

Department of Electronics and Communications Engineering

INTERNSHIP REPORT ON

Networking System of BDCOM Online Ltd.



Prepared by:

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Dept. Of ECE

East West University

Supervised by:

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December 2015

Letter of Transmittal

10 December 2015

To Md. Asif Hossain Senior Lecturer Department of Electronics and Communication Engineering East West University

Subject : Submission of Project Report as Internship(ETE-498)

Dear Sir,

I am pleased to let you know that I have completed my Internship program at BDCOM Online Ltd, Dhanmondi, Dhaka. The attaché contain of the internship report that has prepared for your evaluation and consideration. The internship has given me a great opportunity to work with the networking system closely and also gave me the opportunity to apply the theoretical knowledge in real life situation which I have acquired since last four years from you and the other faculty of EWU, which would be a great help for me in future.

I am very grateful to you for your guidance throughout the internship period, which helped me a lot to acquire practical knowledge.

Thanking You.

Yours Sincerely

Md. Mahmud Hossain Khan ID# 2012-1-55-052 Dept. of ECE East West University

Declaration

This is certified that the internship report is done by me under the course "Research/Internship(ETE-498)". It has not been submitted elsewhere for the requirement of any degree or any other purpose except for publication.

Md. Mahmud Hossain Khan

ID: 2012-1-55-052

Dept. Of ECE

Acceptance

This internship report is submitted to the **Department of Electronics and Communication Engineering, East West University** is submitted in partial fulfillment of the requirements for the degree of **B.Sc** in **ETE** under complete supervision of the undersigned.

Md. Asif Hossain Senior Lecturer Dept. of ECE

Mohammad Akhter Uz Zaman Deputy. Manager, NOC BDCOM Online Ltd.

Acknowledgement

At first I wish to convey my cordial thanks and gratitude to Almighty Allah for everything. I would like to thank my parents and everyone else who has supported me all the way through to complete the Internship program successfully and also to those who rendered their cooperation in making this report.

I would like to thank **Md. Asif Hossain (Senior Lecturer, Dept. of ECE, EWU)** for guided me with lots of effort and time to perform the internship program.

I want to convey my gratefulness to Mohammad Akhter Uz Zaman (Deputy. Manager, NOC, BDCOM Online Ltd.) who helped me greatly by providing valuable suggestion whenever required my internship report "Networking System of BDCOM Online Ltd." They also gave the opportunity to hold tht flagship of the topic.

I would also like give to acknowledgments everyone of the System Management Department of **BDCOM Online Ltd**. For providing suggestion on how to work and what is the procedure to work in a practical manner and also how to make the internship report in a better way. They helped me in many ways by allowing whatever assistance I needed. Otherwise it was not possible for me to complete my report.

Abstract

This report focuses on the whole networking system of an ISP company. Internet Service Provider (ISP) can provide various services like data connectivity service, Internet service, Security ensures, Fiber optic networks, Network infrastructure design and maintenances and support. In enterprise network infrastructure, ISPs provide redundant links or backup mechanism that can keep up a network even when unplanned outage occurs. To ensure maximum availability of a designed network it is difficult when power outage or load shedding occurs. There are many kind of services also can provide an ISP like IP telephony services, Vehicle tracking system, restore petrol and cut of engine also.

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Chapter 1

Introduction

In the broadest terms, people like to view the Internet as a cloud, you put your data in one place, it comes out the place you want it to on the other side. In reality the internet is tens of thousands kilometers of fiber optic cable, hundreds of thousands to millions of kilometers of copper wire, and hardware and software connecting them all together in a redundant, fast, and self-sufficient network. But not to worry, it's not that bad: you only have to worry about a very small portion of the network, you can let someone else worry about the rest, and you even get someone to yell at when things go wrong.

I had an opportunity to work with most leading IT and Internet Service Provider (ISP) service provider that is BDCOM Online Limited. I consider myself timely to get a chance to take a deep look to their development methods, working models, deals and industrial behavior. And I was intending to look into the Networking Industry and how it looks like practically, how they interact with their clients, how they design a system and what are their rules in their environmental work.

I got the chance to work in Network Operation Center (NOC) in BDCOM Online Limited. We know computer networking is the principal part of our modern life. I decided to know about computer networking and how does it work, how to design a wide area network and backbone network, what are the important keys to design a beneficial network, how can I design cost effective network and how to mitigate downtime of a network.

About BDCOM Online Ltd.

BDCOM Online Limited was incorporated under the Companies Act. 1994 on 12th February, 1997 as a private limited company with an authorized capital of Tk. 10,000,000.00 consisting of 100,000 ordinary shares of Tk. 100.00 each. On December 12 2001, BDCOM was converted into a public limited company with an authorized capital of Tk. 250,000,000.00 consisting of 25,000,000 ordinary shares of Tk. 10.00 each. At present authorized capital of Tk. 1,000,000,000.00 consisting of Tk. 1,000,000,000.00 consisting of 100,000,000 ordinary shares of Tk. 10.00 each increased as on 29th June 2010. At present paid up capital of the Company is Tk. 383,409,450.00 consisting of 38,340,945 ordinary shares of Tk. 10 each.

Name and Address

Name of the Company: BDCOM ONLINE LIMITED

Unlice Address ·		RANGS Nilu Square (5th floor), Satmosjid Road, House # 75; Road # 5/A, Dhanmondi R/A, Dhaka 1209, Bangladesh							
Phone :		+88 09 666 333 666							
Fax :		+88 02 8122789							
Email :		office@bdcom.com							
Web Site :		www.bdcom.com, www.bdcom.net							
Trade License									
Registration Num	ber :	No. 110084							
Registered To :		Dhaka City Corporation							
Certificate of In	corporatio	on							
Number :		No. C-32328(1449)/97							
Date :		12th February, 1997							
Registered To :		Register of Joint Stock Companies and Firms Bangladesh, Dhaka, Bangladesh							
ISO Certificatio	n								
Name :	ISO 9001	2008							
Certificate Number :	63806/A/0	0001/UK/En	Issue No: 1						
Date of Issue :	11 May 20	015	Expiry Date: 10 May 2018						
Issued By :	United Re UK.	egistrar of Systems Ltd.							

Values:

The Values objects of BDCOM Online Limited are set out as follows

- Facilitate and promote use of ICT in all sectors of the economy.
- Develop an efficient ICT infrastructure that provides open access to international and national network.
- To facilitate high speed, dedicated broadband connectivity directly to client's premises over a radio/wireless and Optical Fiber link.
- To provide data connectivity almost anywhere in the country through its network.
- Create employment opportunity in ICT sector.
- To help corporate houses create and maintain their identity in an attractive way through dynamic & innovative web sites.
- To provide enterprise-grade data security solutions to corporate houses in order to protect their sensitive information.

Services:

□ Internet

- Corporate
- Small Business
- Home user

□ Data Communication

- Nationwide Secure Connectivity
- Dark Fiber Connectivity
- Clear Channel Connectivity
- Capacity Based Connectivity
- □ Network
 - Corporate Network
 - Small Business Network
 - Personal Area Network

□ Graphic

- Photoshop
- Illustrator
- InDesign

Solutions:

□ Enterprise

- Network
- IP-VPN
- Hosting
- Co-location
- E-Mail

□ System Integration

- ICT Consultancy
- Customized Solution
- Training
- □ IP Phone
 - Corporate
 - Home
 - Call Center
 - IPPBX
 - Short-code Routing
 - Audio-Video Conference

Chapter 2

Devices

Router:

A **router** is a networking device that forwards data packets between computer networks. Routers perform the "traffic directing" functions on the Internet. A data packet is typically forwarded from one router to another through the networks that constitute the internetwork until it reaches its destination node.

A router is connected to two or more data lines from different networks (as opposed to a network switch, which connects data lines from one single network). When a data packet comes in on one of the lines, the router reads the address information in the packet to determine its ultimate destination. Then, using information in its routing table or routing policy, it directs the packet to the next network on its journey. This creates an overlay internetwork.





The most familiar type of routers are home and small office routers that simply pass data, such as web pages, email, IM, and videos between the home computers and the Internet. An example of a router would be the owner's cable or DSL router, which connects to the Internet through an ISP. More sophisticated routers, such as enterprise routers, connect large business or ISP networks up to the powerful core routers that forward data at high speed along the optical fiber lines of the Internet backbone. Though routers are typically dedicated hardware devices, use of software-based routers has grown increasingly common.

Switch:

A network switch (also called switching hub, bridging hub, officially MAC bridge is a computer networking device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device. Unlike less advanced network hubs, a network switch forwards data only to one or multiple devices that need to receive it, rather than broadcasting the same data out of each of its ports.



Figure 2: Switch

A network switch is a multiport network bridge that uses hardware addresses to process and forward data at the data link layer (layer 2) of the OSI model. Switches can also process data at the network layer (layer 3) by additionally incorporating routing functionality that most commonly uses IP addresses to perform packet forwarding; such switches are commonly known as layer-3 switches or multilayer switches. Beside most commonly used Ethernet switches, they exist for various types of networks, including Fibre Channel, Asynchronous Transfer Mode, and InfiniBand.

Media Converter:

A fiber media converter is a simple networking device that makes it possible to connect two dissimilar media types such as twisted pair with fiber optic cabling. They were introduced to the industry nearly two decades ago, and are important in interconnecting fiber optic cabling-based systems with existing copper-based, structured cabling systems. They are also used in metropolitan area network (MAN) access and data transport services to enterprise customers.



Figure 3: Media Converter

A fiber media converter is a simple networking device that makes it possible to connect two dissimilar media types such as twisted pair with fiber optic cabling. They were introduced to the industry nearly two decades ago, and are important in interconnecting fiber optic cabling-based systems with existing copper-based, structured cabling systems. They are also used in metropolitan area network (MAN) access and data transport services to enterprise customers.

Power Over Ethernet (PoE):

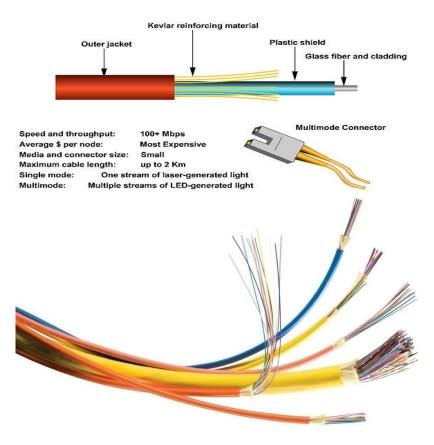
Power over Ethernet or PoE describes any of several standardized or ad-hoc systems which pass electrical power along with data on Ethernet cabling. This allows a single cable to provide both data connection and electrical power to devices such as wireless access points or IP_cameras. Unlike standards such as Universal Serial Bus which also power devices over the data cables, PoE allows long cable lengths. Power may be carried on the same conductors as the data, or it may be carried on dedicated conductors in the same cable.



Figure 4: PoE Device

Fiber Optic:

Optical fiber or fiber optic refers to the medium and the technology associated with the transmission of information as light pulses along a glass or plastic strand or fiber.



Fiber Optic Cable

Figure 5: Optical Fiber

Advantages of Fiber Optic cable:

- Greater bandwidth than metal cables. Large carrying capacity.
- Less susceptible than metal cables to interference.
- Much thinner and lighter than metal wires.
- Data can be transmitted digitally rather than analogically.
- Fiber optic cables costs much less to maintain.

Chapter 3

Design of a Network

Below the steps of a business network design. It will fulfill all of the requirements of any organization.

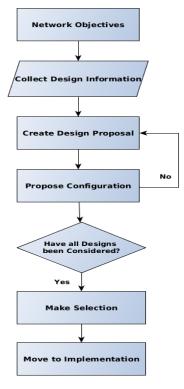


Figure 6: Design steps of a business network

Objectives of a network design:

- a) Who are the users of this network and what are the requirements?
- b) What types of application will be supported?
- c) Does the design replace of existing network?
- d) Overall Responsible for network management
- e) What is the budget?
- f) designed consideration

Requirements to design a network:

- a) Bandwidth Requirements
- b) Performance Requirements
- c) Protocols Required
- d) Quality of Service/Type of Service (QoS/ToS)
- e) Sensitivity to Packet Loss and Delay
- f) Multicast
- g) Scalability
- h) Security

Backbone Network Design:

To design a network, we need to follow some rules or steps that create a network more efficient and give high performance. A designed network has some goals that are discussed earlier.

- I. Scalability
- II. Availability
- III. Security
- IV. Manageability

To fulfill the fundamental goals of a network must be built an architecture that allows for both flexibility and growth.

Hierarchical networks have some advantages over flat network designs. The benefit of hierarchical design is that local traffic remains local. Only traffic goes to other networks and it's moved to a higher layer. A flat network using Layer-2 devices provide to control broadcasts or to filter undesirable traffic. As more devices and applications are added to a flat network then response times degrade until the network becomes unusable.

Keeping all of the above, we can use the hierarchical method to design of our desire network. There are some benefits of hierarchical network that are given below.

Actually hierarchical network is divided into three layers.

- 1) Core layer: Connects distribution layer devices
- 2) Distribution layer: Interconnects the smaller local networks
- 3) Access layer: Provides connectivity for network hosts and end devices

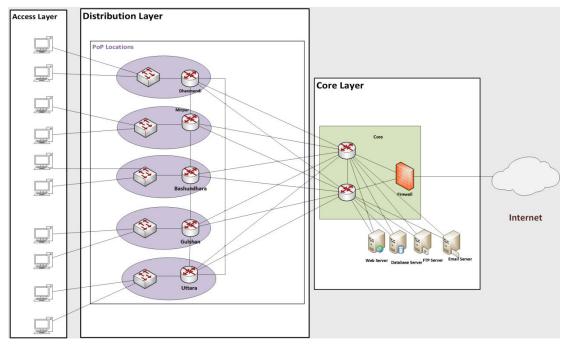


Figure 7: Hierarchical Design of a Network.

For long distance we can use fiber optic cable or radio connectivity for backbone connection. Fiber optic and radio connectivity is more efficient than Ethernet cable. Due to signal degradation we cannot use Ethernet cable long distance. On the other hand, by using optical fiber and radio connectivity we can transfer signal for long distance. Most of the backbone network is connected by fiber optic cable or radio connectivity.

Network Planning:

A typical task has to follow to perform a proper planning of a network that can solve the complexity. A planned network has to perform of the business of an organization. In that case, a perfect network plan is followed to the proper business plan

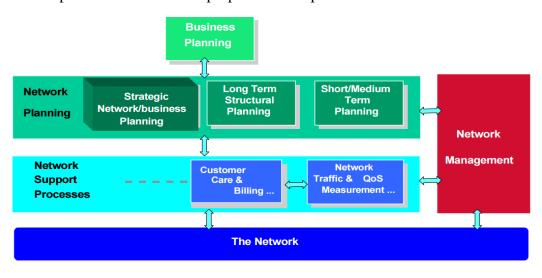


Figure 7.2: Network planning processes

Long Term Planning (LTP): Long lifetime and large investments for their deployment.

Strategic Planning:

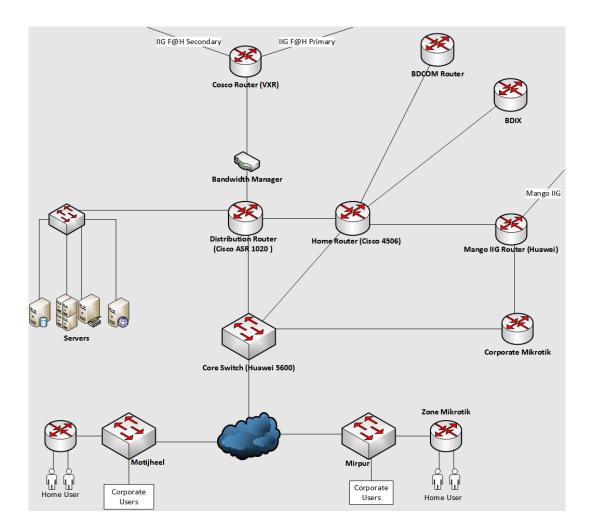
- Technology
- Network mechanism
- Recovery mechanism

Fundamental Planning:

- Topology planning
- Allocation of function in network nodes
- Distribution functions in network nodes.
- Resource optimization

- **Medium Term Planning**: Capacity upgrading of the network nodes and links. This always following the long-term (LT) deployment strategies.
- Short Term Planning: The routes and the telecommunications systems that support a demand on this planning

Overall design of a Network Planning:



Chapter 4

Internship Activities

In this paper is about ISP network design and maintenance in Network Operation Center (NOC). The main works of NOC is to ensure high security, proper maintenance service and reliable connection to the clients.

3.1. ISP NOC support system

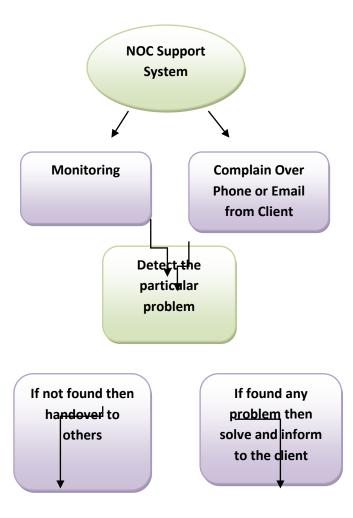


Figure 7: NOC support system of BDCOM

To achieve these features the main task of NOC is monitoring all of the connections. For monitoring purposes BDCOM NOC uses Network Performance Monitoring tools like Solarwind or Orion, Nagios, Cacti with MRTG.

Orion Solarwind:

Solarwind is a network performance monitoring tool that has used for quickly detects, diagnose, and resolve network performance problems & outages.

• Monitors and analyzes real-time, in-depth network performance metrics for routers, switches, servers, and any other SNMP-enabled devices.

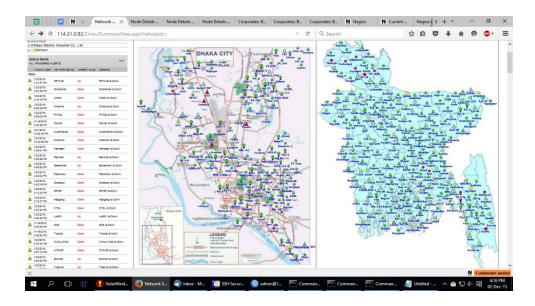


Figure 8: Network Performance Monitoring using Solarwind.

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Figure 9: Status report of an interface of Down Time

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Figure 10: Status report of an interface of Up Time

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٢	"Netor	e -Tangail	113	3 ms	8 %	Node Up	11 hours, 50 minutes	
٢	"Sham	oly POP	113	1 ms	4 %	Node Up	18 hours, 7 minutes	
٠	Dhann	ondi-1	113	0 ms	0 %	Node Up	11 hours, 50 minutes	
٩	Sunan	nganj-Rese	eller 113	9 ms	0 %	Node Up	35 minutes	
	Creati	/e 113.11.	400.000	2 ms	0 %	Node Up	2 days, 15 hours, 53 minutes	

Figure 11: Status report of Reseller

Nagios:

• Nagios is an open source network monitoring application. It is originally designed to run under Linux. It watches hosts and services that you specify, alerting you when things go bad and when they get better.

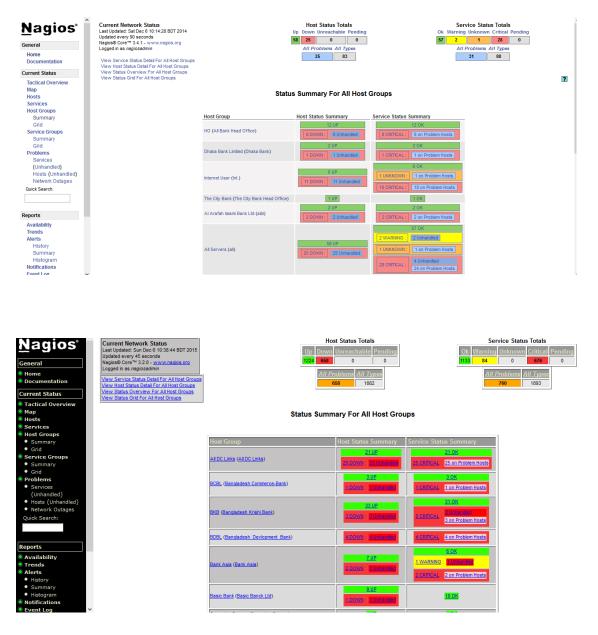


Figure 12: Device Status using Nagios

Cacti with MRTG:

Cacti is an open source network monitoring and graphing tools. Cacti allows a user to provide services at predetermined intervals and graph the resulting data. It is generally used to graph time series data of metrics such as CPU load and network bandwidth utilization. And we used cacti for monitoring our network bandwidth utilization.

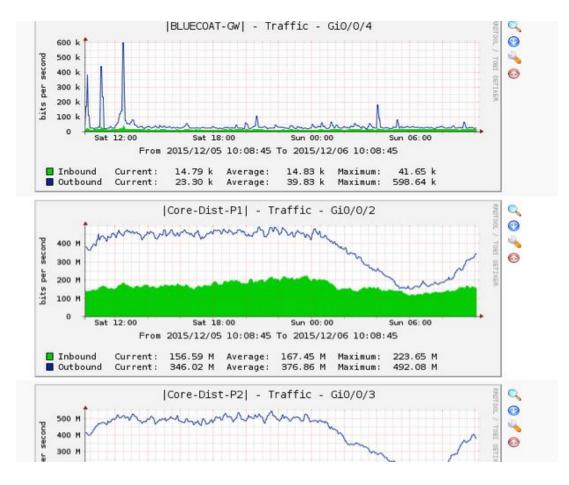


Figure 12: Bandwith Usage graph

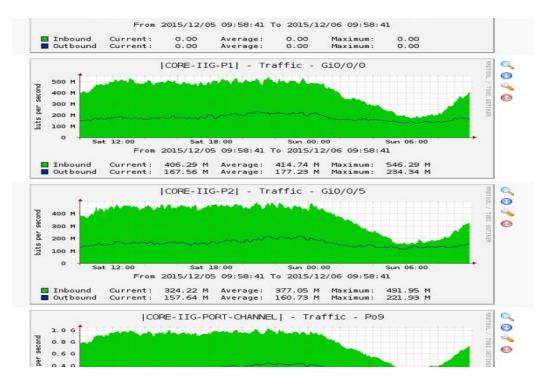


Figure 13: Bandwith usage graph(2)

Winbox:

Connect and configure Mikrotik RouterOS routers via a graphical user interface by using Winbox. It is more helpful for graphical user interface and also has console system. Here are some specification of Mikrotik router using Winbox.

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Routing									Dec/06/2015 04:20:27	system error critical	login failure for user system from 161.0.252. via telnet
System Cueues									Dec/06/2015 04:20:35	system error critical	login failure for user echo welcome from 161.0.252.227 via telnet
Files									Dec/06/2015 04:21:31	system error critical	login failure for user root from 119.167.153. via ssh
Log									Dec/06/2015 04:21:41	system error critical	login failure for user root from 119.167.153. via ssh
Radius Tools									Dec/06/2015 04:33:35	system info account	user noc logged in from 59.152.106.218 via winbox
New Terminal	•							٠	Dec/06/2015 04:33:35	system info account	user noc logged in from 59, 152, 106, 218 via
	0 items out of 12									-,	winbox
ISDN Channels	U						1 110	_	1		
KVM	Name	 Service 	Caller ID	Encoding	Address	Uptime		•			
Make Supout rif	R @adel2050@smile.com.bd	pppoe	00:0B:CD:A5:32:13		113.11.78.95	00:18:08					
Manual	R @apurba.bishnu@smile.com.bd	pppoe	00:15:C5:80:76:9D		113.11.116.158						
Exit	R Rababu2050@smile.com.bd R Riakir2050@smile.com.bd	pppoe	C8:BC:C8:A3:CE:FD E8:11:32:62:02:67		113.11.26.187 113.11.26.188	00:31:57 00:20:29		_			
Exat	R R kochi97@smile.com.bd	pppoe	00:13:30:0F:5D:80		113.11.26.188	01:29:04		_			
	R Grumon2050@smile.com.bd	pppoe	F0:79:59:2F:5A:6E		113.11.26.191	1d 10:36:					
	R Shimanta@smile.com.bd	pppoe	C0:4A:00:07:7D:B2		113 11 116 155	13:31:15					
	R Rsumaiya2050@smile.com.bd	pppoe	FC:AA:14:64:13:F8		113.11.116.157	21:12:29					
	R Rzahidriyad94@smile.com.bd	pppoe	E0:DB:55:B4:0A:C3		113.11.116.156	17:46:32					

Figure 14: Basic specification of winbox

	3			Uptime 1d 10:40:00 Memory 1872.2 MiB CPU 1% Hide Passwords
Interfaces	Address List		IP Pool	Route List
Wireless	+ - < × 🗂 🍸	Find	Pools Used Addresses	Routes Nexthops Rules VRF
Bridge	Address / Network	Interface 🗸		Find 슈 - < ※ 전 🍸 Find al
PPP	D @113.11.26.128 113.11.26		Name / Addresses	Next Pool Dst. Address / Gateway
Mesh	D +113.11.26.128 113.11.1		harre / Addresses	none AS 0.0.0/0 113.11.126.129 reachable ether
	D +113.11.26.128 113.11.1 D +113.11.26.128 113.11.1		+ bbasic 113.11.35.64/28	none DAC 113.11.26.187 DAC 113.11.26.187
IP D	D +113.11.26.128 113.11.1 D +113.11.26.128 113.11.1		🕆 bronze 113.11.26.130-113.11.26.191	none DAC 113.11.26.188 <pppoe-jakir2050@smile.com.bd< td=""></pppoe-jakir2050@smile.com.bd<>
IPv6 D	D #113.11.26.128 113.11.5		⊕ dhcp_pool1 192.168.0.2-192.168.1.254	none DAC 113.11.26.191 <pppoe-rumon2050@smile.com.< td=""></pppoe-rumon2050@smile.com.<>
MPLS D	D +113.11.26.128 113.11.26		⊕gold 113.11.122.16/28	none DAC 113.11.53.215 <pppoe-kochi97@smle.com.bd< td=""></pppoe-kochi97@smle.com.bd<>
	D +113.11.26.128 113.11.20		⊕ guest 10.0.162.0/24	none DAC 113.11.78.95 combined proceeded 2050@smile.com.br
Routing 1	D 🕆 113.11.26.128 113.11.70	8.95 <pppoe-adel2050@smile.com.bd></pppoe-adel2050@smile.com.bd>	🕆 maxim 113.11.53.208/29	none DAC > 113.11.116.155 <pppoe-shimanta@smile.com.bd< td=""></pppoe-shimanta@smile.com.bd<>
System 1	113.11.126.132/29			none DAC 113.11.116.156 <pppoe-zahidriyad94@smile.com< td=""></pppoe-zahidriyad94@smile.com<>
Queues	192.168.0.1/23	0.0 ether3	🕆 unknown_user 192.168.100.0/23	none DAC 113.11.116.157 <pppoe-sumaiya2050@smile.co DAC 113.11.116.158 <pppoe-apurba.bishnu@smile.co< td=""></pppoe-apurba.bishnu@smile.co<></pppoe-sumaiya2050@smile.co
				DAC 113.11.106.136 spppoe-apurba.bishnu@smile.co
Files				DAC 192.168.0.0/23 ether3 reachable
Log				
Radius				
Tools D				
New Terminal			•	
ISDN Channels	11 items			12 items
KVM	Firewall			
Make Supout if		s Connections Address Lists Layer7 Protocols	Policies Peers Remote Peers Proposals Inst	talled SAs Keys
	- + - < × 🖾 🍸 🚝 F	Reset Counters 00 Reset All Counters Find	all 🖣 🕂 🛏 🛷 💥 🗂 🍸 Statistics	Find
Manual	# Action	Chain Src. Address Dst. Address Protoc	ol Src. Port 🔻 Src. Address / Src. Port Dst. Address Ds	st. Port Proto Action
Exit	2 X drop	forward 17 (ud		
	::: Drop_ILLIGAL_VOIP			
	3 🔀 drop	forward 6 (tcp)		
	::: Drop_ILLIGAL_VOIP			
	4 X drop	forward 17 (ud	p)	
	::: Drop_ILLIGAL_VOIP 5 Xdrop	forward 6 (tcp)		
	;;; Drop ILLIGAL VOIP	forward 6 (tcp)		
	6 X drop	forward 6 (tcp)		
	Drop ILLIGAL VOIP	loiwaid o (icp)		
	7 × drop	forward 17 (ud	p)	
	::: drop ssh brute forcers		r/	
	8 × drop	input 6 (tcp)		
		input 6 (tcp) input 6 (tcp)		

ю	C* Safe Mode								Uptime: 1d 10:41:5	7 Memory: 1	871.7 MiB 0	PU: 7%	Hide Pass	vords 📕 🛅
	Interfaces	Terminal			□ ×	Neigh	bor List							
	Wireless	MikroTik Router	OS 5.20 (c) 1999-2012	http://www.mikrotik.com/	•	Neigh	bors Discovery	Interfaces						
	Bridge					T							1	ind
	PPP						Interface	/ IP Address	MAC Address	Identity	Platform	Version	Board Na.	IPv6 V
	Mesh						Lether2-WAN	113.11.126.130	00:13:72:97:71:A1	BROTHE.	. MikroTik	2.9.27		no
		(10434 messages n					ether2-WAN ether2-WAN	172.31.3.10 10.255.128.2	D4:CA:6D:38:B7:6B D4:CA:6D:4A:40:97			5.11 5.16	RB750 RB750	no
	IPv6 D	dec/06/2015 03:13 8.17.27 via ssh	:07 system, error, critical	login failure for user admin	from 151.4		ther2-WAN		00:0C:41:22:AD:34		MikroTik		NB/30	no
	MPLS D	dec/06/2015 03:37	:30 system, error, critical	login failure for user ubnt f	rom 151.48									
	Routing 1	.17.27 via ssh		login failure for user ubnt f										
		.17.27 via ssh	:22 System, error, critical	login failure for user ubnt f	rom 151.46									
		dec/06/2015 04:13 29.219 via ssh	:13 system,error,critical	login failure for user a from	113.106.1									
			:27 system.error.critical	login failure for user system	from 161.									
	l en	0.252.227 via tel	net											
		dec/06/2015 04:20 m 161.0.252.227 v		login failure for user echo w	elcome fro									
		dec/06/2015 04:21	:31 system, error, critical	login failure for user root f	rom 119.16									
	New Terminal	7.153.187 via ssh		login failure for user root f	nom 110 16	•								٠
	ISDN Channels	7.153.187 via ssh		Togin failure for user foot i		4 item	s							
	KVM	[noc@Isolution] >			•									
	Make Supout rf	DNS Settings				+					F	ind		
	Manual	Servers:	114.31.0.66	\$	ОК			MAC Address 00:11:21:68:8D:FF	Interface ether2-WAN			•		
	Exit		8.8.8.8	\$	Cancel	-								
		Dynamic Servers:			Apply									
		Dyrianic Servers.			Арру									
X			Allow Remote Requests		Static									
B		Max UDP Packet Size:	4096		Cache									
Nir		Cache Size:	2048	KiB										
ŝ		Cache Used:	8											
RouterOS WinBox														
te														
no														
R						1 item								

Figure 15: Differnt types of routing, firewall, terminals, routes list, IPSecs and traffic monitoring.

Chapter 5

GPS Vehicle Tracking System

Global Positioning System (GPS) is a worldwide radio-navigation system formed from the constellation of 24 satellites and their ground stations. The Global Positioning System is mainly funded and controlled by the U.S Department of Defense (DOD). The system was initially designed for the operation of U. S. military. But today, there are also many civil users of GPS across the whole world. The civil users are allowed to use the Standard Positioning Service without any kind of charge or restrictions.

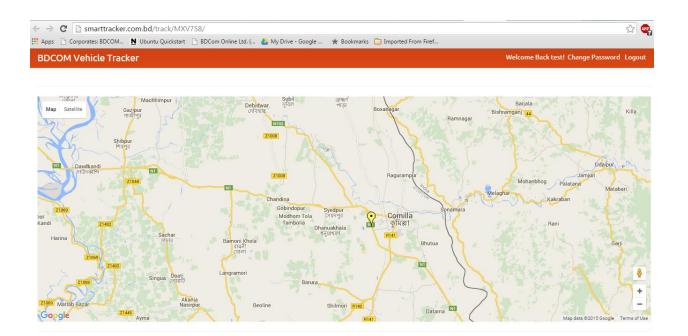


Figure 16: Smarttracker tracking system

Global Positioning System tracking is a method of working out exactly where something is. A GPS tracking system, for example, may be placed in a vehicle, on a cell phone, or on special GPS devices, which can either be a fixed or portable unit. GPS works by providing information on exact location. It can also track the movement of a vehicle or person. So, for example, a GPS tracking system can be used

by a company to monitor the route and progress of a delivery truck, and by parents to check on the location of their child, or even to monitor high-valued assets in transit.

GPS provides special satellite signals, which are processed by a receiver. These GPS receivers not only track the exact location but can also compute velocity and time. The positions can even be computed in three-dimensional views with the help of four GPS satellite signals. The Space Segment of the Global Positioning System consists of 27 Earth-orbiting GPS satellites. There are 24 operational and 3 extra (in case one fails) satellites that move round the Earth each 12 hours and send radio signals from space that are received by the GPS receiver.

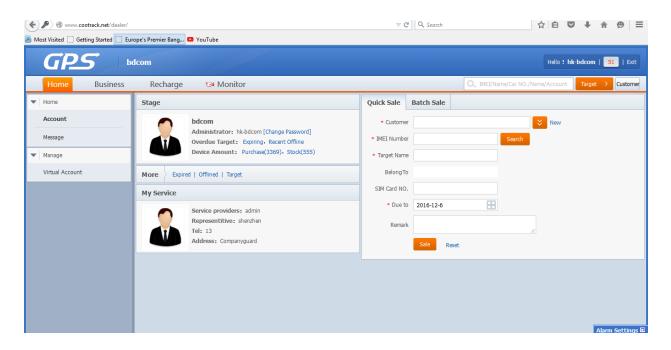


Figure 17: Coo track system.

IP Telephony Service:

Voice over IP (**VoIP**) is a methodology and group of technologies for the delivery of <u>voice</u> communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. Other terms commonly associated with VoIP are **IP telephony**, **Internet telephony**, **broadband telephony**, and **broadband phone service**.



The term *Internet telephony* specifically refers to the provisioning of communications services (voice, fax, SMS, voice-messaging) over the public Internet, rather than via the public switched telephone network (PSTN). The steps and principles involved in originating VoIP telephone calls are similar to traditional digital telephony and involve signaling, channel setup, digitization of the analog voice signals, and encoding. Instead of being transmitted over a circuit-switched network, however, the digital information is packetized, and transmission occurs as IP packets over a packet-switched network. Such transmission entails careful considerations about resource management different from time-division multiplexing (TDM) networks.

Chapter 6 Conclusion

Internship is an opportunity to acquire a real life experience of what I learned in my academic life. Working as an intern in the Network operations center of BDCOM Online Ltd. I have learnt to be dedicated to the job. Dedicative mindset is the most important thing to work in such a sophisticated environment. It is beyond mere official matter. For most of the engineering or technical company, the engineers have to get attached with the working process.24x7 service monitoring has taught me how to handle technical staffs in an efficient manner. As there was an opportunity to serve BDCOM Online Limited many ways. I have gathered a lot of experience throughout the entire internship period. There was a scope in the field of computer network planning and designing, Data connectivity, ensuring security, different types of application configuration. I have learned so many significant procedures from my supervisors and colleagues and conducted some tasks on a regular basis throughout my entire Internship period and ultimately earned the confidence to deal with Assignment myself. It is a great opportunity to use the knowledge and skills that I had acquired. I also learned how to handle critical faults and got the new ideas. Doing this kind of work is really helpful for my career and I like to do this kind of work again.

References:

http://openbookproject.net/courses/intro2ict/networking/intro.html https://en.wikipedia.org/wiki/Computer_network http://www.pctechauthority.com/learn-pc-networking/intro-to-networkcommunications.html http://www.bdcom.com/ http://www.bdcom.com/profile.html http://www.bdcom.com/factsheet.html http://www.eetimes.com/document.asp?doc_id=1278363 http://www.cootrack.net/index_en.shtml http://smarttracker.com.bd/accounts/signin/?next=/ http://cacti.smile.com.bd/ http://mailx.bdcom.net/nagios/ http://210.4.76.3/nagios3/ http://114.31.7.2:81/nagios/ http://www.scte.org/documents/pdf/CCNA4%20Sample.pdf http://www.scte.org/documents/pdf/CCNA4%20Sample.pdf http://upload.ecvv.com/upload/Product/20098/China_Fiber_Optic_Media_Converter2009828 1545522.jpg http://www.ndm.net/lan/images/stories/cisco/routers/Cisco-2801-Integrated-Services-Router.jpg https://en.wikipedia.org/wiki/Router_%28computing%29 https://en.wikipedia.org/wiki/Network_switch https://en.wikipedia.org/wiki/Fiber_media_converter https://en.wikipedia.org/wiki/Power_over_Ethernet http://www.solarwinds.com/network-performance-monitor.aspx https://en.wikipedia.org/wiki/MikroTik