

Switching II

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Switching techniques and networking

- *Switching is the technology allowing to get a message between the nodes of a network*
- Crossbar switching: mechanical (in the past) or electronic.
- Bus and cable switches: computer buses or cables (switching + transportation = network)
 - Token passing approach (similar to the locks used by multiprocessors connected by a bus)
 - Ethernet approach: cable or ring, packets, conflicts, resending
- Synchronization and Hub switch: star networks (no conflicts)

Networking

- Connections: *cable / wireless*
- A *node*, or *host* is any device on the network
- *Data transfer rate / bandwidth*
- A *protocol* is a set of rules that defines how data is formatted and processed on a network
- The *client/server model*
- *File servers and web servers*

Types of Networks

- *Local-area network (LAN)*
 - *Ring topology* (a LAN configuration)
 - *Star topology* (another LAN configuration)
 - *Bus topology* (yet another LAN configuration):
Ethernet (the industry standard)
 - A special node on a LAN may serve as a *gateway*
- *Wide-area network (WAN)*
- *Metropolitan-area network (MAN)*
- *The Internet*

Internet Connections

- The *Internet backbone*
 - An *Internet service provider (ISP)*
 - Connection via a *cable modem*
 - A *digital subscriber line (DSL)*
 - A *dial-up* connection via a *phone modem*
- } Broadband

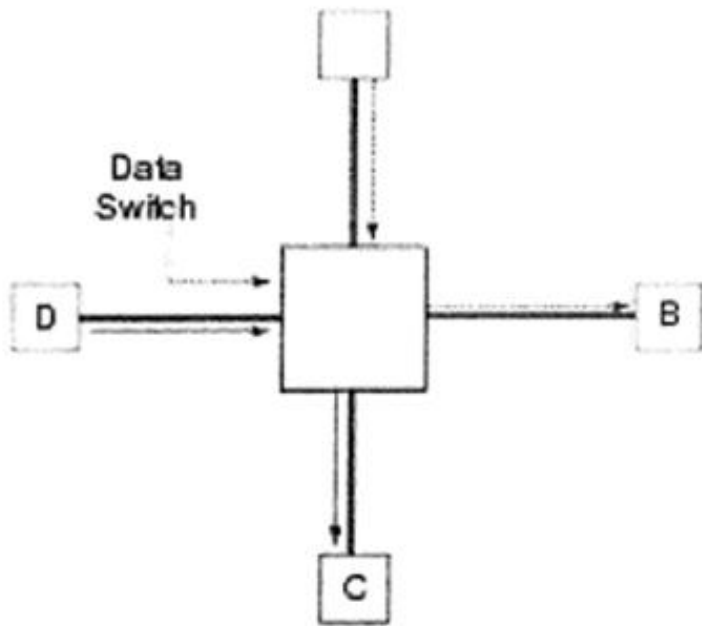
The word *modem* stands for **modulator/demodulator**.

Download / upload

Packet Switching

- Divide a message into *packets*, send them separately, have them collected and reassembled at their destination.
- *Routers* direct packets between networks.
- *Repeaters* strengthen and propagate signals along communication lines.

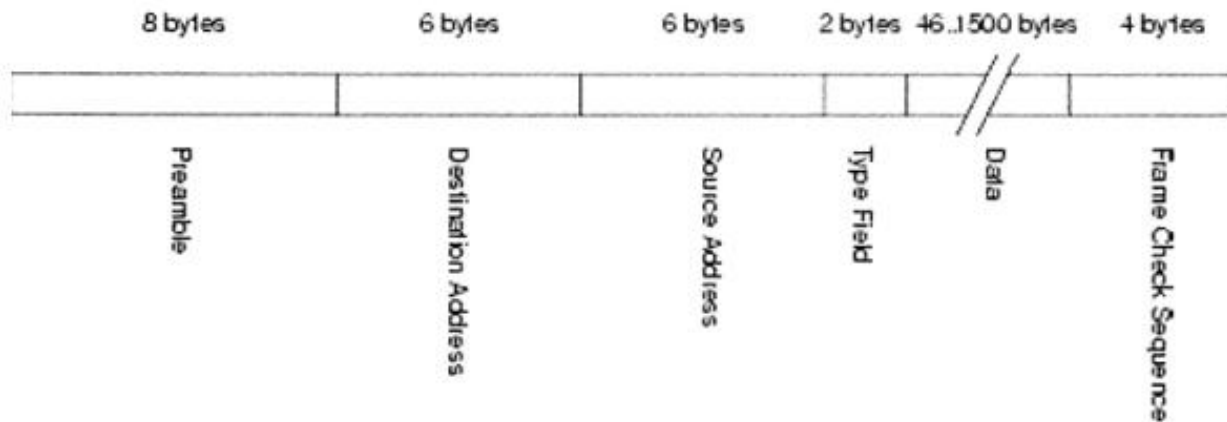
(a) Circuit Switching Based System

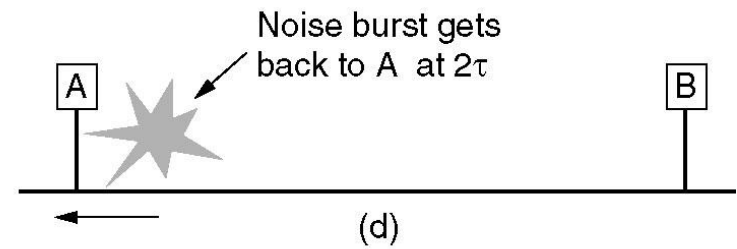
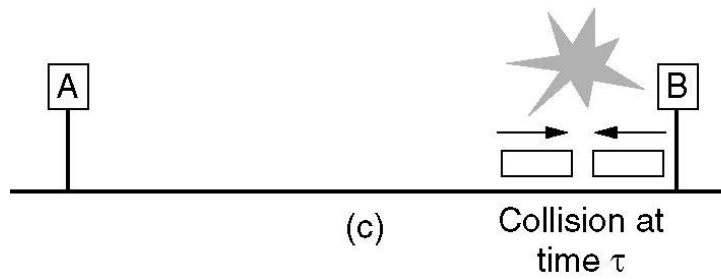
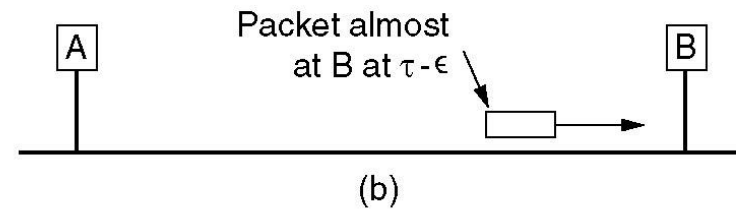
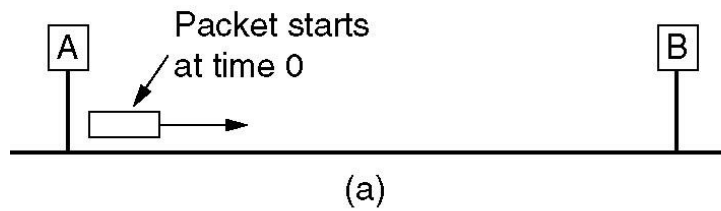
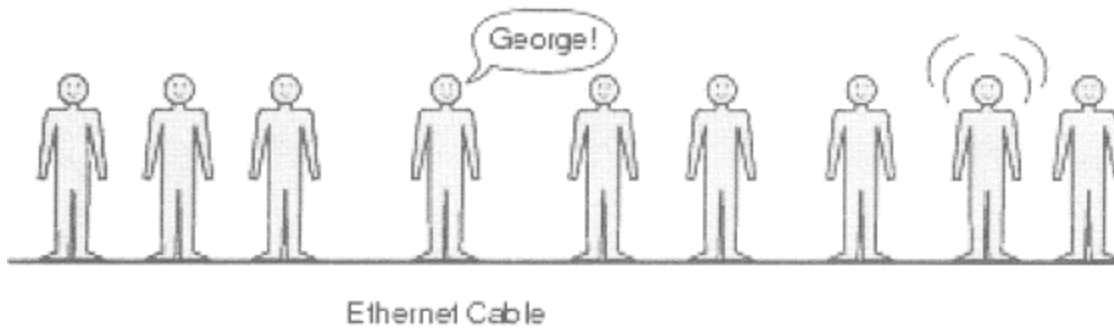


(b) Packet Switching Based System

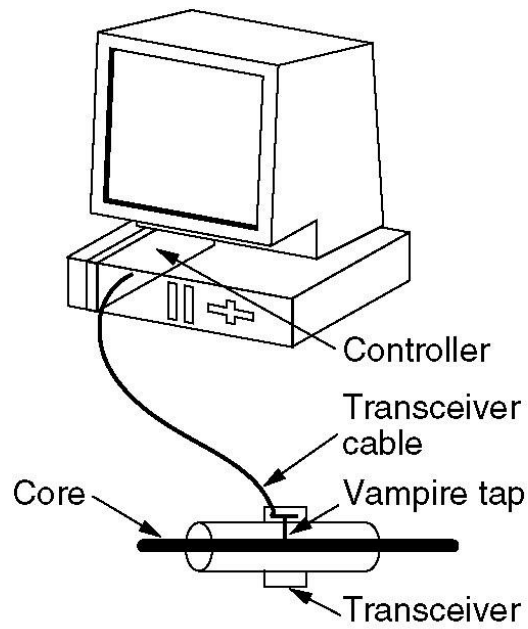


The Ethernet Datagram

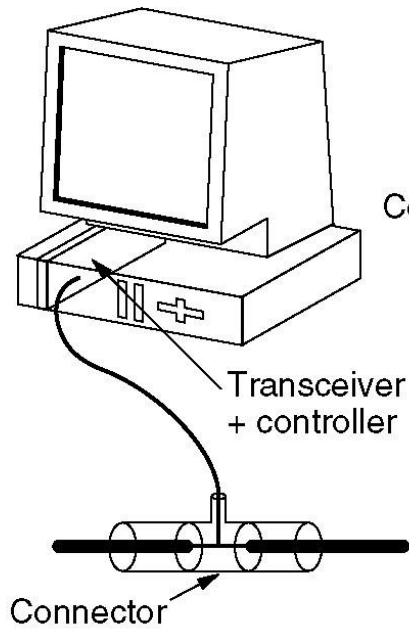




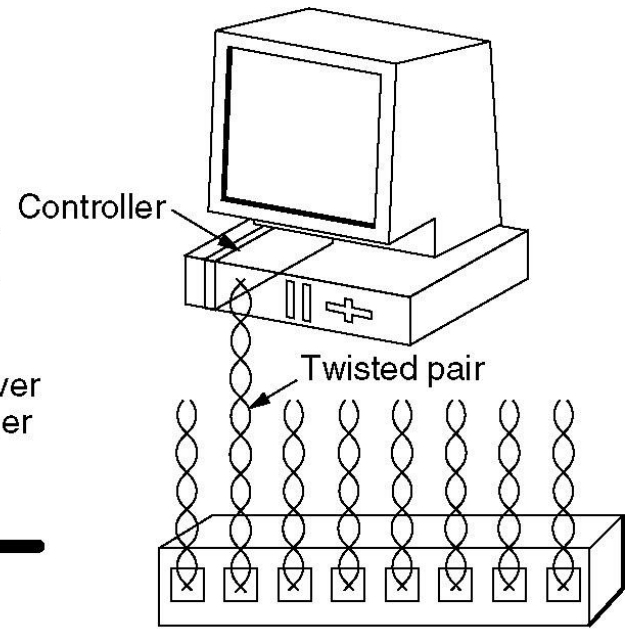
Ethernet Cabling



(a)

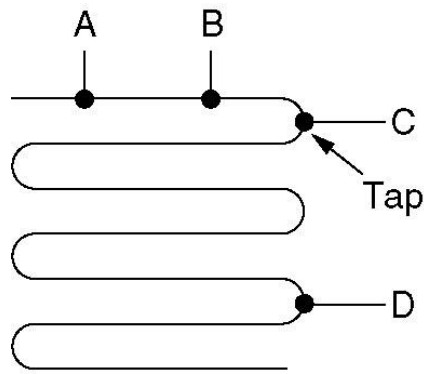


(b)

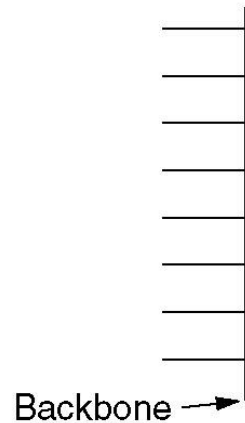


(c)

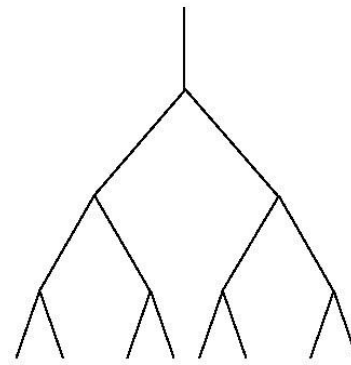
Ethernet Cabling



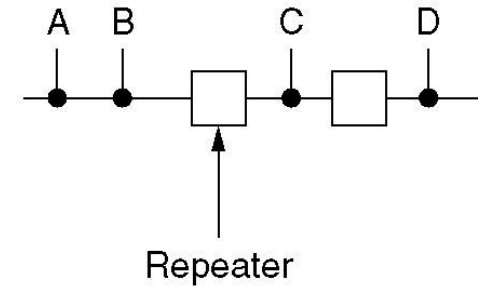
(a)



(b)



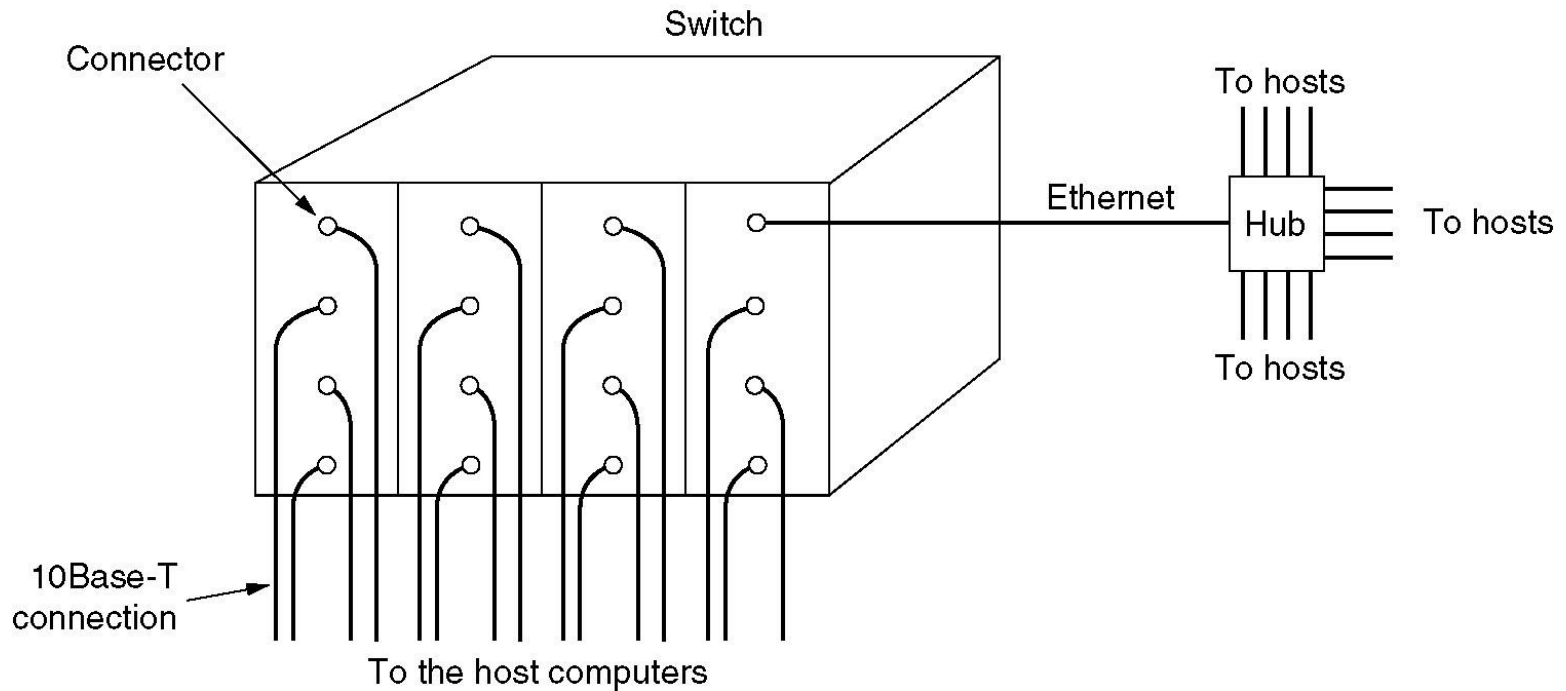
(c)



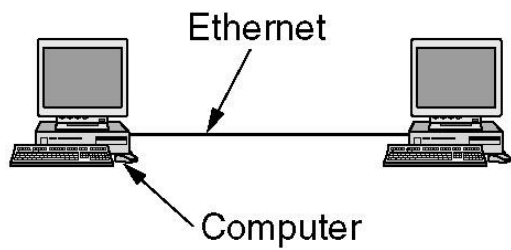
(d)

Cable topologies. (a) Linear, (b) Spine, (c) Tree, (d) Segmented.

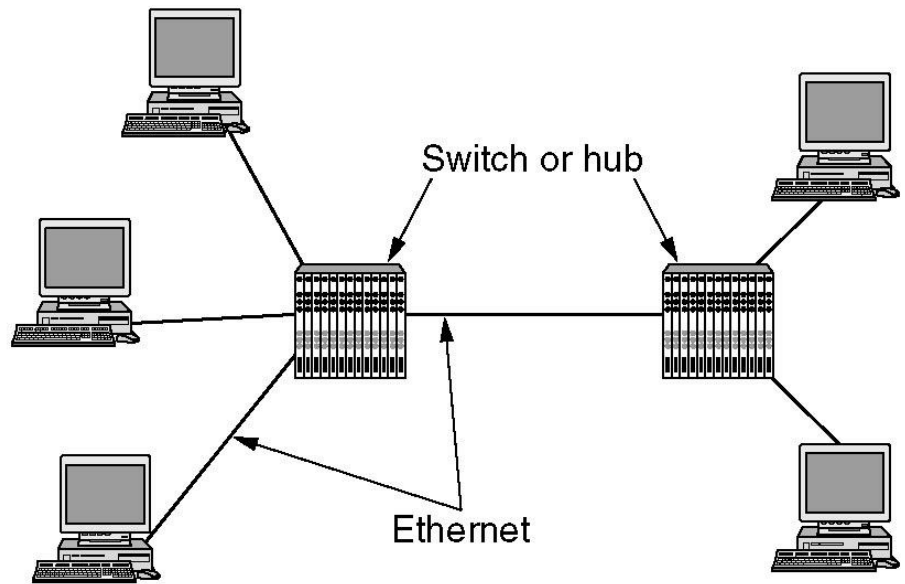
Switched Ethernet



A simple example of switched Ethernet.



(a)



(b)