

**MEDICAL DEVICE INVENTORY
MANAGEMENT FOR A MEDICAL
ESTABLISHMENT NETWORK OF SERVICE
PROVIDER**

RESEARCH PAPER

PREFACE

Medical Device Inventory Management for a Medical Establishment Network of Service Provider will be the topic of my choice as part of the final project for the Application Engineering & Development coursework. This document contains an initial research and background study of the most basic components that will be the part of the application system which this project is aimed at developing.

This document contains a basic study about the different organizations that participate in the entire work-flow. Each organization will have certain people who will actively use this application for doing their tasks. This document also contains some research about such individual users as how they perform their day-to-day tasks. Along with individuals, there are some object that an organization owns or it may also be a case that several organizations share some objects. A research about such objects and components, as how they are used by different individuals in various organization, has been done and noted in this document.

In addition to the research on several components associated with this system, the document also contains a basic business idea of how the system is going to be designed. This includes the different organizations, roles and users involved in the system and how they interact with each other in order to make an efficient information system.

INTRODUCTION

The Medical Device Inventory Management System is a standalone desktop application which will be used by large Healthcare Systems like the Partners Healthcare System to manage their inventory of large number of costly medical equipment. The basic purpose of this application is to provide an efficient solution for the hospitals, which are managed by the Partners Healthcare System, to share the costly medical equipment among each other, thus, eliminating the need to stock costly equipment which will not be used very often.

In addition to the inventory management feature, this system will also provide a platform for the various suppliers or the manufacturers of these medical instruments to manage their products and communicate with the healthcare system in order to fulfill their product orders.

Also, there is another feature that this system will provide. Medical clinicians working in the various hospitals associated with the healthcare system will be provided with a platform to manage their day-to-day activities such as scheduling a surgical operation or requesting to buy some new medical equipment. For scheduling a surgical operation, the clinicians will be required to reserve the required instruments, the operating room and a medical team in advance.

This introduction to the topic will be followed by some research about the healthcare system under discussion and its associated hospitals.

PARTNERS HEALTHCARE

Partners Healthcare System, Inc. is an integrated healthcare system that owns several hospitals in Massachusetts, mainly in the Boston area. Partners Healthcare is a not-for-profit organization which was founded by Brigham and Women's Hospital and Massachusetts General Hospital, which are two of the nation's leading medical centers. Along with the two founding academic medical centers, the healthcare system also includes primary care and specialty physicians, community hospitals, specialty facilities, community health centers and other health related entities.

Massachusetts General Hospital, one of the founders of the Partners Healthcare is the largest teaching hospital in Boston, Massachusetts. It is affiliated to the Harvard Medical School and is the third oldest general hospital in the United States. Partner's second founder, **Brigham and Women's Hospital** is also affiliated to the Harvard Medical School and is the second largest teaching hospital after Massachusetts General Hospital.

Along with these two founding hospitals, there are many community hospitals and medical centers which are associated with the Partners Healthcare System. One of such hospital is the **Newton-Wellesley Hospital**. Located in Newton, Massachusetts, the hospital offers a range of medical, surgical and specialty care, including maternity services, a 24-hour emergency department and orthopedic, critical care and oncology inpatient units.

In order to provide these medical, surgical and specialty care, the doctors of the hospital will require many basic as well as very sophisticated and costly **medical equipment**. Every hospital can manage the very basic instruments on their own, but purchasing and managing the more sophisticated instruments is proving to be a costly affair for the Partners Healthcare. The system has many hospitals associated with them, and purchasing these costly instruments separately for each hospitals is turning out to be a budget problem for the

organization. This is the reason why the healthcare system wants to have a **central warehouse** for such costly instruments which can then be shared by the entire association for hospitals whenever required.

Other hospitals associated with the Partners Healthcare System are North Shore Medical Center, McLean Hospital, Martha's Vineyard Community Hospital, Nantucket Hospital and many more. By sharing the costly devices among all these hospitals, a lot of money can be saved and used for other purpose rather than buying a large quantity of these medical devices for each of the hospitals and then not using them very frequently. But this idea will only work if it has an effective software system which will efficiently manage the centralized inventory. Doctors from the associated hospitals can schedule a surgical operation by reserving the medical devices which they will be requiring, well in advance.

Considering a surgical operation, medical devices are not the only things which are required by the doctors. Most importantly, they need an **operation room** and a **care team** to assist them in the procedure. The software system will allow the doctors to also reserve these operating rooms and the care team. The operating rooms and the care team will be specific to the hospital and not centralized as in case of the medical devices.

The warehouse being the centralized repository for the entire healthcare system, it is solely responsible to manage and maintain the various medical devices. It also has the responsibility of purchasing new devices that are needed, may be to replace the old instruments or to add stock. For this purpose, the software system will also provide access to a list of **suppliers or manufacturers** of the medical devices. The suppliers can directly list their products using the software system. The warehouse manager can browse through the list offered by various suppliers and can place orders for the required products.

This is the current scenario of the Partners Healthcare System, Inc. about how the software system will help them with their proposal of implementing a centralized repository. The next section contains the details or the business idea of the software system in more technical terms.

PROPOSED SYSTEM

The software system will integrate the functionalities for several types of users working under different organizations. These users will be having different types of roles even if they are working in the same organization. For this business problem, the system will comprise of four basic organizations. Each organization will have users which perform different kinds of work in that organization and hence will be assigned appropriate roles and granted access privileges accordingly. The different organizations are System Organization, Store Organization, Warehouse Organization and the Hospital Organization. Each of these organizations are explained in details further.

1) System Organization:

This organization can be said as the main administrative organization which is the owner of the software application. We can say that Partners Healthcare represents the System Organization. There will be just one role associated with this organization viz. **System Administrator**.

A system administrator has many responsibilities. He/she is responsible for registering a store in the system and also create and manage different users associated with that store. A store provides a software platform for the medical device manufacturers or suppliers to do business with Partners Healthcare.

A system administrator is also responsible for creating and managing users who will work in managing the inventory, which is kept as a different organization and not a part of the System Organization.

Along with Warehouse and Store users, the system administrator also has an additional responsibility of registering hospitals to the software system. As in with stores, system administrator creates and manages users associated with the Hospital Organization.

2) Store Organization:

This organization deals with the list of manufacturers who have registered on the system to sell their products directly through the system. Every store will have a store administrator who will be the main user for that store. He/she is responsible for creating new users which can be store administrators or product managers or sales managers.

A product manager manages the product catalog and processes order request sent by the inventory managers. The sales managers generate invoices for the orders and also manages the payments received for the orders.

3) Warehouse Organization:

This organization is the most important organization in this software system. All the other organizations communicate with this organization to perform their own tasks and responsibilities. This organization has a main warehouse administrator who creates and manages other users within the organization. Other roles in this organization is the device manager and the finance manager.

Device manager basically manages the inventory. His/her responsibility includes adding new devices to the inventory, removing some devices (generally the defective ones), temporary discontinuing devices and schedule maintenance for the devices. They also process new device request which are sent by the hospital administrators. The finance managers are responsible with creating orders and managing payments.

4) Hospital Organization:

This organization will contain all the hospitals associated with the Partners Healthcare System. Every hospital will have a main hospital administrator who will create other hospital administrators and register doctors. They will also manage medical staffs and operating rooms. Both medical staffs and operating rooms are required along with the medical devices, when a doctor is going to perform a clinical

operation. These administrators will also forward request for purchasing new devices to the warehouse managers. These requests are sent by the doctors to the administrators.

In addition to requesting for new devices, the doctors' main responsibility is to schedule a clinical operation. For scheduling an operation, the doctor is required to reserve an operating room where he/she will carry out the operation. Also, he/she will need to reserve the medical devices from the warehouse which he/she will need to carry out the operation procedure and the medical staff who will assist the doctor during the operation.

These are the different organizations which will constitute the entire system for the Partners Healthcare System, Inc. However, the above proposed system is just an overview of how the system will work. The detailed structure of the system will be covered in the next document, which will define the entire business model with the help of an object model and other UML diagrams.

REFERENCES

1. <http://www.partners.org/About/Company-Information/Default.aspx>
2. http://en.wikipedia.org/wiki/Partners_HealthCare
3. http://en.wikipedia.org/wiki/Massachusetts_General_Hospital
4. http://en.wikipedia.org/wiki/Brigham_and_Women%27s_Hospital
5. http://en.wikipedia.org/wiki/Newton-Wellesley_Hospital