Practical no: 1

Name: Saloni Vishwakarma
Batch-Roll no: C1-13
Subject: Computer Security Lab
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Aim: Introduction to Computer Security Foundations

Task 2: Understanding Network Topologies and Protocols (Cisco Packet Tracer and WireShark)
- Set up a simple network topology with multiple computers.
- Configure basic network protocols and services.
- Analyze potential security vulnerabilities in the network setup.

1)Bus Topology: Alternatively mentioned as line topology, bus topology could even be a specific quiet topology during which each computer and network device is connected to a minimum of one cable or backbone. In general, the term refers to how various devices are acknowledged during a network. counting on sort of network card, coax or an RJ-45 network cable is employed to attach them.
Bus topology carries transmitted data through the cable. because data reaches each node, the node checks the destination address (MAC/IP address) to work out if it matches their address. If the address does not match with the node, the node does nothing more. But if the addresses of nodes match to address contained within data then they process on knowledge. In the bus, communication between nodes is done through a foremost network cable.

Advantages of Bus Topology :
-It is the easiest network topology for connecting peripherals or computers in a linear fashion.
-It works very efficiently well when there is a small network.
-The length of cable required is less than a star topology.
-It is easy to connect or remove devices in this network without affecting any other device.
-Very cost-effective as compared to other network topology i.e. mesh and star
-It is easy to understand topology.
-Easy to expand by joining the two cables together.

Disadvantages of Bus Topology :

-Bus topology is not great for large networks.

-Identification of problems becomes difficult if the whole network goes down.

-Troubleshooting individual device issues is very hard.

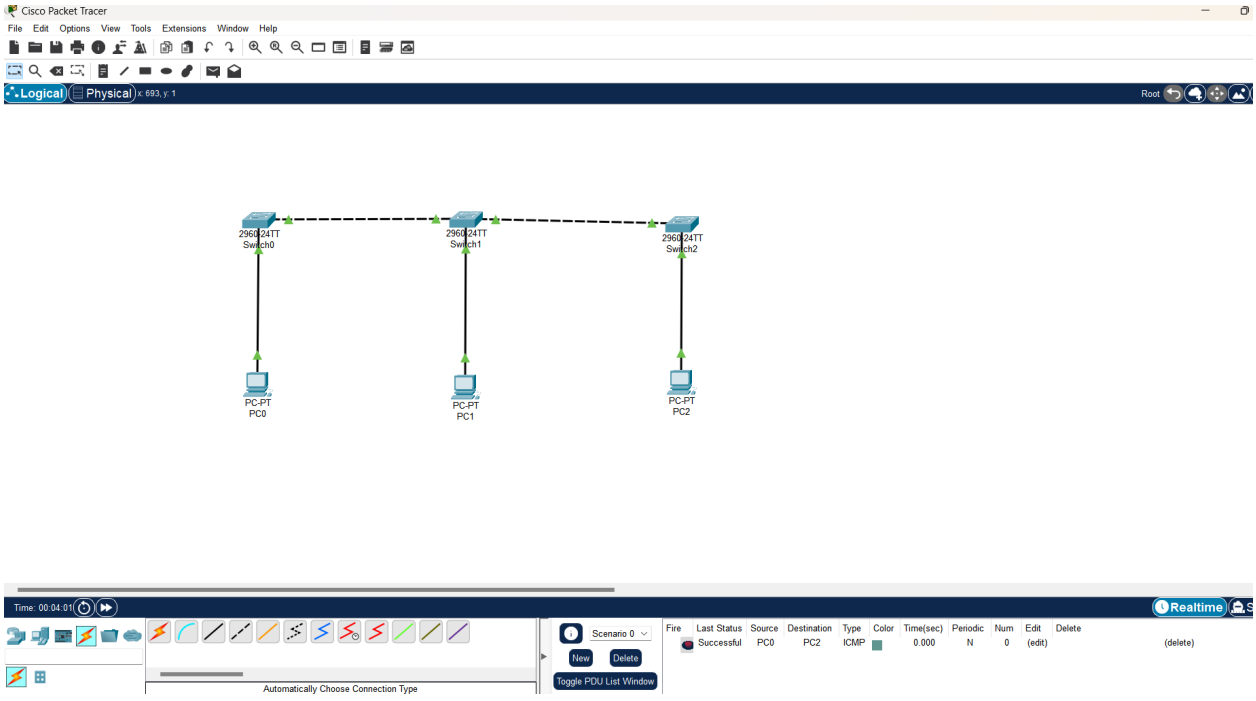
-Need terminators are required at both ends of the main cable.

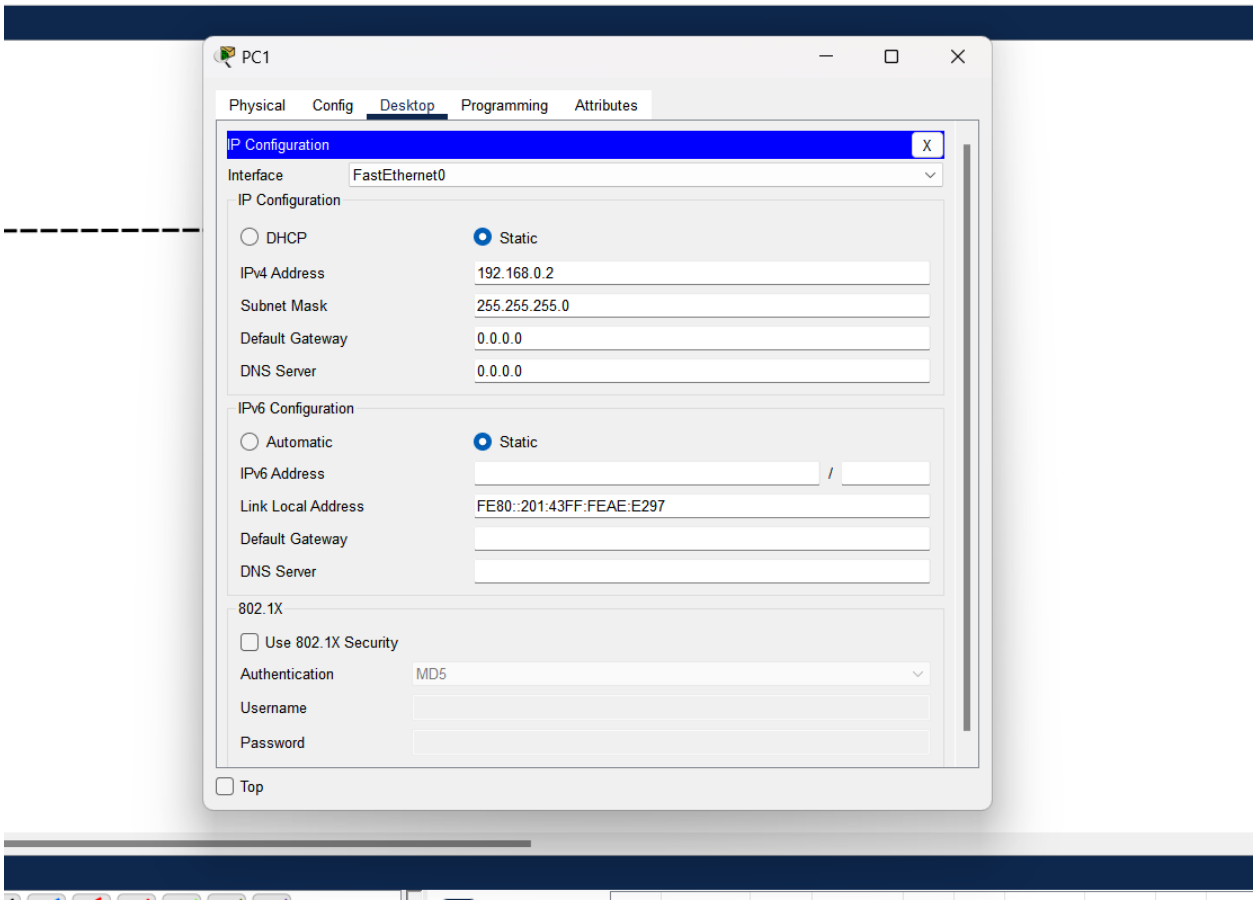
-Additional devices slow the network down.

-If the main cable is damaged, the whole network fails or splits into two.

-Packet loss is high.

-This network topology is very slow as compared to other topologies.

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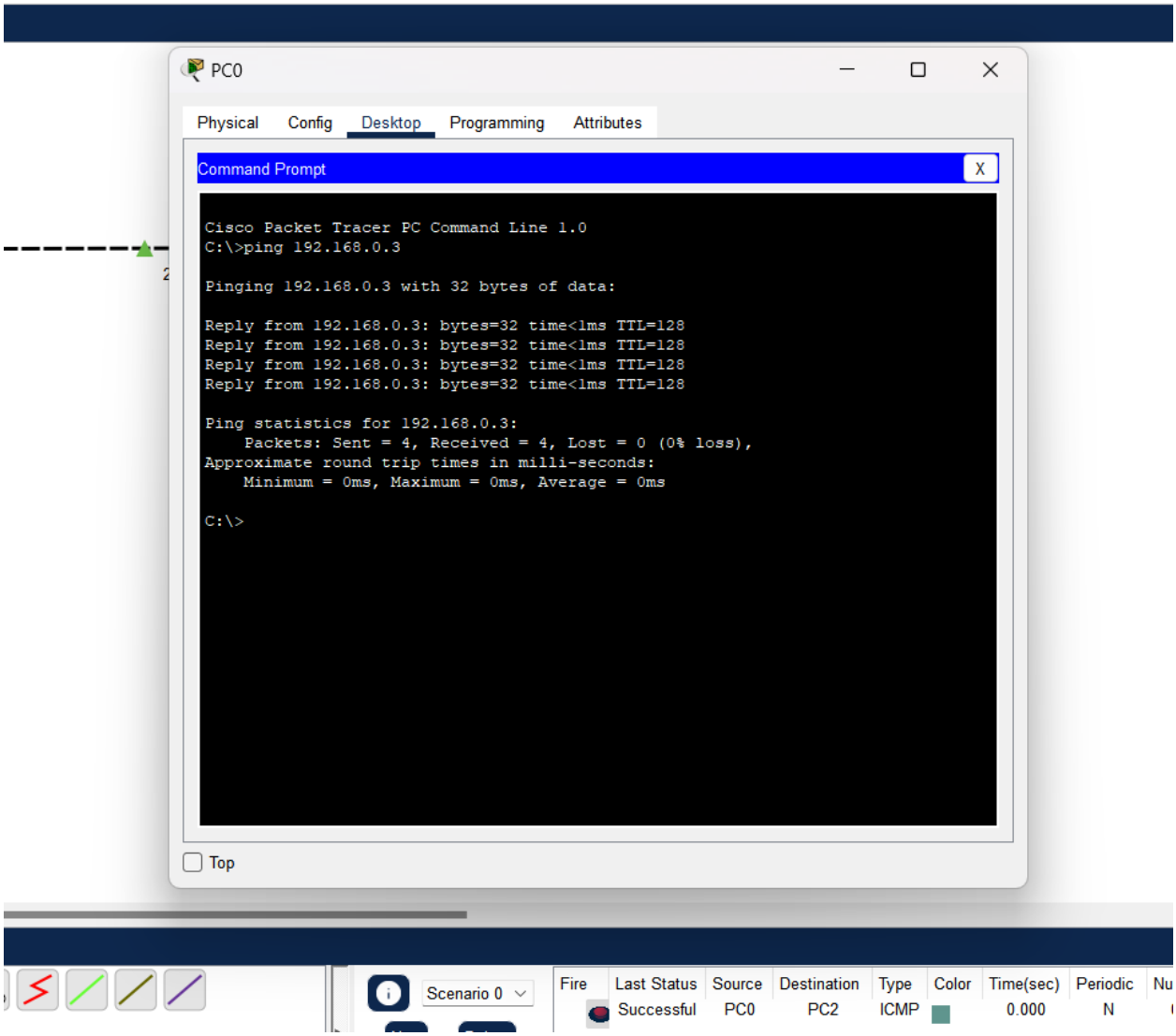


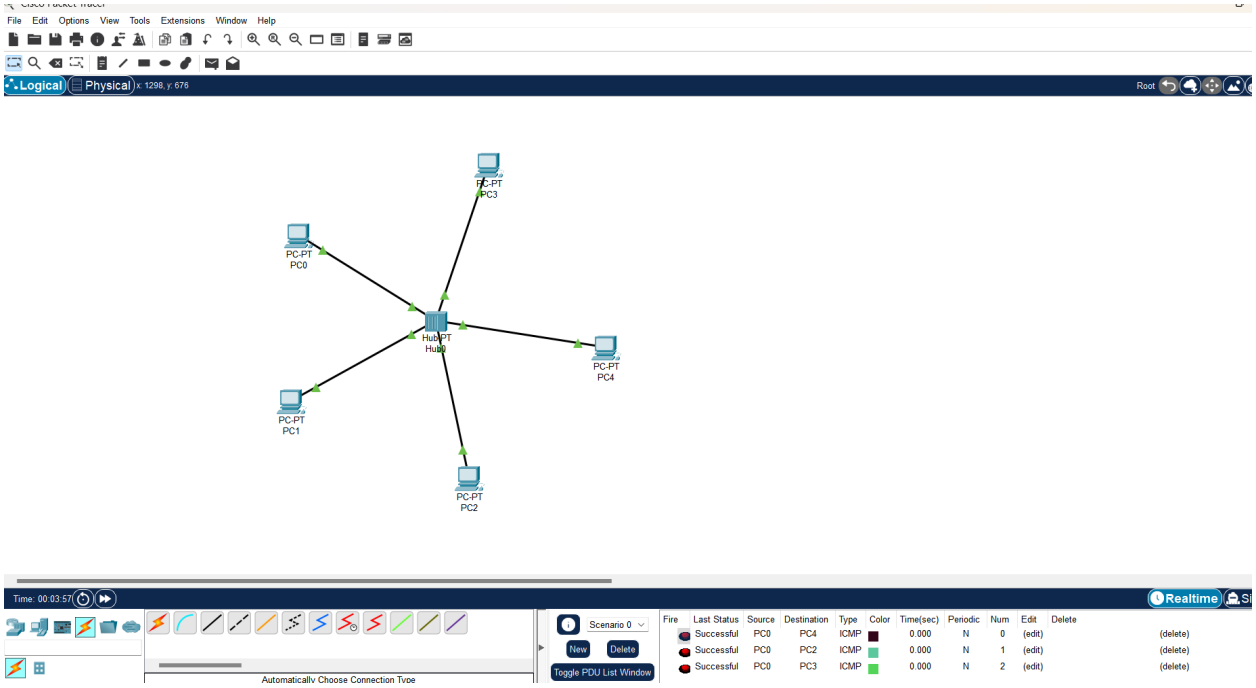
2) Star Topology: Star Topology A star may be a topology for a Local Area Network (LAN) during which all nodes are individually connected to a central connection point, sort of a hub or a switch. A star takes more cable than e.g. a bus, but the benefit is that if a cable fails, just one node is going to be brought down. Each device within the network is connected to a central device called a hub. If one device wants to send data to another device, it's to first send the info to the hub then the hub transmits that data to the designated device. The number of links required to connect nodes in the star topology is N where N is the number of nodes.

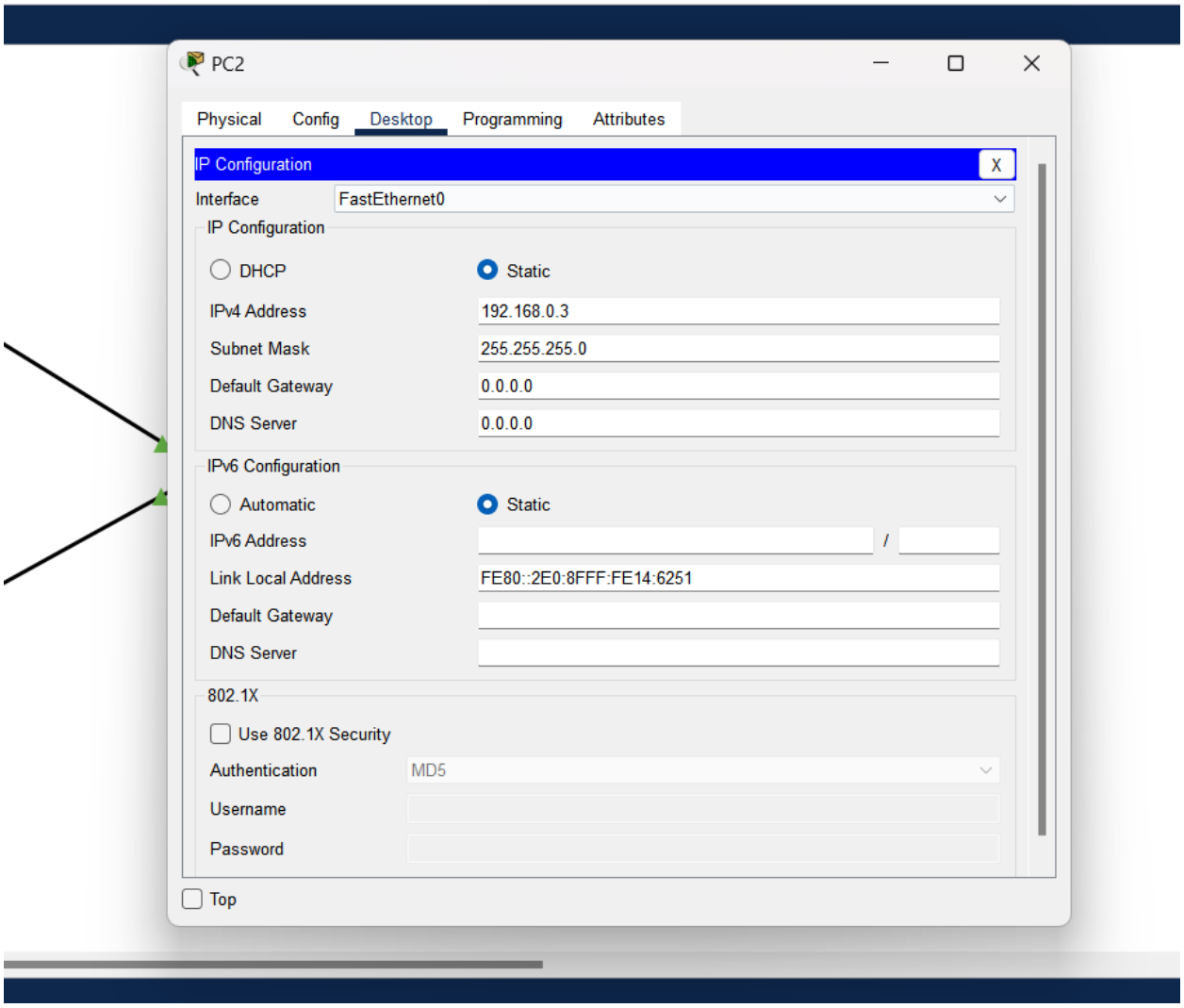
Advantages of Star Topology:

-It is very reliable – if one cable or device fails then all the others will still work

-It is high-performing as no data collisions can occur
-Less expensive because each device only need one I/O port and wishes to be connected with hub with one link.
-Easier to put in
-Robust in nature
-Easy fault detection because the link are often easily identified.
-No disruptions to the network when connecting or removing devices.
-Each device requires just one port i.e. to attach to the hub.
-If N devices are connected to every other in star, then the amount of cables required to attach them is N. So, it's easy to line up.

Disadvantages of Star Topology:
-Requires more cable than a linear bus .
-If the connecting network device (network switch) fails, nodes attached are disabled and can't participate in network communication.
-More expensive than linear bus topology due to the value of the connecting devices (network switches)
-If hub goes down everything goes down, none of the devices can work without hub.
-Hub requires more resources and regular maintenance because it's the central system of star .
-Extra hardware is required (hubs or switches) which adds to cost
-Performance is predicated on the one concentrator i.e. hub.

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DNS Server
0.0.0.0
IPv6 Configuration
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Static
IPv6 Address
/
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DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
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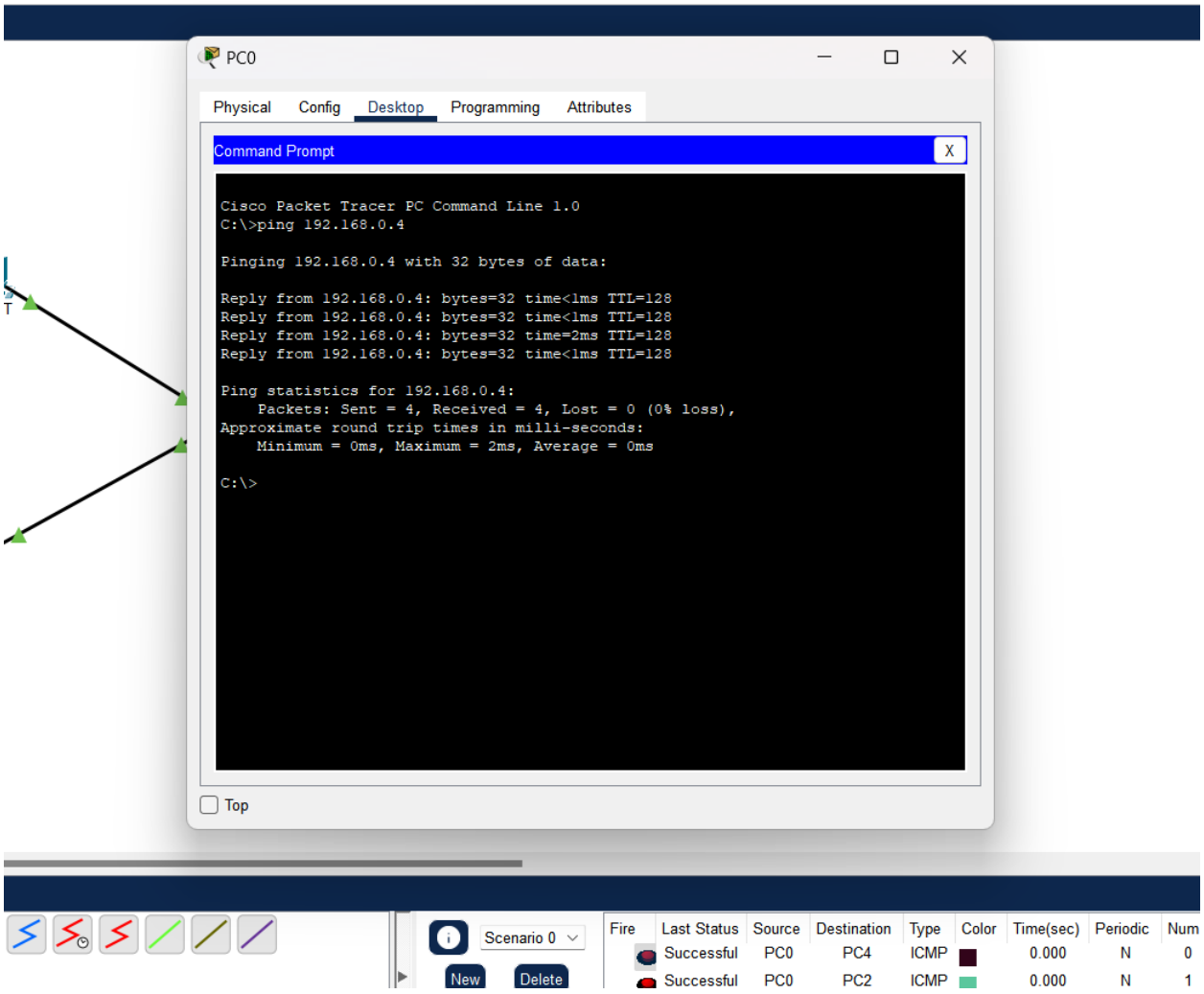

Conclusion: Both Star and Bus Topology networks have their advantages and disadvantages, and the choice between them depends on the specific networking requirements. A Star Topology network is scalable and reliable but can be expensive, while a Bus Topology network is inexpensive but can be difficult to maintain and troubleshoot. Understanding the differences between the two network topologies can help in choosing the right one for a specific networking requirement.