MANUAL DESIGN OF HOSPITAL NETWORK

A COURSE PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this mini project report "**MANUAL DESIGN OF HOSPITAL NETWORK**" is the bonafide work of "**SIDDHANT MANDAL (RA2011027010079), PARAG MAHAJAN (RA2011027010088), SWAGAT S . KALITA (RA2011027010092)** and **AKELLA SRI RAM (RA2011027010093)"** who carried out the project work under my supervision.

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1. ABSTRACT

This project will primarily focus on the network proposal designed for a Hospital. A hospital management software is of utmost necessity in a hospital as the efficient flow of orders and instructions need to be taken to not only work efficiently but also save people's lives. In this network topology the nodes (i.e., computers, switches, routers or other devices) are connected to a local area network (LAN) and network via links (twisted pair copper wire cable or optical fiber cable). We have used Cisco Packet Tracer for designing the network topology. It is a general design which can be implemented at any higher level to manage network systems.

2. INTRODUCTION

File transfer protocol is a network used to copy a file. And even for transmitting files between computers using the internet. FTP is mostly used to transfer web page files from their creator to the system that acts as their server to everyone on the internet, can also be used for downloading programs or any from severs.File transfer protocol is a network used to copy a file. And even for transmitting files between computers using the internet. FTP is mostly used to transfer web page files from their creator to the system that which acts as their server to everyone on the internet, can also be used for downloading programs or any from servers.

Although transferring files from one system to another is very simple and straightforward, sometimes it can cause problems. For example, two systems may have different file conventions. Two systems may have different ways to represent text and data. Two systems may have different directory structures. FTP protocol overcomes these problems by establishing two connections between hosts. One connection is used for data transfer, and another connection is used for the control connection.

The **main objective** of this project is to design a network for a hospital with given constraints. With the given constraints, we have a Main block with 10 nodes and three Clinical wards with five nodes each connected to the main block. The main block also includes two additional floors with one node each. All these nodes are dynamically assigned IP addresses through a server in the main block using Dynamic Host Configuration Protocol (DHCP). We also set up a simple webpage on our website and gave it a generic name using a Domain Name Subsystem(DNS) Server.

3. LITERATURE SURVEY

Despite an extensive body of knowledge on network outcomes and on how hospital network structures may contribute to the creation of outcomes at different levels of analysis, less attention has been paid to understanding how and why hospital organizational networks evolve and change. The aim is to study the dynamics of networking behaviors of hospital organizations.

Recently, a number of studies have addressed the issues of the determinants of patient transfer between hospital organizations. In order to reduce staff uncertainty and coordinate their efforts, hospitals tend to streamline destination selection such that staff immediately contact a ‘‘usual’’transfer destination . Transfer destination selection, therefore, was primarily driven at an institutional level by organizational concerns and bed supply, rather than physician choice or patient preference. Remaining within the ambit of the organizational features, further studies have shown how patients are more likely to be transferred between hospitals differing in size, high-volume and larger hospitals are more attractive partners than small hospitals based on their greater availability of resources and infrastructures, resource complementarity especially in terms of technological assets and expertise matter in explaining the propensity of hospital to collaborate, and that patients often move from low-performance hospitals to high-performing hospitals. Among the institutional variables, it was highlighted how patients are more likely to be transferred between hospitals belonging to the same Local Health Authority (LHA) and having the same organizational forms (ownership-governance structure). Finally, the literature analyzed the impact of the geographical variable, highlighting how geographically proximate hospitals were somewhat more likely to share patients. Despite this abundance of studies, most of them have in common the limit of being studies with a cross sectional data setting or that have not been pushed to longitudinally analyze the evolution of patient transfer dynamics in a wide span of time. There are two researches that, however, are an exception to this limitation. The first, conducted by Lomi et al., observed patient sharing events between hospitals during four consecutive years finding that quality of care, measured as 45-day risk adjusted readmission rate, has an impact on the propensity of hospital organizations to exchange patients over time. The second, conducted by Stadtfeld et al., explains assimilation and differentiation mechanisms (among which the propensity to transfer patients) between network partners over time. However, currently, no studies have already provided a longitudinal investigation of the determinants of patient transfer evolution employing stochastic actor-based model for network dynamics, and modeling partner selection choice as a combination of multiple organizational attributes and endogenous network-based processes. The present study aims to fill this gap in the literature.

4. REQUIREMENTS

4.1 Requirement Analysis

There are total 4 modules in our project

1. Main Building (with 3 floors)
2. Ward A
3. Ward B
4. Ward C

4.2 Network Requirement

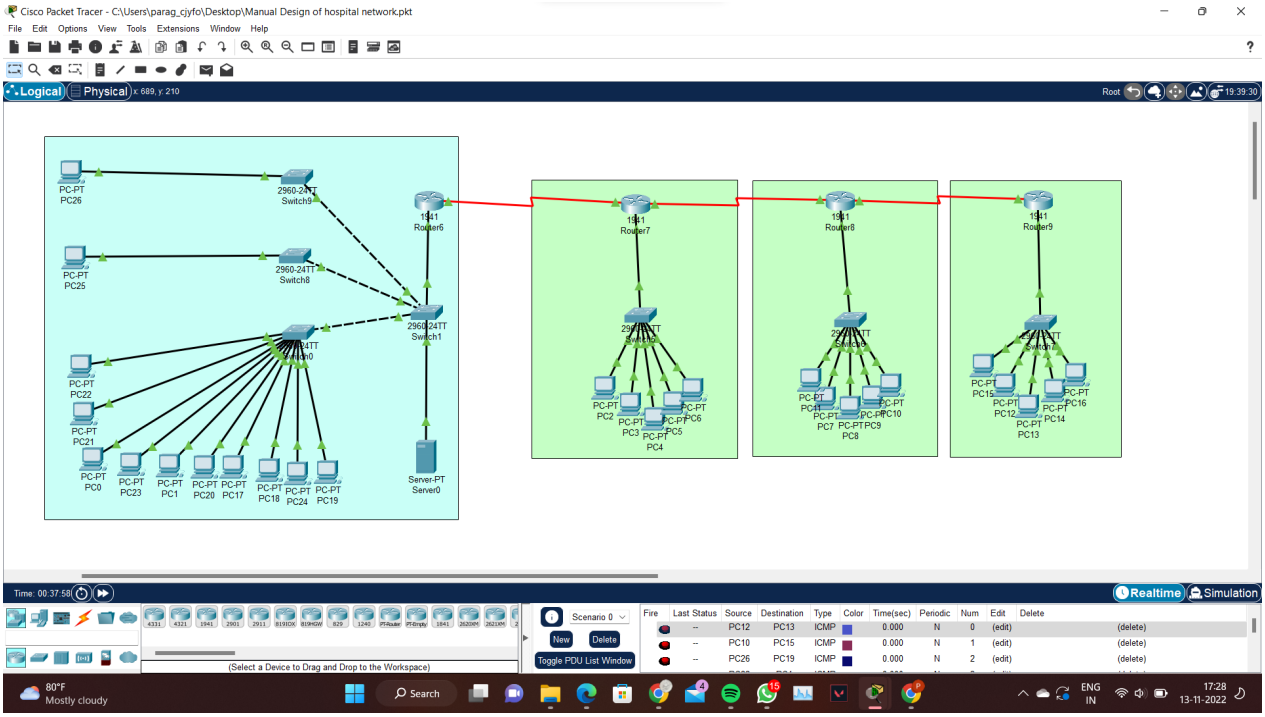
1. Hardware requirement analysis in the main block with quantity.
2. Hardware requirements analysis in wards.
3. The employees should receive dynamic IP addressing from a central server.
4. Network should be loop free at Layer 2.
5. Every computer should be able to access the hospital management software from each of the locations using a fixed IP address.
6. IP Network design table.
7. Identify configurations on the hardware wherever appropriate.
8. Network topology diagram with necessary equipment.
9. Websites and webpages using DNS Server

4.3 Hardware Requirement

Devices	Requirements
Routers	4
PCs	27
Switches	7
Serial DCE	3
Copper Straight Through Cables	32
Copper Cross-Over Cables	3
Server	1

5. ARCHITECTURE AND DESIGN

The network architecture is as follows:



The architecture consists of three major networks:

- 1. Main Building (with 3 floors)
- 2. Ward A
- 3. Ward B
- 4. Ward C

These networks are interconnected with each other with varying degrees (discussed in the implementation chapter).

6. IMPLEMENTATION

6.1 Address Table

The address table is as follows:

Building	IP Address	Subnet Mask
Main building	192.168.1.1	255.255.255.0
Ward A	192.168.2.1	255.255.255.0
Ward B	192.168.3.1	255.255.255.0
Ward C	192.168.4.1	255.255.255.0

Configuration Guidelines

In the main ward we have 10 Pcs on the ground floor and one

PC each on the first and second floors. These PCs are all connected to one router. This configuration is further connected in the bus topology to the three clinical wards. We chose to connect the routers in a bus-like topology so that we can easily implement more blocks with their own network configurations in the future. Each ward has an I router connecting 5 PCs to it.

These are all LAN configurations. IPs are dynamically allocated to every node through DHCP protocol from the server. DHCP automates and centrally manages these configurations rather than requiring network administrators to manually assign IP addresses to all network devices. The routers and nodes are also connected in a star topology within each building/block. Routing

is done in all the configurations through RIPv1 routing.

Finally, we use the DNS Server to set up a simple web page showing a hospital menu and some links to navigate within the website.

7. TESTING AND VERIFICATION

8. RESULTS

Hence we successfully configured the Manual Hospital Network .

9. FUTURE ENHANCEMENT

A network proposal has to be designed for a hospital which has the following.
There is a main block and three wards in the campus. The main block is the administrative block where registration of new patients takes place. The main block has 3 floors. The hospital has identified hospital management software, which should be accessible by the employees. The software is installed on a server at the administrative block. On the ground floor, there are 10 computers in the billing section. At other floors, there is one computer user each. The farthest distance between the computer on the top most floor and the ground floor is less than 70 meters. The wards have 3 floors each, with 5 computers in the ground floor of each ward. The distance between the wards and the blocks are less than 80 Meters. The computers in the wards may be increased based on future expansion plans.

10. REFERENCES

Cisco Packet Tracer Documentation:

[1]https://www.cisco.com/c/dam/en_us/training-events/netacad/course_catalog/docs/Cisco_PacketTracer_DS.pdf

[2]https://www.researchgate.net/publication/325032141_Exploring_the_networking_behaviors_of_hospital_organizations