Computer Networks

A Bottom up approach

Basics of IP addressing

OUTCOMES

Upon the completion of this session, the learner will be able to

★ Understand the basics of IP addressing.

★ Know how to see the IP address in real device.

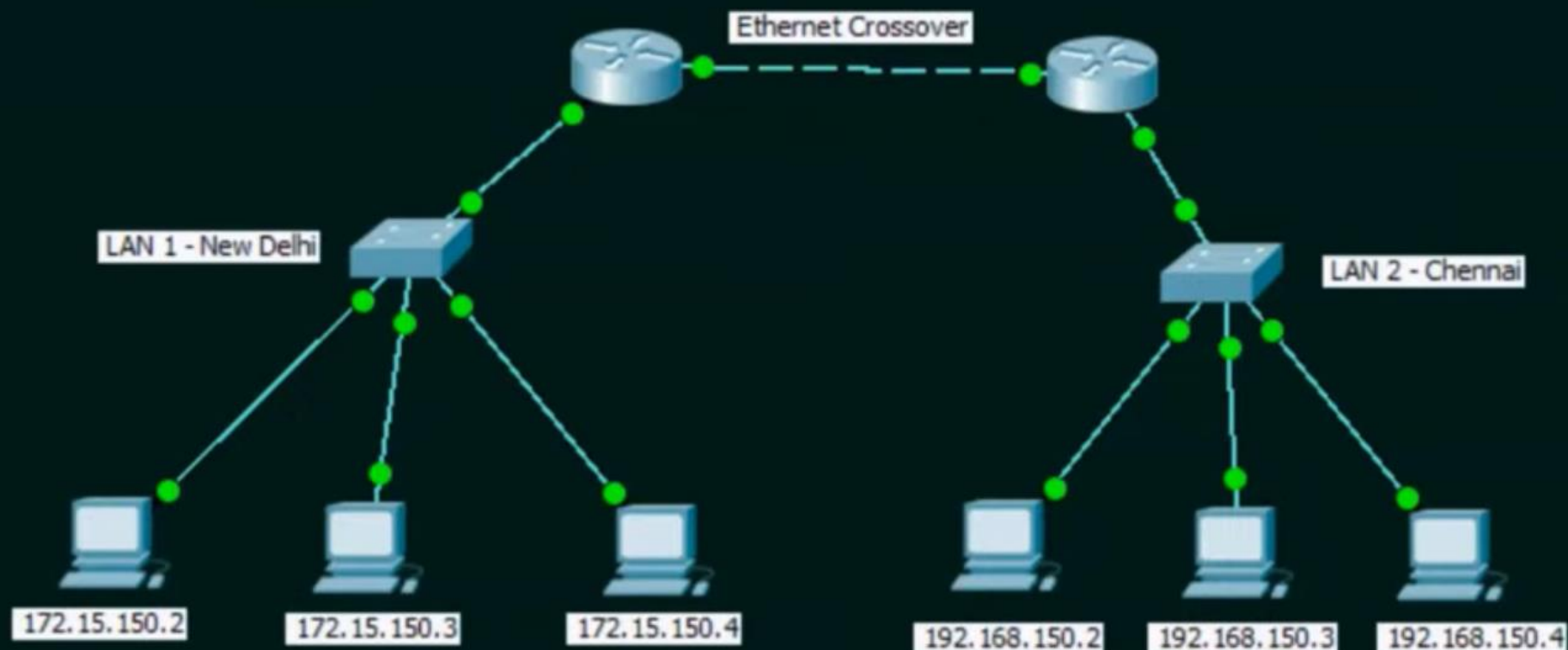★ Identify valid and invalid IP addresses.

IP Address

IP stands for Internet Protocol.

Every node in the computer network is identified with the help of IP address.

IP Address

Every node in the computer network is identified with the help of IP address.

IP Address (IPV4)

★ Every node in the computer network is identified with the help of IP address.

★ Logical address.

★ Can change based on the location of the device.

★ Assigned by manually or dynamically.

★ Represented in decimal and it has 4 octets (x.x.x.x).

★ 0.0.0.0 to 255.255.255.255 (32 bits).

How to see IP Address in real device???

Activity Time

Identify the valid and invalid IP addresses in the following set and place the options in the appropriate columns.

a. 24.25.26.8

b. 10.3.156.256

c. 0.0.0.0

d. 255.255.255.255

e. 100.2.6.345.456

f. 16.2e.45.67

Valid IP Addresses	Invalid IP Addresses

Activity Time

Identify the valid and invalid IP addresses in the following set and place th
options in the appropriate columns.

a. 24.25.26.8

b. 10.3.156.256

c. 0.0.0.0

d. 255.255.255.255

e. 100.2.6.345.456

f. 16.2e.45.67

Valid IP Addresses	Invalid IP Addresses
a, c, d	b, e, f

OUTCOMES

Upon the completion of this session, the learner will be able to

★   Understand the basics of IP addressing.

★   How to see the IP address in real devices.

★   Identify valid and invalid IP addresses.

Computer Networks

A Bottom up approach 🌍

Basics of MAC addressing

Outcomes

Upon the completion of this session, the learner will be able to

★ Understand the basics of MAC addressing.

★ Understand the difference between IP address and MAC Address.

★ See the MAC address in real devices.

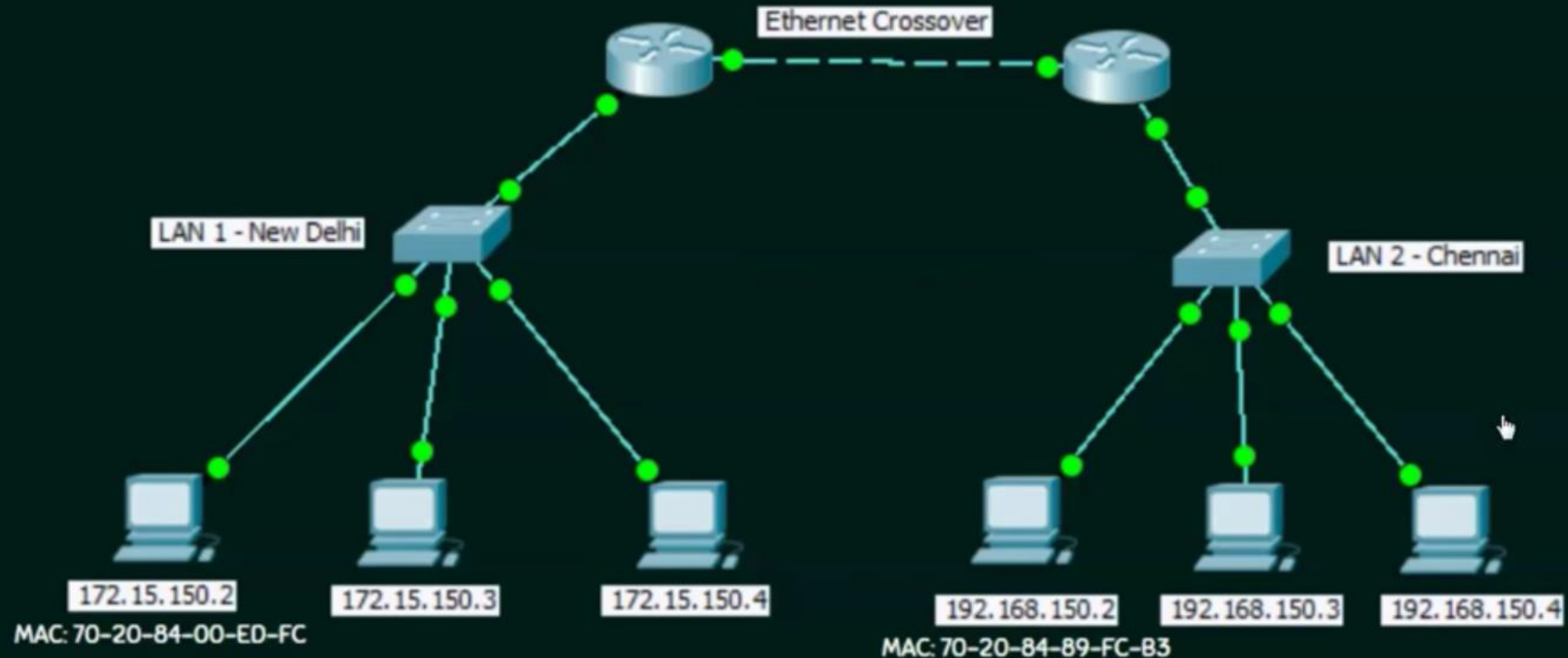# MAC Address

MAC stands for Media Access Control.

Every node in the LAN is identified with the help of MAC address.

IP Address = Location of a person.

MAC Address = Name of the person.

MAC Address

★ Every node in the LAN is identified with the help of MAC address.

Ethernet Crossover

LAN 1 - New Delhi

LAN 2 - Chennai

172.15.150.2
MAC: 70-20-84-00-ED-FC

172.15.150.3

172.15.150.4

192.168.150.2

192.168.150.3

192.168.150.4

MAC: 70-20-84-89-FC-B3

MAC Address

★ Every node in the LAN is identified with the help of MAC address.

★ Physical address or Hardware Address.

★ Unique.

★ Cannot be changed.

★ Assigned by the manufacturer.

★ Represented in hexadecimal.

★ Example: 70–20–84–00–ED–FC (48 bits).

★ Separator: hyphen(–), period(.), and colon(:).

IP Address Vs MAC Address

IP Address	MAC Address
Needed for communication.	Needed for communication.
32 bits.	48 bits.
Represented in Decimal.	Represented in hexadecimal.
Router needs IP Address to forward data.	Switch needs MAC address to forward data
Example: 10.10.23.56	Example: 70–20–84–00–ED–FC

How to see MAC address???

COMPUTER NETWORKS

A Bottom up approach

Basic Networking Commands (Part 1)

OUTCOMES

Upon the completion of this session, the learner will be able to

★ Know the basic networking commands such as

- IPCONFIG

- IPCONFIG/ALL

- NSLOOKUP

- PING

- TRACERT

How to use the basic networking commands?

Programs (1)

cmd

Files (6)

README

DOSBox 0.74 Manual

BIOS.H

DOS.H

BGIDEMO.C

Setup

See more results

```
C:\Windows\system32\cmd.exe

C:\Users\Shrinikha>ipconfig

Windows IP Configuration


Wireless LAN adapter Wireless Network Connection:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2405:201:e807:77e0:502b:d0af:92a6:2b74
   Temporary IPv6 Address. . . . . . : 2405:201:e807:77e0:4012:dd69:520a:d61b
   Link-local IPv6 Address . . . . . : fe80::502b:d0af:92a6:2b74%16
   IPv4 Address. . . . . . . . . . . : 192.168.29.173
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::7add:12ff:feb5:adbc%16
                                       192.168.29.1

Ethernet adapter Local Area Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Ethernet adapter Bluetooth Network Connection:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Tunnel adapter isatap.{E953AEF5-D3DF-41CB-98BD-10949DF46F62}:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Tunnel adapter isatap.{0DE4C715-0ACE-4AC0-86B5-8299EDEEB307}:

   Media State . . . . . . . . . . . : Media disconnected
```

```
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Windows IP Configuration


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   IPv4 Address. . . . . . . . . . . : 192.168.29.173
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
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   Subnet Mask . . . . . . . . . . . : 255.255.255.0
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   Media State . . . . . . . . . . . : Media disconnected
```

Layer 3 means Network Layer.
Network Layer uses IP Addresses.

```
C:\Windows\system32\cmd.exe

Windows IP Configuration


Wireless LAN adapter Wireless Network Connection:

   Connection-specific DNS Suffix  . :
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                                       192.168.29.1

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   Connection-specific DNS Suffix  . :

C:\Users\Shrinikha>ipconfig/all_
```

```
C:\Windows\system32\cmd.exe - nslookup

C:\Users\Shrinikha>nslookup
Default Server:  reliance.reliance
Address:  2405:201:e807:77e0::c0a8:1d01

> www.nesoacademy.org
Server:  reliance.reliance
Address:  2405:201:e807:77e0::c0a8:1d01

Non-authoritative answer:
Name:     nesoacademy.org
Address:  192.169.217.12
Aliases:  www.nesoacademy.org

>
```

```
C:\Windows\system32\cmd.exe - ping 192.169.217.12
```

```
C:\Users\Shrinikha>nslookup
Default Server:   reliance.reliance
Address:   2405:201:e807:77e0::c0a8:1d01

> www.nesoacademy.org
Server:   reliance.reliance
Address:   2405:201:e807:77e0::c0a8:1d01

Non-authoritative answer:
Name:      nesoacademy.org
Address:   192.169.217.12
Aliases:   www.nesoacademy.org

>
C:\Users\Shrinikha>ping 192.169.217.12

Pinging 192.169.217.12 with 32 bytes of data:
Reply from 192.169.217.12: bytes=32 time=328ms  TTL=48
```

```
C:\Windows\system32\cmd.exe

> www.nesoacademy.org
Server:   reliance.reliance
Address:   2405:201:e807:77e0::c0a8:1d01

Non-authoritative answer:
Name:     nesoacademy.org
Address:  192.169.217.12
Aliases:  www.nesoacademy.org

>
C:\Users\Shrinikha>ping 192.169.217.12

Pinging 192.169.217.12 with 32 bytes of data:
Reply from 192.169.217.12: bytes=32 time=328ms TTL=48
Reply from 192.169.217.12: bytes=32 time=347ms TTL=48
Reply from 192.169.217.12: bytes=32 time=268ms TTL=48
Reply from 192.169.217.12: bytes=32 time=290ms TTL=48

Ping statistics for 192.169.217.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 268ms, Maximum = 347ms, Average = 308ms

C:\Users\Shrinikha>ping 10.20.34.5

Pinging 10.20.34.5 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.20.34.5:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Shrinikha>
```

```
C:\Windows\system32\cmd.exe
```

```
C:\Users\Shrinikha>tracert 192.169.217.12_
```

```
C:\Windows\system32\cmd.exe

C:\Users\Shrinikha>tracert 192.169.217.12

Tracing route to ip-192-169-217-12.ip.secureserver.net [192.169.217.12]
over a maximum of 30 hops:

  1      3 ms       1 ms       1 ms   reliance.reliance [192.168.29.1]
  2      4 ms       3 ms       6 ms   100.90.247.1
  3      5 ms       4 ms       4 ms   172.25.106.38
  4      5 ms       4 ms       5 ms   172.25.106.38
  5      5 ms       5 ms       4 ms   172.17.114.42
  6      6 ms       4 ms       4 ms   172.17.114.41
  7      7 ms       5 ms       5 ms   103.198.140.170
  8    203 ms     202 ms     203 ms   49.45.4.85
  9    270 ms     211 ms     299 ms   103.198.140.83
 10    218 ms     340 ms     270 ms   reserved.metro.la.ipv4.godaddy.com [206.223.123.
32]
 11    292 ms     306 ms     307 ms   148.72.32.16
 12    228 ms     222 ms     224 ms   be38.trmc0215-01.ars.mgmt.phx3.gdg [184.168.0.69
]
 13    312 ms     218 ms     218 ms   ip-208-109-112-121.ip.secureserver.net [208.109.
112.121]
 14    310 ms     306 ms     306 ms   ip-192-169-217-12.ip.secureserver.net [192.169.2
17.12]

Trace complete.

C:\Users\Shrinikha>_
```

OUTCOMES

Upon the completion of this session, the learner will be able to

★ Know the basic networking commands such as

- IPCONFIG

- IPCONFIG/ALL

- PING

- TRACERT

- NSLOOKUP