TITLE

"Hospital System Network Design"

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ABSTRACT

In response to the ever-evolving landscape of healthcare and technological advancements, Melbourne Health Services is embarking on a transformative journey to revamp its network infrastructure. This project entails the meticulous design and implementation of a resilient, in-house network solution, aimed at replacing the existing reliance on third-party services. The core objectives include enhancing cost-effectiveness while upholding the pillars of Confidentiality, Integrity, and Availability (CIA) in data management and communication

INTRODUCTION

Melbourne Health Services operates across two strategic locations – the central headquarters and a branch hospital, each equipped with diverse departments catering to the comprehensive healthcare ecosystem. The current reliance on third-party IT services has prompted a strategic shift towards internal control, where Melbourne Health Services aims to establish its network infrastructure. This encompasses the deployment of a Local Area Network (LAN), Wide Area Network (WAN), and a dedicated Server-Side site. The proposed network design follows a hierarchical model, ensuring redundancy and fortified security through individual network segments for each department

PROBLEM STATEMENT

The prevailing dependency on external IT services raises concerns related to both cost efficiency and information security. Melbourne Health Services recognizes the imperative to take command of its network infrastructure, ensuring that data confidentiality, integrity, and availability are not only maintained but elevated to industry-leading standards.

PROJECT GOAL

This project harbors the primary objective of crafting and implementing a cost-effective and impregnable network infrastructure for Melbourne Health Services. This involves the establishment of segregated network segments for each department, adhering to a hierarchical model, and implementing comprehensive security measures to fortify data and communication channels.

PROPOSED METHODLOGY

Hierarchical Network Design:

- Leverage a hierarchical model encompassing Core Routers, Multilayer Switches, and Access Switches for each department.
- Implement redundancy strategies to enhance overall network reliability.

VLANs and Subnetting:

- Allocate VLANs and subnets for each department based on the 192.168.100.0 base network.
- Apply VLAN configurations to switches to securely isolate and manage traffic.

Security Measures:

- Configure Access Control Lists (ACLs) to meticulously control user access to each site.
- Implement Virtual Private Network (VPN) solutions to establish secure communication channels between HQ and the Branch network.
- Enforce port-security measures to restrict unauthorized access to switch ports.

Routing Protocol (OSPF):

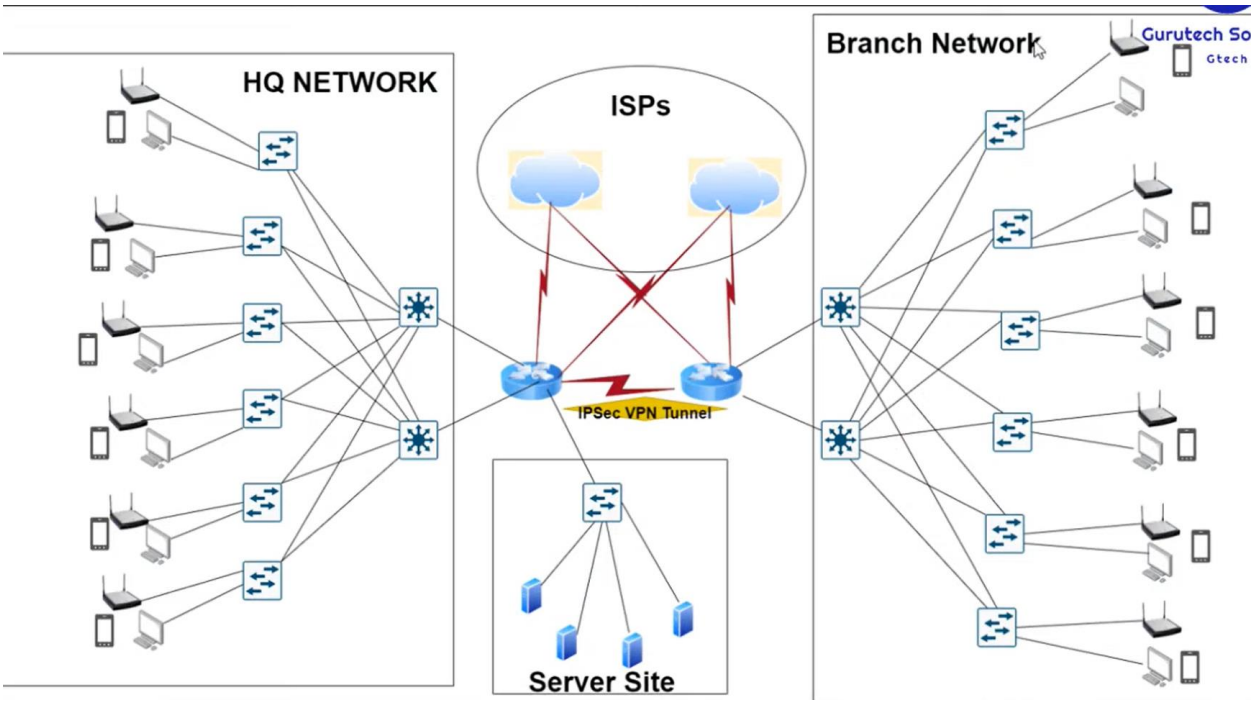
- Deploy OSPF for dynamic routing and the seamless advertisement of routes throughout the network.

DHCP Configuration:

- Establish DHCP servers for the dynamic allocation of IP addresses within the server room.
- Allocate static IP addresses to devices within the server room for enhanced stability.

Monitoring and Testing:

- Integrate advanced network monitoring tools to ensure both optimal performance and robust security.
- Conduct comprehensive testing procedures to validate the effectiveness of communication channels, DHCP services, OSPF routing, VPN connectivity, and security measures.



PROJECT MILESTONES

Network Design and Topology Implementation

- Develop a detailed network topology outlining the placement of routers, switches, and servers.
- Configure Core Routers, Multilayer Switches, and Access Switches.

VLANs and Subnetting Configuration

- Devise a comprehensive plan for VLAN allocation, ensuring scalability and efficiency.
- Implement VLAN configurations on respective switches.

Security Measures Implementation (ACLs, VPN, Port-Security)

- Configure Access Control Lists, defining stringent rules for user access.
- Implement VPN solutions for secure communication.
- Set up port-security measures to safeguard switch ports.

Routing Protocol Configuration (OSPF)

- Deploy OSPF across routers and multilayer switches to facilitate dynamic routing.
- Ensure seamless advertisement of routes within the network.

DHCP Server Setup and Testing

- Establish DHCP servers within the server room.
- Conduct extensive testing to validate the dynamic allocation of IP addresses.

Network Monitoring Tool Implementation

- Deploy advanced network monitoring tools for real-time performance tracking.
- Ensure proactive identification and resolution of potential issues.

EXPECTED OUTCOME

- **Enhanced Security:**
  Augmented data confidentiality, integrity, and availability through the implementation of robust security measures.
- **Cost-Efficiency:**
  Reduction in costs associated with third-party services by internalizing and managing the network infrastructure.
- **Operational Efficiency:**
  Streamlined communication between departments, dynamic IP allocation, and efficient routing through OSPF.
- **Reliability:**
  Increased network reliability and redundancy through the meticulous hierarchical design.

CONCLUSION

In summary, the proposed network redesign for Melbourne Health Services offers a strategic solution to enhance security, operational efficiency, and cost-effectiveness. The comprehensive approach, from hierarchical design to advanced security measures, ensures a robust and adaptable network infrastructure. Anticipated outcomes include improved data integrity, reduced operational costs, and increased reliability, positioning the organization for future growth. The project milestones and ongoing staff training underscore a commitment to long-term sustainability and technological resilience. Overall, the proposed changes signify a proactive step towards aligning Melbourne Health Services with industry-leading standards in healthcare IT infrastructure.