

# Module : CCNA- Routing And Switching

## 1. Explain Switch

Ans. A **switch** is a **network device** used to connect multiple devices (PCs, printers, servers) within a **Local Area Network (LAN)**.

### Main functions:

- Works at **Layer 2 (Data Link Layer)** of OSI model
- Uses **MAC addresses** to forward data
- Sends data **only to the correct device**, not to all (unlike hub)

### Advantages:

- Faster communication
- Reduces network traffic
- More secure than hub

### Example:

PC1 → Switch → PC2 (data goes only to PC2)

## 2. Explain Switch Boot Sequence

Ans. When a **Cisco switch is powered ON**, it follows a fixed startup process called **Boot Sequence**.

### Switch Boot Steps:

1. **POST (Power On Self Test)** o Checks hardware  
(RAM, Flash, CPU)
2. **Boot Loader** o Small program stored in ROM o  
Initializes flash file system
3. **Load IOS** o Cisco IOS loaded from **Flash memory** into RAM
4. **Load Startup Configuration** o Configuration  
file loaded from **NVRAM**
  - o If not found → switch enters **setup mode**

### Memory used:

- ROM → Boot Loader
- Flash → IOS
- RAM → Running IOS & config
- NVRAM → Startup config

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

Ans. You can access the **Switch Command Line Interface (CLI)** in 3 ways:

#### **1. Console Access (Local)**

- Using **console cable**
- Direct physical connection
- Used for **initial configuration**

#### **2. Telnet (Remote – insecure)**

- Access switch over network
- Needs **IP address configured**
- Password is sent in **plain text** telnet 192.168.1.1

#### **3. SSH (Remote – secure)**

- Encrypted communication
- Most recommended
- Needs:
  - IP address
  - Username & password
  - Crypto key ssh -l admin 192.168.1.1

**Best practice:** Use **SSH**

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

Ans. **What is Cisco IOS?**

**Cisco IOS (Internetwork Operating System)** is the **software** that runs on Cisco switches and routers.

#### **Functions:**

- Device configuration
- Network security
- Routing & switching
- Interface management

#### **Basic Cisco IOS Configuration (Switch)**

Switch> enable

Switch# configure terminal

Switch(config)# hostname S1

S1(config)# enable password cisco

S1(config)# line console 0

```
S1(config-line)# password console123  
S1(config-line)# login  
S1(config)# exit  
S1# copy running-config startup-config
```

Modes in IOS:

- User mode >
- Privileged mode #
- Global config (config)#
- Interface config (config-if)#

## 5. Explain Switch Port

Ans. A **switch port** is a **physical interface** used to connect end devices.

### Types of Switch Ports:

#### 1. Access Port

- Connects to **end devices**
- Carries **single VLAN**

```
Switch(config)# interface fa0/1
```

```
Switch(config-if)# switchport mode access
```

```
Switch(config-if)# switchport access vlan 10
```

#### 2. Trunk Port

- Connects **switch to switch**
- Carries **multiple VLANs**

```
Switch(config)# interface fa0/24
```

```
Switch(config-if)# switchport mode trunk
```

### Port Status:

- **Up / Down**
- Can be enabled or disabled

```
Switch(config-if)# shutdown
```

```
Switch(config-if)# no shutdown
```