

# Computer Networks

## CS361 Lab2

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CPT experiment file link:[https://drive.google.com/drive/folders/1BPQQF3IE3Z34IKh3qd\\_A5wcMsMf8dpwu?usp=sharing](https://drive.google.com/drive/folders/1BPQQF3IE3Z34IKh3qd_A5wcMsMf8dpwu?usp=sharing)

### **Q1. What is a router and how it functions?**

A router is a networking device that joins different computer networks. It is in charge of forwarding data packets between networks and operates at Layer 3 of the OSI model, which is the network layer. In order to direct traffic between various networks and enable device communication within those networks, routers are frequently used in homes, businesses, and online.

#### ***Functions:***

##### **1. Packet Forwarding:**

- a) Packet Inspection: When a data packet arrives at the router, the router examines the destination IP address of the packet.
- b) Decision Making: The router compares the destination IP address with its routing table to determine the best path for the packet to reach its destination network.

##### **2. DHCP (Dynamic Host Configuration Protocol):**

Many routers have a built-in DHCP server. DHCP assigns IP addresses dynamically to devices within the local network. This simplifies network configuration for users and ensures that every device on the network has a unique IP address.

##### **3. Firewall and Security:**

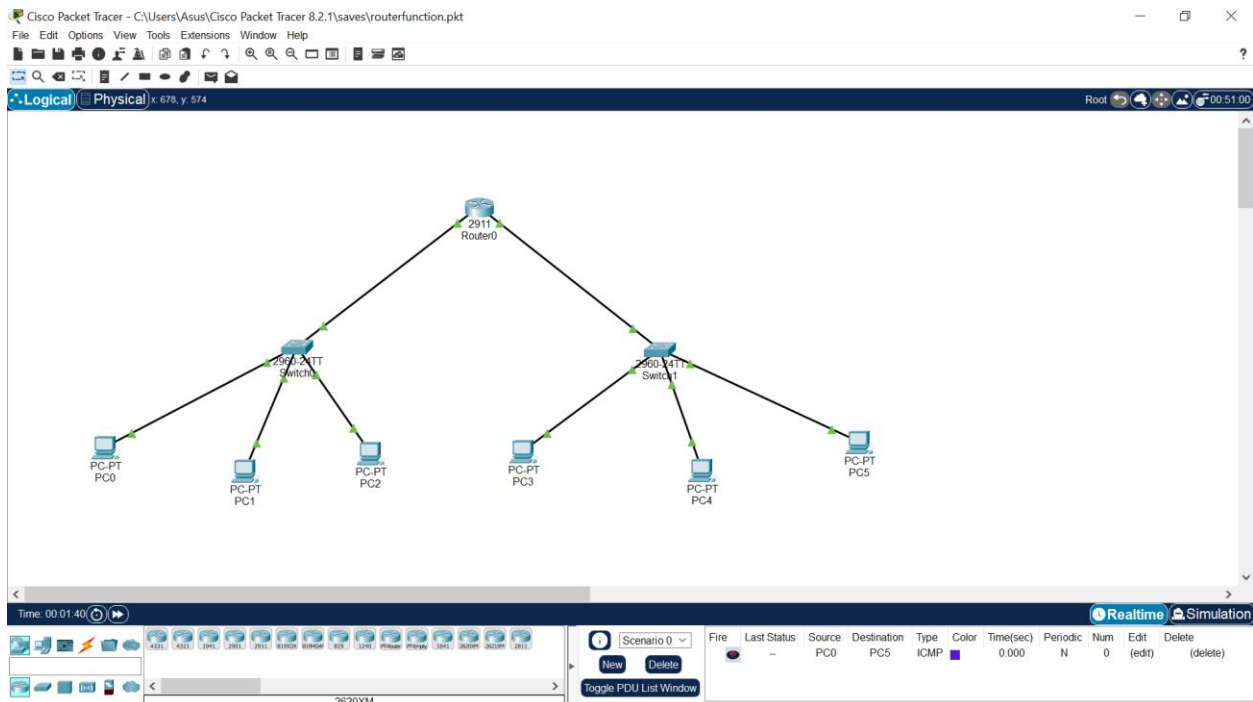
Routers often include firewall capabilities to filter incoming and outgoing traffic, enhancing network security. Firewalls can block specific ports or IP addresses to protect the network from unauthorized access and attacks.

Routers are essential elements of the contemporary internet and local area networks because they facilitate data exchange both within and across networks.

Continued.....

**Q2. Make a small network using router and switches as demonstrated in lab. Show that message transferred from one end device in first network to other end device in second network is successful.**

**Creating network..**



**Checking connection...**

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

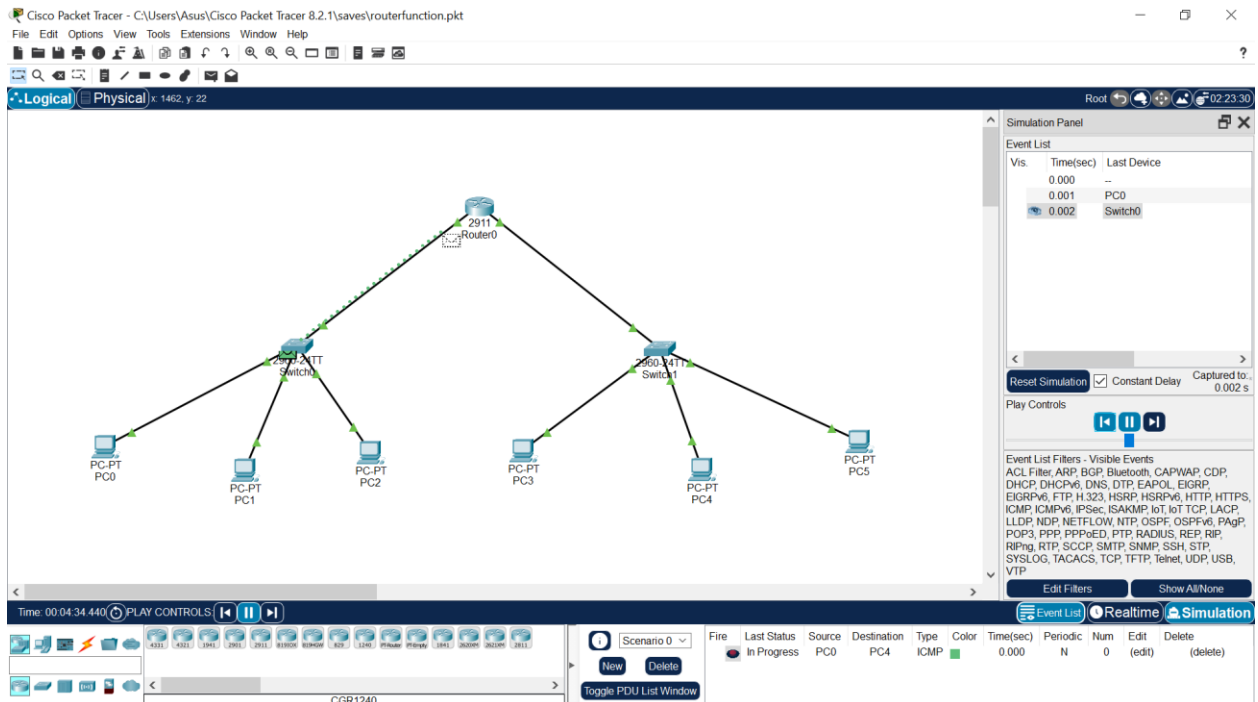
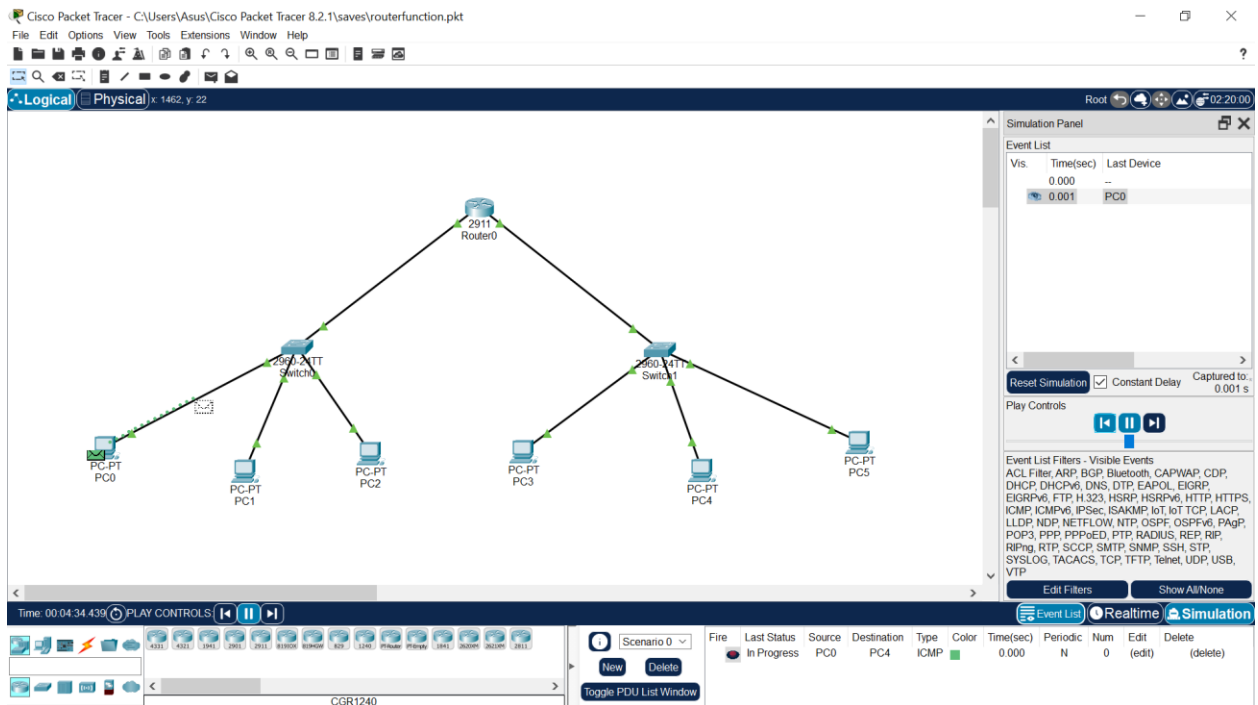
Request timed out.
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127
Reply from 192.168.1.2: bytes=32 time<1ms TTL=127
Reply from 192.168.1.2: bytes=32 time=1ms TTL=127

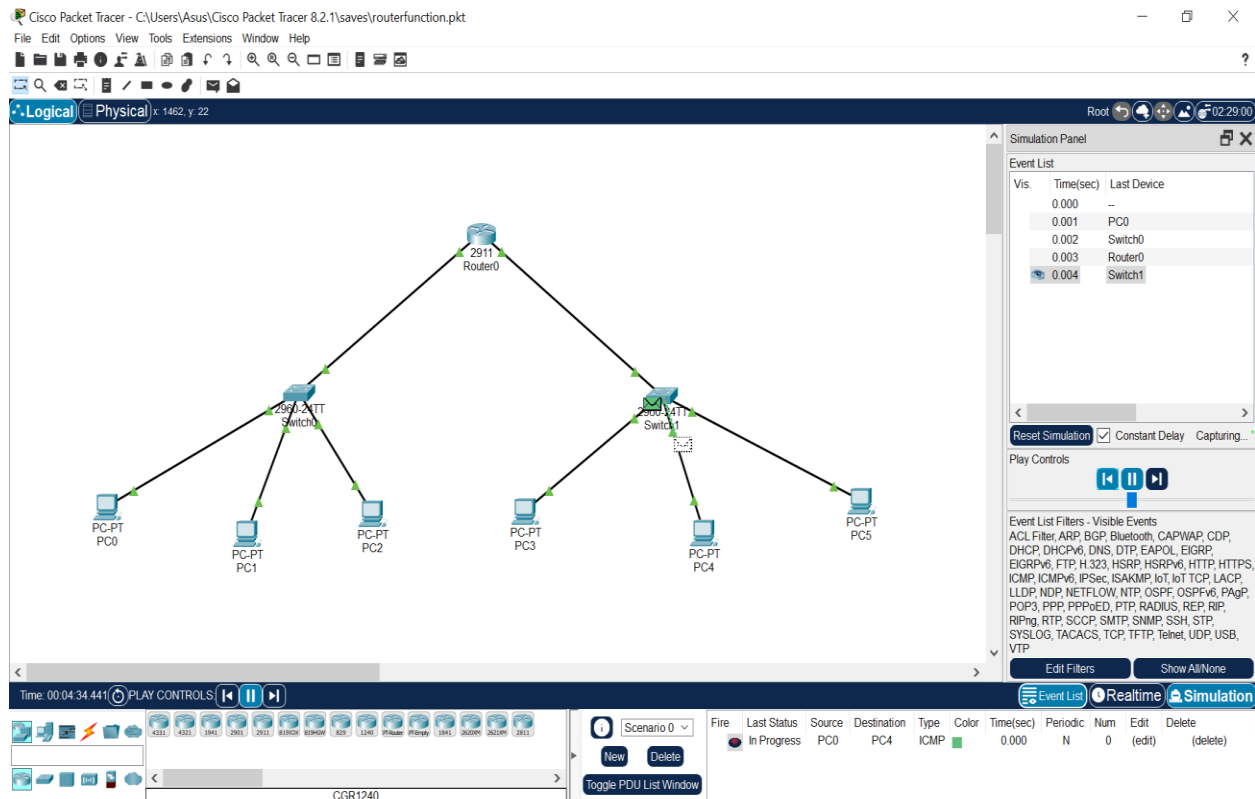
Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

**Connection established...**

## Transferring packets...





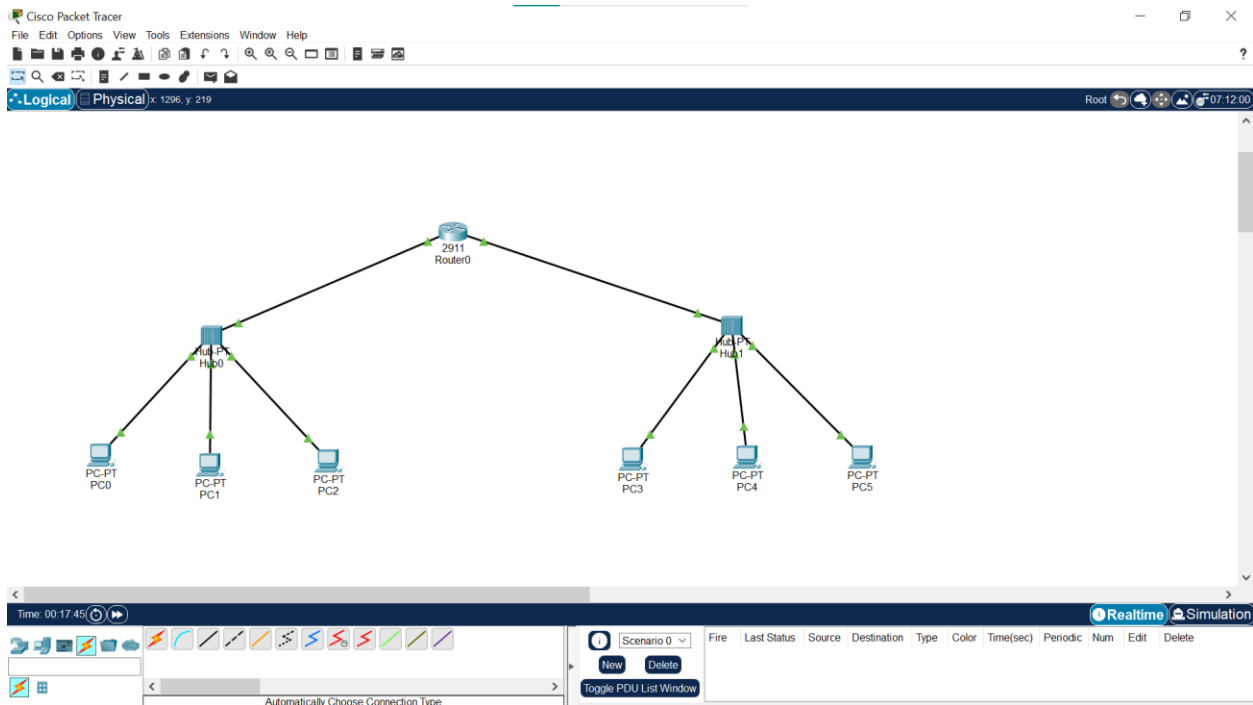
Packet transfer Successful!!

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC4	ICMP		0.000	N	0	(edit)	(delete)

Continued...

**Q3. Now instead of switches, use hubs to make the network designed in (2). What do you observe?**

Creating network..



Checking connection..

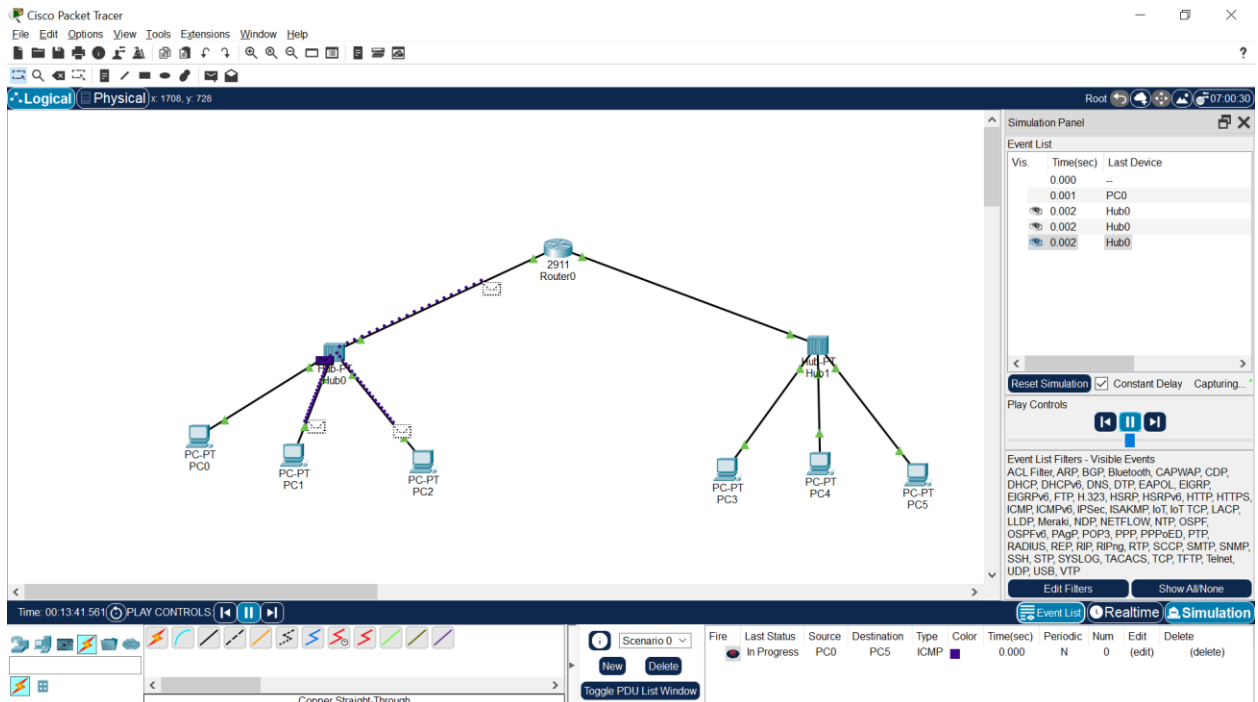
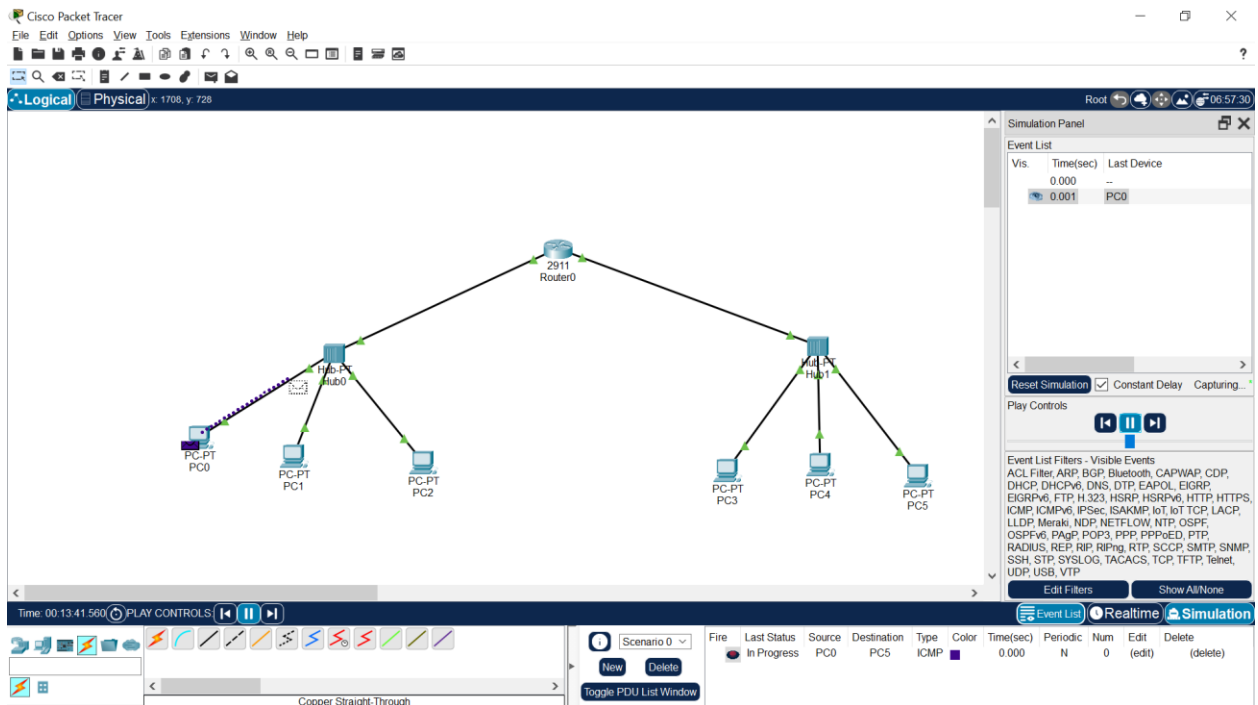
```
Pinging 192.168.1.3 with 32 bytes of data:

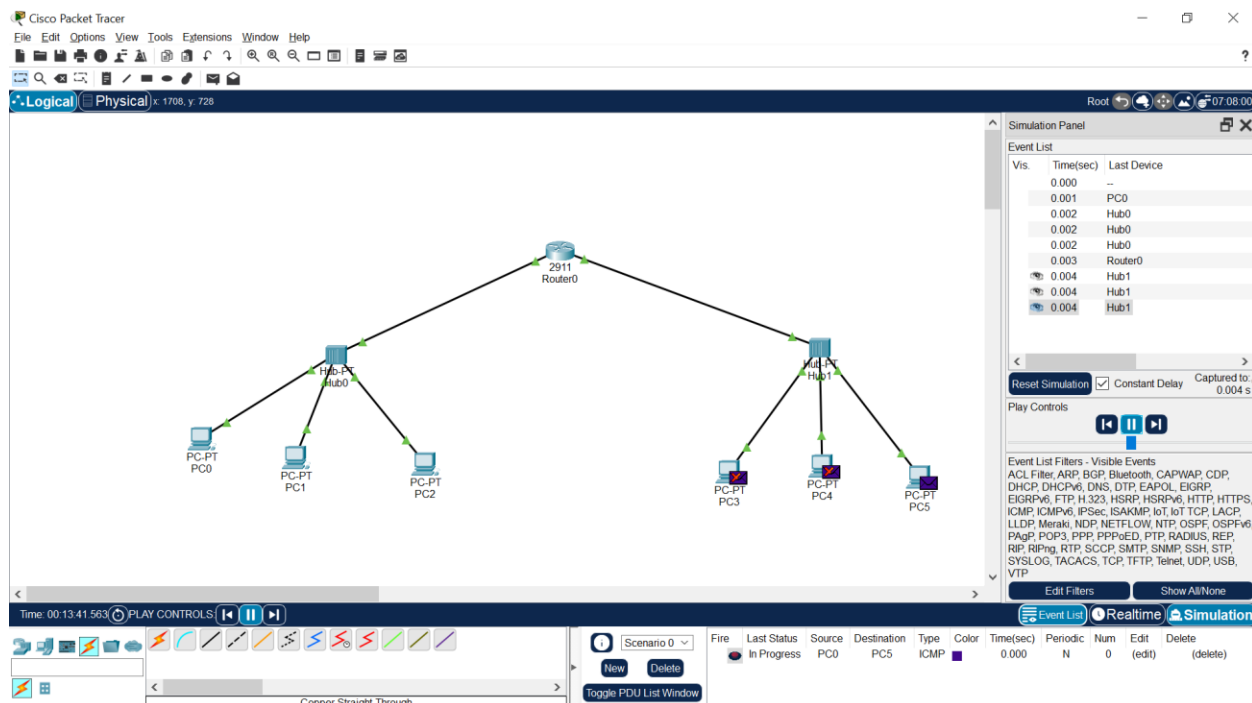
Request timed out.
Reply from 192.168.1.3: bytes=32 time<1ms TTL=127
Reply from 192.168.1.3: bytes=32 time=3ms TTL=127
Reply from 192.168.1.3: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 3ms, Average = 1ms
```

Connection established!...

## Transferring Packets...





Packet transfer successful!...

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC5	ICMP		0.000	N	0	(edit)	(delete)

The difference that has been observed is that through switch, packet is received by the specific destination address/computer only since switch has the memory or routing table. It helps switch to deliver message to the destination device only.

On the other hand, sender hub broadcasts the message to other computers also apart from sending to router. Then after receiving from router the receiver hub also broadcasts message to all computer/devices including the targeted/destination one.