TOPOLOGY :- Network topology plays a crucial role in determining the performance, reliability, and scalability of a computer network. It influences factors such as data transmission efficiency, fault tolerance, and ease of network management. Various types of network topologies exist, each with its own characteristics, advantages, and disadvantages.

Types of Network Topologies

Ring Topology

Description: In a ring topology, devices are connected in a circular chain, with each device connected to two neighboring devices. Data travels around the ring in one direction until it reaches its destination.

Advantages:

Simple and easy to implement.

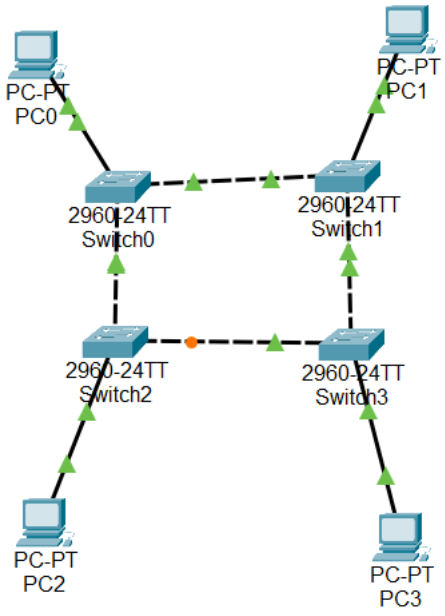
Equal access to network resources for all devices.

Disadvantages:

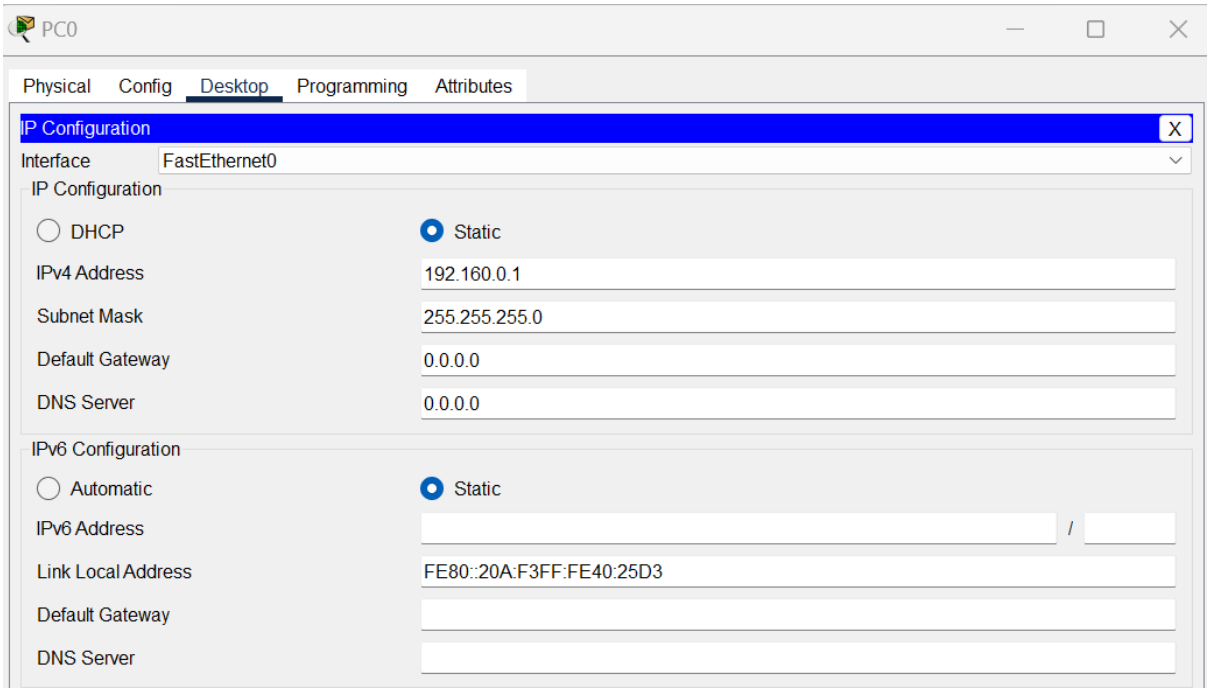
Vulnerable to cable failures; a single break in the ring can disrupt the entire network.

Limited scalability.

Example: Token Ring networks (less common today).



Configuration of IP And Subnet Mask:



IP of Desk 0 = 192.160.0.1

Subnet Mask = 255.255.255.0

IP of Desk 1 = 192.160.0.2

Subnet Mask = 255.255.255.0

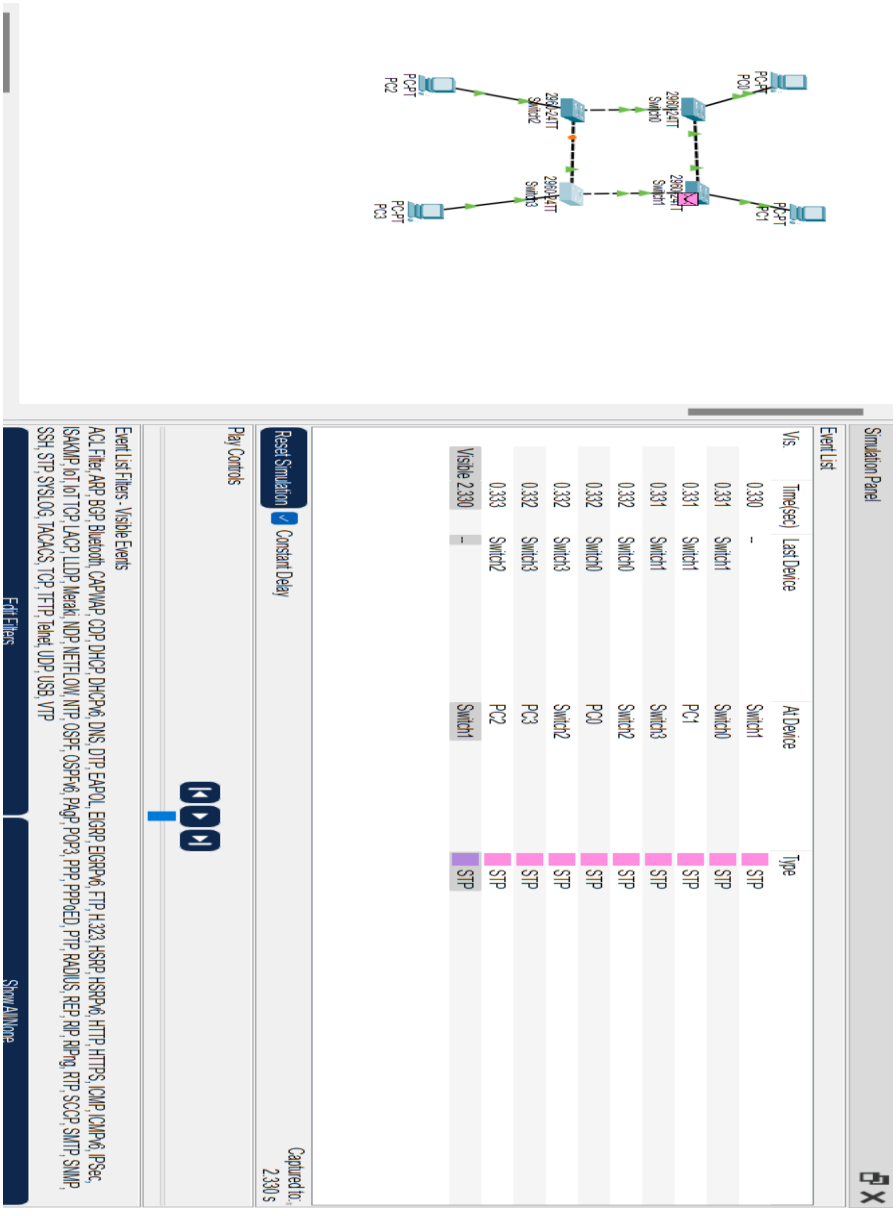
IP of Desk 2 = 192.160.0.3

Subnet Mask = 255.255.255.0

IP of Desk 3 = 192.160.0.4

Subnet Mask = 255.255.255.0

Output:


Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
0.330
-
Switch1
STP
0.331
Switch1
Switch0
STP
0.331
Switch1
PC1
STP
0.331
Switch1
Switch3
STP
0.332
Switch0
Switch2
STP
0.332
Switch0
PC0
STP
0.332
Switch3
Switch2
STP
0.332
Switch3
PC3
STP
0.333
Switch2
PC2
STP
Visible 2.330
-
Switch1
STP
Reset Simulation
Constant Delay
Captured to: 2.330 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
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
2960-24TT Switch0
2960-24TT Switch1
2960-24TT Switch2
2960-24TT Switch3

Ring Topology

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Advantages:

Simple and easy to implement.

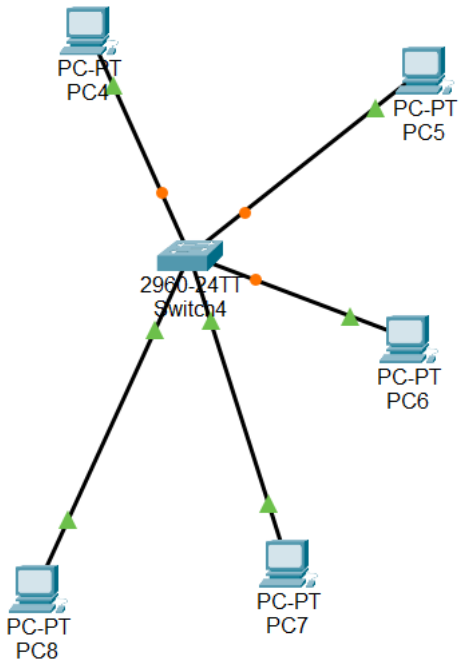
Equal access to network resources for all devices.

Disadvantages:

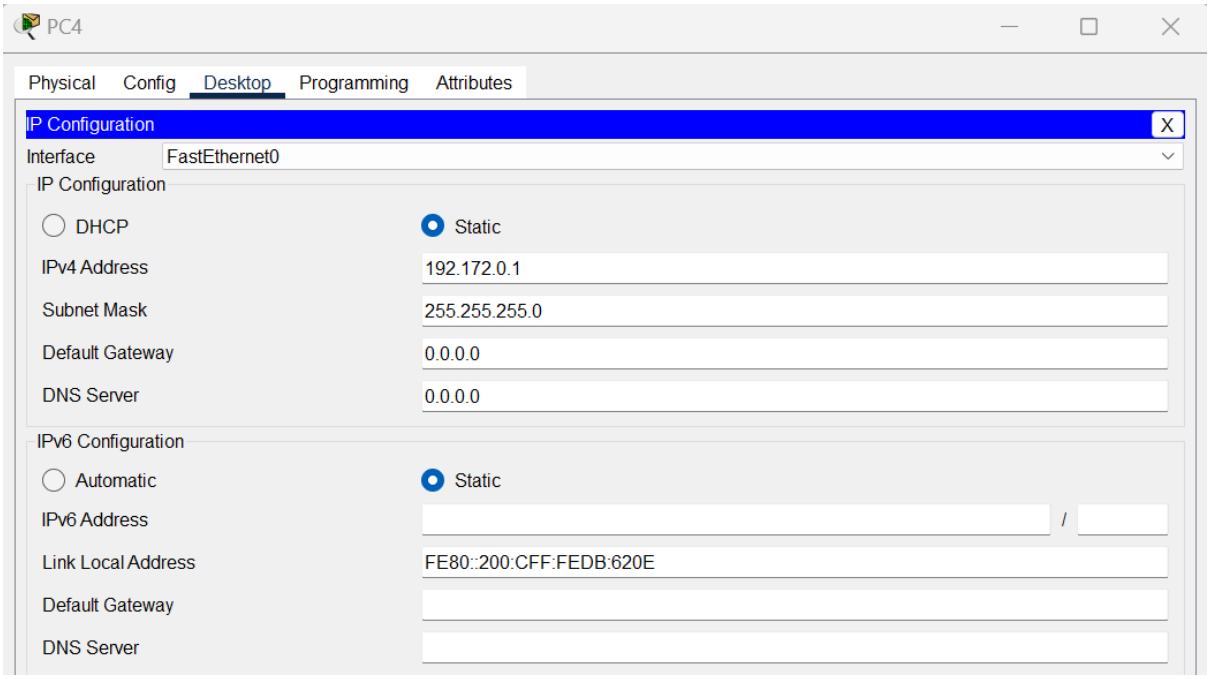
Vulnerable to cable failures; a single break in the ring can disrupt the entire network.

Limited scalability.

Example: Token Ring networks (less common today).



Configuration of IP And Subnet Mask:



IP of Desk 0 = 192.172.0.1

Subnet Mask = 255.255.255.0

IP of Desk 1 = 192.172.0.2

Subnet Mask = 255.255.255.0

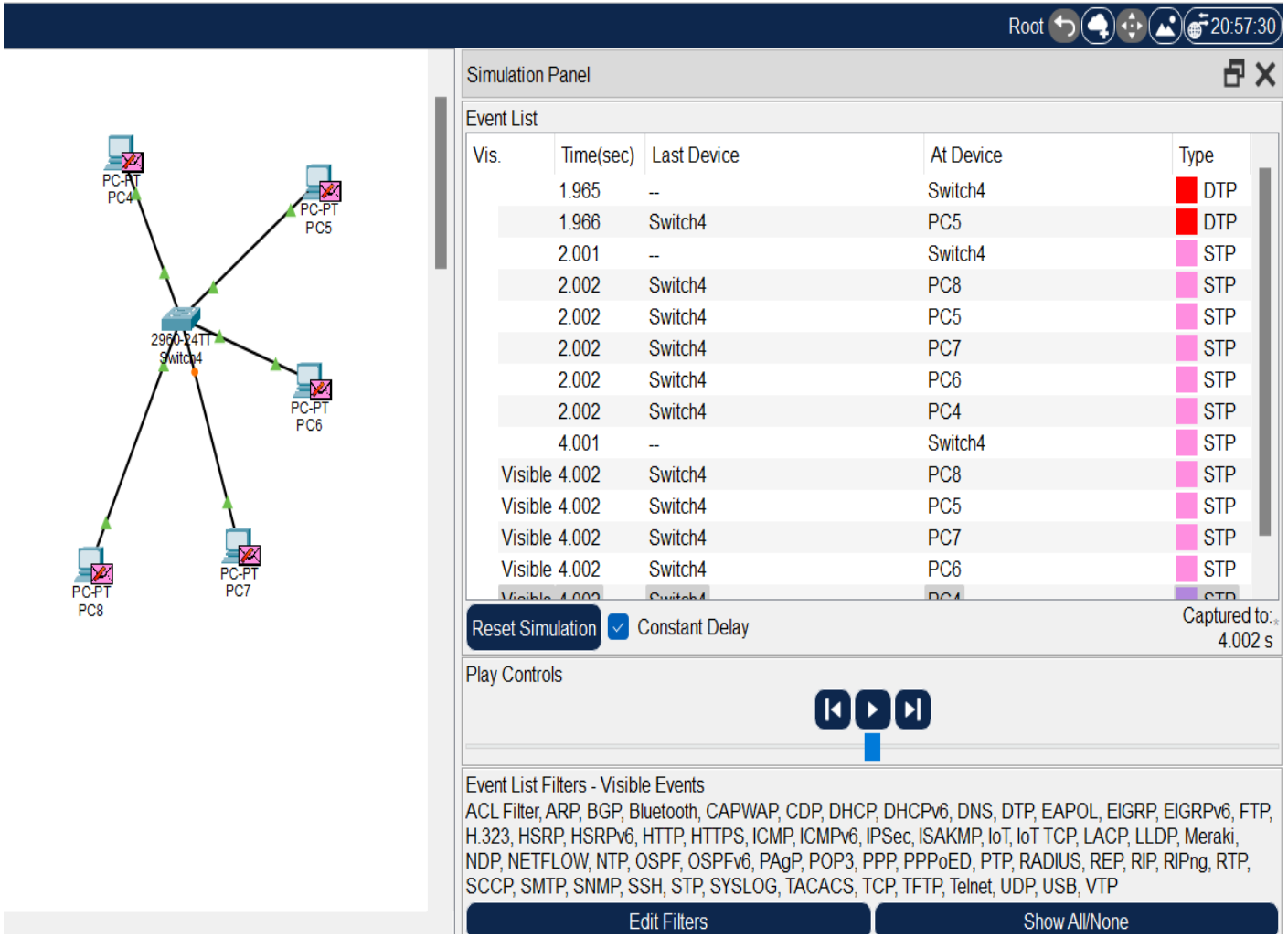
IP of Desk 2 = 192.172.0.3

Subnet Mask = 255.255.255.0

IP of Desk 3 = 192.172.0.4

Subnet Mask = 255.255.255.0

Output:


Root
20:57:30
Simulation Panel
Event List
Vis. Time(sec) Last Device At Device Type
1.965 -- Switch4 DTP
1.966 Switch4 PC5 DTP
2.001 -- Switch4 STP
2.002 Switch4 PC8 STP
2.002 Switch4 PC5 STP
2.002 Switch4 PC7 STP
2.002 Switch4 PC6 STP
2.002 Switch4 PC4 STP
4.001 -- Switch4 STP
Visible 4.002 Switch4 PC8 STP
Visible 4.002 Switch4 PC5 STP
Visible 4.002 Switch4 PC7 STP
Visible 4.002 Switch4 PC6 STP
Reset Simulation
Constant Delay
Captured to: 4.002 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
PC-PT PC4
PC-PT PC5
2960-24TT Switch4
PC-PT PC6
PC-PT PC8
PC-PT PC7

Bus Topology

Description: In a bus topology, all devices are connected to a single communication line, called the bus or backbone. Data transmitted by any device is received by all other devices on the network, but only the intended recipient processes the data.

Advantages:

Simple and easy to implement.

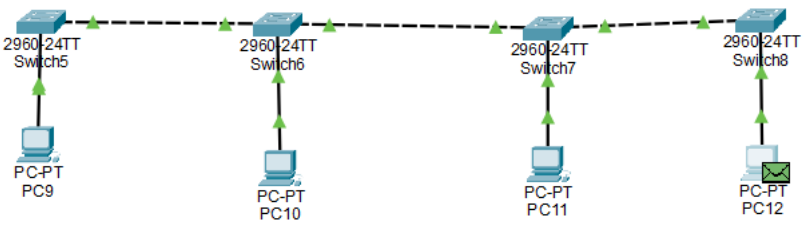
Requires minimal cabling.

Disadvantages:

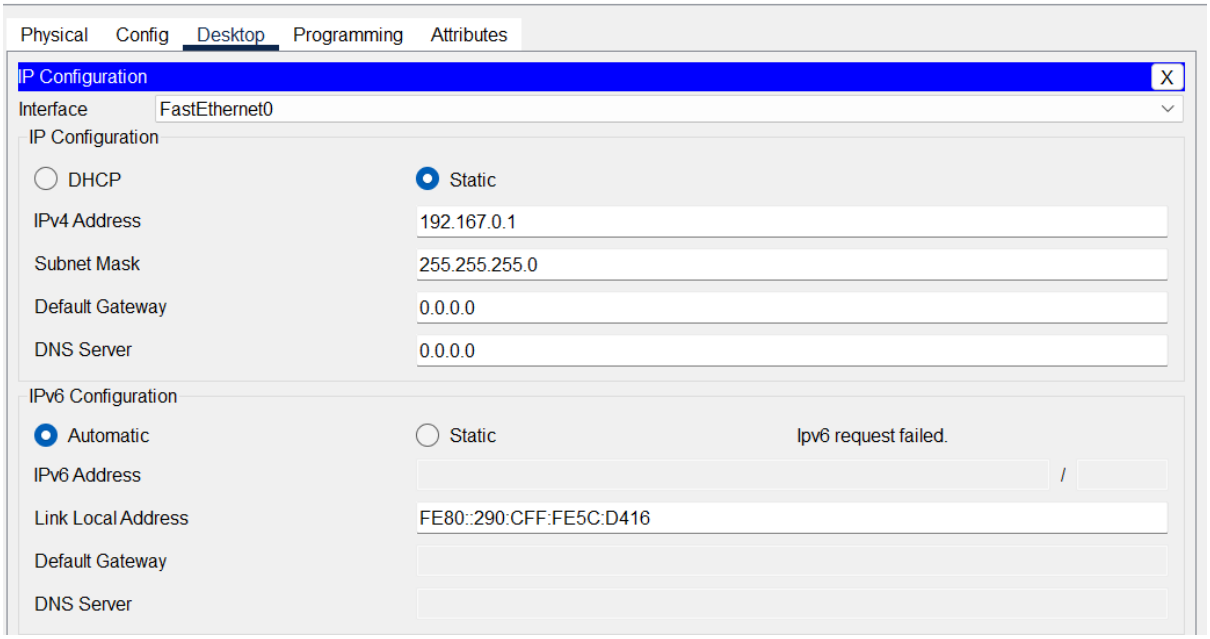
Limited scalability.

Susceptible to cable failures, which can disrupt the entire network.

Example: Ethernet networks using coaxial cables.



Configuration of IP And Subnet Mask:



IP of Desk 0 = 192.167.0.1

Subnet Mask = 255.255.255.0

IP of Desk 1 = 192.167.0.2

Subnet Mask = 255.255.255.0

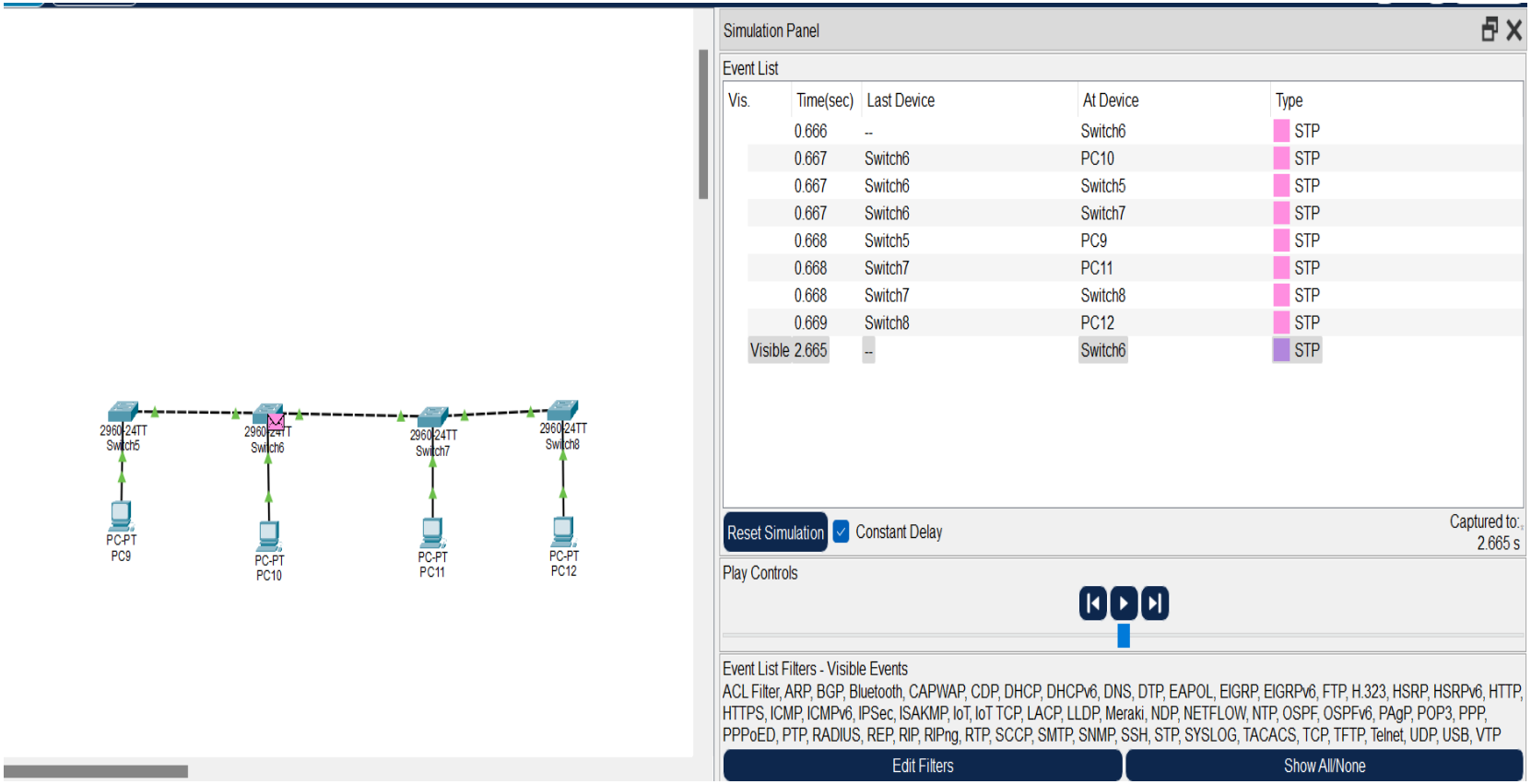
IP of Desk 2 = 192.167.0.3

Subnet Mask = 255.255.255.0

IP of Desk 3 = 192.167.0.4

Subnet Mask = 255.255.255.0

Output :


2960-24TT
Switch5
2960-24TT
Switch6
2960-24TT
Switch7
2960-24TT
Switch8
PC-PT
PC9
PC-PT
PC10
PC-PT
PC11
PC-PT
PC12
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
0.666 -- Switch6 STP
0.667 Switch6 PC10 STP
0.667 Switch6 Switch5 STP
0.667 Switch6 Switch7 STP
0.668 Switch5 PC9 STP
0.668 Switch7 PC11 STP
0.668 Switch7 Switch8 STP
0.669 Switch8 PC12 STP
Visible 2.665 -- Switch6 STP
Reset Simulation
Constant Delay
Captured to: 2.665 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

Mesh Topology

Description: In a mesh topology, every device is connected to every other device in the network. This results in redundant paths between devices, which improves fault tolerance and network reliability.

Advantages:

High fault tolerance; multiple paths ensure data can still be transmitted even if one path fails.

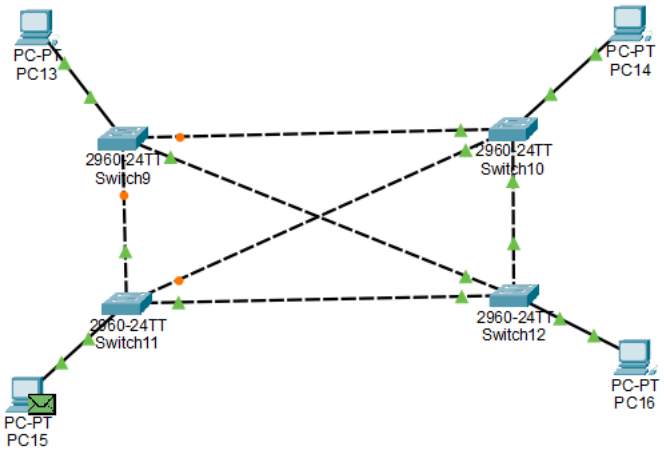
Scalable and flexible.

Disadvantages:

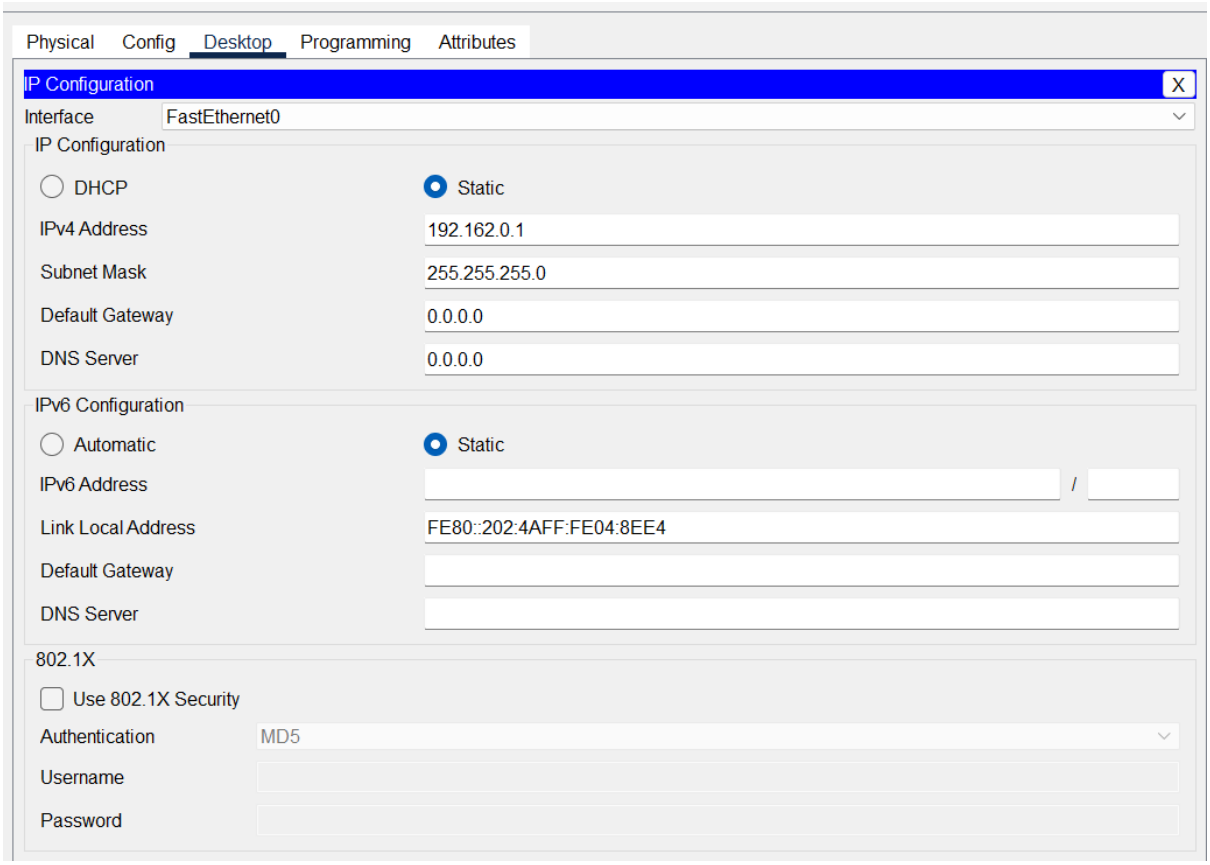
Expensive to implement due to the high number of connections required.

Complex to manage and troubleshoot.

Example: Wide area networks (WANs) and internet backbone networks.



Configuration of IP And Subnet Mask:



IP of Desk 0 = 192.162.0.1

Subnet Mask = 255.255.255.0

IP of Desk 1 = 192.162.0.2

Subnet Mask = 255.255.255.0

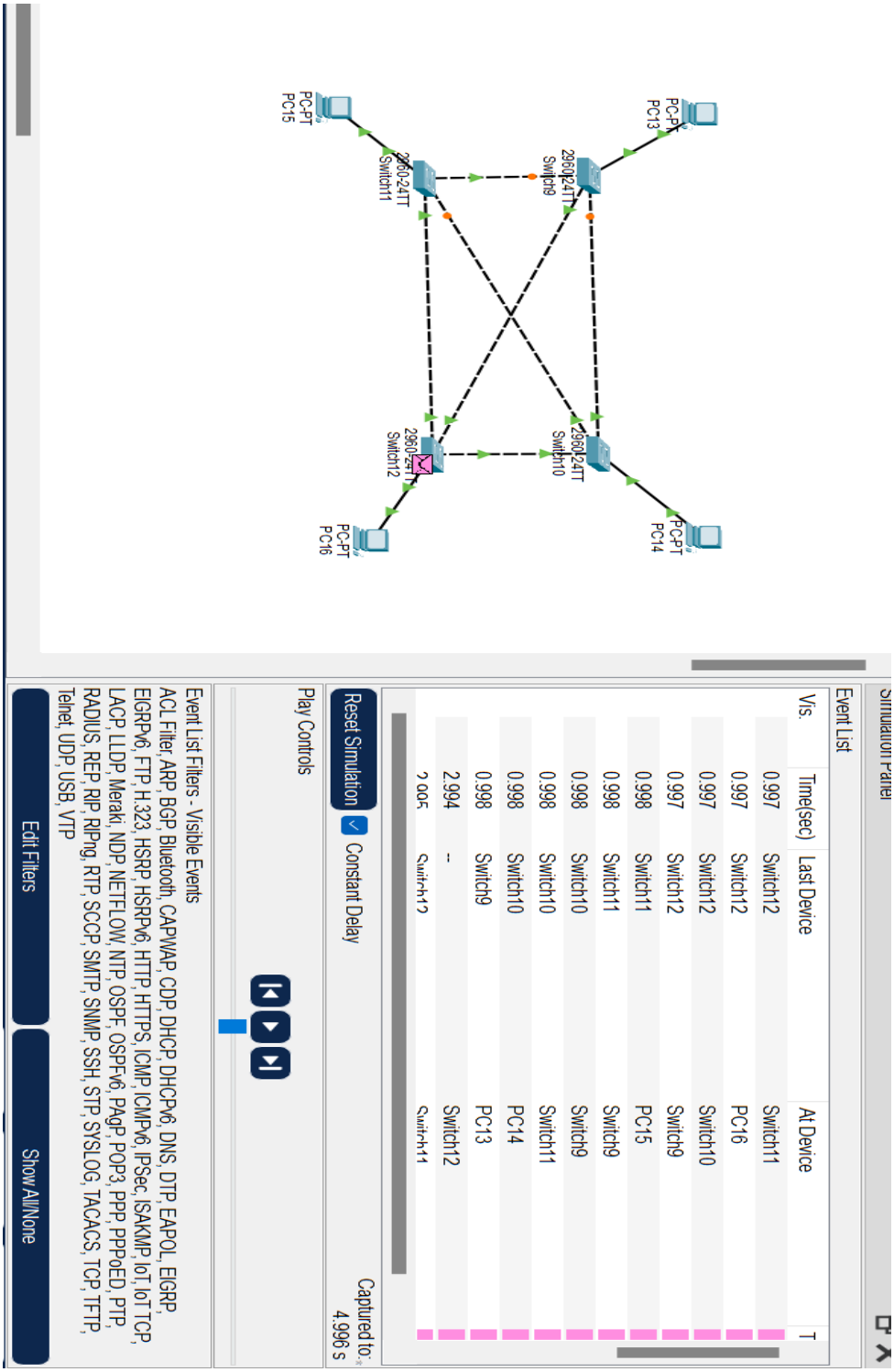
IP of Desk 2 = 192.162.0.3

Subnet Mask = 255.255.255.0

IP of Desk 3 = 192.162.0.4

Subnet Mask = 255.255.255.0

Output:


PC-PT PC13
2960-24TT Switch9
PC-PT PC15
2960-24TT Switch11
2960-24TT Switch10
PC-PT PC14
2960-24TT Switch12
PC-PT PC16
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
0.997 Switch12 Switch11
0.997 Switch12 PC16
0.997 Switch12 Switch10
0.997 Switch12 Switch9
0.998 Switch11 PC15
0.998 Switch11 Switch9
0.998 Switch10 Switch9
0.998 Switch10 Switch11
0.998 Switch10 PC14
0.998 Switch9 PC13
2.994 - Switch12
Reset Simulation
Constant Delay
Captured to:
4.996 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

Hybrid Topology

Description: A hybrid topology is a combination of two or more basic network topologies. For example, a network may combine elements of star and bus topologies or star and ring topologies.

Advantages:

Provides flexibility to meet specific network requirements.

Can leverage the strengths of different topologies while mitigating their weaknesses.

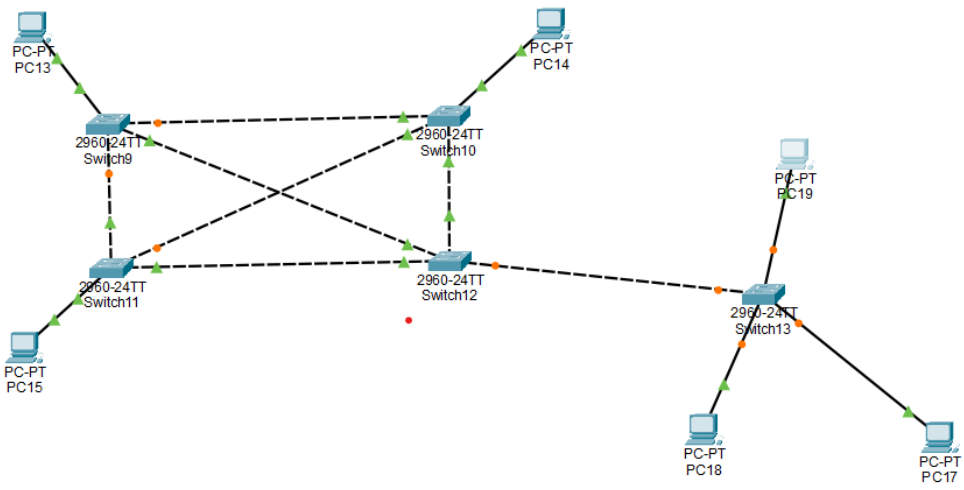
Disadvantages:

Can be complex to design and implement.

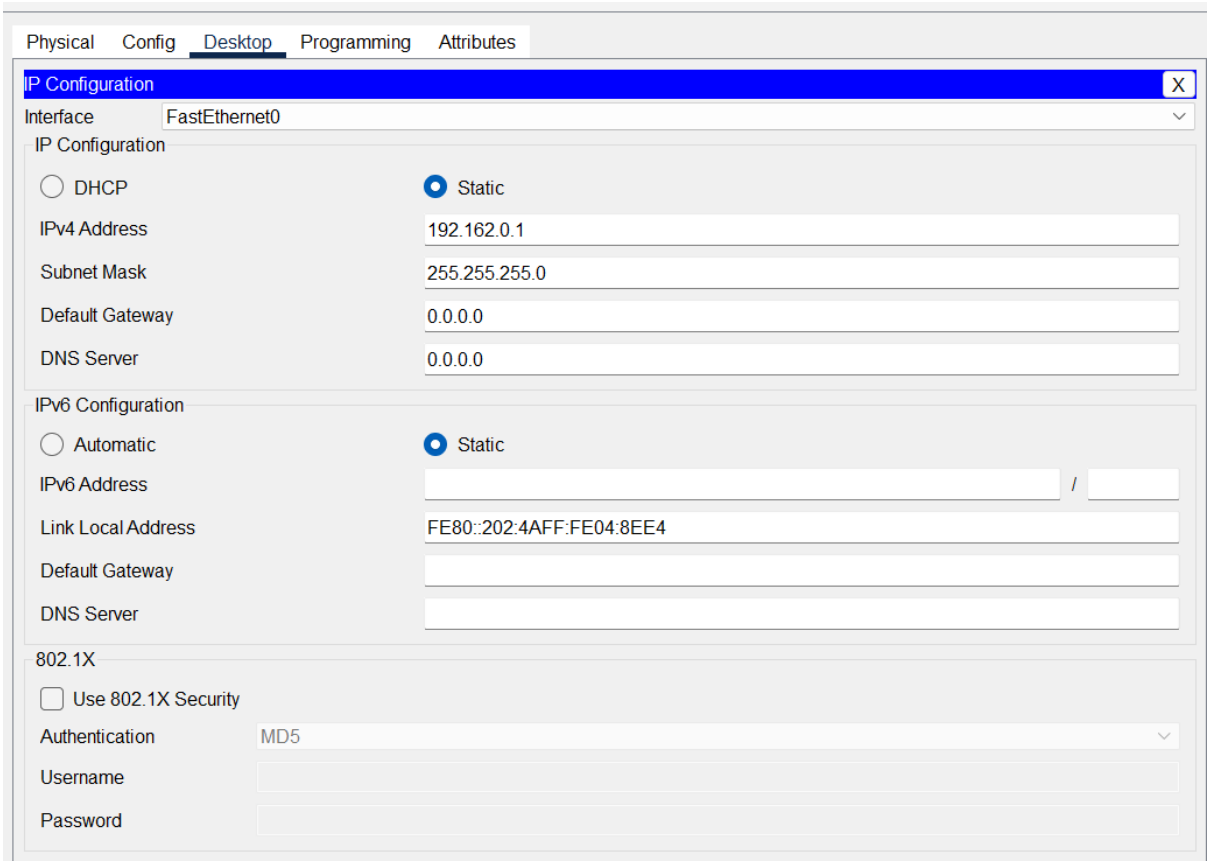
Requires careful planning to ensure interoperability between different topology components.

Example: Large enterprise networks with multiple interconnected segments.

Hybrid = mesh + Star



Configuration of IP And Subnet Mask:



IP of Desk 0 = 192.162.0.1

Subnet Mask = 255.255.255.0

IP of Desk 1 = 192.162.0.2

Subnet Mask = 255.255.255.0

IP of Desk 2 = 192.162.0.3

Subnet Mask = 255.255.255.0

IP of Desk 3 = 192.162.0.4

Subnet Mask = 255.255.255.0

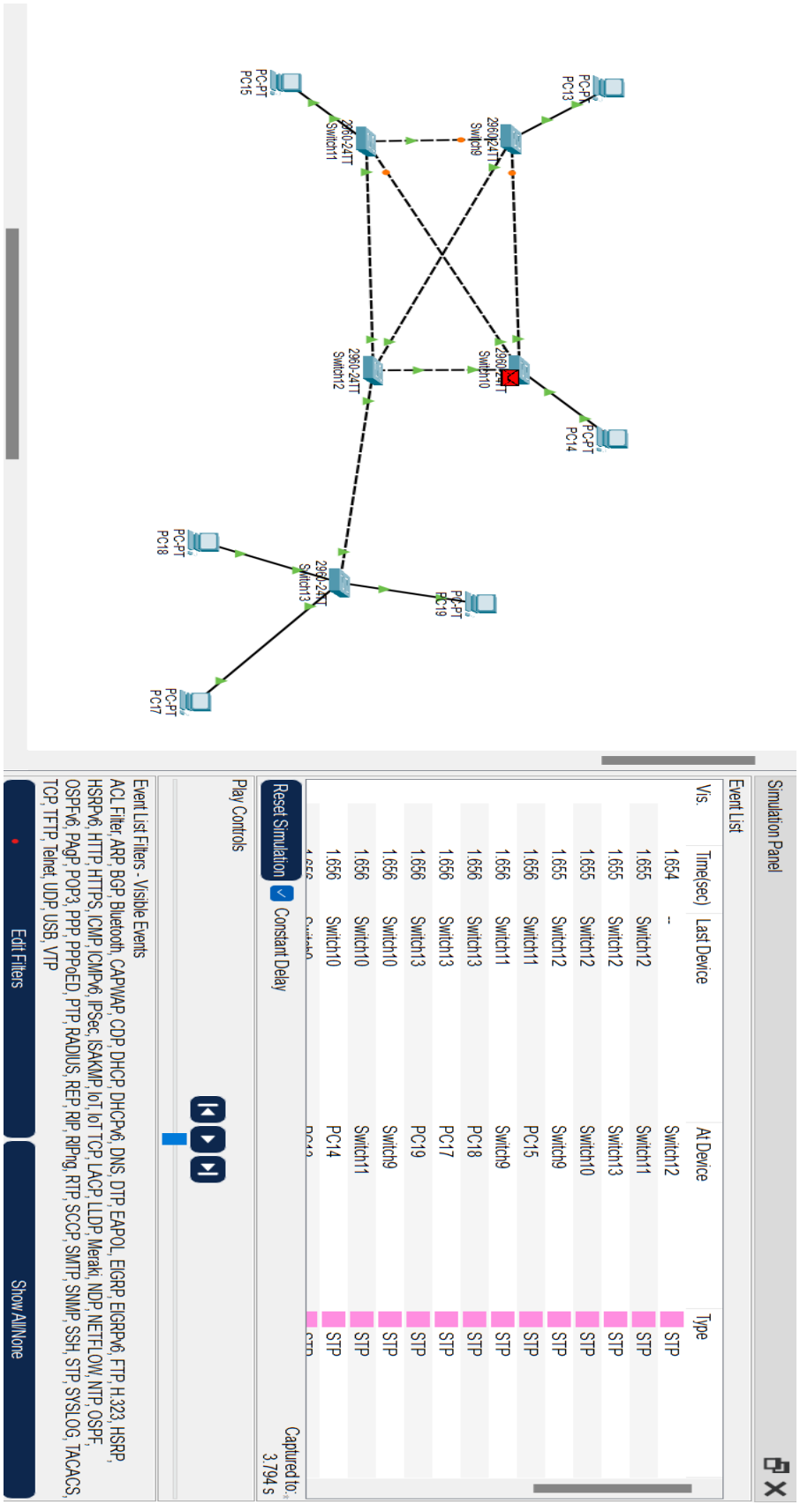
IP of Desk 4 = 192.162.0.5

Subnet Mask = 255.255.255.0

IP of Desk 5 = 192.162.0.6

Subnet Mask = 255.255.255.0

Output :


Simulation Panel
Event List
Vis.
Time(sec)
Last Device
At Device
Type
1.654
--
Switch12
STP
1.655
Switch12
Switch11
STP
1.655
Switch12
Switch13
STP
1.655
Switch12
Switch10
STP
1.655
Switch12
Switch9
STP
1.656
Switch11
PC15
STP
1.656
Switch11
Switch9
STP
1.656
Switch13
PC18
STP
1.656
Switch13
PC17
STP
1.656
Switch13
PC19
STP
1.656
Switch10
Switch9
STP
1.656
Switch10
Switch11
STP
1.656
Switch10
PC14
STP
Reset Simulation
Constant Delay
Captured to:
3.794 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
PC-PT PC13
PC-PT PC15
2960-24TT Switch9
2960-24TT Switch11
2960-24TT Switch10
2960-24TT Switch12
PC-PT PC14
PC-PT PC18
2960-24TT Switch13
PC-PT PC19
PC-PT PC17