

INTERNSHIP ON INFORMATION TECHNOLOGY ADMINISTRATION

SUBMITTED

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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

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Approval

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I, hereby declare that the work presented in the internship report has been done by us under the supervision of **Ms. Zerín Nasrín Tumpa**, Lecturer (Senior Scale) Department of CSE, Daffodil International University. I also declare that no part of this project has been or is being submitted elsewhere for the award of any degree or diploma.

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Finally, In closure, I must politely applaud our parents' unwavering devotion and compassion.

ABSTRACT

ISP users can use them to access the internet. When at least two computers are linked and ready to share data or files. This is referred to as a network. The ISP sector is vast, and there are several things to understand and apply in order to be a strong carrier in ISP. The internet is becoming a more vital aspect of our lives, and ISPs are making it easier for customers to have access to it. Numerous works connected to hardware and software exist for various purposes. I need to configure routers and switches, in addition to controlling the topology for the optimum results. In the company, there are various types of work, such as configuring routers, switches, firewalls, VLANs, numerous servers for maintenance like DNS server, Mail server, proxy server, FTP server, Web server & controlling bandwidth, resolving customer problems. It is incredibly difficult to keep the system working without them since each one of them operates in a distinct way. I chose this topic for my report, "**Internship on Information Technology Administration.**" This article discussed about OSI model, TCP/IP network and the causes of the configuration of routers, switches, VLSM, VLAN, firewalls, NAT, OLT, and servers.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Our nation is advancing day by day, and it has transformed into a digital nation. And the internet is the main factor in making this a digital nation. In the ISP sector, the most in-demand services include e-commerce, social media, gaming, and online shopping. ISPs provide their customers with a wide range of services, including email, MPLS, dedicated bandwidth, data connectivity, and software. All applicants are admitted by the ISP business after rigorous training. Because of this, the ISP members are quite knowledgeable.

1.2 Motivation

One of the affiliates in competition is ISP. My internship has trained me how to network effectively.

After completing an internship, I became aware of how well I fit in with different groups or networking. I completed six (6) to seven (7) hours of work.

It will drastically improve my academic career.

One type of employment is an internship. I will learn a lot of things from this four-month internship that will help me much in my next employment.

My work experience has shown me how to be a productive employee, to exercise skillful leadership, and to avoid teamwork.

I constantly strive to gain valuable experience through internships that can advance me and benefit.

1.3 Objective

The Report's primary goal is to:

- ✓ Gain deeper comprehension of interacting in ISP industry.
- ✓ A quick explanation of the ISP.
- ✓ Being aware of an IT officer's duties.
- ✓ Knowing Switch, Router, VLAN, Servers, different type of cable etc.
- ✓ Clientele's expectations and degrees of satisfaction with ISP services.

1.4 Report Layout

Through my internship, I picked up a lot of responsibilities and activities. In Chapter 1, I described the company's services, SWOT and organizational. I describe my mission, circumstances and operations in chapter 3. I demonstrated competence acquired, a winning strategy and reflections a conclusion, and my professional employment in the final two chapters of chapters 4 and 5.

CHAPTER 2

INTERNSHIP ORGANIZATION

2.1 Company introduction

One of the top Internet service providers in the Southeast region has been Skynet. Skynet started itself in Noakhali's Chowmuhani in 2007. After a lot of effort and great ideas, the business has achieved success and is in a strong position.

Skynet firmly adheres to their work and corporate philosophy. They started out with a tiny company. A classic example of strong leadership and collaboration is Skynet. Skynet is always considerate of its partners, customers, and employers. Skynet offers the quickest internet connection for both residential and business users in accordance with their needs and preferences. Within 30 minutes, they resolved customer issues. As a result of their improved facilities, their clientele is growing daily.

2.2 Services

Skynet Chowmuhani has introduced the following service:

- ✓ Bandwidth
- ✓ Mail service
- ✓ MPLS service
- ✓ Data connectivity
- ✓ 24 hours' support

2.3 SWOT Analysis

The original points made by the business scenario and this company's skill level, which have the greatest influence on strategy formulation, are summarized in this inquiry.

STRENGTHS:

- ✓ In a short amount of time, gained a solid reputation with regulators and consumers.
- ✓ Provides the best services possible.
- ✓ compares favorably to other ISPs in terms of return on frozen in the protective system.

WEAKNESSES:

- ✓ Does not provide adequate customer service when the weather is bad for an extended period of time.
- ✓ Absence of experienced in addition to skilled labor in some areas.

OPPORTUNITIES:

Skynet's commercial success is based on a 7-point structure.

the third part's aspects –

- ✓ Approach
- ✓ Erection
- ✓ Arrangement

THREATS:

- ✓ DNS Spoofing
- ✓ DNS poisoning
- ✓ BGP session hijacking
- ✓ Route leaks

2.4 Organizational Structure

According to the locations of the current businesses, Skynet is structured.

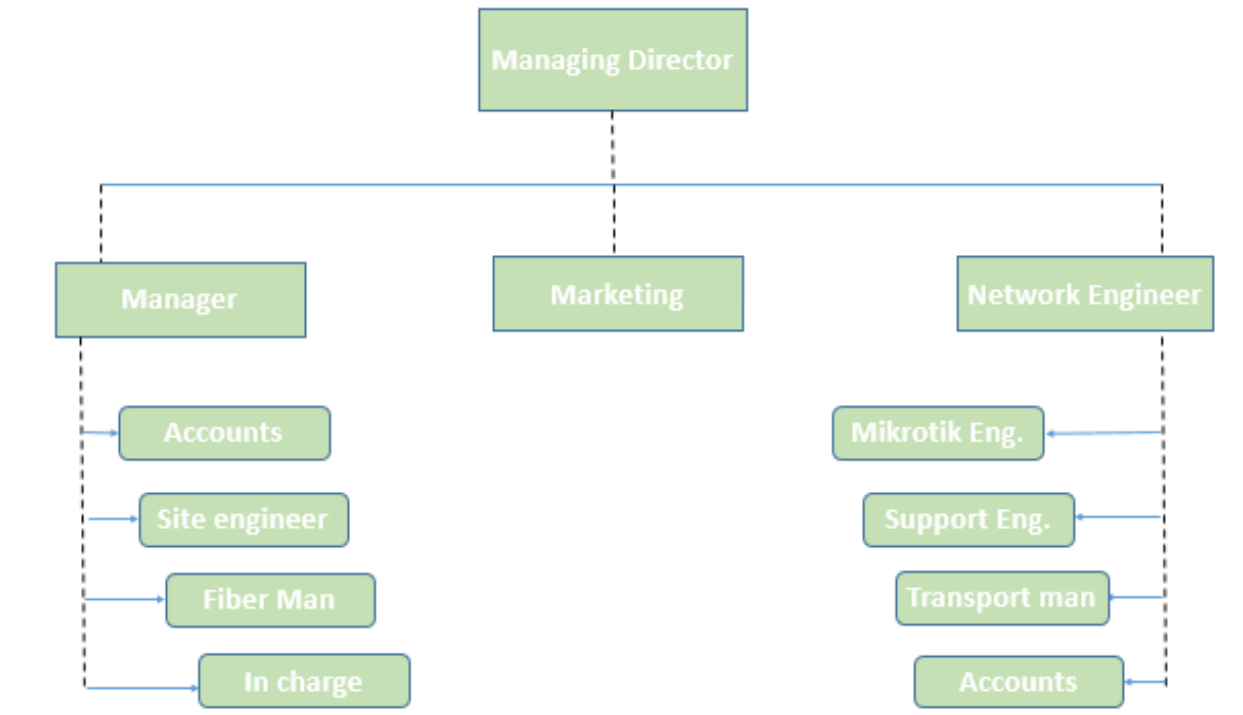


Figure 2.1: Organizational Structure of Skynet

CHAPTER: 3

EXERCISE, EVENTS AND ACTIVITIES

3.1 Daily Task and Activities

Parameter settings for quite a Basic Access point:

```
Router#clock set 04:45:00 14 may 2022
Router#show clock*
|*04:45:3.965 UTC Sat may 14 2022
```

- Configuring the router hostname to LB2

```
Router(config)#hostname LB2
```

- Set Banner Message of the Day to *Unauthorized Access Prohibited!*

```
NB1(config)#banner mod #Unauthorized Access Prohibited! #
```

- Newly-entered passwords must have a minimum length of 6 characters.

```
LB2(config)#security passwords min-length 6
```

- Protect device configurations from unauthorized access with the encrypted password. Set the password to Anis@21.

```
LB2(config)#enable secret Anis@21
```

- Secure all the ways to access the router. Set the passwords to Anis@21.
- Prevent all passwords from being viewed in clear text in device configuration files.

```
LB2(config)#service password-encryption
```

- Prevent device status messages from interrupting command line entries at the device console.

Figure 3.1: Parameter settings for quite a Basic Access point:

3.2 Analysis of prior studies

If a network is being considered, It may be distinguished according to the type of data communication phrase utilized on It, whether It Is carrying speech to text or both forms of impulses, and who Is In charge of maintaining the network In light of the current nature of Its Interconnection.

3.3 Computer Networking

A set of connected computers that access assets, swap directories, or facilitate collaboration make up a computer network.

A computer network would be an arrangement where a variety of computers are interconnected simultaneously. A collection of computers that share resources via network nodes. The nodes can include servers, networking hardware, or other specialized equipment.

3.4 PPPoE in Mikrotik Router

ISP setup with PPPoE server configuration. Creating 3MB pack for PPPoE user.

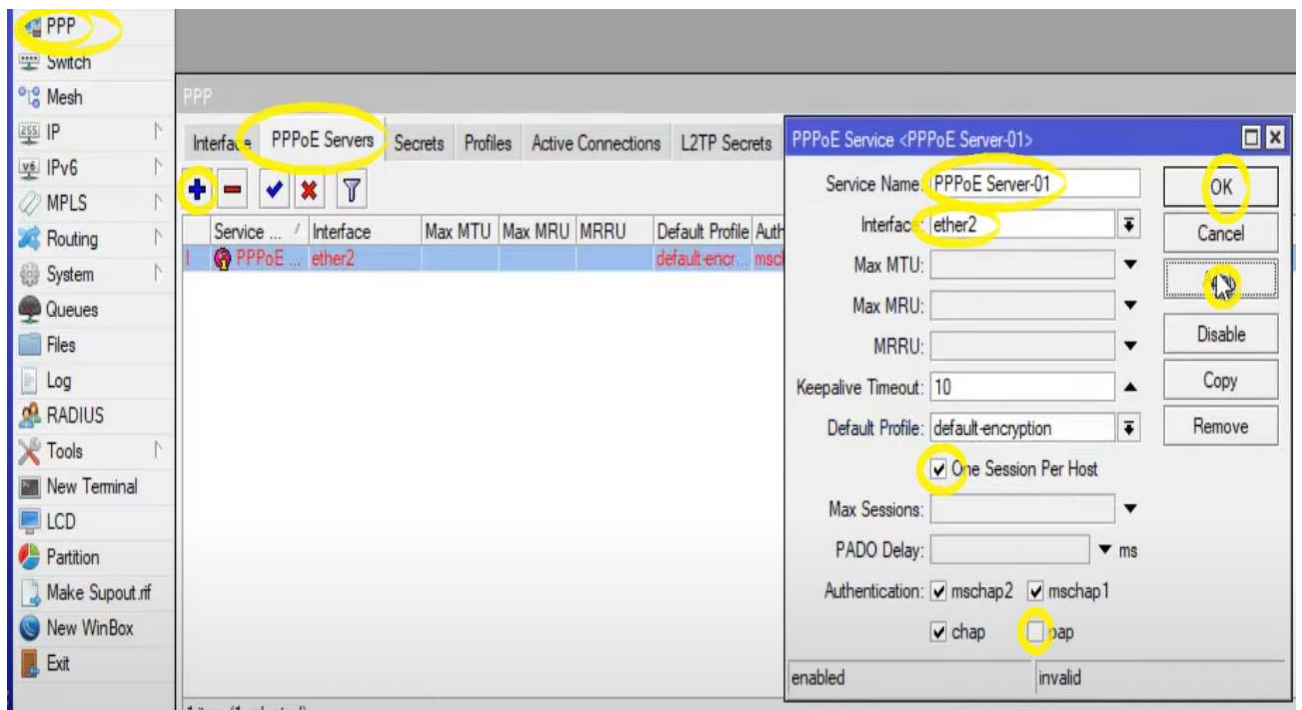


Figure 3.2: Produce PPPoE server

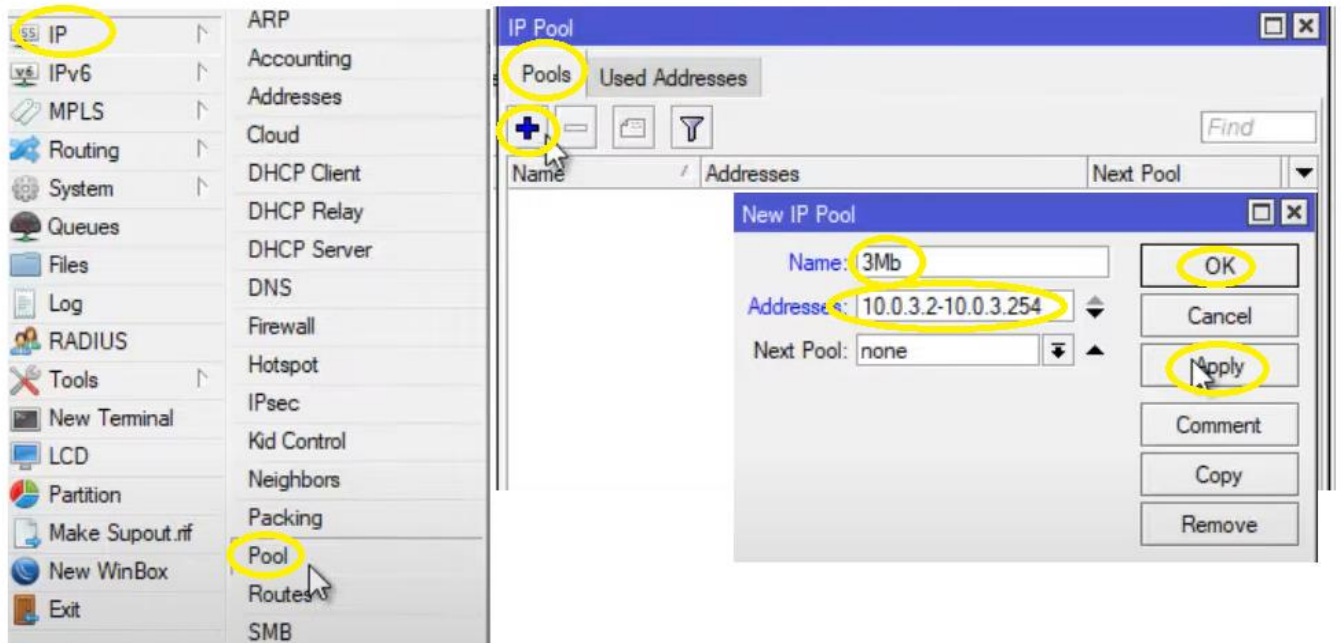


Figure 3.3: Create pool for 3MB package remote address

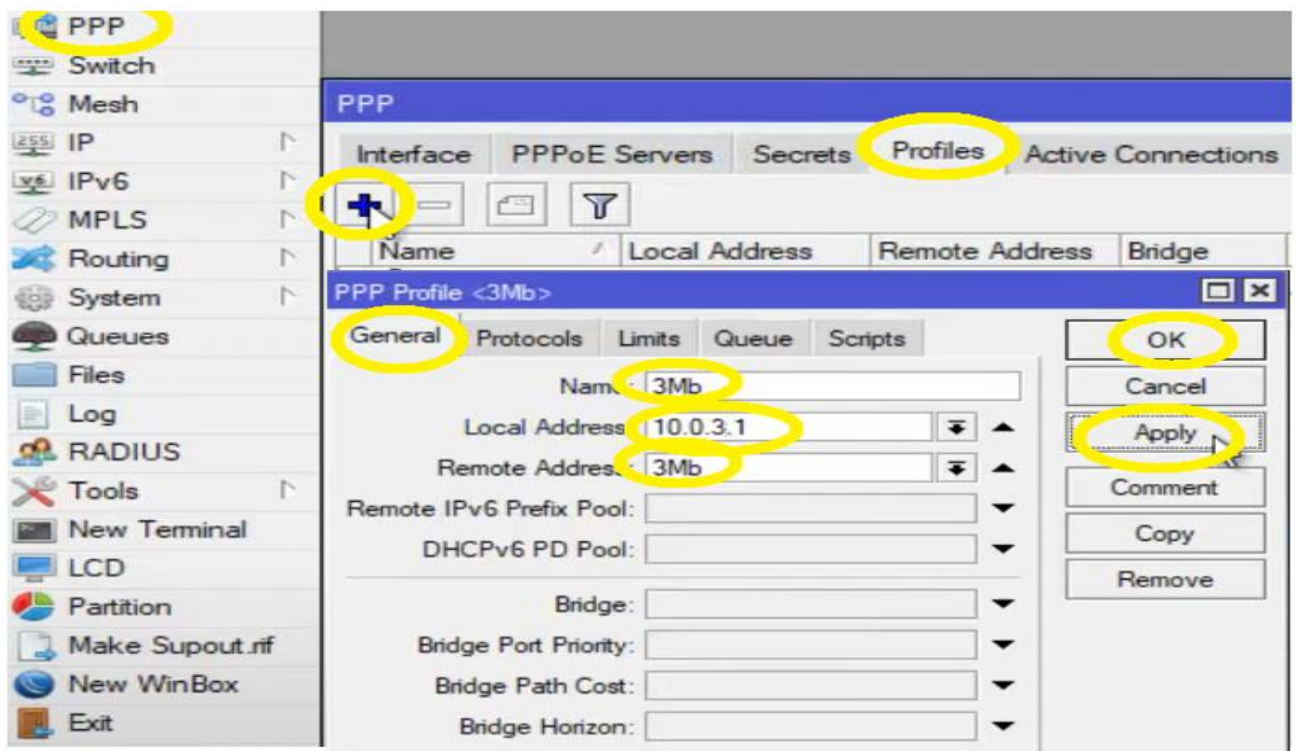


Figure 3.4: create profile for 3MB package

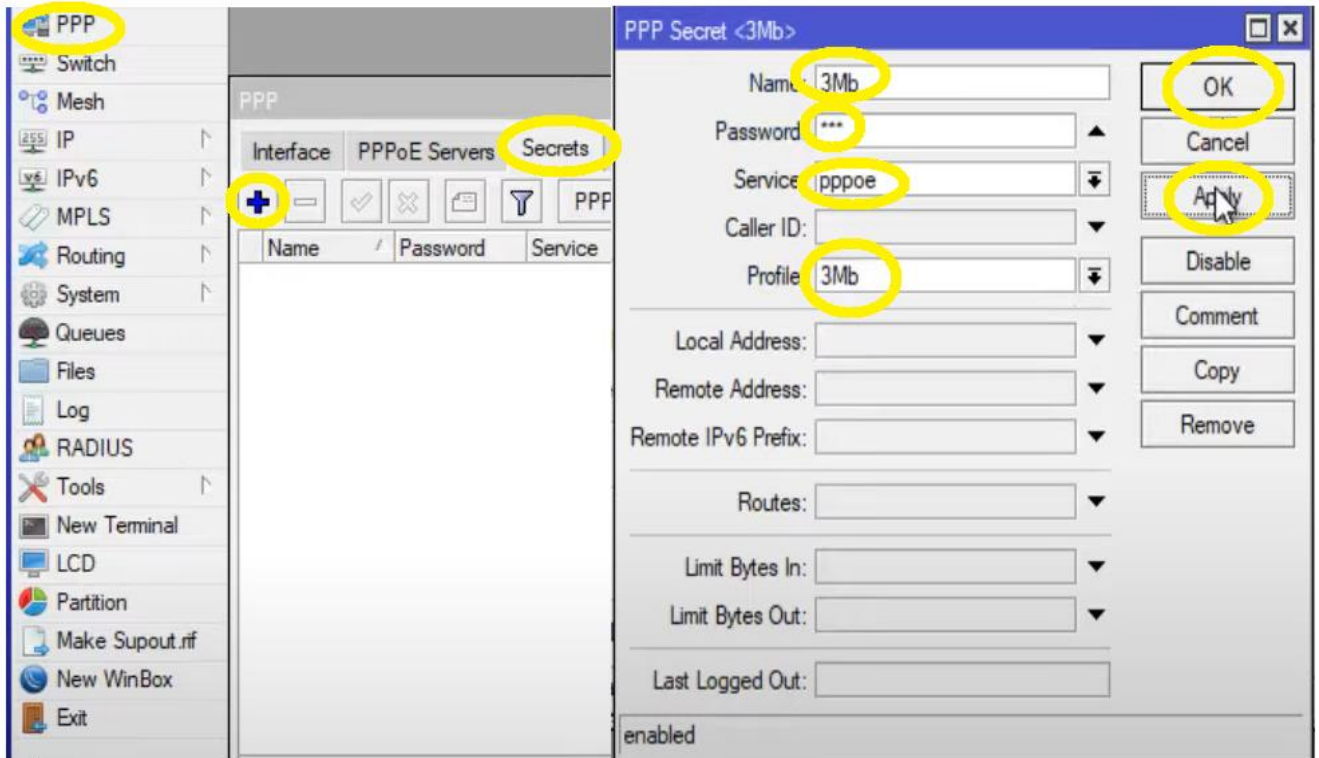


Figure 3.5: Create user ID & pass for 3MB pack

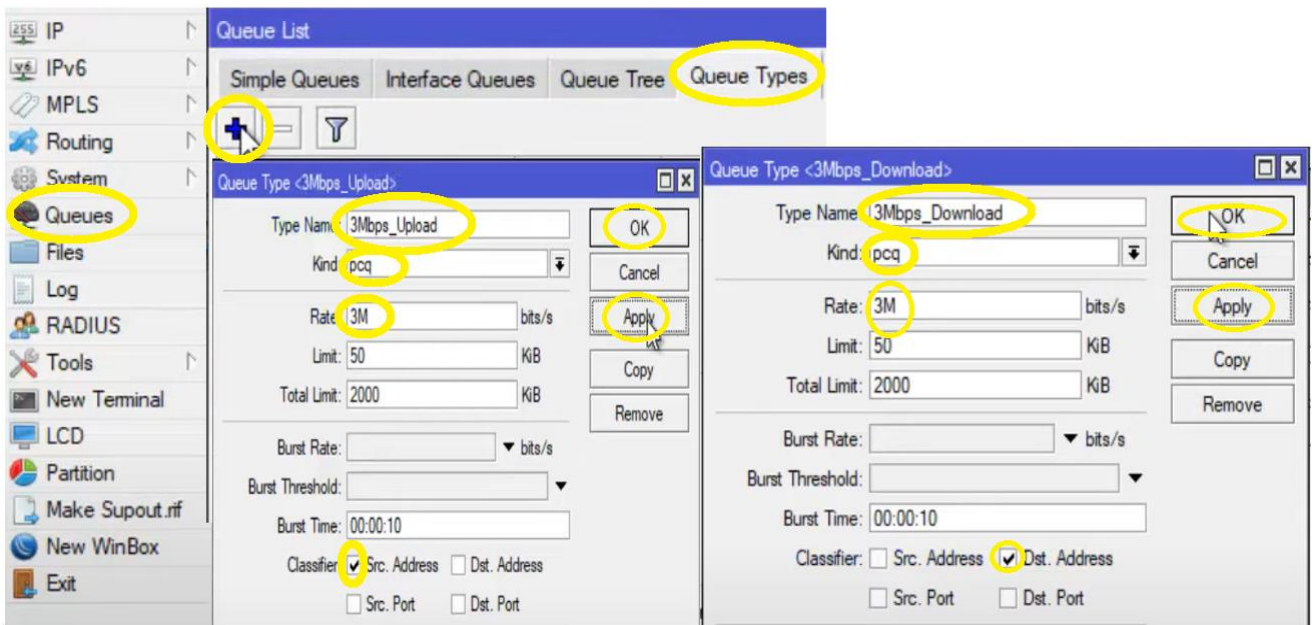


Figure 3.6: define Upload and Download pcq

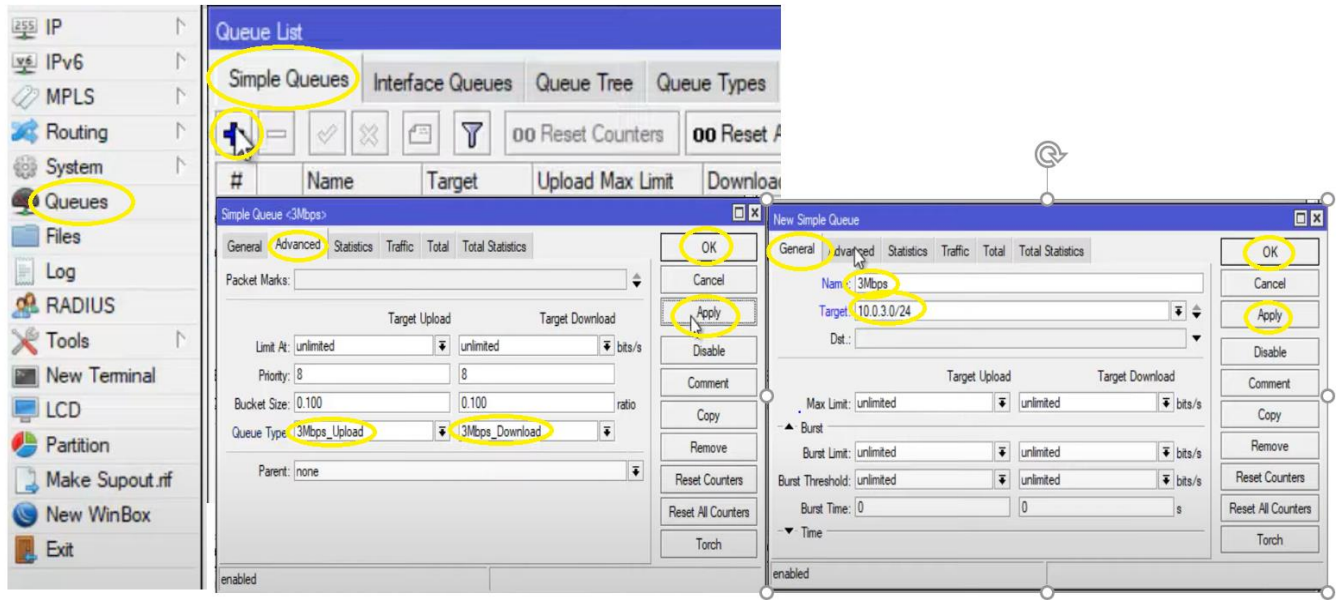


Figure 3.7: Generate queue for 3MB

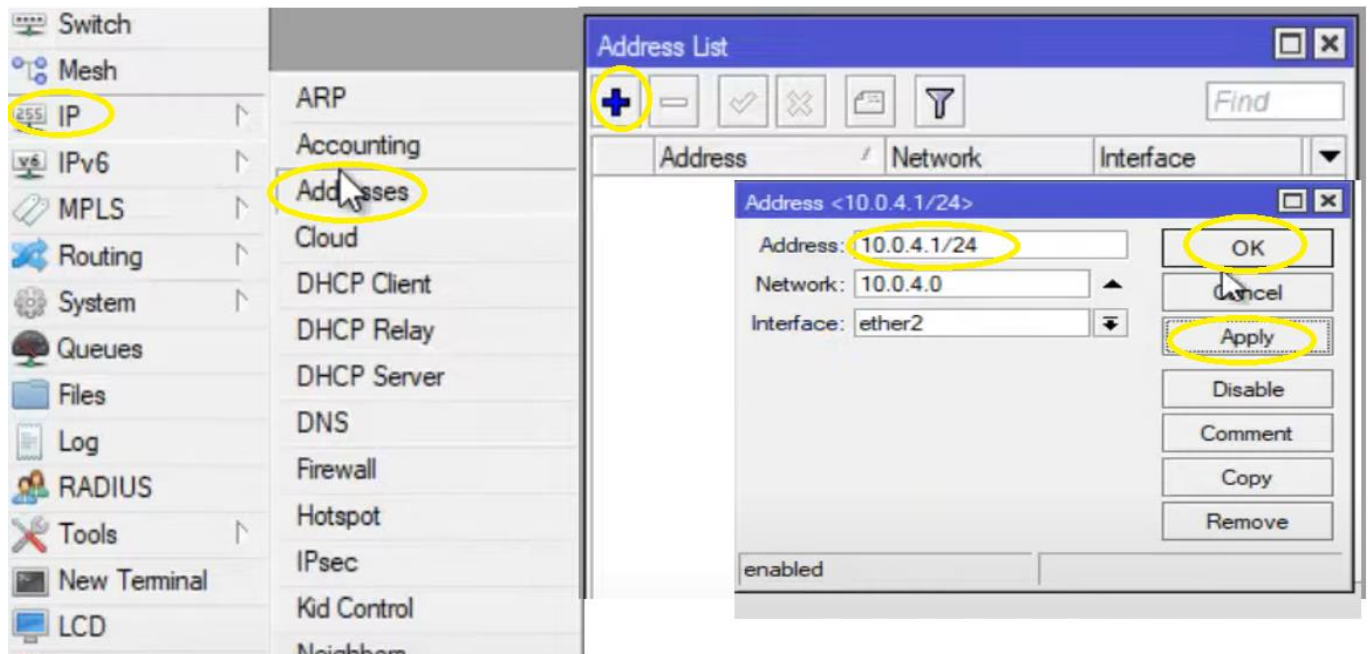


Figure 3.8: Functional PPPoE server at Ether port2

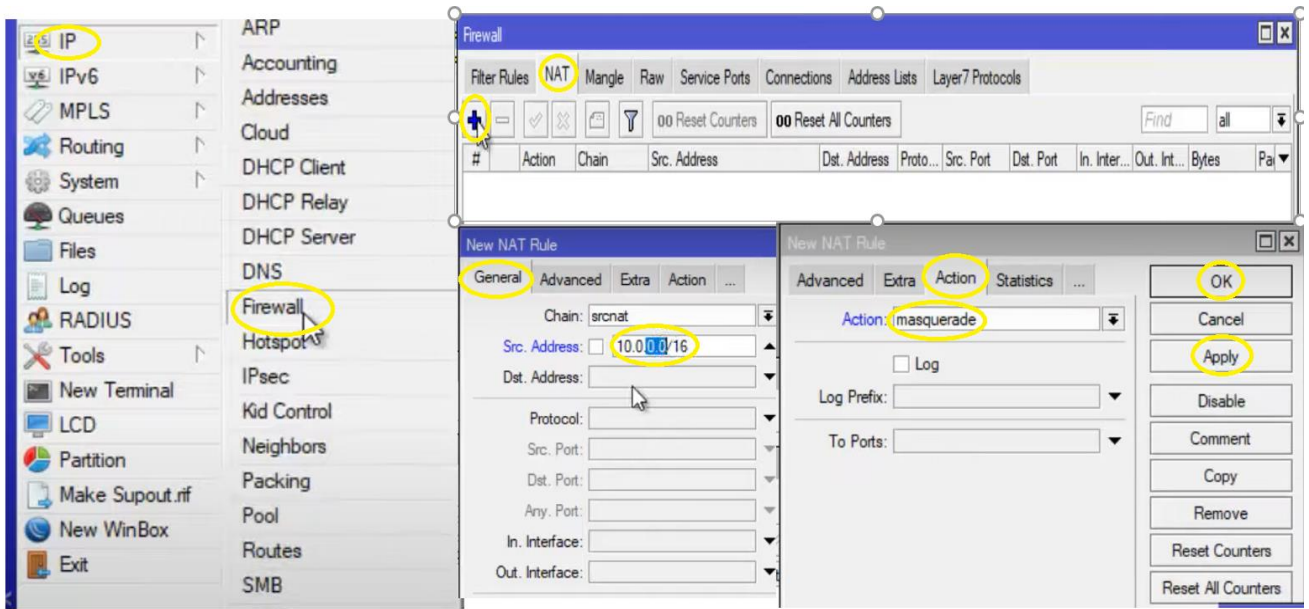


Figure3.9: Generate NAT for Internet access.

3.5 VLAN configure in Mikrotik Router

Configure VLAN on, Vlan100 and Vlan200 ports for Vlan100 and Vlan200 are all ports attached to router. Set port 2 and 3 under Vlan100 and port 3,4 under Vlan200.

First we have to create bridge for Vlan100 and Vlan200.

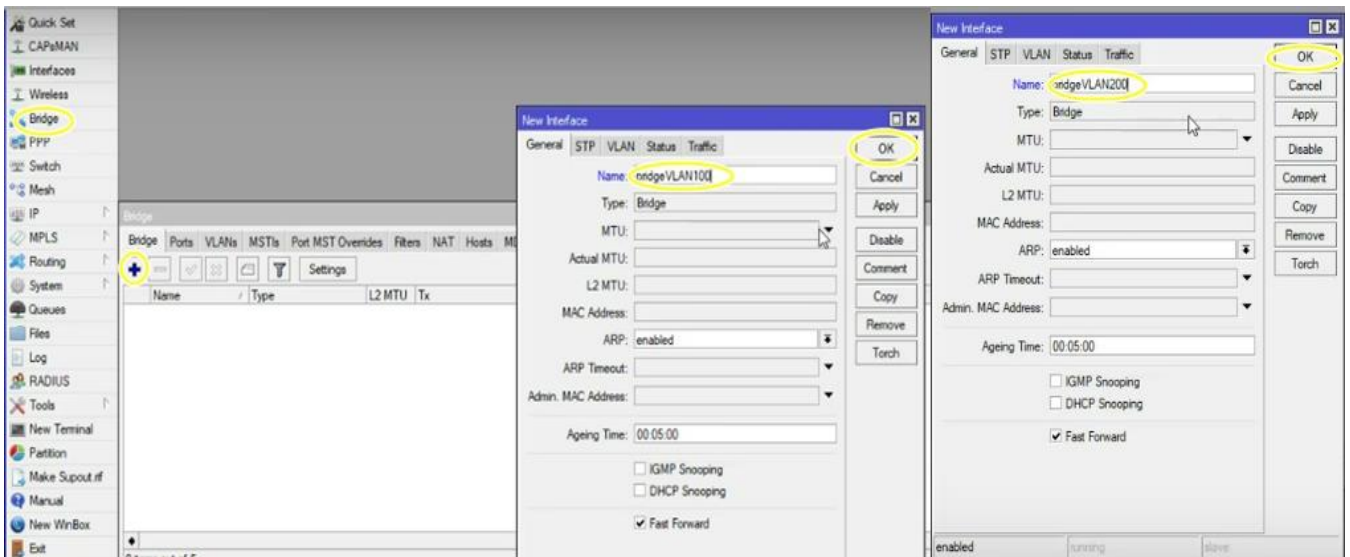


Figure 3.1.0: create bridge for Vlan100 and Vlan200

After create bridge set port 2 and 3 under Vlan100 and port 4,5 under Vlan200

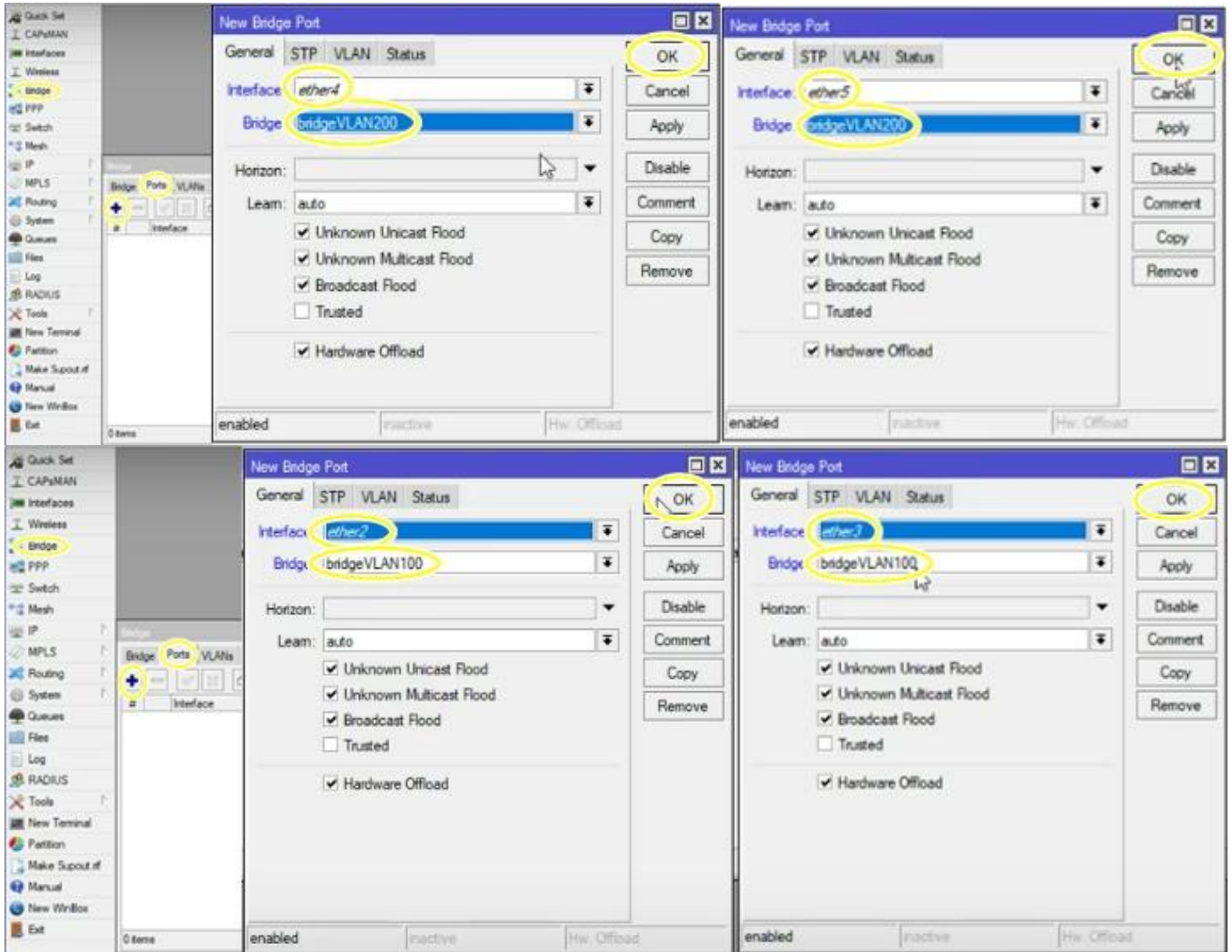


Figure 3.1.1: Setup ports under VLANS.

Create interface and set VLAN ID

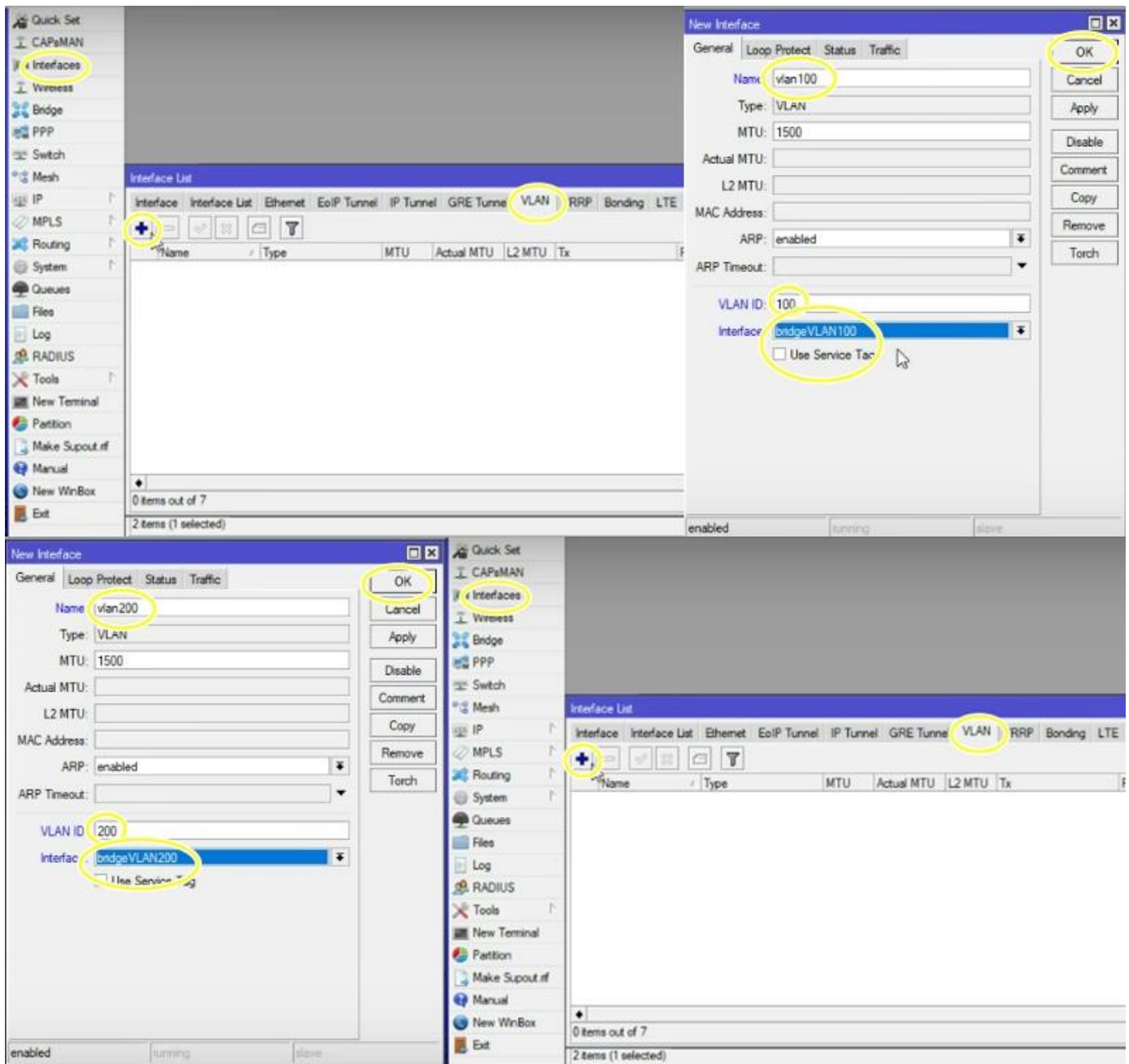


Figure 3.1.2: Create interface and set VLAN ID

Set IP address for VLAN

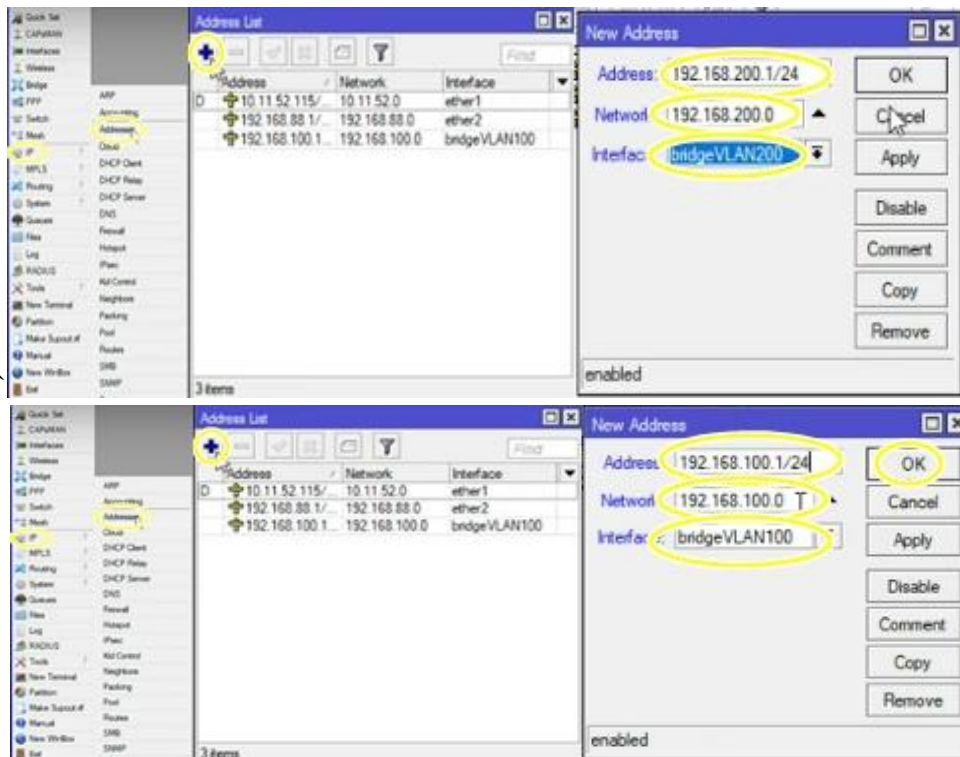
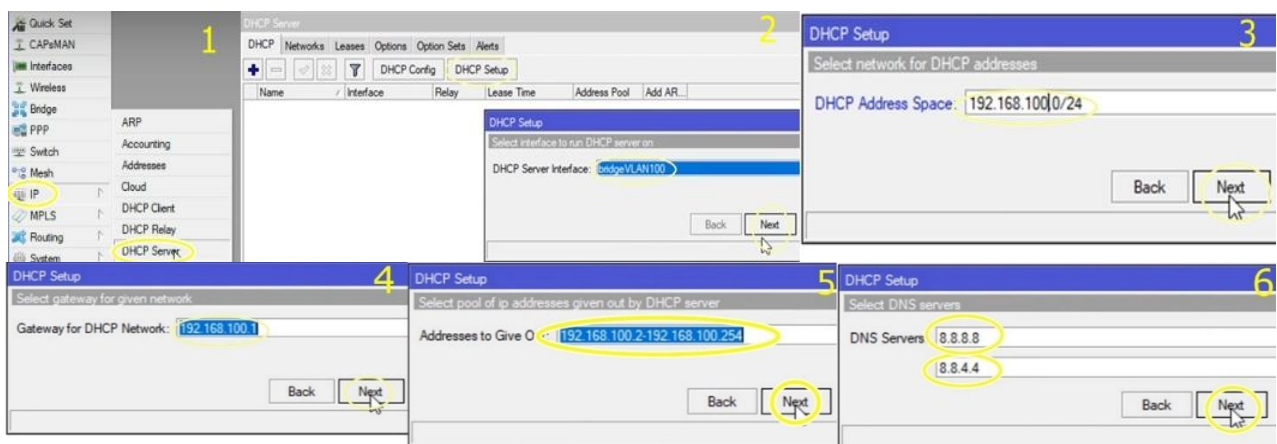


Figure 3.1.3: Set IP address for VLAN

DHCP server setup for Vlan100



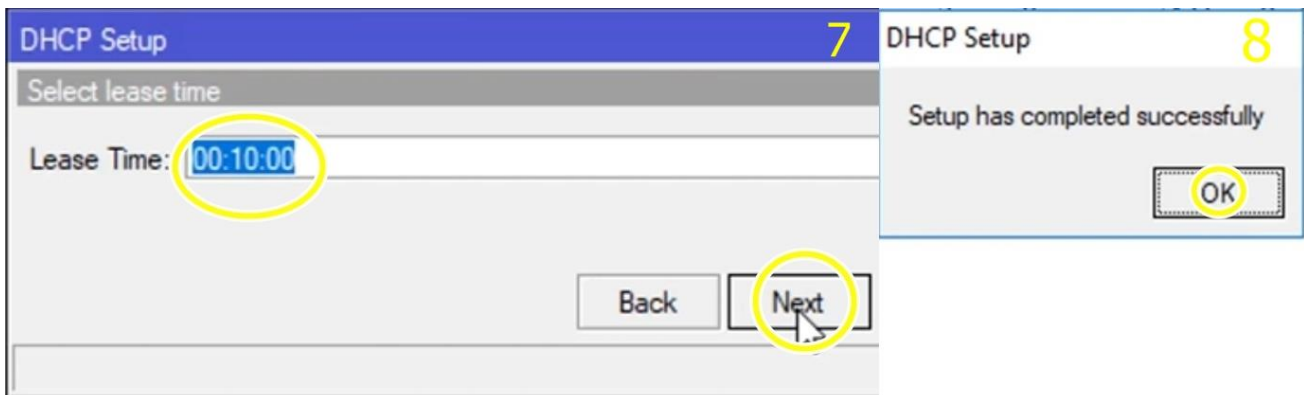
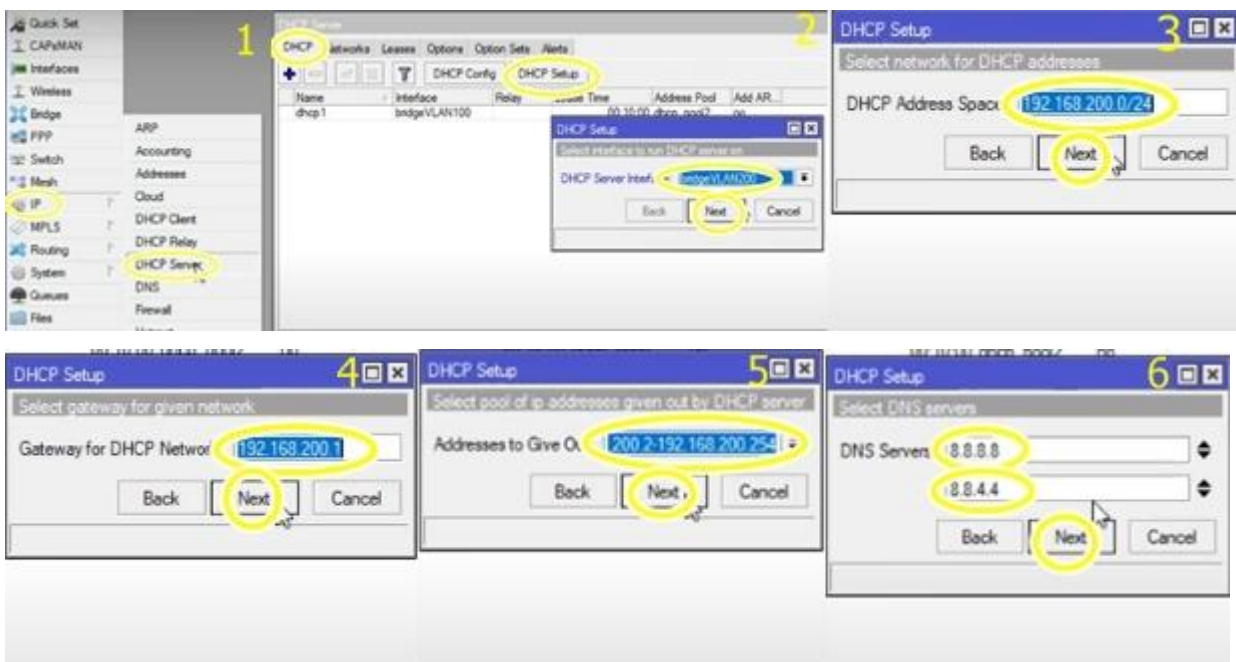


Figure 3.1.4: DHCP server setup for Vlan100

DHCP server setup for Vlan200



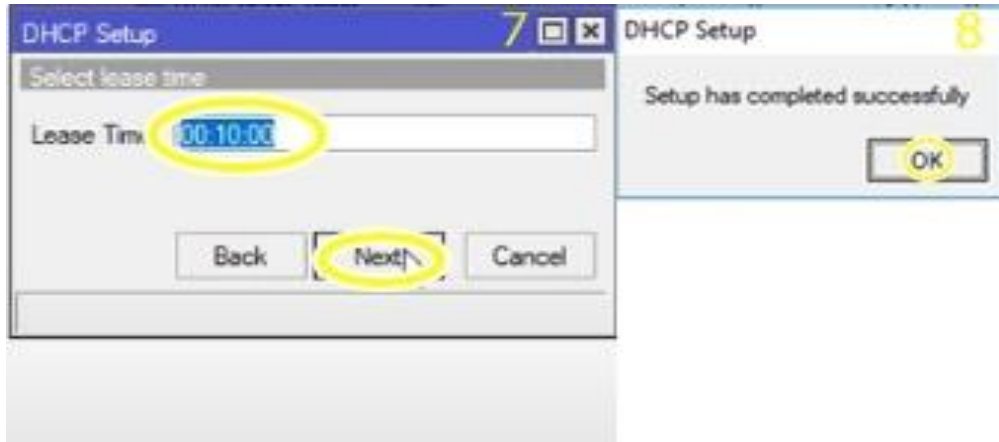


Figure 3.1.5 DHCP server setup for Vlan200.

3.6 Switch

In the OSI scheme, switches perform first at Data Link layer (Layer 2). It's a specialized kind of telecom equipment that gathers messages and thereafter distributes them to the primary audience. A network device is a piece of networking hardware that connects devices on a computer network by receiving and transmitting data to the targeted devices via packet switching. A network switch is a multiport network bridge that uses media access control addressing to route data at the data connection layer.

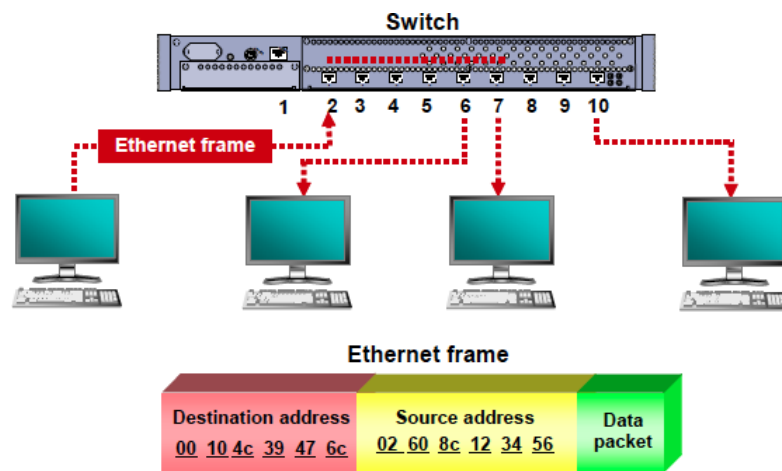


Figure 3.1.6: Switch

3.7 Router

A router is piece of equipment that enables communication between two or more distinct packet-switching networks or subnetworks that are located in various geographical locations. It supervises traffic within various networks and facilitates the ability for several devices to use a single broadband connection by distributing datagrams to their separate IP addresses.

- ✓ It is an internetworking device used to connect two or more different networks.
- ✓ It works on layer 3 i.e. network layer
- ✓ It acts as a Gateway
- ✓ It has an operating system

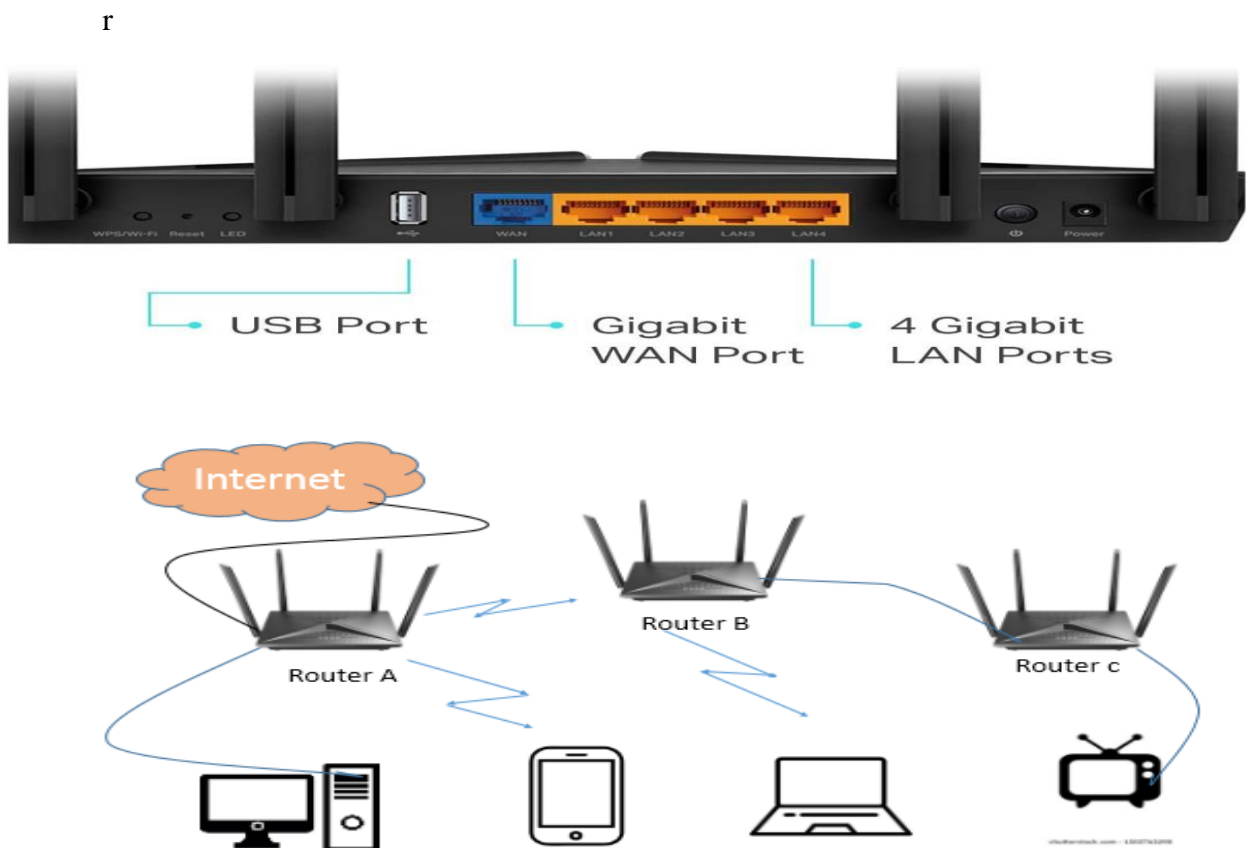


Figure 3.1.7: Router

Features of Router

- ✓ Data rate and transmission cost
- ✓ Network traffic & Collision free protocol
- ✓ Data rate/transmission cost
- ✓ Working in Network layer & Creates broadcast domain
- ✓ Generally Big Network.

3.8 OLT

The **OLT**, often referred to as optical line termination, is the hardware device's endpoint in a dormant optical network. An OLT consists of a voice gateway (VGW) uplink card, a precursor router, an optical access card (GWR), and a central processing unit (CPU). At 1490 nanometers, it can send a signal to the operating system (nm). By utilizing optical splitters to reach the target devices, the signal can reach up to 128 ONTs at a distance of up to 20 kilometers.

Features of OLT

- ✓ A downstream frame treatment for receiving and churning an asynchronous transfer mode cell to produce a downstream frame, and transforming the downstream frame's parallel data into serial data.
- ✓ A wavelength partition multiplex is used to execute a wavelength division multiplex of the serial data of the downstream frame after it has undergone an electro-optical transformation.
- ✓ An upstream frame processing for physically managing each distributed slot and physical layer operations administration and looking after (PLOAM) cells while also extracting data from the wavelength division multiplexing, looking at an upstairs field, creating a slot border, and handling each.
- ✓ The creation of a control signal for the media access control (MAC) protocol's execution as well as variables and timing signals for both upstream and downstream frame processing.
- ✓ A control method that uses the variables and timing signals produced by the control signal generation to direct both the upstream and downstream frame processing.

- ✓ Converting network traffic and the collision-free protocol from the standard signals used by a FiOS service provider to the frequency and framing of the PON system.
- ✓ coordination of multiplexing between transformation devices on optical network terminals (OLTs) at client locations.

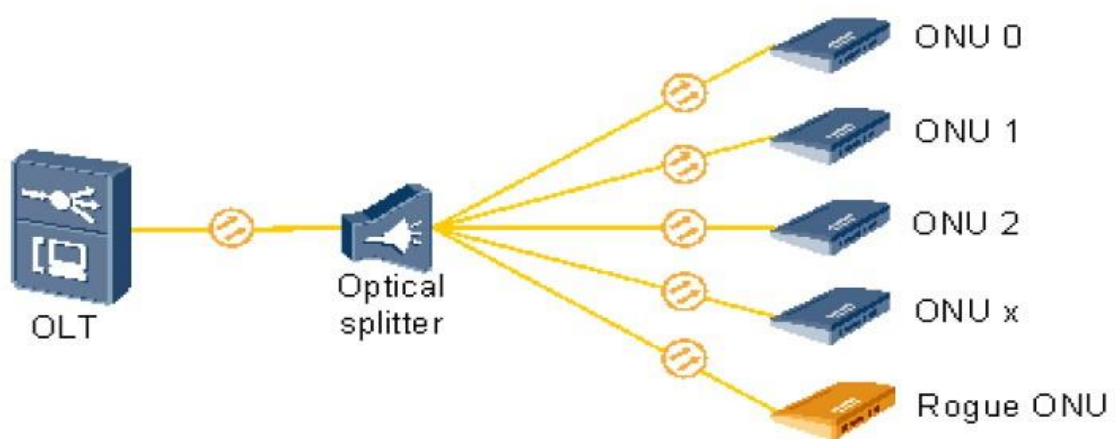


Figure 3.1.8: OLT.

3.9 Methodology

The term "Network Structure & Security of ISP Company" refers to the entire network structure as well as a number of security protectors in this project. We are conducting observations at various ISP companies in order to collect data or data-related information.

The (OSI) wasn't always this way; in the 1970s, when computer networking was in its early stages, two single models were combined in 1983, and the Standardization Organization of the World established the OSI layer in 1984.

Supply a statement prototype in instruction to assure that different counterman will cooperate in networks. (OSI) is an abbreviation for Open Systems Interconnection. All 7 layers of data are transmitted between software project authorization.

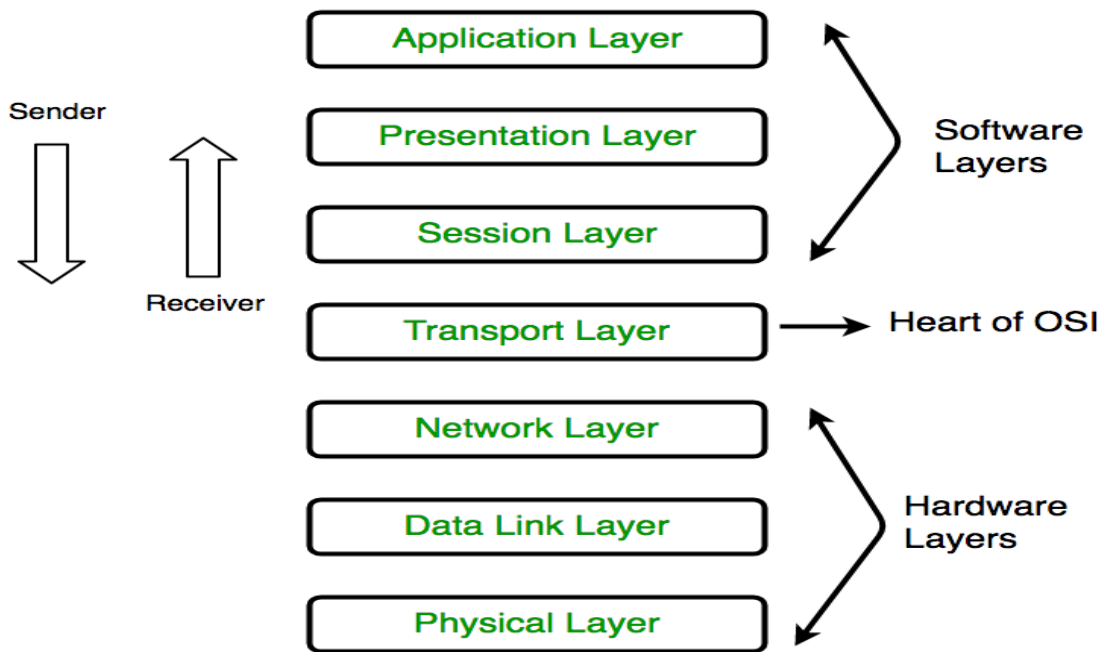


Figure 3.1.9: The OSI reference model

3.1.0 TCP/IP Network framework

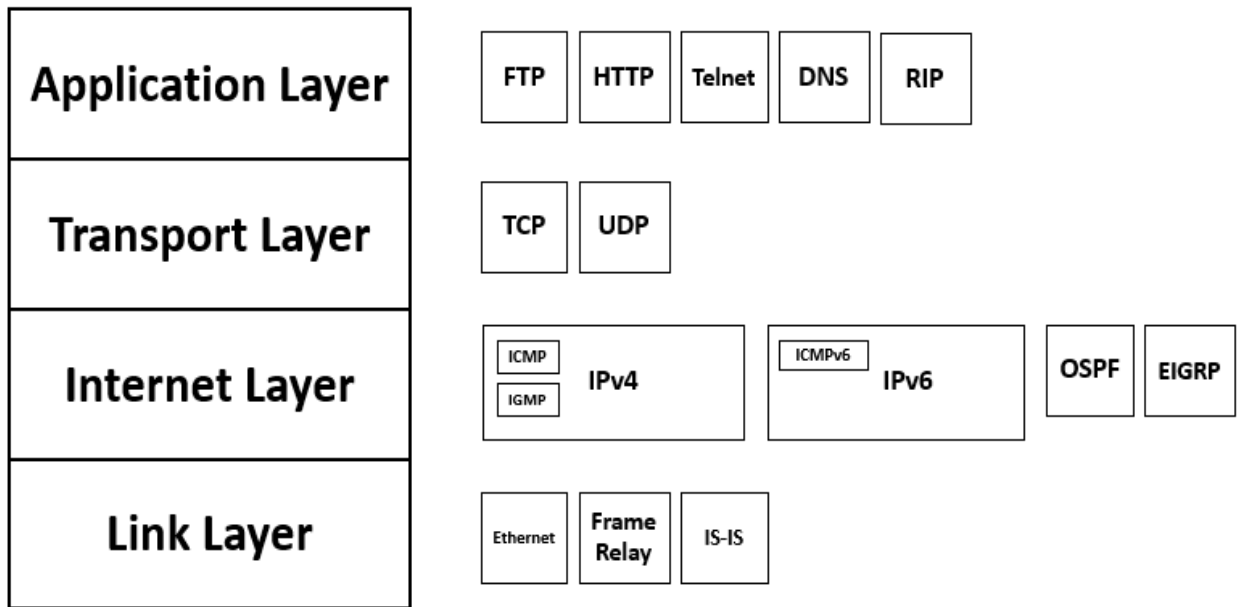


Figure 3.2.0: primarily using the TCP/IP concept for interfaces and networks.

3.1.1 Project Duty and Actions

Configuration Static router:

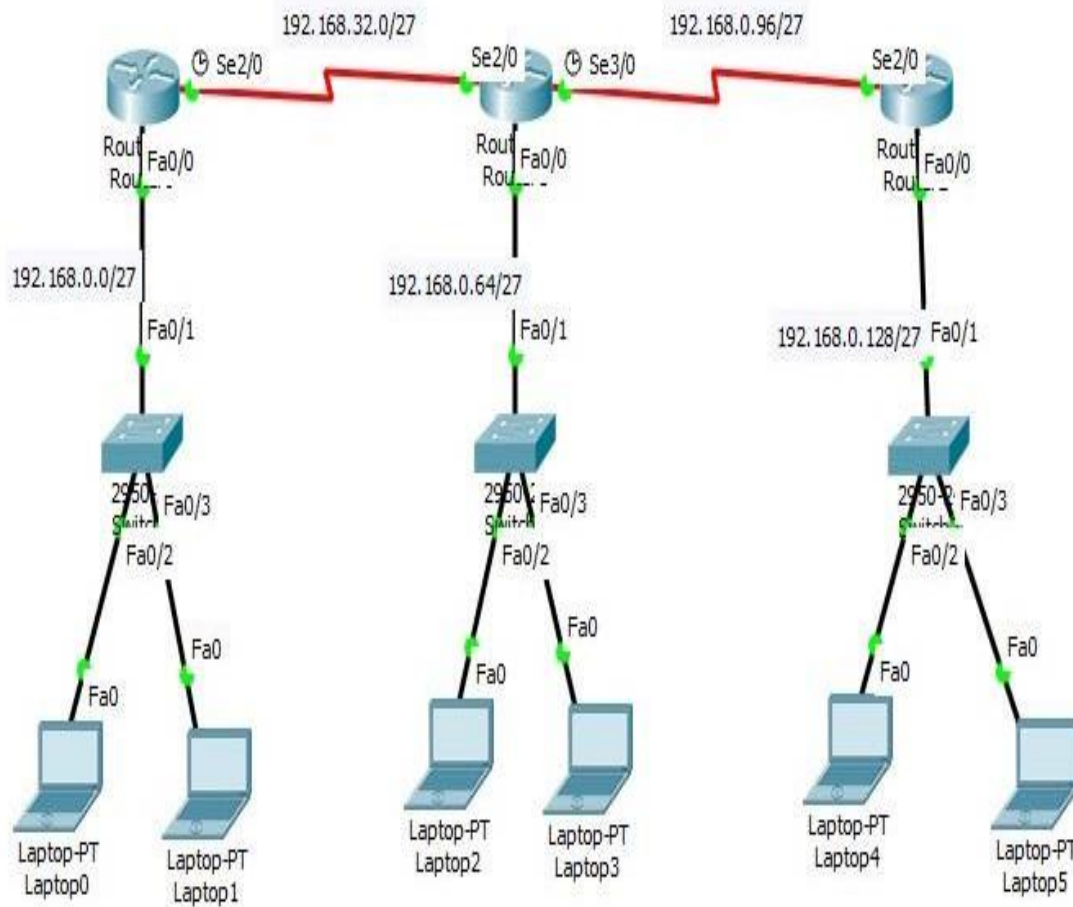


Figure 3.2.1: Static Router configure

3.1.2 Hardware Firewall

To create a network flashpoint, a hardware firewall is used as equipment. This firewall is passed by all network links that cross this barrier. This makes it possible for it to examine both incoming and outgoing network traffic, as well as to implement access controls and other security measures.

This firewall offers several networking and security features, as well as hardware and software elements necessary to enforce a network border.

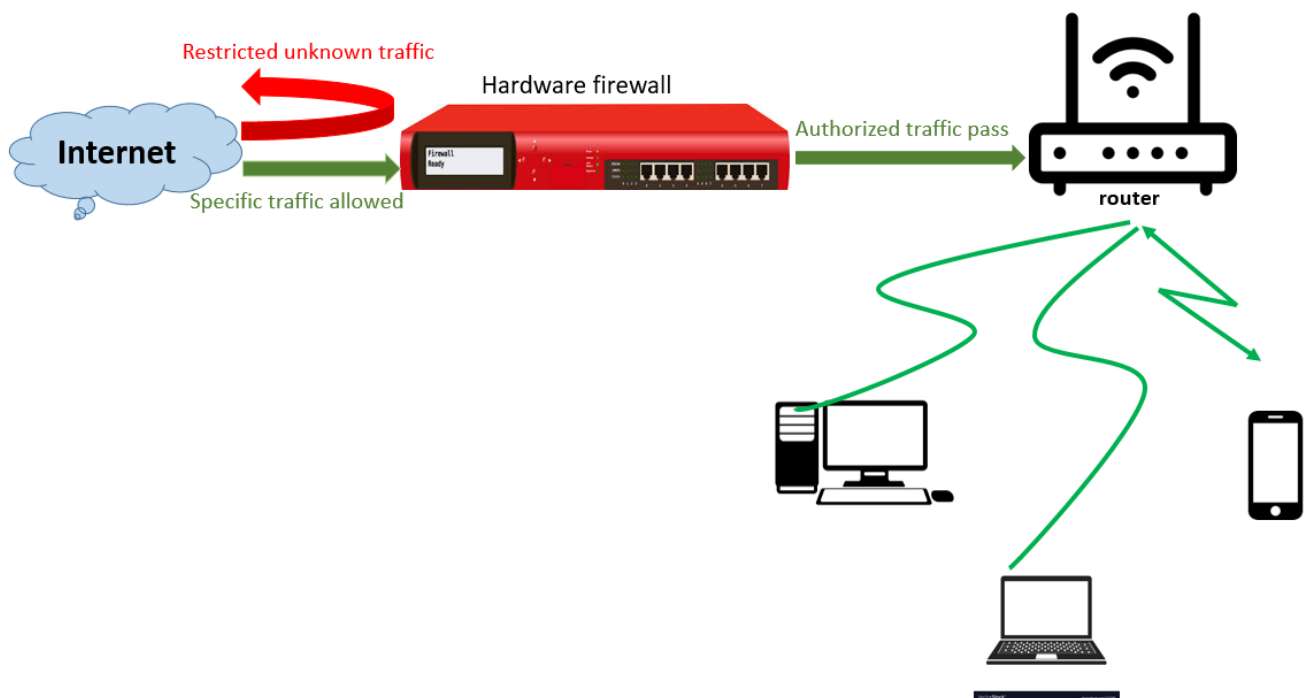


Figure 3.2.2: Hardware Firewall

3.1.3 Virtual Local Area Network (VLAN)

With the help of the idea known as Virtual Local Area Networks (VLAN), we can logically segment the devices on layer 2. (data link layer). Multiple devices that are connected to different physical LANs and refer to a subnetwork may be grouped together by this. With the help of VLANs, network managers can divide a network with a single switch into sections to better meet the demands for functionality and security.

All transmission packets will be conventional by the diplomacies in the identical broadcast province. Nevertheless, only switches are able to receive them because routes do not send out broadcast packets. To forward packets between VLANs or to the broadcast domain, inter-VLAN relaying is crucial. VLAN essentially allows for the establishment of several small niche that are very uncomplicated to administer.

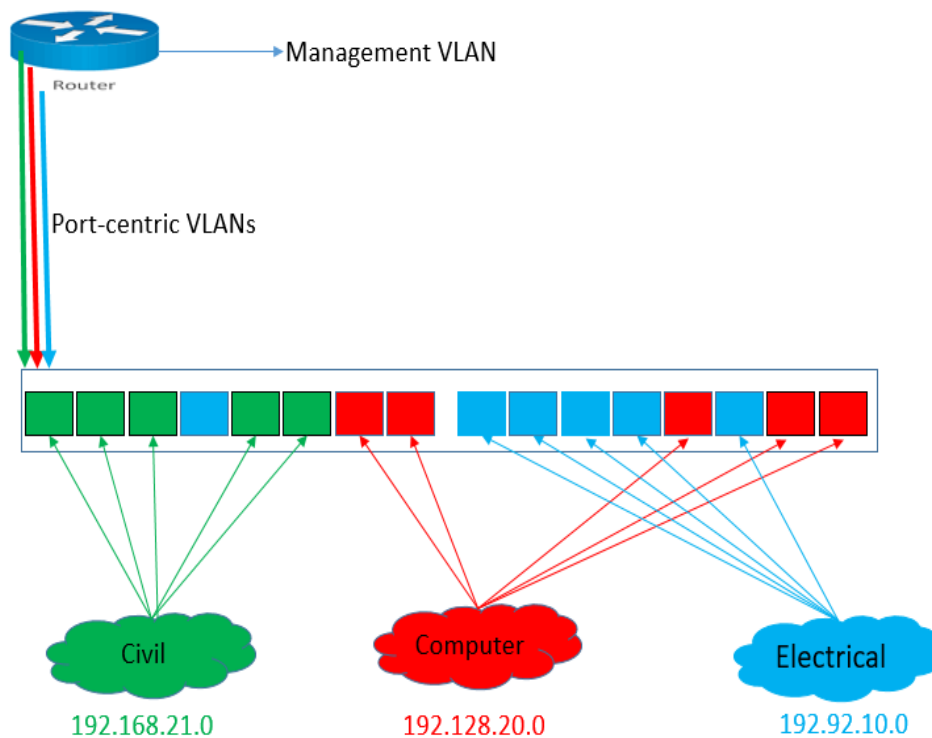


Figure 3.2.3: Virtual Local Area Network

VLSM

- ✓ Variable length subnet mask is referred to as VLSM.
- ✓ The same as sub-netting, VLSM is a practice.
- ✓ VLSM is a method used by network engineers to organize subnets of varying sizes into a hierarchy.
- ✓ Making it possible to create subnet with different host counts without wasting large figure.

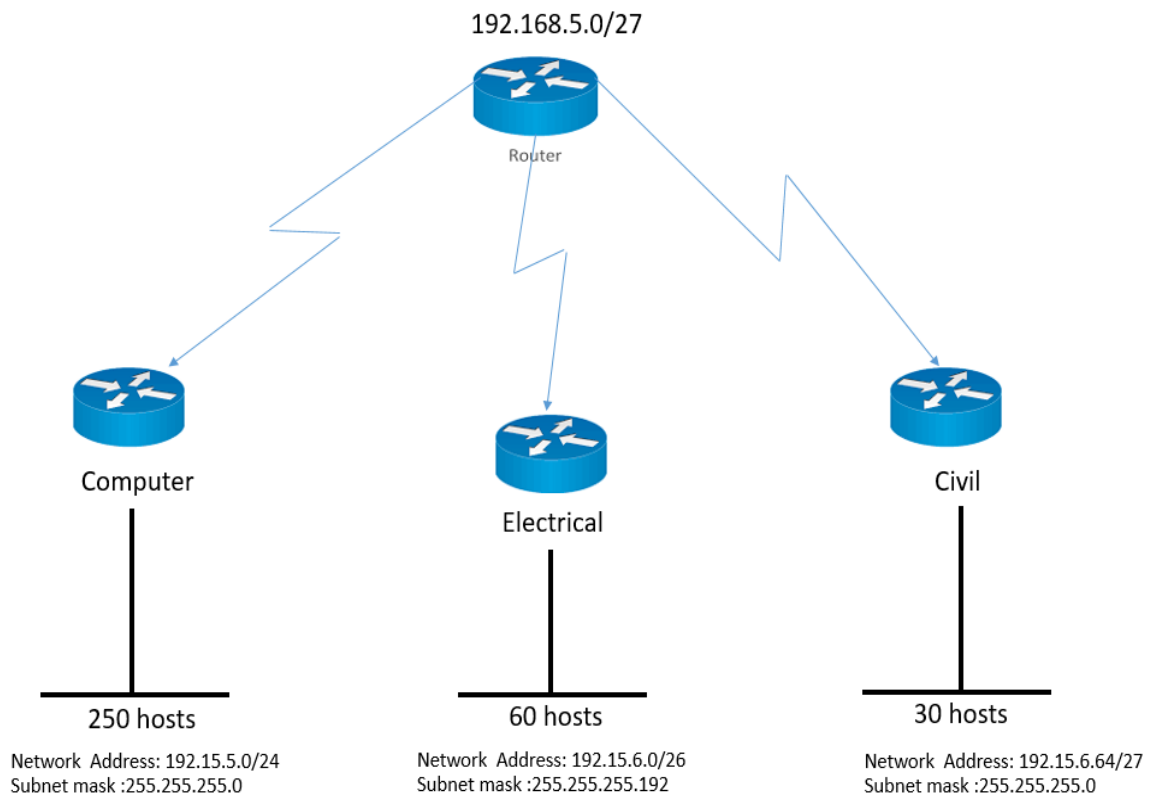


Figure 3.2.4: VLSM

3.1.5 PPPoE

Point-Point-Protocol over Ethernet is referred to as PPPoE. ISPs offer PPPoE to their customers who have broadband modems with PPPoE connections that are already set up. ISPs typically employ PPPoE to provide their customers with internet access services.

3.1.6 PPPoE configure

But occasionally, the administrator would have to manually set up the connection. They will therefore require knowledge of the PPPoE login, password, and (MTU) maximum transmission unit size. The client should receive the account and password from the ISP, but the administrator is in charge of choosing the MTU size.

For the internet to function effectively, the exact size of the MTU must be specified. The size is expressed in octets and sets a maximum size restriction for packets that can be sent across a network. If a packet runs into a router that can't handle the packet size when being transferred, it may need to be retransmitted. A too-small MTU can lead to more headers below and more acknowledgements that must be sent and received. The suggested maximum MTU for a network interface linked to a PPPoE network is typically 1492.

When users must configure PPPoE connections directly from their computers, like when a bridging modem is configured for pass-through PPPoE connectivity, for instance. Operators must manually configure the PPPoE connection in this case. Major operating systems, including macOS, Windows, and Linux, come with native PPPoE functionality, making connection setup quite simple.

3.1.7 Challenges

One solution to the IP address scarcity that is frequently used is network address translation (NAT). The "private" IP address granted by NAT may only be used within a local area network (LAN). It ought to be changed into the "public" IP address utilized on the Internet.

We may postpone the need to define schedule solutions to the IP address problem by leveraging NAT to share a large number of private IP addresses underneath a single public IP address.

NAT and port address translation (PAT) are comparable but they are not identical principles. PAT provides the ability to map incoming sessions to a particular internal host and port when they are introduced from an external host.

➤ Configuration of NAT

- ✓ Create a NAT-SOURCE access list that will match the internal private IP addresses.

- ✓ Configure PAT.

A Wireless Router: A wireless router is a gadget that combines the capabilities of a wireless access point and a router (WAP). It offers access to a private computer network or the Internet. Depending on the maker and model, it can operate on a wired LAN, a wireless-only LAN, or a wired and wireless network.

CHAPTER 4

APTITUDES AND WISE MOVE.

4.1 Aptitudes Got

Erudition with prospective conclusions introduce and constitute to create an employer-serving design and testing organization In addition to supporting the knowledge objectives, internship role of Supervisor will enable an summary to document manipulation and technique.

4.2 Smart Plan

All IT-based organizations require networking internships to function effectively in networking. An organization will lean more toward a bright layout if it has a smart plan in place. Utilizing all available knowledge, expertise, and other resources is the wise course of action.

4.3 Reflections

They succeeded in managing a variety of customary programs and a worldwide federation. They are in charge of staying current with technology and, whenever feasible, enhancing services.

With a highly skilled technical sage community, they can negotiate cutting-edge network and communications solution.

CHAPTER 5

ASSUMPTION AND FUTURE OCCUPATION

5.1 Argument and Assumption

Internship has been great, according to the survey. I started out working seven hours a day. I can connect the sectors of many different individuals because I have glimpsed the future. Through my internship, I gained knowledge of fundamental concepts, time management skills, and self-motivation. Learning how to set up routers, VLANs, PPPoE, and networking operating systems can help you become more knowledgeable about the whole process.

5.2 Scope for future Career

There are numerous areas with accessible career opportunities.

- ✓ Network architects
- ✓ Work-in ISP corporation
- ✓ Technical support
- ✓ Computer security specialist
- ✓ Administrator
- ✓ Traffic analysis by monitoring tools
- ✓ Content filtering

REFERENCES

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APPENDICES

Company Details:



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