INTERNSHIP IN TELECOMMUNICATION & COMPUTER NETWORKING AT BTCL

BY

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled "**Internship in Telecommunication and Networking at BTCL**" submitted by **Mahjabin Amirun Jugonty ID: 201-15-13616** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfilment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation was held on date: 19-01-2023.

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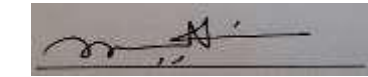**Assistant Professor**
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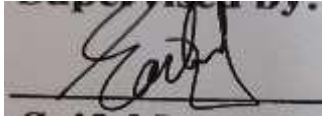**Dr. Mohammad Shorif Uddin**   **External Examiner**
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DECLARATION

We hereby declare that, this project has been done by me under the supervision of **Saiful Islam, Assistant Professor, Department of Computer Science and Engineering** Daffodil International University and Co-Supervised by **Johora Akter Polin, Lecturer, Department of Computer Science and Engineering**. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degreeor diploma.
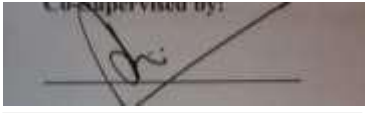
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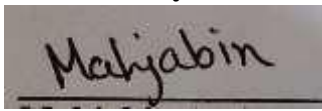Assistant Professor
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I am really grateful and wish our profound our indebtedness to **Saiful Islam**, **Assistant Professor**, Department of CSE Daffodil International University, Dhaka and Co-Supervised by **Johora Akter Polin, Lecturer, Department of CSE**. Deep Knowledge & keen interest of our supervisor in the field of "*Internship in Telecommunication and networking at BTCL*" to carry out this project. His endless patience, scholarly guidance, continual encouragement, constant and energetic supervision, constructive criticism, valuable advice, reading many inferior drafts and correcting them at all stage have made it possible to complete this project.

I would like to express our heartiest gratitude to Professor **Dr. Touhid Bhuiyan Professor & Head of the Department,** Department of CSE, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

I would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, I must

ABSTRACT

BTCL handles the PSTN, IGW, IIG, ICX, ISP, NGN, and is a CC Domain Registrar in addition to being a voice carrier (.BD). Nearly all of the copper, fiber optic, and microwave networks in the country are owned and run by BTCL. In 1853, the BTCL's Post and Telegraph Division was established. As of right present, the government owns all of BTCL. Landline telephone service is one of the most vital services provided by BTCL. There are many services offered, including dial-up, ADSL, high-bandwidth local and international leased lines, VPN, MPLS, country domain (.bd), co-location, and others. Soft switch services and triple play on fiber at home will soon be offered by NGN. After finishing a four-month internship at Bangladesh Telecommunications Company Limited, I wrote this essay. Through this internship program, I was able to get knowledge about a telecoms company's daily operations. This article places a strong emphasis on myobservations and professional expertise.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Telecommunication networks are platforms for sending electromagnetic or optical signals between various places to transmit analogue or digital information. The information could be presented as audio, video, or in another way entirely. Wired or wireless network architectures are also possible. Internet, cable TV, mobile, and landline telephone networks are all examples of telecommunication networks. BTCL is the biggest telecom provider in Bangladesh. The government owns a publicly traded corporation in that industry. It has numerous branches spread out around the area. BTCL offers phone and internet connections throughout the local area. Since I'm very interested in communication and want to learn as much as I can about it, I chose BTCL for my internship. The telecoms firm BTCL is the best. A well-known government-owned telecommunications firm is BTCL. Both telecommunications and internet services are offered by BTCL. Ultimately, I want to intern at BTCL so that I may familiarize myself with the key terms in networking and telecommunications. By learning essential details about communications and computer networking, I will be able to make a substantial contribution to the development of a "Digital Bangladesh."

1.2 Motivation

The term "telecommunications" refers to the electrical transmission of data over great distances. Information can be sent via a variety of methods, including voice conversations, data, text, pictures, and video. By establishing communication links between computer systems that are located more or less distantly, telecommunication networks are created. Additionally, networked equipment that may communicate data Computer networking is the practice of pooling resources. Data transmission via physical or These network devices use communications, a collection of protocols, and wireless technologies.

As a student studying computer science, I have a keen interest in the field of networking and telecommunications. That's the reason I choose BTCL for my internship because A well-known government-owned telecommunications firm is BTCL. Both telecommunications and internet services are offered by BTCL.Considering everything, I want to intern at BTCL. so that I may get knowledgeable about the crucial elements of networking and telecommunications.

I will be able to significantly contribute to the creation of a "Digital Bangladesh" by studying vital information about communications and computer networking.

1.3 Internship Objective

The main goals of this report are to present knowledge and information obtained during the internship time with the organization and to fulfill the criteria of the CSE program.

- I have the opportunity to educate myself in networking and communication.

- I'd also like to learn more about growing networks, networking security, and othersubjects.

- I'm interested in learning about all of the telecom company's services.

- be aware of services like IGW&ICX, domains, hosting, and others.

- be familiar with telecommunications data transmission.

- Become familiar with network topology

- Obtaining your first job experience will provide you a competitive advantage onthe job market.

- In addition to my technical knowledge, I should familiarize myself with thecorporate culture of the telecom business.

- Learn about the working practices and official culture of telecommunicationscompanies.

1.4 Introduction to the company

- Bangladesh Telecommunication Company Limited, sometimes known as BTCL, is a business that was formed in pursuance of the Companies Act of 1994.

- It is a publicly held firm that is owned by the federal government.

- Certified professional members and government officials make up the majority ofthe appointments is a Director on the Board of Directors.

- The government has the option to transfer a sizable portion of BTCL's share tothe public.

- In urban areas, BTCL offers both telephone and internet service.

- BTCL employs over 13,000 people and has a net worth of Rs 15,000 crore.

- In Bangladesh, BTCL is a well-known government-owned telecommunicationscompany.

- It manages distance calls as well as telephone and internet services.

1.5 Report Layout

In this report the report layout organized as follow Chapter:

Chapter:-1 Introduction, Motivation, Objective, Introduction to the company, Report layout.

Chapter:-2 Organization Introduction, History, Services of Company, SWOT Analysis.

Chapter:-3 Task, Projects, Activities, Challenges.

Chapter:-4 Public switched telephone network, ADSL, GEPON, Optical Fiber, Call Flow, Switch Room, Air Conditioner.

Chapter:-5 Conclusion of discussion, Possibilities of Future Career.

CHAPTER 2
ORGANIZATION

Figure 2.1 BTCL Logo [1]

2.1 History and services

In British India, the Posts and Telegraph Department was established in 1853. The Telegraph Act of 1885 was enacted in 1885. The Wireless Act of 1933 was enacted in 1933. Pakistan Telegraph and Telephone Department was renamed in 1962. Bangladesh Telegraph & Telephone Department was renamed Bangladesh Telegraph & Telephone Department under Ministry in 1971.Department of Posts and Telecommunications. The Telegraph and Telephone Board Ordinance of 1975 was enacted. The Bangladesh Telegraph and Telephone Board (BTTB) was established in 1979 with the authority to award licenses for telecommunications and wireless services. Policy on Telecommunications in 1998. On July 1, 2008, BTTB (Bangladesh Telecommunications Company Limited) formally began business. The Bangladeshi government owns every share of BTCL. Shares will eventually be offered for bond formation. 2009 A law modifying the Bangladesh Telegraph and Telephone Board is recognized as the Bangladesh Telegraph and Telephone Board (Amendment) Act, 2009.

Figure 2.2 BTTB Logo [1]

2.2 BTCL Services

Telephone With (internet)	Date and internet	Transmission	Domain and hosting	IPLC	Alaap	ICX & IGW

Leased Line Internet · VPN · Real IP Address · Local Content / Cache · NIX · Co-location · Backhaul · .BD & .বাংলা Domain · Web Hosting
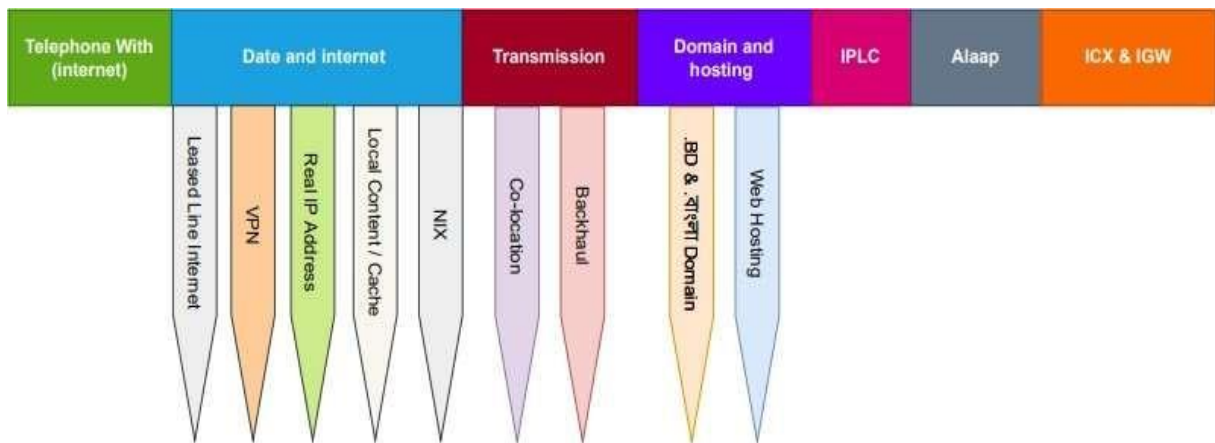
Figure 2.3 BTTB services [2]
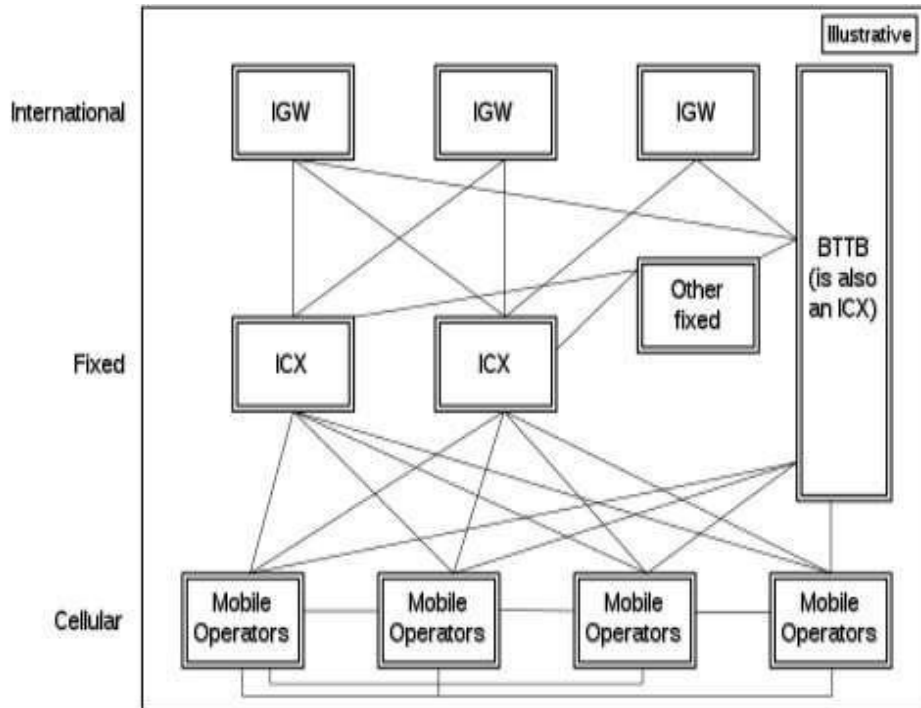
2.3 Structure of Telecommunications

Figure 2.4 Topology of Bangladesh's Telecommunications Network [3]

In accordance with the National Telecommunications Policy of 1998 and the International Long-Distance Telecommunications Services (ILDTS) Policy of 2007, all mobile operators must interlink via Interconnection Exchange (ICX), and all international calls must be handled by a Ban International Gateway (IGW) that is connected to both mobile and fixed controllers via ICXs.

When a call is placed from a mobile or fixed operator to another network, the Interconnection Exchange (ICX) will accept it and transmit it, depending on whether the call is local or international, to the destination network or to the IGWs. Additionally, ICX will connect calls from IGWs to the intended number.

2.4 SWOT Analysis

I try to uncover the Fortes Weaknesses during my internship.

Organization:

- Bangladesh's biggest Telecommunication.

- This government-owned telecommunications company has the backing of the Bangladeshi government at all times.

- Provide internet and telephone lines to homes, businesses, government agencies, and private offices, among other services.

- It has several locations around the nation.

- Maintaining a large number of employees.

- As well as equipment, and having highly skilled workers.

Weaknesses:

- Personnel are hard to come by.

- The wage structure is insufficient, as well as the employees lack motivation.

- Marketing is poor in relation to the private industry.

- Inadequate Resources.

- A lack of adequate education for the workforce.

Opportunities:

- Increase business workflow's level of automation.

- Cellphone Connection.

- Online services.

- High speed data transmission.

- extremely quick internet access.

- and reasonably priced Internet and phone line.

Threats:

- Assault by hackers.

- Oftentimes, clients are not reliable.

- Insufficient bandwidth.

2.5 Organizational Structure

Figure 2.5 Organogram of BTCL [3]

CHAPTER 3

TASKS, PROJECT AND ACTIVITIES

3.1 Daily Task and Activities

During my internship, I worked in the switch room and the outdoor plant (OSP).

Daily Task in Switch Room

I would collect client requests for phone and internet lines, update them on BTCL's own Web portal, and help clients with a range of questions. This includes generating user IDs and allocating numbers based on consumer preferences. My instructor has been quite helpful in this regard. I've made an effort to address a range of problems that I've come across throughout the years. This is how I've carried out a lot of tasks in the switch room.

Figure 3.1 Working at Switch Room with my Group Member

Figure 3.2: Switch Room

3.2 Project Task and Activities

I used to frequently check the requests for the internet and telephone lines that came to a Swiss room on BTCL's official website. As part of my regular routine, I used to create a new user ID for the client and email it to BTCL Sher-e-Bangla Nagar.

3.3 Challenges

Even though it is hard to comprehend everything there is to know about the telecommunications industry or to take the proper steps in such a short period of time, I will do my best. I spent the majority of my time in the Switch room because I worked for BTCL and could watch such activities there. I have completed the work that was assigned to me, although I have encountered a number of difficulties when working on OSP. And I've tried to come up with answers. I have experience with MDF and some knowledge of it. I'm doing my best to use the lessons I've learned in the past.

Figure 3.3: C & C08

CHAPTER 4
TELECOMMUNICATION NETWORK

4.1 Public Switched Telephone Network

Even though many of us absolutely takes it for casually, the telephone you use at home is one of the most amazing things ever invented. To talk with somebody, just pick up the phone and dial a few digits. You are immediately connected to the that individual and may begin a two-way discussion without them.

You can get in touch with practically everyone on the earth because to the telephony network's global reach. When you consider the state of the world 100 years ago, when it may have taken several weeks to send a one-way written message to anyone, you realize how amazing the phone is.

Surprisingly, the phone is one of the most fundamental gadgets in your home. The fact that your home's telephone connection hasn't changed in over a decade accounts for its simplicity. A ancient phone from the 1920s might be connected to your house's wall socket and work just fine! This article will talk about the telephone equipment you have at home and the phone network it links to so you may make calls. Begin on the pages after this one.

4.2 ADSL

Over standard copper telephone wires, Asymmetric Digital Subscriber Line (ADSL) technology provides households with fast voice and video transmission speeds. Those areas with lowest costs are those where cable TV is not often utilized.

4.3 How ADSL work

ADSL runs on pre-existing wire telephone service by segregating the bands with higher frequencies using a DSL filter, also known as a splitter, to allow concurrent use of the landline and the ADSL modem. The connection ends at the telephone exchange's central office DSL accessing splitter (DSLAM), where a second splitter separates the voice signal from the phone network. The one-way nature of most multimedia communication,

in which a large amount of information travels toward the user and only a little amount of interactive control information is returned, was taken advantage about when ADSL was developed. It is a more affordable alternative to a typical dial-up link for faster internet connectivity.

4.4 ADSL Speed Factors

- The separation from the neighborhood market

- The and so kind gauge of the wire employed

- The string's connects' quantity and kind

- The wire's closeness to other wires carrying quasi data such as ADSL, ISDN, and others

- The cables' closeness to transmitters.

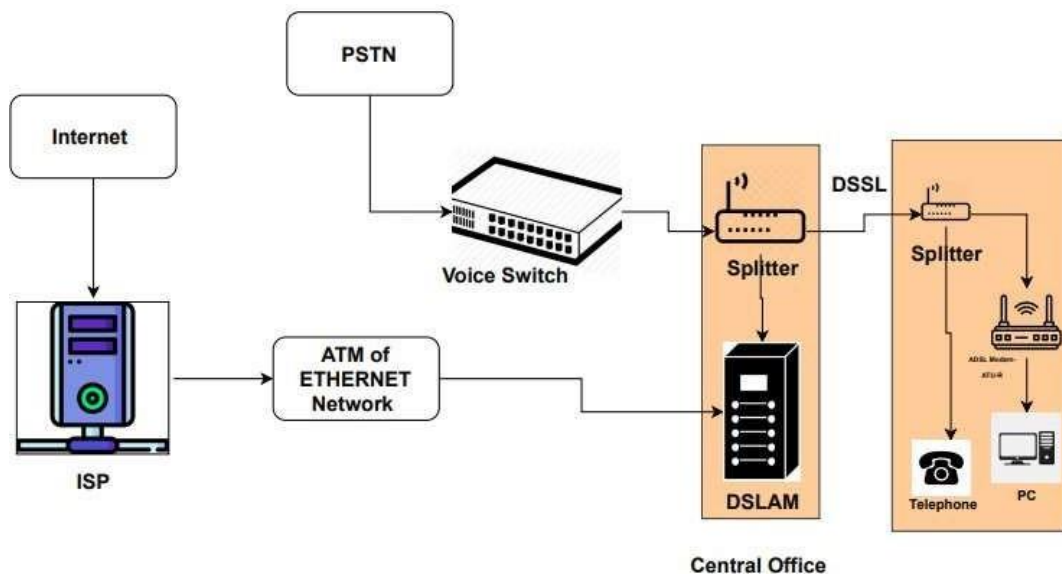- The D/W travels close to an electric line.

Figure 4.1 ADSL Loop Architecture [4]

4.5 ADSL Range

- Without a booster, the maximum distance for DSL is typically 5.5 km.

- As you get closer to the phone company headquarters, the data rate rises.

Data Rate	Wire Gauge	Wire size	Distance
1.5 or 2 MBps	24 AWG	0.5 mm	5.5 km
1.5 or 2 MBps	26 AWG	0.4 mm	4.6 km
6.1 MBps	24 AWG	0.5 mm	3.7 km
1.5 or 2 MBps	26 AWG	0.4 mm	2.7 km

4.6 GPON

The Bangladesh Telecommunication Co. Ltd. has made both the high-speed Gigabit Passive Optical Network (GPON) connection and prepaid phone services accessible (BTCL).

The photons from the central office are injected by a laser in the OLT into a glass-and-plastic fiber-optic cable that terminates in a passive optical splitter. The splitter divides the central office's single signal into several signals that could ultimately be distributed to up to 64 customers.

What are the three essential GPON elements? An OLT (Optical Line Terminal), an ONU device (Optical Network Unit), and a passive splitter are the three primary components of GPON.

4.7 GPON Motivation

GEPON (Ethernet Passive Optical Network) is a government optical access network that employs point-to-multipoint architecture and passive optical fiber transmission to provide a variety of services over Ethernet. It also goes by the name EPON.

4.8 GPON Principal

The Wavelength Division Multiplexing (WDM) technology used by PON makes it possible to communicate in both directions over a single fiber.
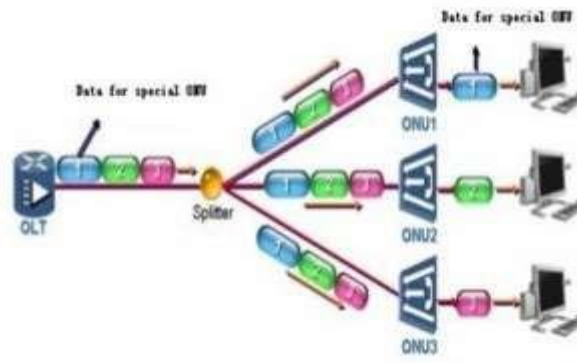
Figure 4.2 GEPON Principal [5]

GPON uses two multiplexing methods to segregate the upstream and downstream signals of different users over a single fiber:

The transmission of data packets in the downstream direction is broadcast.
Data packets are transferred via TDMA in the upstream direction.

4.9 GPON Components

There are four main components in this GPON system:

- Optical line terminal (OLT),
- Transmitting media (cabling and components)
- Fiber optical splitter,
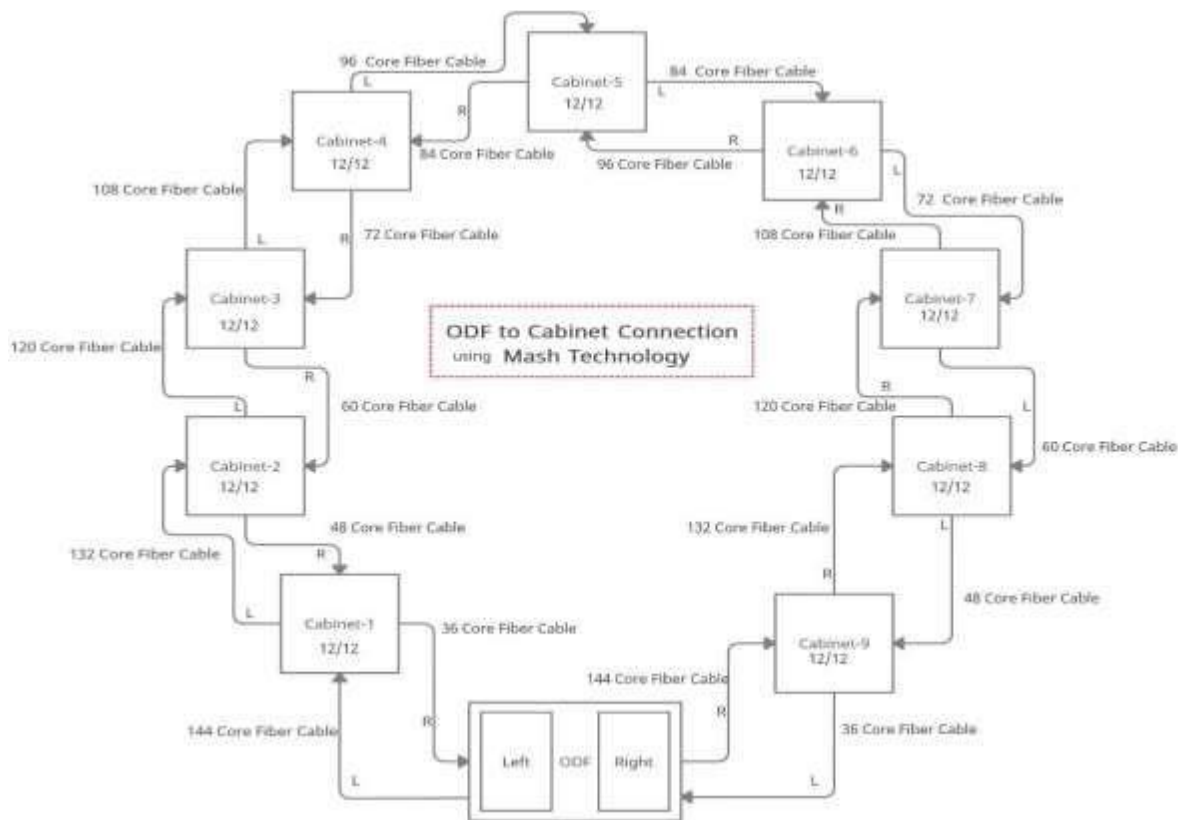- Optical network terminal (ONT).

Figure 4.3 The connection diagram for GPON & ODF to cabinet [5]

GPON Connection Procedure:

- First, Check the power the power at DP with optical meter.
- Draw optical drop cable from DP to customer premises.
- Splice the optical drop cable with the DP pigtail.
- Splice the other end of optical drop with another pigtail, which inserted inside the ATB box.
- Connect ONT or MDU with ARB box through an optical patch.
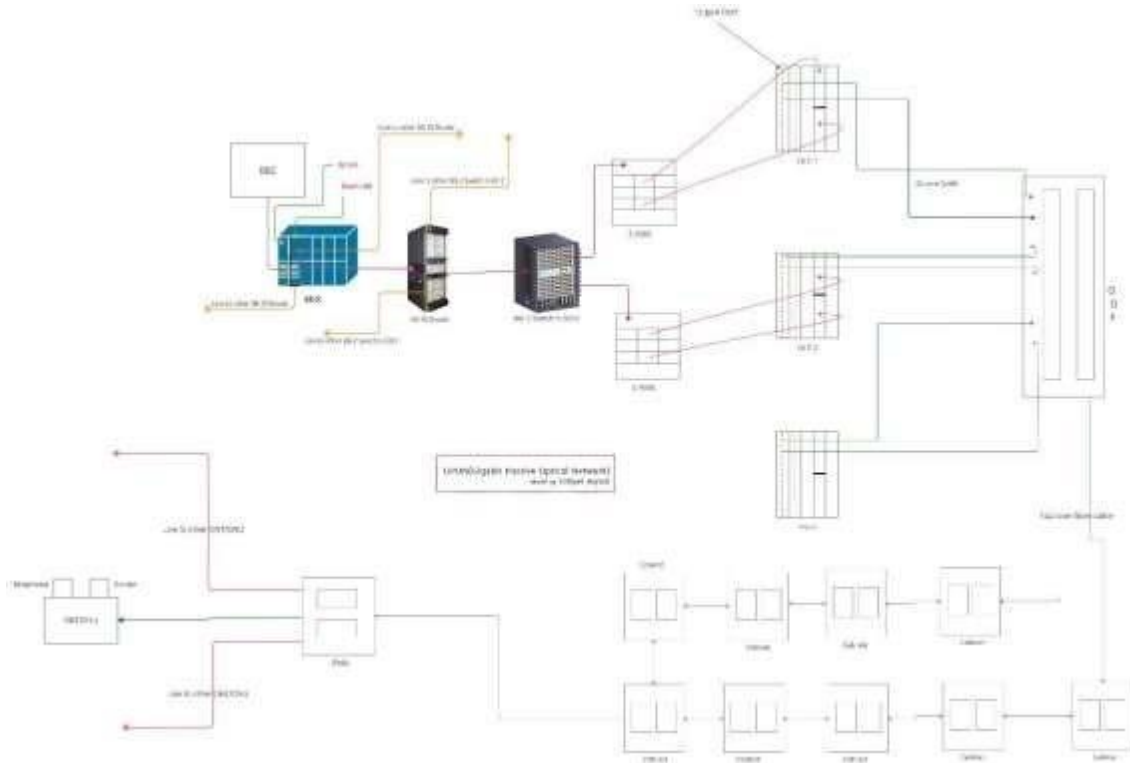- Connect ONT or MDU with Router/PC/Phone by using LAN cable.

Figure 4.4 GEPON [5]

A longer transmission distance is one of the advantages of GPON technology. higher speed. One feature of GPON is that it allows for data transmission over greater distances than conventional cable networks. GPON is renowned for having faster speeds than other cable networks. It has a greater variety, takes up less space, is less expensive, and is therefore environmentally friendly.
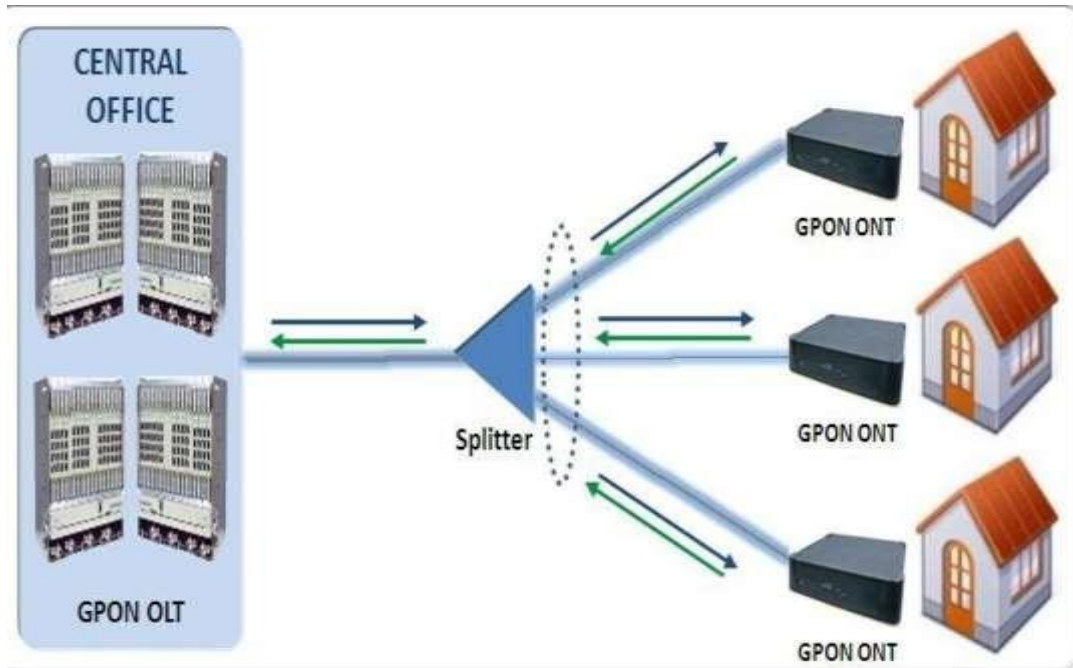
Figure 4.5 GPON Principal Data Multiplexing [5]

4.10 Optical Fiber

An optical fiber is a waveguide or "light pipe" that carries light along its clear, thin, elastic core between two places. Fiber-optic communications are capable of transmitting information at higher data rates and over longer distances than prior communication methods thanks to the widespread use of optical fibers. Because fiber provides less power loss and is resistant to electronic radiation, metal wires are being replaced with fiber.

4.11 History of Optical Fiber

- Glass has been used to create textiles since the Roman era. However, the first "optical telephone" wasn't created by the French Chappe twins until the 1790s. A network of lights installed on towers were used by operators to transmit messages from one tower to the next. Optics research made significant strides in the century that followed.

- Alexander Graham Bell's photophone, an optical telephone system, was granted a patent in 1880. The telephone, however, which was his first invention, turned out to be more useful. The basement-located electric arc lamp that William Wheeled

- built was used to direct light through a network of light pipes with a highly reflecting coating to illuminate the interior of the house.
- In 1888, surgeons Roth and Reuss of Vienna lit bodily cavities with bent glass rods. Henry Saint-Rene, a French engineer, created the bent glass rod mechanism six years later in an early effort at television. David Smith, an American, used a curved glass rod to make the dental illumination that he proposed for a provisional patent in 1898.
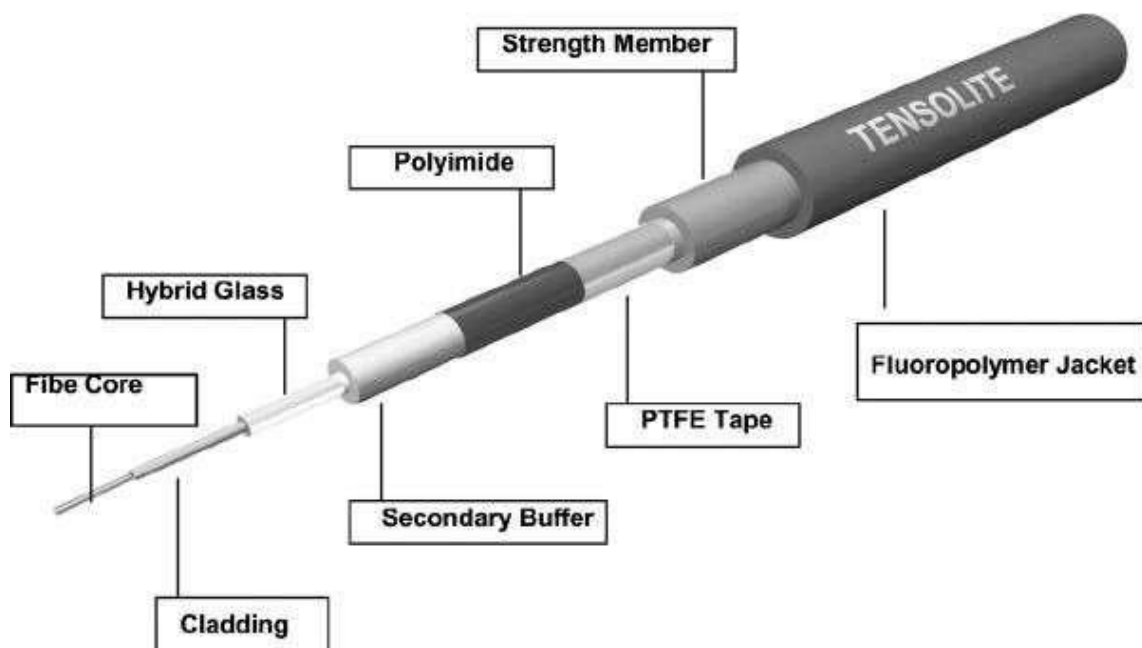

Figure 4.6 Design of Optical Fiber [6]

4.12 Fiber Optic Cable

The configuration known as a fiber-optic cable, also known as an optical-fiber cable, is comparable to an electrical cable but also includes one or more optical fibers that are used to carry light.
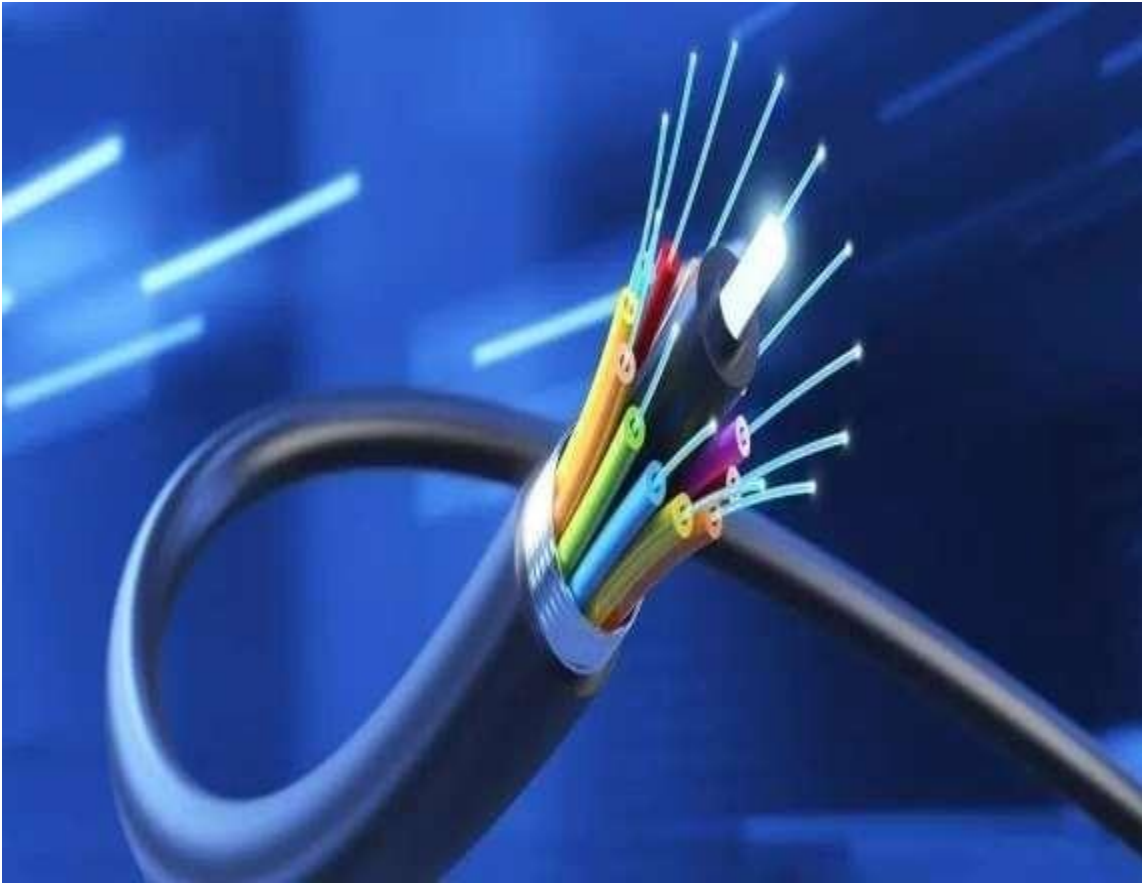

Figure 4.7: Fiber Optic Cable

4.13 Call Flow

In order to help contact center employees solve problems with customer service call flow was developed. Employees in their first year at your call center should pay special attention to this since it will help them ask the right questions to get issues resolved as fast as possible.

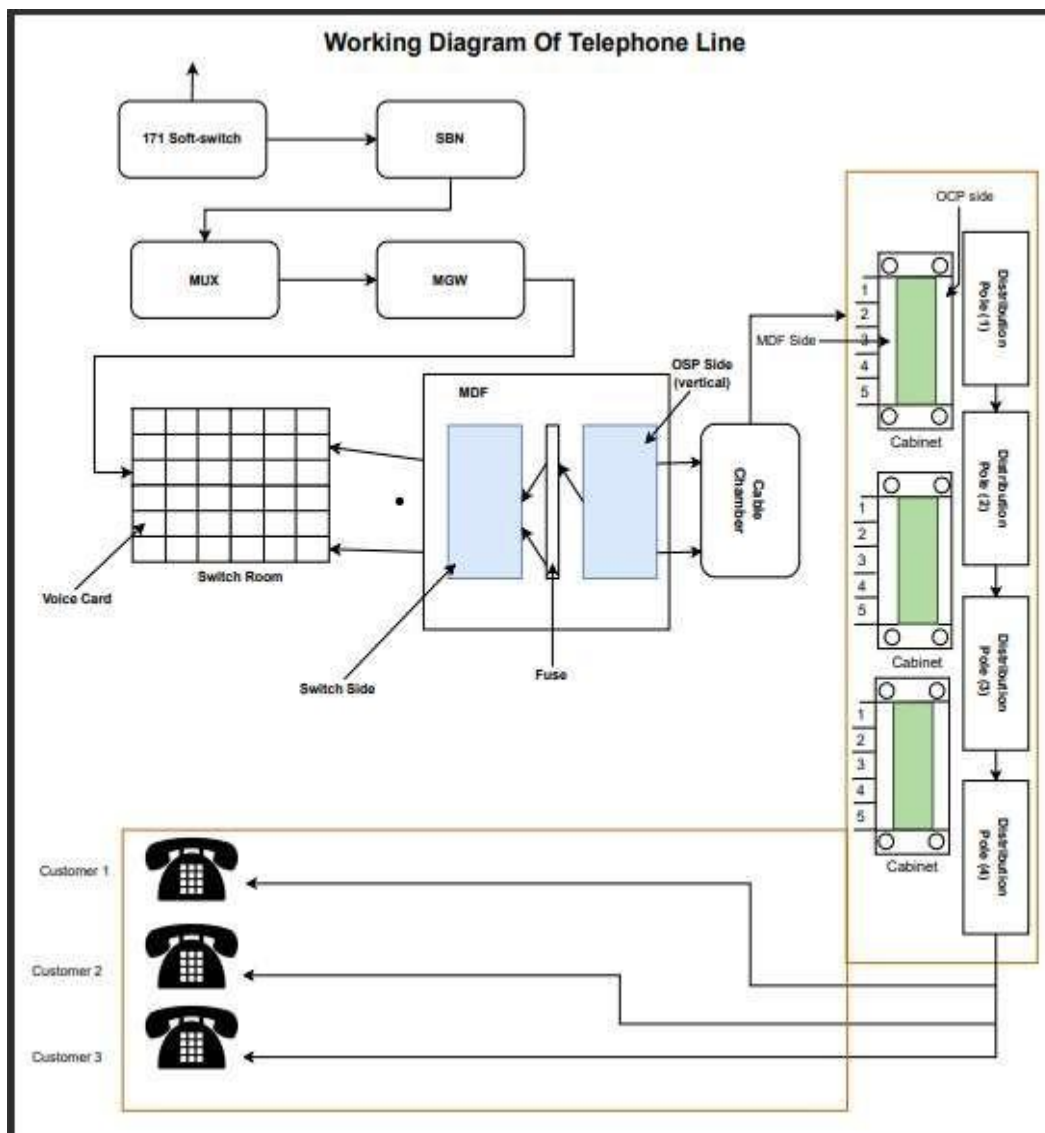Figure 4.8 Call flow

4.14 Switch room

The proposal must include the necessary electrical and cooling components for the Switch to operate. The infrastructure for the power stations are listed below. BTCL uses electricity in two distinct ways.

4.15 Air-Condition

Trade air conditioning unit and OMC rooms must both be included in the winning proposal. The bidders must supply a thorough specification sheet for the cooling system with their offer. The existing power demand of a air conditioner is calculated using the parameters provided below. One control module must handle all essential monitoring and control functions for the air conditioning system. The control panel must contain the necessary alarm loops, and the ability to display and hear alarms, in order to transfer OMM.

Figure 4.9 Air Condition

4.16 IMS：IP Multimedia Subsystem

The PS domain is used as a relay by the 3GPP-introduced IMS (IP Multimedia Subsystem-IMS) in R5 phase. IMS offers multi-media services to mobile users over a full-IP network.
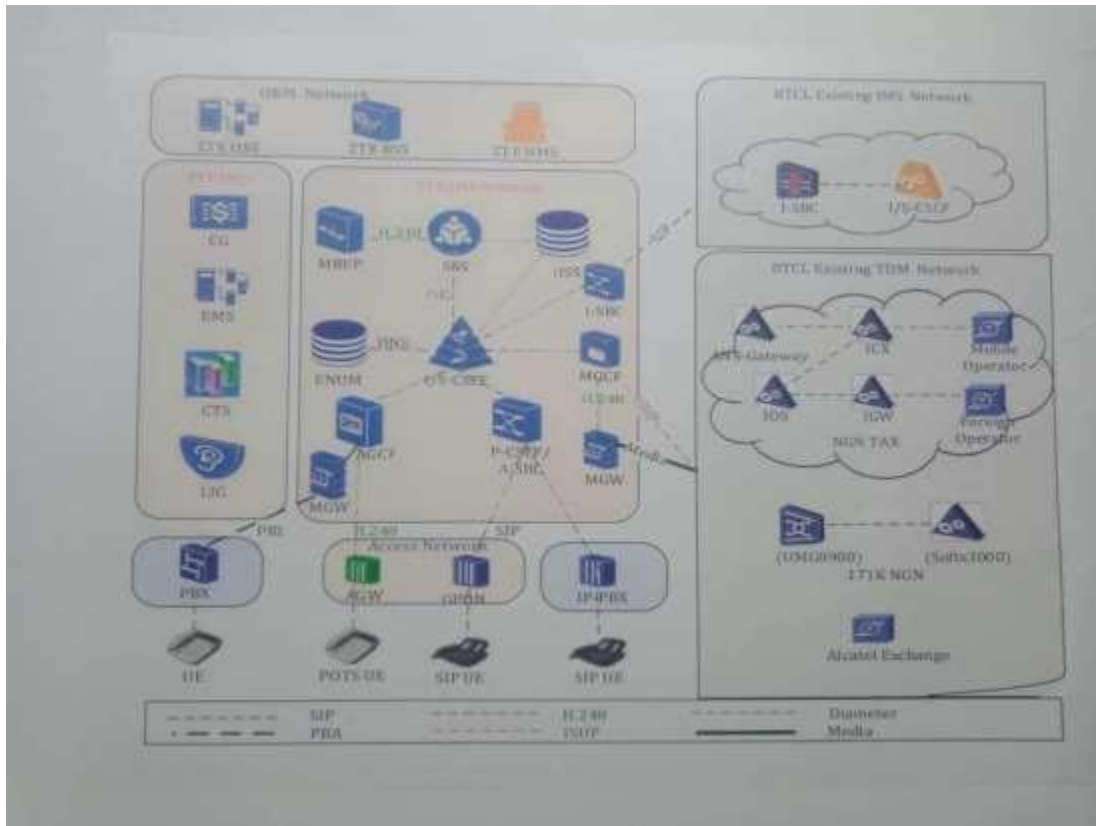

Figure 4.10

4.16.1 IP

- IP-based transmission

- IP-based session control

- IP-based service implementation

4.16.2 Multimedia

- Voice, video, image, text, and other combinations, etc.

- Support various access methods and multiple access point.

- Capacitance-varying methods and terminals.

4.16.3 Subsystem

- Utilize the current network infrastructure to its utmost potential to get the most out of it.

- PS/GPRS networks are regarded by wireless networks as bearer network.

- Fixed network regards the IP system based on fixed access as the bearer network.

CHAPTER 5
CONCLUSION AND FUTURE PLANNING

5.1 Conclusions of the Discussion

Implementing research and innovation on telecommunications operations, a dynamic and essential part of the telecom sector, is a huge, difficult, professional, and time-consuming task that calls for, among other things, excellent analytical skills, quick learning abilities, and strong observational skills. Because of this, I am content and relieved to have finished and documented my internship experience in this respectable sector of telecommunications in a friendly setting. My success was indeed a result of God's grace, the teachings of my acclaimed professors at Daffodil International University, and the leadership of the BTCL Sher-E-Bangla Exchange Telecom Division. Along with my best efforts and constructive hard work, I also receive love from family and friends. Given my commitment and integrity, I would be grateful if this internship thesis on the BTCL Telecommunications System was considered favorably and warmly.

5.2 Possibilities for a future career

My internship at Bangladesh Telecommunications Company Limited has been tremendously beneficial and enriching for me as a young person attempting to obtain a highly regarded degree in Computer Science and Engineering. I've had the chance to put my theoretical principles into practice while taking on difficult practical tasks. My favorite educational institution, Daffodil International University, has a highly skilled and reputable faculty. Any difficulties I've encountered during my internship have been aided by my excellent Instructor. I am grateful that Bangladesh Telecommunications Company Limited (BTCL) and my outstanding lecturers provided me with a real-world setting in which to hone my communication skills. I'm delighted to announce that I now consider this internship to be a life-changing experience.

APPENDIX

Company Details

Name: Bangladesh Telecommunication Company Limited (BTCL)

Address: Head office 37/E, Telejogajog Bhaban, Eskaton Garden Dhaka.

Tel: +880248311500

Email: md@btcl.gov.bd

Call Center : 16402

Website: http://www.btcl.gov.bd

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[4] ADSL https://www.techtarget.com/searchnetworking/definition/ADSL
(last accessed on 25 November 2022)

[5] Optic-Fiber

https://www.timbercon.com/resources/blog/history-of-fiber-optics/(last accessed on 25
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