Activity based

Project Report on

Computer Network

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Project Report : 01

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Design and Implementation of a Local Area Network (LAN) for a Specific Location

Project Statement:

Design and implement a Local Area Network (LAN) for a specified location, such as a school, office building, or community center. The project involves identifying optimal spots for network devices (switches, routers, and access points), configuring the network with appropriate IP addresses, establishing communication between different sub-networks, and calculating the overall cost of network development. This project aims to provide students with hands-on experience in network design, configuration, and cost analysis.

Project Objective: To understand development stages in Local Area Network

Project Outcome: Student can develop Local Area Network and perform cost analysis of Network Infrastructure

Theory:

Site Survey:

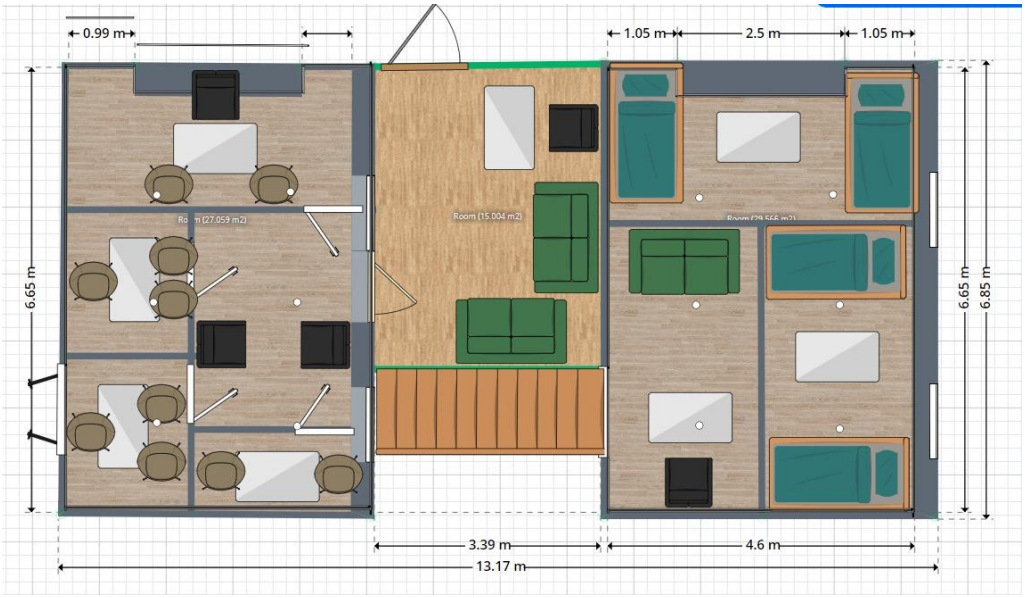
A detailed report documenting the site survey findings, including the physical layout and identified spots for network devices.
Purpose: The survey was conducted to analyze the physical layout and determine the optimal placement of network devices for a office network setup, including desktops, laptops, smartphones, switches, routers, and wireless access points

Key Requirements for Network:

- Wired connectivity for PCs and switches.
- Centralized routing via the Cisco 1941 Router.
- Network scalability and security

Methodology for hospital lan set up

Site Survey:



Conduct a comprehensive assessment of the physical location to ensure optimal placement of network components.

Steps:

- Perform a walk-through of the office to identify possible locations for switches, routers, access points, printers, and user devices.
- Measure room dimensions to determine cable lengths and power outlet availability.
- Analyse wall materials (concrete, drywall, etc.) that may affect signal strength for wireless connections.
- Document the existing infrastructure (power outlets, data ports, current wiring).
- Identify potential obstructions that could interfere with wireless signals or cabling.

santa sopankaka hospital saswad

This hospital is located in saswad pune highway which this hospital is connected with the town
saswad which is two floors where the hospital needs to set up lan for different rooms of hospital which includes 6 rooms

Live photo

https://www.google.com/maps/place/SANT+SOPANDEV+MEDICAL/data=!4m7!3m6!1s0x3bc2ef8795a989ff:0x9da82e18ac47b49f!8m2!3d18.3558998!4d74.0282871!16s%2Fg%2F11bwd0fznc!19sChIJ_4mplYfvwjsRn7RHrBguqJ0?authuser=0&hl=en&rclk=1

live photo

2.Network Design:

Router :

- Cisco 1941 Router (or any other similar enterprise-grade router).
- This router will route traffic between different subnets and allow communication between LANs and the wireless network

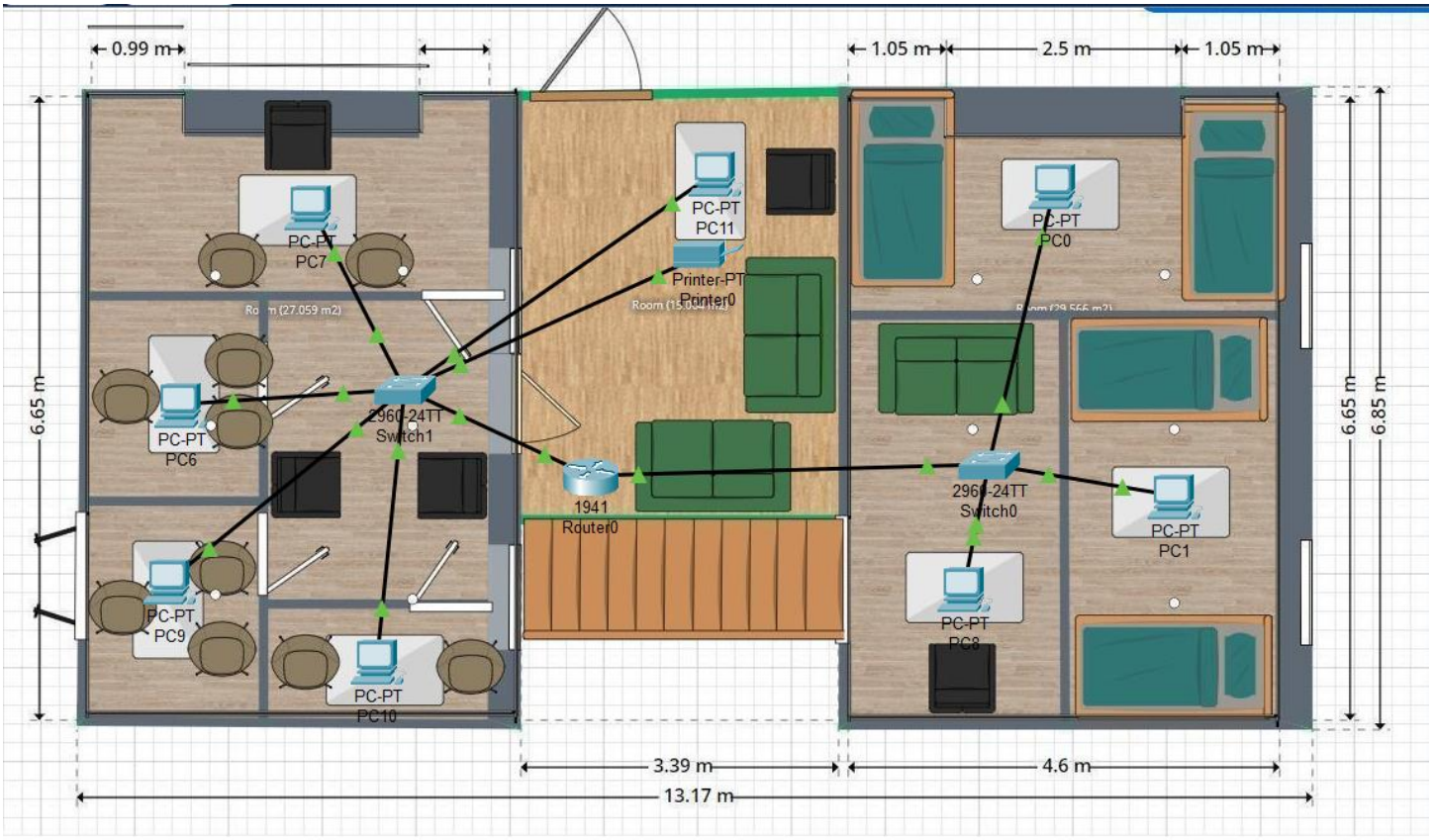
Switches:

- TP-Link 24-Port Gigabit Switch (or similar enterprise-grade switches).
- Switches will be used to connect multiple devices (PCs, routers, and wireless router).

Ethernet cables: Cat6 will be used to run from the central switch to each bungalow.

- **Cat6 cables** are recommended because they support longer distances with minimal signal loss (up to 100 meters).

- **3D MODEL FULL IMPLEMENTATION: -**



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC7	PC11	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC1	PC0	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC9	PC11	ICMP		0.000	N	2	(edit)	(delete)

- **IP address Configuration:**

  The switch zero LAN will have the default gateway as 192.168.1.1 and subnet mask as255.255.255.0

  and the PC connected to it

  will have itaddress as

  PC1 :192.168.1.10

  PC2 :192.168.1.11

  PC3 :192.168.1.12

  and so on…

  The switch One LAN will have the default gate way as 192.168.2.1 and subnet mask as 255.255.255.0
  and the PC connected to it will have it address as

  PC6:192.168.2.10
  PC7 :192.168.2.11
  PC8:192.168.2.12
  PC9:192.168.2.13
  PC10: 192.168.2.14
  PC11: 192.168.2.15

- **Cisco Network Cost Analysis**

  - **Network Components:**

1. Switches:

- Model: Cisco Catalyst 2960 (based on the image)
- Quantity: 2 (Switch0, Switch1)
- Estimated price per switch: ₹75,000
- Total for switches: ₹1,50,000

2. PCs/Workstations:

- Quantity: 11(PC-PT devices in the diagram)
- Estimated price per PC: ₹40,000
- Total for PCs: ₹4,40,000

3. Printers:

- Quantity: 1 (Printer-PT in the diagram)
- Estimated price: ₹25,000
- Total for printer: ₹25,000

4. Cabling:

- Ethernet cabling for all connections
- Estimated 350 meters of CAT6 cable
- Price per meter: ₹50
- Total for cabling: ₹17,500

5.Routers:

- Model:-Cisco 1941
- Quantity:-1
- Price per Router: ₹18000
- Total Cost : ₹18000

- **Software and Configuration:**

5. Network Operating System:

- Cisco IOS for switches (included in switch price)

6. IP addressing:

- Using private 192.168.x.x addressing scheme (no additional cost)

Hardware Costs total :
₹2,54,000

- ## Labor Costs

Task	Quantity	Cost per Unit (₹)	Total Cost (₹)	Source
PC/Laptop Setup & Configuration	11	₹500	₹5,500	Estimated market rate
Router Installation	1	₹800	₹800	Estimated
Switch Installation	2	₹300	₹600	Estimated
Testing & Troubleshooting	Entire setup	₹2,000	₹2,000	Flat fee for network testing

Labor Cost:- ₹8,900

- ## Summary of Total Costs

Category	Total Cost (₹)
Hardware Cost	₹2,54,000
Labor Cost	₹8,900
GST and taxes	₹50,000 (approx.)
Total Project Cost	**₹3,12,900**

- **CONCLUSION**

To design a LAN for a hospital, focus on scalability, reliability, and security. Ensure the network supports current and future growth, offers high uptime, and protects sensitive patient data through firewalls and encryption. Use network segmentation to separate admin, patient, and medical device networks. Prioritize bandwidth for essential tasks like digital imaging and cloud services. Implement centralized management for easier monitoring, and establish robust backup and disaster recovery plans. This ensures smooth operations and compliance with healthcare regulations.

1. **Labor Costs**

Task	Quantity	Cost per Unit (₹)	Total Cost (₹)	Source
PC/Laptop Setup & Configuration	14	₹500	₹7,000	Estimated market rate
Router Installation	1	₹800	₹800	Estimated
Switch Installation	2	₹300	₹600	Estimated
Wireless Access Point Setup	1	₹250	₹250	Estimated
Testing & Troubleshooting	Entire setup	₹2,000	₹2,000	Flat fee for network testing

Labor cost total : 10.650

2. **Summary of Total Costs**

Category	Total Cost (₹)
Hardware Cost	₹9,85,000
Labor Cost	₹10,650
GST and taxes	₹50,000 (approx.)
Total Project Cost	**₹10,45,650**

Conclusion :

Setting up an home network using a, TP-Link 24-Port Gigabit Switches, WRT300N wireless router, and wired PCs/laptops ensures a reliable and scalable infrastructure. By carefully planning, configuring IP addressing, installing the hardware, and conducting through testing, you create a secure and efficient environment for both wired and wireless communications. Proper documentation and training ensure smooth management and maintenance of the network, allowing the office to operate with improved connectivity and resource sharing.