

## Switch Interfaces

Command: show ip interface brief for switches:

- 1- Interfaces.
- 2- IP-Address: will remain unassigned as they are layer2 switch ports don't need an IP address.
- 3- OK?: Legacy indicator whether IP address is valid or not generally you are not allowed to assign invalid one (YES).
- 4-Method:indicates whether ip address is set or not.
- 5- Status: Layer1 status, if interface is connected "up" by default otherwise "down".
- 6- Protocol: Layer2 status, if interface is connected "up" by default otherwise "down".

Command: show interfaces status:

- 1- Port: a list of interfaces.
- 2- Name: interface description.
- 3- Status: connected or notconnect or disabled if shutdown and other statuses.
- 4- Vlan.
- 5- Duplex: by default auto (negotiate with the neighboring device and use full duplex if possible).  
Unconnected interfaces have a duplex of auto, a-full means automatically negotiated a duplex of full with neighboring device.
- 6- Speed : by default auto (means they can negotiate with the device they are connected to and use the fastest speed they are capable of), a-100 means a speed of 100 mb/s was auto negotiated with neighboring device).
- 7- Type: Interface type EX: 10/100 BaseTX.

Command: interface <interface> to configure interface then configure speed, duplex,desc,...etc.

When speed and duplex are configured "a" which stands for auto is removed.

Command: interface range <f0/5 – 6>, <f0/9-12> to configure a range of interfaces for example shutdown unused interfaces for security concerns.

In modern day networks half duplex is not used.

A HUB is an old network device which is simply a repeater that floods any frame it receives and its half duplex operates at layer 1 .

If two end hosts try to send two frames at the same time it might eventually lead to collision due to flooding both frames at the same time so the receiver would receive neither frame. All devices connected to a hub are part of collision domain. To deal with collision Ethernet devices use a mechanism called "CSMA/CD" (carrier sense multiple access with collision detection) → before sending frames devices listen to the collision domain until they detect that other devices are not sending., if a collision occurs due to bad timing or others the device sends a jammed signal to inform the other devices that a collision happened and each device then waits a random period before resending the frame.

Switches won't try to send 2 frames to the same host at once so each port represents a separate collision domain, so collisions are rare.

Interfaces that can run at different speeds are by default speed and duplex auto.

They negotiate to the neighboring device the best speed they are both capable of.

If auto negotiation is disabled the switch will try to sense the speed the other device is operating at, if it fails it will use the slowest supported speed, if it ends up using 10 or 100 mb/s it uses half duplex otherwise full duplex (can't sense duplex), If it sensed a 10 or 100 mb/s and was adjusted to half duplex while connected device is full duplex a duplex mismatch occurs which can cause collisions, that's why auto negotiation is better.

Command: show interfaces <interface name optional> can show counters as ( same on a router):

- 1- total number of packets received on interface and total number of bytes.
- 2- Runts: frames smaller than minimum frame size 64 bytes.
- 3- Giants: frames larger than max frame size of 1518 bytes.
- 4- CRC: frames that failed CRC checks.
- 5- frame: frames with illegal or incorrect format.
- 6- input errors: total of various counters and output errors: frames switch tried to send but failed due to an error)