Kardan University BCS Faculty Network Strategy

Outline

- Cisco IOS
- Cisco Switch Internals
- Switch interfaces
- Switch Boot Process
- Accessing a Cisco Switch
- DHCP
- Telnet

Cisco IOS

- IOS (Internetworking Operating System)
- IOS is the basic and core software of a switch & Router that allocates resources and manages things such as hardware.
- Cisco IOS is a proprietary kernel that provides routing, switching, internetworking and telecommunication services.
- The first IOS was written by William Yeager, 1986

Cisco Switch Internals (Hardware)

- Switch components and their functions
  - **CPU -** Executes operating system instructions
  - **Random access memory (RAM) -** Contains the running copy of configuration file. Stores routing table. RAM contents lost when power is off
  - **Read-only memory (ROM)** - Holds diagnostic software used when switch is powered up. Stores the Switch's bootstrap program.
  - **Non-volatile RAM (NVRAM) -** Stores startup configuration. This may include IP addresses (protocol, Hostname of Switch)
  - **Flash memory -** Contains the operating system (Cisco IOS)

Switch Interfaces

- LAN Interfaces: (RJ45+Data Transfer) R---R/S/B/H/PC
  - Ethernet Interface [10Mbps]
  - Fast Ethernet Interface [100Mbps]
  - Gigabit Interface [1000Mbps]
  - 10Gigabit Interface [10000Mbps]
  - 40Gigabit Interface [40000Mbps]
  - 100Gigabit Interface [100000Mbps]

Switch Interfaces

- **Management Interfaces: Used for switchConfiguration**
  - **Auxiliary port (Modem, Rarely for configuration) RJ45**
  - **Console Port (Configuration):**
    - **The console cable is used to connect a switchto a PC for configuration**
    - **One end of the console cable is RJ45 (connected to the console port of the R/S) and other end of the cable is Serial connected to the PC.**
    - **We need to have a software on the PC such as hyper-terminal or Putty.**

Connecting to a Switch

- You can use the Console port to connect to the switch (Console port is the RJ 45 port)
- You can also use the Auxiliary port to connect to the Switch/switch (Auxiliary port is also used to connect the modem to the Switch)
- We can also connect to the switch through the Telnet
- switchof 2800 is called ISR (Integrated Service Switch) which has pre-installed Security Device Manager (SDM)
- SDM is a web based device-management tool that let us configure the switchgraphically through the web console.

Switch Boot Process

- First the switch runs Power On Self Test (POST)
- Then it loads the system IOS from flash memory to RAM
- Then it loads the startup configuration from NVRAM into RAM, which is now called running configuration
- If there is no startup configuration in the NVRAM, then the switch sends a broadcast looking for a TFTP host, if the broadcast fails, it will go to what is called Setup Mode (it’s a step by step process to help you configure the switch).
- To enter the Setup mode write the SETUP from privileged mode, to exit the Setup mode, use the Ctrl+C shortcut.

Three main modes of a Switch/Router

- **User Exec Mode (User Mode) Switch>**
- This mode is used for simple statistics and through this mode we can enter the privilege mode by the Enable command to exit the console , write logout in this mode
- **Privilege Mode: Switch#**
- Here u can see and change the configuration of the Switch, you can go back to the User Exec Mode just by entering Disable command
- **Global Configuration Mode Switch(Config)#**
- Here you can make changes to the switchglobally. write Configure Terminal (Conf T) in privilege mode . write exit or ctrl+z to go back to the privilege mode

Basic Commands

- R>enable {User Exec Mode}
- R# Conf T {Privilege Mode}
- R(Config)# {Global Configuration Mode}
- R(Config)#Hostname R1 {sets a hostname for Switch}
- R(Config)#Enable Password 123 {sets password in Plane text}
- R(Config)#Enable Secrete 1234 {sets encrypted password}

Basic Commands

- **To setup password for Console Port:**
- R(Config)#line console 0
- R(Config-line)# password 123456
- R(Config-line)#login
- **To set IP address to an Interface:**
- R#conf t
- R(Config)# interface fastEthernet 0/0
- R(Config-if)# ip address 192.168.10.1 255.255.255.0
- R(Config-if)# description Third Floor of ATVI
- R(Config-if)#no shutdown

Basic Commands

- **To enable telnet and setup telnet password:**
- R(Config)#line vty 0 4
- R(Config-line)#password 12345
- R(Config-line)#login
- **To save changes:**
- R# write
- R# copy running-config startup-config

Basic Commands

- **Show commands:**
- R#clock set hh:mm:ss 25 June 2014 {sets Date and Time}
- R#Show Version {shows IOS Details}
- R# show running-config {shows all configuration}
- R# show flash
- R# show ip interface brierf
- R# show interfaces
- R# show ip route

Basic Commands

- R# reload [restarts the Switch]
- R# copy startup-config running-config [stores the running configuration into NVRAM]
- R# copy flash tftp [backs up the IOS from flash memory into the TFTP Server]
- R# copy running-config TFTP [saves running configuration into TFTP server]
- R# show startup-configuration
- R# erase startup-configuration [deletes startup configuration]

DHCP Server Configuration

- R1(config)# ip dhcp pool NET-POOL
  R1(dhcp-config)# network 192.168.1.0 255.255.255.0
- R1(dhcp-config)# default-switch192.168.1.1
  R1(dhcp-config)# dns-server 192.168.1.5
  R1(dhcp-config)# domain-name Firewall.cx {Optonal}
  R1(dhcp-config)# lease 9 {Optional}
- R1(config)# ip dhcp excluded-address 192.168.1.1 192.168.1.5
  R1(config)# ip dhcp excluded-address 192.168.1.10
- show ip dhcp binding

Debugging

- R# traceroute 192.168.10.1
  - [traces the path to the remote network]
- R# debug all
  - [shows all the traffic flow in or out of the Switch]
- R# undebug all
  - [stops debugging process]
- R# show process
  - [show the percentage of CPU of switchbeing busy]

REFERENCES

- https://study-ccna.com/administrative-distance-metric/

THANK YOU