High-Speed Networks: Introduction (2)

Abdulaziz Almulhem

Some ideas and thoughts were the thoughts of Prof. M. Shyman of U. of Maryland

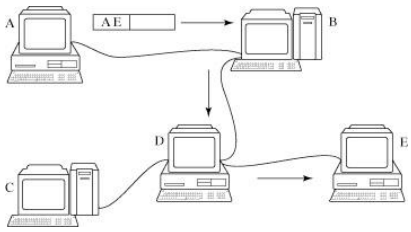
Recap

- Why do we need HS networks?
- Driving technologies.

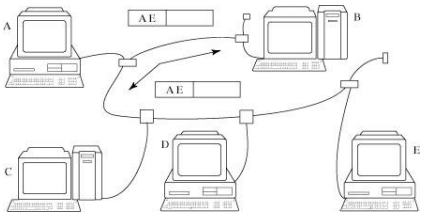
This lecture

- Networking technologies
- The growth in speed (ATM)
- Networking Models (layered archit.)
- Network Protocols
- Internetworking

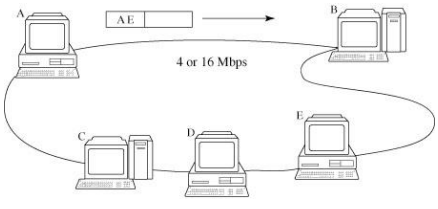
Store and Forward



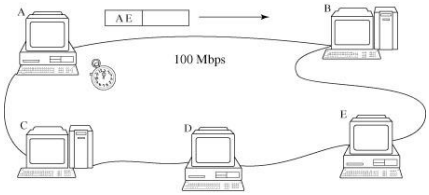
Ethernet



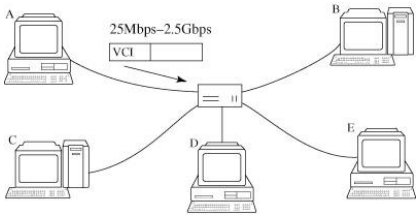
Token Ring



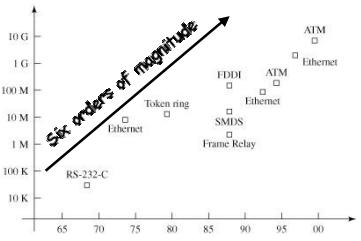
FDDI (Fiber Distributed Data Interface)



ATM (Asynchronous Transfer Mode)



Comparison



ATM Networks

- Factors for ATM success
  - » Internal signaling (SS7)
    - mechanism for defining, setting up, tearing down logical connections
  - » External signaling
    - User defines the expected traffic characteristic and requests network services and QoS

ATM Networks (Cont.)

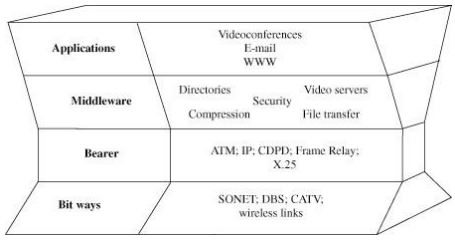
- » Physical layer
  - ATM operates over SONET with megabits per second
  - Now it is gigabits per second
- » ATM adaptation
  - different data types can be serviced by different transfer services

Networking Models

- OSI
- IP
- Open Data Network (ODN)
  - Search the Internet for resources on ODN

ODN

- Recently proposed by a panel of network engineers
- To help understand how to interconnect telephone, computer and cable networks, despite the differences in their technologies, services and markets.



Protocols

- Set of rules or conventions
  - » Objective: easier communications
- Key features:
  - » Syntax: data formats (vocabulary)
  - » Semantics: control info (grammar)
  - » Timing: Speed matching and sequencing (fast speaker)

Internet Protocol (IP)

- Transmission Control protocol (TCP)
  - » Connection-oriented
  - » Reliable
  - » Apps: FTP, Email, Telnet
- User Datagram Protocol (UDP)
  - » Connectionless
  - » Unreliable
  - » Apps: SNMP

Internetworking

- Key technologies that played a role in the evolution of internetworking:
  - » TCP/IP
    - IP is known as a non-reliable delivery routing layer that is flexible and general
    - TCP provides reliable communications
  - » Ethernet:
    - from 3Mbps to Gigabit
    - Most Internet configurations involve it.

Internetworking (Cont.)

- » Dynamic routing:
  - Enables the construction of large, different networks
  - reconfigure as necessary
  - readjust at congestion
- » Packet switching:
  - more protocols are based on this technology