

## Lecture 9 → Basics of IP Addressing..

① IP Address → Internet Protocol Address.

→ Every node in computer networks is identified with help of IP address.

Eg:- 172.15.150.2

② 2 types → IPv4 and IPv6 (discussed later).

### IPv4 characteristics

→ Every node has an IP address

→ Can change for a device based on its location.

→ Assigned manually (or) dynamically.

→ Represented in decimal [0.0.0.0 to 255.255.255.255]  
(32bit address)

③ In a real device. → ip config command in cmd gives the ip-address.

## Lecture 10 → Basics of MAC Addressing

① MAC → Media Access Control.

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

Eg:- 70-20-84-00-E3-PC.

② MAC address → Name of device.  
(LAN)

IP address → Location of device

③ IP addresses are router friendly and mac address are switch friendly.

④ → Characteristics of MAC

→ Every node in LAN identified with help of MAC address.

→ Unique, cannot change.

→ Assigned by manufacturer.

(48 bits)

→ Represented in hexadecimal. [70:20:84:00:ED:FC]

→ for separation (:), (-) or (.) can be used.

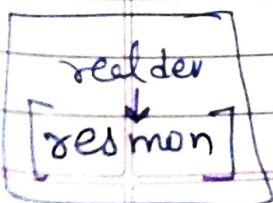
⑤ To see Mac address in device → in cmd, give  
ipconfig/all.

### Lecture 11 → Basis of Port Addressing.

① → After the LAN (switch) identifies device using MAC address, the package should also reach right process.

② → Also called Port number. → Dynamic (new process).  
→ fixed (predefined)

→ port number vary from (0 — 65535)

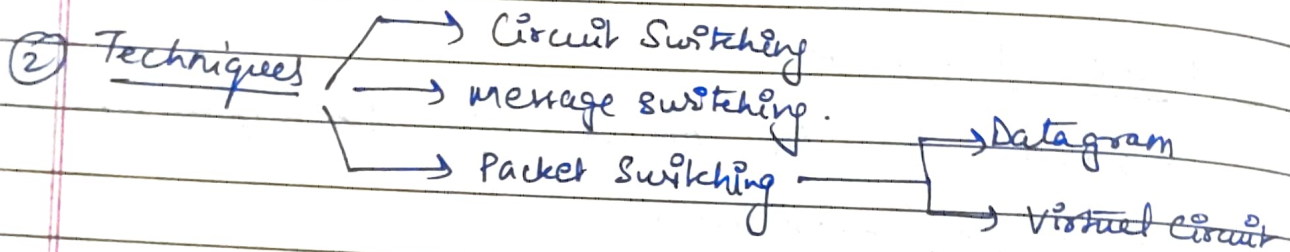


eg: — chrome browser requesting youtube.com.  
[one of the processes]

## Lecture 12 → Switching Techniques in Computer Networks.

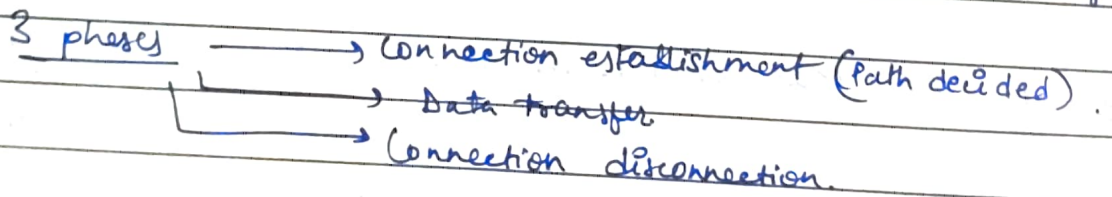
### Switching.

① Helps in deciding the best route for data transmission. If multiple paths are present in a large network.



③ Circuit Switching.  
(Telephones).

→ A dedicated path is established b/w sender and receiver, and before the data transfer connection established first.



④ Message Switching

→ Store & Forward mechanism.

→ Not suited for streaming or real time applications.

Break down, forwarded and when all detected at node then forwarded again.



## ⑤ Packet Switching

→ Like message switching, the message/package is broken down into small chunks but unlike message switching, small chunk sent as a packet not stored in nodes.

→ Each packet, ∴ should have source & destination IP address & sequence numbers.

↳ Helps receiver to Reorder, check missing packets & send acknowledgement.

### → Datagram

### Virtual Circuit

① Connectionless Switching.

① connection oriented switching.

② Path not fixed, decided by intermediate nodes.

② Preplanned route before message is sent.

③ Each independent chunk called datagram.

③ Call accept & call request used to develop connection.

## Lecture 13 — Layering in Computer Networks.

① Layering → Breaking the problem into more manageable components (layers).

[Easier to troubleshoot].

⇒ Layered Architectures

- OSI Reference Model
- TCP/IP Model.

② OSI Model (Reference).

\* Open System Interconnection.

→ Not a protocol, just a guideline, hence called OSI reference model.

→ Flexible, robust & interoperable.

→ Irrespective of diff hardware & software doesn't matter

③ TCP/IP Model

Transmission Control Protocol / Internet Protocol..

Developed before OSI model.

TCP/IP is a hierarchical protocol.

# Lecture 14, 15, 16, 17 → OSI Reference Model.

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- ① Layers → 7 →
- Application
  - Presentation
  - Session
  - Transport
  - Network
  - Data Link
  - Physical
- } Please DON'T Throw the Sausage Pizza Away

- ② Any data/packet, has to pass all layers on every device  
(PCs (7 layers)), (3 layers in intermediate <sup>nodes</sup>) (routers). [for addressing]

Sender (7 to 1)  
Receiver (1 to 7)

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## ③ Application layer

→ Enables the user to access network resources.

- File transfer & Access management.
  - Mail services, Directory services.
- (Eg: internet) } Services

## ④ Presentation layer

→ what do first 8 bit represent, next 8 bit.

→ Concerned with the syntax and semantics of the information exchanged b/n systems.

→ what section represent what.

Translation  
Encryption  
Compression } into a format accepted by receiver.  
Services.



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⑤ Session layer

→ Establishes, maintains and synchronizes the interaction among communication devices

Dialogue Control.  
Synchronization } Services.  
→ Allows comm devices to enter into dialog. (half duplex or full)

16.

⑥ Transport layer

→ Responsible for process to process delivery of the entire message.

[Even specific them computer to computer]

Connectionless or connection: Port addressing  
Connection control  
Segmentation & Reassembly  
End-to-end flow control  
Error control } Services.  
→ for very big messages broken.

⑦ Network layer

→ Responsible for delivery of data from original source to destination network.

Logical addressing  
Routing } IP addressing.  
Services  
Finding best route for packet to reach.

⑧ Data link layer

→ Moving data (frames) from one node to other.

→ Grouping 0 and 1s.

Framing.

(MAC) Physical addressing. } Services.  
 Flow control.  
 Access control.  
 Error control.

(who is matter)

## ④ Physical layer

→ Responsible for transmitting bits over a medium. It also provides electrical & mechanical specifications.

→ medium can be wireless/wired..

Converts data (0s & 1s by data link layer) to electrical (or) light signals. or waves.

Transmission (Half, Full duplex).

Representation of bits

Data Rate

Physical characteristics of bits

Line configuration

Physical Topology

Services.

⑩ Recap & An example shown.