

Campus Networking Workshop

Cisco Configuration Introduction



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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 IOS code is stored in RAM
- ROM:
 - Contains basic software for hardware testing and initialization.



Cisco router components:

Memory types

- Flash:
 - Stores IOS and backup configuration files.
 - Not volatile.
- NVRAM (non-volatile RAM):
 - Stores router configuration.
- External Storage:
 - Compact Flash (CF) – for IOS and backup configuration files



Cisco router components: Software

- POST:
 - Power-On Self-Test.
 - Stored in ROM.
 - Checks basic router functions
- Bootstrap:
 - In ROM.
 - Initiates router and loads IOS



Cisco router components:

Software

- 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 IOS command *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 next time it boots
 - This is where the running-config is saved
 - `show startup-config`



Configuration backups

- You can store configuration in other places
 - In router's internal or external Flash memory
 - On a server, via TFTP or SCP
- Can be copied with copy command:
 - `copy running-config startup-config`
 - `write memory` (old version of the above command)
 - `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, alter configuration and files, run tests, debugging, etc.
 - Router#
- ROM Monitor
 - Password recovery and IOS installation

Management input sources

- Console:
 - Direct access via serial port
- Auxiliary Port:
 - Access via Modem or other serial devices
 - (Also used for accessing other serial devices)
- Virtual Terminals (VTY):
 - Telnet/SSH

Changing the configuration

- Commands are implemented 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
 - Be very careful with cut and paste!
 - Copied by SCP or TFTP from a file prepared previously on a SCP or TFTP server



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
```



Command Shorthand

- IOS understands shorthand
 - Complete command does not need to be typed as long as the initial characters are unique

```
router(config)# int e 0
router(config-if)# ip add 192.168.1.1 255.255.255.0
router(config-if)# no sh
router(config-if)# ^Z
router# sh ip int br
```

Interface	IP-Address	OK?	Method	Status	Protocol
Ethernet0	192.168.1.1	YES	NVRAM	up	up

- Can you work out the full form of the above commands?



Moving faster around the command line

- Move within command history
 - ↑ Previous command
 - ↓ Next command
- Line editing
 - ← move to the left within a line
 - → move to the right within a 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
```

- Be very careful with “debug” commands!
 - Some will cause the router to become unresponsive

Undoing Configuration

- To undo IOS configuration:
 - Simply negate the configuration command

```
Router# sh run int eth 0
interface ethernet 0
  description Link to Core-Router
  ip address 192.168.1.10 255.255.255.224
Router# conf t
Router(config)# int eth 0
Router(config-if)# no ip address
Router(config-if)# ^Z
Router# sh run int eth 0
interface ethernet 0
  description Link to Core-Router
Router#
```



Questions?



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