#### INTERNSHIP ON NETWORK AND SYSTEM ADMINISTRATION WITH MIKROTIK AND LINUX PLATFORM

#### SUBMITTED

BY

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

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# APPROVAL

This Internship titled "Network and System Administration with MikroTik and Linux Platform", submitted by Amanullah Khan to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as Some Blessing of the Necessity for the Degree of Bachelor of Science (BSC) in Computer Science & Engineering (CSE) and approved as its style and contents.

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#### ABSTRACT

MikroTik Router operating system is the operating system of MikroTik Router boardhardware. The computer includes lot of variety of features for IP & wireless networks. These functions include Firewall, Nat, Routing, Hotspot, Bandwidth Limiter, DNS server, Point to Point Tunneling Protocol, Hotspot, DHCP server, and many other features. As a student of CSE, I have completed my internship report in DOL "on Network and System Administration with MikroTik and Linux platform". The report is a requirement of the internship program for my Bachelor of Science course degree. The report discussed about the purpose of the specific server using on ISP.

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# **CHAPTER 1**

#### Introduction

#### **1.1 Introduction**

Network and System Administration With MikroTik and Linux platform is Main objective of my internship program is to prepare myself as a skilled person in the competitive job market. So internship is very essential for skill development. I would like to achieve some special quality in order to prove myself as a skilled one. The Daffodil international university has a nice opportunity that was the internship system. We get it on the last semester. It is my big challenge to prove me, in any time anywhere in any place. The full system support given by daffodil online ltd (DOL). On that company I want to gather a large technical knowledge. For that region I want to say that I was very proud of me to get Daffodil international university.

## **1.2 Motivation**

As a Linux system and networking administrator, there are very good job areas in Bangladesh and in the world. I think Linux system and network administration are most important in networking. Because we are completing Cisco certified network Associated (CCNA). Moreover Linux has own secured Kernel to protect it from Virus so we not need to buy antivirus to protect our system. So I use a free Operating System CentOS-6 to setup this system to make this cost effective.

## **1.3 Internship Objectives**

To understand the functioning and working conditions of a corporate company. To gain skills that could help me in my future career. To see what it is like to work in a professional environment. To enhance my communication skills. Today, most organization use mikroTik router for ISP configuration and use Linux operation system. Linux operating system is one open source operating system. Actually Linux operating system used for server configuration. Conceptually, Linux is considered the world most powerful, flexible and robust server based operating system.

# **1.4 Introduction to the Company**

Daffodil Online Ltd Is one of the most Internet Service Provider (ISP) and ASPs in Bangladesh and providing one stop integrated ICT services and solution since July 2002. DOL is going to conduct the most challenging & demanding IT professional courses and training in the day of globalization. Daffodil Online Limited (DOL) is one of the fastest ISP's in Bangladesh to connect-everyone, anywhere all the time to deliver high quality Information and Communication Technology (ICT) services at a reasonable price. DOL use the latest technologies and upgrading the services wherever it is required.

## **1.5 Report Layout**

**Chapter-1** I have described objective of internship, Introduction, Motivation of internship and Introduction to the company. **Chapter-2** I have described About Company Profile. I describe about DOL, service, etc. **Chapter-3** I have described about daily task and activities, Challenges, etc.**Chapter-4** I have described is Smart Plan, Competencies Earned and Reflections.**Chapter-5** I have described Conclusion and Future Scope. Scopes for futher career.

# CHAPTER 2 ORGANIZATION

#### 2.1 About the Company

Daffodil Online Ltd. prides itself as one of the leading nationwide Internet Service Provider (ISP) in Bangladesh. They are the most experienced and oldest company in the ICT field where they are basic business ethics is Long Term Relationship with they are customers. As we look at the growth over the decade since our inception, they are extremely proud of what they have achieved, and even more excited about they are outlook for an equally promising future.

## 2.2 Product and Market Situation

Daffodil Online Ltd. Provides different type of IT Services and Professional Training services.

- IT Services:
- Web Designing,
- Website development
- Web hosting
- Domain registration
- Web development
- Internet Service Provider
- Hi speed Wi-Fi Zone
- Bulk SMS Service. etc
- Professional Training Services:
- Network and system administration With Linux
- Network and system administration With Mikrotic
- MYSQL and PHP.
- Web Development Design using Joomla. etc

# 2.3 Target Group:

Daffodil Online Ltd. One of the most Internet Service Provider (ISP) in Bangladesh. They are the oldest and most experienced company in the ICT field.

(DOL) also provides different type of professional training services and IT Services in Bangladesh.

# 2.4 SWOT Analysis

SWOT Analysis is a useful technique for understanding your Weaknesses, Strengths, Opportunities and Threats related to business competition or project planning.it is a strategic planning technique used to help a organization or perso

# 2.5 Organizational Structure

Here, Figure 2.1- show the Organizational-Structure of **DOL** Daffodil Online Limited.



Figure 2.1: Organizational Structure of Daffodil Online Limited (DOL)

# **CHAPTER 3**

# Tasks, Events And Activities

# 3.1 Daily Tasks and Activities

1<sup>st</sup> Month: First month of my internship I have learned the following topics:

- Learning & understanding About Basic Networking, Ipv4 Addressing and Subnating .
- Learning & understanding About Network Components of Network and Cabling (FTP, Fiber Optic).
- Understanding Basic routing & cisco switching commands
- Learning & understanding About cisco switch configuration
- Understanding VLAN, TELNET, SSH in Cisco switch and Router
- Learning & understanding Basics concept of router.
- Understanding different type router.
- Learning & understanding routing configuration
- How router works.

2<sup>nd</sup> Month: Second month of my internship I have learned the following topics:

- MikroTik router installation.
- Static routing configuration.
- Dynamic routing configuration
- Bandwidth management Using MikroTik router
- Maintenance MikroTik router
- Maintenance routing protocols

**3<sup>rd</sup> Month:** Third month of my internship I have learned the following topics:

- Linux Installation.
- Understanding partitions
- IP Addressing.
- Package Install, Remove, Update using [yum]
- Centos6 IP Address Configuring

4<sup>th</sup> Month: 4<sup>th</sup> month of my internship I have learned the following topics:

- WEB Server.
- FTP Server.
- SAMBA Server.

# **3.2 Activities and Events:**

- Basic routing & cisco switching commands using
- Mikrotik Routers Troubleshooting
- Understanding About
- LAN and Ciscoswitches Troubleshooting
- Bandwidth management
- Understanding VLAN, TELNET, SSH
- Understanding About Basic Networking
- Understanding About Centos6 Installation
- Understanding About Cabling Using FTP
- Understanding About WEB, FTP, SAMBA Server.

# 3.3 Project Task and Activities:

Learning & understanding About Basic Networking, Ipv4 Addressing and Subnating . About Network Components of Network and Cabling (FTP, Fiber Optic). Understanding Basic routing & cisco switching commands. MikroTik router installation, bandwidth management and MikroTik router maintenance

Understanding About cisco switch configuration. Understanding VLAN, TELNET, SSH in Cisco switch and Router. Learning & understanding Basics concept of router. Understanding different type router. And understanding linux Installation and different type of server.

## **3.4 Basic Configuration of Cisco Switch**

• **Cisco Switch:** Figure 3.1 show about cisco Switch.



Figure 3.1: Shows a Cisco Switch

#### • Line console password setting :

First of all, go to Switch CLI and then type given codes below. Figure 3.2 Show Line console password setting

Switch>en Switch#conf t Switch(config)#hostname Amanullah [ change the hostname ] Amanullah(config)# Amanullah(config)#line c Amanullah(config)#line console 0 Amanullah(config-line)# Amanullah(config-line)#pass Amanullah(config-line)#password 12345 [Here **password** is the command & set the password ] Amanullah(config-line)#login Amanullah(config-line)#exit Amanullah(config-line)#exit



Figure 3.2: Shows Line console password Configuration

• Verify line console password: Figure 3.3: Shows Verify line console password

Switch1			
Physical Config	CLI		
	IOS Command I	Line Interface	
			*
Amanullah con0 is	now available		
Press RETURN to g	et started.		
User Access Verif	ication		=
Password:			130
Amanullah>			-
200		Сору	Paste

Figure 3.3: Shows Verify line console password

#### • Privileged Mode Security :

First of all, go to Switch CLI and then type given codes below . in figure 3.4: Shows User Access Verification Amanullah>en Amanullah#conf t Amanullah(config)#ena Amanullah(config)#enable s Amanullah(config)#enable secret abcd Amanullah(config)#exit Amanullah(config)#exit

The switch now asks for the password.

Switch1	
Physical Config CLI	
106 6	
IUS Command Li	ine Interrace
	A
Press RETURN to get started.	
User Access Verification	
Password:	
Password:	
Amanullah>en	
Password:	=
Password:	
Amanullah#	
Amanullah#	-
	Copy Paste

Figure 3.4: Shows User Access Verification

# 3.5 Telnet Configure On Cisco Switches

After telnet services configure in a switch to access it remotely from anywhere. In figure 3.5: Shows Configure telnet configuration

• Configure Telnet : Go to Switch CLI and then type given codes below

Amanullah>en Amanullah#conf t Amanullah(config)#int Amanullah(config)#int v Amanullah(config)#int vlan 1 Amanullah(config-if)#ip add Amanullah(config-if)#ip address 192.168.10.1 255.255.255.0

#### Amanullah(config-if)#no sh Amanullah(config-if)#no shutdown Amanullah(config-if)#Exit



Figure 3.5: Shows Configure telnet

After adding ip address than go to Switch CLI and set line vty 0.4 for access telnet. In figure 3.6: Shows Telnet User Access Verification

Amanullah>en Amanullah#conf t Amanullah(config)#lin Amanullah(config)#line v Amanullah(config)#line vty 0 4 Amanullah(config-line)#pass Amanullah(config-line)#password 123456789 Amanullah(config-line)#login Amanullah(config-line)#exit Amanullah(config)#



Figure 3.6: Shows Telnet User Access Verification

First of all, go to the PC's command prompt and then type given codes below

PC > <u>telnet 192.168.10.1</u> Trying 192.168.10.1 ...Open User Access Verification Password:

# **3.6 VLAN configuration**

As an example, you can see a VLAN topology below. In this topology, 2 Cisco switches and 8 PCs are used. In Figure 3.7: Shows VLAN topology. And Figure 3.8, Figure 3.9 Show about VLAN Configuration on Switch-1 and Switch 2



Figure 3.7: Shows VLAN topology

VLAN on Switch-1 and VLAN on Switch-2 Configuration Process Show to the Appendix-C page.



Figure 3.8: Shows VLAN Configuration on Switch-1

VLAN Configuration on Switch-2: Figure 3.9: Shows about VLAN Configuration on Switch-2

Physical Config CLI	
IOS Command Line Interfac	e
Switch-2 (config)#	
Switch-2 (config)#	
Switch-2 (config)#	
Switch-2(config)#	
Switch-2(config)#	
Switch-2(config)#vlan 10	
Switch-2(config-vlan) #name Student	
Switch-2(config-vlan) #exit	
Switch-2(config) #	
Switch-2(config) #vlan 20	
Switch-2(config-vlan)#name Teacher	
Switch-2(config-vlan) #exit	
Switch-2(config)#	
Switch-2(config)#	
Switch-2(config)#int r f 0/1-2	
Switch-2(config-if-range) #sw m a	
Switch-2(config-if-range) #sw a vl 10	
Switch-2(config-if-range) #exit	
Switch-2(config)#	
Switch-2(config)#	
Switch-2(config) #int r f 0/3-4	
Switch-2(config-if-range) #sw m a	
Switch-2(config-if-range) #sw a vl 20	
Switch-2(config-if-range) #exit	
Switch-2(config)#	
Switch-2(config)#	
Switch-2(config)#	
Switch-2(config)#	L.
Switch-2(config)#	
	Conv

Figure 3.9: Shows VLAN Configuration on Switch-2

#### Vlan Trunks :

Trunks are commonly used between switches and other network devices such as a router, another switch, or a server. A network technician must be very familiar with configuring a trunk and ensuring it works properly.

#### **Trunk Port Assign:**

Switch(config)# Switch(config)#interface fastEthernet 0/5 Switch(config-if)#description trunk Switch(config-if)#switchport mode trunk Switch(config-if)#exit Switch(config)#

# 3.7 MikroTik Router

• **MIKROTIK ROUTER RB2011UIAS :** Figure 3.10: Shows about Rb2011UiAS Mikrotik Rouret.



Figure 3.10: Shows Rb2011UiAS Mikrotik Rouret

# 3.8 MikroTik Static IP Configuration:

- First Of All
- Power on the MikroTik Router
- Unshielded-Twisted-Pair cable Plug-in Between mikroTik router and PC
- open Winbox.exe

Here ISP has given a IP address, Gateway, DNS and Subnetmask. E.g.

- IP address: 192.168.101.0/24
- Gateway: 192.168.101.2
- Subnet Mask: 255.255.255.0

WAN-Configuration: Figure 3.11: Shows Router Interface List.



Figure 3.11: Shows Router Interface List

**Step 1.** winbox open: IP  $\rightarrow$  Address  $\rightarrow$  New address :  $\rightarrow$  192.168.101.130/24  $\rightarrow$ Interface : WAN\_ether2  $\rightarrow$  Apply  $\rightarrow$  OK. Figure 3.12: Shows Adding IP address for WAN\_ether2

Interfaces						
Wireless		ARP				
Bridge		Accounting				
PPP		Addresses				
Mesh		DHCP Client	Address	List		
IP	1	DHCP Relay	-		7	
IPv6	4	DHCP Server	Ad	dress	Network	Interface
MPLS	1	DNS	D 🕆	192.168.101.130/24	192.168.101.0	WAN_ether2
Routing	Ν	Firewall		New Address		
System	1	Hotspot		100 100 100	101 100 /04	
Queues		IPsec		Address: 192.160	3.101.130/24	ОК
Files		Neighbors		Network: 192.168	3.101.0	Cancel
Log		Packing		Interface: WAN_e	ther2 <b>Ŧ</b>	Apply
Radius		Pool				Disable
Tools	1	Routes				
New Termin	al	SMB				Comment
ISDN Chanr	hels	SNMP				Сору
KVM		Services				Remove
Make Supoi	ut.rif	Socks	1 item (1	enabled		
Manual		TETP			1	
E-++		Terffin Flaur				

Figure 3.12: Shows Adding IP address for WAN\_ether2

**Step 2:** IP  $\rightarrow$  Routes  $\rightarrow$  New Routes  $\rightarrow$  Gateway : (192.168.101.2)  $\rightarrow$  Apply  $\rightarrow$  OK ! Figure 3.13: Shows Adding gateway for WAN\_ether2

Interfaces			
Wireless		ARP	Route List
Bridge		Accounting	Routes Nexthops Rules VRF
PPP		Addresses	
Mesh		DHCP Client	Dst. Address / Gateway
IP	1	DHCP Relay	DAS 0.0.0.0/0 192.168.101.2 reachable WAN_ether2
IPv6	1	DHCP Server	
MPLS	1	DNS	
Routing	1	Firewall	New Route
System	1	Hotspot	General Attributes
Queues		IPsec	Dst. Address: 0.0.0.0/0
Files		Neighbors	Gateway: 192.168.101.2
Log		Packing	
Radius		Pool	Check Gateway:
Tools	1	Routes	Type: unicast
New Termin	al	SMB	
ISDN Chann	nels	SNMP	2 ite
KVM		Services	Scope: 30
Make Supou	ut .rif	Socks	Target Scope: 10
Manual		TFTP	Routing Mark:
Exit		Traffic Flow	Pref. Source:
		UPnP	
		Web Proxy	

Figure 3.13: Shows Adding gateway for WAN\_ether2

**Step 3:** IP  $\rightarrow$  DNS  $\rightarrow$  DNS Settings $\rightarrow$ 1<sup>st</sup> DNS servers= 8.8.8.8 and 2<sup>nd</sup> DNS servers= 8.8.4.4 $\rightarrow$  Apply  $\rightarrow$  OK ! Figure 3.14: Shows about Adding DNS Server

Interfaces						
Wireless		ARP				
Bridge		Accounting				
PPP		Addresses				
Mesh		DHCP Client				
IP	1	DHCP Relay				
IPv6	1	DHCP Server				
MPLS	1	DNS	DNS Settings			
Routing	1	Firewall	Comment	0.0.0.0		
System	1	Hotspot	Servers:	0.0.0.0		UK
Queues		IPsec		8.8.4.4	\$	Cancel
Files		Neighbors	Dynamic Servers:	192.168.101.2		Apply
Log		Packing		Allow Remote Re	auests	Static
Radius		Pool	Max UDP Packet Size:	4096		Casha
Tools	1	Routes	Cache Size:	2049	KIR	Lache
New Termin	al	SMB	Cache Size.	2040		
ISDN Chanr	nels	SNMP	Cache Used:	19		
KVM		Services	-			
Make Supor	ut.rif	Socks				

Figure 3.14: Shows Adding DNS Server

• LAN-Configuration:

**1**<sup>st</sup> **Step:** Firstly go to IP → Than go to Address → New address → address: →10.10.10.1/24 → Interface LAN\_ether1 → Apply than Ok ! Figure 3.15: Shows Adding IP Address for LAN\_ether1

Bridge		Accounting		
PPP		Addresses		
Mesh		DHCP Client	Address List	
IP	1	DHCP Relay	🛉 🖃 🖉 🛐 🛛 👘	d
IPv6	$\[ \]$	DHCP Server	Address / Network Interface	-
MPLS	ŀ.	DNS	D 🕆 192.168.101.130/24 192.168.101.0 WAN_ether2	
Routing	$\uparrow$	Firewall	New Address	
System	<u>►</u>	Hotspot		
Queues		IPsec	Address: 10.10.10.1/24 OK	
Files		Neighbors	Network: Cancel	
Log		Packing	Interface: LAN_ether1	
Radius		Pool	Disable	
Tools	$\[ \]$	Routes	Disble	
New Terminal		SMB	Comment	
ISDN Channel	s	SNMP	Сору	
KVM		Services	Remove	
Make Supout.r	if	Socks	1 item	
Manual		TFTP		

Figure 3.15: Shows Adding IP Address for LAN\_ether1

**2<sup>nd</sup> Step:** First of all go to **IP** → Than go to **Firewall** → NAT → General → here given Chain: **srcnat** → Adding ip address Src. Address: **10.10.10.0/24** Figure 3.16: and Figure 3.17 show about Create NAT

Bridge								
PPP	Erewall							
Mesh	Dilton Dula	NAT Manal	Segura Parte	Connections	Addenas Lista	Laura 7 Perte	ala	
IP I				Connections	Address Lists	Layer / Flotoc	UIS	
IPv6			] <b>\Y</b>	set Counters	00 Reset All	Counters		Find
MPLS N	#	Action Chain	Src. Addre	ss Dst. Addre	ess Proto Sro	. Port Dst. F	ort In. Inter	Out. Int Bytes Pad
Routing 1	1	New NAT Rule						
System 1		General Adv	mand Extra An	tion Chatlation				
Queues		Adva	shiceu Extra Ac	uon otausuca	3		1	
Files		Cha	ain: srcnat				•	Cancel
Log		Src. Addre	ss: 🗌 10.10.10.0	/24				Apply
Radius		Dst. Addre	ss:				•	Disable
Tools 1	8	-						-
New Terminal		Protoc	:ol:					Comment
ISDN Channels		Src. Po	ort:				4	Сору
KVM		Dst. Po	ort:					Remove
Make Supout.rif	•	Any, Po	ort:					Reset Counters
Manual	0 items	la Interfac						These Counters
Exit		III. III.CIId						Reset All Counters
		Out. Interfac	ce:					

Figure 3.16: Create NAT

**3<sup>rd</sup> Step:** IP  $\rightarrow$  Firewall  $\rightarrow$  NAT $\rightarrow$  action  $\rightarrow$ select **masquerade**  $\rightarrow$ Apply than Ok!

Interfaces			
Wireless			
Bridge			
PPP	Reval		
Mesh	Dhard NAT	March Carros Bate Conserver Addres (Star Law 7 Bateria)	
IP 1	Filler Rules 1071	Mangre Service Forts Connections Address Lists Layer/ Frotocols	1 Prov. 1
IPv6		00 Reset All Counters	Find all
MPLS 1	# Action	Chain Src. Address Dst. Address Proto Src. Port Dst. Port In. Inter C	)ut. Int Bytes Pac 🔻
Routing 1	New NAT	D.de/	
System 1	New WAT		
Queues	General	Advanced Extra Action Statistics	OK
Files	A	ction: masquerade	Cancel
Loa		accept add dst to address list	Apply
Radius		add src to address list	
Tools		jump	Disable
New Terminal		log masquerade	Comment
ISDN Channele		netmap	Сору
		redirect	Remove
NVIVI	17/2/1	return	TIGHIOVG
Make Supout.nf	•	sane src-nat	Reset Counters
Manual	Utems		Reset All Counters
Exit	¥2		

Figure 3.17: Create NAT

• User PC configure:

go to your PC  $\rightarrow$ Local Area Connection  $\rightarrow$ TCP/IPv4 Properties  $\rightarrow$  Use the following Ip Address =10.10.10.10, S Mask=255.255.255.0, gateway=10.10.10.1 and DNS Figure 3.18: Shows Adding IP Address for User Pc

Local Area Connection Network: 2 Intel(R) PRO/1000 MT Network C	General Netw Cor Cor Gor eral You can get IP setting this capability. Otherw for the appropriate IP O Obtain an IP add O Use the following	s assigned automatically if your network supports ise, you need to ask your network administrator settings. iress automatically JP address:
	This IP address: Subnet mask; Default gateway:	10       .       10       .       10         255       .       255       .       0         10       .       10       .       1
	Obtain DNS serve Alternate DNS serve	ar address automatically IDNS server addresses: er: 8 . 8 . 8 . 8 er: 8 . 8 . 4 . 4
	D Validate settings	supon exit Advanced

Figure 3.18: Shows Adding IP Address for User Pc

• Bridge Configuration : here step 1,2,and 3 show about create bridge and Figure 3.19, Figure 3.20 and Figure 3.21 show Bridge Configuration



**<u>Step 1</u>**: Bridge  $\rightarrow$ New Interface  $\rightarrow$ Name: Lan\_bridge  $\rightarrow$ Apply $\rightarrow$ Ok

Figure 3.19: Bridge Configuration

**<u>Step 2</u>**: Bridge  $\rightarrow$  Ports  $\rightarrow$  select all interface under of bridge  $\rightarrow$  Apply $\rightarrow$ Ok

Interfaces										
Wireless										
Bridge	Ridge		_							
PPP	Ridge Por	S Eitam	ΝΔΤ	Hoste						
Mesh				T					Find	
IPv6		e /	Bridg	je	Priority (h	Path Cost	Horizon	Role	Root Pat	•
MPLS		er I er 3	LAN	_bridge	80	10		designated port designated port		
Routing	1	New Bridge	Port							
System	P	General	Status	1			ſ	OK		
Queues										
Files		Inter	ace:	ether I				Cancel		
Log		Br	idge:	LAN_bridge			Ŧ	Apply		
Radius		Pri	ority:	80			hex	Disable		
Tools	1	Path (	Cost	10				Comment		
New Terminal		1 0111	obat.	i g				Common		

Figure 3.20: Configuration Bridge

# Step3:

 $IP \rightarrow Address \rightarrow Address List \rightarrow NewAddress \rightarrow Ip=10.10.10.1/24 \rightarrow Interface=Lan\_bridg e \rightarrow Apply \rightarrow Ok$ 

Interfaces								
Wireless								
Bridge								
PPP	_		Address	List			[	
Mesh			+ -	-	8 🖾	7	Find	
IP	1		A	ddress	∠ Netw	ork	Interface	-
IPv6	1			10.10.	10.1/24 10.1	0.10.0	LAN_bridge	
MPLS	1		0 1	F 152.10	0.101.1 132.	100.101.0	WAN_ether2	
Routing	4							- 1
System	1	New Addre	:55					
Queues		Address:	10.10.10.1/24		OK			- 1
Files		Network:	0.0.0.0		Cancel			- 1
Log		Interface:	LAN bridge	Ŧ	Apply			
Radius			LAN_bridge	1080 - U	7600			
Tools	1		ether1		Disable			- 1
New Termina	al		ether3		Comment			- 1
ISDN Chann	nels				Copy			
KVM					Remove			
Make Supou	ut.rif				TIGHIOVE			
Manual		enabled						

# 3.9 Bandwidth Management :

Here I'm Discuss about Dedicated and Shear bandwidth Control in Mikrotik

- Simple Queues ( Dedicated Bandwidth )
- PCQ
- Total Bandwidth Queues
- Priority Bandwidth
- Parent Queues Share Bandwidth.
- Simple Queues ( Dedicated Bandwidth ) :

Fast of all go to Queues  $\rightarrow$  Queues List  $\rightarrow$  (+)  $\rightarrow$  New simple Queue  $\rightarrow$ General  $\rightarrow$ 

[Given Name: Amanullah\_1Mb, Target IP Address: 10.10.10.10 And Select Max limit: Upload=1M, Download=1M]  $\rightarrow$  apply  $\rightarrow$ Ok Figure 3.22: Shows Dedicated Bandwidth Configuration

						-	_	
Queue List								
Simple Queues Inter	face Queues	Queue Tree	Queue	e Types				
+ - 🖌 🗙	<b>-</b> 7	00 Reset Co	unters	oo Re	iset All Counter	s		Find
# Name	4	Farget Address	/ Rx	Max Limit	Tx Max Limit	Pac	ket	
0 🖻 Amanuli	ah_1MB  1	10.10.10.10	1M	1	1M		1	
Simple Queue <an< td=""><td>nanullah_1MB</td><td>l&gt;</td><td></td><td></td><td></td><td></td><td></td><td></td></an<>	nanullah_1MB	l>						
General Advan	ced Statistic	s Traffic Tol	al To	tal Statistic	cs			ОК
Name:	Amanullah 1	MB	N/					Cancel
Tamat Address	10 10 10 10							Analy
Target Hadress.	10.10.10.10							Арріу
	✓ Target Up	pload		Target D	)ownload			Disable
Max Limit:	1M		₹ 1	М		₹	bits/s	Comment
- A- Burst				18 14		-11-55	123 - 17	Conv
Burst Limit:	unlimited		₹ u	nlimited		Ŧ	bits/s	
Burst Threshold:	unlimited		₹ u	nlimited		₹	bits/s	Hemove
1 it Burst Time:	0		0	6			s	Reset Counters
								Reset All Counters
	2ueue List       Simple Queues       Inter       Image: Transformer       Image: Target Address:       Max Limit:	Simple Queues     Interface Queues       #     Image: Comparison of the system       #     Image: Comparison of the system       Ø     Image: Comparison of the system       Simple Queue < Amanullah_IMB	Aueue List         Simple Queues       Interface Queues       Queue Tree         Image: Comparison of the state	Aucuse List         Simple Queues       Interface Queues       Queue Tree       Queue         Image: Simple Queues       Image: Simple Queue       Target Address       / Rx         Image: Simple Queue       Amanullah_1MB       Image: Simple Queue       / Target Address       / Rx         Image: Simple Queue       Advanced       Statistics       Traffic       Total       Total         Simple Queue       Advanced       Statistics       Traffic       Total       Total         General       Advanced       Statistics       Traffic       Total       Total       Total         Target Address:       10.10.10.10       Image: Variage Upload       Imagee       Imageee       Imageeee       Imageeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee	Aucuse List         Simple Queues       Interface Queues       Queue Tree       Queue Types         Image: Simple Queues       Image: Simple Queues       Image: Simple Queue       Target Address       Image: Rx Max Limit         Image: Simple Queue       Amanullah_1MB       Image: Simple Queue       Image: Rx Max Limit       Image: Rx Max Limit         Image: Simple Queue       Advanced       Statistics       Treffic       Total       Statistic         Simple Queue       Advanced       Statistics       Treffic       Total       Total       Statistic         Name:       Amanullah_1MB       Image: Statistics       Treffic       Total       Total       Statistic         Name:       Advanced       Statistics       Treffic       Total       Total       Statistic         Name:       Advanced       Statistics       Treffic       Total       Total       Statistic         Name:       Image: Upload       Image: Target Upload       Image: Target Direct       Target Image: Umlimited         Max Limit:       Image: Umlimited       Image: Umlimited       Image: Umlimited       Image: Umlimited         Burst Times       Image: Umlimited       Image: Umlimited       Image: Umlimited       Image: Umlimited         Image: Timae	Advanced       Statistics       Traffic Total       Total Statistics         Image: Advanced       Statistics       Traffic Total       Total Statistics         Name:       Amanullah_1MB       Image: Advanced       Target Download         Image: Advanced       Statistics       Image: Advanced       Image: Advanced         Image: Advanced       Statistics       Traffic Total       Total Statistics         Name:       Amanullah_1MB       Image: Advanced       Image: Advanced         Target Address:       10.10.10       Image: Advanced       Image: Advanced         Image: Advanced       Image: Advanced       Image: Advanced       Image: Advanced         Image: Advanced       Image: Advanced       Image: Advanced       Image: Advanced         Image: Advanced       Image: Advanced       Image: Advanced       Image: Adva	Auseue List         Simple Queues       Interface Queues       Queue Tree       Queue Types         Image: Simple Queues       Image: Simple Queues       Queue Types         Image: Simple Queues       Image: Simple Queue       Target Address       / Rx Max Limit       Tx Max Limit       Paceus         Image: Simple Queue       Amanullah_1MB       Image: Simple Queue       Advanced       Statistics       Treffic       Total       Statistics         General       Advanced       Statistics       Treffic       Total       Statistics       Name:         General       Advanced       Statistics       Treffic       Total       Statistics         Name:       Amanullah_1MB       Image: Upload       Image: Target Download       Image: Target Download         Target Upload       Image: Target Download       Image: Umilimited       Image: Umilimited       Image: Umilimited         Burst Limit:       Umilimited       Image: Umilimited       Image: Umilimited       Image: Umilimited       Image: Time         Image: Time       Image: Umilimited       Image: Umilimited       Image: Umilimited       Image: Time       Image: Time	Aucuse List         Simple Queues       Interface Queues       Queue Tree       Queue Types         Image: Simple Queues       Image: Simple Queues       Queue Types         Image: Simple Queues       Image: Simple Queue       Image: Simple Queue       Image: Simple Queue         Image: Simple Queue       Image: Simple Queue       Image: Simple Queue       Image: Simple Queue       Image: Simple Queue         Simple Queue       Amanullah_IMB       Image: Simple Queue       Image: Simple Queue       Image: Simple Queue         General       Advanced       Statistics       Traffic       Total       Total       Statistics         General       Advanced       Statistics       Traffic       Total       Total       Statistics         Mare:       Amanullah_IMB       Image:       Image: Queue       Image: Queue       Image: Queue         Target       Upload       Image: Target Download       Image: Queue       Image: Queue       Image: Queue         Image:       Image: Queue       Image: Queue       Image: Queue       Image: Queue       Image: Queue         Image:       Image: Queue       Im

Figure 3.22: Shows Dedicated Bandwidth Configuration

## • **PCQ**:

First go to Queues  $\rightarrow$  Queue Type  $\rightarrow$ New Queue type [ Typename= **1\_MB**, Kind= **pcq**, Rate= **1MB**, Select **Src** and **Dst** Address ]  $\rightarrow$ Apply  $\rightarrow$  Ok [Same Way to create 2MB, 3MB and 4MB etc. pcq ]. Figure 3.23: Shows PCQ Configuration.

Wireless						
Bridge		Queue List				
PPP		Simple Queues Interface Queues	Queue	Tree Queue Types		
Mesh			1	-		Ind
IP	P	Tune Name	Kind	New Queue Type		
IPv6	N	1 MB	DCG	Type Name:	4_MB	ОК
MPLS	L.	2_MB	pcq	Kind:	pcq F	Cancel
Bouting	P	3_MB	pcq			
Svetam	N	* default-small	pfifo	Rate:	4M	Apply
0		<ul> <li>ethemet-default</li> </ul>	pfifo	Limit:	50	Сору
Jueues		hotspot-default	stq	<b>T</b>	0000	
Files		* only-bardware-queue	mq priro	Total Limit:	2000	Hemove
Log		* synchronous-default	red	Durat Data:		
Radius		* wireless-default	sfq	buist nate.	·	
Tools	1			Burst Threshold:	•	
New Termin	al			Burst Time:	00:00:10	
ISDN Chanr	nels			- Classifier		3
10 MA				Src. Address	🛛 🗹 Dst. Address	
NV IVI		11 items		Src. Port	Dst. Port	

Figure 3.23: Shows PCQ Configuration

Simple Queue  $\rightarrow$  (+)  $\rightarrow$  New simple Queue  $\rightarrow$  General  $\rightarrow$ [Name: 1MB\_User, Target Address: 10.10.10.0/24 And given Max Limit: Up=200M Dow=200M go to Advanced Figure 3.24: Shows PCQ Configuration

Interfaces		Queue List									
Wireless		Simple Queues Interface Queues Queue Tree Queue Types									
Bridge		📥 👝 🖉 🖾 🕱 🖉 🕾 Reset Counters 📴 Reset All Counters									
PPP		Toward Ad De Man Link To Man Link De Inder									
Mesh											
IP	1										
IPv6	1	New Simple Queue									
MPLS	1	General Advanced Statistics Traffic Total Total Statistics									
Routing	1	Name: 1Mb Liser									
System	1	Tarret Address: 10.10.00/24									
Queues		Taget Address. [10:10:10:0/24									
Files		✓ Target Upload ✓ Target Download									
Log		Max Limit: 200M 🔻 200M 🔻 bits/									
Radius		- A- Burst									
Tools	1	Burst Limit: unlimited T bits/									
New Termina	al	Burst Threshold: unlimited									
ISDN Chann	nels	Burst Time: 0 s									
KVM		-•- Time									
Make Supou	.t.rif										

Figure 3.24: Shows PCQ Configuration

Advanced  $\rightarrow$  Queue Type : Up= Select **1\_M** and Dow= **1\_M**  $\rightarrow$  Apply  $\rightarrow$  Ok

Interfaces									
Wireless		Simple Queues	terface Queues	Queue Tree	Queu	e Types			
Bridge			0 🝙 🔽	· Reset (	ounters	DOD R	eset All Counters	1	Find
PPP				0- 110301 C					1 ma
Mesh		0 🔒 1Mb	User 10.10.10.0	Pox Max Lin	nit 1X I 200	iax Limit M	Раскет		
IP	$\uparrow$		-		. 0.57.55	199			
IPv6	Þ	Simple Queue <	1Mb_User>						
MPLS	1	General Adva	anced Statistics	Traffic To	tal To	al Statisti	ics		ОК
Routing	1	P2P:			1	МВ		-	Cancel
System	1	Paalest Madea:			2	MB			Anal
Queues		I BOKGLIVIDIKS.			4	MB			Abbiy
Files		Dst. Address:			de	fault-sma	JI.		Disable
Log		Interface:	all		et	hemet-de itspot-def	fault ault	E	Comment
Radius			Target Upload		.m	ulti-queue	-ethemet-default		Conv
Tools	1	Limit At:	unlimited		<b>∓</b> \$)	nchronou	is-default	/s	Breese
New Termina	el		1 MD			mp	fault	Ē	Hemove
ISDN Channe	els	Guede Type.	LT-MD			MD			Reset Counters
KVM		Parent:	Parent: none 🔹					Ŧ	Reset All Counters
Ma <mark>ke S</mark> upou	t.rif	Priority:						Torch	
Manual			59 19						, oren

Figure 3.25: Shows PCQ Configuration

## • Total Bandwidth Queues :

**Queue**  $\rightarrow$  Simple Queue  $\rightarrow$  (+)  $\rightarrow$  General  $\rightarrow$  [Name: Total\_Bandwidth, Target Address: 0.0.0.0/0, Max Limit: Up= 500M, Dow= 500M ]  $\rightarrow$  Apply  $\rightarrow$ Ok Figure 3.26: Shows Total Bandwidth Queue Configuration

Interfaces	Queue List						
Wireless	Simple Queues	nterface Queue:	s Queue Tree	Queue Types	3		
Bridge		0 @ 🔽	C Reset C		Reset All Cour	iters	Find
PPP							[7 ma
Mesh	0 11Mb	User	10.10.10.0/24	200M	200M	Раскет	
IP P	1 🔒 Ama	nullah_1MB	10.10.10.10	1M	1M		
IPv6 ⊨	2 🚊 Tota	I_Bandwidth	0.0.0.0/0	500M	500M		
MPLS N	Simple Queue <1	Fotal_Bandwidth					
Routing P	General Adva	nced Statistics	s Traffic Tota	Total Statis	tics		ОК
System 🗅	Name	Total Bandwi	idth			1	Cancel
Queues	Tarrat Address	0000/0					
Files	Target Address	. [0.0.0.0/0				•	Арріу
Log		✓ Target Up	load	✓ Target	Download		Disable
Radius	Max Limit	: 500M	1	500M		▼ bits/s	Comment
Tools 1	- A- Burst	12					Canu
New Terminal	Burst Limit	: unlimited		unlimited		▼ bits/s	Сору
ISDN Channels	Burst Threshold	: unlimited	3	unlimited		▼ bits/s	Remove
KVM	Burst Time	: 0		0		s	Reset Counters
Make Supout.rif		18 <sup>0</sup>		1072			Reset All Counters
Manual							Torch

Figure 3.26: Shows Total Bandwidth Queue Configuration

#### • Priority Bandwidth :

**Queue**  $\rightarrow$  Simple Queue  $\rightarrow$  (+)  $\rightarrow$  General  $\rightarrow$  [Name: **CHR**, Target Address: **10.10.10.50**, Max Limit: Up= **10M**, Dow= **10M** ]  $\rightarrow$  And go to Advanced . Figure 3.27 and 3.28: Shows Priority Bandwidth Queue Configuration

Interfaces			Lat.									
Wireless		Simple Q		terface Queue	s Queue Tree	Queue Type	s					
Bridge					C Reset C		Beset All Cour	iters	Find			
PPP					T		T 11 12 1		1.014			
Mesh		#	Name 1Mb	User	10 10 10 0/24	200M	200M	Packet				
IP	$\uparrow$	1	🚊 Aman	ullah_1MB	10.10.10.10	1M	1M					
IPv6	1	2	Total_	Bandwidth	0.0.0.0/0	500M	500M					
MPLS	$\uparrow$	New Si	imple Queu	ie								
Routing	$\[ \]$	Gener	al Advan	iced Statistic	s Traffic Tota	al Total Statis	stics		ОК			
System	$\uparrow$		Cancel									
Queues		Terre	Addamas.	10 10 10 50								
Files		Targe	A Address.	10.10.10.00				•	Apply			
Log				✓ Target Up	load	✓ Targe	t Download		Disable			
Radius			Max Limit:	10M		■ 10M		▼ bits/s	Comment			
Tools	$\uparrow$	- <b>A</b> - [	Burst						Com			
New Terminal		- 1	Burst Limit:	unlimited		■ unlimited		▼ bits/s	Copy			
ISDN Channels		Burst	Threshold:	unlimited		• unlimited		➡ bits/s	Remove			
KVM		E	Burst Time:	0		0		s	Reset Counters			
Make Supout.r	f		Time						Reset All Counters			
Manual									Torch			

Figure 3.27: Shows Priority Bandwidth Queue Configuration Advanced  $\rightarrow$  Priority = 1  $\rightarrow$  Apply  $\rightarrow$  Ok

Interfaces							
Wireless	Simple Queues	Interface Queu	es Queue Tree	Queue Types			
Bridge		0 6 5	▼		Reset All Cours	tere	Find
PPP			Tieser Cr		Theset Air Court	ILCIS	Linia
Aesh		) User	10 10 10 0/24	Place Max Limit	200M	Packet	
4 S	1 🚨 Ama	anullah_1MB	10.10.10.10	1M	1M		
Pv6 ►	2 🔒 Tota	al_Bandwidth	0.0.0.0/0	500M	500M		
APLS N	Simple Queue <	CHR>	10,10,10,00	1914	TUN		
Routing N	General Adv	anced Statisti	cs Traffic Tota	Total Statis	tics		OK
lystem ►						ii	
lueues	P2P:						Cancel
iles	Packet Marks:					<b></b>	Apply
og	Dst. Address:					•	Disable
ladius	Interface:	all				Ŧ	Comment
iools N		Tarrat Uplear	4	Tarnet Dow	ioload		Com
lew Teminal	1 1	Fullesterd		lunkated	anodu	<b>T</b> has /s	Сору
SDN Channels		Uniimited			- 1/2	➡ Dits/s	Remove
CVM	Queue Type:	default-small		default-sm	all	Ŧ	Reset Counters
lake Supout.rif	Parent:	none				₹	Reset All Counters
lanual	Priority:	1					Tarch

Figure 3.28: Shows Priority Bandwidth Queue Configuration

#### • Parent Queues Share Bandwidth

**Queue**  $\rightarrow$  Simple Queue  $\rightarrow$  (+)  $\rightarrow$  General  $\rightarrow$  [Name: **1MBShareUser**, Target Address: **10.10.0/24**, Max Limit: Up= **1M**, Dow= **1M** ]  $\rightarrow$  Apply  $\rightarrow$  Ok

Same Way to Create **1MBShareUser-1** IP=10.10.10.23, **1MBShareUser-2** IP=10.10.10.25 **1MBShareUser-3** IP=10.10.10.28 Figure 3.29, 30 and 31: Shows Parent Queues Share Bandwidth Configuration

Interfaces	Queue List	
Vir <mark>e</mark> less	Simple Queues Interface Queues Queue Tree Queue Types	
Bridge	- Reset Counters 00 Reset All Counters	Find
PP	The Address Do Martine To Martine Date	1110
<mark>⁄les</mark> h	H Name Target Address PX Wax Limit TX Wax Limit Packet	
۲ ۹	New Simple Queue	
Pv6 ↑	General Advanced Statistics Traffic Total Total Statistics	ОК
IPLS M	Newsy 1MP Chara Llag	Canaal
louting M		Cancel
iystem 🗅	Target Address: 10.10.10.0/24 ♀	Apply
lueues	✓ Target Upload ✓ Target Download	Disable
iles	Max Limit: 1M ∓ 📶 🖡 bits/s	Comment
og	-A- Burst	
ladius	Burst Limit: unlimited 🐺 unlimited 🐺 bits/s	Сору
iools N	Burst Threshold: unlimited 🔻 unlimited 🖛 bits/s	Remove
lew Terminal	0 Burst Time: 0 0 s	Reset Counters
SDN Channels		Reset All Counters
.VM		Tanak
ake Supout.rif		Torch
lanual		

Figure 3.29: Shows Parent Queues Share Bandwidth Configuration

Click On **1MBShareUser** and go to  $\rightarrow$  Advanced  $\rightarrow$  Selecet [ Parent : **1MBShareUser-1** ]  $\rightarrow$  Apply  $\rightarrow$  Ok

Interfaces	_	Que	ue List										
Wireless		Sim	ple Queues	Interface	Queues	Queue 1	īree Qu	ieue Types					
Bridge	_							an De		ă.		[ max	20
PPP				*	J	UU Hes	et Count	ers UU He	set All Counters			Pina	
Mesh		#	Name	0.0	1	Target Ad	dress	Rx Max Limit	Tx Max Limit	Packe	t		_
IP	N	0		1MB Sha	user_1	10 10 10 0	/24	1M	1M				
IDuc	N	2	🚊 1M	B Share	User_2	10.10.10.2	25	1M	1M Smooth				
100		3	🚊 1M	B Share I	User_3	10.10.10.2	28	1M	1M				
MPLS	E .		CHAR OF		Name I In								~
Routing	1		Simple Queu	e < IMB S	hare Us	er_1>	1	(	Drag the	curso	raroo	nd the area you	~
System	1		General A	dvanced	Statist	ics Traffic	Total	Total Statisti	cs Want to ca			OK	
Queues			P	2P:					0		•	Cancel	7
Files			Packet Mar									Analy	٦
Log			I BOKOL MAI	No.							-	VPPIY	_
Radius			Dst. Addre	SS:							•	Disable	
Tools	1		Interfa	ce: all							Ŧ	Comment	٦
New Termin	al	4.7		Taros	et Uoload	ł		Target Dowr	load			Conv	۲
ISDN Chanr	nels	4 18	Limit	At: unlim	nited		Ŧ	unlimited		ŦĿ	oits/s	Perrova	۲
KVM			Ourse To		di amali		-	defends enne	1			TIGHTUVE	_
Make Supor	ut.rf		offene TX	pe. lueia	ultesmail			uerault-sina				Reset Counters	
Manual			Pare	ent: none							Ŧ	Reset All Counters	5
Fxit			Prior	1MB	Share L	lser					(A		-
			110	1MB 1MB	Share L Share L	lser_2 lser_3						Iorch	

Figure 3.30: Shows Parent Queues Share Bandwidth Configuration

Same way to Select 1MBShareUser-2 And 1MBShareUser-3

Vvireless		Queue Li	st					1
Bridge		Simple G	ueues Interface Queues	Queue Tree (	Queue Types			
PPP				De Deve Cer		and All Country	. 1	Find
Mesh				- Neser Cou		set All Counten	s	Lenia
P	N	#	Name /	Target Address	Rx Max Limit	Tx Max Limit	Packet	
nuc.	N	2	INE Share User_3	10.10.10.25	1M	1M		
rvo		1	1MB Share	10.10.10.23	1M	1M		
MPLS	P	0	🚊 1MB Sh	10.10.10.0/24	1M	1M		
Routing	N. 1							
System	N.							
System Queues	1							
öystem Queues illes	1							
Gystem Queues Files Log	1							
System Queues Files Log Radius	1							
System Queues Files Log Radius Fools	1							
System Queues Files Log Radius Tools New Termin	1 1							
System Queues Files Log Radius Fools Vew Termin SDN Chanr	P P Ial	Alam			10			

Figure 3.31: Shows Parent Queues Share Bandwidth Configuration

# **3.10 Centos Installation**

# • Linux Set up in VMware

We virtualized our project by using VMware which is able to run multiple virtual machines. To set up new virtual machine first we have been installed the VMware. Figure 3.32, 3.33, 3.34, 3.35 and 3.36 : Shows about Create a new Virtual machine.

- Go to Create a new Virtual machine and select Typical than click next
- Select Typical than click next



Figure 3.32: Shows Create a new Virtual machine

• Figure : Select  $\rightarrow$  I will install OS later and Click Next

A virtual machine is like a physical computer; it system. How will you install the guest operation	needs an ope g system?	erating
install from:		
<ul> <li>Installer disc:</li> </ul>		
No drives available		
Installer disc image file (jso):     F:\Software\New folder\Linux need Software\c	entos-( 🛩	Browse
I will install the operating system later.		
The statistic providence of the second state of the state of the	hard disk.	

Figure 3.33: Shows Create a new Virtual machine

• Select OS Linux and Version-centos 64 bit

Select a Guest Operati	ing System
Which operating syst	em will be installed on this virtual machine?
Guest operating system	
C Microsoft Windows	
Linux	
Novell NetWare	
🗇 Solaris	
VMware ESX	
O Other	
Version	
CentOS 64-bit	

Figure 3.34: Shows Create a new Virtual machine

• Select Virtual machine as a single file

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine. Maximum disk size (GB): 200.0 200.0 200.0 200.0 Recommended size for CentOS 64-bit: 20 GB Store virtual disk as a single file Split virtual disk into multiple files	The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine. Maximum disk size (GB): 200.0 200.0 200.0 Recommended size for CentOS 64-bit: 20 GB Store virtual disk as a single file Split virtual disk into multiple files Split virtual disk into multiple files	Specify Disk Capacity How large do you want th	nis disk to be?
Maximum disk size (GB):     200.0       Recommended size for CentOS 64-bit:     20 GB       Store virtual disk as a single file     Split virtual disk into multiple files	Maximum disk size (GB):     200.0       Recommended size for CentOS 64-bit:     20 GB       Image: Store virtual disk as a single file     Split virtual disk into multiple files       Splitting the disk makes it easier to move the virtual machine to another compute but may be dusk or anothe	he virtual machine's hard disk omputer's physical disk. These dd applications, files, and data	is stored as one or more files on the host : file(s) start small and become larger as you a to your virtual machine.
Recommended size for CentOS 64-bit: 20 GB     Store virtual disk as a single file     Split virtual disk into multiple files	Recommended size for CentOS 64-bit: 20 GB     Store virtual disk as a single file     Split virtual disk into multiple files     Splitting the disk makes it easier to move the virtual machine to another     concertue but may used use preferences with varue large disks	1aximum disk size (GB):	200.0
Store virtual disk as a single file Split virtual disk into multiple files	Store virtual disk as a single file Split virtual disk into multiple files Splitting the disk makes it easier to move the virtual machine to another compute but may be disk.	ecommended size for CentOS	64-bit: 20 GB
	Splitting the disk makes it easier to move the virtual machine to another	Store virtual disk as a single Split virtual disk into multiple	file files
Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks	THE REPORT OF A DECIMARY AND A	Splitting the disk makes it ea	asier to move the virtual machine to another verformance with very large disks

Figure 3.35: Shows Create a new Virtual machine

• Select CD/DVD and Browse The ISO File

Power on this virtu Edit virtual machine	ual machine ne settings	Hardware Options		
Power on this virt. GDEdit virtual machine Devices Processor Processor Processor Devices Processor Devices Processor Devices Processor Devices Processor Devices Processor Devices Devices Processor Devices Processor Devices Devi	Lal machine es settings 1 GB 1 200 GB Auto detect Custom (VMnet0) Present Auto detect Present Auto detect escription of this	Hardware Options	Summary IGE IGE I Coston (West) Present Auto detect Auto detect Auto detect Auto detect Auto detect	Device status Connected Connect at power on Connection Use physical drive: Auto detect Use 20 mage file: Use 20 mage file: This Serbiare Herr Folder Linux nee: Thronse Advanced
			😵 Add ) Remove	OK Cancel Heb

Figure 3.36: Shows Create a new Virtual machine

- Power on The Virtual Machine
- Select Install and Press the Enter key. Figure-

3.37,3.38,3.39,3.40,3.41,3.42, 3.44, 3.45,3.46 : show about Centos-6

Installation



Figure 3.37: Centos-6 Installation

• Select the Skip key



Figure 3.38: Centos-6 Installation

• Select basic storage device & Click Next



Figure 3.39: Centos-6 Installation

• Click **Discard any Data** than Click Next



Figure 3.40: Centos-6 Installation

• Ensure Root Password and Click next

onfirm: •••••••j	oot <u>P</u> assword:	•••••					
	nfirm:	1					
					(	- 1	

Figure 3.41: Centos-6 Installation

• Select Custom layout and Click next



Figure 3.42: Centos-6 Installation

# **3.11 Linux Partition**

#### **Create 3 Partitions:**

1→Root (/)

 $2 \rightarrow /boot$ 

3→swap

- First of all select total free space →Create →select standard partition
   → Create→ Mount point: (/Boot) | Size: 500 →Ok
- Select Free space → Create → Select physical volume → Create → Select fill to maximum allowable size → Ok
- Create  $\rightarrow$  LVM Volume Group  $\rightarrow$  Create  $\rightarrow$  Set VG name  $\rightarrow$  Ok
- Select Free space → Create →Select LVM Logical Volume→ Create→ File system Type : Swap | Size :2048 → OK
- Select Free space → Create →select LVM Logical Volume→ Create→ Mount point : (/) | size: (100000) →Ok
- Select Free space → Create → Select LVM Logical Volume→ Create→ Mount point : ( /home ) | Size: ( Select total size) →Ok

Create Partition and then click next. Figure 3.43: Create Centos 6 Partition.

Device	Size (MB)	Mount Point/ RAID/Volume	Туре	Format	
· LVM Volume Groups					
✓ VolGroup-DoLL	204296				
LogVol01	100000	1	ext4	$\checkmark$	
LogVol00	2048		swap	$\checkmark$	
LogVol02	102248	/home	ext4	$\checkmark$	
Hard Drives					
∽ sda (/dev/sda)					
sda1	500	/boot	ext4	$\checkmark$	
sda2	204299	VolGroup-DoLL	physical volume (LVM)	$\checkmark$	
				k	

Figure 3.43: Create Centos 6 Partition

• Select Desktop



Figure 3.44: Centos-6 Installation

• Than Select Reboot and Click Next



Figure 3.45: Centos-6 Installation

• Type Your Root Password and click Login

	CentOS release 6.4 (Final)
Other.	
Passw	vord:
	<u>C</u> ancel Log In

Figure 3.46: Centos-6 Installation

# 3.12 Centos-6 Run Level :

Run-level 0 [ Shut Down ], Run-level 3 [ Full Multi User Mode], Run-level 1 [ Single User Mode ],

Run-level 4 [ Unused ], Run-level 2 [ Multi User Mode ], Run-level 6 [ Reboot ]

# 3.13 Move And copy:

copy a File:

[ cp –r / daffodil / root / desktop ]

Move a File:

[ mv /root / desktop / Amanullah ]

# 3.14 Remove, Install & update Packages Using YUM;

Install package:

[yum install vim –y ]

Remove Packges:

Uninstall a package using yum

[yum remove samba-y ]

Update Packges:

Update a package using yum [yum update Firefox]

# **3.15 Server Configuration:** Working Details:

- > FTP Server.
- ➢ Web Server.
- Samba Server.
- > Mail Server.
- > Nagios Server.

#### • Add, Change and Delete and IP Address In Centos 6 operating system:

To configure the main IP address as static, you must change the entry for eth0 in /etc/sysconfig/network-scripts/ifcfg-eth0. To carry out this change, enter the following:-

# vi /etc/sysconfig/network-scripts/ifcfg-eth0 [For Minimal Mode commad]
# vim /etc/sysconfig/network-scripts/ifcfg-eth0 [For Desktop Mode commad]
DEVICE=eth0
BOOTPROTO=static
ONBOOT=yes
BROADCAST=
IPADDR= 192.168.50.16
NETMASK=255.255.255.0
GETEWAY= 192.168.50.1
DNS1=8.8.88
DNS2=8.8.4.4
After complete this change than Save it and type CD to Exit

# 3.16 FTP Server

## • Server Needed

- New Operating System
- ➢ IP Configuration
- Host Name Sate
- SELinux Configuration
- **FTP**:

FTP is a File Transfer Protocol. Ftp is the standard network protocol used for transfer files between a server on a computer network and client.

#### • Server Configuration:

[**Step 1**] First of all Install the package (vsftpd) by using this command (#yum install vdftpd –y). Figure 3.47: Shows Install a package using yum install



Figure 3.47: Shows Install a package using yum install

[Step 2] Now Edit the Configuration file by using this command ( #vim /etc/vsftpd/vsftpd.conf ). Figure 3.48: Shows Edit the Configuration file command



Figure 3.48: Shows Edit the Configuration file command

[**Step 3**] Go the line 12 no Line and change the line anonymous Enable = [Yes to No]. Figure 3.49: Shows FTP Configuration Process



Figure 3.49: Shows FTP Configuration Process

**[Step 4]** Go to line no 85 and 97 active the line by deleting [ # ]. Figure 3.50: Shows FTP Configuration Process



Figure 3.50: Shows FTP Configuration Process

[Step 5] Now Edit the Configuration file by using this command [ #vim /etc/sysconfig/iptables ]. Figure 3.51: Shows FTP Configuration Process



Figure 3.51: Shows FTP Configuration Process

[Step 6] Now the Configuration and write those things. Figure 3.52: Shows FTP Configuration Process.

<u>File Edit View Search Terminal H</u> elp		
<pre># Firewall configuration written by system-config-firewall # Manual customization of this file is not recommended. filter :INPUT ACCEPT [0:0] :OUTPUT ACCEPT [0:0] :OUTPUT ACCEPT [0:0] A INPUT -m statestate ESTABLISHED,RELATED -j ACCEPT -A INPUT -i lo -j ACCEPT -A INPUT -i lo -j ACCEPT -A INPUT -m statestate NEW -m tcp -p tcpdport 21 -j ACCE A INPUT m statestate NEW -m tcp p tcp -dport 22 -j ACCE A INPUT m state state NEW m tcp p tcp dport 80 j ACCE -A INPUT -j REJECTreject-with icmp-host-prohibited -A FORWARD -j REJECTreject-with icmp-host-prohibited COMMIT</pre>	PT PT PT	
INSERT	12,65	All 🚽

Figure 3.52: Shows FTP Configuration Process

[Step 7] Now I have to write [ #adduser ] for FTP user and [ #password ] for password

#### #User name Amanullah

#### #Password \*\*\*\*\*\*\*\*

[Step 8] Now I have to open browser and given ftp://192.168.50.16

# 3.17 Web Server:

- Configuring :
- Package Name: [ httpd ]
- Default http port: [ 80 ]
- Default https Port: [ 443 ]

[Step 1] firstly install a httpd package by yum install [ #yum install httpd -y ]

[Step 2] Now command [ #service httpd start ] Then [ #chkconfig httpd on ]

[Step 3] Now default location command is [ #cd /var/www/html ] then creating a Static Site command [ #vim index.html ]

[Step 4] Now use file location this command [ #cd /etc/httpd/conf ]

Then vim configures file location and this command [ #vim httpd.conf.]

[Step 5] At last open browser and write http:// 192.168.50.16 and show my web page.

# 3.18 Challenges:

There are many different types of challenges have to be faces during my Internship. And I am correcting all the problems.

- I have to be so careful during execution- because the commands are very case sensitive.
- Router Configuration Problem during working MikroTik router
- Password management challenges faces during working Linux server.
- Winbox Connection Problem during working MikroTik router
- Router Configuration Problem during working MikroTik router
- Find Network system problem and fix them.
- Find Network Software problem and solve it.
- During the installation of the server, various challenge I faced.

# CHAPTER- 4

# **Smart Plan and Competencies**

# **4.1 Competencies Earned:**

- Concept of IP Addressing.
- Develop solutions for technical issue, networking & security problems.
- understanding About cisco switch configuration
- Understanding VLAN, TELNET, SSH in Cisco switch and Rou
- Install MikriTik OS.
- Know About Static routing configuration
- Know About Dynamic routing configuration
- Bandwidth management
- Maintenance MikroTik router
- Install, configure, and troubleshoot client network operating systems.
- Install Linux based OS in server and system.
- Expert in command line based system in Linux.
- Clear concept about file system structure of Linux operating system.
- Configuration of various servers like Web Server, FTP Server and Mail Server.
- Configuration HTTPD access, NFS access, and Telnet access.
- Acquiring about computer network software, components of a network.
- Configuring IP Address in CentOS.

# 4.2 Smart Plan:

For gain the success every company should have a smart plan. Generally some common things and personal creativity of combination create a smart plan.

# 4.3 Reflections:

Daffodil Online Limited confers Work Life Balance. DOL confer me scale between personal life& work. It's having knowledge of balance will improve job conception.

My work environment is transparent and open form of communication. Employees of DOL are always keeping desired communication between them. Office work becomes significant because the employee knows what they really avail sense gives for DOL. Daffodil Online Limited confer me transparent & open communication between employee and me.

Daffodil Online Limited confer me training & development expertness when change is more protrusive ever before, it's necessary for organizations keep along with changes and train employees. Team work is most important for organizations. Its help find out a problem discuss together. This is a work of identity and everybody working for them. Everybody working by to achieve a bigger goal and works as a team work. I am learning strong team spirit from Daffodil Online Limited (DOL).

#### **CHAPTER-5**

#### **Future Career and Conclusion**

#### **5.1 Conclusion and Discussion:**

MikroTik OS is designed as a network Router. MikroTik Router operating system is the operating system of MikroTik Router boardhardware. The computer includes lot of variety of features for IP & wireless networks. These functions include Firewall, Nat, Routing, Hotspot, Bandwidth Limiter, DNS server, P to P Tunneling Protocol, Hotspot, DHCP server, and many other features. As a student of CSE, I have completed my internship report in DOL "on Network and System Administration with MikroTik and Linux platform". The report is a requirement of the internship program for my Bachelor of Science course degree. The report discussed about the purpose of the specific server using on ISP. And Linux is a open source and free operating system.Linux is an operating system Just like WIN-7, WIN-10, WIN-8, WIN-XP and Mac OS. There are different type versions of Linux. Such as- Ubuntu, Centos, Fedora etc.

# **5.2 Scope for Further Career:**

My future scope is very exception. A successful internship can help my future scope and turn on an experience into a career opportunity. My future scope is desire.

- Work on a network administrator.
- Linux administrator.
- Network engineer.
- Industrial engineer.
- Systems engineer
- Systems Administrator
- Build release management Engineer
- Linux Engineer
- Java Developer
- Linux Engineering Admin
- TechOps Engineer

# **References:**

[1]Get idea about DOL <u>https://www.daffodilnet.com/</u> (Used in 1.4 Introduction to the Company and 2.1 About the Company)

[2]Learn about mikrotik <u>https://mikrotik.com/aboutus</u> (Used in 3.7 Mikrotik router)

[3]Learn about web serser <u>https://whatis.techtarget.com</u> (Used in 3.17 Web Server)

[4]Learn about ftp serser <u>https://www.ostechnix.com/setup-ftp-server-step-by-step-in-centos-6-x-rhel-6-x-scientific-linux-6-x/</u> (Used in 3.16 Ftp server)

[5]Learn mikrotik <u>https://mikrotik.com/</u> (Used in 3.7 mikrotik router)

# **Appendix A:**

#### **Internship Reflection:**

The primary goal of my internship in a professional setting, practical solutions to real-world problems is to apply the knowledge gained in the classroom. And professionally relevant competencies and relationships in a professional setting, learning to deal with new knowledge, skills, and the ability to determine how to sharpen and develop plans. Add to network with other professional's supervisors and professional relationships. To fulfill the duties of my internship, I'm exercising proper business etiquette. I am an organization's mission vision is implemented, how to contact colleagues, how power is shared, how it is structured, how decisions are made, how to understand the culture of a professional organization, and what degree of accountability and feedback to the organization. With an assessment at the end of my internship supervisor and internship experience running through individual meetings provides an opportunity to take a professional opinion. Internship experiences to prepare for life in a global society, leadership and service, my gift to be able to put it to use.

# **Appendix B: Company Detail:**



Name	Head Office Daffodil Online Limited
Address	102, Shukrabad (3rd floor), Mirpur Road, Dhanmondi, Dhaka - 1207, Bangladesh
Telephone	02-9143258-60
Fax	880-2-8116103
E-mail	info@daffodilnet.com
Website	www.daffodilnet.com
Type of Organization	NationwideInternet Service Provider (ISP)

# Appendix C: VLAN Configuration On switch-1 And Switch-2:

• VLAN Configuration on Switch-1:

Switch> Switch>en Switch>enable Switch#conf t Switch(config)#vl Switch(config)#vlan 10 Switch(config-vlan)#name Student Switch(config-vlan)#exit Switch(config)# Switch(config)# Switch(config)#vl Switch(config)#vl Switch(config)#vlan 20 Switch(config-vlan)#name Teacher Switch(config-vlan)#name Teacher

• After adding Vlan Name Than Assign interface name in VLAN 10 and Vlan 20

Switch(config)# Switch(config)# Switch(config)#int r f 0/1-2 Switch(config-if-range)# Switch(config-if-range)# Switch(config-if-range)#sw m a Switch(config-if-range)# Switch(config-if-range)#sw a vlan 10 Switch(config-if-range)#exit Switch(config)# Switch(config)#int r f 0/3-4 Switch(config-if-range)# Switch(config-if-range)#sw m a Switch(config-if-range)# Switch(config-if-range)#sw a vlan 20 Switch(config-if-range)#exit Switch(config)# Switch#

#### • VLAN Configuration on Switch-2: After Configuration Vlan 10 Than Same

Way to configuration on VLAN 20

(config)# (config)#vlan10 (config-vlan)# (config-vlan)#nameStudent (config-vlan)# (config-vlan)#exit (config)#vlan20 (config-vlan)# (config-vlan)#nameTeacher (config-vlan)# (config-vlan)#exit (config)#int r f 0/1-2 (config-if-range)#sw m a (config-if-range)#sw a vl 10 (config-if-range)#exit (config)#int r f 0/3-4 (config-if-range)#sw m a (config-if-range)#sw a vl 20 (config-if-range)#exit (config)#