LECTURE #2

KEY DATA COMMUNICATION TERMINOLOGY

- **Link**: **connects adjacent nodes**
  Wires, Cables, Any thing that physically connects two nodes
- **Path: end-to-end route within a network**
- **Circuit: the conduit over which data travels**
- **Packetzing**: **dividing messages into fixed-length packets prior to transmission over a network's communication media**
- **Routing: determining a message's path from sending to receiving nodes**
  - ✓ **The transmission medium may itself be a network, so route needs to be specified**

Network

"A NETWORK is a set of devices (Nodes) connected by Communication Links"

- **Node**: Can be a Computer, Printer or any other device capable of sending or receiving
  - The links connecting Nodes are called COMMUNICATION CHANNELS
    Networks- Why we need them?

Networks- Why we need them?

It is often impractical for devices to be directly connected for two major reasons:

- The devices are very far apart. They are expensive to connect just two devices with one in Lahore and other in Islamabad
- Large set of devices would need impractical number of connections e .g. Telephone Lines in the world and all the computers owned by a single organization

Solution to the Problem=Networks

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- Solution is to connect all devices to a central system known as a ***NETWORK*** in which all terminals or computers share the links.

- Two Main Classifications of the Networks

  - LANS
  - WANS

DISTRIBUTED PROCESSING

- Instead of a single large machine being responsible for all aspects of a process , each separate computer handles a subset of the task
  - ✓ Example – Project Given as a part of the Course
  - ✓ Example – Office Work

Advantages of Distributed Processing

❖ **Security**

A system designer can limit the kind of interaction that a given user can have with the entire system.

- ✓ For example : Bank's ATM

❖ **Distributed Data bases**

No one system need to provide storage capacity for the entire database

- ✓ For example WWW gives user access to pages stored anywhere on Internet

❖ **Faster Problem Solving**

Multiple computers working on a problem can solve a problem faster than a computer working alone

❖ **Security through Redundancy**

Multiple computers running the same program provide security through redundancy
If one computer's hardware breaks down others cover up

❖ **Collaborative Processing**

Both multiple computers and multiple users can interact for a task

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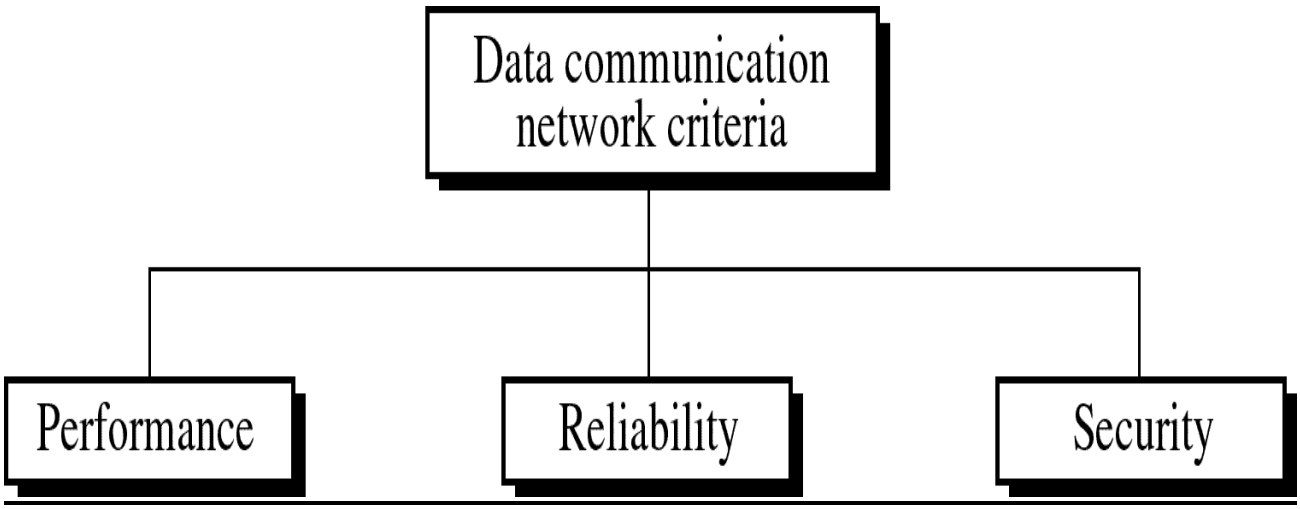
Network Criteria



- **Performance**

Can be measured in many ways including ***Transit and Response Time***

- **Depends on a no. of Factors:**
  - Number of USERS
  - Type of Transmission Medium
  - Hardware
  - Software
  - Network Criteria

  - **Number of USERS**
    - ✓ Large Number of concurrent users slow network
    - ✓ Design of a network
    - ✓ Peak Load Periods
    - ✓ Network Criteria
  - **Type of Transmission Medium**
    - ✓ Medium defines speed at which data can travel
    - ✓ Fiber Optic Cable
    - ✓ 100Mbps and 10 Mbps
    - ✓ Hardware
    - ✓ Software

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- **Hardware**

  - ✓ Effect speed and the capacity of transmission
  - ✓ Fast computer with large storage capacity
  - ✓ Software
  - ✓ Network Criteria

- **Software**

  - ✓ Software processes data at sender , receiver and intermediate nodes
  - ✓ All communication steps need software:
  - ✓ Moving message from node to node
  - ✓ Transforming,
  - ✓ Processing at the sender and receiver
  - ✓ Error Free Delivery

  Well designed software can speed up the process

- **Reliability**

  - Depends on a no. of Factors:

    - Frequency of Failure
    - Recovery Time of a Network after Failure
    - Catastrophe
    - Fire , Earthquake or Theft

- **Security**

  - **Unauthorized Access**

    - Sensitive data
    - Protection at multiple levels:
    - Lower level: Passwords and user ID codes
    - Upper Level: Encryption

  - **Viruses**

Network Applications

- **Marketing and Sales**

  - **Marketing**

    - Collect, exchange and analyze data relating to the customers needs

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- Product development cycles

- **Sales**

  - Tele shopping,
  - On line reservation systems

- **Financial Services**

  - Online Banking
  - Foreign Exchange Transfers
  - Rates

- **Manufacturing**

  - Computer Aided Design
  - Computer Assisted Manufacturing
  - Network Applications

- **Electronic Messaging**

- **Teleconferencing**

  - Conferences to occur w/o participants at the same place
  - Chat
  - Voice Conferencing
  - Video Conferencing

- **Cable Television**

Summary

- Key Data Communication Terminology
- Networks and why we need them?
- Distributed Processing
- Network Criteria
- Network Applications

Reading Sections

- Section 1.3, "Data Communications and Networking" 2nd Edition by Behrouz A. Forouzan
- Sections 1.3, "Data and Computer Communication" 6th Edition by William Stallings

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