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Computer Networks

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Abstract: ***The Primary purpose of a computer network is to share resources. A computer network is referred to as client/server if (at least) one of the computers is used to "server" other computers referred to as "client". Besides the computers, other types of devices can be part of the network. In the early day of networking, there will be once central server that contains the data and all the clients can access this data through a Network Interface card. Later on client server architecture came into existence, where still burden is there on the server machine. To avoid the disadvantages in distributed computing was introduced which reduce the burden on the server by providing work sharing capabilities. This paper describes how the concept of distributed computing came into existence based on the advantages and disadvantages that raised in earlier networking concepts. The concept of distributed computing speaks that once data is available within the server(s), it should be able to be accessed and processed from any kind of client device like computer, mobile phone, PDA, etc.***

Keywords: LAN, WAN, MAN, PAN, SAN

1. Introduction

A computer network consists of two or more computers that are interconnected with each other and share resources such as printers, server, and hardware and exchange the data in the form of file, facilitating electronic communication. Computers on a network can be connected through twisted pair cables, telephone lines, radio waves, satellites or optical fiber cables. The first computer network designed was the 'Advanced Research Project Agency Network (ARPANET)' by the United States Department of Defense. Since then, myriads of new computer networking technologies have been designed. This tutorial only covers the first three network technologies i.e. LAN, WAN and MAN. However, currently there are multiple networking technologies in use which have been enlisted below. Computer Networks is an international, archival journal providing a publication vehicle for complete coverage of all topics of interest to those involved in the computer communications networking area.

Figure 1: Computer Network

Local Area Network (LAN)

A Local area Network is a network that is used for communicating among computer devices, usually within an office building or home. Local Area Network covers a small physical area, like a home, office, or a small group of building, such as a school or airport. LAN's enable the sharing of resources such as files or hardware devices that may be needed by multiple users. In LAN the speeds of communicate is 10 Mbps to 10 GB. There are requires little wiring, typically a single cable connecting to each device. LAN's can be either wired or wireless. Twisted pair coaxes or fiber optic cable can be used in wired LAN's. Every LAN uses a protocol – a set of rules that governs how packets are configured and transmitted. Nodes in a LAN are linked together with a certain topology. These topologies include:

- Bus topology
- Ring topology
- Star topology

The Local Area Network is shown in Figure 2

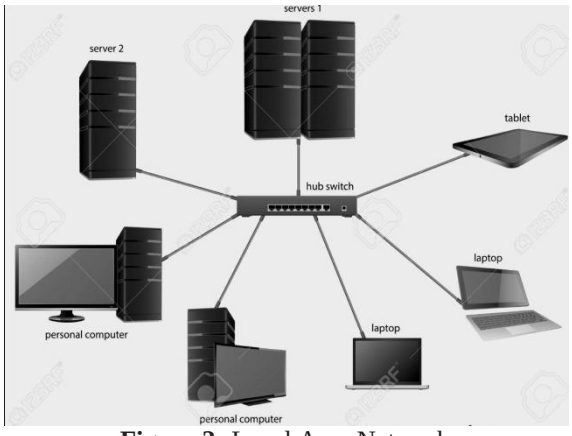

Figure 2: Local Area Network

The Advantages of Local Area Network are we get high Speed. It's not so costly. Our computer is Secure. We get more option for Sharing. The Disadvantages of Local Area Network is Requires Administrative Time. The problem is file server may be fail. And there is chance cables may be break.

Wide Area Network (WAN)

A Wide Area networks cover a broad area, like communication links that cross metropolitan, regional, or

national boundaries. The internet is the best example of a WAN. The multiple LANs can be connected together using devices such as bridges, routers, or gateways, which enable them to share data. There is Contains multiple LAN's and MAN's. There are uses satellites and microwave relays. The data transfer rate depends upon the ISP provider and varies over the location. The Wide Area Network is shown in Figure 3.

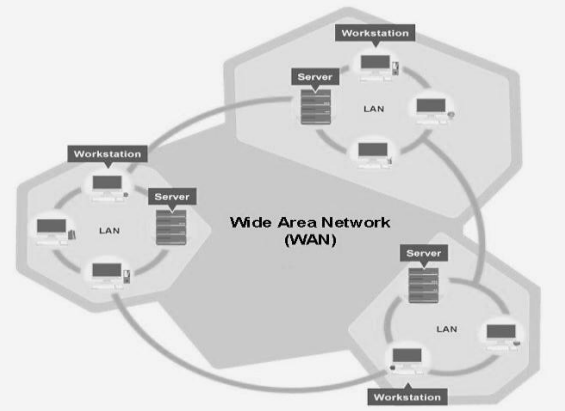

Figure 3: Wide Area Network

The Advantages of Wide Area Network can connect the computer to a wider area geographically, for example connecting Florida, United States with the world. WAN network seeks to connect schools in Florida with other places in the world as an example of Tokyo in just a few minutes, without the need to provide a large sum of money for a pay phone. It is Covers a large geographical area so long distance businesses can connect on the one network. There is flexibility to Shares software and resources with connecting workstations. The Disadvantages of Wide Area Network needs a good firewall to restrict outsiders from entering and disrupting the network. The WAN Setting up a network can be an expensive, slow and complicated. The Technology Used In Wide Area Network are ISDN (Integrated service digital network), Frame relay technique, SMDS (Switched multimegabit data service), SONET (Synchronous optical network), HDLC (High data link controlled) and SDLC (Synchronous Data Link Control).

Metropolitan Area Network (MAN)

A Metropolitan area network (MAN) is a large computer network that usually spans a city or a large campus. A Metropolitan area network is optimized for a larger geographical area than a LAN, ranging from several blocks of buildings to entire cities. A Metropolitan area network might be owned and operated by a single organization, but it usually will be used by many individuals and organizations. A Metropolitan area network often acts as a high speed network to allow sharing of regional resources. A MAN typically covers an area of between 5 and 50 km diameter. The Examples of MAN: Telephone company network that provides a high speed DSL to customers and cable TV network. The Metropolitan Area Network is shown in Figure 4.

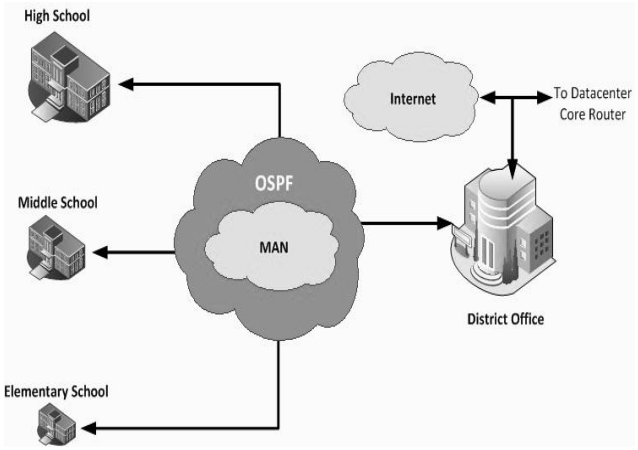

Figure 4: Metropolitan Area Network

The Advantages of Metropolitan Area Network is the biggest advantage of MAN is the bandwidth (potential speed) of the connecting links. It provides a good back bone for a larger network and provides greater access to WANs. The dual bus used in MAN helps the transmission of data in both directions simultaneously. A MAN usually encompasses several blocks of a city or an entire city. This means that resources (such as database and files) shared on the network can be accessed extremely quickly. The Disadvantages of Metropolitan Area Network is more cable required for a MAN connection from one place to another. It is difficult to make the system from hackers and industrial espionage (spying) graphical regions. The cost is what inhibits the geographical reach of MAN which is also another drawback.

Personal Area Network (PAN)

A personal area network, or PAN, is a computer network organized around an individual person within a single building. This could be inside a small office or residence. A typical PAN would include one or more computers, telephones, peripheral devices, video game consoles and other personal entertainment devices. If multiple individuals use the same network within a residence, the network is sometimes referred to as a home area network, or HAN. In a very typical setup, a residence will have a single wired Internet connection connected to a modem. This modem then provides both wired and wireless connections for multiple devices. The network is typically managed from a single computer but can be accessed from any device. This type of network provides great flexibility. The Personal Area Network is shown in Figure 5.

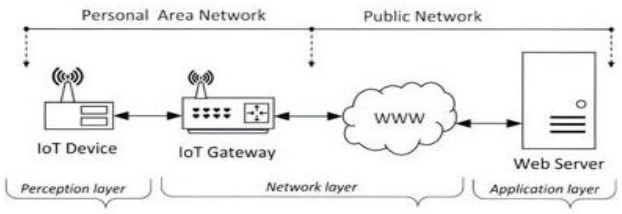

Figure 5: Personal Area Network

Storage Area Network (SAN)

A SAN typically supports data storage, retrieval and replication on business networks using high-end servers, multiple disk arrays and Fiber Channel interconnection technology. Storage Area Networks (SANs) technology is similar but distinct from network attached storage (NAS) technology. While SANs traditionally employ low-level network protocols for transferring disk blocks, a NAS device typically works over TCP/IP and can be integrated fairly easily into home computer networks. The term SAN can sometimes refer to system area networks instead of a storage area network. System area networks are clusters of high performance computers used for distributed processing applications requiring fast local network performance. Storage area networks, on the other, are designed specifically for data management. SANs support disk mirroring, backup and restore, archival and retrieval of archived data, data migration from one storage device to another and the sharing of data among different servers in a network. SANs can incorporate sub networks with network attached storage (NAS) systems. Simplification of Storage Administration is now possible because of Storage Area Networks cause cables and a storage device doesn't need to be moved physically. Moving data from one server into another is now a breeze. Storage area networks are great tools in recovering important data and backups. Distant location doesn't affect the storage area networks as long as the secondary storage array is working. This enables storage replication either implemented by disk array controllers, by server software, or by specialized SAN devices. Since IP WAN's are often the least costly method of long-distance transport, the Fiber Channel over IP (FCIP) and ISCSI protocols have been developed to allow SAN extension over IP networks. The Storage Area Network is shown in Figure 6.

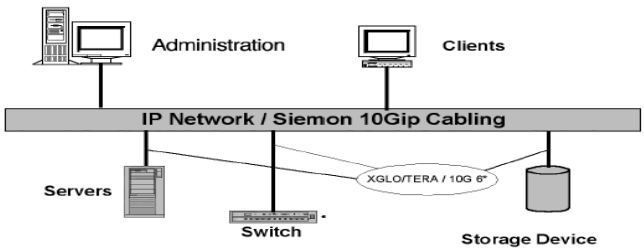

Figure 6: Storage Area Network

2. Conclusion

There are many advantages of computer networks, such as LAN's provide excellent reliability, high data transmission rate, they can easily be managed, and shares peripheral devices too. Local Area Network cannot cover cities or towns and for that Metropolitan Area Network is needed, which can connect city or a group of cities together. Further, for connecting country or a group of Countries one requires Wide Area Network. LAN is a private network used in small office or homes usually within 1km range with high speed transfer data rate and fulltime service connectivity in low cost. WAN covers large geographical area for example, a country or a continent. Its data transfer is usually low as compared to LAN, but it is compatible with a variety of access lines and has an advantage security. MAN covers an area bigger than LAN within a city or town and server as an ISP for larger LAN. It uses optical fibers or wireless infrastructure to link the LANs therefore, providing high speed regional recourse sharing. Same as personal area network (PAN) is a computer network used for data transmission amongst devices such as computers, telephones, tablets and personal digital assistants. A SAN moves storage resources off the common user network and reorganizes them into an independent, high-performance network. This allows each server to access shared storage as if it were a drive directly attached to the server.

References

[1] Briere, E. (1966). Quantity before quality in second language composition. Language Learning 16, 141-151
[2] Bums, H. & Culp, G. (1980, August). Stimulating invention in English composition through computer Assisted instruction. Educational Technology, 5-10
[3] Daedalus Integrated writing environment [Computer software). (1994). Austin, TX: The Daedalus Group, Inc.
[4] Keirn, W. (1989). The writing-grammar battle: Adventures of a teacher/administrator. English Journal, 78, 66-70
[5] Brewin, B., UPS to spend $127M on tri-mode wireless driver terminals. http://www.computerworld.com
[6] Haskin, D., Motient Files for Chapter 11. http://www.internetnews.com
[7] The switch from CDPD to GPRS. http://www.airlink.com/
[8] ARDIS, DataTac 4000, Software Developers Reference Guide, Revision 2.0
[9] Goldsmith, C., Wireless Local Area Networking for Device Monitoring. University Of Rochester, Rochester NY.
[10] IEEE Std 802-2002, IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture, page 1, section 1.2: "Key Concepts", "basic technologies"
[11] Karunakar Pothuganti and Anusha Chitneni "A Comparative Study of Wireless Protocols: Bluetooth, UWB, ZigBee, Wi-Fi", Advance in Electronic and Electric Engineering, ISSN 2231- 1297, Volume 4, Number 6 (2014), pp. 655-662