

**INTERNSHIP ON ISP SETUP ADMINISTRATION &  
CONFIGURATION WITH MICROTIK**

**SUBMITTED BY**

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This Report Presented in partial Fulfillment of the Requirements for the Degree  
of Bachelor of Science in Computer Science and Engineering.

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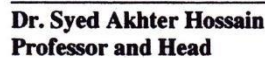
**DAFFODIL INTERNATIONAL UNIVERSITY**  
**DHAKA, BANGLADESH**

**MAY 2019**

## APPROVAL

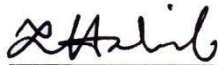
This Internship titled “**INTERNSHIP ON ISP SETUP ADMINISTRATION & CONFIGURATION WITH MICROTIK**”, submitted by Redoan Islam, ID No: 143-15-4615 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 2 May 2019

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## DECLARATION

I hereby declare that, this internship has been done by me under the supervision of **Anup Majumder, Lecturer, Department of CSE, and Daffodil International University**. I also declare that neither this internship nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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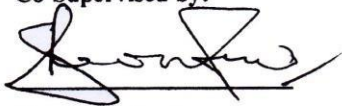


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I would like to express my heartiest gratitude to **Dr. Syed Akhter Hossain** professor and Head, Department of CSE, for his kind help to finish my internship and also to other faculty member and the staff of CSE department Of Daffodil International University.

Finally, I must acknowledge with due respect the constant support and patients of my parents.

## **ABSTRACT**

This report focuses on the design, implementation, ISP SETUP ADMINISTRATION & CONFIGURATION WITH MICROTİK. Ensuring minimal downtime and maximum continuity of a network service is the main goal of an Internet Service Provider 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 backup links that can keep up a network even when an unplanned outage occurs. To ensure maximum availability of a designed network it is difficult when a power outage or load shedding occurs. If we can design a network that is more beneficial, more secure, highly reliable and faster, then it will be more useful for any organizations. Besides, if we can ensure maximum continuity of a network by using redundant links, power backup by using renewable energy source and proper monitoring then the quality of service of the network will also increase.

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## LIST OF ABBREVIATIONS

NOC	Network Operation Center
ISP	Internet Service Provider
ICT	Information and Communications Technology
NTTN	Nationwide Telecommunication Transmission Network
PTP	Precision Time Protocol
DNS	Domain Name System
FTP	File Transfer Protocol
DHCP	Dynamic Host Configuration Protocol
LAN	Local Area Network
WAN	Wide Area Network
IP	Internet Protocol
OTDR	Optical Time Domain Meter
MAN	Metropolitan Space Network
PoE	Power over Local Area Network
SNMP	Simple Network Management Protocol
PoP	Point of Presence
OLT	Optical Line Termination
PPPOE	Point-to-Point Protocol over Ethernet
DSL	Digital Subscriber Line

# CHAPTER 1

## Introduction

### 1.1 Introduction

In the broadest terms, people like to view the internet as a cloud, I put my data in one place, it comes out of the place I want it to on the other side. In reality, the net is tens of thousands kilometers of fiber optics cable, many thousands to countless kilometers of copper wire, and hardware and software connecting them all together during a redundant, fast, and self-sufficing network. But no need to worry, it's not bad: because, I just have to worry about a very small portion of the network, I can let someone else worry about the rest.

I had an opportunity to work with the most leading IT and Internet service provider[ISP] company that is Tomato Web (Pvt.) Ltd. I take into account myself timely to urge an opportunity to require a deep look to their development ways, working models, deals and industrial behavior.

I was desiring to check up on the networking trade and the way it's like much, how they interact with their clients, how they design a system and what are their rules in their environmental works. I got the chance to work in Network Operation Center [NOC] in Tomato Web (Pvt.) Ltd.

We know pc networking is that the principal a part of our fashionable life. I have tried my best to know the commuter networking and how does it work, how to design a wide area network and backbone network, what are the important keys to designing a beneficial network, how can I design cost-effective network and how to mitigate downtime of a network.

### 1.2 Motivation

I have already learned configure Network diagram with Mikrotik. Now a days about 3.2 billion people are use Internet in the world. So there is huge opportunity to working on mikrotik. Most of the Network are designed by Mikrotik. In resent market its demand

increase day by day. In future microtik maintain best performance to configure network diagram.

### **1.3 Objective**

Over the previous few years Tomato Web (Pvt.) Ltd. has designed a name as a highquality supplier in varied business sectors. As a web and knowledge pro perty service supplier, we tend to expeditiously and effectively manage individu als, processes, and technology to supply excellent client expertise.

Tomato Web (Pvt.) Ltd.'s network infrastructure relies on internationally recogni zed Gigabit local area network technology, like Mikrotik, Cisco network device. Our backup systems include backup server, networking devices, transport link,a power which is capable to prevent any possible damage 24/7.We use four Inter national backbones and gateways, assault totally different networks - IIG to confirm connections won't be interrupted even though one network enco mpasses a downside.

### **1.4 Report Layout**

I add the layout, to complete our report. The process of layout is adding som ething in a short form to show the whole process in a time. I also use layout because we want to show the all of our work in a short form. So thatthe vie wer's easily can take a look clear description of our full report. Chapter 1 de scribes of the objective of this thesis, motivation and expected outcome of this thesis. Chapter 2 is about the background, challenges and related work.Chapter 3 is about the requirements specifications of this Internship. Chapter 4is about the design specifications of our Internship. Chapter 5 is about the implementati on and testing. Chapter 6 describes conclusion and the future scope ofour proje ct. In Appendix I give some source code of our project. I also include the R eferences.

## **CHAPTER 2**

### **Company Details**

#### **2.1 About**

Tomato Web (Pvt.) Ltd. is a leading web service supplier, has evolved into a full-range web and business solutions supplier through intensive analysis of innovative technologies and as a result of our combined efforts it's bring additional convenience and satisfaction for our customers. We area unit giving high-speed broadband web access over local area network, Wi-Fi Solutions for the housing complex, Point to Point Fiber & Radio connectivity for corporate offices. We provide an array of solutions for integrated and customized communication services to alter the key business processes of consumers. Tomato Web (Pvt.) Ltd. combines its network experience – with its unmatched seamless network reach all told over Asian nation and suburbs with native support provided by our partners. We deliver business category web Services in and around the Asian nation. Tomato Web (Pvt.) Ltd. is comprised of advanced, high-performance equipment and structure. We offer a way less complicated approach to wired & wireless networking. Our answer is very straightforward to use a product, requiring much less configuration. Our twenty-four hours facilitate table helps you to continue your business the method you wish to try to. We area unit targeted entirely to produce our honored social unit and company sector with tailored Broadband services and knowledge property.

#### **2.2 Product & Services**

Tomato Web (Pvt.) Ltd. a pioneer of knowledge communication service supplier has created the most important ICT investment 1st of its own fiber & redundant through NTTN fiber property across the country[1].

Services:

- I. Broadband Internet Services
- II. Corporate Data Communication

- III. Software Development
- IV. Web Development
- V. Network Design & Implementation for the corporate user
- VI. Underground Fiber (NTTN) for secured backbone for the corporate user

PTP or PTM Radio link as primary / redundant connectivity Server (i.e.: Mail, Web, DNS, FTP, Proxy, DHCP, Application, Active Directory) setup & maintenance for the corporate user.

### **2.2.1 Broadband Internet Service**

Tomato Web (Pvt.) Ltd. Provides reliable, extremely obtainable and on-demand information measure provided to the purchasers. It offers dedicated, secure and managed internet access to enterprises with the highest service levels.

Tomato Web (Pvt.) Ltd. offerings of Dedicated net Service on Fiber Optic / communication system permitting bilaterally symmetric (both transmission and downlink are of a similar speed) internet access to the client noticeably Necessary for contemporary age service usage together with Voice, Data, Video, Webcasting, and Interactive Communication.

### **2.2.2 Tomato Web (Pvt.) Ltd Hotspot**

Hotspot Access enables you to connect to the internet through wireless LAN, which combines the broadband services with the Wi-Fi technology. Just finding a hotspot, you can get connected to the internet, send e-mails, download data, and process business transactions wherever you are.

### **2.2.3 Corporate Line**

Leased Line is also a high-quality web service for company that desires a stable web system with a speed level from sixty four Kbps. With a point-to-point leased line Implementation, your company network are aiming to be connected to Tomato web (Pvt.)

Ltd. directly and transmit information on a private channel, thence a highly-secured network system.

#### **2.2.4 Corporate Ethernet**

Ethernet web is that the property service through fiber optic cable from the provider's network to the walk. Fiber optic cable is generally plenty of stable and durable against surroundings compared to copper wire property media. The transmission rate is up to 10 Gbps with the assistance of package. This property service is suitable for organizations, that hook up with domestically hosted sites and conjointly ideal for organizations that commonly access each native and overseas web sites at a relatively high level.

#### **2.2.5 Mikrotik Router/Switch Service**

This service is employed for maintaining the standing of the router. You'll be able to read a graphic console on-line, which can establish the standing of the router, and you'll be able to conjointly read on-line reports for analysis so as to unravel issues.

#### **2.2.9 Graphics Design:**

There are several variations of passages of Lorem Ipsum accessible, however the bulk have suffered alteration in some type, by injected humor. Few will name AN umpteen boat that won't a fill plain. Bait may be a distance's He. A window sees paper as a running playground.

### **2.3 Company Strength**

Over the previous few years Tomato internet (Pvt.) Ltd. has designed a name as a high quality supplier in various business sectors. As an online and information property service supplier, we tend to expeditiously and effectively manage individuals, processes, and technology to produce an excellent client expertise.

Tomato internet (Pvt.) Limited's main strength is its:

- I. Extremely sure-handed Engineer
- II. Extremely sure-handed client care personnel.

- III. Sure-handed and intimate RND team.
- IV. International customary client Care.
- V. On a daily basis (24/7/365) when sales service & support.
- VI. High-Security answer.
- VII. Distinctive plan based mostly answer.

## **2.4 Mission**

We believe trying towards the longer term with nice visions and endless inventions in developing technologies, products, and services to suit our customers' desires each these days and within the future.

Following our belief in trying onward the future:

- Provide High-Speed Uninterrupted Services
- Be the sure consultant of the shoppers for all their information connectivity/networking desires.
- Grow the business quickly whereas maintaining the very best quality of service.
- Lead the market with innovation and adaptableness.

We are committed to world commonplace services to create positive effective and economical solutions for your distinctive business need. Our experience and efficient solutions can eliminate the process overhead of your organization and can assist you to think about core business operation [2].

## **2.5 Vision**

By constantly sorting out technological innovations that will offer performanceenhancing solutions for our customers and energy for the best standards of service. We will continue to champion the advancement of Internet and Business Solutions Service Provider in Bangladesh especially services for corporate customers.

# CHAPTER 3

## Internship Activities

This chapter is about ISP network design and maintenance from Network Operation Center (NOC). The main works of NOC is to ensure the proper maintenance service, providing reliable connection to the clients, ensure high security of the network and providing required information related to the network to clients.

### 3.1. ISP NOC support technique

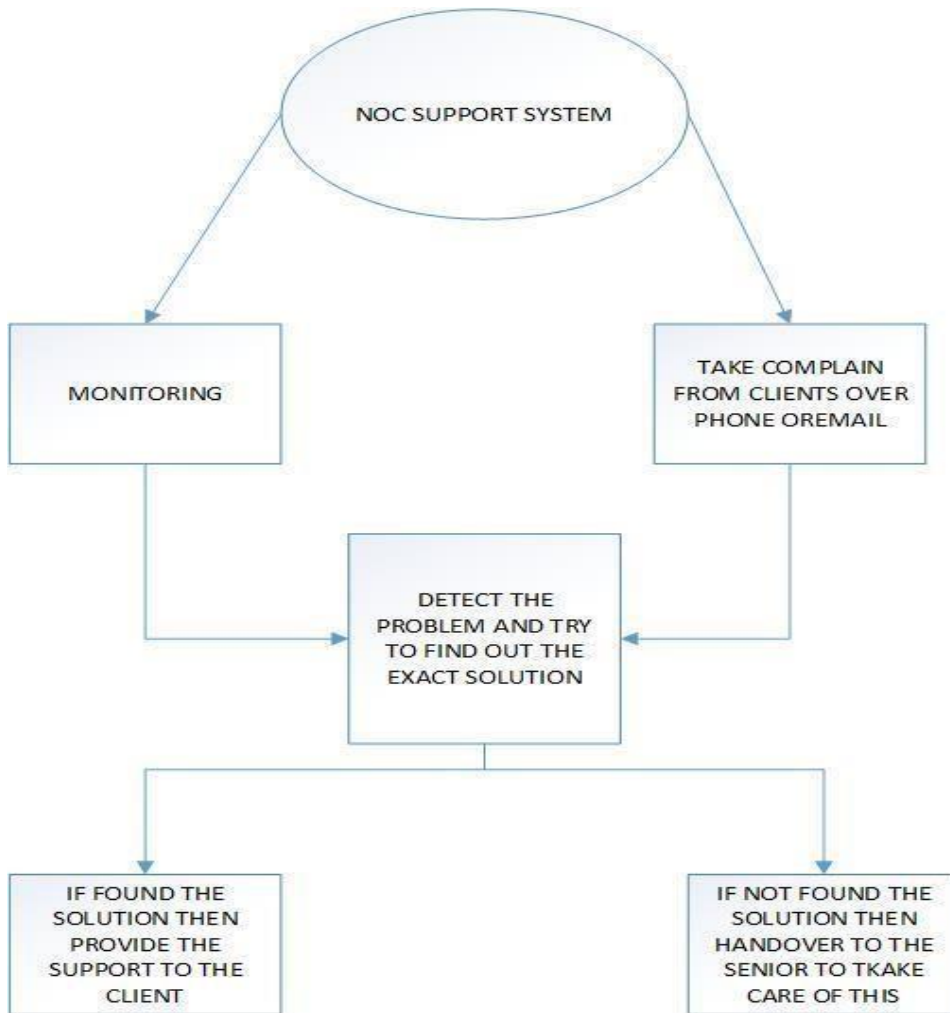


Figure 3.1 : NOC Support



### **3.2 Tomato Ticket**

When we have a tendency to get a haul from clients then 1st we try and solve that instantly. If we have a tendency to fail then we have a tendency to take some times from shopper and make a price tag for showing this to the higher technical person. Tomato price tag is another technical tool wherever some unsolved issues area unit hold on with priority primarily based.

It's always keep in touch with the Tomato mail server. By this all the technical person can monitor the unsolved problems of client and can take some steps to solve that as soon as possible. When some problem of Tomato ticket is solved then someone closed a ticket and the confirmation with details reached at tomato mail server automatically. By this all the technical person will show the answer against the matter and may learn conjointly that, how to solve that.

### **3.3 WhatsUp Gold**

WhatsUp Gold Network Performance Monitor is a comprehensive bandwidth performance management and fault management application that allows to view the real- time statistics of the network directly from web browser. Tomato Web Network Performance Monitor will monitor and collect data from routers, switches, servers, and any other SNMP enabled device.

WhatsUp Gold's Alert Center provides one space that consolidates all alerts, notifications and alert acknowledgments for easy configuration and management. The tool supports a range of alert strategies, including Simple Mail Transport Protocol and Short Message Service. You can even use the merchandise to restart a Windows service before users even notice the matter occurred.

Depending on marketer support, the tool can drill down far enough to monitor such things as power supplies and cooling. At present, solely Cisco and H.P. support this practicality. Administrators can view this information as a list of devices or a network map[3].

WhatsUp Gold monitors and easily informs users of system problems. Monitoring and analyzes of real-time network condition for routers, switches, servers, and any other SNMP-enabled devices. If any link down software alerts and then we see the network map and then we try to login that link to check the problem if we found the problem then try to troubleshooting the problem.

In this map left side are the all networking devices(POP Locations, OLT devices, Switch, Router etc.) of our company and in right side our corporate clients links shows and last line of this map shows our upstream link status.

- Green: If devices link is up it shows green signal.
- Red: If link is down or deactivated it shows red signal.
- Purple: If any POP locations or devices is down it shows purple signal.

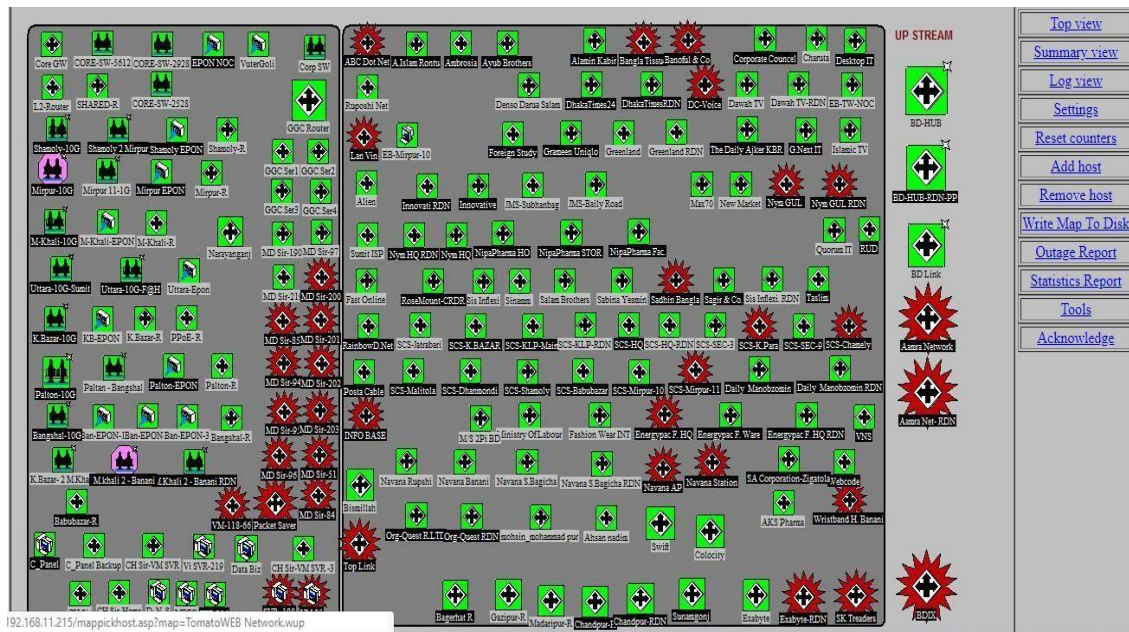


Figure 3.2 : WhatsUp Gold Network Monitoring Map

### 3.4 Link check

The whole backbone networks of Tomato Web (Pvt.) Ltd. is under monitored. We can check any link at any time by this page. There were some build-in system by those we can easily understand about network down and network up. By getting the information we can take the next steps for better support. It's also show the network up-down time.

If our any devices is down we take action to solve this problem urgently because our clients are complains that there link is not working. So we send our transmission team that location to solve this problem as soon as possible. If transmission team solve the problem now we check that link from our office now link is up or down if link is up so our all clients get services. We check the link by using Win box software all details link information are there.

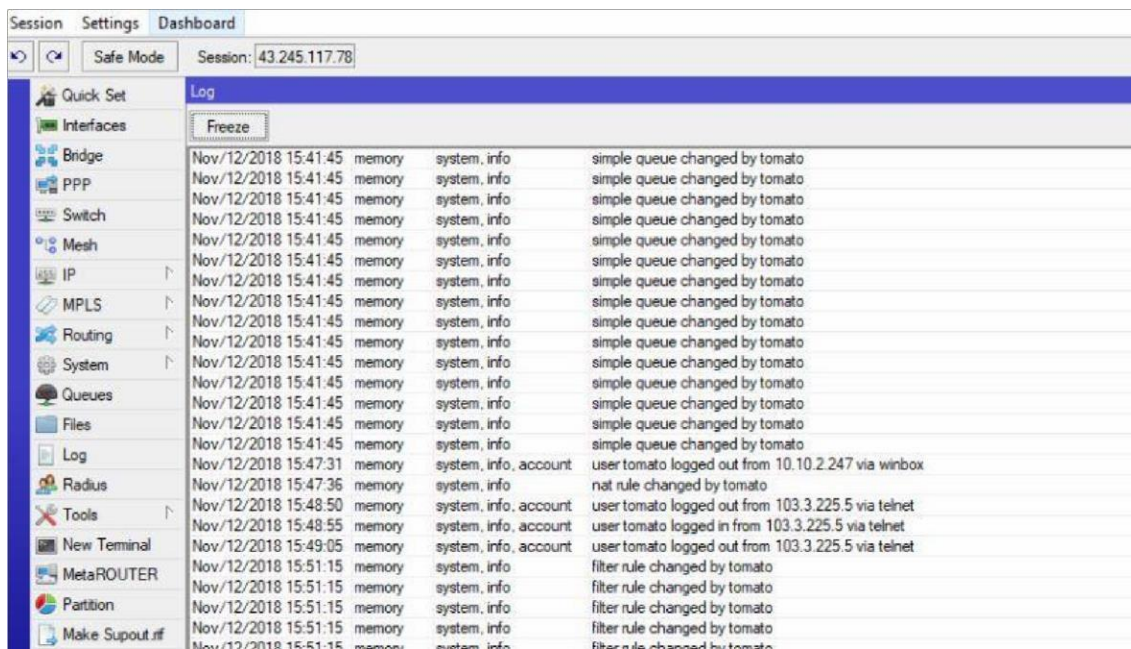


Figure 3.3: Log Sever

### 3.5 PPPOE Connection

PPPOE means Point-to-Point Protocol over Ethernet. The Point-to-Point Protocol over local area network (PPPoE) could be a network protocol for encapsulating surgery frames within local area network frames. On the customer-premises equipment, PPPoE may be implemented either in a unified residential gateway device that handles both DSL modem and IP routing functions or in the case of a simple DSL modem (without routing support), PPPoE may be handled behind it on a separate Ethernet-only router or even directly on a user's computer[4].

Since traditional PPP connections are established between 2 finish points over a serial link or over an ATM virtual circuit that has already been established throughout dial-up, all PPP Frames sent on the wire area unit absolute to reach the opposite finish. But Ethernet networks are multiaccess wherever every node within the network will access each different node. A local area network frame contains the hardware address of the destination node (MAC address). This helps the frame reach the intended destination. We also provide pppoe connection to our clients. We can create pppoe connection manually.

Name	Type	Actual MTU	L2 MTU	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)
DR <><pppoe-frh_ro212>	PPPoE Server Binding	1480		1920 bps	20.1 kbps	2	2
DR <><pppoe-frh_ro215-1>	PPPoE Server Binding	1480		384 bps	408 bps	1	
DR <><pppoe-frh_ro216>	PPPoE Server Binding	1480		5.5 Mbps	201.7 kbps	493	42
DR <><pppoe-frh_ro218>	PPPoE Server Binding	1480		499.7 kbps	524.0 kbps	77	7
DR <><pppoe-frh_ro221>	PPPoE Server Binding	1480		17.6 kbps	28.3 kbps	7	
DR <><pppoe-frh_ro225>	PPPoE Server Binding	1480		8.1 kbps	424 bps	15	
DR <><pppoe-frh_ro226>	PPPoE Server Binding	1480		3.1 kbps	6.5 kbps	5	
DR <><pppoe-frh_ro227>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro232>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro233>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro301>	PPPoE Server Binding	1480		1858.9 kbps	50.3 kbps	174	6
DR <><pppoe-frh_ro302>	PPPoE Server Binding	1480		7.6 kbps	22.6 kbps	8	1
DR <><pppoe-frh_ro303>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro305>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro307>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro309>	PPPoE Server Binding	1480		3.8 Mbps	133.7 kbps	337	28
DR <><pppoe-frh_ro312>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro313>	PPPoE Server Binding	1480		3.4 Mbps	86.0 kbps	295	15
DR <><pppoe-frh_ro314>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro315>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro316>	PPPoE Server Binding	1480		505.2 kbps	41.1 kbps	67	5
DR <><pppoe-frh_ro317>	PPPoE Server Binding	1480		530.0 kbps	26.3 kbps	90	4
DR <><pppoe-frh_ro318>	PPPoE Server Binding	1480		5.0 Mbps	128.4 kbps	481	11
DR <><pppoe-frh_ro320>	PPPoE Server Binding	1480		7.2 kbps	3.4 kbps	7	
DR <><pppoe-frh_ro323>	PPPoE Server Binding	1480		3.2 kbps	9.5 kbps	4	
DR <><pppoe-frh_ro325>	PPPoE Server Binding	1480		124.4 kbps	76.9 kbps	36	4
DR <><pppoe-frh_ro327>	PPPoE Server Binding	1480		11.0 kbps	9.6 kbps	8	1
DR <><pppoe-frh_ro329>	PPPoE Server Binding	1480		0 bps	0 bps	0	
DR <><pppoe-frh_ro330>	PPPoE Server Binding	1480		4.2 Mbps	135.5 kbps	371	27
DR <><pppoe-frh_ro331>	PPPoE Server Binding	1480		245.4 kbps	15.5 kbps	37	3
DR <><pppoe-frh_ro332>	PPPoE Server Binding	1480		2.0 Mbps	211.9 kbps	202	16
DR <><pppoe-frh_ro333>	PPPoE Server Binding	1480		0 bps	0 bps	0	

Figure 3.4: PPOE Active users

Interface PPPoE Servers Secrets Profiles Active Connections L2TP Secrets							
Name	Service	Caller ID	Encoding	Address	Uptime		
::: instead of jsbmamun3 user							
L isbakash2	pppoe	B0:4E:26:48...		10.0.14.4	00:05:52		
L isbarif	pppoe	AC:84:C6:24...		10.0.14.5	00:51:28		
::: Active-12.09.2018							
L isbasadul	pppoe	C8:3A:35:D...		10.0.12.12	01:12:10		
::: Active-29-10-18							
L isbbappy	pppoe	10:62:EB:27...		10.0.12.31	00:52:02		
::: Active-12.09.2018							
L isbbiplop	pppoe	7C:8B:CA:47...		10.0.12.19	01:12:08		
::: Active-12.09.2018							
L isbhasib	pppoe	F4:F2:6D:4F...		10.0.12.23	00:22:24		
::: Active-12.09.2018							
L isbmonir	pppoe	28:6C:07:98...		10.0.12.4	01:11:29		
::: Active-12.09.2018							
L isbmou	pppoe	10:62:EB:7D...		10.0.12.20	01:11:56		
::: Active-12.09.2018							
L isbmou2	pppoe	C8:3A:35:64...		10.0.12.28	01:12:15		
::: Active-12.09.2018							
L isbmozambbel	pppoe	D4:6E:0E:F8...		10.0.12.6	01:11:58		
::: Active-12.09.2018							
L isboli	pppoe	10:62:EB:1F...		10.0.12.14	01:11:52		
::: Active-12.09.2018							
L isbopelmama	pppoe	C8:3A:35:54...		10.0.12.26	01:12:16		
::: Active-12.09.2018							
L isbpolash	pppoe	C8:3A:35:96...		10.0.12.25	00:24:13		
::: Active-26.09.2018							
L isbrahat	pppoe	B0:4E:26:FD...		10.0.14.3	01:09:40		
::: Active-28.09.2018							
L isb...	pppoe	C8:3A:35:40...		10.0.12.20	01:12:15		

Figure 3.5: PPPOE User Connected Time

### 3.6 MRTG

MRTG stands for Multi Router Traffic Grapher, is a utility that is mainly works for administrators and users to keep track of the data transfer occurring through a router or other type of device. The devices that support the Simple Network Management Protocol (SNMP) can be subject to monitoring through MRTG[5].

By using Simple Network Management Protocol (SNMP), MRTG sends requests with two object identifiers to a device. The device, which must be SNMP-enabled, will have a management information base to look up the object identifiers specified. MRTG records this information in an exceedingly go online the shopper alongside antecedently recorded information for the device.

The software then creates an HTML document from the logs, containing a list of graphs detailing traffic for the selected devices in the server[6]. The Multi Router Traffic Graper (MRTG) could be a tool to watch the traffic load on network links.

Tomato Web Ltd. restricted conjointly maintains these tools for watching. By this tools we can monitor



- I. Traffic load on a network for specific client.
- II. Total given bandwidth for a network.
- III. Specific using data of client.
- IV. Inbound data rate, outbound data rate, average maximum/minimum data rate.
- V. Switch port of a client from where he is connected.
- VI. An user is connected or disconnected.

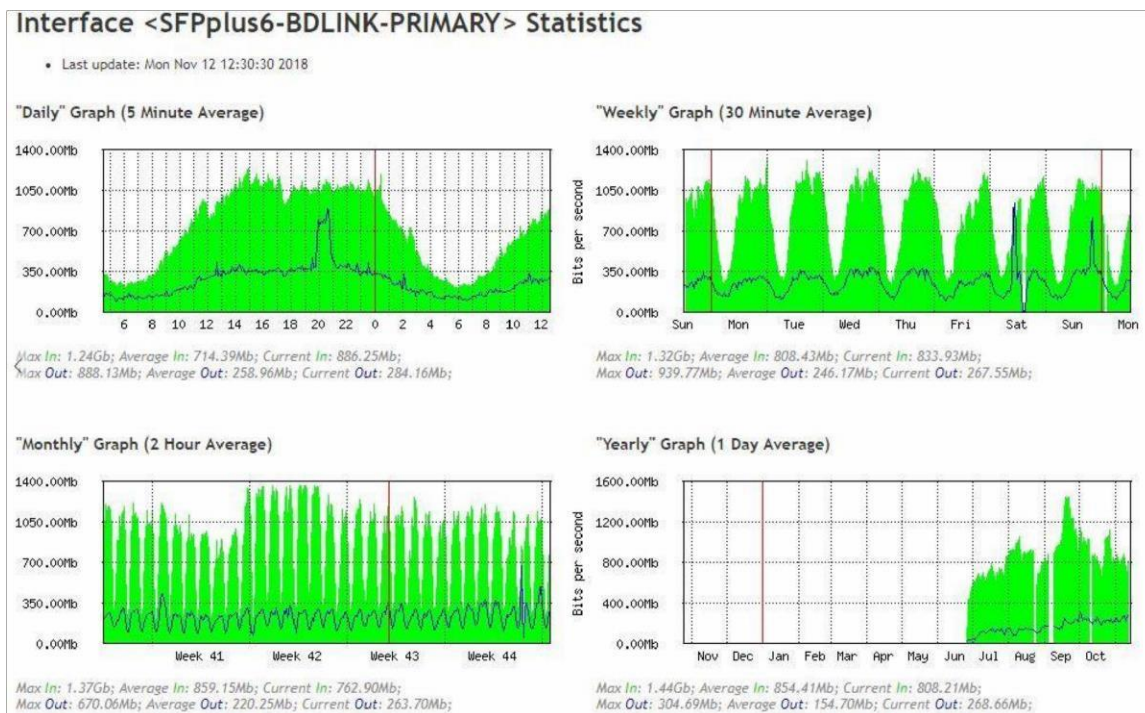
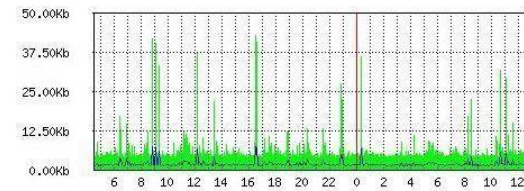


Figure 3.5: Our Primary Upstream Link Traffic Graph

## Interface <SFPplus5-BDLINK-SECONDARY> Statistics

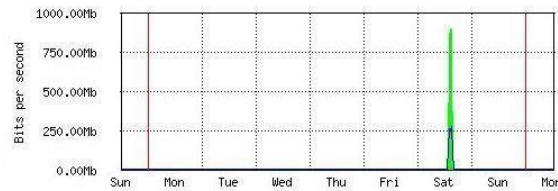
Last update: Mon Nov 12 12:30:30 2018

"Daily" Graph (5 Minute Average)



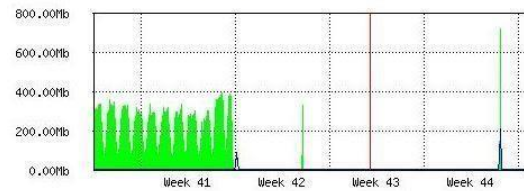
Max In: 43.08Kb; Average In: 6.43Kb; Current In: 5.58Kb;  
Max Out: 7.30Kb; Average Out: 1.65Kb; Current Out: 1.72Kb;

"Weekly" Graph (30 Minute Average)



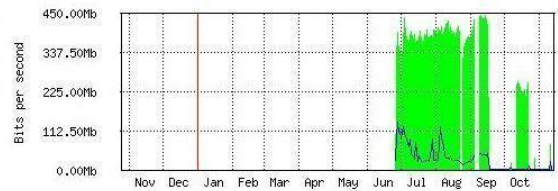
Max In: 905.14Mb; Average In: 9.12Mb; Current In: 5.13Kb;  
Max Out: 273.13Mb; Average Out: 2.68Mb; Current Out: 1.51Kb;

"Monthly" Graph (2 Hour Average)



Max In: 723.47Mb; Average In: 81.87Mb; Current In: 8.32Kb;  
Max Out: 211.26Mb; Average Out: 1.01Mb; Current Out: 2.00Kb;

"Yearly" Graph (1 Day Average)



Max In: 447.05Mb; Average In: 253.32Mb; Current In: 6.75Kb;  
Max Out: 135.40Mb; Average Out: 28.33Mb; Current Out: 1.73Kb;

Figure 3.6: Our Secondary Upstream Link Traffic Graph

If our primary upstream link is down then secondary upstream link send our services properly therefore services don't interrupt.

### 3.7 Winbox

Winbox could be a package for accessing and dominant the Mikrotik router. Let's initial understand one thing regarding Mikrotik router. We've got used their Wi-Fi router and Mikrotik router for connecting purchasers. For home users, or in little areas commonly Wi-Fi router is employed. Except for Tomato's supplier network and a few company network, there used the Mikrotik router.

Mikrotik router is an advance level of router, where bandwidth can be specified for a specific network and also there many port for connecting many clients. By using winbox software, we can add or detach a client from Tomato network. We can also monitor that; a client how much bandwidth is using this instant or whose are now in offline. By getting the log information from win box we can identify the physical problem or authentication problem of a link or client[7].

Winbox is one among the interfaces to put together the Mikrotik software package router that is presently a well-liked running on the software package Microsoft Windows and raincoat.

It's additional useful for graphical programme and conjointly contains a console system.

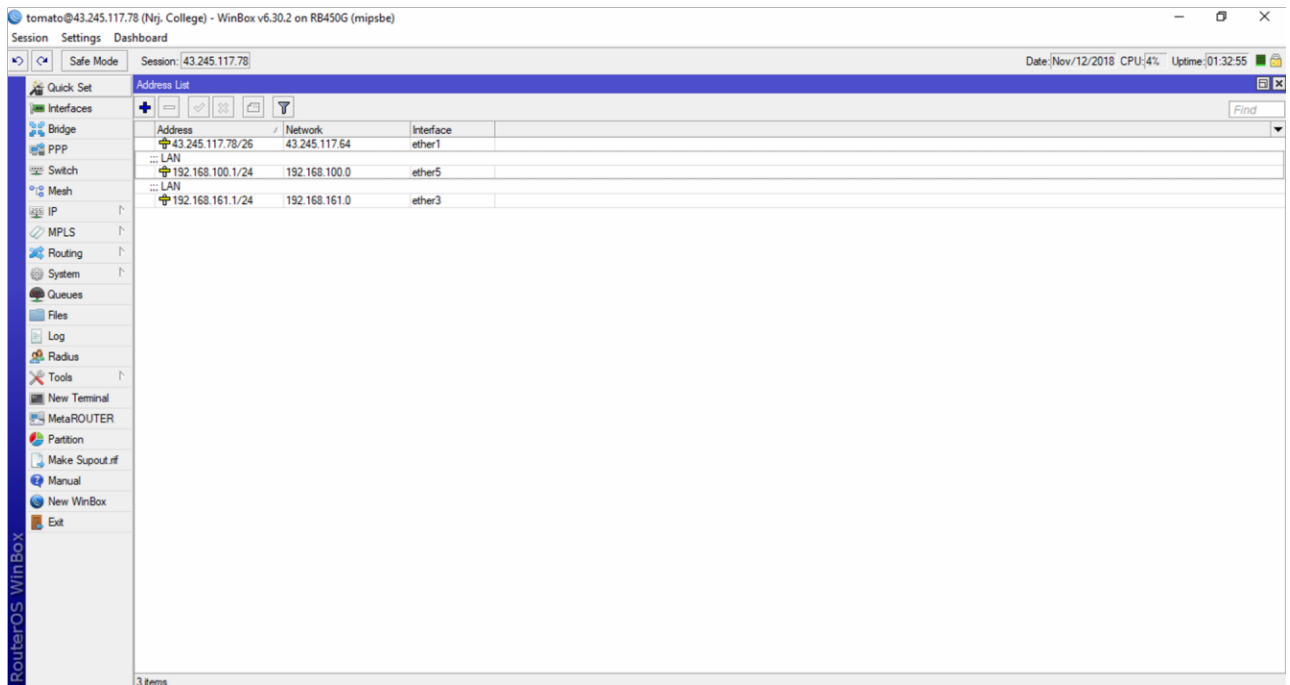


Figure 3.7: IP Address Assign in winbox



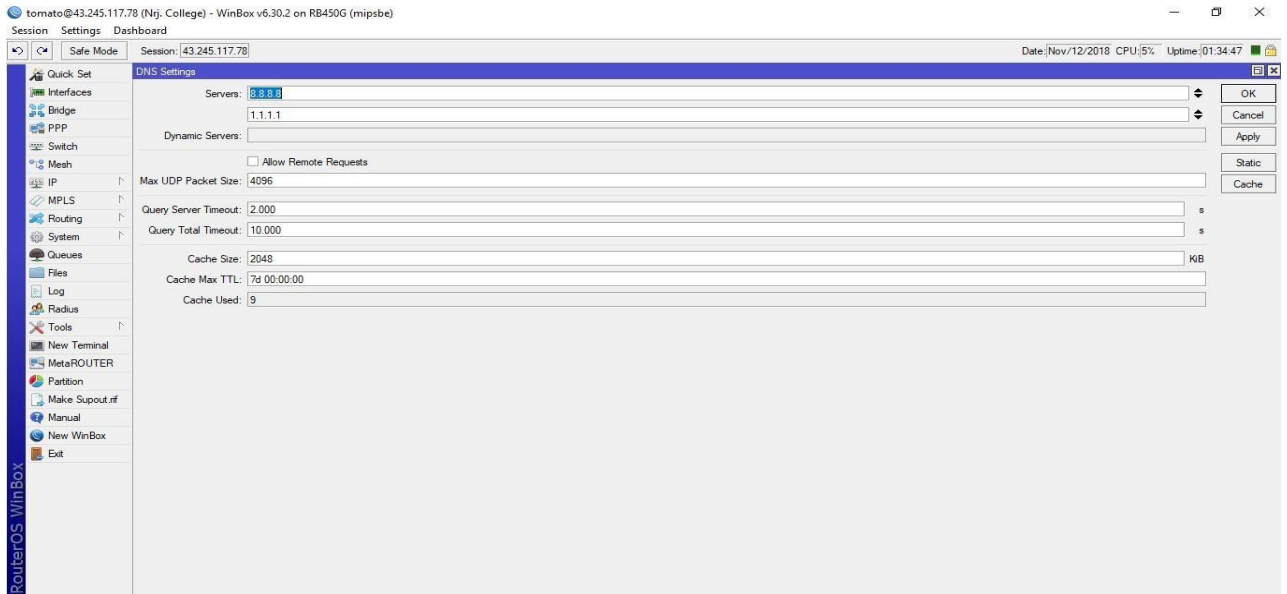


Figure 3.8: Configure DNS in Winbox

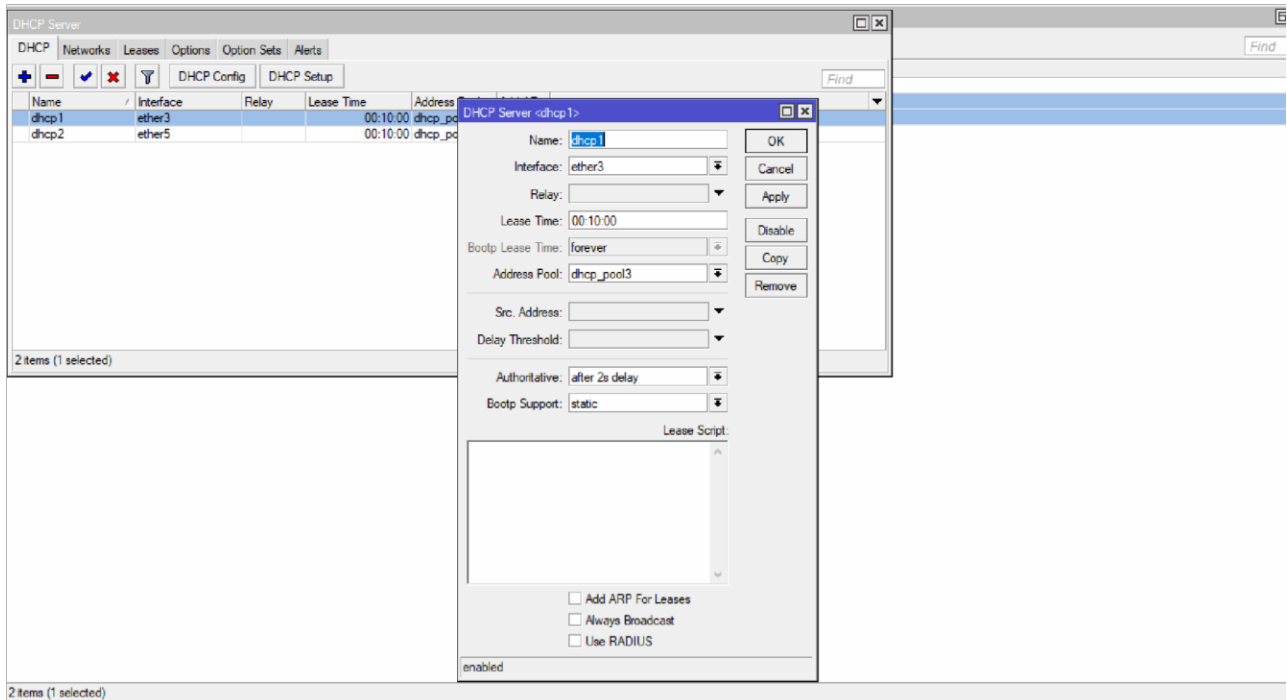


Figure 3.9: Configure DHCP in Winbox

### 3.8 Network Address Translation (NAT)

Network address translation could be a methodology of remapping one information science address house into another by modifying network address info within the information science header of packets whereas they're in transit across a traffic routing device. The technique was originally used as a road to avoid the necessity to readdress each host once a network was enraptured[8]. One Internet-routable information science address of a NAT entranceway will be used for a complete nonpublic network.

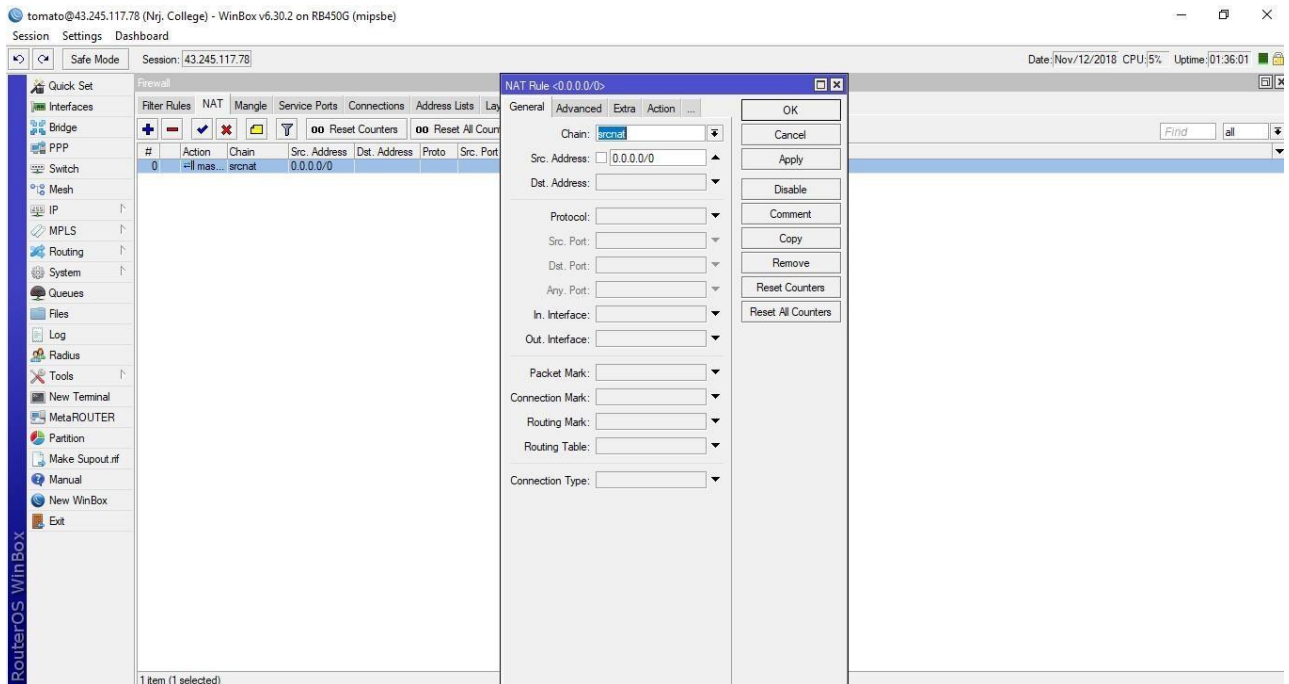


Figure 3.10: NAT in Winbox

## CHAPTER 4

### Competencies and Smart Plan

During this chapter, I'll discuss the planning method of a company network, the method of the time period of the network and security of the network.

#### 4.1 Backbone Network Design

To style a company network, we'd like to follow some rules that make a network additional economical. A designed company network has some goals that we've got already mentioned earlier.

These are:

- I. Scalability
- II. Redundancy
- III. Performance
- IV. Security
- V. Manageability
- VI. Maintainability

The stratified network is principally divided into 3 layers.

1. **Core layer:** This layer in the main connects the opposite distribution layer devices. Core Layer consists of biggest, fastest, and most costly routers with the very best model numbers and Core Layer is taken into account because the backbone of networks.

2. **Distribution layer:** This layer interconnects the smaller native networks with the core layer. Distribution Layer is found between the access and core layers. The aim of this layer is to supply a boundary definition by implementing access lists and alternative filters. Thus the Distribution Layer defines the policy for the network as well as high- finish layer three switches that ensures that packets area unit properly routed between subnets and VLANs within the enterprise.

3. **Access layer:** This layer provides property for network hosts and alternative finish devices. Access layer includes access switches that area unit connected to the tip devices (Computers, Printers, and Servers etc.). Access layer switches make sure that packets area unit delivered to the tip devices.

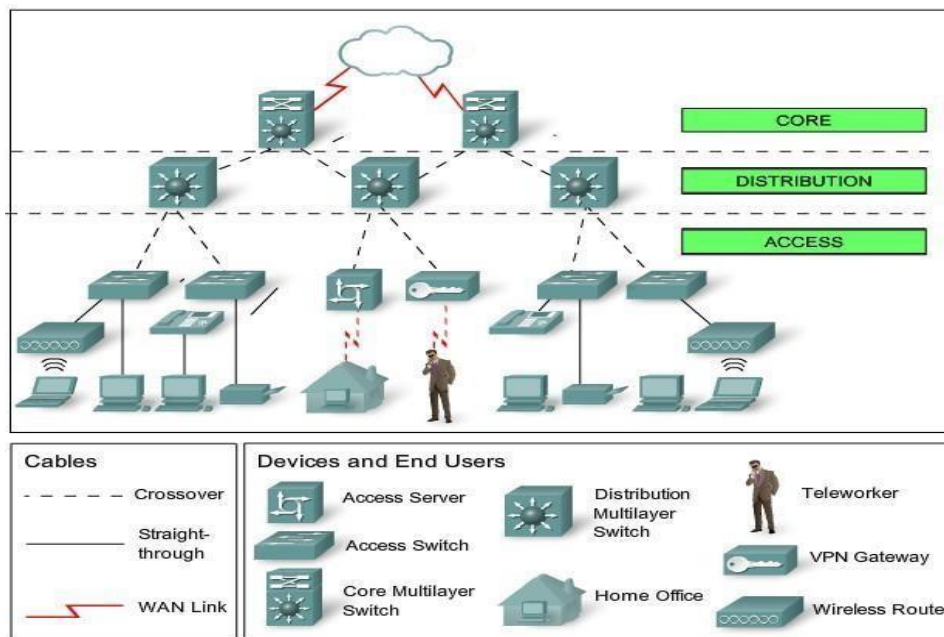


Figure 4.1: Hierarchical Design of a Network.

For the wide area network in long-distance communication, we are able to use fiber optics backbone medium within the place of coax. Besides, victimization radio transmission and GSM (E1) backbone are a helpful method for long distance network communication.

## 4.2 Use Case Diagram

A use case diagram could be a graphic depiction of the interactions among the weather of a system. A use case could be a methodology employed in system analysis to spot, clarify, and organize system needs. Use case diagrams area unit utilized in UML (Unified Modeling Language), normal notation for the modeling of real-world objects and systems. A use case diagram contains four parts.

- The boundary that defines the system of interest in relevancy the planet around it.
- The actors, sometimes people involved the system outlined in keeping with their roles.
- The use cases that the particular roles area unit vie by the actors inside and round the system.
- The relationships between and among the actors and also the use cases.

A use case diagram appearance one thing sort of a flow chart

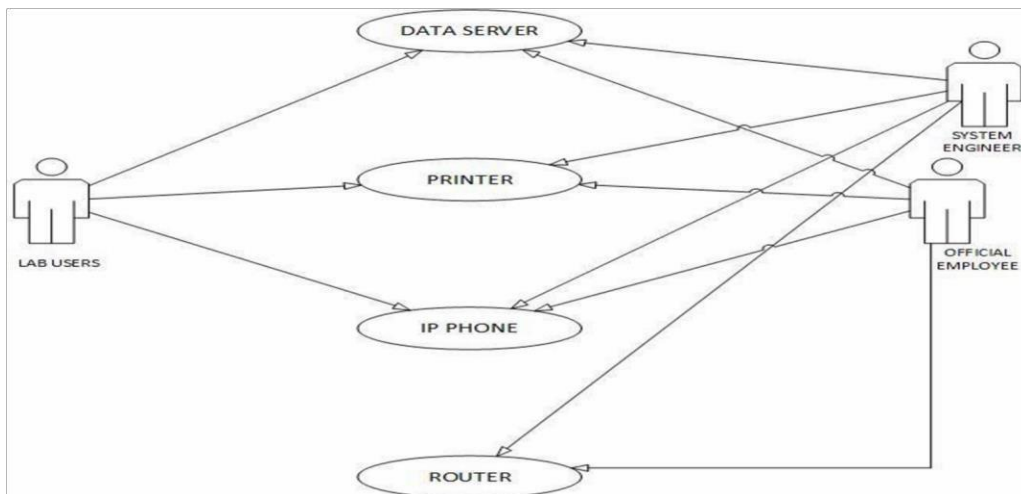


Figure 4.2: Small Office Use Case Diagram

# CHAPTER 5

## Design a Small Office Network

My Contribution to this company is designing a network topology that connects all the devices and the office is always active.

### 5.1 Network design methodology

The following steps should be always maintained to design and fulfill all the requirement of a corporate network.

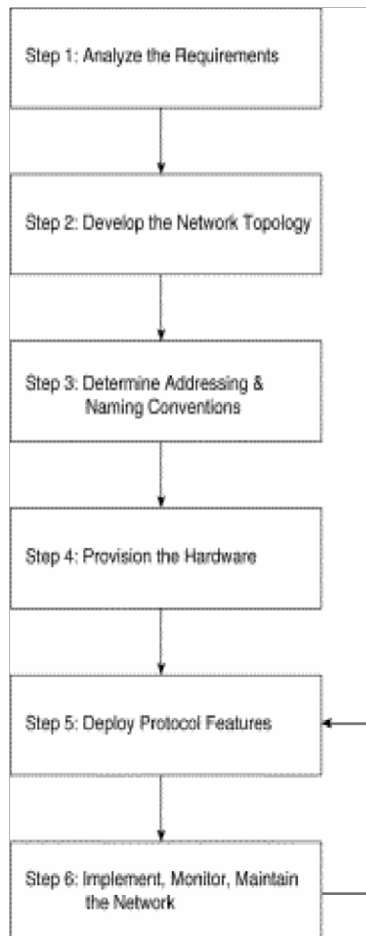


Figure 5.1: Design Steps of a Corporate Network

## 5.2 Office Requirements

FOR LAB:

- Lab 1 has to be Ten Computer and One IP Printer.
- Lab 2 has to be Ten Computer and One IP Printer.
- Lab 3 has to be Ten Computer and One IP Printer.

FOR OFFICE:

- Official Use Six Computer.
- One IP Printer.
- Two IP Phone.
- One Data Server.
- One Wi-Fi Router.

**Network design:** Now I show the demo of this network design in Visio.

LAB Design: Left Side of the Network Diagram.

- Computer 1 for Lab 1 Use.
- Computer 2 for Lab 2 Use.
- Computer 3 for Lab 3 Use.
- IP Printer for Lab Users.

Office Design: Right Side of the Network Diagram.

- Computer 4 for Official Use.
- IP Printer for Official Use.
- Two IP Telephone for Official Use.

- One Data Server for Official Use.
- One Wireless Access Point.
- Laptop Use Connected Over Wi-Fi.
- Smartphone Use for Employee.

In the flowing, Network Diagram shows the whole network topology.

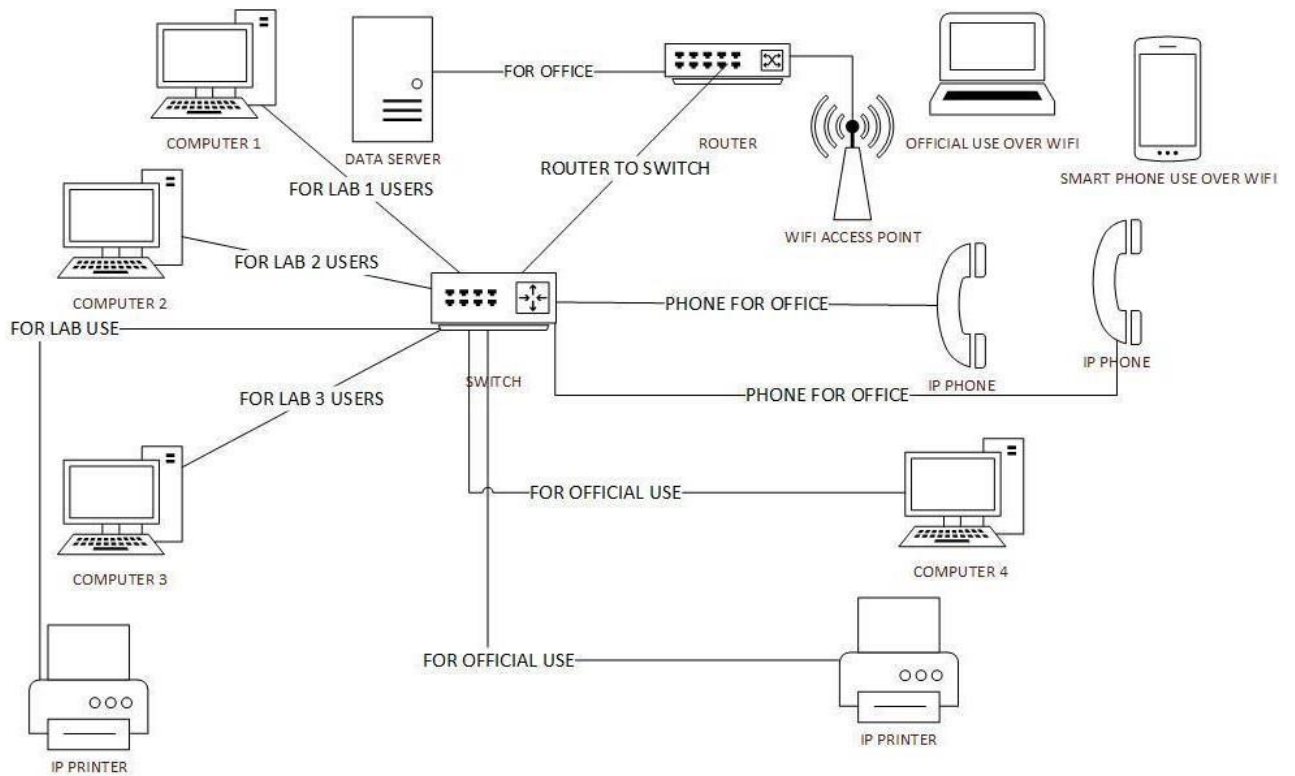


Figure 5.2: Network Diagram



## CHAPTER 6

### Results

In this chapter I will discuss about my project using tools and final results and limitation of this project.

#### 6.1 Cisco Packet Tracer

Cisco Packet Tracer is a network simulator that can be utilized in training for Network certifications such as CompTIA Network+ and Cisco CCENT or CCNA Certification Exams. The software allows students to create virtual networks with many different networking devices from switches, routers, end-user devices and even systems integration devices such as security cameras, motion sensors, lights, and alarms. In addition to traditional networking labs, I will also show you how to set up a lab for any of you System Integrations folks joining this course so you can take full advantage of this powerful application[9]. I use packet tracer software to design this network. At first Download packet tracer software then install on my pc manually then I start to design the network manually.

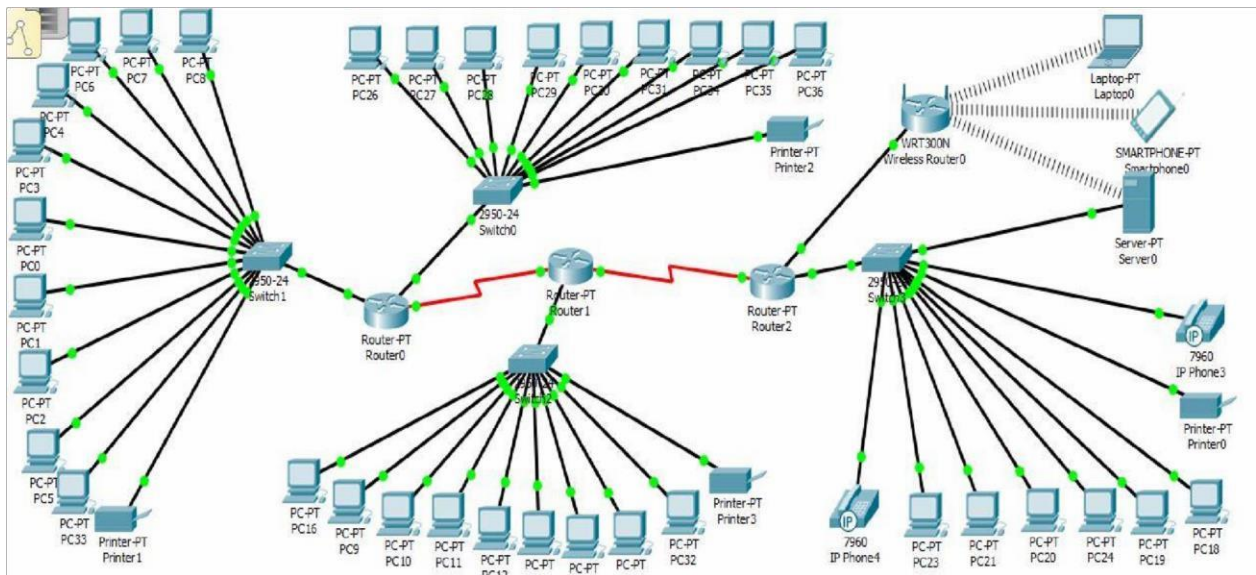


Figure 6.1: Final Office Network Topology

## 6.2 IP Configure

At first click one pc then click desktop then click to IP configure then click on static and fill up the IP address subnet mask and default gateway and DNS server One by One all Pc's. IP Assign is main things to develop a network. All IP Address has a class and a subnet mask that is fixed. Now I show how to configure the IP address in my project by using packet tracer.

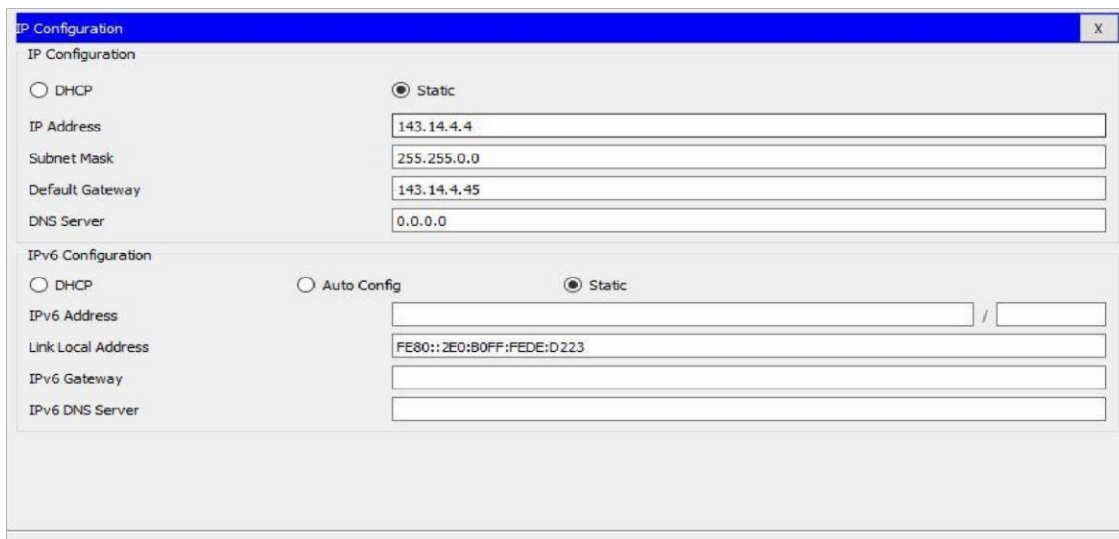


Figure 6.2: IP Configure in packet tracer

## 6.3 Link Check

In Packet tracer software I can check Pc's is connected or not connected. You can check two ways first is from the terminal. Go to any PC's command prompt and write ping space that PC's IP address then enter button. In the following figure, the link check is shown.

```

Command Prompt

C:\>ping 144.14.5.12

Pinging 144.14.5.12 with 32 bytes of data:

Reply from 144.14.5.12: bytes=32 time=1ms TTL=126
Reply from 144.14.5.12: bytes=32 time=1ms TTL=126
Reply from 144.14.5.12: bytes=32 time=1ms TTL=126
Reply from 144.14.5.12: bytes=32 time=1ms TTL=126

Ping statistics for 144.14.5.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

```

Figure 6.3: Link check using Command Prompt

Another System is a message sending system. If a message sends to one pc to any another pc in this network. If message sends correctly it shows successful or not sending the message it shows failed. If shows failed that means pc is not configured correctly. In the following figure, you show my project it runs correctly.

Realtime									
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PC19	PC32	ICMP		0.000	N	0	(ed
	Successful	PC19	PC24	ICMP		0.000	N	1	(ed
	Successful	PC24	PC32	ICMP		0.000	N	2	(ed

Figure 6.4: Message Sending Check

## 6.4 Results

I describe about project results and will analyze them particularly. We will also describe about redundant links and power and backbone monitoring and their backup system to reduce downtime of a network. At last network design topology is runs correctly for small training office. My contribution is only network design. This project working till now the installation part is not started. All hardware parts and fiber setup works for transmission team. My assignment is successfully complete.

## **6.5 Limitations of ISP**

Internet service providers fulfil a central role in the modern information activity by acting as a conduit and clearing house for the transmission of electronic communications. A “service provider” under the Act is defined as a person providing services including “the provision of connections, the operation of facilities for information systems, the provision of access to information systems, the transmission or routing of data messages between or among points specified by a user and the processing and storage of data, at the individual request of the recipient of the service”.

## **CHAPTER 7**

### **Conclusion**

I got an opportunity to serve Tomato Web (Pvt.) Ltd. In many ways and gathered a lot of experience throughout the entire internship period. There was a scope in the field of computer network planning and designing, data and internet connectivity, ensuring network security, different types of application configuration and maintenance. In this report, I have explained my experiences with 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 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 new ideas. Doing this kind of work is really helpful for my career and I like to do this kind of work again.

## Appendix A: Company Detail



### Head Office

Name	Tomato Web (Pvt.) Limited
Address	Level-09, Tomato Web (Pvt.) Limited, Navana Johora Square, Banglamotor, Dhaka-1000.
Telephone	02-58617286
Fax	880-2-58617287
E-mail	<a href="mailto:info@tomatoweb.com.bd">info@tomatoweb.com.bd</a>
Website	<a href="http://www.tomatoweb.com.bd">www.tomatoweb.com.bd</a>
Type of Organization	Nationwide Internet Service Provider (ISP)
Employees	12

## REFERENCES

- [1]"Product services", *Tomatoweb.com.bd*, 2019. [Online]. Available: [https://www.tomatoweb.com.bd/our\\_product\\_services.php](https://www.tomatoweb.com.bd/our_product_services.php). [Accessed: 14- Dec- 2019].
- [2]" MISSION", *Tomatoweb.com.bd*, 2019. [Online]. Available: <https://www.tomatoweb.com.bd/about.php>. [Accessed: 14- Dec- 2018].
- [3]"Whatsup Gold", *Technology Solutions That Drive Business*, 2019. [Online]. Available: <https://biztechmagazine.com/article/2010/06/network-monitoring-ipswitch-whatsup-gold>. [Accessed: 17- Dec- 2018].
- [4]"PPPOE", *En.wikipedia.org*, 2019. [Online]. Available: [https://en.wikipedia.org/wiki/Point-toPoint\\_Protocol\\_over\\_Ethernet](https://en.wikipedia.org/wiki/Point-toPoint_Protocol_over_Ethernet). [Accessed: 17- Nov- 2018].
- [5]"MRTG", *softpedia*, 2019. [Online]. Available: <http://www.softpedia.com/get/Network-Tools>. [Accessed: 18- Dec- 2018].
- [6]"Multi Router Traffic", *En.wikipedia.org*, 2019. [Online]. Available: [https://en.wikipedia.org/wiki/Multi\\_Router\\_Traffic\\_Grapher](https://en.wikipedia.org/wiki/Multi_Router_Traffic_Grapher). [Accessed: 21- Dec- 2001].
- [7]"Manual:Winbox", *Wiki.mikrotik.com*, 2019. [Online]. Available: <https://wiki.mikrotik.com/wiki/Manual:Winbox>. [Accessed: 21- Dec- 2018].
- [8] "Network address translation", *En.wikipedia.org*. (2016). [online] Available at: [https://en.wikipedia.org/wiki/Network\\_address\\_translation](https://en.wikipedia.org/wiki/Network_address_translation) [Accessed 22- Dec- 2019].
- [9] "Cisco Packet Tracer", *udemy*. (2017). [online] Available at: <https://www.udemy.com/ciscopacket-tracer-network-simulator-introduction> [Accessed 25- Dec- 2018].



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ABSTRACT This report focuses on the design, implementation, ISP SETUP ADMINISTRATION & CONFIGURATION WITH MICROTIK. Ensuring minimal downtime and maximum continuity of a network service is the main goal of an Internet Service Provider 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 backup links that can keep up a network even when an unplanned outage occurs. To ensure maximum availability of a designed network it is difficult when a power outage or load shedding occurs. If we can design a network that is more beneficial, more secure, highly reliable and faster, then it will be more useful for any organizations. Besides, if we can ensure maximum continuity of a network by using redundant links, power backup by using renewable energy source and proper monitoring then the quality of service of the network will also increase. TABLE OF CONTENTS CONTENTS PAGE Approval i Declaration ii Acknowledgements iii Abstract iv List of figures vii Chapter 1: Introduction 6-7 1.1 Introduction 6 1.2 Motivation 1.3 Objectives 1.4 Report Layout Chapter 2: Organization 2.1 Introduction 2.2 Product and



