Empirical Study on Network Configuration Using MikroTik Router.

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This Report Presented in One-sided Achievement of the Requirements of the Degree of Bachelor of Science in Electronics and Telecommunication Engineering.

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APPROVAL

This project titled "**Empirical Study on Network Configuration Using MikroTik Router**" submitted by Ekranul Tanvir to the Department of Electronics and Telecommunication Engineering (ETE), Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. Electronics and Telecommunication Engineering and approved as to its style and contents. The presentation will be held on August,2020.

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DECLARATION

We hereby declare that this project is our own work and effort under the supervision of **Ms. Tasnuva Ali, Assistant Professor of the Department of Electronics and Telecommunication Engineering, Faculty of Engineering.** Daffodil International University, Dhaka. It has not been submitted anywhere for any award. Where other sources of information have been used, they have been acknowledged.

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Ekranul Tanvir

ABSTRACT

At present network configuration and management is one of the significant terms for developing the country day by day. In our daily life internet connection became the fundamental requirement. Worldwide internet service provider (ISP) usually delivers the network connectivity to the home user. The router handle this network connectivity which is a special device. MikroTik router has been studied in this experimental report. Daffodil Online Ltd is (DOL) is one of the promoter ISP in Bangladesh. In order to optimize the network, the network configuration and management of Daffodil Online using MikroTik has been studied and sketch accordingly in this report.

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CHAPTER 1 Introduction

1.1 Introduction

Nowadays people can develop their activities by using information technology via internet. For doing loyal work internship is an important employment challenge for students so that people can appreciate to see their true work. It is seemed to me it is high time to extend my knowledge to do better in working model, deals and industrial behavior. Today each business and enterprise are connected to software communication and information technology. It is called E-Commerce. Most of the people can enhance their job quality via E-Commerce without wasting their time on smartphones. Domain name system (DNS) is one of the significant parts of the internet. It should be known by us how network downtime is reduced, how affordable and profitable network is developed and built.

1.2 Motivation

Motivation which is extensive power for everyone. If you want to do better in your life you should have a high motivational capacity. Now I am a student of ETE department in Daffodil International University. Collecting practical information help the students to gain a capacious view of the subject and the importance of it is very significant in practical life. During the internship I completed the detail of MikroTik Router. The internship motivates me to do better in future life hopefully.

1.3 Internship Objectives

As a qualified person, the target of my internship to train in a competitive job market. It is very necessary to build up skill. When I have outstanding qualities, it will make me a skillful person. The objective of the internship is to provide consciousness to improve work practically. For this objective self-dependent will be createt.

1.4 Report Layout

Chapter 1: Described Introduction, Objective and Motivation.

Chapter 2: Described the Networking, types of Networking which is using for MikroTik, Introduction of MikroTik and types of so many router.

Chapter 3: Displayed preparing went to, doled out obligations, Mikrotik fundamental charge and portrayed about various kind of steering setup (DHCP, PPPoE, ARP, Firewall) goal.

Chapter 4: Report decision and Future development.

CHAPTER 2

Introduction of MikroTik

2.1 Networking

In the present time networking is an important thing to communicate. From one place to another we cannot think of sharing data without networking. Now it is easy to us to exchange data from one place to another through networking. By distributing data between several computers we can build a network. MikroTik is a Latvian company that was based in 1996 to develop wireless and routers ISP system. Most of the countries around the world MikroTik provides software and hardware system for net property. The perception in victimization industry complete routing system and standard laptop hardware system allowed America in 1997 to make the Router OS computer code that gives intensive stability, controls for all types of knowledge routing and interfaces. We tend that we can set to create their own Router BOARD and also hardware. There are many resellers and customers in most elements each country on the globe. [1]

2.2 Types of Networking

There are different kind of networks.

2.2.1 LAN (Local Area Network)

In our daily routine we use the local area network whole day. Its main intention is working to little medium workplace such as courts, business commerce networks and small medium share info and resources and office lamps, print electronic equipment scanner etc. Native space Network are accustomed to emphasize computers substitute network devices and the devices can share the resources from one another computers. The computer network is concerned, the sole cable used here is restricted by the absolute distance and additional options of the computer network. [2]



Figure 2.2.1: Local Area Network

2.2.2 MAN (Metropolitan Area Network)

MAN stands for Metropolitan area Networks which is a range of different types of networks. New class of a network can be relatively by an individual. MAN is larger than a LAN. MANs seldom enlarge on the so much facet – 100 km and repeatedly constitute an alternative of different kind of hardware and transmission media. The form of cable TV network is it's one network and so it's a technical term to connect a range of PC networks into an even larger network. Consequently, sharing PC networks to LAN except as device to device in resources area unit. Particularly it is a combination of the networks like Cable TV network, casing the whole city or a group of many endemic areas Networks. During this process sharing resource from network to network and laptop to laptop to move. MAN is commonly recognize by large organization to associate its several branches across the city. [2]



Figure 2.2.2 Metropolitan Area Network

2.2.3 WAN (Wide Area Network)

Wide Area Network is exhibited in a spacious geographical area with LAN and MAN. This kind of network was exhibited using the telephone company because of wide area network which is difficult to grow, technologies and special areas used for connecting to several LANs. WAN of the plans to construct more than the LAN is really difficult to operate because of the necessity for creating a LAN across the world, the satellite is used in many cases. Greater portion of wide area networks work at 1.544 Mbps at 56kbps speed. [2]



Figure 2.2.3 : Wide Area Network

2.3 Training Served

For my internship I choose Daffodil Online Ltd. The training time was about four months and there Cisco networking MicroTouch switch configuration MikroTik Router is done about. For training I was admitted DOL and started class. About Cisco networking we have no idea at first. First we will learn IP configuration. We find different information about IP subletting and conciliation then we started installing micro router. If MikroTik router can do a new configuration forward, it will have to reset the process to give it first. First we get an internet connection in the microcytic router to scan the IP in the interface and DNA and gateway is required to be given. The Mikrotik router we have no idea about different kind of configuration of the MikroTik router. Then we have the DHCP configuration Pppoe service which about we know all kinds of configuration and bandwidth management and also can share bandwidth. MkroTik router also know how to configure block the bandwidth of YouTube and Facebook. We could not complete four month course because epidemic of the CORONA Virus. For this reason I completed only MikroTik routing.

At the first step we learn about IP sub netting and networking properly and switch configuration VLAN and switch Management.

- Comprehension and learning about network components.
- Understand and studying basics of MikroTik.
- ✤ Basic centos commands.

At the second stage from training we learn MikroTik simple configuration and OS installation of MikroTik in VMware.

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- Concept of IP Addressing
- OS installing of MikroTik
- ✤ Web site faltering

At the third stage we learn MikroTik hole configuration that is very important for Mikrotik router management.

- ✤ IP configuration
- Sub netting
- Networking binding
- Cisco
- VLAN
- PPPOE
- Static and DHCP
- Bridge
- Bandwidth management
- ✤ ARP/AP
- ✤ Wireless configuration
- ✤ Firewall
- ✤ Firewall security

2.4 OS of MikroTik

MikroTik OS is an operating system. The operating system comes with various license levels ranging from 0-6. Where 0 is 24 hour experiment version. In experiment mode we can test all outlook of router OS free. We can compare the different license level features. Router OS is very easy to installing. Either download ISO image or burn it to CD and boot from it. Net install write Router OS to any secondary drive which we have attached to our Windows PC. By moving the drive to our Router PC and boot it. About all the installation methods, upgrade files and more can be found here. [3]

2.5 MikroTik Ethernet Route

2.5.1 HEX lite

HEX lite is 5 port LAN router by a nice plastic case. Its grade is under the router OS license alone there absolutely is not any doubt once it entangle managing our wired home network. Not only it is inexpensive, small, discreet trying and simple to use. It is most perhaps the first cheap MPL capable router on the market, between option and values there are no more compromise. It's impenetrable style and pure look, it'll work any SOHO atmosphere. [5]



Figure 2.5.1: HEX lite

2.5.2 HEX PoE

Wireless connectivity is not necessary because HEX PoE is a five port Gigabit Ethernet router for location. For adding optical fiber connectivity the device has a USB 2.0 port and an SFP port. The ports 2to5 can power another PoE efficient devices with the equal voltage as applied to the unit. It is safe and spontaneous to use, in the meantime it's come with a very powerful 800MHz CPU, the supporting of Router OS is susceptible of all the advanced configuration. Less power adapters and cables are liable for anxiety about Max current is 1A/port, Ethernet ports are shielded. It is also supportive passive PoE input and passive or 802.3af/at PoE output. Ethernet ports 2to5 can efficient other PoE capable devices with the equivalent voltage as applied to the unit. [4]



Figure 2.5.2: HEX PoE

2.5.3 RB2011

The RB2011 is a low cost multiport device series. Designed for indoor use and attainable in many kinds of cases with a collection of options. The RB2011iL-IN is the most basic model, with 5 Ethernet ports, 5 Gigabit Ethernet ports, power jack and PoE support. The new Atheros next generation powered is 600MHz 74K MIPS network processor. There is a PoE output

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function for port #10 - it can power other PoE capable devices with the same voltage as applied to the unit. The maximum load on the port is 500mA. [6]



Figure: 2.5.3 RB2011

2.5.4 CC1036-8G-2S+

Now fastest router has become even better, the new CCR1036-8G-2S+ now has two SFP+ ports for 10G interface support (SFP+ module available separately). It also uses the same 36 core Tiller CPU as our other CCR1036 model and give the same performance, but 10 gigabit links are possible. The device comes in a 1U case, has 2 SEP+ ports, eight Gigabit Ethernet ports, a serial console cable, and a USB port. The CCR1036-8G-2S+ has 2 sodium slots, by default it is shifted with 4GB Ram, but Router OS has no memory limit. Also available now, the EM model with 16GB of RAM supports both SFP. [7]



Figure 2.5.4: CC1036-8G-2S

CHAPTER 3

Configuration of MikroTik

3.1 Win box Interface Menu

Win box is a compressed use that sanctions the administration of MikroTik Router OS utilizing an urgent. It is an endemic Win 32 binary. All of the Winbox interface functions are as immediate as possible reflect the quiet function, for this there is no Winbox sections in the manual. There are some advanced and system

- + For key exchange and authentication Winbox uses ECSRP
- + By SIA MikroTik is issued the Winbox is signed with an extended validation certificate.
- + Other side knows the password and both sides verify that.

Winbox uses AES128-CBC-SHA as an encryption algorithm

Login: sabbir Password: Session: cowno Note: PC CAMPU	16					
Password:	46					Autosave Session
Session: cowno Note: PC CAMPU	18					Open In New Windo
Note: PC CAMPU	10				¥ Browne	
0	15					
Chorb:						¥
D-HOM Louis						1x
HoMON Agent:						•
Add/Set					Connect To RoMON Conn	ect.
203.190.10.219.245	sabbr	(pwn)	sabbr	Girls HOSTEL		
203.190.11.50.245	sabbir	<pre>cown></pre>		Girls HOSTEL		
203.190.13.210	Sabbir	A		ARUNA POLLI		
203.190.15.202.246	sabbir	(pwn)		PC CAMPUS		

Figure 3.1: Winbox

3.2 Static Configuration

Routing decisions are required by the static routing in the routing table, only admin can update this manually. Her the route choice is limited but only one default route is available, static routes are usually completed. If we have few route setup devices and no future route change is needed, Static routing can also be used.

Step 1: Winbox open: Ip>Address 192.168.0.1/24>Interface=ether1>

Ip>Address 172.16.0.1/24>Interface=ether4>

Apply>OK

vidress List		
	T	Find
Address	/ Network 172.16.0.0	Interface
· 192 168 50 2/24	192.168.50.0	ether1



Step 2: Ip>Routes>=192.168.50.1)>Apply>OK

Route	List.				
Route	s Nexthops Rul	es VRF			
ŧ		7			
	Dst. Address	Gateway	Distance	Routing Mark	Pref. Source
AS	P00000	192.168.50.1 reachable ether1		1	
DAC	172.16.0.0/24	ether4 reachable		0	172.16.0.1
DAC	▶ 192.168.50.0	ether1 reachable		0	192.168.50.2

Figure 3.3: Add Route

Step 3: Ip>Firewall>NAT>+action>masquerade>Apply>OK

Advanced Extra Action Statistics		OK
Action: masquerade	*	Canc
C Log		Apply
Log Prefix:	-	Disable
To Ports:		Comment
		Сору
		Remove
		Reset Counters
		Reset All Counters

Figure 3.4: Set Firewall

Step 4: Ip>DNS>DNS Seeting>servers=203.190.10.252

DNS Settings			
Servers:	203.190.10.252	•	OK
	203.190.10.253	•	Cantel
Dynamic Servers:			Apply
	Allow Remote Requests		Static
Max UDP Packet Size:	4096		Cache
Query Server Timeout:	2.000		
Query Total Timeout:	10.000	5	
Max. Concurrent Queries:	100		
Max. Concurrent TCP Sessions:	20		
Cache Size:	2048	KB	
Cache Max TTL:	78 00:00:00		
Cache Used:	9 KiB		

=230.190.10.253

Figure 3.5: Add DNS

3.3 DHCP Configuration

DHCP is a network management protocol which is used to progressively assign the IP address and to any device or node on the network, it is allow to communicate via IP. It is a network management protocol. DHCP will run as well as on large enterprise networks and small local networks.

Step 1: Go to IP>DHCP server tab. The window of the DHCP server will apper.

Step 2: Click the DHCP setup button and select ether2 then click the next

HEP Server					
DHCP Networks	Leases Opti	ons Option Set	s Alierts		
+	8 9 DH	ICP Config D	HCP Setup		Find
Name	/ Interface	Relay	Lease Time	Address Pool Add AR	
			DHCP Setup		
			Select interfac	e to sun DHCP server on	
			DHCP Server	Madana Milita	
			Unit Server	Action Diverse	
				Back Next Cancel	
				D	
			-		
tens					

Figure 3.6: Select DHCP Server Interface

Step 3: Now DHCP address space input field, given LAN network block (172.16.0.1) and click next. LAN user will receive the IP from this network.

DHCP Server				
DHCP Netwo	rks Leases Options	Option Sets	Nerta	
+ 0	B T DHCP	Config DHC	2 ^p Setup	Find
Name	/ Interface	Fielay	Lease Time Address Pool Add AR	-
	DHCP Config DHCP Setup Interface Relay Lease Time Address Pool Add AR DHCP Setup DHCP Setup DHCP Address Space: 172.16.0.0724			
			Select network for DHCP addresses	
			DHCP Address Space: 172.16 0.0/24	
			Ruck Next Cound	
0.2				
O denna				

Figure 3.7: Select Network Block

Step 4: Select a gateway for the given DHCP network input box in the gateway and click next.

DHCP Networ	ks Leases Options	Option Sets	Alerts	
+ - ~	B T DHCP	Config DH	P Setup	Find
Name	/ Interface	e Relay Lease Time Address Pool / DHCP Setup	Lease Time Address Pool Add AR	-
			DHCP Setup	
Oitems				

Figure 3.8: Select Gateway

Step 5: The IP address of DHCP client/LAN user provides the IP range will be entered and click next.

Step 6: Give DNS server IP and press next

	DHCP	Config DHC	P Setup			Find
• ⇒ ∞ ≈ 1	/ Interface	Relay	Lease Time	Address Pool Add AR.		New York
			DHCP Setup			
			Select DNS se	oven.		
			DNS Servers:	203,190,10,252	•	
				203.190.10.253	•	
				Back Next	ancel	
			1			

Figure 3.9: Select DNS Server

Step 7: Enter the IP lease time then press next.

DHCP Server	k			
DHCP Net	works Leases Options	s Option Sets	Alerts	
+	DHCP	P Config DHK	'P Setup	Find
Name	DHCP Config DHCP Setup Interface Relay Lease Time Address Pool Add AR	Lease Time Address Pool Add AR	.	
			DHCP Setup	
			Select lease time	
			Lease Time: 00.10.00	
			Back Next Council	
			back week a cancer	
Oitems				

Figure 3.10: Set Lease Time

Step 8: Now DHCP is complete and successful message will be displayed.

II			
	T DHCP Confi	g DHCP Setup	Find
Name dhop1	/ interface other4	Relay DHCP Setup no no	
		Setup has completed successfully	
		OK	

Figure 3.11: DHCP Setup Complete

Any IP device like desktop, laptop, mobile etc. now link to the network. For this device a MicroTik DHCP server IP is automatically allocated. Click leases to see the DHCP client's IP lease status.

3.4 Bandwidth Management

Bandwidth management have two ways.

I. Add multiple queues.

C* Safe Mode Session: D41	CA 5D 53 66 A4	
Quick Set		
M Interfaces		
T Wreless		
Bridge		
PPP		
2 Switch		
🕼 Mesh	Change Last	
we r	Simple Gueues Interface Queues Queue Types	
Ø MPLS 🕴	+ - V X C Y 00 Reset Counters 00 Reset Al Counters	Find
Routing 1	# Name Target Upload Max Limit Download Max Limit Packet Marks Total Max Limit ds.	-
🖯 System 🗅	0 💼 Shuvo 192 168 2.20 512k 513k	100
Durues		
Files	Single Luce Crives	
E Log	General Advanced Statistics Total Total Statistics OK	
A Radus	Name: Shaves Cancel	
🔀 Tools 🛛	Target: 192.168.2.20	
Mew Terminal	Del Terretter	
MetaROUTER	Lisacie	
Pattion	Target Upload Target Download Comment	
All Make Supout of	Max Limit: 512k ¥ 512k Copy	
😝 Manual	Bunt Remove	
New WinBox	Bunt Linit: unlimited ¥ unlimited ¥ bits/s Reset Counters	
E. Ext	Burst Threshold: unlimited ¥ unlimited ¥ bits/s	
	Burst Time: 0 0 s	
	Torch	

Figure 3.12 Bandwidth Management

II. Define two PCQs queue types. (for 1 upload and 1 download)

Most of the time I use win box. So the exact CLI commands do not remember. In winbox go to Queues then types Add (+) give it name say. 10M-Download, kind=pcq, rate=10M, Classifier=Dst. Address for rest defaults are ok.

Another one is added:

Name=10M-Upload, kind=pcq,rate=10M,Classifier=Src Address

3.5 PPPOE Configuration

PPPoE is a network protocol for encapsulating point to point protocol frames inside Ethernet frames, it stands for point to point protocol over Ethernet. It is also used mainly with DSL services. It is take advantage of mainly with DSL circumstance where separate users connect DSL modem over Ethernet. Ethernet networks have no receptivity for a connection and packet predicated. Even they lack rudimental security property to bulwark against IP and MAC friction and rogue DHCP servers. Individual users associate to a DSL modem over Ethernet. Ethernet. Ethernet networks have no receptivity for a connection and packet predicated is a predicated.

Step 1: Creating PPPoE client, We guess that our WAN port is ether1. WAN cable plug into ether1- press PPP then press plus sign. Add +.Then choose and PPPoE client. After click general tab, we will see interface then choose an ether1. Go Dial out tab, after fill in User and Password then Click Apply. After that we see status connected on the bottom.

C* Safe Mode Sea	ion: 192.168.0.120					
Quick Set						
Interfaces						
Wreless						
Bidge						
PPP	Queue List					
z Swech	Simple Queues Interface Queues	Queue Tree Queue Types				
2 Mesh	+ - < x C T	00 Reset Counters 00 Reset All Cou	rtes		Find	
5 P 1	# Name	Target Upload Max Limit	Download Max Limit Packet Marks	Total Max Limit (bi		
MPLS ?	0 OStavo	192 168 4 254 2M	2M 1M			
Routing 1	2 E Total Network	192.168.4.0/24 2M	24			
) System 1						
Queues						
Files						
Log						
B. Radus						
Tools P						
New Terrinal						
MetaROUTER						
Patition						
Make Supout rf						
Manual						
New WinBox						
Ext	James (Texture)	Depend	Description and			
	a dens (1 seecred)	2 0 Q/8080	a packets doened			

Figure 3.13 PPPoE Configuration

Step2: Set DNS, press IP then select DNS, fill in the DNS IP address.

Step3: After the Ports tab, press on add + add port into bridge, Select interface add into the bridge then choose bridge that created earlier and press ok.

Step4: For LAN add IP address, press IP then choose Address. Press add+ then add new IP address, after filling the IP address then choose the bridge name and create earlier.

Step5: Creating DHCP server, after setup then choose bridge and click next.

Step6: NAT LAN network, press IP and choose Firewall, in the general tab select scant and select PPPoE out1. Choose masquerade then ok.

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e ettog & loternet e met ep ene mode		Dial-up Dial-up	Band Connection 2 Connection Security Sign in Shave	Cana	×	Related write Charge skip Remote and Writebox Fer Here a quest of here Can be for	ngs Los optimum Shareng Contact Son? No Detter
n hiting & biterret 9 net. 40 are mode		Dial-up Dial-up	Band Connection 2 Connection 2 Connection 2 Sign in Sign in Shave	Central Tr	*	Related with Change ship Denset and Without free Here a question of range Make Window Che in here	nga Lind ngantanan Sananga Camban Nanga Sanan Sanan Sanan Sanan Sanan Sanan Sanan Sanan Sanan
e etting & loternet e met. 40 ene mode le hangon	~	Dial-up Dial-up	Band Connection 2 Convertiently Sign in Shown	Centre	() ×	Related write Change along Nonwell and Writewell (No Have a quest) Chan in Band Chan in Band	nge Land og standard Vision og Landard Non? No Detter
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Figure 3.14: PPPoE Configuration



Figure 3.15: PPPoE Configuration

3.6: Wireless Connection

Wireless LAN uses radio waves to connect devices the internet and business network and application. After connect Wi-Fi hotspot at a hotel, café, airport lounge or other public place, connect to the business wireless network.

Step1: New security profile is create go to Wireless>Security Profiles then then add new profile. Virtual access point create go to Wireless>Interfaces then add virtual AP.

New Security Profile			Interface (wian-phones)			
General PADILIS EAP	antio Kong	OK	General Wrekess W	/DS Status Traffic		OK
CONTON POADIOS EAP 3	Kauc Neys	OK	SSID	gos phones	•	Cancel
Name:	wpia2 phones	Cancel	Master Interface	wian	*	Apply
Mode	dynamic keys 🐨	Apply	Avea:	C	-	Disable
A share and the state			Security Profile:	wpa2-phones	*	Comment
Authentication Types.	WPA FAP WPA2 FAP	Сору	WPS Mode:	disabled	*	Сору
Unicast Onhers	Fass com	Bemove	Max Station Count:	2007		Remove
cricas opres.		10000	WMM Support	disabled	*	Simple Mode
Group Ciphers:	aes com bup		VLAN Mode	no tag	(¥)	Torch
WPA Pre-Shared Key:			VLAN ID:	(1		
WPA2 Pre-Shared Key			Default AP Tx Rate	[▼ bps	
1121245555555			Default Client Tx Rate:		▼ bps	
Supplicant Identity:				Contract Authenticate		
Group Key Update:	00:05:00			Default Forward Hide SSID		
			Multicast Helper	default	[#]	
Management Protection:	allowed			Multicast Buffering		
Management Protection Key:				Keepalive Frames		
			enabled	sunning	alarve	

Figure 3.16: Wireless Connection

Step2: IP>Address then add new address. Go IP >Pool that add new pool.

IP Pool <dhc< th=""><th>p-phones></th><th></th></dhc<>	p-phones>			
Name:	dhcp-phones			ОК
Addresses:	10.46.2.64-10.46.2.25	4	\$	Cancel
Next Pool:	none	Ŧ	•	Apply
				Сору
				Remove

Figure 3.17 Wireless Configuration

Step3: For connect to the Wi Fi network DHCP is used to assign address to devices. If we create the pool they will use. Then assign a few other special addresses.

Go to IP>DHCP Server>DHCP tab>DHCP Server

New DHCP Server			
Name:	wlan-phones		ОК
Interface:	wlan-phones	₹	Cancel
Relay:		-	Apply
Lease Time:	1d 00:00:00		Disable
Bootp Lease Time:	forever	*	Copy
Address Pool:	dhcp-phones	₹	Remove
Src. Address:		-	
Delay Threshold:	[-	
Authoritative:	after 2s delay	Ŧ	
Bootp Support:	static	Ŧ	

Figure 3.18: Wireless Configuration

Safe Mode	Sesson: D4 CA 50 53 66 A5										
Quick Set	Wireson Tables						14				
# Interfaces	Interfaces Natione Dual Access List	Registration C	ormect Lat Security P	hoffes Channels				en de	Network		
Bridge	+	Scamer Freq.	Usage Alignment	Wireless Sniffer Wi	eless Snooper	and the Product of the		盟			
PPP	RS @vefan1 Wveless (Athen	ta AR9 22	290 42	t bps 0	ta Packet s	T T T T T T T T T T T T T T T T T T T	0 DACAN	6	Broadband Connection 2		
Switch								10			
IP T	DKCF Service					1			Broadband Connection		
MPLS 1	DHCP Networks Leaves Options	Option Sets Al	lerts					1			
Flouting P	+	Aska Static O	heck Status		Find						
System 1	Server Active Address Active M	MAC Addre Act	ive Host Name	Expires After Status				1.200	EN C	_	1
	100 100 100 100 100 100 100	1 h al a a a a a a a a a	A	Do be and the set of							
Queues	192 168 4 254 DB 32 E 192 168 4 253 CB 3D 0	E3.5E.46.E6 Rec 04.38.C7.27 DE1	dnsNoteSPro-Redmi SKTOP-AG7T4T2	2d 23 56 09 bound 2d 23 56 36 bound				C.	Connected secured		
Gueues	192,168,4,254 DB 32 E 192,168,4,253 CB 3D 5	E3.5E.46.E6 Red D4.38.C7.27 DE1	dnsNoteSPro-Redmi SKTOP-AG7T4T2	2d 23 56 09 bound 2d 23 56 36 bound			. 1	(iii	Shuvo Connected, secured		
Gueues Files Log Radus	192 168 4 254 DB 32 6 192 168 4 253 CB 30 D	23.5E.46.E6 Rec 04.38.C7.27 DE3	dnsNoteSPro Redns SKTOP-AG7T4T2	2d 23 56 09 bound 2d 23 56 36 bound		80		(k.	Shuvo Connected, secured Properties		
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Gueves Fies Log Radus Tools F New Teminal	192 163 4 254 DB 32 6 192 168 4 253 CB 30 C	Classical Control Cont	Instate SPro-Redmi SKTOP-AG7T4T2 WDS Nationne NV p bridge	2d 23 56 09 bound 2d 23 56 36 bound 2 Status Traffic		ок		(k.	Shuvo Connected, secured Properties		
Gueues Files Log Radus Tools / New Teminal MetaROUTER	192 163 4 254 08 22 0 192 168 4 253 C8 30 1 192 168 4 253 C8 30 1 Venture General	Di SE 46 E6 Rec Di 38 C7 27 DE Olan 15 Wreiess HT Mode a Band 2	shifede SPio-Redni SKTOP-AG7T4T2 WDS: Nativeme NV p bridge GHI-8	20 23 56 09 bound 20 23 56 36 bound 2 Status Traffic		OK Cancel			Shuvo Connected; secured Properties	Discon	×
Queues Files Log Radus Tools P New Teminal MetaROUTER Pattion	192 164 4 254 05 32 5 192 164 4 253 05 30 192 164 4 253 05 30 0 00000000000000000000000000000	Di SE 46 E6 Rec Di 36 C7 27 DE Wretess HT Mode A Band 2 Dannel Width 2	WDS Natione NV p bridge GHz B OMHz	24 23 56 09 bound 24 23 56 36 bound 25 Status Traffic		OK Cancel Asoly			Shuvo Connected; secured Properties NO PAIN Secured	Discon	10
Cueues Files Log Radue Tools Tools Filew Teminal MetaROUTER Pattion Make Supout of	192.168.4.254 05.25 192.168.4.253 c6 30 #terface (General	C15E 45E6 Rec D438C727 DE1 Wreless HT Mode a Band 2 Frequency 2	MUNUSESPo-Redm SKTOP-AG71412 WDS Natione NV p bridge GHLB OMHz 412	2d 23 56 09 bound 2d 23 56 36 bound 2d Status Traffic	V Htt	OK Cancel Assly Deable		le.	Shuvo Connected, secured Properties NO PAIN Secured	Discon	10
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Conves Files Files Log Radue Tools Tools Files Fastion Make Seport of Marvai New WinBox Est	192.164.424 05.25 192.164.425 05.00 Uter 4.253 05.00 General O	Calde 46 E6 Rec D4 38 C7 27 DE3 Wireless HT Mode A Band 2 Darmal With 2 Frequency 2 Scan Lat 6	MinitoteSPio-Redmi SKTOP-AG71412 WDS: Nativene NV p bridge GHz B OMHz H12 Psylop ofead	2d 23 56 09 bound 2d 23 56 36 bound 2 Skatus Traffic	* * *	OK Cancel Assly Dasble Comment Advanced Mode			Shuw Connected, secured Properties NO PAIN Secured Asif hasan	Discon	10
Gueues Files Log Radus Tools 7 New Teminal MetaROUTER Pattion Male Suport of Manual New Worllox Est	192.168.4 254 05.2 5 192.168.4 253 c5 30 192.168.4 253 c5 30 General O	Cl 35: 44 EG Rec D4 38 C7 27 DE3 Wireless HT Mode A Band 2 Darmal With 2 Frequency 2 Scan Lat: 6 dess Protocol a	MulticleSPin-Redm SKTOP-AG77412 WDS Nationer NV p bridge GHz-8 OMHz 412 Prvvo efeut	21 23 56 09 bound 21 23 56 36 bound 2 Status Traffic	* * * *	OK Cancel Assly Daable Comment Advanced Mode Torch		Ce Ce Network	Shuve Connected, secured Properties NO PAIN Secured Asif hasan cork & Unternet, settings extituty, such as making a cores	Discon	
Gueues Files Log Tools 7 Netwo Terminal Netwo Terminal Netwo Terminal Make Seport of Marcual Netwo Worlbox Est	192.168.4.254 05.25 192.168.4.253 c63.05 (General O	CaldE 46 E6 Rec Do4 38 C7 27 DE3 Windexs HT Mode R Band 2 Parmel Width 2 Frequency 2 SSID 5 Scan Latt 0 dess Protocol a	MUNICAS PRO-Redmi SKTOF-AG/77412 WDS Nateme NV o bridge Gridge Gridge Gridge Huno Para Para Para Para Para Para Para Par	22 23 56 09 bound 2d 23 56 36 bound 2 Status Traffic	* [*] *] *]	OK Cancel Apply Deable Comment Advancel Mode Torch Scan		Ca Ca Netwo Diario	Shuvo Commetced, secured Properties NO PAIN Secured Asif hasan kork & Internet, settings prettings, such as making a conve	Discon	10
Ganues Files Log Radus Tools F New Terminal Make Sapaut if Marka Make Sapaut if Marka Make Sapaut if Marka Sapat if Marka Sapat if	192.168.4.254 05.25 192.168.4.253 c63.05 General O Www.S	CaldE 46 E6 Rec Del 38 C7 27 DES Weekens HT Mode R Band 2 Parmal Weth 2 Frequency 2 SSID 5 Scan Lat d ecuty Profile 5 Bindos Mode r	Shither SPin-Redm SKTOP-AG7412 WDS Nationer NV Distance NV SHite 8 OMHz 412 David efault Pavid Set 9 David efault Pavid	21 23 56 09 bound 26 23 56 36 bound 21 23 56 36 bound 21 Statum Traffic	¥ [¥ MH4 ¥ 0 ¥ 0	OK Cancel Acoly Deable Connert Advanced Mode Torch Scan_ Fing, Usga_		C. C. Network	Shuxo Connected, secured Properties NO PAIN Secured Asif hasan work & Internet settings exettings, such as making a cons igh 6/4	Discon	10

Figure 3.19: Wireless Configuration

3.7 ARP Configuration

A static IP is put by ARP binding to MAC address entry in a devices ARP table. DHCP conservations accommodate a device on the network to get the same IP assignment making DHCP requests. They are not related.

At first, select ARP IP then + sign, add information then press ok. Then select static IP address, MAC address. Interface: ether2, Same LAN steps need to repeat on DHCP server. Click IP and DHCP server.



Figure 3.20: ARP Configuration

Then press on + sign, add required information on DHCP server, MAC address and static IP address, use static IP

Server dhcp1

3.8 Bridge Configuration

Step 1: Select Bridge menu



Figure 3.21: Select Bridge

Step 2: Go to bridge tab and click on (+)



Figure 3.22: Click Bridge plus sign

Step 3: Give Interface name. Click apply then ok



Figure 3.23: Add Bridge Name

Step 4: Then go to Ports and click (+)

Sabbir@203.190.13.2 Session Settings Dar	10 (BaborhatPOP) - WinBox v6.42.2 on CCR1016-12G (Bile) ahboard	- σ ×
C+ Safe Mode	Session: 203.190.13.210	Memory 1504.0 M8 Tene 14.42:10 CPU:111.
Guick Set	Boda Floor VLNa MSTs For MST Oversides Films NAT Hode MDB	Ere I
31 Brdge	New Bidge Part	a ra
RE PPP	OK 10 designated port	
*2 Medi	Cancel 10 designated port	
O MPLS 1	Apply 10 designated port	
Routing 1	Horizon: Disable	
🗐 System 🕴 1	Leam ado ¥ Connert	
n Gueues	Copy	
Res .	Broadcast Rood	
di Radus	V Hardware Officad	
X Tools		
Mew Terminal	enabled Inscrite Disc Official	
LCD		
Make Sport of		
@ Manual		
New WinBox		
Eut		
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22		
Ro		

Figure 3.24: Add Port

Step 5: From dropdown menu choose physical interface.



Figure 3.25: Select Interface & Bridge

3.9: IP Server

	Safe Mo	de	Session: 192.168.0.120					
1	Quick Set							
-	Interfaces							
ī.	Wreless							
	Bridge	_						
1	PPP		P	Service List				
¥. :	Switch	-		* X Y				Find
10	Mesh	-		Name	Port	Available From	Certificate	*
201	P	1		• api • api-ssl	8728		none	
2	MPLS	1		@ ftp	21			
¢.	Routing	P		O seh	22			
2	System	1		• winbox	8291			
	Queues			• www	80		Date	
	Files		·					
	Log	_						
-	Radius	-						
5	Tools	- P						
	New Termina							
2	MetaHOUTE	R						
	Partition	-						
-	Make Supou	4						
	Manual							
	New WinBox							
-	E-ult							

Figure 3.26: IP Service

3.10: User ID

	Session: 192.168.0.120	
Quick Set	User List	
Interfaces	Users Groups SSH Keys SSH Private Keys Active Users	
T Wreless		
Bridge	Name / Group Allowed Address Last Logged In	
PPP	system default user	
Switch	admin full Jan/02/1970 00:54:09	
18 Mesh	New User	
IP P	Name: user1	OK
MPLS F	Group: read	Cancel
Routing	Allowed Address	Analy
System 1	write	мрру
Queues	Last Logged In:	Disable
Files	Password:	Comment
E Log	Confirm Password:	Copy
🥵 Radius		Permana
🗡 Tools 🗈 🏷		Hemove
New Terminal		
MetaROUTER		
Partition		
Ake Supout.nf		
Manual		
New WinBox		

Figure 3.27: User ID

CHAPTER 4

Conclusion and Future Career Scope

4.1 Conclusion

The experience of the internship was excellent and teachable. When I complete my internship I realize that from Daffodil Online Ltd if anyone complete the training they can perfectly operate the MikroTik Router. I also able to operate MikroTik router. I also done configuration microcontroller routers very well. Now I can operate MikroTik router myself. In this session I also learned creating network institution via ISP. Hope the internship of mine will able to lead and serve the society successfully.

Future Career Scope

In networking sector there are a lot of opportunities available for job. In MikroTik Networking sector, there have many different field opportunities for career including CISCO, AWS, JNCP etc. As the technology and network communication advances, networks are interconnected progressively. Consequently, every person must live up to the latest network technological and communication aptitude. It helps every person to achieve depth wisdom to resolve many kinds of problems in future life.

Reference

- 1. Networking:"http://openbookproject.net/courses/intro2ict/networking/intro.html"
- 2. Types of networks and importance: "https://study.com/academy/lesson/types-of-networks-lan-wan-wlan-man-san-pan-epn-vpn.html"
- 3. MikroTik Networks: "https://mikrotik.com/software"
- 4. HEX PoE: "https://mikrotik.com/product/RB960PGS"
- 5. HEX lite: "https://mikrotik.com/product/RB750r2"
- 6. RB2011: "https://mikrotik.com/product/RB2011UiAS-2HnD-IN"
- 7. CC1036-8G-2S+: "https://mikrotik.com/product/CCR1036-8G-2Splus"