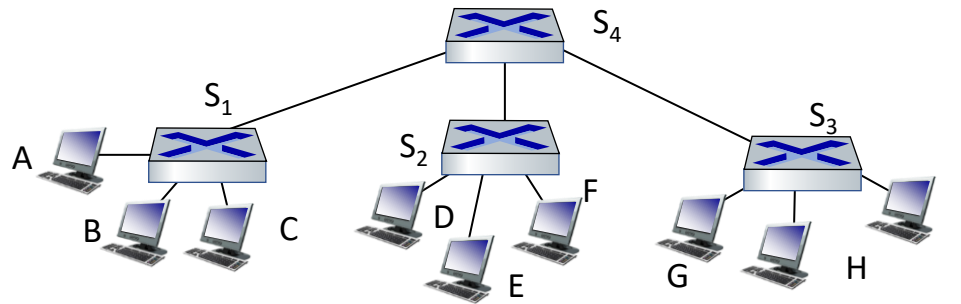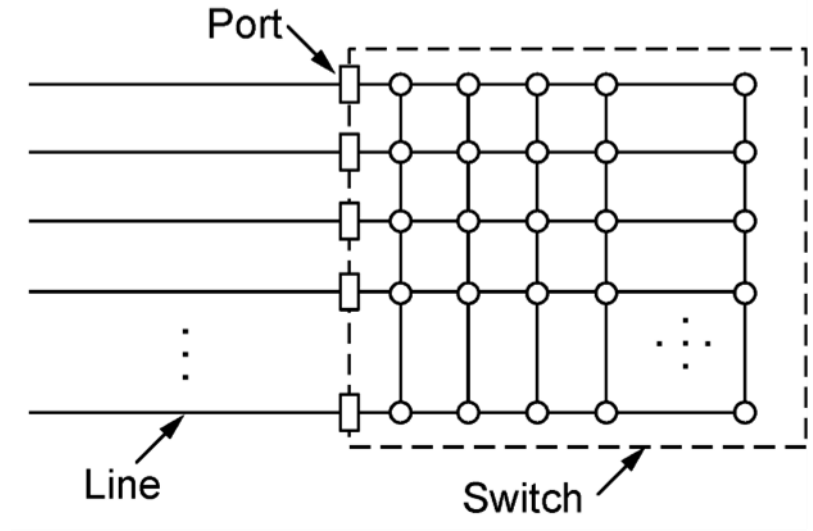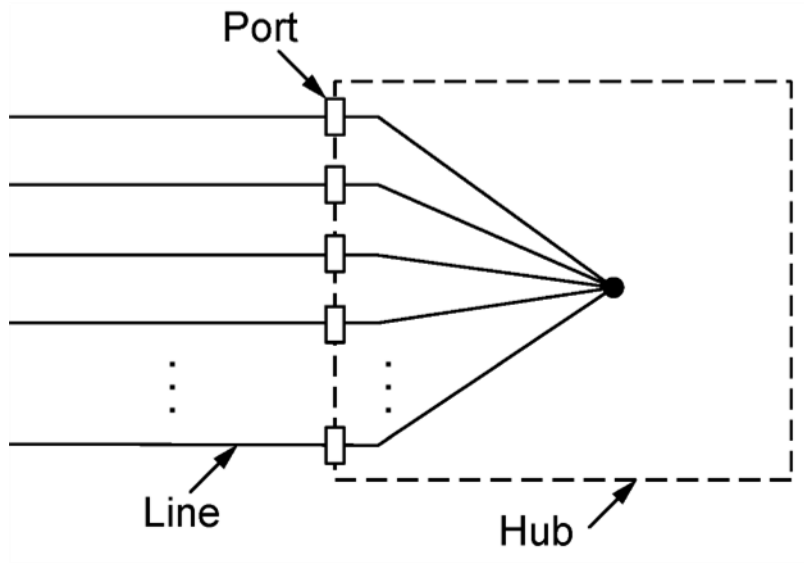# Computer Networks

Hubs and Switches

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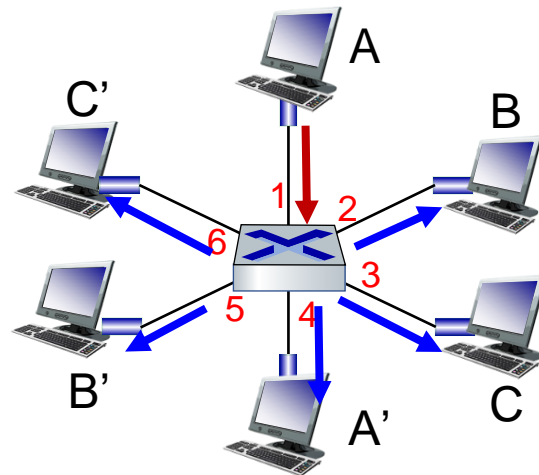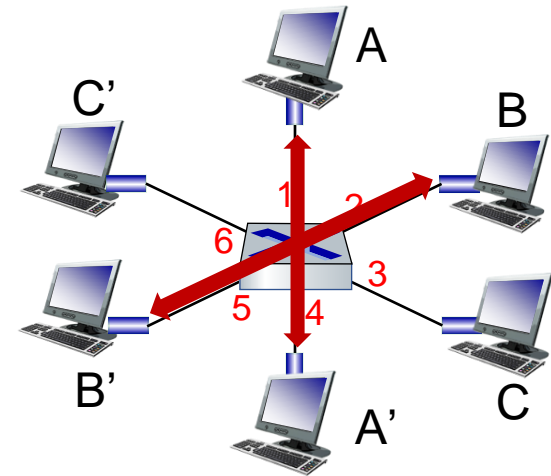
IIT Kanpur

Hubs vs Switches

Hubs vs Switches

Hubs

- Bits coming from one link is repeated to all other links

- No frame buffering

- No CSMA/CD at hub
  - One large collision domain

- Hub: A-to-A' and B-to-B' cannot transmit simultaneously

Switches

- Hosts have dedicated, direct connection to switch

- Switches buffer packets

- Ethernet protocol used on each incoming link, so:
  - No collisions; full duplex
  - Each link is its own collision domain

- Switching: A-to-A' and B-to-B' can transmit simultaneously, without collisions

- Hubs vs switch: https://community.fs.com/blog/do-you-know-the-differences-between-hubs-switches-and-routers.html

Cut-through Switches

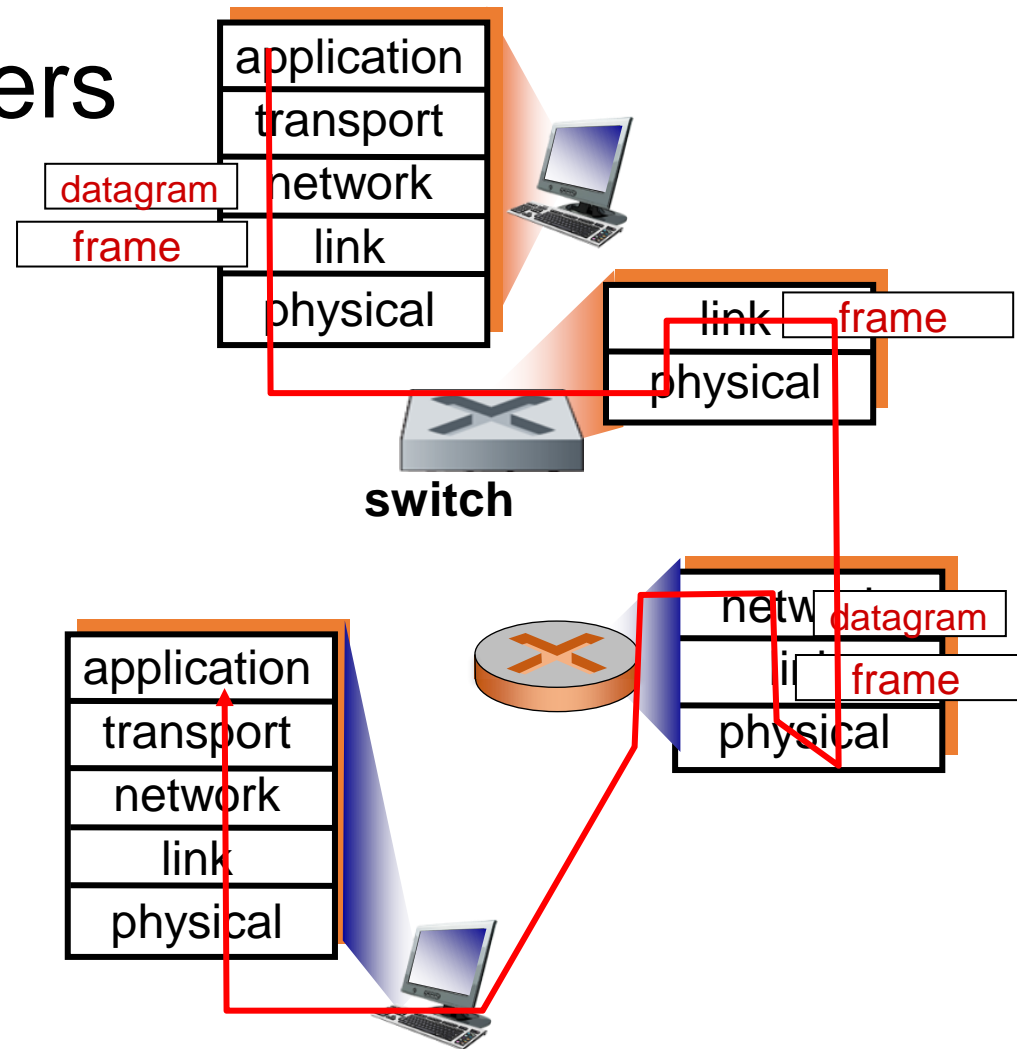- Switches start forwarding the frames just after reading the destination address
  - Slightly reduces the latency

| preamble	dest. address	source address	type	data (payload)	CRC
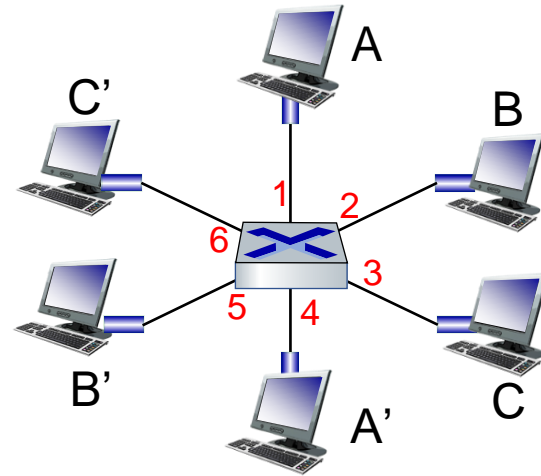
Switches vs. routers

Both are store-&-forward:

- **Routers:** network-layer devices (examine network-layer headers)

- **Switches:** link-layer devices (examine link-layer headers)

application
transport
network
link
physical

datagram
frame

link   frame
physical

switch

netw   datagram
li   frame
physical

application
transport
network
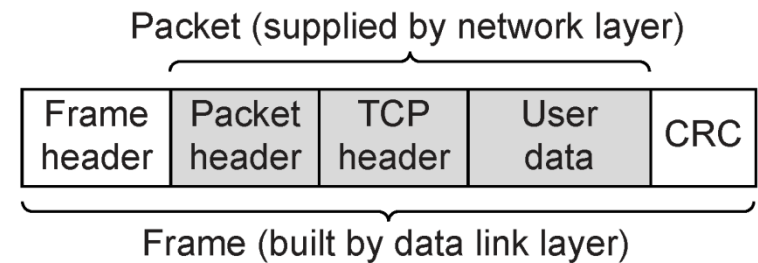link
physical

Switches vs. routers

Both have forwarding tables:

- **Routers:** compute tables using routing algorithms, IP addresses

- **Switches:** learn forwarding table using flooding, learning, MAC addresses
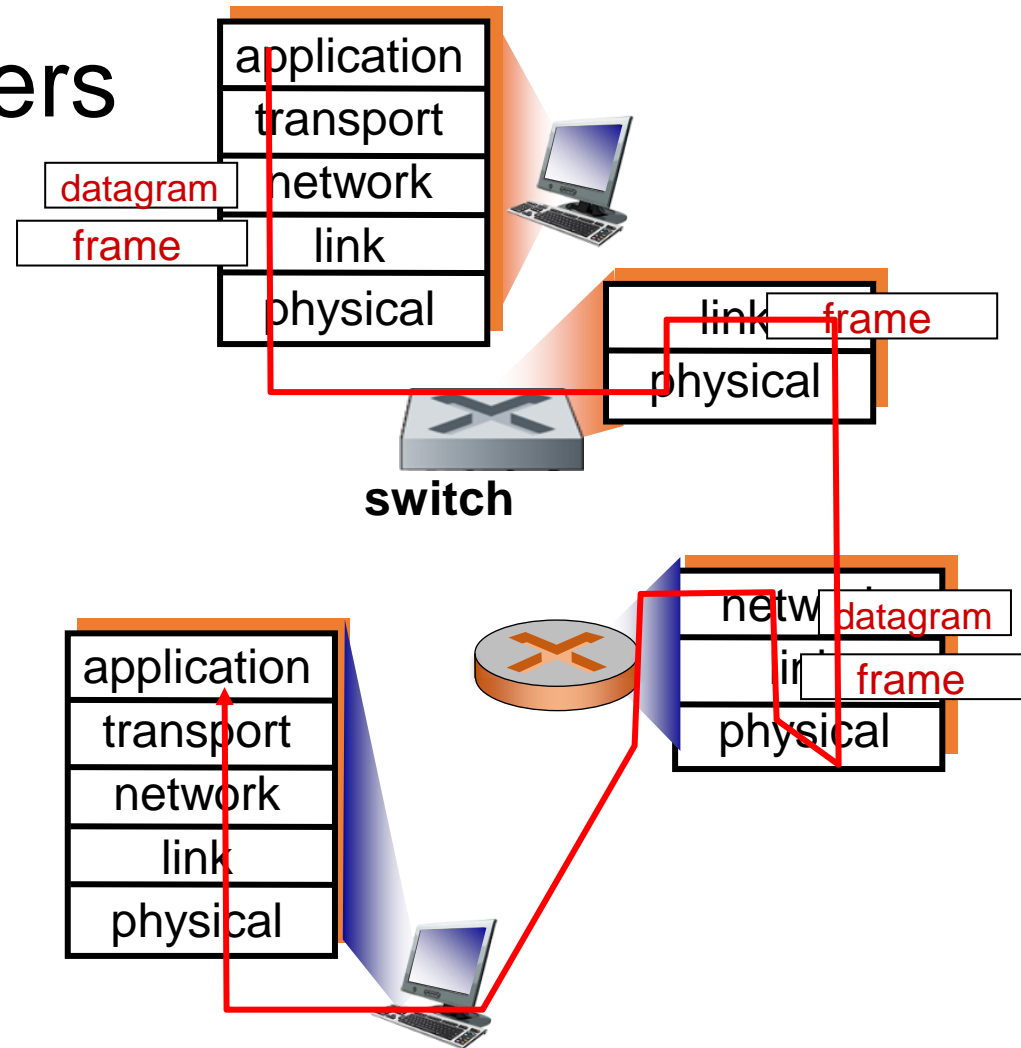
Hubs vs Switches vs Routers

Network layer	Router
Data link layer	Bridge, switch
Physical layer	Repeater, hub

Packet (supplied by network layer)

Frame header	Packet header	TCP header	User data	CRC

Frame (built by data link layer)

Summary

❑Hubs and switches:

- Hubs
- Switches
  - Cut-through switches
- Routers