

Campus Networking Workshop

Introduction to Cisco Router Configuration

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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 Internetwork Operating System (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

config-register

- Controls various low-level settings
 - Tell router to load or ignore configuration
 - Terminal behavior
- 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.
 - Modified with `configure terminal` command
 - `show running-config`
 - **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`
 - `copy running-config tftp`
 - `copy startup-config tftp`
 - `copy startup-config flash:saved-config`
 - `copy flash:saved-config startup-config`

Access Modes

- User EXEC
 - Limited access. Show router 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

Management input sources

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

Changing the configuration

- Commands are activated immediately
 - 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

Changing the configuration

```
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 values
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
```

Moving faster around the command line

- Move within command history
 - ↑ Previous command
 - ↓ Next command
- Line editing
 - ← and → to 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`