands
  disconnect            Disconnect an existing network connection
  enable                Turn on privileged commands
  exit                  Exit from the EXEC
<-output truncated->

r1>configure terminal
       ^
% Invalid input detected at '^' marker.
```

Privileged EXEC Mode

In order to have access to all commands, you must enter *privileged EXEC mode*, which is the second level of access for the EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. In privileged EXEC mode, you can enter any EXEC command, because privileged EXEC mode is a superset of the user EXEC mode commands.

If a password has been configured on the system, you will be prompted to enter it before being allowed access to privileged EXEC mode. The password is not displayed on the screen and is case sensitive. If an enable password has not been set, privileged EXEC mode can be accessed only by a local CLI session (terminal connected to the console port). If you attempt to access privileged EXEC mode on a router over a remote connection, such as a telnet connection, and you have not configured a password for privileged EXEC mode you will see the **% No password set** error message.

Privileged EXEC mode is set by default to privilege level 15. Because many privileged EXEC mode commands set operating parameters, privileged EXEC level access should be password protected to prevent unauthorized use. Privileged EXEC mode is sometimes referred to as "enable mode," because the **enable** command is used to enter the mode.

The privileged EXEC mode prompt consists of the host name of the device followed by a pound sign(#)*

*This prompt is not exclusive to privileged EXEC (privilege level 15) mode, all privilege levels except privilege level 1 and 0 use the # prompt

Privileged EXEC Mode

```
r1#show privilege
Current privilege level is 15

r1#?
Exec commands:
  access-enable         Create a temporary Access-List entry
  access-profile        Apply user-profile to interface
  access-template       Create a temporary Access-List entry
  alps                  ALPS exec commands
  archive               manage archive files
  audio-prompt          load ivr prompt
  auto                  Exec level Automation
  beep                  Blocks Extensible Exchange Protocol commands
  bfe                   For manual emergency modes setting
  call                  Voice call

r1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
r1(config)#
```

Global Configuration Mode

The term "global" is used to indicate characteristics or features that affect the system as a whole. Global configuration mode is used to configure your system globally, or to enter specific configuration modes to configure specific elements such as interfaces or protocols.

The prompt for global configuration mode consists of the host-name of the device followed by (config) and the pound sign (#)

Changes to the configuration take effect each time you press the Enter or Return key at the end of a valid command. However, these changes are not saved into the startup configuration file until you issue the **copy running-config startup-config** EXEC mode command.

Global Configuration Mode

```
r1# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
r1 (config)#?
Configure commands:
  aaa                 Authentication, Authorization and Accounting.
  aal2-profile            Configure AAL2 profile
  access-list           Add an access list entry
  alarm-interface           Configure a specific Alarm Interface Card
  alias               Create command alias
  alps                Configure Airline Protocol Support
<-output truncated->

r1(config)# hostname AppliedASAP
AppliedASAP(config)#
```

Interface Configuration Mode

There are a ton of difference configuration submodes. We're not going to review all of them in this lesson, but we will look at the one the you'll most often: interface configuration mode. Many features are enabled on a per-interface basis. Interface configuration commands modify the operation of an interface such as an Ethernet, FDDI, or serial port. Interface configuration commands always follow an **interface** global configuration command, which defines the interface type.

To exit interface configuration mode and return to global configuration mode, enter the **exit** command.

```
r1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
r1(config)# interface Serial0/0
r1(config-if)#ip address 10.1.12.2 255.255.255.0
r1(config-if)#no shutdown
*Mar  1 05:33:43.154: %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
*Mar  1 05:33:44.162: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0,
changed state to up
r1(config-if)#exit
r1(config)#
```

Exiting Configuration Mode

exit – will exit you out of the current configuration mode. If you're in interface configuration mode, it will return you to global configuration mode. If you issue the exit command from global configuration mode, you will go back to EXEC mode.

```
r1(config)#interface Serial0/0
r1(config-if)#exit
r1(config)#exit
r1#
```

end – will exit you out of configuration mode and into EXEC mode regardless of which configuration mode you are in.

```
r1(config)#interface Serial0/0
r1(config-if)#end
r1#
```

Exiting Configuration Mode

Ctrl-Z – will exit you out of the current configuration mode and into Privileged User EXEC mode.

```
r1(config)#interface Serial0/0
r1(config-if)# ^Z
r1#
```

Ctrl-C – much like Ctrl-Z, but with one important difference (see next slide).

```
r1(config)#interface Serial0/0
r1(config-if)#        <-Ctrl-C, note no characters are displayed
r1#
```

Exiting Configuration Mode

If you use **Ctrl-Z** at the end of a command line in which a valid command has been typed, **that command will be added to the running configuration file**. In other words, using **Ctrl-Z** is equivalent to hitting the Enter (Carriage Return) key before exiting. For this reason, it is safer to end your configuration session using the **end** command. Alternatively, you can use the **Ctrl-C** key combination to end your configuration session without sending a Carriage Return signal.

```
r1(config)#interface s0/0
r1(config-if)#description ->Don't add this description ^Z
r1#show run interface s0/0
interface Serial0/0
 description ->Don't add this description
```

```
r1(config)#interface s0/0
r1(config-if)#description ->Don't add this description [Ctrl-C]
r1#show run interface s0/0
interface Serial0/0
 end
```

ROM Monitor Mode (ROMMON)

There's actually one more CLI mode, and it's one you really do not want to see…but at some point in your career you will:

ROM monitor mode is a separate mode used when the router cannot boot properly. If your system (router, switch, or access server) does not find a valid system image to load when it is booting, the system will enter ROM monitor mode. ROM monitor (ROMMON) mode can also be accessed by interrupting the boot sequence during startup.

ROMMON is outside the scope of this lesson (check out the password recovery lesson for all types of ROMMON fun). The next slide will show you an example of ROMMON mode (invoked by sending a break character during a reload) on a Cisco 2851 router.

ROM Monitor Mode (ROMMON)

System Bootstrap, Version 12.4(13r)T, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2006 by cisco Systems, Inc.
Initializing memory for ECC
PC = 0xbfcd0d54, Cause = 0x2000, Status Reg = 0x3041a803
c2851 platform with 262144 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled
Upgrade ROMMON initialized
PC = 0xbfcd0d54, Cause = 0x2000, Status Reg = 0x3040a803
rommon 1 > PC = 0xbfcd0d54, Cause = 0x2000, Status Reg = 0x3040a803
rommon 1 > ?
alias set and display aliases command
boot boot up an external process
break set/show/clear the breakpoint
confreg configuration register utility
cont continue executing a downloaded image
context display the context of a loaded image
cookie display contents of motherboard cookie PROM in hex
<-output truncated->
rommon 2 >

Summary

Cisco IOS has a number of command line interface (CLI) modes. The most important modes to be aware of are the two EXEC modes (user and privileged) which are used primarily for verification and troubleshooting commands. The commands available in EXEC mode depend (by default) on the EXEC privilege level which can range from 0 (very few available commands) to 15 (all commands are available). User EXEC mode is privilege level 1 and Privileged EXEC mode is level 15.

You can enter Global Configuration mode from Privileged EXEC mode. Global configuration mode is used to configure your system globally, or to enter specific configuration modes to configure specific elements such as interfaces or protocols. From Global Configuration mode you can enter into any of a slew of subconfiguration modes. The one that you'll use the most is Interface Configuration mode.

ROM Monitor Mode (ROMMON) is a separate mode used when the router cannot boot properly. If your device is in ROMMON there's most likely a big problem. You can induce ROMMON mode by changing your configuration register or sending a break character during POST. You should probably play with ROMMON a little in a lab situation so that it's not a shock to you when the day comes (and it will come) that you see it in production.