

**EMPIRICAL STUDY ON NETWORK MONITORING, MIKROTIK  
ROUTER AND RADIUS SERVER CONFIGURATION OF MERITS  
TECHNOLOGIES LIMITED**

**BY**

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This Report Presented in Partial Fulfillment of the Requirements of the  
Degree of Bachelor of Science in Electronics and Telecommunication  
Engineering

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**DAFFODIL INTERNATIONAL UNIVERSITY**

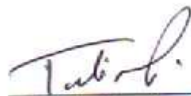
**DHAKA-1207, BANGLADESH**

**OCTOBER 2019**

## **APPROVAL**

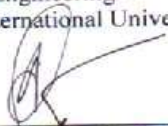
This Project titled “**Empirical Study On Network Monitoring, Mikrotik Router and Radius Server Configuration**” submitted by Mahsabin Akter and Md. Emran Hossain Maruf to the Department of Electronics and Telecommunication Engineering (ETE), Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Electronics and Telecommunication Engineering and approved as to Its style and contents. The presentation was held on October, 2019.

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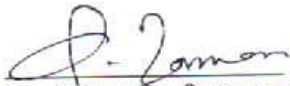
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## DECLARATION

We hereby declare that this project is our own work and effort under the supervision of **Prof. Dr. A.K.M. Fazlul Haque, Associate Dean, Faculty of Engineering and Professor, Department of Electronics and Telecommunication Engineering, Faculty of Engineering, Daffodil International University, Dhaka.** It has not been submitted anywhere for any award. Where other sources of information have been used, they have been acknowledged.

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The genuine sprit of accomplishing an objective is through the method for greatness and grim order. We would have never been prevailing with regards to finishing our assignment without the participation, support and help gave to us by different characters.

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We might want to offer our heartiest thanks to **Md. Taslim Arefin**, Associate Professor and head, Department of Electronics and Telecommunication Engineering, for his caring assistance to complete our proposition and furthermore to other employees, the staffs of the ETE Department of Daffodil International University.

We want to convey my gratefulness **Merits Technologies Limited** who helped me greatly by providing valuable suggestions whenever required my internship report they also gave the opportunity to hold that flagship of the topic. We would conjointly like provide to acknowledgments everybody of the Information Technology (IT) Department of Merits Services Technologies Limited. (for providing suggestion on what is told way to) work in addition what's the procedure to figure in a very sensible manner and also how to make the post report in a better way. They helped me in many ways by allowing no matter help I required. Otherwise it was insufferable for me to complete our report.

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**Mahsabin Akter**

**Md. Emran Hossain**

## **ABSTRACT**

This report centers around plan, usage and observing of an IT & Software solution service provider system. Web access Provider can give different administrations like information availability administration, Internet administration, Security guarantees, Fiber optic systems, Network foundation structure and systems of support and backing. In a giant business organize foundation, IT support gives reinforcement connects that can keep up a system in any event, when impromptu blackout happens. To guarantee most extreme accessibility of a planned system it is troublesome when power blackout or burden shedding happens. On the off chance that we can plan a system that is progressively useful, increasingly secure, exceptionally solid and faster, then it will be progressively helpful for any associations. In addition, on the off chance that we can guarantee greatest progression of a system by utilizing excess connections, control reinforcement by utilizing sustainable power source and appropriate checking then the nature of administration of the system will likewise increment.

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# Chapter 1

## INTRODUCTION

### 1.1 Introduction

In the broadest terms, individuals like to see the Internet as a cloud, you put your information in one spot, It turns out the spot you need It to on the opposite side. As a general rule the web is a huge number of kilometers of fiber optic link, several thousands to a huge number of kilometers of copper wire, and equipment and programming associating them all mutually in a pointless, speedy, and autonomous system. Yet, not to be on edge, It's not so terrible: you just must be on edge about an extremely little segment of the system, you can let another person be worried about the unwind, and you even get somebody to shout at when things turn out badly. I had a chance to work with most driving IT and Software arrangements that is Merits Technologies Limited [3]. I view myself as opportune to get an opportunity to investigate their improvement strategies, working models, bargains and mechanical conduct. Furthermore, I was aiming to investigate the Networking Industry and what it looks like for all intents and purposes, how they cooperate wIth their customers, how they plan a framework and what are their principles in their ecological work. I found the opportunity to work in IT office and design Mikrotik Router, Radius server and Cash server in Merits Technologies Limited. We realize PC systems administration is the central piece of our advanced life. I chose to think about PC systems administration and how can It work, how to structure a wide zone system and spine organize, what are the significant keys to plan a valuable system, how might I configuration financially savvy system and how to relieve vacation of a system.

### 1.2 Motivation

Motivation is a big power for every man. If you have a low power of motivation you don't successes in your life. In this world whose persons who have a motivation power he must be arrive his/her goal. If we know the full environment of a network system and a Mikrotik Router, Radius server & Cash server configuration we must be adjust with the system. It remains that it is a big power for network environment with us. If we understood the full system of network system and if we adjust with us we can challenge every part of my technical life.

### **1.3 Objectives**

Extreme goal of our internship is to set ourselves up as a qualified one in the focused activity advertise. In this way, this is exceptionally successful of ability improvement. we might want to assemble some uncommon quality to give myself as gifted one. Temporary job in applied science is intended to supply work skill with the IT, whereas students area unit still in learning to coordinate job expertise with educational coaching, and to assist student to create the transition from room to job. Self-motivated and self-directed a desire to work.

### **1.4 Summary of the Company**

Merits Technologies Limited has been one of the main network access supplier organization in the region Baridhara, Gulshan, Banani as well as national wide. We give best IT & Software solutions and friend's clients per the necessity of client's aspiration. We have 15-year business aptitude. We are at show serving in excess of 700+ companies and corporate clients across national wide. Our best groups of profoundly qualified and encounter build whom we assurance will give the stature conceivable gauges of workmanship. We are constantly one stage ahead in this focused field.

#### **1.4.1 WHY CONNECT WITH US?**

- We have 24/7 maintain Services
- 99.99% Uptime assurance
- 15+ Years of examine knowledge
- 7000+ Customer faith

#### **1.4.2 PRODUCT AND MARKET SITUATION**

Our main focused areas are

- Border Surveillance
- Cyber Security
- Cyber Forensic Equipment
- Embedded System
- Access Control Service
- Network Security

- Data Center Consulting Service
- Data Center Design and Engineering Service
- Data Center Monitoring and Control Service
- Vulnerability Assessment
- Computer Emergency Response Team
- Cyber Security Service
- Cyber Security Operation Center
- Data Standard Security (PCI)
- Cyber Security Training

## 1.5 Company Profile

Name: Merits Technologies Limited  
 Address: House #5, Road:8/A Nikunja – 1, Dhaka  
 Telephone: +8801914534892  
 Email: *info@merItstec.com*  
 Website: <https://merItstechnologies.com/index.html>

## 1.6 REPORT OUTLINE

**First Chapter:** Introduction of our work, Motivation, & objectives of our work, summary of the company, service provided by Merits Technologies Limited, it's profile and Report layout are described in this chapter.

**Second Chapter:** We have described about daily task and activities, Events and Activities and Challenges.

**Third Chapter:** The monitoring technique as well as the tools of monitoring a IT & software solutions company, which was our one of major task during our work has been described here. Cacti, MTGA graphical presentations, Weather maps, Winbox and other basic monitoring tools which were used by us in our internship period.

**Fourth Chapter:** Configuration a Mikrotik router was the most challenging task in our work and in this section, we are trying to write the steps to configure a Mikrotik router that we configure during our work.

**Fifth Chapter:** Radius Server or Radius manager, Radius server home page, difference radius and active directory, Wi-Fi security, advantage of radius, Authentication, Actives client list, Mbps history show, Billing update, Clint form update are defined here.

**Sixth Chapter:** This is the last chapter of our report and we have conclude our hole work, tasks and activities of our internship work.

## Chapter 2

### TASKS AND ACTIVITIES

#### 2.1 Daily Tasks and Activities

- **Month - 1:** First month of internship on Merits Technologies Limited we have learned the following:
  - Network Components.
  - Basics of Router.
  - Basics of switch.
  - Media Converter.
  - Power over Ethernet (PoE).
  - Fiber Optic.
  
- **Month – 2:** The following tasks were assigned to us
  - Design of a network.
  - Planning of a network.
  - LAN connection.
  - IT support system.
  - Radius Sever Maintained
  - MikroTik Router.
  
- **Month – 3:** We performed the following tasks:
  - Configuration of Mikrotik Router.
  - IP address.
  - DNS server.
  - Route.
  - Bandwidth Manage.

## **2.2 Activities**

- Monitor Computer Systems and Network.
- Setting up client records, consents, and passwords.
- Troubleshooting.
- Troubleshooting neighborhood and switches.
- Fixing system flaws.
- Technical bolster for individuals utilizing the system.
- Day to day administrator and checking of system utilize.
- Suggesting IT answers for business issues.
- Client Support via telephone or Physical move to customer Ends.

## **2.3 Project Task and Activities**

Task is exactly the same thing as associate degree activity, others say that a task is a work package that may embody one or a lot of activities, and at last, to create things more confusing, associate degree other cluster of Project Managers believes that the previous statement is simply true once inverted: an activity is a work package that may embody one ore a lot of tasks.



## CHAPTER 3

### NETWORK MONITORING

The fundamental works of monitoring a network is to guarantee the best possible upkeep benefit, giving dependable association with the customers, guarantee high security of the system and giving required data identified with the system to customer.

**3.1 Support technique:** Monitoring of the whole network is the main task of NOC department. For monitoring purposes Prisma digital IT service providers use Network Performance Monitoring tools like Weatherman, bandwidth, uplink and Downlink of optical fiber and Cacti.

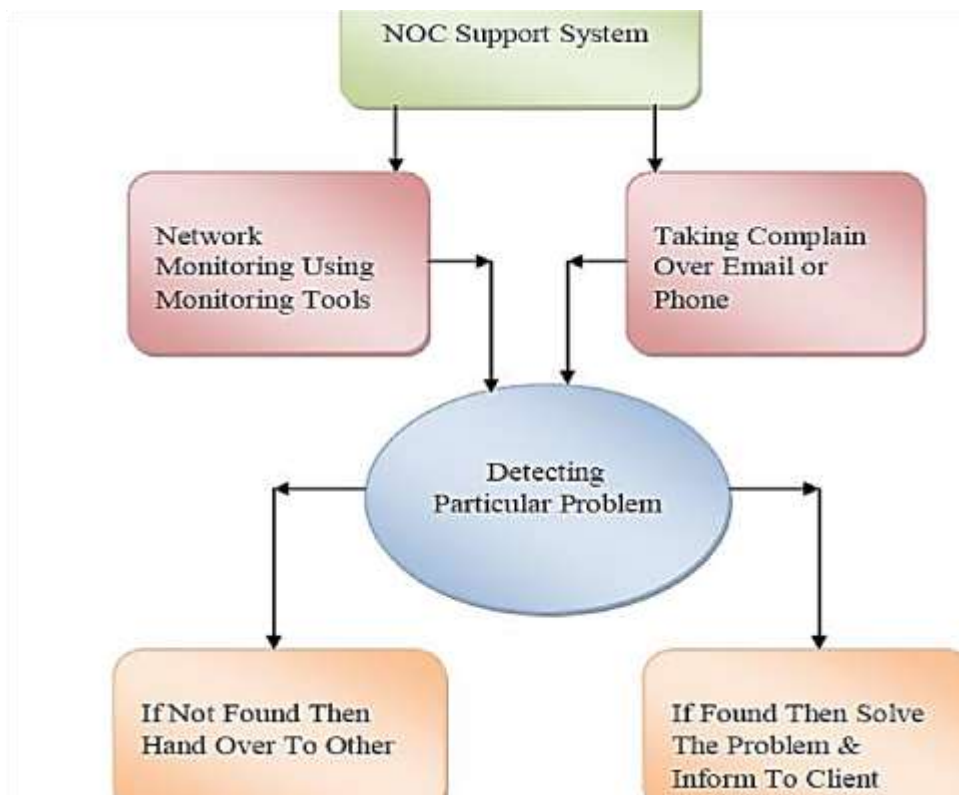


Figure 3.1: Support technique

## 3.2 Network Monitoring Using Monitoring Tools

Firstly, we describe the deceive network monitoring tools.

- Cacti
- Weather map
- MRTG
- Winbox
- Switch port status

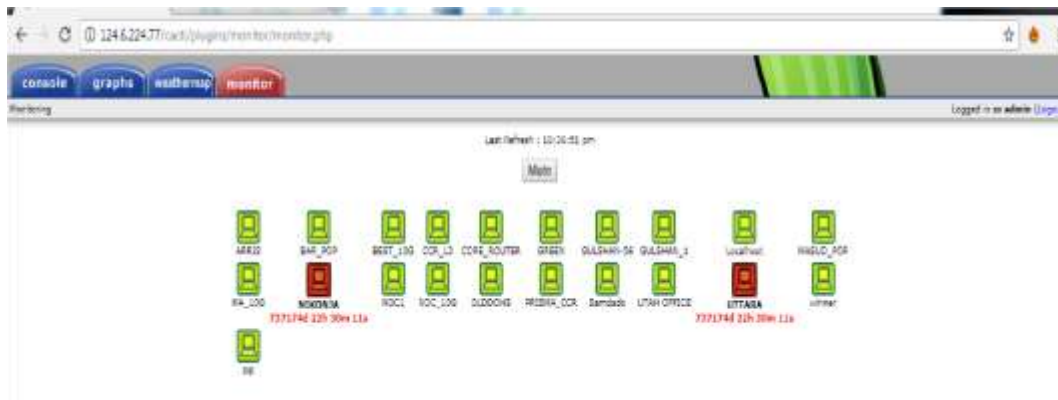
### 3.2.1 Cacti

Prickly plants is a whole framework outlining course of action planned to equip the vitality of RRD Tool's data amassing and graphing helpfulness. Thorny plants give a speedy poller, moved outline tinplating, various data acquiring methodologies, and customer organization features. Most of this is enclosed by a fundamental and easy to use interface that looks good for LAN-examined foundations to complex frameworks with a few contraptions.



**Figure 3.2: Cacti**

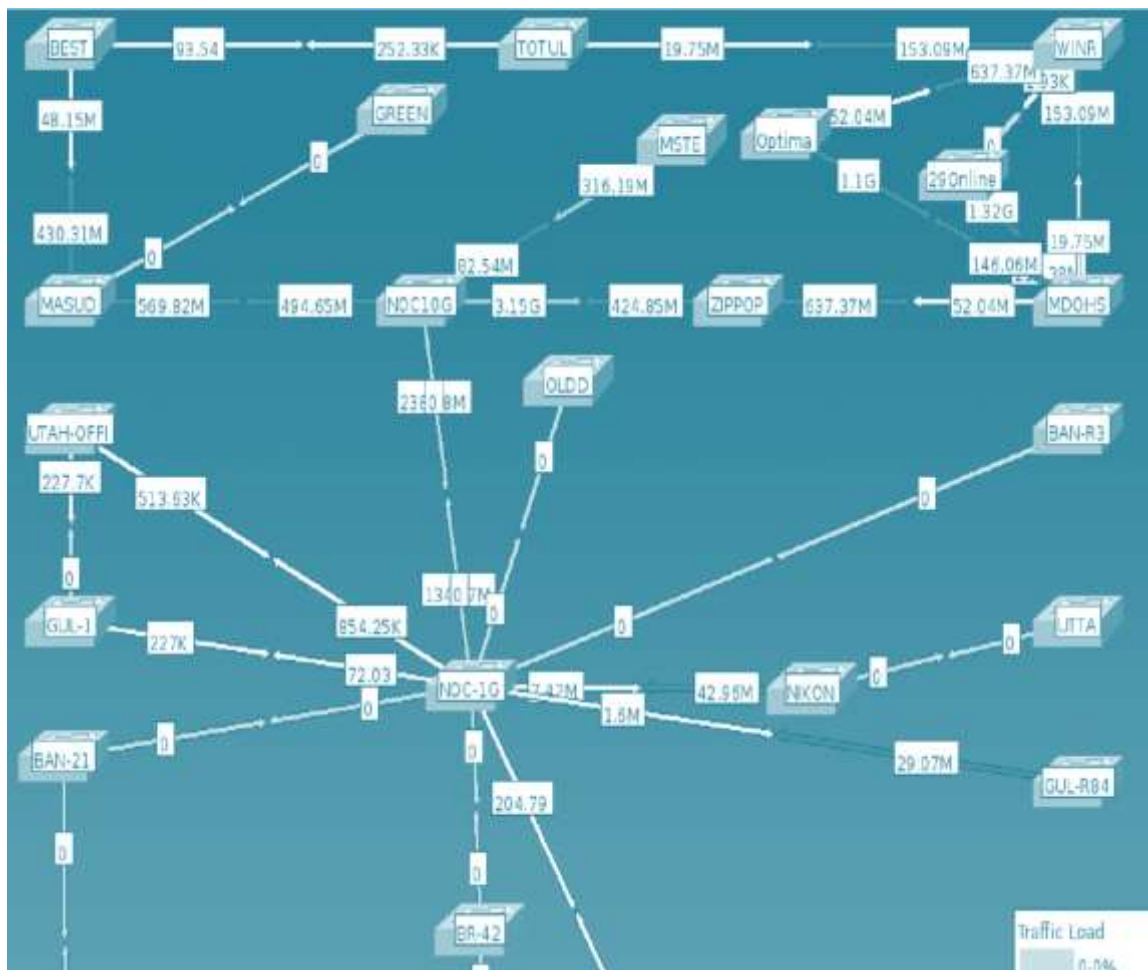
Monitoring pop in cacti software. This software pop and down work. If pop is going down then maintenance work have to be down. POP down cacti software found red single pop up monitor found green single.



**Figure 3.3: Cacti**

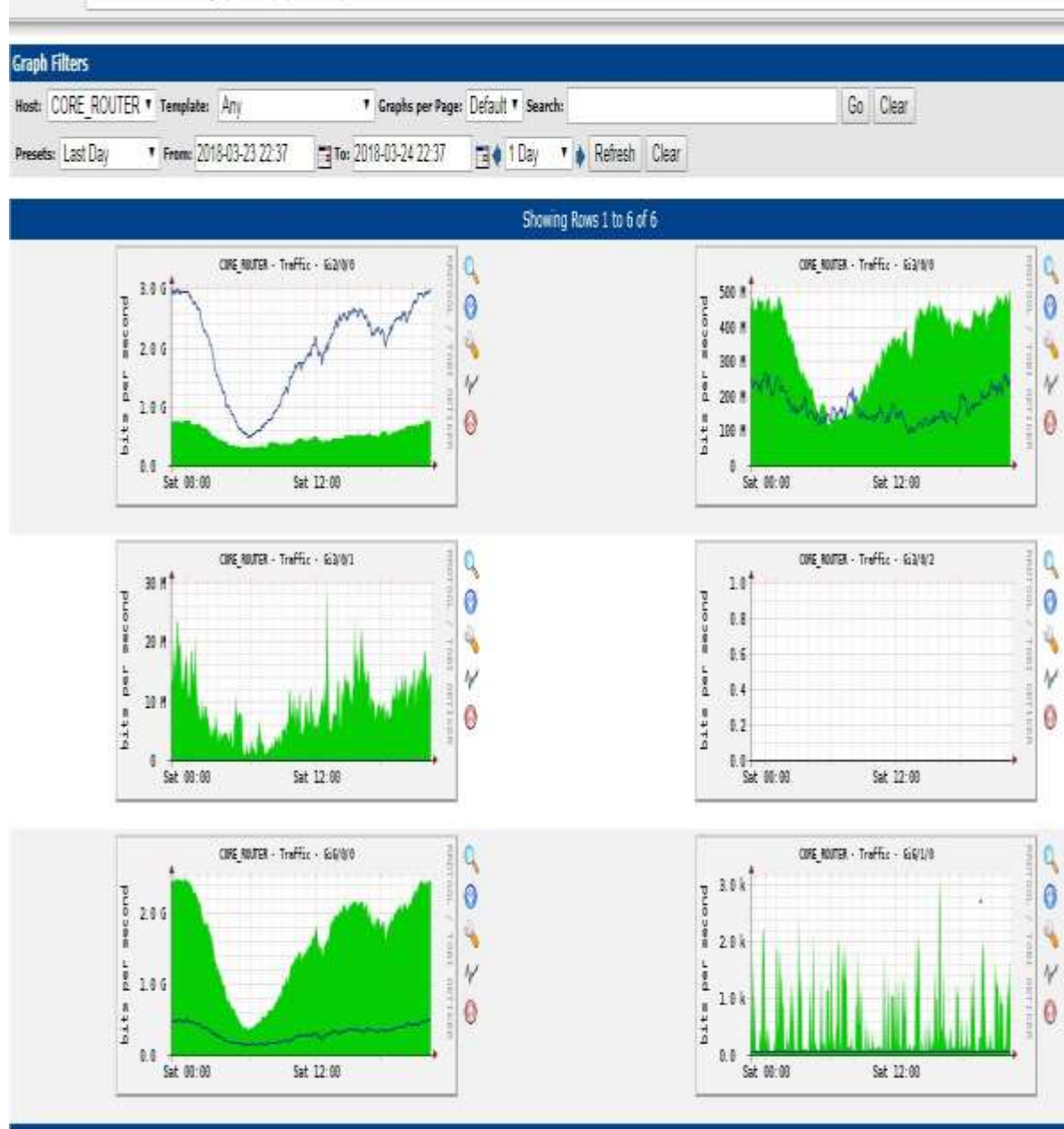
### 3.2.2 Weather map

Weather map is cabling monitoring software. Monitoring to see sites are going smoothly or not. Checking bandwidth by weather map .Also checking there is fiber cut or not by weather map.



**Figure 3.4: Weather map**





**Figure 3.7: MRTG INDEX PAGE (Traffic summary of different router and weather map)**

### 3.2.4 Winbox

Winbox is one of the interfaces to design the Mikrotik Operating System switch which is as of now a prevalent running on the working framework Microsoft windows and MAC. It is more useful for graphical UI and furthermore has comfort framework. Here are a few particulars of Mikrotik switch utilizing Winbox.

#	Name	Target	Upload Max Limit	Download Max Limit	Upload	Download
363	501992-Abdul Wahid	124.6.229.112	2M	2M	0 bps	0 bps
360	501490-zulfkar	124.6.229.115	2M	2M	0 bps	0 bps
457	501707-Nasent Garden 4	124.6.229.117	2M	2M	0 bps	0 bps
373	500120-Ahneque Uz Zaman	124.6.229.120	2M	2M	635 bps	461 bps
334	502115-Murazzam	124.6.229.125	2M	2M	0 bps	0 bps
412	500524-Israt akram	124.6.229.133	2M	2M	0 bps	0 bps
411	501628-Mr Saleuddin Raikha	124.6.229.135	2M	2M	0 bps	0 bps
385	501934-col. Iqbal rahman	124.6.229.136	2M	2M	262 bps	467 bps
384	503121-HMT Engineering CSC	124.6.229.137	2M	2M	1918 bps	8.2 kbps
383	502946-Keya Group (Residence)	124.6.229.138	2M	2M	1320 bps	0 bps
380	502804-Wing. Com. Pol. Hrn. Shaidul Islam	124.6.229.140	2M	2M	0 bps	0 bps
351	502213-Dr. MD Hossain Aneer	124.6.229.143	2M	2M	0 bps	0 bps
488	502501-Syed Musarr Aman	124.6.229.150	2M	2M	0 bps	0 bps
429	500696-Abdul Moniam	124.6.229.152	2M	2M	0 bps	135 bps
263	500261-SARA ALAM	124.6.229.158	2M	2M	757 bps	1117 bps
262	502298-Zinat H	124.6.229.159	2M	2M	6.0 kbps	3.3 kbps
259	502101-DR. Salm. Gulshan 2	124.6.229.162	2M	2M	0 bps	0 bps
257	501324-Dr. Muzanur-Rahman-Gul	124.6.229.164	2M	2M	0 bps	0 bps
256	501986-COI TAREQ	124.6.229.165	2M	2M	0 bps	0 bps
254	501771-Ahmedur rahman	124.6.229.168	2M	2M	0 bps	0 bps
249	501850 M A Hasib	124.6.229.171	2M	2M	29.2 kbps	11.8 kbps
248	501736-rasid sultana	124.6.229.173	2M	2M	0 bps	0 bps
233	502998-Ayan	124.6.229.174	2M	2M	0 bps	0 bps
243	masud manouf para (complementary)	124.6.229.178	2M	2M	0 bps	0 bps
242	501162-Pazzak	124.6.229.180	2M	2M	0 bps	0 bps
238	502012- nasul islam	124.6.229.184	2M	2M	0 bps	0 bps
447	503072-Eng. Murad (Subeatu Mububata)	124.6.229.193, 124.6.229.235	2M	2M	5.1 kbps	56.0 kbps
423	502870-Hafzul islam	124.6.229.195	2M	2M	0 bps	0 bps
443	501862-Ambob Farhad	124.6.229.214	2M	2M	0 bps	0 bps
440	502198-Ambob Farhad 2	124.6.229.215	2M	2M	0 bps	0 bps
386	502502-Sheerin Dream	124.6.229.224	2M	2M	0 bps	0 bps
382	502184-Shahadat Hossain -VP	124.6.229.227	2M	2M	12.4 kbps	86.5 kbps
408	502190-Abide sultana	124.6.229.232	2M	2M	0 bps	0 bps
388	502210 Sayidul_Baidhara	124.6.229.242	2M	2M	888 bps	322 bps
461	502998-Rashed Haque problemmmmmmmmmmm	124.6.229.251	2M	2M	0 bps	0 bps
454	IBRAHIM_HOME	124.6.229.254	2M	2M	0 bps	0 bps
471	500635 HUNYARA KHALEQ	124.6.231.8	2M	2M	0 bps	0 bps
389	502706-Admah Internasional Ltd	124.6.231.10	2M	2M	930 bps	1024 bps

Figure 3.8: Winbox

Winbox Work to increase the bandwidth and reduce the customer MAC address. If we get customers message we understand that the internet is working and the internet does not work if there is no MAC address.

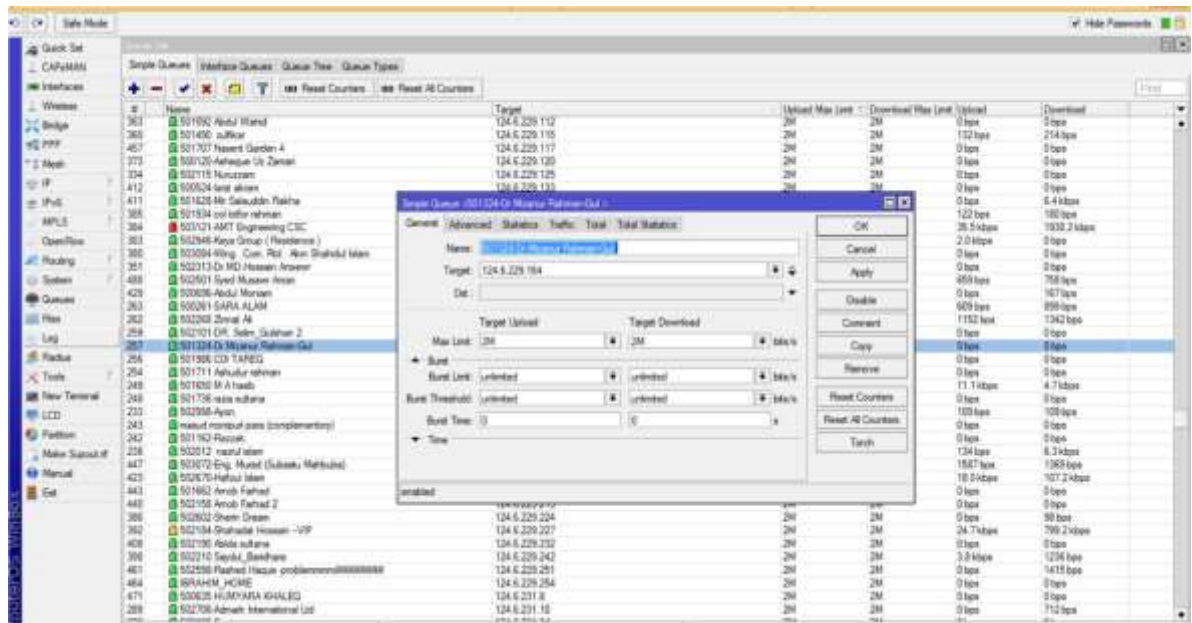
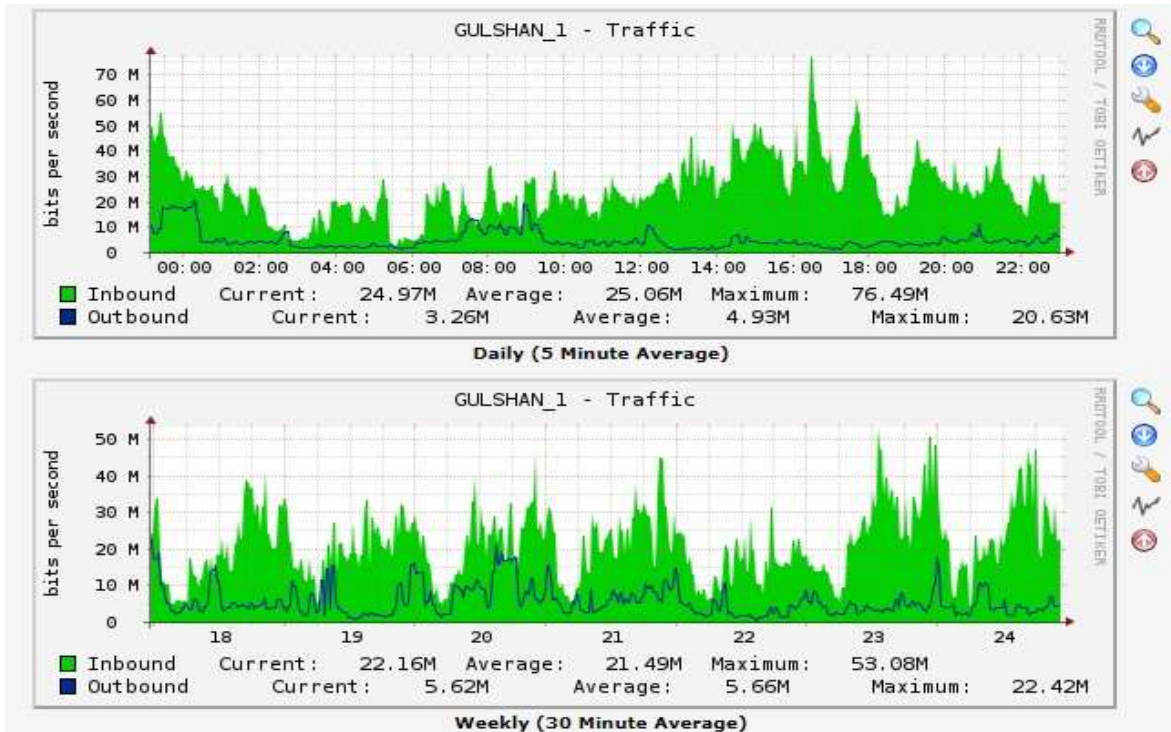


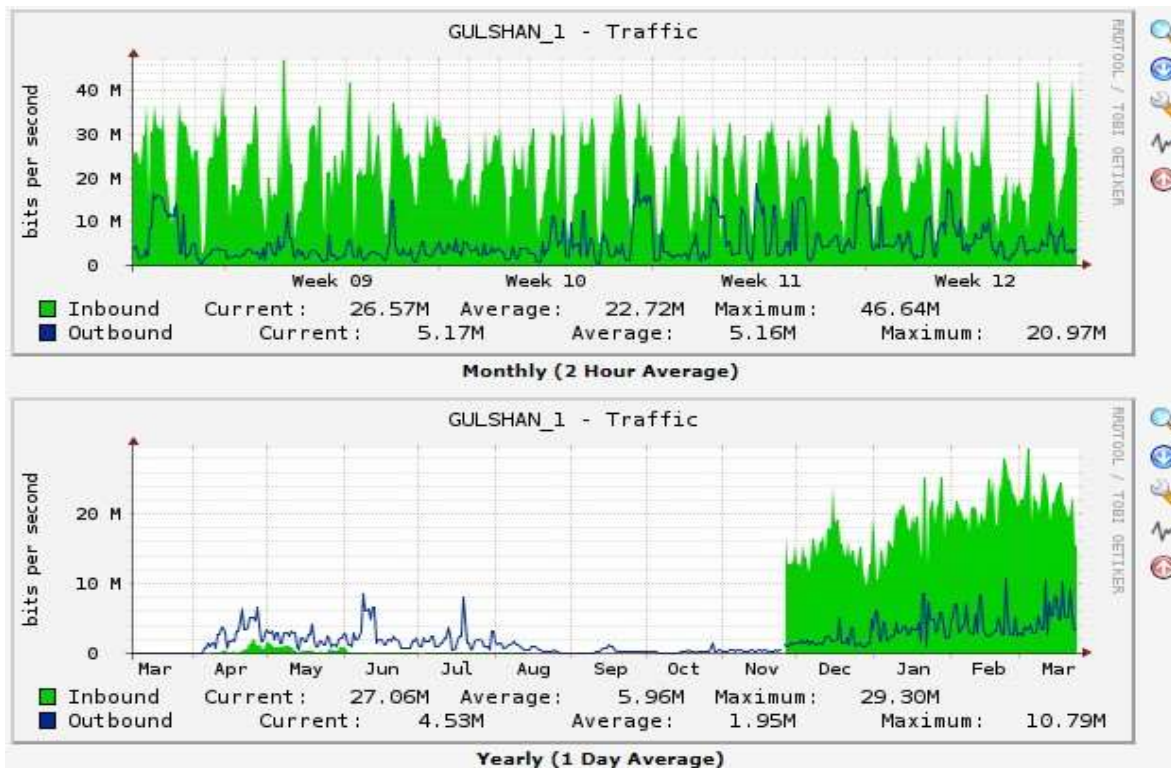
Figure 3.9: This picture shows how bandwidth is offered to customer.



Figure 3.10: bandwidth offered to customer



**Figure 3.11: Live monitoring of Bandwidth offered to customer**



**Figure 3.12: Live monitoring of Bandwidth offered to customer**





Figure 3.13: The image is calling customer manageable software .Through this image the customer can see how much bandwidth use is doing.

The screenshot shows the 'Devices' page in Cacti. It features a table listing various network devices. The table has the following columns: Name, Type, Status, In Use, Hostname, Current (ms), Average (ms), and Availability. The data is as follows:

Name	Type	Status	In Use	Hostname	Current (ms)	Average (ms)	Availability
ARIKIS	24	2	2	124.6.224.40	2.63	3.94	99.89
BAR_POP	22	8	8	124.6.224.229	1.88	2.11	95.72
BEET_10G	17	3	3	124.6.224.220	2.82	3.45	95.4
COR_L3	8	4	4	124.6.224.241	7.18	26.97	99.88
CORE_ROUTER	20	8	8	124.6.224.22	1.11	29.69	92.92
GREEN	28	2	2	124.6.224.228	4.95	5.72	97.34
GULSHAN-05	28	2	2	124.6.224.227	1.53	5.21	95.59
GULSHAN_3	29	3	3	124.6.224.223	1.97	3.0	95.49
Localhost	1	3	3	127.0.0.1	0.12	0.48	100
MADUD_POP	22	8	8	124.6.224.243	2.28	3.88	90.41
NA_10G	15	3	3	124.6.224.248	1.82	3.5	96.23
NEONS	40	4	4	124.6.224.252	1.66	2.86	95.57
NIKONIA	22	2	2	124.6.224.246	1.18	1.39	96.89
NDCL	2	28	28	124.6.224.247	2.76	7.07	96.92
NDG_10G	14	7	7	124.6.224.226	1.59	4.38	95.73
OLDDGHS	28	2	2	124.6.224.242	5.38	3.2	97.3
PRISMA_CCE	22	8	8	124.6.224.50	7.07	25.88	95.87
Sandaly	22	2	2	124.6.224.234	3.42	15.24	95.42
UTAW OFFICE	28	2	2	124.6.224.242	1.47	5.61	96.57
UTAWA	24	1	1	124.6.224.225	1.88	2.07	96.69
winner	4	8	8	124.6.224.238	124.82	5.98	95.08
zfp	3	4	4	124.6.224.229	1.87	1.38	95.43

Figure 3.14: The image is calling customer manageable software .Through this image the customer can see how much bandwidth use is doing.

### 3.2.5 Switch port status

Switch port status, transmit and receive alert for individual nodes.

System Information	
Device Type	SWITCH
BIOS Version	0.4.0
Firmware Version	2.2.0A
Serial No.	20013062273
MAC Address	00E0.0F3F.B628
IP Address	124.6.224.245
Current Time	1970-1-22 10:32:4
Uptime	21 Day -10 Hour -32 Minute -4 Second
CPU Usage	11%
Memory Usage	50%

Figure 3.15: Switch device information

Here is the situation of various port status on an individual switch. On the left side, green shading comments the UP status of switch port, red shading comments the down status and red crossed

Port	Admin State	Operational State	MAC Address	Speed	Duplex	Link Status
g0/7	Enable	Down	00E0.0F3F.B62F	---	---	OFF
g0/8	Enable	Down	00E0.0F3F.B630	---	---	OFF
g0/9	Enable	Down	00E0.0F3F.B631	---	---	OFF
g0/10	Enable	Down	00E0.0F3F.B632	---	---	OFF
g0/11	Enable	Down	00E0.0F3F.B633	---	---	OFF
g0/12	Enable	Down	00E0.0F3F.B634	---	---	OFF
g0/13	Enable	Down	00E0.0F3F.B635	---	---	OFF
g0/14	Enable	Down	00E0.0F3F.B636	---	---	OFF
g0/15	Enable	Down	00E0.0F3F.B637	---	---	OFF
g0/16	Enable	Connect	00E0.0F3F.B638	1000Mb/s	Full	OFF
g0/17	Enable	Down	00E0.0F3F.B639	---	---	OFF
g0/18	Enable	Down	00E0.0F3F.B63A	---	---	OFF
g0/19	Enable	Down	00E0.0F3F.B63B	---	---	OFF
g0/20	Enable	Down	00E0.0F3F.B63C	---	---	OFF
g0/21	Disable	Down	00E0.0F3F.B63D	---	---	OFF
g0/22	Enable	Down	00E0.0F3F.B63E	---	---	OFF
g0/23	Enable	Down	00E0.0F3F.B63F	---	---	OFF
g0/24	Enable	Down	00E0.0F3F.B640	---	---	OFF
tg0/1	REST POP	Connect	00E0.0F3F.B641	10000Mb/s	Full	OFF
tg0/2	Enable	Down	00E0.0F3F.B642	---	---	OFF
tg0/3	NOC BANANG	Connect	00E0.0F3F.B643	10000Mb/s	Full	OFF
tg0/4	Green Road POP	Connect	00E0.0F3F.B644	10000Mb/s	Full	OFF

Figure 3.16: Switch port status for one node.

### 3.3 Taking Complain Over Email or Phone

When the customer is complain customer service then call her ID number. (Example: 506178).Customer service compline send the customer Support is the first check customer compline. Then update the latter in take box with problem and try to solve its problem. For example the picture below.

SL	Ticket ID (EDIT)	Client Name (Detail)	Complain/Problem	STATUS
1	12242017-170947	Bio Dent.....503100	New Connection Form forward to Mr. Mamun and Ibrahim.....Hasan	PENDING
2	01222018-115552	SAS Group-502482	No Connection	PENDING
3	01222018-111241	MD. Atzur Rahman.....502985	T. D.C To Re Connection.....Form Forward to Mr. Zakir Ref: Siraj Biling	PENDING
4	01222018-111130	DMD Mujibur Rahman	NO CONNACITION	PENDING
5	01222018-105747	Roswitha Amels (German Emb)	T.D.C. From Forwarded To Mr.Zahidul . .....Rubel .....	PENDING
6	01222018-105700	Mehrin-501877	No Connectivity	PENDING
7	01222018-105248	Cor.Salam-502419	No Connectivity	PENDING
8	01222018-105228	A B M Shajahan	D.C. From Forwarded To Mr.Zahidul . .....Rubel .....	PENDING
9	01222018-083633	Col Salam ---- 502385	No Connectivity	PENDING
10	01212018-210947	Sohel.....500549	No Connectivity	PENDING
11	01212018-203542	Shabir Hussain.....501003	No Connectivity	PENDING

Figure 3.17: Taking System

▶ Ticket ID	: 12242017-170947
▶ Customer Name	: Bio Dent ..... 503100
▶ Open Date	: 24-12-2017
▶ Open Time	: 06-09 pm
▶ Complain (Trouble)	: <i>New Connection Form forward to Mr. Mamun and Ibrahim.....Hasan</i>
▶ Action (CS)	: <i>01811422217</i>
▶ Action (Support)	: <i>[need to collect A Type MC for house from Zakir vhai ] Talk with customer he will inform us after 18-01-18.....Zahedul.....15-01-18 Talk with customer he will inform us after 24-1-18.....Shakil.....22-1-18</i>
▶ Remark (If any)	: <i>[need to collect A Type MC for house from Zakir vhai ]</i>
▶ Set Ticket Status	: SET - Problem Status ...
▶ Probable Solve Date	: 25-01-2018
▶ Concern Department	: 02 - CUSTOMER_SUPPORT
▶ Ticket Open By	: rubel

Figure 3.18: Taking System

# Chapter 4

## MIKROTIK ROUTER CONFIGURATION

### 4.1 Mikrotik Router of Summary

A switch is one in everything about principal popular switches to any IT arrange additionally as any endeavor work environment organize. MikroTik Router contains a huge amount of systems administration benefits that encourage to make a steady and wash organize subsequently basically [5]. It's previously mentioned that any IT Company or Enterprise working environment can't go one day while not MikroTik Router. Along these lines, the framework executives UN organization aren't exploitation MikroTik Router in any case, they'll by and by start exploitation MikroTik Router, I think. As a PC client, I'm conjointly victimization MikroTik Router concerning three years in my network and very I even have got an awfully stable and swish network. MikroTik Router is particularly famous for data measure the board administration and parcel separating functionalities additionally as ease worth. MikroTik Router is furthermore most loved to any PC client due to having graphical program (GUI) programming framework named Winbox that oversees MikroTik Router in this way essentially. since the use of MikroTik Router is developing apace, this content is intended to bring up the principal setup of a MikroTik Router from horrendously beginning exploitation Winbox programming framework all together that a substitution MikroTik Router client will essentially tack together his/her switch from frightfully starting and may work his system swimmingly.

### Fundamentals to Construct a MikroTik Router

Previous to going to begin fundamental configuration of a MikroTik Router you should have under in sequence.

- Necessary acquaintance about IP Addressing.
- A MikroTik Router panel or MikroTik Router OS installed on a PC.
- Winbox Software.
- PC with windows operating organization installed and RJ45cables.

## Configure the router

Primer style has DHCP client on WAN interface (ether1), grasp a rest of the ports are determined your local system with DHCP server intended for mechanical location design on client strategy. To fasten to the switch, you must line your PC to just acknowledge DHCP settings and top inside the persuade in one of all the neighborhood ports.

## Signing into the the router

To entrée the router enters address 182.169.10.0



Figure 4.1: log in system

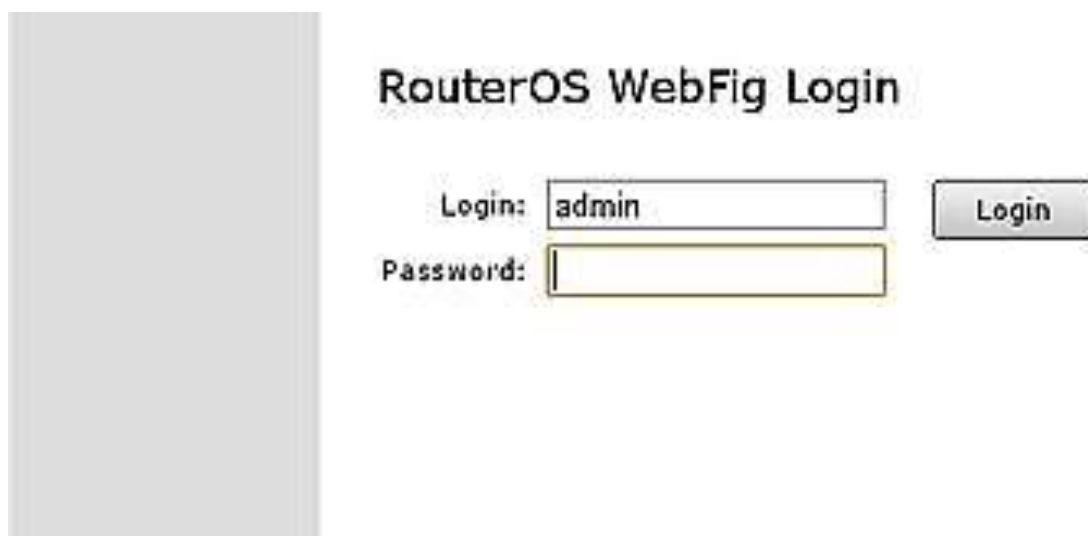


Figure 4.2: Log In Form

## 4.2 Configure access to internet

In the event that preparatory on the figuration did not exertion (IT isn't given that DHCP server for routine setup) at that point, we will contain to incorporate subtle elements from our IT for the static design of the switch. These settings should take in.

- IP address you protect the utilization
- Network veil for the IP address
- Default door address
- Less vital settings concerning switch setup:
- DNS address for name statement
- NTP server address for time routine setup
- Your past MAC address of the interface confronting IT

## 4.3 Network Address Translation (NAT)

Since we tend to zone unit abuse local and worldwide systems, we must set up organize disguise, so our PC arrange is taken cover behind informatics address gave by IT. That ought to be along these lines, since IT does not comprehend what {neighborhood |LAN PC network} addresses are advancing to utilize and our LAN won't be directed from worldwide system. To check if you have the source NAT open 'IP >>Firewall >> tab NAT' and check click the high- light is in our configuration.

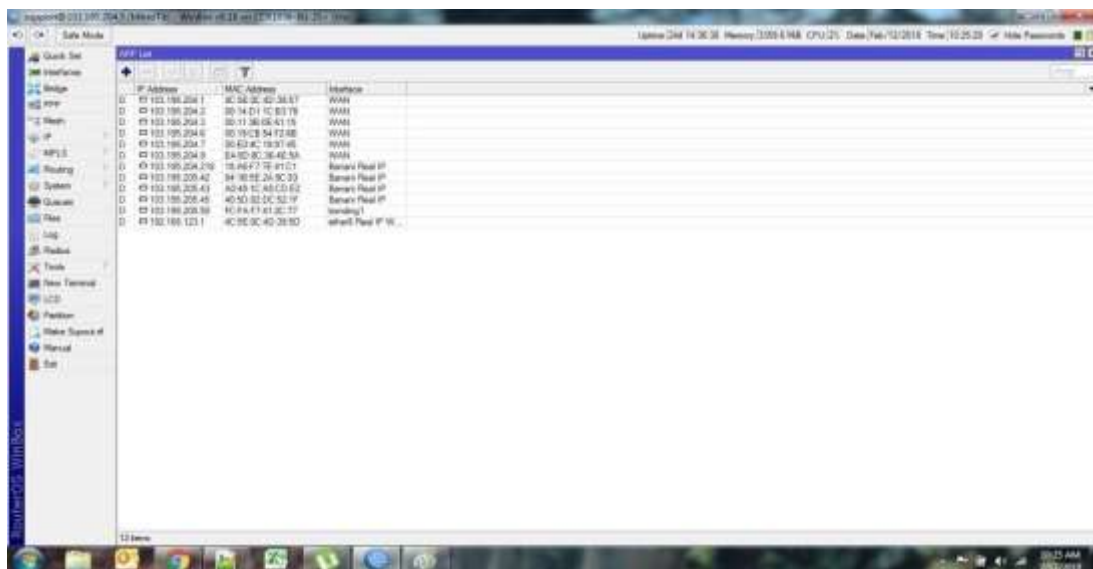
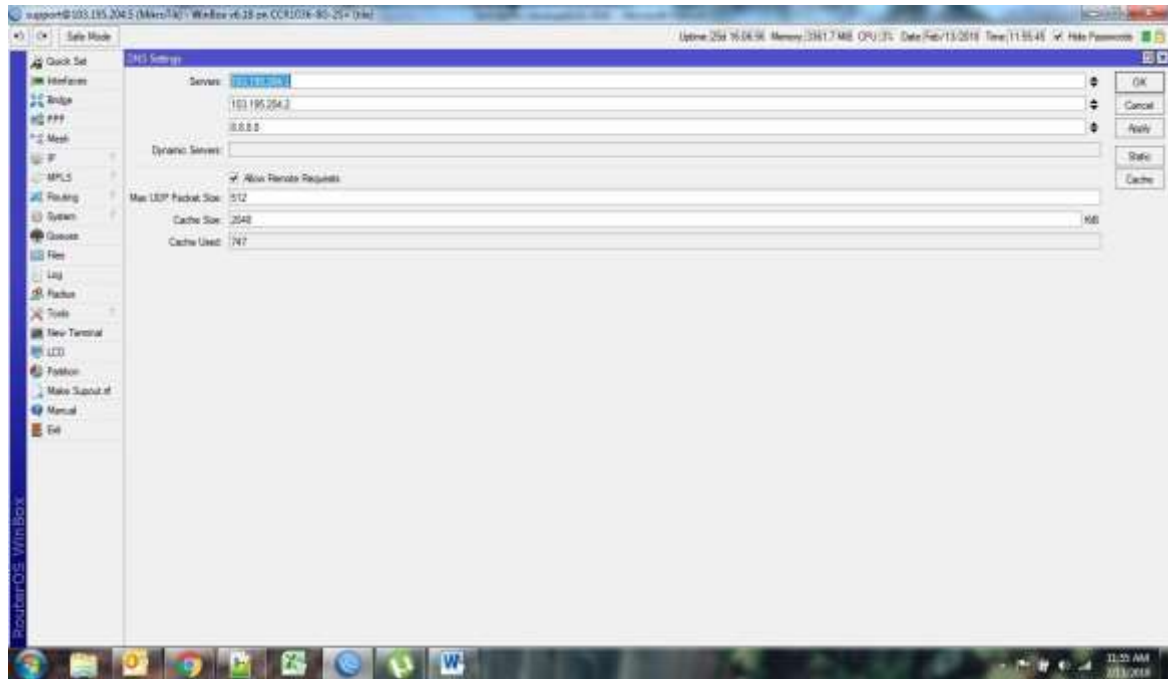


Figure 4.3: NAT

#### 4.4 Domain Name system

On the off chance that you need to open web pages or get admission to net has through region call DNS must be designed, either on your switch or our PC. In the extent of this guide, I will exhibit the main decision of switch arrangement, so that DNS locations are given out by DHCP-Server that you are as of now utilizing.



**Figure 4.4: DNS Sever**

#### DNS server how to open and see the configures flow the Step

Step, this be able to be complete in 'IP --> DNS ->Settings -first Open 'IP -->DNS.

#### Interface Name

Winbox go to interface tab Mikrotik in Mikrotik router's™ is a router operating machine and software program which turns a regular Intel computer or the steps to show Mikrotik into a proxy server with internet proxy in case you left it blank all interface IP will be Mikrotik router net proxy configuration the hotspot characteristic provided by means of Mikrotik

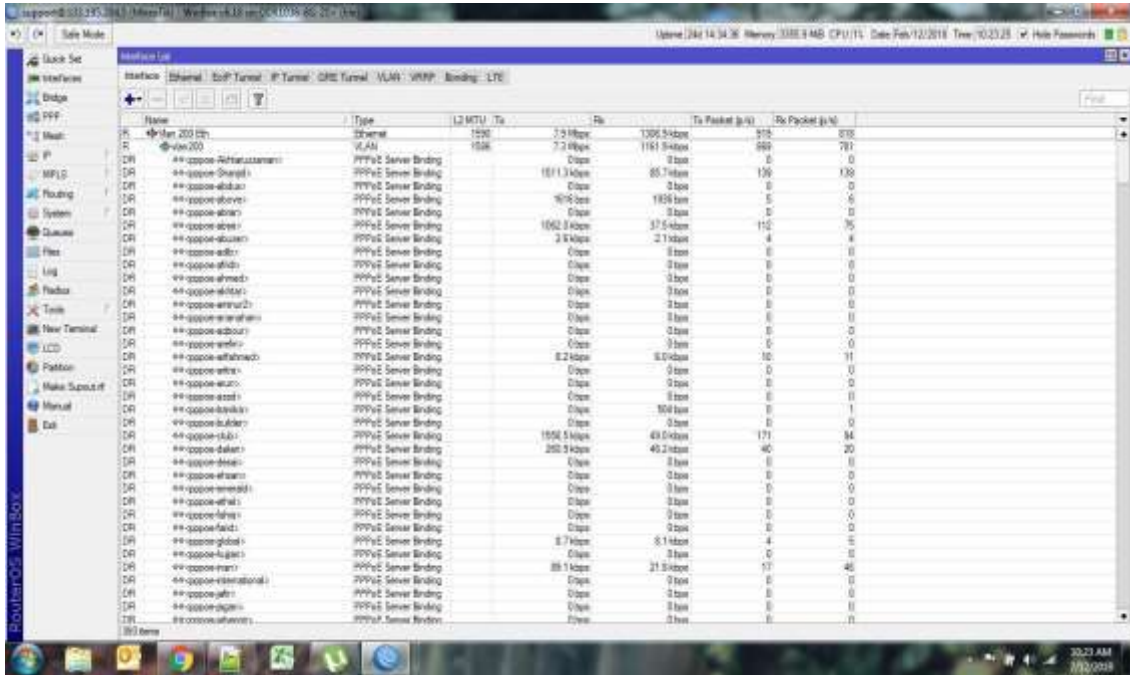


Figure 4.5: Interface Name

### 4.5 Router

Permits defining a set of interfaces for less difficult interface management in special interface primarily based configuration sections which include neighbor a discovery, firewall, bridge and net discover. Sub-menu: menu incorporates information about all available on the router.

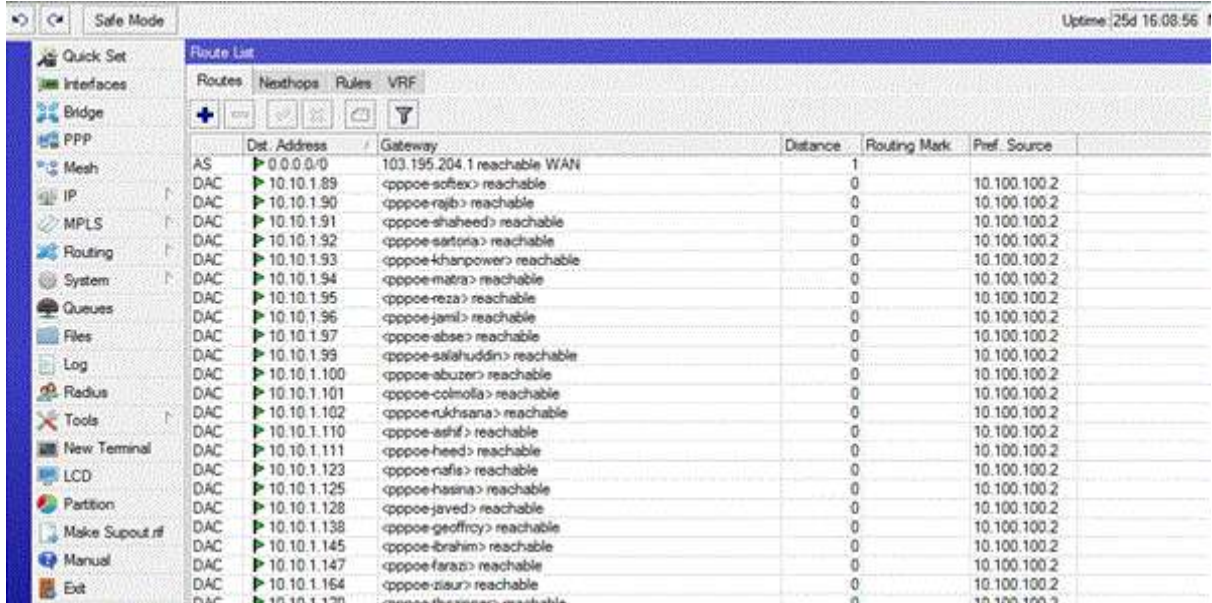


Figure4.6:Routers



## Routers

- Outing records base 2 default direction three multipath (ecmp)routes
- 4 routes with the interface as a gateway 5 route selection 6.next hop research
- 7 forwarding records bases 8 routing desk lookup nine Residences
- General residences 12 Different read-most effective residences thirteen GP path houses

### 4.6 Bandwidth Manage in MikroTik Router

Bandwidth manages is most critical features of the MikroTik router. While we take the fixed bandwidth form IT service providers and distribution neighborhood place network LAN websites. Whilst we take 10 MB bandwidth form IT service providers and I have 20 non-public computer systems, then how I can distribute bandwidth into every laptop. Because of this bandwidth control device is wanted and the [https://mikrotik.com/] MikroTik router is a most lovely bandwidth manipulate the tool. If we assume that, there are lots of workers in an office and all people want internet bandwidth but a few people no want every time want bandwidth and some character each time need bandwidth as according to his work, then we are able to repair bandwidth. Appears that, we take 10MB bandwidth form isp and we can distribute into 20 laptops. every laptop gets 512k if we do now not distribute then some users use full bandwidth and a few users cannot use proper bandwidth even some person don't have any bandwidth for that reason bandwidth manipulate is needed. So we are able to display MikroTik router configures grade by grade now.

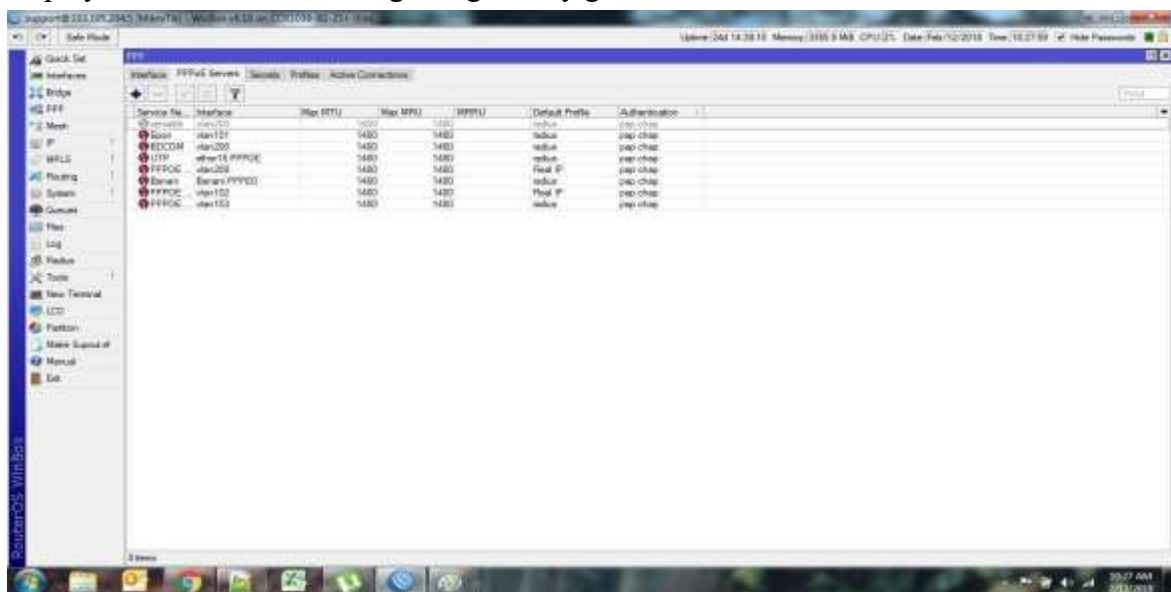


Figure 4.8: MikroTik Router Interface

## Configuration MikroTik Router Interface

Step1: Open winbox> queues > simple queues > click on plus > call= queue1 > goal deal with=192.168.0.5 (NB: your LAN site IP in case you want to govern bandwidth against of unique laptop or unique IP). Target upload, max limit=512k, goal download, max restrict=512k > apply >good enough

Step2: open Winbox> queues > easy queues > click on plus > name= queue2 > target deal with=192.168.0.5 (and your LAN website IP in case you want to manipulate bandwidth against of particular computer or unique IP). Target upload, max limit=512k, goal download, max restrict=512k>apply>adequate

## 4.7 Basic of Winbox

Mikrotik routers™ turns a standard pc laptop right into an effective community router. Just upload preferred community pc interfaces to increase the router talents. Far-flung manage with easy actual-time home windows utility (Winbox)

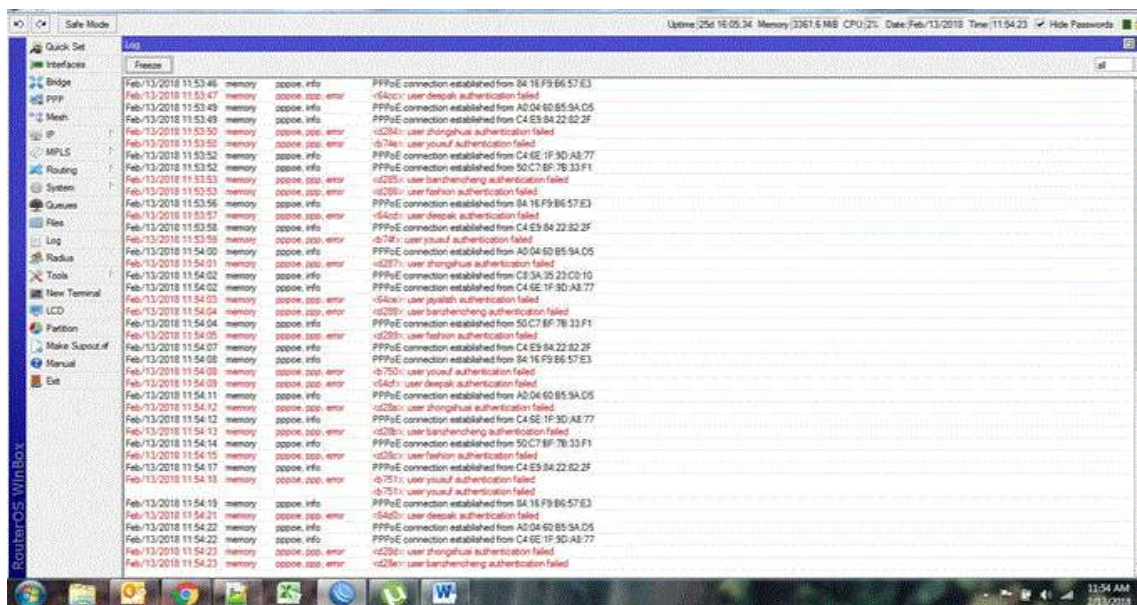


Figure 4.9: MikroTik Winbox to interface

## 4.8 MikroTik Winbox

- Superior pleasant of service management with burst assist
- State full firewall with p2p protocol filtering, tunnels, and IPSec
- Step bridging with filtering competencies
- Words and virtual ape capabilities
- Hotspot for plug-and-play access
- Rip, OSPF, BGP routing protocols
- Gigabit Ethernet ready
- V.35, x.21, t1/e1 synchronous assist
- IP telephony
- Far-flung win box GUI admin
- Telnet /SSH/ serial console admin
- Real-time configuration and monitoring

## 4.9 Challenges

No effort has not tested, but instead four months of my brief position capacity and to share friends in the wake of finding out about the party time, I've found that there is some wide challenges understudy. I think it is that collaborator' three things: unpaid/under, transitory, and they are in a test to get preparing. Now and again, lacking work: There's deficient work doled out to me. I'm totally worn out, underutilized, strumming my fingers at my work zone and allured to investigate Facebook. A ton of work: due to associates are only glad to provoke a foot inside the door, some work spots may exchange out of young staff by giving them appallingly broaden timeframes of idle dull work. Hesitant to make a solicitation: out of the blue there's a joining of work, and I at long last get the opportunity to substantiate myself! Regardless, I'm questionable with respect to x, y,. I may feel the strain to be A self-sufficient and free worker; regardless, it's commonly higher to show vulnerabilities! Try with various Intern: Luckily, I was an understudy; we make a solicitation of one another and can without a great deal of an all-encompassing collaborate with meanders that have worked in packs where there was such a gathering relationship. Understudies in a future work opportunity or a suggestion for a not all that terrible letter will fight in other office conditions, may not be so satisfying.

# Chapter 5

## RADIUS SERVER AND BILLING PLAN

### 5.1 Radius Server or Radius Manager

Sweep faraway confirmation dial-in client bearer (range) could be a shopper - server convention and programming that empowers remote get right of passage to servers to talk with an important server to verify dial-in shoppers and approve their entrance to the asked framework or administration. Vary allows a trial to stay purchaser profiles in an important information that everybody remote server will rate. It manages higher security, facultative an organization to ascertain an approach that may be dead at a solitary controlled system issue [1].

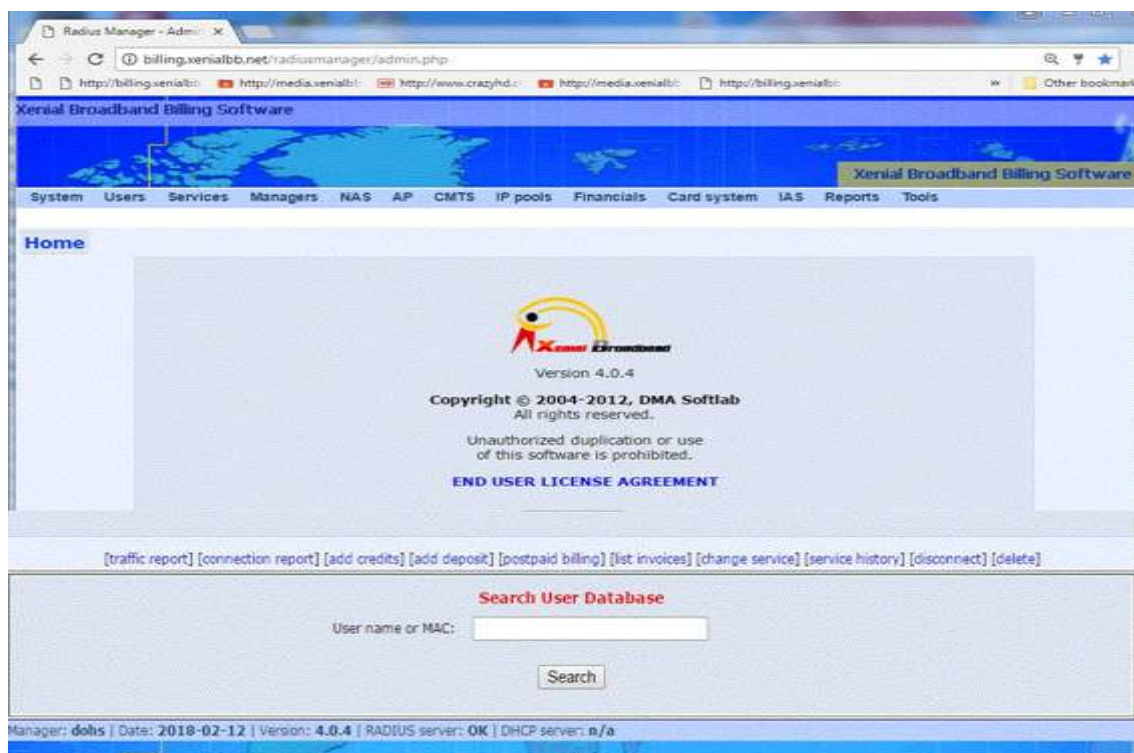


Figure 5.1: Radios server home page

Having a fundamental administration likewise implies that it's less hard to tune use for charging and for protecting group records. Made with the guide of Livingston (now possessed by methods for Lucent), the range is a true venture standard used by some of system item enterprises and is a proposed IETF favored.

## **5.2 RADIUS server and Active Directory.**

For what reason may I need a sweep server if my customers can join and verify with enthusiastic posting? At the point when do I require a range server? Span servers have generally been the open source open door for structures utilizing as indicated by individual validation (accept Wi-Fi arrange that wants a username and secret key) versus pre- shared key (PSK) designs.

In current years, numerous spans based absolutely structures now offer the ability to take advantage of dynamic catalog utilizing central LDAP connectors. [<https://en.wikipedia.org/wiki/RADIUS>] yet again the customary usage of the sweep is group motivate passage to related versus enthusiastic catalog that could have an entire assortment of makes utilization of/usage to answer your inquiry, in spite of the way that you can connect with advert creds you could, in any case, need to utilize the range server to control the discussion for the Wi-Fi client after they've validated through an include.

## **5.3 Wife Security with radius.**

While setting up a Wi-Fi group at household, you ordinarily establishment a sad and secret word, take the conveyance of the defaults for each different choice and be finished with it. (in a few cases, those are accomplished for you by utilizing your transporter organization — you don't have to assume.) you extend the secret word with a hover of relatives and guests, and each individual is happy.

Undertaking Wi-Fi is somewhat stand-out. in the event that you establish a Wi-Fi group in your undertaking with a solitary secret key for all workforce and site guests, that watchword in this way spills out, and individuals (previous representatives, providers, and snoops of various sorts) can sign on your Wi-Fi group whenever. the situation is for the most part awful if the Wi-Fi group gives clients access to delicate certainties, comprising of financials, highbrow possessions, and customer data. you may interchange the Wi-Fi secret word at times, however then you have to convey it to the greater part of the collection of laborers keeping in mind the end goal to sign in yet again, and the issue starts all through. there's a higher way: Wi-Fi validation with a sweep.

#### **5.4 Advantages of radius Wi-Fi authentication.**

Before diving into what range is and how it functions, allows investigate what it gets you Individualized verification. Each client (or instrument) is appointed exceptional certifications for gaining admittance to the Wi-Fi group [4]. No additional passwords sharing, as every client deal with his or her own qualifications.

Match up with LDAP/enthusiastic posting. The machine might be set up with the goal that the clients' system posting passwords are utilized to verify on the Wi-Fi group, allowing single flag on for clients. The wide assortment of usage choices. The range might be connected to a conferred on-preface server, the utilization of purchased span server programming program or a free/open-source decision which incorporates free sweep. Numerous system contraptions and server working structures have range coordinated, so no more programming or equipment purchase is needed.

There are likewise cloud-essentially based range offerings accessible, which can free you from the framework setup and upkeep obligations by and large. This is extremely appealing to little gatherings with obliged (or nonexistent) it workforce and value run.

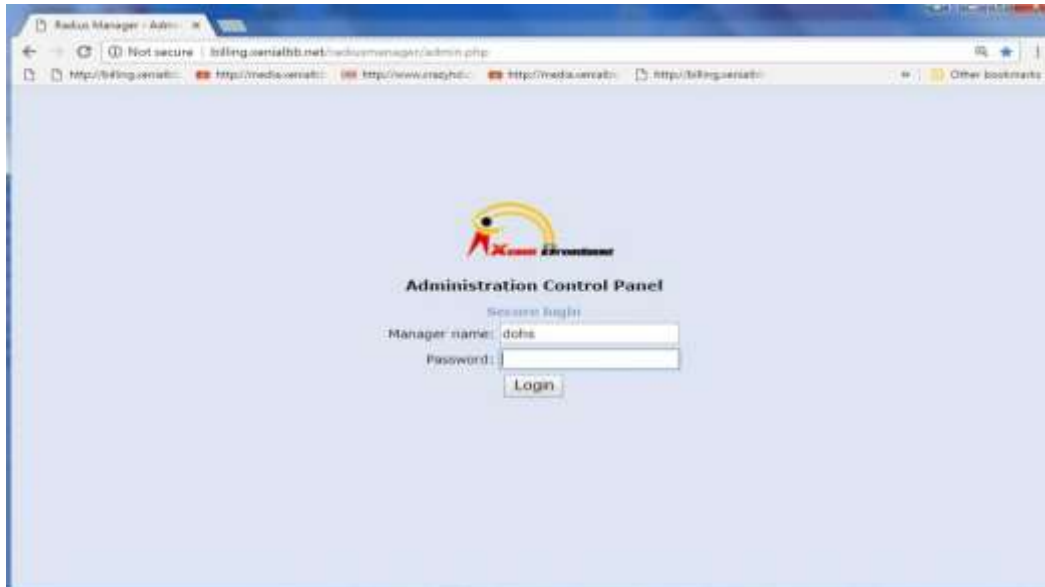
#### **5.5 Administration Control Penal.**

Billing.Xenialbb.net-This address to I have to need log in the server site.

Example: Manager Name: Dons 2. Password: 1245678999

#### **Administration Control Panel**

The above picture showing administration control panel at design range server verification with the exuberant registry for remote clients. Before you design your firebox to utilize your enthusiastic index and span servers to validate remote clients, guarantee that the settings portrayed in this area are arranged to your range and vivacious posting servers. Windows server 2016 and 2012 are the bolstered range server frameworks.



**Figure 5.2: Administration Control Panel**

For entire summons to arrange your sweep server or dynamic registry server, see the vendor documentation for each server.

### 5.6 Active client monthly data used list at the Radius server.

- Users list show how total client active in the sever here is serial to next page
- Show with the all client address, name, IP and mobile numbered.
- These Server have many options for the showing Clint details.
- Every month data use list shows the picture.
- When start the client use date using the history record in the server.
- When client not use the data the automatically deleted that.
- If you want to see how many clients in this time on live active then go to report and client the on-client client status the show all online.



**Figure 5.3: User month mb using list**

## 5.7 User how much Mbps are used how to see

When Client Ask you, I want my Mbps history, then your radius server login and see the TAB Report online client history, then every month and yearly show that your using history in the radius server, See the example before picture showing it.

## 5.8 Update the Internet bill in the Radius Server

- At the point when need to your Client Update Internet charge the Log in Radius.
- The server at that point sees The ADD Deposit tap the catch and come to refresh Internet.

Service change history

#	Requested on	Requested by	Requested for	Scheduled to	Service name	Status
1.	2014-03-22	masum	saiful	2014-03-22	512k Gold	completed
2.	2014-12-23	admin	saiful	2014-12-23	1Mb Share	completed
3.	2015-11-30	admin	saiful	2015-11-30	2Mb Unlimited	completed
4.	2016-06-27	dohs	saiful	2016-06-27	3Mb	completed
5.	2016-07-28	dohs	saiful	2016-07-28	4Mb Share	completed
6.	2017-06-09	dohs	saiful	2017-06-09	2Mb	completed
7.	2017-06-10	dohs	saiful	2017-06-10	4Mb Share	completed
8.	2017-07-10	dohs	saiful	2017-07-10	2Mb	completed
9.	2017-08-09	support	saiful	2017-08-09	4Mb Share	completed

Search User Database

User name or MAC:

Manager: dohs | Date: 2018-02-12 | Version: 4.0.4 | RADIUS server: OK | DHCP server: n/a

**Figure 5.4: open the bill from update table**

Server to choose the cash and afterward snap to the catch Finish at that point charging programming to naturally refresh customer charge then customer not rebates her web. Also, the photo to I need to demonstrate that.

Mega Is old customer I need to put her full data on the server and he officially associated with web and see the picture. Here appearing here User Name, Account status, association status enlistment date, last when he gives to the bill all details see possible in radius server.



## CHAPTER 6

### CONCLUSION

To develop a total Office Network need to think about those fundamental server and Router, Switch design. Despite the fact that a few workplaces need more servers and other system Device according to their prerequisite. Be that as it may, on the off chance that we can design those servers and Network Device, at that point we can make other server and Device as well. I have taken in a great deal from those designs and effectively finished my temporary position. On the off chance that we can utilize Cisco Router Switch, at that point we can get security and a lot more offices.

What's more, temporary job is an incredible open door for our obtain a genuine encounter of what I realized in my scholastic life. Filling in as an assistant in the Network activities Merits Technologies Limited, I have figured out how to be committed to the activity. Dedicative and mentality is the most significant thing to work in such a refined domain. It is beyond mere official matter. For most of the engineering or technical company, the engineers have to working performance get attached with the working process. 24x7 service monitoring has taught me how to handle technical staffs and hole work in an efficient manner. As there was an opportunity to serve Online limited many ways. I have gathered a lot of experience in the (Merits Technologies Limited) ISP 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 and maintain. In this report I have explained my experiences and about Network Designing and Optimization. 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 got the confidence to deal with Assignment ourselves. It is an extraordinary chance to utilize the learning and aptitudes that we have procured. We likewise figured out how to deal with basic blames and got the new thoughts. Doing this sort of work is extremely useful for my profession and we like to do this sort of work once more.

## REFERENCE

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- [2] Wikipedia, <https://en.wikipedia.org/wiki/RADIUS> / last accessed on 10-03-2018 at 12:17pm.
- [3] [http://www.tomax7.com/mcse/cisco\\_routerconfig.htm](http://www.tomax7.com/mcse/cisco_routerconfig.htm)
- [4] Daffodil online Ltd, <https://sites.google.com/daffodilvarsity.edu.bd/picsediu/> last accessed on 03-03-2018 at 11: 8pm.
- [5] [www.youtube.com/watch?v=8q6IVWrI8hE](http://www.youtube.com/watch?v=8q6IVWrI8hE)
- [6] [www.youtube.com/watch?v=OFmJiiqJciY](http://www.youtube.com/watch?v=OFmJiiqJciY)
- [7] [www.cisco.com/en/US/docs/wireless/.../configuration/.../c70err.html](http://www.cisco.com/en/US/docs/wireless/.../configuration/.../c70err.html)
- [8] [www.packettracernetwork.com/dhcpconfiguration.html](http://www.packettracernetwork.com/dhcpconfiguration.html)
- [9] [www.tomshardware.com](http://www.tomshardware.com) › Forum › Networking › LAN/WAN
- [10] [www.bitsbyjohn.com/.../cisco-ccna-tutorial-configure-dhcp-on-cisco-...](http://www.bitsbyjohn.com/.../cisco-ccna-tutorial-configure-dhcp-on-cisco-...)
- [11] [www.cisco.com/en/US/docs/ios/12\\_0t/12\\_0t1/.../Easyip2.html](http://www.cisco.com/en/US/docs/ios/12_0t/12_0t1/.../Easyip2.html)
- [12] [www.youtube.com/watch?v=5TBUALTxrtI](http://www.youtube.com/watch?v=5TBUALTxrtI)
- [13] [www.packettracernetwork.com/voipconfiguration.html](http://www.packettracernetwork.com/voipconfiguration.html)
- [14] [www.packettracertrivia.com/PacketTracer/index.html](http://www.packettracertrivia.com/PacketTracer/index.html)
- [15] [www.engineersgarage.com/articles/what-is-internet-history-working](http://www.engineersgarage.com/articles/what-is-internet-history-working)
- [16] [en.wikipedia.org/wiki/Internet](http://en.wikipedia.org/wiki/Internet)