

**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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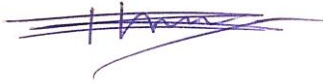


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APPROVAL

This Project/internship titled “Working Process Of Telecommunication Networking Of Bangladesh Telecommunication Company Ltd. (Btcl)”, submitted by Md: Sadakul Islam, ID No: 182-15-11514 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 09/09/2021.

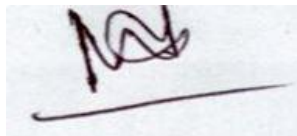
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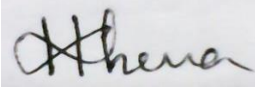
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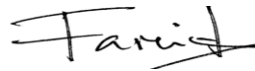
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We hereby declare that, this project has been done by us under the supervision of **Ms. Afsara Tasneem Misha, Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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I also would like to express our heartiest gratitude to **Dr. Touhid Bhuiyan**, Head the Department of CSE for his kind help to finish my Internship and also to other faculty member and staff of CSE department of Daffodil International University .I would like to express special thanks to my parents for their encouragement during all the hard times in my life and my career.

Finally, and especially, I want to express my heartfelt gratitude to Almighty Allah, the beneficent, the magnificent.

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

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Through this internship program, I gained important experience and knowledge about the working environment in the corporate office of my career. The importance of doing internship after graduation is immense. I got the opportunity to do an internship with Bangladesh Telecommunication Limited Company (BTCL) in a reputed government office in Bangladesh. Through the internship, the telecommunication company has gained knowledge about the devices used in the telecommunication industry, the software used and the old and new telecommunication networks. Bangladesh Telecommunication Company Gains Practical and Practical Knowledge of Telephone Distribution Room. Bangladesh Telecommunication Limited has acquired practical and practical knowledge in internet services and various services. Bangladesh Telecommunication Limited has established a new connection in the MDF room. Through this work I have gained experience and knowledge. I have faced many problems while doing all these things. BTCL officials and employees have helped in many ways during these problems. Through this I have gained many skills and experiences which will help me a lot in my real working life. During my internship I have participated in official training with the authorities of BTCL. As a result of taking part in this training I have gained a lot of knowledge as well as experience working in the corporate office. While running this internship program I have had the opportunity to increase my knowledge as well as express my strengths and weaknesses which will help me a lot in my future career development. We are proud to be students at Daffodil International University. Daffodil International University offered me an internship through phase 1 and phase 2 through the BSc program. I have gained a lot of practical experience through this internship that will help me a lot in my work life.

1.2 Motivation

I really like the work process of BTCL. I have learned a lot through internship at BTCL. I have gained practical experience from BTCL. Through this internship I have been able to work with their officers and employees to accelerate my knowledge and gain practical experience working in the corporate branch.

1.3 Objective

The main purpose of my taking this internship is to acquire career skills and to develop myself. Before entering the career, it is important to gather the environmental experience and strategies of the organization. Through this internship I have been able to gain practical skills and experience in managing communication with others and gaining my own skills in other fields. These will play a very important role in my career. My career skills and strategies will play a role in my sense of responsibility and success in my career. This internship helps us to gain knowledge of altitude. This internship increases the chances of a career after graduation. Last but not least, through this internship, the right conduct of corporate life experiences builds skills with communication 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. BTCL is playing a very important role in the economic growth of Bangladesh and there is a strong possibility that it will help the economic growth in the future. Bangladesh telecommunication business is developing rapidly. BTCL with small steps Started and today BTCL is the largest government telecommunication service provider in Bangladesh. BTCL is no longer the main metropolis of Bangladesh but BTCL now has optical fiber access at the upazila and union level of our country. Able to set up network. 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 has corporate and wholesale communication facilities Provides such as internet, television, video conferencing etc. The company has spread its services across the country. Telecommunication has made the human communication system much easier. Its main function is voice pulling and internet to bring people together through. 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 plays a very important role in the economic development of our country. So, I am especially grateful to BTCL.

1.4.1 History of BTCL

Our country's government telephone company and the country's largest telecommunications company is BTCL. BTTB Public Limited Company on July 1, 2006 after Bangladesh Wire and Telephone Board BTTB Company was established after our country gained independence. Was established and renamed BTCL. The total number of employees and officers of Bangladesh Telecommunication Company Limited is 12636. BTCL provides land-line telephone service in our country. Besides, BTCL is domestic and international in our country. With calling and internet services. The Government of Bangladesh issued PSTN licenses to a number of government and non-government organizations in 2004. Bangladesh Telecommunication Company Limited's business has been broken since 2006 because since then Other operators started getting licenses. BTCL or Bangladesh Telecommunications Company Limited is the largest telecommunications company in Bangladesh. The company was founded as the Bangladesh Telegraph & Telephone Board (BTTB) following Bangladesh's independence in 1971. On July 1, 2008 the BTTB became a public limited company and was renamed as BTCL [1]. The Bangladesh government initially owned all BTCL shares, but stated it would sell the shares to the public the following year. The value of BTCL is estimated to be at ₹15,000 crore (₹150 billion). BTCL has a total of 12,636 officials and staff [2]. BTCL provides land-line telephone services in Bangladesh's urban areas, including domestic long-distance calling and international services as well as internet services. In 2004, the Bangladesh Government issued a number of PSTN licenses to private companies, but they were barred from providing services in the lucrative Dhaka market (which accounts for the majority of the nationwide market). The monopoly held by BTCL was broken when other operators started to receive licenses from 2007.

1.4.2 Early history

The Telegraph branch under the Posts and Telegraph Department was created in 1853 in the then British India and was regulated afterwards under the Telegraph Act-1885. The Telegraph branch was reconstructed in 1962 in the then East Pakistan as Pakistan Telegraph and Telephone Department [3].

1.4.3 Post-independence

Following Bangladesh's independence, the Bangladesh Telegraph and Telephone Department was set up under the Ministry of Posts and Telecommunications in 1971. This was converted into a corporate body named 'Telegraph and Telephone Board' by promulgation of Telegraph and Telephone Board Ordinance, 1975. Pursuant to a 1979 ordinance, the Telegraph and Telephone Board was converted into a government board named the Bangladesh Telegraph and Telephone Board (BTTB) [4].

1.4.4 Bangladesh Telecommunications Company Limited

On 1 July 2008, BTTB transformed to a government-owned Public Limited Company under a new name of Bangladesh Telecommunications Company Limited BTCL.[1] BTCL has launched a 24-hour call center for customers. Customers in Dhaka will be able to call the number and reach the BTCL for enquiry, according to a company media release. BTCL runs a red telephone exchange for the VIPs which is secured and always live [5].

1.4.5 Internet services

BTCL provides dial-up Internet access in all 64 districts of the country, making it the most-accessible Internet service provider in the country. As of January 2009, its total dial-up subscriber is 32,433. Since the beginning of 2007 BTCL have improved its Dial-up Internet service for better customer satisfaction. It also handles the .bd domain [6]. BTCL provides consumer-level broadband Internet services under the branding of BCUBE. The service is provided through ADSL2+ technology. BTCL has outsourced its BCUBE sales and customer support to EMEM Systems Ltd, System & Services Ltd (SSL) and Seaview Technologies Ltd. Till now BTCL have got about 15,000 customers. BTCL's monthly income about ৳19,000,000 per month from this service. The state-owned telephony firm will develop a broadband wireless access network across the country soon with Korean help to provide uninterrupted upgraded services to its clients, officials said. Bangladesh Telecommunications Company Limited (BTCL) in cooperation with Korean Economic Development Cooperation Fund (EDCF) will establish the modern network Satellites Bangladesh's first satellite on earth's orbit will have 40 transponders to provide telecommunications and broadcast services. US-based Space Partnership International (SPI) has already started designing the satellite and will also help launch it under a contract signed with the

government. The two ground stations that will control the satellite will be built at Gazipur's Jadavpur and Rangamati's Betunia on the land owned by Bangladesh Telecommunications Company Limited (BTCL). The government plans to have the satellite, named after the Father of the Nation Bangabandhu Sheikh Mujibur Rahman, sent to space by June 2017.

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

BTCL was the Bangladesh Telegraph and Telephone Division before 2008, BTCL was established on 1 July 2006. The Bangladesh government owns all the shares of BTCL but later The Bangladesh government offloaded shares for 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 BTCL.

BTCL Head Office - 3 / E, Eskaton Garden, Telecommunication Building, Dhaka, Bangladesh. BTCL provides dial-up internet access facility in every district of our country. BTCL has transformed into the highest internet access service provider in our country. BTCL since 2006. .Bd and .Bangla domain services. BTCL Board of Directors Members Chairman Telecommunication Secretary, 3 Joint Secretaries of the Ministry of Information and Telecommunication, One Brigadier General of Bangladesh Army, FBCCI President, Chartered Accountant, President of the Institute, Dr. Zafar Iqbal, eminent writer and scientist of our country, Chairman, Managing Director and Board Member of BTCL.



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

2.2 Product and Market Situation

Notable product services of Bangladesh Telecommunications Company Ltd. (BTCL) [7]:

- International Gateway (IGW) Services-
IGW Transit ISP provides international internet service through internet connection service. Existing international line management in these IGW services, Proxy and filtering. BTCL provides international voice traffic guru acceptance and transmission services through the switching system. The IGW service is theirs through an assistant license from the BTRC running commercial activities.
- Interconnection Exchange (ICX) Services –
Provides interconnection, monitoring, ELI and roaming number services within the telecommunication network through ICX service. BTRC to set up two POIs for ICX Allowed.
- 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
- Nationwide Telecommunication Transmission Network (NTTN) Operators-
The government of our country is providing transmit network services through NTTN. BTCL is the largest transmit network in our country. The PGCB has ensured the network of high school colleges and universities BTCL as well as additional transmit network services.
- International Terrestrial Cable (ITC) Services-
The Government of Bangladesh provides submarine cable services through ITC. To provide internet service in our country, the government has two submarine cables all over the world Has been able to connect to the Internet.smw4 has installed 1600 km of optical

fiber and its landing station is at Cox's Bazar. smw5 20,000 thousand kilometers optical Fiber has set up its landing port at Mongla.

- SEA-ME-WE-4 (SMW4)
- SEA-ME-WE-5 (SMW5)
- Public Switched Telephone Network (PSTN) Operator-
PSTN is primarily operated by telephone operators. PSTN acts as a node to communicate to the network through point-to-point communication, besides no PSTN uses dial-up Internet access services for everyone connected to the Internet.
- Satellite Communication-
Satellite is basically an artificial, satellite transfer that relays and calms telecommunication signals. Satellite communicates with transmitters and receivers on Earth or Has been providing communication channel services. Satellite services are being used for important purposes like television, telephone, radio, internet etc. At present 1364 contacts. There are artificial satellites, which are used by organizations for both public and private services. The main purpose of the satellite is to allow communication between different geographical points. Providing and transmitting signals around the earth and these signals use artificial satellite radio and microwave frequencies of communication.
- Nationwide – ISP
Through Nationwide-ISP, BTCL provides nationwide-ISP services to connect Bangladesh with the rest of the world. BTCL provides high-bandwidth services through a network for Internet services in our country's corporate offices, corporate businesses and homes.
- .bd and. Domain Services-
. 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 special service is to receive the service by typing the address of the specified website in Bangla.

It is possible to use Bangla language in international cyber services and through this people will be able to know about our Bengali language, at the same time to know our country better. Will get a chance. Cyber services will increase the use and knowledge of Bangla language.

2.3 Target Group

Every organization has a target and moves forward with that target. Every organization has to move forward using modern technology, Goals must be met. This is a must have, for any Affiliate, promoting any program. We need to enhance efficiency in all areas of IT service quality infrastructure through advanced information technology. Using all modern technology, BTCL is moving forward with the right initiative. Analog is changing all devices to modern information technology dependent devices. The main objective of BTCL is to develop the people of our country and the people of the country by keeping pace with the developed world through the use of advanced information technology. I support such a realistic modern initiative of 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.

2.5 Organizational Structure

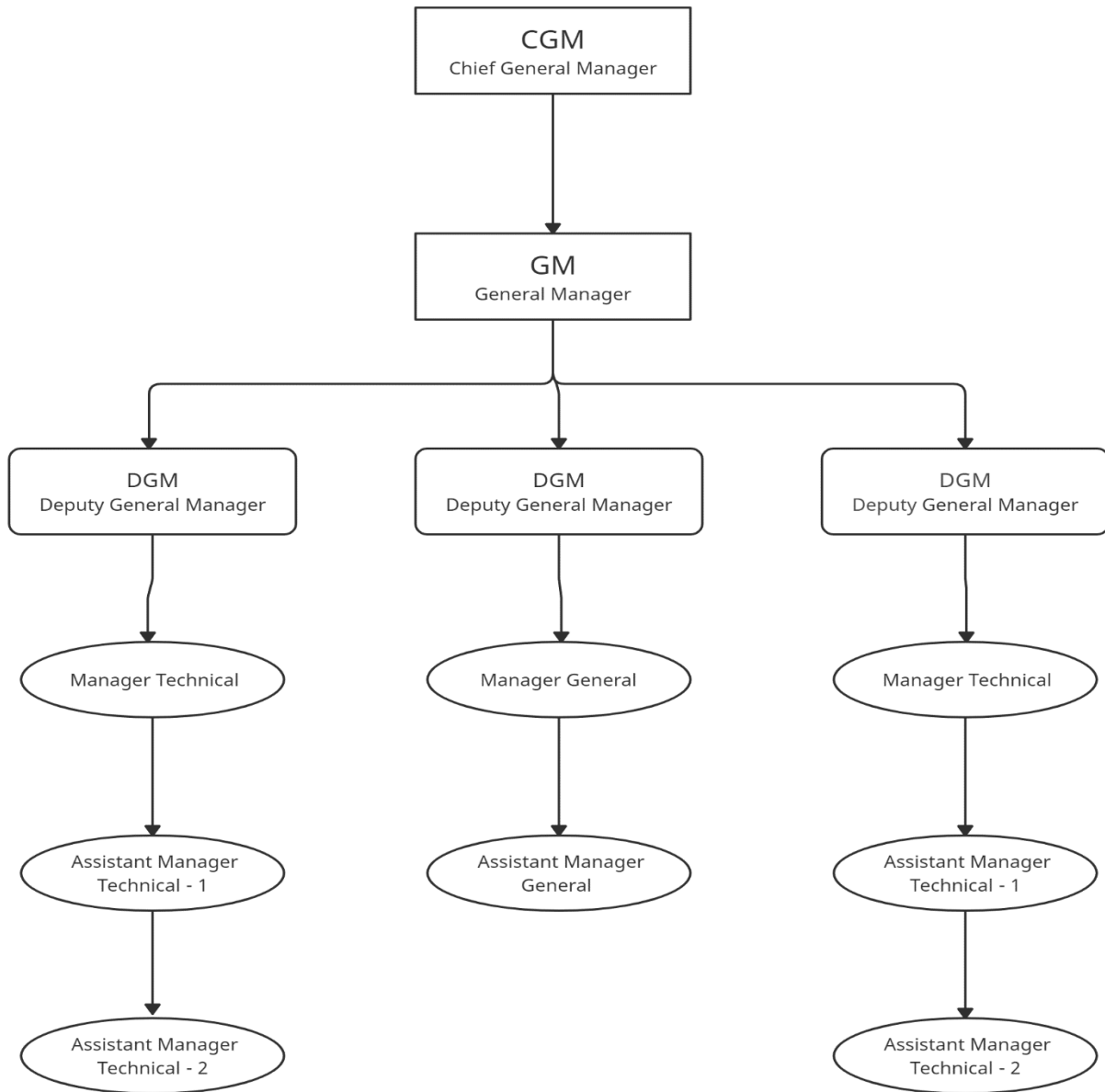


Figure 2.5: Organizational Structure

CHAPTER 3

TASKS, PROJECTS AND ACTIVITIES

3.1 Daily Task and Activities

During the internship of Bangladesh Telecommunication Company Limited I saw the following things and also, I gained practical knowledge and gained practical experience.

- How Bangladesh Telecommunication Company Limited provides our services.
- How the main distribution frame MDF works;
- Main Distribution frame connecting new lines and fixing faulty lines.
- Switch room inspection of Bangladesh Telecommunication Company Limited
 1. soft switch
 2. IP based switch
- Inspection of Power Backup System of Bangladesh Telecommunication Company Limited
- Operate bandwidth internet lines using micritic
- International Internet Gateway IIG
- Nationwide internet service providers ISP
- Domain service
- Telecom service

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 [8].

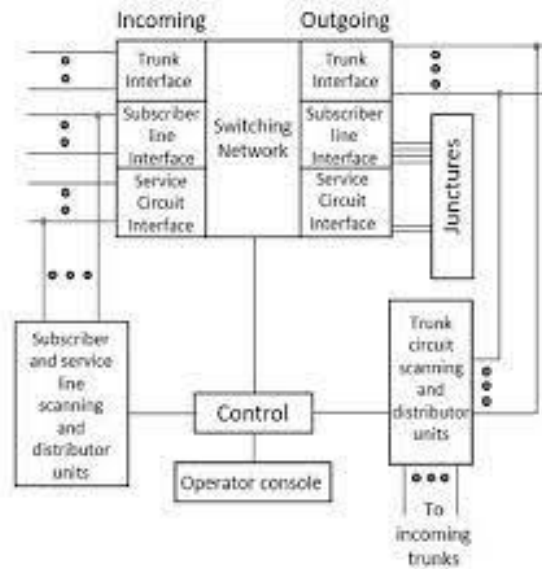


Figure 3.1.2: Switching System

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 –
 1. Subscriber Loop Signaling.
 2. Interexchange Signaling.
 3. 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.

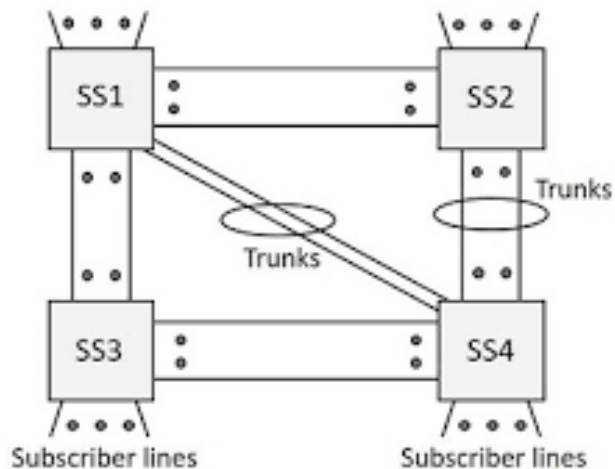


Figure 3.1.3: Telecommunication Network

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.

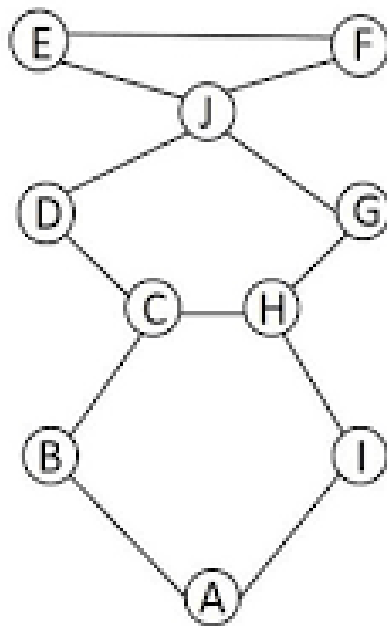


Figure 3.1.7: Multi-Exchange Network

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.

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 [9].

- 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 band width 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

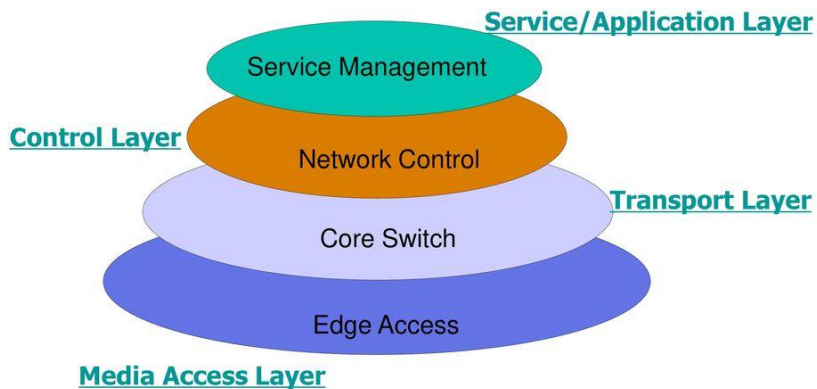
to end QoS broadband capability services. For this, service providers have limited access to customers. Its special service is to maintain security and privacy.

- 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

NGN Hierarchical Architecture



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Figure 3.1.9(a): 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.

Functions for different layer:

- **Edge access:** Subscribers and terminals are connected to the network. Until delivery information is converted into a different format.
 - **Core switching:** The core switching layer is made up of equipment in the backbone network and the MAN, such as routers and layer-3 switches. It uses packet switching technologies to provide subscribers with a common, interconnected data transport network that ensures high reliability, quality of service assurance, and capacity.
 - **Network control:** To gain primary real-time call control and link control, the network control layer uses software switching or soft switching technologies.
 - **Service management:** The value-added facilities and operation support are provided by the service management layer.
-
- **Next-Generation Network (NGN) Network Architecture-**
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 [10].

NGN Network Architecture

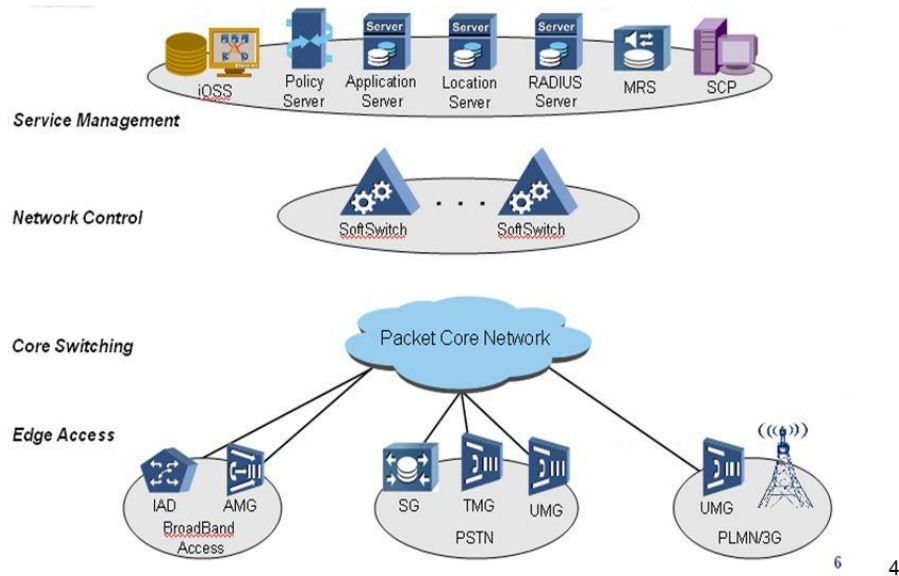


Figure3.1.9(b): Next-Generation Network (NGN) Network Architecture

- 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 are 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).

- **Edge access:**
 - Integrated access device (IAD)
 - Media terminal adapter (MTA)
 - Universal access unit (UA)
 - SIP phone/H.323 phone
 - Signaling gateway (SG)
 - Trunk media gateway (TMG)
 - Universal media gateway (UMG)

- **Service Management Layer:**
 - Integrated operation support system (iOSS).
 - Policy server.
 - Application server.
 - Location server.
 - Media resource server (MRS).
 - Service control point (SCP).

- **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.

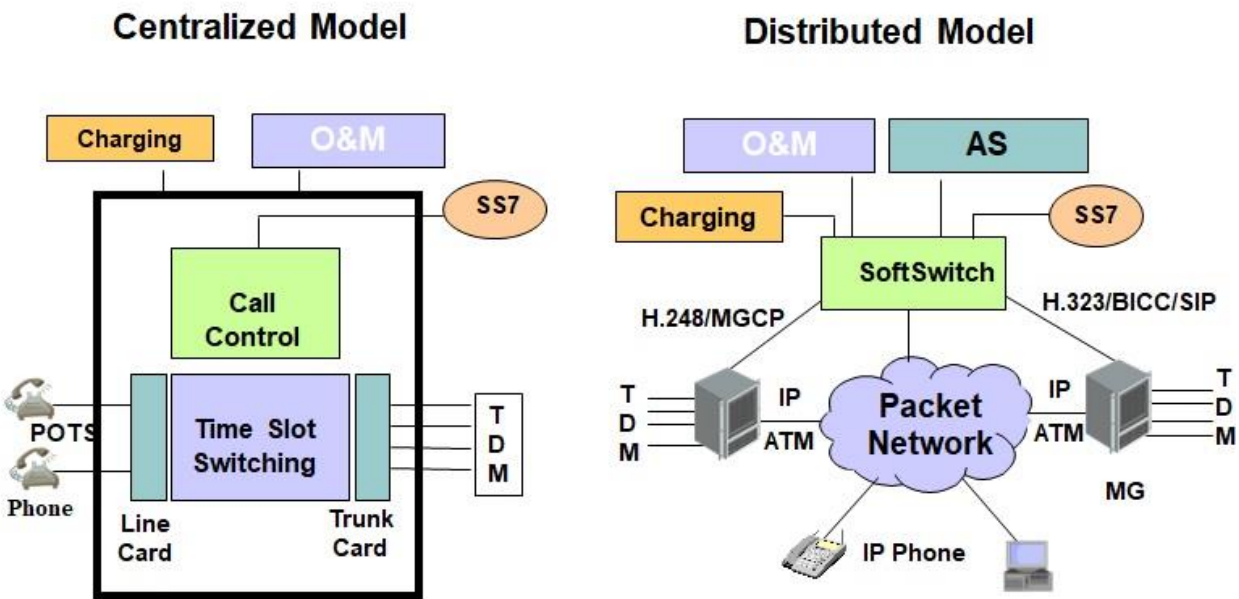


Figure 3.1.9(c): Next-Generation Network (NGN) - Distributed System Architecture Diagram

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

Edge access layer used for access different network, include broadband network, PSTN, PLMN and 3G network, 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: 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.

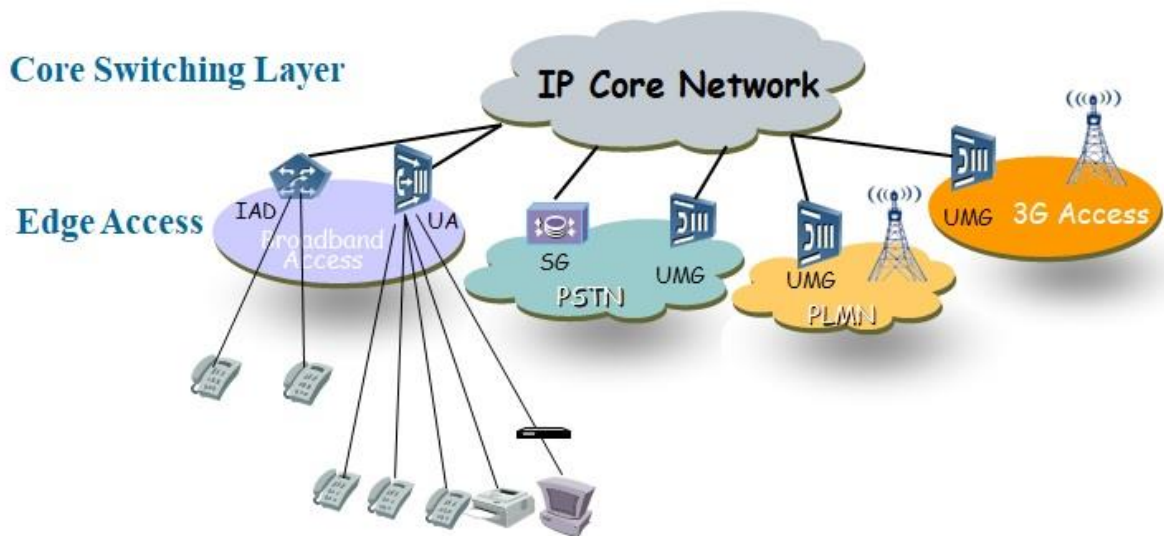


Figure 3.1.9(d): Next-Generation Network (NGN) - Edge Access Layer Diagram

- H.323 phone: is a multimedia device working in the H.323 protocol, such as the H.323 VPB220 hardware terminal and H.323 Open Eye 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).
- **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.

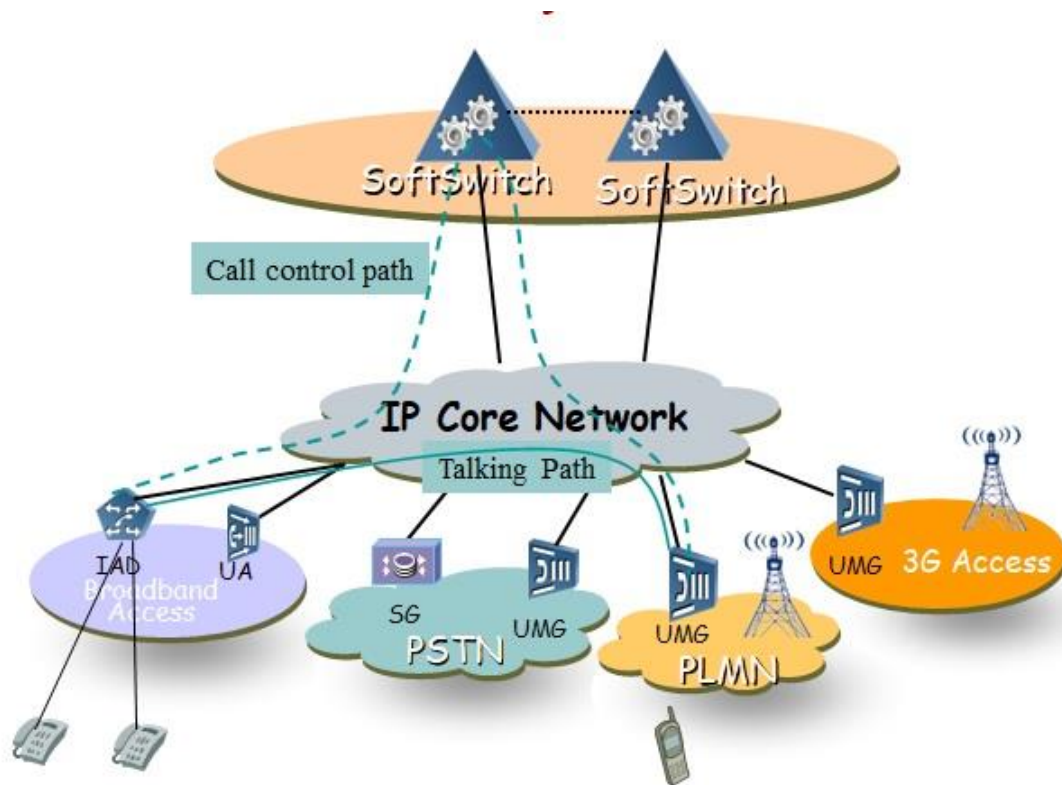


Figure 3.1.9(e): Next-Generation Network (NGN) - Control Layer Diagram

- 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 softs-witches. 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: 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:

- Open and distributed network architecture.
- NGN adopts the hierarchical architecture, which is divided into media access layer, transport layer, control layer and service/application layer.
- Independent network control layer.
- Internetworking and gateways.
- NGN is based on standard protocols and packet switching network.

3.1.10 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).

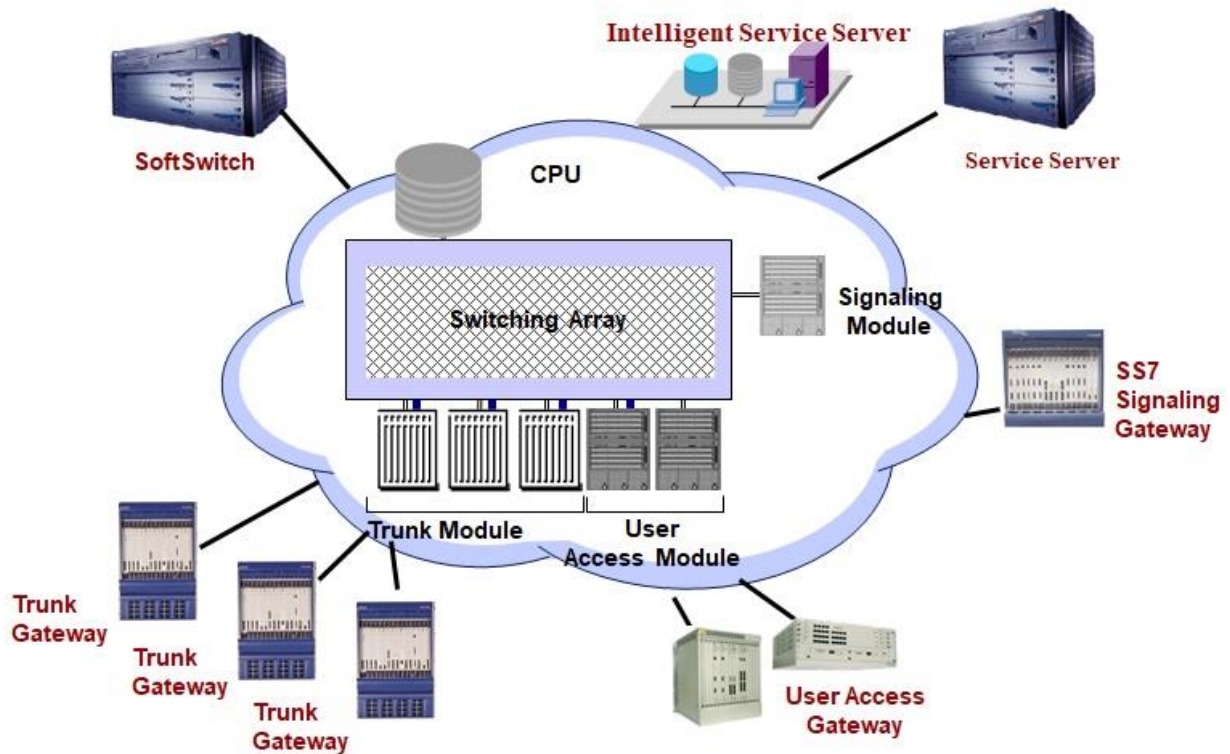


Figure 3.1.10(a): Public Switched Telephone Network (PSTN) and Next-Generation Network (NGN) Diagram

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

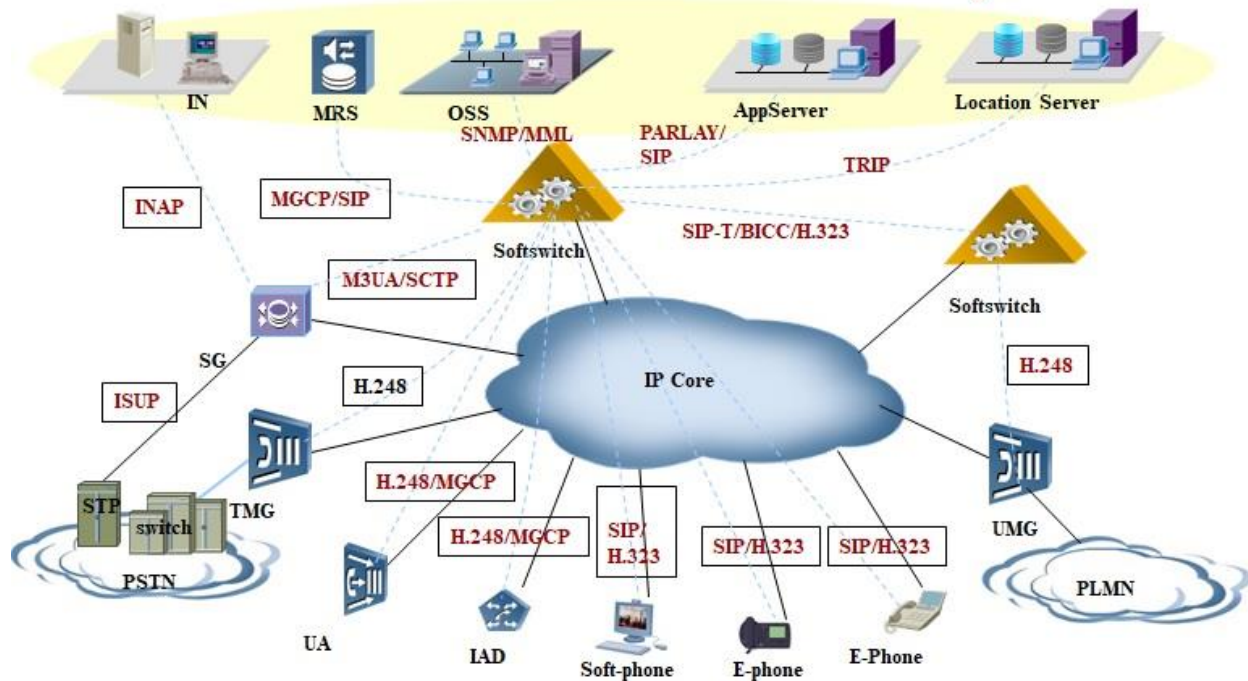


Figure 3.1.10(b): Common Protocols in Next-Generation Network (NGN) System Diagram

- **NGN Soft switch based Architecture-**

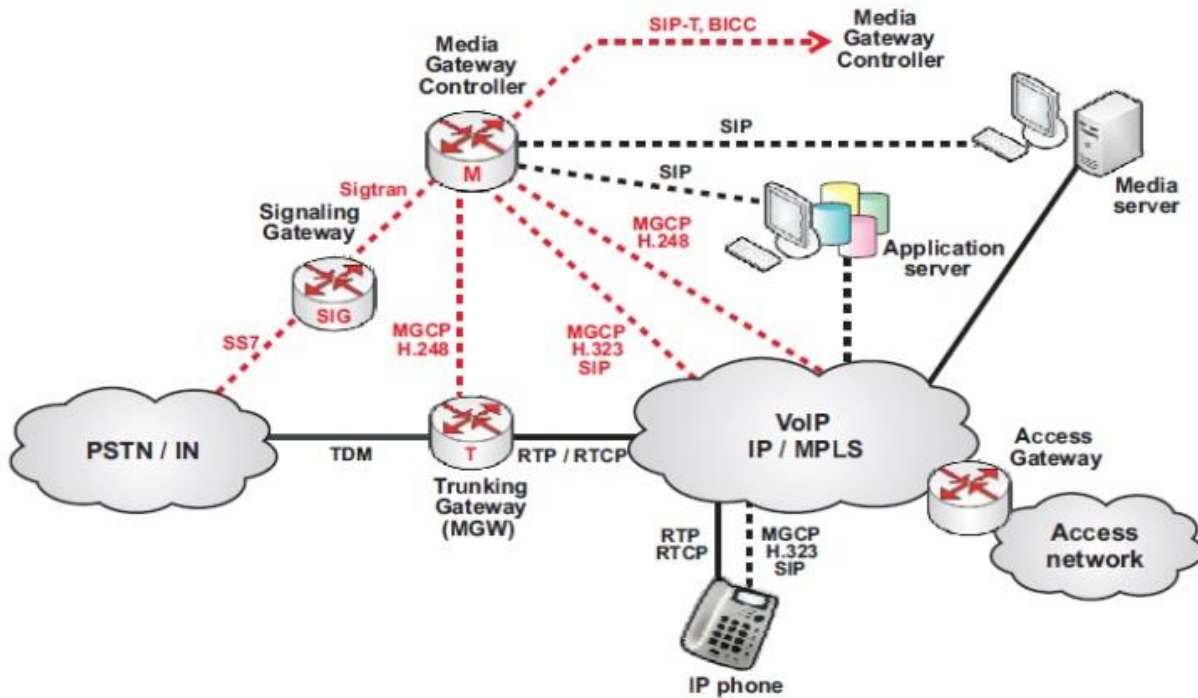


Figure 3.1.10(c): Components of Soft switch-based Architecture

- **Packet based networks**

- The current trend is to use IP-based networks over multiple transport options (ATM, SDH, WDM, etc.).
- Quality of Service (QoS) guarantees for voice, video, and multimedia in real time must be given by IP-based networks.

- **Access Gateways**

- Requires subscriber lines to be connected to the packet network.
- Converts analogue access (Pots) or 2 Mb/s access interface traffic into packets.
- Access to the NGN network and facilities is given to subscribers.

- **Trunking Gateways**

- Allows traditional TDM telephony networks and packet-based NGN networks to communicate with each other.
- TDM circuits/trunks (64kbps) flows are converted into data packets.

- **Application Server (AS)**
 - A unit that assists in the execution of services, such as controlling Call Servers and NGN special resources (e.g. media server, message server).

- **Soft switch /MGC**
 - Referred to as the Media Gateway Controller or Call Agent (MGC).
 - Inside the network, offers "Service Delivery Access"
 - Call Control and Media Gateway Control (Access and/or Trucking) via H.248 protocol are handled by this individual.
 - For interworking with the PSTN N7 signaling network, performs signaling gateway features or uses a signaling gateway.
 - Connects to Intelligent Network/Applications servers in order to offer the same services as TDM users.

3.1.11 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 Diagram-

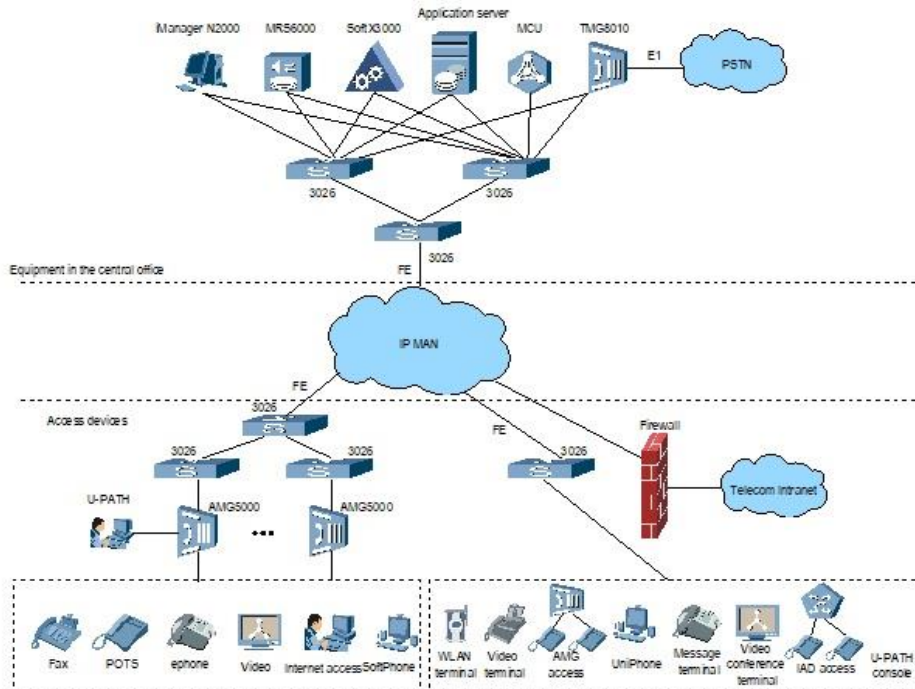


Figure 3.1.11: Commercial Networking Example Diagram

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

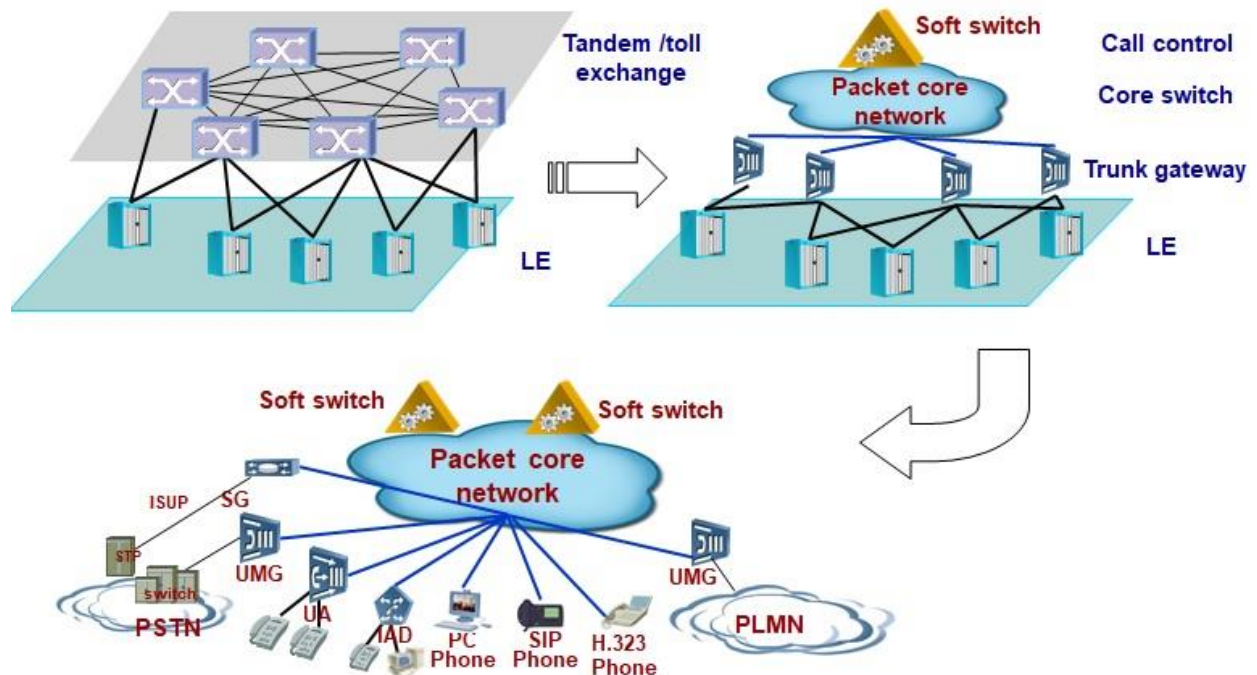


Figure 3.1.12: Evolution from Public Switched Telephone Network (PSTN) to Next Generation Network (NGN) Diagram

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)

3.2 Events and Activities

I have worked with Bangladesh Telecommunication Company Limited BTCL Telephone Connection Division. Due to which I have gained real experience. Simultaneously visited the switch room of BTCL. Has gained real experience on how the switch works and how to connect new numbers to the switch.

Using Microtek, BTCL has gained knowledge about how to provide internet service all over Bangladesh. I have gained detailed knowledge about the use of Micritic by working with officials. We have gained knowledge about how Bangladesh Telecommunication Company Limited provides ISP line service. Participating in various trainings of Bangladesh Telecommunication Company Limited as well as participating in various events of BTCL.

3.3 Project Task and Activities

After joining the internship of Bangladesh Telecommunication Company Limited BTCL, I first started the internship program through the work of Main Distribution frame MDF. By working on the main distribution frame, I began to gain knowledge of usage skills.

In the first month the main distribution frame gets a chance to work on the frame and learn to connect new lines. In the second month I visit the switch rooms and get a basic idea. I gain a lot of knowledge and skills by working in a switching room. In the third month, Bangladesh

Telecommunication Company Limited's Bandwidth Internet ISP visited the service and worked on the use of Micritic.

Through which we can gain knowledge and experience about micritic. Bangladesh Telecommunication Company Limited has got the opportunity to work through the participation of BTCL's telecommunication services. Thanks to the internship of Bangladesh Telecommunication Company Limited BTCL,

I came to know how many licenses Bangladesh Telecommunication Company Limited BTCL provides their services through. Main Distribution Frame MDF Bangladesh Telecommunication Regulatory Commission has gained practical experience on how to add new numbers as per BTRC guidelines. Participated in various activities of Main Distribution Frame MDF and Switching Gained skills and knowledge.

3.4 Challenges

The officers and staff of Bangladesh Telecommunication Company Limited must have been very busy. It was very difficult to do internship there. Moreover, in the current pandemic situation, it was very challenging to go to the office during the covid 19's and work with the officers.

Office officials have helped me a lot in the midst of their busy schedule. I have had to face many challenges many times during my internship. It was very difficult for me to adapt to Bangladesh Telecommunication Company Limited.

At the beginning of the internship Main Distribution frame started my internship through activities in the MDF room. Adapting to a new environment at that time was very challenging. Thanks to the sincerity and cooperation of the officers and officers, I have been able to adapt to the environment very quickly.

I have been able to complete my internship at the right time through the right guidelines and the right steps of the officer under Bangladesh Telecommunication Organization Limited BTCL.

CHAPTER 4

COMPETENCIES AND SMART PLAN

4.1 Introduction

I need to improve my knowledge and skills in order to survive in today's job market. In order to do so, I need to improve my skills by gaining knowledge and experience about the current job market. I need to know exactly what I'm going to do. I need to be able to manage my affairs, and I need to be aware of the decision-making process. responsibilities and responsibilities. I should do some research on management and supervisory skills. By further developing my skills, I need to improve my skills in a specific field related to the job market. If I can put all of my skills to good use at the right time, I'll be able to advance my career if I'm in the right place. And if I can't complete this skill at the appropriate time and in the appropriate location, I'll never be able to advance in my profession.

In light of the present job market and the need for interns, I chose this program. During my four-month internship, I attempted to gain knowledge, experience, and abilities in a variety of disciplines, including telecommunications, networking, and other practical education, and I was able to learn something. Because of this powerful communication system, the current world is extremely advanced, and computer knowledge and abilities are required to succeed. In today's developed world, it's a competitive market.

4.2 Smart Plan

I am optimistic that this Bangladesh Telecommunications Company Ltd. (BTCL) internship program has provided me with practical information and skills that will help me advance in my future profession. Now I'm trying to figure out what I want to do with my life.

Professional life during my internship with Bangladesh Telecommunications Company, I was able to learn a lot about the industry Ltd. (BTCL) will benefit my future information and communication profession. In today's world market, this is a sector. Our country's and the world's demand for this highly modern technology is growing by the day. Through Bangladesh Telecommunications, I've had the opportunity to work on some meaningful projects.

I am currently attempting to enhance the number of interns in the Company Ltd. (BTCL) internship program. Information and abilities that are being developed during this internship term, and strive

to put them into practice as much as possible. A similar time My current objective is to put it into action in our country and around the world. Via network engineering knowledge and skills.

4.3 Reflection

Through this Bangladesh Telecommunications Company Ltd. (BTCL) internship program, I was able to learn a lot of significant experience, information, and skills in the field of telecommunication networking, which has greatly aided in my professional development. In the subject of telecommunication networking, practical work experience and abilities are required. At In today's world, the telecommunications profession is a sophisticated and active one.

Country as well as the rest of the world. I'm hoping that my years of experience, knowledge, and talents will help me succeed. Bangladesh Telecommunications Company Ltd. offers an internship program. Bangladesh Telecommunications Company Ltd. (BTCL) will be quite beneficial in the smart employment market.

Now I understand how a telecoms business works and how Bangladesh Telecommunications Company Ltd. (BTCL) controls its switch rooms and MDF (MDF)and other networking devices, as well as how to address real-world challenges while doing so gain experience, knowledge, and skills to work with experienced executives over time.

CHAPTER 5

CONCLUSION AND FUTURE CAREER

5.1 Conclusions of the Discussion

The challenge of performing research and discovery activities on telecommunications operations, a complex and important aspect of the telecom industry, is massive, competitive, skilled, and laborious, requiring careful observing abilities, fast learning abilities, enhanced analytical skills, and so on. As a result,

I am overjoyed and relieved to have completed and documented my internship experience in a resourceful environment on this highly acclaimed Telecommunication subject. This success was due to the grace of God, the teachings of my esteemed educators from Daffodil International University, the advice of the BTCL Sher-e-Bangla Exchange Switch Division, the support of my family and friends, and, last but not least, my own best efforts and positive hard work. Given my commitment and honesty,

I would be thankful if this internship study on the BTCL Telecommunications System was approved in a strongly optimistic and accepting manner. During my internship, despite the fact that I was given a fantastic learning opportunity. The biggest issue was a lack of time. Another reason was the company's code of ethics, which prevented the staff from providing me with more in-depth detail.

They were constrained by the need to uphold organizational secrecy and confidentiality. It should be noted that the realistic environment of working with any Telecom-based company necessitates that worker be not only familiar with, but also experienced with the technologies used in the organization's online operations.

To meet this requirement, any employee in the Telecom division undergoes rigorous training. I was fortunate enough to receive basic Telecom network operations training from them. And though I only had a limited time to complete my internship, this greatly aid my understanding of networking events.

5.2 Future Career Possibilities

As a student pursuing a highly regarded degree in Computer Science and Engineering, my internship at Bangladesh Telecommunications Company Limited has been extremely enriching and helpful, helping me to participate in important and resourceful practical tasks while putting my theoretical skills to good use. by my favorite educational institute, Daffodil International University's, incredibly talented and well-respected faculty members.

Specially, my honorable supervisor has guided me to overcome any hurdles faced by me on course of my internship. Thereby I feel ostensibly thankful to my respected teachers for providing me with the proper educational background as well as to Bangladesh Telecommunications Company Limited (BTCL) for allowing me provide with the practical field to hone my Telecommunication skills. As a result, I am pleased to consider this internship experience a watershed moment in my journey to become a good practitioner, the foundation stone of which was laid with my degree from my beloved university.

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