

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

**PROPOSAL DOCUMENT**

- *Vineet L. Dandekar*

## **PREFACE**

*As mentioned in the Research Paper submitted before this document, Medical Device Inventory Management for a Medical Establishment Network of Service Provider is the project topic on which a software application will be developed. The earlier document contained the problem statement i.e. the issue in hand which has to be resolved using the software system. It also contained a background research about the organizations involved within the system and the fundamental users associated with the system. The document concluded with the basic idea of how the application system will be designed. However, it did not contain a detailed architectural structure, but gave an overview of the system and its related entities.*

*This document contains the basic architecture of the system, which includes a detailed object model that explains the flow of data around the system. This architecture design is based on several assumptions about various functionalities, information, background processes, etc. that are supposed to be involved in the working of the organization which is going to use the software application. The document lists down the assumptions made while designing the architecture of the system.*

# PROBLEM STATEMENT

Partners Healthcare System, Inc. is an integrated healthcare system that owns several hospitals in Massachusetts, mainly in the Boston area. These 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 of hospitals whenever required.

Also, doctors from the hospitals need a platform to schedule surgical operations by reserving the medical devices along with reserving the operating room and a team of medical staff who will assist him in the procedure. The system should provide this functionality as well.

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 should 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.

# SYSTEM DESIGN

The software system will integrate the functionalities for several types of users working at different organizational levels. These users will be assigned different roles depending on their position within the organization and the work the user is assigned and authorized to do.

According to the ecosystem model, the Partners Healthcare, Inc. will represent the ecosystem and every other entity will be inside it. The ecosystem will have several networks where each network represent a single county in the state of Massachusetts. Each of these networks will have an association or a consortium of hospitals, a warehouse from which these hospitals will share devices from, and a list of suppliers from whom the warehouse will buy new devices from. Each hospital, warehouse and supplier will represent an Enterprise in the ecosystem model. Within each of these enterprises, there will be different organizations which will handle specific tasks within the enterprise. For example, a hospital enterprise will have two organization viz. Doctor Organization and Resource Organization. Each of these organization will have a list of users associated with it, who will be assigned roles and granted privileges according to the type of the user. This system is entirely a role-based system which will provide different interfaces according to the type of user using it.

Based on the problem statement, and the research and analysis on the problem, following roles have been proposed:

- 1) System Administrator
- 2) Hospital Administrator
- 3) Doctor
- 4) Resource Manager
- 5) Warehouse Administrator
- 6) Inventory Manager
- 7) Account Manager
- 8) Supplier Administrator
- 9) Product Manager
- 10) Sales Manager

# ROLE-BASED FUNCTIONALITY

- **System Administrator –**
  - Initially configures the system by creating a system administrator account.
  - Creates and manages different networks.
  - Creates and manages different enterprises within each network.
  - Creates administrator accounts for each enterprise.
  - View overall reports.
  
- **Hospital Administrator –**
  - Manage different organizations within hospital.
  - Add and manage users within each organization.
  - View reports specific to the hospital.
  
- **Doctor –**
  - Requests resource manager to schedule a surgical operation
  - View its surgical schedule
  
- **Resource Manager –**
  - Adds and manages operating rooms
  - Adds and manages medical staff
  - Schedules surgical operations
  - Requests warehouse to buy new devices.
  
- **Warehouse Administrator –**
  - Manages different organizations within warehouse.

- Add and manage users within each organization.
- View reports specific to the warehouse.
  
- **Inventory Manager –**
  - Manages products in the inventory.
  - Schedules maintenance for the inventory items
  
- **Account Manager –**
  - Processes order request received from hospitals.
  - Processes payment requests received from suppliers.
  
- **Supplier Administrator –**
  - Manages different organizations within warehouse.
  - Add and manage users within each organization.
  - View reports specific to the supplier.
  
- **Product Manager –**
  - Adds and manages products.
  - Processes order request from the warehouse.
  
- **Sales Manager –**
  - Request for payments from the warehouse
  - Processes the payments received from warehouse.

## DETAILED OBJECT MODEL

