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
- 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# -  PRVILEDGED 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
```