

Cisco Config Introduction

Cisco router components: Memory types

- RAM
 - Stores packet buffers, ARP cache, routing table, software code and data structures necessary for router operation. Running configuration and decompressed IOS code is stored in RAM
- ROM
 - Contains basic software for hardware testing and initialization
- Flash
 - Stores IOS and backup configuration files. Not volatile
- NVRAM (non-volatile RAM)
 - Saves router configuration

Cisco router components: Software

- POST
 - Power-on Self-Test. Stored in ROM. Checks basic router functions
- Bootstrap
 - In ROM. Initiates router and loads IOS
- ROM Monitor
 - In ROM. Used for tests and troubleshooting. Basic interface for troubleshooting low-level issues
- IOS (Internetwork Operating System)
 - Provides all of the higher-level router functionalities

Configuration Register

- Controls various low-level settings
 - Tells router to load or ignore NVRAM configuration at startup
 - Terminal behaviour (e.g. serial speed)
- Current value can be seen with
 - `show version`
- Most common settings are:
 - 0x2102 - normal
 - 0x2142 - ignore configuration

Where is the configuration?

- Router always has two configurations
 - running-config
 - In RAM. Shows which parameters are currently in use.
 - `show running-config`

- Modified with `configure terminal` command
- `startup-config`
 - In NVRAM. Loaded by router in next reboot
 - This is where the running-config is saved
 - `show startup-config`

Configuration backups

- You can store configuration in other places
 - In router's Flash memory
 - In a server, via TFTP
- Can be copied around with `copy` command
 - `copy running-config startup-config`
 - or `write memory` (old style)
 - `copy running-config tftp`
 - `copy startup-config tftp`
 - `copy startup-config flash:saved-config`
 - `copy flash:saved-config startup-config`

When the router has no configuration....

- It asks `Would you like to enter the initial configuration dialog? [yes/no]:`
- Just say `n` (no)
 - otherwise you get a tedious series of questions to answer

Access modes

- User EXEC
 - Limited access. Show interface state, etc.
 - `Router>`
- Privileged EXEC (enabled mode)
 - Detailed examination, manipulate configuration and files, run tests, debugging, etc.
 - `Router#`
- ROM Monitor
 - Password recovery and IOS installation
 - `rommon 1>`

Management input sources

- Console
 - Direct access via serial port
- Auxiliary Port
 - Access via Modem
- Virtual Terminals (VTY)
 - Telnet/SSH

Changing the configuration

Commands are activated immediately. So be careful when typing!

When working on serial console or via Telnet or SSH, commands can be copied from a text file and pasted into the terminal

```
router>
router>enable
... type password ...
router#
router# configure terminal
router(config)#
... type commands ...
router(config)# end
router# write memory
```

How to tell where you are

```
Router> - USER EXEC
Router# - PRIVILEGED EXEC
Router(config) - Global configuration
Router(config-if) - Interface configuration
Router(config-subif) - Sub-interface configuration
Router(config-route-map) - Route-map configuration
Router(config-router) - Routing protocol configuration
Router(config-line) - Line configuration
rommon 1> - ROM Monitor
```

Context Help

Use "?" to obtain a list of commands available in your current configuration mode

```
Router(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
  appfw               Configure the Application Firewall policy
  application         Define application
  archive              Archive the configuration
  arp                 Set a static ARP entry
  ...
```

Online help

Use "?" also to see all possible parameters to an incomplete command:

```
Router(config)#username ?  
  WORD  User name  
Router#show ?  
  aaa                Show AAA value  
  aal2               Show commands for AAL2  
  access-expression  List access expression  
  access-lists       List access lists  
  accounting          Accounting data for active sessions  
  ...
```

Command completion

Use the Tab key to complete a command

```
router(config)#int<TAB>  
router(config)#interface et<TAB>  
router(config)#interface ethernet 0  
router(config-if)#ip add<TAB>  
router(config-if)#ip address n.n.n.n m.m.m.m
```

You can just type the abbreviated form if it's unambiguous

```
router(config)#int e 0  
router(config-if)#ip add n.n.n.n m.m.m.m
```

Moving faster around the command line

Move within command history:

- [Cursor Up] - Previous command
- [Cursor Down] - Next command

Line editing:

- [Cursor Left] and [Right] - move within the line
- Ctrl-a : move to beginning of line
- Ctrl-e : move to end of line
- Ctrl-k : delete until end of line

Verifying and troubleshooting

```
show running-config
show run interface f0/0
show ip int brief
debug ip ospf hello / events / adj
show log
show version
```

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