Veronicah muthoni

Pioneer international university

# RESEARCH ON CLASSIFICATION OF NETWORKS

Networks are basically classified based on the following qualifications i.e.:

**Geographical coverage/Scale:** Computer networks may be classified according to the scale:

* Local Area Network (LAN)
* Metropolitan Area Network (MAN)
* Wide Area Network (WAN)

**Local Area Network(LAN)**

A **Local Area Network** is a computer network covering a small Networks geographical area**,** like a home, groups of buildings. Usually it is used in the connection of limited number of printers and servers to connect to the internet. Smaller Networks generally consist of one or more switches linked to each other - often with one connected to a router, cable modem, or DSL modem for Internet access. LANs **Network** may have connections with other LANs **Network** via leased lines, leased services.

components of a LAN include:

         Network Interface Cards (NICs) for each network device required to access the network. It is the interface between the machine and the physical network.

         Network Operating System –software applications required to control the use of network operation and administration.

         Network devices such as Workstations, printers, file servers which are normally accessed by all other computers.

         Cable as a physical transmission medium.

         Network Communication Devices i.e., devices such as hubs, routers, switches etc.  used for network connectivity.

**Characteristics of LAN**

         LAN’s are private networks, not subject to tariffs or other regulatory controls.

         LAN’s operate at relatively high speed when compared to the typical WAN (.2 to 100 MB /sec).

        There are different types of Media Access Control methods in a LAN, the prominent ones are Ethernet, Token ring, Arcnet.

         It connects computers in a single building, block or campus, i.e. they work in a restricted geographical area.

         It connects computers in a single building, block or campus, i.e. they work in a restricted geographical area.

        The networking is done through Buses or Rings.

**ADVANTAGES OF LAN**

        It allows sharing of expensive resources such as Laser printers, software and mass storage devices among a number of computers.

         LAN allows for highspeed exchange of essential information.

         It contributes to increased productivity. A LAN installation should be studied closely in the context of its proposed contribution to the long-range interest of the organization.

**DISADVANTAGES OF LAN**

         The financial cost of LAN is still high in comparison with many other alternatives.

         It requires memory space in each of the computers used on the network. This reduces the memory space available for the user’s programs.

         Some type of security system must be implemented if it is important to protect confidential data.

        Some control on the part of the user is lost. You may have to share a printer with other users. You may face a situation like, for example, the entire network suddenly locking up because one user has made a mistake.

**Ethernet** is a family of computer networking technologies for local area networks (LANs) commercially introduced in 1980. Ethernet has largely replaced competing wired local area network (LAN) technologies. Ethernet uses a bus or star topology Network.

**By Connection Method:**

Computer networks can also be classified according to the hardware technology that is used to connect the individual devices in the network such as **Optical fiber, Ethernet, Wireless LAN**.

**By Functional Relationship (Network Architectures):** Computer networks may be classified according to the functional relationships which exist between the elements of the network. This classification also called computer architecture. There are two type of network architecture:

* Client-Server
* Peer-to-Peer Architecture

**By Network Topology:** Network Topology signifies the way in which intelligent devices in the network see their logical or physical relations to one another. Computer networks may be classified according to the network topology upon which the network is based, such as:

* Bus Network
* Star Network
* Ring Network
* Mesh Network
* Star-Bus Network
* Tree or Hierarchical Topology Network

**3. Functional relationship (network architecture)**

Computer networks may be classified according to the functional relationships which exist among the elements of the network, e.g., active networking, client–server and peer-to-peer (workgroup) architecture.

**4. Network topology**

Computer networks may be classified according to the network topology upon which the network is based, such as bus network, star network, ring network, mesh network.

Network topology is the coordination by which devices in the network are arranged in their logical relations to one another, independent of physical arrangement. Even if networked computers are physically placed in a linear arrangement and are connected to a hub, the network has a star topology, rather than a bus topology. In this regard, the visual and operational characteristics of a network are distinct. Networks may be classified based on the method of data used to convey the data;

these include digital and analog networks.

**Metropolitan Area Network (MAN)**

Metropolitan area networks, or MANs, are large computer network usually spanning a city. They typically use wireless infrastructure or Optical fiber connections to link their sites.

A MAN is optimized for a larger geographical area than a LAN, ranging from several blocks of buildings to entire cities. MANs can also depend on communications channels of moderatetohigh data rates. A MAN might be owned and operated by a single organization, but it usually will be used by many individuals and organizations. MANs might also be owned and operated as public utilities or privately owned. They will often provide means for internetworking of local networks. Metropolitan area networks can span up to 50km, devices used are modem and wire/cable.

A Metropolitan Area Network is a large computer network that spans a metropolitan area or campus. Its geographic scope falls between a WAN and LAN. MANs provide Internet connectivity for LANs in a metropolitan region, and connect them to wider area networks like the Internet.

1)   The network size falls intermediate between LAN and WAN. A MAN typically covers an area of between 5 and 50 km diameter. Many MANs cover an area the size of a city, although in some cases MANs may be as small as a group of buildings or as large as the North of Scotland.

2)   A MAN often acts as a high speed network to allow sharing of regional resources. It is also frequently used to provide a shared connection to other networks using a link to a WAN.

**Characteristics of MAN**

1)  It generally covers towns and cities (50 kms)

2)  It is developed in 1980s.

3)  Communication medium used for MAN are optical fibers, cables etc.

4)  Data rates adequate for distributed computing applications.

**Wide Area Network (WAN)**

Wide Area Network (Figure 8) is a network system connecting cities, countries or continents, a network that uses routers and public communications links. The largest and most wellknown example of a WAN is the Internet.

WANs are used to connect LANs and other types of networks together, so that users and computers in one location can communicate with users and computers in other locations. Many WANs are built for one particular organization and are private. Others, built by Internet service providers, provide connections from an organization's LAN to the Internet. WANs are often built using leased lines. At each end of the leased line, a router connects to the LAN on one side and a hub within the WAN on the other. Leased lines can be very expensive. Instead of using leased lines, WANs can also be built around public network or Internet.

**Characteristics of WAN**

1)   It generally covers large distances (states, countries, continents).

2)   Communication medium used are satellite, public telephone networks which are

connected by routers.

3)   Routers forward packets from one to another (Table 1) a route from the sender to

the receiver.

**Uses of Computer Networks**

**Uses of Networks for Companies**

**1.Resource Sharing:**

Many organizations have large space and less resourses to enhance productivity thus they are forced to share resourses at hand in performing their productions. For example in an institution like a school where papers need to be printed where as there are less printing resourses they use the network perform the printing of tue papers in that different computers connected to the same printer work and send their task to be printed at a certain location where the printer is sharing resourses.

**2.High Reliability:**  
The second goal or use of networking in companies is to high reliability by having alternative sources of supply. For example, all the files can be replicated on two or more machines, so that in case one of them is not available (due to hardware failure), other copies can be used. This feature is used in financial institutions.

**3.Saving Money:**   
  
The third goal is to save money. Small computers often have better price/performance ratio than the larger ones. Mainframe (room-size) computers are roughly ten faster than the personal computers, but are a thousand times costly. This imbalance caused the system designers to design a system consisting of personal computers, one per user, with data kept on one or more shared file server machines. In this model, the user are called the clients and this whole arrangement is known as the **client-server model**.  
  
In client-server model, the communication generally takes the form of a request message from a client to the receiver asking for some work to be done. Server does the work and sends back the reply.

**4.Scalability:**   
  
Another goal is scalability. Scalability is the ability to increase the system performance gradually as the workload grows, by just adding more processors.

**Uses of Networks to People**

**1.Access to Remote Information:**   
  
Access to remote information occurs in many forms. One of the areas where it is happening is access to the financial institutions. Many people pay their bills, manage bank accounts and handle investments electronically. Home shopping is also becoming popular these days.  
  
Another application that falls under this category is the access to information systems like **World Wide Web** which contains information about art, business, history, government, geography, economics and several other topics.  
  
All the above applications involve the interaction between the user and a remote database.

**2.Person to Person Communication:**   
**Electronic Mail** popularly known as email is widely used by millions of people to send text messages, photographs audio as well as video to other people or group of people. This application belongs to person to person communication category.  
  
Videoconferencing is also becoming popular these days. This technology makes it possible to have virtual meetings among far flung people. It is also a type of person to person communication.

**3.Interactive Entertainment:**   
These days we can see many live programs and shows. The best thing is that we can interact with them by participating in the quizzes and the contests organized by them.

# NETWORK CLASSIFICATION BY THEIR COMPONENT ROLE

**NETWORK CLASSIFICATION BY THEIR COMPONENT RULE**

* **Local Area Network**
* **Peer to peer network**
* **Client server network**

## **PEER TO PEER NETWORK**

In peer-to-peer network each computer is responsible for making its own resources available to other computer on the network

Peer to peer is useful for a small network containing less than 10 computers on a single LAN.

peer to peer network do not have a central control system. these are no serves in peer network.

### **ADVANTAGES**

1. the less expensive
2. easy administrate
3. more built in redundancy
4. easy set up and low cost

### **DISANVANTAGES**

1. not very secure
2. no control point of storage or file archiving
3. additional load on computer because of resources sharing
4. hard to maintain version control

## Client server network

Client server network is where computers containing resourses are connected to computers that need the resourses inorder to functionor perform what a user who is the client intends to do.

This may go in two ways that is back and forth in that a computer can be used as a server to provide information to another computer that lacks the information but requires it. The same comperter may be a personal computer for another user yet a server to that is accessed by another computer through a network.