**Assignment**

**Assignment module 8:** **Network Access Basics routing & advanced routing concept, switching concept.**

**1.Explain Switch**

**Answer: -**

**1. In Networking**

A **network switch** is a device that connects devices (like computers, printers, and servers) on a local area network (LAN). It uses MAC addresses to forward data only to the specific device it's meant for, improving efficiency and security.

**Example:**

* If PC A sends a file to PC B, the switch ensures only PC B receives it, not every device on the network.

**Key points:**

* Operates at Layer 2 (Data Link layer) of the OSI model.
* Smarter than a hub (which broadcasts data to all devices).
* Can be unmanaged (plug-and-play) or managed (configurable)

**2. Explain Switch Boot Sequence**

**Answer: -**

**1.** **Power-On Self-Test (POST)**

* When the switch is turned on, it runs a self-diagnostic test.
* It checks basic hardware components like RAM, CPU, and interfaces.
* If everything passes, the boot process continues. If not, the switch may halt or display errors.

**2. Boot Loader Execution**

* A small program stored in ROM called the Boot Loader is run.
* It initializes low-level hardware and prepares the switch to load the main operating system.

**3. Load IOS (Internetwork Operating System)**

* The switch looks in Flash memory for the IOS image (Cisco’s operating system).
* It copies the IOS image from Flash to RAM.
* If IOS is missing or corrupted, the switch enters ROMMON mode (a special recovery mode).

**4. Load Startup Configuration**

* The switch checks NVRAM for the startup-config file.
* This file contains saved configurations like VLANs, interface settings, and passwords.
* If no config is found, the switch enters setup mode or boots with default settings.

**3. Explain Three Methods to access Switch Command Line Interface**

**Answer: -**

**1. Console Access (Direct Physical Access)**

**Description:**

* This method uses a console cable (often RJ-45 to USB or USB-C) connected from your computer to the switch’s console port.
* It’s used when the switch is not yet configured or you are troubleshooting.

**Requirements:**

* Terminal emulator software (e.g., PuTTY, Tera Term, HyperTerminal).
* Console cable.

**Use Case:**

* First-time setup
* Password recovery
* Device in ROMMON mode

**2. Telnet (Remote Access - Unsecured)**

**Description:**

* Telnet allows remote CLI access over the network using port 23.
* It sends data in plain text (unsecured), so it's not recommended for production environments.

**Requirements:**

* The switch must have an IP address configured on a VLAN interface (e.g., VLAN 1).
* Telnet must be enabled on the switch.

**Security:**

* Not encrypted; can be intercepted.
* Should only be used in isolated, secure labs.

**3. SSH (Secure Shell - Remote Secure Access)**

**Description:**

* SSH provides encrypted CLI access over the network via port 22.
* It is the preferred method for secure remote management.

**Requirements:**

* IP address configured on the switch.
* SSH service enabled.
* Username and password or key-based authentication.

**Security:**

* Fully encrypted session.
* Recommended for production networks.

**4. Explain and Configuring the Cisco Internet Operating System**

**Answer: -**

**Basic IOS Command Modes**

| Mode | Prompt Example | Purpose |
| --- | --- | --- |
| User EXEC | Switch> | Basic monitoring (limited commands) |
| Privileged EXEC | Switch# | Full monitoring and access |
| Global Config | Switch(config)# | Global settings |
| Interface Config | Switch(config-if)# | Port/IP configuration |
| Line Config | Switch(config-line)# | Console, SSH, or Telnet settings |

**Cisco IOS Configuration Flow**

1. Enter enable mode
2. Enter configure terminal
3. Set hostname, passwords, and IP
4. Secure with SSH or ACLs (optional)
5. Save configuration with copy running-config startup-config

**5. Explain Switch Port**

**Answer: -**

A switch port is a physical or logical interface on a network switch that allows devices to connect and communicate over a network.

Think of a switch port like a wall socket — devices plug in (via Ethernet cables) and communicate with each other through the switch.

**Switch Port Modes**

| Mode | Description |
| --- | --- |
| Access Mode | For end-user devices (one VLAN) |
| Trunk Mode | For other switches/routers (multiple VLANs) |
| Dynamic Auto | Passively waits to become trunk |
| Dynamic Desirable | Actively tries to form trunk |

**A switch port is the point where a device connects to a switch. It can be:**

* Access Port (single VLAN, end device),
* Trunk Port (multiple VLANs, switch-to-switch),  
  and can include features like speed settings, security, and PoE.

**Switch Port Characteristics**

| **Feature** | **Description** |
| --- | --- |
| **Speed** | 10/100/1000 Mbps or higher |
| **Duplex** | Full or half (how data is sent/received) |
| **Port Security** | Restricts devices based on MAC address |
| **PoE Support** | Some ports provide power to devices (like IP phones or cameras) |

**2- R1, R2, R3, and R4 have their Fast Ethernet 0/0 interfaces attached to the same VLAN. A network engineer has typed a configuration for each router by using a word processor. He will later copy and paste the configuration into the routers. Examine the following exhibit, which lists configuration for the four routers, as typed by the network engineer. Assuming that all four routers can ping each other’s LAN IP addresses after the configuration has been applied, choose the routers that will be able to form a neighbour relationship with the other routers on the LAN. (You can assume that, if not shown in the exhibit, all other related parameters are still set to their defaults.) (Choose two)**

**Answer: -**

A. R1  
B. R2

**3 - enable secret [password] is hashed using the algorithm.**

**Answer: -**

A. MD5

**4- An engineer connects to Router R1 and issues a show ip ospf neighbor command. The status of neighbor 2.2.2.2 lists FULL/BDR. What does the BDR mean?**

**Answer: -**

**D**. Router 2.2.2.2 is a backup designated router.

**5- Which command is used to view the neighbor discovery table on a PC**?

**Answer: -**

**C**. netsh interface ipv6 show neighbor

**6- What type of variable is being shown? Routers = [R1,R2,R3]**

**Answer: -**

A. List

**7- Identify the fields in an IPv4 header. (Choose three)**

**Answer: -**

B. Time to Live

C. Source address

D. Destination address