Network : Overview

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Reference

William Stalling, Data and Computer Communications 10/E, Prentice Hall

Data Communications & Data Networking

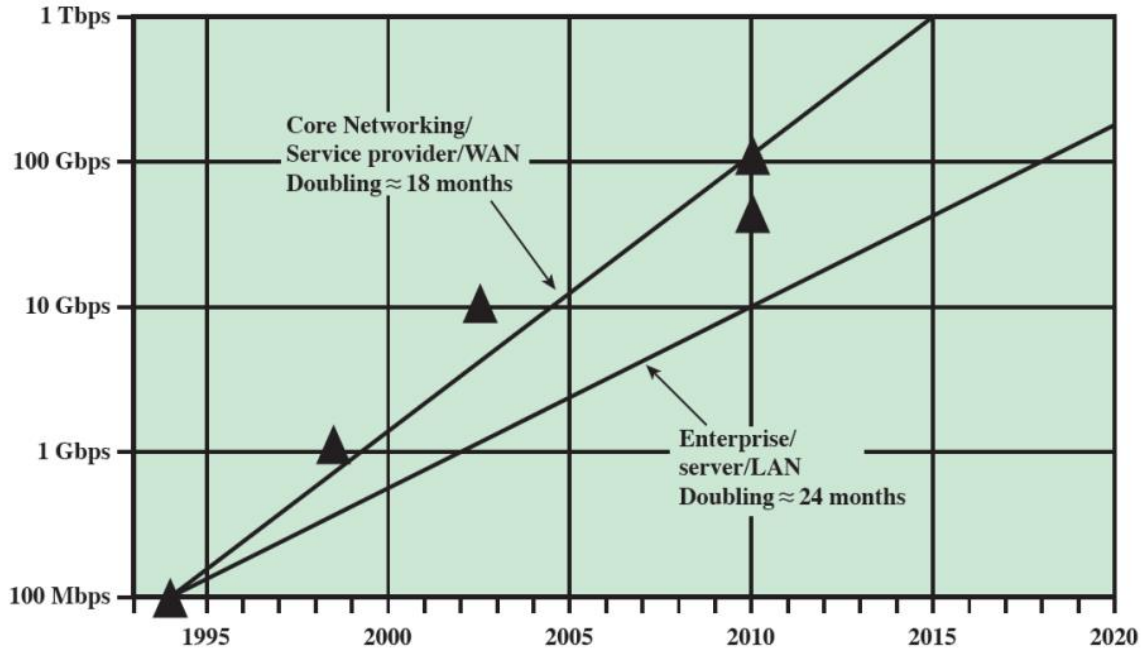
"The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point"

The Mathematical Theory of Communication,

Claude Shannon

Notable Technology Trends

- Faster and cheaper in both computing and communication
  - More powerful computers supporting more demanding applications
  - The increasing use of optical fiber and high-speed wireless has brought transmission prices down and greatly increased capacity



Notable Technology Trends

- Today's networks are more "intelligent"
  - Differing levels of quality of service (QoS)
  - Variety of customize services of network management and security
- Internet, Web, and associated applications have emerged as dominant features for both business and personal network
  - "everything over IP"
- Mobility
  - Smart devices became drivers of the evolution of business networks
  - Enterprise applications are now routinely delivered on mobile devices
  - Cloud computing is being embraced

Key Communications Tasks

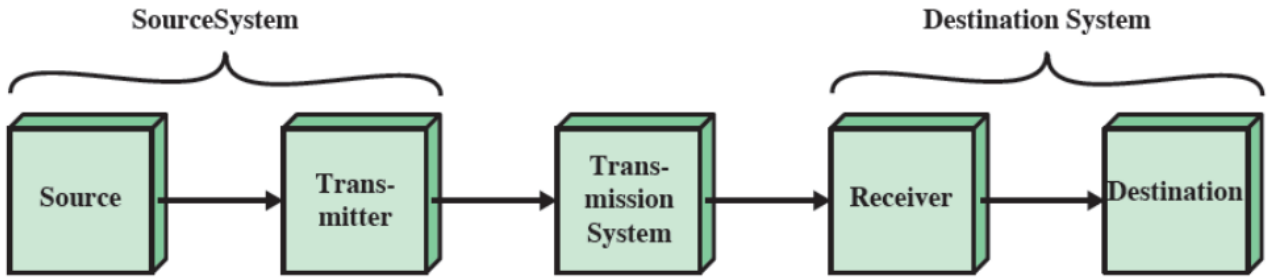
- Transmission system utilization
- Interfacing
- Signal generation
- Synchronization
- Exchange management
- Error detection and correction
- Addressing and routing
- Recovery

Key Communications Tasks

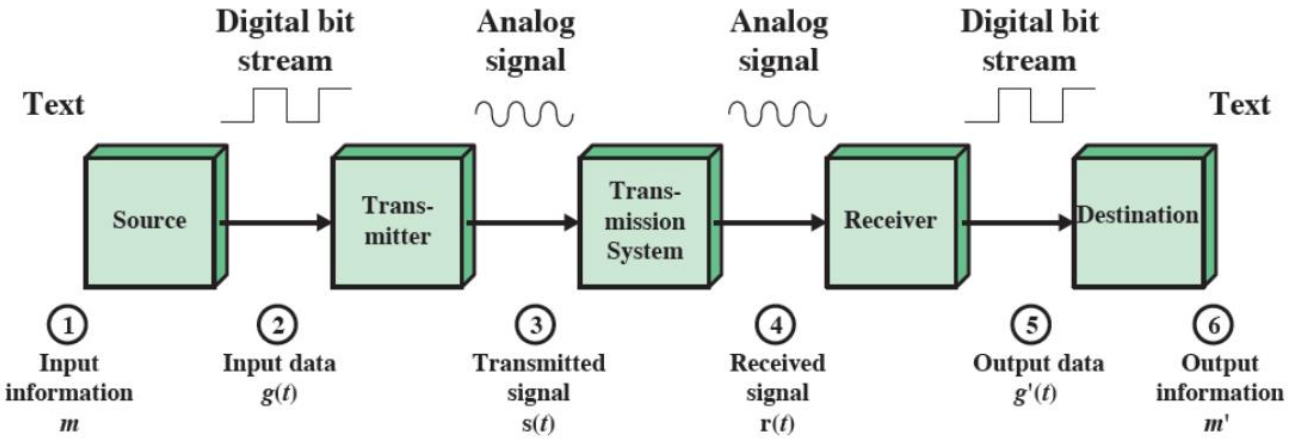
- Message formatting
- Security
- Network management

Data Communication Model

- Simplified communications model



- Simplified data communications model



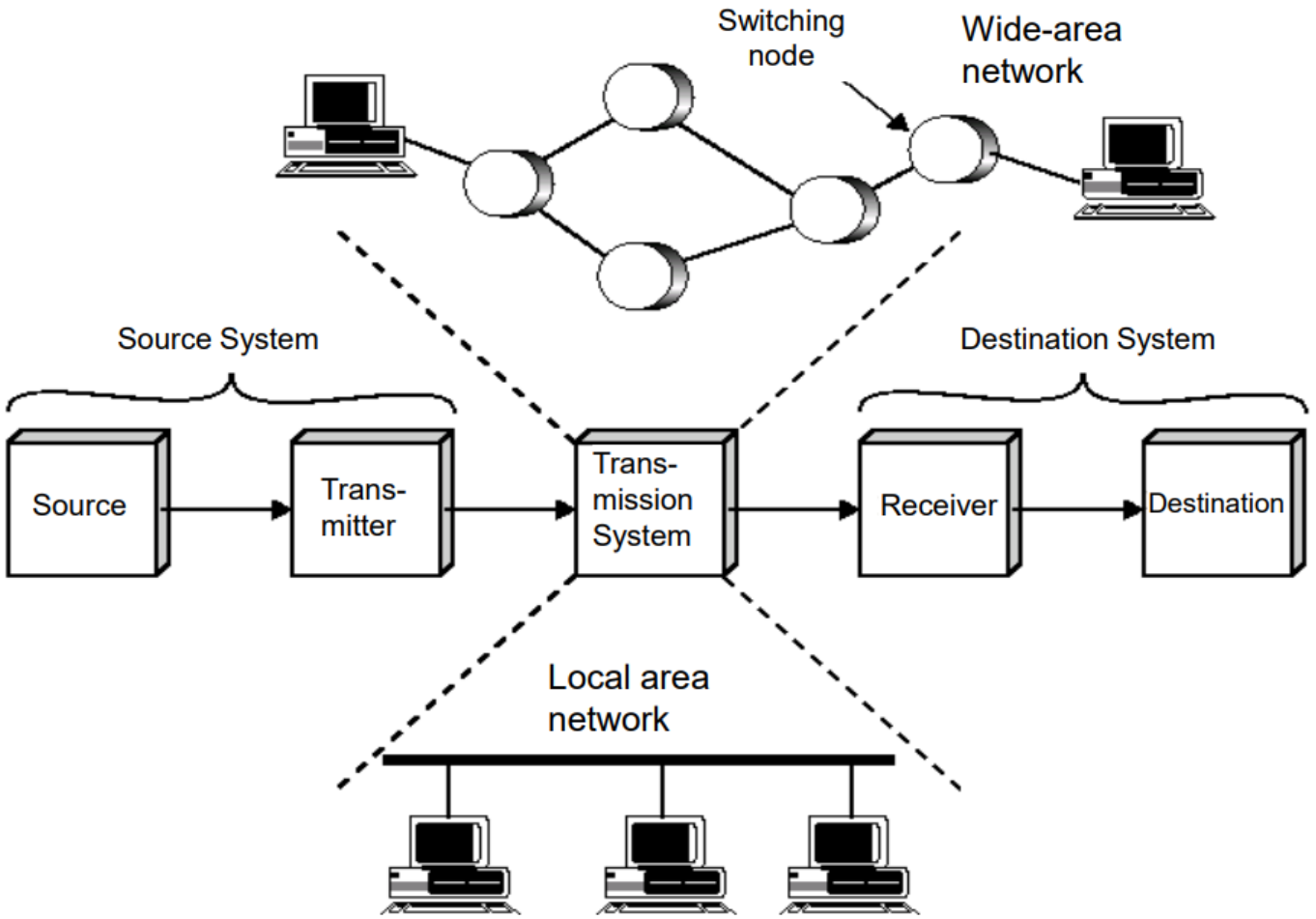
Transmission Lines and Medias

- The transmission line is the basic building block of any communications facility
- The business manager is concerned with a facility providing
  - The required capacity
  - With acceptable reliability
  - At minimum cost
- Two transmission mediums are currently driving the evolution of data communications
  - Fiber optic transmissions
  - Wireless transmissions

Why Data Networking

- Background
  - Growth of computer is driving need for interconnection
  - Larger set of devices may need impractical number of connections
- Point to point communication not usually practical, why?
  - A group of computers would be usually getting together in the same location
  - Digital data delivery is inherently in intermittent pattern, in contrary of analog data
- Solution is a communications network
  - Wide Area Network (WAN)
  - Local Area Network (LAN)

Simplified Network Model



The Internet

- Internet evolved from ARPANET
  - Developed to solve the dilemma of communicating across arbitrary, multiple, packet-switched network
- Foundation is the TCP/IP protocol suite