

Computer Networks Lab

Week 6

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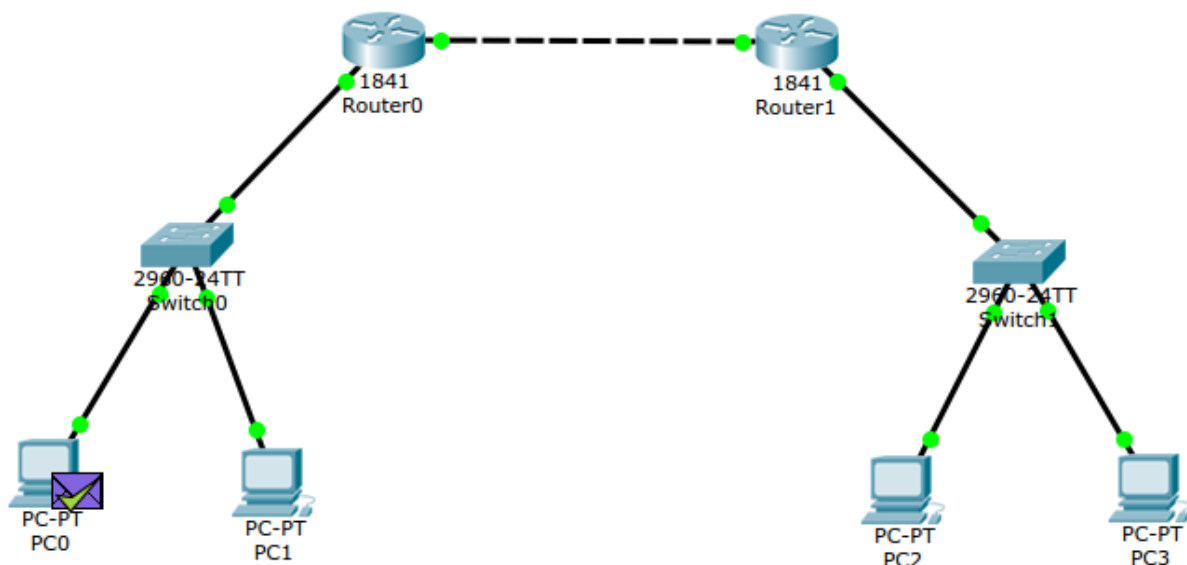
I Section

Designing and Simulation of Network Topology using Cisco Packet Tracer

1. Task 1

1. 1. Configuring the Network Topology

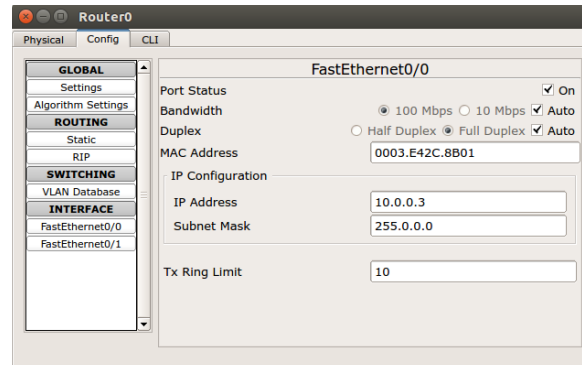
The network devices were arranged to match the given topology in Cisco packet tracer. Each of them were connected by using the appropriate physical connections.



IP address have been assigned to each of the network interfaces being used in the routers and the end systems. The routing tables are then configured manually by adding the required routing informations.

1. 2. Configuring the network and Routing tables

The network configuration options can be obtained by clicking on the network device and going to the config tab.

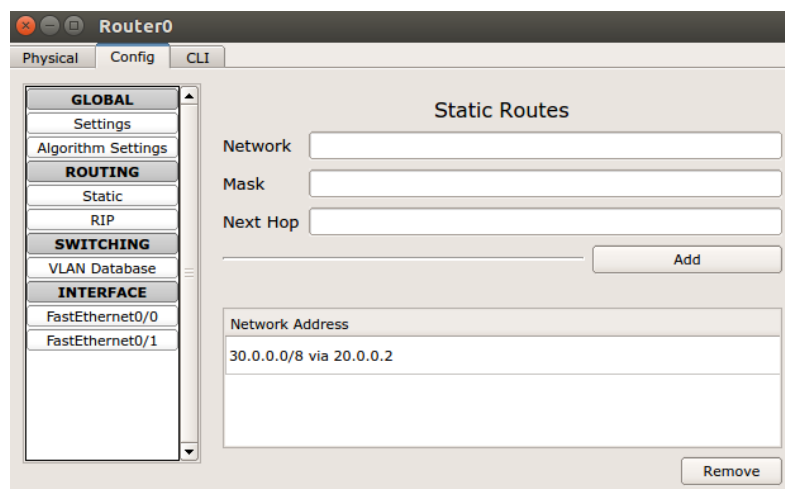


The network configuration information for all network devices in the topology have been summarized in the table given below.

End System	Interface Name	IP Address	Subnet Mask	Gateway
PC0	FastEthernet0	10.0.0.1	255.0.0.0	10.0.0.3
PC1	FastEthernet0	10.0.0.2	255.0.0.0	10.0.0.3
PC2	FastEthernet0	30.0.0.2	255.0.0.0	30.0.0.1
PC3	FastEthernet0	30.0.0.3	255.0.0.0	30.0.0.1

Router	Interface Name	IP Address	Subnet Mask
Router0	FastEthernet0/0	10.0.0.3	255.0.0.0
Router0	FastEthernet0/1	20.0.0.1	255.0.0.0
Router1	FastEthernet0/0	20.0.0.2	255.0.0.0
Router1	FastEthernet0/1	30.0.0.1	255.0.0.0

After configuring the end systems as well as the routers, we need to add routing tables in the routers so that we can connect one network with the other via the router. The routing tables can be added by clicking on one of the routers and selecting the static tab.



The routing tables for all the routers have been given in the following table.

Router	Destination Network	Next Hop
Router0	30.0.0.0	20.0.0.2
Router1	10.0.0.0	20.0.0.1

After all of the above steps have been completed, the network should be able to transmit packets from one end system of one network to another end system on another network via the routers.

1. 3. Transferring a PDU Packet

After the network has been configured properly, we can check if the network is working properly by transmitting a packet from one end system to another end system on another network.

If the packet transfer is successful, it indicates that the network is working properly. If the packet transfer failed, then it indicates that the network has broken paths which has lead to the packet being transmitted being lost along the path of transmission and it has not been able to reach the destination end system.

We can get to know if the transmission was successful or not by observing the status field in the bottom right corner.

The screenshot displays a network simulation environment. The main window shows a logical topology with two routers, Router0 and Router1, connected by a dashed line. Router0 is connected to a switch (2960-24TT Switch0), which is connected to two PCs (PC0 and PC1). Router1 is connected to another switch (2960-24TT Switch1), which is connected to two PCs (PC2 and PC3). The simulation panel on the right shows an event list with columns: Vis., Time(sec), Last Device, At Device, Type, and Info. The event list shows a sequence of ICMP packets being sent from PC0 to PC2 via the routers. The status field at the bottom right indicates the packet was successfully transmitted.

Vis.	Time(sec)	Last Device	At Device	Type	Info
	1.320	PC0	Switch0	ICMP	
	1.321	Switch0	Router0	ICMP	
	1.322	Router0	Router1	ICMP	
	1.323	Router1	Switch1	ICMP	
	1.324	Switch1	PC2	ICMP	
	1.325	PC2	Switch1	ICMP	
	1.326	Switch1	Router1	ICMP	
	1.327	Router1	Router0	ICMP	
	1.328	Router0	Switch0	ICMP	
	1.329	Switch0	PC0	ICMP	

Simulation Panel
Event List

Reset Simulation ☒ Constant Delay Captured to: 1.329 s

Play Controls
Back Auto Capture / Play Capture / Forward

Event List Filters - Visible Events
ACL Filter, ARP, BGP, CDP, DHCP, DHCPv6, DNS, DTP, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPsec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, RADIUS, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP

Edit Filters Show All/None

Time: 00:33:17.202 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward

Scenario 0

New Delete

Toggle PDU List Window

Automatically Choose Connection Type

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Failed	PC0	PC2	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC0	PC2	ICMP		1.319	N	1	(edit)	(delete)

Simulation

Initially, the packet may not get transmitted as the network requires some time to learn the routes. After a few tries, we can send a packet from one end system on one network to the other end system on a different network.

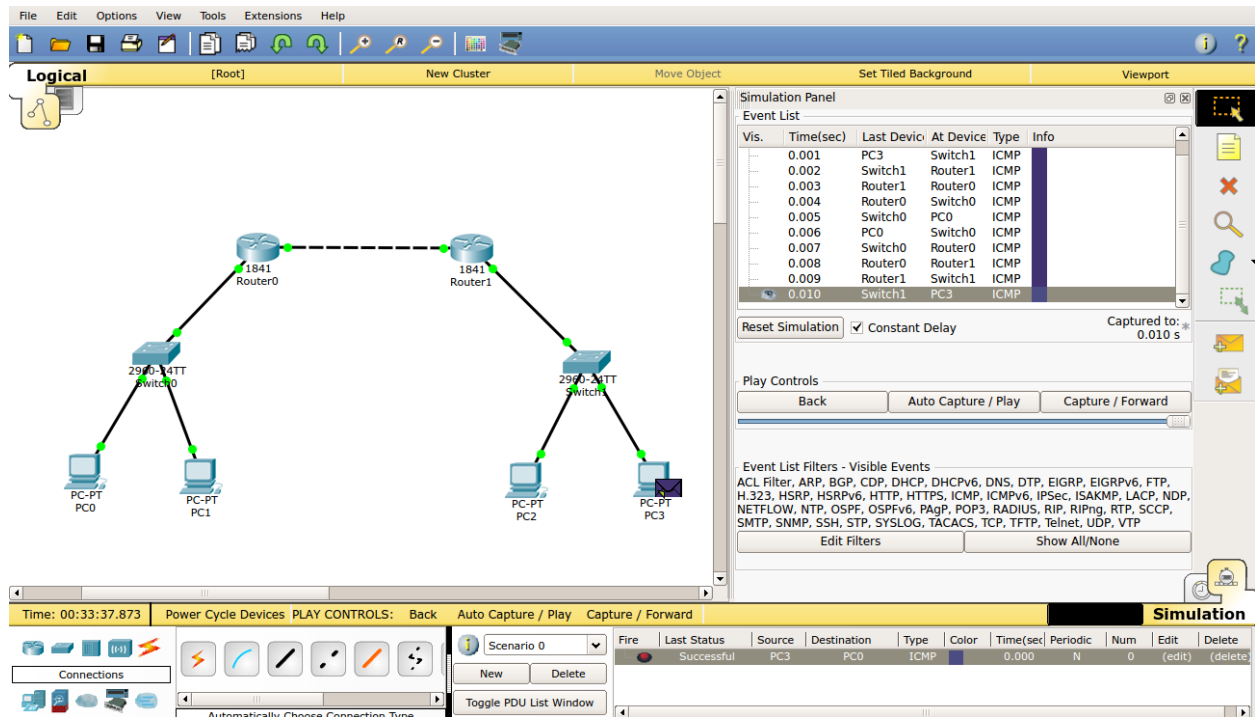
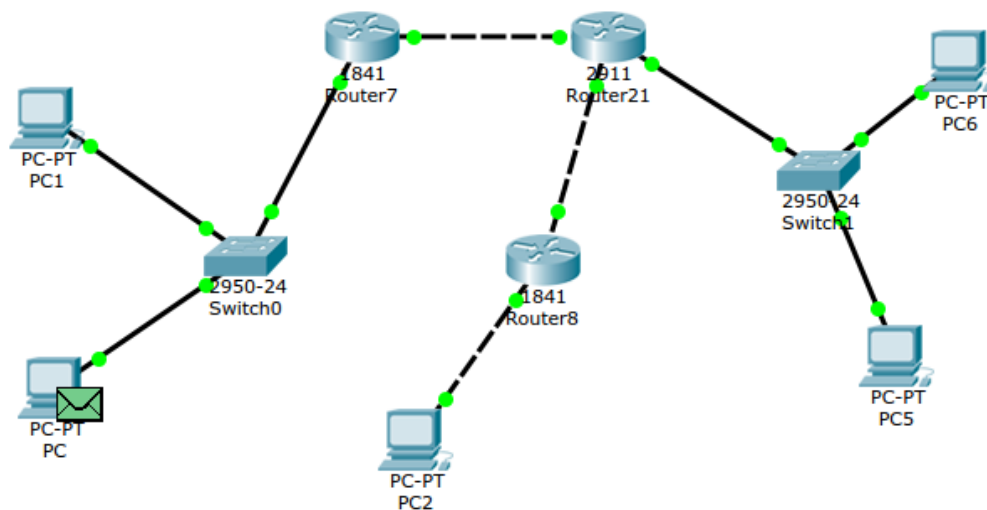


Figure : Transferring Packet from PC3 to PC0

2. Task 2

In this task, we will use a different topology. All the network configuration steps were repeated as we did for Task1.

2. 1. Creating the Topology



2. 2. Configuring the Topology and adding routing tables

The network devices were configured and the routing tables were added to the routers. The IP address of network devices are summarized in the following table.

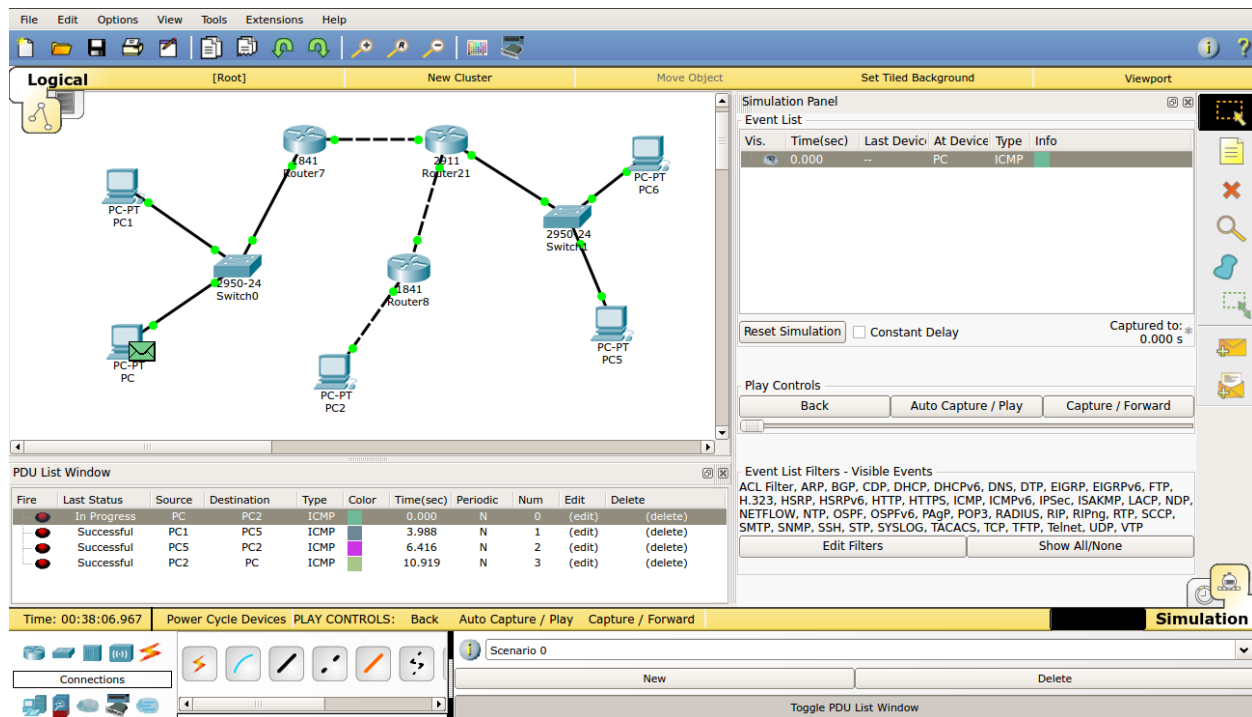
End Systems	Interface Name	IP Address	Gateway
PC	FastEthernet0	1.1.1.3	1.1.1.1
PC1	FastEthernet0	1.1.1.2	1.1.1.1
PC2	FastEthernet0	6.6.6.2	6.6.6.1
PC5	FastEthernet0	2.2.2.3	2.2.2.1
PC6	FastEthernet0	2.2.2.2	2.2.2.1

The Subnet mask for all end systems is 255.0.0.0

Routers	Interface Name	IP Address	Subnet Mask
Router7	FastEthernet0/0	1.1.1.1	255.0.0.0
Router7	FastEthernet0/1	3.3.3.1	255.0.0.0
Router21	FastEthernet0/0	3.3.3.2	255.0.0.0
Router21	FastEthernet0/1	2.2.2.1	255.0.0.0
Router21	FastEthernet0/2	5.5.5.2	255.0.0.0
Router8	FastEthernet0/0	5.5.5.1	255.255.255.0
Router8	FastEthernet0/1	6.6.6.1	255.255.255.0

The routing tables for all three routers were added as given in the table below

Router	Destination Network	Next Hop
Router7	2.2.2.0	3.3.3.2
Router7	5.5.5.0	3.3.3.2
Router7	6.6.6.0	3.3.3.2
Router21	1.1.1.0	3.3.3.1
Router21	6.6.6.0	5.5.5.1
Router8	3.3.3.0	5.5.5.2
Router8	1.1.1.0	5.5.5.2
Router8	2.2.2.0	5.5.5.2



In the above figure, we have 4 packets being transmitted from different end systems on different networks. We can see that the status of all packets are Successful hence our topology has been configured properly.