LAB 2

Router:

Router is networking device used in-between different computer networks. It passes data packet from one network to another.

Interfaces and IP address of router:

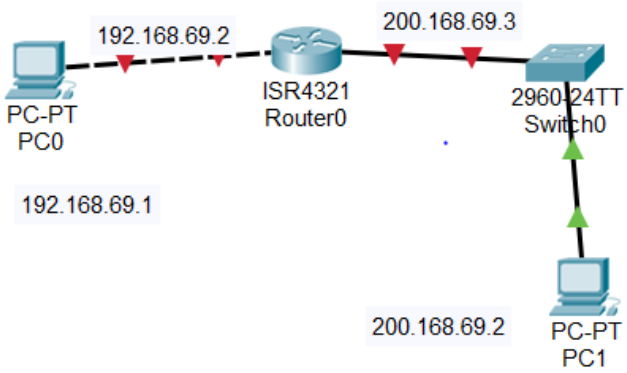
Router have Two type of interface and each interface have IP address assigned to it.

The first router interface is called the WAN (Wide Area Network) interface. This is the side of the router that faces the Internet and has a public IP address. The second router interface is called the LAN (Local Area Network) interface. This is the side of the router that faces the home network's computers and has a private IP address.

Routing table is used to show where data packets travelling over IP network will be directed.

Different Fields of Routing Table:

1. Network ID:
   Network ID with respect to the route.
2. Subnet Mask:
   It is used to match destination IP address with network ID.
3. Next Hop:
   IP address at which data packet is forwarded.
4. Outgoing Interface:
   Outgoing interface the packet should go out to reach the destination network.
5. Metric:
   It indicates the no of routers crossed to the network ID.



Here, Router have networks connected to it, so it will have two interfaces and each interface will have its own IP address.

Forwarding procedure:

Routing table for Router0:

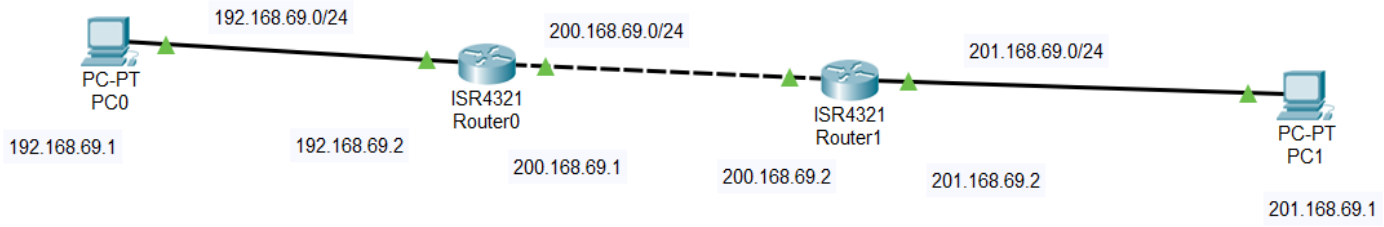
Interface	Network Id	Subnet Mask	Next Hop
1	192.168.69.0	255.255.255.0	-
2	200.168.69.0	255.255.255.0	-

Here, we want to pass message from PC0 to PC1.Now, router will extract the destination IP address which is 200.168.69.2 & extract the Network Id with the help of subnet mask and try to match it with Interface ID in the Routing Table. now when it finds it, it will pass the message to the corresponding interface ID. This process of exacting destination IP address and finding it in Routing table is called Forwarding procedure.

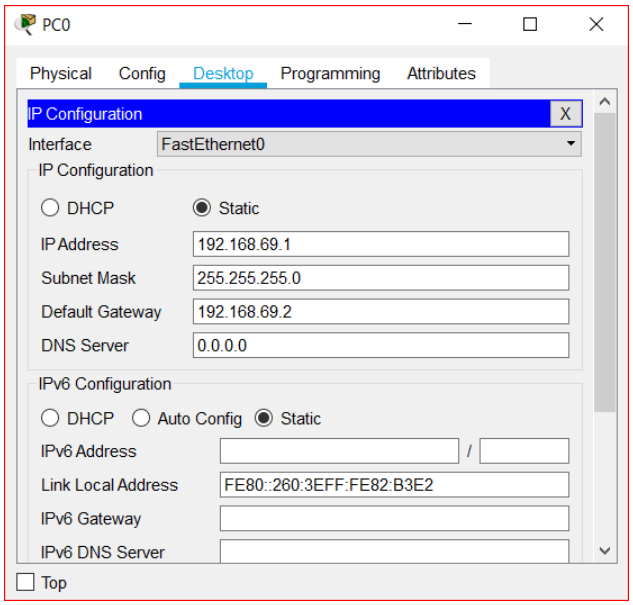
Default Routing:

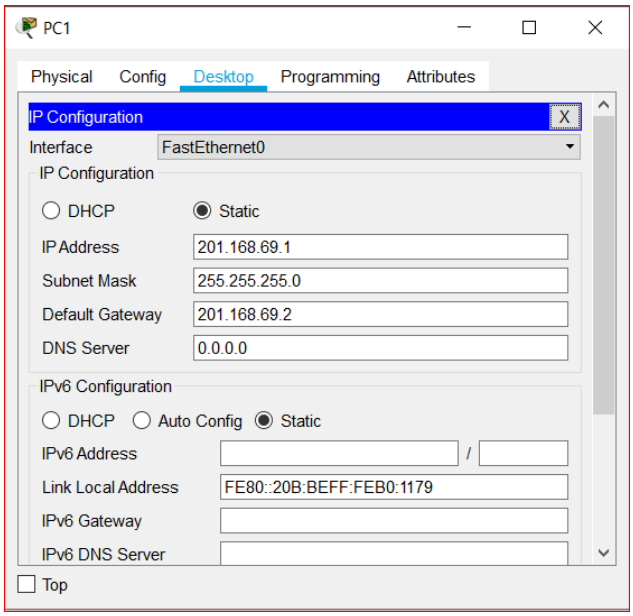
Default routing is one type of configuration in Computer network, in which data packets are forwarded even without destination IP address. here, default route and subnet mask, both are set to zero. After this entry added into routing table is called Default entry.

Network circuit 1:



First of all, set IP address and Default Gateway for PCs and interfaces of Routers.





Now in CLI of Router0:

Router>enable

Router#configure terminal

Router(config)#interface GigabitEthernet0/0/0 (configure with PC0)

Router(config-if)#ip address 192.168.69.2 255.255.255.0

Router(config-if)#no shutdown (it will set state to up)

Router(config-if)#exit

Router(config)#interface GigabitEthernet0/0/1 (configure with router1)

Router(config-if)#ip address 200.168.69.1 255.255.255.0

Router(config-if)#no shutdown (it will set state to up)

Router(config-if)#exit

Router(config-if)#ip route 201.168.69.0 255.255.255.0 200.168.69.2 (static entry for routing table of Router0)

Now in CLI of Router1:

Router>enable

Router#configure terminal

Router(config)#interface GigabitEthernet0/0/0 (configure with PC0)

Router(config-if)#ip address 201.168.29.2 255.255.255.0

Router(config-if)#no shutdown (it will set state to up)

Router(config-if)#exit

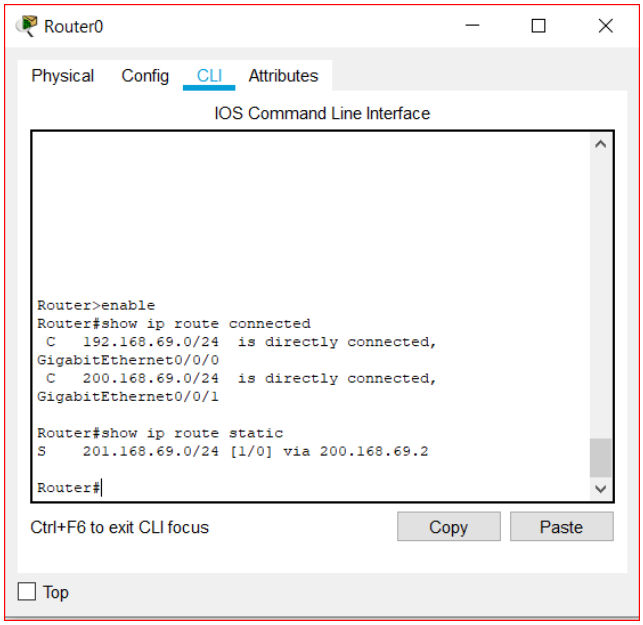
Router(config)#interface GigabitEthernet0/0/1 (configure with router1)

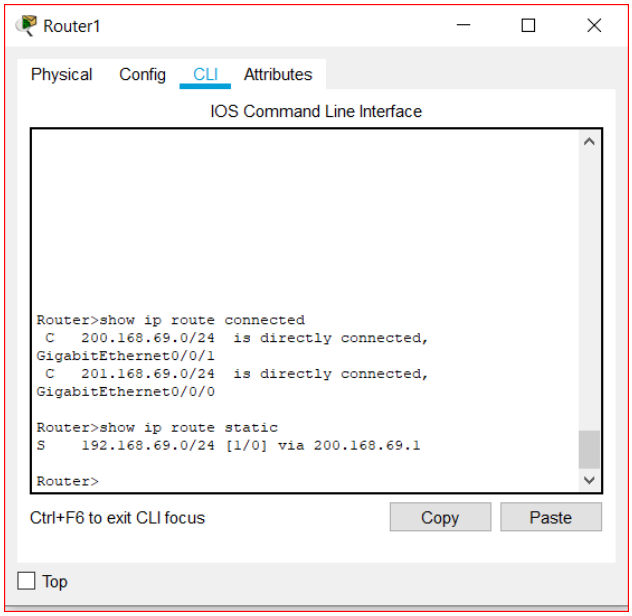
Router(config-if)#ip address 200.168.69.2 255.255.255.0

Router(config-if)#no shutdown (it will set state to up)

Router(config-if)#exit

Router(config-if)#ip route 192.168.69.0 255.255.255.0 200.168.69.1 (static entry for routing table of Router1)





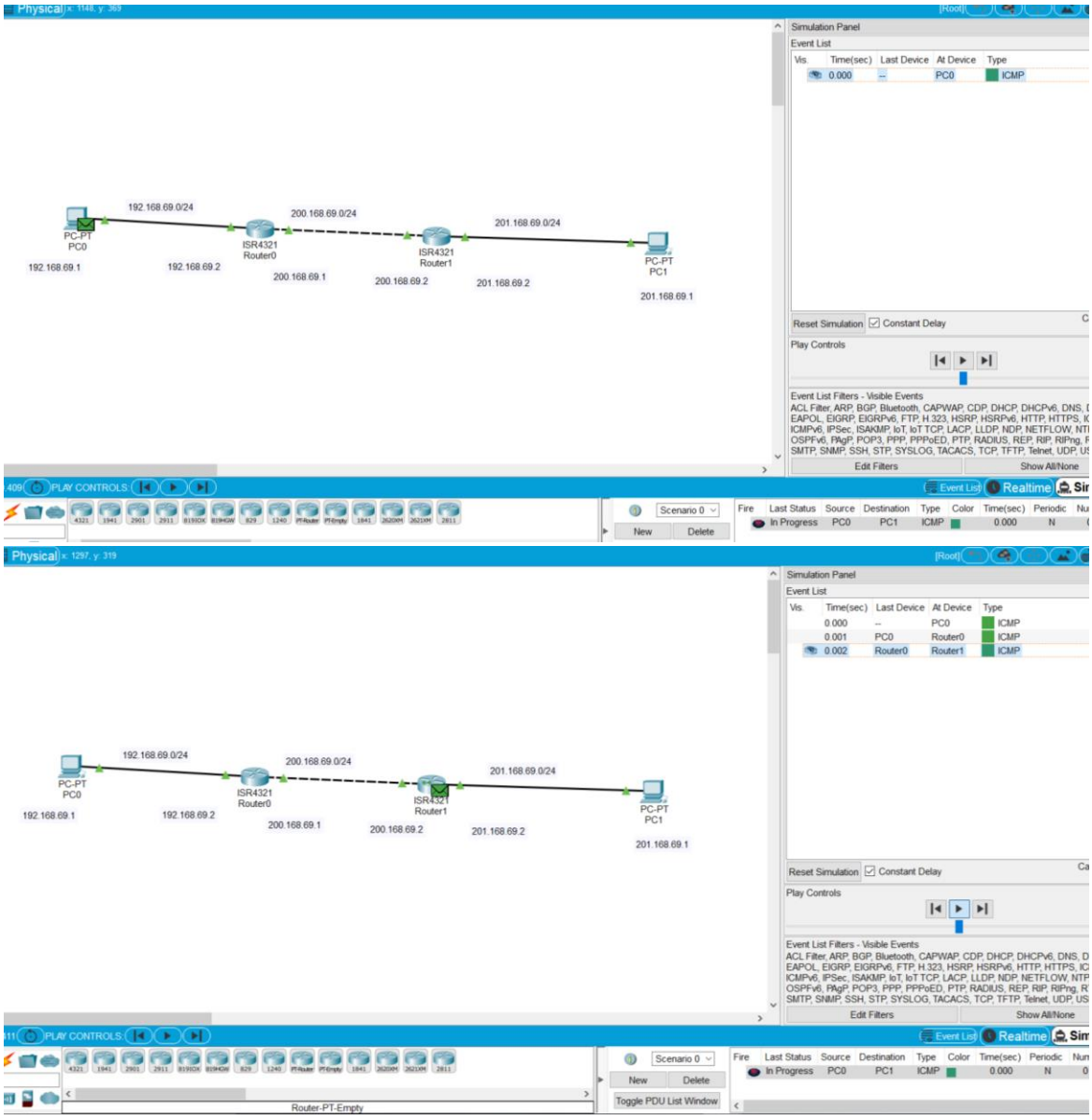
Routing Table for Router0

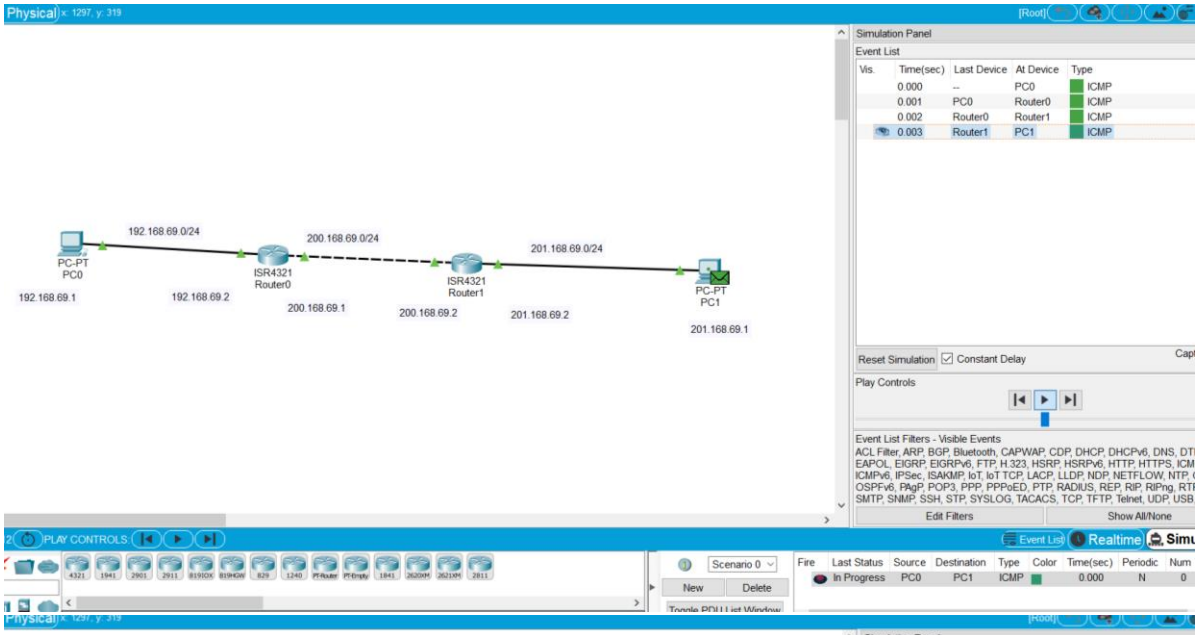
Interface	Network Id	Subnet Mask	Next Hop
1	192.168.69.0	255.255.255.0	-
2	200.168.69.0	255.255.255.0	-
2	201.168.69.0	255.255.255.0	200.168.29.2

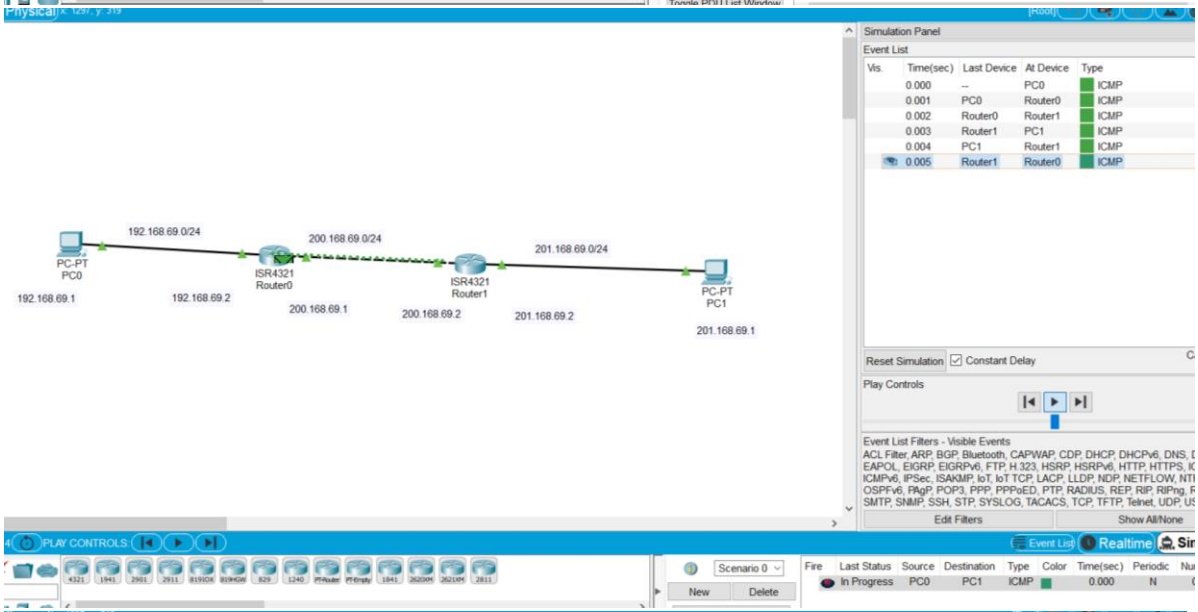
Routing Table for Router1

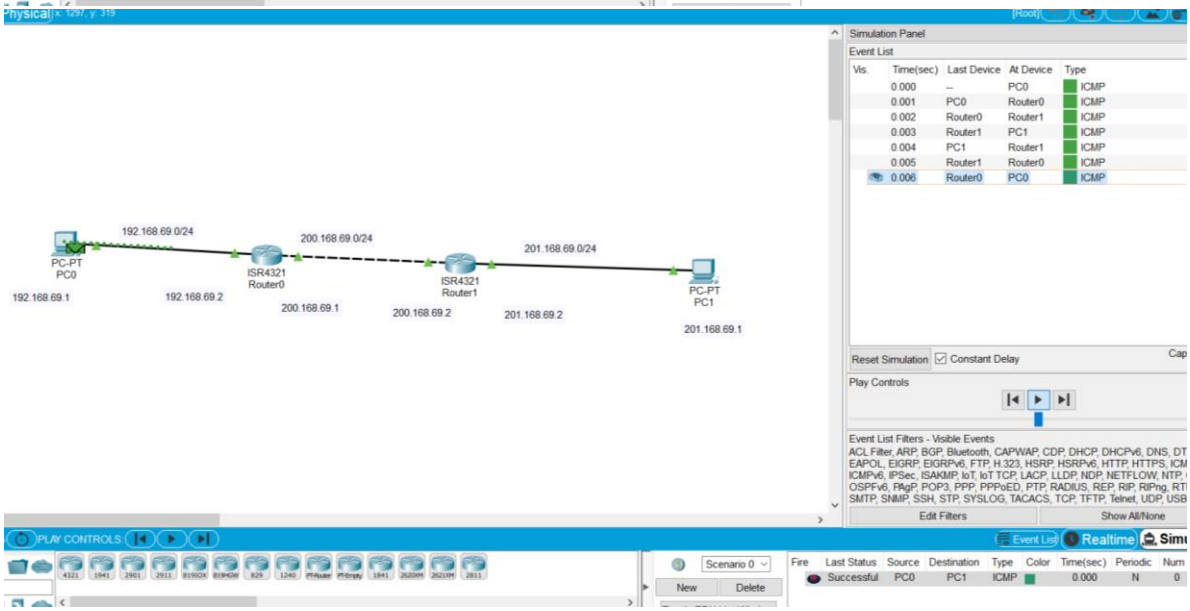
Interface	Network Id	Subnet Mask	Next Hop
4	201.168.69.0	255.255.255.0	-
3	200.168.69.0	255.255.255.0	-
3	192.168.69.0	255.255.255.0	200.168.29.1

Message Passing between PC0 to PC1:

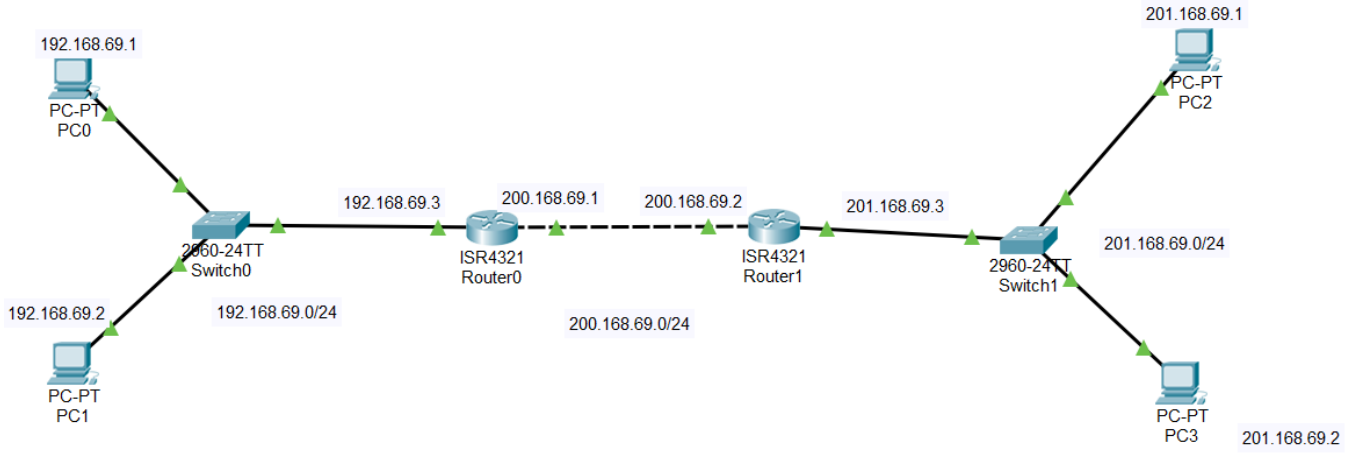



Physical
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
0.003 Router1 PC1 ICMP
192.168.69.0/24
200.168.69.0/24
201.168.69.0/24
PC-PT PC0
ISR4321 Router0
ISR4321 Router1
PC-PT PC1
192.168.69.1
192.168.69.2
200.168.69.1
200.168.69.2
201.168.69.2
201.168.69.1
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
Edit Filters
Show All/None
PLAY CONTROLS
Scenario 0
New
Delete
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
In Progress PC0 PC1 ICMP 0.000 N 0

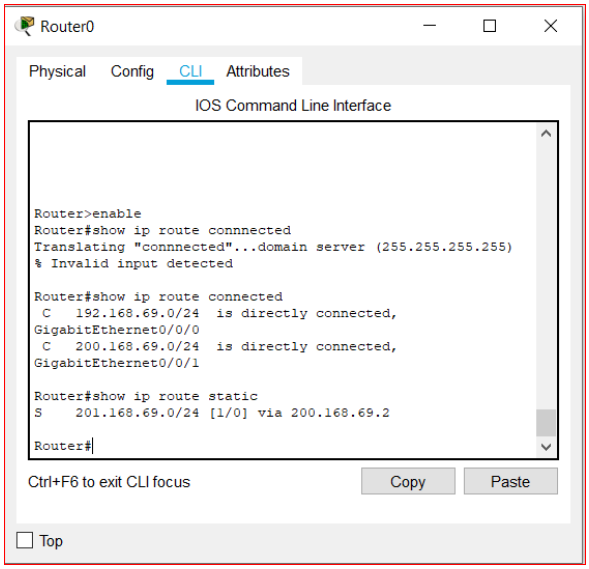

Physical
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
0.003 Router1 PC1 ICMP
0.004 PC1 Router1 ICMP
0.005 Router1 Router0 ICMP
192.168.69.0/24
200.168.69.0/24
201.168.69.0/24
PC-PT PC0
ISR4321 Router0
ISR4321 Router1
PC-PT PC1
192.168.69.1
192.168.69.2
200.168.69.1
200.168.69.2
201.168.69.2
201.168.69.1
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
Edit Filters
Show All/None
PLAY CONTROLS
Scenario 0
New
Delete
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
In Progress PC0 PC1 ICMP 0.000 N 0

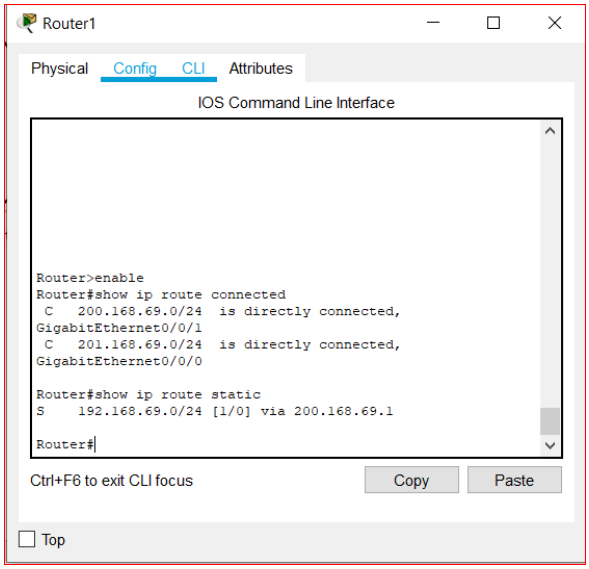

Physical
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC0 ICMP
0.001 PC0 Router0 ICMP
0.002 Router0 Router1 ICMP
0.003 Router1 PC1 ICMP
0.004 PC1 Router1 ICMP
0.005 Router1 Router0 ICMP
0.006 Router0 PC0 ICMP
192.168.69.0/24
200.168.69.0/24
201.168.69.0/24
PC-PT PC0
ISR4321 Router0
ISR4321 Router1
PC-PT PC1
192.168.69.1
192.168.69.2
200.168.69.1
200.168.69.2
201.168.69.2
201.168.69.1
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
Edit Filters
Show All/None
PLAY CONTROLS
Scenario 0
New
Delete
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
Successful PC0 PC1 ICMP 0.000 N 0

Network circuit 2:

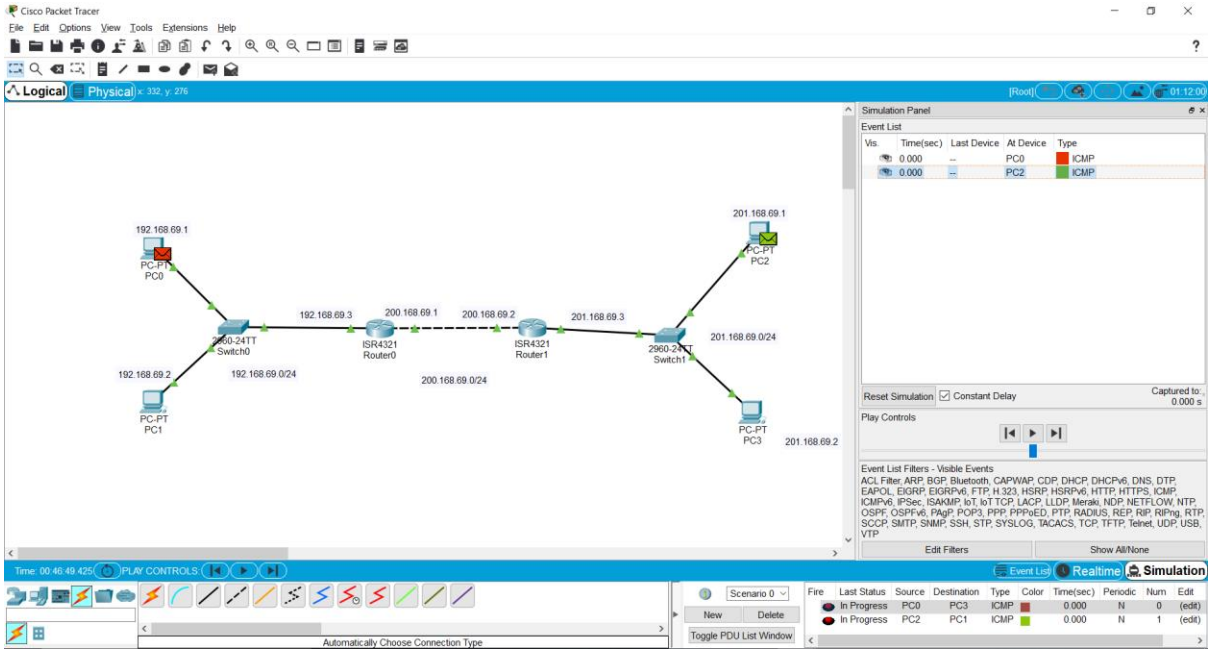


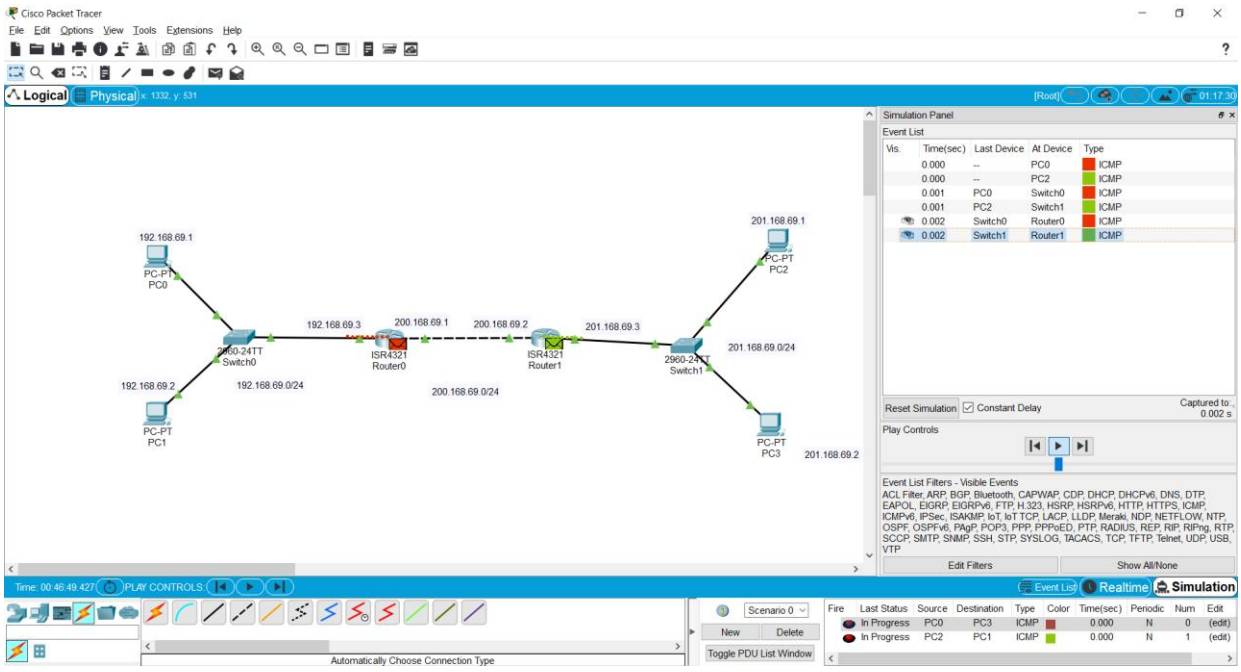
After all the configuration between PCs and routers,

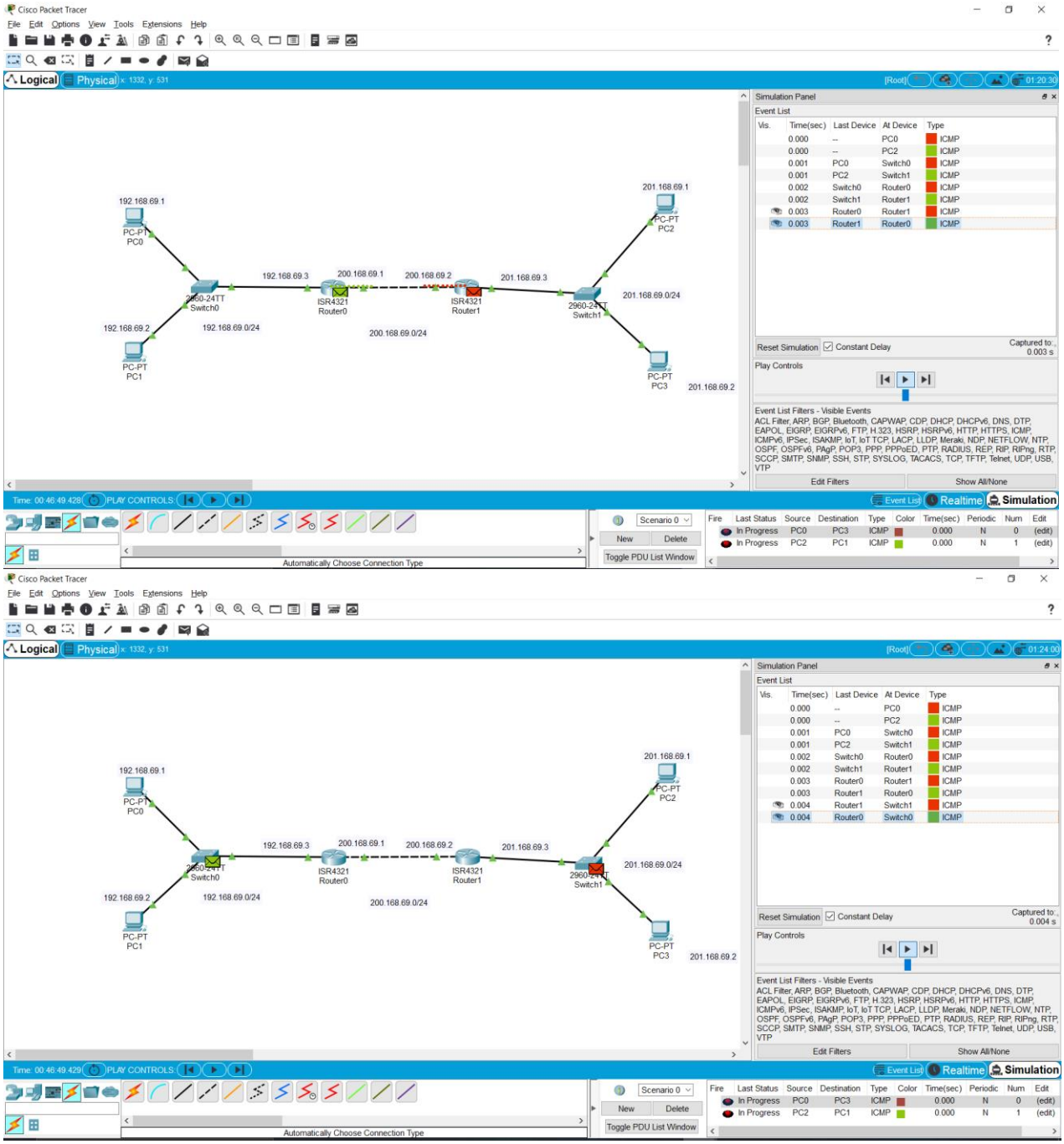




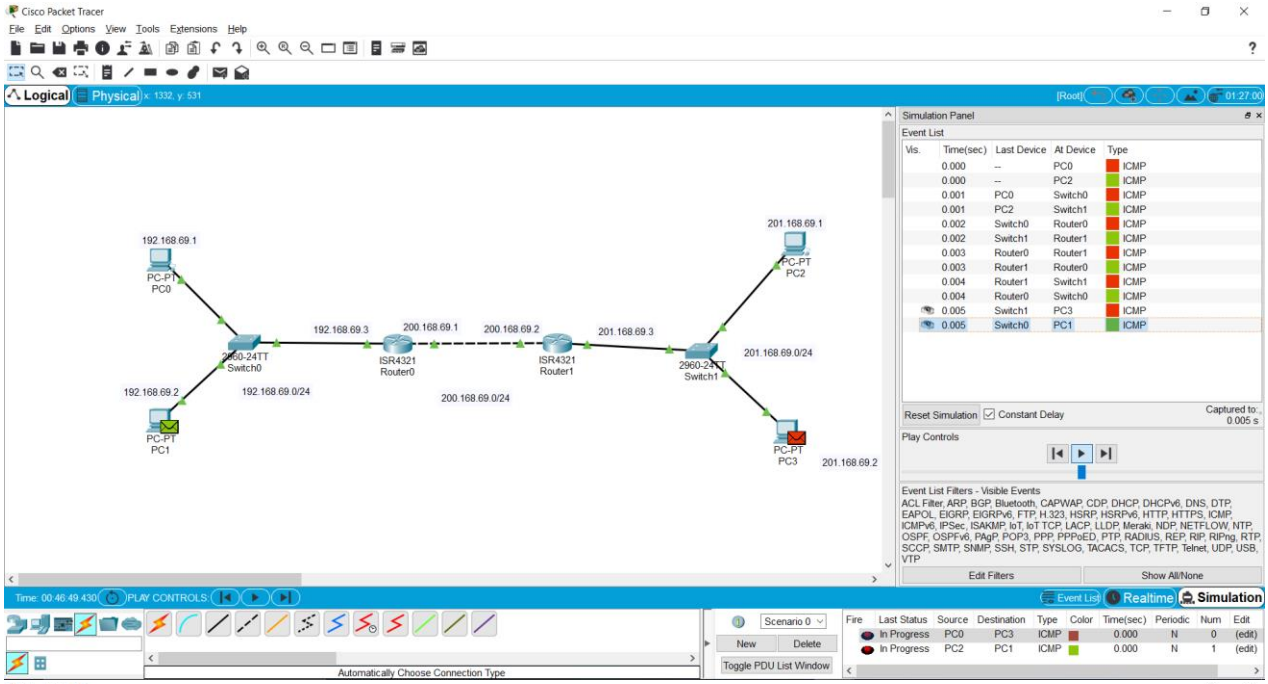
Message passing between PC0 to PC3 and PC2 to PC1:

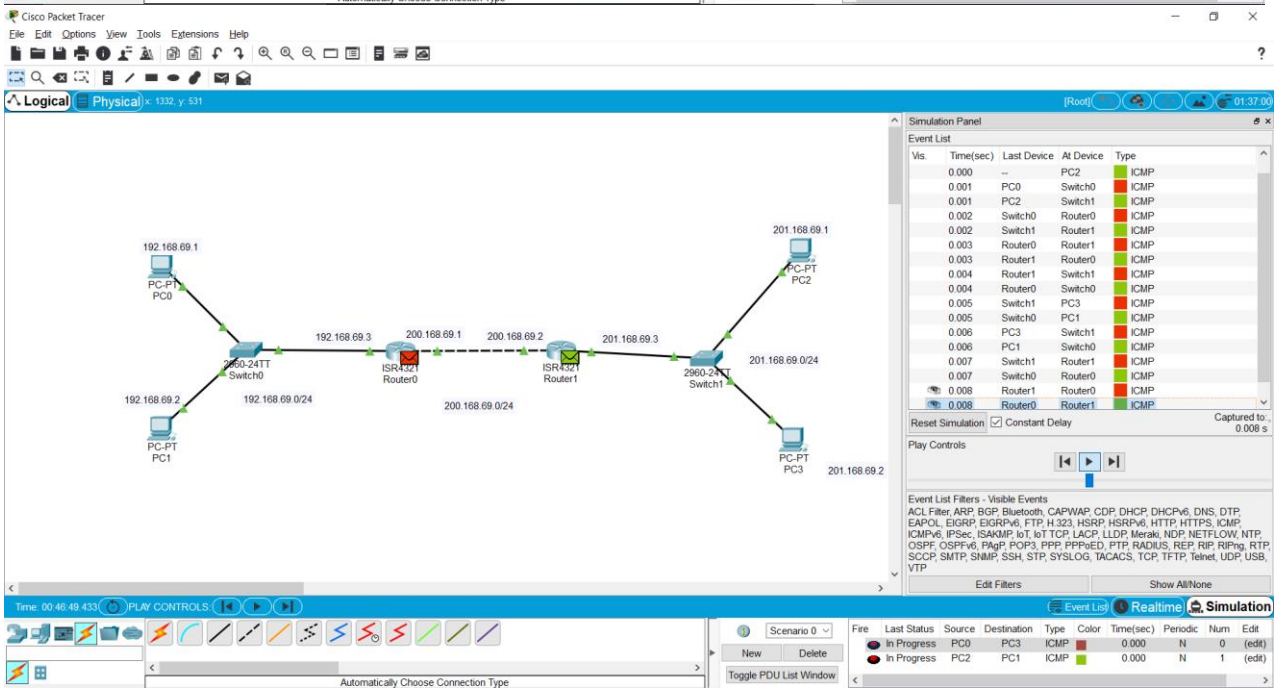


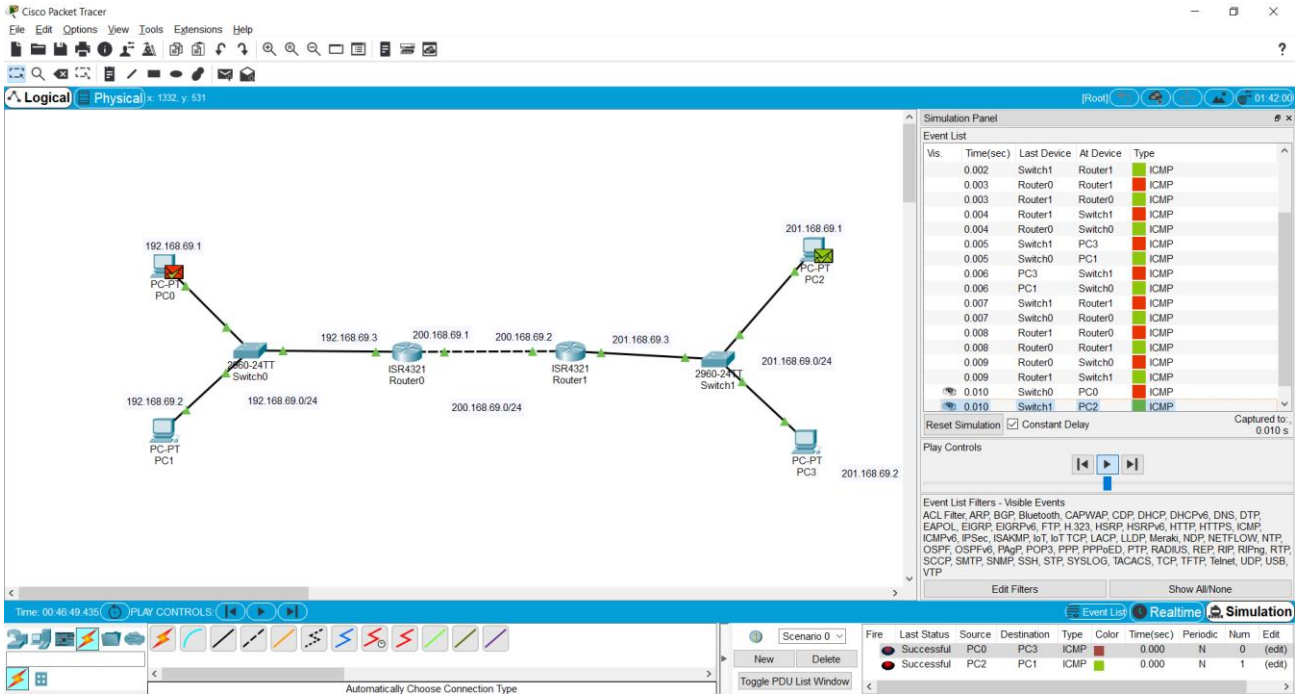



Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical x: 1332, y: 531
[Root]
01:20:30
192.168.69.1
PC-PT
PC0
201.168.69.1
PC-PT
PC2
192.168.69.3
200.168.69.1
200.168.69.2
201.168.69.3
2960-24TT
Switch0
ISR4321
Router0
ISR4321
Router1
2960-24TT
Switch1
201.168.69.0/24
192.168.69.2
192.168.69.0/24
200.168.69.0/24
PC-PT
PC1
PC-PT
PC3
201.168.69.2
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC0 ICMP
0.000 -- PC2 ICMP
0.001 PC0 Switch0 ICMP
0.001 PC2 Switch1 ICMP
0.002 Switch0 Router0 ICMP
0.002 Switch1 Router1 ICMP
0.003 Router0 Router1 ICMP
0.003 Router1 Router0 ICMP
Reset Simulation
Constant Delay
Captured to:
0.003 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, PPPoED, 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: 00:46:49.428
PLAY CONTROLS:
Event List
Realtime
Simulation
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
In Progress PC0 PC3 ICMP 0.000 N 0 (edit)
In Progress PC2 PC1 ICMP 0.000 N 1 (edit)

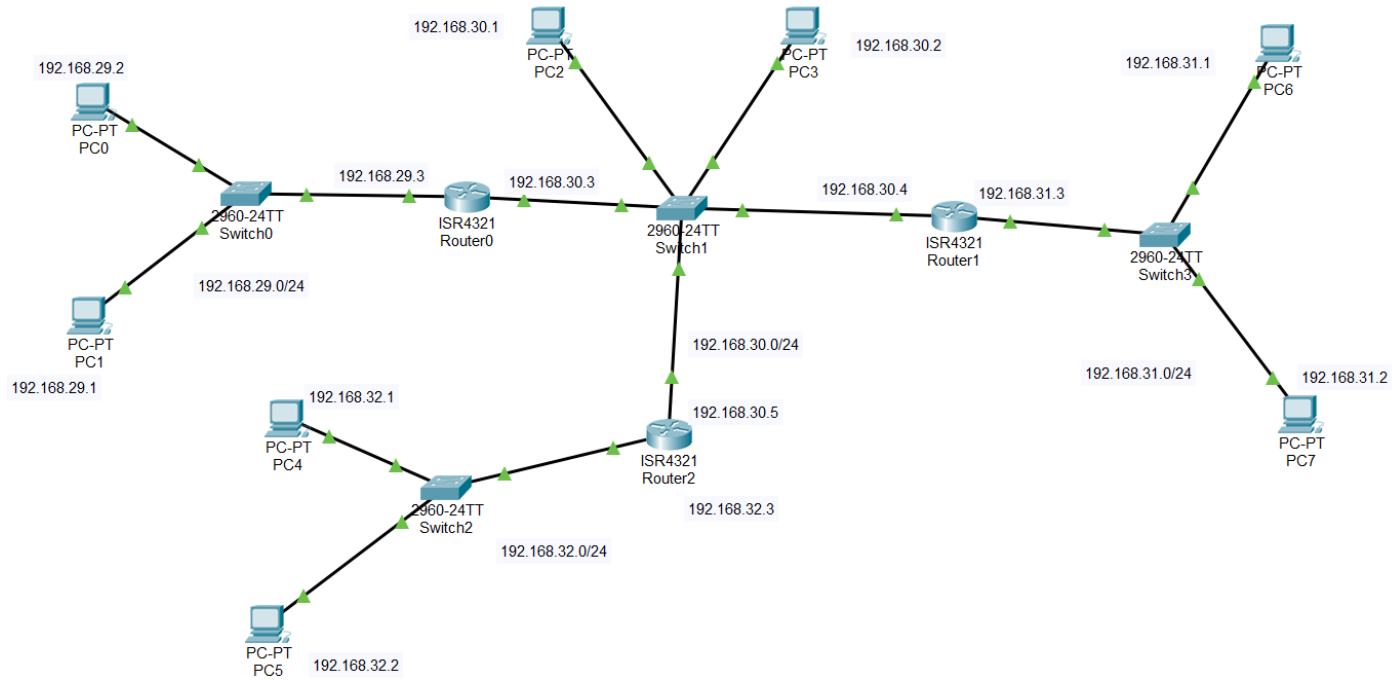
Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical x: 1332, y: 531
[Root]
01:24:00
192.168.69.1
PC-PT
PC0
201.168.69.1
PC-PT
PC2
192.168.69.3
200.168.69.1
200.168.69.2
201.168.69.3
2960-24TT
Switch0
ISR4321
Router0
ISR4321
Router1
2960-24TT
Switch1
201.168.69.0/24
192.168.69.2
192.168.69.0/24
200.168.69.0/24
PC-PT
PC1
PC-PT
PC3
201.168.69.2
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC0 ICMP
0.000 -- PC2 ICMP
0.001 PC0 Switch0 ICMP
0.001 PC2 Switch1 ICMP
0.002 Switch0 Router0 ICMP
0.002 Switch1 Router1 ICMP
0.003 Router0 Router1 ICMP
0.003 Router1 Router0 ICMP
0.004 Router1 Switch1 ICMP
0.004 Router0 Switch0 ICMP
Reset Simulation
Constant Delay
Captured to:
0.004 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, PPPoED, 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: 00:46:49.429
PLAY CONTROLS:
Event List
Realtime
Simulation
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
In Progress PC0 PC3 ICMP 0.000 N 0 (edit)
In Progress PC2 PC1 ICMP 0.000 N 1 (edit)


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC0 ICMP
0.000 -- PC2 ICMP
0.001 PC0 Switch0 ICMP
0.001 PC2 Switch1 ICMP
0.002 Switch0 Router0 ICMP
0.002 Switch1 Router1 ICMP
0.003 Router0 Router1 ICMP
0.003 Router1 Router0 ICMP
0.004 Router1 Switch1 ICMP
0.004 Router0 Switch0 ICMP
0.005 Switch1 PC3 ICMP
0.005 Switch0 PC1 ICMP
Reset Simulation Constant Delay
Captured to: 0.005 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, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters Show All/None
192.168.69.1
PC-PT PC0
201.168.69.1
PC-PT PC2
2960-24TT Switch0
ISR4321 Router0
ISR4321 Router1
2960-24TT Switch1
192.168.69.3
200.168.69.1
200.168.69.2
201.168.69.3
201.168.69.0/24
192.168.69.2
192.168.69.0/24
200.168.69.0/24
PC-PT PC1
PC-PT PC3
201.168.69.2
Time: 00:46:49.430 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
In Progress PC0 PC3 ICMP 0.000 N 0 (edit)
In Progress PC2 PC1 ICMP 0.000 N 1 (edit)
Automatically Choose Connection Type

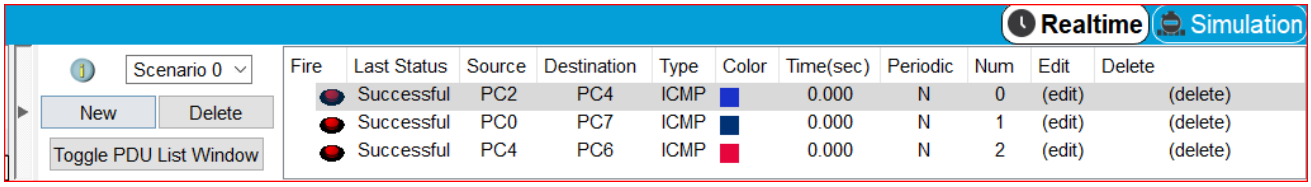

Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
0.000 -- PC2 ICMP
0.001 PC0 Switch0 ICMP
0.001 PC2 Switch1 ICMP
0.002 Switch0 Router0 ICMP
0.002 Switch1 Router1 ICMP
0.003 Router0 Router1 ICMP
0.003 Router1 Router0 ICMP
0.004 Router1 Switch1 ICMP
0.004 Router0 Switch0 ICMP
0.005 Switch1 PC3 ICMP
0.005 Switch0 PC1 ICMP
0.006 PC3 Switch1 ICMP
0.006 PC1 Switch0 ICMP
0.007 Switch1 Router1 ICMP
0.007 Switch0 Router0 ICMP
0.008 Router1 Router0 ICMP
0.008 Router0 Router1 ICMP
Reset Simulation Constant Delay
Captured to: 0.008 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, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters Show All/None
192.168.69.1
PC-PT PC0
201.168.69.1
PC-PT PC2
2960-24TT Switch0
ISR4321 Router0
ISR4321 Router1
2960-24TT Switch1
192.168.69.3
200.168.69.1
200.168.69.2
201.168.69.3
201.168.69.0/24
192.168.69.2
192.168.69.0/24
200.168.69.0/24
PC-PT PC1
PC-PT PC3
201.168.69.2
Time: 00:46:49.433 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit
In Progress PC0 PC3 ICMP 0.000 N 0 (edit)
In Progress PC2 PC1 ICMP 0.000 N 1 (edit)
Automatically Choose Connection Type



Network circuit 3:



Message passing between PC2 to PC4, PC0 to PC7 and PC4 to PC6:


Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Successful PC2 PC4 ICMP 0.000 N 0 (edit) (delete)
Successful PC0 PC7 ICMP 0.000 N 1 (edit) (delete)
Successful PC4 PC6 ICMP 0.000 N 2 (edit) (delete)