

**CT-376 Computer Communication Networks**

**Complex Computing Activity (CCA) through Open-Ended Lab (OEL)**

**Course Learning Outcome:**

**CLO 3 (P3):** Build computer networks on various topologies.

**Complex Computing Activity Attributes:**

- **CA-2 Level of interactions:** Requires resolution of significant problems arising from interactions among wide-ranging or conflicting technical, computing, contextual, or other issues.
- **CA-5 Familiarity:** Can extend beyond previous experiences by applying principles-based approaches.

**Lab Title: Configuring a Redundant Inter-VLAN Network with Dynamic IP Assignment**

**Objective:**

A small business with two offices, Sales and Support, needs a network that ensures connectivity, provides redundancy, and dynamically assigns IP addresses to devices.

**Instructions:**

- Create two separate networks for Sales and Support using switches and VLANs.
- Configure a router to enable communication between the two networks.
- Implement DHCP for dynamic IP assignment in both networks.
- Test connectivity between devices in Sales and Support networks and simulate router failover.

**Assumptions & Constraints:**

- Switches used in the network support VLAN configuration.
- The router used is capable of inter-VLAN routing and supports DHCP relay or has DHCP server capabilities.
- Each VLAN (Sales and Support) will operate on a distinct IP subnet to enable proper routing and isolation.
- Router failover can be simulated using a second router or virtualized environment to demonstrate redundancy.
- The lab may be limited to one router and two switches; redundancy must be simulated within these bounds or using virtual devices.
- DHCP scopes must not overlap between VLANs; each scope must align with its VLAN's subnet.
- Failover mechanisms must avoid proprietary solutions (e.g., HSRP/VRRP) unless the environment supports them.

**Deliverables:**

A .zip file containing all .pkt files.

**Complex Computing Activity Assessment Rubrics**  
**CT-376 Computer Communication Networks**

Student Name: \_\_\_\_\_

Student Roll No.: \_\_\_\_\_

<b>Criteria and Scales</b>		
<b>Fully Complete &amp; Functional (2)</b>	<b>Partially Complete (1)</b>	<b>Incomplete/Incorrect (0)</b>
<b>Criterion 1: Network Design and VLAN Configuration:</b> To what extent has the student configured the network? <b>(CA2: Level of Interactions)</b>		
Correct VLAN setup separating Sales and Support with proper switch configuration.	VLANs configured with minor issues in separation or device assignment.	No VLANs configured or network design is incorrect.
<b>Criterion 2: Router Configuration and Inter-VLAN Routing:</b> To what extent has the student resolved the configuration and routing issues? <b>(CA2: Level of Interactions)</b>		
No routing or fails to enable inter-network communication.	Routing configured but communication between VLANs is unreliable or incomplete.	No routing or fails to enable inter-network communication.
<b>Criterion 3: DHCP Implementation:</b> To what extent has the student implemented DHCP? <b>(CA5: Familiarity)</b>		
DHCP server correctly assigns IPs dynamically to both networks.	DHCP configured but with issues (e.g., conflicts, incorrect scopes).	No DHCP; static IPs used or dynamic assignment not working.
<b>Criterion 4: Connectivity Testing:</b> To what extent has the student tested the network implementation? <b>(CA2: Level of Interactions)</b>		
All devices in Sales and Support successfully communicate with each other.	Partial connectivity; some ping tests between Sales and Support are successful.	Devices cannot communicate; all ping tests fail.
<b>Criterion 5: Redundancy and Router Failover:</b> To what extent has the student set up redundancy or failover? <b>(CA5: Familiarity)</b>		
Full failover tested; network continues to operate when router failure is simulated.	Redundancy/failover configured but unreliable or partially working.	No redundancy or failover setup.

Total Marks: \_\_\_\_\_/10

Teacher's Signature: \_\_\_\_\_