

NETWORKING SYSTEM AND MIKROTIK ROUTER CONFIGURATION & RADIUS SERVER

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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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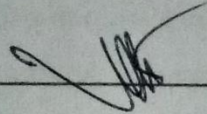
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APPROVAL

This internship title "NETWORKING SYSTEM AND MIKROTIK ROUTER CONFIGURATION & RADIUS SERVER," Submitted by Md. Motalib Ali, ID No: 152-15-5667 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 Bachelor of Science in Computer Science and Engineering (BSc) and approved as to its style and contents. The presentation has been held on 6th May 2018.

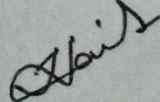
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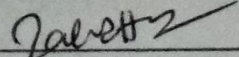
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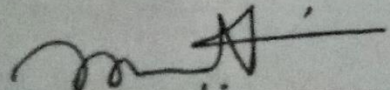
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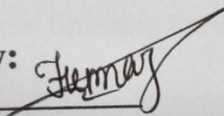
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DECLARATION

I hereby declare that, this internship report is prepared by me, Md. Motalib Ali to the department of Computer Science and Engineering, Daffodil International University. Under the supervision of **Dr. Fernaz NarinNur, Assistant Professor, Department of CSE,** Daffodil International University.

I also declare that neither this internship report nor any part of this internship report has been submitted elsewhere for award of any Degree or Diploma. I also declare that, I collect information from is **XENIAL BROADBAND LIMITED**, Data Center and Internet Service Provider (ISP) Based Company.

Supervised by:



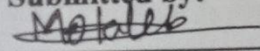
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I really grateful and wish I profound my indebtedness to **Dr. FernazNarin Nur Assistant Professor, Department of CSE atDaffodil International University, Dhaka.** Deep Knowledge & keen interest of my supervisor in the field of Networking influenced us to carry out this project. She's endless patience, scholarly guidance, continual encouragement, constant and energetic supervision; constructive criticism, valuable advice, reading much inferior draft and correcting them at all stage have made it possible to complete this project.

I would like to express our heartiest gratitude to **Dr. FernazNarin Nur Assistant Professor, Department of CSE,** for his kind help to finish my project and also to other faculty member and the staff of CSE department of Daffodil International University. I would prefer to like to our entire course mate in daffodil International University, who took part in this discuss whereas finishing the course works.

I want to convey my gratefulness **XENIAL BROADBAND LIMITED** who helped me greatly by providing valuable suggestion whenever required my internship report they also gave the opportunity to hold that flagship of the topic.

I would conjointly like provide to acknowledgments everybody of the System Management Department of **XENIAL BROADBAND limited.** (For providing suggestion on what is told way to} work and 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 my report.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

MikroTik Router is one in every of the foremost well-liked routers to any ISP network also as any enterprise workplace network. MikroTik Router contains a ton of networking services that facilitate to create a stable and swish network thus simply. it's aforesaid that any ISP Company or Enterprise workplace cannot go one day while not MikroTik Router. So, the system directors UN agency aren't victimization MikroTikRouter nonetheless, they'll presently begin victimization MikroTik Router, I think.

This design is implemented using **Winbox**. After implementation of all service, this system is tested in different stages and it works successfully as a prototype. In the future I need to improve centralize configuration system to get better performance for users.

In enterprise network infrastructure, ISPs offer redundant links or backup mechanism which will continue a network even once unplanned outage happens. to make sure most convenience of a designed network it's tough once equipment failure or load shedding happens. There area unit several quite services can also offer AN ISP like scientific discipline telephone services, Vehicle following system, restore fuel and cut of engine conjointly.

Radius Server or Radius Manager with connects to the MikroTikrouter. It make easily share ip user and maintained and Billing section every moth automatic or manual updating billing to the system if not update the system then automatic disconnect to the internet in the server.

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Chapter 1

1.1 Introduction

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

I had an opportunity to work with most leading IT and Internet Service Provider (ISP) service provider that is XENIALBROADBAND LIMITED [3]. I consider myself timely to get a chance to take a deep look to their development methods, working models, deals and industrial behavior. And I was intending to look into the Networking Industry and how it looks like practically, how they interact with their clients, how they design a system and what are their rules in their environmental work. I got the chance to work in Network Operation Center (NOC) and configure a Mikrotik Router Radius server & Cash server in XENIAL BROADBAND LIMITED. We know computer networking is the principal part of our modern life. I decided to know about computer networking and how does it work, how to design a wide area network and backbone network, what are the important keys to design a beneficial network, how can I design cost effective network and how to mitigate downtime of a network.

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 goal. If I know the full environment of a network system and a Mikrotik Router Radius server & Cash server, configuration I must be adjust with the system. It remain that it is a big power for network environment with me. If I understood the full system of network system and if I adjust with me I can challenge every part of my technical life.

1.3 Internship Objectives

Ultimate objective of my internship program is to prepare myself as an eligible one in the competitive job market. So this is very effective of skill development. I would like to gather some extraordinary quality to provide myself as skilled one.

Internship in applied science is meant to supply work expertise with the ISP, 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 Introduction To The Company

XENIAL BROADBAND LIMITED has been one of the most important internet repair providers in Gulshan-Baridhara-Banani. We provide former internet fix for home and business users according to the need of customer's objective. We have 16+ years practice and authority support team to offer any resolution about broadband internet within a short time (30 minutes). We are at this time serving more than 700+ home users across Gulshan-Baridhara-Banani. We are always one step ahead in this competitive field. Broadband strive to authorize its Internet users with the freedom to right of entry Infotainment content and to surf with no restraint.

We worth ourselves because the pioneering Nationwide ISP that pioneer the removal of restraining business practices like information measure caps and transfer shaping. At a similar time, we have a tendency to apply best apply like best path routing; make sure that subscribers get exactly what they pay money for – quick web access. Network fully complied with IPv6 routing. Our devoted 24/7 consumer overhaul service starts with ardent Human bit. There aren't any voice instrumentality and no written response. Whether you reach out to us through phone, chat or email, our client Service Helpdesk team is there to help you 24/7/365.

REPORT LAYOUT

First Chapter: I have described in this chapter, Introduction, Motivation internship objective of internship, Introduction to the company.

Second Chapter: I have described the Organization of my internship. And this chapter gives the information about where the internship has been attached to undertake this program. And CCTV system, Web hosting, Web design, Broadband, IT Services xenial broadband ltd & training Programmers.ISP, Target Group, SWOT Analysis.

Third Chapter: I have described about daily task and activities, Events and Activities and Challenges. Switch, Router, Learning and understanding About Network Components' Media converter, PoE, Fiber Optical, Design of network, Objective of network design, network style, network backbone design, Hierarchical design of a network, Planning of a network, LAN connection, Lan Setup, NOC support system, mrtg with cacti, Bandwidth usage graph, Mikrotik Router of Summery, Router to internet Access, IP addressing, NAT, Domain name system, Interface, Router list, Bandwidth Manage and Configuration, Basic of Winbox.

Fourth Chapter: I have described is Competencies Earned, Smart Plan, Reflections.

Fifth Chapter: I have described is this 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.

Sixth Chapter: I have described is Discussion and Conclusion and Future Scope. Internship Reflection, Reference, company details.

Chapter 2

Organization

2.1 Introduction

Xenial Broadband Limited Has been one of the main network access supplier organization in the region Baridhara, Gulshan and Banani. We give faster net administration to home and friends clients per the necessity of client's aspiration. we have the 15-year business aptitude and master hold up a group to supply any arrangement about broadband web inside a little time (30 minutes). We are at show serving in excess of 700+ home and corporate 300+ clients across Baridhara, Gulshan, and Banani. We are splendid to design, introduce, test, and confirm Local Area Network (LAN). 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.

WHY CONNECT WITH US?

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

2.2 Product and Market Situation

CCTV System

Networks might be an in a straight-line provider of safety cameras (CCTV, network IP, and HD-SDI), video police force examination systems, and CCTV instrumentality for home and commerce digital security system.

Web Hosting

We present most cost-effective internet hosting and name register mutually with a twenty-four-hour customer care repair throughout the country.

Web Design

We can develop inert, dynamic & E-commerce web site. If you wish an exclusive & customary website in small value then Networks Ltd is that the best answer for you.

Broadband

Networks provide the simplest, efficient network and message respond in Dhaka the uppermost class hold up for home, workplace company network.

➤ IT Services

- Corporate Internet resolution
- Protection resolution.
- Domains register and web hosting.
- Website development.
- Open resource application resolution.
- Internet Service Provider
- Hi-speed Wi-Fi Zone.
- Data Connectivity, Data interior& Co-Location.
- Proxy & DNS Server resolution, Mail Server resolution.
- And All computer garnishes
- Skilled route and training:
-

➤ Professional Training Services

- ISP complex and administration.
- Training Course on specialized Ethical Hacking (CEH).
- ISP Setup and Administration using MikroTik.
- Website Development with Wordpress

2.3 Target Group

The company's client stand includes all clients and all little- to medium-sized businesses, counting start-ups. The company strategy to thinks on clients, as these are ideals targets for our new quick offerings and hold the most growth possible for the company. Web Solutions feels that these marketplace segments have particular pricing and service needs, and make more devoted, dependable customers.

2.4 SWOT Analysis

SWOT analysis is a Strengths, Weaknesses, Opportunities and Threats, strategic making plans method used to assist a person or organization become aware and threats associated with enterprise competition or assignment making plans. [2] it's miles meant to specify the objectives of the commercial enterprise task or venture and perceive the internal and external elements that are favorable and adverse to attaining those goals. users of a swat evaluation frequently ask and solution questions to generate significant statistics for every category to make the device beneficial and identify their competitive gain.

Strengths: characteristics of the business or assignment that supply it an advantage over others

Weaknesses: characteristics of the commercial enterprise that region the business or venture at a downside relative to others.

Opportunities: factors inside the surroundings that the commercial enterprise or mission should exploit to its advantage.

Threats: elements in the surroundings that would reason trouble for the commercial enterprise or assignment.

The diploma to which the inner environment of the firm matches with the outside surroundings is expressed through the concept of the strategic match. the identity of swots is critical due to the fact they are able to inform later steps in planning to reap the objective. first, decision-makers need to consider whether or not the objective is workable, given the swots. if the objective is not manageable, they must pick a one of a kind objective and repeat the manner.

➤ **Strengths:**

- ✓ Communication between individuals isolated by separate (at home and inside the work environment)
- ✓ Working from home effortlessly
- ✓ Setting up an online business
- ✓ Gathering data (profitable resource in business)

➤ **Weaknesses:**

- ✓ New participants think little of levels of skill expected to survive the market□
Large totals of cash required to set up organizations
- ✓ Competition for little affiliates
- ✓ Numerous valuing levies and administration alternatives

➤ **Opportunities:**

- ✓ Age structure of the population changing
- ✓ Number of households in the UK increasing
- ✓ Introduction of simpler tariffs
- ✓ Revision of regulatory framework

➤ **Threats:**

- ✓ The Economic Crisis - Householders more averse to expand their Broadband memberships Stock Market's absence of trust in the computerized interchanges advertise.
- ✓ Does it stay to be perceived how far purchasers can be convinced to grasp the Internet
- ✓ the What hindrances do you confront?
- ✓ What are your rivals doing?
- ✓ Are quality norms or particulars for your activity, items or administrations evolving?
- ✓ Is changing innovation debilitating your position?
- ✓ Do you have an obligation or income issues?

Chapter 3

Tasks, Projects and Activities

3.1 Daily Task and Activities

Month - 1: In the first month of internship on Xenial Broadband Limited I have learned and performed the following tasks:

- Learning & understanding About Network Components.
- Learning & understanding Basics of Router.
- Learning & understanding Basics of switch.
- Learning & understanding Media Converter.
- Learning & understanding Power over Ethernet.
- Learning & understanding Fiber Optic.

➤ **Month – 2-3:** In the second and third month of internship on Xenial Broadband Limited I have learned and performed the following tasks:

- Design of a network.
- Planning of a network.
- Lan connection.
- ISP NOC support system.
- Radius Sever Maintained
- MikroTik Router.

➤ **Month – 4:** In the third month of internship on daffodil online limited I have learned and performed the following tasks:

- Configuration of Mikrotik Router.
- IP address.
- DNS server.
- Route.
- Bandwidth Manage.

3.2 Events and Activities

- Monitor and Maintain Computer Systems and Network.
- Setting up client records, consents, and passwords.
- Troubleshooting servers and switches.
- 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.

3.3 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.

3.4 Learning & understanding About Network Components & Router

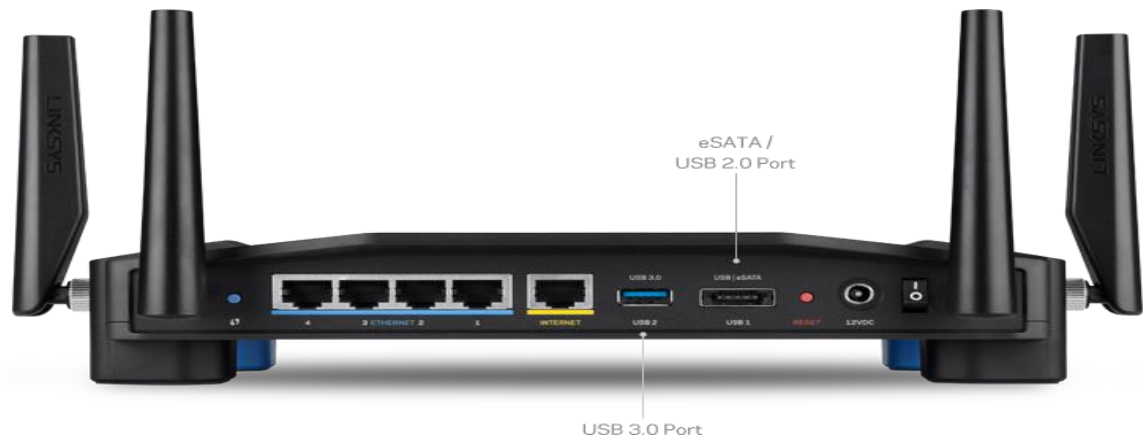


Figure: 3.4 Router

Figure 3.4 Router- Router is Electric wife device, one associate degree information packet comes in on one in each one of the lines, the router reads the address data inside the packet to check its final destination. It directs the packet to future network on its journey. This produce connects degree layover internetwork.

The most familiar kind of routers place element home and small administrative center routers that entirely skip statistics, like the website, email, IM, and films a number of the residence computer systems and hence net. Companion degree instance of a router will be the owner's cable or phone line router that connects to net from aspect to facet degree ISP.

A set of refined routers, like enterprise routers, restore massive business or isp networks as much as the dominant center routers that ahead information at high charge at the fiber strains of the net. Backbone. Though' routers area half normally keen hardware devices, use of software-based routers has fully grown more and a lot of ordinary.

3.5 Switch.



Figure: 3.5: Switch

Figure 3.5 Switch

A switch could be a systems administration gadget that advances information bundles between workstation systems. A switch is associated with 2 or a considerable measure {of learning of information of information} lines from out and out various systems (as unfriendly a system switch that interfaces information lines from one single system).

Systems administration is the need to some component for the switches, and switches are one of another's gadgets that let you associate at least one PCs to different PCs, even different systems....NAT – Network Address Translation – is the way that the switch interprets the IP tending to of parcels that cross the web. Change to get, technique and forward data to the goal gadget. Dislike less propelled organize centers, a system switch advances data altogether to 1 or different gadgets that require to get it, rather than broadcasting steady data out of each one of its ports.

3.6 Media Converter

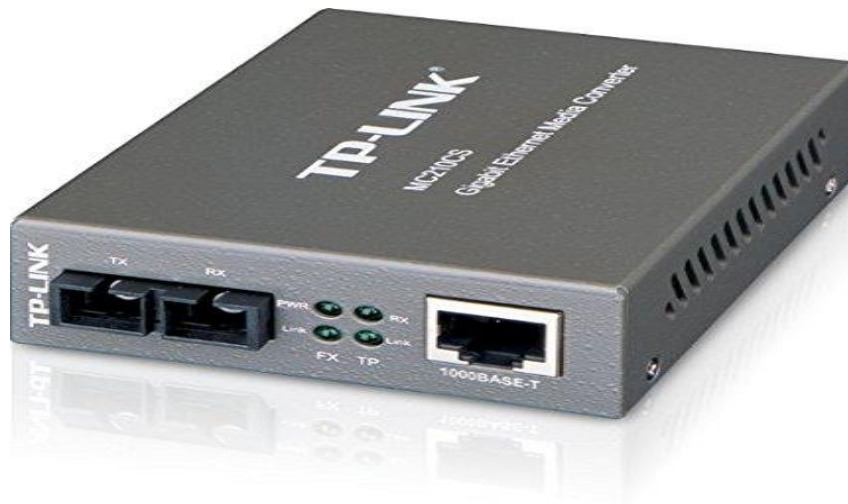


Figure: 3.6: Media Converter

Figure 3.6 Media Converter

A fiber media device may be an easy networking device that produces it attainable to attach 2 dissimilar media sorts like twisted combine with fiber optic cabling. They were introduced to the business nearly 20 years past, and square measure vital in interconnecting fiber optic cabling-based systems with existing copper-based, structured cabling systems. they're conjointly employed in metropolitan space network (MAN) access and information transport services to enterprise customers.

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3.7 Power Over Ethernet (PoE)



Figure 3.7 Power Over Ethernet

Figure 3.7 Power Over Ethernet

Power over LAN or author describes any of many standardized or ad-hoc systems that pass wattage alongside knowledge on LAN cabling. This permits one cable to supply each knowledge affiliation and wattage to devices like wireless access points or information processing cameras. Not like standards like Universal Serial Bus that additionally power devices over the information cables, author permits long cable lengths. Power is also carried on identical conductors because the knowledge or it's going to be carried on dedicated conductors within the same cable.

3.8 Fiber Optic

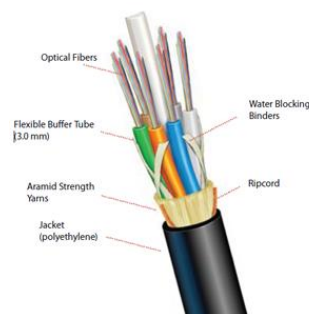


Figure: 3.8 Fiber Optic

Figure 3.8 Fiber optics, or glass fiber, refers to the medium and therefore the technology related to the transmission of data as light-weight pulses on a glass or plastic strand or fiber. A fiber optic cable will contain a variable range of those glass fibers -- from a number of up to one or two hundred. close the optical fiber core is another glass layer referred to as protective covering. A layer called a buffer tube protects the protective covering, and a jacket layer acts because of the final protecting layer for the individual strand.

3.9 Design of a Network

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

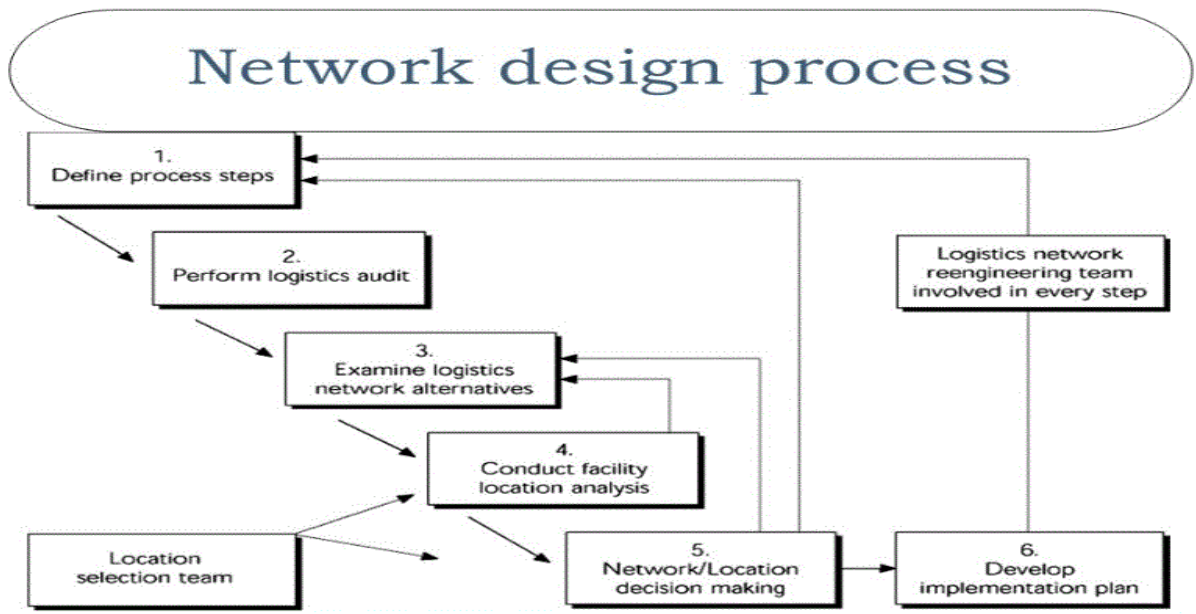


Figure 3.9: Design steps of a business network

Figure 3.9 Objectives of a network design

- a) Who square measure the users of this network and what square measure the requirements?
- b) What sorts of application are supported?
- c) Does the look replace of existing network?
- d) Overall answerable for network management
- e) What is that the budget?
- f) Designed thought.

3.10 needs to style a network

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

3.11 Backbone Network Design

To design a network, we'd like to follow some rules or steps that make a network a lot of economical and provides high performance. A designed network has some goals that square

The measure mentioned earlier.

- Scalability
- Availability
- Security
- Manageability

To fulfill the basic goals of a network should be engineered AN design that enables each flexibility and growth.

Hierarchical networks have some blessings over flat network styles. The good thing about hierarchic style is that native traffic remains native. Solely traffic goes to different networks and it's rapt to a better layer. Flat network mistreatment Layer-2 devices give to manage broadcasts or to filter undesirable traffic.

As a lot of devices and applications square measure else to a flat network then response times degrade till the network becomes unusable.

Keeping all of the higher than we are able to use the hierarchic technique to the style of our want network. There square measure some edges of the hierarchic network that square measure gave below.

3.12 Layer network

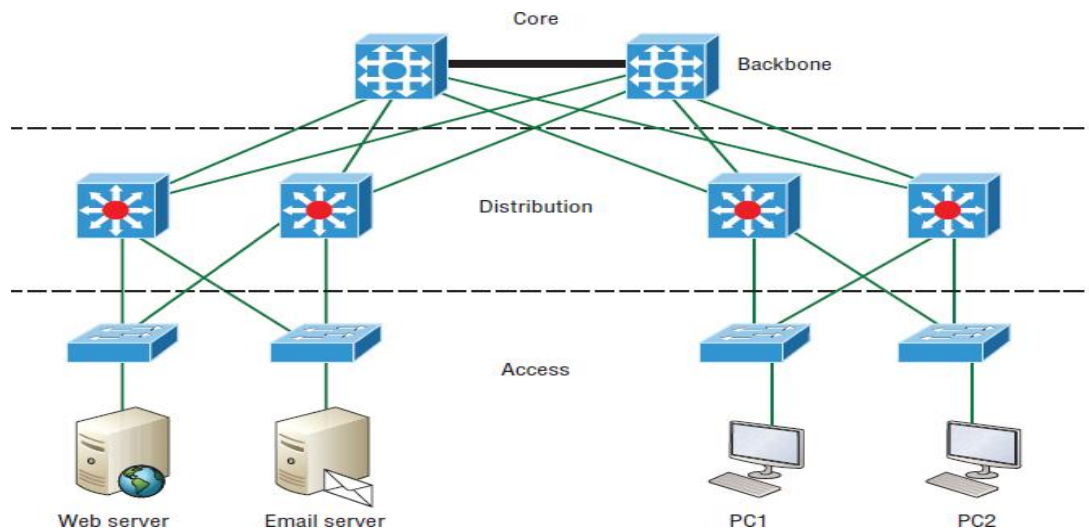


Figure: 3.12 Layer network

Figure 3.12 Layer network

Actually, a hierarchic network is split into 3 layers.

- 1) Core layer: Connects distribution layer devices
- 2) Distribution layer: Interconnects the smaller native networks
- 3) Access layer: Provides property for network hosts and finish devices

First-time backbone and some network device take and connected core layer to distribute layer
Interconnect the smaller native networks. Next Access layer to using many client more internets

Example.

- Web Server
- Mail Server
- Some PC

3.13 Planning of a network

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

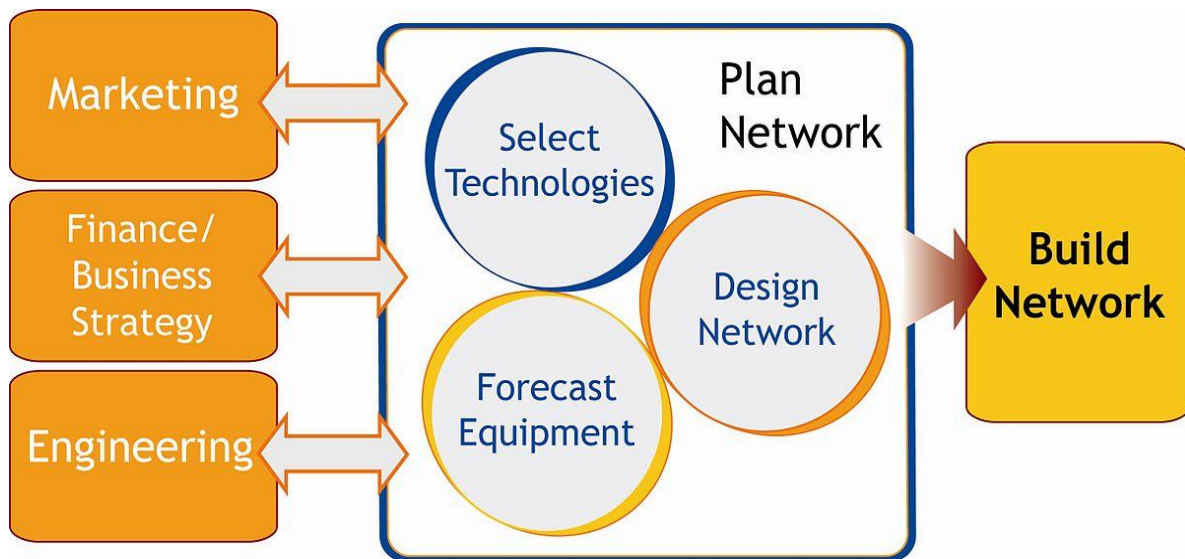


Figure: 3.13 Network planning

Figure 3.13 Network planning

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

Strategic Planning:

- Technology
- Network mechanism
- Recovery mechanism

- **Fundamental Planning:**

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

• **Medium Term Planning:** Capacity upgrading of the network nodes and links. This always following the long-term (LT) deployment strategies.

- **Short-Term Planning:** The increased demand would then stress the wireless network and likely result in. Therefore, the design, construction, routing, and maintenance of telecommunication lines are dependent on.

3.14 Overall design of a Network Planning

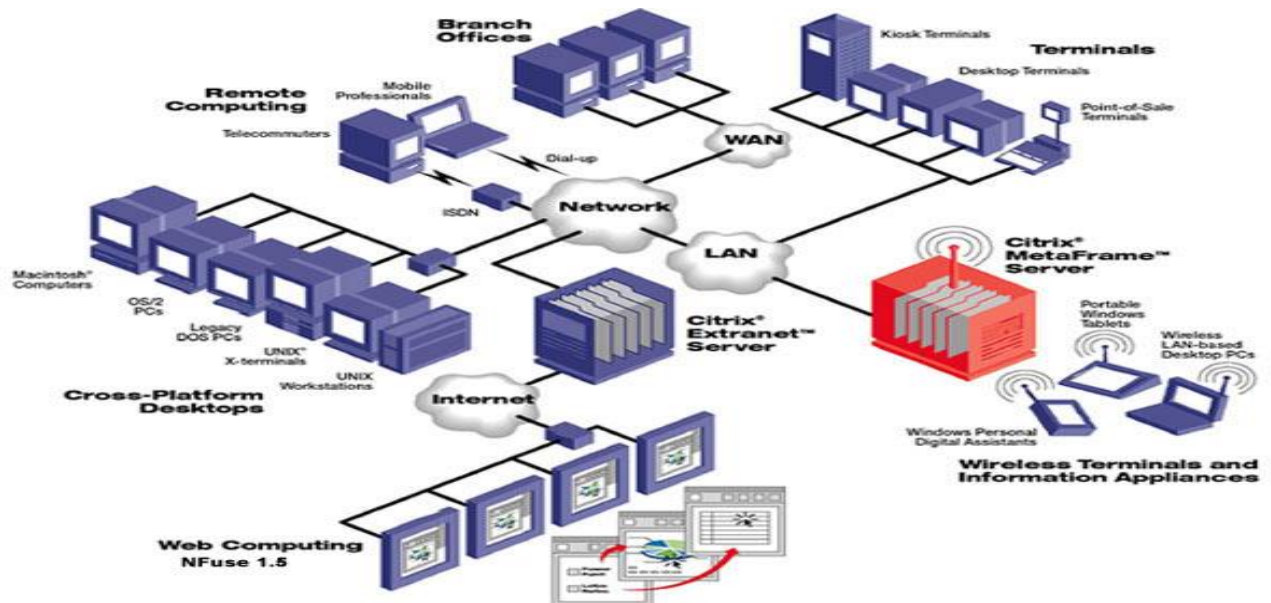


Figure: 3.9: Design of A Network Planning

Figure 3.9: Design of a Network Planning

- Above Image shown a network planning, as we know it is consist with several LAN, MAN and WAN and its work stations and servers. Servers and work stations are communicate themselves via internet. They are connected with router and switch.
- Here we see a small connection using some workstation and a server is called Local Area Network or LAN. And the LAN is connected with internet.
- And see another network connected to internet are consist with some branch office and every branch office having several number of work stations. This is a Wide Area Network or WAN.

➤ 3.15 Local area network connection

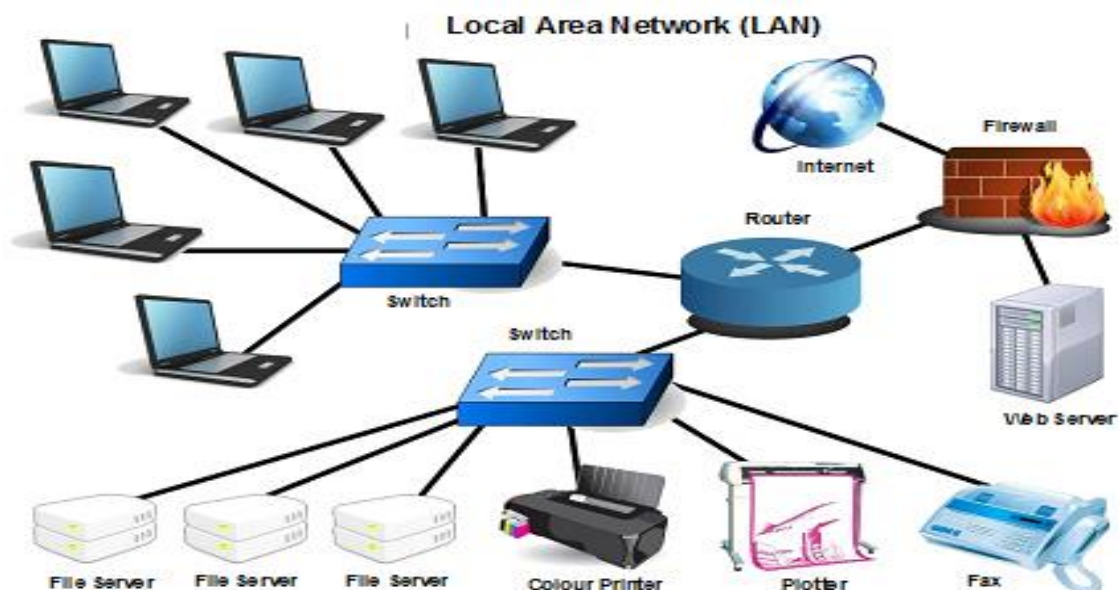


Figure 3.25 LAN Connections

Figure 3.25 LAN that means local area network it is a group of computers and associated devices that share a common communications line or wireless to communicate a server or computer. Typically, a LAN encompasses computers and peripherals connected to a server among a definite region such as an office or a commercial establishment. Computers and different mobile devices use a LAN affiliation to share resources such as a printer or network storage.

Configuring the LAN Setup Options

The LAN information science Setup menu permits configuration of LAN information science services like DHCP and permits you to put together a secondary or “multi-home” LAN information science setup within the LAN. The default values square measure appropriate for many users and things. These square measure advanced settings most typically designed by a network administrator.

To change the LAN information science services

The screenshot displays the Netgear LAN Setup web interface. At the top, there is a navigation bar with links: Network Configuration, Security, VPN, Administration, Monitoring, Web Support, and Logout. Below this, a secondary menu includes WAN Settings, Wireless Settings, WAN Mode, Dynamic DNS, LAN Setup (highlighted), LAN Groups, and Routing. The main content area is titled 'LAN Setup' and contains two sub-sections: 'LAN TCP/IP Setup' and 'DHCP'. In the 'LAN TCP/IP Setup' section, the IP Address is set to 192.168.1.1 and the Subnet Mask is 255.255.255.0. The 'DHCP' section has two radio buttons: 'Disable DHCP Server' and 'Enable DHCP Server', with the latter being selected. Below these are several input fields: Domain Name (netgear.com), Starting IP Address (192.168.1.2), Ending IP Address (192.168.1.254), WINS Server, Lease Time (24 Hours), and a checked checkbox for 'Enable DNS Proxy'. At the bottom of the form are two buttons: 'Apply' and 'Reset'.

Figure: 3.16 LAN Setup

Figure 3.16: LAN Setup

1. Choose Network Configuration from the most menu and LAN Setup from the computer menu of the browser interface. The LAN information science Setup screen can show
2. Enter the scientific discipline Address of your router (factory default: 192.168.1.1). Certify that local (area network-LAN-Computer network) Port scientific discipline address and demilitarized zone port scientific discipline address are in several subnets.
3. Enter the scientific discipline Subnet Mask. The subnet mask specifies the network variety portion of Associate in networking scientific discipline address. Your router can mechanically calculate the subnet mask supported the scientific discipline address that you assign. Unless you're implementing subletting, use 255.255.255.0 because the subnet mask computed, by the router.

4. DHCP Server. Naturally, the switch can work as a DHCP server, giving TCP/IP setup for all PCs associated with the switch's neighborhood. On the off chance that another gadget on your system is the DHCP server, or in the event that you'll physically assemble all gadgets, pick the Disable DHCP Server radio catch. On the off chance that the change DHCP Server radio catch is picked, finished the consequent fields: DHCP Log. Click this button to check the information processing addresses that are allotted by the DHCP Server to PCs and different DHCP shoppers.

- Starting information processing Address. This box specifies the primary of the contiguous addresses within the information processing address pool. 192.168.1.2 is that the default begins to address.
- Ending information processing Address. This box specifies the final of the closest addresses inside the in-sequence processing address pool. 192.168.1.254 is that the default ending address.
- WINS Server. This pack will recognize the window NetBIOS wine waiter information giving out if one is Reward in your network.
- Lease Time. This box specifies the Lease time to lean to the DHCP shoppers.

3.18 ISP NOC support system

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

3.18 NOC Support System

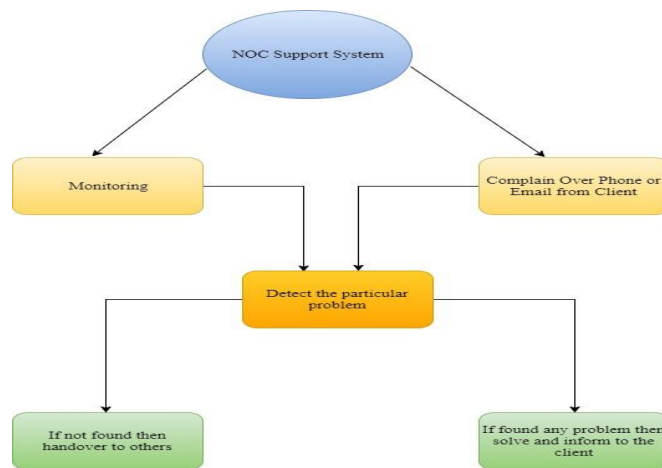


Figure: 3.18 NOC Support System

Figure 3.18 NOC Support System, To achieve these features the main task of NOC is monitoring all of the connections. For monitoring purposes, NOC uses Network Performance Monitoring tools like Solar wind.

3.19 Cacti with MRTG

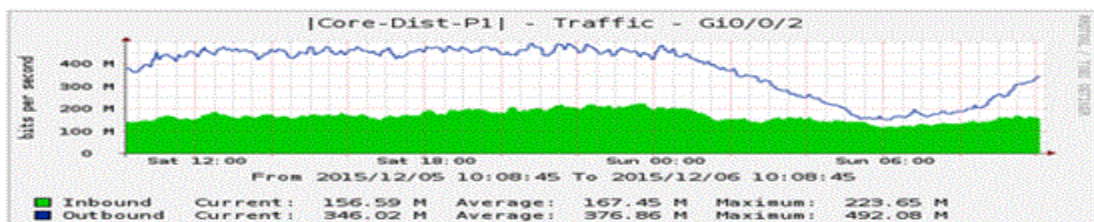


Figure: 3.19 Cacti with MRTG

Figure 3.19 Cacti With MRTG- Cacti is an open resource network monitoring and graphing utensils. Cacti allow a user to provide services at programmed intervals and graph the resultant data. It is usually used to graph time sequence data of metrics such as CPU load and network bandwidth exploitation. And we used cacti for monitoring our network bandwidth utilization.

3.20 Bandwidth usage graph

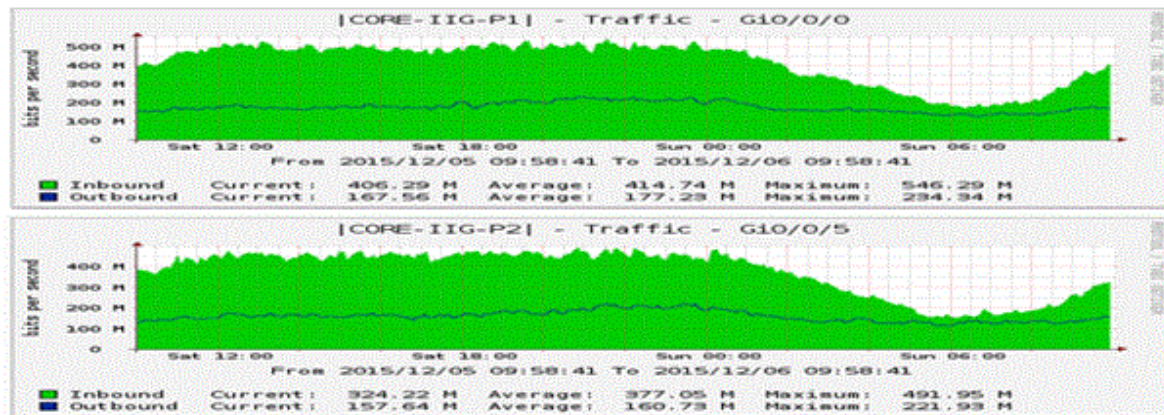


Figure: 3.20 Bandwidth usage graph

3.21 Mikrotik Router of Summary

A router is one in every of the foremost well-liked routers to any ISP network also as any enterprise workplace network. MikroTik Router contains a ton of networking services that facilitate to create a stable and swish network thus simply [5]. it's aforesaid that any ISP Company or Enterprise workplace cannot go one day while not MikroTik Router. So, the system directors UN agency aren't victimization MikroTik Router nonetheless, they'll presently begin victimization MikroTik Router, I think. As a computer user, 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 especially renowned for information measure management service and packet filtering functionalities also as low-cost worth.

MikroTik Router is additionally favorite to any computer user due to having graphical program (GUI) software system named Winbox that helps to manage MikroTik Router thus simply. because the usage of MikroTik Router is growing apace, this text is meant to point out the fundamental configuration of a MikroTik Router from terribly starting victimization Winbox software system in order that a replacement MikroTik Router user will simply tack together his/her router from terribly beginning and may operate his network swimmingly.

Prerequisites to Configure 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 RJ45 cables.

Configure The router

Preliminary style has DHCP user on WAN interface (ether1), embrace a remainder of the ports are calculated your native network with DHCP server designed for mechanical address configuration on user policy. to affix to the router, you have got to line your laptop to simply accept DHCP settings and cap within the coax in one of all the local area network ports.

Logging into the router

To entrée the router enters address 192.168.10.0



Fig: 3.21:log in system

Figure:

3.21 Log In Form

3.21 Configure access to internet

In the event that preparatory on the figuration did not exertion (ISP isn't given that DHCP server for routine setup) at that point, we will contain to incorporate subtle elements from our ISP 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 ISP

3.21 IP Address

To run IP addresses of the router open 'IP --> Address' open and add to ip address in MikroTik Router. (rf. The pick 3.22)

3.22 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 ISP. that ought to be along these lines, since ISP does not comprehend what {neighborhood |LAN PC network} addresses are advancing to utilize and our LAN won't be directed from worldwide system.

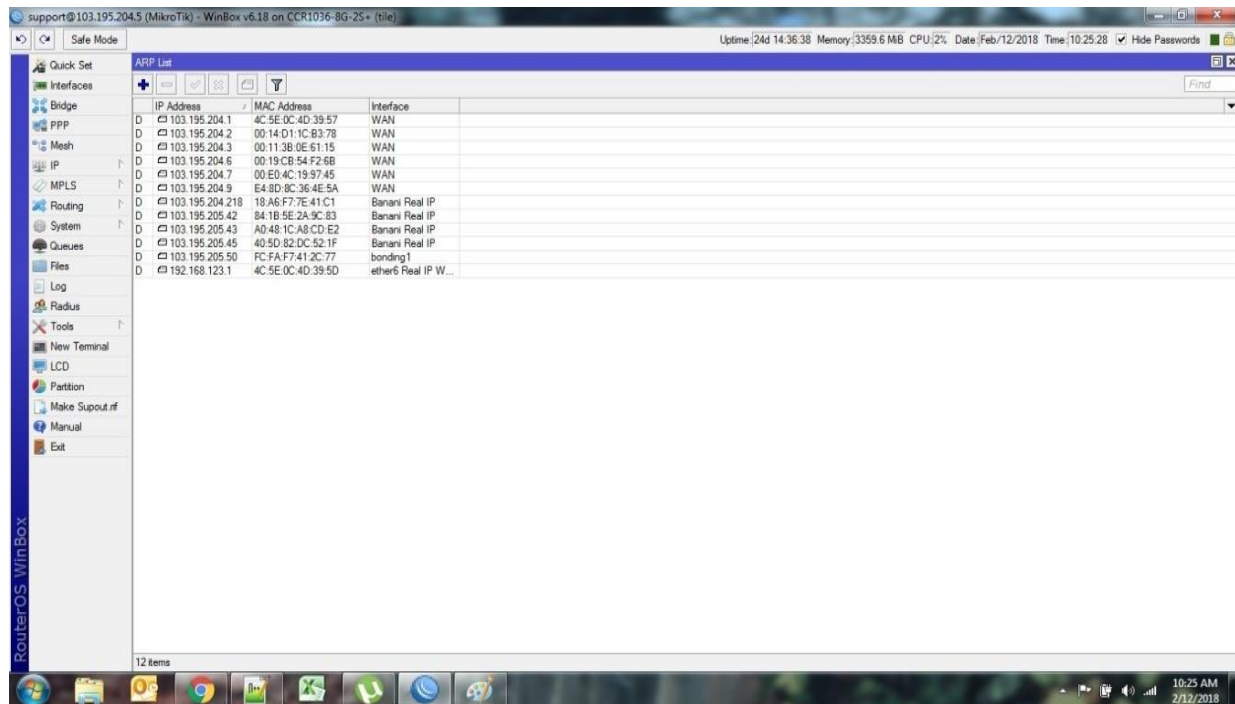


Figure: 3.22 NAT

Figure 3.22 NAT

To check if you have the source NAT open 'IP >> Firewall >> tab NAT' and check click the highlight is in our configuration.

3.24 Domain Name system

If you want to open internet pages or get admission to net hosts through area call DNS must be configured, either on your router or our computer. In the scope of this guide, I will present the only choice of router configuration, so that DNS addresses are given out by DHCP-Server that you are already using.

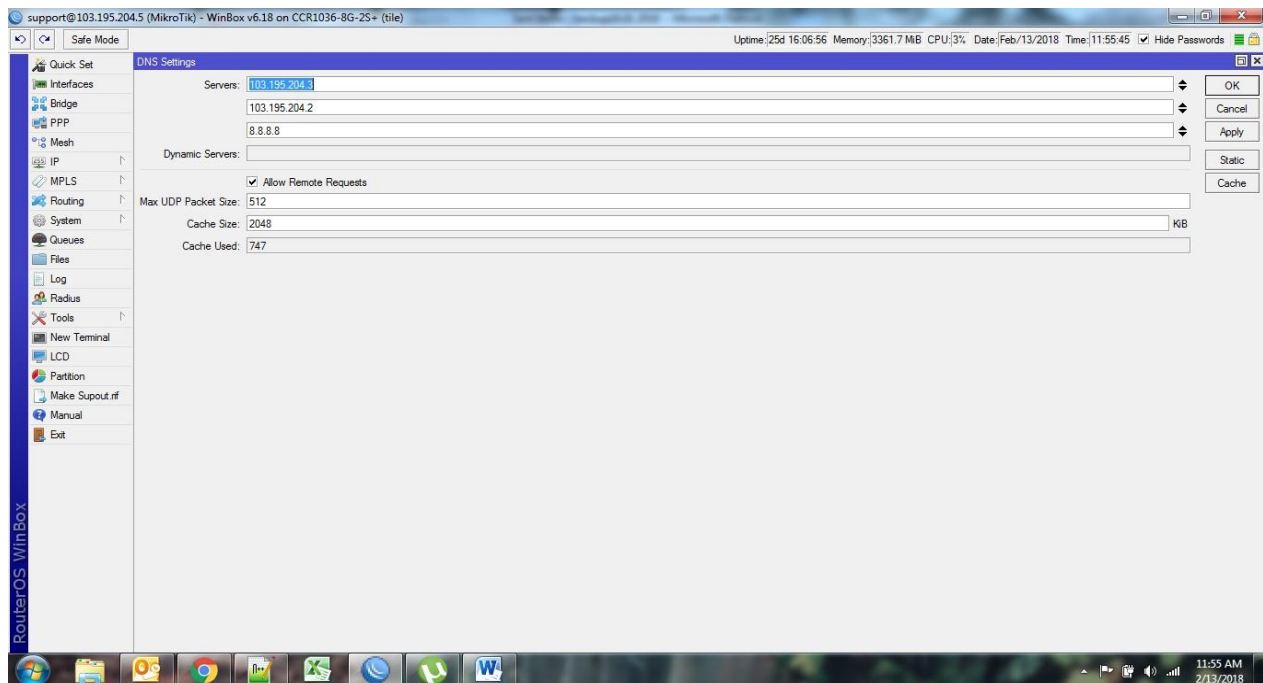


Figure: 3.24 DNS sever

Figure 3.24 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.

3.24 Interface Name:

Name	Type	L2 MTU	Tx	Rx	Tx Packet (p/s)	Rx Packet (p/s)
R Vlan 200 Eth	Ethernet	1590	7.9 Mbps	1306.9 kbps	919	818
R Vlan 200	VLAN	1586	7.3 Mbps	1161.9 kbps	869	781
DR pppoe-Akhtaruzzaman	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-Shanjid	PPPoE Server Binding		1511.3 kbps	85.7 kbps	139	139
DR pppoe-abdus	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-above	PPPoE Server Binding		1616 bps	1936 bps	5	6
DR pppoe-abrar	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-abse	PPPoE Server Binding		1062.0 kbps	37.5 kbps	112	75
DR pppoe-abuzer	PPPoE Server Binding		2.6 kbps	2.1 kbps	4	4
DR pppoe-adib	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-afid	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-ahmed	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-akhtar	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-aminurZ	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-ananahan	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-aqbour	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-arefin	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-arifahmed	PPPoE Server Binding		8.2 kbps	6.0 kbps	10	11
DR pppoe-aritra	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-arun	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-azad	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-banika	PPPoE Server Binding		0 bps	504 bps	0	1
DR pppoe-builder	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-club	PPPoE Server Binding		1558.5 kbps	49.0 kbps	171	94
DR pppoe-dallan	PPPoE Server Binding		260.9 kbps	46.2 kbps	40	20
DR pppoe-desai	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-ehsan	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-emerald	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-ethel	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-fahia	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-farid	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-global	PPPoE Server Binding		8.7 kbps	8.1 kbps	4	5
DR pppoe-hujan	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-inan	PPPoE Server Binding		89.1 kbps	21.8 kbps	17	46
DR pppoe-international	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-jafin	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-jagan	PPPoE Server Binding		0 bps	0 bps	0	0
DR pppoe-sahandiz	PPPoE Server Binding		0 bps	0 bps	0	0

Fig: 3.24: Interface Name

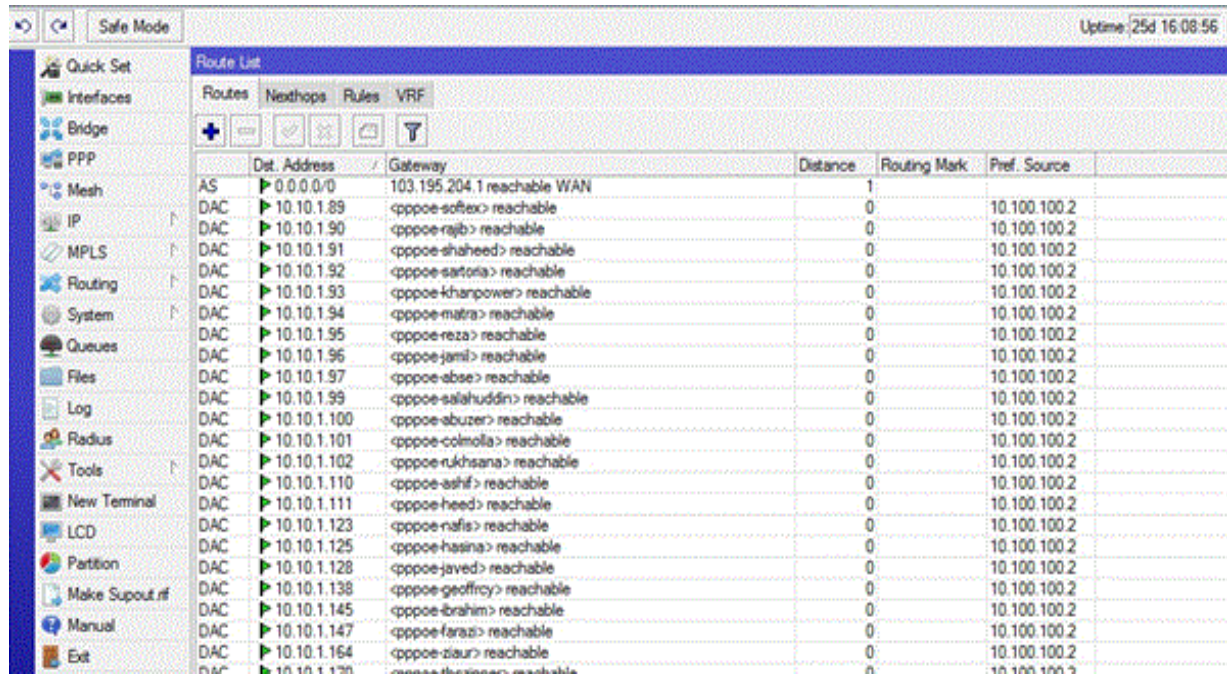
Figure 3.24: Interface Name

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

3.25 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.

Assessment



Dest. Address	Gateway	Distance	Routing Mark	Pref. Source
AS 0.0.0.0/0	103.195.204.1 reachable WAN	1		
DAC 10.10.1.89	<ppoe-sofex> reachable	0		10.100.100.2
DAC 10.10.1.90	<ppoe-rajb> reachable	0		10.100.100.2
DAC 10.10.1.91	<ppoe-shaheed> reachable	0		10.100.100.2
DAC 10.10.1.92	<ppoe-satoria> reachable	0		10.100.100.2
DAC 10.10.1.93	<ppoe-khanpower> reachable	0		10.100.100.2
DAC 10.10.1.94	<ppoe-matra> reachable	0		10.100.100.2
DAC 10.10.1.95	<ppoe-reza> reachable	0		10.100.100.2
DAC 10.10.1.96	<ppoe-jami> reachable	0		10.100.100.2
DAC 10.10.1.97	<ppoe-abse> reachable	0		10.100.100.2
DAC 10.10.1.99	<ppoe-salahuddin> reachable	0		10.100.100.2
DAC 10.10.1.100	<ppoe-abuzer> reachable	0		10.100.100.2
DAC 10.10.1.101	<ppoe-colimola> reachable	0		10.100.100.2
DAC 10.10.1.102	<ppoe-rukhsana> reachable	0		10.100.100.2
DAC 10.10.1.110	<ppoe-ashif> reachable	0		10.100.100.2
DAC 10.10.1.111	<ppoe-heed> reachable	0		10.100.100.2
DAC 10.10.1.123	<ppoe-nafis> reachable	0		10.100.100.2
DAC 10.10.1.125	<ppoe-hasina> reachable	0		10.100.100.2
DAC 10.10.1.128	<ppoe-javed> reachable	0		10.100.100.2
DAC 10.10.1.138	<ppoe-geoffroy> reachable	0		10.100.100.2
DAC 10.10.1.145	<ppoe-ibrahim> reachable	0		10.100.100.2
DAC 10.10.1.147	<ppoe-farazi> reachable	0		10.100.100.2
DAC 10.10.1.164	<ppoe-ziaur> reachable	0		10.100.100.2
DAC 10.10.1.170	<ppoe-thamara> reachable	0		10.100.100.2

Fig: 3.25 Routers

Figure 3.25 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

3.26 Bandwidth Manage in MikroTik Router

The bandwidth manages: bandwidth manages is most critical features of the MikroTik router. While we take the fixed bandwidth form isp and distribution neighborhood place network LAN websites. Whilst we take 10 MB bandwidth form isp 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.

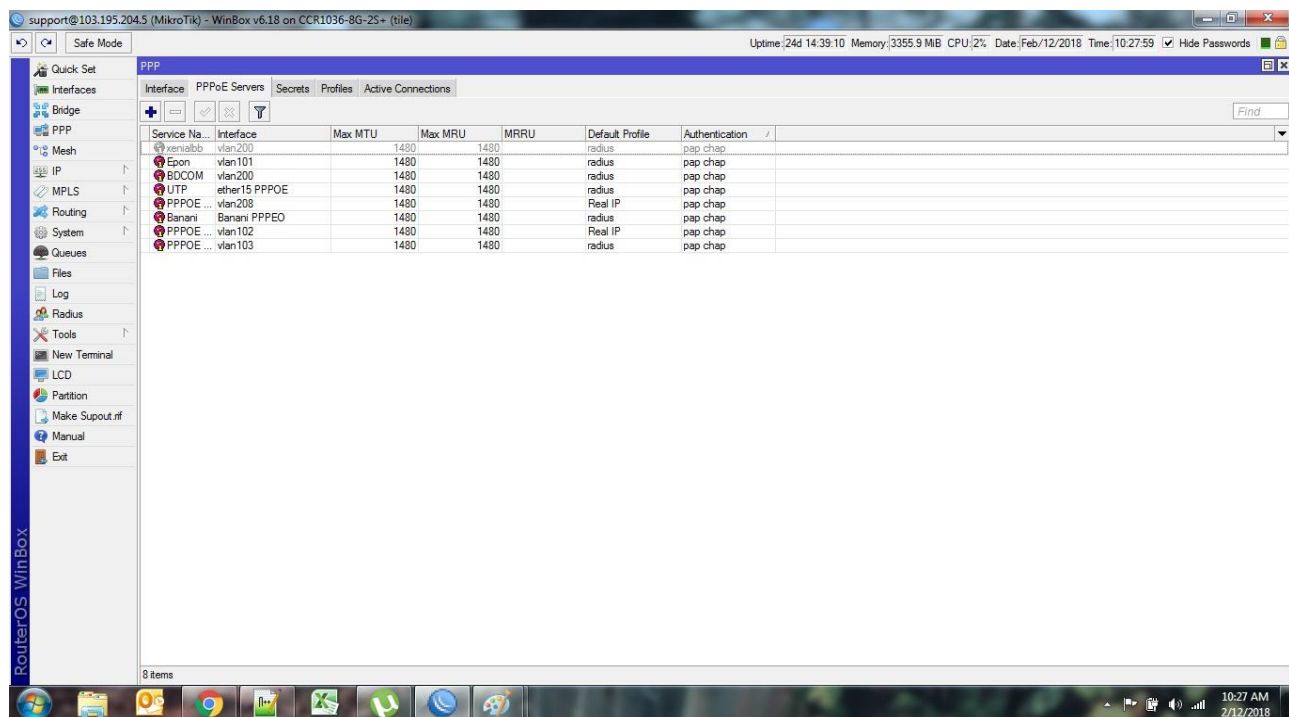


Figure: 3.26 MikroTik Router Interface

Configuration: 3.26 MikroTik Router Interface

Step1: Open winbox> queues > simple queues > click on plus > call= queue1 > goal deal with=192.168.0.5 (n.b: 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

3.27 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)

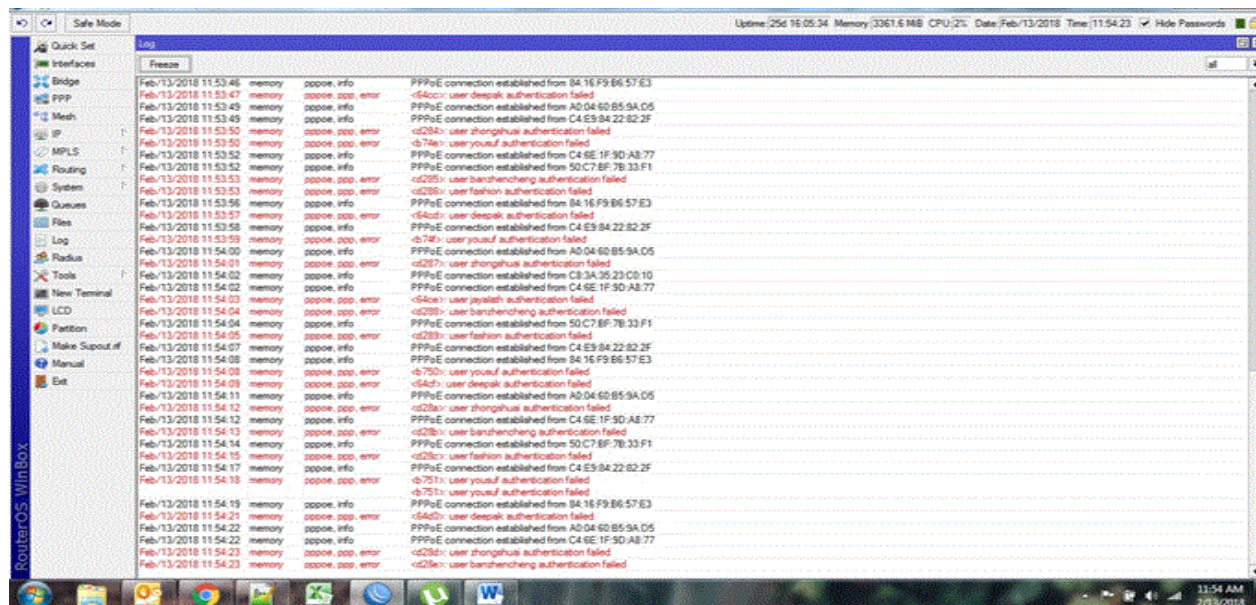


Figure: 3.27 MikroTik Winbox to interface

3.27 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

3.28 Challenges

No exertion has not challenged, but rather four months of my temporary position ability and to share companions in the wake of catching wind of the happy hour, I've discovered that there is some broad difficulties understudy. I think it is that assistant' three things: unpaid/under, temporary, and they are in a challenge to pick up training. In some cases, insufficient work: There's insufficient work doled out to me. I'm exhausted, underutilized, strumming my fingers at my work area and enticed to scrutinize Facebook. A lot of work: because of assistants are just happy to prompt a foot inside the entryway, some work spots may trade out of youthful staff by giving them horrendously extend periods of time of inert dull work. Reluctant to make a request: unexpectedly there's a joining of work, and I finally have the chance to substantiate myself! In any case, I'm dubious as for x, y,. I may feel the strain to be AN autonomous and free laborer; in any case, it's generally higher to illustrate vulnerabilities! Endeavor with different Intern: Luckily I was an understudy; we make a request of each other and can without a lot of an extended team up with wanders that have worked in bunches where there was such a group relationship. Understudies in a future work opportunity or a proposition for a not too bad letter will battle in other office circumstances, may not be so pleasing.

Chapter 4

Competencies and Smart Plan

4.1 Competencies Earned

Capabilities Earned or learning result is an announcement of what a student is required to know, comprehend or have the capacity to do because of a learning procedure. Introduce and decommission of both system and server machines at two data centers. The Student Association office reserves numerous understudy Intern Learning Outcomes: Gathering and arranging data into an Internship Project Description: Participate in the update of the Network Lab and site. Learning Outcomes. Introduce and Configure programming and redesigns; Install, arrange and test organize Employer Services • Furthermore, reliable with the learning results, the Internship On-Site Supervisor will give an introduction concerning authoritative strategies and methodology.

4.2 Smart Plan

Every company should have a smart plan to gain the success. Basically, some common things of combination create a smart plan.

4.3 Reflections

Online Ltd they expanded they are task and administration portfolio as per the client's suggestion and thinking about requests for time. They worked with numerous national tasks and global associations and accomplished the notoriety. They are utilizing the most recent advancements and overhauling the administrations wherever it is required. They are group Network Solution division can supply condition of-craftsmanship system and media transmission arrangements with an exceptionally skilled specialized learning gathering.

Chapter 5

5.1 Radius Server or Radius Manager

Sweep faraway confirmation dial-in customer bearer (range) is a shopper - server convention and programming that empowers remote get right of passage to servers to speak with an essential server to verify dial-in clients and approve their entrance to the asked framework or administration. range enables an endeavor to keep buyer profiles in an essential database that everyone remote server can rate. it manages better security, enabling a company to establish an approach that can be executed at a solitary controlled system factor [1].

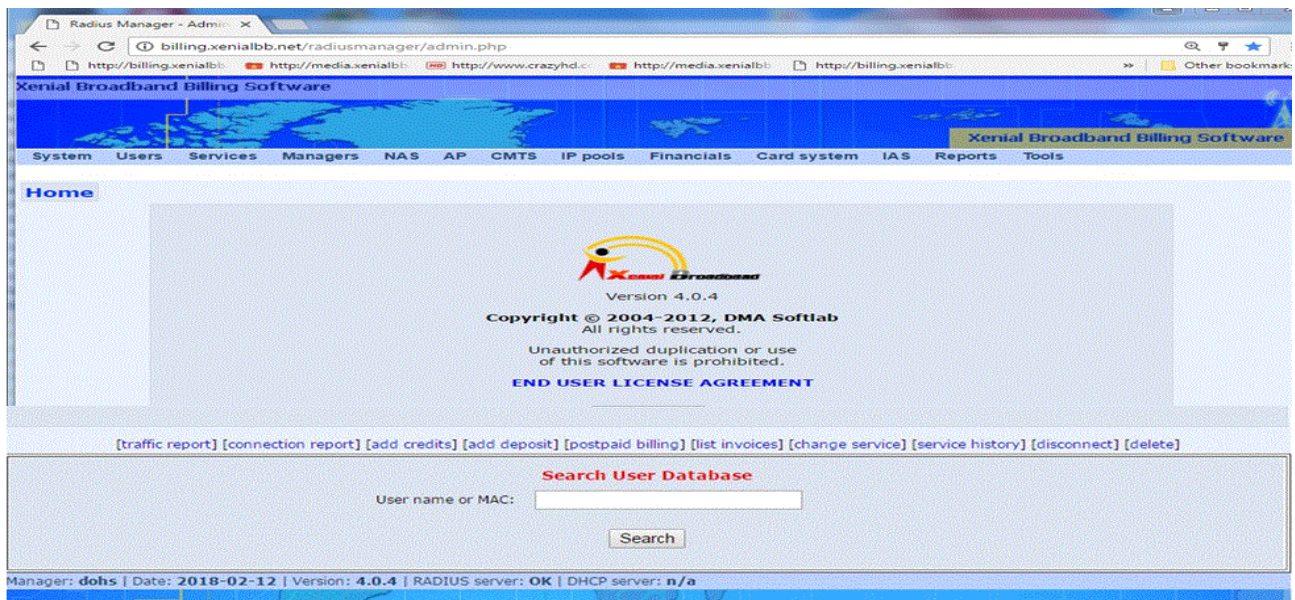


Figure: 5.1 Radios server home page

Figure 5.1 Radios server

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 span 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 WiFi 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 deals 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 Panel.

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

Example

1. Manager name : Dons
2. Password: 1245678999

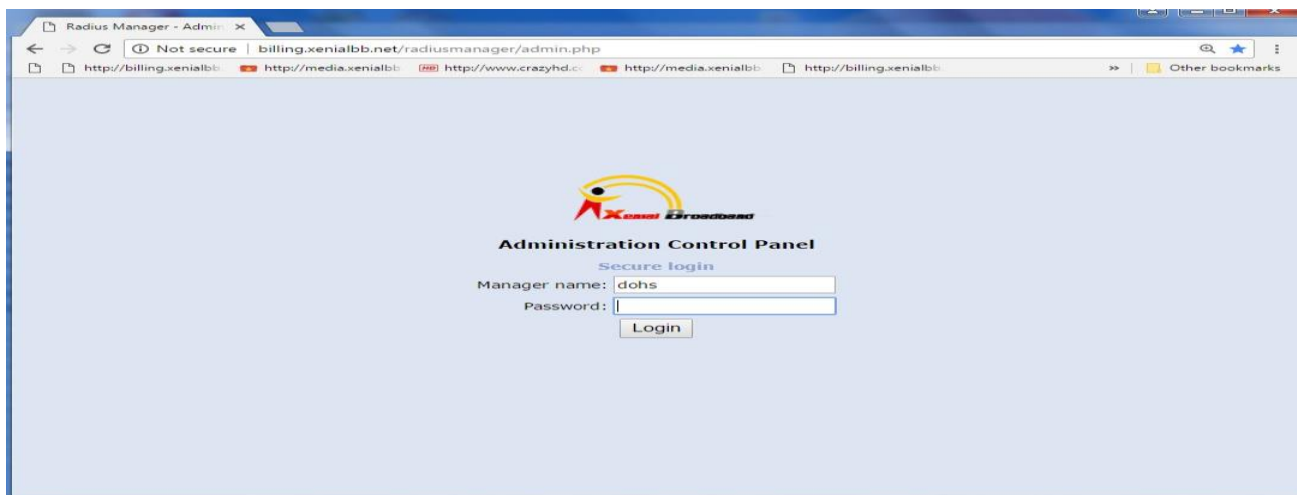


Figure: 5.5 Administration Control Panel

Figure 5.5 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.

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

5.6 Active client monlty data used list at the Radius server.

The screenshot shows the Radius Manager Admin interface. The browser address bar displays the URL: `billing.xenialbb.net/radiusmanager/admin.php?cont=list_service_history&username=saiful`. The page title is "Xenial Broadband Billing Software". The navigation menu includes: System, Users, Services, Managers, NAS, AP, CMTS, IP pools, Financials, Card system, IAS, Reports, Tools. The main content area is titled "Service change history" and shows a table with 9 rows of data. The status "Found: 9" is displayed at the top right of the table. Below the table is a "Search User Database" section with a text input field for "User name or MAC:" and a "Search" button. At the bottom of the page, a status bar shows: "Manager: dohs | Date: 2018-02-12 | Version: 4.0.4 | RADIUS server: OK | DHCP server: n/a".

#	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

Figure : 5.6 User monlth mb using list

Figure: 5.6 Active client monlty data used list at the Radius server

- Users list show how total client active in the server here is serial to next page 1>2>3>.....
- Show with the all client address, name, ip and mobile number etc.
- These servers have many options for showing client details.
- Every month data use list shows the picture.
- When start the client use date using the to history record in the server.
- When client not use the data the automatically deleted that.
- If you want to see how many client in this time online active then go to report and client the online client status the show all online.

5.8 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.

5.9. Update the Internet bill in the Radios 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

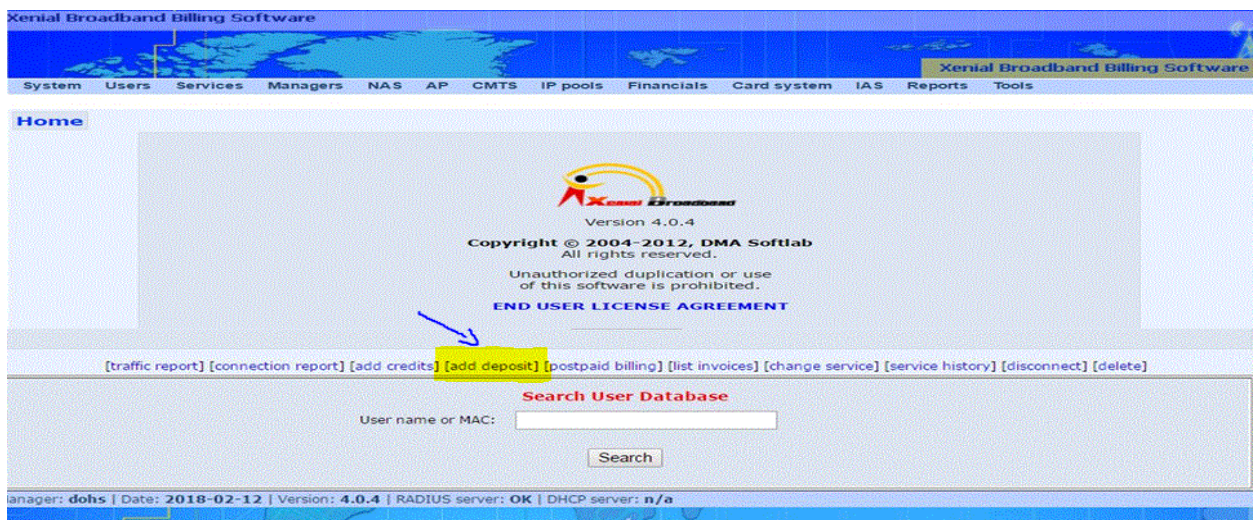


Figure: 5.9 open the bill from update table

Figure 5.9 Billing Update

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 give to the bill all details see possible in radius server.

Chapter 6

Conclusion and Future Career

6.1 Discussion and Conclusion

Internship is a great opportunity for my acquire a real life experience of what I learned in my academic life. Working as an intern in the Network operations Xenial Broadband Online Ltd. I have learnt to be dedicated to the job. Dedicative and mindset is the most important thing to work in such a sophisticated environment. It is beyond mere official matter. For most of the engineering or technical company, the engineers have to 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 (xenial broadband 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 earned the confidence to deal with Assignment myself. It is a great opportunity to use the knowledge and skills that I had acquired. I also learned how to handle critical faults and got the new ideas. Doing this kind of work is really helpful for my career and I like to do this kind of work again.

6.2 Scope for Further Career

Ventures inside the profession exhibit still as any unremarkable business intensely consider workstation systems administration to maintain association amongst staff and keep the business exuding. They should be managed by devoted United Nations office |people that| people that| those that| those who} make relate position inventively related who aren't reluctant to claim (attempt) an intelligent approach on investigating. It not exclusively ups push your quality however also at an identical time takes off your mechanical information. The present system designing is stifled with Graphical User Interfaces.

Appendices

Appendix A: Internship Reflection

The essential objective of my temporary position in an expert setting, viable answers for certifiable issues is to apply the information picked up in the classroom. Also professionally pertinent capabilities and connections in an expert setting, figuring out how to manage new information aptitudes, and the capacity to decide how to hone and create plan. Add to coordinate with other expert's administrators and expert connections. To satisfy the obligations of my entry-level position, I'm practicing appropriate business manners.

I am an association's central goal/vision is executed, how to contact partners, how control is shared, how it is organized, how choices are made, how to comprehend the way of life of an expert association, and what level of responsibility and input to the association. With an appraisal toward the finish of my temporary job director and entry-level position encounter going through individual gatherings gives a chance to take an expert supposition. Temporary position encounters to plan for life in a worldwide society, administration, and administration, my blessing to have the capacity to put it to utilize.

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