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course :- computer Networks for communication

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Assignment Unit-1

Scenario :-

A call center wants to implement a fault - tolerant, scalable LAN setup.

a) Suitable Topology and Justification :

Recommended Topology : Star Topology with Redundant Links

- Justification :-
- Centralized management using a core switch
- Easy to troubleshoot and expand (scalable).
- If one workstation fails, the rest of the networks remains unaffected.
- Redundant links (e.g. through dual-core switches) provide fault tolerance.

b) configuration of Network Interface card (NIC's).

Steps for NIC configuration :

a. Install NIC drivers on all network stations and servers.

b. Assign IP addresses :
   -> use static IPs for servers
   -> use DHCP for client systems.

c. Enable full-duplex mode for better data transfer efficiency.

d set correct speed (1Gbps or higher) to match the switch capability
e. Configure MAC filtering or bonding (optional)
-> NIC Teaming for redundancy and load blancing (especially on servers).
f. Verify with ipconfig/ifconfig and test connectivity using ping (or) traceroute

c. Need for VLAN's in such environments:

• Resons to use VLANs:

a. Traffic segmentation:
-> separate voice, data, and management traffic

b. Improved security.
-> Isolate departments (HR, IT, support).

c. Reduced Broadacts Domains
-> Increases network efficiency and performance

d. simplified Managment:
-> Logical grouping of users even if they're not physically located together.

e. Qos (Quality of service):
-> Prioritize voice traffic to ensure call quality.

d) Suggested Layer 2 and Layer 3 Devices:

• Layer 2 Devices (Data Link Layer):

• Managed switches (support VLANs and port security)

-> Network Interface cards (NICs)

• Layer 3 Devices (Network Layer):

-> Routers (for connecting different networks (or) to the internet)

-> Layer 3 switches (for inter-VLAN routing and higher performance