



NLC INDIA LIMITED -NEYVELI

INTERNSHIP REPORT ON

**“STUDY OF TELECOMMUNICATION NETWORK
SWITCHING SYSTEM IN NLCIL, NEYVELI”**

SUBMITTED BY

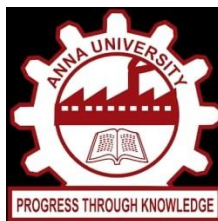
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BACHELOR OF ENGINEERING

ELECTRONICS AND COMMUNICATION ENGINEERING



**UNNIVERSITY COLLEGE OF ENGINEERING,
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(A Constituent College of Anna University Chennai)

PANRUTI CUDDALORE DISTRICT-607 106



NLC INDIA LIMITED

(“NAVARATNA “-GOVERNMENT OF INDIA ENTERPRISE NEYVELI-607801
TAMILNADU)

BONAFIDE CERTIFICATE

Certified that the internship report on” **A STUDY ON TELECOMMUNICATION
NETWORK SWITCHING SYSTEM IN NLCIL, NEYVELI**” is the **BONAFIDE** work of

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Second year B.E. in Electronics and Communication Engineering of
“**UNIVERSITY COLLEGE OF ENGINEERING PANRUTI**”, Tamil Nadu in the
Telecommunication Division of **NLC INDIA LIMITED**, carried out under our
supervision during the period of 21-06-2023 to 04-07-2023.

This performance, conduct and attendance during the period where found be

_____.

DATE:

PLACE: NEYVELI

SIGNATURE OF THE GUIDE



NLC INDIA LIMITED

NAVARATNA “-GOVERNMENT OF INDIA ENTERPRISE NEYVELI, TAMILNADU)

CERTIFICATE

This is to certify that this internship work entitled “**A STUDY OF TELECOMMUNICATION NETWORK SWITCHING SYSTEM IN NLCIL, NEYVELI**” is a BONAFIDE record of the work submitted by

SOWMIDRA.L.R

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In partial fulfilment of the requirement for the award of degree of **BACHELORE OF ENGINEERING (Electronics and Communication Engineering)** from **UNIVERSITY COLLEGE OF ENGINEERING PANRUTI,(AFFILIATED TO ANNA UNIVERSITY-CHENNAI)****TAMIL NADU**. This project work is BONAFIDE work done using during the period from 21.06.2023 to 04.06.2023 at **NLC INDIA LIMITED, NEYVELI**.

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DECLARATION

I hereby declare that the Internship training entitled "**A STUDY OF TELECOMMUNICATION NETWORKING SYSTEM IN NLCIL, NEYVELI**" done at NLCIL TELECOMMUNICATION DIVISION. Submitted to department of Electronics and Communication Engineering in **UNIVERSITY COLLEGE OF ENGINEERING PANRUTI** for awarding in Electronics Communication and Engineering is reward of the original work done by myself under the guidance of **SHRI.PAWAN BHARATI, DEE/TELECOM CENTRE, BLOCK-26, NLCIL, NEYVELI.**

This report is only for reference and no part will be published or copied anywhere with the return permission from officials of **NLCIL, NEYVELI**

- 1.
- 2.
- 3.

DATE:

PLACE: NEYVELI

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(SOWMIDRA.L.R

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ACKNOWLEDGEMENT

I wish to express thank the eminent personalities who served as the backbone for the internship apart from the efforts taken by me

I wish to express my sincere thanks to **NLC INDIA LIMITED** for providing me the opportunity to carry out the internship.

Sincere thanks **SHRI.ABRAHAM GEORGE, GM / L&DC, SHRI. K. PRABHARAKAN CM/L&DC, Mr. A. KALYANA SUNDARAM JE/E** Learning and Development Centre for his kind patronage and for all the facilities to do the internship successfully.

We concerned it a great privilege to recur our deep sense of gratitude to our Principal **DR.R.DHANAVUAYAN**, We express our sincere and profound thanks to the help of our department **MR.F.ARUMAINATHAN**, The Head of the ECE Department, MUTHIAH POLYTHCHIC COLLEGE, for giving the permission to do in the internship at telecom Centre of NLC India Ltd.

My sincere thanks to **SMT.D.GEETHA, GM/ TELECOMMUNICATION**, we indebted to **SHRI PAWAN BHARATI, DEE/TELECOMMUNICATION**, for their guidance and constant supervision as well as for providing necessary information regarding the internship and also for the support in completing their internship.

We are obliged to staff members of the telecommunication for the valuable information provided by them in their respective fields we are grateful for the cooperation during the period of my internship.

ABSTRACT

In today's life telecommunication is the major part of our life. Every moment we connect to each other using telecommunication technology. There are number of techniques used in telecommunication based on quality. Though nowadays telecom is mainly dominated mainly by mobile telephone, majority of communication in industries are still dependent on ISDN. All service work with switching network at its core. This report mainly focuses on study of telecom network on their working by its hardware. This internship gave me a skill to face an office environment. The objective of this training is to expose to student's actual environment, this training also helped me to apply my academic knowledge practically. This report gives an outline on the basis of telecommunication.

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INTRODUCTION TO NICIL:

NLC India Limited (NLC) Neyveli Lignite Corporation is an ownership of the Ministry of coal government of India produces about million ton of Lignite from open cast mines at Neyveli in the state of Tamil Nadu in southern India and a Harsings in Bikaner Rajasthan state. The lignite is used at pushed thermal power stations of 3640 MW installed capacity to produce electricity is joint venture has a 1000 STW thermal power station cool. Lately, it has diversified into renewable energy production and installed 1319 MW solar power plants to produce from photovoltaic (PV) cells and 53 MW electricity from windmills. It was incorporated in 1956 and owned by the Government of India. A small portion of its stock was sold to the public to list its shares on stock exchanges where are traded. It is under the administrative control of the Ministry of Coal.

HISTORY:

Lignite deposit was a chance finding when some "brown substance gushed out with water in Rao Bahadur St. Jambulingam Mudaliar's 620 Acre own fan artesian well during 1934. He acted swiftly and contacted the then British Raj which sent geologists to Neyveli. It was later identified as Lignite. He generously extended a substantial portion of the sprawling land-bank for soil exploration. Through his effort and donated his 620 acres land to the Madras Government. NLC has been a forerunner in the country in the energy sector for 62 years. Contributing a lion's share in lignite production and significant share in thermal power generation. It was inaugurated by the first Prime Minister Jawaharlal Nehru in 1956. NLC operates four opencast lignite mines of a total capacity of 306 million ton per annum (MITPA) at Neyveli and Barsingsar: Six Lignite based pithead thermal power stations with an aggregate capacity of 3640 MW at Neyveli and Barsingsar and a 1000MW coal based thermal power Station at Thoothukudi, Tamil Nadu through its subsidiary, NLC Tamil Nadu Power Limited (NTPL), a joint venture between NLC and TANGEDCO (equity participation in the ratio of 89:11), NLC recently commissioned a 1x500 MW unit at Neyveli which is also Asia's largest lignite fired Boiler.

NLC has also forayed into renewable energy sector with commissioning of a 1319 MW Solar Photovoltaic Power Plant including 1 MW rooftop project at Neyveli and a 51 MW wind energy plant at Kaluneerkulam village of Tirunelveli district in Tamil Nadu. The company is also setting up 1209 MW Solar Power Projects at Tirunelveli, Virudhunagar and Ramanathapuram districts of Tamil Nadu, of which, 300 MW have been commissioned. NLC is aiming to achieve a total renewable energy capacity of 4251 MW. NICIL has a target of becoming a 20,000+ MW company by 2025. Works are under progress for the lignite based Neyveli New Thermal Power Plant (1000 MW), Bithnok TPS and Barsingsar TPS Expansion (each 250 MW). Further, NLC, jointly with the Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited (UPRVUNL), is setting up a 3x660 MW coal based thermal power plant at Ghatampur in Uttar Pradesh, through its subsidiary company Neyveli Uttar Pradesh Power Limited (NUPPL) (equity participation in the ratio of 51:49). Apart from the above, the addition of thermal capacity to the tune of 6040 MW by way of installation of new plants and acquisition of power assets to the tune of 3000 MW is in the pipeline. NLC has also contributed significantly to socio- economic development for more than half a century.



POWER PROJECTS:

NLC India has five pithead Thermal Power Stations with an aggregate capacity of 4240 MW. Further, NLC India has so far installed 51 wind turbine generators of 1.50 MW each and also commissioned 140 MW solar photovoltaic power plant in Neyveli, resulting in an overall power generating capacity of 4431 MW (excl. JVs).





THERMAL PPOWER STATION II:

The 1470 MW Second Thermal Power Station consists of 7 units of 210 MW each. In February 1978, the Government of India sanctioned the Second Thermal Power Station of 630 MW capacity (3 X210 MW) and in February 1983, the Government of India sanctioned the Second Thermal Power Station Expansion from 630 MW to 1470 MW with addition of 4 units of 210 MW each. The first 210 MW unit was synchronised in March 1986 and the last unit (Unit-VID) was synchronised in June 1993. The power generated from Second Thermal Power Station after meeting the needs of Second Mine is shared by the Southern states viz., Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Union territory of Puducherry.

Thermal Power Station 1-Expansion:

Thermal Power Station-i has been expanded (2x 210 MW) using the lignite available from Mine-1 expansion. The scheme TPS I Expansion, was sanctioned by the Government of India in February 1996. Unit-I was synchronised in October 2002 and Unit- in July 2003. The power generated from this Thermal Power Station, after meeting the internal requirements, is shared by the Southern States Tamil Nadu, Kerala, Karnataka, and Union Territory of Puducherry.

Barsingsar Thermal Power Station:

The Government of India sanctioned the Barsingsar Thermal Power Station 250 MW (2 X 125 MW) in October 2004. The units were commissioned in December 2011 and in January 2012. The power generated from this Thermal Power Station after meeting internal requirements is shared by the DISCOMS of the state of Rajasthan

Thermal Power Station 1-1st Expansion:

This Project consists of two units of 250 MW capacity each. Unit-II attained commercial operation in April 2015 and Unit-1 in July 2015. The lignite requirement is met through expansion of Mine-II. The steam generators of this project employ eco-friendly Circulating Fluidised Bed Combustion (CFBC) technology. This technology has been adopted for 250 MW capacity units for the first time in India

TELECOMMUNICATION IN NLC:

Telecommunication in NC was first established in 1986. It has a Private Network for communication within Neyveli, called PABX (Private Automatic Branch Exchange). The Telecommunication in Neyveli is possible through exchange located at

- Thermal Power Station
- Mine 1
- Thermal Power Station II Thermal Power Station expansion
- Mine I
- Service Unit
- Mine I expansion
- Block-26
- GENERAL HOSPITAL NLC
- Block 16
- Block-21

FLUIDIZED BED

NEYVELI NEW THERMAL POWER STATION

Neyveli Thermal Power Station is a set of power plant situated near lignite mines of Neyveli. It consists of two distinct units capable of producing 1020 MW and 1,970 MW respectively including their expansion units. It is operated by NLCIL.

SOLAR POWER PLANT

Government-owned mining and power generating company, Neyveli Lignite Corporation India Limited (NLCIL), has announced that out of the 709 MW of solar power projects awarded by the Tamil Nadu Generation and Distribution Corporation (TANGEDCO), the remaining 351 MW have been completed in the districts of Tirunelveli, Tuticorin, Virudhunagar, and Ramanathapuram. A 10 MW solar photo voltaic power plant was commissioned in Neyveli making it the first renewable energy project in NLCIL. The plant located on 54 acres was installed by the Bharat Heavy Electricals limited at a cost of Rs. 74.60 crore.

130MW SOLAR POWER PLANT IN NEYVELI:

A 130 MW solar power plant was commissioned by NLC India Ltd at 33/110 KV pooling substation in Neyveli. The 130 MW Solar power project has been implemented in two blocks of 65 MW each. Bharat Heavy Electricals Ltd (BHEL) was engaged for executing one block of 65 MW with deployment of indigenous solar modules while M/s Jakson Engineers Pvt Ltd. was entrusted with executing the second block of 65 MW. The project is spread over four different locations within Neyveli and the power generated from each site has been connected to the pooling Sub-station, which has been established at the cost of 38.10 crore by engaging M/s GE T&D Ltd. The entire power generated from the plant will be supplied to Tamil Nadu Generation and Distribution Corporation

(Tangedco). NLCIL has signed a power purchase agreement with Tangedco at the preferential tariff of 25.10 per unit FOR 25 YEARS.

TELEPHONE EXCHANGE:

A telephone exchange, telephone switch, or central office is a telecommunications system used in the public switched telephone network (PSTN) or in large enterprises. It interconnects telephone subscriber lines or virtual semantics over time. The term telephone exchange is often used synonymously with central office, a Bell System term. Often, a central office is defined as a building used to house the inside plant equipment of potentially several telephone exchanges, each serving a certain geographical area. Such an area has also been referred to as the exchange or exchange area. In North America, a central office location may also be identified as a wire centre, designating a facility to which a telephone is connected and obtains dial tone. For business and billing purposes, telecommunication carriers define rate centres, which in larger cities may be clusters of central offices, to define specified geographical locations for determining distance measurements.

In the United States and Canada, the Bell System established in the 1940s a uniform Nationwide numbering system of identifying central offices with a three- digit central office code and a three-digit numbering plan area code (NPA code, or area code). Central office codes were unique in each numbering plan area. The NPA code and the central office code were used as prefixes in subscriber telephone numbers. With the development of international and transoceanic telephone trunks, especially driven by direct customer dialling, similar efforts of systematic organization of the telephone networks occurred in many countries in the mid-20th century.

For corporate or enterprise use, a private telephone exchange is referred to as a private branch exchange (PBX), when it has connections to the public switched telephone network. A PBX is installed in enterprise facilities, typically near large office spaces or within an organisational campus to serve the organisation's telephones and any private leased line circuits. Smaller

installations might deploy a PBX or key telephone system in the office of a receptionist.

TANDEM OFFICE:

A telephone central office or switchboard used entirely for the interconnection of telephone exchanges that reduces the number of trunk circuits.



EVOLUTION OF TELEPHONE TECHNOLOGY: 1800's

Our flashback begins with the world's first telephone: the liquid transmitter. Two inventors, Alexander Graham Bell and Elisha Gray, both independently designed devices that could transmit speech electronically. Bell reached the patent office mere hours before Gray, and won the famous battle over the invention of the telephone when his patent was passed on March 7, 1876. The first words that were reportedly transmitted through the telephone receiver were "Mr. Watson, come here I want to see you," from Bell to his assistant, Thomas A. Watson.

By early 1877, the first official telephone lines were established as a part of Bell Telephone Company and the first regular telephone line was constructed between Boston and Somerville, Massachusetts.

Early 1900's:

The first telephone exchanges were performed by a switchboard throughout the late 1800's and turn of the century. Almon B. Strowger invented a telephone that could perform the first automatic telephone exchange and did not require an operator, Although Stronger filed the first patent for a rotary dial phone in 1891, the dialling devices did not make their way into the Bell System until the 1920's.

1970's-1980's:

Leaping decades ahead, we found ourselves with touchtone dialling and the first cordless phones by 1970. A completely experimental picture-phone system was developed by AT&T to transmit images throughout a phone call. Deemed too bulky and expensive, the idea was scrapped until later on being incorporated into a personal computer. The "80s brought about a revolution in telephony communications with the first testing of VOLP service, caller ID and the introduction of the mobile phone.

1990's:

Although the term "Smartphone" had not been coined at the time of its release, the IBM Simon is considered the groundbreaking device that first combined Telephone and PDA features. The cell phone craze had hit the ground running with consumers quickly discovering the benefits of being accessible while on-the-go.

2000's:

The technology throughout this decade advanced exponentially. Mobile phones became more compact, offered high resolution screens and had more features ever before. VoIP technology expanded into businesses and applications, and text/voice/video software such as Skype allowed people to connect in even more ways.

2012:

With innovative device features such as the iPhone 4S's Siri and Apple iOS 6 Maps and Passbook, we are relying on our cell phones for more and more each and fewer people use a landline phone from their homes.



DEVICES USED FOR COMMUNICATION:

NETWORK SWITCH:

Switches are networking devices operating at layer 2 or a data link layer of the OS model. They connect devices in a network and use packet switching to send. Receive or forward data packets or data frames over the network. A switch has many ports, to which computers are plugged in. When a data frame arrives at any port of a network switch, it examines the destination address, performs necessary: checks and sends the frame to the corresponding device(s). It supports Unicast , multicast as well as broadcast communications.

GATEWAY:

A gateway is a network node that forms a passage between two networks operating with different transmission protocols. The most common type of gateways, the network gateway operates at layer 3.i.e. network layer of the OSI (open systems interconnection) model. However, depending upon the functionality, a gateway can operate at any of the seven layers of OSI model. It acts as the entry exit point for a network since all traffic that flows across the networks should pass through the gateway. Only the internal traffic between the nodes of a LAN does not pass through the gateway.

EXCHANGE MANAGEMENT CONSOLE (EMC):

MC was installed in Exchange Server 2007 and Exchange Server 2010. It is a rewrite of the Exchange System Manager user interface navigation tree. In Exchange Server 2010. EMC was one of the two management interfaces installed. The other being the Exchange.

ELECTRONIC CONTROL PANEL (ECP):

Built on top of the Windows Power Shell engine. EMC utilises remote Power commands to perform administrative tasks. The commands are visible in the console - for noting and future scripting. Additionally, EMC uses role-based access control (RBAC) to determine and control each user's administrator level when accessing the console.

If an Exchange Server has the edge transport server role installed, the EMC displays only this role to administrators. However, if other roles are installed, the EMC displays all of them such as:

- Exchange Hub Transport
- Client Access
- Unified Messaging
- Mailbox Server

Exchange Server via a single console. Microsoft replaced EMC with the Exchange Admin Centre (EAC), which was introduced in Exchange Server 2013. The EAC is a web-based administrator console that's optimised for Exchange deployment in on-premises, online and hybrid configurations





SMPS



VRLA Battery



TADIRAN EXCHANGE CABINET2) Cabinet:

It consists of

- i. PSU (Power Supply Unit Card): To maintain Power Supply to the cabinet.
- ii. Control card: like CPU which is already programmed.
- iii. Group Control Card: Controls the shelf.
- iv. Shelf-Control Card: Controls the telephone numbers.
- v. Analog Card: To Control Analog Telephones.
- vi. Digital Card: To Control Digital Telephones.
- vii. DTR Card: To Control Dial Tone.
- viii. 8DRCP (Tadiran): For Conference Calling.
- ix. IDSP: For Caller ID.

CARDS



ISDN EXCHANGE at BL-26

FIRST RACK:



- RPS:(Ringer power supply)
- 24 SLS

SECOND RACK:



- PB-ATS (PB):
- 24SA

THIRD RACK:



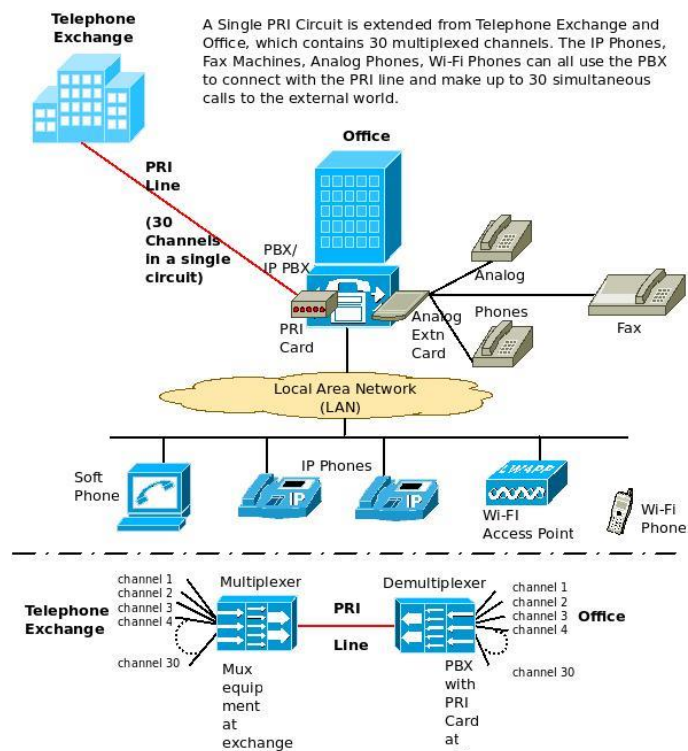
- 8TC
- 24SFT

FOURTH RACK:



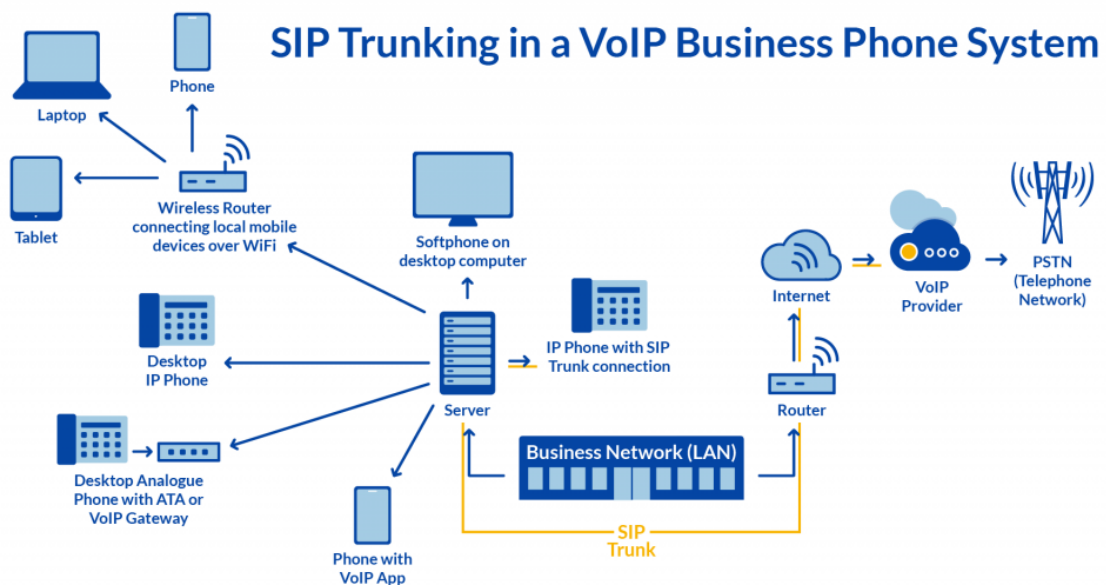
- iDSP
- MCP-ATS: 32GC,PRI

PRI connections :



PRI Line - Architecture Diagram

IP(SIP) connection:



TYPES OF CABLES

PIJF CABLE MAINTENANCE SECTION

POLY INSULATED JELLY FILLED CABLES are popularly known as PIJF cables and consist of twisted pairs of polyethylene copper conductors. These cables are available up to 1800 Later on, due to various factors like escalation in the cost of Lead sulated and more incidence of faults due to paper insulation the Polythene insulated Jelly filled cables (Popularly known as PUF) are used extensively now a days in the telecommunication networks The PIJF cables are available up to 3600 pairs

FIG:PIJF CABLE



II-JUMPER WIRE:

A fibre jumper, sometimes called a fibre patch cord is a length of fiber fitted with LC, SC, MTRJ or ST connectors at each end. The a smaller form factor connector, is most commonly used Fiber Jumpers also come in hybrid varieties with one type of connector on the end and another type of connector on the other Jumpers are used LC, In the same manner as p hardware to the structured cabling system. 5 patch cords, to connect end devices or network.

Fiber patch cords come in either single mode or multimode and sh be selected to match the structured cabling system. The only exception to this is mode conditioning patch cords (also known as mode conditioning fibre jumpers) that are required when transmitting gigabi signals over 200m on 62.5-micron multimode fibre. When a fibre channel is tested, it is called a channel test if patch cords are included, but a permanent link test otherwise.



FIG: JUMPER CABLE

III-SWITCH BOARD CABLE:

A telephone cable is a method of guided transmission for your telephone line. This means it acts as a physical path to transmit electromagnetic waves and carry information from point to point. This is done by means of a conductive material such as copper wiring. SIS is commonly referred to as Switchboard or Panel board wire. It is a building wire product made of an insulated copper conductor usually tin coated-with thermoset, cross-linked polyethylene (XLPE) insulation. The conductors are stranded for high flexibility to make installation in tight spaces easier, and are tinned to facilitate soldering. The XLPE insulation is rated for use at 90°C in either wet or dry locations at an operating voltage of 600 V. Kris-Tech wire and cable is manufactured in compliance with the applicable requirements of the NEC (National Electrical Code). The insulation properties of SIS are the same as XHHW-2. Although Kris Tech manufactures SIS in sizes #18 through #4/0 AWG, the smallest UL recognized conductor is #14 AWG. Our standard stock product is grey and is rated VW-1 for flame retardant properties.

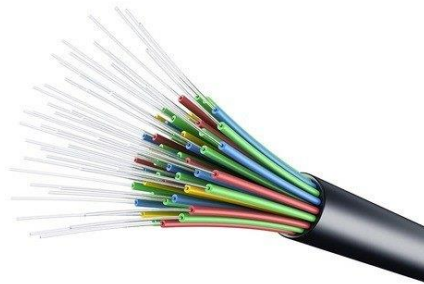


FIG: SWITCH BOARD CABLE

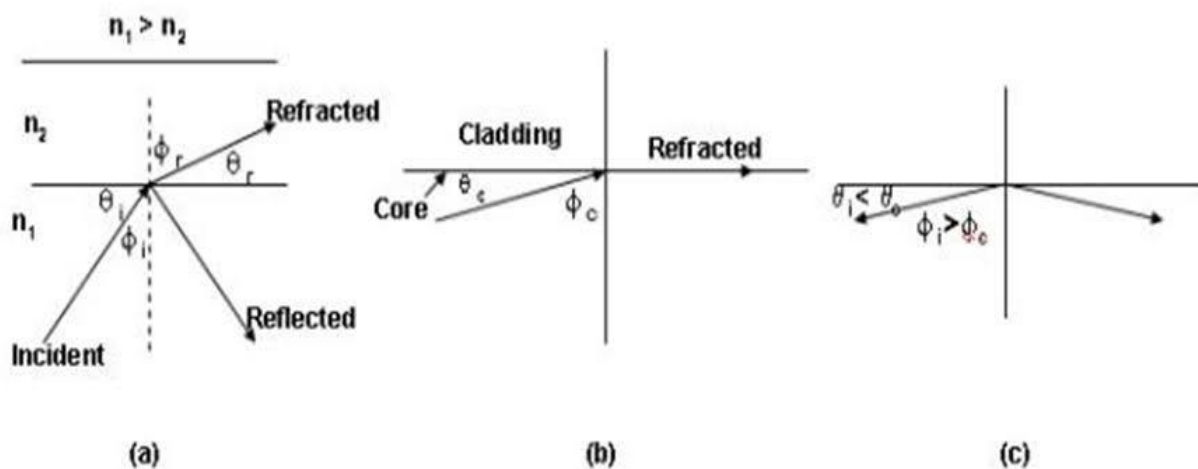
OPTICAL FIBRE COMMUNICATION:

An optical fibre can be understood as a dielectric waveguide, which operates optical frequencies. The device or a tube, if bent or if terminated to radiate energy, is called wave-guide, in general. Following image depicts a bunch of fibre optic cables. The electromagnetic energy travels through it in the form of light. The light propagation, along a waveguide can be described in terms of a set of guided electromagnetic waves, called as modes of the waveguide.

WORKING PRINCIPLE:

Optical fibre works on the principle of total internal reflection. When light travelling in an optically dense medium hits a boundary at a steep angle larger than the critical angle for the boundary), the light is completely reflected. This is called total internal reflection. This effect is used in optical fibre to confine light in the core.

“TOTAL INTERNAL REFLECTION “



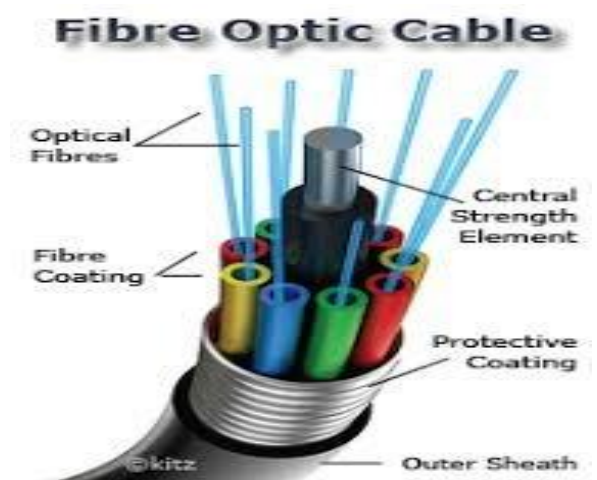
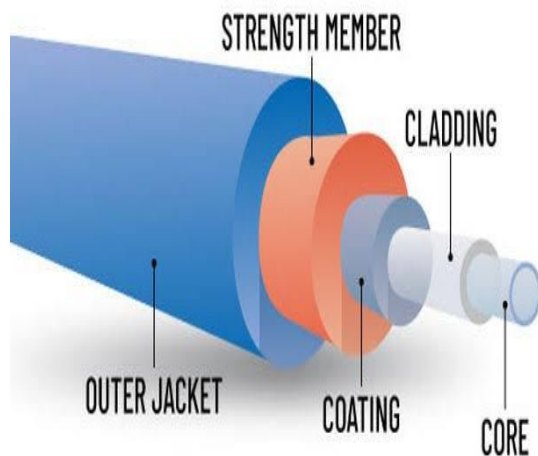
Light travels through the fibre core, bouncing back and forth off the boundary between the core and cladding. Because the light must strike the boundary with an angle greater than the **critical angle**, the only light that enters the fibre within a certain range of angles can travel down the fibre without leaking out. This range of angles is called the acceptance cone of the fibre. The size of this acceptance

PARTS OF A FIBRE:

The most commonly used optical fibre is single solid Di-Electric cylinder of radius 'a' and Index of refraction n . The following figure explains the parts of an optical fibre. This cylinder is known as the Core of the fibre, A solid di-electric material surrounds the core, which is called Cladding, Cladding has a refractive index n_2 which is less than n_1 .

Cladding helps in :

- Reducing the scattering loss
- Adds mechanical strength to the fiber.
- Protects the core from absorbing unwanted surface contaminants



Types Of Optical Fibre:

Depending upon the material composition of the core, there are two types of fibre used commonly. They are:

Step-index fibre-

The refractive index of the core is uniform throughout and undergoes an abrupt change (for step) at the cladding boundary. Graded-index fibre- The core refractive index is made to vary as a function of the radial distance from the centre of the fibre. Both of these are further

Divided into two types:

Single-mode fibre-

These are excited with lasers.

Multi-mode fibre-

These are excited with LEDs.



OPTICAL FIBRE COMMUNICATIONS (OFC):

The communication system of fibre optics is well understood by studying the parts and sections of it.

The basic components are light signal transmitter, the optical fibre, and the photo detecting receiver. The additional elements such as fibre and cable splicing connectors, regenerators, beam splitters, and optical amplifiers are employed to improve the performance of the communication system.

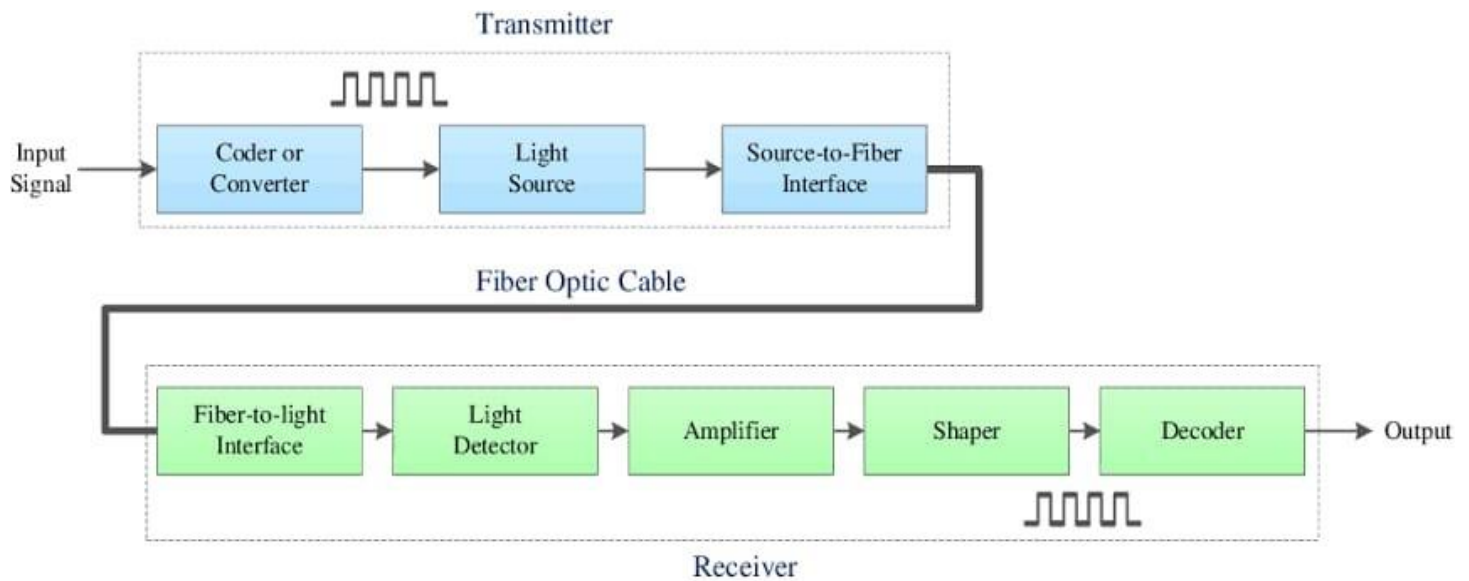


Figure 2.Fiber optic communication system

FUNCTIONAL ADVANTAGES:

THE functional advantages of optical fibre are:

- Transmission bandwidth of the fibre optic cables is higher than the metal cables.
- The power loss is very low and hence helpful in long-distance transmission. Fibre optic cables provide high security and cannot be tapped. Fibre optical cables are the most secure way for data transmission.
- Fibre optic cables are immune to electromagnetic interference.

- These are not attracted by electrical noise.

DISADVANTAGES:

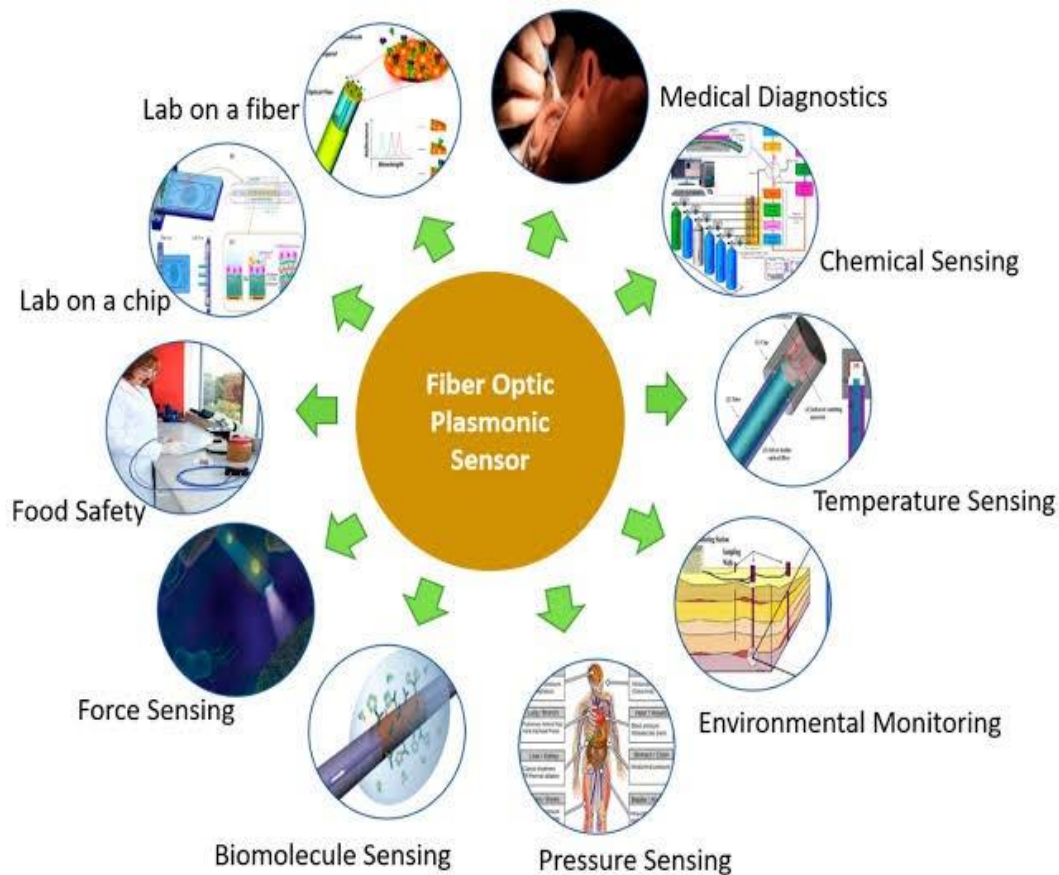
Although fibre optics offer many advantages, they have the following drawbacks.

- Though fibre optic cables last longer, the installation cost is high.
- The number of repeaters are to be increased with distance.

APPLICATIONS OF OPTICAL FIBRE:

The optical fibre have many applications. Some of them are as follows:

- Used in telephone systems, Used in submarine cable networks
- Used in data link for computer networks, CATV Systems
- Used in CCTV surveillance cameras Used for connecting fire, police, and other emergency services
- Used in hospitals, schools, and traffic management systems.



OFC MAINTAINENCE:

TESTING OPTIC FIBER CABLES:

MEASURING LOSS USING OLTS:

Always required and Read TIA-5688 or TIA/TSB140 from cover to cover and you will find it requires you to make only one type of measurement, insertion loss, to certify a fibre optic cable. Also known as "dB Loss", "attenuation", or simple insertion loss is singled out by the TIA because it can be impacted by poor installation practices. For example, a poorly polished or dirty connector can be

The image shows two pieces of equipment connected by a yellow fiber optic cable. On the left is the FAFL Optical Power Meter, which has a blue frame and a black face. The LCD screen displays three readings: 1510 nm, -5.38 dBm, and 1550 nm, -5.56 dBm. The meter has buttons for units (µW, dBm), reference (Ref), and various measurement functions. On the right is the FAFL OLS4 Optical Laser Source, also with a blue frame and black face. It features a digital display showing 1510 nm and 1550 nm, and buttons for wavelength selection (1510 nm, 1550 nm) and power control. Both devices are connected by a yellow fiber optic cable with blue connectors.

include 100 or more meters of fibre in a ring-shaped or rectangular case, terminated by jumpers that will mate with the fibre under test.

TECHNICAL AND TELEPHONE SERVICING:

TECHNICAL:

All materials, Telephones, Cables and the maintenance spares on regular purchase, local purchase and impress basic carried out.

TELEPHONE AND INSTRUMENT SERVICING LAB:

In Telephone Instrument Lab at block-26 Tandem Exchange, regularly around 25 numbers of telephone instruments of various makes and models push button, CLIP telephones, main, extension telephones are repaired. Any fault occurs in telephone connected in series are repaired by good working telephones through satellite exchanges.

BASIC COMPONENTS OF TELEPHONE:

Even with the emergence of mobile communications, the endline phone is still a staple in voice communications. Almost every home and virtually every business has at least one landline phone installed.

THE RINGER THE SWITCH:

THE HANDSET THE DIALER:

RINGER:

The ringer alerts the user to an incoming call by emitting an audible tone or ring. Ringers are of two types, mechanical or electronic. Both types are activated by a 20-hertz, 75-volt alternating current generated by the switching office.

SWITCH:

Telephone switches route calls through the PSTN (Public Switched Telephone Network). When you pick up the handset on your home telephone, you are initiating a connection with your local telephone switch. When you dial a telephone number, your phone switch interprets the digits you dial and determines where to route your call.

HANDSET:

A handset is a component of a telephone that a user holds to the ear and mouth to receive audio through the receiver and speak to the remote party via the built-in transmitter.

DIALER:

Dialer is an electronic device that is connected a telephone line to monitor the dialed numbers and alter them to seamlessly provide services that otherwise require Lengthy National or International access codes to be dialed.

OFC MAINTAINENCE:

OPTICAL TIME DOMAIN REFLECTOMETER(OTDR):

An optical time-domain reflectometer (OTDR) is an optoelectronic instrument used to characterize an optical fiber. An OTDR is the optical equivalent of an electronic time domain reflectometer. It injects a series of optical pulses into the fibre under test and extracts, from the same end of the fibre, light that is scattered (Rayleigh backscatter) or reflected back from points along the fibre. The scattered or reflected light that is gathered back is used to characterize the optical fibre. This is equivalent to the way that an electronic time-domain meter measures reflections caused by changes in the impedance of the cable under test. The strength of the return pulses is measured and integrated as a function of time, and plotted as a function of length of the fibre.



OPTICAL POWER METER (OPM):

An optical power meter (OPM) is a device used to measure the power in an optical signal. The term usually refers to a device for testing average power in fiber optic systems. Other general purpose light power measuring devices are usually called radiometers, photometers, laser power meters (can be photodiode sensors or thermopile laser sensors), light meters or lux meters. A typical optical power meter consists of a calibrated sensor, measuring amplifier and display. The sensor primarily consists of a photodiode selected for the appropriate range of wavelengths and power levels. On the display unit, the measured optical power and set_wavelength is displayed. Power meters are calibrated using a traceable calibration standard.

VISUAL FAULT LOCATOR(VFL):

Visual Fault Locator which can be also called visual fault identifier(VFL), fiber fault locator, a fiber fault detector , etc, is a visible laser available in red laser light energy into an optical fiber. It is a cost-effective way to spot defects of fiber glass such as sharp bends, breaks, faulty connectors and other faults which will “leak” red or green light visually. It can also locate the fault of OTDR dead zone and make fiber identification from one end to the other end. No matter for installing new fibers or troubleshooting the existing networks, visual fault identifier is a helpful handy kit.



SPLICING-JOINING THE FIBER:

Splicing in optical fiber is joining two fiber optic cables together. The other, more common, method of joining fibers is called termination or connectorization. Splicing is most commonly used in the field but has application in cable assembly houses.



BSNL COORDINATION SECTOR:

LANDLINE:

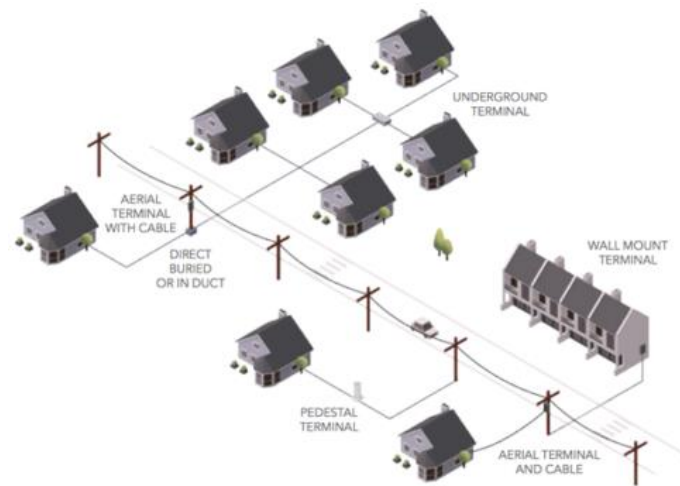
A landline (also known as land line, land-line, main line, home phone, fixed-line, and wireline) is a phone that uses a metal wire or optical fiber telephone

line for transmission as distinguished from a mobile cellular network, which uses radio waves for transmission. A landline can be hard-wired or cordless and typically refers to the operation of wireless devices or systems in fixed locations such as homes. Fixed wireless devices usually derive their electrical power from the utility mains electricity, unlike mobile wireless or portable wireless, which tend to be battery-powered. Although mobile and portable systems can be used in fixed locations, efficiency and bandwidth are compromised compared with fixed systems. Mobile or portable, battery-powered wireless systems can be used as emergency backups for fixed systems in case of a power blackout or natural disaster.



FITH-FIBER TO THE HOME:

Fiber to the Home or simply FTTH is a technology that uses optical fiber rectly from the central point to the residential premises (as shown in the following image). It provides uninterrupted high-speed internet service Here, H includes both home and small business. FTTH includes fiber-optic solutions designed for residential deployments. In FTTH networks, fibers are directly connected to individual homes or multitenant buildings. FTTH includes various favors of both PONs and PTP Ethernet-based solutions.



FTTH SUPPORTS ALL THE AVAILABLE SERVICES.

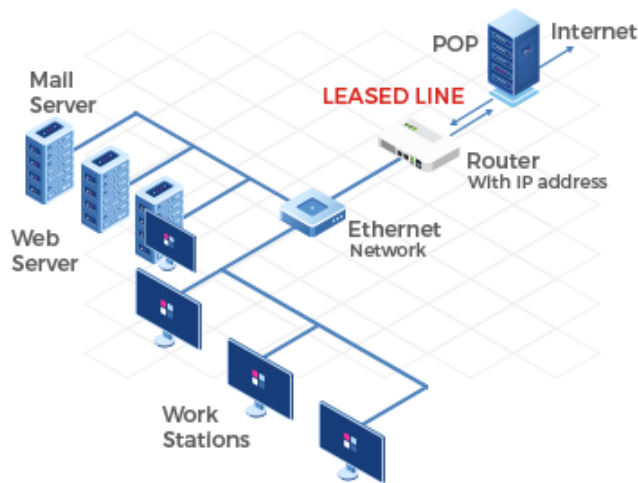
- Distance and Bandwidth....
- Differential Fiber Distance. Logical Reach.
- Mean Signal Transfer Delay
- Optical Access Network (OAN)
- Optical Distribution Network (ODN)...
- Optical Line Termination (OLT)....

- Optical Network Termination (ONT) Optical Network Unit (ONU)

ILL-INTERNET LEASED LINE:

Leased line is a dedicated data connection with a fixed bandwidth. It enables small, medium, and large businesses to connect to the internet in a secure, reliable, and highly efficient manner, with maximum download capacity, between two or more locations provided according to a Commercial contract. It provides resilience, and uptime. A leased line is a private telecommunications circuit

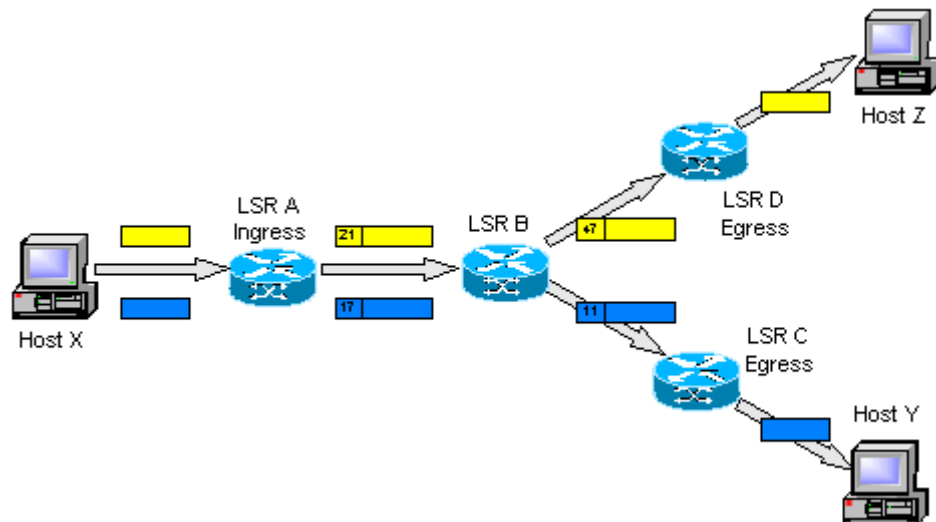
[11:16 am, 26/06/2023] sometimes also known as a private circuit, and as a data line in the UK. Typically, leased lines are used by businesses to connect geographically distant offices. Unlike traditional telephone lines in the public switched telephone network (PSTN) leased lines are generally not switched circuits, and therefore do not have an associated telephone number. Each side of the line is permanently connected, always active and dedicated to the other. Leased lines can be used for telephone, Internet, or other data communication services. Some are ringdown services, and some connect to a private branch exchange (PBX) or network router. The primary factors affecting the recurring lease fees are the distance between end stations and the bandwidth of the circuit. Since the connection does not carry third-party communications, the carrier can assure a specified level of quality. An Internet leased line is a premium Internet connectivity product, normally delivered over fiber, which provides uncontended, symmetrical bandwidth with full-duplex traffic. It is also known as an Ethernet leased line, dedicated line, data circuit or private line.



MPLS-MULTIPROTOCOL LABEL SWITCHING:

[11:18 am, 26/06/2023] Multiprotocol Label Switching (MPLS) is a routing technique in telecommunications networks that directs data from one node to the next based on labels rather than network addresses. Whereas network addresses identify endpoints the labels identify established paths between endpoints. MPLS can encapsulate packets of various network protocols, hence the multiprotocol component of the name. MPLS supports a range of access technologies, including T1/E1, ATM, Frame Relay, and DSL. There are two standardized protocols for managing MPLS paths, the label distribution protocol (LDP) and RSVP-TE an extension of the resource reservation protocol (RSVP) for the traffic engineering. Furthermore, there exist extensions of the border gateway Protocol (BGP) that can be used manage an MPLS path.

[11:19 am, 26/06/2023] Close User Group (CUG) is a supplementary service provided by the mobile operators to mobile subscribers who can make and receive calls from any member associated within the group. This service is applicable for SMS also. There will be administrative owner who will be responsible for invoicing. Irrespective of this a CG member can make and receive calls to and from other networks outside the CUG group too; although calls outside a CUG group may not be invoiced by the administrative owner.



CUG-CLOSE USER GROUP:

TYPES OF SWITCHING:

1. Circuit Switching 2. Packet Switching

CIRCUIT SWITCHING:

Circuit switching is a type of network configuration in which a physical path is obtained and dedicated to a single connection between two endpoints in the network for the duration of a dedicated connection. Ordinary voice phone service uses circuit switching. This reserved circuit is used for the duration of a call.

PACKET SWITCHING:

In telecommunications, packet switching is a method of grouping data into packet that are transmitted over a digital network. Packets are made of a header and a payload. Data in the header is used by networking hardware to direct the packet to its destination, where the payload is extracted and used by an operating system, application software, or higher layer protocols. Packet switching is the primary basis for data communications in networks computer worldwide. The routing and transferring of data by mean of addressed packets so that a channel is occupied during the transmission of the packet only, and upon completion of the transmission the channel is made available for the transfer of other traffic.

VoIP Technology:

DEFINITION:

VoIP or Voice over Internet Protocol, also known as IP Telephony or Internet Calling is alternative way of making phone calls that can be less costly than standard telephone calls over PSTN (Public Switched Telephone Network)

WORKING:

VoIP works by taking standard analog audio signals and converts them in to digital data that can be transmitted over the internet using the IP Protocol.

ATA(ANALOG TO ADAPTER):This is simplest and most common form of VoIP calling. By using an ATA (Analog Telephone Adaptor), you are able to connect a standard phone to you computer or your internet connection for use with VoIP.

IP PHONE:An IP phone is a specialized phone that looks like a regular phone with the usual handset you would expect to see, along with the cradle and buttons.

COMPUTER-TO-COMPUTER:Of all three of the main systems, this would be the easiest way of using VoIP. Computer-to-computer VoIP calls use software loaded on your PC or device, a microphone and speakers (or headset) and your internet connection to allow you to make calls from computer to computer. Popular services like Skype utilize this VoIP platform to provide their services.

HOTLINE:

A hotline is a point to point connections link in which a call is automatically directed to the preselected destination without any additional action by the user when the end instrument goes off hook .An example would be a phone that automatically connects to emergency services on picking up the receiver. Therefore, dedicated hotline phones do not need a rotary dial or keypad.

A hotline can also be called n automatic signalling , ringdown, or off-hook services.

INDIA PAKISTAN: On 20 June 2004 , both India and Pakistan agreed to extend a nuclear testing ban and to set up an Islamabad –New Delhi hotline between their foreign country aimed at preventing misunderstanding that might lead to nuclear war. The hotline was set up with the assistance of United States Military Officers.

CHINA-INDIA:

India and china announced a hotline for the foreign ministers of both countries while reiterating their commitment to strengthening ties and building “mutual political trust” , As of August 2015 the hotline was yet to be made operational.

CONCLUSION:

Furthermore, I have experienced that it is of importance that education is objective and that have to be aware of the industrial aspect of the topics we study on the whole this internship training was a useful experience. I have gained information, skills and met many new people. I got insight into professional practices currently advocated in the industry. I learned the new different facts of working within a well-established industry, Related to our Study I learned more about the manufacture, assembly and transmission lines,

The internship training was also good to find out what is my strength and weakness and this helped me to define what skills and knowledge I have

Improved in the upcoming training. I can confidently assert that the knowledge gained through this internship is sufficient to contribute towards my future endeavours. The training given by telecommunication department was very much useful. This training enabled to know about networking, telecommunications in Neyveli and a practical knowledge about the limiter circuit of telephone and fault detection

I Learned a lot of information regarding exchange system, and observed that in practical. The internship was also good to find out what our strength and weakness. This helped me to identify our skills. At last, this Internship has given me new insight and motivation to pursue a career in core electrical department.

Telephone exchange system is totally programmable. It facilitated complex Installation procedures and other integrated requirements for communication.

A back up of the program file will help you for future reference. Thus, the telephone exchange system helps in bringing a modern world.

REFERENCE:

- NIC INDIA. in
- <https://www.britannica.com/technology/telephone>
- WIKIPIEDIA

FEEDBACK:

The work experiences encouraged in the internship allowed me to develop my Skills, think this will be very useful to further develop my skills. The overall experience was good and positive, Everything learned will be useful in my future career in this field We all know that practical experience is the best and the internships give hands on experience they need.