

Lab #2
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Designing and Simulation of Network Topology using Cisco Packet Tracer

Objectives:

- To understand the purpose of Cisco Packet Tracer.
- To navigate, choose network and end devices and customize them.
- To interconnect devices and configure them using simple interface.
- To become familiar with building topologies in Packet Tracer.
- To simulate data interactions traveling through a network.

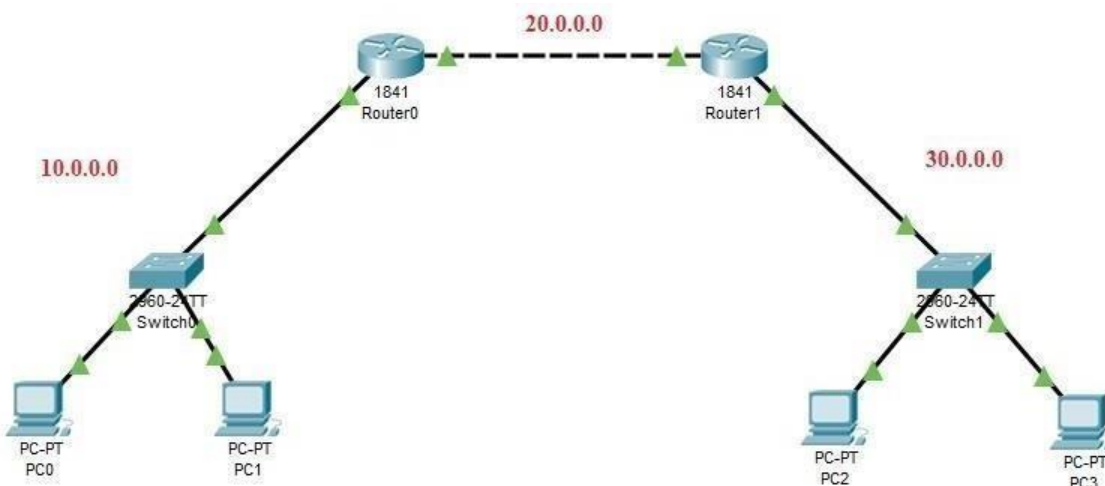
Prerequisites:

This lab assumes some understanding of the building blocks of communication networks and internet. At this point, we haven't discussed other protocols but you may use Packet Tracer in later labs to discuss those as well. Several types of devices and network connections can be used. For this experiment we will keep it simple by using end devices, switches, routers, and connections.

Task 1 (Demo)

Network Topology:

To replicate given scenario, create a topology in packet tracer, as shown in following image.



PC & Router Configuration Details:

PC0:

IP Address ---> 10.0.0.1

Gateway ---> 10.0.0.3

PC1:

IP Address ---> 10.0.0.2

Gateway ---> 10.0.0.3

Router 0:

FastEthernet0/0 ---> 10.0.0.3

FastEthernet0/1 ---> 20.0.0.1

Router 1:

FastEthernet0/0 ---> 30.0.0.1

FastEthernet0/1 ---> 20.0.0.2

PC2:

IP Address ---> 30.0.0.2

Gateway ---> 30.0.0.1

PC3:

IP Address ---> 30.0.0.3

Gateway ---> 30.0.0.1

Routing Table Entries:

Router	Network	Next Hop
Router 0	30.0.0.0	20.0.0.2
Router 1	10.0.0.0	20.0.0.1

PC4

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.0.0.1

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.3

DNS Server 0.0.0.0

PC5

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 10.0.0.2

Subnet Mask 255.0.0.0

Default Gateway 10.0.0.3

DNS Server 0.0.0.0

PC6

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 30.0.0.2

Subnet Mask 255.0.0.0

Default Gateway 30.0.0.1

DNS Server 0.0.0.0

PC7

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 30.0.0.3

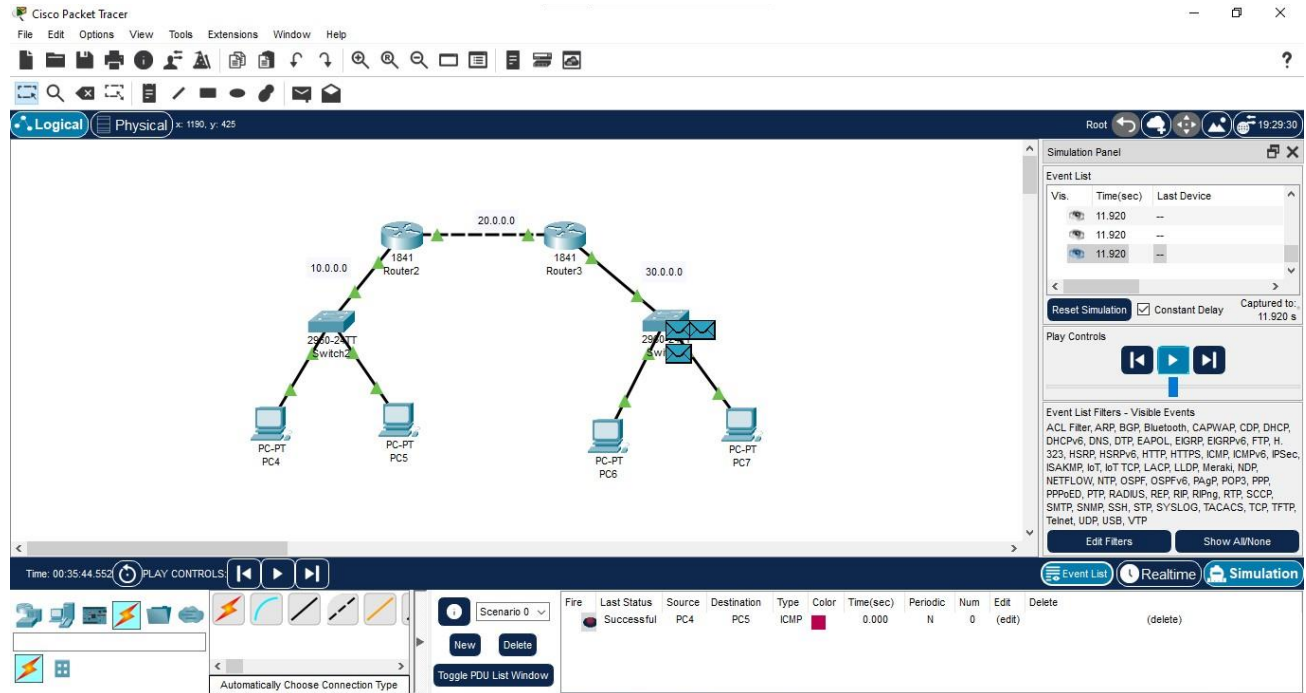
Subnet Mask 255.0.0.0

Default Gateway 30.0.0.1

DNS Server 0.0.0.0

Execution Procedure:

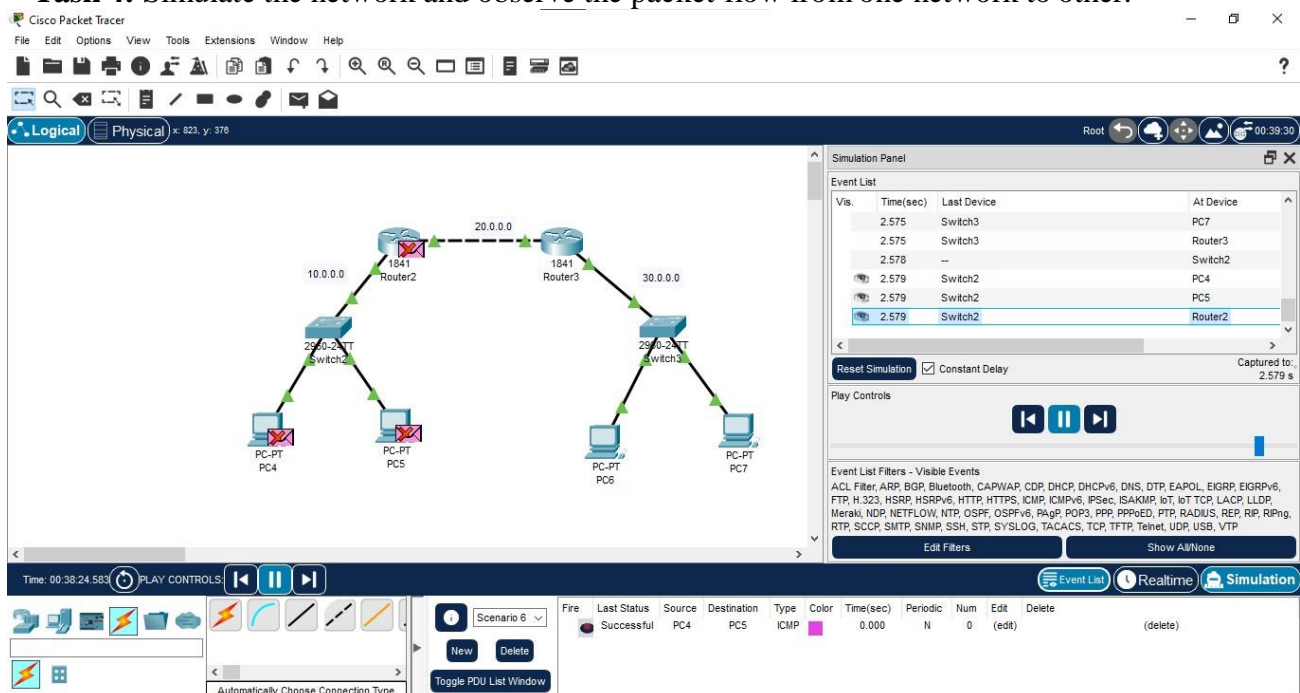
Task 1: Design a network topology with desktops, switches and routers similar to the network depicted in the above diagram.



Task 2: Configure the PCs and routers with the details provided above.

Task 3: Send a simple PDU from any PC on network 10.0.1.0 to any other PC on other network 10.0.3.0 and vice-versa.

Task 4: Simulate the network and observe the packet flow from one network to other.



Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x: 841, y: 202

Root 01:17:00

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device
	1.999	Switch3	PC7
	1.999	Switch3	Router3
	1.999	--	Switch2
	2.000	Switch2	PC4
	2.000	Switch2	PC5
	2.000	Switch2	Router2

Reset Simulation ☒ Constant Delay Capturing...

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PaGP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:39:18.567 PLAY CONTROLS

Scenario 8

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	Router2	Router3	ICMP		0.000	N	0	(edit)	(delete)

Cisco Packet Tracer

File Edit Options View Tools Extensions Window Help

Logical Physical x: 817, y: 212

Root 00:57:30

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device
	0.003	Switch2	PC5
	0.003	Switch2	Router2
	0.003	Router2	Switch2
	0.004	Switch2	PC4
	0.899	--	Switch3
	0.900	Switch3	PC7

Reset Simulation ☒ Constant Delay Captured to: 0.900 s

Play Controls

Event List Filters - Visible Events

ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PaGP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:38:49.475 PLAY CONTROLS

Scenario 7

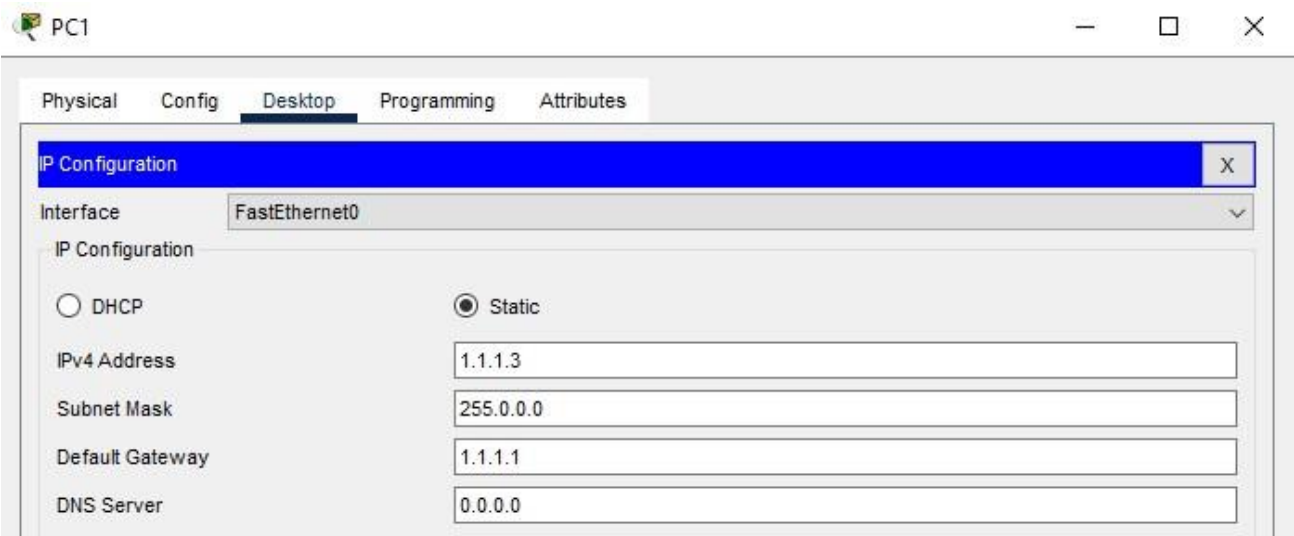
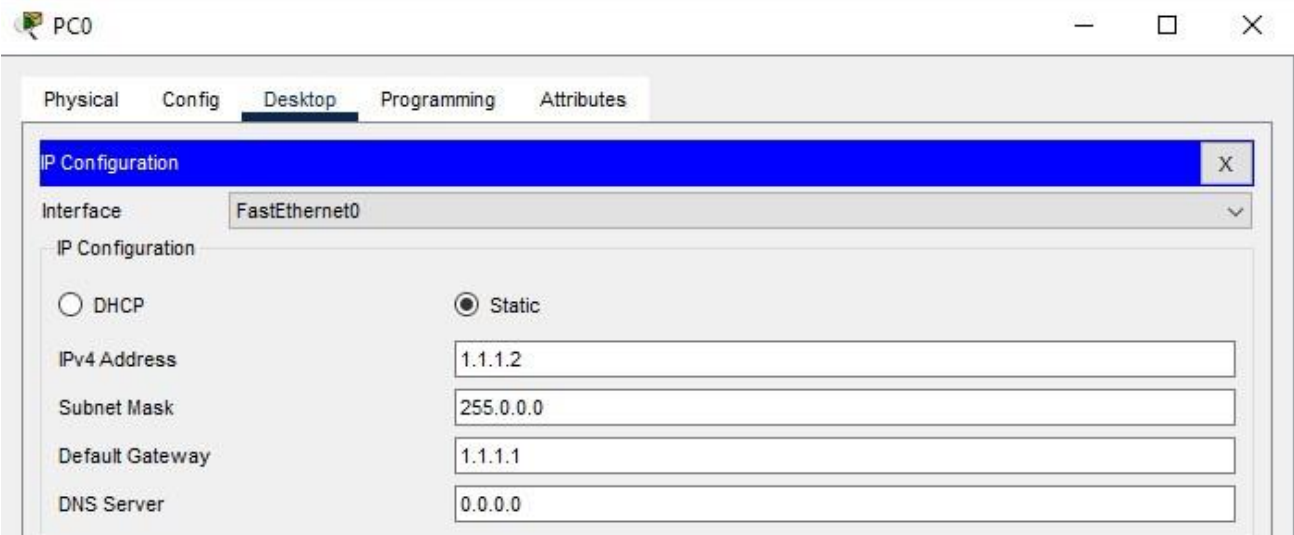
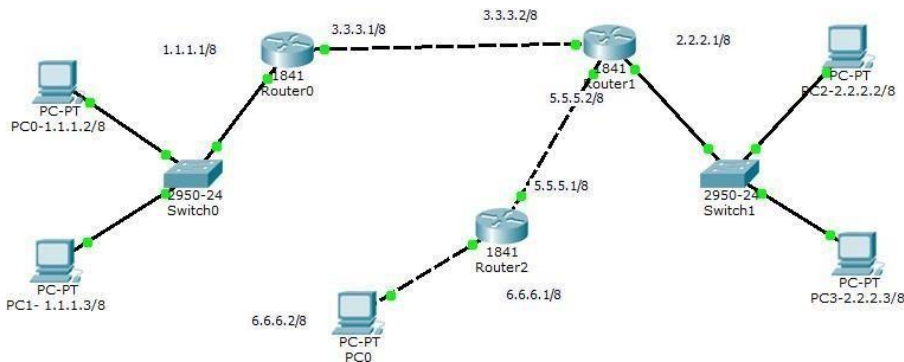
New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC4	Router2	ICMP		0.000	N	0	(edit)	(delete)

Task 2 (Mandatory)

In this task, students should explore how to add interfaces to the router.



PC2



Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 6.6.6.2

Subnet Mask: 255.0.0.0

Default Gateway: 6.6.6.1

DNS Server: 0.0.0.0

PC3



Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 2.2.2.3

Subnet Mask: 255.0.0.0

Default Gateway: 2.2.2.1

DNS Server: 0.0.0.0

PC4



Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 2.2.2.2

Subnet Mask: 255.0.0.0

Default Gateway: 2.2.2.1

DNS Server: 0.0.0.0

Router0 (Mask = 255.0.0.0)

Router0

PhysicalConfigCLIAttributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Static Routes

Network

Mask

Next Hop

Add

Network Address

2.0.0.0/8 via 3.3.3.2

6.0.0.0/8 via 3.3.3.2

Remove

Equivalent IOS Commands

Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
%SYS-5-CONFIG_I: Configured from console by console
ip route 2.0.0.0 255.0.0.0 3.3.3.2
Router(config)#ip route 6.0.0.0 255.0.0.0 3.3.3.2
Router(config)#
Router(config)#
Router(config)#
Router(config)#

Router0

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet0/0

Port Status

☐ On

Bandwidth

☒ 100 Mbps

☐ 10 Mbps

☒ Auto

Duplex

☒ Half Duplex

☐ Full Duplex

☒ Auto

MAC Address

00E0.A36B.E101

IP Configuration

IPv4 Address

1.1.1.1

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Router0

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet0/1

Port Status

☐ On

Bandwidth

☒ 100 Mbps

☐ 10 Mbps

☒ Auto

Duplex

☒ Half Duplex

☐ Full Duplex

☒ Auto

MAC Address

00E0.A36B.E102

IP Configuration

IPv4 Address

3.3.3.1

Subnet Mask

255.0.0.0

Tx Ring Limit

10

Router1 (Mask = 255.0.0.0)

The screenshot shows the Router1 configuration window with the 'Config' tab selected. The left sidebar contains a tree view with categories: GLOBAL, ROUTING, SWITCHING, and INTERFACE. Under ROUTING, 'Static' is selected. The main area is titled 'Static Routes' and contains input fields for 'Network' (6.0.0.0), 'Mask' (255.0.0.0), and 'Next Hop' (5.5.5.1). Below these fields is an 'Add' button. A table below the 'Add' button lists the configured static routes:

Network Address
1.0.0.0/8 via 3.3.3.1
6.0.0.0/8 via 5.5.5.1

Below the table is a 'Remove' button. At the bottom of the window, the 'Equivalent IOS Commands' section shows the following commands:

```
Press RETURN to get started!

Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#ip route 1.0.0.0 255.0.0.0 3.3.3.1
Router(config)#ip route 6.0.0.0 255.0.0.0 5.5.5.1
Router(config)#
```

The screenshot shows the Router1 Physical Device View. The left sidebar contains a 'MODULES' list with the following items: HWIC-1GE-SFP, HWIC-2T, HWIC-4ESW, HWIC-8A, HWIC-AP-AG-B, WIC-1AM, and WIC-1ENET. The main area is titled 'Physical Device View' and contains a diagram of the router hardware. The diagram shows the front panel with various ports and modules. The 'WIC-1ENET' module is highlighted in yellow. The diagram also shows the 'FE 0/0' and 'FE 0/1' ports. The 'WIC-1ENET' module is connected to the 'FE 0/0' port. The diagram also shows the 'FE 0/1' port. The 'WIC-1ENET' module is connected to the 'FE 0/0' port. The diagram also shows the 'FE 0/1' port. The 'WIC-1ENET' module is connected to the 'FE 0/0' port.

Router1

Physical **Config** CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- FastEthernet0/0
- FastEthernet0/1
- Ethernet0/1/0

FastEthernet0/0

Port Status ☐ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address 0010.1102.4A01

IP Configuration

IPv4 Address 3.3.3.2

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Router1

Physical **Config** CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- FastEthernet0/0
- FastEthernet0/1
- Ethernet0/1/0

FastEthernet0/1

Port Status ☐ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address 0010.1102.4A02

IP Configuration

IPv4 Address 5.5.5.2

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Router1

Physical **Config** CLI Attributes

GLOBAL

- Settings
- Algorithm Settings
- ROUTING**
- Static
- RIP
- SWITCHING**
- VLAN Database
- INTERFACE**
- FastEthernet0/0
- FastEthernet0/1
- Ethernet0/1/0

Ethernet0/1/0

Port Status ☐ On

Bandwidth ☒ 10 Mbps ☐ 100 Mbps ☒ Auto

Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address 00E0.F957.1A06

IP Configuration

IPv4 Address 2.2.2.1

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Router2 (Mask = 255.0.0.0)

Router2

Physical Config CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

Static Routes

Network

2.0.0.0

Mask

255.0.0.0

Next Hop

5.5.5.2

Add

Network Address

1.0.0.0/8 via 5.5.5.2

2.0.0.0/8 via 5.5.5.2

Remove

Equivalent IOS Commands

Would you like to enter the initial configuration dialog? [yes/no]:

Press RETURN to get started!

Router>enable

Router#

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#

Router(config)#ip route 1.0.0.0 255.0.0.0 5.5.5.2

Router(config)#ip route 2.0.0.0 255.0.0.0 5.5.5.2

Router(config)#

Router2

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet0/0

Port Status ☐ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address 0060.70D6.4201

IP Configuration

IPv4 Address 5.5.5.1

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Router2

Physical **Config** CLI Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

FastEthernet0/0

FastEthernet0/1

FastEthernet0/1

Port Status ☐ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto

MAC Address 0060.70D6.4202

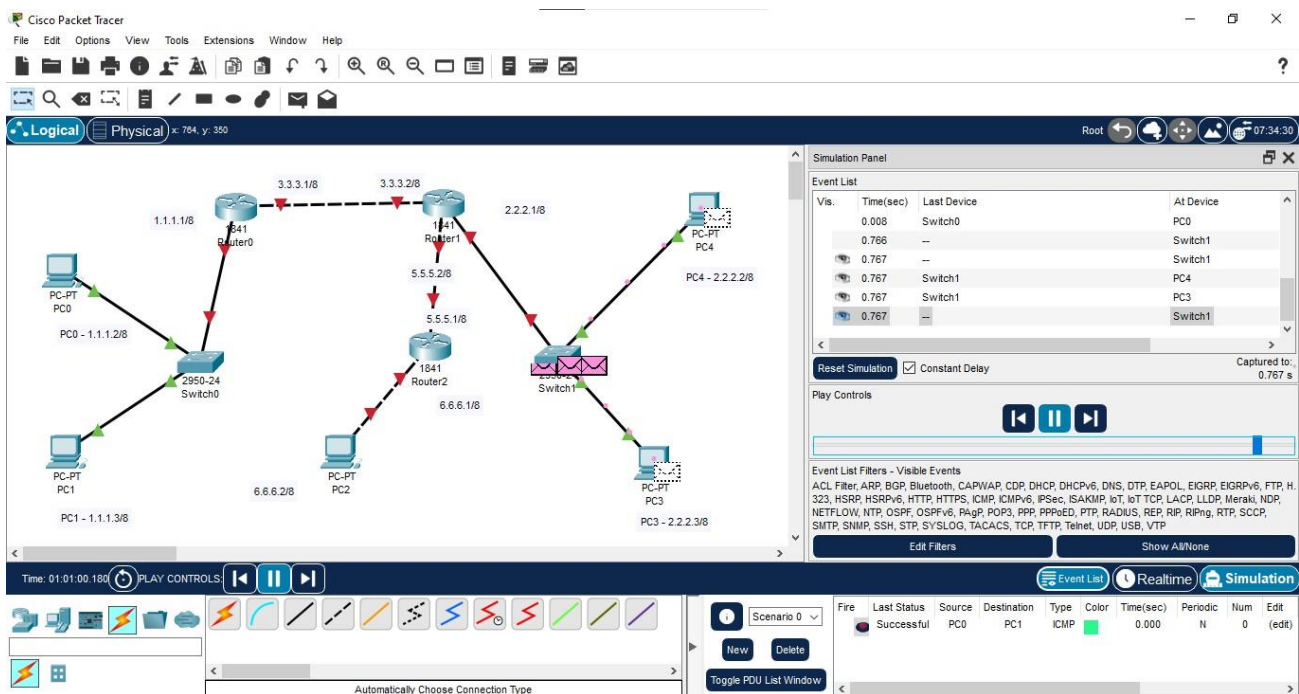
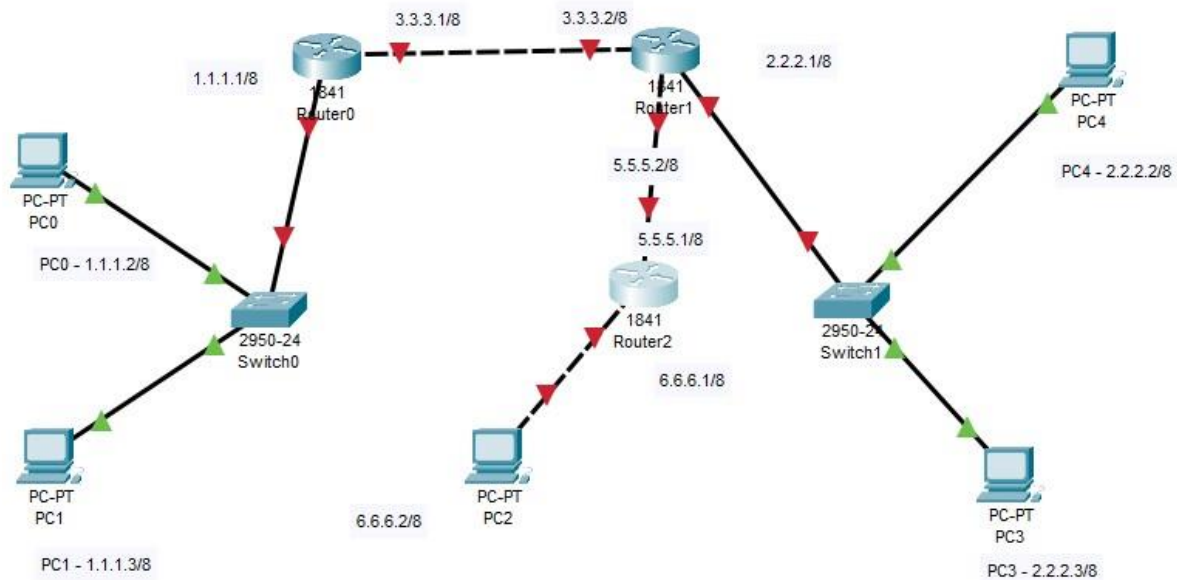
IP Configuration

IPv4 Address 6.6.6.1

Subnet Mask 255.0.0.0

Tx Ring Limit 10

Final Setup



Submission:

Students are expected to take the screenshot of both the Topologies with the successful message after packet transmission.

The routing tables in all the routers in Topology -2.

Submissions will be through Google forms/ Google classroom