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**Project Report**

**Computer Network (lab)**

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**Network Design Report for XYZ Company**

**Title: Network Design for XYZ Company**

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**Course**: Computer Networks (Lab)  
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# Abstract

This report explains the design and setup of a network for XYZ Company using Cisco Packet Tracer. The network is built to support communication between different departments. It is reliable, easy to manage, and secure. The network uses subnets for better organization and includes DHCP to assign IP addresses automatically.

**Objectives**

1. Design a network that connects all departments.
2. Make communication smooth across the company.
3. Use subnetting to manage IP addresses effectively.
4. Set up DHCP to assign IPs automatically to devices.
5. Ensure the network can grow and stay secure.

**Network Design**

**Devices Used**

## "The network is designed to support additional devices and can be expanded as needed to meet requirements."

* **Router**: 1
* **Switches**: 3 (Model: Cisco 2960)
* **End Devices**:
  + PCs: 10
  + Printers: 2
* **Servers**:
  + DHCP Server
  + Web Server

**IP Address Plan**

* **Main Network**: 192.168.0.0/24
* **Subnets**:
  + **HR Department**:
    - Subnet: 192.168.0.0/26
    - Range: 192.168.0.1 - 192.168.0.62
  + **IT Department**:
    - Subnet: 192.168.0.64/26
    - Range: 192.168.0.65 - 192.168.0.126
  + **Sales Department**:
    - Subnet: 192.168.0.128/26
    - Range: 192.168.0.129 - 192.168.0.190

**Configuration**

**Router Configuration**

The router connects all the departments and helps them communicate.  
**Commands**:

Router> enable

Router# configure terminal

Router(config)# interface g0/0

Router(config-if)# ip address 192.168.0.1 255.255.255.192

Router(config-if)# no shutdown

Router(config)# interface g0/1

Router(config-if)# ip address 192.168.0.65 255.255.255.192

Router(config-if)# no shutdown

Router(config)# interface g0/2

Router(config-if)# ip address 192.168.0.129 255.255.255.192

Router(config-if)# no shutdown

**DHCP Configuration**

The DHCP server automatically gives IP addresses to devices.

**Commands**:

Router(config)# ip dhcp pool HR

Router(dhcp-config)# network 192.168.0.0 255.255.255.192

Router(dhcp-config)# default-router 192.168.0.1

Router(dhcp-config)# exit

Router(config)# ip dhcp pool IT

Router(dhcp-config)# network 192.168.0.64 255.255.255.192

Router(dhcp-config)# default-router 192.168.0.65

Router(dhcp-config)# exit

Router(config)# ip dhcp pool Sales

Router(dhcp-config)# network 192.168.0.128 255.255.255.192

Router(dhcp-config)# default-router 192.168.0.129

Router(dhcp-config)# exit

**Switch Configuration**

The switches connect the devices like PCs and printers.  
**Commands**:

Switch> enable

Switch# configure terminal

Switch(config)# interface vlan 1

Switch(config-if)# ip address 192.168.0.2 255.255.255.192

Switch(config-if)# no shutdown

**Testing and Verification**

1. **Ping Test**:
   * Devices in the same department can communicate.
   * Devices in different departments can communicate through the router.
2. **DHCP Test**:
   * Devices got IP addresses automatically from the DHCP server.
   * Verified using the ipconfig command.

**Challenges and Solutions**

* **Issue 1**: DHCP gave incorrect IPs because of overlapping pools.
  + **Solution**: Fixed the subnet masks and corrected DHCP settings.
* **Issue 2**: Devices couldn’t connect across departments.
  + **Solution**: Checked and corrected router IP settings.

**Conclusion**

The network for XYZ Company is now functional and meets all requirements. It allows smooth communication between departments, assigns IP addresses automatically, and uses subnetting for better management. This network is ready to scale and supports secure operations. Future improvements can include adding VLANs and stronger security features.

**References**

1. Cisco Packet Tracer Official Documentation.
2. Online Tutorials and Resources.