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SWITCHING SYSTEM

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Abstract: **A communications system consisting of switching centers and their interconnecting media. (188). Part of a communication system organized to temporarily associate functional units, transmission channels or telecommunication circuits for the purpose of providing a desired telecommunication facility.**
Note: Examples of NATO-owned switching system are IVSN and TARE. Switching centers receives the control signals messages or conversation and forward to the required destination, after necessary modification (link amplification) if necessary. A switching system is a collection of switching elements arranged and controlled in such a way as to sleep a communication path between any two distant points. Technically, the design for telephone switching center or equipment requirements in a telecommunication system are determined of the traffic intensity is defined as the product of the celling rate and the average holding time. This paper reveals about the information about the switching system and the research about that. Advantages and disadvantages of the switching system which we are using. A telephone network is composed of a variety of all processing equipment, interstate switching links and inters office trunks because of the random nature of the call request, the design of equipment switching links and trunks are quite different . Thus, the traffic analysis is the fundamental request for the design of cast effective, efficient and effective configuration of network.

I. INTRODUCTION

Switching is an engineering approach on computer networking. Telecommunication networks carry information signals among entities which are geographically far apart. The entities are involved in the process of information transfer which may be in the form of a telephone conversation (telephony) or a file transfer between two computers or message between two terminals etc. Today it is almost turism to state that telecommunication system are the symbol of our informative age. With the rapidly growing traffic and untargeted growth of cyberspace, telecommunication becomes a fabric of our life. The future challenges are enormous as we anticipate rapid growth items of new services and no. of users. What comes with the challenges is a genuine need for more advance methodology supporting analysis and design of telecommunication architectures.

Switching systems are about how do we move traffic from one part of the network to another and to connect end system to switches to each other and data arriving to an input port of a switch have to be moved to one or more of output ports. The communication switching system enables the universal connectivity. The universal connectivity is realized when any entity is one part of the world can communicate with any other entity is another part of the world. The telecommunication links and switching were mainly designed for voice communication. With the appropriate attachments and equipments they can be used to transmit data. Samuel F.B Morse's developed the first significant work in telecommunication. F.B Morse developed code telegraphy in 1837. In 1844, a 40 mile telegraph line was setup between Baltimore and Washington by F.B Morse. The purpose of telecommunication switching system is to provide the means to pass information for any terminal device selected by the originator. Telecommunication system are divided in four parts –End system, transmission system, switching system, Signaling. A telephone network is composed of a variety of all processing equipments, intestate switching links and inters office trunks, because of the random nature of the call request. The design of equipments witching links and trunks are quite difficult. Thus, the traffic analysis is the fundamentals request for the design of cost effective, efficient and effective configuration of network.

II. HISTORICAL DEVLOPMENT

By the early 1800's scientist had developed ways to generate and transmit electricity. In 1819, oersted discovered the relation between magnetism and electricity. Ampere, Faraday and others continued this work in 1820. In 1834, Gauss and Weber wired over the roofs of Gottingen to make a telegraph system. Samuel F.B. Morse's developed the first significant

work in telecommunication. In 1874, Ban dot invented a "multiplexes" system which enables up to six signals from telegraph machines to be transmitted together over the same line. Elisha gray and Alexander graham bell contributed significant works and filed paper related to telephony. The early stages of the development of telecommunication were due to A.G. Bell, G. Marconi and C.E. Shannon. In 1876, Bell invented a telephone system. In1897 Marconi patented a wireless telephone system. Teletypewriter service was initiated in 1931.

In early days, a very simple exchanges whose control is provided by a human operator and the elements of the switch assemblies are plugs and sacks. With increase in demand of service, human operator exchanges was replaced by the inventions of range of electromechanical switching devices. Of all the electromechanical switching devices that become available over the years, the step-by-step switching system invented by Almon B. Strowger in 1892 is still quite popular. The next automatic electromechanical switching system was cross bar switching. First patient of crossbar device was granted in 1915 to J. n. Reynolds of west electric, USA.

The use of computers to control the switching led to the designation "electronic" switching system(ESS) or Electronic automatic exchange(EAX). In 1970, first electronic switching system No. 1 ESS or No. 1 EAX was introduced. Digital electronic switching matrices were first introduced into the U.S.public network in 1976 with AT& T's No. 4 ESS digital toll switch. By the mid 1980's the interoffice transmission environment has changed to almost exclusively digital.

III. CENTRALIZED SWITCHING SYSTEM

Centralization of surveillance, control, and analysis of Electronic Switching Systems is gaining wide acceptance throughout the telephone industry as the appropriate approach to maintaining high standards of reliability in a cost-effective manner. This paper discusses some of the major issues confronting the design of systems that support this centralization. These issues include force management and work control concepts as well as specific design constraints on the systems themselves. The No. 2 Switching Control Center System, which is the principal Bell operations system supporting this centralization, is used as a vehicle to describe specific issues involved.

CENTRALIZED MODEL

The distributed system cannot be extended to large terminal cases and the increased geographical separation of terminals. A simple centralized system, which reduces the average length of transmission link. But this system increases the total switching costs. Introducing more local centers instead of one national center switching machine can further reduce the transmission cost. Two local centers are connected by links called trunk. A trunk in telephone system is a communication path that contains shared circuits that are used to interconnect central offices.

Signal Characteristics

Telecommunication is mainly concerned with the transmission of messages between two distant points. The signal that contains the messages is usually converted into electrical waves before transmission. Our voice is an analog signal which has amplitude and frequency characteristics.

Voice Frequency: The range of frequencies used by a communication device determines the communication channel, communicating devices, bandwidth or information carrying capacity. The most commonly used parameter that characterizes as electrical signal is its bandwidth of analog signal or bit rate if it is a digital signal.

Speech Spectrum: The telephone channel over which we wish to send data are designed to transmit electrical oscillations (microphone converts sound into equivalent number of electrical oscillation) of voice .

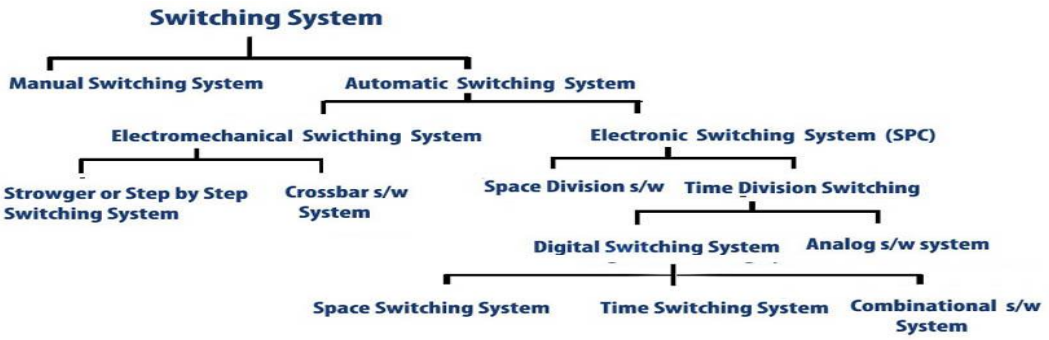
Decibels: The decibel is a valuable unit for telecommunication because losses or gains in signal strength may be added or subtracted if they are referred to in decibels. The signal Strength at various frequencies is expressed by the unit of decibel

(dB) in telecommunication. The decibel is a unit of power ratio. The power ratio is expressed as G = 10 log10p2/p1Where P1 is input power (Normally) and P2 is output power.

The decibel is also used to be defined as the unit of attenuation. One decibel attenuation Means that a signal has dropped to 0.794 of its original power. One decibel gain means that a signal has increased to 1.259 of its original power. The decibel concept is further discussed in later chapter.

Voltage and current level can be quoted in decibel as follows G = 10 log10p2/p1=v2I2

SWITCHING



Types of switching system

1. Telephone switches
2. Datagram routers
3. ATM switches

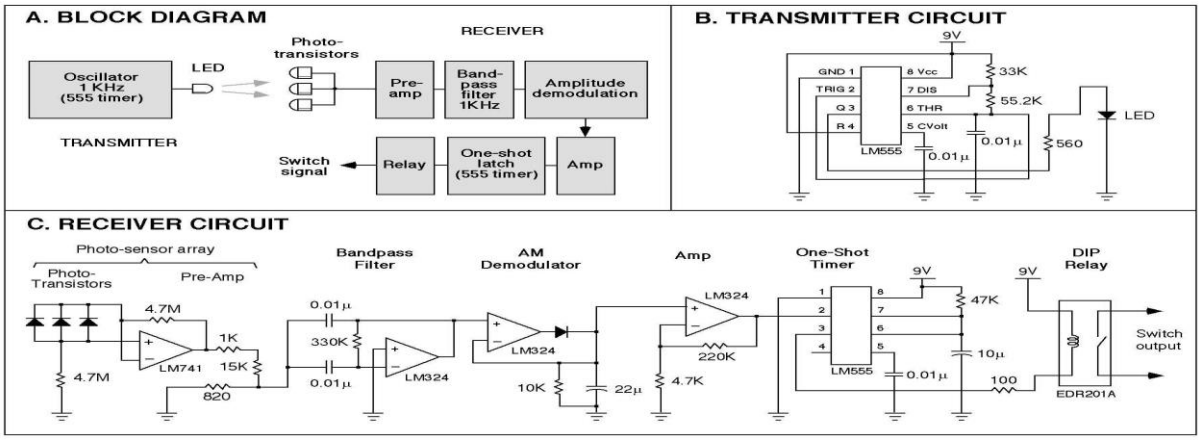
Switching Techniques

In large networks there might be multiple paths linking sender and receiver. Information may be switched as it travels through various communication channels. There are three typical switching techniques available for digital traffic.

- Circuit switching
- Message switching
- Packet switching

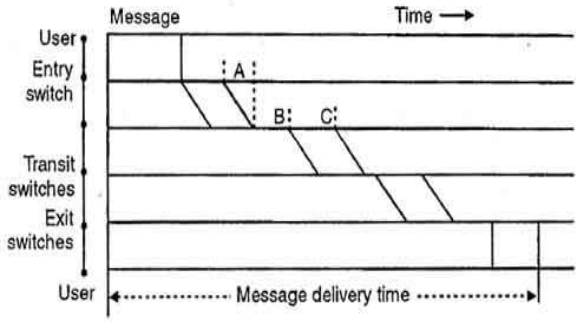
CIRCUIT SWITCHING

Circuit switching is a technique that directly connects the sender and the receiver in an unbroken path. Telephone switching equipments; for example, establishes a path that connects the caller's telephone to the receiver's telephone by making a physical connection. With this type of switching technique, once a connection isestablished, a dedicated path exist between both ends until the connection is terminated. Routing decision must be made when the circuit is first established, but there are no decision made after that time.

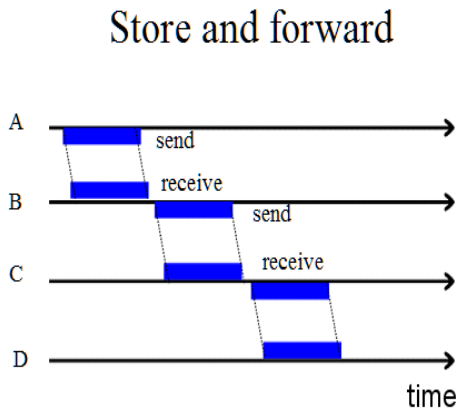


MESSAGE SWITCHING

With message switching there is no need to establish a dedicated path between two stations. When a station sends a message, the destination address is appended to message. The message is then transmitted through the network, in its entity, from node to node. Each node receives the entire message, stores it in its entirety on disk, and then transmits the message to the next node. This type of network is called a store-and-forward network.



End to end delay in message delivery



PACKET SWITCHING

Packet switching can be seen as a solution that tries to combine the advantages of message switching and circuit switching and to minimize the disadvantages of both. There are two methods of packet switching: Datagram and virtual circuit.
In both packet switching methods, a message is broken into small parts, called packets. Each packet is tagged with the appropriate source and destination address. Since packets have a strictly defined maximum length, they can be stored in main memory instead of disk, therefore access delay and cost are minimized. Also the transmission speeds, between nodes, are optimized. With current technology, packets are general accepted into the network on a first –come, first-served basis. If the network becomes overloaded, packets are delayed or discarded.

IV. CONCLUSION

The communication switching system enables the universal connectivity. The universal connectivity is realized when any entity is one part of the world can communicate with any other entity in another part of the world. In many ways telecommunication will acts as a substitutes. Telecommunication has evaluated and growth at an expensive rate in recent years and will undoubtedly continue to do so. This research concludes that telecommunication links and switching were mainly designed for voice communication. A modern society, therefore needs new facilities including very high bandwidth switched data networks, and large communication satellites with small, cheap earth antennas. In telephone system, the frequencies it passes are restricted to between 300 to 3400Hz. Thus the network bandwidth is 3100Hz.the bandwidth and bit rate for various types of systems is different.

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