1. Basic Network Topology Module: Set up fundamental network topologies (e.g., star, bus, ring) to understand their characteristics and Performance.

 # Background Research for the problem statement:

- Characteristics, advantages, and disadvantages of each topology.
- Understanding of IP addressing and subnetting concepts.
- Troubleshooting commands like PING for network diagnostics.
- Configuration of switches and VPCs in a simulated environment.

 # Observations:

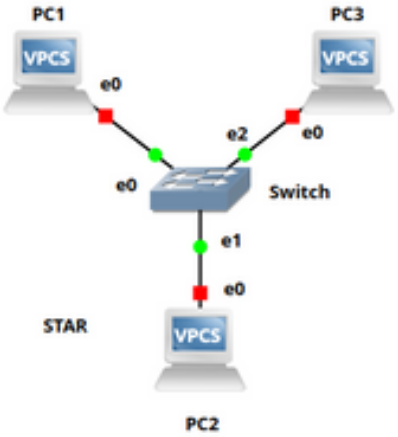
- **Star Topology:**

Advantages:

- Centralized control with the central hub.
- Fault isolation: issues with one connection don't affect others.

Disadvantages:

- Dependency on the central hub; if it fails, the entire network may be affected.
- Increased cabling compared to bus or ring topologies.



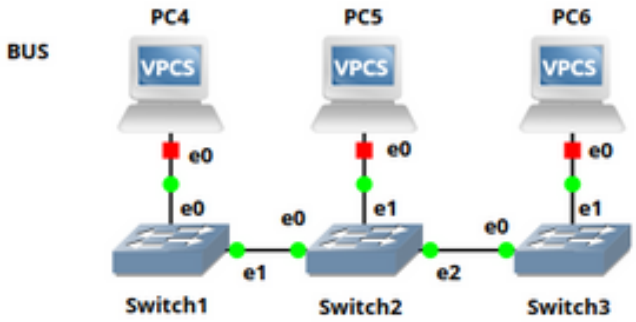
- **Bus Topology:**

Advantages:

- Devices are connected to a single cable, so efficient in a small network.
- The length of cable required is less.

Disadvantages:

- Single point of failure is there, if the main cable fails, the entire network is affected.
- Limited scalability; performance degrades as more devices are added.
- Performance decreases as the number of devices increases.



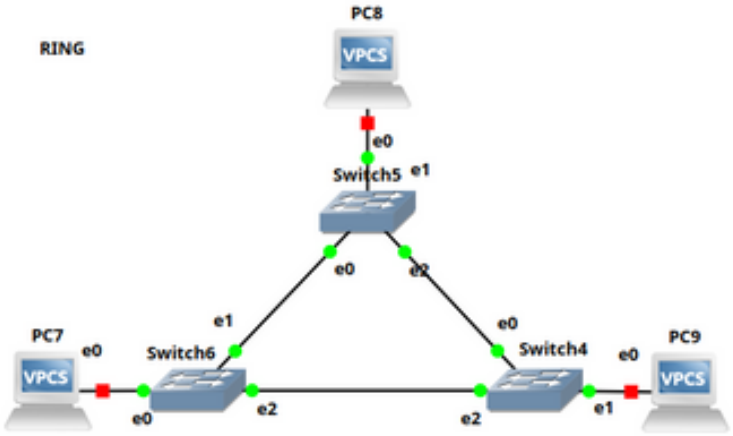
- **Ring Topology:**

Advantages:

- Equal access to the network for all devices.
- No central point of failure like in the bus topology.
- Good performance for sequential data transmission.

Disadvantages:

- Adding or removing devices can be complex.
- Failure of one device or connection can disrupt the entire network.


RING
PC8
VPCS
e0
Switch5
e1
e0
e2
e1
e0
PC7
e0
Switch6
Switch4
e0
PC9
VPCS
VPCS
e0
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