Empirical Study on Transmission Network of Gazi Networks Limited (ICX)

By

Md. Zahid Hasan Shashi

ID: 152-19-1799

This Internship Report is presented in partial fulfillment of the requirements of the Degree of Bachelor of Science in Electronics and Telecommunication Engineering

Supervised By

Engr. Md. Zahirul Islam

Assistant Professor

Department of ETE

Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA-1207, BANGLADESH

May, 2018

APPROVAL

This Internship Report Titled "**Empirical Study on Transmission Network of Gazi Network Ltd**" is submitted by Md. Zahid Hasan Shashi to the Department of Electronics & Telecommunication Engineering, Daffodil International University, has been accepted as fit for the partial fulfillment of the condition for the Degree of BSc (Hon's) in Electronics & Telecommunication Engineering & approved as to its style and guts. The Presentation will be held on May, 2018.

BOARD OF EXAMINERS

Md. Taslim Arefin
Associate Professor & Head — Chairman
Department of ETE
Daffodil International University

Dr.Engr.Quamruzzaman
Professor — Internal Examiner
Department of ETE
Daffodil International University

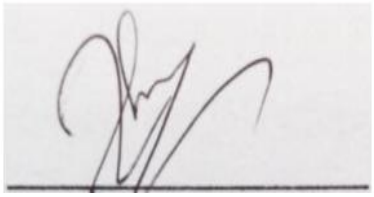
Ms. Shahina Haque
Assistant Professor — Internal Examiner
Department of ETE
Daffodil International University

Dr. Subrata Kumar Aditya — External Examiner
Professor
Department of EEE
University of Dhaka

DECLARATION

I hereby declare that this Internship Report has been done by me under the supervision of **Engr. Md. Zahirul Islam**, Assistant Professor, Department of ETE, Daffodil International University & Gazi Network Ltd. I also declare that neither this report nor any part of it has been submitted away for award of any degree or diploma.

Supervised by



Engr. Md. Zahirul Islam
Assistant Professor
Department of ETE
Daffodil International University

Submitted by

Md.Zahid Hasan Shashi
ID:152-19-1799
Department of ETE
Daffodil International University

ACKNOWLEDGMENTS

At First, I am like to convey my gratitude to the Almighty for charitable me the right path while trying the duty.

The real sprit of achieving a goal is finished the way of quality and austere castigation. I would have never thrived in effecting my task without the teamwork, help and support provided to me by many personalities.

This internship report would not consume been possible without the provision and direction of **Engr. Md. Zahirul Islam, Assistant Professor,** Department of Electronics and Telecommunication Engineering, Daffodil International University, Dhaka, under whose direction I chose this topic.

I would like to rapid my heartiest gratitude to **Md. Taslim Arefin, Associate Professor and Head,** Department of Electronics and Telecommunication Engineering, for his kind help to surface our thesis and also to other faculty participants, the staffs of the ETE Department of Daffodil International University.

I must grant with due esteem the perpetual support and endurance of my family members for final this internship.

Md. Zahid Hasan Shashi

Abstract

It was a great occasion to work under GAZI Networks Ltd. The main resolve of the program was to see the real life state. The moot knowledge is not well plenty to compete with real domain. This internship package was helpful to face the real waged atmosphere. In GAZI Networks Ltd. I have paid a good time in erudition and was satisfied for my best sweats, learnt to deal with different states, had experience of communal working location which affects an employee act and attitude towards labor, had good time in knowledge and performance. I have also collected experience about the turmoil of the trouble times while standard was going through one of its foremost transition phase. Poise, on time decision making, steadiness, hard work, team graft, seeking victory out of dark, origination, creativity, organizational persistence are the key scholarship's out of my work and I would like to say that it resolve be one of my top skill that would remain per mean help me in upcoming which will offer many tasks. I would like to acme this, that my skill with GAZI Networks Ltd was very striking and full of cultures, where I found a lot of helpful changes in my arrogance, learning and performance

TABLE OF CONTENT

List of Figures

Chapter 1

Introduction

1.1 Introduction

Telecom officials blatant an ICX (Interconnection Exchange) based interconnection tenet in 2007 and with that proceeding a new era of interconnection in Bangladesh. The ICX has no subscriber and is not also conventional connected with any external operator. So the movement of IGW's (International Gateway) and ANS's (Access Network Services) is also the traffic of ICX's. With the open data from BTRC and BTTB, it is observed that the total worldwide traffic (both incoming & outgoing) choices from 35 to 45 million paid minutes per day and the entomb operator traffic is about 45 million per day. There is still specific dormant international movement extending from 3 to 4 million which is careful as proscribed movement. With the synchronized effort among the law applying supports, the new IGW and ICX machinists under the guide ranks of BTRC, a considerable volume of barred movement can be moved back to the legal channel. It can be understood that international call will rise much every year due to the subjects like growing numbers of Bangladeshi exiles outside the country. This will also help to improve the domestic tile-density and rise the business actions

1.2 About Gazi Network Ltd

GAZI Networks Limited is the interconnection exchange (ICX) operator licensed by Bangladesh Telecommunications Regulatory Commission (BTRC) for the routing of domestic and international voice traffic to and from ANS & IGW. Gazi Networks Limited will commercially launch in 12-04-2012, now the company is one of the leading ICX operations in Bangladesh. The company has highly skilled, hardworking, professional and talented manpower. The management team has also extensive experience in the telecom sector. GAZI Networks Limited has three exchange. They are located in Dhaka, Khulna, and Bogra .

1.3 Company Profile

Name:	**Gazi Networks Ltd**
Address:	Head Office 25, Segun Bagicha (1st Floor) Dhaka-1000, Bangladesh
Telephone:	+88-01966604567
Email:	**info@gazinetworks.com**
Website:	http://www.gazinetworks.com

1.4 Objective of the Report

The main objectives of this report are as follows:

1. To Identify The Transmission Network Architecture Gazi Net Ltd.
2. To Observe the SDH Network Which is Used In Telecom Mostly.
3. To Identify Different Transmission Protocol
4. Working And Monitoring Alarms In Tejas NMS System

1.5 Summary of the Report

The objective of this Internship is to improve an effective knowledge in Transmission System of Gazi Network. In ***The First chapter,*** I have termed the Details & objective an overall view that I am going to instrument during these internship work and I would describe the background of Gazi Network .

The Second Chapter, mainly discuss about Bangladesh Telecom Network Topology. The structure of Network. Then Network topology designate. Although style of ICX (Interconnection exchange)

The Third chapter is describing, of Transmission System here details of definition, the parameters of data transmission and TDM Transmission and Topology of Transmission. At least style of transmission of IGW and ICX

The Fourth Chapter is Geographical Device Interfaces

The last one is Chapter ***Five*** that is Alarms and ***Chapter six*** Conclusion.

2.1 Structure

As term in the National Telecommunication Law 1998 and test Extended Distance Telecommunication Facility (ILDTS) Policy 2007, all mobile workers is to interconnect through Interconnection Talk (ICX) and international calls to be said by International Door (IGW) which is to be close to the mobile and fixed the hands complete the ICXs.

The Interconnection Exchange (ICX) will receive all calls from the mobile and static operators whenever the call is through to other network and will permit it to the determination network if the call is limited, and will permit to the IGWs the call is international. ICX will also bring calls received from IGWs where the call is designed. Below demonstrate (fig-2.1) the erection of interconnection between different edges.

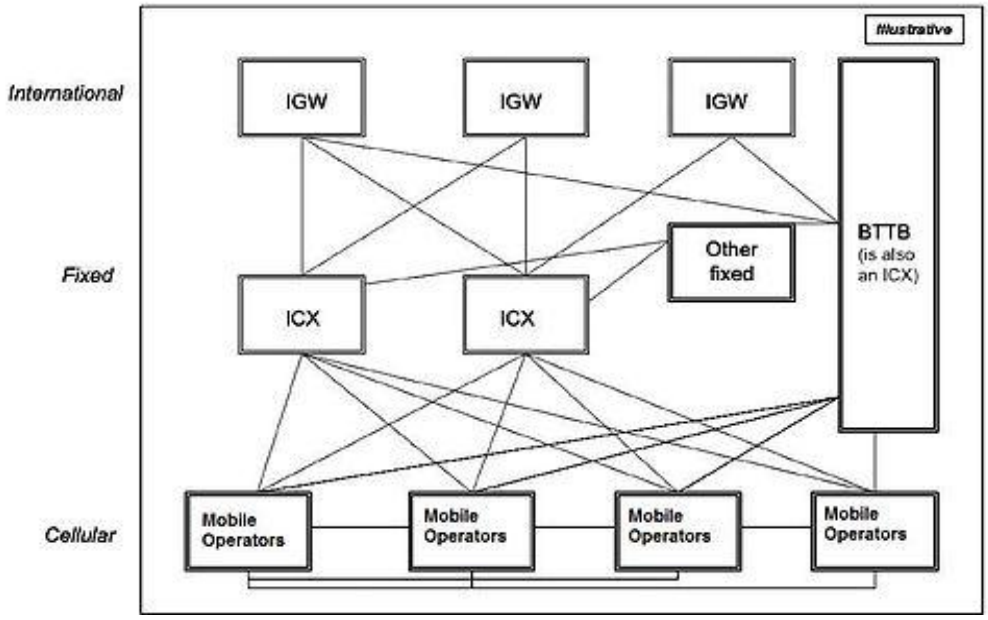


Fig 2.1: The Basic structure of network topology.

2.2 Network topology:

Network construction shall be based on three layers with seemly equipment and technologies subject to alteration as and when mandatory.

- The first layer is IGWs, which will be joined to International Long Distance Cable (ILDC) networks and ICX. IGWs will have satellite earth position or VSAT as backup until substitute ILDC is existing.

- The second layer is the ICX, which will be joined with IGWs and entrance network service (ANS) hands. IPTSPs will be connected to NIX for inter IPTSP for internal voice traffic. International and inter operators internal say traffic will be directed finished ICXs.

- The third Layer is the ANS operators who provide facilities through end users straight. This layer is to endorse the connectivity between the ICX/NIX and the subscribers.

2.3 Interconnection Exchange (ICX):

"Interconnection Exchange (ICX)" is the moving structure which provides interconnection among telecommunication networks of hands and permits monitoring, lawful interception (LI) services and traveling number convenience.

- The number of ICX hands will be strong-minded by the government as per situation of the telecommunication region of Bangladesh.

- Position of the ICXs will mainly be at Dhaka. More ICX will be setup in other locations liberated on traffic volume and to allow further rural people to be joined with the network as and when essential.

- ICXs will have major support connectivity controlled for international setups concluded ILDC network.

- IGWs will have bodily link with ICXs. ICXs will improve and conserve interconnection services to tie the IGWs to ICXs and ICXs to ANS hands via their POPs. Belowhere show the figure Overall Design

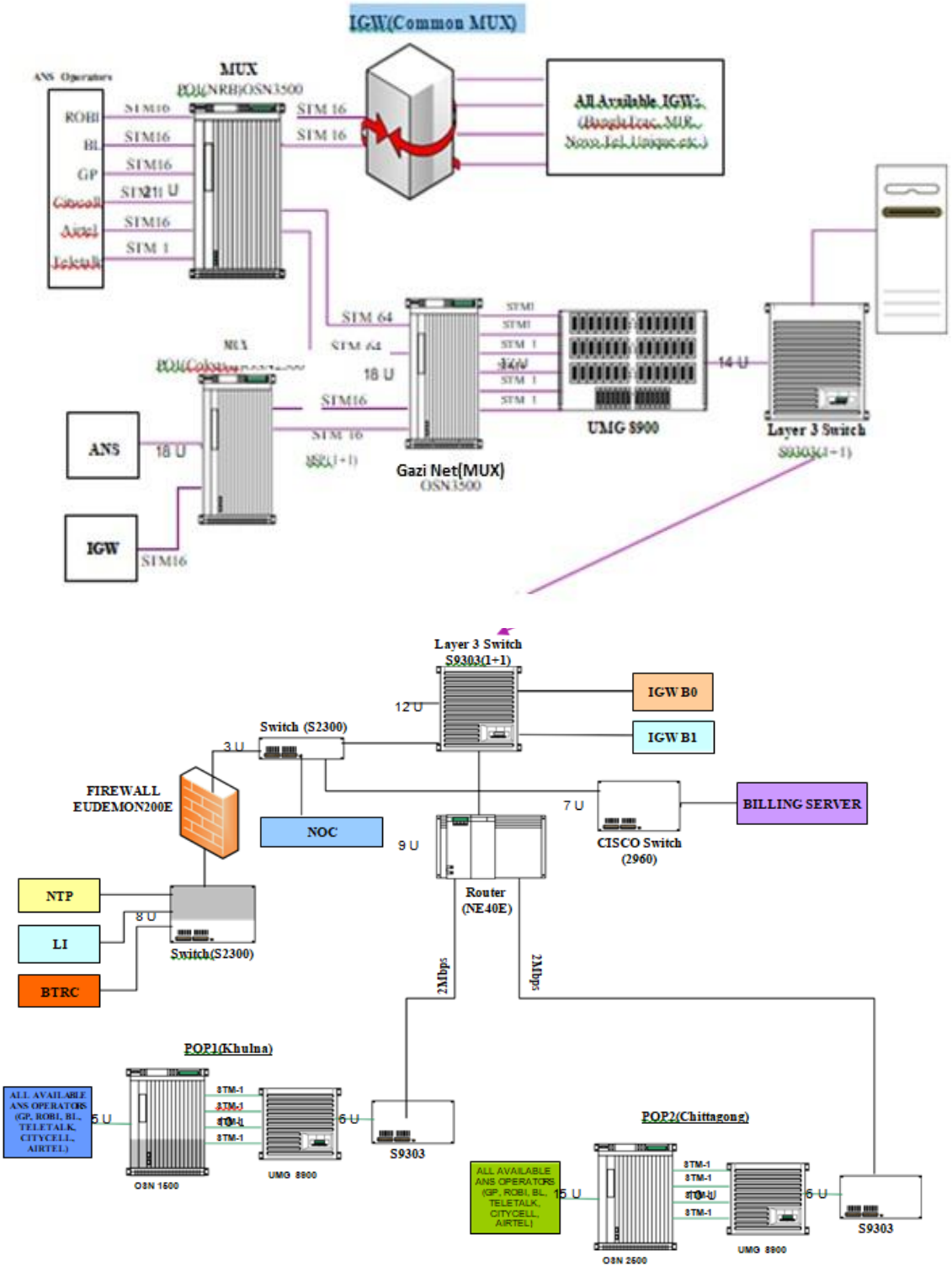


Fig 2.3 Interconnection Exchange

Chapter 3

Transmission of Telecommunication

Definition of transmission in all aspects

3.1 Transmission:

In telecommunications, transmission (Tx) is the process of sending and propagating an equal or digital information sign over a physical steeplechase or point-to- multipoint transmission average, both certain, optical fiber or wireless. [2]– Transmission of a arithmetical message, or of a digitized equivalent signal, is recognized as numerical message.

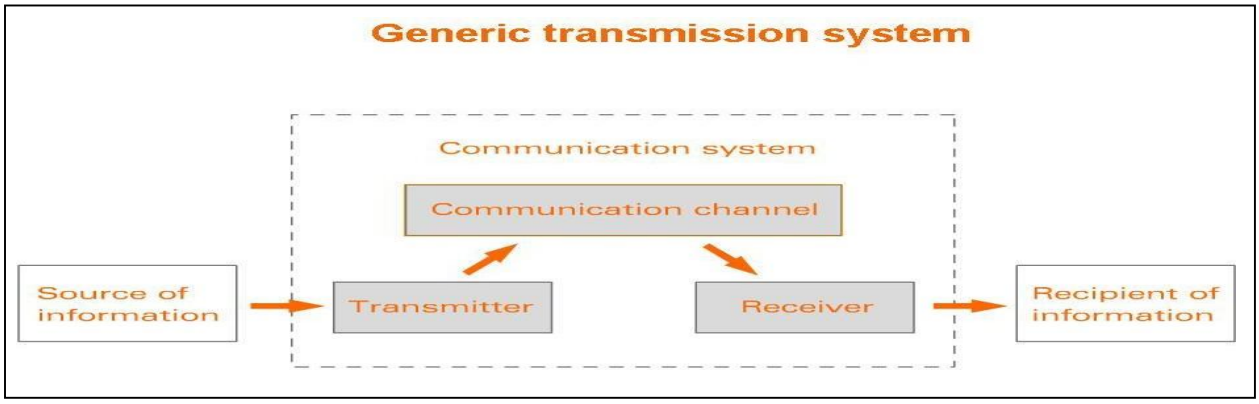


Fig 3.1: Basic Transmission System.

In telecommunications, show (TX) is the way of sending and spreading an equivalent or ordinal info signal over a corporal point-to-point or point-to multipoint diffusion average, either bound, visual fiber or wireless. [2]– Transmission of a arithmetical message, or of a digitized alike sign, is recognized as ordinal communication.

3.2PDH Basics

Before 1970, world's telephony systems were originated on single streak, voice rate, and all influences were over bent copper duo. Throughout early 1970's ordinal broadcast schemes began to seem using Pulse Code Inflection (PCM). PCM allows analogue waveforms such as language to be rehabilitated into a binary arrangement fit for transmission over extended distances via digital schemes. PCM everything by sampling the similarity signal at regular breaks, assigning another value to the example and then conveying this worth as a binary river. This procedure is still in use today and procedures the root of almost all the transmission schemes that we presently use.

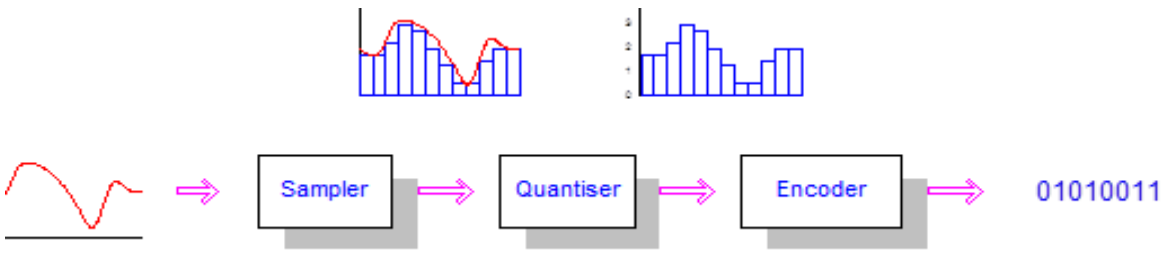


Fig 3.2: Basic PDH

3.3 PDH Networks

PDH signal is organized in such a way that, it is terrible to excerpt a single 2 Mbit/s signal from inside a higher order (say 140 Mbit/s) torrent. In order to irritated connect 2 Mbit/s signal among one transmission organization and another, it must be de-multiplexed back unhappy to its main rate first. This procedures a multiplexer crag.

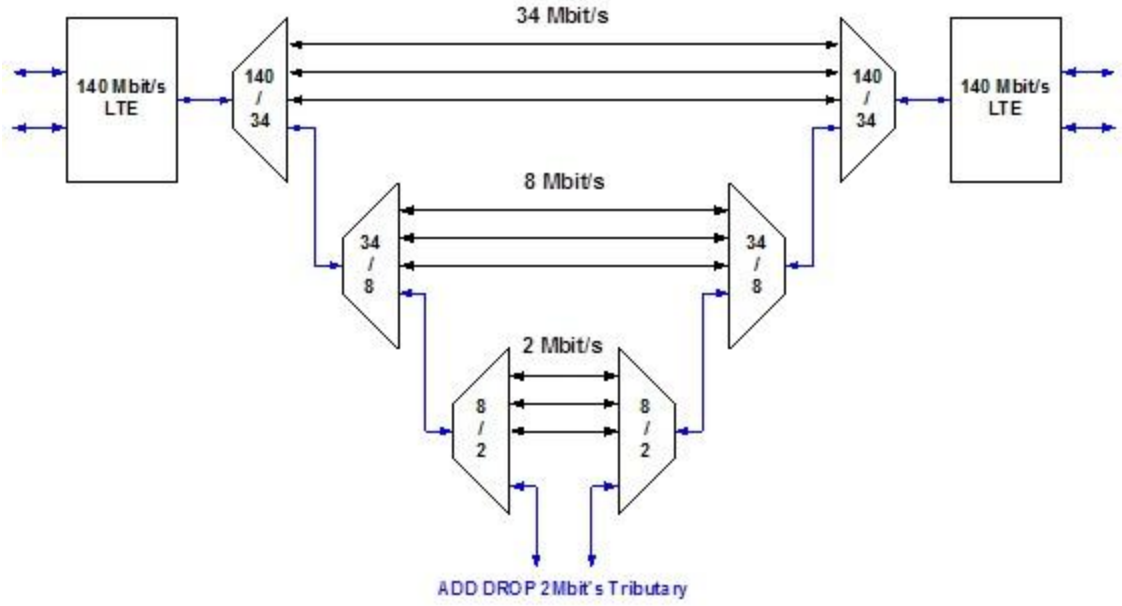


Fig 3.3: PDH Network

More usable space & control is taken up in stands in node sites by these gear mountain & cause extra maintenance-associated snags. Paraphernalia in different ranked levels synchronized from a varied source and at a disparate rate, which may lead to clocking glitches that can reason errors For a simple 2 Meg sign, jumping wants to be done at all heights, that brand up the separate programmer system. This clues to large totals of bodily bulky wheedle wiring. Effective use of bandwidth is attained in PDH due to the detail that, it is input small above. But this bounds the organization aptitude of PDH. Involuntary storage of route info is not available which leads to

the obligation of precise paper annals to avoid glitches. It is not likely to remotely arrange gear and the fear nursing is only incomplete to journalism loss of efforts.

Guard of the programmer paths is normally using 1+1 guard and existing at the higher PDH levels i.e.140 Mbit/s and overhead only.

3.4 Summary of PDH Limitations

Interconnection amongst different nationwide schemes were difficult (European/North American). Clocking in dissimilar hierarchy levels are complete separately, so slips likely. Multiplexer mountain' is expensive and stubborn. Imperfect running functionality. Path Defense obtainable at advanced rates only. While likening to today' values, more Disposed to to liabilities. All these schemes works acceptable in a stand-alone ladder. But it does brand global inter-connection very problematic and expensive. This was the main reason for the growth of a new globally agreed normal.

Origin of SDH

As gotten from the previous post about PDH, PDH is a practical but faulty scheme. At the start it was the best available technology and was a vast leap forward in telecom broadcast, As a end of development in the field of silicon fries and combined microchips, client request soon delivered the need to current a new and better system. & it was predictable to resolve the current bounds of PDH. As a next stage, Bell core obtainable SYNTRAN (Synchronous Transmission) system. However this was only a evolution system. Soon it was relieved with SONET (Synchronous Optical Network).Initially SONET might only carry the ANSI (American National Standards Organization) bit tolls i.e. 1.5, 6, 45 Mbit/s. Goal of the outline was to deliver easier total interconnection, Hence, SONET was modified to carry the European usual bit rates of 2, 8, 34 &

140Mbit/s. In 1989 the ITU-T (International Telecommunications Combination - Telecommunication's tuning section), published references which roofed the values for SDH. These stood accepted in North America by ANSI (SONET is now supposed of as a subset of SDH), creation SDH a truly global normal

3.5 Overview

The SDH regular defines a amount of 'Containers' each compliant to an current PDH input rate. Material from the external PDH signal is situated into the pertinent bottle. Each flask then has some director material known as the 'Path Overhead' (POH) and padding bits added to it. The path above bytes allow the scheme worker to attain end to end treatment of areas such as error symbol, alarm sign and presentation nursing data. The ampule and the trail above calm form a 'Virtual Container' (VC). Due to clock phase vicissitudes, the start of the clients' PDH data might not accord with the jump of the SDH edge. Documentation of the jerk of the PDH data is attained by count a 'Pointer'. The VC and its relevant cane cool form a 'Tributary Unit' (TU) Branch units are then multiplexed together in stages (Tributary User Group 2(TUG-2) - Tributary User Group 3 (TUG-3) - Virtual Container 4 (VC-4)), to form an Executive Unit 4 (AU-4). Extra stuffing, canes and costs are added thru this procedure. This AU-4 in effect covers 63 x 2 Mbit/s channels and all the control info that is required. Finally, Section Expenses (SOH) are added to the AU-4.These SOH's cover the control bytes for the STM-1 unit including of inclosing, section exhibition monitoring, keep and operational switch info. An AU-4 plus its SOH's calm form and STM-1 passage edge.

3.6 Graphical SDH Multiplexer Structure

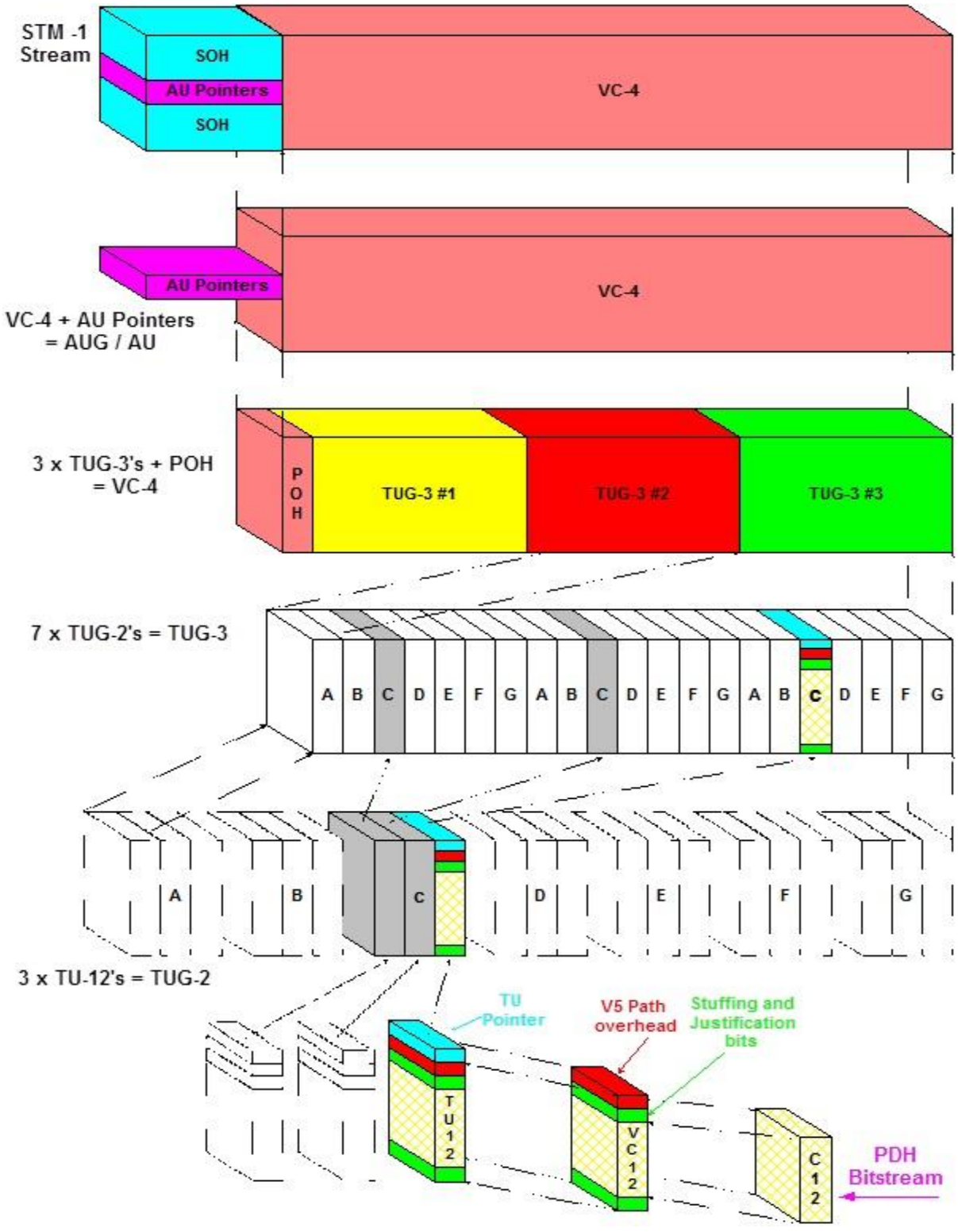


Fig 3.6: Graphical SDH Multiplexer Structure

3.7 Full SDH Multiplexer Structure

Drawing below complaints full SDH Multiplexing building. PDH signs enter on the precise into the relevant container and development crossways to the left finished the many procedures to procedure the STM edge.

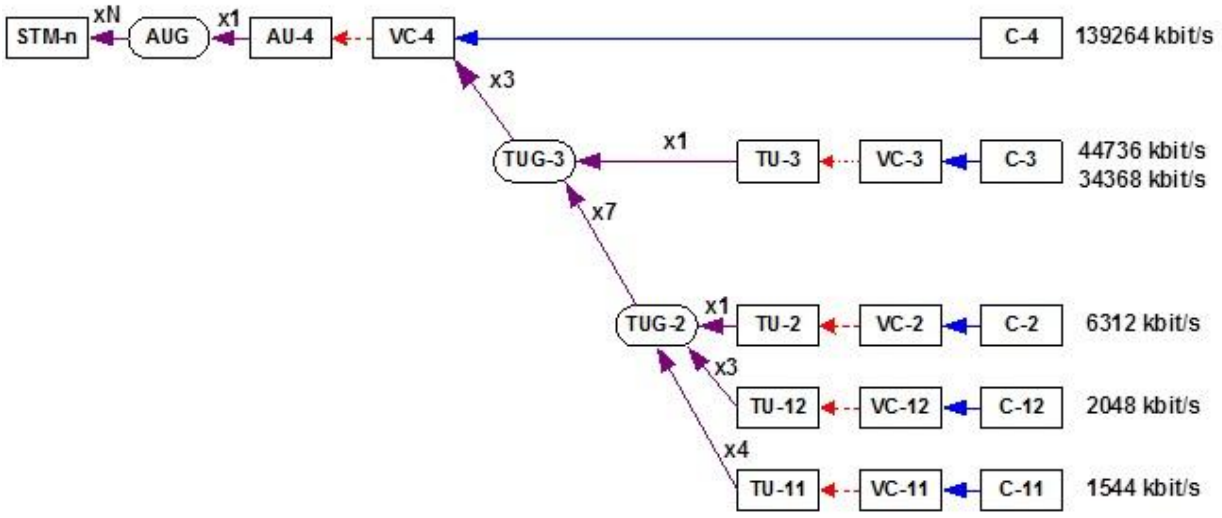


Fig 3.7: Full SDH Multiplexer Structure

3.8 Basic SDH Network Topology

SDH networks are typically positioned in endangered jewels. This has the profit of giving defense to the facts, by if an alternative way for it to portable over in the occasion of gear or network flop. All side of the loop (known as A and B, or rarely, East and West), covers of a separate take and receive gravel. These threads will take diverse physical tracks to the aloof end gear to minimalize the risk of both habits deteriorating at the similar time. The SDH gears have the ability to detect the tricky and will routinely switch to the substitute route.

3.9 Features and Advantages of SDH

In earlier post we have seen the limitations of PDH. Now let us see the rewards of SDH. SDH licenses the mixing of the current European and North American PDH bit rates. All SDH gear is based on the use of a single chief reference clock basis & hence SDH synchronous. Friendly with the majority of present PDH bit rates SDH runs for extraction/insertion, of a lower directive bit rate from a complex order aggregate torrent, without the need to de-multiplex in phases. SDH allows for joined management using a central network control. SDH delivers for a standard optical line thus allowing the inter-working of diverse manufacturer's gear. Increase in network dependability due to reduction of essential equipment/jumping

3.10 Mbps FRAME - FORMAT

Let us study about usual 2 Mbps frame format G.704 / G.732

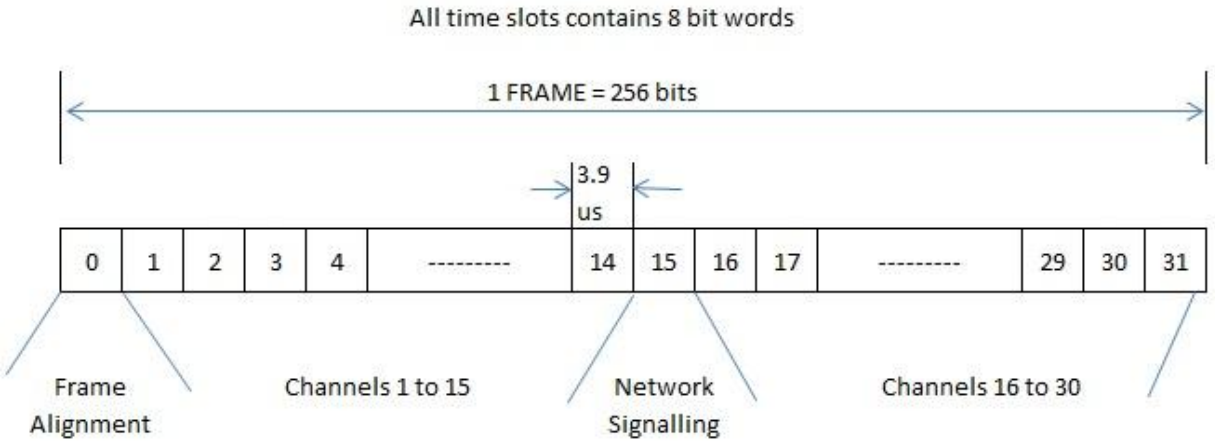


Fig 3.8: Mbps Frame - Format

Each 2 Mbps frame comprises 256 bits (32 timeslots) at a recurrence rate of 8 kb/s. The first timeslot i.e. TS 0 is kept for framing, error-checking and alarm signs. Remaining 31 canals can

be used for data circulation. Individual timeslots / channels can be used for 64 kbps PCM. Occasionally TS16 is reserved for motioning. For example - ISDN prime rate D channel signaling (Q.931). The start of 32 timeslot frame is meant by the frame arrangement word 0011011 in TS0 of alternative frames. In the other edge, bit 2 is set to one and bit 3 covers the Abet for transfer alarm to the far end. If three edge alignment words in four are conventional in error, then the receiving fatal declares loss of frame arrangement and pledges a resin way

3.11 Positive Justification in PDH

Let us read the concept of optimistic justification

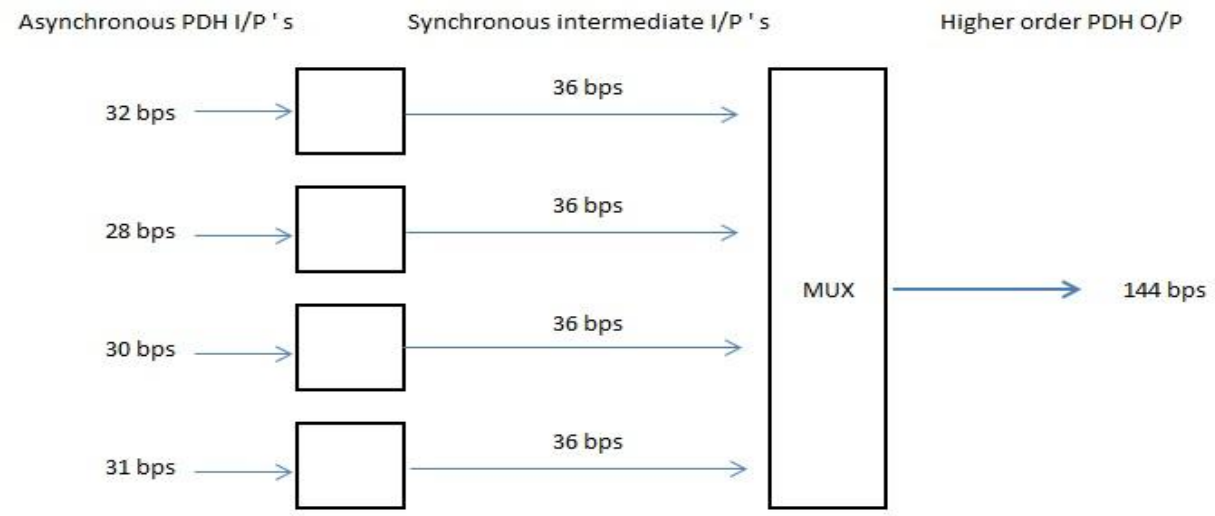


Fig 3.09: Positive Justification PDH

The diagram above proves the basic principle of helpful justification. There are 4 asynchronous inputs. All are taken to same frequency (i.e. 36 bps) by addition suitable number of jobless bit to each branch. Now all these 4 synchronous 36 bps inputs are multiplexed to get the production rate of 144 bps. Admires of this process takes home at the DE multiplexer. From each branch signs, redundant bits are detached to recover the unique signal. These jobless bits

are called “padding” or “justification” bits. The advanced order stream will be taking frame assembly and framing bits so that inserted tributary bits can be better

3.12 Line Rates and Hierarchy in SDH & SONET

The first hierarchy equal for SDH is set at 155,520 Kbit/s/s. This is known as a Synchronous Carriage Module 1 (STM-1). Higher levels are only multiples of the first equal

Line Rates and Hierarchy

SDH	SONET	Line Rate
STM-0	STS-1 / OC-1	51.84 Mb/s
STM-1	STS-3 / OC-3	155.52 Mb/s
STM-4	OC-12	622.08 Mb/s
STM-16	OC-48	2.488 Gb/s
STM-64	OC-192	9.96 Gbps

Fig 3.10: Line Rates and Hierarchy in SDH & SONET

SDH allows for many PDH input rates to be charted into ampules as exposed below:

Ampule C11: 1544 Kbit/s (1.5 Mbit/s)

Ampule C12: 2048 Kbit/s (2 Mbit/s)

Ampule C2: 6312 Kbit/s (6 Mbit/s)

Ampule C3: 49,536 Kbit/s (45 & 34 Mbit/s)

Ampule C4: 139,264 Kbit/s (140 Mbit/s)

As can be seen after this chart, the only PDH degree that is not reinforced by SDH is 8 Mbit/s.

SDH Concatenation, Interview minutes on Contiguous concatenation

There are two kinds of concatenation in SDH. They are Adjoining concatenation and Simulated concatenation. In this article, let us study about contiguous concatenation.

3.13 Contiguous Concatenation

The SDH frame can be supposed of as transport lorry. The data to be elated is placed in the VC-4 'Container'. This is then fastened to the SOH 'Cab unit' that 'drives' the facts to its terminus. The maximum carrying volume of the vehicle is resolute by the size of the 'container'. Then although the SDH sign is 155 Mbit/s in size, the chief single circuit that can be spread at any one time by the buyer is limited to the size of the VC-4 i.e. 140 Mbit/s.

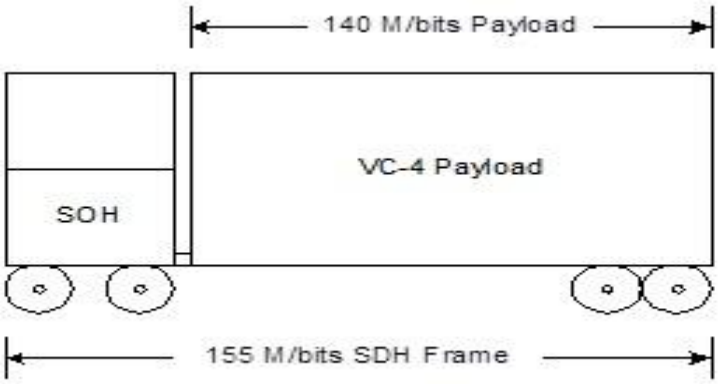


Fig 3.11: Contiguous Concatenation

When using advanced tolls of SDH (STM-4, STM-16 etc.), various 'containers' and 'cabs' are added one after added, to form a more van. The customer is still partial to a distinct trip size of 140 Mbit/s conversely, since each separable 'container' is restful the same size (140 Mbit/s). They can still transmit multiple 140 Mbit/s circuits simultaneously. Standard STM-4 manufacture is given below

The curb of 140 Mbit/s per individual tour is not a efficient way of handling bandwidth. In order to overwhelmed this limitation, a method of uniting 'containers' composed has been industrialized which is called 'Concatenation

3.14 STM-1 Frame Structure & Section Overhead

STM-1 Frame Building

STM-1 frame covers 2430 bytes of material. Each byte contains 8 data jiffs (i.e. a 64kbit/s channel). Period of STM-1 transport edge is 125ms. The number of edges per second is 1 second / 125ms = 8000 Edges per second. So, rate of STM-1 edge is calculated as follows: - 8 bits x 2430 bytes x 8000 per additional = 155,520,000 bits/s or 155 Mbit/s.

STM-1 edge chopped up into 9 segments, stacked on top of all other as shown in the drawing below. The bits start at the highest left with byte amount one and are recite from left to correct and top to bottom. They are decided as 270 columns across and 9 rows sad.

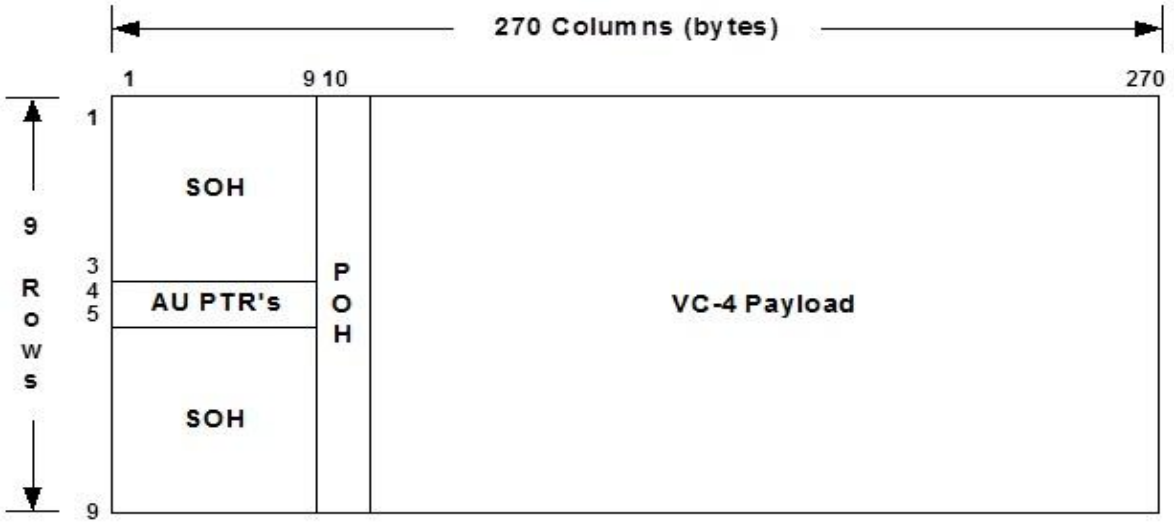


Fig 3.12 STM-1 Frame Structure & Section Overhead

3.15 STM-1 Section Overheads

The STM-1 Section above (SOH) consists of nine pillars by nine rows as shown under. It methods the start of the STM-1 frame. The SOH covers control and status messages at the optical fiber level. First three rows are RSOH (Regenerator Unit Overhead), Fourth row is AU-4 pointer. Fifth to Ninth row are MSOH (Multiplexer section above).

A1	A1	A1	A2	A2	A2	J0		
B1			E1			F1		
D1			D2			D3		
H1	H1	H1	H2	H2	H2	H3	H3	H3
B2	B2	B2	K1			K2		
D4			D5			D6		
D7			D8			D9		
D10			D11			D12		
S1	Z1	Z1	Z2	Z2	M1	E2		

A1, A2 - Framing bytes (A1=11110110, A2=00101000)

B1 - Bit Interleaved Parity 8 (BIP-8)

B2 - Bit Interleaved Parity 24 (BIP-24)

J0 - Section Path Trace

D1-D12 - Data Control Channel

E1, E2 - Engineering Order Wire channel

F1 - Maintenance Channel

H1, H2, H3 - AU Pointers/Justification opportunity

K1, K2 - Automatic Protection Switching

S1 - Synchronisation Status Monitor

Z1, Z2 - Spare

M1 - Multiplexer Section REI (FEBE)

Fig **3**.13 STM-1 Section Overheads

3.16 Linear (point to point) protection:

In a linear network, protection is attained through an extra protection fiber. It can protect the network after fiber or NE card letdown. Dissimilar variants of linear protection are 1+1, 1:1 and 1:N.

How it works?

Head-end and tail-end NEs have ties (mixes). Head-end and tail-end NEs uphold bidirectional motioning channel. Signaling is controlled in K1 and K2 bytes of *shield* channel. K1 – tail-end status and requests. K2 – head-end status.

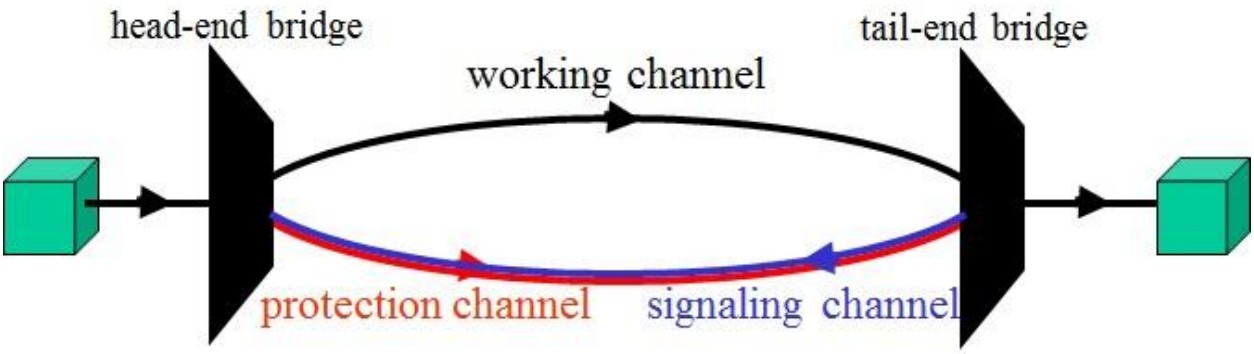


Fig 3.14 Linear (point to point) protection

3.17 Linear 1+1 protection:

This is humblest form of protection. Can be at OC-n level (different bodily fibers) or at STM/VC level (called **A**ct Network **C**onnection **P**rotection) or end-to-end trail (called trail protection*)* Head-end bond always sends data on both stations. Tail-end chooses station to use based on BER, doles, etc. No essential for signaling. For non-retentive cases, there is no difference between. Working and protection stations. BW use is 50%.

3.18 Linear 1:1 protection:

In this case, Head-end Bridge usually sends data on working channel. When tail-end detects failure it signals (using K1) to head-end. Head-end then starts sending data over protection channel. When not in use, protection channel can be used for (discounted) extra traffic (pre-emptible unprotected traffic).

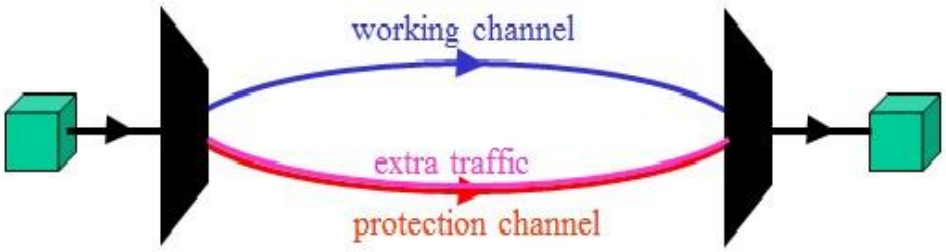


Fig 3.15: Linear 1:1 protection

3.19 Linear 1: N protection:

This is very much alike to 1:1 protection with a small change. Here, in order to save BW we assign 1 protection station for every N working channels. Here, N incomplete to 14

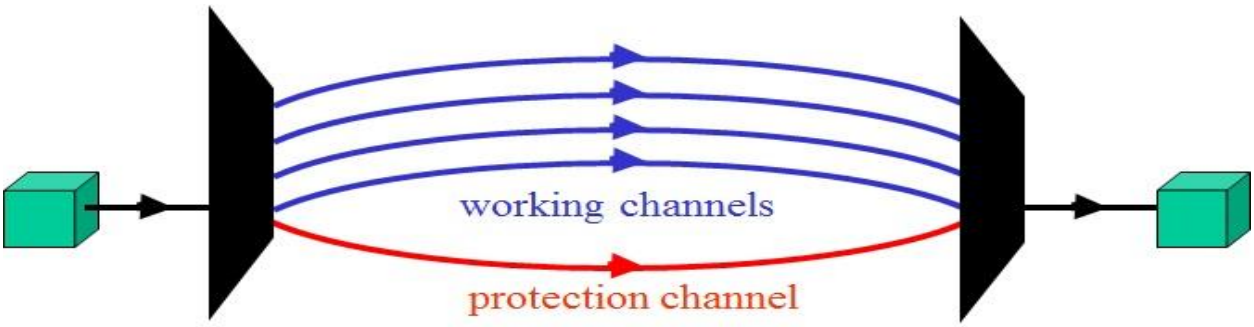


Fig 3.16: Linear 1: N protection

3.20 UPSR: Unit-directional Path Switched Ring:

In a unite-directional ring, facility traffic flows in one way. (clockwise in below diagram). Shield traffic flows in conflicting direction (counter clockwise)

In this instance, traffic from C to B voyages in clockwise way via A. Traffic from B to C travels right in clockwise direction. This shape is also known as complex section keen protection ring. This is since, one fiber carries service circulation while the other is keen to protect the main track. All traffic is extra in both orders. Decision as to which to use at drop idea (no signaling). Normally non-reverie, so effectively two multiplicity paths Main gain of this configurations are: single ended swapping, simple to implement and fixes not require any procedure. Single ended swapping is always faster while likened to dual ended swapping. Chances of reestablishing traffic under manifold fail conditions is tall. Also, application of this architecture is least luxurious. However this style is Inefficient for core networks. There is no latitudinal reuse. Node needs to unceasingly monitor every branch to be dropped.

3.21 BLSR, Bi-directional Line Switched ring

There are two types of BLSR organized in various networks.

1. 2-fiber BLSR

2. 4-fiber BLSR

3.22 fiber BLSR:

This coordination is also known as two fiber multiplex-section communal protection ring. Here, service traffic tides bi-directionally. Both the twines carries service and security channels.

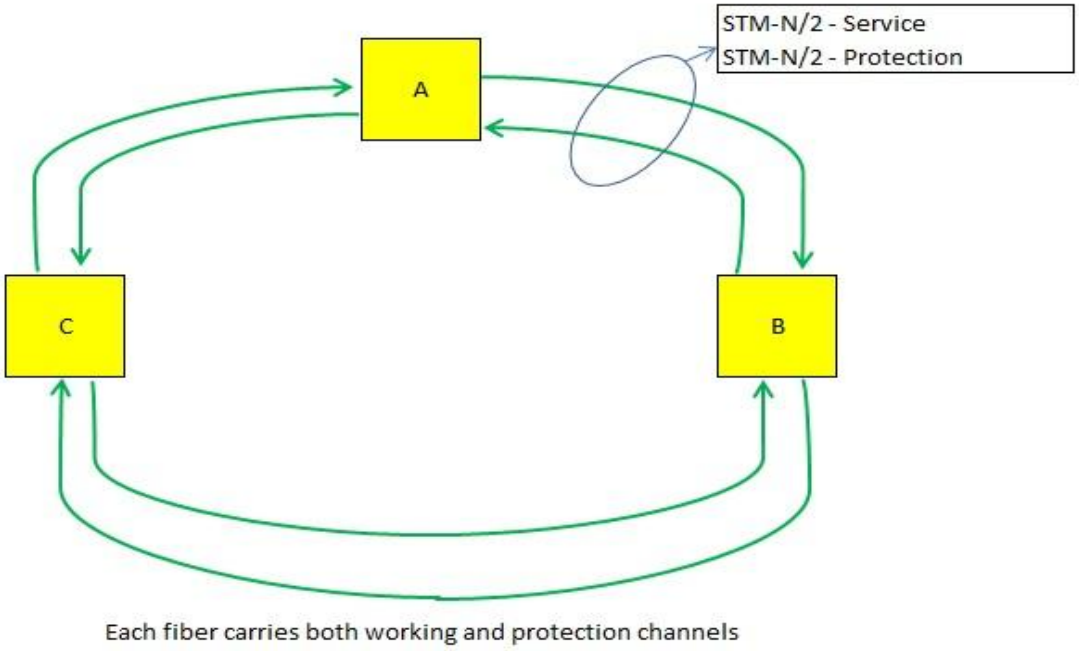


Fig 3.17: fiber BLSR

When the protection stations are not required, they can be recycled to carry extra traffic, but at the time of protection swapping, this extra traffic is released. Only ring switching is reinforced by this building. At the time of ring swapping, those channels carrying facility traffic are switched to the stations that carry the protection circulation in the opposite way.

3.23 Fiber BLSR:

This system is also recognized as four-fiber multiplex-section joint protection ring. This is the best robust ring design. This is most expensive to gizmo because of the extra ocular hardware requisite

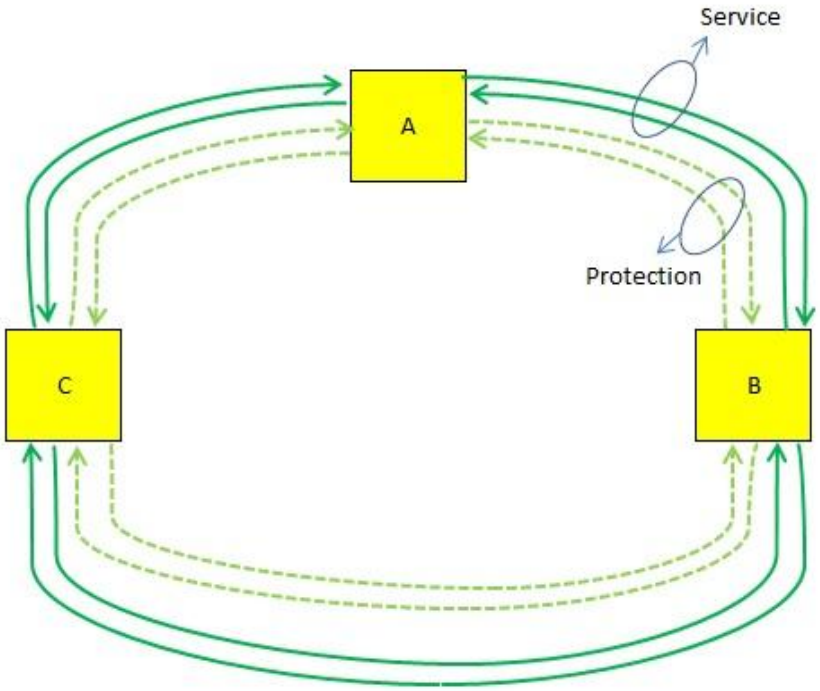


Fig 3.18: Fiber BLSR

In this classification, bi-directional pairs of fibers are recycled to connect each area in the ring. One bidirectional duos carries the waged channels, while the other brace carries protection conduits. 4F-BLSR funds both span switching and ring moving. (but both not at the alike time). Multiple span buttons can coexist on the ring. This is for, only the protection channels along one area are used for each time switch.

Geographical Device Interfaces

Gazi Network limited has four types of MUX. Those are following below-

4.1. Switch Room MUX

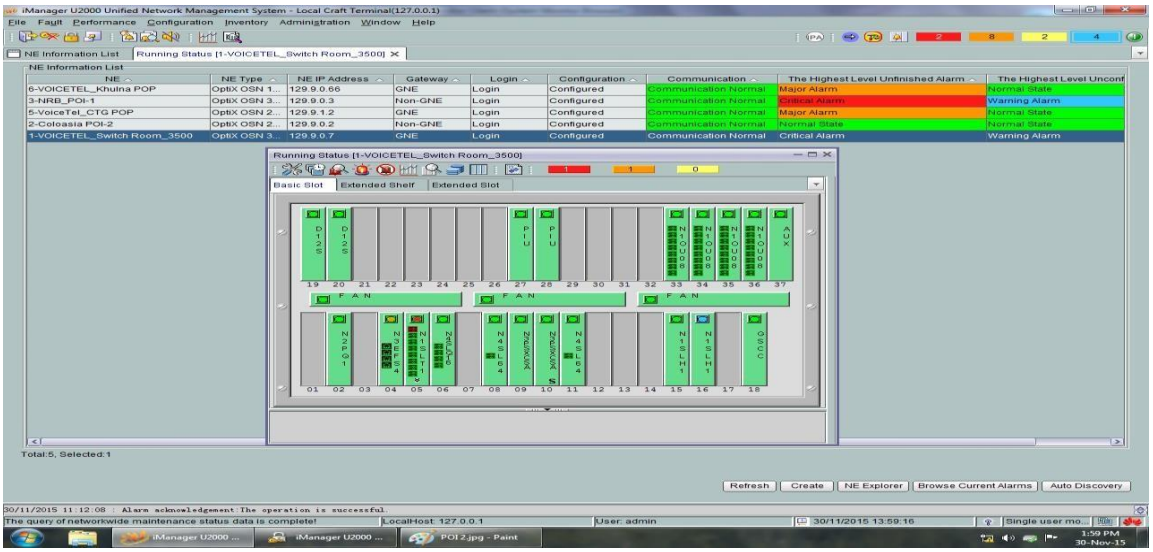


Fig 4.1: Switch Room Mux

4.2 NRB POI 1 (MUX)

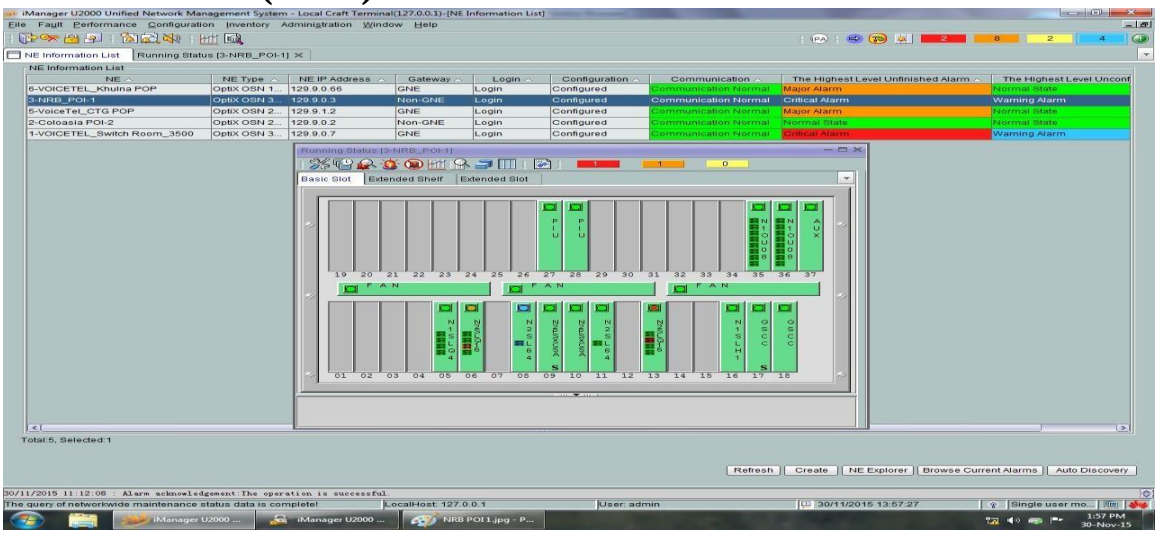


Fig 4.2: POI 1 MUX

4.3 COLOASIA POI 2 (MUX)

Fig 4.3: POI 2 (MUX)

4.4 Chittagong POP

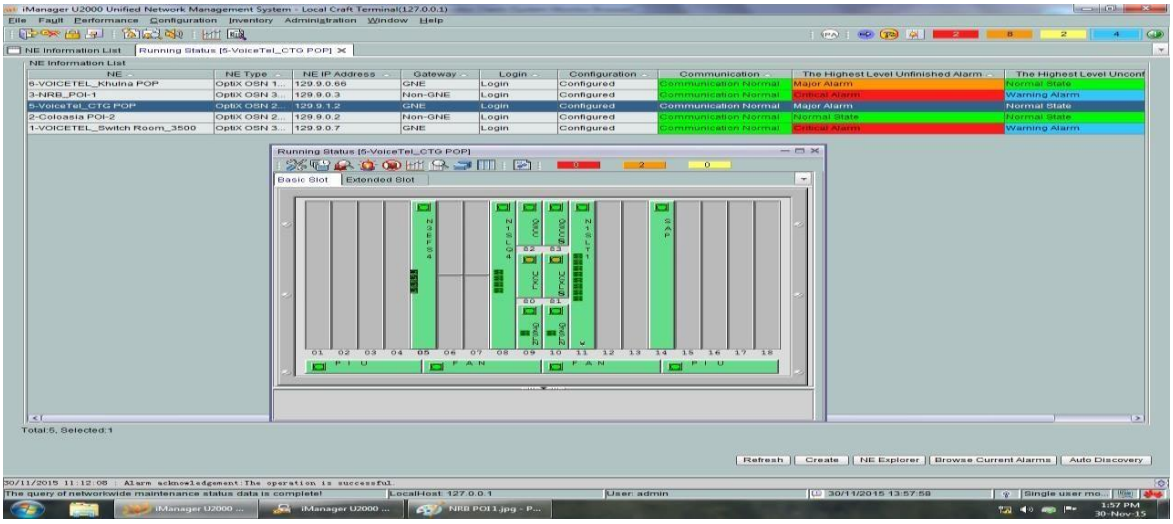


Fig 4.4: Chittagong POP

4.5 Khulna POP

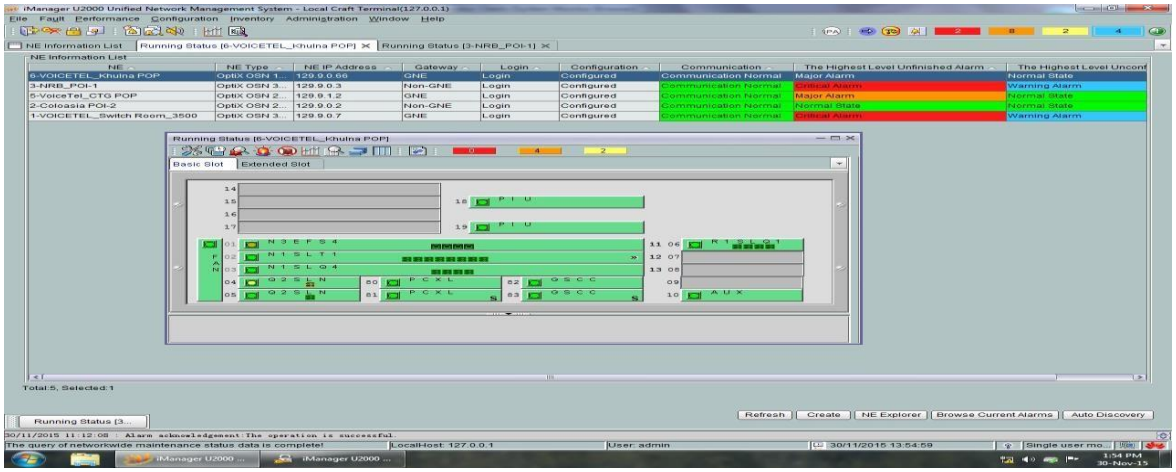


Fig: 4.5 Khulna POP

Alarm

However working in NOC (Network Operation Center) section, there are getting some following types of common alarms in the physical transmission-

5.1. R_LOS

Description

The R_LOS is an alarm indicating loss of signals on the receive side of the line.

Attribute

Alarm Severity	Alarm Type
Critical	Communication alarm

Possible Causes

The possible causes of the R_LOS alarm are as follows:

Optical Interface Board

- Cause 1: The local optical interface is not in use (in the case of the optical interface board).
- Cause 2: The opposite laser is shut down, and therefore no optical signals are accessed (in the case of the optical edge board).

Electrical Interface Board

- Cause 3: A fiber cut occurs or the act of the line declines.

IF Board

- Cause 4: The signal modes of both ends are different (in the case of the STM-1 electrical interface board).

Common Cause

- Cause 5: Other alarms trigger the R_LOS alarm (in the case of the IF board).
- Cause 6: The receive board at the local station is faulty, and therefore the signal fails to be received on the line.
- Cause 7: The transmit board (including the cross-connect and timing board) at the opposite station is faulty, and therefore the signal fails to be transmitted on the line.

R_LOF

Description

The R_LOF is an alarm indicating loss of frames on the receive side of the line. When the correct A1 and A2 bytes are not contained in five consecutive frames received at the receive optical interface of the local station, the R_LOF alarm is reported.

Attribute

Alarm Severity	Alarm Type
Critical	Communication alarm

Possible Causes

The possible causes of the R_LOF alarm are as follows:

- Cause 1: Two boards at different rates are interconnected (in the case of the optical interface board).
- Cause 2: The transmit cable is faulty, and the fiber connector is loose or contaminated (in the case of the optical interface board).
- Cause 3: Other alarms elicit the R_LOF alarm (in the item of the IF meal).
- Cause 4: The receive board at the local station is broken, and thus the frame structure is lost.
- Cause 5: The transmit board (including the cross-connect board) at the opposite station is faulty, and thus the frame structure is lost.

5.2. AU_AIS

Description

The AU_AIS is an alarm indication of the administrative unit (AU). This alarm occurs when the optical interface on the local NE receives the AU pointer of all 1s.

Attribute

Alarm Severity	Alarm Type
Major	Communication alarm

Possible Causes

The possible causes of the AU_AIS alarm are as follows:

- Cause 1: The local NE insets the AIS alarm to the lower level track.
- Cause 2: The upstream NE inserts the AIS alarm to the downstream NE.
- Cause 3: The cross-connect structure of the service type is indecent.
- Cause 4: The transmit boards (comprising the cross-connect and skill board) on the upstream NE are damaged.
- Cause 5: The receive boards on the local NE are faulty.

5.3. HP_RDI

Description

The HP_RDI is an alarm indicating a remote defect in the higher order path.

Attribute

Alarm Severity	Alarm Type
Minor	Communication alarm

Possible Causes

The possible causes of the HP_RDI alarm are as follows:

- Cause 1: The service receive end (opposite end) terminates the HPOH, the section-level or higher order alarm exists.
- Cause 2: The receive end (opposite end) is configured with lower order services, and the HP_SLM, HP_TIM, HP_LOM alarms are reported.
- Cause 3: The service receive end (opposite end) terminates the HPOH, and the alarms that insert the AIS signal exist.

5.4. IN_PWR_LOW

Description

The IN_PWR_LOW is an alarm indicating that the input optical power is very low. This alarm occurs when a board detects that the actual input optical power is lower than the lower threshold of the input power reference value.

Attribute

Alarm Severity	Alarm Type
Critical	Equipment alarm

Possible Causes

The possible causes of the IN_PWR_LOW alarm are as follows:

- Cause 1: The threshold of the optical power is not set properly.
- Cause 2: The fiber connector is loose or dirty.
- Cause 3: The transmit power of the opposite station is very low.
- Cause 4: The model of the selected ophthalmic module is incorrect.

Chapter 6

Conclusion

Conclusion

Gazi Networks Ltd. an ICX worker was chosen as an case to show the initialization course of ICX worker. The connectivity of Gazi Networks Ltd. in Dhaka and other two telecom zones in Bangladesh is alike to other ICX operators. So, the group size, initialization cost, yearly costs and fees to BTRC etc. have comparisons. Studying provided services, CAPEX, OPEX and Organogram of Gazi Networks Ltd. can give us an total view. Gazi Networks Ltd. was recognized in 2012 with government's view to lessen the complexity of interconnection and be a part of the total telecom scheme in order to intersect workers and monitor the process. Gazi Networks Ltd. is related with Grameenphone, Robi, Airtel, Telltale, Bangla link and City cell in Dhaka zone. The Firm is connected with all the 29 IGWs done the 7 IOSs, 6 Mobile operators, 2 IPTSP workers and BTRC.

In Dhaka zone Gazi Networks Ltd. is proficient enough to grip all domestic calls as well as global incoming and outward calls. It is linked with the ANSs in Khulna and Bogra zone to handle regional local calls. Despite Bangladesh taking an vastly promising telecom souk – it seemed to be repeatedly waiting to happen till this time. The BTTB (Bangladesh Wire and Telephone Board), the innovator in the telecom sector in the nation with land phone, PSTN (Public Swapped Telecom Network) was the lone worker. The BTTB was shaped in 1972. The inherited & age old equivalent system of telephone exchange sustained for many years. Most region towns had access to another system for urgent infrastructures, in the form of a UHF or VHF radio scheme or radio relay network. With the overview of satellite networks in the post-independence decade, done facilities at Petunia

and Aliabad earth-satellite places were mile-stones in the segment. Bangladesh planned to recover its telecommunications thru the Third Five-year plan (1985-90) by the fitting of a digital radio convey network, mechanization of telephone connections and installation of a mobile phone network in Dhaka and there after slow induction of digital connections across the republic, the general and global telecom services ongoing to recover.

Before 2012 there were only 3 ICX operators in Bangladesh. But since then the call rates stood receiving cheaper more and more people of the nation involved themselves inside the telecom network of Bangladesh. As a outcome the number of calls was cumulative very quickly. The weight was too high for the current 3 ICX operators to transmit so many calls near the Mobile workers which had been resultant technical difficulties very frequently. To resolve the problematic and create more service and better monitoring BTRC decided to present more ICX workers. Then in 2012 BTRC gave license to 23 more ICX workers in the telecom segment and Gazi Networks Ltd. became one of the foremost ICX operator within year.

References

1. Company website: http://www.voicetelltd.com.

2. https://en.wikipedia.org/wiki/Transmission_(telecommunications)

3. https://en.wikipedia.org/wiki/Data_transmission

4. https://en.wikipedia.org/wiki/Network_packet

5. http://whatis.techtarget.com/definition/time-division-multiplexing-TDM

6. https://en.wikipedia.org/wiki/Power_transmission

7. http://pluto.ksi.edu/~cyh/cis370/ebook/ch05b.htm

8. https://www.techopedia.com/definition/21314/plesiochronous-digital-hierarchy- pdh

9. http://searchnetworking.techtarget.com/definition/SDH

10. http://whatismyipaddress.com/vpn

11. https://en.wikipedia.org/wiki/Multiprotocol_Label_Switching

12. https://en.wikipedia.org/wiki/Virtual_Private_LAN_Service

13. http://searchtelecom.techtarget.com/definition/dense-wavelength-division- multiplexing

14. http://searchmobilecomputing.techtarget.com/definition/W-CDMA

15. http://ecomputernotes.com/computernetworkingnotes/communication- networks/what-is-transmission-media-and-types-of-transmission-media

16. http://iramkhan0322.blogspot.com/2012/11/transmission-media.html

17. http://www.tutorialspoint.com/gsm/gsm_operations.htm

18. https://en.wikipedia.org/wiki/Ring_network