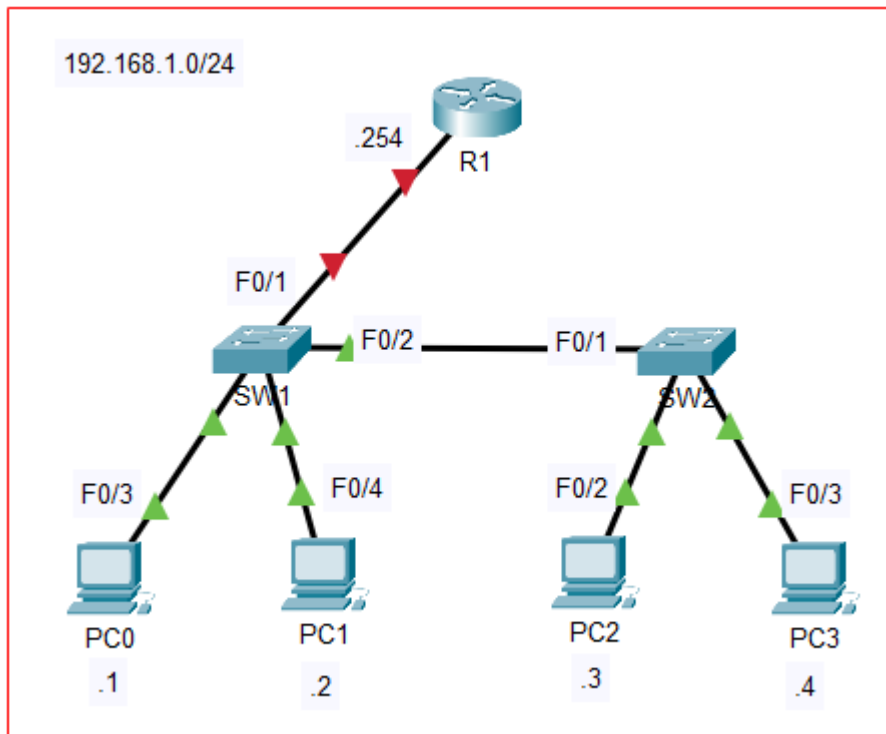# DAY 9 - Switch Interfaces

Purinat33

Switch Interface

Viewing Interfaces:

From SW1:

- **Viewing** SW1's interface (Same command as router): `show ip interface brief`

```
SW1#show ip interface brief
Interface          IP-Address       OK? Method Status                Protocol
FastEthernet0/1    unassigned       YES manual down                  down
FastEthernet0/2    unassigned       YES manual up                    up
FastEthernet0/3    unassigned       YES manual up                    up
FastEthernet0/4    unassigned       YES manual up                    up
FastEthernet0/5    unassigned       YES manual down                  down
FastEthernet0/6    unassigned       YES manual down                  down
FastEthernet0/7    unassigned       YES manual down                  down
FastEthernet0/8    unassigned       YES manual down                  down
FastEthernet0/9    unassigned       YES manual down                  down
FastEthernet0/10   unassigned       YES manual down                  down
```

- None of the interfaces have no **IP Assignment** because a **Switch is a**

Layer 2 Device while IP Address is a **Layer 3 Addressing**.

– There are reasons to assign IP Addresses to Switch's interfaces, but that comes later.

- **Router vs. Switch Interfaces**:
    – **Router** interfaces have the `shutdown` command applied by default (`administratively down/down` State)
    – **Switch** interfaces **DO NOT** have the `shutdown` command applied by default.
        * Will be in the `up/up` state if connected to another device.
        * Will be in the `down/down` state if **NOT** connected to another device.
- **View Speed and Duplex of each interface** via `show interfaces status`

```
SW1#show interfaces status
Port        Name                 Status       Vlan     Duplex  Speed Type
Fa0/1                            notconnect   1        auto    auto  10/100BaseTX
Fa0/2                            connected    1        auto    auto  10/100BaseTX
Fa0/3                            connected    1        auto    auto  10/100BaseTX
Fa0/4                            connected    1        auto    auto  10/100BaseTX
Fa0/5                            notconnect   1        auto    auto  10/100BaseTX
Fa0/6                            notconnect   1        auto    auto  10/100BaseTX
Fa0/7                            notconnect   1        auto    auto  10/100BaseTX
Fa0/8                            notconnect   1        auto    auto  10/100BaseTX
Fa0/9                            notconnect   1        auto    auto  10/100BaseTX
Fa0/10                           notconnect   1        auto    auto  10/100BaseTX
Fa0/11                           notconnect   1        auto    auto  10/100BaseTX
Fa0/12                           notconnect   1        auto    auto  10/100BaseTX
Fa0/13                           notconnect   1        auto    auto  10/100BaseTX
```

– **Name**: Description of an interface.
– **Status**: *Connected* or *Not Connected*
– **VLAN**: Will be covered later.
– **Duplex**: Direction of sending/receiving data.
– **Speed**: Depend on the **Speed of the slower of the two** (The interface *vs.* The device connecting to that interface).
    * eg: **10 Mbps** device connecting to the **100 Mbps** port will make the communication speed of this conncetion = **10 Mbps**.
– **Type**: `10` (**Ethernet**, Slower than **Fa**) and `100` (**Fast Ethernet** or **Fa**)
    * No `1000` or `10G` since these are **Fa** (**Fast Ethernet**) interfaces an not **G** (**Gigabit Ethernet**)

Duplex:

```
Switch(config)#interface f0/1
Switch(config-if)#duplex ?
  auto  Enable AUTO duplex configuration
  full  Force full duplex operation
  half  Force half-duplex operation
```

- **Full Duplex**:
    – The device *can send and receive data* **AT THE SAME TIME**, it does

not have to wait. (Most Modern Devices have this capabilities.)

- **Half Duplex**:
 - The device *cannot send and receive* data at the same time.
  - If it is receiving a frame, it must **wait** before sending a frame.
 - eg: **Hub**

Hub:

- Is considered to be a **Layer 1 Device** instead of Layer 2 because it performs similar function to *switches* (**Frame Routing**) but **without** the use of any **MAC Addressing** or **MAC Table**.
- More similar to a networking *repeater*.
- Will **Always Flood** the frames regardless of the frame's type.
- Devices connected to a Hub must always operate in **Half-Duplex** mode.
- Have a mechanism to deal with collisions called **CSMA/CD**.
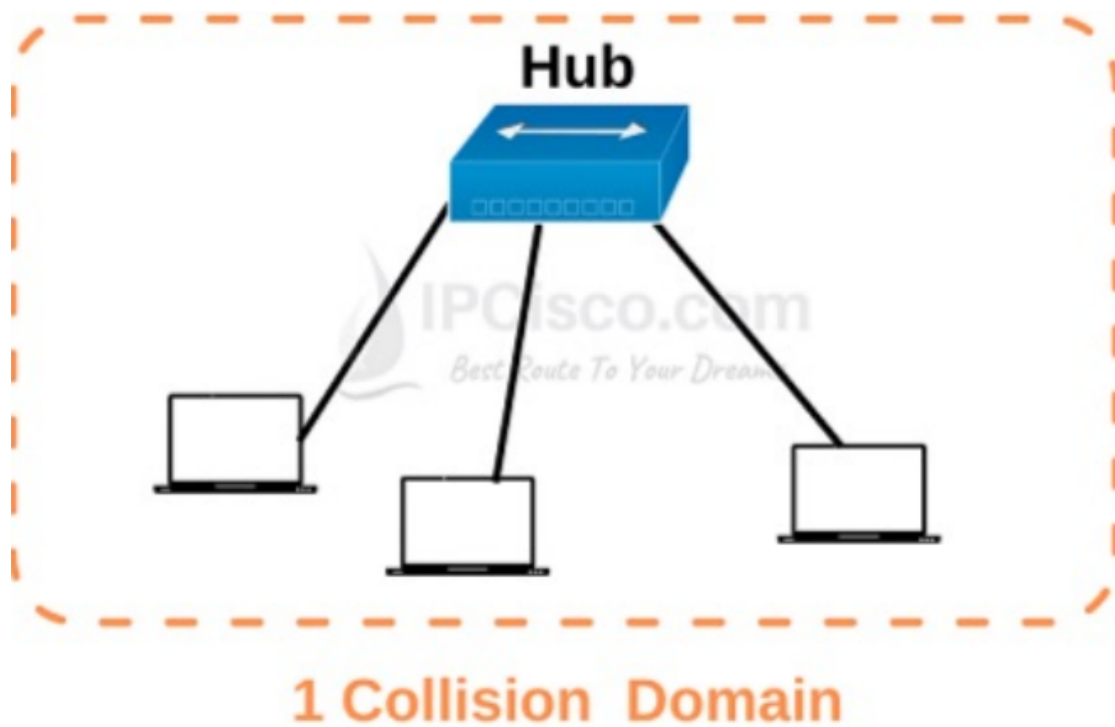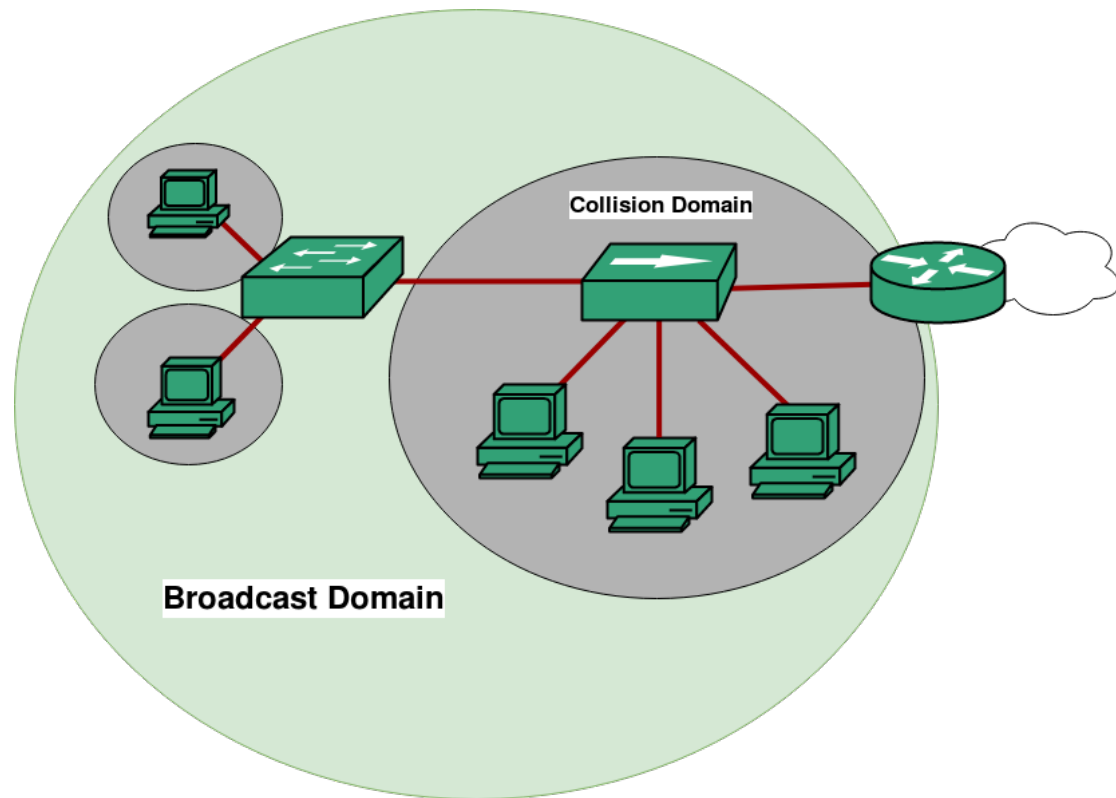
1 Collision Domain

CSMA/CD in

- **C**arrier **S**ense **M**ultiple **A**ccess *with* **C**ollision **D**etection
- Used in Half-Duplex situation (like **Hub** network) to deal with collisions.
- Before sending frames, devices **LISTEN** to the **Collision Domain** until they detect that other devices are not sending.
- If a **Collision** does occur, the device sends a jamming signal to inform the other devices that a collision happened.
- Each device will wait *a random period of time* before sending frames again.

Switch
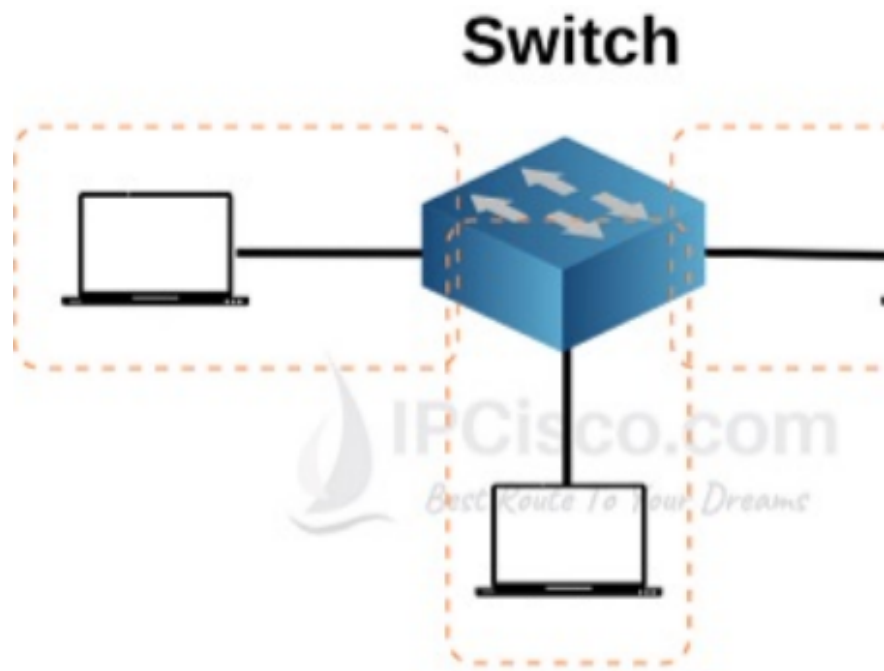
3 Collision Domain

Collision Domain in Switches

- As established, **Switches** are considered a **Layer 2 Device** due to usage of **MAC Addressing**, **Frame Forwarding** etc.
- Collisions *rarely* occur (More of a configuration fault rather than normal usual occurrences like in Hub)
- Devices connected to a Switch can operate in **Full-Duplex** mode.

Speed:

```
Switch(config-if)#speed ?
  10     Force 10 Mbps operation
  100    Force 100 Mbps operation
  auto   Enable AUTO speed configuration
```

Auto-negotiation

- Interfaces that can run at different speeds (**10/100** or **10/100/1000** have default settings of `speed auto` and `duplex auto`
- Interfaces **advertise** their capabilities to the neighboring device, and they negotiate the best `speed` and `duplex` settings they are capable of.
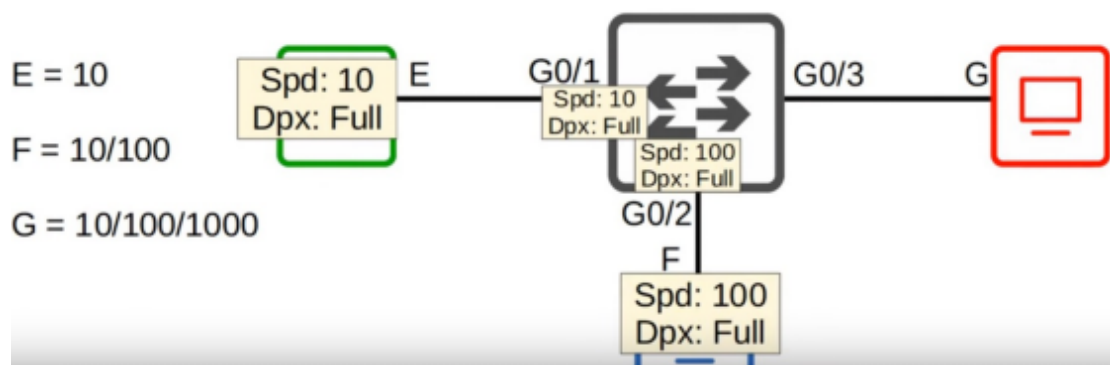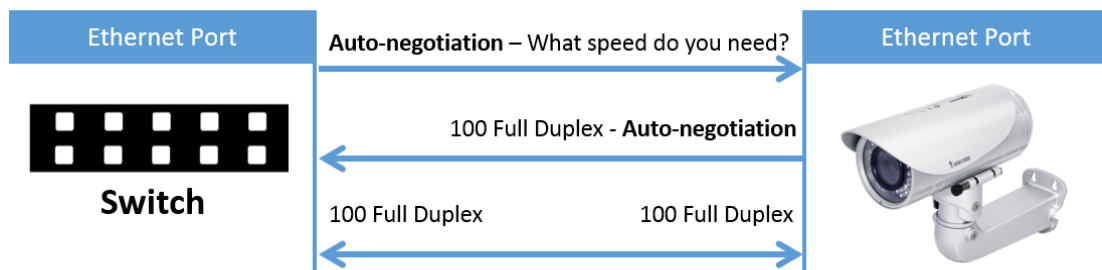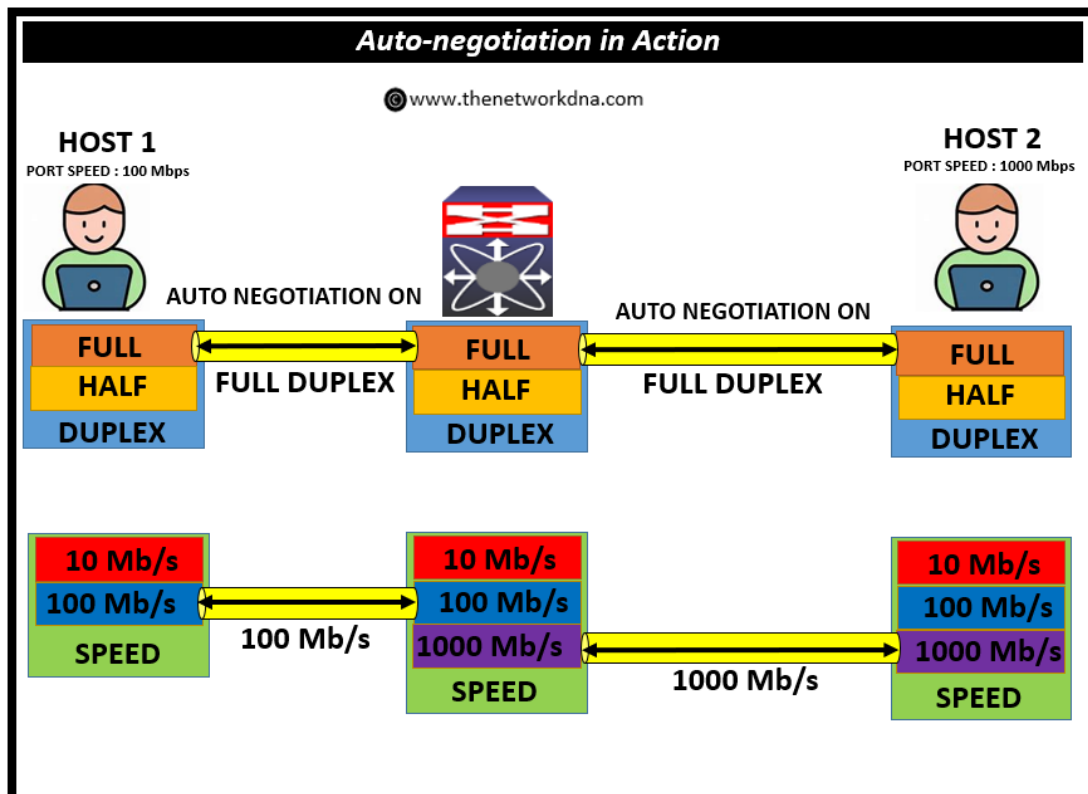
What if auto-negotiation is disabled on the device connected to the Switch?
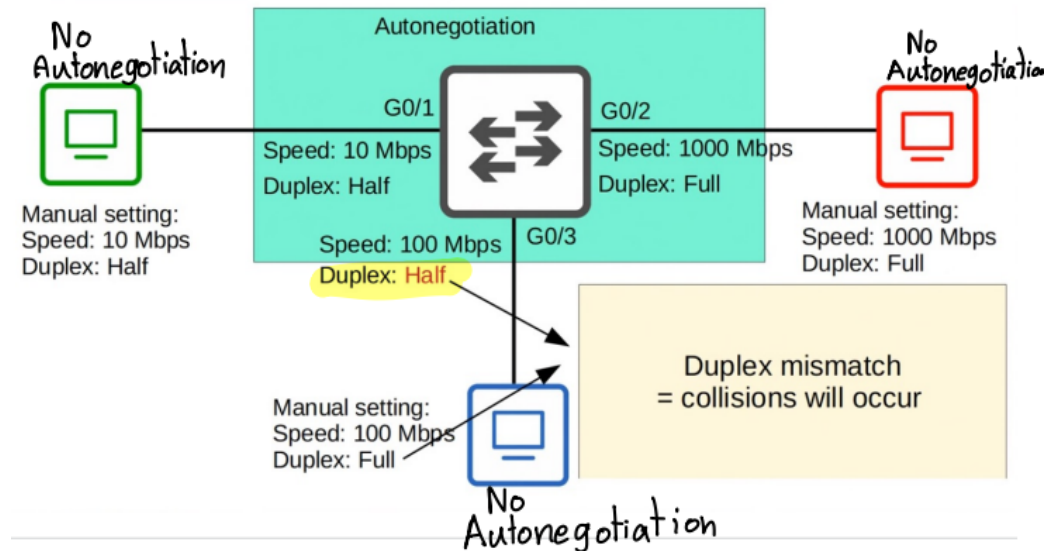
- **Speed**: The switch will try to sense the speed that the device is operating at.
    - If it fails to sense the speed, it will use the **slowest supported speed**

– eg. **10 Mbps** on a **10/100/1000** Interface
- **Duplex**:

  *If the speed is **10 or 100** Mbps, the switch will use **Half-Duplex**.*

  If the speed is **1000 Mbps** or greater, the switch will use **Full-Duplex**.

Interfaces Error

- `show interfaces {interface-name}` (Like routers).
- Interesting statistics: