Switching Protocols with Commands

1. STP (Spanning Tree Protocol)

- **What it does?**: Prevents loops in the network. If multiple switches are connected, it disables one link to avoid traffic circling.
- **Why it matters?**: Loops can crash the network.
- **Versions**: STP (original), RSTP (Rapid), MSTP (for large networks).
- **Example**: Two switches connected with two cables, STP disables one.
- **Commands**:
    - Enable STP for a VLAN :

      enable

      configure terminal

      spanning-tree vlan 10
    - Check STP status :
      show spanning-tree vlan 10
    - Switch to RSTP :
      spanning-tree mode rapid-pvst

2. VTP (VLAN Trunking Protocol)

- **What it does?**: Synchronizes VLANs across all switches. If you create a new VLAN, VTP notifies others.
- **Why it matters?**: Reduces manual configuration.
- **Modes**: Server (manages), Client (follows), Transparent (manages itself).
- **Example**: Create VLAN 10 on one switch, VTP updates all others.
- **Commands**:
    - Set to Server mode:
      enable

configure terminal

vtp mode server

vtp domain MyNetwork # Domain name

vtp password cisco123 # Password (optional)

- Check VTP status:
  show vtp status

- Add a VLAN:
  vlan 10
  name SALES
  exit

3. DTP (Dynamic Trunking Protocol)

- **What it does?**: Automatically sets ports to Trunk mode (for multiple VLANs).
- **Why it matters?**: Speeds up switch connections.
- **Note**: Can be disabled with switchport mode access.
- **Example**: Connect two switches, DTP creates a Trunk.
- **Commands**:
  - Set port to auto Trunk :
    enable
    configure terminal
    interface GigabitEthernet0/1
    switchport mode dynamic desirable # Suggests Trunk

  - Disable DTP :
    switchport mode access
    switchport nonegotiate

  - Check port status :
    show interfaces trunk

4. CDP (Cisco Discovery Protocol)

- **What it does?**: Discovers Cisco devices (switches, routers) and shows their details.
- **Why it matters?**: Helps map the network.
- **Example**: Use show cdp neighbors to see what's connected to port 1.
- **Commands**:
    - Enable CDP (usually on by default):
      enable

      configure terminal

      cdp run

    - Check neighbors :
      show cdp neighbors

    - Disable CDP (if not needed):
      no cdp run

5. LLDP (Link Layer Discovery Protocol)

- **What it does?**: Like CDP, but works with all brands, not just Cisco.
- **Why it matters?**: Useful with non-Cisco switches.
- **Example**: Detects a Huawei switch.
- **Commands**:
    - Enable LLDP:
      enable

      configure terminal

      lldp run

    - Check neighbors:
      show lldp neighbors

- Configure port for LLDP:
  interface GigabitEthernet0/1
  lldp transmit
  lldp receive
  exit

6. IGMP Snooping

- **What it does?**: Sends multicast traffic (like video) only to devices that need it.
- **Why it matters?**: Saves bandwidth.
- **Example**: In IPTV, only TVs get the video stream.
- **Commands**:
  - Enable IGMP Snooping:
    enable

    configure terminal

    ip igmp snooping

  - Enable for a specific VLAN:
    ip igmp snooping vlan 10

  - Check status:
    show ip igmp snooping

7. EtherChannel (PAgP or LACP)

- **What it does?**: Combines multiple ports to increase speed and reliability.
- **Why it matters?**: If one port fails, others keep working.
- **Types**: PAgP (Cisco), LACP (standard).
- **Example**: Bundle two ports, speed goes from 1 Gbps to 2 Gbps.
- **Commands**:
  - Configure with LACP:

```
enable
configure terminal
interface range GigabitEthernet0/1 - 2
channel-group 1 mode active    # LACP active
exit
interface port-channel 1
switchport mode trunk
switchport trunk allowed vlan 10,20,30
```

- Configure with PAgP:
  channel-group 1 mode desirable   # PAgP active

- Check status:
  show etherchannel summary