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Cisco IOS Commands

Cisco routers use a variety of commands, to execute operations and configure network devices, that are entered through the text-based command line interface (CLI). Because Cisco systems use a CLI, accuracy in typing commands is essential. Even small mistakes can result in errors or unexpected behavior.

The operating system found on Cisco routers and switches, called Cisco IOS, is structured around different modes with each granting a specific level of access and capability. These modes are indicated by the prompt displayed on the left side of the screen. The prompt begins with the device's hostname followed by a symbol. For example, "R1>" signifies *User EXEC* mode on a device named "R1". User EXEC mode allows basic monitoring. To perform advanced tasks, a user must enter *Privileged EXEC* mode, represented in the prompt with a "#." From there, additional configuration modes are available. Understanding how to move between these modes is crucial, as different commands are only available at specific levels.

Cisco IOS commands often require arguments or parameters to specify details such as interface names, IP addresses, or routing options. When these values are used, placeholders will be presented to indicate that the user must supply the correct information. For example, a command might show "R1# <hostname>". In practice, the user would substitute the desired name for <hostname>.

This handout collects the IOS commands that are most frequently used in the ITN (Introduction to Networks) classes. It is not an exhaustive list of all possible commands but focuses on those most relevant for basic configuration, troubleshooting, and practice in a classroom or lab setting. By learning to recognize the different prompts, understand the hierarchy of modes, and how to correctly input commands with their required arguments, students will be better prepared to work with Cisco routers and switches in real-world environments.

Prompt	Command	Description
Router>	enable	Switch to privileged EXEC mode
Router#	configure terminal	Launches the configuration terminal
Router(config)#	hostname <hostname>	Set hostname for the device.

Possible values for <hostname>:

The hostname is meant to be a description of the device to which it is applied. Because of this, so long as the supplied value starts and ends with a letter, does not include spaces, special characters such as underscores, @, #, $, !, or periods, and is not longer than 63 characters, any value may be supplied in place of <hostname>.

Prompt	Command	Description
<hostname>#	show interface <interface name>	Shows status and configuration settings for <interface name>
<hostname>#	show IPv6 interface <interface name>	Shows status and configuration settings for IPv6 <interface name>

Possible values for <interface name>:

<interface name> refers to a particular interface on the router or switch. The most common interface used in class will be **vlan 1.**

When you are setting up or troubleshooting a router, you will need to view the status and configuration of a specified interface. That is what the *show interface* and *show IPv6 interface* commands are used for. This is one of the times when you need to specify if you are using an IPv6 compatible interface or not, hence the two commands being used for accurate diagnostics and configuration verification.

Prompt	Command	Description
<hostname>#	show ip nat translations	Displays the NAT table.
<hostname>#	show ip nat statistics	List counters for packets and NAT tables entries, as well as basic configuration
<hostname>#	copy running-config <destination>	Copy running configuration to <destination>

Possible values for <destination>:

startup_config - Initial configuration used when router boots up.

nvram – non-volatile storage of the router.

Prompt	Command	Description
<hostname>#	show ip route show ipv6 route	Displays the contents of the IP routing tables stored in RAM
<hostname>#	show ip interface brief	Shows breakdown of interface statuses
<hostname>(config)#	interface <interface name> <interface #>	Switch to interface configuration

Possible values for <interface name>:

The interface names refer to the names of the port connections on the router/switch. These will typically be based on their connection type and/or speeds and so will be listed as: **GigabitEthernet** or **Vlan**.

Possible values for <interface #>:

To differentiate between interfaces, they will be designated with numbers in some context. The exact form the numbers take will vary based on the interface in question but seeing values such as “0/0/0” and “1” are common.

Prompt	Command	Description
<hostname>(config-if)#	no shutdown	Changes the state of the selected interface to 'up'

The *no shutdown* command is used to activate an interface following configuration of the interface. It is frequently mistakenly believed that the command prevents the interface from shutting down. What it actually does is switch the state of the interface to 'up' from 'down'.

Prompt	Command	Description
<hostname>(config)#	ip default-gateway <IPv4 Address>	Set the default gateway to <IPv4 address>
<hostname>(config-if)#	ip address <IPv4 address> <subnet>	Sets the IP address of the selected interface to <IPv4 Address> and subnet to <subnet>

Possible values for <IPv4 Address>:

IPv4 addresses are 4 blocks of numbers, divided by a period. Each block will range in value from 0 to 255. So, you can use any value from 0.0.0.1 to 255.255.255.255, depending on your networking scheme. Typical values will include addresses such as 192.168.0.1, 172.16.0.0, and 10.10.10.2

Prompt	Command	Description
<hostname>(config-if)#	ip address <IPv6 address>/<prefix>	Sets the IPv6 address of the selected interface to <IPv6 Address> and prefix length to <prefix>

Possible values for < IPv6 address>/<prefix>:

IPv6 addresses are 128-bit hexadecimal values that are represented as a series of 8 groups of 4 characters separated by a colon. Each group is referred to as a hextet and represents 16 bits. Often, there will be 2 or more groups of 0000. When this is the case, it is acceptable to shorten the address by simply representing these hextets a double colon (::). This can only be done once per address. The address can be further shortened by removing leading zeros from each hextet.

For example, the IPv6 address 2001:0db8:85a3:0000:0000:000e:0370:7334 can be rendered as 2001:db8:85a3::e:370:7334

The <prefix> is a slash value denoting how many bits in the address represent the network address and thus allowing the rest to be used for host addresses. Typically, during class labs, you will be working with a prefix of /64, indicating that the first 64 bits are reserved for the network address. In this example, that would mean that the network address would be 2001:0db8:85a3:0000.