Project Report

Course Code: CSE 314

Course Title: Computer Networks Lab

Submitted to:

Azizul Hakim Shuvo

Senior Professor

Department of Computer Science and Engineering

Daffodil International University

Submitted by:

Bipro Roy
ID: 191-15-12976
Section: M
Department of Computer Science and Engineering
Daffodil International University

My network Scenario

In this project, I designed a sample network for a college. The college has 5 rooms 1 IT Room, 1 Teachers Room, 3 Lab Rooms and 1 common room.

In IT room, there can be up to 10 devices. I have taken 3 routers,1 Pc and 1 laptop as a demo. In this section I have used Static IP configuration.

In teachers' room, there is an arrangement for 50 devices.

In this room I have used static IP configuration.

In each Lab Rooms, there is an arrangement for 60 devices. I have used DHCP for IP Configuration. Lab1 can't use DNS service.

In Common Room, there can be up to 50 devices can be connected through wireless router.

Some of the features I've added in this network are,

- ✞ All the devices existing in the network can ping each other.
- ✞ I have used dynamic routing to establish connectivity through the whole network as it is much more convenient to use.
- ✞ I have used a password protected wireless router through which people can use wireless connection in common room.
- ✞ Another task for configuring this network was configuration of Servers i.e. DNS, HTTP, FTP etc.

- ✞ I have configured DNS server as DNS servers translate human-friendly domain names to machine-friendly IP addresses.
- ✞ For configuring HTTP I made a custom webpage which can be accessed from any host in the any network by IP address called 10.0.1.6 or tas@edu.com.
- ✞ For configuring the FTP same concept. Here I made a user called ‘abc’ and password ‘12345’
- ✞ For configuring the Email server I used the same concept by giving usernames and passwords.
- ✞ I have configured DHCP for IP configuration in Lab1, Lab2 and Lab3.

Thus, my entire network is configured.

Devices used:

1.Routers

2.Switches

3.PCs

4.Laptops

5.Servers

6.Smart Phones

7.Tablet PCs

8. Printer

What are the new things I've added?

- I have added password protected wireless router For wireless network configuration.
- Configured Email server for sending mail from one device to another.
- Configured DNS server to translate human-friendly domain names to machine-friendly IP addresses.
- Configured HTTP server for browsing custom web page.
- Configured FTP server for enabling file transfer from one device to another.
- Configured DHCP which automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information.
- Added smart devices smartphone, tablet PC and prepared PC and laptop for wireless connection.
- In my network devices of wireless network can communicate to the other networks.

Calculations:

The calculations for the network are given below:

193-15-2920

Calculations:

IP Address : 10.0.0.0

For lab 1 : 61

nb = 6 nb = 26

IP: 10.0.0.0/26

Mask: 255.255.255.192

m = 64

k = 0

b = 63

Net : 10.0.0.0

1st : 10.0.0.1

Last: 10.0.0.62

Broadcast: 10.0.0.63

For lab 2 : 61

nb = 6 nb = 26

IP : 10.0.0.64/26

Mask : 255.255.255.192

m = 64

k = 64

b = 127

Net: 10.0.0.64

1st : 10.0.0.65

Last : 10.0.0.126

Broadcas: 10.0.0.127

For lab 3 : 10.0.0.128 - 161

nb = 6 nb = 26

IP : 10.0.0.128/26

Mask : 255.255.255.192

m = 64

h = 128

b = 191

Net : 10.0.0.128

1st : 10.0.0.129

Last : 10.0.0.190

Broadcast : 10.0.0.191

For teachers : 50+1 = 51

hb = 6 nb = 26

IP : 10.0.0.192/26

Mask : 255.255.255.192

m = 64

h = 192

b = 255

Net : 10.0.0.192

1st : 10.0.0.193

Last : 10.0.0.254

Broadcast : 10.0.0.255

IT ROOM = 11

nb = 4 nb = 28

IP: 10. 0. 1. 0/28

MASK: 255. 255. 255. 240

m = 16

h = 0

b = 15

Network: 10.0. 1. 0

1st : 10.0.1.1

Last : 10. 0. 1. 14

Broadcast: 10.0.1.15

In between: 2

IP: 10. 0. 1. 16/30

Mask: 255. 255. 255. 252

m = 4

h = 16

b = 19

Net: 10. 0. 1. 16

1st : 10. 0. 1. 17

Last: 10. 0. 1. 18

Broadcast: 10. 0. 1. 19

In between: 2

hb = 2 nb = 30

IP: 10.0.1.20/30

Mask: 255.255.255.252

Net: 10.0.1.20

1st: 10.0.1.21

Last: 10.0.1.22

Broadcast: 10.0.1.23

m = 4

h = 20

b = 23

In between: 2

hb = 2 nb = 30

IP: 10.0.1.24/2

Mask: 255.255.255.252

Net: 10.0.1.24

1st: 10.0.1.25

Last: 10.0.1.26

Broadcast: 10.0.1.27

m = 4

h = 24

b = 27

In between: 2

IP: 10.0.1.28/30

Mask: 255.255.255.252

m = 4
h = 28
b = 31

Net: 10.0.1.28

1st: 10.0.1.29

Last: 10.0.1.30

Broadcast: 10.0.1.31

In between: 2

IP: 10.0.1.32/30

Mask: 255.255.255.252

m = 4
h = 32
b = 35

Net: 10.0.1.32

1st: 10.0.1.33

Last: 10.0.1.34

Broadcast: 10.0.1.35

In between: 2

IP: 10.0.1.36/30

Mask: 255.255.255.252

m = 4
h = 36
b = 39

Net: 10.0.1.36

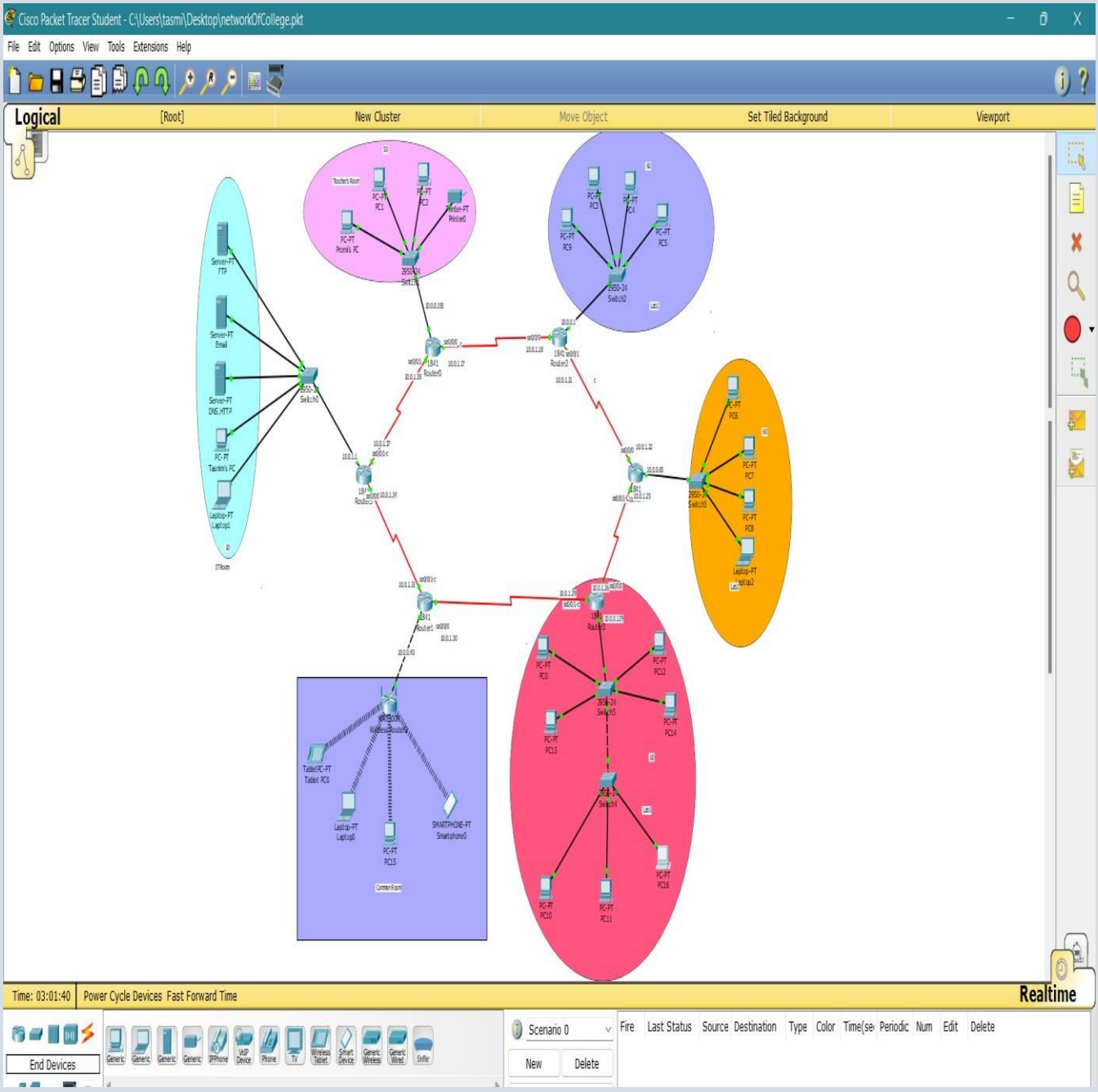
1st: 10.0.1.37

Last: 10.0.1.38

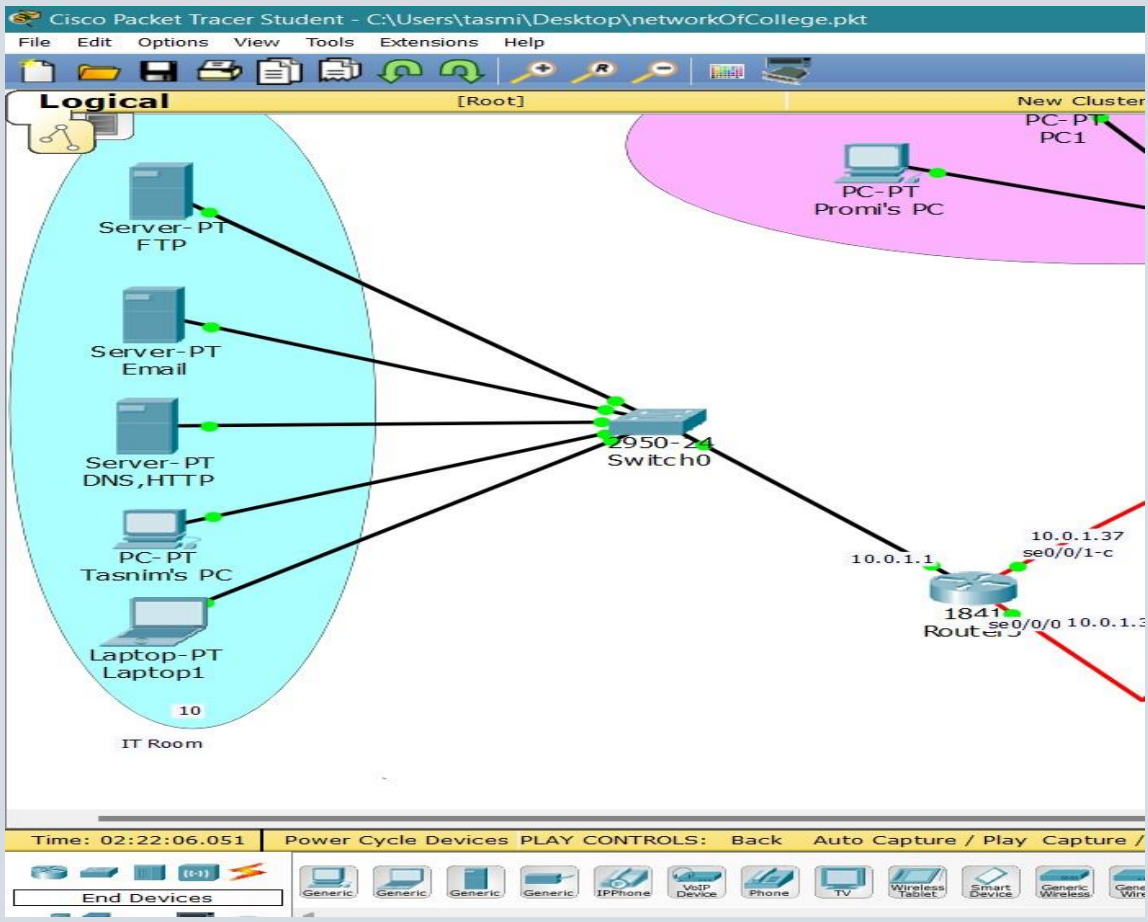
Broadcast: 10.0.1.39

Design:

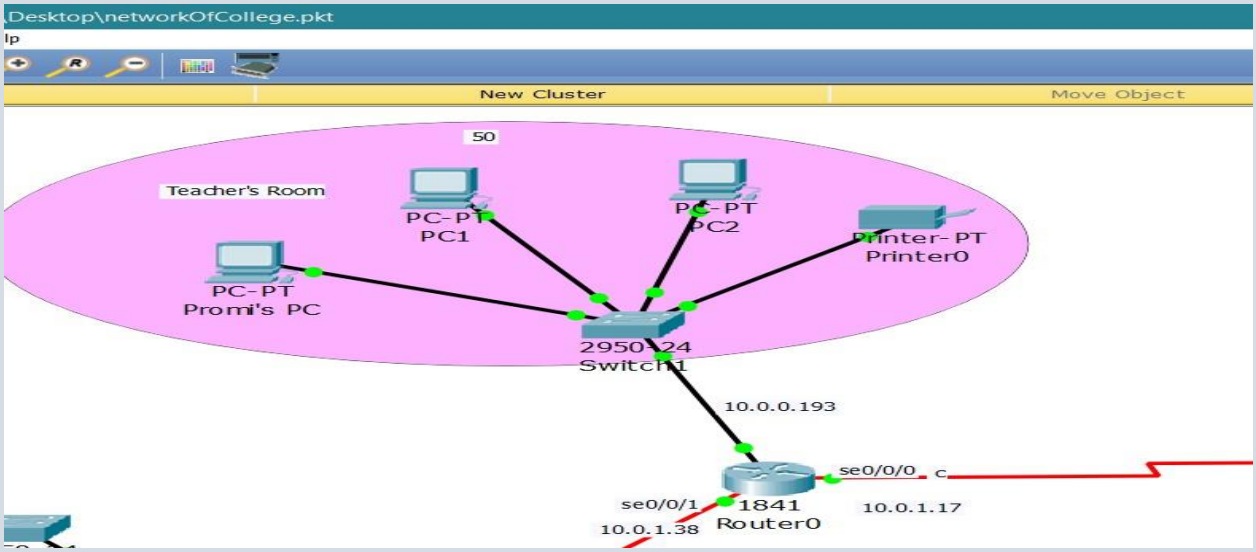
The design of the above described network is given below:



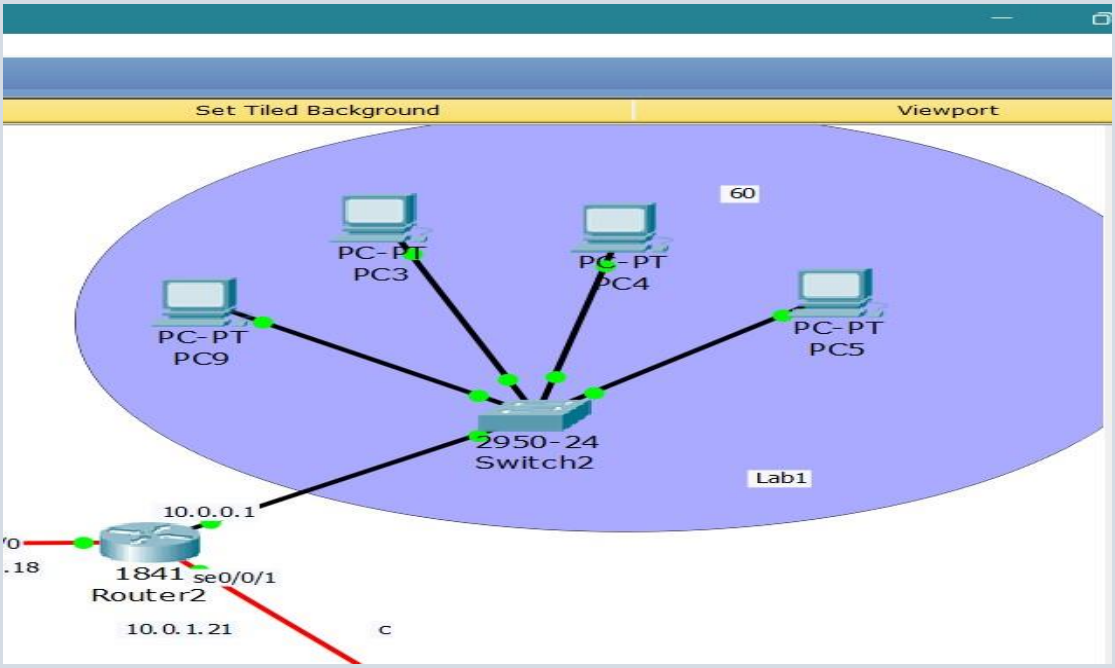
IT Room:

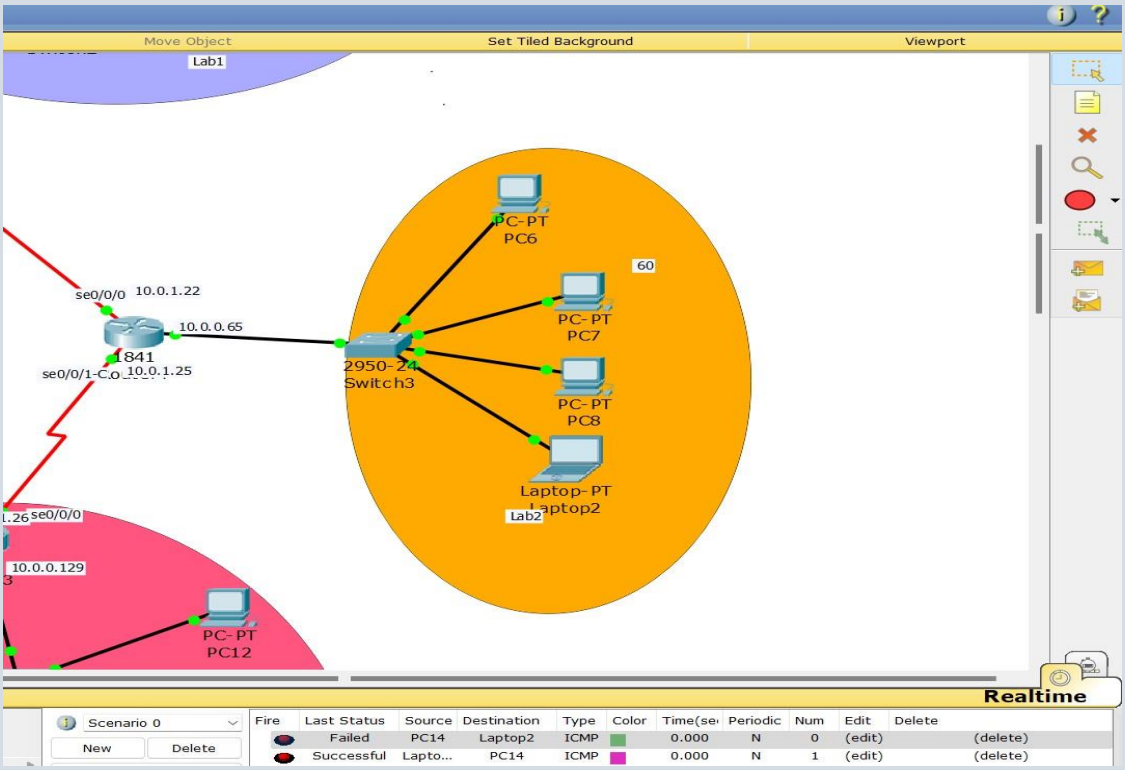


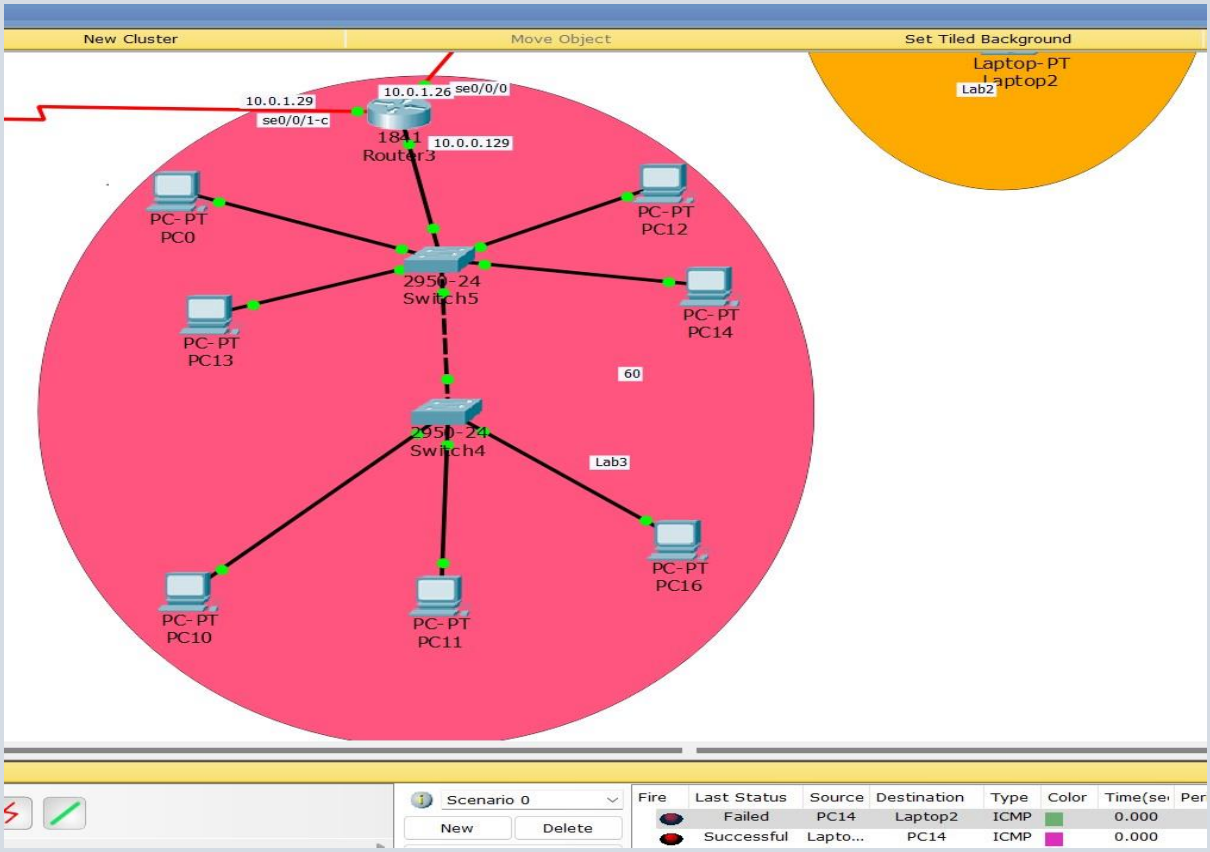
Teachers' Room:



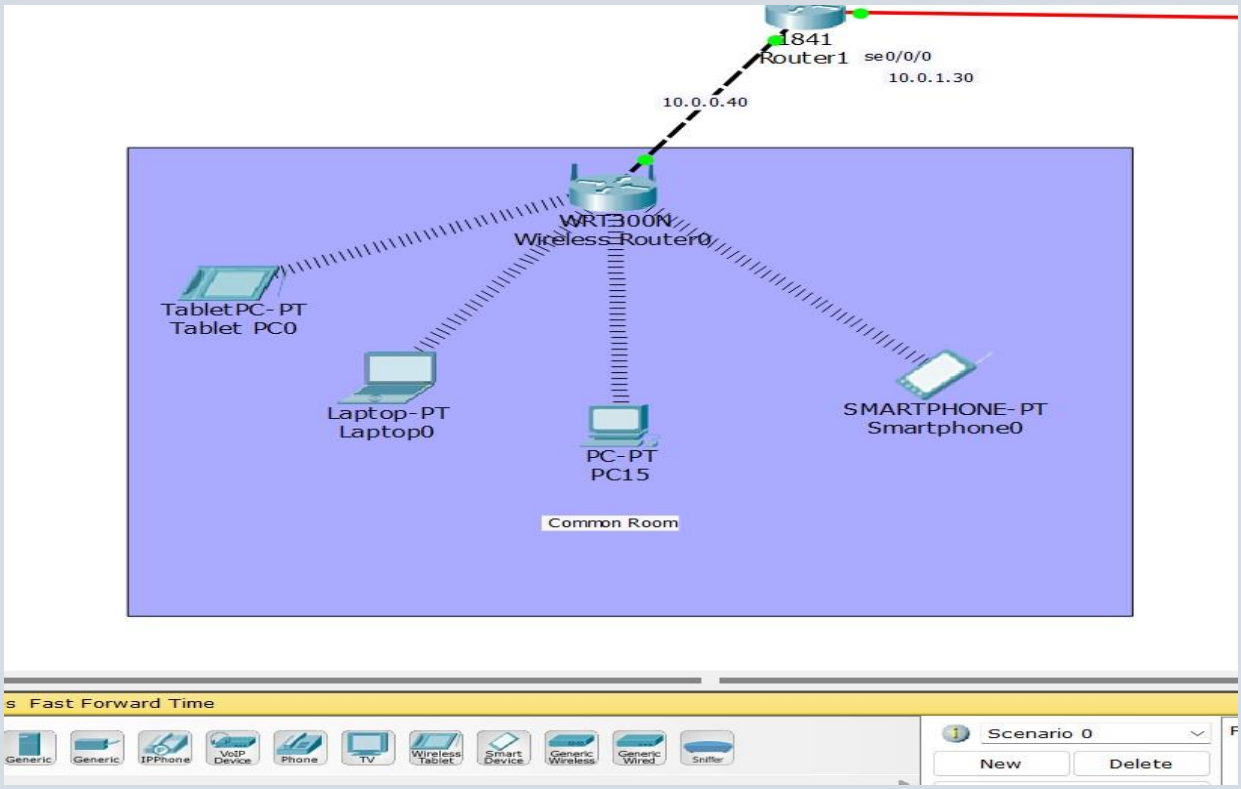
Lab1, Lab2, Lab3:


Set Tiled Background
Viewport
60
PC-PT
PC3
PC-PT
PC4
PC-PT
PC9
PC-PT
PC5
2950-24
Switch2
Lab1
10.0.0.1
1841
Router2
se0/0/1
10.0.1.21


Move Object
Set Tiled Background
Viewport
Lab1
PC-PT
PC6
60
se0/0/0
10.0.1.22
10.0.0.65
1841
PC-PT
PC7
2950-24
Switch3
10.0.1.25
PC-PT
PC8
Laptop-PT
Laptop2
Lab2
se0/0/0
10.0.0.129
PC-PT
PC12
Realtime
Scenario 0
New
Delete
Fire
Last Status
Source
Destination
Type
Color
Time(se
Periodic
Num
Edit
Delete
Failed
PC14
Laptop2
ICMP
0.000
N
0
(edit)
(delete)
Successful
Lapto...
PC14
ICMP
0.000
N
1
(edit)
(delete)


New Cluster
Move Object
Set Tiled Background
Laptop-PT
Laptop2
Lab2
10.0.1.29
se0/0/1-c
10.0.1.26
se0/0/0
1841
Router3
10.0.0.129
PC-PT
PC0
PC-PT
PC12
2950-24
Switch5
PC-PT
PC13
PC-PT
PC14
60
2950-24
Switch4
Lab3
PC-PT
PC16
PC-PT
PC10
PC-PT
PC11
Scenario 0
New
Delete
Fire
Last Status
Source
Destination
Type
Color
Time(se
Per
Failed
PC14
Laptop2
ICMP
0.000
Successful
Lapto...
PC14
ICMP
0.000

Common Room:


1841
Router1
se0/0/0
10.0.1.30
10.0.0.40
WRT300N
Wireless-Router0
TabletPC-PT
Tablet PC0
Laptop-PT
Laptop0
PC-PT
PC15
SMARTPHONE-PT
Smartphone0
Common Room
s Fast Forward Time
Scenario 0
New
Delete

Codes:

Router0:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.0.0.193 255.255.255.192
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.1.17 255.255.255.252
Router(config-if)#clock rate 56000
Router(config-if)#no shut  exit
Router(config)#int s0/0/1
Router(config-if)#ip address 10.0.1.38 255.255.255.252
Router(config-if)#no shut
```

Router2:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.0.0.1 255.255.255.192
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.1.18  255.255.255.252
Router(config-if)#no shut  exit
Router(config)#int s0/0/1
Router(config-if)#ip address 10.0.1.21  255.255.255.252
Router(config-if)#clock rate 56000  Router(config-if)#no
shut
```

Router4:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.0.0.65 255.255.255.192
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.1.22  255.255.255.252
```

```
Router(config-if)#no shut
exit
Router(config)#int s0/0/1
Router(config-if)#ip address 10.0.1.25  255.255.255.252
Router(config-if)#clock rate 56000  Router(config-if)#no
shut
```

Router3:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.0.0.129 255.255.255.192
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.1.26  255.255.255.252
Router(config-if)#no shut  exit
Router(config)#int s0/0/1
Router(config-if)#ip address 10.0.1.29  255.255.255.252
Router(config-if)#clock rate 56000  Router(config-if)#no
shut
```

Router1:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.1.30  255.255.255.252
Router(config-if)#no shut  exit
Router(config)#int s0/0/1
Router(config-if)#ip address 10.0.1.33  255.255.255.252
Router(config-if)#clock rate 56000  Router(config-if)#no
shut
```

Router5:

```
Router>en
```

```
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.0.1.1 255.255.255.240
Router(config-if)#no shut
Router(config-if)#exit
Router(config)#int s0/0/0
Router(config-if)#ip address 10.0.1.34  255.255.255.252
Router(config-if)#no shut  exit
Router(config)#int s0/0/1
Router(config-if)#ip address 10.0.1.37  255.255.255.252
Router(config-if)#clock rate 56000
Router(config-if)#no shut
```

RIP VER 2:

```
Router 0:
Router(config)#router rip
Router(config-router)#ver 2
Router(config-router)#network 10.0.0.192
Router(config-router)#network 10.0.1.16
Router(config-router)#network 10.0.1.36
Router(config-router)#no auto-summary  Router(config-router)#

Router 2:
Router(config)#router rip
Router(config-router)#ver 2
Router(config-router)#network 10.0.0
Router(config-router)#network 10.0.1.20
Router(config-router)#network 10.0.1.16
Router(config-router)#no auto-summary  Router(config-router)#

Router 4:
Router(config)#router rip
Router(config-router)#ver 2
Router(config-router)#network 10.0.0.64
Router(config-router)#network 10.0.1.20
Router(config-router)#network 10.0.1.24
Router(config-router)#no auto-summary  Router(config-router)#

Router 3:
Router(config)#router rip
Router(config-router)#ver 2
Router(config-router)#network 100.0.0.128
Router(config-router)#network 10.0.1.24
Router(config-router)#network 10.0.1.28
Router(config-router)#no auto-summary
```

Router(config-router)#
Router 1:
Router(config)#router rip
Router(config-router)#ver 2
Router(config-router)#network 192.168.2.0
Router(config-router)#network 10.0.1.28
Router(config-router)#network 10.0.1.32
Router(config-router)#no auto-summary Router(config-router)#

Router 5:
Router(config)#router rip
Router(config-router)#ver 2
Router(config-router)#network 10.0.1.0
Router(config-router)#network 10.0.1.32
Router(config-router)#network 10.0.1.36
Router(config-router)#no auto-summary Router(config-router)#

DHCP:

Router>en
Router#conf t
Enter configuration commands, one per line. End with
CNTL/Z.
Router(config)#ip dhcp pool TasminPoolOne
Router(dhcp-config)#default-router 10.0.0.1
Router(dhcp-config)#network 10.0.0.0 255.255.255.192
Router(dhcp-config)#exit

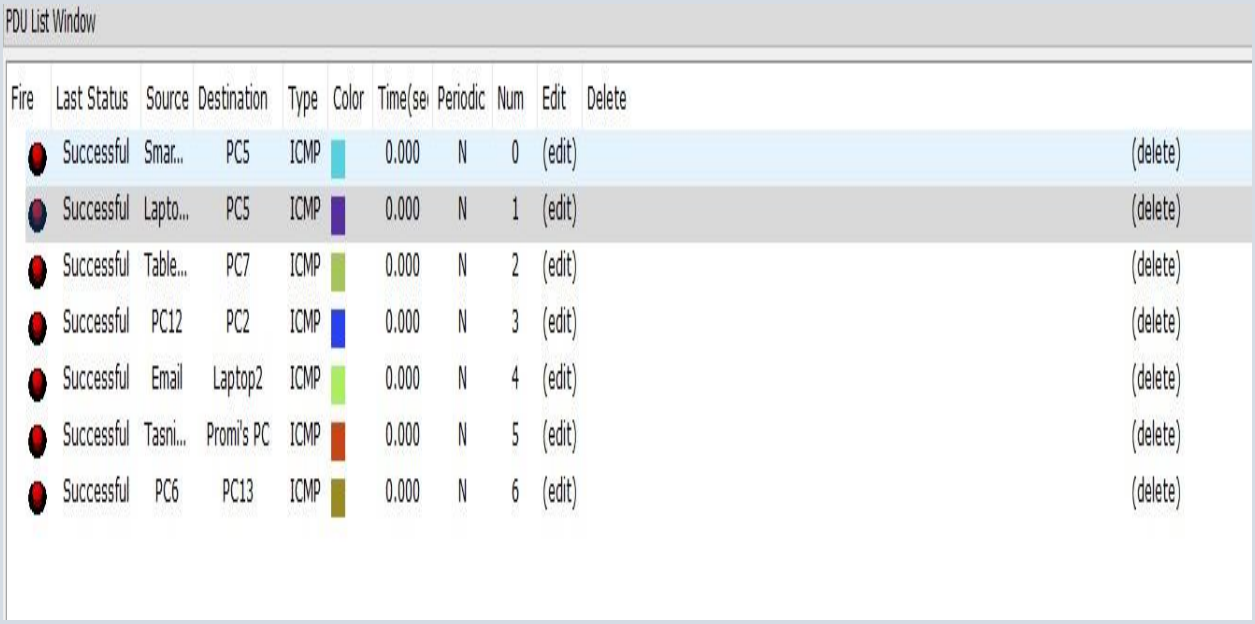
Router>en
Router#conf t
Enter configuration commands, one per line. End with
CNTL/Z.
Router(config)#ip dhcp pool tasminPoolTwo
Router(dhcp-config)#network 10.0.0.64 255.255.255.192
Router(dhcp-config)#default-router 10.0.0.65
Router(dhcp-config)#dns-server 10.0.1.6
Router(dhcp-config)#exit
Router>en

Router#conf t
Enter configuration commands, one per line. End with
CNTL/Z.
Router(config)#ip dhcp pool TasminPoolThree
Router(dhcp-config)#network 10.0.0.128 255.255.255.192

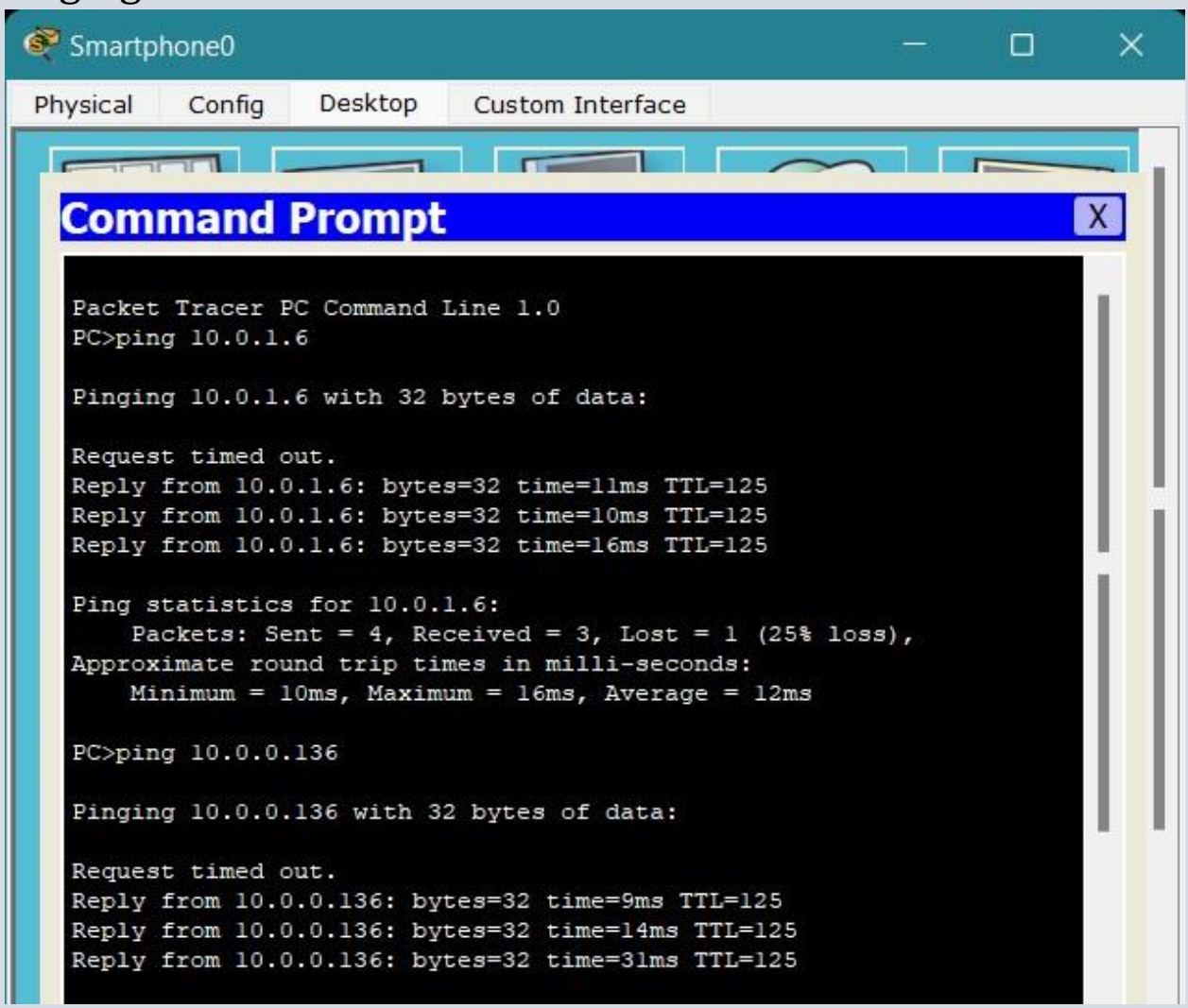
```
Router(dhcp-config)#default-router 10.0.0.129
Router(dhcp-config)#dns-server 10.0.1.6
Router(dhcp-config)#exit
Router(config)#
```

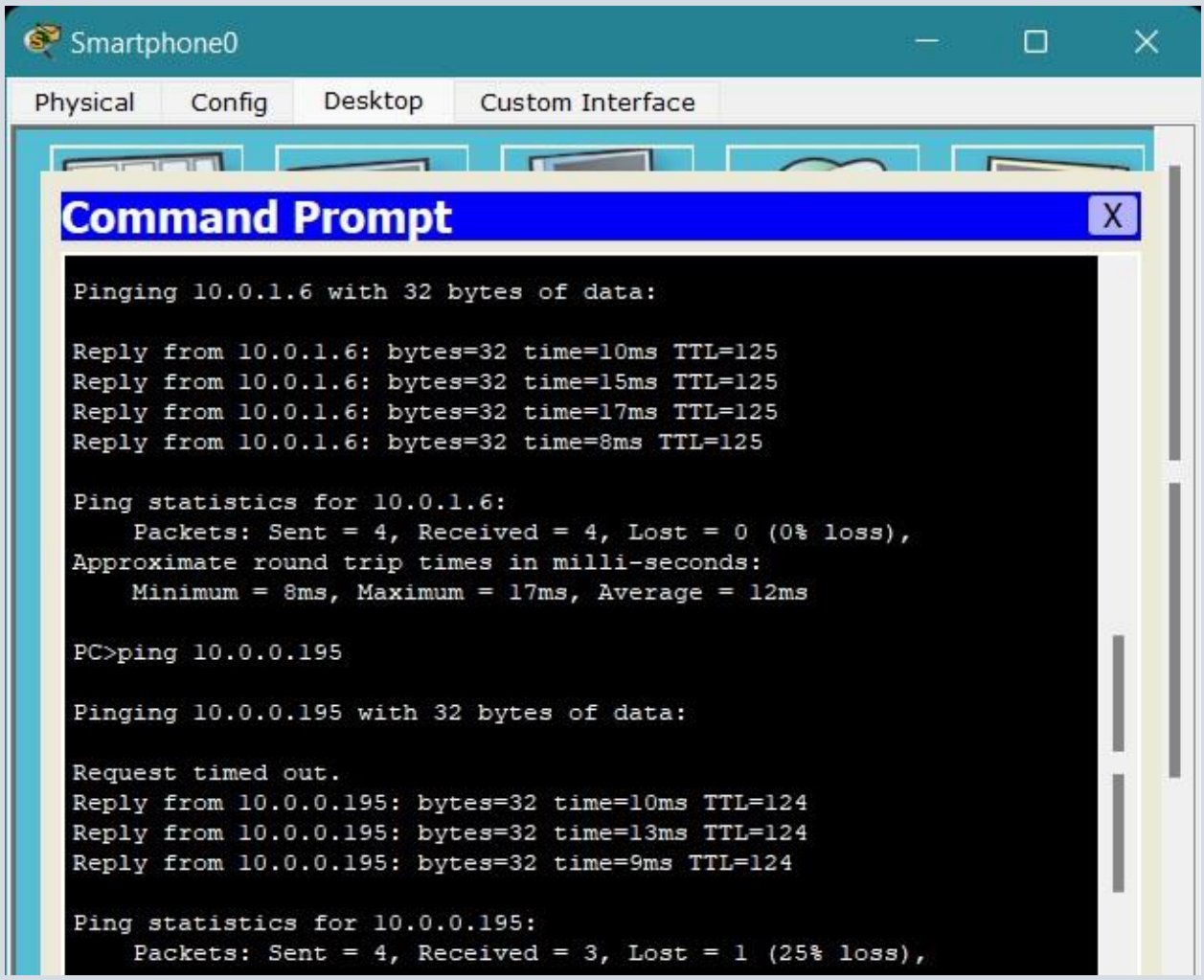
Result:

PDU List Window:

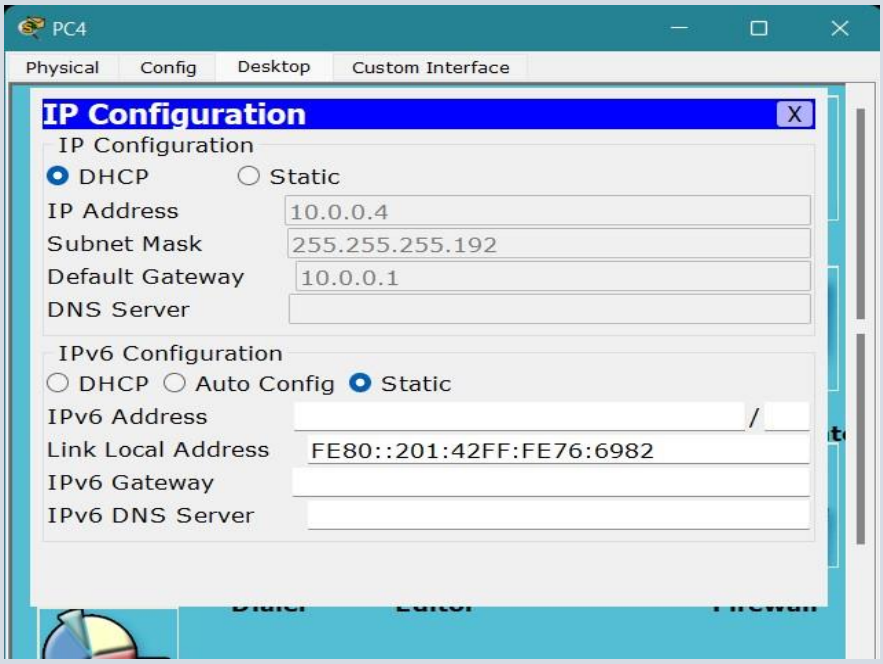


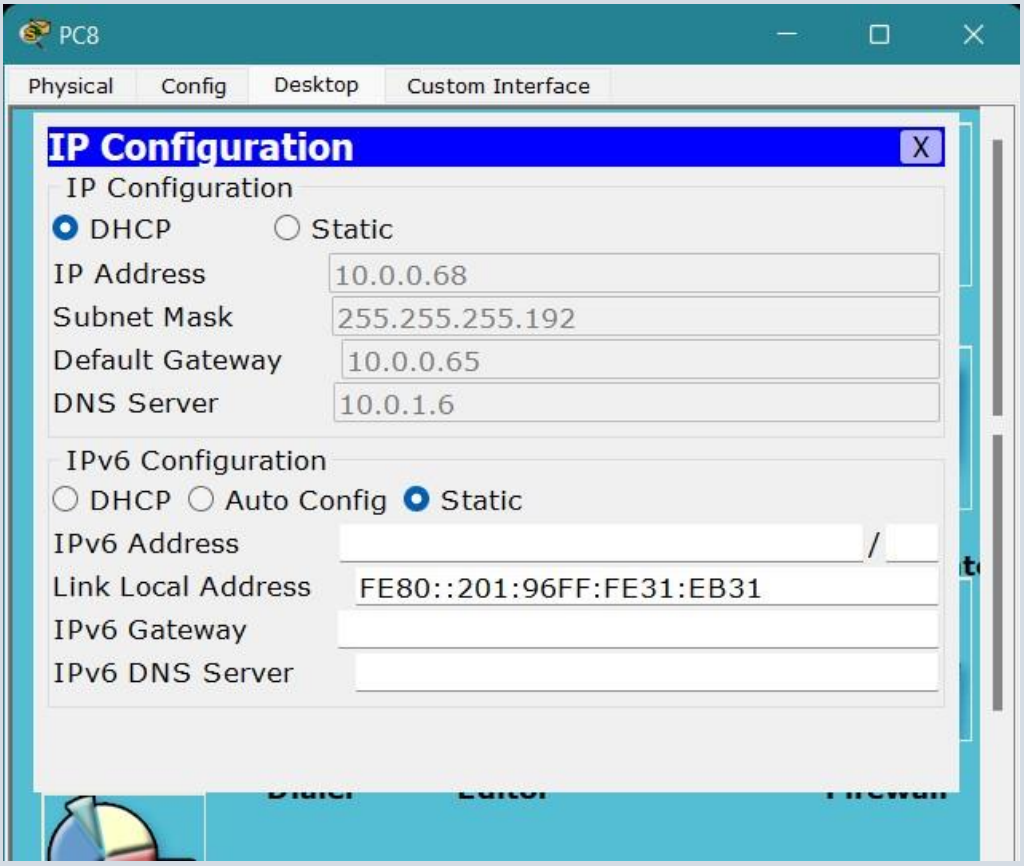
Pinging:

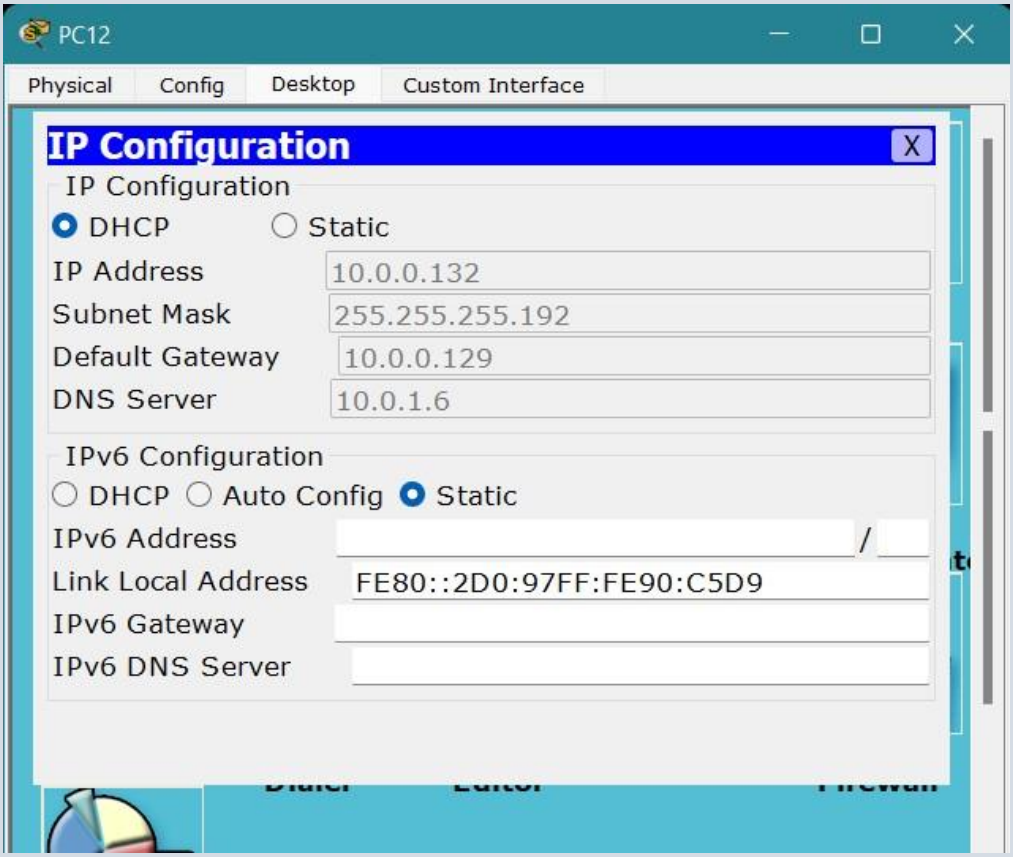

Smartphone0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Packet Tracer PC Command Line 1.0
PC>ping 10.0.1.6
Pinging 10.0.1.6 with 32 bytes of data:
Request timed out.
Reply from 10.0.1.6: bytes=32 time=11ms TTL=125
Reply from 10.0.1.6: bytes=32 time=10ms TTL=125
Reply from 10.0.1.6: bytes=32 time=16ms TTL=125
Ping statistics for 10.0.1.6:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 10ms, Maximum = 16ms, Average = 12ms
PC>ping 10.0.0.136
Pinging 10.0.0.136 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.136: bytes=32 time=9ms TTL=125
Reply from 10.0.0.136: bytes=32 time=14ms TTL=125
Reply from 10.0.0.136: bytes=32 time=31ms TTL=125


Smartphone0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Pinging 10.0.1.6 with 32 bytes of data:
Reply from 10.0.1.6: bytes=32 time=10ms TTL=125
Reply from 10.0.1.6: bytes=32 time=15ms TTL=125
Reply from 10.0.1.6: bytes=32 time=17ms TTL=125
Reply from 10.0.1.6: bytes=32 time=8ms TTL=125
Ping statistics for 10.0.1.6:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 8ms, Maximum = 17ms, Average = 12ms
PC>ping 10.0.0.195
Pinging 10.0.0.195 with 32 bytes of data:
Request timed out.
Reply from 10.0.0.195: bytes=32 time=10ms TTL=124
Reply from 10.0.0.195: bytes=32 time=13ms TTL=124
Reply from 10.0.0.195: bytes=32 time=9ms TTL=124
Ping statistics for 10.0.0.195:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),

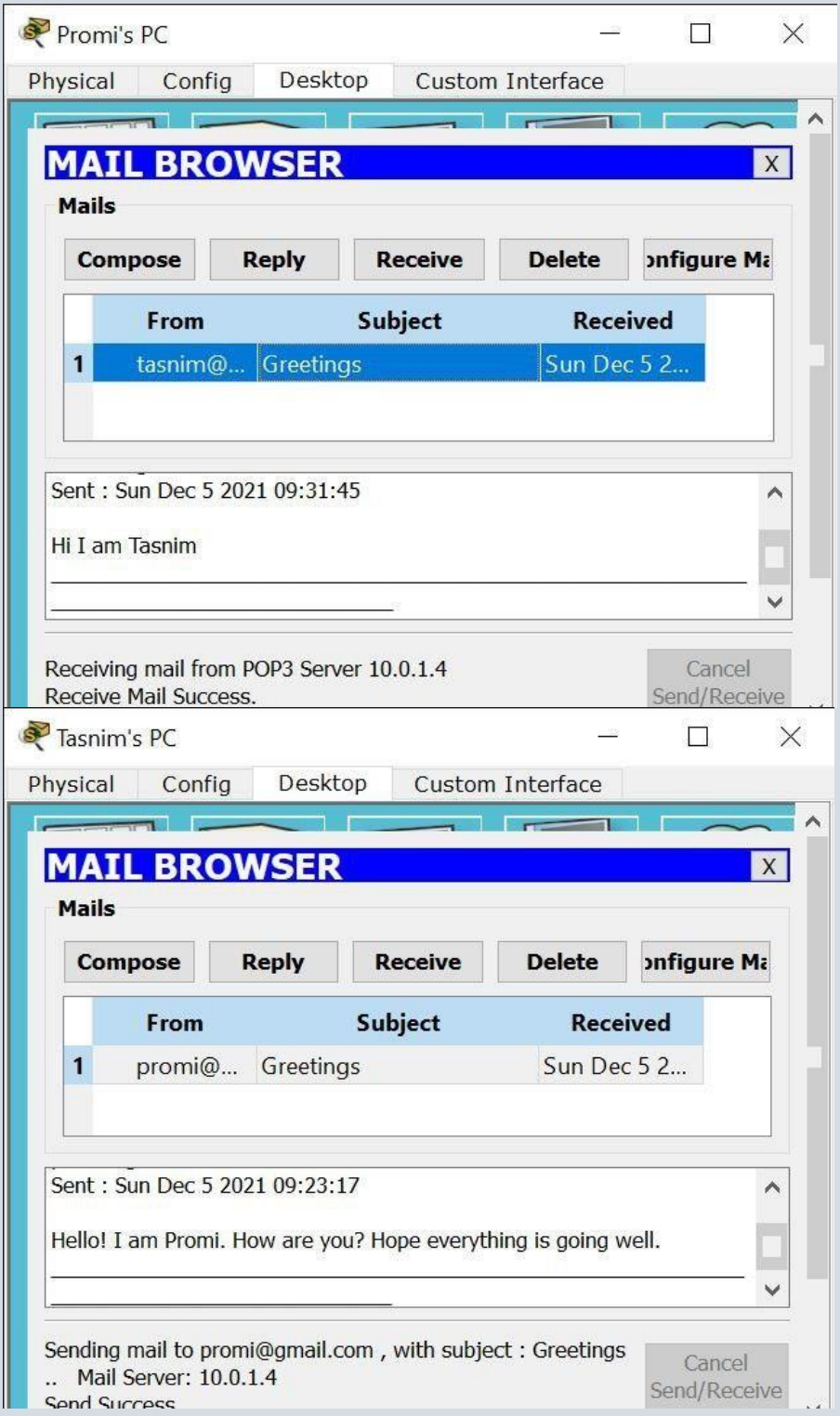
DHCP:


PC4
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
10.0.0.4
Subnet Mask
255.255.255.192
Default Gateway
10.0.0.1
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::201:42FF:FE76:6982
IPv6 Gateway
IPv6 DNS Server

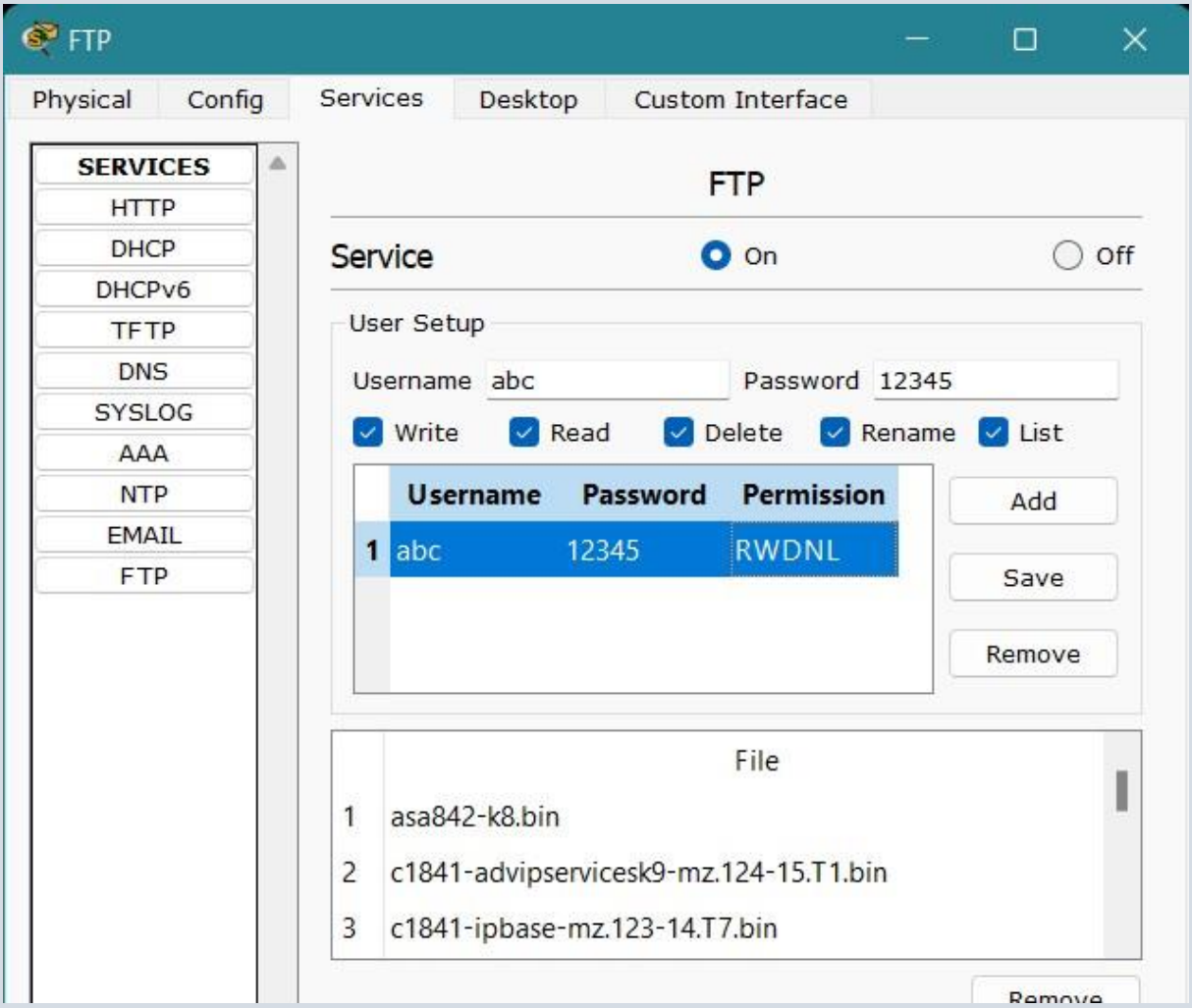

PC8
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
10.0.0.68
Subnet Mask
255.255.255.192
Default Gateway
10.0.0.65
DNS Server
10.0.1.6
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::201:96FF:FE31:EB31
IPv6 Gateway
IPv6 DNS Server

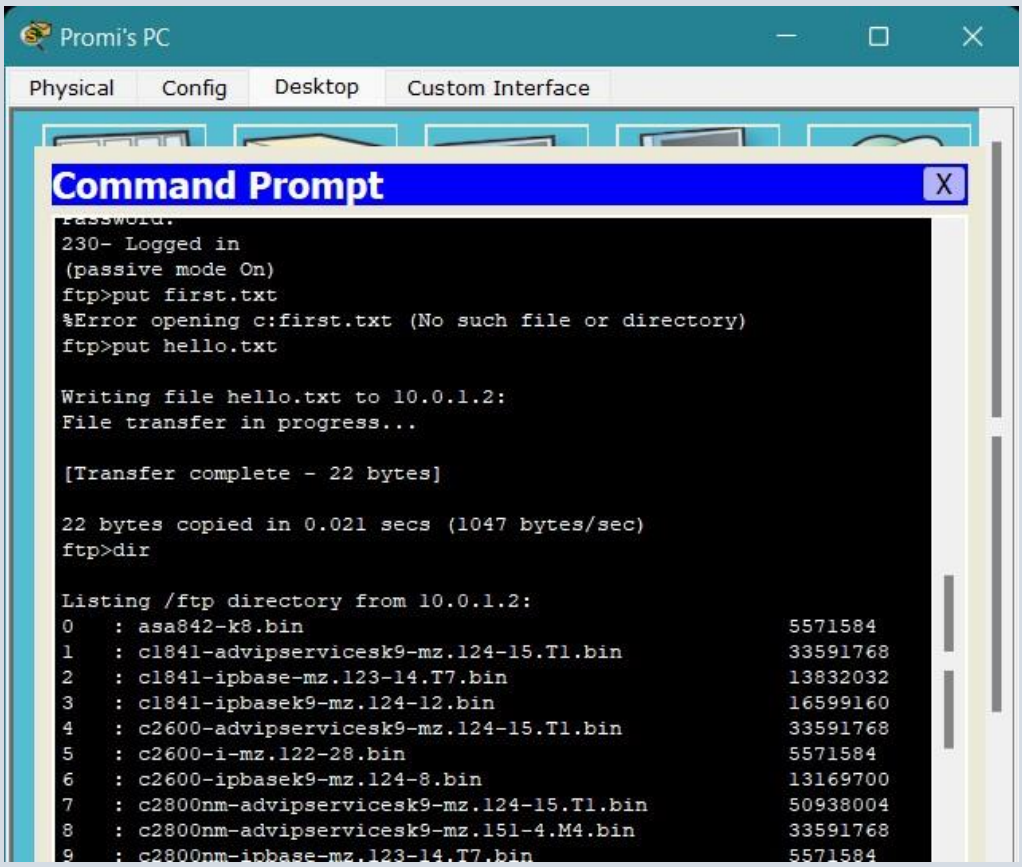

PC12
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
10.0.0.132
Subnet Mask
255.255.255.192
Default Gateway
10.0.0.129
DNS Server
10.0.1.6
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::2D0:97FF:FE90:C5D9
IPv6 Gateway
IPv6 DNS Server

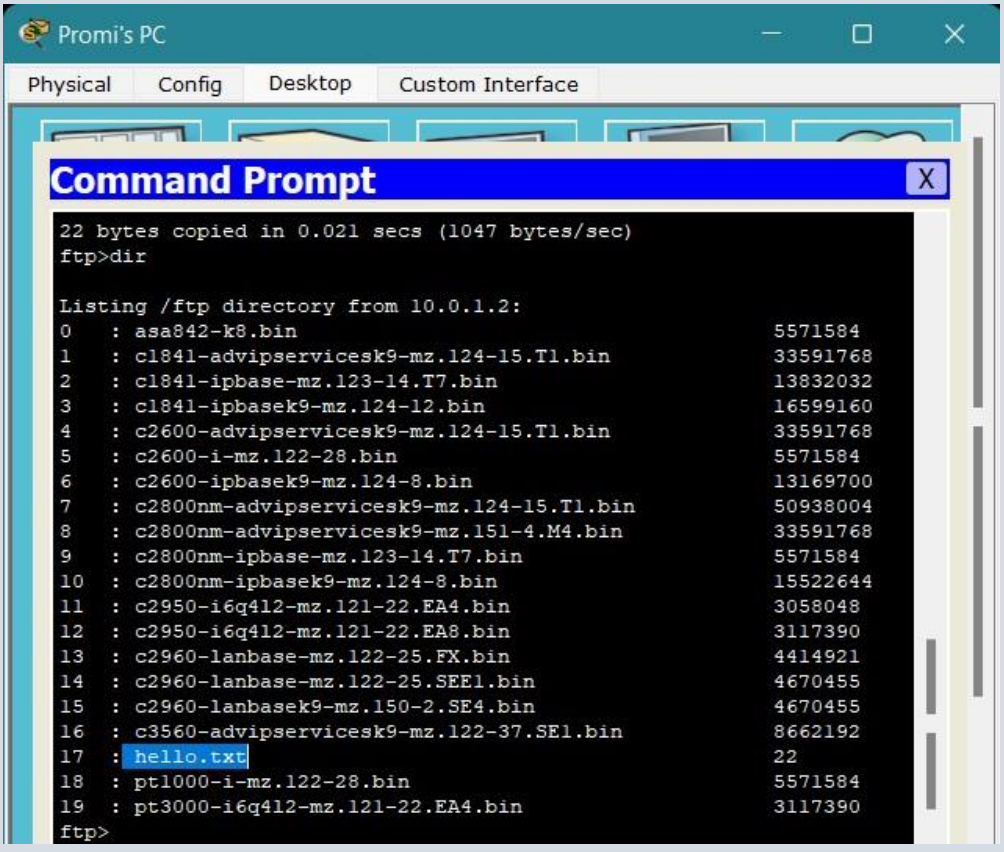
Email:

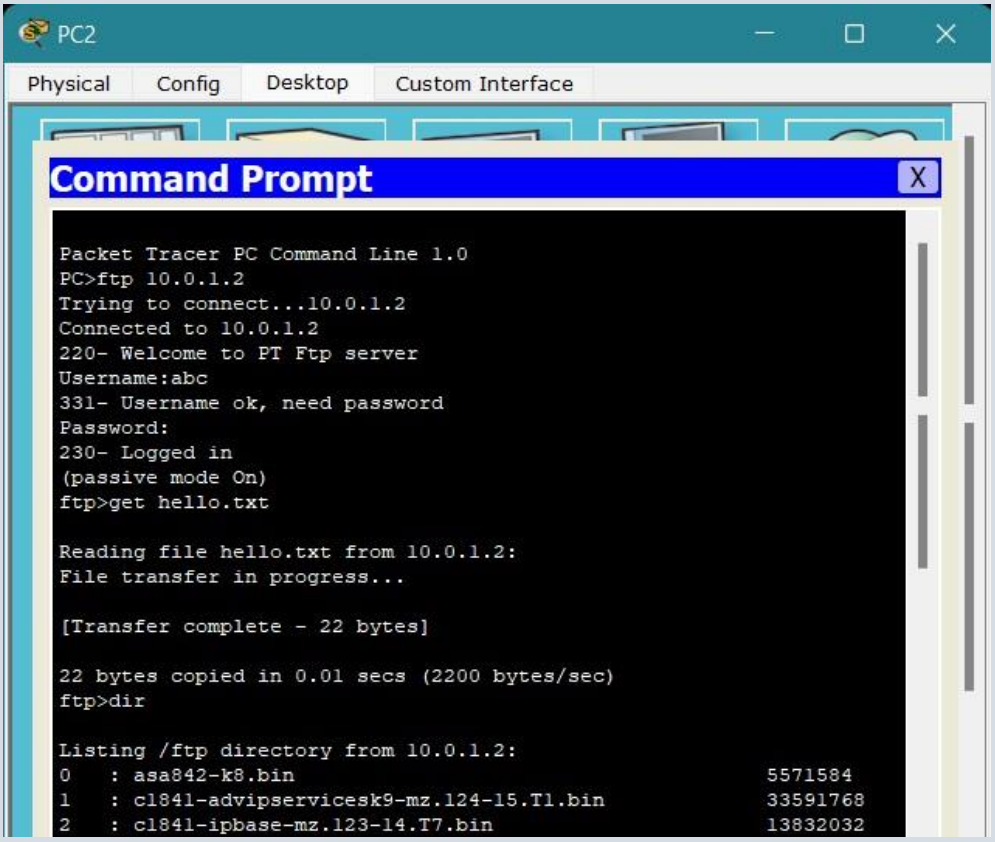

Promi's PC
Physical
Config
Desktop
Custom Interface
MAIL BROWSER
X
Mails
Compose
Reply
Receive
Delete
onfigure Ma
From
Subject
Received
1
tasnim@...
Greetings
Sun Dec 5 2...
Sent : Sun Dec 5 2021 09:31:45
Hi I am Tasnim
Receiving mail from POP3 Server 10.0.1.4
Receive Mail Success.
Cancel
Send/Receive
Tasnim's PC
Physical
Config
Desktop
Custom Interface
MAIL BROWSER
X
Mails
Compose
Reply
Receive
Delete
onfigure Ma
From
Subject
Received
1
promi@...
Greetings
Sun Dec 5 2...
Sent : Sun Dec 5 2021 09:23:17
Hello! I am Promi. How are you? Hope everything is going well.
Sending mail to promi@gmail.com , with subject : Greetings
.. Mail Server: 10.0.1.4
Send Success
Cancel
Send/Receive

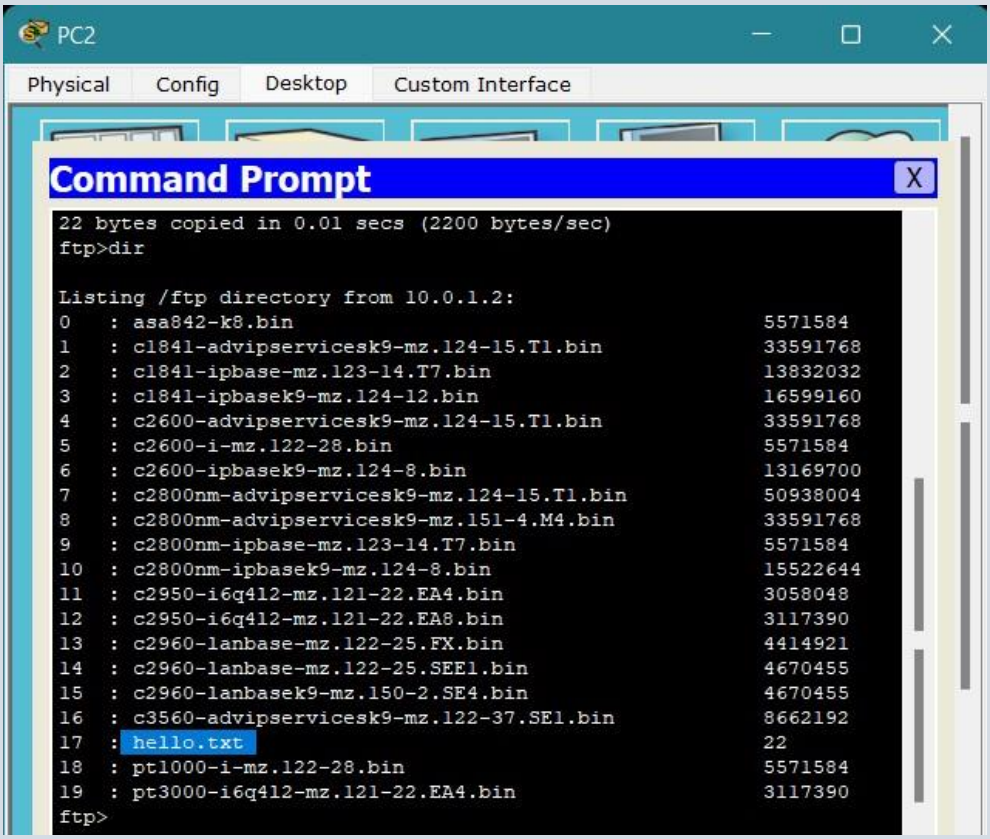
FTP:


FTP
Physical
Config
Services
Desktop
Custom Interface
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
FTP
Service
On
Off
User Setup
Username abc
Password 12345
Write
Read
Delete
Rename
List
Username
Password
Permission
1 abc 12345 RWDNL
Add
Save
Remove
File
1 asa842-k8.bin
2 c1841-advipservicesk9-mz.124-15.T1.bin
3 c1841-ipbase-mz.123-14.T7.bin

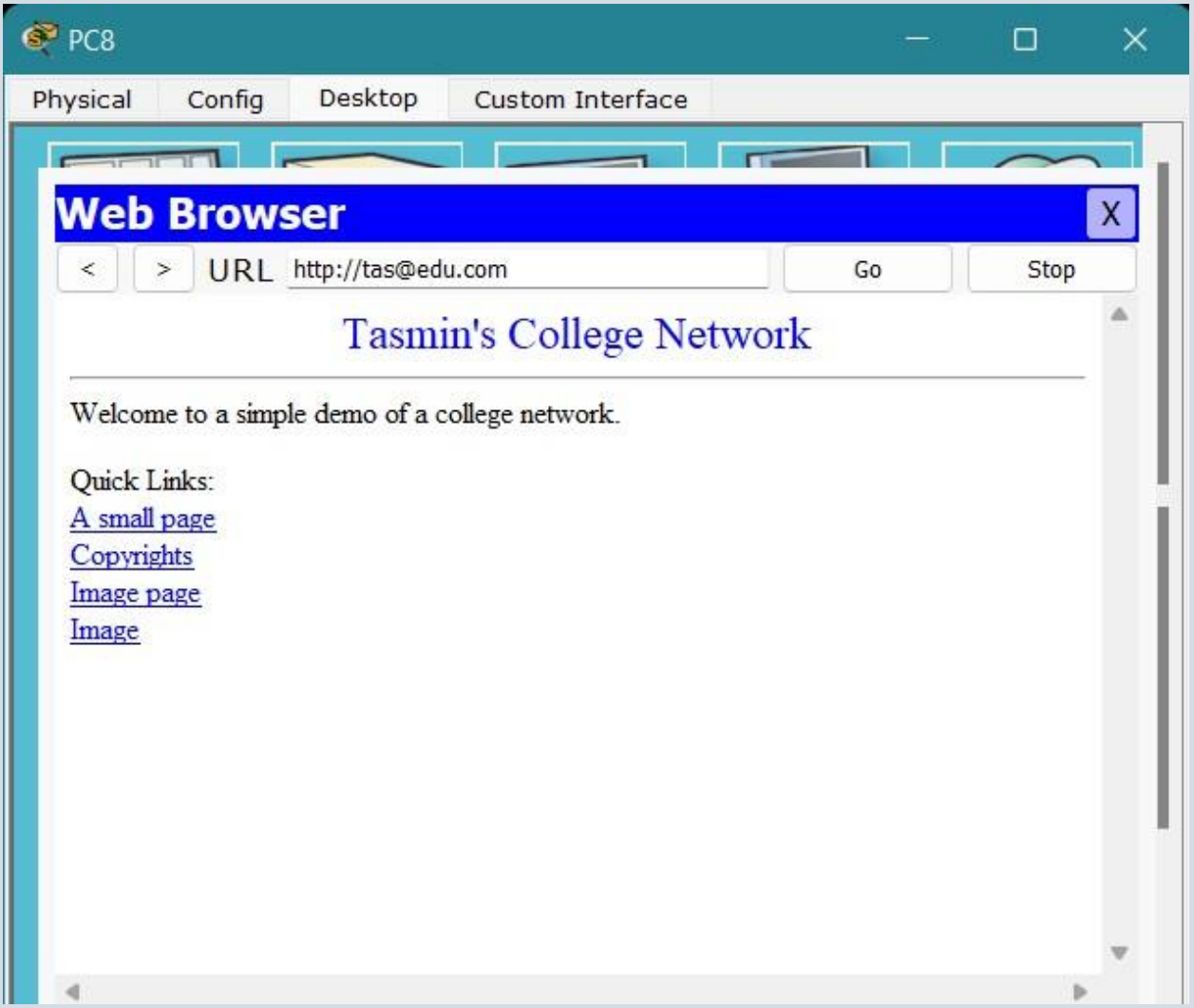

Promi's PC
Physical
Config
Desktop
Custom Interface
Command Prompt
X
230- Logged in
(passive mode On)
ftp>put first.txt
%Error opening c:first.txt (No such file or directory)
ftp>put hello.txt
Writing file hello.txt to 10.0.1.2:
File transfer in progress...
[Transfer complete - 22 bytes]
22 bytes copied in 0.021 secs (1047 bytes/sec)
ftp>dir
Listing /ftp directory from 10.0.1.2:
0 : asa842-k8.bin 5571584
1 : c1841-advipservicesk9-mz.124-15.T1.bin 33591768
2 : c1841-ipbase-mz.123-14.T7.bin 13832032
3 : c1841-ipbasek9-mz.124-12.bin 16599160
4 : c2600-advipservicesk9-mz.124-15.T1.bin 33591768
5 : c2600-i-mz.122-28.bin 5571584
6 : c2600-ipbasek9-mz.124-8.bin 13169700
7 : c2800nm-advipservicesk9-mz.124-15.T1.bin 50938004
8 : c2800nm-advipservicesk9-mz.151-4.M4.bin 33591768


Promi's PC
Physical
Config
Desktop
Custom Interface
Command Prompt
X
22 bytes copied in 0.021 secs (1047 bytes/sec)
ftp>dir
Listing /ftp directory from 10.0.1.2:
0 : asa842-k8.bin 5571584
1 : c1841-advipservicesk9-mz.124-15.T1.bin 33591768
2 : c1841-ipbase-mz.123-14.T7.bin 13832032
3 : c1841-ipbasek9-mz.124-12.bin 16599160
4 : c2600-advipservicesk9-mz.124-15.T1.bin 33591768
5 : c2600-i-mz.122-28.bin 5571584
6 : c2600-ipbasek9-mz.124-8.bin 13169700
7 : c2800nm-advipservicesk9-mz.124-15.T1.bin 50938004
8 : c2800nm-advipservicesk9-mz.151-4.M4.bin 33591768
9 : c2800nm-ipbase-mz.123-14.T7.bin 5571584
10 : c2800nm-ipbasek9-mz.124-8.bin 15522644
11 : c2950-i6q412-mz.121-22.EA4.bin 3058048
12 : c2950-i6q412-mz.121-22.EA8.bin 3117390
13 : c2960-lanbase-mz.122-25.FX.bin 4414921
14 : c2960-lanbase-mz.122-25.SEE1.bin 4670455
15 : c2960-lanbasek9-mz.150-2.SE4.bin 4670455
16 : c3560-advipservicesk9-mz.122-37.SE1.bin 8662192
17 : hello.txt 22
18 : pt1000-i-mz.122-28.bin 5571584
19 : pt3000-i6q412-mz.121-22.EA4.bin 3117390
ftp>


PC2
Physical
Config
Desktop
Custom Interface
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ftp 10.0.1.2
Trying to connect...10.0.1.2
Connected to 10.0.1.2
220- Welcome to PT Ftp server
Username:abc
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>get hello.txt
Reading file hello.txt from 10.0.1.2:
File transfer in progress...
[Transfer complete - 22 bytes]
22 bytes copied in 0.01 secs (2200 bytes/sec)
ftp>dir
Listing /ftp directory from 10.0.1.2:
0 : asa842-k8.bin 5571584
1 : c1841-advipservicesk9-mz.124-15.T1.bin 33591768
2 : c1841-ipbase-mz.123-14.T7.bin 13832032


PC2
Physical
Config
Desktop
Custom Interface
Command Prompt
22 bytes copied in 0.01 secs (2200 bytes/sec)
ftp>dir
Listing /ftp directory from 10.0.1.2:
0 : asa842-k8.bin 5571584
1 : c1841-advipservicesk9-mz.124-15.T1.bin 33591768
2 : c1841-ipbase-mz.123-14.T7.bin 13832032
3 : c1841-ipbasek9-mz.124-12.bin 16599160
4 : c2600-advipservicesk9-mz.124-15.T1.bin 33591768
5 : c2600-i-mz.122-28.bin 5571584
6 : c2600-ipbasek9-mz.124-8.bin 13169700
7 : c2800nm-advipservicesk9-mz.124-15.T1.bin 50938004
8 : c2800nm-advipservicesk9-mz.151-4.M4.bin 33591768
9 : c2800nm-ipbase-mz.123-14.T7.bin 5571584
10 : c2800nm-ipbasek9-mz.124-8.bin 15522644
11 : c2950-i6q412-mz.121-22.EA4.bin 3058048
12 : c2950-i6q412-mz.121-22.EA8.bin 3117390
13 : c2960-lanbase-mz.122-25.FX.bin 4414921
14 : c2960-lanbase-mz.122-25.SEE1.bin 4670455
15 : c2960-lanbasek9-mz.150-2.SE4.bin 4670455
16 : c3560-advipservicesk9-mz.122-37.SE1.bin 8662192
17 : hello.txt 22
18 : pt1000-i-mz.122-28.bin 5571584
19 : pt3000-i6q412-mz.121-22.EA4.bin 3117390
ftp>

DNS, HTTP:



Thus, we get a fully working network of a college.

References:

1. Google

2. YouTube