

# IP Address

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# Previous Session

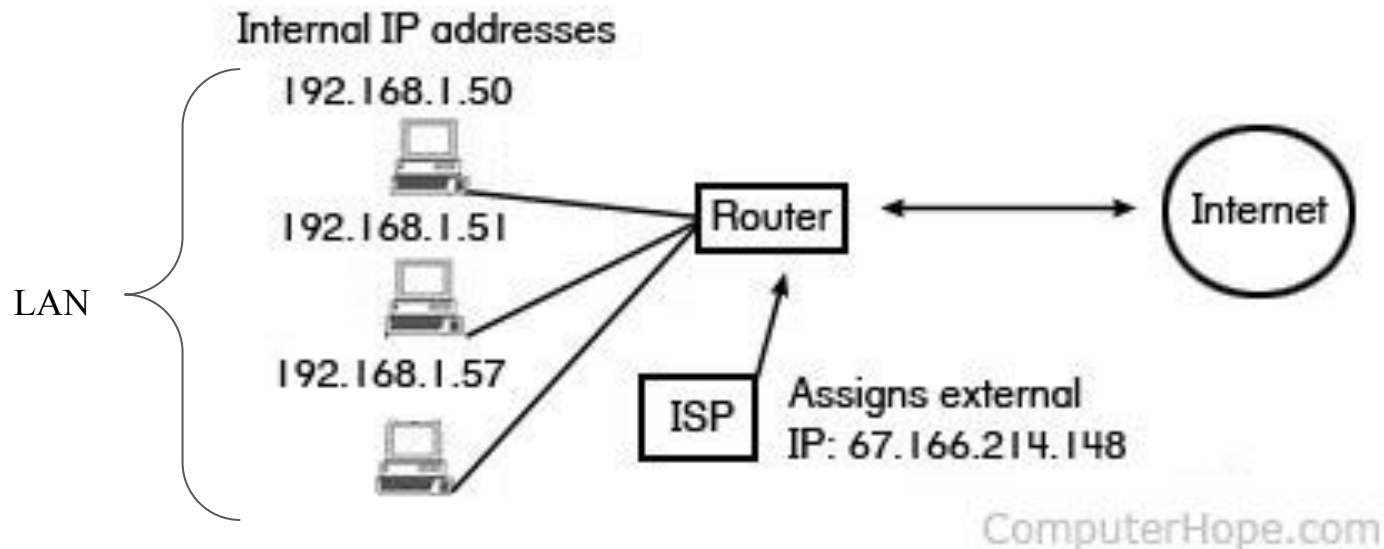
- Roles of Network Layer
  - Finding the optimal path
  - Routers and Routing Tables
  - Providing QoS
- Virtual Circuits
  - Dedicated Path
  - VC ID
- Differences between Datagram Subnet and VC Subnet
- IP Addresses - Who will assign ?
  - ICANN, IANA, RIR, ISPs

# How to Manage ?

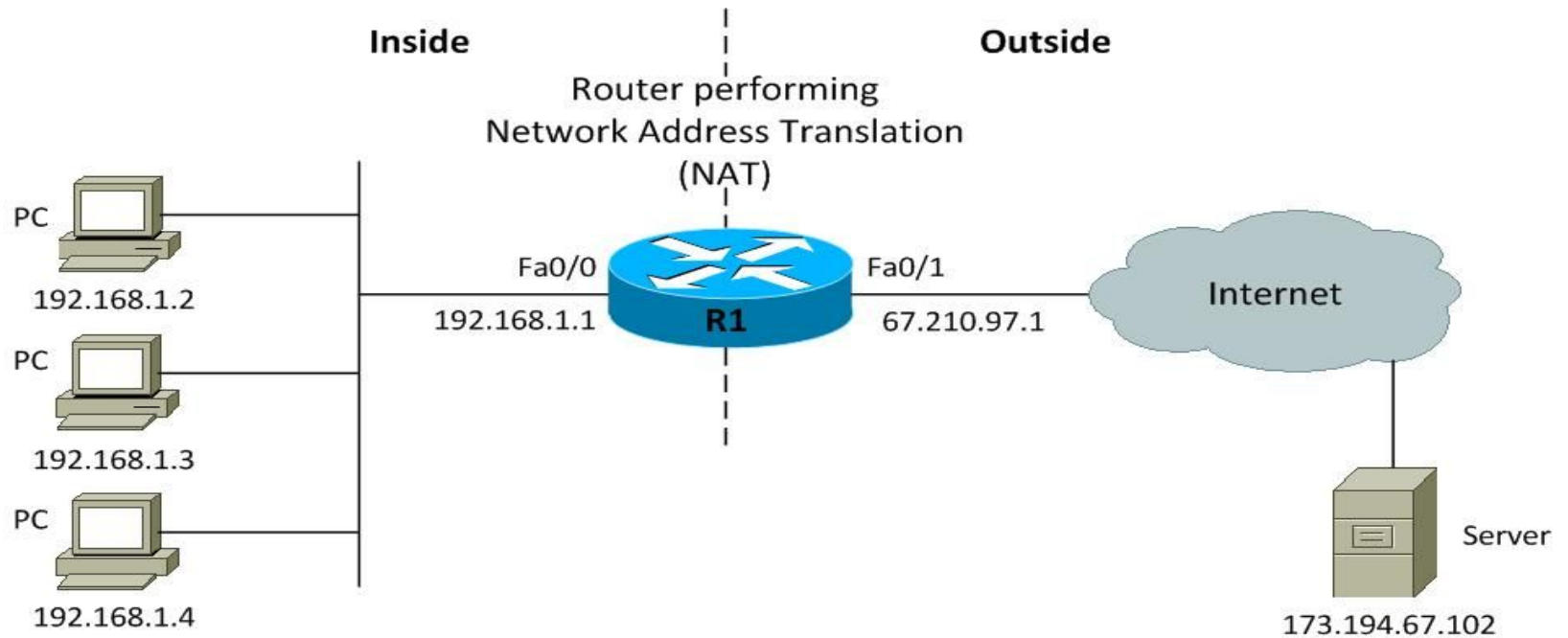
- Entire World Needs IP Address
- Can Not Restrict People
- @ NITK - 500 + systems
  - IP address for 500 systems (Hostels are not included)?
  - What about the cost of the 500 + IP Addresses ?
- Solution
  - Public and Private Address
  - Increase the IP addresses
  - Remember IPv6 ?

# Private and Public IP Addresses

- Public IP address is open to Internet.
- Private is with in the organization.
- @ NITK : One or more Public IP address
  - All systems in NITK, has private IP address (10.100. X. X ).
  - These private IP addresses are not visible in Internet.
  - Assigned by system admin.
- For 500 + systems,
  - No need to purchase all 500+ public IP address.
  - All systems will be handled by private address only.



- Port - Connection endpoint.
  - Serial Port, Parallel Port
  - Endpoints where physical devices are connected,
  - Usually associated with sockets.
  - Socket Programming (Home work)
- Ranges from 0 - 65535
  - **Ports 0–1023** – system or [well-known ports](#)
  - **Ports 1024–49151** – user or registered ports
  - **Ports 49152–65535** – [dynamic](#) / [private](#) / [ephemeral ports](#)
- Network Address Translation (NAT Table)
  - Router maintains it.



**NAT Translation Table**

Protocol	Inside Local IP : Port	Inside Global IP : Port
ICMP	192.168.1.2 : 18	67.210.97.1 : 18
ICMP	192.168.1.3 : 19	67.210.97.1 : 19
ICMP	192.168.1.4 : 20	67.210.97.1 : 20

# Private and Public IP addresses

	<b>Private IP Address</b>	<b>Public IP Address</b>
Visibility	With in the LAN (With in NITK) Used within the LAN/Network	Outside the Network (Outside NITK) Used Globally
Communication	It is used to communicate within the network	It is used to communicate outside the network
Where Can I Find ?	Not over the Internet	Over the Internet
Who Assigns It ?	Network Administrator	ISPs
How Much Should I Pay ?	Free of Cost	Depends on the ISPs



# Does your mobile have IP Address?

- YES.
- Settings > About device > Status
  - Both IP address and MAC address.

## Mobile IP Address is private or public ?

- It is Public.



# Static and Dynamic IP addresses

- Static IP address - Does not change
- Dynamic IP address - Changes Frequently (Can be Private or Public)
  - A pool of free IP addresses.
  - When the system is connected to the network New IP is given.
  - From the pool of available IP addresses one will be assigned
  - Once the system is shutdown/ leaves the network the IP address will be returned to the Pool
- Dynamic Host Configuration Protocol (DHCP) - for Private IP Address
  - Manages the IP address
- ISPs - for Public IP Address

# Addressing Schemes

- Dotted Decimal Format
  - $X.X.X.X$
- IPv4
  - 32 bit - 8 bytes -  $2^{32}$
  - Total Addresses - 429,496,7296
- IPV6
  - 128 bit - 16 bytes -  $2^{128}$
  - Double the IP Addresses of IPv4