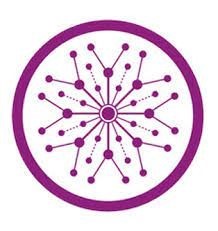
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**Superior University Gold Campus**

**Assignment #**

**Program:**

BS DATA SCIENCE

**Course Name:**

**CN lab**

**Submitted to:**

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# **IBEX Call Center Network Design Using Cisco Technologies**

## 1. Introduction

This project aims to design a call center network using Cisco technologies, implementing VLAN, DHCP, and routing. The goal is to create a scalable, secure, and efficient network infrastructure that ensures smooth communication between various departments.

## 2. Project Requirements

- \*\*Hardware:\*\* Cisco switches, routers, and end-user devices (workstations, IP phones).  
- \*\*Software:\*\* Cisco IOS for configuration and a network simulation tool like Cisco Packet Tracer or GNS3.

## 3. Network Design Overview

### VLAN Configuration

Virtual Local Area Networks (VLANs) will be used to separate network traffic by department. Each VLAN will act as a distinct broadcast domain, ensuring better traffic management and security. For example, separate VLANs could be configured for Customer Support, HR, and IT.

### DHCP Setup

Dynamic Host Configuration Protocol (DHCP) will be configured to automatically assign IP addresses to devices in each VLAN. Each VLAN will have its own address pool to avoid conflicts.

### Routing Configuration

Inter-VLAN routing will be implemented to enable communication between different VLANs. A routing protocol such as OSPF or static routing will be used to manage data flow between internal networks and external destinations.

## 4. Implementation Steps

### Step 1: VLAN Configuration

- Access the switch's configuration mode.  
- Create VLANs for each department.  
- Assign ports to the appropriate VLANs.

### Step 2: DHCP Configuration

- Configure a DHCP server to assign IP addresses dynamically.  
- Define address pools specific to each VLAN.  
- Ensure that the default gateway is set for each VLAN.

### Step 3: Routing Configuration

- Enable routing on the Layer 3 switch or router.  
- Set up a routing protocol to handle inter-VLAN communication.  
- Verify routing using diagnostic commands to ensure connectivity.

## 5. Network Security Measures

- Implement Access Control Lists (ACLs) to control traffic between VLANs.  
- Enable port security to restrict unauthorized devices.  
- Use routing security features to protect against malicious activity.

## 6. Testing and Validation

- Perform ping tests between devices in different VLANs to verify connectivity.  
- Ensure devices receive IP addresses from the correct DHCP pool.  
- Validate routing tables and paths using show commands.

## 7. Challenges and Solutions

\*\*Challenge:\*\* Misconfigured VLAN assignments.  
\*\*Solution:\*\* Recheck port-to-VLAN mapping and trunking configuration.

\*\*Challenge:\*\* DHCP not issuing IP addresses correctly.  
\*\*Solution:\*\* Verify DHCP pool settings and VLAN interface configurations.

## 8. Conclusion

This network design ensures that the call center's communication infrastructure is secure, efficient, and scalable. Future enhancements could include integrating Quality of Service (QoS) for voice traffic prioritization.