

STUDY ON COMPUTER NETWORKS

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Abstract : In this paper we are going to see about the how computer networks have been connected to LAN, MAN, WAN connection, and network topologies and uses of an OSI model how the layers have been got connected to repeaters, bridges ,routers ,gateways. normally an connection is very helpful for every network to got connected in the correct way so that data may reach its destination node and about the topologies .

Keywords: *Network,Applications, Lan ,Man,Wan*

I.INTRODUCTION

The past three centuries dominated by a single technology. Industrial Revolution accompanying by the great mechanical systems in the 18th century.The age of the steam engine in 19th century.20th century 3key technology processing ,distribution, and information gathering.other industries are becoming older but computer industry remains younger. A medium-sized company have had one or two computers while large institutions at most a few dozen .all the networks were interconnected to the multiple networks. These systems are called computer networks.[2]

II.USES OF COMPUTER NETWORKS

The traditional uses at companies and for individuals and move to recent development regarding home networking and mobile users.

- Business Applications
- Home Applications
- Mobile Users
- Social Issues

➤ Business Applications:

Substantial number of computers have a many companies. The computers have been isolated from others at an some point and each and every management may decide to connect them. Information about the entire company. The issues here is resource sharing and the goal to make all programs especially data available to anyone network location of the resource and the user. Every large and medium sized company and many small companies are virtually depend on computerized information.

➤ Home Applications:

In 1977 Ken Olsen president of Digital Equipment Corporation the number two computer in the world. There is no reason for any individual to have computer in his home. More popular uses of the internet of home appliances are

- Access to remote information
- Person –to-person communication
- Interactive entertainment
- Electronic commerce

Remote information access to comes in many forms .It can be surfing the World Wide Web for information. [2]

➤ Mobile user:

Mobile computers such as notebook computers and personal digital assistants (PDAs) are one of the fastest growing segments of the computer industry. Now a days each and every body has been working in the various fields as telephone, mail communications,messages.The whole different network application area for wireless networks is the merge of call phones and PDAs wireless computers.

➤ Social issues:-

Each and every common social network has some advantages and disadvantages .moreover all the issues are taking part through any network problems and any LAN connection problem. People have networks operates claiming that they responsible for components are contents what they carry just carry just a newspaper and magazines.[2]

Local Area Network (LAN):-

It is a communication network. It have been connected to multiple connecting devices through any areas it transfer the data according to the areas as high rates or low rates. Sharing hardware and software resources and it is individual workstations. Equipment and support can be costly. It is a medium of optical fibres ,coaxial cables, twisted pair and wireless. High speed networks (.2 to 100 Mb/sec).[1]

Wide Area Network (WAN):-

It connects sites across the region , country and the world. Switching allows many computers to connect to many switches, rather than to each other. Computers are connected each other to form a network such architecture are called Point –to – Point architecture. [1]

Metropolitan Area Network (MAN):-

It covers a city or a region of a city. It borrow technologies from LANs and WANs. It supports high-speed disaster recovery system and real-time transaction backup systems. It may be a single network such as cable television networks available in many cities. A man uses distributed queue dual bus. It is a range of within a 100Km (a city).[1]

Home Networks:-

It is a fundamental idea is that in the future most homes will be set up for networking. The one of the visionary concepts

no one asked but once they arrived no one can imagine how they lived without them.

Many devices are capable of being networked some categories are:

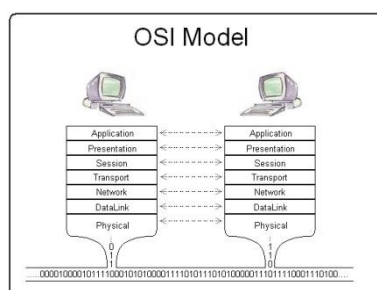
- Computers (Notebook PC, PDA, Shared Peripherals)
- Entertainment(VCR,DVD,Camera,MP3)
- Appliances(Refrigerator,Clock ,Aircro, Lights)

Home computers networking is already here in a limited way. Home network has some fundamentally different properties than other network types. The networks and devices have to be easy to install.[2]

OSI Models:

Open system interconnection

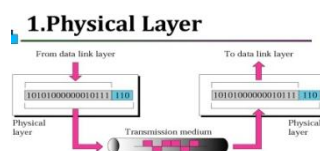
It was developed by international Organization for standards (ISO). A model of how protocol and networking components could be made. OSI is not a protocol. There are 7 layers of OSI Models.



- Application Layer
- Presentation Layer
- Session Layer
- Transport Layer
- Network Layer
- Data link Layer
- Physical Layer

Physical Layer:-

It is a bottom layer of OSI Model. It is responsible for actual physical connecting between the devices. Converts bits to signal. It is a Bit synchronization of Transmission synchronous asynchronous.

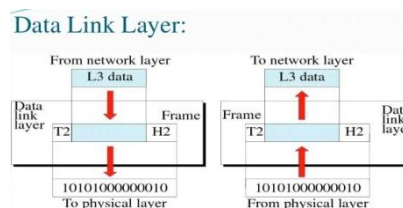


Functions:

- Signal encoding
- Medium
- Bit synchronization
- Transmission type
- Transmission mode
- Multiplexing
- Interface
- Band width
- Signal type

Data link Layer:-

Transmitting the group of bits between adjacent nodes. It is responsible for moving frames or packets from one node to next. The data unit of network layer will contain these address.



It consist of two types as

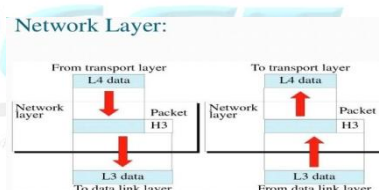
- LLC-logical link control
- MAC-media access control

Functions:

- Addressing
- Flow control
- Synchronization
- Media access control
- Error control
- Node to node delivery

Network layer:-

It is responsible for transmitting the packet os bits to the destinations across sub network or multiple network. This layer ensure successful delivery of packet to destination.

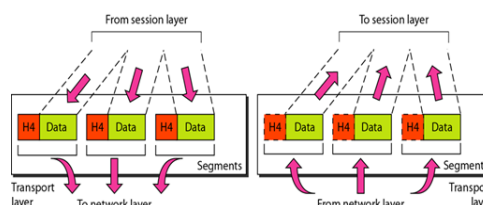


Functions :

- Routing
- Congestion control
- Logical addressing
- Address transformation
- Accounting & billing
- Source to destination error free delivery

Transport Layer:

It is used to transfer the data from session layer to the network layer. It is used to divide the data into parts of packets and send to the destination nodes.



There are 2 types:

- Connection Oriented Transmission
- Connectionless Oriented Transmission

Functions:

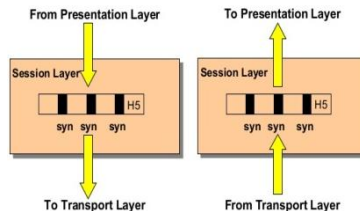
- Host to host message delivery
- Application to application communication
- Connection

➤ Segmentation & reassembly

Session Layer:

Establishment, Maintaining, and Ending a session. It sends synchronous packet establishment request. To end-sender sends acknowledgement.

Session Layer



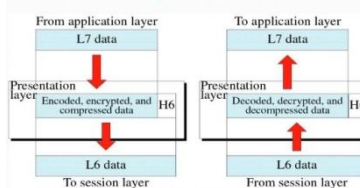
Functions:

- Sessions and sub sessions
- Synchronization
- Session closure
- Dialog control

Presentation layer:

The host are using ASCII and EBCDIC it is used to translate and encrypt the data and compress and decompress, De encrypt the data.

Presentation Layer:



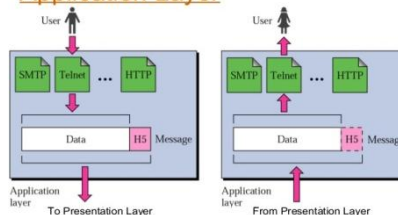
Functions:

- Translation
- Encryption
- compression

Application Layer:

It is used to fulfill the request of an user by getting an help from the other layers

Application Layer



Functions:

- Network abstraction
- File access and transfer
- Mail services
- Remote login
- World wide web
- **Network Virtual Terminal :**
It allows a user to log on to a remote host.
- **Network Abstraction:**

Provides an abstraction of the underlying network to an end user and an application.[1]

Network Topology:-

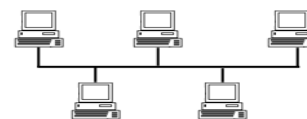
Network topologies describe the ways in which the elements of a network are mapped. It describe the physical and logical arrangement of the network nodes. The physical topology of a network refers to the configuration of cables, computers and other peripherals.

Types of Topologies:-

- Bus Topology
- Star Topology
- Ring Topology
- Mesh Topology
- Tree Topology
- Hybrid Topology

Bus Topology:-

All the node (file server and peripherals) on a bus topology are connected by one single cable. A bus topology consists of a main run of cable with a terminator at each end. All nodes (File server, Workstations and peripherals) are connected to the linear cable.



Bus Topology

Advantages:-

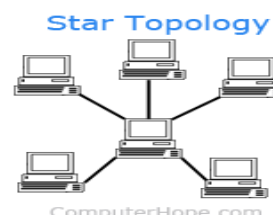
- It is Cheap, easy to handle and implement.
- Require less cable
- It is best suited for small networks.

Disadvantages:-

- The cable length is limited.
- The limits the number of stations that can be connected.
- This network topology can perform well only for a limited number of nodes.

Star Topology:-

In a star network each node is a connected to a central device called a hub. The hubs are used for sending the data to the another node and controls it



ComputerHope.com

Advantages:-

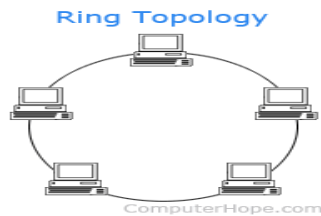
- Easy to manage
- Easy to locate problems
- Easy to install and wire.

Disadvantages:-

- Require more cables length than a linear topology.
- If the hub fails nodes are disabled
- More expensive

Ring Topology:-

This topology consist of two neighbours for communication. The data have been travel in same direction. To implement a ring network we use the token ring technology.



Advantages:-

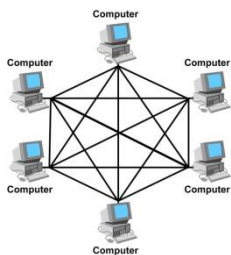
- Easier to manage than a Bus Network.
- Good Communication over long distance.
- Handles high volume of traffic.

Disadvantages:-

- The failure of a single node of the network can cause the entire network to fail.

Mesh Topology:-

This topology is also used to connect with other network and it is expensive and costly. In this topology each and every node sent a message to the other



Advantages:-

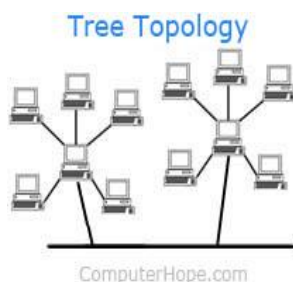
- In dedicated links there is not at all any traffic problems
- Point to point links make fault identification easy.

Disadvantages:-

- Installation is complex as each node is connected to every node.
- Cabling cost is high.

Tree Topology:-

A tree topology is an combination of star topology in it. This tree topology is used to link other network topology using the nodes and links to connect with other.

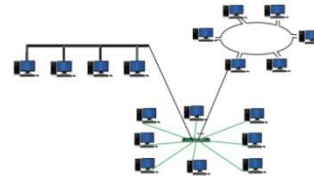


Advantages:-

- Point-to-point takes place in separate segments
- Server hardware and software are controlled by the vendors

Disadvantages:-

- Segments gets down when breaks
- It is not easy to connect with other topologies



Hybrid Topology:-

It is an topology consist of any network topologies more than other. A hybrid topology always accures when two different basic network topologies are connected.

Advantages:-

- It is extremely flexible
- It is very reliable

Disadvantages:-

- Expensive.[1]

Connecting devices:-

Normally connecting devices have been divided into two types as

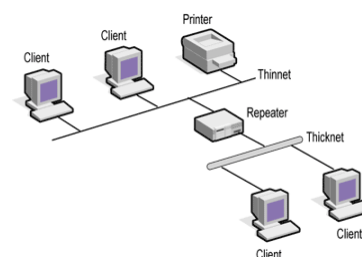
- Networking devices
- Internetworking devices

Networking devices :

Two types as ,

Repeaters:-

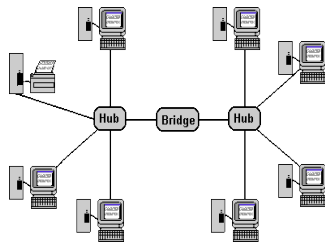
It is an regenerator or an electronic device which simply regenerates a signal .it has been mainly working on the physical layer of OSI model. It carries an signal the bits as 0 and 1 from one end to the other



Bridge:-

A bridge is a connecting device which has it own processor, memory and two NIC Cards to connect two portions of a networks. Facilitates host to host communication .Operates at the physical as well as data link layer. Bridge is to divide a big network in to smaller sub-networks called segments. A two segment is connected as an single network. There are three types as

- Learning bridge
- Simple bridge
- Multiport bridge

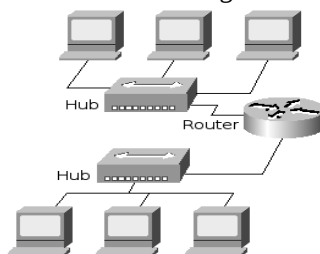


Internetworking devices :

Two types as,

Routers:

It is an intelligent device which is used to connect two or more networks. It is usually working on the physical, data link and networking. It has been working on distance vector routing and link state routing



Gateway:-

Two networks that use different protocols. It works at all seven layers of OSI Model. Unlike a router a gateway can forward packets across different networks that may also use different protocols.[1]



III.CONCLUSION

Thus the paper will helps us to understand about the network conections and its various applications in it. It helps us to know about the uses of networking devices as well as internetworking devices. About the topology and its advantages and disadvantages of each and every topology. Networks plays an major role in our day to day life. Without networks we may not understand about the current situation of each and everything.

IV.REFERENCE

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- [2]. Andew S. Tanenbaum, "COMPUTER NETWORKS" Copyright 2003 By Pearson Education Inc. And Dorling Kinderseley Publishing Inc.