

## To Seek 'Help' in Router Command-Line Interface (CLI)

In a router's Command-Line Interface (CLI), the 'help' command or '?' symbol is a valuable tool for getting assistance and understanding available commands. The 'help' command provides a list of available commands and a brief description of their functions. Here's how you can use it:

### 1. Using the 'help' Command:

- **Basic Syntax:**

- To view a list of available commands and a brief description, simply type 'help' and press Enter.

```
Router> help
```

- **Examples:**

- List all available commands:

```
Router> help
```

- Display help for a specific command:

```
Router> help <command>
```

### 2. Using the '?' Symbol:

- **Basic Syntax:**

- In the router CLI, you can also use the '?' symbol after typing a partial command or when unsure about the syntax.
- This will provide suggestions and options available for the entered command.

```
Router> <partial_command> ?
```

- **Examples:**

- Show available options after typing a partial command:

```
Router> show ?
```

- Display options for a specific command:

```
Router> show interfaces ?
```

### 3. Help Commands for Different Modes:

- **User Mode ('Router>'):**

- In User Mode, you can use 'help' to get a list of available commands for basic operations and monitoring.
- Example:

```
Router> help
```

- **Privileged Mode ('Router#'):**

- In Privileged Mode, 'help' provides access to more advanced commands for configuration and management.
- Example:

```
Router# help
```

- **Global Configuration Mode ('Router(config)#'):**

- In Global Configuration Mode, 'help' displays commands for configuring global settings.
- Example:

```
Router(config)# help
```

- **Interface Configuration Mode ('Router(config-if)#'):**

- In Interface Configuration Mode, '?' helps with configuring specific interface parameters.
- Example:

```
Router(config-if)# ip address ?
```

### 4. Examples of 'help' Command Usage:

- **View a list of available commands:**

```
Router> help
```

- **Get help for a specific command:**

```
Router> help show
```

- **Display available options for a command:**

```
Router> show ?
```

- **Get help for a specific interface configuration command:**

```
Router(config-if)# ip address ?
```

- **Display commands available in Global Configuration Mode:**

```
Router(config)# help
```

- **View available options for OSPF routing configuration:**

```
Router(config-router)# network ?
```

## 5. Exiting Help:

- After viewing the help information, you can press 'Ctrl + C' to exit the help menu and return to the command prompt.
- The 'help' command or '?' symbol in the router CLI is used to get information about available commands, their syntax, and usage.
- In User Mode, 'help' provides basic command listings.
- In Privileged Mode, 'help' offers more advanced command options for configuration and management.
- In Global Configuration Mode and Interface Configuration Mode, '?' helps with configuring specific parameters.

The 'help' command is an essential tool for navigating and understanding the router's CLI, providing guidance on available commands and their usage.

Router commands:

router used of '1941 model'

type no(n) for setup mode initial configuration

Router> enable Router> en?

(hiting enter it will take you line by line, if you press space it will take you to next page.)

```
> c?
> co?
> con?
> conf?
(press tab to autocomplete command)
> configure ?
(it will show option within configure command)
> configure terminal
> int
> interface
> interface ?
> interface g
> interface g0/0
Router(config-if)>
```

IP - interface configuration password -1. line pass- usermode - 2.enable sec password

## command 1

```
Router# show history
```

(it will show last 10 command)

## command 2

```
Router# show terminal
```

(it will display terminal property along with terminal history size-last 10 command)

## command 3

```
Router# terminal history size 25
```

(It will show last 25 command) all these command executed in privillaged mode only.

## configuration password

Router# configure terminal Router(config)# line con 0 Router(config)# line aux 0 Router(config)# line vty 0 4

```
Router(config)# line con 0
Router(config-line)# password cisco
Router(config-line)# login
Router(config-line)# exit
(for password authentication you must type above two commands)
```

```
Router(config)# line aux 0
Router(config-line)# password cisco
Router(config-line)# login
Router(config-line)# exit
```

```
Router(config)# line vty 0 4
Router(config-line)# password cisco
Router(config-line)# login
Router(config-line)# exit
```

(ctrl + z get you directly into previllaged mode)

```
Router(config)# enable secret sunbeam
```

(sunbeam is password for enable secret password, which allow you to enter into previllaged mode) (this is last time to see password, affterword it will be encrypted)

```
#show running-config
```

(it will show the all configuraition what you done.)

## password encrytion service

Router(config)# service password-encryption (this command will encrypted all password) (after encrypting the password, you will stop the service immediatly)

to stop this servce Router(config)# no service password-encryption

## change hostname

```
Router(config)# hostname A
A(config)# hostname RouterA
RouterA(config)# exit
```

## To save configuration

```
RouterA#copy running-config startup-config  
(copy running-config is source and startup-config is destination)  
(to save configuration)
```

## configuration of physical interface

```
RouterA# conf t  
RouterA(config)# int g0/0  
RouterA(config-if)#no shutdown
```

(thes command are related with physical activity of interface) (it is not part of configuration, it is directly related with physical hardware.)

```
RouterA(config-if)# ip address 172.16.10.1 255.255.255.0
```

(ip address (ip address) (subnet mask))

```
RouterA(config)#int g0/1  
RouterA(config-if)# no shut  
RouterA(config-if)# ip address 172.16.20.1 255.255.255.0  
RouterA(config-if)# exit
```

## monitoring commands

(show running configuration)

```
Router#show startup-config
```

```
Router#show start
```

(show start up configuration)

```
Router#show version
```

(this command display IOS version, ROM version, Memory size, IOS file name, configuration register value(0x2102)) (this command shows software and hardware information)

```
Router# show interface
```

(display interface property) eg. interface g0/0 is UP line protocol UP

```
Router# show ip protocol
```

(show ip protocol information)

```
Router# show ip interface
```

(show ip interface information)

```
RouterA# show ip interface brief
```

(show ip interface information in horizontal way.)

```
RouterA# exec-timeout 0 0
```

(this session will never timeout)

```
RouterA# exec-timeout 0 30
```

(this session will terminate after 30 sec.)

```
RouterA# exec-timeout 1 30
```

(this session will terminate after 90 sec)

## Giants and Runts in Networking

In the context of networking, "giants" and "runts" are terms used to describe specific types of frames or packets that can occur on a network. These terms are related to the size of the frames or packets being transmitted and can indicate potential issues with network performance or configuration.

## 1. Giants:

- **Definition:**

- Giants refer to frames that exceed the maximum Ethernet frame size allowed on a network.
- In Ethernet networks, the standard maximum frame size is 1518 bytes for regular Ethernet (including 14 bytes for the Ethernet header and 4 bytes for the Frame Check Sequence).
- Any frame larger than this standard maximum size is considered a giant.

- **Causes:**

- Giants often occur due to network misconfigurations, such as incorrect MTU (Maximum Transmission Unit) settings on devices.
- They can also be caused by devices sending frames with improper or corrupted data.

- **Effects:**

- Giants can lead to inefficient use of network bandwidth, as larger-than-necessary frames take longer to transmit.
- They can cause congestion and collisions on the network, impacting overall performance.
- Some network devices may discard giants, leading to potential data loss or retransmissions.

- **Detection:**

- Giants are typically identified by network monitoring tools or through error counters on network devices.
- Devices such as switches and routers may increment error counters when receiving giants.

## 2. Runts:

- **Definition:**

- Runts are frames that are smaller than the minimum Ethernet frame size allowed on a network.
- For standard Ethernet networks, the minimum frame size is 64 bytes (excluding the preamble and frame check sequence).

- **Causes:**

- Runts can occur due to collisions or interference on the network.
- They may also result from misconfigurations, such as incorrect duplex settings causing frames to be cut off.

- **Effects:**

- Runts are often the result of data collisions, where two devices try to transmit data simultaneously.
- They can indicate issues with network congestion or improper device configurations.



- Similar to giants, runts can lead to inefficient use of network bandwidth and potential performance degradation.

- **Detection:**

- Runts are typically detected by network devices when they receive frames that are smaller than the minimum allowable size.
- Error counters on switches and routers may increment when runts are detected.

## Handling Giants and Runts:

- **Troubleshooting:**

- When giants or runts are detected, network administrators should investigate the cause.
- This may involve checking device configurations, examining network traffic, and ensuring proper collision detection and avoidance mechanisms are in place.

- **Prevention:**

- To prevent giants and runts, administrators should configure devices with appropriate MTU sizes.
- Ensuring that all devices on the network are set to the same MTU helps prevent issues with frame sizes.
- Properly configuring duplex settings and implementing collision detection mechanisms can also help reduce the occurrence of runts.

- **Monitoring:**

- Regularly monitoring network traffic and error counters on network devices can help identify and address giants and runts.
- Network management tools can provide real-time alerts and historical data to track trends and patterns.

## Configuration Register

### Configuration Register in Router CLI

The Configuration Register in a router is a 16-bit value that determines how the router boots up, the console speed, and other system parameters. It plays a crucial role in the router's startup process and behavior. In the router's Command-Line Interface (CLI), you can view and modify the Configuration Register using specific commands. Here's an overview:

#### 1. Viewing the Configuration Register:

- **Basic Syntax:**

- To view the current Configuration Register value, use the 'show version' command.
- Look for the "Configuration register is" line in the output.

- **Example:**

```
Router> show version
```

Configuration register is 0x2102 (will be 0x2102 at next reload)

- In the example above, '0x2102' is the hexadecimal value of the Configuration Register.

## 2. Modifying the Configuration Register:

- **Basic Syntax:**

- To change the Configuration Register value, you need to enter Global Configuration Mode and use the 'config-register' command.

- **Example:**

```
Router(config)# config-register 0x2142
```

- **Note:** The '0x2142' value in the example above is just an example. You would replace it with the desired hexadecimal value for your configuration needs.

## 3. Common Configuration Register Values:

- **0x2102:**

- This is the default and most common value. It tells the router to load the IOS image from flash memory and to load the startup configuration from NVRAM.

- **0x2142:**

- This value tells the router to ignore the startup configuration in NVRAM during boot. It is often used for password recovery procedures.

- **0x2101:**

- This value tells the router to boot into ROM Monitor (ROMMON) mode. It is used for troubleshooting and recovery purposes.

## 4. Examples of Changing the Configuration Register:

- **Change to default value (0x2102):**

```
Router(config)# config-register 0x2102
```

- **Change for password recovery (0x2142):**

```
Router(config)# config-register 0x2142
```

## 5. Save Changes and Reload:

- After changing the Configuration Register, remember to save the configuration using the 'write memory' command.

```
Router# write memory
```

- Reload the router for the changes to take effect.

```
Router# reload
```

## configuration register values

0X2142 - ignore NVRAM 0X2101 - Mini IOS 0X2102 to 0X210F - Normal Boot

## Password Recovery

### Password Recovery in Router CLI

Password recovery in a router's Command-Line Interface (CLI) is a process used to regain access to a router if the login credentials (username and password) have been forgotten or lost. This process involves interrupting the router's boot sequence and then modifying the configuration to reset the password or restore the router to factory defaults. Here's a general overview of the password recovery process:

### step1

restart the router

### step2

(shift + ctrl + Break) stop the booting up sequence and it booted up to boot# prompt i,e rom mode

### step3

Boot# ios-conf=0X2142 (2500 o/r - 0X2142, 2500 confreg 0X2142)

### step4

Boot# save

### step5

restart router and say no (n) to setup

### step6

enter Router> enable

## step7

Router# copy start run (old conf to startup conf)

## step8

Router# conf t

## step9

Router(config)# enable secret sunbeam

## step10

Router(config)# config -reg 0X2102 (shifting back to reg value)

## step11

Router# copy run start

### Notes:

- These steps are a general guideline and may vary slightly depending on the router model and software version.
- Always ensure that you have permission and authorization to perform password recovery on a router.
- It's recommended to keep a record of passwords in a secure location to avoid the need for password recovery.

### Summary:

Password recovery in a router's CLI involves interrupting the boot process, changing the configuration register, reloading the router without the startup configuration, entering setup mode, resetting the password, restoring the configuration register, saving the configuration, and finally rebooting the router.

### Trivial File Transfer Protocol in Router

RouterA# copy (source) (destination) RouterA# copy run tftp RouterA# copy start tftp RouterA# copy flash tftp

In router pinging successo will denoted as exclamatory sign !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! In router pinging failure will shown in dot sign .....

```
RouterA# copy tftp flash
```

(this command help to upgrade the router, it will upgreade the IOS)

In router erase flash will denoted as eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee

### Cisco Discovery Protocol (CDP)

Cisco Discovery Protocol (CDP) is a Cisco proprietary protocol used for network discovery and management on Cisco devices. It allows Cisco devices to discover and collect information about directly connected neighboring Cisco devices, such as routers, switches, and access points. CDP operates at Layer 2 of the OSI model and helps in troubleshooting, network planning, and device management. Here's an overview of CDP:

## 1. Features and Functions:

- **Network Discovery:**

- CDP enables Cisco devices to discover and learn about neighboring Cisco devices directly connected to their interfaces.
- Devices exchange information such as device type, capabilities, IP addresses, software version, and platform information.

- **Topology Discovery:**

- By exchanging CDP packets, devices can create and maintain a map of the network topology.
- This helps administrators visualize how devices are interconnected and the path packets take through the network.

- **Device Monitoring:**

- CDP allows for monitoring of device status and changes in the network.
- Administrators can use CDP to detect when a new device is connected or when an existing device goes offline.

- **Neighbor Information:**

- CDP provides detailed information about neighboring devices, including their device ID, IP address, platform, and interface information.
- This information is valuable for troubleshooting and verifying network connections.

- **Viewing CDP Information:**

- To view information about neighboring Cisco devices, use the following command:

```
Router# show cdp neighbors
```

## 2. Viewing Detailed CDP Information:\*\*

- To view detailed information about a specific neighbor, use:

```
Router# show cdp neighbors <interface>
```

- **Viewing Detailed CDP Information:**

- To view detailed information about a specific neighboring device, use:

```
Router# show cdp neighbors detail
```

### 3. Disabling CDP:

- **Global Configuration Mode:**

- To disable CDP on an specific interface, use the following command:

```
Router(config-if)# no cdp enable
```

- **Disabling CDP Globally:**

- To globally disable CDP on the entire device, use:

```
Router(config)# no cdp run
```

- **changing CDP timer:**

- to change the CDP timer in sec., use:

```
RouterA(config)# cdp timer 90
```

- To hold the time in sec., use:

```
RouterA(config)# cdp hold time 240
```

### 4. CDP Version Compatibility:

- **CDP Compatibility:**

- Cisco devices running CDP can discover and communicate with other Cisco devices that also support CDP.
- CDP is proprietary to Cisco, so non-Cisco devices do not support it.
- Cisco Discovery Protocol (CDP) is a valuable tool for network discovery, topology mapping, and device monitoring in Cisco networks. By exchanging CDP packets, Cisco devices can learn about neighboring devices, their capabilities, and how they are connected. Administrators can enable, disable, and view CDP information to manage and troubleshoot their networks effectively.

show users:

```
RouterA# show user
```

- to check how many administrator can currently configuring router
- 0 con 0 IP (It shows active users)
- 1 vty 0 4 IP
- 2 vty 1 IP

(If you want to delete vty 1 user but before that you must change enable secret password)

```
RouterA# clear line 2
```

show sessions:

to show all sessions use

```
RouterA# show session
```

0 RouterA 172.16.10.1 1 RouterB 172.16.20.1 2 RouterC 172.16.30.1

Shift+ctrl+6 then press 'x' ( to alter the sessions )

```
RouterA# disconnect 1
```

(to disconnect the specifice session )