9. Switch Interfaces

Cisco CLI for Switches

Entering Privileged EXEC Mode
Enter Privileged EXEC mode:
SW1> enable

Show all interfaces and their statuses:
SW# show ip interface brief

- Displays Interface, IP Address, Method, Status (Layer 1), and Protocol (Layer 2).
- **Switches Default Behavior:** Interfaces are **not administratively down**, unlike routers (shutdown command). Unused ports show as "down/down."

Show Interface Status

Command:

SW1# show interfaces status

Displays:

- **Port:** Interface name.
- **Name:** Description.
- **Status:** Connection status (connected, notconnect).
- **VLAN:** VLAN assigned to the interface (default is VLAN 1).
- **Duplex:** Full or half (default: Auto).
- **Speed:** Mbps (default: Auto).
- **Type:** Medium type and interface capability.

Configuring a Range of Interfaces

To save time configuring multiple interfaces:

Enter Global Config Mode:
SW1# conf t

1.

Select an Interface Range:
SW1(config)# interface range f0/5 - 12 or int range f0/5 - 6, f0/9 -12 works too

2.

Apply Configurations (e.g., Add Description, Shutdown Unused Ports):
SW1(config-if-range)# description ## not in use ##
SW1(config-if-range)# shutdown

3.

Verify Status:
SW1# show interfaces status

4.

Set speed:

SW1(config-if-range)# speed 1000

5.

Set Duplex:

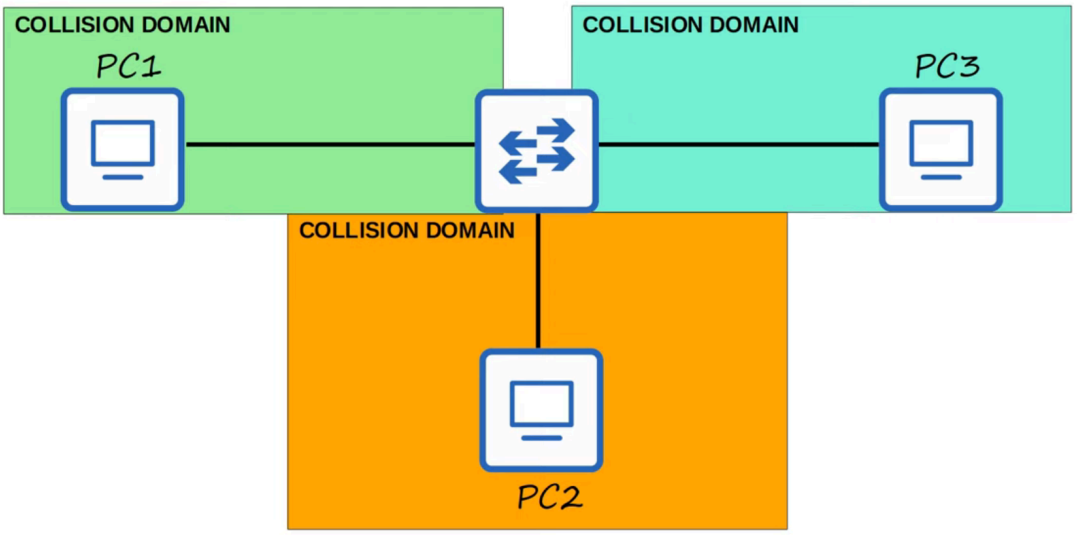
SW1(config-if-range)# duplex full/half

Full Duplex vs Half Duplex

- **Full Duplex:** Devices can send and receive simultaneously. Supported by most modern switches.
- **Half Duplex:** Devices can either send or receive, not both. Rarely used today but was common in LAN hubs.

Collisions and CSMA/CD

- **Half Duplex Devices** use **CSMA/CD (Carrier Sense Multiple Access with Collision Detection):**
    - Devices "listen" to the collision domain before sending data.
    - If a collision occurs, a jamming signal is sent, and devices retry after a random delay.
    - Collisions occur in **collision domains** (e.g., devices connected to a hub).
- **Switches (Layer 2):** Minimize collisions by providing dedicated connections.Devices attached to a switch can operate in a full duplex.



- **Hubs (Layer 1):** Flood frames, leading to frequent collisions.Devices attached to a hub must operate in half duplex.

Speed and Duplex Auto-Negotiation

Switches default to **auto-negotiation** for speed and duplex settings:

1. Interfaces advertise their capabilities.
2. They negotiate the best speed and duplex settings.

If Auto-Negotiation Fails:

- **Speed:**
  - The switch attempts to match the device's speed.
  - If unsupported, it defaults to the **lowest speed (e.g., 10 Mbps)**.
- **Duplex:**
  - For 10/100 Mbps: Defaults to **Half Duplex**.
  - For 1000 Mbps or higher: Defaults to **Full Duplex**.

Interface Counters and Error Types

To check interface statistics and errors:

SW1# show interfaces <interface name>

Displays the following error stats:

1. **Runts:** Frames smaller than 64 bytes.
2. **Giants:** Frames larger than 1518 bytes.
3. **CRC Errors:** Frames failing the Cyclic Redundancy Check (CRC).
4. **Frame Errors:** Frames with incorrect format.
5. **Input Errors:** Total of all receive errors (e.g., runts, giants, CRC).
6. **Output Errors:** Frames the switch attempted to send but failed.

Key Takeaways

- Switches are **Layer 2** devices, reducing collisions with dedicated connections.
- Auto-negotiation simplifies speed and duplex setup but may need manual tuning if disabled.
- Use `interface range` to efficiently manage multiple ports.
- Monitor **interface errors** to diagnose connection issues effectively.