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CS2120 COMPUTER NETWORKS

Mini Project Report

Hotel Management Network Design and Implementation

Submitted

By

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CERTIFICATE

Certified that the CS2120 Computer Networks Mini Project work titled H*otel Management Network Design and Implementation* is carried out by *Adhithi M* (1RVU23CSE020) and *Banasmita Jena* (1RVU23CSE104) who are bonafide students of the School of Computer Science and Engineering, RV University, Bengaluru, during the year 2024–25. It is certified that all corrections/ suggestions from all the continuous internal evaluations have been incorporated into the project and in this report.

Dr. Jobin Thomas	Dr. Sudhakar K. N
Faculty Guide	Program Director

1 Problem statement

In this project, we emulate a hotel network infrastructure to overcome the issues of secure, scalable, and efficient communication in a multi-floor hospitality setting. The network is modeled using VLAN segmentation to separate departments like Administration, IT, and Guest Services logically and inter-VLAN routing to facilitate controlled communication between the segments. To offer a more centralized internet service, we added an ISP router which is deployed and set with static routing as well as Network Address Translation (NAT), allowing internal devices to securely reach external networks. This simulation models actual networking implementations in the hotel industry, representing fundamental concepts of network design, routing, and access control.

2. Introduction

We created and simulated a full-featured network infrastructure for a multi-story hotel in this project to help tackle the issues of secure and efficient communication among various departments and users. The hotel is divided into logical sections like IT, Admin, Reception, and Guest Access, which are each allocated a distinct VLAN to maintain data protection, structured traffic flow, and administrative management. Equipment on three floors is linked through a structured topology that includes routers, switches, and end devices.

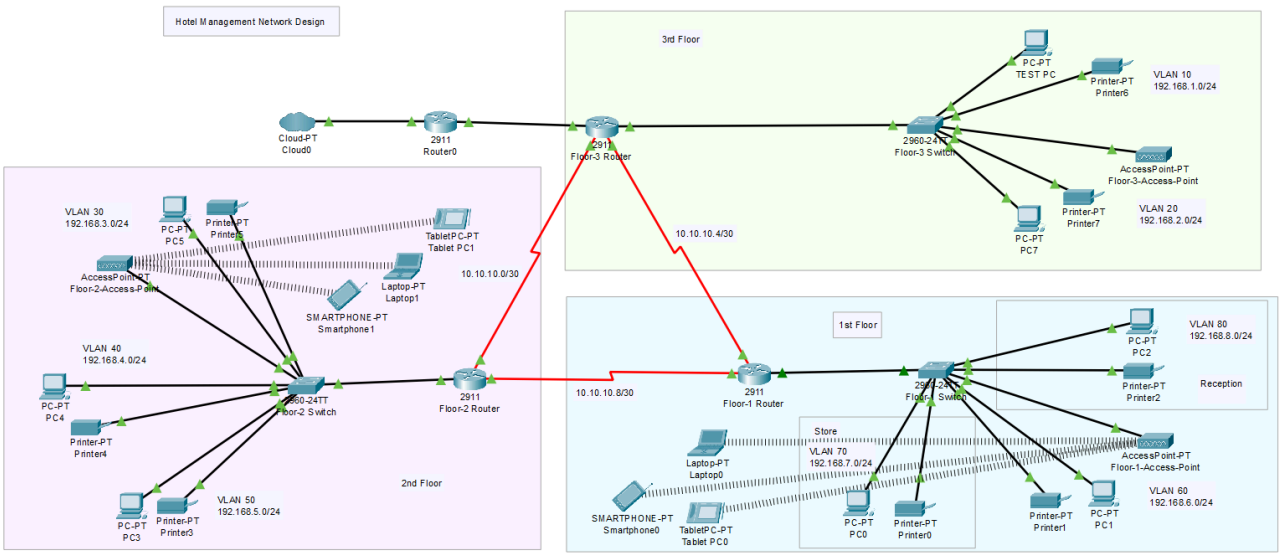
The fundamental aim of this network is to guarantee scalability, performance, and segregation of services without prohibiting controlled interaction whenever it's absolutely necessary. VLANs are vital in segmenting the network logically, where devices belonging to the same department may interact even though they happen to be placed differently physically. Security is promoted here by restricting the scope of the broadcast domains as well as avoiding redundant traffic in-between unrelated departments.

To allow communication among various VLANs and between floors,an inter-VLAN routing is established through the routers present in every floor. Static routing is employed to manage data packet pathways among routers for accurate delivery throughout the network. There is a central Floor-1 router that serves as the portal to outside networks, which connects to an ISP router that emulates the internet. This structure simulates how enterprise-level networks handle internal communication and outside connectivity.

One of the most important elements of the network is the use of Network Address Translation (NAT). It enables multiple internal devices with private IP addresses to connect to the internet using a single public IP address which offers both address conservation and a further layer of security. Static NAT and Port Address Translation (PAT) are employed to handle this conversion process, which is essential in real-world networks where public IP addresses are scarce.

This project emphasizes the importance of network technologies like VLANs, inter-VLAN routing, static routing, NAT, and application of protocols like ICMP (for verifying connectivity using ping). The simulation simulates real-world networking configurations encountered in hotels and corporate environments, offering a solid grounding in scalable and secure network design and management. It not only focuses on the technical setup but also covers planning and logical structuring involved in providing real-time communication and service delivery in a professional environment.

3 Network Diagram



4. Configuration setup

Router Configuration Table

Device	Interfaces	IP Address	Description	Notes
Router1 (1st Floor)	Serial 0/0/0	10.10.10.1/30	Connect to Router2	DCE
	Serial 0/0/1	10.10.10.5/30	Connect to Router3	
	Gig 0/0	VLAN Interfaces	Connect to Switch	OSPF, DHCP
Router2 (2nd Floor)	Serial 0/0/0	10.10.10.2/30	Connect to Router1	
	Gig 0/0	VLAN Interfaces	Connect to Switch	OSPF, DHCP
Router3 (3rd Floor)	Serial 0/0/0	10.10.10.6/30	Connect to Router1	
	Gig 0/0	VLAN Interfaces	Connect to Switch	OSPF, DHCP

Switches Configuration Table (1 per Floor)

Device	VLANs Supported	Ports	Special Config
Switch1 (1st Floor)	60, 70, 80	Access ports for PCs, Printers, WiFi	Standard trunking, VLAN assignment
Switch2 (2nd Floor)	30, 40, 50	Access ports	VLAN configuration
Switch3 (3rd Floor)	10, 20	Access ports	Port security for IT VLAN (sticky, fa0/1)

End Devices (Grouped by Floor and VLAN)

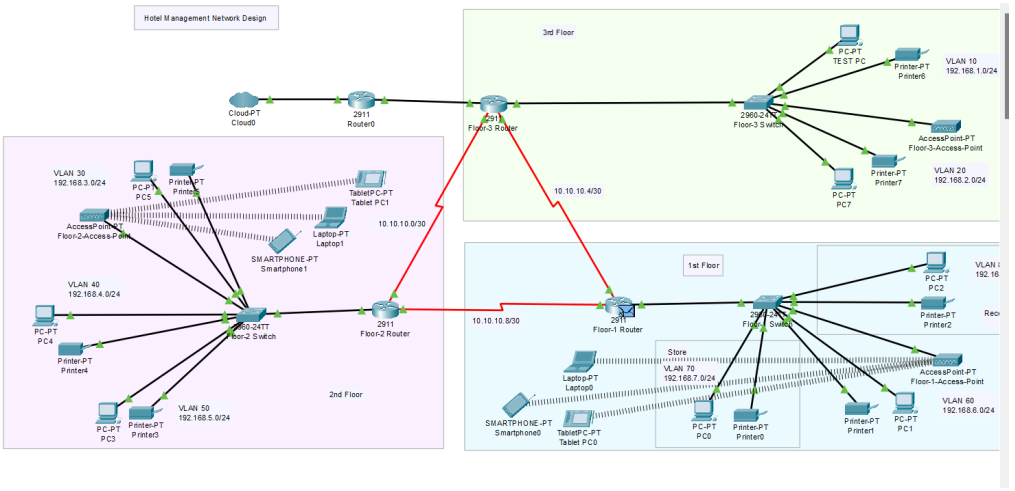
Device	VLAN	IP Range	Connected to	Notes
Reception PC & Printer	80	192.168.8.0/24	Switch1	DHCP
Store PC & Printer	70	192.168.7.0/24	Switch1	DHCP
Logistics PC & Printer	60	192.168.6.0/24	Switch1	DHCP
Finance PC & Printer	50	192.168.5.0/24	Switch2	DHCP
HR PC & Printer	40	192.168.4.0/24	Switch2	DHCP
Sales PC & Printer	30	192.168.3.0/24	Switch2	DHCP
Admin PC & Printer	20	192.168.2.0/24	Switch3	DHCP
IT PC & Printer	10	192.168.1.0/24	Switch3	DHCP
Test-PC (IT)	10	DHCP from Router3	Switch3 (fa0/1)	Port security config

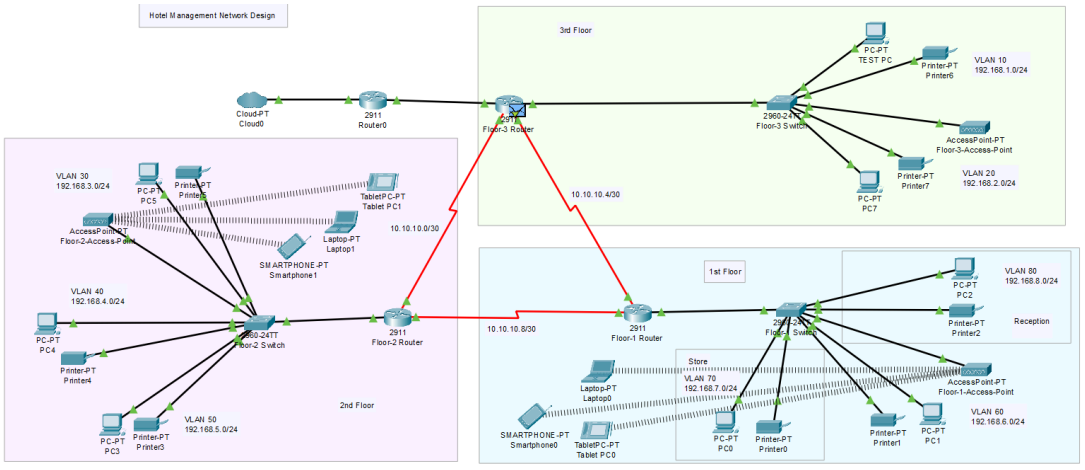
Security and Access Configuration

Configuration	Devices	Description
OSPF Routing	All Routers	Dynamic route advertisement
DHCP	All Routers	Serve IP addresses to respective VLANs
SSH	All Routers	Secure remote login enabled
Test-PC Access	Switch3 (fa0/1)	Only Test-PC allowed via sticky MAC
VLAN Assignment	All Switches	Department-based VLANs for segmentation

5. Results

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 200.0.0.1

Pinging 200.0.0.1 with 32 bytes of data:

Request timed out.
Reply from 200.0.0.1: bytes=32 time<1ms TTL=254
Reply from 200.0.0.1: bytes=32 time<1ms TTL=254
Reply from 200.0.0.1: bytes=32 time<1ms TTL=254

Ping statistics for 200.0.0.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```





6. Conclusion

In this project, we were successfully able to design and simulate a planned hotel network by applying VLANs for logical partitioning, setting up inter-VLAN routing and static routes for effective communication, and providing internet access through NAT and a simulated ISP router. We designed a scalable and secure architecture with Cisco Packet Tracer that replicates real-world networking habits popularly applied in the hospitality field. This simulation not only clarified fundamental networking principles but also illustrated how structured network design enhances performance, security, and manageability in advanced environments. This project can be expanded in the future by adding wireless access points, dynamic routing protocols such as OSPF, and applying firewall or intrusion prevention systems to further advance network security and functionality.