Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Information Technology

Department of

Artificial Intelligence and Data Science

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Class: S.Y.	Division: B	Roll No: 272028
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PAGE NO.:
DATE: / /

FCN Assignment No. 3

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Aim: Demonstrate the different types of topologies and types of transmission media by using a packet tracer tool.

Component: cisco Packet tracer tool.

Prerequisite: knowledge of various Topologies of computer Network
knowledge of CISCO packet tracer tool

Theory:-

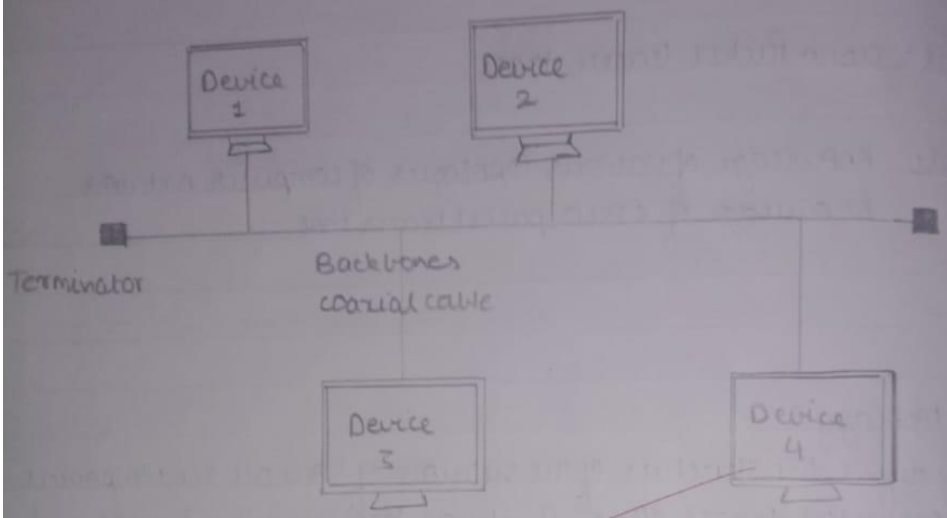
1. What is topology?

→ Topology define the structure of the network of how all the component are interconnected to each other. A network topology is the physical and logical arrangement of nodes and connection in a network. Nodes usually include device such as switches, router and software with switch & router feature. Network topologies are often represented as a graph. Network topology play a major role in how a network function. Namely, the topology has a direct effect on network functionality.

2. Types of topology:-

- Network topology are categorized as either a physical network topology or logical network topology.
- In this topology of a network is the physical layout of nodes and connection.

BUS TOPOLOGY



PAGE NO.:
DATE: / /

- physical topology includes the following :→
1. Bus topology
2. star topology
3. Ring topology
4. Tree topology
5. Hybrid topology

3 Explaination of each topology :→

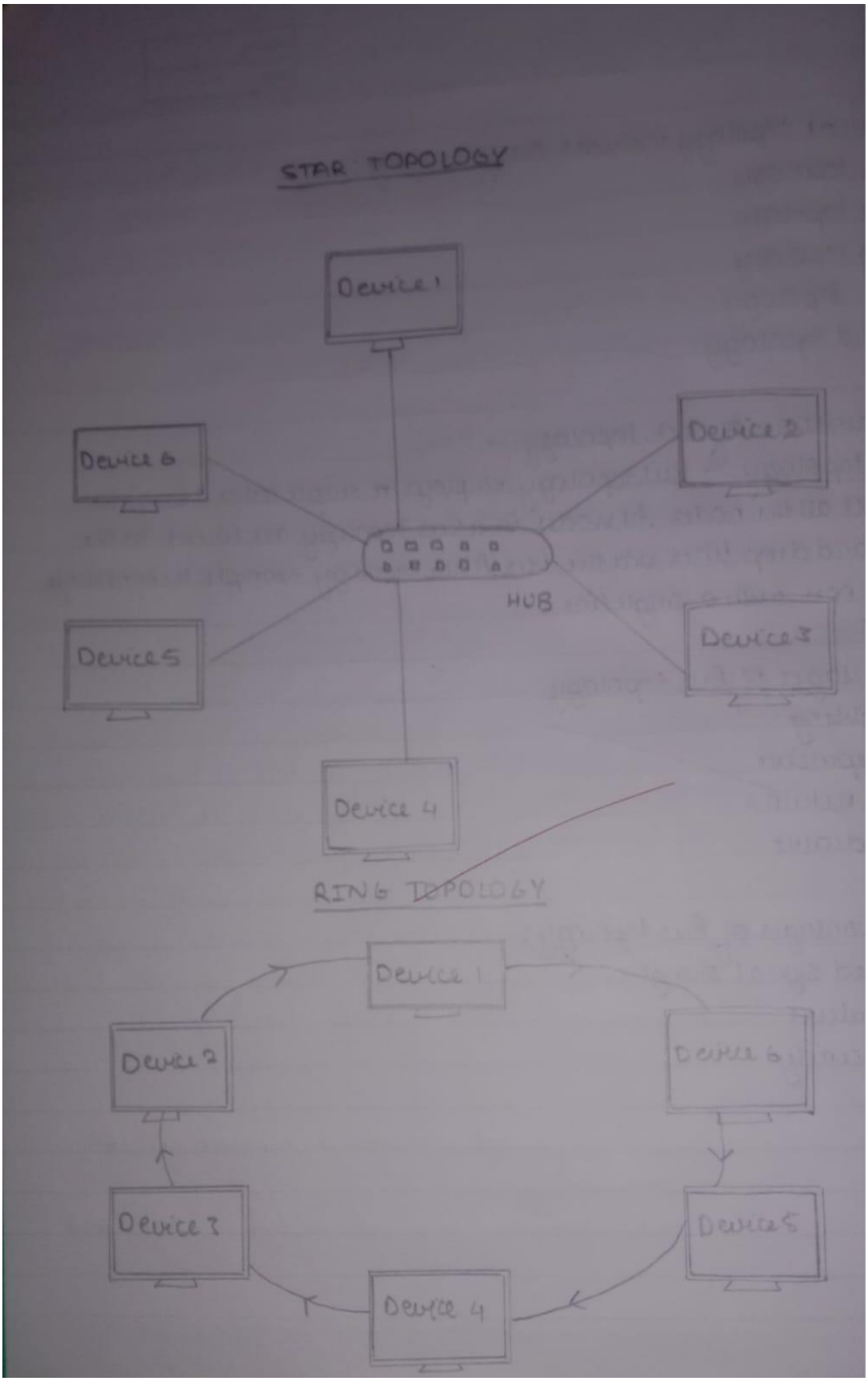
1. Bus topology :→ Bus topology employs a single cable (Bus) to connect all the nodes. All nodes in a Bus Topology are linked to the Tops and drop lines via the bus. A bus topology example is connecting two floors with a single line.

Advantages of Bus topology

- less cabling
- less expensive
- small network
- upgradeable

Disadvantages of Bus topology :

- Reduced signal strength
- core failure
- low security


STAR TOPOLOGY
Device 1
Device 6
Device 2
HUB
Device 5
Device 3
Device 4
RING TOPOLOGY
Device 1
Device 2
Device 6
Device 7
Device 5
Device 4

PAGE NO. :
DATE : / /

2. Star topology :-

- A hub connect to all computer in this types of network topology.
- A central nodes connect to all other nodes.
- We can use this types of network topology on LAN network due to its low cost and ease of setup.

Advantages of star topology :-

- Network failure prevention
- Performance help with a small no. of nodes and very little network traffic.
- Upgradation: this topology makes adding, deleting and moving devices simples

Disadvantages of star topology :-

- expensive: the cost of installing star topology is high.
- Slow connection: Heavy network traffic can sometimes significantly slow the bus.

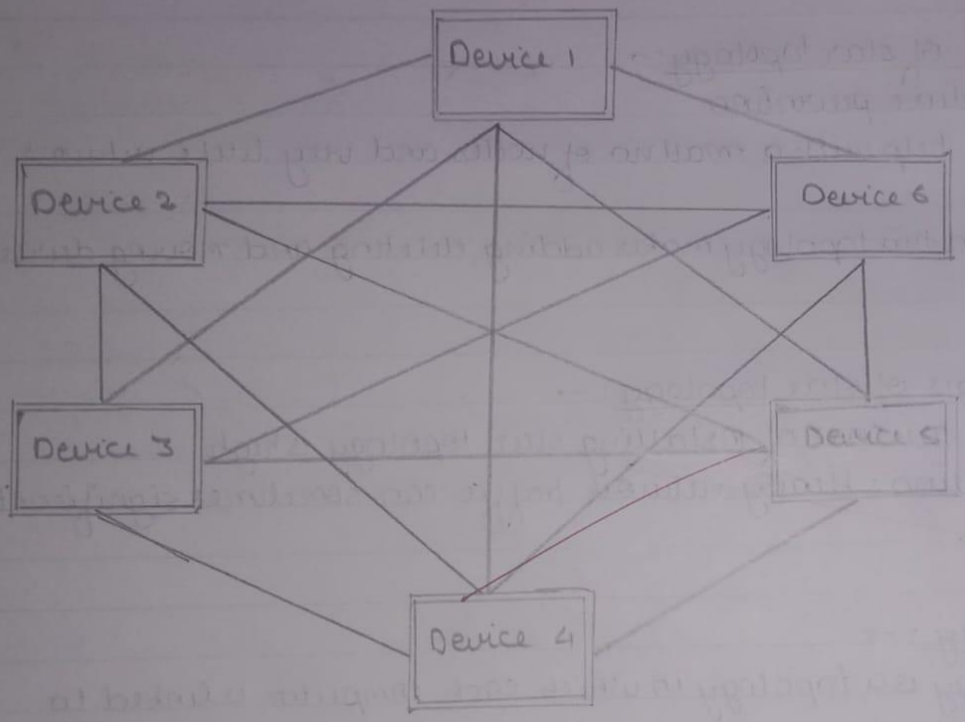
3 Ring topology :-

- Ring topology is a topology in which each computer is linked to another on both side.
- The last computer is linked to the first, forming a ring.
- This topology enables each computer to have exactly two neighbors.

Advantages of Ring topology :-

- Token system: only nodes that have token can transfer data
- less cabling - Every Nodes manages the cable to it closet neighbor.
- Easier trouble shooting : It is less challenging to manage and install because the nodes or cable flaw are easily discernible.

MESH TOPOLOGY



PAGE NO.:
DATE: / /

Disadvantages of Ring topology:-

- Difficult to upgrade: Adding or removing nodes is problematic because it disrupt network activity.
- Failure of a network - when one system crashes, it disturb the overall network activity.

4. Mesh topology: →

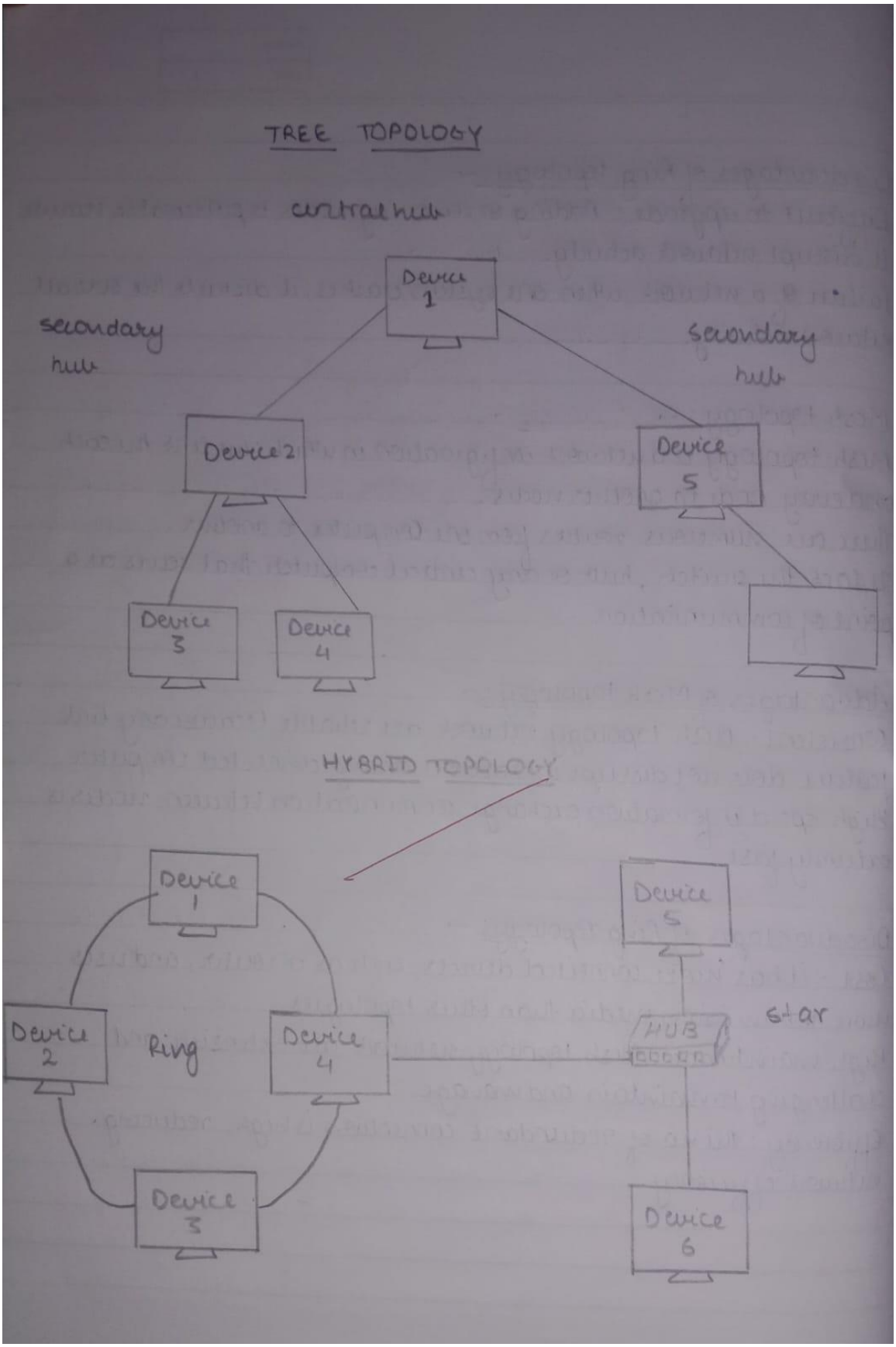
- Mesh topology is a network configuration in which we link the each and every node to another nodes.
- There are numerous routes from one computer to another.
- It lack the switch, hub or any central computer that serves as a point of communication.

Advantages of Mesh topology:-

- Consistent - Mesh topology network are reliable because any link failure does not disrupt interaction among connected computer.
- High speed information exchange communication between nodes is extremly fast.

Disadvantages of Ring Topology: →

- Cost - it has more connected devices, such as a router, and uses more transmission media than other topologies.
- High maintenace: Mesh topology network are extensive and challenging to maintain and manage.
- Efficiency: The no. of redundant connection is high, reducing network efficiency.


TREE TOPOLOGY
central hub
Device 1
secondary hub
secondary hub
Device 2
Device 5
Device 3
Device 4
HYBRID TOPOLOGY
Device 1
Device 5
Device 2
Ring
Device 4
HUB
star
Device 3
Device 6

PAGE NO.:
DATE: / /

5 Tree topology :-

- Tree topologies are also known as hierarchical topology, as the root nodes connect all other nodes to form a hierarchy.
- This topology is known as a star Bus topology because it combines several star topologies into a single bus.
- Data flows from top to bottom in this network topology from the central hub to the secondary hub and then to the devices or from bottom to top.

Advantages of tree topology :-

- Interconnection: All nodes can connect to the large and intermediate network.
- It aids in structuring as the tree-like shape allow any nodes to hold its child. And this can make it much easier to structure the entire network.
- expansion of nodes is possible and easily achievable in this network structure.

Disadvantages of tree topology :-

- Expensive
- Network failure: if the primary central nodes or another wire fail, all other nodes may become disconnected.

6 Hybrid Topology :-

- This topology technology combine all of the topologies
- The topology can take any shape that we want.

Advantages of hybrid topology :-

- These types of network topology combine the advantages of various topog topologies into a single topology.

PAGE NO.:
DATE: / /

- Scalable: Hybrid network are easily scalable as we can easily integrate the new hardware component.

Disadvantage of hybrid Topology:

- Expensive - because it combines the benefits of multiple topologies into a single topology.
- Complex design.

step to demonstrate the topologies on cisco Packet tracer: →

1. first, open the cisco Packet tracer desktop and select the devices given below switches and PC.
2. Then create a network topology (Ring, Mess or tree, star)
3. Connect similar devices with copper cross over and diffuent devices with copper. Straight cable or use an automatic connecting cable to connect the devices with other.
4. Configure the PCs with IP address.
5. Verify the connection by pinging the IP address of any host in command prompt.
6. If we can see the replies from the targeted node on PCs then the connection is verified.

Conclusion:

Thus we have successfully simulated diffuent types of topologies by using cisco Packet tracer.

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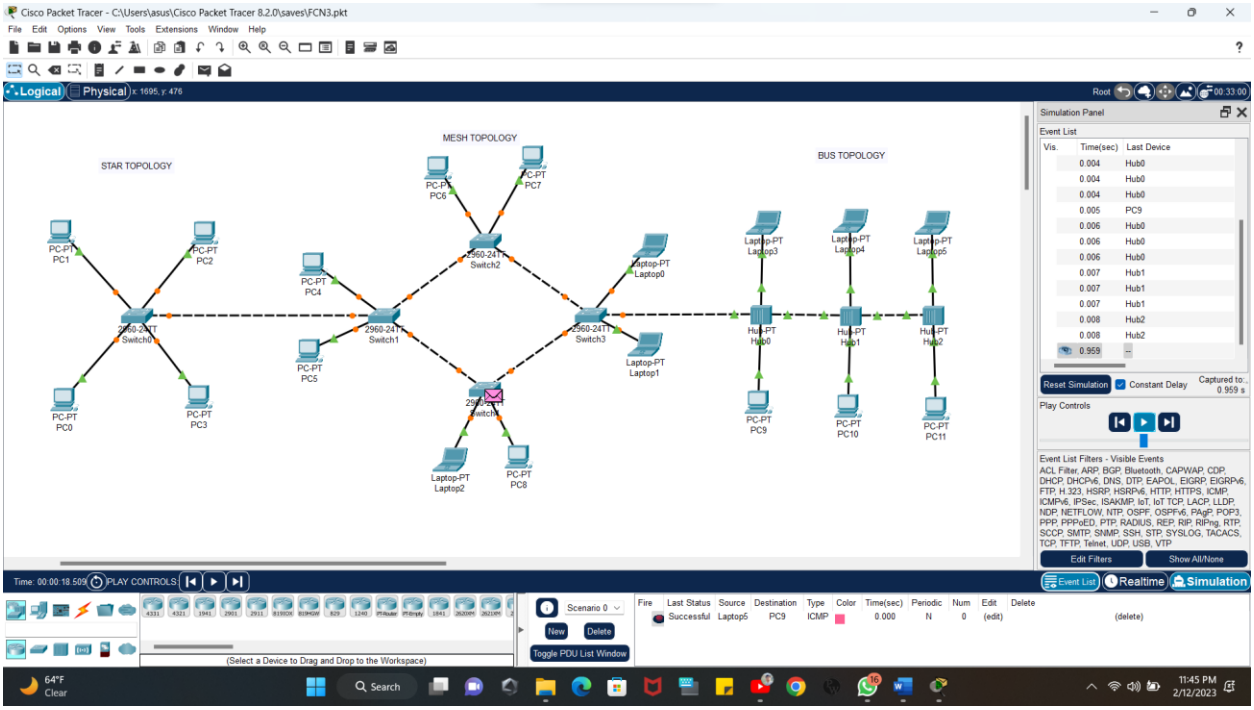
Ashwin
9/2/23.

Snapshot:


Cisco Packet Tracer - C:\Users\asus\Cisco Packet Tracer 8.2.0\saves\FCN3.pkt
File Edit Options View Tools Extensions Window Help
Logical
Physical
STAR TOPOLOGY
MESH TOPOLOGY
BUS TOPOLOGY
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
PC-PT PC4
PC-PT PC5
PC-PT PC6
PC-PT PC7
PC-PT PC8
PC-PT PC9
PC-PT PC10
PC-PT PC11
2960-24TT Switch0
2960-24TT Switch1
2960-24TT Switch2
2960-24TT Switch3
Laptop-PT Laptop0
Laptop-PT Laptop1
Laptop-PT Laptop2
Laptop-PT Laptop3
Laptop-PT Laptop4
Laptop-PT Laptop5
Hub-PT Hub0
Hub-PT Hub1
Hub-PT Hub2
Simulation Panel
Event List
Vis. Time(sec) Last Device
Reset Simulation
Constant Delay
Play Controls
Event List Filters - Visible Events
Edit Filters
Show All/None
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
(Select a Device to Drag and Drop to the Workspace)
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful Laptop5 PC9 ICMP 0.000 N 0 (edit) (delete)
64°F Clear
Search
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