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ID: 18-37518-1

Course Name: Computer Networks

Section: E

Semester: Spring 2020-21

Task: Homework

Submission Date: 30-04-2021

Problem Statement:

I have to configure a network satisfying the following conditions:

1. The IP block is XW.1ZV.0.0/16.

2. Configure the 'DHCP for subnet R' router such that it acts as a DHCP server for the subnet R. This configuration must be done through Telnet protocol from PC 10. Thus, do at last after doing all other configuration.

3. Use EIGRP routing protocol.

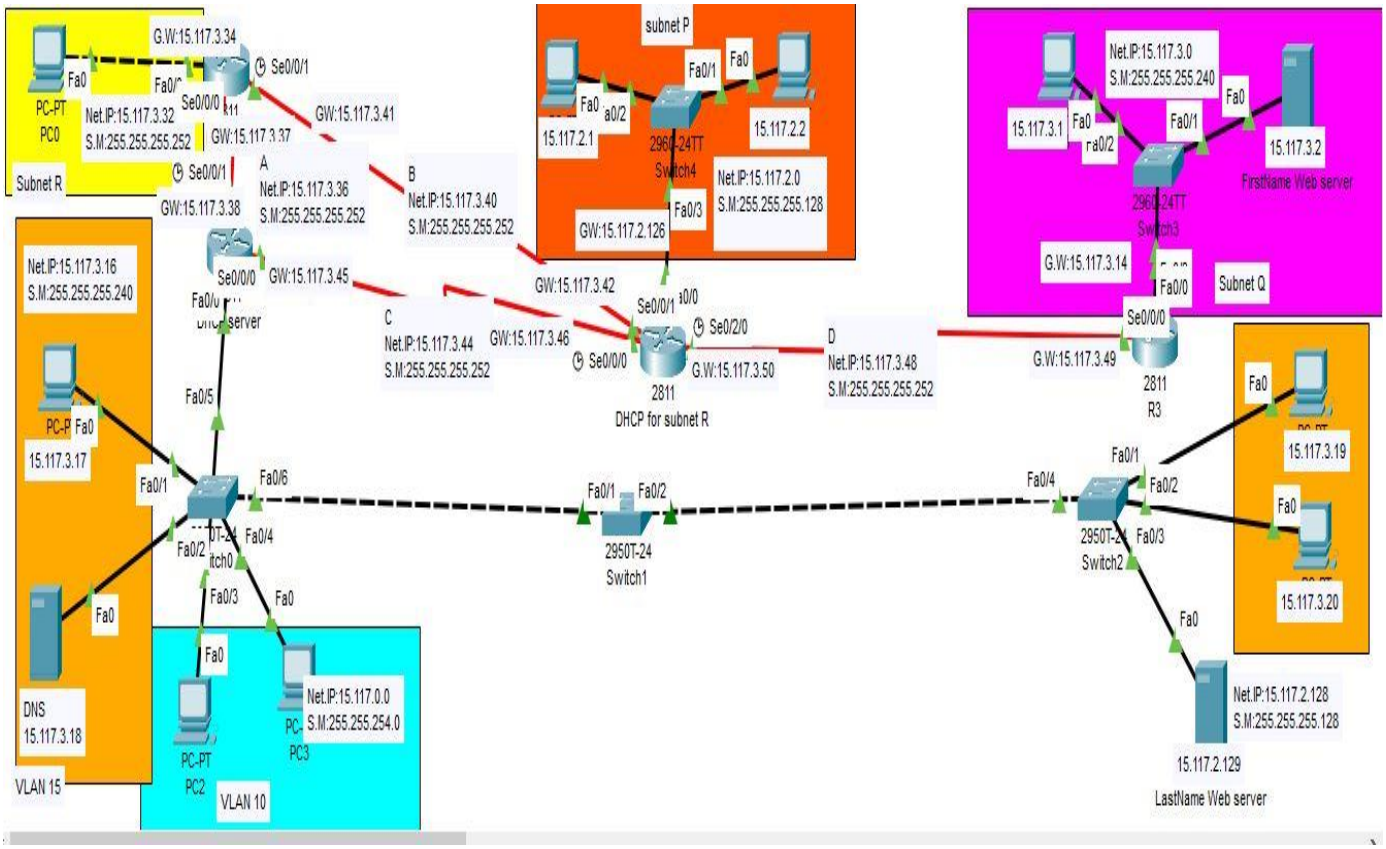
4. The computers of the VLAN 10 will get IP addresses from the DHCP server.

5. There are two web servers: FirstName and LastName. Suppose that your name is Abu Bakr. Then the domain name of the FirstName and LastName servers will be www.abu.com and www.bakr.com. The first and second website's homepages show your Maternal grandfather's upzilla name and your father's name, respectively. Please note that you do not need to provide the real information.

6. Configure VTP in Switch 0, Switch 1 and Switch 2.

7. Configure the whole network in such a way that all devices are reachable from any of the devices of the whole network.

Designed Network:



VLSM:

IP requirement of each subnet and the IP block of this network are given below,

My ID number= ST-UVWXY-Z =18-37518-1

So,

S=1, T=8, U=3, V=7, W=5, X=1, Y=8, Z=1

Subnet P=YX=81

Subnet Q=XW=15

VLAN 10 =2WV= 257

VLAN 15 =ZS=11

VLAN which the LastName Web server connected to=TX=81

Subnet R=4

A=4

B=4

C=4

D=4

The IP block is XW.1ZV.0.0/16 = 15.117.0.0

Table: VLSM

Subnet	No. of IPs required	How many bits to borrow	No. of allocated IPs	No. of host bits No. of net bits	Subnet mask	Allocated IP range
VLAN 10	257	$2^9>257>2^6$	512	X=9 Y=23	255.255.254.0	15.117.0.0-15.117.1.255
P	81	$2^7>81>2^6$	128	X=7 Y=25	255.255.255.128	15.117.2.0-15.117.2.127
VLAN which the LastName web server connected	81	$2^7>81>2^6$	128	X=7 Y=25	255.255.255.128	15.117.2.128-15.117.2.255
Q	15	$2^4>15>2^3$	16	X=4 Y=28	255.255.255.240	15.117.3.0-15.117.3.15
VLAN 15	11	$2^4>11>2^3$	16	X=4 Y=28	255.255.255.240	15.117.3.16-15.117.3.31
R	4	$2^2=4$	4	X=2 Y=30	255.255.255.252	15.117.3.32-15.117.3.35
A	4	$2^2=4$	4	X=2 Y=30	255.255.255.252	15.117.3.36-15.117.3.39
B	4	$2^2=4$	4	X=2 Y=30	255.255.255.252	15.117.3.40-15.117.3.43
C	4	$2^2=4$	4	X=2 Y=30	255.255.255.252	15.117.3.44-15.117.3.47
D	4	$2^2=4$	4	X=2 Y=30	255.255.255.252	15.117.3.48-15.117.3.51

Table 1: Switch 0

Task	Command	Purpose
VTP Configuration:	Switch(config)#vtp mode server Switch(config)#vtp domain khan Switch(config)#vtp password 123	Configures the switch as a VTP server. Defines the VTP domain name as khan Set the VTP Password as 123
Vlan Creation	Switch(config)#vlan 10 Switch(config-vlan)#name VLAN10 Switch(config)#vlan 15 Switch(config-vlan)#name VLAN15	Create vlan 10 Give the vlan 10 name VLAN10 Create vlan 15 Give the vlan 15 name VLAN15
Interfaces Configuration:	Switch(config)#interface range fa0/1-2 Switch(config-if-range)#switchport mode access Switch(config-if-range)#switchport access vlan 15 Switch(config)#interface range fa0/3-4 Switch(config-if-range)#switchport mode access Switch(config-if-range)#switchport access vlan 10 Switch(config)#interface fa0/6 Switch(config-if)#switchport mode trunk Switch(config)#int fa0/5 Switch(config-if)#switchport mode trunk	Select interfaces from fa0/1 to fa0/2 switch port mode is set as access Access port is set for vlan 15 Select interfaces from fa0/3 to fa0/4 switch port mode are set as access Access port are set for vlan 10 Select interface fa0/6 switch port mode is set as trunk Select interface fa0/5 switch port mode is set as trunk

Table 2: Switch 1

Task	Command	Purpose
VTP Configuration:	Switch(config)#vtp mode client Switch(config)#vtp domain khan Switch(config)#vtp password 123	Configures the switch as a VTP client. Defines the VTP domain name as khan Set the VTP Password as 123
Interfaces Configuration:	Switch(config)#interface range fa0/1-2 Switch(config-if-range)#switchport mode trunk	Select interfaces from fa0/1 to fa0/2 Switch port mode is set as trunk

Table 3: Switch 2

Task	Command	Purpose
VTP Configuration:	Switch(config)#vtp mode client Switch(config)#vtp domain khan Switch(config)#vtp password 123	Configures the switch as a VTP client. Defines the VTP domain name as khan Set the VTP Password as 123
Interfaces Configuration:	Switch(config)#interface range fa0/1-2 Switch(config-if-range)#switchport mode access Switch(config-if-range)#switchport access vlan15 Switch(config)#interface fa0/4 Switch(config-if)#switchport mode trunk	Select interfaces from fa0/1 to fa0/2 Switch port are set as access port Access ports are set for vlan 15 Select interface fa0/4 Switch port mode is set as trunk

Table 4: Router 1

Task	Command	Purpose
Interfaces Configuration:	Router(config)#int fa0/0	Select interface fa0/0
	Router(config-if)#ip address 15.117.3.34 255.255.255.252	IP address of the Interface.Do not forget to provide subnet mask of the network
	Router(config-if)#no shutdown	Activate the interface
	Router(config-if)#exit	Exit
	Router(config)#int se0/0/1	Select interface se0/0/1
	Router(config-if)#ip address 15.117.3.41 255.255.255.252	IP address of the Interface.Do not forget to provide subnet mask of the network
	Router(config-if)#clock rate 64000	Network Speed
	Router(config-if)#no shutdown	Activate the interface
	Router(config-if)#exit	Exit
	Router(config)#int se0/0/0	Select interface se0/0/0
	Router(config-if)#ip address 15.117.3.37 255.255.255.252	IP address of the Interface.Do not forget to provide subnet mask of the network
	Router(config-if)#no shutdown	Activate the interface
EIGRP Routing Configuration	Router(config)#router eigrp 19	Use EIGRP. Do not forget to provide Autonomous System number.This number can be from the range 1-65535
	Router(config-router)#network 15.117.3.32 255.255.255.252	Connected Network IP and it's Subnet mask
	Router(config-router)#network 15.117.3.40 255.255.255.252	Connected Network IP and it's Subnet mask
	Router(config-router)#network 15.117.3.36 255.255.255.252	Connected Network IP and it's Subnet mask

	Router(config-router)#no auto-summary	Summarize routes to their classfull address's at networks automatically
IP helper Configuration	Router(config)#interface fa0/0 Router(config-if)#ip helper-address 15.117.3.42	Select default gateway of subnet R Set one of the active interface of DCHP serve for R as the ip helper-address for subnet R .

Table 5: DHCP server

Task	Command	Purpose
ROAS	Router(config)#int fa0/0	Select interface fa0/0
	Router(config-if)#no shutdown	Activate the interface fa0/0
	Router(config-if)#int fa0/0.1	Create and Select Sub-interface for vlan 1
	Router(config-subif)#encapsulation dot1q 1	Tagging protocol for vlan 1
	Router(config-subif)#ip address 15.117.2.254 255.255.255.128	IP address of the sub-interface.Do not forget to provide subnet mask of the network
	Router(config-if)#int fa0/0.10	Create and Select Sub-interface for vlan 10
	Router(config-subif)#encapsulation dot1q 10	Tagging protocol for vlan 10
	Router(config-subif)#ip address 15.117.1.254 255.255.254.0	IP address of the sub-interface.Do not forget to provide subnet mask of the network
	Router(config-if)#int fa0/0.15	Create and Select Sub-interface for vlan 15
	Router(config-subif)#encapsulation dot1q 15	Tagging protocol for vlan 15
	Router(config-subif)#ip address 15.117.3.30 255.255.255.240	IP address of the sub-interface.Do not forget to provide subnet mask of the network
DHCP server for vlan 10	Router(config)#interface fa0/0.10	Select Sub-interface of vlan 10
	Router(config-subif)#ip address 15.117.1.254 255.255.254.0	

	Router(config-subif)#no shut Router(config-subif)#exit Router(config)#ip dhcp pool nusrat Router(dhcp-config)#network 15.117.0.0 255.255.254.0 Router(dhcp-config)#dns-server 15.117.3.18 Router(dhcp-config)#default-router 15.117.1.254	IP address of the interface.Do not forget to provide subnet mask of the network Activate the sub-interface Exit Create a pool of IP, can give any name to the pool Network IP from which IP address will be allocated to different clients.Do not forget to provide the subnet musk of the network Provide DNS server's IP address.This is optional Provide default gateway's IP address
Interfaces Configuration:	Router(config)#int se0/0/0 Router(config-if)#ip address 15.117.3.45 255.255.255.252 Router(config-if)#no shutdown Router(config-if)#exit Router(config)#int se0/0/1 Router(config-if)#ip address 15.117.3.38 255.255.255.252 Router(config-if)#clock rate 64000 Router(config-if)#no shutdown Router(config-if)#exit	Select interface se0/0/0 IP address of the Interface.Do not forget to provide subnet mask of the network Activate the interface Exit Select interface se0/0/1 IP address of the Interface.Do not forget to provide subnet mask of the network Network Speed Activate the interface Exit
EIGRP Routing Configuration	Router(config)#router eigrp 19	Use EIGRP. Do not forget to provide Autonomous System number.This number can be from the range 1-65535

	Router(config-router)#network 15.117.3.36 255.255.255.252 Router(config-router)#network 15.117.3.44 255.255.255.252 Router(config-router)#network 15.117.3.16 255.255.255.240 Router(config-router)#network 15.117.0.0 255.255.254.0 Router(config-router)#network 15.117.2.128 255.255.255.128 Router(config-router)#no auto-summary	Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Summarize routes to their classfull address's at networks automatically

Table 6: DHCP for Subnet R

Task	Command	Purpose
Interfaces Configuration:	Router(config)#int se0/0/0 Router(config-if)#ip address 15.117.3.46 255.255.255.252 Router(config-if)#clock rate 64000 Router(config-if)#no shutdown Router(config-if)#exit Router(config)#int se0/0/1 Router(config-if)#ip address 15.117.3.42 255.255.255.252 Router(config-if)#no shutdown Router(config-if)#exit Router(config)#int se0/2/0	Select interface se0/0/0 IP address of the Interface.Do not forget to provide subnet mask of the network Network Speed Activate the interface Exit Select interface se0/0/1 IP address of the Interface.Do not forget to provide subnet mask of the network Activate the interface Exit Select interface se0/2/0

	Router(config-if)#ip address 15.117.3.50 255.255.255.252 Router(config-if)#clock rate 64000 Router(config-if)#no shutdown Router(config-if)#exit Router(config)#int fa0/0 Router(config-if)#ip address 15.117.2.126 255.255.255.128 Router(config-if)#no shutdown Router(config-if)#exit	IP address of the Interface. Do not forget to provide subnet mask of the network Network Speed Activate the interface Exit Select interface fa0/0 IP address of the Interface. Do not forget to provide subnet mask of the network Activate the interface Exit
EIGRP Routing Configuration	Router(config)#router eigrp 19 Router(config-router)#network 15.117.3.40 255.255.255.252 Router(config-router)#network 15.117.3.44 255.255.255.252 Router(config-router)#network 15.117.2.0 255.255.255.128 Router(config-router)#network 15.117.3.48 255.255.255.252 Router(config-router)#no auto-summary	Use EIGRP. Do not forget to provide Autonomous System number. This number can be from the range 1-65535 Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Summarize routes to their classfull address's at networks automatically
Telnet configuration	Router(config)#enable secret 123 Router(config)#line vty 0	Secret password for Privileged Mode Set that one device can configure remotely. Highest 16 devices can remotely configure.

	Router(config-line)#password 19 Router(config-line)#login	Vty password. Login as the passwords are used to login.This command is optional.

Table 7: R3

Task	Command	Purpose
Interfaces Configuration:	Router(config)#int fa0/0 Router(config-if)#ip address 15.117.3.14 255.255.255.240 Router(config-if)#no shutdown Router(config-if)#exit Router(config)#int se0/0/0 Router(config-if)#ip address 15.117.3.49 255.255.255.252 Router(config-if)#no shutdown Router(config-if)#exit	Select interface fa0/0 IP address of the Interface.Do not forget to provide subnet mask of the network Activate the interface Exit Select interface se0/0/0 IP address of the Interface.Do not forget to provide subnet mask of the network Activate the interface Exit
EIGRP Routing Configuration	Router(config)#router eigrp 19 Router(config-router)#network 15.117.3.0 255.255.255.240 Router(config-router)#network 15.117.3.48 255.255.255.252 Router(config-router)#no auto-summary	Use EIGRP. Do not forget to provide Autonomous System number.This number can be from the range 1-65535 Connected Network IP and it's Subnet mask Connected Network IP and it's Subnet mask Summarize routes to their classfull address's at networks automatically

Necessary screenshots:

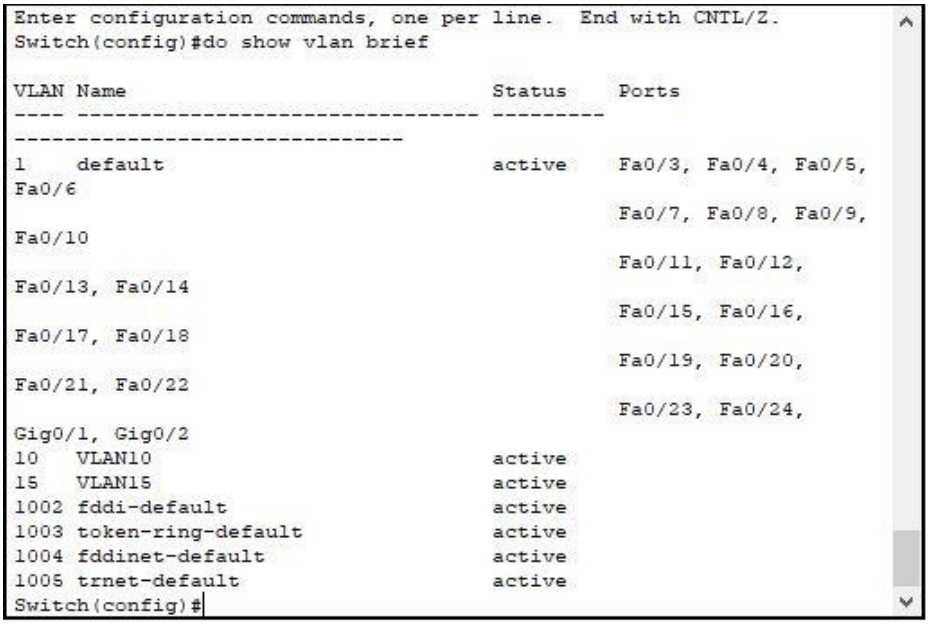


Figure 1: Do Show vlan brief switch 0

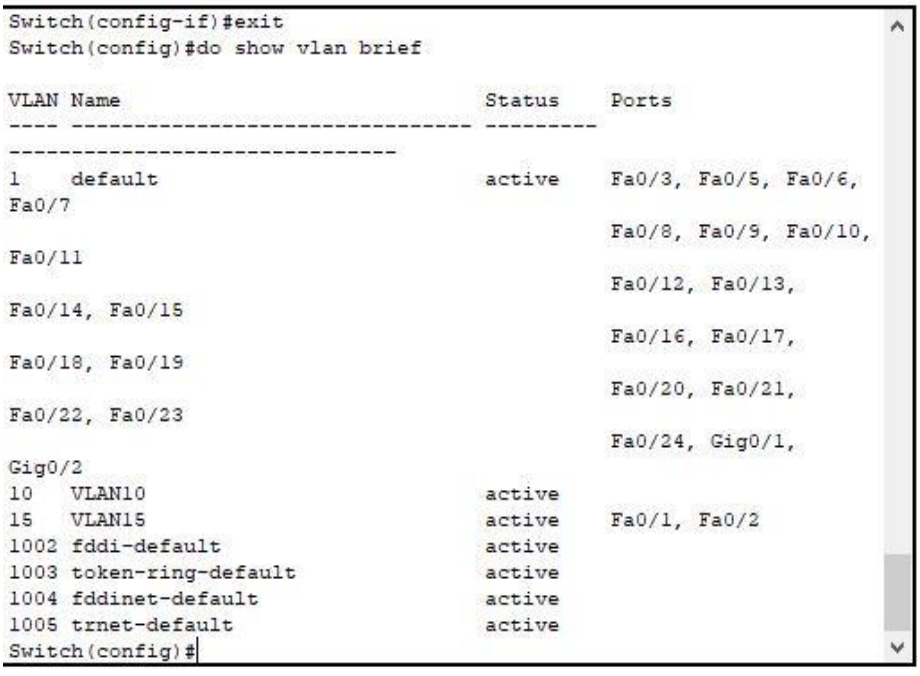


Figure 2: Do Show vlan brief switch 1

```
Switch#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#do show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- ---------
-------------------------------
1    default                           active    Fa0/5, 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, Gig0/1
                                                 Gig0/2
10   VLAN10                            active    Fa0/3, Fa0/4
15   VLAN15                            active    Fa0/1, Fa0/2
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch(config)#
```

Figure 3: Do Show vlan brief switch 2

```
changed state to up

Router(config-subif)#encapsulation dot1q 15
Router(config-subif)#ip address 15.117.3.30 255.255.255.240
Router(config-subif)#exit
Router(config)#do show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
FastEthernet0/0        unassigned      YES unset  up
up
FastEthernet0/0.1      15.117.2.254    YES manual up
up
FastEthernet0/0.10     15.117.1.254    YES manual up
up
FastEthernet0/0.15     15.117.3.30     YES manual up
up
FastEthernet0/1        unassigned      YES unset  administratively
down down
Serial0/0/0            unassigned      YES unset  administratively
down down
Serial0/0/1            unassigned      YES unset  administratively
down down
Vlan1                  unassigned      YES unset  administratively
down down
Router(config)#
```

Ctrl+F6 to exit CLI focus Copy Paste

Figure 4: Sub-interfaces created in DHCP server

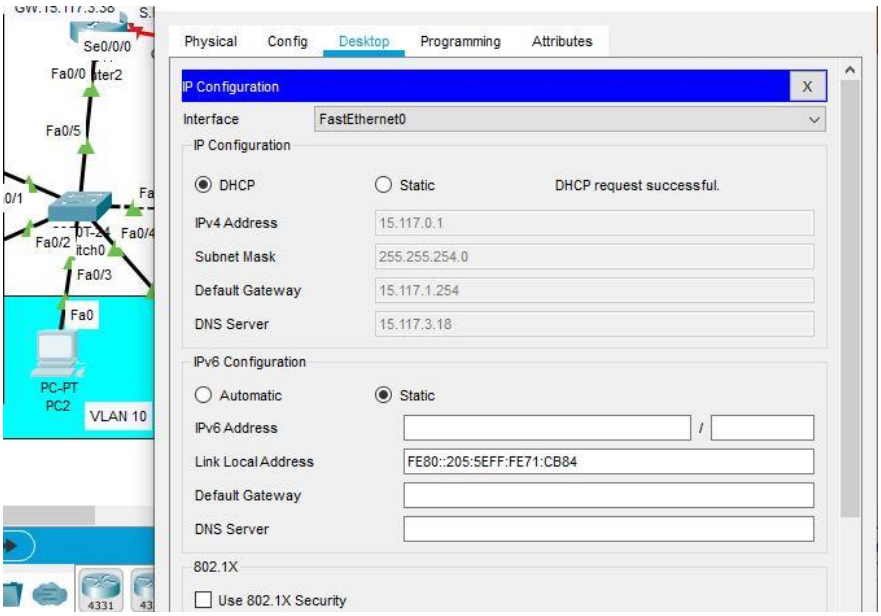


Figure 5: PC1 from vlan 10 configuration from DHCP

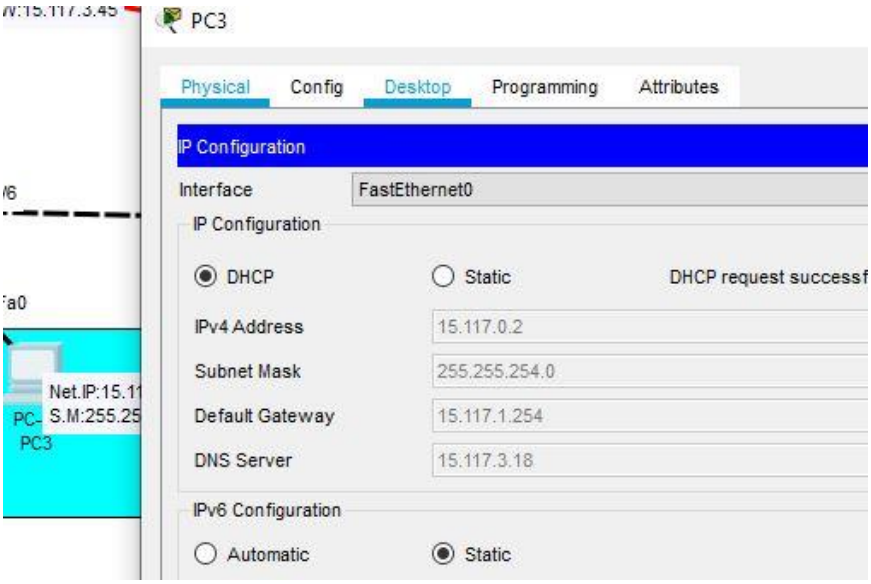


Figure 6: PC2 from vlan 10 configuration from DHCP

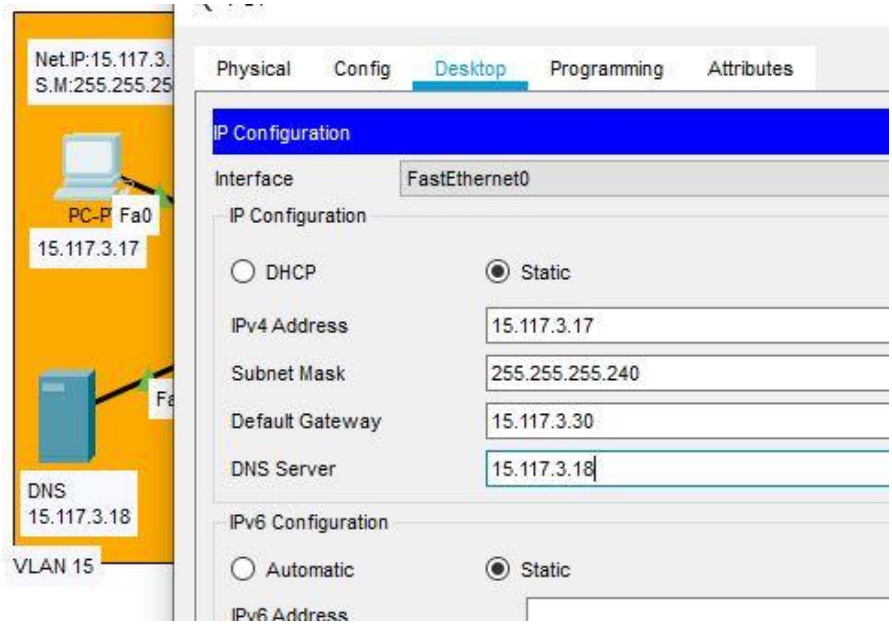


Figure 7 : Manual Configuration of PC from Vlan 15

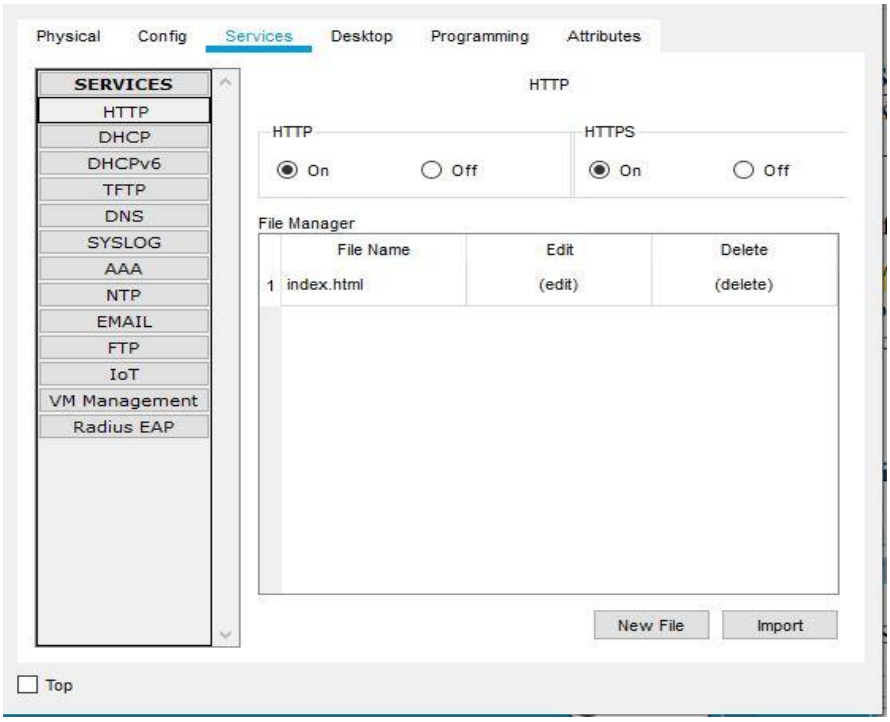


Figure 8 : Web server

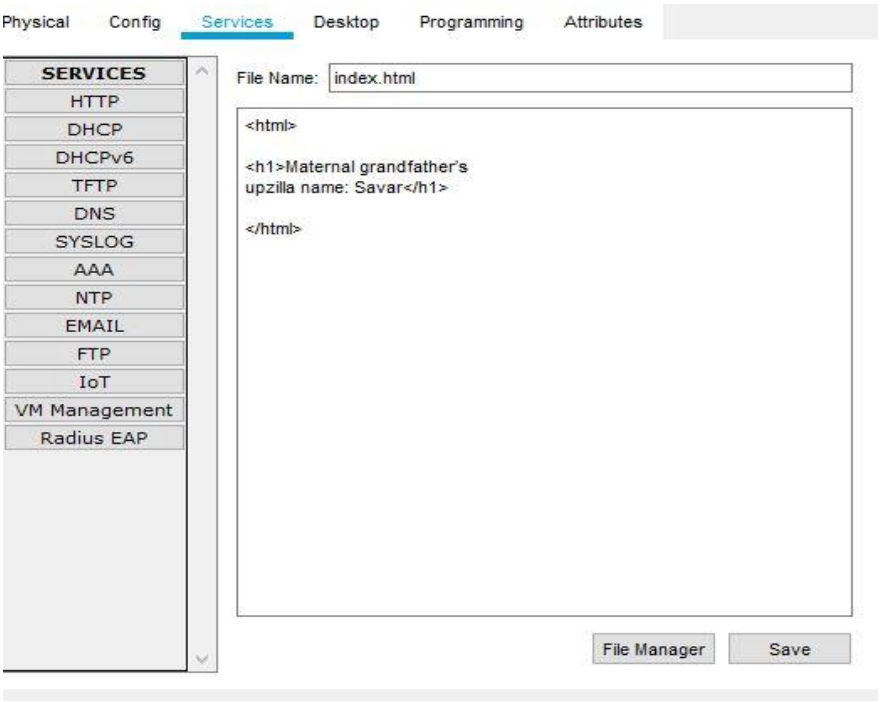


Figure 9: Web server

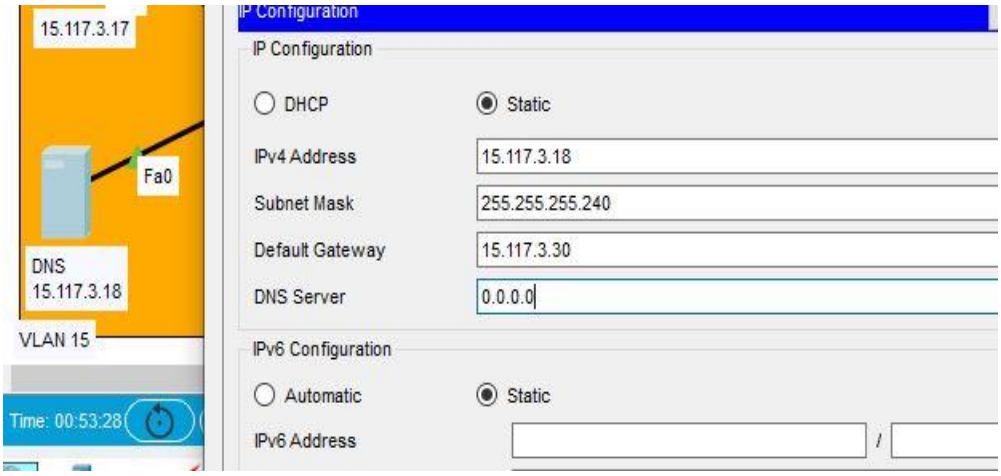


Figure 10: DNS server Configuration

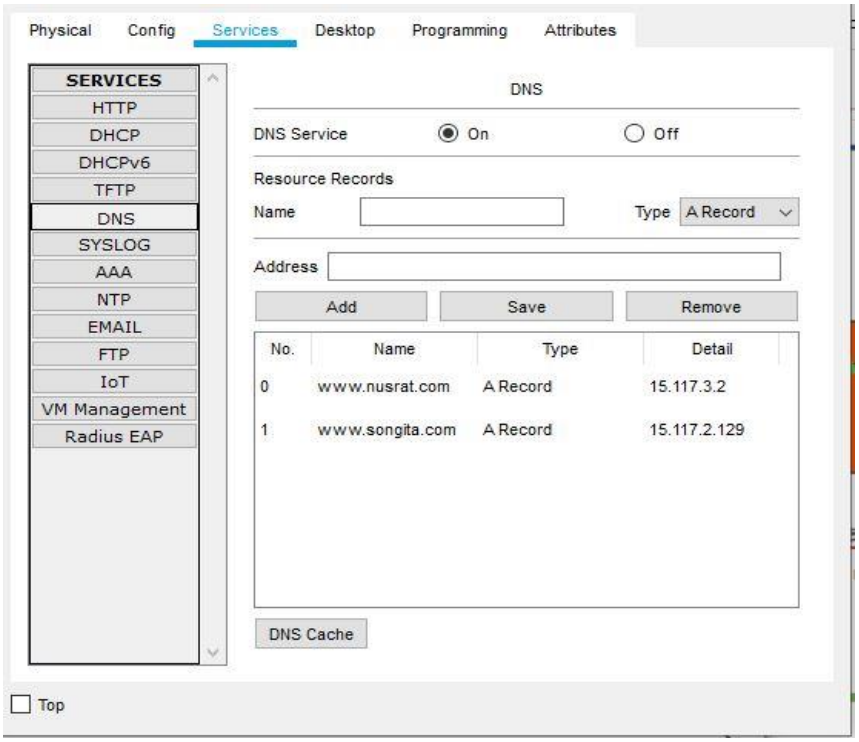


Figure 11: FirstName web server's and LastName web server's IP address's and Domain names is added into DNS server

Figure 12: Browse the FirstName web server page by it's domain name www.nusrat.com

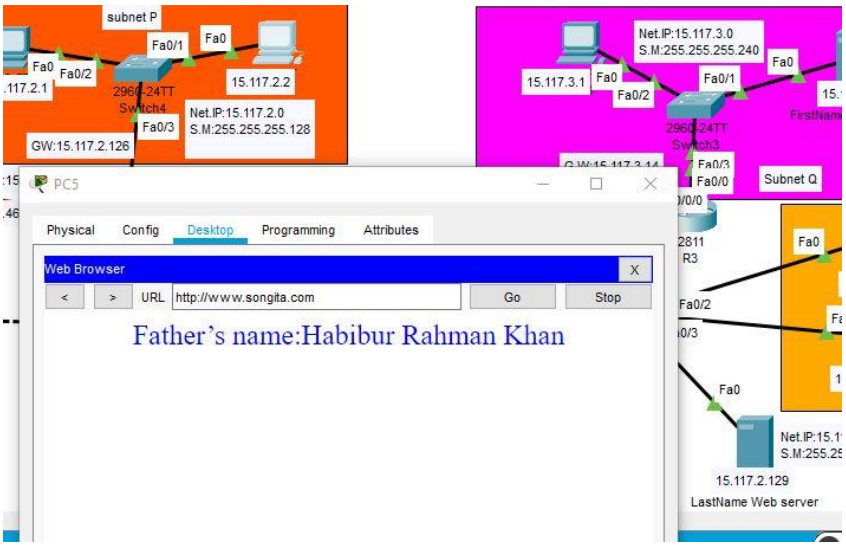


Figure 13: Browse the LaseName web server page by it's domain name www.songita.com

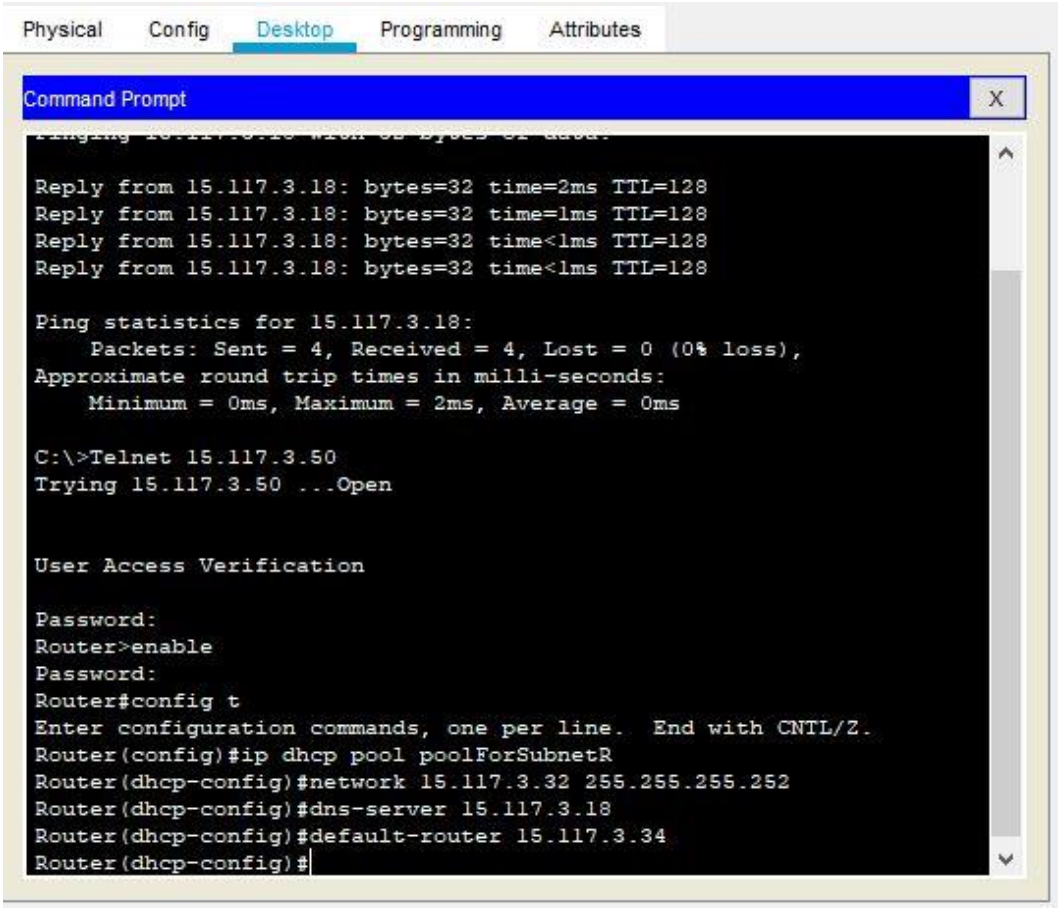


Figure 14: Telnet Configure of DHCP for subnet R from PC 10

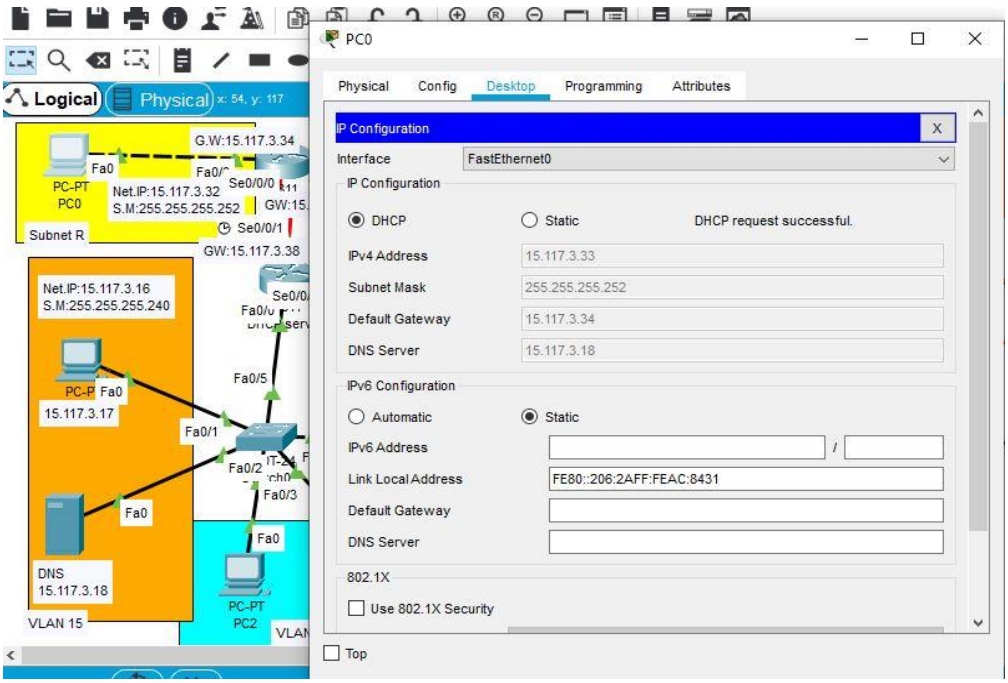


Figure 15:Subnet R PC configuration from DHCP for subnet R

Confirmed Communication:

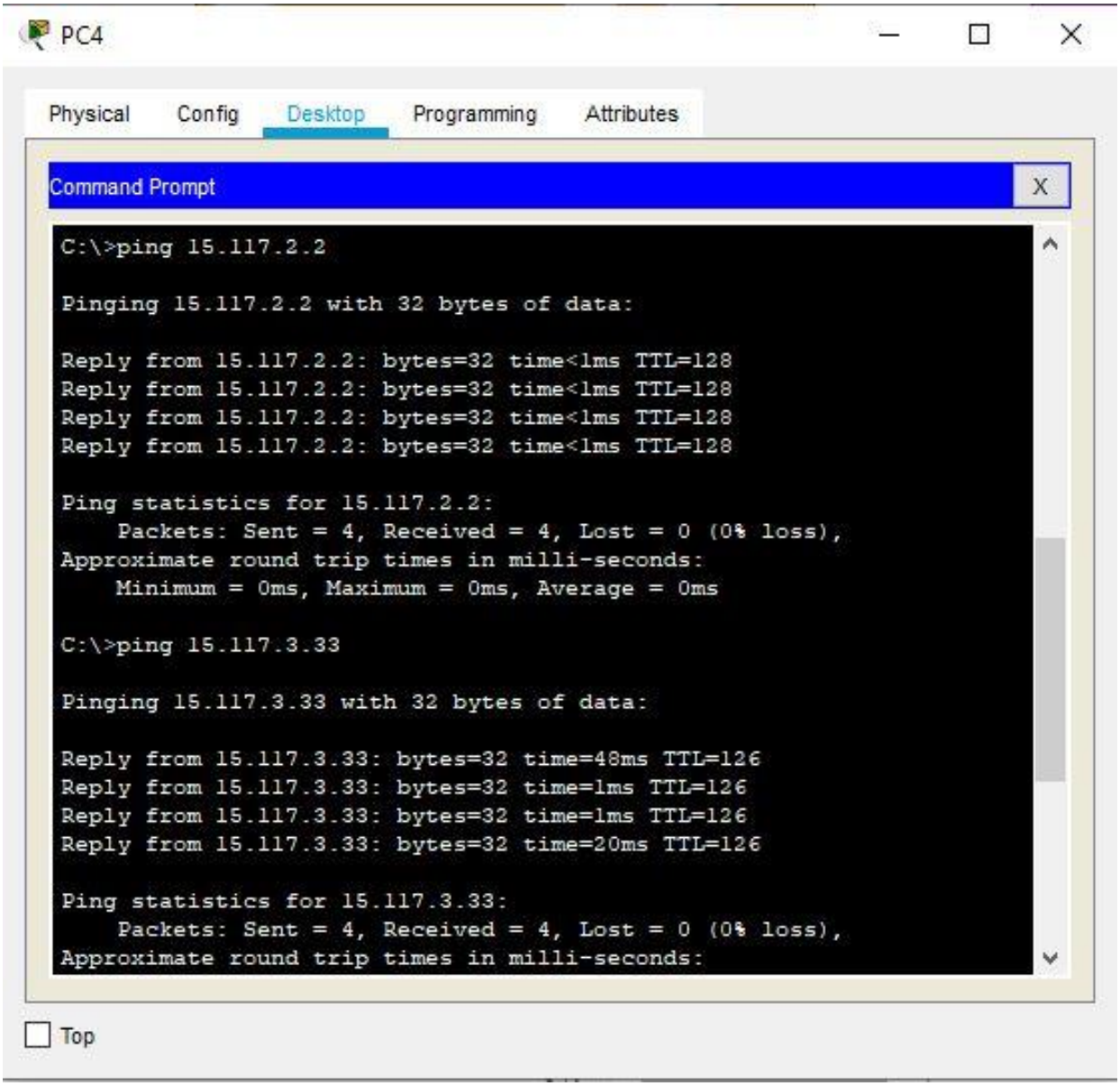


Figure 16: Ping from P to P and R

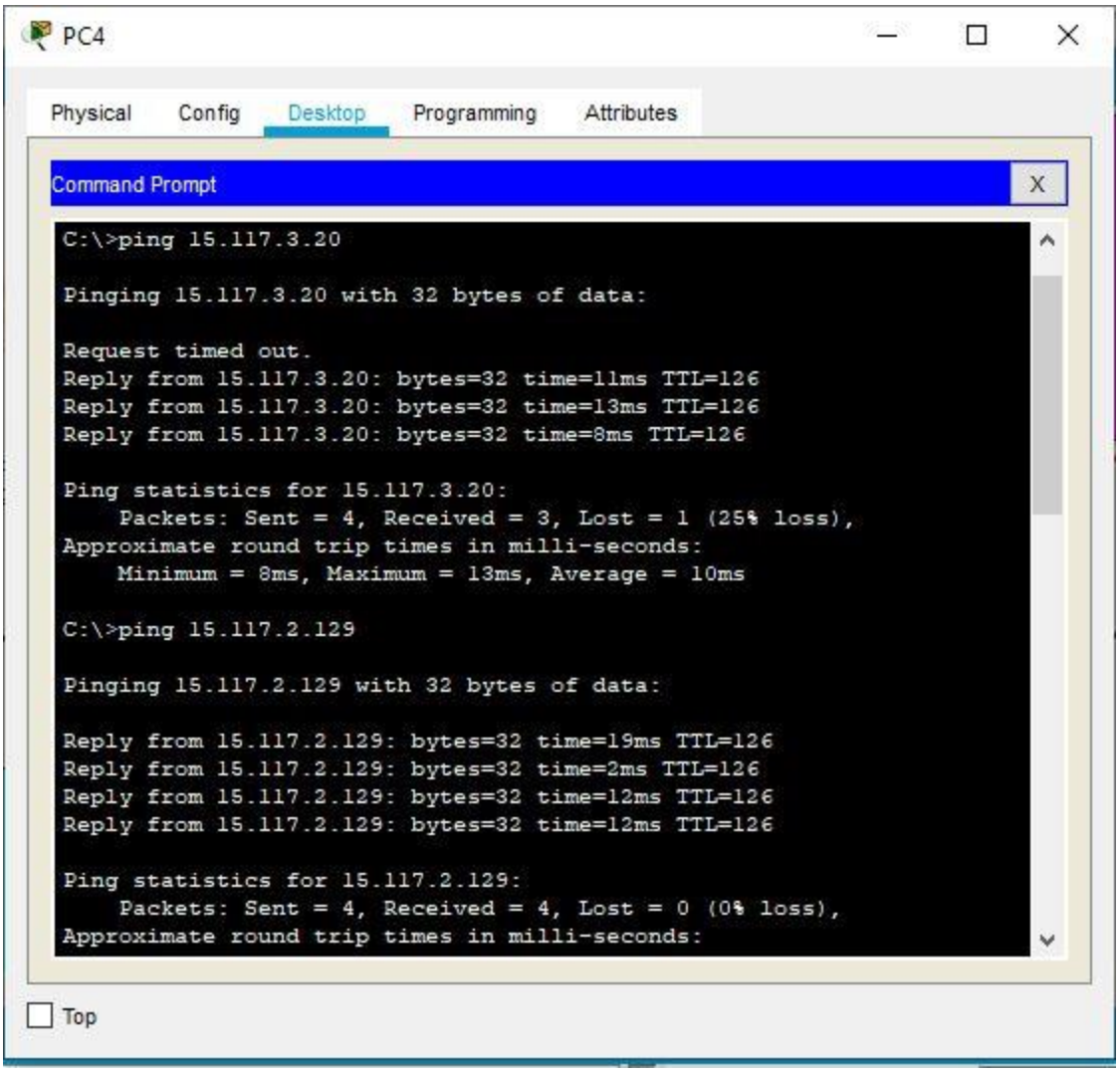


Figure 17: Ping from P to Vlan 1 and Vlan 15

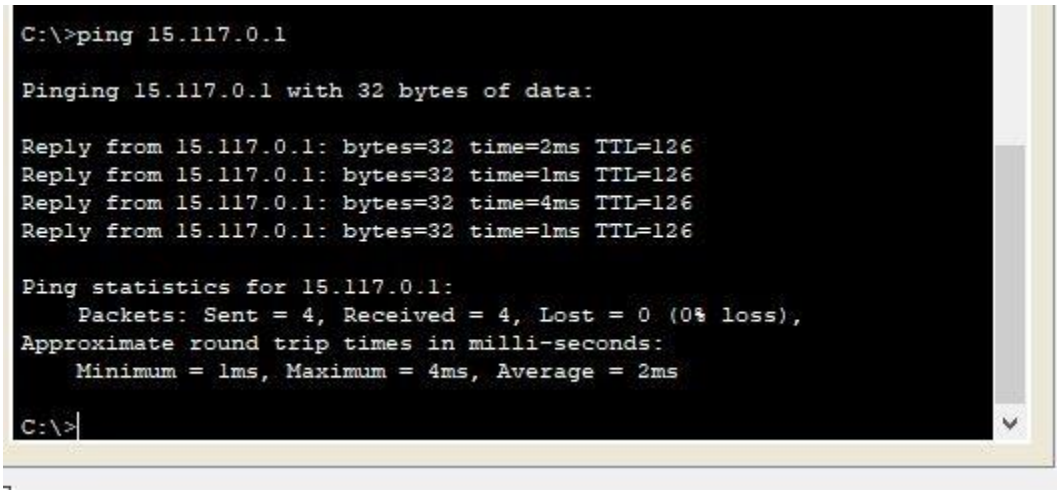


Figure 18: Ping from P to Vlan 10

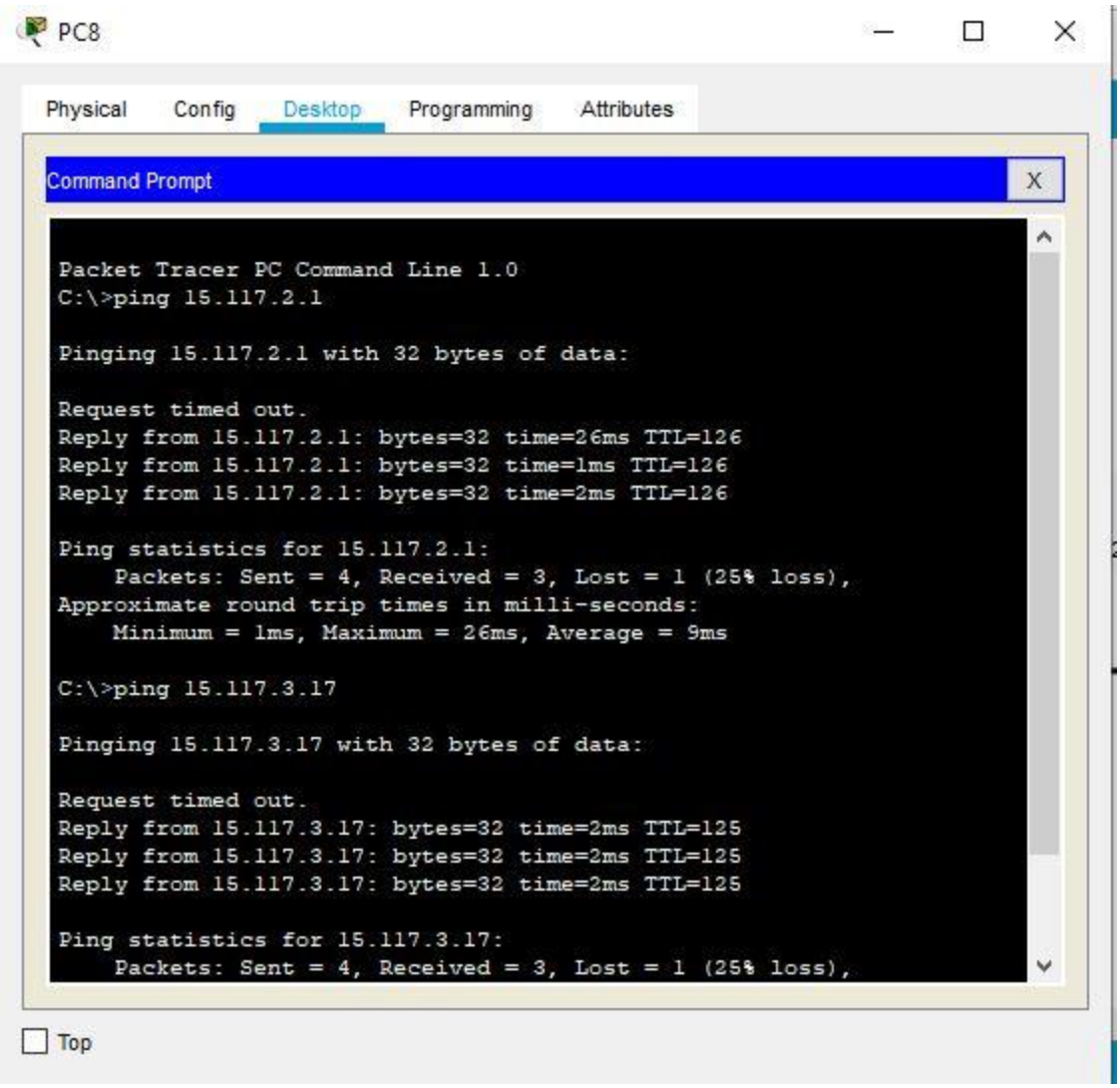


Figure 19: Ping from Q to P and Vlan 15

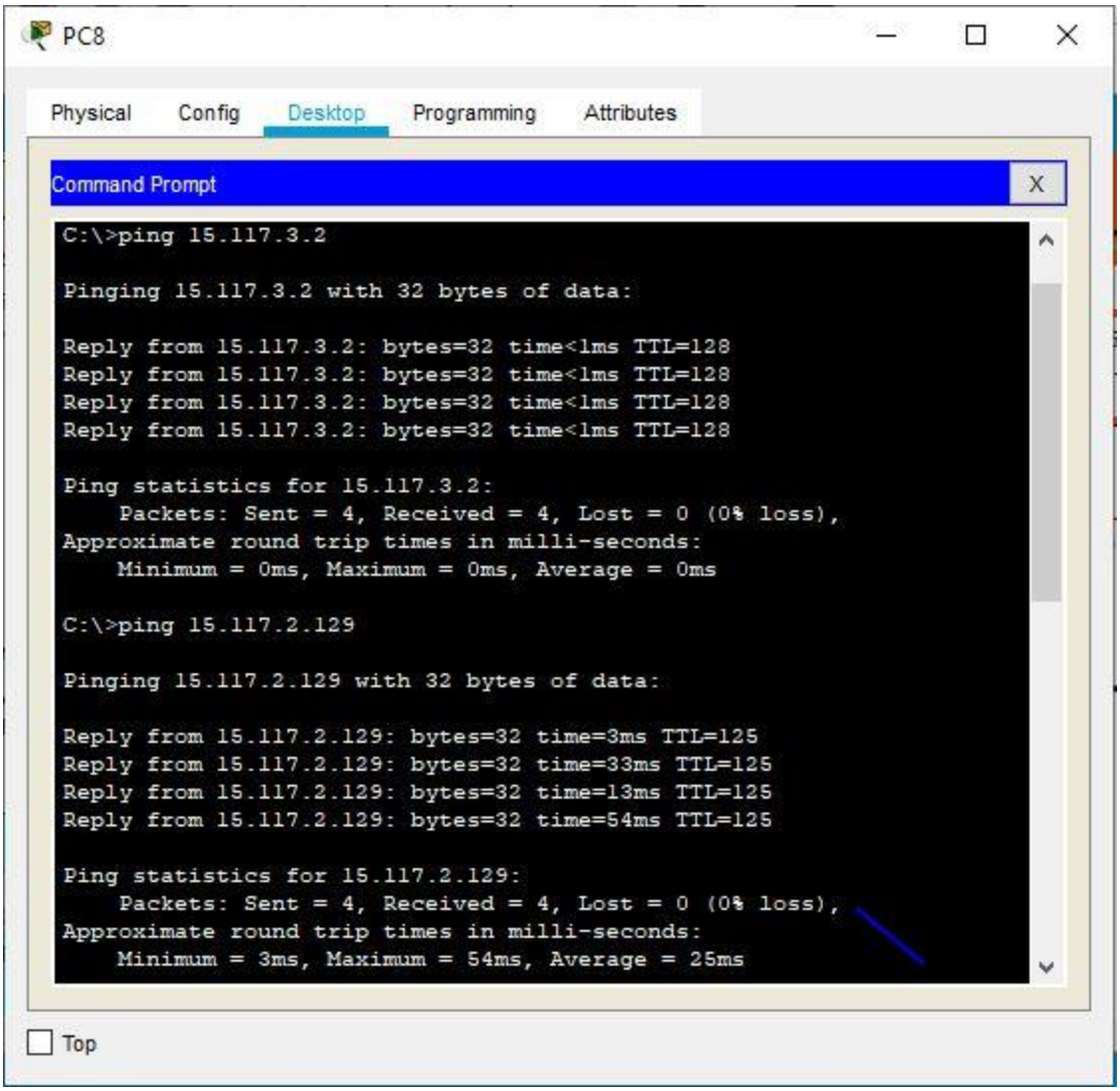


Figure 20: Ping from Q to Q Vlan 1

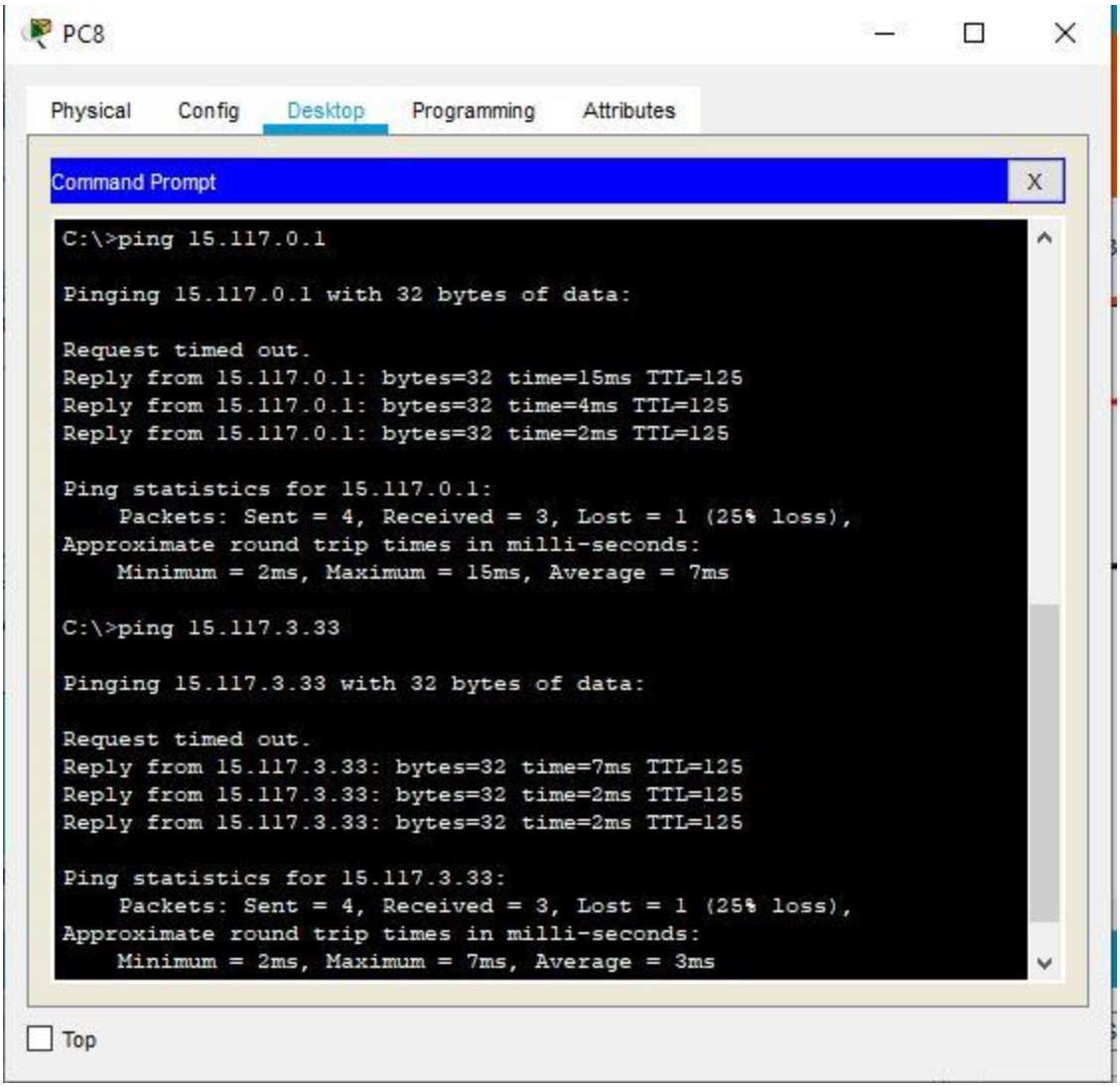


Figure 21: Ping from Q to R Vlan 10

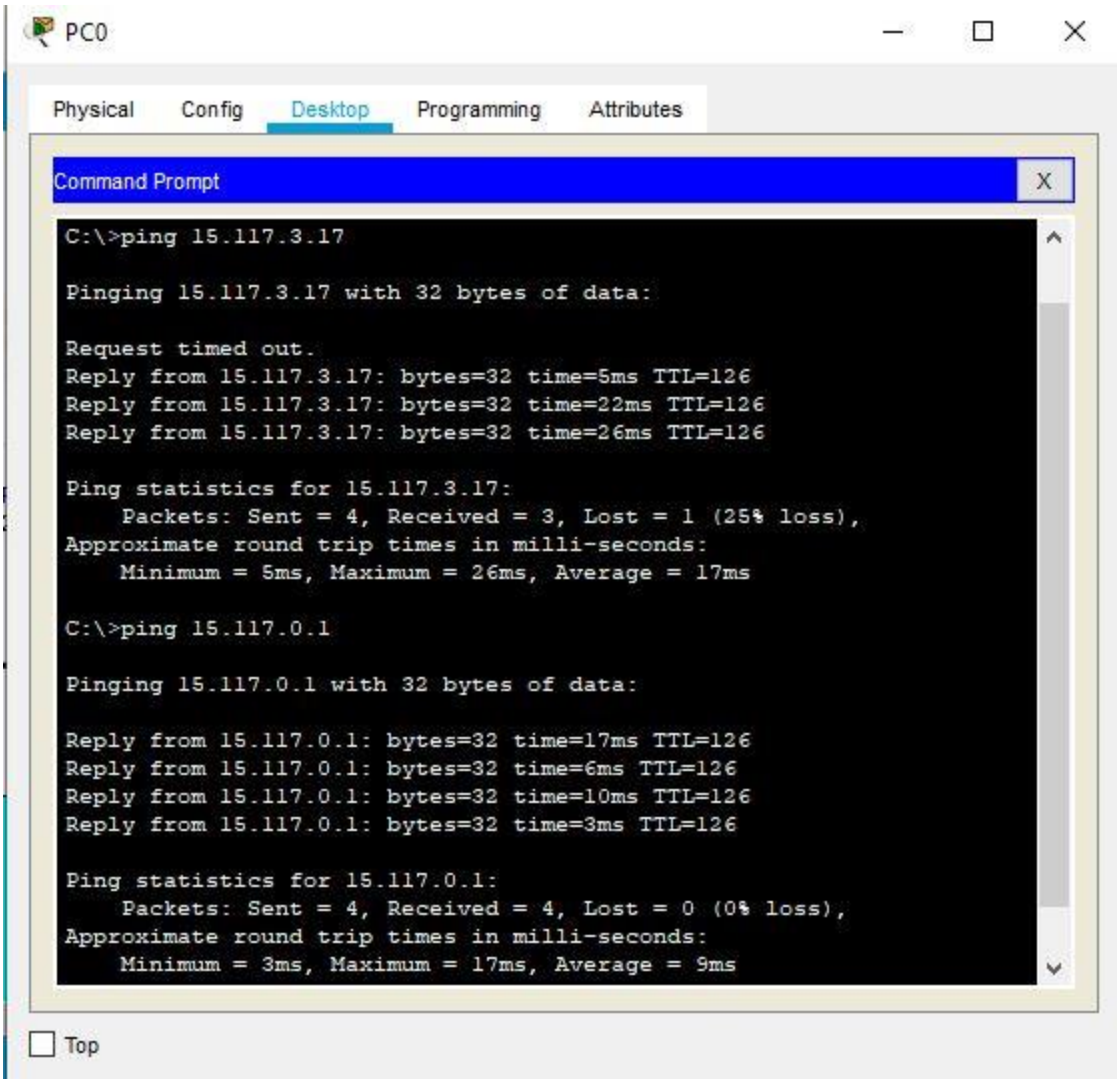


Figure 22: Ping from R to Vlan 10 and Vlan 15

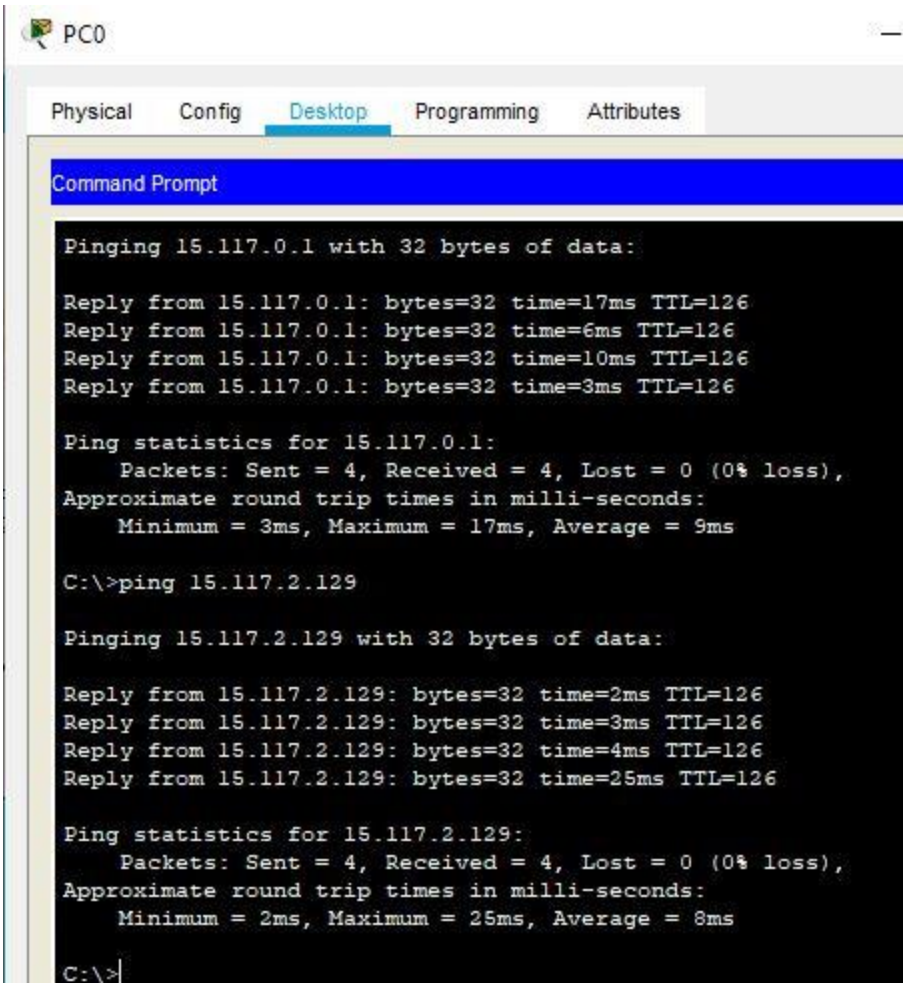


Figure 23: Ping from R to Vlan 1

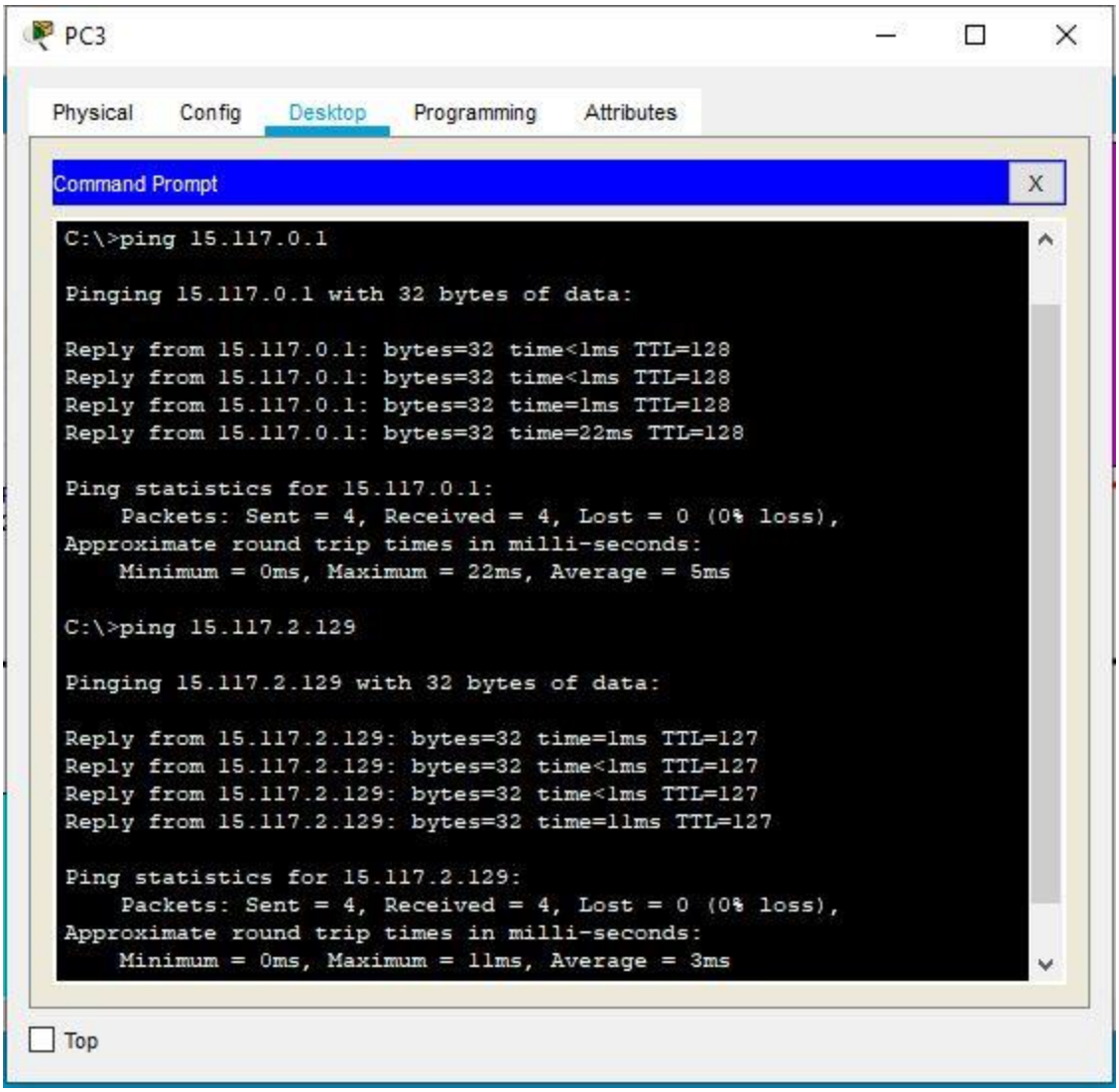


Figure 24: Ping from Vlan 10 to Vlan 10 and Vlan 1

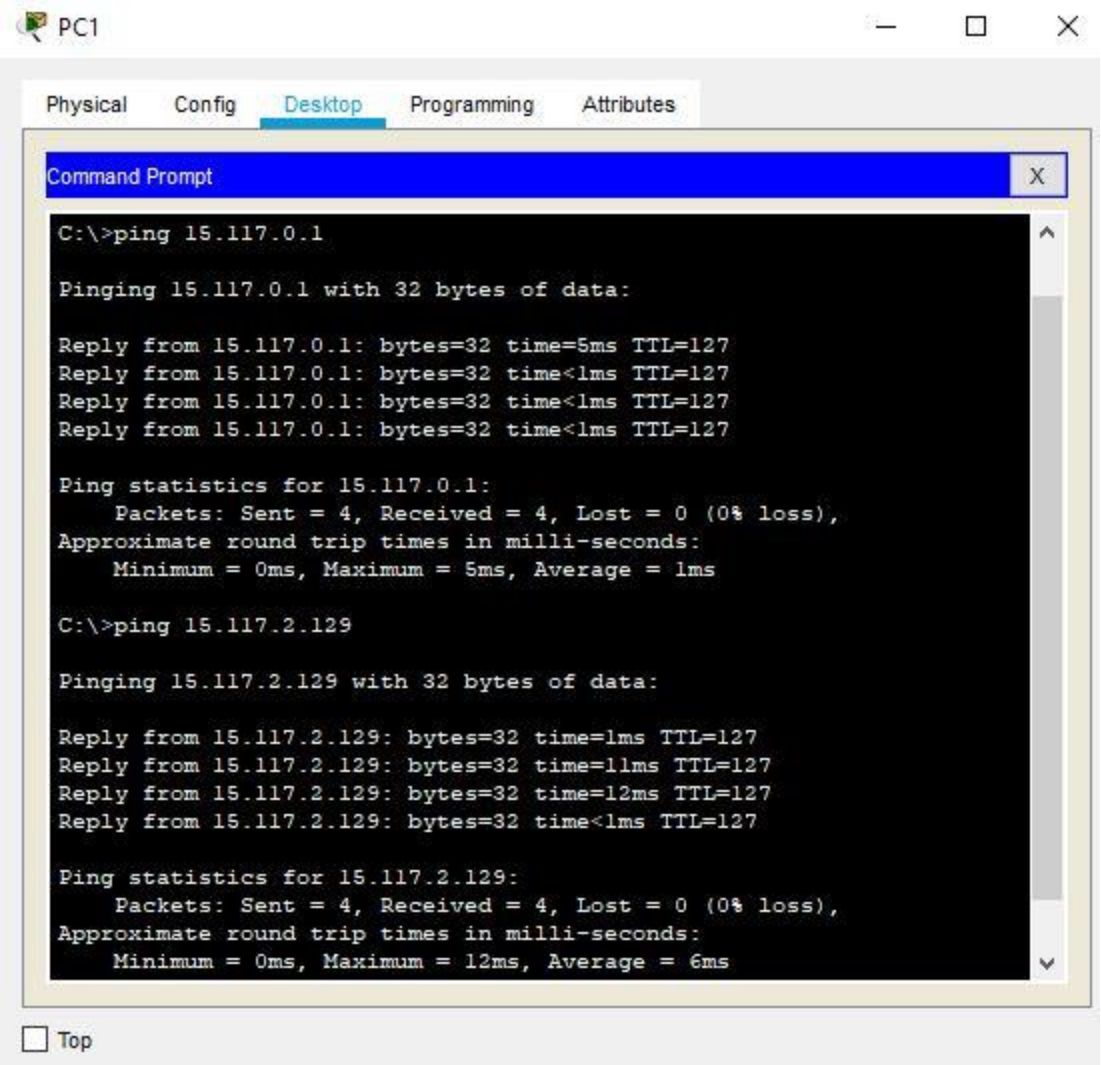


Figure 25: Ping from Vlan 15 to Vlan 10 and Vlan 1

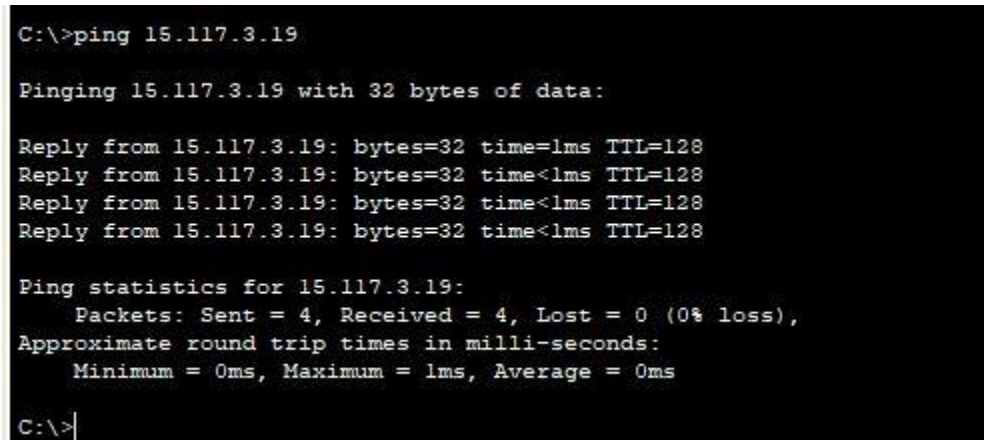


Figure 26: Ping from Vlan 15 to Vlan 15