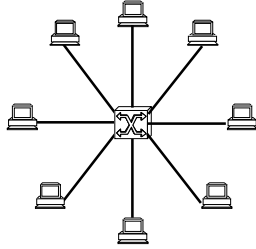


Switching and Forwarding

- Outline
 - Store-and-Forward Switches

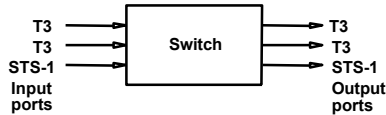


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Scalable Networks

- Switch
 - forwards packets from input port to output port
 - port selected based on address in packet header



- Advantages
 - cover large geographic area (tolerate latency)
 - support large numbers of hosts (scalable bandwidth)



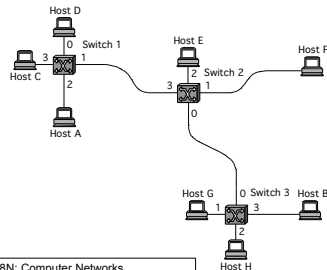
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Datagram Switching

- No connection setup phase
- Each packet forwarded independently
- Sometimes called connectionless model

- Analogy: postal system
- Each switch maintains a forwarding (routing) table



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Datagram Model

- There is no round trip time delay waiting for connection setup; a host can send data as soon as it is ready
- Source host has no way of knowing if the network is capable of delivering a packet or if the destination host is even up.
- Since packets are treated independently, it is possible to route around link and node failures
- Since every packet must carry the full address of the destination, the overhead per packet is higher than for the connection-oriented model



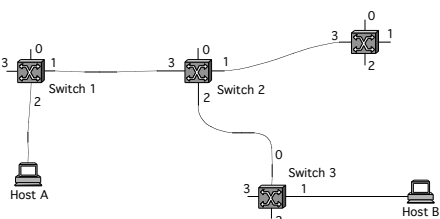
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Virtual Circuit Switching

- Explicit connection setup (and tear-down) phase
- Subsequence packets follow same circuit
- Sometimes called connection-oriented model

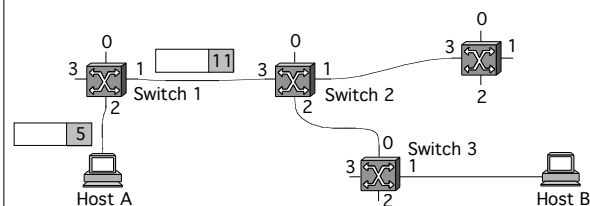
- Analogy: phone call
- Each switch maintains a VC table



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Message from Host A to Host B



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Message from Host A to Host B

- Virtual circuit numbers are unique per link - I.e., link local

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Virtual Circuit Model

- Typically wait full RTT for connection setup before sending first data packet.
- While the connection request contains the full address for destination, each data packet contains only a small identifier, making the per-packet header overhead small.
- If a switch or a link in a connection fails, the connection is broken and a new one needs to be established.
- Connection setup provides an opportunity to reserve resources.

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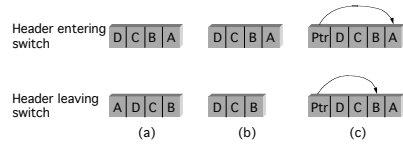
Source Routing

- Each packet carries the routing information
 - Source host knows the exact route
- Node rotate the address

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Maintaining the source route

- A) rotation of route
 - We will know the reverse path
- B) Stripping
 - Packets become smaller
- C) Pointer
 - Each router updates the pointer



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