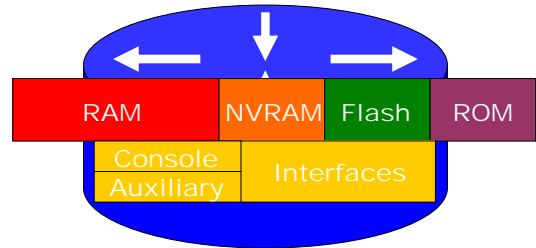


Router Basics

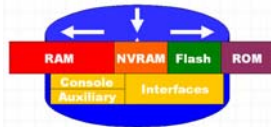
ดร. อนันต์ วัฒนชัย
Anan Phonphoem, Ph.D.
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Internal Components



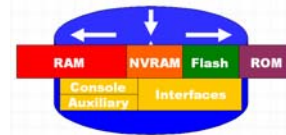
RAM

- Temporary storage for router config files
- RAM content is lost on power down
- Stores...
 - Routing tables
 - ARP cache
 - Fast switching cache
 - Packet buffering
 - Packet hold queues



NVRAM

- Non-volatile RAM
- Stores backup/startup configuration files
- Content is not lost when router is powered down or restarted.



Flash

- EEPROM (Electrically Erasable Programmable Read-Only Memory)
- Holds the Cisco IOS
- Allows updating of software without replacing the Flash chip
- Store Multiple versions of IOS
- Retained on power down



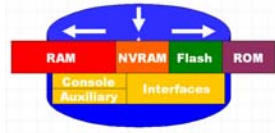
ROM

- Contains POST (Power On Self Test)
- A bootstrap program (loads the Cisco IOS)
- And operating system software
 - Backup, trimmed down version of the IOS
 - Upgrades require installing new chip set



Interfaces

- Network connections through which packets enter and exit the router
- Attached to the motherboard or as separate modules.



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Using the Router

- Understand the Basics of Router's Command Line Interface (CLI).
- Demonstrate How to Log into the Router.
- Demonstrate How to Enter Router Modes.
- Demonstrate Ability to Discern Different Router Modes and Commands

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Router User Interface

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User Interface

- To config: router console
- *user mode*—Typical tasks include those that check the router status. In this mode, router configuration changes are not allowed.
- *privileged mode*—Typical tasks include those that change the router configuration.

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User EXEC Modes

- User mode (Limited mode)
 - Checking the routers status, looking at routing tables, etc.
 - You cannot configure the router
 - Prompt = ">"

Password:
Router>

Means you're in user mode

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Privileged EXEC Modes

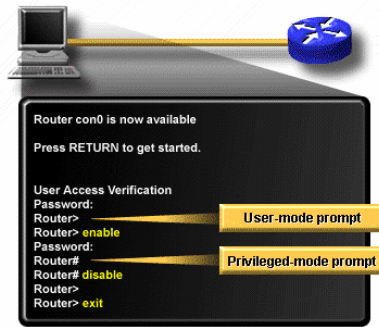
- Privileged mode
 - Does everything User mode does
 - Full power to configure the router
 - In user mode, you enter the command "enable" and then the privileged password

Router> enable
Password:
Router#

Means you're in privileged mode

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Logging In to the Router: Cisco IOS



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Command Lists

- To get a list of commands available in either user mode or privileged mode, enter a **?** at the prompt.

```

Router> ?
Router# ?
    
```

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Getting Help on a Command

- The **?** can be used with a partial command
- To use this help feature, enter the partial command, then tap the **space bar**, then type **?**
- For example...

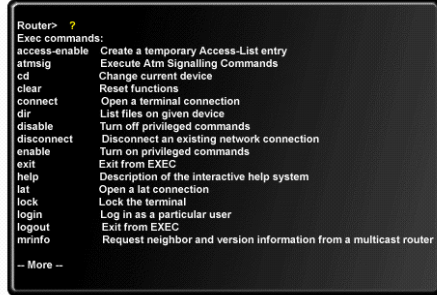
```

Router# show ?
ip
flash:
interfaces
ipx
version
parser
    
```

The Router returned all the available commands for "show"

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User-Mode Command List

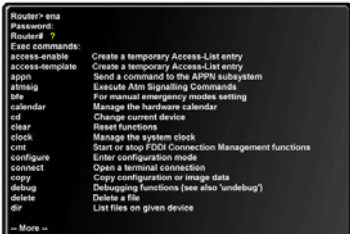


More-- you can continue viewing onto the next available screen by pressing the space bar

Typing a question mark (?) displays a handy list of commonly used commands.

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Privileged-Mode Command List



To access privileged mode, type **enable** (or the abbreviation **ena**). You will be prompted for a password.

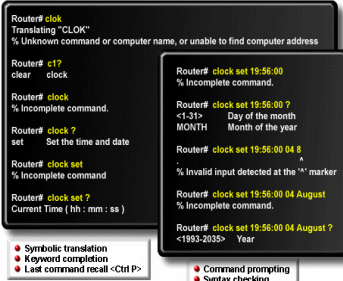
Privileged-Mode Command List (cont.)

Privileged-Mode Command List (cont.)

Privileged-Mode Command List (cont.)



Help Functions



Use help to check the syntax for setting the clock. The help output shows that the set keyword is required

- Symbolic translation
- Keyword completion
- Last command recall <Ctrl-P>

- Command prompting
- Syntax checking

Press **Ctrl-P** (or the up arrow key) to repeat the previous command entry automatically.

The caret symbol (^) and help response indicate an error. To list the correct syntax

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Error Indicator

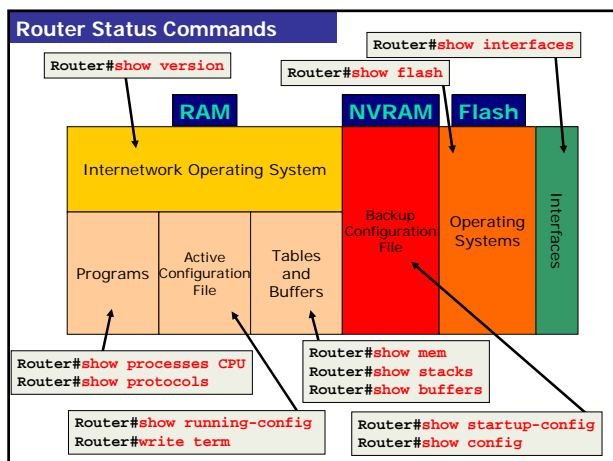
- a carat (^) symbol will indicate where the error occurred.
- For example...

```
Router# show runing-config
      ^
% Invalid input detected at the '^' marker
```

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The Show Command

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Show Commands

- **show version** -- displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot image
- **show startup-config (show config** on Cisco IOS 10.3 or earlier) -- displays the backup configuration file
- **show flash** -- shows information about the Flash memory device

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Show Commands

- **show interfaces** -- displays statistics for all interfaces configured on the router
- **show processes** -- displays information about the active processes
- **show protocols** -- displays the configured protocols; shows the status of all configured Layer 3 protocols

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Show Commands

- **show running-config (write term** on Cisco IOS 10.3 or earlier) -- displays the active configuration file
- **show memory** -- shows statistics about the router's memory, including memory free pool statistics

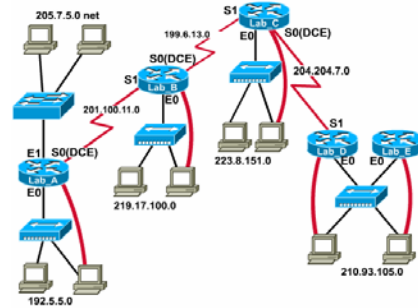
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Show Commands

- **show stacks** -- monitors the stack use of processes and interrupt routines and displays the reason for the last system reboot
- **show buffers** -- provides statistics for the buffer pools on the router

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Main Topology



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