
The Hospital Network - A New Approach Towards Networking

Zeeshan Ahmed Siddique

Abstract

This research paper is related to a project using networking in hospitals and has looked at various recommendations and techniques to use private addressing schemes for the hospital network. We have performed fast switching between the LANs and have ensured the provision of a secure WLAN network. This will contribute towards health promotion which is a core dimension of quality in hospital services, along with patient safety and clinical effectiveness.

Introduction

Now more than ever, excellent patient care relies on staff having the tools to access the most up-to-date information to enhance the clinical decision-making process. When the nurses talk about charting, they are usually referring to the thorough, timely documentation of the patient's status based on their nursing assessments, and the interventions they perform based on their vital signs, lab data, and more. They also chart about medication administration, and their observations of the patient's response to the therapy. It is no secret that networking has become an essential part of our lives. Once the new reporting environment is integrated into the network, users will be able to build reports by selecting the criteria, measures, and output formats that are specific to the patient's needs.

Hospital / Health Network will be able to eliminate the data islands across the organization, simplify how information is distributed among users, and increase employee efficiency. Users will also be able to obtain information from the entire network, eliminating the need to manually locate, collate, and analyze the data. With these reporting tools in the hands of clinicians, the business will be able to ensure that information is standardized across the network.

Proposed Solution and Technical Feasibility

In this project plan, the primary recommendation is to use private addresses for the network. Using private addresses has been a best-practice policy for private internal networks since 1996. For private addresses; a traditional Class C network has been used in which the hospital could release eight of the Class C networks to the ISP, retaining two for ISP connectivity. With private addresses, the hospital can choose to use 172.16.0.0/16 for private addressing. The addressing scheme provides sufficient address space for each network and is recommend for using a highspeed Layer 3 switch for the building LANs. They can use the router for Internet and WAN access.

Recommended IP Scheme

The recommended IP scheme is shown in table 1. The Project will approximately take 2 months to complete and technical staff required for this task is 8 including 1 project manager and 1 team leader. While using routing protocol that supports variable length subnet mask (VLSM) like RIP version or Enhanced Interior Gateway Routing Protocol (EIGRP) it is recommended to use two access points on each floor for redundancy then use layer 3 switches to provide high-speed switching between LANs.

Table 1: Recommended IP Scheme				
Floor	Servers	Client		IP network
1	15	0		172.16.0.0/24
1	0	40		172.16.1.0/24
2	0	43		172.16.2.0/24
3	0	39		172.16.3.0/24
4	0	42		172.16.4.0/24
5	0	17		172.16.5.0/24
6	0	15		172.16.6.0/24
7	0	14		172.16.7.0/24
8	0	20		172.16.8.0/24
9	0	18		172.16.9.0/24
10	0	15		172.16.10.0/24
WLAN6, 7, 8,9,10	0	40		172.16.20.0/24

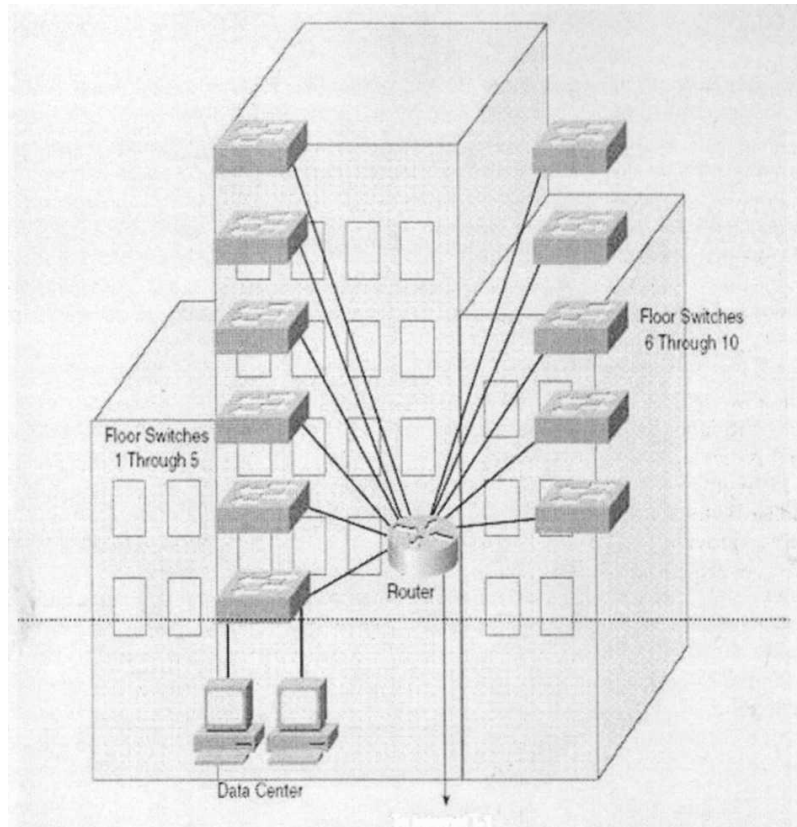


Fig. 1: Implementation of recommended IP Scheme. Installation Guidelines

Tracer 5.0 is a standalone, medium-fidelity, simulation-based networking technology learning environment, that provides users with the ability to design, configure, and troubleshoot computer networks at a CCNA-level of complexity. These guidelines provide detailed information about this release, including content, known issues, and support information. Release Content.

Packet Tracer is a simulator use to do configuration in routers and switches. Operating systems require to run packet tracer are Microsoft Windows 2000, Windows XP, Vista Home Basic, Vista Home Premium, Fedora 7, or Ubuntu 7.10 and Hardware requirement to run packet tracer are CPU: Intel Pentium 300 MHz or equivalent RAM: 96 MB Storage: 250 MB of free disk space Screen resolution: 800 x 600 or higher.

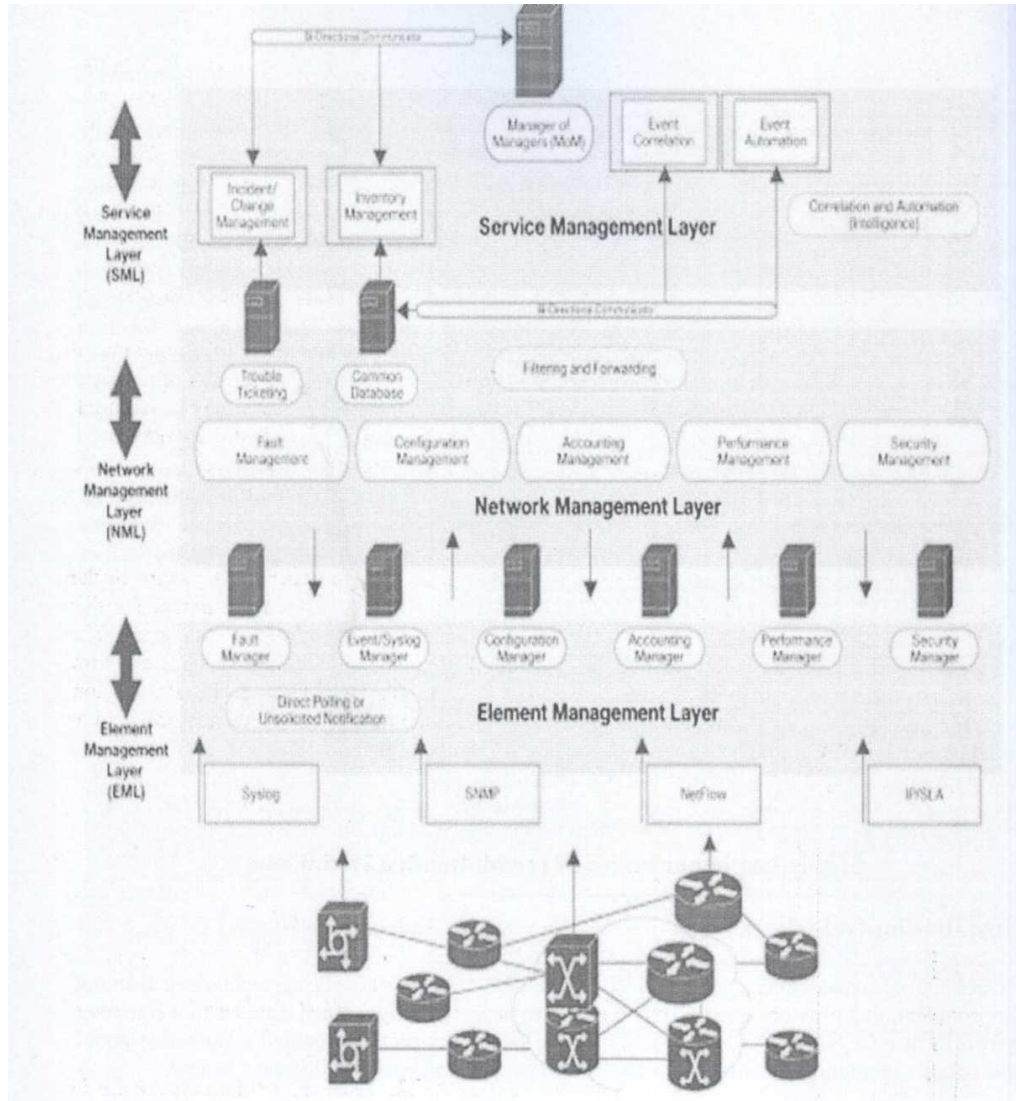


Fig. 2: Various layers of management for the implementation of IP Scheme

Conclusion

The research work in this project was completed in three steps. In the first step, the initial requirements and the type of environment were considered while analyzing the problems faced in the previous system due to its particular technology used. However, in the second step, the different types of reports were examined to ensure the results on the single click and for the required upcoming software, the proposed applications and their requirements were checked. This enabled us to check how the previous network was working to find out the main deficiencies into the previous network, so that they can be removed, to obtain a robust system.

In the third step, we proposed two solutions for the hospital network to solve their problems.

The first solution involved the time scheduling of the project, in which the task and the time were divided according to the month, week, days, hours by keeping in mind that the links of the team are to be made with other team in which time-to-time discussions with the party may be required. Furthermore, some sort of correction might be needed by keeping in mind that the work on the risk analysis on the network is in progress and what type of impacts will result after the implementation of the project so that proper steps can be taken to save the time and solve the problem appropriately.

In the second solution, we draw the diagrams which can help us to make the structure of the project intact. We used sequence diagram, data flow diagram, and data flow model for this purpose, generating the model and especially we designed the Pilot Network diagram. The critical part of the project is the bug testing which shows the full attention of designs and how it's working after the implementation. The screen shots were displayed through the presentation to handle the errors which can occur during the usage and the proper guideline was provided to the end user for the complete assistance in the future.

Reference(s)

- [1] Lammle T (2007), *CCNA: Cisco Certified Network Associate* London
- [2] Cisco Press (2007), *CCDA: Cisco Certified Design Associate study guide* Sanfrancisco, America
- [3] Benjamin Edelman (2006), *Pricing and Efficiency in the market for IP Addresses* Harvard Business School
- [4] Barath Raghavan (2009), *Enlisting ISPs to improve Online Privacy; IP Address mixing by default* University of Washington
- [5] Deering, S. and R. Hinden. (1996). *Internet Protocol, Version 6 (IPv6). Request for Comments 1883.* \
- [6] Francis, P. and K. Egevang. (1994). *The IP Network Address Translator (NAT). Request for Comments 1631.*
- [7] Fuller, V., T. Li, J. Yu, and K. Varad han. (1993). *Classless Inter-Domain Routing (CIDR): An Address Assignment and Aggregation Strategy. Request for Comments 1519.*
- [8] Huston, G. (1994). *Management of Internet Address Space. Request for Comments 1744.*
- [9] Kleinrock, L. and K. Farouk. (1977). *Hierarchical Routing for Large Networks.* Computer Networks 1.
- [10] Rekhter, Y. and T. Li. (1993). *An Architecture for IP Address Allocation with CIDR. Request for Comments 1518.*
- [11] Rekhter, Y and T. Li. (1996) *Implications of Various Address Allocation Policies for Internet Routing. Request for Comments 2008.*
- [12] Shenker, S., D. Clark, D. Estrin, and S. Herzog. (1996). *"Pricing in Computer Networks: Reshaping the Research Agenda,"* Telecommunications Policy 20(3).