

Computer Networking – A Survey

Rahul Kumar^{1*}, Ribca², Amit Puri³, Pritika Talwar⁴

^{1,2}MCA Student, Department of Computer Applications, Global Group of Institutes, Amritsar, India

^{3,4}Assistant Professor, Department of Computer Applications, Global Group of Institutes, Amritsar, India

Abstract: Computer networks are used more and more often. A computer network today consists of much more than just a group of connected devices. A system of connected computers is known as a computer network, and it is used to share digital information. The ability to evaluate, organize, and transmit information that is crucial to profitability is made possible by computer networks. The crucial development in computer networking has been the growth of intranets and the internet. Private business networks that use the internet as its foundation include intranets and the internet. An intranet allows a business to gather, organize, and transmit information more quickly and easily than ever before, which is the only reason why organizations are currently deploying them at a dizzying pace. Just to stay competitive, many organizations are embracing intranets; those that don't risk falling behind.

Keywords: Computer networking.

1. Introduction

Communication between two or more applications operating on physically separate machines is supported by networking. A computer network is a group of connected computers that may communicate with one another and other computers on the network by exchanging data. When two or more computers are linked to share data and resources, a network is formed. A group of computers communicating over communication mediums while adhering to a set of protocols. A computer network is basically a group of interconnected computers that can share information and/or resources like hard drives, CD-ROMs, fax modems, printers, etc. An interconnected group of autonomous computers, where autonomous refers to no computer and interconnected to the ability of the computers to communicate information. It's not new to make devices communicate with one another for communication purposes. A computer can now be networked to the internet, another pc, or even a home stereo. Other attempts at telephony, such the telegraph and telephone, have now developed into more complex gadgets. Early computers had to physically share space, which made it challenging to share data and other information. Researchers realized this was impractical and created a method to "connect" the computers so they could more effectively share resources. Thus, the first computer network emerged. Many uses, including secure audio transmission in military channels, were made available by the then-new communication technique known as packet switching. These fresh circuits served as the foundation.

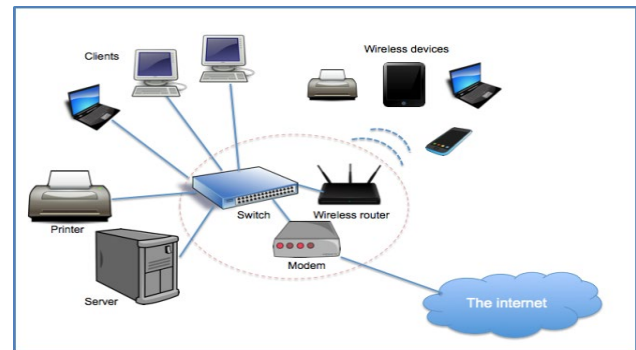


Fig. 1. Representation of networking

A. Peer-to-Peer Networks

First peer-to-peer networks are more frequently used in situations involving less than 10 machines and when stringent security is not required. Since they all have the same status and interact with one another on an equal basis, computers are referred to as peers. All the computers connected to the network can share shared resources like printers and scanners that are attached to any one computer, as well as files. Figure 2 illustrates how computers are interconnected in peer-to-peer networks.

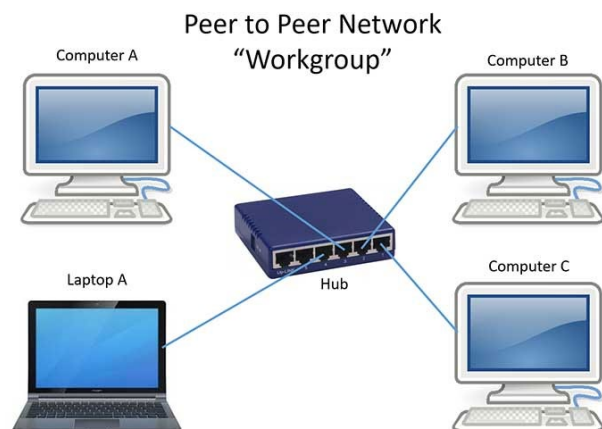


Fig. 2. Peer to peer network

B. Client/Server Networks

For larger networks, client/server networks are more appropriate. The storage place for information and applications shared through a network is a central computer, or "server." The server often has more performance than an average computer.

*Corresponding author: rseemar0@gmail.com

The other computers, referred known as the "client computers," are also subject to server control over their network access. Only the network administrator will be able to access the server; everyone else cannot. Just the client PC's are accessible to others. A client/server network area's computer connections are shown in (client/server network area). It is typically viable to employ just one transmission medium when constrained (cabling). Due to the fact that you are only incurring a tiny amount of expenses, this technology is less expensive to adopt than WAN.

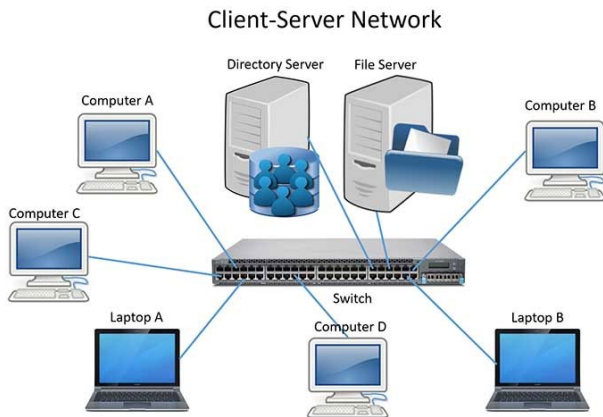


Fig. 3. Client-Server network

2. Typical Physical Topologies

There are various types of physical and logical topologies. The most typical and crucial for comprehending the topologies of Ethernet and Token Ring are.

- Ring topology
- Star topology
- Bus topology

A. Bus Topology

Bus Topology

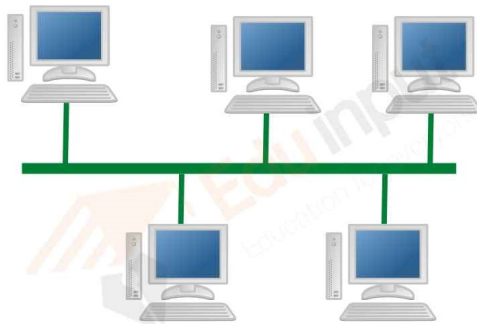


Fig. 4. Bus topology

Every device connected to a single shared wire is said to be in a bus physical topology. Computers (workstations and servers) are connected directly to the backbone utilizing terrestrial microwave-connectors in a physical bus topology network, which usually employs one long cable known as a backbone. The backbone is terminated at both ends to cut off

the signal after it has travelled through all devices. The bus topology was the first topology to be utilized to link the computers in a network. The first topology type is this one. A failure model would be this. In most bus topologies, electrical or electromagnetic signals can move in both directions. Following diagram illustrates a network with a bus topology.

B. Ring Topology

Wires are arranged in a circle for ring topologies. Each node has connections to either of its sides and its neighbours, and it only moves in one way around the ring. Every unit in the ring has a transmitter and a receiver, acting as a repeater to send the signal to the following unit. Signal degradation is minimal because the signal is regenerated at each device. When some time passed, the ring topology emerged. The ring topology was created to overcome the drawbacks of the bus topology. Yet another failure model is this. For token-passing access mechanisms, ring topologies are the optimum choice. Only the node holding the token, which is passed around the ring, is able to transmit data. There aren't many ring topologies.

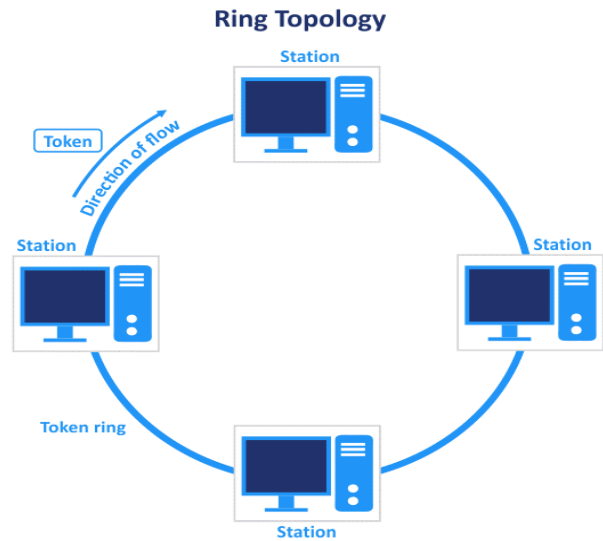


Fig. 5. Ring topology

C. Star Topology

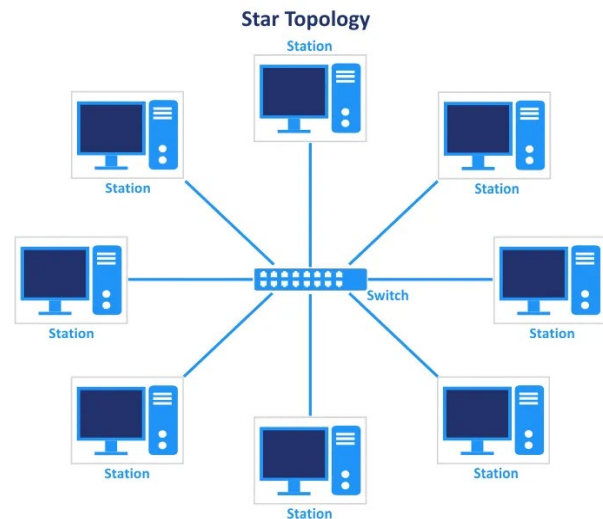


Fig. 6. Star topology

In star topologies, drop connections that reach in every direction are connected to a central device. Each networked device is linked to the hub, multiport repeater, or switch at the centre by a point-to-point connection. A tree or hierarchical network topology can be created by nesting star topologies inside of other stars. In a star topology, electrical or electromagnetic signals are transmitted from a networked device to a switch through a drop cable before being forwarded to another network. The star topology was created in order to circumvent the drawbacks of the bus topology and the ring topology. This is not a model for failure. Yet, it is a widely accepted model, and its topology is now utilized everywhere. It represents a star topology LAN.

3. Conclusion

In conclusion, a network is a group of two or more computers that are linked by a telecommunications system in order to

exchange information and share resources. Businesses wouldn't be able to share resources and boost efficiency as efficiently without a network. Large-scale Internet usage was made possible for businesses thanks to the WAN network. This enabled the business to hold meetings remotely via video conference and data sharing via the network. As you can see, networks provide the end user a number of advantages. Whether wired or wireless, networks are a crucial component of technology.

References

- [1] Cherita L. Corbett, Raheem A. Bayyah, John A. Copeland, "Using Active Scanning to Identify Wireless NICs," in: Proceedings of the 7th IEEE Workshop on Information Assurance, U.S. Military Academy, West Point, NY, 21-23 June 2006.
- [2] Pranab Kumar Chakravarty, "Computer Networking Technologies and Application to IT Enabled Services."
- [3] Antonio Carzanig, "Basic concepts in Computer Networking," September 2014.