**Computer Networks**

• A large number of separate but interconnected computers are called computer networks.

• Two computers are said to be interconnected if they are able to exchange information

Computer network connects two or more autonomous computers. The computers can be geographically located anywhere. Networks come in many sizes, shapes and forms.

Computer network and distributed system. The key distinction is that in a distributed system, a collection of independent computers appears to its users as a single coherent system. Usually, it has a single model or paradigm that it presents to the users. Often a layer of software on top of the operating system, called middleware, is responsible for implementing this model. A well-known example of a distributed system is the World Wide Web. It runs on top of the Internet and presents a model in which everything looks like a document (Web page).

• In a nut shell we can say that a distributed system is a software system built on top of a network.

**Uses of Computer Networks**

• Business Applications

• Home Applications

• Mobile Users

• Social Issues

**Social Issues**

• Network neutrality

• Digital Millennium Copyright Act

• Profiling users

• Phishing

**Applications of Networks**

**Resource Sharing**

Hardware (computing resources, disks, printers)

Software (application software)

**Information Sharing**

Easy accessibility from anywhere (files, databases)

Search Capability (WWW)

**Communication**

Email

Message broadcast

**Remote computing**

**Distributed processing (GRID Computing)**

**Types**

• Personal area networks

• Local area networks

• Metropolitan area networks

• Wide are networks

• The internet

**Basic Communications Mode**

• Source

Data to be transmitted is generated by this device, example: telephones, personal computers etc.

• Transmitter

The data generated by the source system are not directly transmitted in the form they are generated. The transmitter transforms and encodes the information in such a form to produce electromagnetic waves or signals

• Transmission System

A transmission system can be a single transmission line or a complex network connecting source and destination.

• Receiver

Receiver accepts the signal from the transmission system and converts it to a form which is easily managed by the destination device.

• Destination

Destination receives the incoming data from the receiver.

• Data Communication

The exchange of data between two devices through a transmission medium is Data Communication. The data is exchanged in the form of 0’s and 1’s. The transmission medium used is wired/wireless. For data communication to occur, the communication device must be part of a communication system.

Data Communication has two types Local and Remote which are discussed below

• Local :

Local communication takes place when the communicating devices are in the same geographical area, same building, face-to-face between individuals etc.

• Remote :

Remote communication takes place over a distance

**• Components of Data Communication**

• Message : It is the information to be delivered.

• Sender : Sender is the person who is sending the message.

• Receiver : Receiver is the person to whom the message is to be delivered.

• Medium : It is the medium through which message is to be sent for example modem.

• Protocol : These are some set of rules which govern data communication.

**Protocol layers and service models**

protocols define format, order of msgs sent and received among network entities, and actions taken on msg transmission, receipt

**Protocols**

Set of rules that Govern Data Communication

Used for communications between entities in a system.

¬ Entities

User Applications

e-mail facilities

Terminals

♣ Systems

Computer

Termin

Remote sensor

**Protocol Architecture**

Task of communication broken up into modules.

¬ For example file transfer could use three modules

File transfer Application

Communication service module

Network access module

♣ Key elements of a protocol are syntax, semantics and it’s timing.

.¬ Layers can offer two different types of services to the layers above them.

– Connection oriented

– Connection less

**Connection Oriented**

Connection oriented service is modeled after the telephone system.¬ To talk to some one you pick up the phone, dial the number, talk and¬ then hang up.

In connection oriented service

1. Establish a connection

2. Use the connection

3. Release the connection.

**Connection less**

Is modeled after the postal system.¬ Each message(letter) carries the full designation address and each one is¬ routed to the system independent of all others.

• Message sequence • Byte streams

**Connection-Oriented Versus Connectionless Service Six different types of service**