

**WORKING PROCESS OF TELECOMMUNICATION NETWORKING OF
BANGLADESH TELECOMMUNICATION COMPANY LTD. (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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DAFFODIL INTERNATIONAL UNIVERSITY

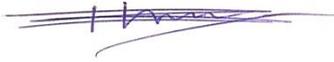
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APPROVAL

This Project/internship titled “**Working Process of Telecommunication Networking of Bangladesh Telecommunication Company Ltd. (BTCL)**”, submitted by Mostafizur Rahman, ID No: 182-15-11690 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on Thursday, 03 June 2021.

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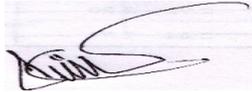
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First of all, I am thankful to Almighty **ALLAH** for empowering and empowering me I am very happy to be able to finish this chapter in the allotted time This report has been completed that my classmates and I have prepared this internship report on studying the work system of Bangladesh Telecommunications Company Limited (BTCL) at the request of our university. Phase 1 and Phase 2 of the university are compulsory courses for obtaining Computer Science and Engineering (CSE) degree It was very important to do this internship report because with the help and cooperation of many people involved in this report. I would like to thank **Bangladesh Telecommunications Company Ltd. (BTCL)** and **BSc in Computer Science and Engineering (CSE) Department** for giving me the opportunity to be an intern at Bangladesh Telecommunications Company Ltd. (BTCL).

I will be grateful to the esteemed faculty of **Daffodil International University** for all kinds of support and cooperation during the rest of my life journey and university studies as well as to Bangladesh Telecommunications Company Ltd. (BTCL) as I have gained a lot of practical experience and knowledge while working at Bangladesh Telecommunications Company Ltd. (BTCL). I am grateful to my Internship Supervisor **Sir Narayan Ranjan Chakraborty**. My supervisor **Sir Narayan Ranjan Chakraborty** gave me timely instructions to write the report and I tried to act and comply with those instructions. By the time my BSc graduation life was over and I was able to finish the important report He has always helped with guidance He has always instructed me to make the report informative and constructive and I have tried to act on that instruction and advice.

I feel very happy and very lucky to be appointed as an intern at **Bangladesh Telecommunications Company Ltd. (BTCL)** During the internship at BTCL. I have been able to gain a lot of important informative guidance and advice and practical experience and knowledge. I have received a lot of help from Bangladesh

Telecommunications Company Ltd. (BTCL). I will be grateful to the esteemed faculty of BTCL for this help, especially **DGM Md. Aminur Rahman Sir, Assistant Manager Md. Mahfuj Howlader Sir.**

Lastly, I would like to express my special thanks and appreciation to **Daffodil International University and Bangladesh Telecommunications Company Ltd. (BTCL)** for giving us the opportunity to show our capabilities through this small effort. Above all, I would like to thank all the people who will read this report and benefit from it now or in the future.

ABSTRACT

To complete the BSc undergraduate program we need to do a minimum of three months internship from any reputed institute to successfully complete the internship work. My internship is a four (04) month program. During these four months I have been able to gain valuable experience and knowledge of my life I am very lucky that I was able to do an internship at Bangladesh Telecommunications Company Ltd. (BTCL). This internship has tried to highlight the structure and design of Bangladesh Telecommunications Company Ltd. (BTCL). This Phase 1 and Phase 2 internship programs of these two courses have helped me a lot to know about telecommunication companies. Bangladesh Telecommunications Company Ltd. (BTCL) provides basic telecommunication services in our country. The telecommunication industry is rapidly advancing our country and it is undoubtedly a fast developing industry Bangladesh Telecommunications Company Ltd. (BTCL) has about 1 million telephone subscribers across the country Bangladesh Telecommunications Company Ltd. (BTCL) has contributed a lot to our country's GDP, has and will bring hope in the future. The Telephone Board was established as a Bangladesh Telegraph and Telephone Board (BTTB) company in 1971 and was renamed Bangladesh Telecommunications Company Ltd. (BTCL) in 2008 after Bangladesh Telegraph and Telephone Board (BTTB) was transformed into a public limited company. The current Bangladesh Telecommunications Company Ltd. (BTCL) has an estimated value of Rs 150 billion. BTCL not only provides telephone service, BTCL has eight (8) licenses. Bangladesh Telecommunications Company Ltd. (BTCL) has copper cabling, microwave, satellite link, optical fiber network etc. BTCL has 33000 capacity broadband internet service. At present, BTCL has been able to gain recognition as a huge telecommunication company in our country. The main purpose of this report is to review the structure and systems of Bangladesh Telecommunications Company Ltd. (BTCL) and evaluate the design of the company and I have tried to do that. I have collected the data of this internship report through personal observations and interviews and also through the websites of some information agencies.

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CHAPTER 1

INTRODUCTION

1.1 Introduction:

This chapter was a very important one for me to gain experience and knowledge about the real corporate office working environment through this internship program. Through my internship at a telecommunications company, I have learned about the various functional requirements of the telecommunications industry, the applications used, the software used, and the telecommunication network devices of old and new technologies. I have gained practical and practical knowledge of Main Distribution Frame (MDF) of Bangladesh Telecommunication Company Limited (BTCL). Bangladesh Telecommunication Company Limited (BTCL) has done a lot of new additions to the Main Distribution Frame (MDF), increased my experience and knowledge through this work and improved my confidence. I ran into a lot of problems while doing the internship. At that time, my team members also helped Bangladesh Telecommunication Company Limited (BTCL) employees and officials through technology and non-technology. I participated in their official training with the Bangladesh Telecommunication Company Limited (BTCL) authorities during the internship. I have gained a lot of knowledge as well as a taste of working in a corporate office to take part in this. While running this internship program I have had the opportunity to increase my knowledge, strengths and weaknesses, which will help me a lot in my future career development. I am really proud to be a Computer Science and Engineering (CSE) student of Daffodil International University. Daffodil International University has given me the opportunity to do internship through phase 1 and phase 2 through the university's BSc program. I am grateful to Bangladesh Telecommunication Company Limited (BTCL) for giving me the opportunity to do their internship. Bangladesh Telecommunication Company Limited (BTCL) has given me practical knowledge and experience that will play an important role in my future career and development.

1.1.1 History of Bangladesh Telecommunications Company Limited:

Bangladesh Telecommunication Company Limited (BTCL) is the government telephone company of our country and the largest telecommunication company in the country. After the independence of our country, Bangladesh Telegraph and Telephone Board (BTTB) Company was established. Bangladesh Telegraph and Telephone Board (BTTB) Public Limited Company was established on July 1, 2006 and was renamed as Bangladesh Telecommunication Company Limited (BTCL). The total number of employees and officers of Bangladesh Telecommunication Company Limited is 12636.

Bangladesh Telecommunication Company Limited (BTCL) provides land-line telephone service in our country. Bangladesh Telecommunication Company Limited (BTCL) also provides international calling and internet services within our country. The Government of Bangladesh issued PSTN licenses to a number of government and non-government organizations in 2004. Bangladesh Telecommunication Company Limited's business broke down in 2006 as other operators started getting licenses.

1.1.2 Pre-History of Bangladesh Telecommunications Company Limited:

British India established the Telegraph Branch in 1953 under the Postal and Telegraph. Later the Telegraph was regulated by Act 1885. Prior to 1962, the Pakistan Telegraph Branch was reorganized into the Pakistan Telegraph and Telephone Division.

1.1.3 After independence of Bangladesh Telecommunications Company Limited:

After the independence of our country, the first Bangladesh Telegraph Telephone Department was established in 1971 under the Ministry of Posts and Telecommunications. The Telegraph and Telephone Board transformed the Telegraph and Telephone Board into a corporate entity through a notification in 1975. According

to the order of 1989, a government board named Bangladesh Telegraph and Telephone Board (BTTB) was formed.

1.1.4 Bangladesh Telecommunications Company Limited:

Customers get 24 hours service through Bangladesh Telecommunication Company Limited (BTCL) Call Center and Bangladesh Telecommunication Company Limited (BTCL) sets up call center for 24 hours service. Bangladesh Telecommunication Company Limited (BTCL) has a special telephone exchange which is always active and secure. It is mainly used for VIPs.

1.2 Motivation:

I support the work of Bangladesh Telecommunication Company Limited (BTCL) and I was eager to gain experience and knowledge in the field I would like to learn in this internship. I also had the opportunity to get acquainted with the skills, advanced telecommunications organization experience and real corporate office environment through the internship program. Provides opportunities to connect with their organization through internship programs at Bangladesh Telecommunication Company Limited (BTCL) and provides experience, knowledge and work opportunities to their officers and employees. Through this internship program of Bangladesh Telecommunication Company Limited (BTCL) I have been able to sharpen and improve my experience and knowledge. Bangladesh Telecommunication Company Limited (BTCL) staff and officials have also been able to inform me about old and new technology devices. I always want to be a valuable resource for the telecommunications system. Through this internship program they have been able to gain accurate experience, skills and knowledge about the organization including telecommunication.

1.3 Objective:

The purpose of my internship program is to develop career skills and strategies directly. Joining an internship program is important and essential for gathering the environment, experience, knowledge, skills and strategies of an organization. I have been able to gain practical real life knowledge, work ethic, communication management and other skills through this internship program. It will play a very important role in my career I am hopeful that career skills and strategies will enhance my sense of responsibility and good work habits. Through this internship report we have a higher level of academic performance. These internship programs increase career prospects after graduation. In education, strength, team spirit, self-confidence, creativity, responsibility skills and the ability to share ideas help to increase. Lastly I would like to say that through the internship program the correct conduct of corporate life has been able to be incorporated with skills, time responsibility, committed, trustworthy attitude and ethical values.

1.4 Introduction to the Company:

Bangladesh Telecommunication Company Limited (BTCL) is the largest government telecommunication company in Bangladesh. Bangladesh Telecommunication Company Limited (BTCL) is a connected telecommunication service provider with about 1 million telephone subscribers. Bangladesh Telecommunications Company Ltd. (BTCL) is playing a very important role in the economic growth of Bangladesh and it has strong potential to support economic growth in the future. Bangladesh telecommunication business is developing rapidly. Bangladesh Telecommunications Company Ltd. (BTCL) started with small steps and today BTCL is the largest government telecommunication service provider in Bangladesh. Bangladesh Telecommunications Company Ltd. (BTCL) is not only the main metropolis of Bangladesh but BTCL has now been able to set up optical fiber access network at the upazila and union level of our country. It has the capacity to serve two submarine cables over long distances and to meet the unified needs of the international infrastructure and the people of our country. This company provides corporate and

wholesale communication facilities such as internet, television, video conferencing etc.

The company has spread its services across the country. Telecommunication has made people's communication system much easier. Its main function is to bring people together through voice tune up and internet. Which BTCL brings with it a lot of responsibilities and is optimistic about the future. Lastly, I would like to say that BTCL is essential in today's society. BTCL is playing a very important role in the economic development of our country, so I am especially grateful to BTCL.

1.4.1 Scope:

In this report, I have tried to present a practical and up-to-date modern technology and device theoretical perspective. Through this internship report I have highlighted what a telecommunications company operates with services, types of work, technology and devices. There are many opportunities to apply practical knowledge and apply it in future life from such communication organization. I have tried to take this experience and knowledge. This kind of experience knowledge and skills make a very important contribution to the career.

1.5 Report Layout:

I have mentioned Chapter 1 in this report layout, In Chapter 1 I discuss in detail this Introduction, History of Bangladesh Telecommunications Company Limited, Pre-History of Bangladesh Telecommunications Company Limited, After independence of Bangladesh Telecommunications Company Limited, Bangladesh Telecommunications Company Limited, Motivation, Objective, Introduction to the Company, Scope Tried to. In Chapter 2 I have tried to discuss about this Introduction, Vision, Mission, Product and Market Situation, Target Group, SWOT Analysis, Organizational Structure. Chapter 3 This I have tried to discuss the full contents of my internship program. These topics are Daily Task and Activities, Elements of a Switching System, Switching System, Telecommunication Network, Electronic

Switching System, Multi-Exchange Network, Main Distribution Frame (MDF), Next-Generation Network, Numbering, Events and Activities, Project Task and Activities, Challenges. Chapter 4 discusses these Competencies Earned, Smart Plan, Reflections and Chapter 5 discusses this Discussion and Conclusion, Scope for Further Career and finally mentions the references clearly.

CHAPTER 2

ORGANIZATION

2.1 Introduction:

Bangladesh Telecommunications Company Ltd. (BTCL) was the Bangladesh Telegraph and Telephone Division before 2008, Bangladesh Telecommunications Company Ltd. (BTCL) was established on 1 July 2006. The Bangladesh government owned all the shares in Bangladesh Telecommunications Company Ltd. (BTCL) but later the Bangladesh government offloaded the shares to the general public. In 1979, the department was reconstituted by order of the President and renamed as Bangladesh Telephone and Telegraph Board (BTTB). The government of Bangladesh formed it for the purpose of providing basic telecommunication services in the country, now it is established under the name of Bangladesh Telecommunications Company Ltd. (BTCL).

Bangladesh Telecommunications Company Ltd. (BTCL) Head Office - 3 / E, Eskaton Garden, Telecommunication Building, Dhaka, Bangladesh.

Bangladesh Telecommunications Company Ltd. (BTCL) provides dial-up internet access facility in every district of our country. Bangladesh Telecommunications Company Ltd. (BTCL) has transformed into the highest internet access service provider in our country. BTCL since 2006. .bd and .bangla domain services.

The members of Bangladesh Telecommunications Company Ltd. (BTCL) Board of Directors are Chairman Telecommunication Secretary, 3 Joint Secretaries of the Ministry of Information and Telecommunication, a Brigadier General of Bangladesh Army, President of FBCCI, Chartered Accountant President of the Institute, Dr. Zafar Iqbal, Chairman of our Board and Director, BT Management.



Figure 2.1: Introduction of Bangladesh Telecommunication Company Ltd. (BTCL)

2.1.1 Vision:

Bangladesh must be a leader as a telecommunication service provider, this is not the main objective of Bangladesh Telecommunications Company Ltd. (BTCL), the main objective of Bangladesh Telecommunications Company Ltd. (BTCL) is to become the leading government organization providing finance and communication technology services in our country by achieving customer satisfaction and improving the quality of shareholders. Bangladesh Telecommunications Company Ltd. (BTCL) is developing appropriate communication services to improve the quality of life and make life easier for the people of our country. Bangladesh Telecommunications Company Ltd. (BTCL) is working to make our country easier to communicate with the world for the future. Bangladesh Telecommunications Company Ltd. (BTCL) is working for a future that will make telecommunication services easier and closer to the people of this country.

2.1.2 Mission:

Bangladesh Telecommunications Company Ltd. (BTCL) started its success through telephone connection to the people, then Bangladesh Telecommunications Company Ltd. (BTCL) took place in the hearts of the people of our country by bringing many more services besides telephone connection. Bangladesh Telecommunications

Company Ltd. (BTCL) has up-to-date knowledge, technology and services to meet the growing demand in our country. Bangladesh Telecommunications Company Ltd. (BTCL) has enriched Bangladesh Telecommunications Company Ltd. (BTCL) through professionalism, motivation, organizational environment, costly, quality service, quality, best technology and customer service to achieve its goals.

2.2 Product and Market Situation:

Notable product services of Bangladesh Telecommunications Company Ltd. (BTCL)

- International Gateway (IGW) Services-

International Gateway (IGW) Transit ISP provides international internet service through internet connection service. Existing international line management, proxy and filtering in this International Gateway (IGW) service. Bangladesh Telecommunications Company Ltd. (BTCL) provides international voice traffic guru acceptance and transmission services through the switching system. The International Gateway (IGW) service runs their commercial activities through an assistant license from Bangladesh Telecommunication Regulatory Commission (BTRC).

- Interconnection Exchange (ICX) Services-

Provides interconnection, monitoring, LI and roaming number services within the telecommunication network through Interconnection Exchange (ICX) service. Bangladesh Telecommunication Regulatory Commission (BTRC) has allowed setting up of two POIs for Interconnection Exchange (ICX).

- International Internet Gateway (IIG) Services-

Through IIG, BTCL transmits and receives international data traffic. It provides computer or app based voice traffic services such as-

- Messenger

- WhatsApp
- Telegram
- imo
- Viber etc.

▪ Nationwide Telecommunication Transmission Network (NTTN) Operators-

The government of our country is providing transmit network services through Nationwide Telecommunication Transmission Network (NTTN). Bangladesh Telecommunications Company Ltd. (BTCL) is the largest transmit network in our country. Power Grid Company of Bangladesh Limited (PGCB) has ensured additional transmission network services in addition to Bangladesh Telecommunications Company Ltd. (BTCL)'s network of offices, primary and high school colleges and universities in our country.

▪ International Terrestrial Cable (ITC) Services-

The Government of Bangladesh provides submarine cable services through International Terrestrial Cable (ITC). The government has been able to connect the internet to the rest of the world through two submarine cables to provide internet service to our country. SMW4 has installed 1600 km of optical fiber and its landing station is at Cox's Bazar. SMW5 has installed 20,000 thousand kilometers of optical fiber. Its landing port is in Mongla.

- SEA-ME-WE-4 (SMW4)
- SEA-ME-WE-5 (SMW5)

▪ Public Switched Telephone Network (PSTN) Operator-

Public Switched Telephone Network (PSTN) is primarily operated by telephone operators. Public Switched Telephone Network (PSTN) acts as a

node to connect the network through point-to-point communication, and also uses the Public Switched Telephone Network (PSTN) dial-up Internet access service for all computers connected to the Internet.

- Satellite Communication-

Satellite is basically an artificial, satellite transfer that relays and carries telecommunication signals. Satellites have been providing communication or communication channel services through transmitters and receivers around the world. Satellite services are being used for important purposes like television, telephone, radio, internet etc. At present, there are 1364 communication satellites, which are used by organizations for both public and private services. The main purpose of satellites is to allow communication between different geographical points and to make signals around the earth and these signals use artificial satellite radio and microwave frequencies of communication.

- Nationwide – ISP-

Through Nationwide-ISP, Bangladesh Telecommunications Company Ltd. (BTCL) provides Nationwide-ISP services to connect Bangladesh with the rest of the world. Bangladesh Telecommunications Company Ltd. (BTCL) provides high-bandwidth services through a network for Internet services in our country's corporate offices, corporate businesses and homes.

- .bd and .bangla Domain Services etc-

.bd and .bangla are the top level country codes of our country. It is the symbol of Bangladesh all over the world. The two registration authorities in ccTLD and MoPTICT are BTCL. .bd and .bangla are the two top level domains run by the Ministry of Posts, Communications and Information Technology. .bangla domain is a special service which can be accessed by

typing the address of the specified website in Bangla, through which Bangla language is being used in international cyber services and through this people will be able to know about our Bangla language, at the same time get to know our country better. Cyber services will increase the use and knowledge of Bangla language.

2.3 Target Group:

Every company needs to change rapidly, set up and move forward in computer and modern technology because it is essential for any company to survive in today's competitive market. Advanced information technology services IT infrastructure is essential for all sectors and skills and service aspects for the whole sector. With these modern technologies, Bangladesh Telecommunications Company Ltd. (BTCL) is trying to move forward through proper initiatives. I support this kind of pragmatic initiative and effort of Bangladesh Telecommunications Company Ltd. (BTCL).

2.4 SWOT Analysis:

I have tried to mention the various services of Bangladesh Telecommunication Company through this "SWOT Analysis" report.

- Review of Bangladesh Telecommunications Company Ltd. (BTCL)'s significant contribution in Bangladesh telecommunication sector.
- Bangladesh Telecommunications Company Ltd. (BTCL)'s significant economic contribution to the telecommunications sector.
- Bangladesh Telecommunications Company Ltd. (BTCL)'s telephone, dial-up internet access, satellite and optical fiber access network installation as well as other services reviewed.
- Historical history of transformation from Bangladesh Telegraph and Telephone Department to Telegraph and Telephone Board in Bangladesh.

I have collected the information through this "SWOT Analysis" website and face-to-face interviews with the staff-officers.

2.5 Organizational Structure:

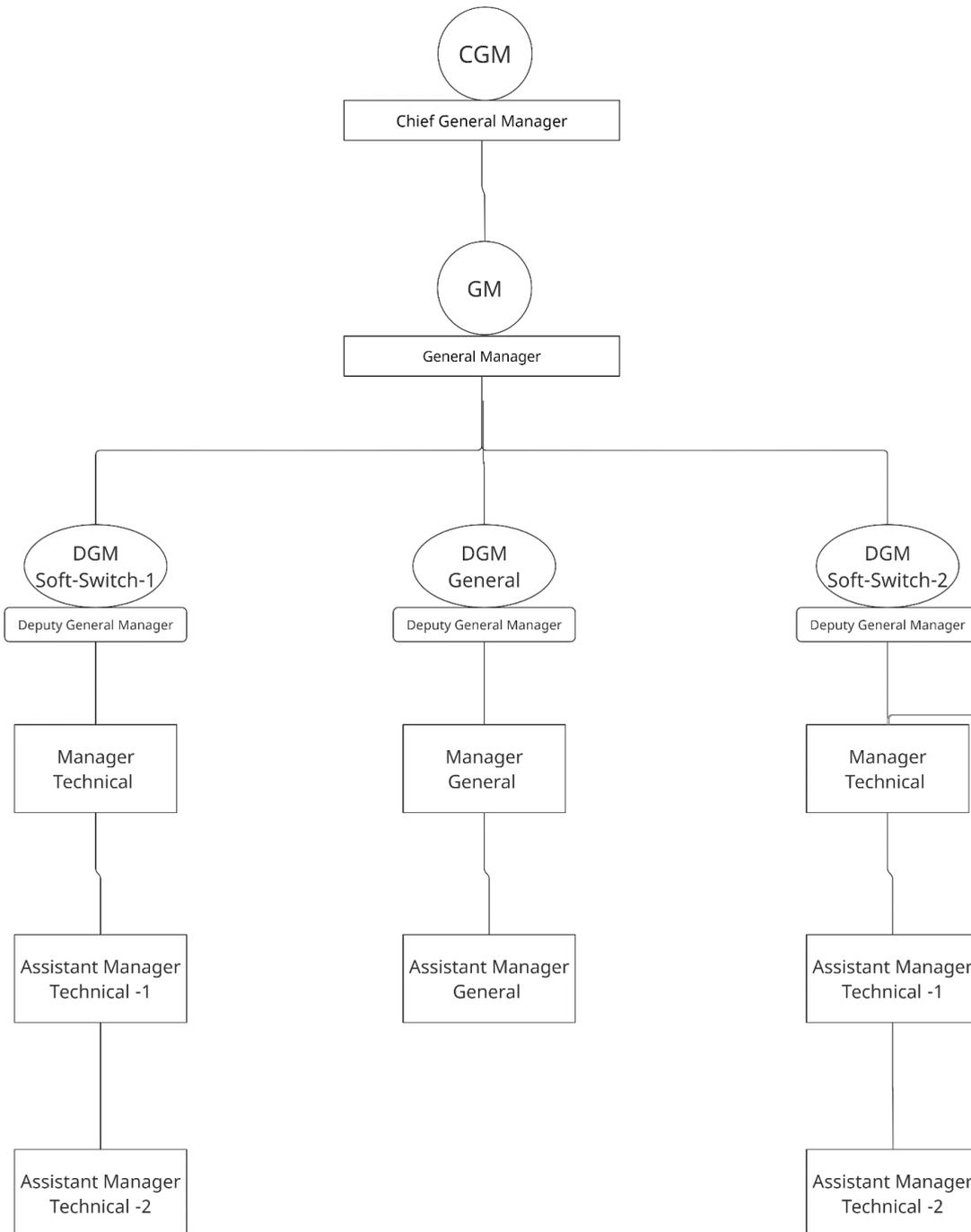


Figure 2.5: Organizational Structure

CHAPTER 3

TASKS, PROJECTS AND ACTIVITIES

3.1 Daily Task and Activities

During the internship at BTCL, the staff of BTCL showed me the following topics, helped me to burn and gain practical knowledge and experience.

- Why and how Bangladesh Telecommunications Company Ltd. (BTCL) provides our services.
- Why and how Main Distribution Frame (MDF) works.
- Main Distribution Frame (MDF)'s practical work experience.
- Multiple switch inspections of Bangladesh Telecommunications Company Ltd. (BTCL) such as-
 - Soft Switch
 - IP Based Switch
- Bangladesh Telecommunications Company Ltd. (BTCL)'s power backup system.
- Bandwidth Management with Mikrotik.
- SEA-ME-WE-4, SEA-ME-WE-5
- International Internet Gateway (IIG).
- Nationwide-Internet Service Provider(ISP).
- Domain Services.
- Telesheba Services.

3.1.1 Elements of a Switching System

I have tried to discuss a switching system in this chapter. The switching system manually serves as the basic component for the functionality of the active switching

system. The switching system conducts a number of other operations besides the network such as control sub system, signaling system, trunk, customer line interface, distributor unit, operator console, important and necessary junctions for the operation of the whole switching system.

3.1.2 Switching System

The following structure refers to the structure of a switching system. We can understand how the different elements work through the following structure.

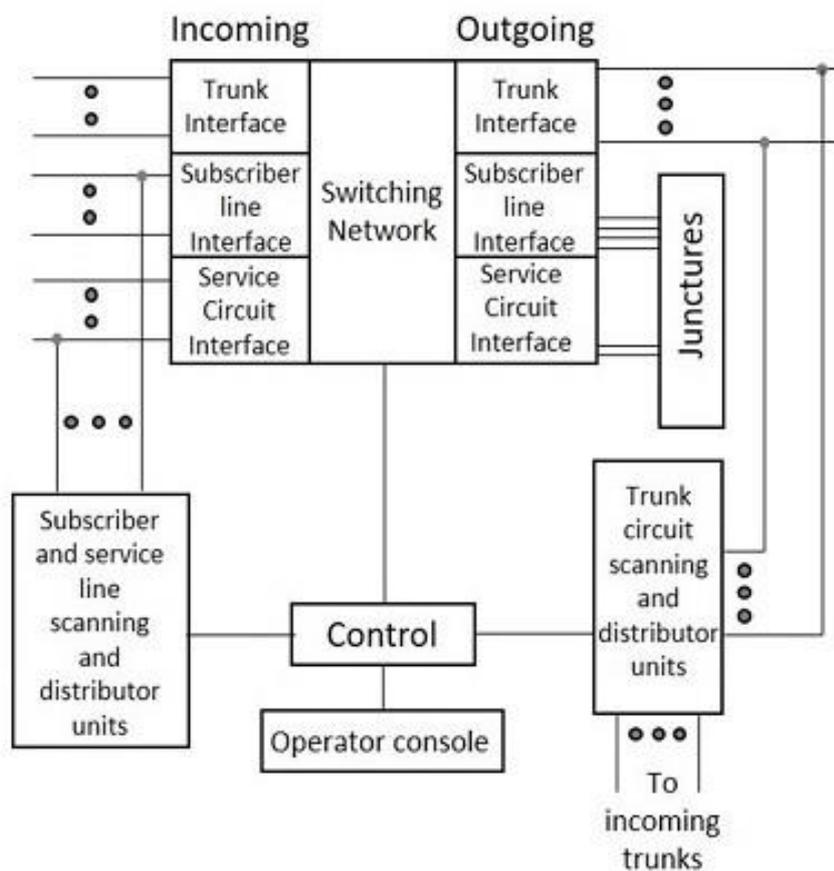


Figure 3.1.2: Switching System

Below I have tried to discuss the different blocks of the structure.

- Switching Network -

Switching systems through switching networks provide switching paths between called and calling customers.

- Control Subsystem -

The control subsystem identifies empty and outlet lines through the switching system and actively establishes the switching paths for the signals on the lines. These control subsystem lines make connections and control breaks. It transmits signaling and information connected to other exchanges with customers and outgoing customers.

- Signaling -

Signaling performs key functions in a switching system by performing control and signal functions. Signaling provides three types of services in a switching system -

- Subscriber Loop Signaling.
- Interexchange Signaling.
- Interexchange or Register Signaling.

- Trunk Interface -

The trunk interface is primarily used to connect the trunk lines of switching systems. The trunk interface keeps the trunk line points connected to the system.

- Subscriber Line Interface -

Subscriber lines are used to connect customers and systems. The point at which the interface of the customer line is connected to the switching system is connected to the customer's line system.

- **Link Scanning Unit -**

The line scanning unit basically perceives the information about the signal through the lines first and then accepts it later. The information obtained from the lines through the line scanning unit is given to the system by identifying and controlling the inlets and outlets.

- **Distributor Units -**

The distributor units are mainly used for signaling transmission services on the respective unit lines. Data is transmitted between the main lines through the unit through the customer line.

- **Operator Console -**

The main function of the operator control is to allow communication with the switch system for maintenance and administrative services.

3.1.3 Telecommunication Network

A telecommunication network is a service provider system that is used to provide remote call placement services to customers. These switching systems are a very important part of telecommunication networking. Switching stations provide communication between customers in order to serve the customers. The switching system is connected to the subscriber context using the trunk line service.

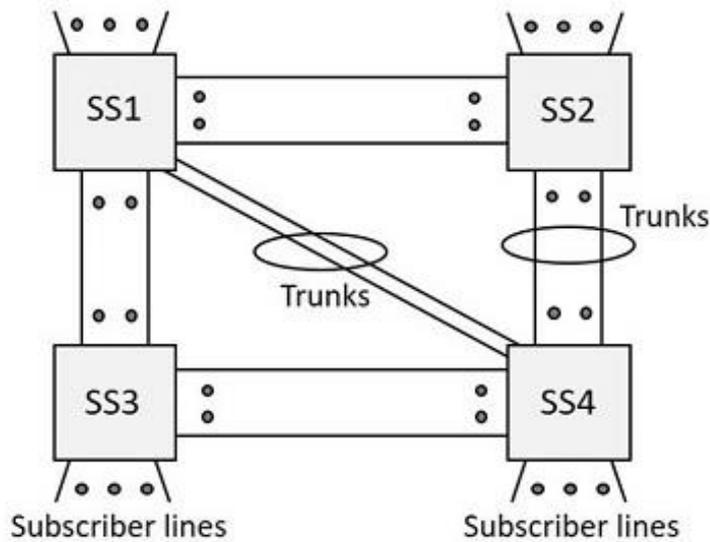


Figure 3.1.3: Telecommunication Network

In the 1900s and 80s, when a person made a remote call, he sent the call to the operator at the nearest switching center and later specified the number and location of the recipient. At that time, the job of the operator of that switching center was to place the call of the customer to the remote switching center and re-supply the call to the customer for later service. The calling service system used here is called trunk call system. For example, a person can book a trunk call from Jessore to Dhaka and after the operator provides the connection through the trunk line and switching system work, he can wait for the operator to call back.

3.1.4 Electronic Switching System

Electronics switching basically performs processor work through the processor or computer, which determines and controls the time of switching. Preserves and controls operations through a processor or computer program as directed. Stored Program Control (SPC) This technology saves processor computer programs and adds new installations to modify the Stored Program Control (SPC) system. The voltage levels of analog time switching are transmitted as they are. Binary switching s are encoded and transferred to binary.

3.1.5 Automatic Switching System

In the manual switching system the operator puts a call after receiving the call request. The operator is solely responsible for connecting to the manual switching system. There are many more disadvantages to manual switching systems and automatic switching systems have many advantages such as-

- Requests for language connection interruptions do not affect who.
- Maintains a high level of privacy.
- Provides services regardless of the system at all times.
- It can set up call release and call establishment services much faster.

The biggest service of this system is to serve the customers without the help of the operator.

3.1.6 Numbering

Number addresses are very necessary and important for identifying customers of a switching system. This allows each customer to be separated by an address on a number so that customers can easily receive services and communicate. Customers are identified by this number. A communication system needs to have a clear system for exchanging and transmitting customer identities. Customers use this number system to connect when they need to communicate.

3.1.7 Multi-Exchange Network

Different ways for a customer to communicate with a specific network help to communicate with a specific exchange. Multi-exchange networks use different routes at different times to connect to the customer.

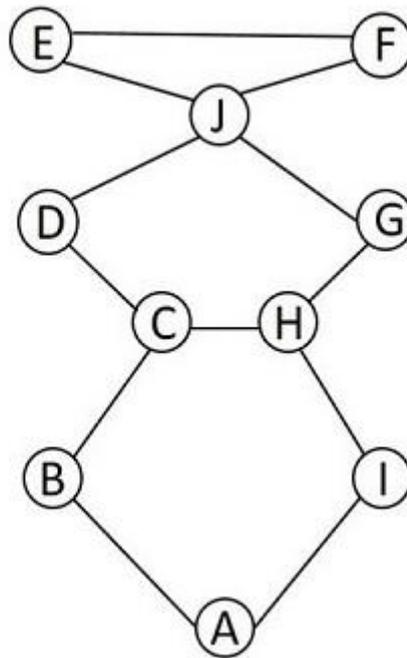


Figure 3.1.7: Multi-Exchange Network

Expected calls from outside are connected to or attempted by neighboring exchanges while each exchange is reserved. Exchanges basically try to provide communication services according to the dialed exchange number. The subscribers of multi-exchange networks vary largely depending on the number calling route.

3.1.8 Main Distribution Frame (MDF)

Main Distribution Frame (MDF) is basically a signal distribution frame. It is the intermediate distribution frame of communication, it provides service through a cabling connection to the telephone network. Bangladesh Telecommunications Company Ltd. (BTCL) provides Main Distribution Frame (MDF) services by telephoning from Main Distribution Frame (MDF) to such customers for the purpose of providing telephone services, and is connected to a specific exchanger. Main Distribution Frame (MDF) works by connecting socket matrix path panels to connect the telephone operator's calls. Each customer is assigned a specific line through the jumper. This assignment line only changes for number change, network route and maintenance purposes. Main Distribution Frame (MDF) is always ready to

successfully connect new customers. Main Distribution Frame (MDF) is a very expensive system and it is always connected to all the exchanges with extra capacity. Apart from a certain amount of cabling capacity and customer line in Main Distribution Frame (MDF), it is also used for various other purposes. MDF's circuits can be connected directly from one external cable to another external exchange. The junction of the Main Distribution Frame (MDF) connects its shots from one exchange to another, this work is done through the junction circuit. Fuses, heat coils and protectors are used in Main Distribution Frame (MDF) customer lines and junction circuits.

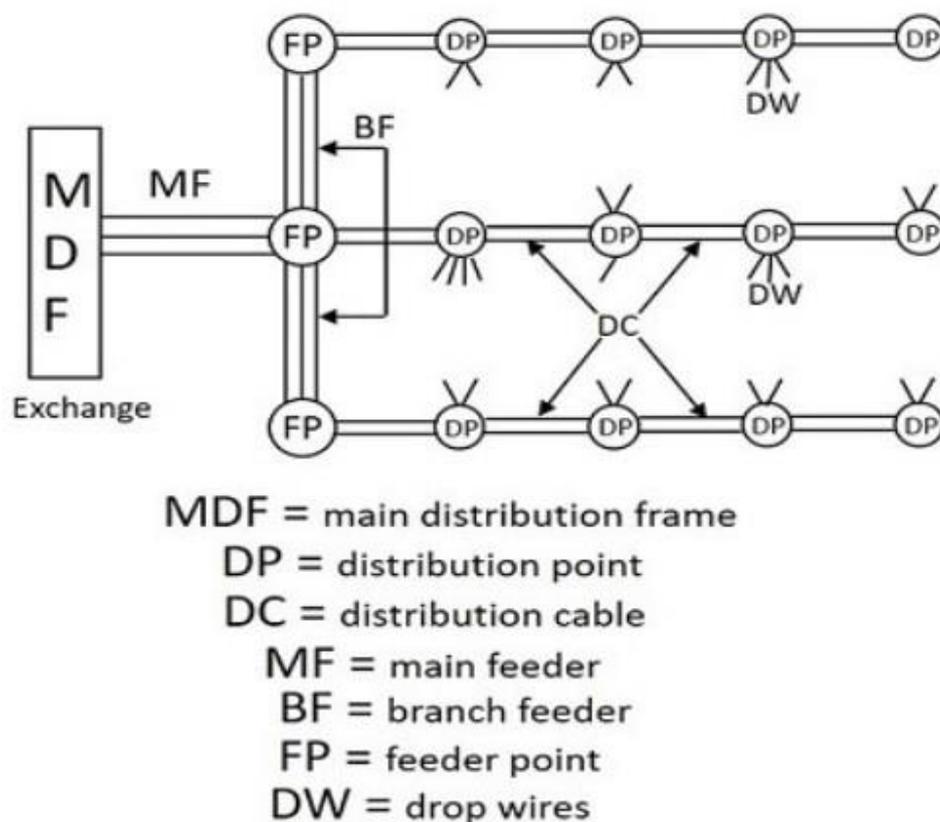


Figure 3.1.8: Main Distribution Frame (MDF)

3.1.9 Next-Generation Network

Next-Generation Network (NGN) is the core architecture of cores and accesses in the telecommunications sector, its network provides data, voice and all kinds of media

services with the help of IP packets used on the Internet. Next-Generation Network (NGN) primarily provides services around Internet Protocol and is used to convert telephone-centric networks.

- Introduction of Next-Generation Network (NGN) -

Next-Generation Network (NGN) is a packet service based network that collects telecommunication services and provides unlimited access to multiple broadband services and independent transport technology and various services. Refers to the aggregation of multiple dedicated transports on a network and builds each transport based on the common IP and Ethernet of the network. Circuit switch architecture through Next-Generation Network (NGN) transfers VoIP transfer Voice transfer, frame relay, migration IP VPN. DSLAM removes the voice path VoIP voice switching infrastructure after setting up the wired access network xDSL in Next-Generation Network (NGN) exchanges.

- Implementation-

The first Next-Generation Network (NGN) manufacturing company is THUS, Next-Generation Network (NGN) has 10,600 km of fiber optical cable service. Improve bandwidth as well as increase optical networks, using wavelength, division multiplexing technology services. THUS uses MPLS technology to provide maximum network performance. Provides video, voice and data traffic services across the infrastructure through MPLS services. THUS Next-Generation Network (NGN) provides seven classes of services, four of which are current MPLS IP or VPN services. Currently several organizations have been able to implement a large project network of Telco.

- Definition of Next-Generation Network (NGN)-

Next-Generation Network (NGN) is basically a packet-based network that provides telecommunications services, as well as using multiple bandwidth and QoS transport. Customers provide various access services through Next-Generation Network (NGN). Next-Generation Network (NGN) performs control by providing call or session carrying capacity and application service. Next-Generation Network (NGN) has been providing end to end QoS broadband capability services. For this, service providers have limited access to customers. Its special service is to maintain security and privacy.

- Next-Generation Network (NGN) System Architecture-

This system architecture level of Next-Generation Network (NGN) is divided into four levels.

- Service Management
- Network Control
- Core Switch
- Edge Access

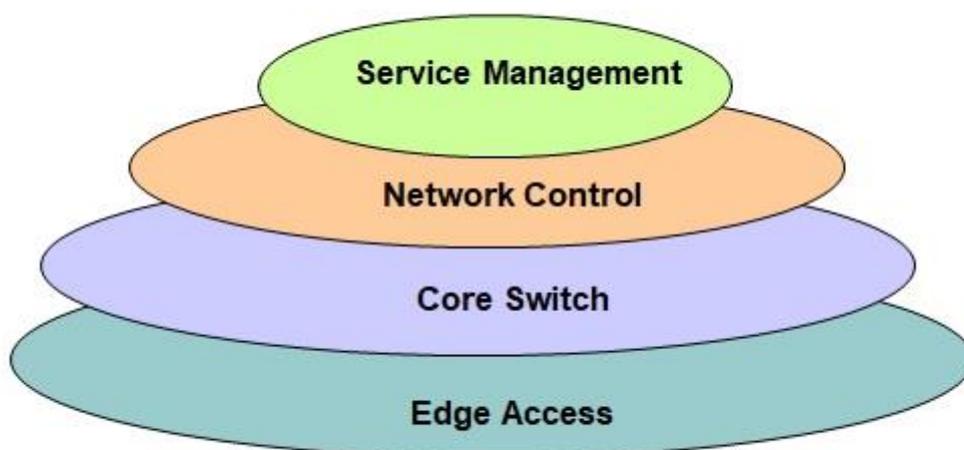


Figure 3.1.9: Next-Generation Network (NGN) System Architecture

- Next-Generation Network (NGN) adopts layers architecture, system are often divided into four layers, Edge access, Core switching, Network control, Service management.
 - Edge Access: Connecting subscribers and terminals to the network. Converting the format of data before transmission.
 - Core Switching: The core switching layer consists of devices, like routers and layer-3 switches that are located within the backbone network and within the MAN. It adopts the packet switching technology and provides subscribers with a standard, integrated platform of knowledge transport, which ensures, high reliability, QoS assurance, High capacity.
 - Network Control: The network control layer adopts the software switching or soft-switching technology to achieve: Primary real-time call control, Connection control.
 - Service Management: The service management layer provides value added services and operation support .

- Next-Generation Network (NGN) Network Architecture-

Next-Generation Network (NGN) Next-Generation Network (NGN) is basically a network architecture through which lower latency can be easily managed and automated services provide many easy traffic optimized paths to be configured.

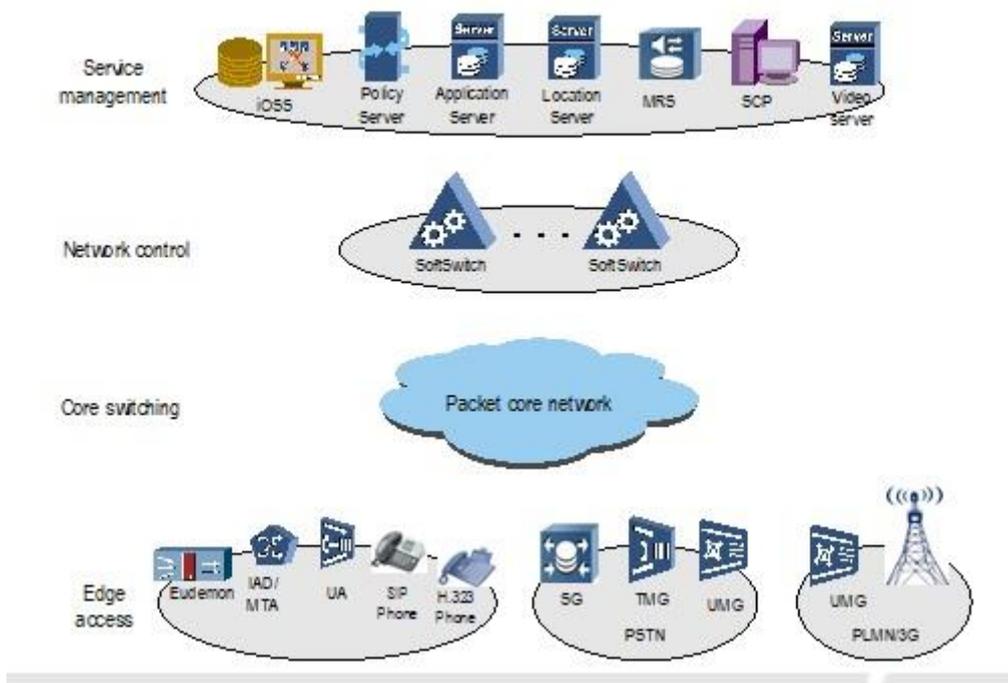


Figure 3.1.9: Next-Generation Network (NGN) Network Architecture

- **Edge Access:** Integrated access device (IAD), Media terminal adapter (MTA), Universal access unit (UA), SIP phone/H.323 phone, signal entryway (SG), Trunk media entryway (TMG), Universal media entryway (UMG).
- **Core change Layer:** The core change layer consists of devices, like routers and layer-3 switches that area unit set within the backbone network and within the MAN. It adopts the packet change technology and provides subscribers with a typical, integrated platform of information transport, that ensures.
- **Network management Layer:** The network management layer adopts the computer code change or soft-switching technology to realize, The soft-switch is that the core device within the NGN.

- Service Management Layer : Integrated operation web (iOSS) ; Policy server; Application server; Location server; Media resource server (MRS) ; Service management purpose (SCP) .
- Next-Generation Network (NGN) - Distributed System Architecture-

The Next-Generation Network (NGN) is an open and distributed network structure in which the service is separated from call control and call control is separated from the bearer. Thus, the service is independent from the network. A group of services can be provided flexibly and rapidly through open protocols and interfaces. Users can customize their own service features irrespective of the network structure and the terminal type of the bearer services.

Two figures in slides, centralized model and distributed model, centralized model like TDM switch, all functional modules integrated in one equipment, but in distributed model, different functional module distributed in different devices. Such as call control module, it is main board in centralized model , but it is soft-switch in Next-Generation Network (NGN) field.

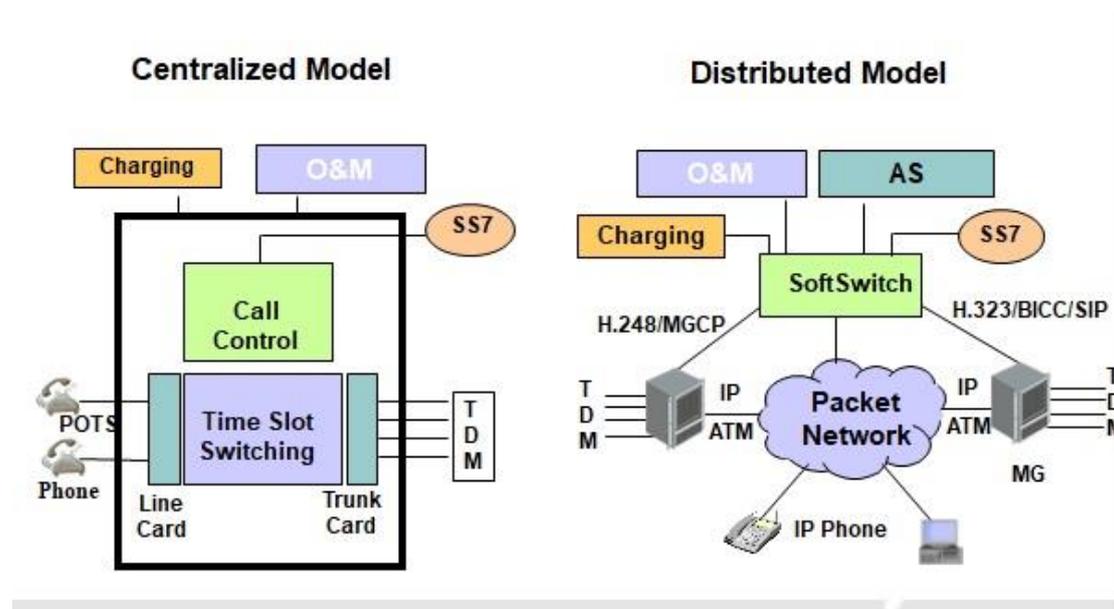


Figure 3.1.9: Next-Generation Network (NGN) - Distributed System Architecture Diagram

- Next-Generation Network (NGN) - Edge Access Layer-

Edge access layer used for access different network, include broadband network ,PSTN, PLMN and 3Gnetwork,all of them can be connected with ip core network.

- IAD : subscribers access in the NGN. It transmits data of the subscriber terminals, voice services and video services to the packet network.
- UA : analog subscriber access, integrated services digital network (ISDN) subscriber access, V5 subscriber access and x digital subscriber line (xDSL) access.
- MTA :is an access device working in Network-Based Call Signaling (NCS) (developed and extended from MGCP). The MTA transmits subscriber data, voice services and video services, and sends them to the IP network through the cable network.

- SIP phone: is a multimedia device working in the Session Initiation Protocol (SIP), such as the SIP VPB220 hardware terminal and SIP Open Eye software terminal of device company.
- H.323 phone: is a multimedia device working in the H.323 protocol, such as the H.323 VPB220 hardware terminal and H.323 OpenEye software terminal of device company.
- UMG : converts the media stream and signaling between formats. It can be used as an SG or a UA. The UMG can connect with devices, such as the PSTN exchange, private branch exchange (PBX), access network devices, network access server (NAS), and base station controller (BSC).

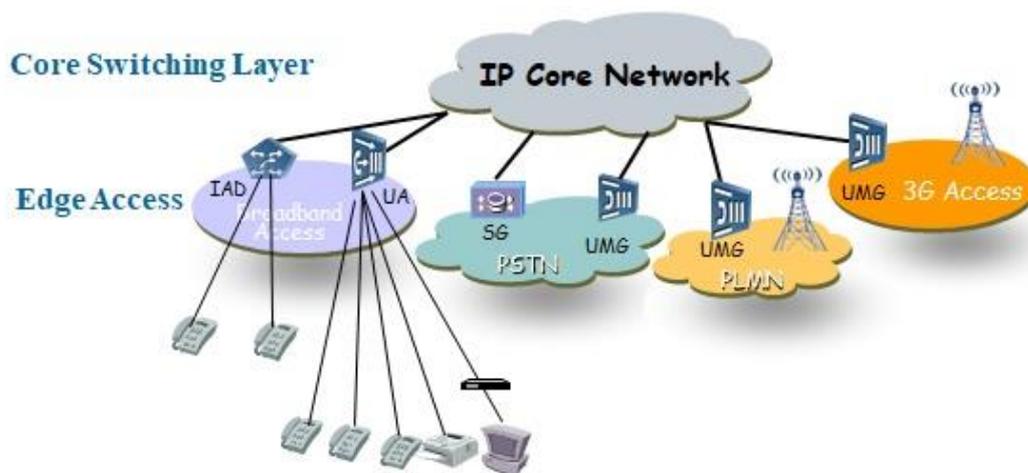


Figure 3.1.9: Next-Generation Network (NGN) - Edge Access Layer Diagram

- Next-Generation Network (NGN) - Control Layer-

The network control layer adopts the software switching or soft-switching technology to achieve: Primary real-time call control; Connection control. The soft-switch is that the core device within the NGN. It provides the subsequent functions: Call control; Media gateway access control; Resource allocation; Protocol processing; Routing; Authentication; Charging; Application Programming Interfaces (API). The soft-switch also provides services such as: Basic voice services Multimedia services. One typical example, the decision from IAD to mobile subscriber, the signaling path will undergo Soft-switch from start point to finish point, therefore the signaling is processed by soft-switch, and therefore the speech path just undergo IP core network. Speech path fixing determined by signaling.

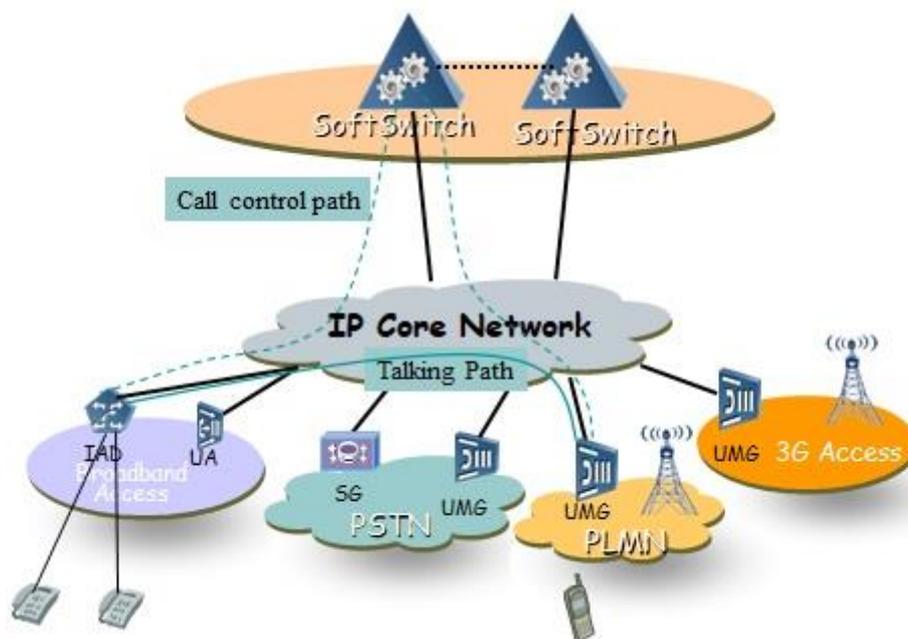


Figure 3.1.9: Next-Generation Network (NGN) - Control Layer Diagram

- Next-Generation Network (NGN) - Service Layer-

The service management layer provides value added services and operation support. The components of the service management layer are:

- iOSS: integrated charging system, network management system which conducts centralized management on the NGN components.
 - Policy server: manages subscriber policies, such as ACL, QoS.
 - Location server: manages the routes between the soft-switches. It indicates the coverage of call destinations and ensures the efficiency of call routing.
 - MRS : processes media streams in the basic and enhanced services. It provides functions of service tone playing, conference service, interactive voice response (IVR), recorded announcement and advanced tone service.
 - SCP : is the core component in the traditional IN, which is used to store subscriber data and service logics. The SCP starts a service logic based on the call events reported from the service switching point (SSP). It then, queries the service database and the subscriber database using the started service logic and sends proper call control instructions. to the SSP on the next action. This helps to realize various intelligent calls, which is the main function of the SCP.
- Characteristics of Next-Generation Network (NGN) -

The Next-Generation Network (NGN) is an open and distributed network structure in which the service is separated from call control and call control is separated from the bearer. Thus, the service is independent from the network. A group of services can be provided flexibly and rapidly through open

protocols and interfaces. Users can customize their own service features irrespective of the network structure and the terminal type of the bearer services.

The network control layer, the soft-switch, employs an open control platform to isolate call control from the media gateways. This layer uses software to provide basic call control functions, including: Call routing, Management control, Signaling interworking, The service providers can customize bearer services, and control protocols on this layer. The network control layer also provides open APIs to help a third party provide services flexibly, quickly and efficiently. With the help of UA, TMG, and SG, the Next-Generation Network (NGN) can interwork with the following types of networks: Public Switched Telephone Network (PSTN), Public land mobile network (PLMN), Third generation (3G) network, IN, Internet, H.323 network. Through this interworking mechanism, the NGN inherits all services from the original networks.

The packet switched core bearer network speeds up the integration of the following networks: Telecom network, Internet, Cable TV network. It also supports a number of services, such as voice, data and video services .And standard protocols make it possible that different devices from different providers are compatible in the same network. So it is very easy to create Next-Generation Network (NGN).

- Contrast between Public Switched Telephone Network (PSTN) and Next-Generation Network (NGN)-

This figure shows the relations for network components between centralized model and distributed model. All centralized model components can be replaced by different devices from Next-Generation Network (NGN).

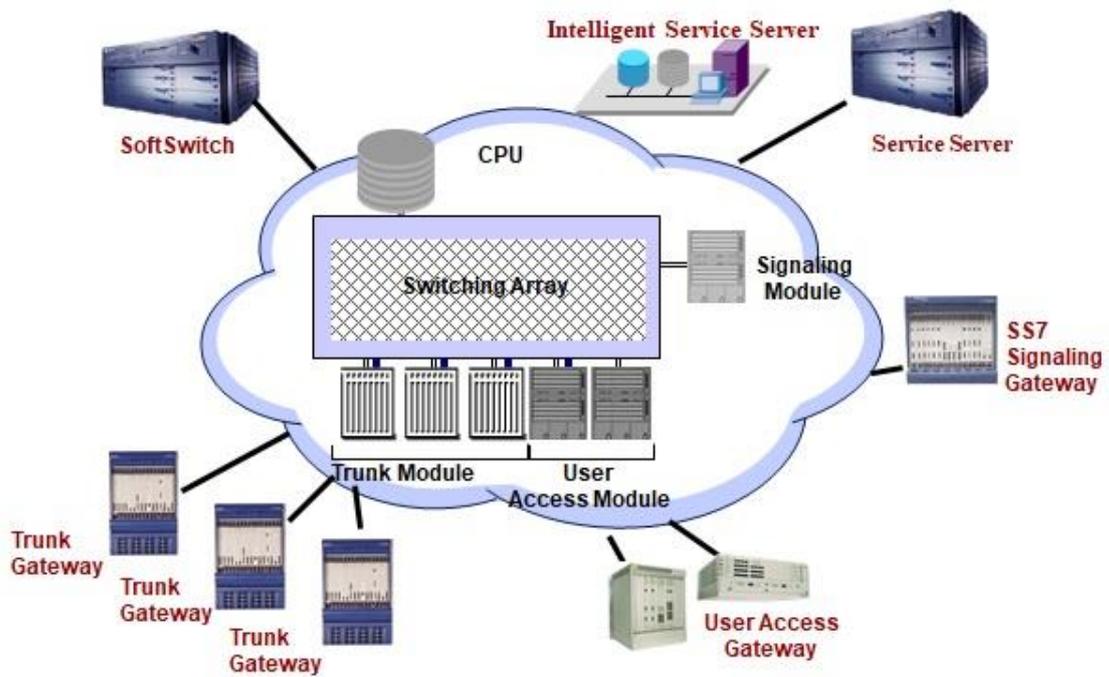


Figure 3.1.9: Public Switched Telephone Network (PSTN) and Next-Generation Network (NGN) Diagram

- Common Protocols in Next-Generation Network (NGN) System-

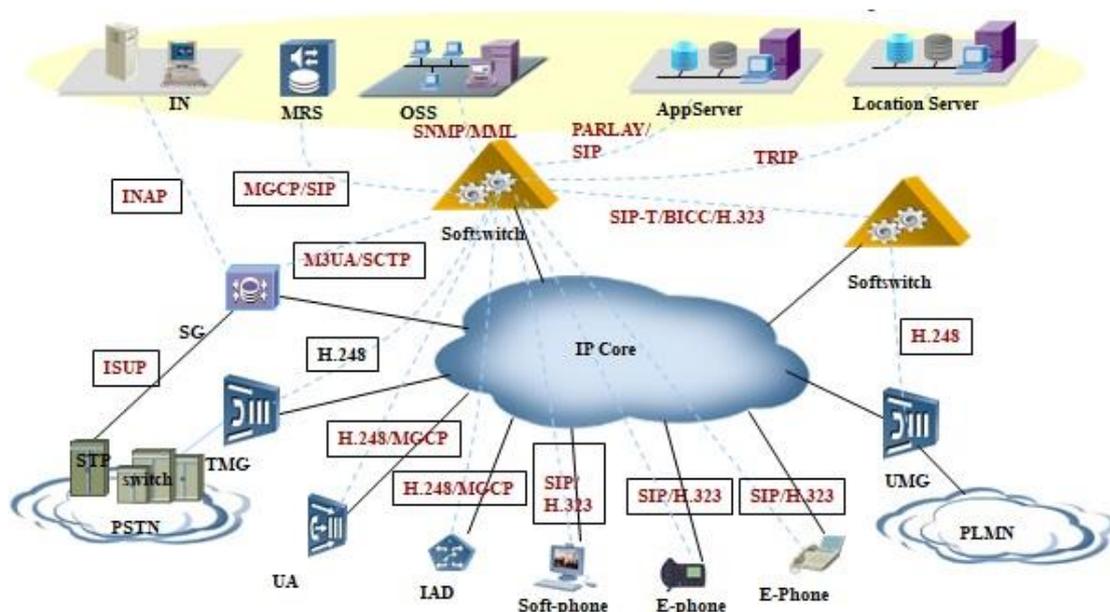


Figure 3.1.9: Common Protocols in Next-Generation Network (NGN) System Diagram

NGN adopts standard protocols, and many protocols used in different connections.

- MGCP: Media gateway control protocol, used for the SoftX3000 to control the media gateways, and connect MGCP packet terminals to the network.
- H248: Media gateway control protocol, used for the SoftX3000 to control the media gateways, and connect H.248 packet terminals to the network.
- SIP: Session initiation protocol, used for the interconnection between the SoftX3000 and other soft-switches or SIP application servers, and to connect SIP multimedia packet terminals to the network.
- H323: IP call and multimedia communication protocol, used for the interconnection between the SoftX3000 and GKs, GWs, or MCUs in

the traditional H.323 network, and to connect H.323 multimedia packet terminals to the network.

- SIP-T: Extension protocol of SIP, used for the transparent transfer of ISUP signaling SNMP, MML used for different servers.

- Commercial Networking Example-

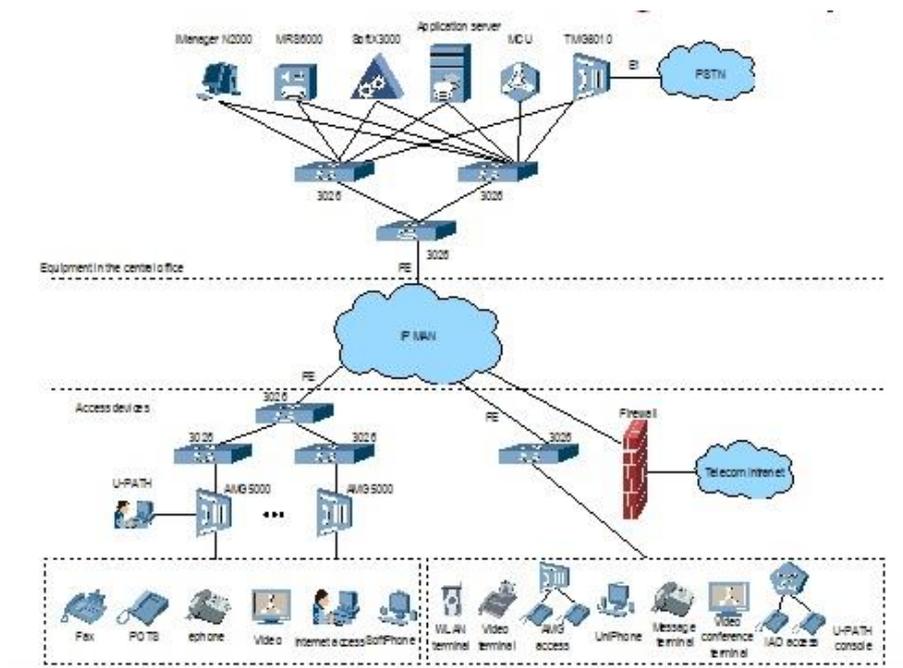


Figure 3.1.9: Commercial Networking Example Diagram

Company D wants to use Huawei U-SYS product series to build a commercial NGN. The NGN uses IP MAN as the core. Without changing the existing PSTN and data network, the NGN provides the integrated access network, with features such as: Advance, Openness, Operability, Manageability, Expansibility, Security.

The commercial NGN of company D is composed of the central office and all kinds of access networks. The central office equipment includes the following:

One SoftX3000, One MRS6000, One iManager N2000, One UMG8900, One video server, Several application servers.

The access equipment includes the following:UA5000, IAD, PSTN telephone, ePhone, Soft phone, WLAN terminal, The networking features of the commercial NGN of company D are as follows: Supports the voice, video, and data converged multimedia services.

The Soft-Switch center controls and provides all the services in the central office. The UMG8900, which has built-in signaling gateway functions, helps to achieve the interworking between NGN and PSTN. Therefore, a physically separate signaling gateway need not be used, and the network construction cost is reduced.

The iManager N2000 is adopted in the network as the integrated network management system. It provides hierarchical access and domain-based access.

- Evolution from Public Switched Telephone Network (PSTN) to Next-Generation Network (NGN)-

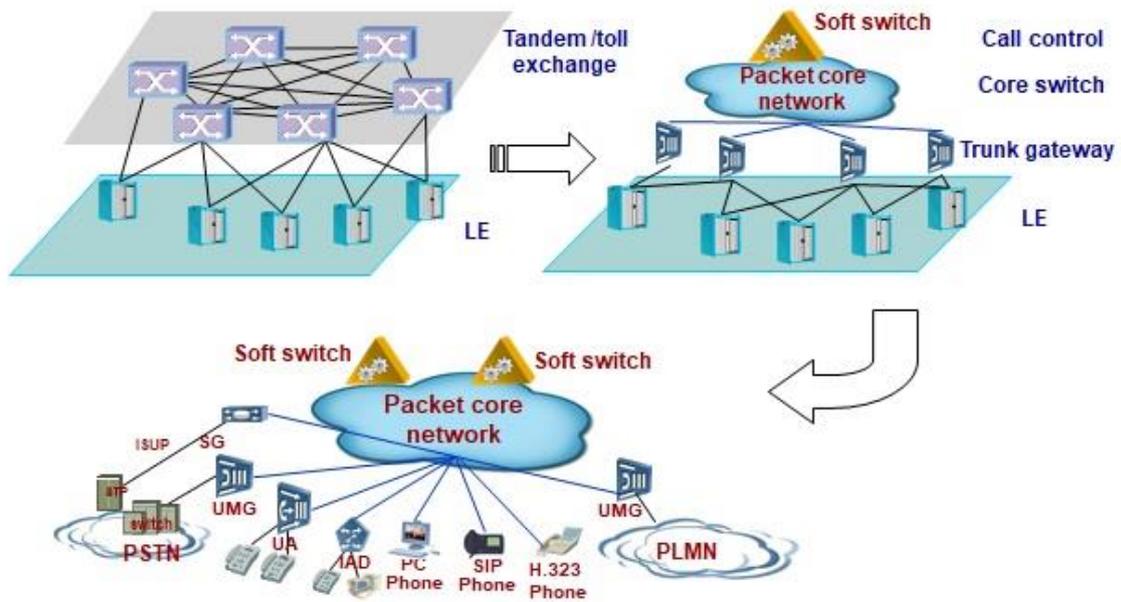


Figure 3.1.9: Evolution from Public Switched Telephone Network (PSTN) to Next-Generation Network (NGN) Diagram

As a gateway of the access layer in the next generation network (NGN), the UMG8900 can serve as an access gateway (AG), a trunk gateway (TG) and a video interworking gateway (VIG). The UMG8900 also supports the embedded signaling gateway (SG) function to provide the signaling adaptation and transfer.

In addition, the UMG8900 can work with a soft-switch to act as a traditional switch in a public switched telephone network (PSTN). Thus, it enables smooth evolution from the PSTN to the NGN.

Step 1:C4 change (Tandem /toll exchange from PSTN change to NGN)

Step 2:C5 change (LE exchange from PSTN change to NGN)

- Next-Generation Network (NGN) Soft-switch based Architecture-

Media Gateway: operate within transport plane, perform all function related to media physical transport between different networks, media processing functions (transcoding, echo cancellation, jitter managing), tones processing and mgt. of information transport

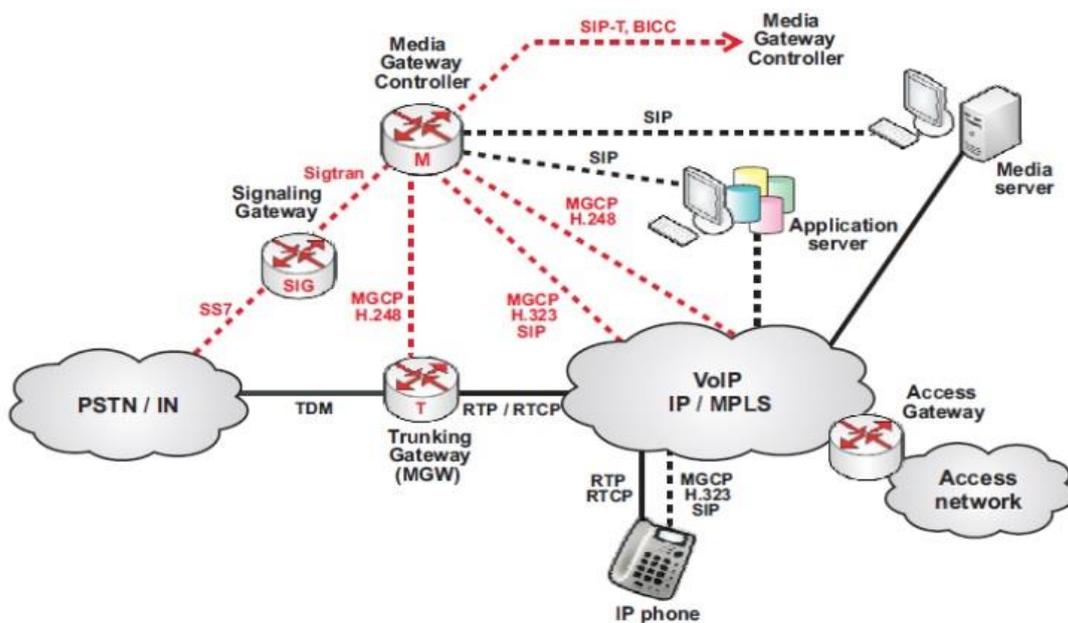


Figure 3.1.9: Next-Generation Network (NGN) Soft-switch based Architecture Diagram

- Access Gateways: Allows the connection of subscriber to the packet network. Convert the traffic flows of analogue access pots or 2 Mb/s access devices into packets.
- Trunking Gateways: Convert TDM circuits/ trunks flows into data packets and vice versa.

- Signalling Gateway: A unit that provides signalling conversion between the NGN and the other networks STP in SS7.

3.2 Events and Activities

I have worked with Bangladesh Telecommunications Company Ltd. (BTCL)'s telephone connection department. I visited Bangladesh Telecommunications Company Ltd. (BTCL)'s switch room and saw how the switch works, how to add a new number to the switch and gained skills and experience. I have seen how the E1, ONU and other networking devices in the switch room work. Bangladesh Telecommunications Company Ltd. (BTCL) officials have been able to gain skills and knowledge on how to provide services to us through telecom services. Bangladesh Telecommunications Company Ltd. (BTCL) employees have also participated in various trainings and office work.

3.3 Project Task and Activities

After joining the internship program at Bangladesh Telecommunications Company Ltd. (BTCL), I started this internship program through Main Distribution Frame (MDF). Through Main Distribution Frame (MDF) I began to gain my practical skills and knowledge. The first month I got the opportunity to work in Main Distribution Frame (MDF) and at the same time was able to gain skills about working in Main Distribution Frame (MDF). Over the next month, I learned about the switch rooms one by one and took part in the switching activities. I got the opportunity to work through the participation of Bangladesh Telecommunications Company Ltd. (BTCL)'s telecom service. Bangladesh Telecommunications Company Ltd. (BTCL) has come to know how many licenses Bangladesh Telecommunications Company Ltd. (BTCL) provides their services through. Through the switch I was able to gain real experience on how to add new numbers as per Bangladesh Telecommunication Regulatory Commission (BTRC) instructions. I have gained skills and knowledge by

participating in various activities of Bangladesh Telecommunications Company Ltd. (BTCL) Main Distribution Frame (MDF) and Switch.

3.4 Challenges

While the Bangladesh Telecommunications Company Ltd. (BTCL) staff and officers are very busy in the office, the Bangladesh Telecommunications Company Ltd. (BTCL) officials have helped me a lot through technology and non-technology during my tenure. Through this internship program I got a sensible idea about the direction of dealing from a telecommunication company. I have faced many challenges through this internship program. At first it was very difficult for me to adapt to this telecommunication company. I started my internship through the activities of Main Distribution Frame (MDF). At that time, adapting to a new environment was very challenging. I have been able to deal with my problems through technology and non-technology. I have been able to finish my internship program at the right time with the right guidance and steps behind the officer under whom I am Bangladesh Telecommunications Company Ltd. (BTCL). The big problem with this internship program was getting acquainted with the operation of the switch system. I have been able to complete my internship work through this internship program of Bangladesh Telecommunications Company Ltd. (BTCL).

CHAPTER 4

COMPETENCIES AND SMART PLAN

4.1 Competencies Earned

If I want to survive in today's job marketplace, I need to develop knowledge and skills. I need to develop my skills in that way by gaining my knowledge and experience about the current job market place. I must have a clear idea of how I will manage my affairs, especially I must have an idea of the decision-making responsibilities and duties. I should do research on skills for management and supervisory rank work. I need to improve my skills in a specific field about the job market by further developing my skills. If I can apply all my skills at the right time and in the right place, I will be able to develop my career. And if I can't complete this skill at the right time and in the right place, I will never be able to develop my career. I have done this internship program considering the current job market and the situation. During my four months internship program, I have tried to gain knowledge, experience and skills on many subjects like telecommunication system, networking and other practical education and have been able to learn something. The present modern world is very advanced only because of this advanced communication system, and computer knowledge and skills are essential to strengthen oneself in the competitive market in this present developed world.

4.2 Smart Plan

I am hopeful that I have been able to acquire practical knowledge and skills through this Bangladesh Telecommunications Company Ltd. (BTCL) internship program which will facilitate and enrich my future career. Now I am analyzing my future career. This internship period of mine at Bangladesh Telecommunications Company Ltd. (BTCL) will enrich my future career in the information and communication sector in the current modern world market. The demand for this advanced modern technology is increasing day by day in our country and all over the world. I have been

able to work with some real things through this Bangladesh Telecommunications Company Ltd. (BTCL) internship program, now I am trying to increase the knowledge and skills that are going on in this internship period and try to practice at the same time. My plan now is to implement it in our country and around the world through knowledge and skills about network engineering.

4.3 Reflections

I have been able to gain a lot of valuable experience, knowledge and skills in the field of telecommunication networking through this Bangladesh Telecommunications Company Ltd. (BTCL) internship program and have helped a lot in enhancing practical work experience and skills in the field of telecommunication networking. At present, telecommunication profession is a smart and dynamic profession in our country and all over the world. I am hopeful that experience, knowledge and skills through this internship program of Bangladesh Telecommunications Company Ltd. (BTCL) will help a lot in the smart job market. Now I know how a telecommunications company operates and how Bangladesh Telecommunications Company Ltd. (BTCL) manages their switch rooms, Main Distribution Frame (MDF) and other networking devices and how to solve problems in real life and at the same time gain experience, knowledge and skills to work with professional executives.

CHAPTER 5

CONCLUSION AND FUTURE CARRIER

5.1 Discussion and Conclusion

This internship program of mine serves as a bridge between theoretical and practical knowledge and experience. Through reviews, I have been able to gain great knowledge and experience during this Bangladesh Telecommunications Company Ltd. (BTCL) internship period. I really enjoyed my Bangladesh Telecommunications Company Ltd. (BTCL) internship program a lot. I am hopeful that this four month internship program of Bangladesh Telecommunications Company Ltd. (BTCL) will help me a lot in developing my career in the job market. Our country is a developing country. The communication sector of our country is developing day by day. The government of our country has undertaken many necessary projects for the development of knowledge and technology in the field of telecommunication and I think more projects will be taken up in the future. Bangladesh Telecommunications Company Ltd. (BTCL) has the potential to become a materials agent through the economic growth of our country. In addition to Bangladesh Telecommunications Company Ltd. (BTCL) telephone services, BTCL has established and provided optical fiber access networking in our country and at the same time has acquired two SEA-ME-WE capabilities to modernize and improve the optical fiber access network. Submarine cable plays an important role in providing increasing service to international traffic, as well as providing satellite services to enable uninterrupted service. The role of Bangladesh Telecommunications Company Ltd. (BTCL) in the field of telecommunication and communication is immense. My internship company Bangladesh Telecommunications Company Ltd. (BTCL) has given me a timely and realistic honest opportunity. I am grateful to Bangladesh Telecommunications Company Ltd. (BTCL) for my internship.

5.2 Scope for Further Career

I have provided a very good clear knowledge and skills in theoretical and practical field through this internship program of Bangladesh Telecommunications Company Ltd. (BTCL). Finding a job in the job market can be very challenging in the true sense of the word if we have no experience of real work in education. Enriches my knowledge and skills through an internship program which makes my career much richer and more beautiful. There are many telecommunication companies in our country. Among these companies, Bangladesh Telecommunications Company Ltd. (BTCL) is the largest and most popular telecommunication company in our country. The main services of Bangladesh Telecommunications Company Ltd. (BTCL) are landline telephone and also BTCL provides a lot of data, internet and optical fiber access networking services in our country. I can get the best opportunity of my career through my job at Bangladesh Telecommunications Company Ltd. (BTCL). I will do my best to succeed in BTCL's next recruitment test. This successful internship program of mine is all about my future career: -

- Working in telecommunication based companies.
- Network Administrator.
- Network Engineer.
- Network Analysis etc.

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