CISCO SYSTEMS

CCNA LAB MANUAL
VERSION 7.0
A PRODUCT
OF

CTTC

PREPARED
BY

FURQAN YASEEN

I would like to thank the Technical Director Mr. Farrukh Nizami, & Traning Consultant Mr. Ahmed Saeed for their guidance. This Lab Manual is the product of the hard work of a team.

The new Cisco **CCNA** curriculum validates the ability to install, configure, operate, and troubleshoot medium-size routed and switched networks, including implementation and verification of connections to remote sites in a WAN. The new curriculum also includes basic mitigation of security threats, introduction to wireless network concepts and terminology, and the addition of more compelling lab exercises.

The recommended **CCNA** training includes the Interconnecting Cisco Network Devices (ICND) Part 1 and ICND Part 2 courses. ICND Part 1 is also the recommended training for CCENT (link to go/ccent) certification.

For more information about the new **CCNA** curriculum, visit:
www.cisco.com/go/**ccna**
www.cttc.net.pk/cisco/ccna

CTTC CCNA program offers students an opportunity to pursue IT curricula through training and hands-on lab exercises.

Name
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Basic Fundamentals of LAN
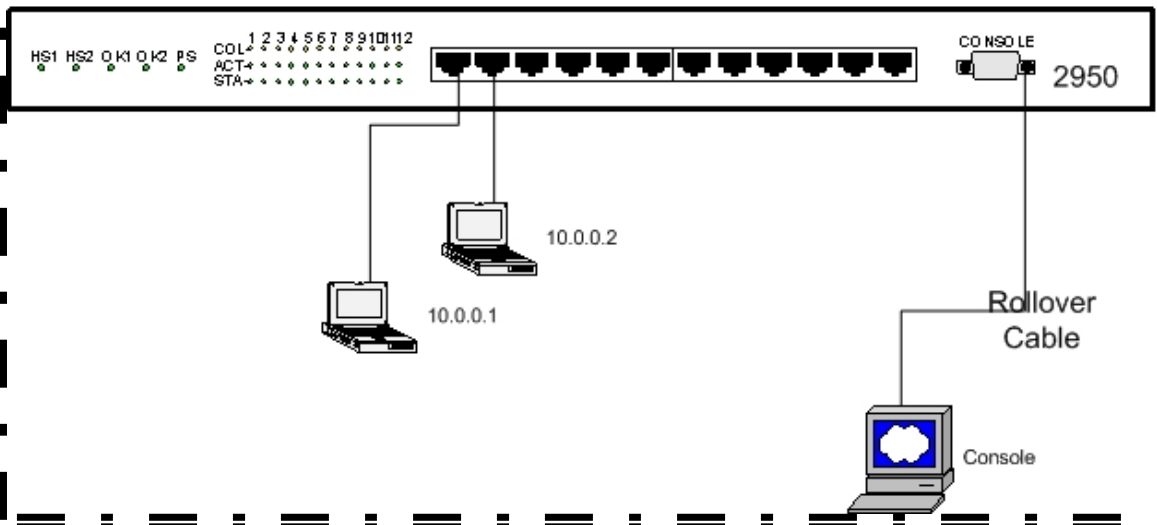
Instruction's Before LAB

- ➢ Before Configuration on Switch the Connectivity is established between PC 10.0.0.1 & PC 10.0.0.2.
- ➢ A terminal is connected to console port.
- ➢ Erase the entire configuration.
- ➢ Putty Software is used to manage the SSH Session.

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```
Switch>enable
Switch#  configure terminal
```

How to Set Hostname and Configure Console Password

```
Switch(config)#  hostname CISCO
CISCO(config)# line console 0
CISCO(config-line)# password cisco123
CISCO(config-line)# login
```

How to Set Privilege level password

!!! Clear Text Password not encrypted(less priority)
```
CISCO(config)# enable password furqan
```

!!! Encrypted password (more Priority)
```
CISCO(config)# enable secret furqanyaseen
```

Verify the Password

```
CISCO(config)# exit
CISCO# exit
```

CISCO con0 is now available

Press RETURN to get started.

User Access Verification
!!! TYPE HERE LINE CONSOLE Password
Password:

```
CISCO>enable
```
!!! TYPE HERE Privilege Level Password
Password:

Lab1

How to Set User Authentication in Switch

CISCO# **conf t**
CISCO(config)# **line console 0**
CISCO(config-line)# login local
CISCO(config-line)# **exit**
CISCO(config)#username furqan password cisco

Verify the Authentication

CISCO(config)# **exit**
CISCO# exit
User Access Verification

Username: **furqan**
Password:
CISCO> **enable**
Password:

Verify the User Status
!!!The * Shows user is active and Connected to Console Port
CISCO# **sh users**
  Line   User   Host(s)   Idle Location
* 0 con 0   furqan   idle   00:00:00

How to Set Telnet password

CISCO(config)# **line vty 0 15**
CISCO(config-line)# **password cisco**
CISCO(config-line)# **login**
CISCO(config-line)# **exit**
!!! Encrypted Telnet password
CISCO(config)# **service password-encryption**

How to Set Banner
CISCO(config)# **banner login # 10 YEARS OF CTTC #**

Verify the Banner
CISCO(config)# **exit**
CISCO# **exit**

10 YEARS OF CTTC
User Access Verification

Username: furqan
Password:
CISCO>**enable**
Password:
CISCO#

Configure SSH

!!! create a local user name
CISCO(config)# **username furqan password cisco**

!!! Assign a domain name
CISCO(config)# **ip domain-name cisco.com**

!!! This Command takes few a min to generate key
CISCO(config)# **crypto key generate rsa**

CISCO(config)# **line vty 0 15**
CISCO(config-line)# **password cisco**
CISCO(config-line)# **login local**

!!! Configure vty ports for using SSH
CISCO(config-line)# **transport input telnet ssh**

Verify Command's

CISCO# **show crypto key mypubkey rsa**

Switch Static IP address Configuration

!!! To Manage Telnet, SSH Session on a Switch we need IP address

!!! Enter Vlan1 Configuration Mode
CISCO(config)# **interface vlan1**
CISCO(config-if)# **ip address 10.0.0.10 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **exit**
CISCO(config)# **ip default-gateway 10.0.0.100**

Verify Command's

CISCO# **show running-config**
CISCO# **show ip interface vlan 1**
CISCO# **show ip interface brief**

Lab1
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Verify the SSH Session
!!! Enter the ip address of Switch and Select SSH Protocols
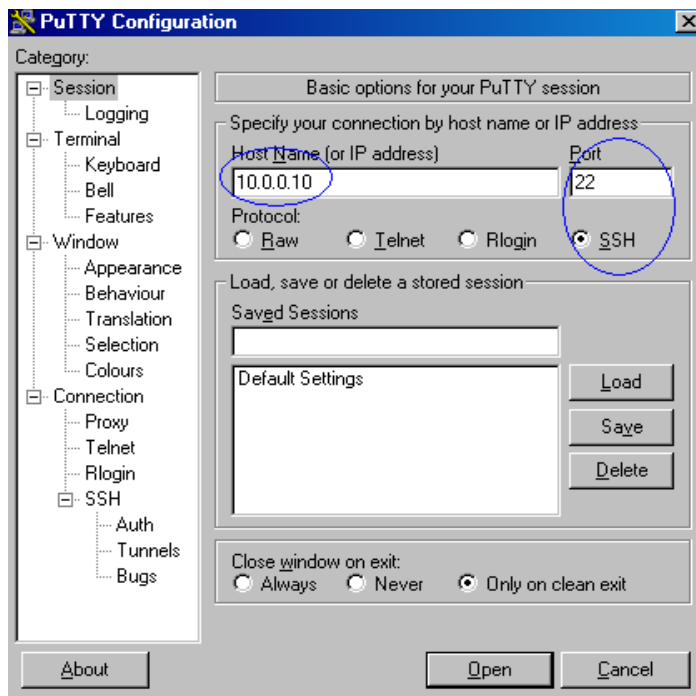
!!! Enter Username and Password to authentication


```
User Access Verification

Username: furqan
```
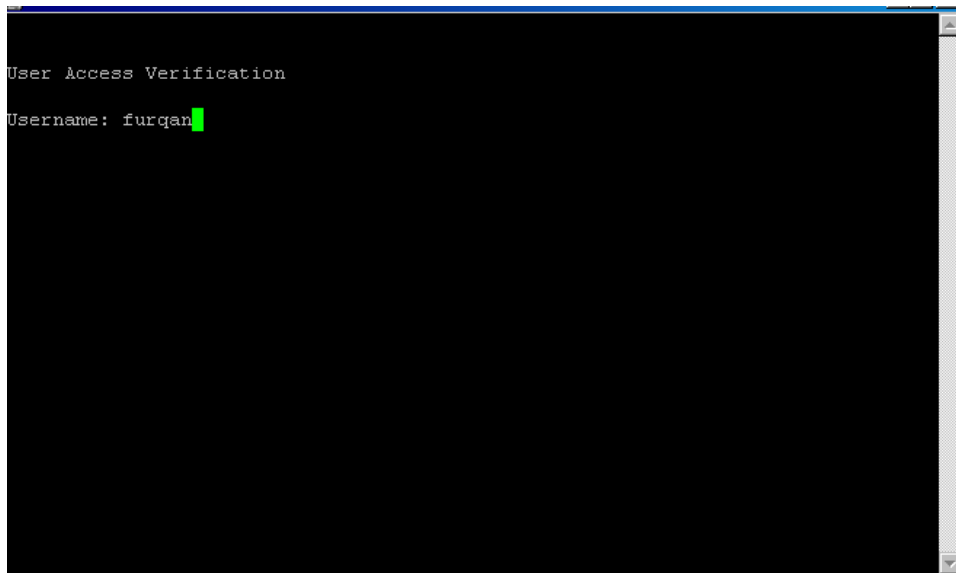
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CISCO(config)# **sh line**

Tty Typ	Tx/Rx	A	Modem	Roty	AccO	AccI	Uses	Noise	Overruns
0 CTY		-	-	- - -	0	3			0/0
* 1 VTY		-	-	- - -	67	0			0/0
2 VTY		-	-	- - -	7	0			0/0
3 VTY		-	-	- - -	134	0			0/0
4 VTY		-	-	- - -	81	0			0/0
5 VTY		-	-	- - -	1	0			0/0
6 VTY		-	-	- - -	40	0			0/0
7 VTY		-	-	- - -	12	0			0/0
8 VTY		-	-	- - -	0	0			0/0
9 VTY		-	-	- - -	0	0			0/0
10 VTY		-	-	- - -	0	0			0/0
11 VTY		-	-	- - -	0	0			0/0
12 VTY		-	-	- - -	0	0			0/0
13 VTY		-	-	- - -	0				0/0
14 VTY		-	-	- - -	0	0			0/0
15 VTY		-	-	- - -	0	0			0/0
16 VTY		-	-	- - -	0	0			0/0

!!!   **"*"**   show that one VTY Session is active

CISCO# **sh vlan**

VLAN	Name	Status	Ports
1	default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4
			Fa0/5, Fa0/6, Fa0/7, Fa0/8
			Fa0/9, Fa0/10, Fa0/11, Fa0/12
			Fa0/13, Fa0/14, Fa0/15, Fa0/16
			Fa0/17, Fa0/18, Fa0/19, Fa0/20
			Fa0/21, Fa0/22, Fa0/23, Fa0/24
			Gi0/1, Gi0/2
1002	fddi-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trnet-default	act/unsup	

!!! By Default all port are member of Vlan 1
Connectivity established b/w all ports and Switch because of Same Vlan

```
C:\Documents and Settings\Administrator>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : 10.0.0.1
        Subnet Mask . . . . . . . . . . . : 255.0.0.0
        Default Gateway . . . . . . . . . : 10.0.0.10

C:\Documents and Settings\Administrator>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128
Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\Administrator>_
```

Creating VLAN and Assign port on VLAN

!!! Switch port 1 is a Part of Vlan10 & Switch port 2 is a part Vlan 20

CISCO(config)# **vlan 10**
CISCO(config)# **name cisco**
CISCO(config)# **exit**

CISCO(config)# **vlan 20**
CISCO(config)# **name linux**
CISCO(config)# **exit**

CISCO(config)# **int fastEthernet 0/1**
CISCO(config-if)# **switchport access vlan 10**

CISCO(config)# **int fastEthernet 0/2**
CISCO(config-if)# **switchport access vlan 20**

CISCO# **sh vlan brief**

```
VLAN Name                       Status    Ports
---- ------------------------------ --------- ------------------------------
1    default                    active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                          Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                          Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                          Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                          Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                          Fa0/23, Fa0/24, Gi0/1, Gi0/2
10   cisco                      active    Fa0/1
20   linux                      active    Fa0/2
1002 fddi-default               act/unsup
1003 token-ring-default         act/unsup
1004 fddinet-default            act/unsup
1005 trnet-default              act/unsup
```

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After assign different port's 10.0.0.1 and 10.0.0.2 are not ping each other.

```
C:\Documents and Settings\Administrator>ipconfifg
'ipconfifg' is not recognized as an internal or external command,
operable program or batch file.

C:\Documents and Settings\Administrator>ipconfig

Windows IP Configuration


Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : 10.0.0.1
        Subnet Mask . . . . . . . . . . . : 255.0.0.0
        Default Gateway . . . . . . . . . : 10.0.0.10

C:\Documents and Settings\Administrator>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Documents and Settings\Administrator>
```

Port Security

CISCO# **sh mac-address-table**

          Mac Address Table

Vlan   Mac Address   Type   Ports
----   -----------   --------   -----
 All   0008.21d1.f100   STATIC   CPU
 All   0100.0ccc.cccc   STATIC   CPU
 All   0100.0ccc.cccd   STATIC   CPU
 All   0100.0cdd.dddd   STATIC   CPU
 1   00b0.d097.5303   DYNAMIC   Fa0/2
 1   00b0.d0ca.04f6   DYNAMIC   Fa0/1
Total Mac Addresses for this criterion: 6

CISCO# **sh port-security interface fastEthernet 0/1**

Port Security   : Disabled
Port Status   : Secure-down
Violation Mode   : Shutdown
Aging Time   : 0 mins
Aging Type   : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses   : 1
Total MAC Addresses   : 0
Configured MAC Addresses   : 0
Sticky MAC Addresses   : 0
Last Source Address   : 0000.0000.0000
Security Violation Count   : 0

!!! Configure port Security on Fast Ethernet 0/1.

CISCO(config)# **int fastEthernet 0/1**
CISCO(config-if)# **switchport mode access**
CISCO(config-if)# **switchport port-security**
CISCO(config-if)# **switchport port-security maximum 1**
CISCO(config-if)# **switchport port-security mac-address sticky**
CISCO(config-if)# **switchport port-security violation shutdown**

CISCO# **sh port-security interface fastEthernet 0/1**

```
Port Security              : Enabled
Port Status                : Secure-up
Violation Mode             : Shutdown
Aging Time                 : 0 mins
Aging Type                 : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses      : 1
Total MAC Addresses        : 1
Configured MAC Addresses   : 0
Sticky MAC Addresses       : 1
Last Source Address        : 00b0.d0ca.04f6
Security Violation Count    : 0
```

CISCO# **sh mac-address-table**
Mac Address Table

Vlan	Mac Address	Type	Ports
All	0008.21d1.f100	STATIC	CPU
All	0100.0ccc.cccc	STATIC	CPU
All	0100.0ccc.cccd	STATIC	CPU
All	0100.0cdd.dddd	STATIC	CPU
10	00b0.d0ca.04f6	STATIC	Fa0/1
20	00b0.d097.5303	DYNAMIC	Fa0/2

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CISCO# **sh port-security**

Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
                (Count)   (Count)   (Count)

     Fa0/1   1   1   0   Shutdown

Total Addresses in System (excluding one mac per port)   : 0
Max Addresses limit in System (excluding one mac per port) : 1024

CISCO# **sh port-security address**
        Secure Mac Address Table

Vlan   Mac Address   Type   Ports Remaining Age
                                                 (mins)
----   -----------   ----   ----- -------------
 10   00b0.d0ca.04f6   SecureSticky   Fa0/1   -

Total Addresses in System (excluding one mac per port)   : 0
Max Addresses limit in System (excluding one mac per port) : 1024

CISCO# **sh ip interface fastEthernet 0/1**
FastEthernet0/1 is up, line protocol is up
  Inbound access list is not set

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!!! After Changing the PC on Fast 0/1

CISCO# **sh port-security**

Secure Port MaxSecureAddr CurrentAddr SecurityViolation Security Action
           (Count)   (Count)   (Count)

    Fa0/1   1   1   1   Shutdown

Total Addresses in System (excluding one mac per port)   : 0
Max Addresses limit in System (excluding one mac per port) : 1024

CISCO# **sh port-security interface fastEthernet 0/1**
Port Security   : Enabled
Port Status   : Secure-shutdown
Violation Mode   : Shutdown
Aging Time   : 0 mins
Aging Type   : Absolute
SecureStatic Address Aging : Disabled
Maximum MAC Addresses   : 1
Total MAC Addresses   : 1
Configured MAC Addresses   : 0
Sticky MAC Addresses   : 1
Last Source Address   : 00b0.d097.5303
Security Violation Count   : 1

CISCO# sh ip interface fastEthernet 0/1
FastEthernet0/1 is down, line protocol is down
  Inbound access list is not set

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Configure IP Address on Fast Ethernet 0/1
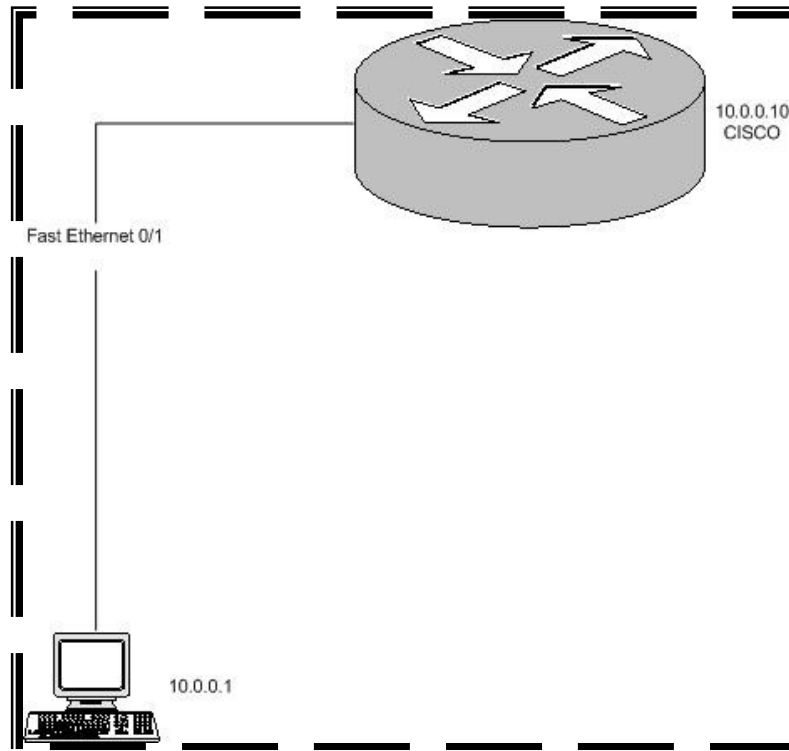
Fast Ethernet 0/1

10.0.0.10
CISCO

10.0.0.1

Router(config)# **hostname CISCO**
CISCO(config)# **int fastEthernet 0/1**
CISCO(config-if)# **ip address 10.0.0.10 255.0.0.0**
CISCO(config-if)# **no shutdown**

CISCO# **sh ip int brief**

Interface	IP-Address	OK? Method Status	Protocol
FastEthernet0/0	unassigned	YES unset administratively down	down
FastEthernet0/1	10.0.0.10	YES manual up	up
Serial0/3/0	unassigned	YES unset administratively down	down
Serial0/3/1	unassigned	YES unset administratively down	down

!!! Make Sure the Connectivity established b/w 10.0.0.1 and 10.0.0.10 after assign ip.

```
C:\WINDOWS\system32\cmd.exe                                            _ □ ×

Windows IP Configuration


Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : 10.0.0.1
        Subnet Mask . . . . . . . . . . . : 255.0.0.0
        Default Gateway . . . . . . . . . : 10.0.0.10

C:\Documents and Settings\Administrator>ping 10.0.0.10

Pinging 10.0.0.10 with 32 bytes of data:

Reply from 10.0.0.10: bytes=32 time=1ms TTL=255
Reply from 10.0.0.10: bytes=32 time<1ms TTL=255
Reply from 10.0.0.10: bytes=32 time<1ms TTL=255
Reply from 10.0.0.10: bytes=32 time<1ms TTL=255

Ping statistics for 10.0.0.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Documents and Settings\Administrator>_
```

Configure Telnet & Privilege mode Password

!!! Clear Text Password
CISCO(config)# **enable password cisco**
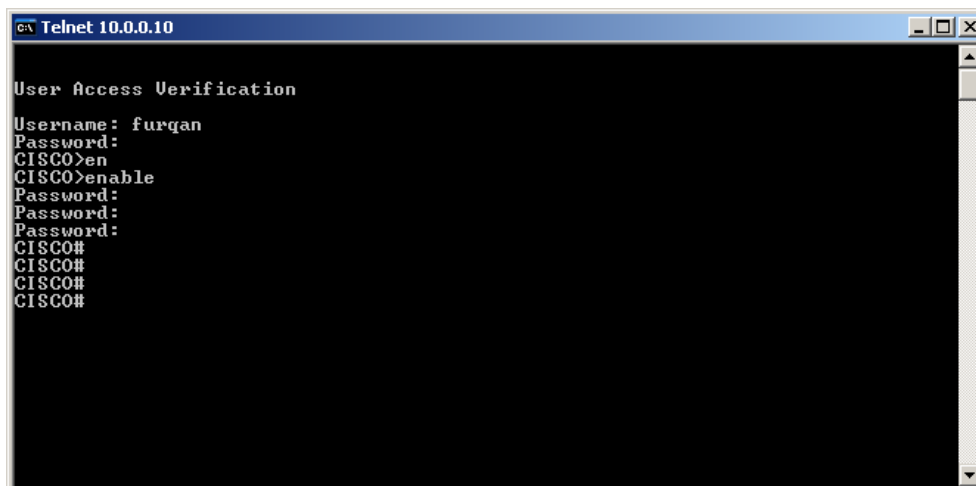
!!! Encrypted Password
CISCO(config)# **enable secret cisco123**

!!! Line Console Password
CISCO(config)# **line console 0**
CISCO(config-line)# **password cttc**
CISCO(config-line)# **login**
CISCO(config-line)# **exit**

!!! User Created so Telnet Session are authenticate with userid
CISCO (config)# **username furqan password cisco**
CISCO(config)# **line vty 0 4**
CISCO(config-line)# **password cisco**
CISCO(config-line)# **login local**
CISCO(config-line)# **exit**

```
Telnet 10.0.0.10                                          _ | □ | ×

User Access Verification

Username: furqan
Password:
CISCO>en
CISCO>enable
Password:
Password:
Password:
CISCO#
CISCO#
CISCO#
CISCO#
```

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CISCO#**sh line**

	Tty	Line	Typ	Tx/Rx	A	Modem	Roty	AccO	AccI	Uses	Noise	Overruns	Int
*	0	0	CTY		-	-	-	-	-	0	0	0/0	-
	1	1	AUX	9600/9600	-	-	-	-	-	0	0	0/0	-
*	194	194	VTY		-	-	-	-	-	1	0	0/0	-
	195	195	VTY		-	-	-	-	-	0	0	0/0	-
	196	196	VTY		-	-	-	-	-	0	0	0/0	-
	197	197	VTY		-	-	-	-	-	0	0	0/0	-
	198	198	VTY		-	-	-	-	-	0	0	0/0	-

Line(s) not in async mode -or- with no hardware support

Configure SSH

SECURE SHELL
Network Diagram

Ethernet

11.0.0.10
CTTC

USER 11.0.0.1
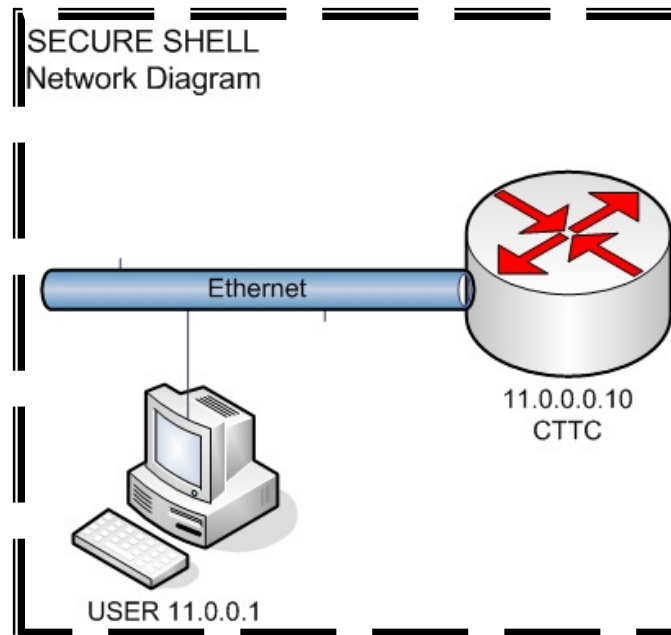
User IP 11.0.0.1 and Connect to 11.0.0.10 fastEhernet0/1 On Router
To SSH Connectivity
Ping 11.0.0.1 to 11.0.0.10
!!!!! 100% Succeed

cisco1841 (config)# **interface fastethernet 0/1**
cisco1841 (config-if)# **ip address 11.0.0.10 255.0.0.0**
cisco1841 (config-if)# **no shutdown**
cisco1841(config)# **hostname cttc**
cttc(config)# **ip domain-name cisco.com**
cttc(config)# **crypto key generate rsa**

The name for the keys will be: cttc.cttc.net
Choose the size of the key modulus in the range of 360 to 2048 for your
General Purpose Keys. Choosing a key modulus greater than 512 may
take a few minutes.
How many bits in the modulus (512):
% Generating 512 bit RSA keys, keys will be non-exportable...(OK)

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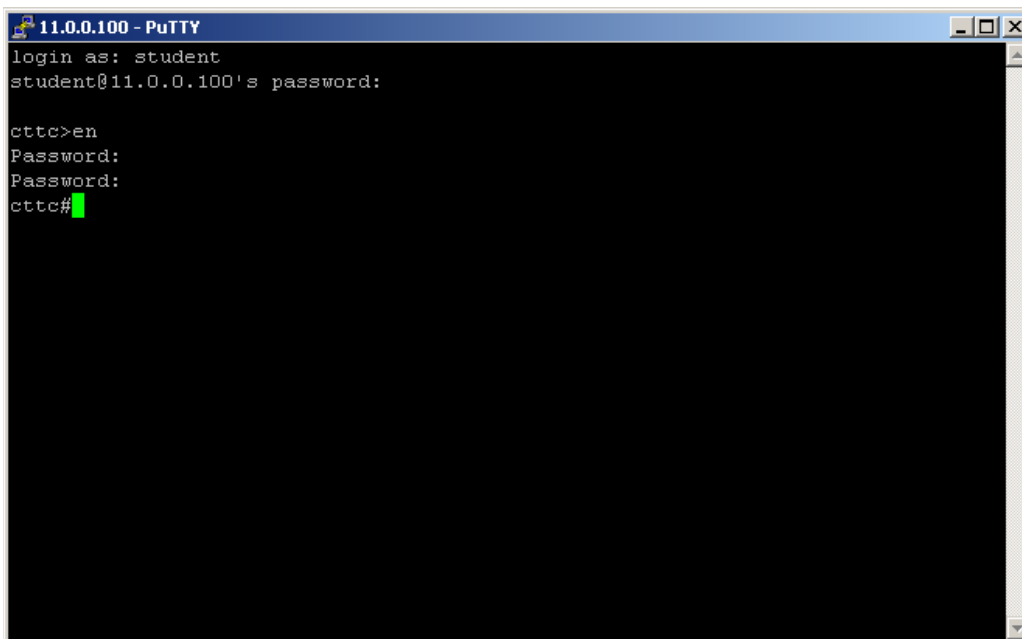
cttc(config)# **username student password furqan**
cttc(config)# **enable password cisco123**
cttc(config)# **line vty 0 4**
cttc(config-line)# **transport input ssh**
cttc(config-line)# **login local**

!!! PC 11.0.0.1
!!! Open Putty.exe
!!! Type the fast Ethernet IP 11.0.0.100

Giving Username & Password

```
11.0.0.100 - PuTTY
login as: student
student@11.0.0.100's password:

cttc>en
Password:
Password:
cttc#
```

Configure Serial Connectivity
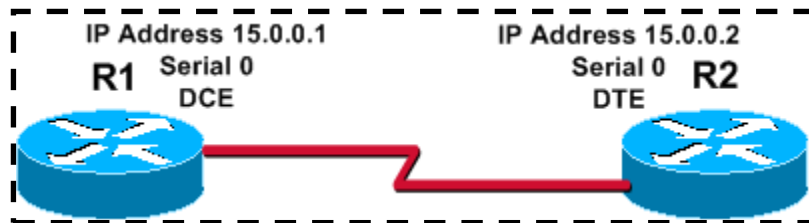
!!! Assign the IP address on CISCO
Cisco 2500(config)# **hostname CISCO**
CISCO(config)# **interface serial 0**
CISCO(config-if)# **ip address 15.0.0.1 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **clock rate 64000**   (Clock Rate will set only DCE Interface)
CISCO(config-if)# **end**

!!! Assign the IP address on R2
Cisco 2500(config)# **hostname R2**
R2(config)# **interface serial 0**
R2(config-if)# **ip address 15.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **end**

CISCO# **show interfaces serial 0**

Serial0 is up, line protocol is up
  Hardware is HD64570
  Internet address is 15.0.0.1/8
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, loopback not set
  Keepalive set (10 sec)
  Last input 00:00:04, output 00:00:00, output hang never
  Last clearing of "show interface" counters 01:48:12
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops

CISCO# **show ip interface brief**

Interface	IP-Address	OK	Method	Status	Protocol
Ethernet0	unassigned	YES	unset	administratively down	down
Serial0	15.0.0.1	YES	manual	up	up
Serial1	unassigned	YES	NVRAM	administratively down	down

CISCO# **ping 15.0.0.2**
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 15.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/32/32 ms

---

Configure Static Routes

CISCO(config)# **interface serial 0**
CISCO(config-if)# **ip address 15.0.0.1 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **clock rate 64000   (Clock Rate will set only DCE Interface)**
CISCO(config-if)# **exit**
CISCO(config)# **interface ethernet 0**
CISCO(config-if)# **ip address 10.0.0.20 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **end**

!!! Assign IP on R2

R2(config)#**interface serial 0**
R2(config-if)#**ip address 15.0.0.2 255.0.0.0**
R2(config-if)#**no shutdown**
R2(config-if)#**end**
R2(config)#**interface ethernet 0**
R2(config-if)#**ip address 20.0.0.2 255.0.0.0**
R2(config-if)#**no shutdown**
R2(config-if)#**end**

!!! ITS Shows Directly Connected Network

CISCO#**sh ip route**
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

R2#**sh ip route**
C   20.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

!!! Static Route Define on CISCO
!!! 20.0.0.0 is the destination Network
CISCO(config)#**ip route 20.0.0.0 255.0.0.0 15.0.0.2**

!!! Static Route Define on R2
!!! 10.0.0.0 is the destination Network
R2(config)#**ip route 10.0.0.0 255.0.0.0 15.0.0.1**

!!! Static Entry now show on Routing Table

CISCO# **sh ip route**

S   20.0.0.0/8 (1/0) via 15.0.0.2
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

S means Static
 20.0.0.0 mean network to reach
/8 means subnet
1 mean AD
0 Mean next hop
15.0.0.2 mean packet flow from here.

R2# **sh ip route**

C   20.0.0.0/8 is directly connected, Ethernet0
S   10.0.0.0/8 (1/0) via 15.0.0.1
C   15.0.0.0/8 is directly connected, Serial0

!!! Verfiy the connectivity
C:\>**ping 20.0.0.1**

Pinging 20.0.0.1 with 32 bytes of data:
Reply from 20.0.0.1: bytes=32 time=20ms TTL=254
Reply from 20.0.0.1: bytes=32 time=20ms TTL=254

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 20ms, Average = 15ms

Lab2
Prepared by
Furqan Yaseen

Configure PPP

Configure PPP Authetication using PAP and CHAP

!!!LHR Router Configuration

ROUTER>enable
ROUTER# **configure terminal**
ROUTER(config)# **hostname LHR**
LHR(config)# **int serial 0/3/1**
LHR(config-if)# **ip address 11.0.0.2 255.0.0.0**
LHR(config-if)# **no shutdown**
LHR(config-if)# **clock rate 56000**
LHR(config-if)# **exit**
LHR(config)# e**xit**
LHR(config-if)# **encapsulation ppp**
LHR(config-if)# **exit**
LHR(config)# **username KHI password cisco**
LHR(config)# **interface serial 0/3/1**
LHR(config-if)# **ppp authentication chap pap**

!!!KHI Router Configuration

ROUTER>**enable**
ROUTER# **configure terminal**
ROUTER(config)# **hostname KHI**
KHIconfig)# **int serial 0/3/1**
KHI(config-if)# **ip address 11.0.0.1 255.0.0.0**
KHI(config-if)# **no shutdown**
KHI(config-if)# **clock rate 56000**
KHI(config-if)# **exit**
KHI(config)# **exit**
KHI(config-if)# **encapsulation ppp**
KHI(config-if)# **exit**
KHI(config)# **username LHR password cisco**
KHI(config)# **interface serial 0/3/1**
KHI(config-if)# **ppp authentication chap pap**

LHR# **sh ip int brief**

Interface	IP-Address	OK	Method	Status	Protocol
FastEthernet0/0	unassigned	YES	unset	administratively down	down
FastEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/3/0	unassigned	YES	unset	administratively down	down
Serial0/3/1	11.0.0.2	YES	manual	up	up

KHI# **sh ip int brief**

Interface	IP-Address	OK	Method	Status	Protocol
FastEthernet0/0	unassigned	YES	unset	administratively down	down
FastEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/3/0	unassigned	YES	unset	administratively down	down
Serial0/3/1	11.0.0.1	YES	manual	up	up

LHR#**sh int serial 0/3/1ual up**

Serial0/3/1 is up, line protocol is up
  Hardware is GT96K Serial
  Internet address is 11.0.0.2/8
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP Open
  Open: IPCP, CDPCP, loopback not set
  Keepalive set (10 sec)
  Last input 00:00:15, output 00:00:08, output hang never
  Last clearing of "show interface" counters 00:09:26
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/1/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
    Available Bandwidth 1158 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    577 packets input, 10392 bytes, 0 no buffer
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    672 packets output, 11929 bytes, 0 underruns
    0 output errors, 0 collisions, 114 interface resets
0 output buffer failures, 0 output buffers swapped out
    223 carrier transitions
    DCD=up DSR=up DTR=up RTS=up CTS=up

LAB 3
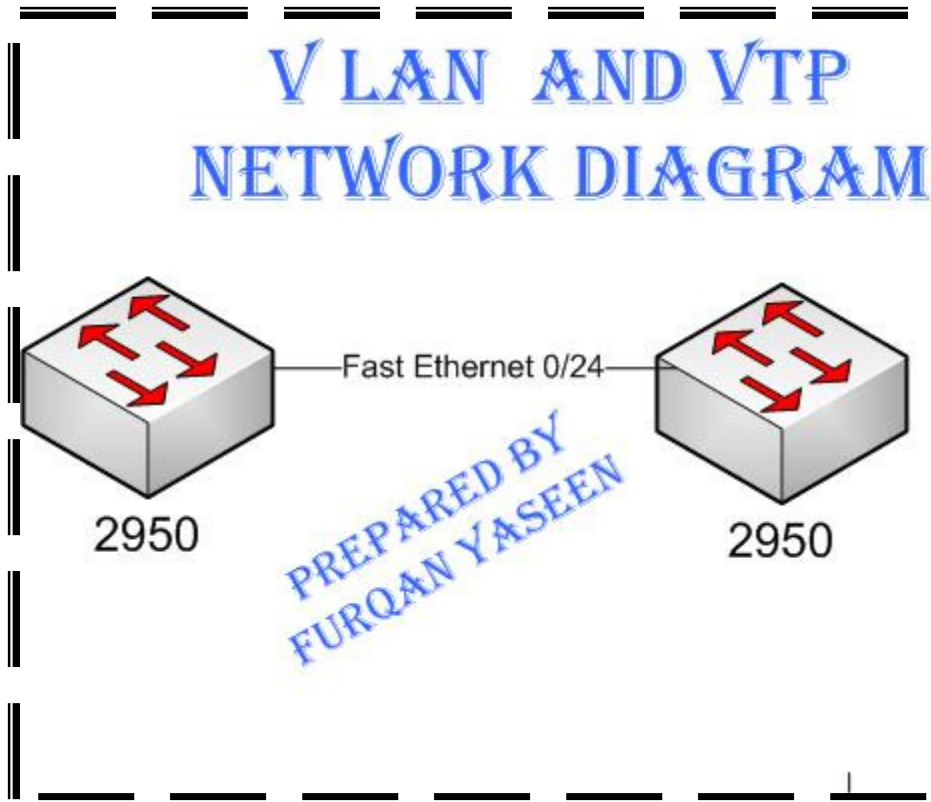
!!! Switch –A Configuration
2950-SWA (config)# **vtp domain CISCO**
2950-SWA(config)# **vtp mode server**
2950-SWA(config)# **int fastEthernet 0/24**
2950-SWA(config-if)# **switchport mode trunk**

!!! Switch –B Configuration

2950-SWB(config)# **vtp domain CISCO**
2950-SWB(config)# **vtp mode client**
2950-SWB(config)# **int fastEthernet 0/24**
2950-SWB(config-if)# **switchport mode trunk**

Verify VTP

2950-SWA # **sh vtp status**

```
VTP Version                         : 2
Configuration Revision              : 3
Maximum VLANs supported locally     : 1005
Number of existing VLANs            : 6
VTP Operating Mode                  : Server
VTP Domain Name                     : CISCO
VTP Pruning Mode                    : Disabled
VTP V2 Mode                         : Disabled
VTP Traps Generation                : Disabled
```

2950-SWB# **sh vtp status**

```
VTP Version                         : 2
Configuration Revision              : 3
Maximum VLANs supported locally     : 250
Number of existing VLANs            : 6
VTP Operating Mode                  : Client
VTP Domain Name                     : CISCO
VTP Pruning Mode                    : Disabled
VTP V2 Mode                         : Disabled
VTP Traps Generation                : Disabled
```

Configure STP
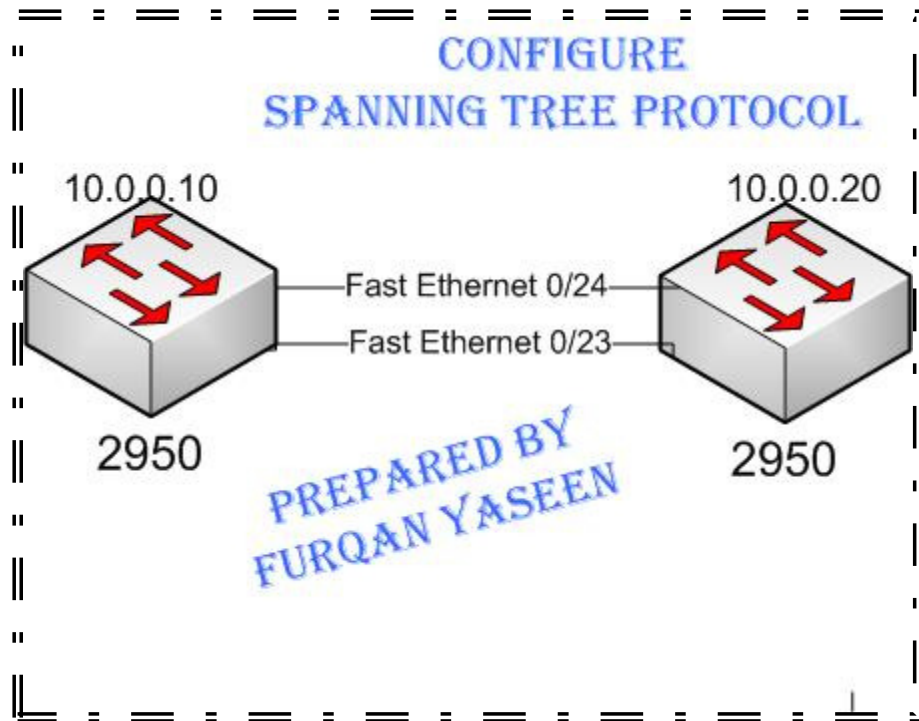
!!!
Switch A configure

2950-SWA# **show spanning-tree**
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID   Priority   32769
               Address   000b.5f03.f9c0
               This bridge is the root
               Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec

```
Bridge ID   Priority       32769  (priority 32768 sys-id-ext 1)
            Address        000b.5f03.f9c0
            Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time 300


Interface        Role   Sts    Cost  Prio.Nbr    Type
---------------- ------- ------- ----- ----------- --------------------
Fa0/1           Desg   FWD   19    128.1       P2p
Fa0/23          Desg   FWD   19    128.23      P2p
Fa0/24          Desg   FWD   19    128.24      P2p
```

2950-SWA#**show spanning-tree detail**

VLAN0001 is executing the ieee compatible Spanning Tree protocol
 Bridge Identifier has priority 32768, sysid 1, address 000b.5f03.f9c0
 Configured hello time 2, max age 20, forward delay 15
 We are the root of the spanning tree
 Topology change flag not set, detected flag not set
 Number of topology changes 4 last change occurred 00:05:35 ago
      from FastEthernet0/23
 Times: hold 1, topology change 35, notification 2
      hello 2, max age 20, forward delay 15
 Timers: hello 1, topology change 0, notification 0, aging 300

 Port 1 (FastEthernet0/1) of VLAN0001 is forwarding
  Port path cost 19, Port priority 128, Port Identifier 128.1.
  Designated root has priority 32769, address 000b.5f03.f9c0
  Designated bridge has priority 32769, address 000b.5f03.f9c0
  Designated port id is 128.1, designated path cost 0
  Timers: message age 0, forward delay 0, hold 0
  Number of transitions to forwarding state: 1
  Link type is point-to-point by default
  BPDU: sent 1657, received 0

 Port 23 (FastEthernet0/23) of VLAN0001 is forwarding
  Port path cost 19, Port priority 128, Port Identifier 128.23.
  Designated root has priority 32769, address 000b.5f03.f9c0
  Designated bridge has priority 32769, address 000b.5f03.f9c0
  Designated port id is 128.23, designated path cost 0
  Timers: message age 0, forward delay 0, hold 0
  Number of transitions to forwarding state: 1
  Link type is point-to-point by default
  BPDU: sent 170, received 2

 Port 24 (FastEthernet0/24) of VLAN0001 is forwarding
  Port path cost 19, Port priority 128, Port Identifier 128.24.
  Designated root has priority 32769, address 000b.5f03.f9c0

Designated bridge has priority 32769, address 000b.5f03.f9c0
Designated port id is 128.24, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 1
Link type is point-to-point by default
BPDU: sent 1643, received 3

!!! Switch B configure

2950-SWB# **show spanning-tree**

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID   Priority   32769
              Address   000b.5f03.f9c0
              Cost   19
              Port   23 (FastEthernet0/23)
              Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec

  Bridge ID   Priority   32769 (priority 32768 sys-id-ext 1)
              Address   000f.2468.0500
              Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec
              Aging Time 300

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Desg	FWD	19	128.1	P2p
Fa0/23	Root	FWD	19	128.23	P2p
Fa0/24	Altn	BLK	19	128.24	P2p

2950-SWB#**show spanning-tree detail**

VLAN0001 is executing the ieee compatible Spanning Tree protocol
Bridge Identifier has priority 32768, sysid 1, address 000f.2468.0500
Configured hello time 2, max age 20, forward delay 15
Current root has priority 32769, address 000b.5f03.f9c0
Root port is 23 (FastEthernet0/23), cost of root path is 19
Topology change flag not set, detected flag not set
Number of topology changes 7 last change occurred 00:13:53 ago
        from FastEthernet0/23
Times: hold 1, topology change 35, notification 2
        hello 2, max age 20, forward delay 15
Timers: hello 0, topology change 0, notification 0, aging 300

Port 1 (FastEthernet0/1) of VLAN0001 is forwarding
 Port path cost 19, Port priority 128, Port Identifier 128.1.
 Designated root has priority 32769, address 000b.5f03.f9c0
 Designated bridge has priority 32769, address 000f.2468.0500
 Designated port id is 128.1, designated path cost 19
 Timers: message age 0, forward delay 0, hold 0
 Number of transitions to forwarding state: 1
 Link type is point-to-point by default
 BPDU: sent 1910, received 0

Port 23 (FastEthernet0/23) of VLAN0001 is forwarding
 Port path cost 19, Port priority 128, Port Identifier 128.23.
 Designated root has priority 32769, address 000b.5f03.f9c0
 Designated bridge has priority 32769, address 000b.5f03.f9c0
 Designated port id is 128.23, designated path cost 0
 Timers: message age 1, forward delay 0, hold 0
 Number of transitions to forwarding state: 1
 Link type is point-to-point by default
 BPDU: sent 2, received 433

Port 24 (FastEthernet0/24) of VLAN0001 is blocking
 Port path cost 19, Port priority 128, Port Identifier 128.24.
 Designated root has priority 32769, address 000b.5f03.f9c0
 Designated bridge has priority 32769, address 000b.5f03.f9c0
 Designated port id is 128.24, designated path cost 0
 Timers: message age 2, forward delay 0, hold 0
 Number of transitions to forwarding state: 2
 Link type is point-to-point by default
 BPDU: sent 3, received 1906

Lab3
Prepared by
Furqan Yaseen

!!! Select Root Port by Changing Cost on Switch-B

2950-SWB(config)# **int fastEthernet 0/24**
2950-SWB(config-if)# **spanning-tree vlan 1 cost 18**

Verify

2950-SWB# **sh spanning-tree**

VLAN0001
  Spanning tree enabled protocol ieee
  Root ID   Priority   32769
               Address   000b.5f03.f9c0
               Cost   18
               Port   24 (FastEthernet0/24)
               Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec

  Bridge ID   Priority   32769 (priority 32768 sys-id-ext 1)
               Address   000f.2468.0500
               Hello Time   2 sec Max Age 20 sec Forward Delay 15 sec
               Aging Time 300

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Desg	FWD	19	128.1	P2p
Fa0/23	Altn	BLK	19	128.23	P2p
Fa0/24	**Root**	**FWD**	**18**	**128.24**	**P2p**

LAB 4
Routing
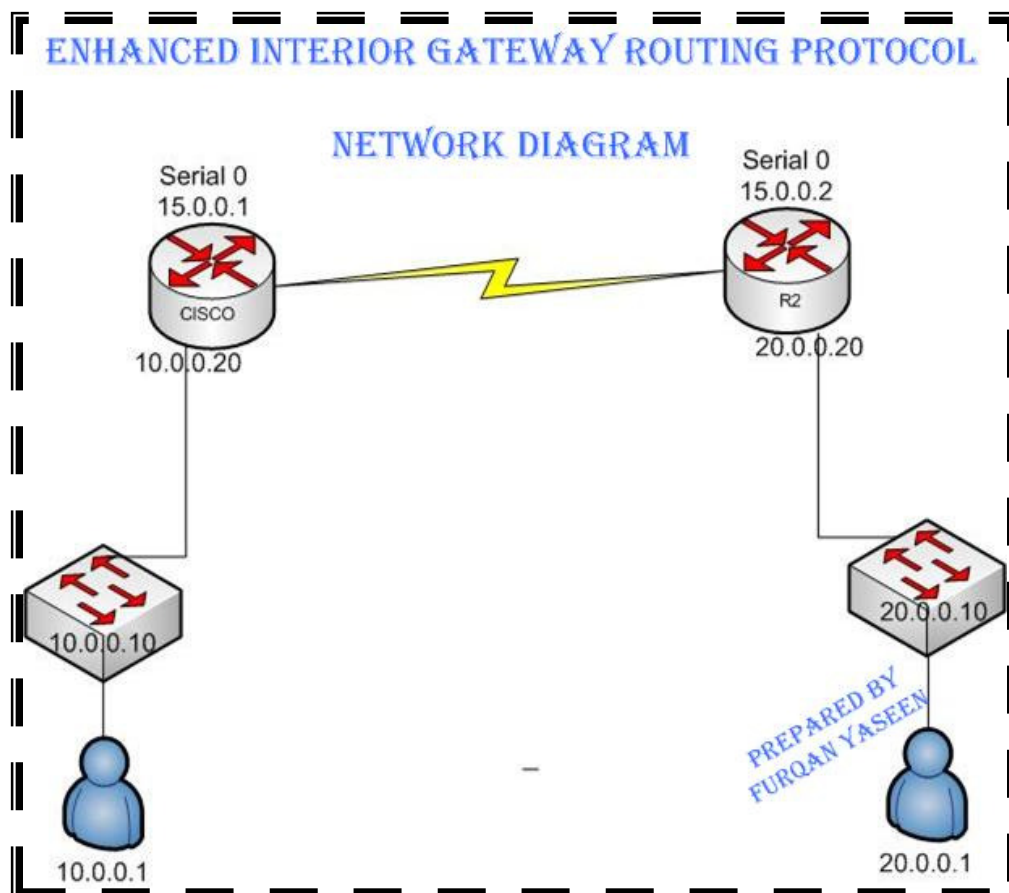
EIGRP

CISCO(config)# **interface serial 0**
CISCO(config-if)# **ip address 15.0.0.1 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **clock rate 64000**
CISCO(config-if)# **exit**
CISCO(config)# **interface ethernet 0**
CISCO(config-if)# **ip address 10.0.0.20 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **end**

R2(config)# **interface serial 0**
R2(config-if)# **ip address 15.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **end**
R2(config)# **interface ethernet 0**
R2(config-if)# **ip address 20.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **exit**

RA(config)# **router eigrp 10**
RA(config-router)# **network 10.0.0.0**
RA(config-router)# **network 15.0.0.0**

RB(config)# **router eigrp 10**
RB(config-router)# **network 20.0.0.0**
RB(config-router)# **network 15.0.0.0**

RA# **sh ip route**

D   20.0.0.0/8 (90/2195456) via 15.0.0.2, 00:04:42, Serial0
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

RB# **sh ip route**

C   20.0.0.0/8 is directly connected, Ethernet0
D   20.0.0.0/8 (90/2195456) via 15.0.0.1, 00:01:12, Serial0
C   15.0.0.0/8 is directly connected, Serial0

Lab4
Prepared by
Furqan Yaseen

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`C:\>ping 20.0.0.1`

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time=20ms TTL=254
Reply from 20.0.0.1: bytes=32 time=20ms TTL=254
Reply from 20.0.0.1: bytes=32 time=10ms TTL=254
Reply from 20.0.0.1: bytes=32 time=10ms TTL=254

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 20ms, Average = 15ms

OSPF

OPEN SHORTEST PATH FIRST

NETWORK DIAGRAM

Serial 0
15.0.0.1

Serial 0
15.0.0.2

CISCO

R2

10.0.0.20

20.0.0.20

AREA 0

10.0.0.10

20.0.0.10

PREPARED BY
FURQAN YASEEN

10.0.0.1

20.0.0.1

CISCO(config)# **interface serial 0**
CISCO(config-if)# **ip address 15.0.0.1 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **clock rate 64000**
CISCO(config-if)# **exit**
CISCO(config)# **interface ethernet 0**
CISCO(config-if)# **ip address 10.0.0.20 255.0.0.0**
CISCO(config-if)# **no shutdown**
CISCO(config-if)# **end**

R2(config)# **interface serial 0**
R2(config-if)# **ip address 15.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **end**
R2(config)# **interface ethernet 0**
R2(config-if)# **ip address 20.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **exit**

CISCO(config)# **router ospf 64**
CISCO(config-router)# **network 10.0.0.0 0.255.255.255 area 0**
CISCO(config-router)# **network 15.0.0.0 0.255.255.255 area 0**

R2(config)# **router ospf 64**
R2(config-router)# **network 15.0.0.0 0.255.255.255 area 0**
R2(config-router)# **network 20.0.0.0 0.255.255.255 area 0**

CISCO# **sh ip route**

O   20.0.0.0/8 (110/74) via 15.0.0.2, 00:22:17, Serial0
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

R2# **sh ip route**

C   20.0.0.0/8 is directly connected, Ethernet0
O   10.0.0.0/8 (110/74) via 15.0.0.1, 00:20:57, Serial0
C   15.0.0.0/8 is directly connected, Serial0

CISCO# **show ip ospf neighbor**

Neighbor ID	Pri	State	Dead Time	Address	Interface
20.0.0.20	1	FULL/ -	00:00:36	15.0.0.2	Serial0

R2# **show ip ospf neighbor**

Neighbor ID	Pri	State	Dead Time	Address	Interface
15.0.0.1	1	FULL/ -	00:00:36	15.0.0.1	Serial0

CISCO# **show ip ospf database**

OSPF Router with ID (15.0.0.1) (Process ID 64)

Router Link States (Area 0)

Link ID	ADV Router	Age	Seq#	Checksum	Link count
15.0.0.1	15.0.0.1	2040	0x80000004	0x7C99	3
20.0.0.20	20.0.0.20	708	0x80000006	0x9957	3

R2# **show ip ospf database**

OSPF Router with ID (20.0.0.20) (Process ID 64)

Router Link States (Area 0)

Link ID	ADV Router	Age	Seq#	Checksum	Link count
15.0.0.1	15.0.0.1	105	0x80000005	0x7A9A	3
20.0.0.20	20.0.0.20	820	0x80000006	0x9957	3

LAB 5
Access Control List

Named Based ACL
Network Diagram
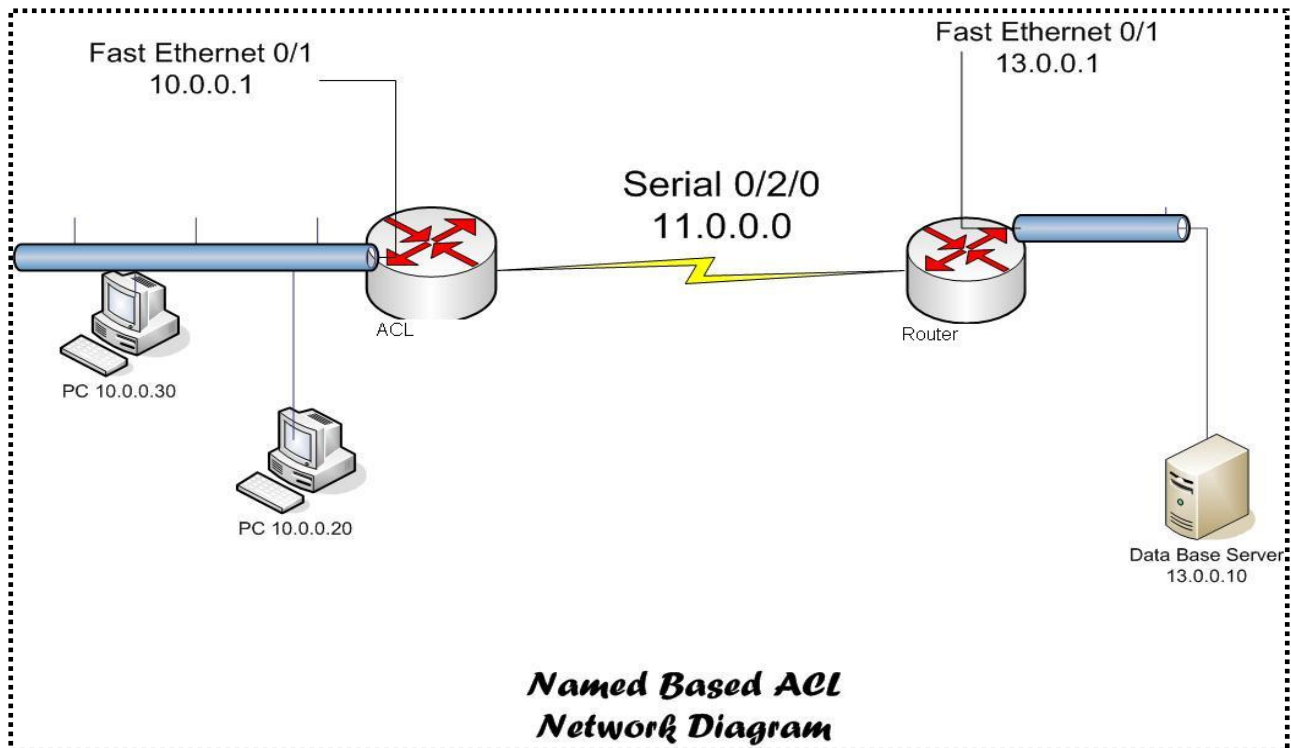
The task on this Lab is to configure a Named Based ACL

1) PC 10.0.0.20 only telnet 13.0.0.10
2) PC 10.0.0.30 only www 13.0.0.10
3) All other service is denied.

!!! Assign IP Address on ACL Router

ACL (config)# **int fastEthernet 0/1**
ACL (config-if)# **ip address 10.0.0.1 255.0.0.0**
ACL (config-if)# **no shutdown**

ACL (config)# **int serial 0/2/0**
ACL (config-if)# **ip address 11.0.0.1 255.0.0.0**
ACL (config-if)# **clock rate 64000**
ACL (config-if)# **no shutdown**

!!! Assign IP Address on Router

Router(config)# **int serial 0/2/0**
Router(config-if)# **ip address 11.0.0.2 255.0.0.0**
Router(config-if)# **no shutdown**
Router(config-if)# **exit**

Router(config)# **int fastEthernet 0/1**
Router(config-if)# **ip address 13.0.0.1 255.0.0.0**
Router(config-if)# **no shutdown**
Router(config-if)# **exit**

!!! After Configuration Make Sure Connectivity Establish b/w 11.0.0.1 & 11.0.0.2

!!! Configure a static Route on Both Router to make sure the Connectivity b/w End to End Network 10.0.0.0 must ping Network 30.0.0.0

ACL (config)# **ip route 13.0.0.0 255.0.0.0 11.0.0.2**
Router(config)# **ip route 10.0.0.0 255.0.0.0 11.0.0.1**

!!! Configure NAMED BASED ACL

ACL (config)# ip access-list extended cttcmarketing

ACL (config-ext-nacl)# **permit tcp host 10.0.0.30 host 13.0.0.10 eq www**
ACL (config-ext-nacl)# **permit tcp host 10.0.0.20 host 13.0.0.10 eq telnet**
ACL (config)# **int fastEthernet 0/1**
ACL (config-if)# **ip access-group cttcmarketing in**
ACL (config-if)# **exit**

Verification:-

Go to PC 10.0.0.20
http://13.0.0.10
!!!! Success Rate 0%

C:>telnet 13.0.0.10
!!!! Success Rate 100%

Similarly

Go to PC 10.0.0.30
http://13.0.0.10
!!!! Success Rate 100%

C:>telnet 13.0.0.10
!!!! Success Rate 0%
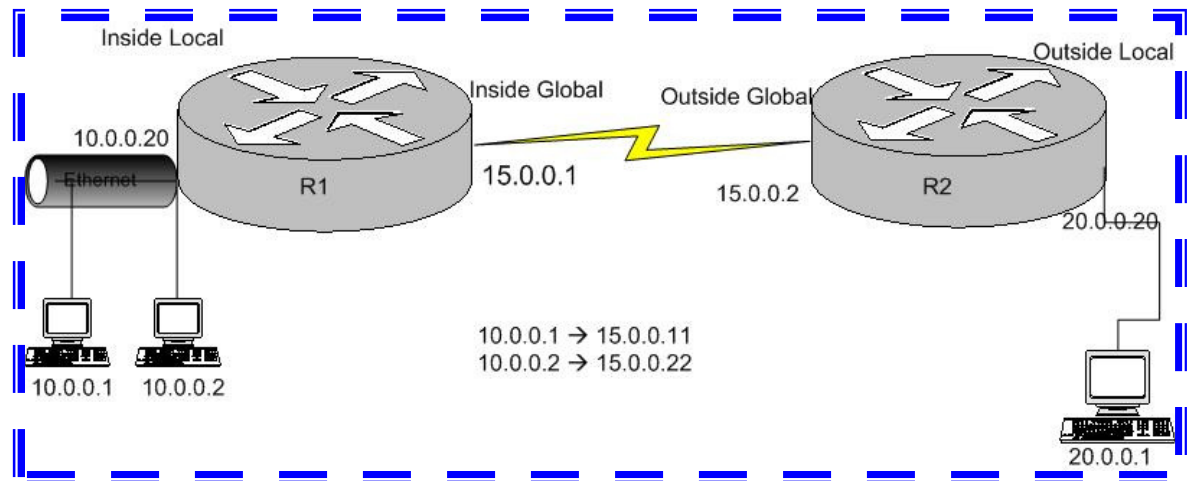
Static Nat:-

!!! Assign the IP Address on R1
R1(config)# **interface serial 0**
R1(config-if)# **ip address 15.0.0.1 255.0.0.0**
R1(config-if)# **no shutdown**
R1(config-if)# **clock rate 64000**
R1(config-if)# **exit**
R1(config)# **interface ethernet 0**
R1(config-if)# **ip address 10.0.0.20 255.0.0.0**
R1(config-if)# **no shutdown**
R1(config-if)# **end**

!!! Assign the IP Address on R2
R2(config)# **interface serial 0**
R2(config-if)# **ip address 15.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **end**
R2(config)# **interface ethernet 0**
R2(config-if)# **ip address 20.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **exit**

!!! Checking the Routing Table of R1

R1# **sh ip route**
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

C means Directly Connected Network

!!! Checking the Routing Table of R2

R2# **sh ip route**
C   20.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

!!! Enable RIP Routing Protocol on R1

R1(config)# **router rip**
R1(config-router)# **network 10.0.0.0**
R1(config-router)# **network 15.0.0.0**

!!! Enable RIP Routing Protocol on R2

R2(config)# **router rip**
R2(config-router)# **network 20.0.0.0**
R2(config-router)# **network 15.0.0.0**

!!! Checking the Routing Table of R1

R1# **sh ip route**
R   20.0.0.0/8 (120/1) via 15.0.0.2, 00:04:42, Serial0
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

R Means Learn From RIP

Lab5
Prepared by
Furqan Yaseen

!!! Checking the Routing Table of R2

R2#**sh ip route**
C   20.0.0.0/8 is directly connected, Ethernet0
R   20.0.0.0/8 (120/1) via 15.0.0.1, 00:01:12, Serial0
C   15.0.0.0/8 is directly connected, Serial0

!!! Enable the inside NAT Translation

R1(config)#**int Ethernet 0**
R1(config-if)#**ip nat inside**

!!! Enable the outside NAT Translation

R1(config)#**int serial 0**
R1(config-if)#**ip nat outside**

!!! Configure the static Nat Translation
R1(config)#**ip nat inside source static 10.0.0.1 15.0.0.11**
R1(config)#**ip nat inside source static 10.0.0.2 15.0.0.22**

Verification:-

Go to PC 10.0.0.1 and Ping 20.0.0.1
GO to PC 10.0.0.2 and Ping 20.0.0.1

R1#show ip nat translations

Pro	Inside global	Inside local	Outside local	Outside global
---	15.0.0.11	10.0.0.1	---	---
---	15.0.0.22	10.0.0.2	---	---
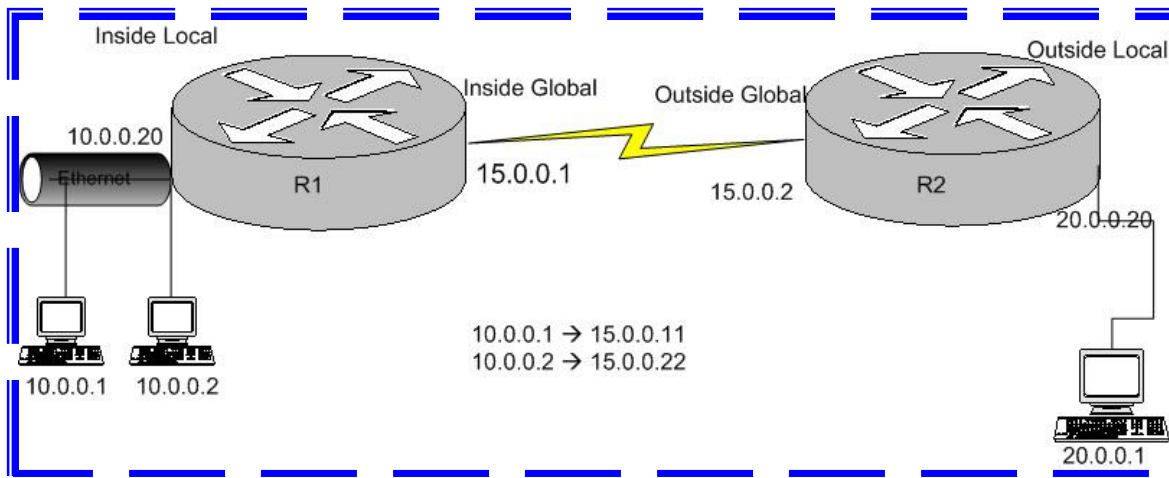
Dynamic Nat:-

The task on this Lab is to configure a Dynamic Nat

1) Configure IP address on All interface
2) Routing Enable
3) Enable Nat on interface
4) Defines a Pool of global
5) Access-list
6) Dynamic Source Translation

!!! Assign the IP Address on R1
R1(config)#**interface serial 0**
R1(config-if)#**ip address 15.0.0.1 255.0.0.0**
R1(config-if)#**no shutdown**
R1(config-if)#**clock rate 64000**
R1(config-if)#**exit**
R1(config)#**interface ethernet 0**
R1(config-if)#**ip address 10.0.0.20 255.0.0.0**
R1(config-if)#**no shutdown**
R1(config-if)#**end**

!!! Assign the IP Address on R2
R2(config)#**interface serial 0**
R2(config-if)#**ip address 15.0.0.2 255.0.0.0**
R2(config-if)#**no shutdown**
R2(config-if)#**end**
R2(config)#**interface ethernet 0**
R2(config-if)#**ip address 20.0.0.2 255.0.0.0**
R2(config-if)#**no shutdown**
R2(config-if)#**exit**

!!! Checking the Routing Table of R1

R1#**sh ip route**
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

C means Directly Connected Network

!!! Checking the Routing Table of R2
R2#**sh ip route**
C   20.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

!!! Enable RIP Routing Protocol on R1
R1(config)# **router rip**
R1(config-router)# **network 10.0.0.0**
R1(config-router)# **network 15.0.0.0**

!!! Enable RIP Routing Protocol on R2
R2(config)# **router rip**
R2(config-router)# **network 20.0.0.0**
R2(config-router)# **network 15.0.0.0**

!!! Checking the Routing Table of R1
R1# **sh ip route**
R   20.0.0.0/8 (120/1) via 15.0.0.2, 00:04:42, Serial0
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

R Means Learn From RIP

!!! Checking the Routing Table of R2

R2# **sh ip route**
C   20.0.0.0/8 is directly connected, Ethernet0
R   20.0.0.0/8 (120/1) via 15.0.0.1, 00:01:12, Serial0
C   15.0.0.0/8 is directly connected, Serial0

!!! Enable the inside NAT Translation

R1(config)# **int Ethernet 0**
R1(config-if)# **ip nat inside**

!!! Enable the outside NAT Translation

R1(config)# **int serial 0**
R1(config-if)# **ip nat outside**

Lab5
Prepared by
Furqan Yaseen

R1(config)# **ip nat pool cttc 15.0.0.41 15.0.0.45 prefix-length 8**
R1(config)# **access-list 1 permit 10.0.0.0 0.255.255.255**
R1(config)# **ip nat inside source list 1 pool cttc**

Verification:-

Go to PC 10.0.0.1 and Ping 20.0.0.1
GO to PC 10.0.0.2 and Ping 20.0.0.1

R1# **show ip nat translations**

Pro	Inside global	Inside local	Outside local	Outside global
---	15.0.0.41	10.0.0.1	---	---
---	15.0.0.42	10.0.0.2	---	---

Overload Nat (PAT):-
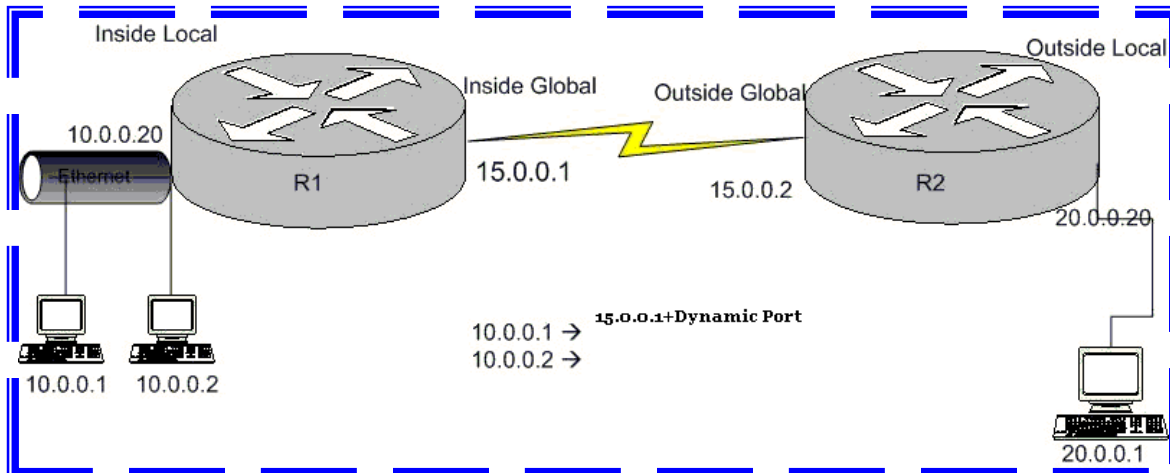
The task on this Lab is to configure a Dynamic Nat

1) Configure IP address on All interface
2) Routing Enable
3) Enable Nat on interface
4) Defines a Pool of global
5) Access-list
6) Overload on Port

!!! Assign the IP Address on R1
R1(config)# **interface serial 0**
R1(config-if)# **ip address 15.0.0.1 255.0.0.0**
R1(config-if)# **no shutdown**
R1(config-if)# **clock rate 64000**
R1(config-if)# **exit**
R1(config)# **interface ethernet 0**
R1(config-if)# **ip address 10.0.0.20 255.0.0.0**
R1(config-if)# **no shutdown**
R1(config-if)# **end**

!!! Assign the IP Address on R2
R2(config)# **interface serial 0**
R2(config-if)# **ip address 15.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **end**
R2(config)# **interface ethernet 0**
R2(config-if)# **ip address 20.0.0.2 255.0.0.0**
R2(config-if)# **no shutdown**
R2(config-if)# **exit**

!!! Checking the Routing Table of R1

R1# sh ip route
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

C means Directly Connected Network

!!! Checking the Routing Table of R2
R2# sh ip route
C   20.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

!!! Enable RIP Routing Protocol on R1
R1(config)# **router rip**
R1(config-router)# **network 10.0.0.0**
R1(config-router)# **network 15.0.0.0**

!!! Enable RIP Routing Protocol on R2
R2(config)# **router rip**
R2(config-router)# **network 20.0.0.0**
R2(config-router)# **network 15.0.0.0**

!!! Checking the Routing Table of R1
R1# **sh ip route**
R   20.0.0.0/8 (120/1) via 15.0.0.2, 00:04:42, Serial0
C   10.0.0.0/8 is directly connected, Ethernet0
C   15.0.0.0/8 is directly connected, Serial0

R Means Learn From RIP

!!! Checking the Routing Table of R2

R2# **sh ip route**
C   20.0.0.0/8 is directly connected, Ethernet0
R   20.0.0.0/8 (120/1) via 15.0.0.1, 00:01:12, Serial0
C   15.0.0.0/8 is directly connected, Serial0

!!! Enable the inside NAT Translation

R1(config)# **int Ethernet 0**
R1(config-if)# **ip nat inside**

!!! Enable the outside NAT Translation

R1(config)# **int serial 0**
R1(config-if)# **ip nat outside**

R1(config)# **ip nat pool cttc 15.0.0.200 15.0.0.200 prefix-length 8**
R1(config)# **access-list 1 permit 10.0.0.0 0.255.255.255**
R1(config)# **ip nat inside source list 1 pool cttc overload**

Verification:-

Go to PC 10.0.0.1 and Ping 20.0.0.1
GO to PC 10.0.0.2 and Ping 20.0.0.1

R1# show ip nat translations

Pro	Inside global	Inside local	Outside local	Outside global
tcp	15.0.0.200:1041	10.0.0.1:1041	20.0.0.1:80	20.0.0.1:80
tcp	15.0.0.200:1042	10.0.0.2:1042	20.0.0.1:80	20.0.0.1:80

LAB 6
Frame-Relay
Hub and Spoke
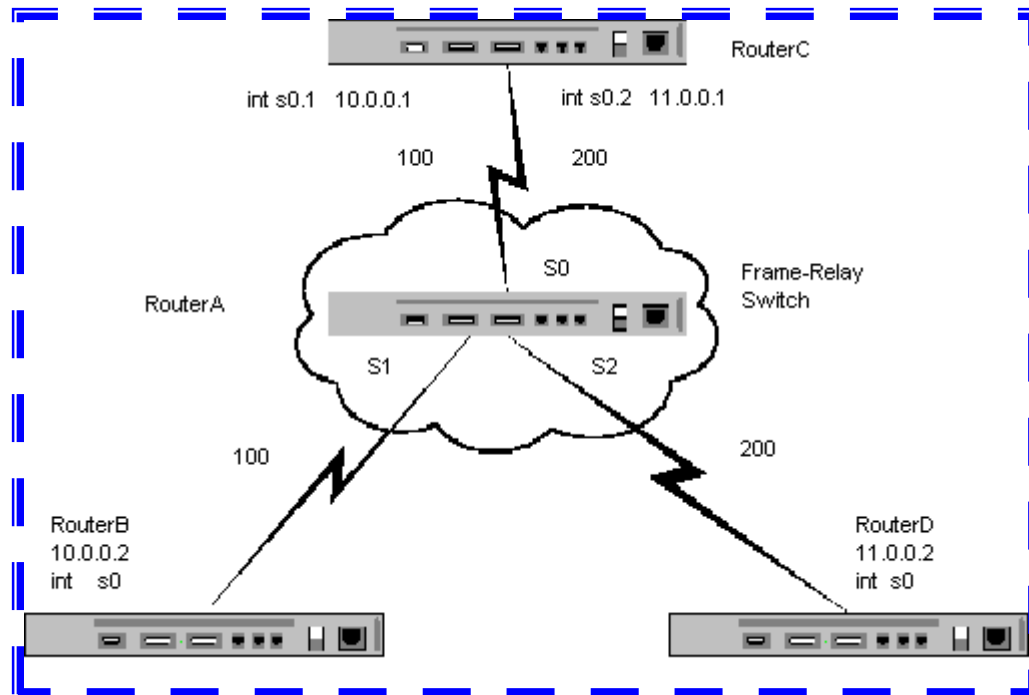
!!! Configuration of Frame-Relay Switch

!!! Enable Frame Relay Switching
FRSwitch(config)# **frame-relay switching**

!!! Enable Encapsulation on Serial Interface
FRSwitch (config)# **int s0**
FRSwitch(config-if)# **no ip address**
FRSwitch(config-if)# **encapsulation frame-relay**
FRSwitch(config-if)# **frame-relay intf-type dce**

!!! Configure DLCI on Frame Relay Switch
FRSwitch(config-if)# frame-relay route <local DLCI > Int<Remote DLCI>
FRSwitch(config-if)# **frame-relay route 100 int s1 100**
FRSwitch(config-if)# **frame-relay route 200 int s2 200**

FRSwitch(config-if)# **no shutdown**

FRSwitch(config)# **int s1**
FRSwitch(config-if)# **no ip address**

!!! Enables encapsulation
FRSwitch(config-if)# **encapsulation frame-relay**

FRSwitch(config-if)# **frame-relay intf-type dce**
FRSwitch(config-if)# **frame-relay route 100 int s0 100**
FRSwitch(config-if)# **no shutdown**

FRSwitch(config)# **int s2**
FRSwitch(config-if)# **encapsulation frame-relay**
FRSwitch(config-if)# **frame-relay intf-type dce**
FRSwitch(config-if)# **frame-relay route 200 int s0 200**
FRSwitch(config-if)# **no shutdown**

!!! Configure Router B as a Frame-Relay Connectivity

RouterB(config)# **int s0**
RouterB(config-if)# **ip address 10.0.0.2 255.0.0.0**
RouterB(config-if)# **encapsulation frame-relay**
RouterB(config-if)# **no shutdown**

!!! Configure Router C acts as a Central Router
RouterC(config)# **int s0**
RouterC(config-if)# **no ip address**
RouterC(config-if)# **encap frame-relay**

!!! Confgiure Point to Point Connectivity
RouterC(config-if)# **int s0.1 point-to-point**
RouterC(config-subif)# **ip address 10.0.0.1 255.0.0.0**
RouterC(config-subif)# **frame-relay interface-dlci 100**

!!! Confgiure Point to Point Connectivity
RouterC(config)# **int s0.2 point-to-point**
RouterC(config-subif)# **ip address 11.0.0.1 255.0.0.0**
RouterC(config-subif)# **frame-relay interface-dlci 200**

!!! Configure Router D as a Frame-Relay Connectivity
RouterD(config)# **int s0**
RouterD(config-if)# **encapsulation frame-relay**
RouterD(config-if)# **ip address 11.0.0.2 255.0.0.0**
RouterD(config-if)# **no shutdown**

Verification:-

FRSwitch # **sh frame-relay route**

Input Intf	Input Dlci	Output Intf	Output Dlci	Status
Serial0	100	Serial1	100	active
Serial0	200	Serial2	200	active
Serial1	100	Serial0	100	active
Serial2	200	Serial0	200	active

Active Shows all Site are connected.

FRSwitch # **sh frame-relay pvc**

PVC Statistics for interface Serial0 (Frame Relay DCE)
DLCI = 100, DLCI USAGE = SWITCHED, PVC STATUS = ACTIVE, INTERFACE = Serial0
  input pkts 21   output pkts 17   in bytes 3040
  out bytes 1650   dropped pkts 1   in FECN pkts 0

  pvc create time 00:08:58, last time pvc status changed 00:02:18

DLCI = 200, DLCI USAGE = SWITCHED, PVC STATUS = ACTIVE, INTERFACE = Serial0
  input pkts 27   output pkts 35   in bytes 3814

PVC Statistics for interface Serial1 (Frame Relay DCE)

DLCI = 100, DLCI USAGE = SWITCHED, PVC STATUS = ACTIVE, INTERFACE = Serial1
    pvc create time 00:07:12, last time pvc status changed 00:02:32
PVC Statistics for interface Serial2 (Frame Relay DCE)

DLCI = 200, DLCI USAGE = SWITCHED, PVC STATUS = ACTIVE, INTERFACE = Serial2
  input pkts 36   output pkts 27   in bytes 2632
  out bytes 3814   dropped pkts 0   in FECN pkts 0
  pvc create time 00:06:29, last time pvc status changed 00:03:13

RouterB# **sh int s0**
Serial0 is up, line protocol is up
   Internet address is 10.0.0.2/8
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation FRAME-RELAY, loopback not set, keepalive set (10 sec)
    LMI DLCI 1023 LMI type is CISCO frame relay DTE
  Broadcast queue 0/64, broadcasts sent/dropped 1/0, interface broadcasts 0
  09:18: %FR-5-DLCICHANGE: Interface Serial0 - DLCI 100 state changed to ACTIVE
  00:09:19: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0, changed
                                 state to up

RouterB# ping 11.0.0.1
Sending 5, 100-byte ICMP Echos to 11.0.0.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

RouterB# ping 11.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 11.0.0.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

RouterB(config)# **router rip**
RouterB(config-router)# **network 10.0.0.0**
RouterB# **sh ip route**

C   10.0.0.0/8 is directly connected, Serial0
R   11.0.0.0/8 (120/1) via 10.0.0.1, 00:00:10, Serial0

RouterB# ping 11.0.0.1
Sending 5, 100-byte ICMP Echos to 11.0.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 60/68/100 ms

RouterB# ping 11.0.0.2
Sending 5, 100-byte ICMP Echos to 11.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 116/116/116 ms

Lab6
Prepared by
Furqan Yaseen

RouterB# **sh frame-relay map**
Serial0 (up): ip 10.0.0.1 dlci 100(0x64,0x1840), dynamic,
        broadcast,, status defined, active

RouterC# **sh frame-relay pvc**
PVC Statistics for interface Serial0 (Frame Relay DTE)
DLCI = 100, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.1
 input pkts 102   output pkts 126   in bytes 8950

DLCI = 200, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.2
 input pkts 211   output pkts 119   in bytes 12124
 out bytes 16096   dropped pkts 0   in FECN pkts 0

RouterC# sh frame-relay map

**Serial0.1 (up): point-to-point dlci, dlci 100(0x64,0x1840), broadcast
      status defined, active**
**Serial0.2 (up): point-to-point dlci, dlci 200(0xC8,0x3080), broadcast
      status defined, active**

RouterC# ping 10.0.0.2
Sending 5, 100-byte ICMP Echos to 10.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 60/60/60 ms

RouterC# ping 10.0.0.1
Sending 5, 100-byte ICMP Echos to 10.0.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 112/116/124 ms

```
RouterD# sh  int s0
Serial0 is up, line protocol is up
  Hardware is HD64570
  Internet address is 11.0.0.2/8
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation FRAME-RELAY, loopback not set, keepalive set (10 sec)
  LMI enq sent  3, LMI stat recvd 0, LMI upd recvd 0, DTE LMI up
  LMI enq recvd 6, LMI stat sent  0, LMI upd sent  0
  LMI DLCI 1023  LMI type is CISCO  frame relay DTE
```

```
RouterD# sh frame-relay lmi
```

```
LMI Statistics for interface Serial0 (Frame Relay DTE) LMI TYPE = CISCO
  Invalid Unnumbered info 0          Invalid Prot Disc 0
  Invalid dummy Call Ref 0           Invalid Msg Type 0
```

```
00:03:56: %FR-5-DLCICHANGE: Interface Serial0 - DLCI 200 state changed to ACTIVE
```

```
RouterD# sh frame-relay pvc
PVC Statistics for interface Serial0 (Frame Relay DTE)
```

```
DLCI = 200, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0
```

```
  input pkts 171        output pkts 309        in bytes 22582
  out bytes 16864         dropped pkts 3          in FECN pkts 0
  in BECN pkts 0        out FECN pkts 0        out BECN pkts 0
  in DE pkts 0         out DE pkts 0
  out bcast pkts 263       out bcast bytes 12124
  pvc create time 00:45:18, last time pvc status changed 00:45:08
```

LAB 7

Inter VLAN Routing
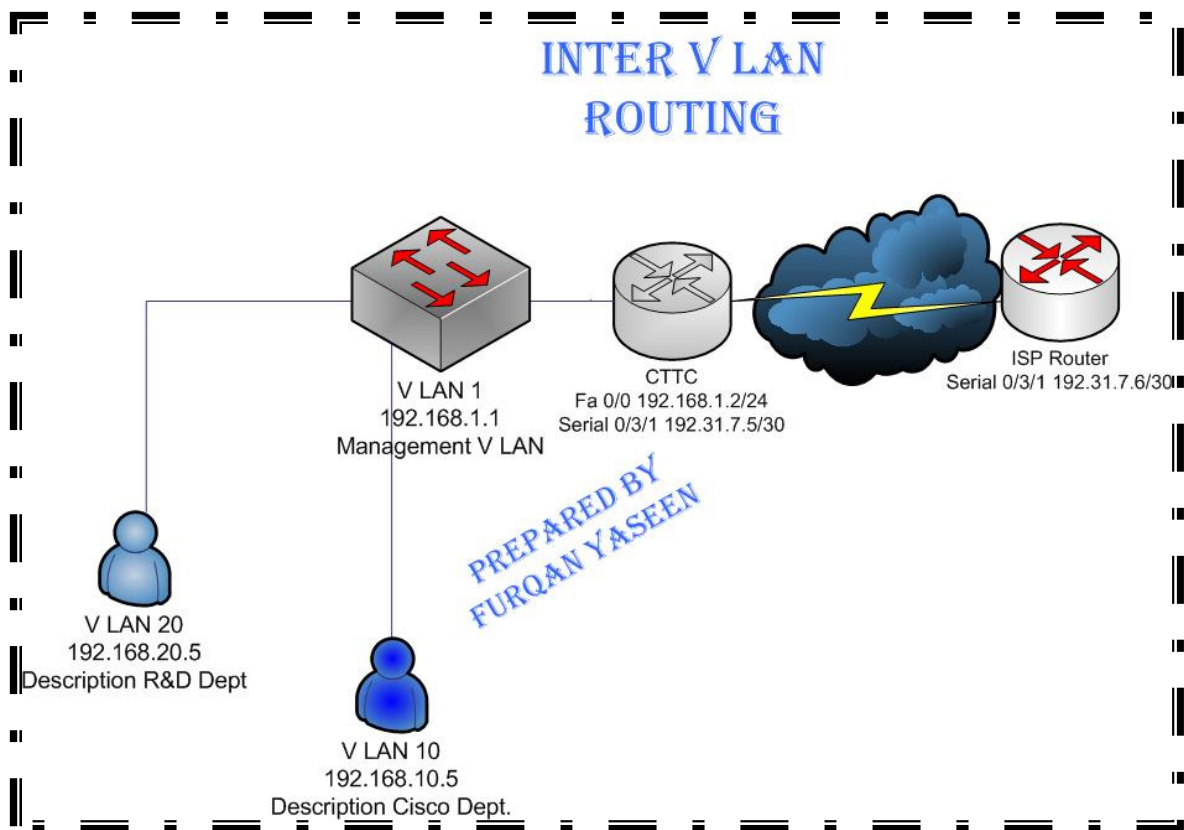
```
Router>enable
Router# conf  t
Enter configuration commands, one per line.  End with CNTL/Z.

Router(config)# hostname ISP
ISP(config)# int serial 0/3/1
ISP(config-if)# ip address 192.31.7.5 255.255.255.252
ISP(config-if)# clock rate 64000
ISP(config-if)# no shutdown
ISP(config-if)#

ISP(config)# int loopback 0
ISP(config-if)# ip address 198.133.219.1 255.255.255.0
ISP(config-if)# description SIMUALTES THE REMOTE WEBSITES
ISP(config-if)# exit
ISP(config)# exit
```

!!! Save The Configuration
```
ISP# write memory
Building configuration...
(OK)


ISP# sh ip int brief
Interface          IP-Address       OK?    Method      Status           Protocol
FastEthernet0/0      nassigned     YES unset  administratively down    down

FastEthernet0/1      unassigned      YES unset  administratively down     down

Serial0/3/0          unassigned      YES unset  administratively down     down

Serial0/3/1          192.31.7.5       YES manual up                       up

Loopback0            198.133.219.1   YES manual up                       up
```

```
Router>
Router>en
Router# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# hostname CTTC
CTTC(config)# no ip domain-lookup
CTTC(config-if)# ip address 192.31.7.6 255.255.255.252
CTTC(config-if)# no shutdown
CTTC(config-if)# description ISP_LINK
CTTC(config-if)# exit
CTTC(config)# int fastEthernet 0/0
CTTC(config-if)# no shutdown
CTTC(config-if)# duplex full
CTTC(config-if)# exit
```

!!! Configure Management VLAN
```
CTTC(config)# int fastEthernet 0/0.1
CTTC(config-subif)# description MANAGE VLAN
CTTC(config-subif)# encapsulation dot1Q 1 native
CTTC(config-subif)# ip address 192.168.1.1 255.255.255.0
CTTC(config-if)# exit


CTTC(config)# int fastEthernet 0/0.10
CTTC(config-subif)# description CISCO DEPT. VLAN 10
```

!!! Encapsulation Dot1q
```
CTTC(config-subif)# encapsulation dot1Q 10
CTTC(config-subif)# ip address 192.168.10.1 255.255.255.0
```

Lab7
Prepared by
Furqan Yaseen

!!! Configure Sub Interface
CTTC(config-if)# **int fastEthernet 0/0.20**
CTTC(config-subif)# **description R&D Dept. vlan 20**
CTTC(config-subif)# **encapsulation dot1Q 20**
CTTC(config-subif)# **ip address 192.168.20.1 255.255.255.0**
CTTC(config-subif)# **exit**
CTTC(config)# **exit**
CTTC# CTTC# **copy running-config startup-config**

Destination filename (startup-config)?
Building configuration...
(OK)

CTTC# **sh ip int brief**

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	unassigned	YES	unset	up	up
FastEthernet0/0.1	192.168.1.1	YES	manual	up	up
FastEthernet0/0.10	192.168.10.1	YES	manual	up	up
FastEthernet0/0.20	192.168.20.1	YES	manual	up	up
FastEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/3/0	unassigned	YES	unset	administratively down	down
Serial0/3/1	192.31.7.6	YES	SLARP	up	up

CTTC# **sh interfaces fastEthernet 0/0.1 description**

Interface	Status	Protocol	Description
Fa0/0.1	up	up	MANAGE VLAN

CTTC#sh interfaces fastEthernet 0/0.10

FastEthernet0/0.10 is up, line protocol is up
  Hardware is Gt96k FE, address is 0007.0e68.60b6 (bia 0007.0e68.60b6)
  Description: CISCO DEPT. VLAN 10
  Internet address is 192.168.10.1/24
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation 802.1Q Virtual LAN, Vlan ID 10.
  ARP type: ARPA, ARP Timeout 04:00:00
  Last clearing of "show interface" counters never

CTTC# **sh interfaces fastEthernet 0/0.20**

FastEthernet0/0.20 is up, line protocol is up
  Hardware is Gt96k FE, address is 0007.0e68.60b6 (bia 0007.0e68.60b6)
  Description: R&D Dept. vlan 20
  Internet address is 192.168.20.1/24
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation 802.1Q Virtual LAN, Vlan ID 20.
  ARP type: ARPA, ARP Timeout 04:00:00
  Last clearing of "show interface" counters never

Press RETURN to get started
Switch>enable
Switch# **config terminal**
Switch(config)# **hostname Layer2-SWITCH**
Layer2-SWITCH(config)# **no ip domain-lookup**

!!! Create VLAN
Layer2-SWITCH(config)# **vlan 10**

Lab7
Prepared by
Furqan Yaseen

!!!Optional Command
Layer2-SWITCH(config-vlan)# **name CISCO_DEPT**
Layer2-SWITCH(config-vlan)# **exit**

Layer2-SWITCH(config)# **vlan 20**
Layer2-SWITCH(config-vlan)# **name R&D**
Layer2-SWITCH(config-vlan)# **exit**

!!! Assign Range to Vlan 10
Layer2-SWITCH(config)# **int range fastEthernet 0/1 – 5**
Layer2-SWITC(config-if-range)# **switchport mode access**
Layer2-SWITC(config-if-range)# **switchport access vlan 10**
Layer2-SWITC(config-if-range)# **exit**

!!!Assign port Range to VLAN 20
Layer2-SWITCH(config)# **int range fastEthernet 0/6 – 10**
Layer2-SWITC(config-if-range)# **switchport mode access**
Layer2-SWITC(config-if-range)# **switchport access vlan 20**
Layer2-SWITC(config-if-range)# **exit**

!!! Trunking Port
Layer2-SWITCH(config)# **int fastEthernet 0/22**
Layer2-SWITCH(config-if)# **description TRUNK LINK B/W CTTC AND SWITCH**
Layer2-SWITCH(config-if)# **switchport mode trunk**

05:33:53: %LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/22, changed state to up

Layer2-SWITCH(config-if)# **exit**
Layer2-SWITCH(config)# **int vlan 1**

Layer2-SWITCH(config-if)# **ip address 192.168.1.2 255.255.255.0**
Layer2-SWITCH(config-if)# **no shutdown**
Layer2-SWITCH(config-if)# **exit**

Layer2-SWITCH(config)# **ip default-gateway 192.168.1.1**
Layer2-SWITCH(config)# **exit**

!!! Configuration Saved
Layer2-SWITCH# **write mem**
Building configuration...

(OK)

Assign IP ADDRESS TO PC 192.168.10.5 which exist in VLAN 10

Assign IP ADDRESS TO PC 192.168.20.5 which exist in VLAN 20
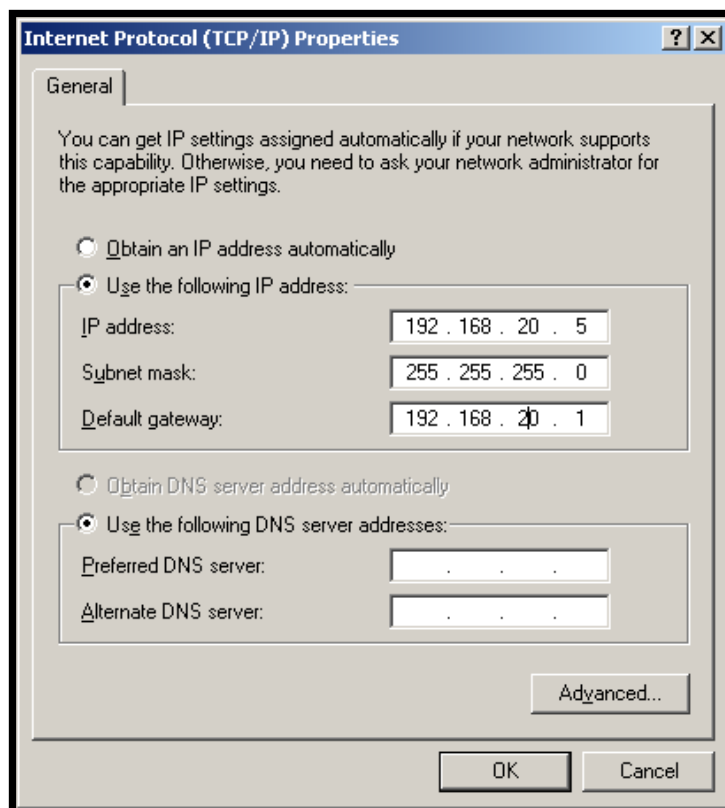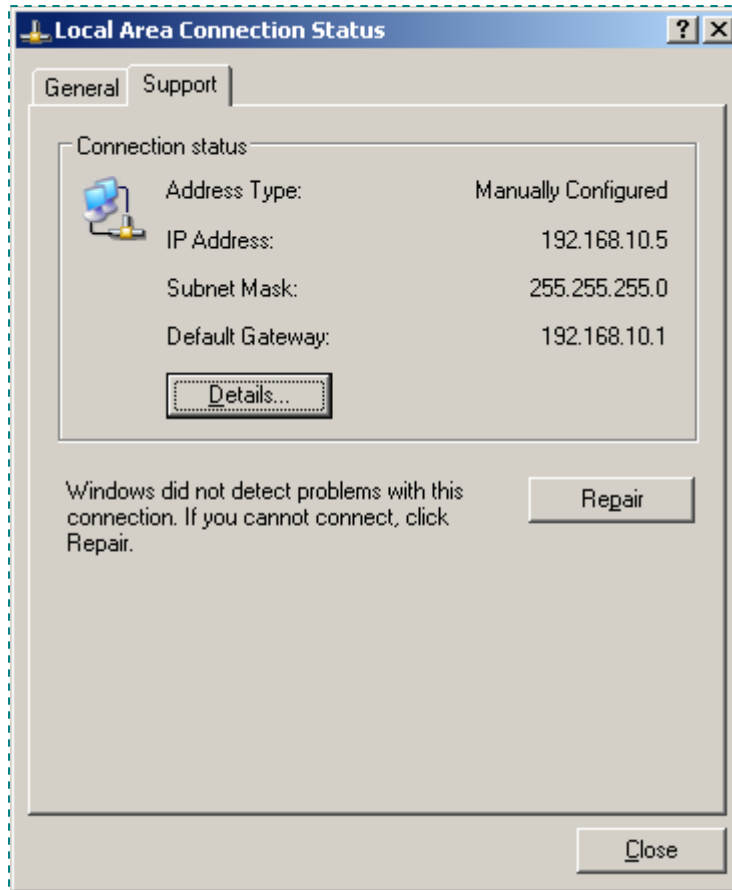
Local Area Connection Status

General | Support

Connection status

Address Type:	Manually Configured
IP Address:	192.168.10.5
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.10.1

Details...

Windows did not detect problems with this connection. If you cannot connect, click Repair.

Repair

Close

Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
⦿ Use the following IP address:

IP address:	192 . 168 . 20 . 5
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	192 . 168 . 20 . 1

○ Obtain DNS server address automatically
⦿ Use the following DNS server addresses:

Preferred DNS server:	. . .
Alternate DNS server:	. . .

Advanced...

OK   Cancel

Show Commands For Verify:

CTTC#sh vlans

Virtual LAN ID: 1 (IEEE 802.1Q Encapsulation)
   vLAN Trunk Interface: FastEthernet0/0.1
 This is configured as native Vlan for the following interface(s)
:FastEthernet0/0

   Protocols Configured: Address: Received: Transmitted:
       IP   192.168.1.1   0   0
       Other   0   27

   49 packets, 8187 bytes input
   27 packets, 7313 bytes output

Virtual LAN ID: 10 (IEEE 802.1Q Encapsulation)

   VLAN Trunk Interface: FastEthernet0/0.10

   Protocols Configured: Address: Received: Transmitted:
       IP   192.168.10.1   411   350
       Other   0   4

Virtual LAN ID: 10 (IEEE 802.1Q Encapsulation)

   vLAN Trunk Interface: FastEthernet0/0.10

   Protocols Configured: Address: Received: Transmitted:
       IP   192.168.10.1   411   350
       Other   0   4

   411 packets, 36469 bytes input
   354 packets, 28128 bytes output

Virtual LAN ID: 20 (IEEE 802.1Q Encapsulation)

   VLAN Trunk Interface: FastEthernet0/0.20

78

Protocols Configured:	Address:	Received:	Transmitted:
IP	192.168.20.1	407	361
Other		0	4

407 packets, 34990 bytes input
365 packets, 28986 bytes output

CTTC#sh vlans dot1q

Total statistics for 802.1Q VLAN 1:
  53 packets, 8769 bytes input
  28 packets, 7685 bytes output
Total statistics for 802.1Q VLAN 10:
  488 packets, 42475 bytes input
  431 packets, 34134 bytes output
Total statistics for 802.1Q VLAN 20:
  474 packets, 40400 bytes input
  431 packets, 34134 bytes output

Lab 8
Configure 6 to 4 Tunnel

CONFIGURING IP V6 TO IP V4 TUNNELS

R2
2.2.2.2/24

172.16.12.0/24

172.16.23.0/24

6 to 4 Tunnel

R1
Loopback 1.1.1.1/24
FEC0::1:1/112

R3
3.3.3.3/24
FEC0::3:1/112

PREPARED BY
FURQAN YASEEN
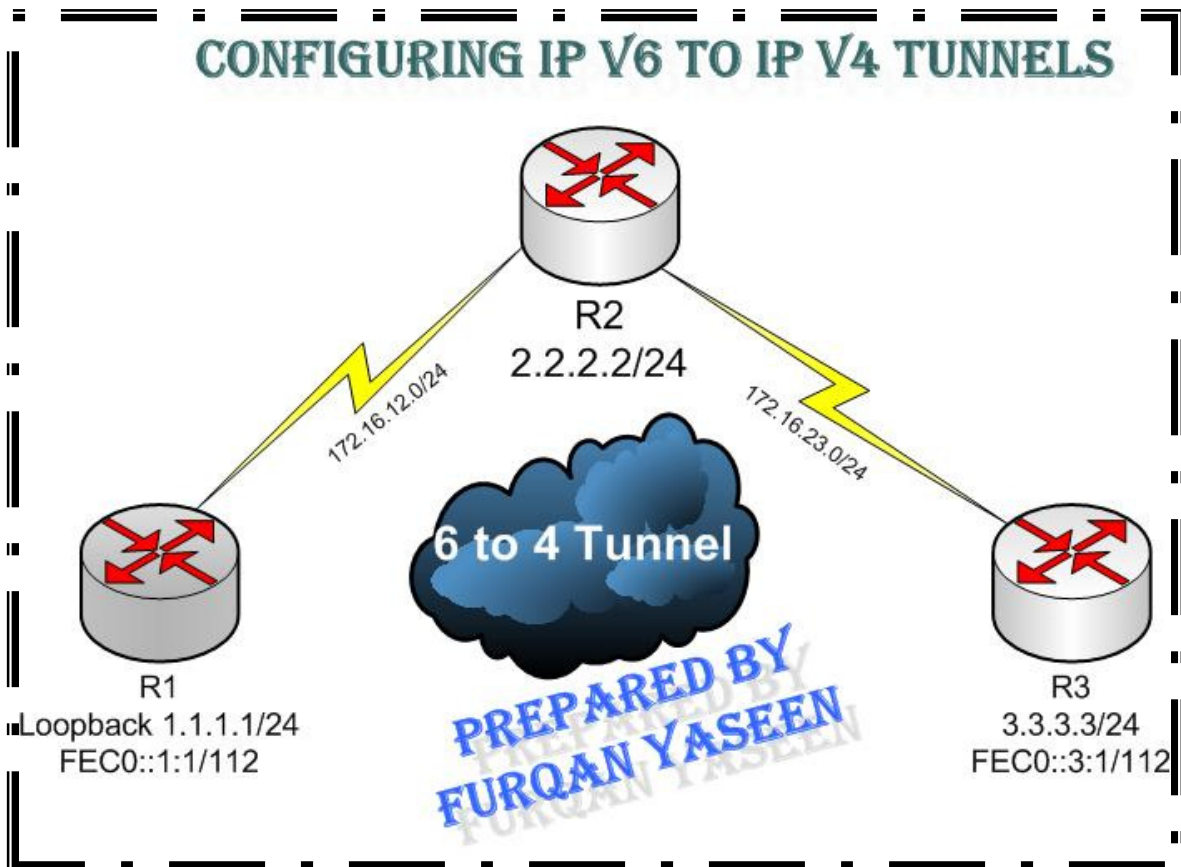
R1(config)# **interface loopback0**
R1(config-if)# **ip address 1.1.1.1 255.255.255.0**

R1(config-if)# **ipv6 address FEC0::1:1/112**

R1(config-if)# **interface serial0/0/0**
R1(config-if)# **ip address 172.16.12.1 255.255.255.0**
R1(config-if)# **clockrate 64000**
R1(config-if)# **no shutdown**

R2(config)# **interface loopback0**
R2(config-if)# **ip address 2.2.2.2 255.255.255.0**
R2(config-if)# **interface serial0/0/0**
R2(config-if)# **ip address 172.16.12.2 255.255.255.0**
R2(config-if)# **no shutdown**

R2(config-if)# **interface serial0/0/1**
R2(config-if)# **ip address 172.16.23.2 255.255.255.0**
R2(config-if)# **clockrate 64000**
R2(config-if)# **no shutdown**

R3(config)# **interface loopback0**
R3(config-if)# **ip address 3.3.3.3 255.255.255.0**
R3(config-if)# **ipv6 address FEC0::3:1/112**
R3(config-if)# **interface serial0/0/1**
R3(config-if)# **ip address 172.16.23.3 255.255.255.0**
R3(config-if)# **no shutdown**

Configure EIGRP

!!! Make sure you disable auto summarization

R1(config)# **router eigrp 1**
R1(config-router)# **no auto-summary**
R1(config-router)# **network 10.0.0.0**
R1(config-router)# **network 172.16.0.0**

R2(config)# **router eigrp 1**
R2(config-router)# **no auto-summary**
R2(config-router)# **network 10.0.0.0**
R2(config-router)# **network 172.16.0.0**

R3(config)# **router eigrp 1**
R3(config-router)# **no auto-summary**
R3(config-router)# **network 10.0.0.0**
R3(config-router)# **network 172.16.0.0**

Create a 6 to 4 Tunnel

!!! Configure a Manual IPV6 Tunnel

R1(config)# **interface tunnel 0**
R1(config-if)# **tunnel mode ipv6ip 6to4**
R1(config-if)# **ipv6 address 2002:AC10:0C01:1::1/64**
R1(config-if)# **tunnel source serial0/0/0**
R1(config-if)# **exit**
R1(config)# **ipv6 route 2002::/16 tunnel0**

R3(config)# **interface tunnel 0**
R3(config-if)# **tunnel mode ipv6ip 6to4**
R3(config-if)# **ipv6 address 2002:AC10:1703:1::3/64**
R3(config-if)# **tunnel source serial0/0/1**
R3(config-if)# **exit**
R3(config)# **ipv6 route 2002::/16 tunnel0**

R1# **ping 2002:AC10:1703:1::3**

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2002:AC10:1703:1::3, timeout is 2 seconds:
!!!!!Success rate is 100 percent (5/5), round-trip min/avg/max = 64/67/68 ms

Configure a IPV6 Static Routes

R1(config)# **ipv6 unicast-routing**
R1(config)# **ipv6 route FEC0::3:0/112 2002:AC10:1703:1::3**

R3(config)# **ipv6 unicast-routing**
R3(config)# **ipv6 route FEC0::1:0/112 2002:AC10:C01:1::1**

Verify the status:-

R1#show ipv6 route
IPv6 Routing Table - 8 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
U - Per-user Static route
I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
D - EIGRP, EX - EIGRP external

S 2002::/16 (1/0)via ::, Tunnel0
C 2002:AC10:C01:1::/64 (0/0) via ::, Tunnel0
L 2002:AC10:C01:1::1/128 (0/0)via ::, Tunnel0
L FE80::/10 (0/0)via ::, Null0
C FEC0::1:0/112 (0/0)via ::, Loopback0
L FEC0::1:1/128 (0/0)via ::, Loopback0
S FEC0::3:0/112 (1/0)via 2002:AC10:1703:1::3
L FF00::/8 (0/0)via ::, Null0

R1#**ping FEC0::3:1**
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0::3:1, timeout is 2 seconds:
Success rate is 100 percent (5/5), round-trip min/avg/max = 64/67/68 ms

R3#**ping FEC0::1:1**
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to FEC0::1:1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 64/66/68 ms

Lab8
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LAB 8

SDM (Secure Device Manager)

Installation

Cisco SDM - Installation Wizard

License Agreement

Please read the following license agreement carefully.

Agreement

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◉ I accept the terms of the license agreement
○ I do not accept the terms of the license agreement

[Print]

InstallShield

[< Back] [Next >] [Cancel]

Cisco SDM - Installation Wizard

Install Options

Install Cisco SDM on this computer or on the router.

Select where you want to install Cisco SDM.

◉ This Computer
   Installs Cisco SDM on this computer.

○ Cisco Router
   Installs Cisco SDM on your router's flash memory.

○ Both (computer and router)
   Installs Cisco SDM on this computer and on your router's flash memory.

[< Back] [Next >] [Cancel]

Lab9
Prepared by
Furqan Yaseen
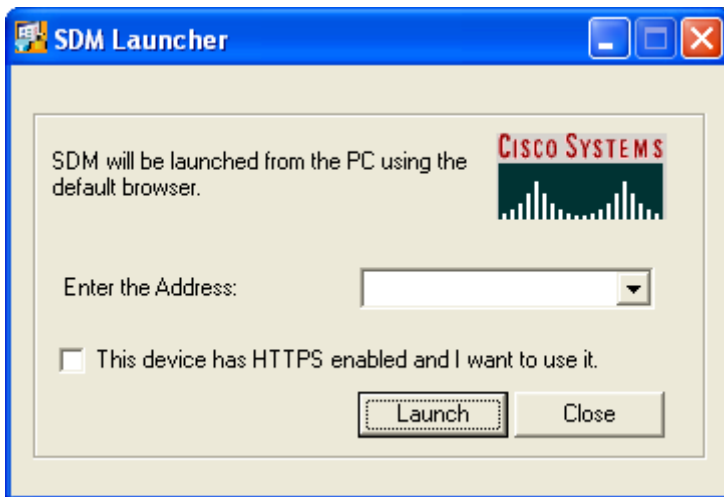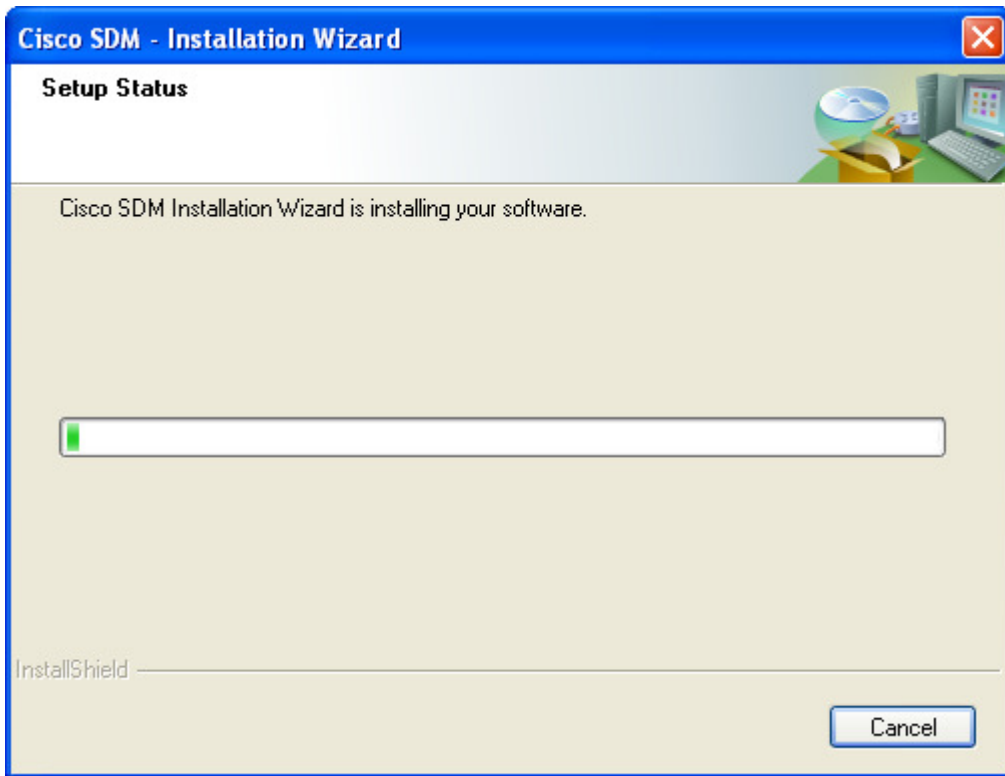
Lab9
Prepared by
Furqan Yaseen

Configuration and Network Diagram
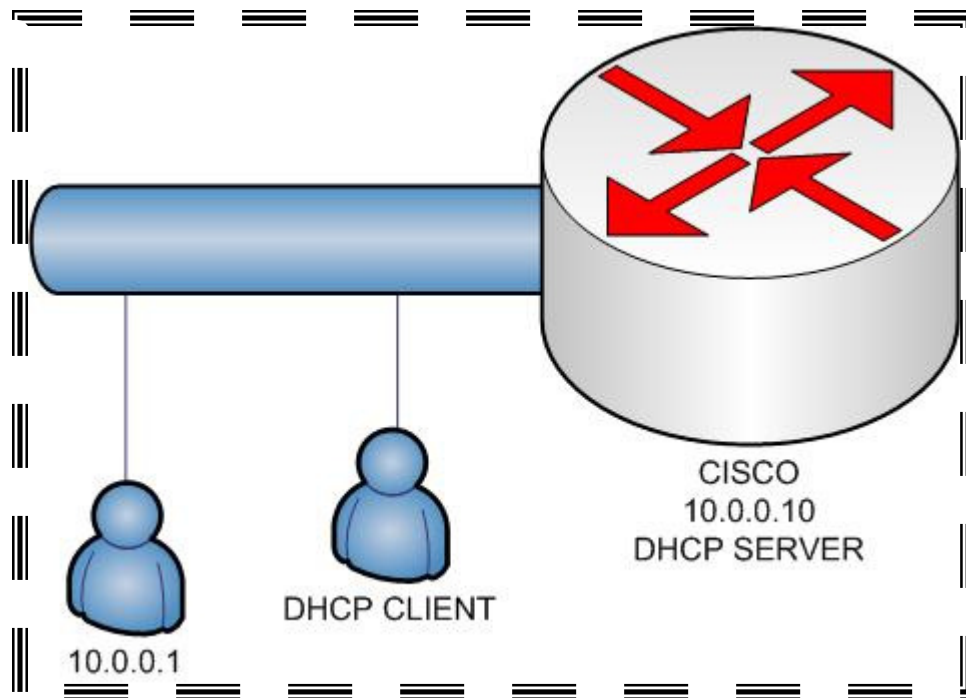
!!! Enable HTTP Server.

CISCO(config)# **ip http server**
CISCO(config)# **ip http authentication local**
CISCO(config)# **username furqan password cisco**
CISCO(config)# **enable password cttc**

!!! Go to SDM Desktop Icon and double Click
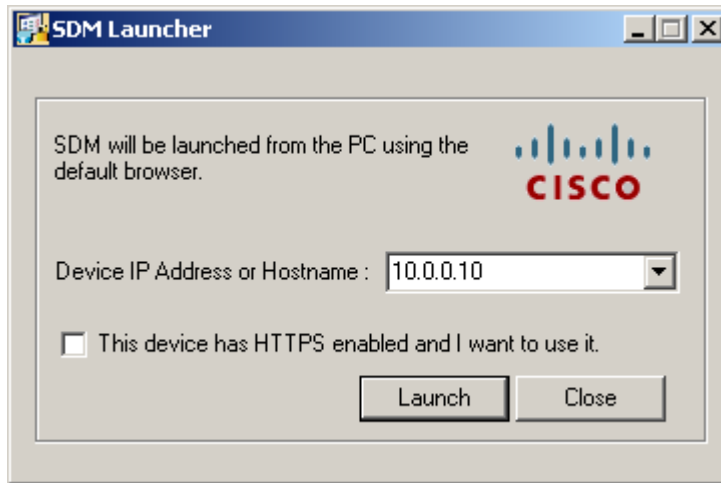
!!! After Establish a connection this screen is shown

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Prepared by
Furqan Yaseen

For Configure DHCP SERVER AS a Router go to

Additional Task→ DHCP→ DHCP POOL→ADD
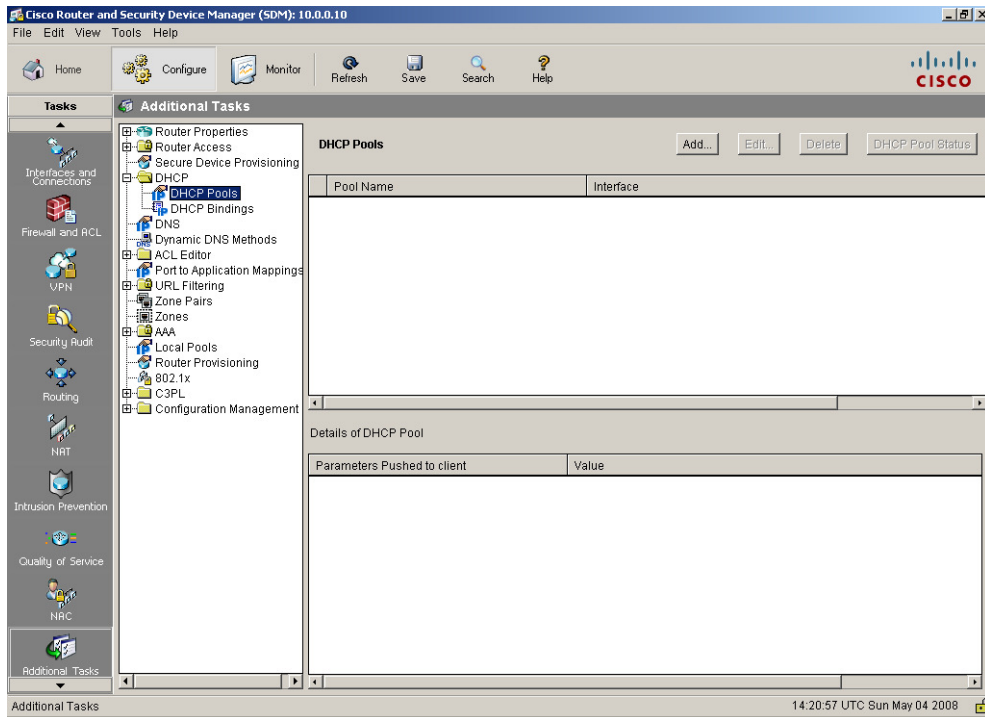
!!! This Screen Appears after Press ADD Button

- ➢ Assign DHCP Pool Name
- ➢ Assign DHCP Pool Network
- ➢ Assign Subnet Mask
- ➢ Assign Starting IP and Ending
- ➢ Assign Default Router
- ➢ Then Click ok
- ➢ Apply the Settings
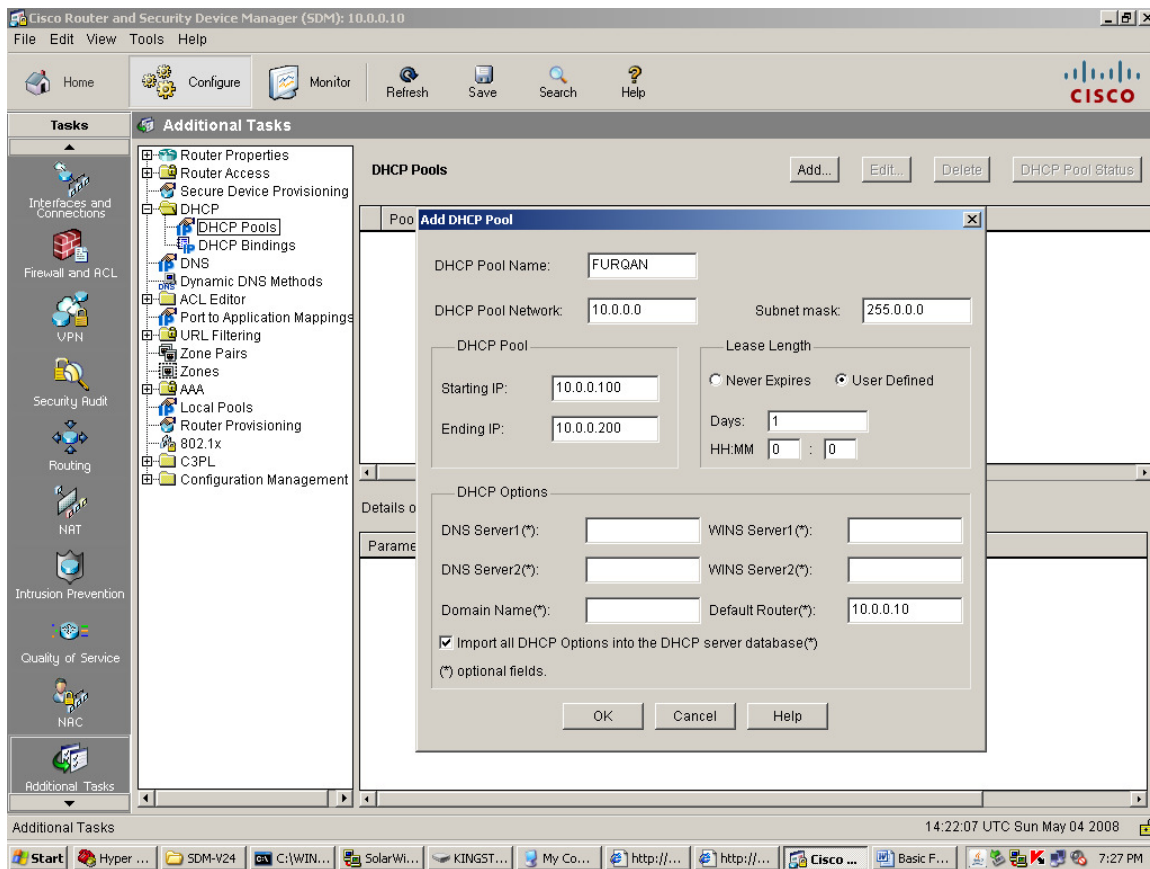
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Prepared by
Furqan Yaseen

!!! Policy Push on Router
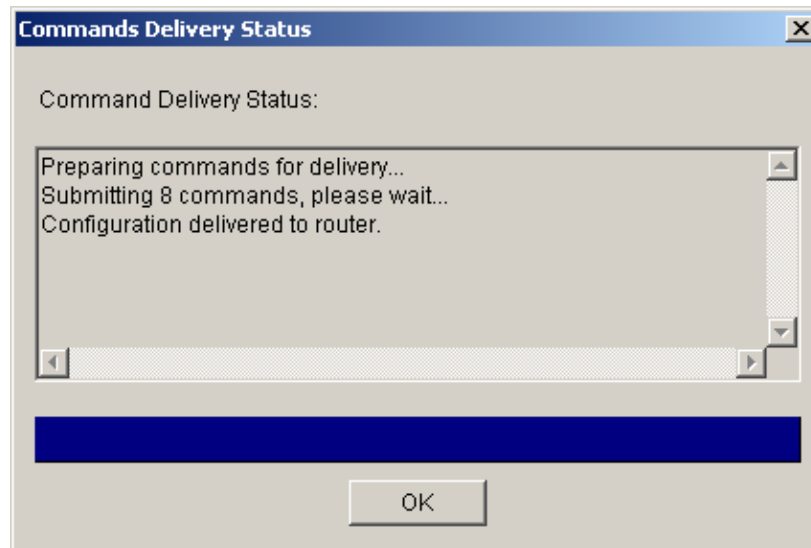
Verification
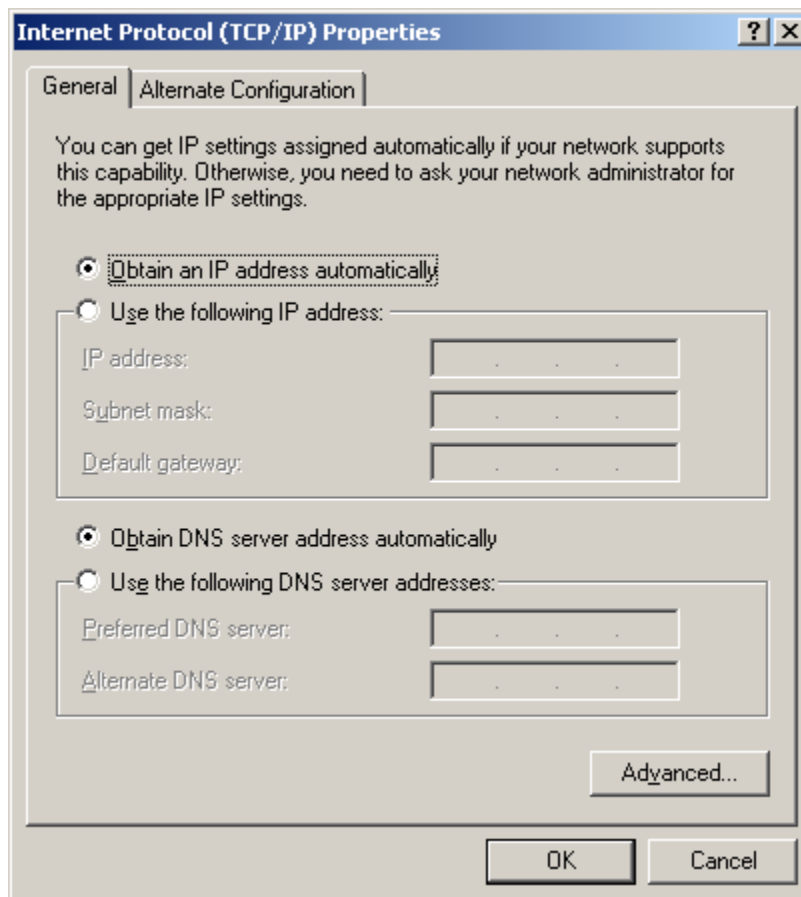
Lab9
Prepared by
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IP assign to DHCP Client using DHCP Server

!!! Verification in Router
Go to DHCP→ DHCP Pools-→ Check the DHCP Pool Status to Show the lease ip.

Lab9
Prepared by
Furqan Yaseen

The Lease ip addresses are listed below
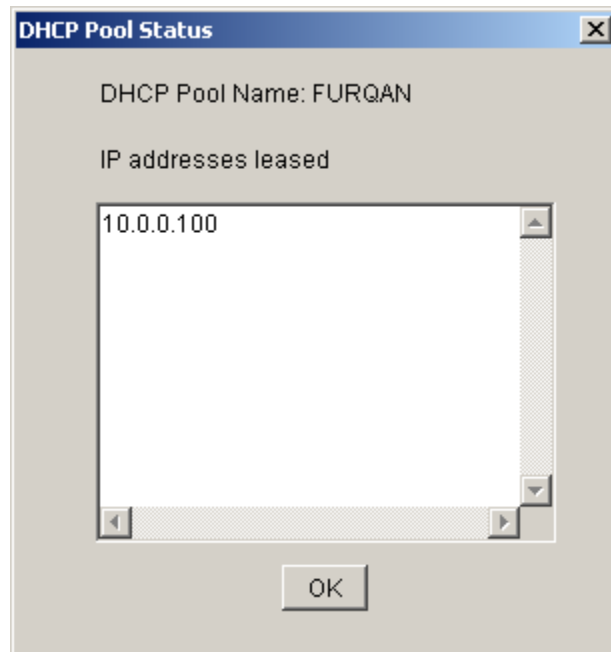
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P.E.C.H.S. near PTCL Exchange

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