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# IP ADDRESSING SCHEME

# ROADMAP

- Protocol
- TCP/IP
- IPv4 Address
- IP Address Types
- NAT

# PROTOCOL

**Protocol:** set of rules to follow to have proper communication.

**Network protocols:**

- TCP/IP - DOD
- IPx/SPx - Novell
- AppleTalk - Apple
- NetBIOS - Microsoft
- OSI – ISO

# WHAT IS TCP/IP

TCP/IP is a standard protocol used between computers and network devices for communication.

**TCP/IP addressing:**

- IP Address is logical address given to each and every device in the network.
- It is a Network layer address(Layer 3)
- Two versions of IP:
  - IP Version 4
  - IP Version 6

# IPV4 ADDRESS

Bit is represented by 0 or 1.
IP address in binary form (32 bit).

32 bits are divided into 4 Octets:

| 01010101 | 10000101 | 10111111 | 00000011 |
|---|---|---|---|
| First Octet | Second Octet | Third Octet | Fourth Octet |

IP Address in decimal form:
85.133.191.3

# RANGE OF IPv4 ADDRESS

Taking example as all 0's and all 1's

| $2^7$ | $2^6$ | $2^5$ | $2^4$ | $2^3$ | $2^2$ | $2^1$ | $2^0$ | |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | = 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | = 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | = 2 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | = 3 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | = 4 |

1 1 1 1 1 1 1 1 = 255

**Total IP Address Range: 0.0.0.0 to 255.255.255.255**

# IP ADDRESS CLASSIFICATION

IP ADDRESS are divided into 5 classes

CLASS A  0 - 127
CLASS B  128 - 191
CLASS C 192 - 223
CLASS D 224 – 239
CLASS E 240 – 255

CLAS A, B, C used in LAN & WAN
CLASS D reserved for multicasting
CLASS E reserved for research & development and for future use

# TYPES OF COMMUNICATION

In an IPv4 network, the hosts can communicate one of three different ways:

- Unicast - One to One
- Broadcast - One to All
- Multicast - One to Many

| PUBLIC IP | PRIVATE IP |
| --- | --- |
| Used on public network(INTERNET) organization | Used with the LAN or within the |
| Recognized on internet | Not recognized on internet |
| Given by the service provider(from IANA) | Given by the administrator |
| Globally unique organization | Unique within the network or |
| Pay to service provider | Free |
| Registered | Unregistered IP |

# PRIVATE IP ADDRESS

There are certain addresses in each class of IP address that are reserved for Private Networks. These addresses are called private addresses.

**CLASS A**

10.0.0.0 to 10.255.255.255 (10.X.X.X)

**CLASS B**

172.16.0.0 to 172.31.255.255

**CLASS C**

192.169.0.0 to 192.168.255.255 (192.168.X.X)

# ELASTIC IP ADDRESS

- To use an Elastic IP address, you first allocate one to your account, and then associate it with your instance or a network interface.
- When you associate an Elastic IP address with an instance or its primary network interface, the instance's public IP address (if it had one) is released back into Amazon's pool of public IP addresses.
- You can disassociate an Elastic IP address from a resource, and reassociate it with a different resource.
- A disassociated Elastic IP address remains allocated to your account until you explicitly release it.
- An Elastic IP address is for use in a specific region only.

# NETWORK AND HOST PORTIONS

IP Address is divided into Network & Host Portion.

| | |
|---|---|
| CLASS A | N.H.H.H |
| CLASS B | N.N.H.H |
| CLASS C | N.N.N.H |

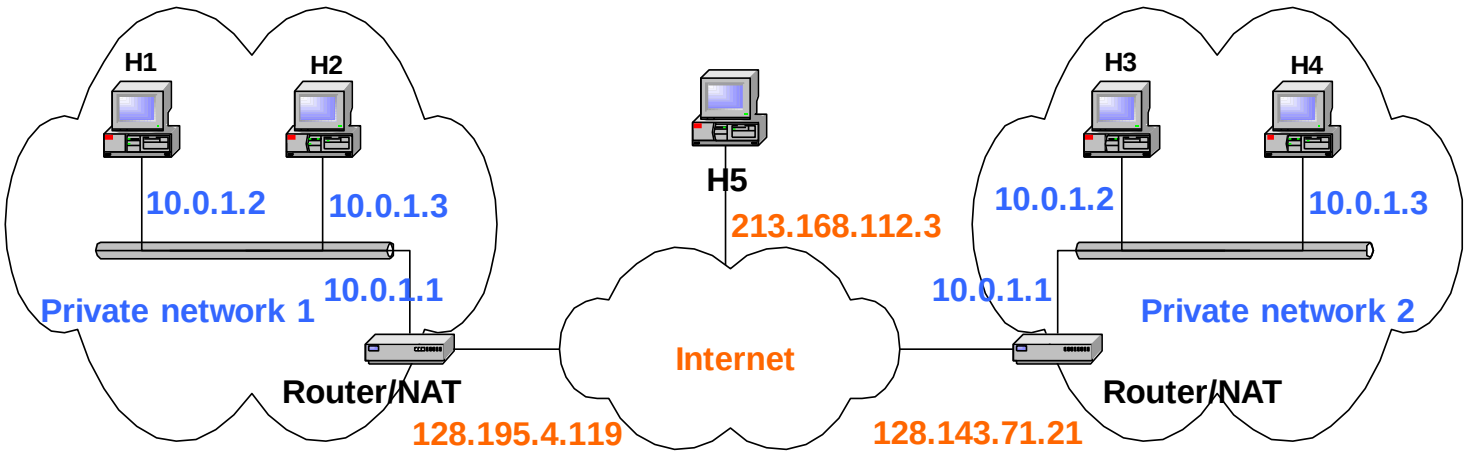
Host:  specific a device in the network.

Network: set of devices

# NETWORK ADDRESS TRANSLATION (NAT)

NAT (Network Address Translation) Maps Private IPs to Public IPs

It is required because of shortage of IPv4 Address




# Thank you