

IPv4 Addressing

Routers are used to connect different LANS, need an IP address for each network they are connected to.

Broadcasts are limited to local networks.

IPv4 length is 4 bytes.

IP is written in dotted decimals as: 192.168.1.254/24 each octet is represented by a byte means first 3 bytes identify the local network portion and the remaining byte represents the end host.

Class A → 0xxxxxxx/8, B → 10xxxxxx/16 C → 110xxxxx/24, D → 1110xxxx, E → 1111xxxx.

Class D are reserved for multicast addresses and E for experimental uses.

127.0.0.0 → 127.255.255.255 are loop back addresses to test network stack of local device.

The first address in each network is the network address/id and the last one is the broadcast address thus can't be assigned to hosts (broadcast dest address is accompanied by dest mac address FFFF.FFFF.FFFF).

Netmasks (represent prefix length): A → 255.0.0.0, B → 255.255.0.0, C → 255.255.255.0.

Max number of hosts per network = $2^{(N.\text{of host bits})-2}$.

On a router → show ip interface brief:

- 1- Interfaces.
- 2- IP addresses assigned to each interface.
- 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: Layer 1 status of the router by default administratively down meaning its disabled with shutdown command.
- 6- Protocol: Layer 2 status if layer 1 is down then 2 is down can't operate.

Switch interfaces status are either up if connected or down if not.

Command: interface <interface-name> to configure a specific interface.

Command: ip address <address> <subnet mask> to configure IP address.

Command: no shutdown to enable interface.

You can directly switch from one interface to another without exit command.

Command: show interfaces <optional interface name> shows layer1, layer2 and some layer3 info about the interface.

You can configure a different mac address in CLI rather than BIA.

Command: show interfaces description:

- 1- Interface.
- 2- Status.
- 3- Protocol.
- 4- Description (optional).

Command: description <description> to configure a description to an interface.