Campus Networking Workshop

Introduction to Cisco Router Configuration

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: Sofware

·**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 bee 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
    - Shown with `show running-config`
    - **startup-config**
    - In NVRAM. Loaded by router in next reboot
    - This is where the `running-config` is saved
    - Shown with `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
- 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

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#
```
- PRIVILEDGED 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
  - **Ctr-a** move to beginning of line
  - **Ctrl-e** move to end of line
  - **Ctrl-k** delete until end of line