Project Report

Comprehensive Network Design for a Multi-Floor Company

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1. Introduction

This report provides a detailed and comprehensive analysis of a network infrastructure designed for a three-story company, simulated using Cisco Packet Tracer. The design emphasizes creating a secure, efficient, and scalable network that supports seamless communication between departments while accommodating future growth. To ensure optimal functionality, a range of devices and connections has been strategically integrated. The report also includes a thorough cost analysis, encompassing hardware, cabling, and overall project expenses, all presented in PKR.

2. Building Layout and Departmental Overview

First Floor

- **Sales Department**: Responsible for client relationship management and revenue generation.
- **HR Department**: Handles employee recruitment, management, and policy implementation.

Second Floor

- **Finance Department**: Manages financial planning, payroll, and budgeting.
- **Admin Department**: Oversees administrative operations and organizational logistics.

Third Floor

- **ICT Department**: Maintains IT infrastructure, supports technical needs, and drives technological innovation.
- **Inside Server Department**: Hosts critical servers and services integral to the network's functionality.

Each department (Sales, HR, Finance, Admin, and ICT) is equipped with the following devices:

- 1 PC for workstations.
- 1 Printer for departmental printing tasks.
- 1 Laptop for flexible, mobile computing.
- 1 Tablet for enhanced portability and multitasking.
- 1 Smartphone for real-time communication and remote work.
- 2 VoIP Phones for robust voice communication.
- 1 Cisco 2960 Switch to interconnect departmental devices.

The Inside Server Department houses specialized equipment, including:

- 1 Cisco 2960 Switch for device interconnection.
- 2 Servers:

    - **DNS Server**: For domain name resolution.
    - **DHCP Server**: For dynamic IP address allocation.

- 1 WLC-2504 Wireless LAN Controller for centralized wireless network management.
- 1 Router-2811 for advanced routing functionalities.

All departmental switches are linked to two Cisco 3650-24PS multilayer switches, forming the backbone of the network.

3. Network Architecture and Security

Core Interconnections

The Cisco 3650-24PS multilayer switches serve as the network's backbone, ensuring efficient routing and switching of data between all connected devices and departments.

Firewall Implementation

Two Cisco 5506-X Firewalls are deployed to protect the network from external threats. One firewall connects to a DMZ switch (Cisco 2960), which links to external-facing servers:

- **FTP Server**: Facilitates secure file transfers.
- **Web Server**: Hosts the company's website and online services.
- **Email Server**: Manages internal and external email communication.

Router and Cloud Integration

The firewalls connect to two Cisco 2911 Routers for redundancy and reliable external connectivity. These routers link to a simulated cloud infrastructure comprising:

- A cluster of Cisco 2911 Routers and a Cisco 2960 Switch.
- Two external PCs to test connectivity and service accessibility.

This architecture ensures uninterrupted communication, reliable external connectivity, and redundancy to minimize downtime risks.

4. Cost Analysis

Hardware Costs

Device	Quantity	Unit Price (PKR)	Total Price (PKR)
PC	8	80,000	640,000
Printer	5	40,000	200,000
Laptop	5	150,000	750,000
Tablet	5	50,000	250,000
Smartphone	5	60,000	300,000
VoIP Phone	10	15,000	150,000
Cisco 2960 Switch	8	70,000	560,000
Cisco 3650-24PS	2	450,000	900,000
Cisco 5506-X Firewall	2	250,000	500,000
Cisco 2911 Router	4	120,000	480,000
WLC-2504	1	700,000	700,000
DNS Server	1	200,000	200,000
DHCP Server	1	200,000	200,000
FTP Server	1	200,000	200,000
Web Server	1	200,000	200,000
Email Server	1	200,000	200,000
Total			**6,430,000**

Cable Costs

Cable Type	Length (meters)	Unit Price (PKR/m)	Total Price (PKR)
Ethernet Cables	1,500	100	150,000
Fiber Optic Cable	200	500	100,000
Total			**250,000**

Overall Cost

Category	Cost (PKR)
Hardware	6,430,000
Cabling	250,000
Grand Total	**6,680,000**

5. Conclusion

The proposed network design provides a secure, scalable, and high-performance infrastructure tailored to the company's operational needs. By integrating advanced hardware, state-of-the-art networking devices, and robust security measures, the design ensures efficient communication, data integrity, and system reliability. With an estimated total cost of PKR **6,680,000**, this network represents an investment in the company's growth, technological advancement, and future-readiness.