

# Real-Time Monitoring Of Real Life Management Systems

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**SECTION: C**

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## Table of Contents

<b>Revision #</b>	<b>1</b>
<b>PROBLEM STATEMENT</b>	<b>4</b>
<b>Executive Summary</b>	<b>4</b>
<b>Current Systems and Processes</b>	<b>4</b>
3.1 Current Operations	4
3.2 Physical Environment	4
3.3 User Organization	5
<b>System Objectives</b>	<b>5</b>
4.1 Description of Products and Services	5
4.2 High level Block diagram showing the solution	6
4.3 Targeted Customers and Benefits	6
4.4 Technology Considerations	7
<b>Product/Service Marketplace</b>	<b>7</b>
<b>Marketing Strategy</b>	<b>8</b>
<b>Organization and Staffing</b>	<b>8</b>
<b>Schedule</b>	<b>8</b>
<b>Financial Projections</b>	<b>9</b>
<b>Issues</b>	<b>9</b>
<b>Assumptions and Constraints</b>	<b>9</b>
<b>Alternatives</b>	<b>9</b>
12.1 Alternative: Same Existing System	9
<b>Findings and Recommendations</b>	<b>10</b>
13.1 Project objectives	10

## **1. PROBLEM STATEMENT**

To develop a real-time monitoring system for hotel management system present in day to day life. Consider an automated hotel management system which takes care of tasks such as billing, table reservation, home delivery & kitchen management. This automated system also requires someone to monitor its functioning. Hence, our objective is to provide the user with updates from the system and allow the user to make certain changes in the system if required, giving the user easy monitoring and control over the system.

## **2. EXECUTIVE SUMMARY**

The real-time monitoring system has a high importance in the field of hotel management (which can be extended to other management systems). With real time updates to the manager who need not be at the hotel's location, can help him monitor its working at any time of the day. The manager has access to all the data generated and also concise reports on them. These reports help him to do his job better. The system contains three main subsystems, the management end (hotel staff), the cloud computing system (analytics end) and the monitoring end (Real time updates/Reports). The current management / monitoring system at the Nisarga Hotel is mostly manual accounting and checking. The technical backbone provide by us will ease the job of the Nisarga hotel manager and make it efficient.

## **3. CURRENT SYSTEMS AND PROCESSES**

### **3.1 Current Operations**

Currently all operations are done manually.

Here is an outline of the current day to day operations:

- A staff member sitting at the billing counter takes the orders on a regular billing machine which generates the bills and maintains a physical and soft copy of each bill for records and stores the total number of orders per day.
- Table reservations are done over the phone by maintaining book records.
- Electronic records of inventory are kept but inventory management is done manually and there is no system for real time tracking.
- There is no system to keep track of bills generated at multiple outlets at the same time

### **3.2 Physical Environment**

The current physical environment (hardware and software) being used for the existing system is a regular computer that allows the user to punch in every order and generate bills respectively.

The manager then checks the daily records manually to see if the accounts are properly handled. He then cross verifies with the number orders placed on that day. In case of inventory management, he checks with the kitchen staff regarding how much of the resources is left and how much must be purchased for the week.

### 3.3 User Organization

Nisarga is a chain of hotels located in Bangalore. It has 2 outlets located in bustling parts of the city namely Vijay Nagar and Basaveshwara Nagar. The cuisine is mainly Andhra but North Indian and Chinese are also served.

#### Clients of the System:

1. **Hotel/ Restaurant staff**
  - a. **Billing & Accounting Staff:** Who manages the accounts and generates bills.
  - b. **Inventory Management Staff:** Who manages the refill of the inventory on a periodic basis.
  - c. **Waiter:** The person who takes in order and generates Kitchen Order Ticket (KOT).
2. **Monitoring staff (End user)** - Viewing the real-time logs and reports.

#### Our Employees at the scene:

1. **Set-Up Official** - The person in charge of setting up the management network at the client's site. He/She creates the local database and then approves the connection to the cloud system.
2. **Customer Support** - The support staff who address the problems faced by our clients. If major problem is detected, the staff reports to the development group.

## 4. SYSTEM OBJECTIVES

The main objectives are as follows:

- View all restaurant bill-wise reports in real time.
- Inventory Management module to keep tight control on stock and prevent wastage and theft.
- Live-data notified on mobile application to eliminate sabotage and data tampering.
- Web application for logs and reports on the functioning of the system.
- Table reservation by hotel's customers.
- Track the turnover time of each table.
- View and analyze the sales report of each restaurant outlet in detail.
- Transferring of data to a centralised cloud system in a set interval of time.

### 4.1 Description of Products and Services

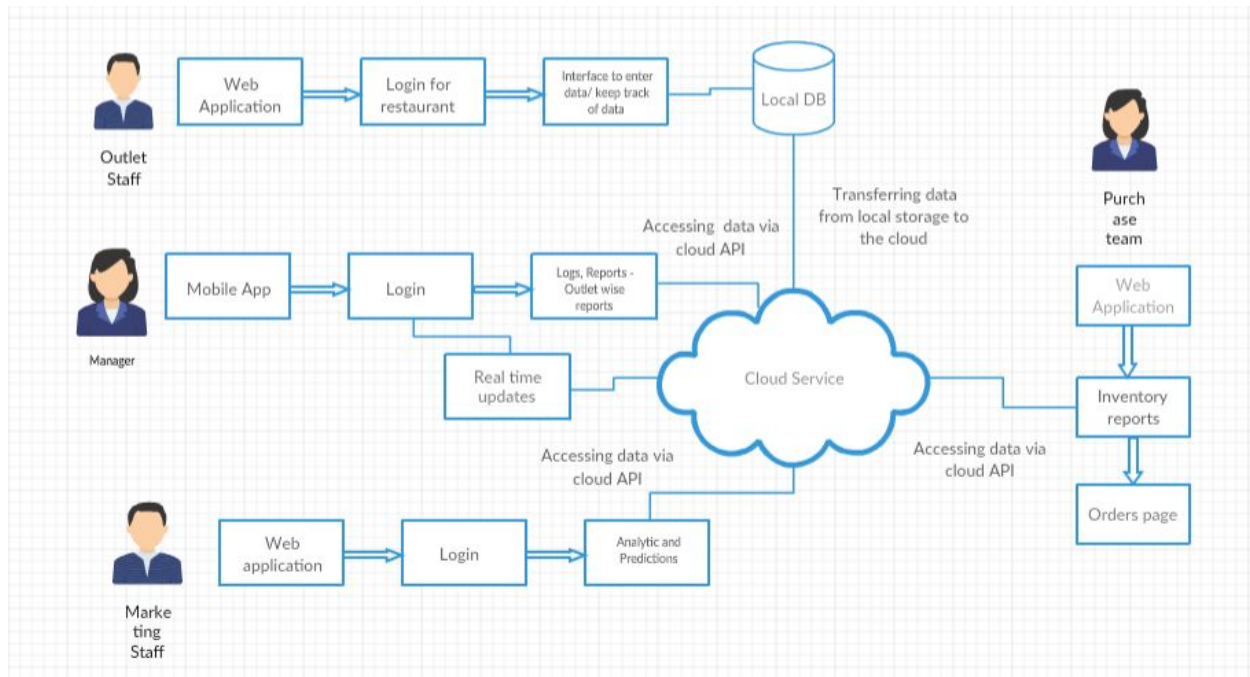
Nisarga is planning to upgrade to a real-time monitoring system. Until now most of the monitoring of bills and inventory has been manual. But because of the huge popularity and hence heavy rush in customers, it is difficult to keep track of orders, tables and inventory and maintain a tight vigil on staff to prevent the misuse of bills and theft.

By maintaining a monitoring system, we can view the restaurant's reports on both mobile and web platform and reduce dependency on non-managerial staff for sales reports. Instant, live-data is made available which eliminates the possibility of rigged data and helps control internal thefts.

We aren't implementing a recipe management system which would automatically deduct the amount of stock consumed based on the recipe of each dish. Also, we aren't supporting

an offline reporting feature that lets the software work smoothly even in the case of an internet outage.

## 4.2 High level Block diagram showing the solution



## 4.3 Targeted Customers and Benefits

Our system would provide easy monitoring of restaurant information on a single platform - need it be orders, billings, inventory. Along with this, it would provide logs and logistic information.

The system will hence provide a better control over the management system with real time monitoring. There exist many management systems that are automated. But if the system fails, finding out the fault will be a cumbersome task. With all the data logged and real time monitoring it would be easier to know the status of the management system and diagnose it when not working properly.

Our product would bring about a lot of changes to **small hotel owners** with its easy to use nature and also provide them an efficient method to monitor their working.

Other customers that the system would benefit:

1. Outlet Staff:
  - Provides a user-friendly environment
  - Quicker and easier billing.
2. Marketing team for the restaurant:

- Analytics of the data helps make predictions to decide what customers are more likely to buy
3. Purchase/Inventory management team:
- Easier inventory management
  - Vendor management is more convenient

#### 4.4 Technology Considerations

The system requires around the clock internet connectivity in order to send real time updates and information. Hence a fast and reliable internet connection is a must. As we are dealing with huge amount of data, efficient **local data storage (MySQL Database or MongoDB)** must be present at the user end and a mechanism to keep deleting data on a periodic basis.

Now that the data gets gathered from the management system software, it must be stored on to the **cloud**. There should be a mechanism present in the management system software that periodically pushes data onto the cloud. This requires easy API calls to perform the mentioned action. As new data get pushed onto the cloud, it must be stored efficiently in order to access it or perform analytics on it.

All the real-time updates and information from the system will be sent to a mobile application. The mobile application should represent the information in an understandable manner and should be easy to use. **Android/iOS application** programming must be learnt.

A **progressive web application** which provides all the information regarding the data accumulated. It should have reports showing the statistics on the working of the system and show all the information logged. The development will require knowledge on front end frameworks such as **React.js** and also backend frameworks like **laravel**.

### 5. PRODUCT/SERVICE MARKETPLACE

*\*let's start by assuming that the real-time monitoring system (product) will be called **ManageX***

The market for real-time monitoring systems for management has vast potential for growth and is **relatively untapped**. The product would be an ideal solution to problems faced not only in Hotel Management but also Hospital Management and Inventory Management. Naturally, the above mentioned would be ManageX's target market.

Survival should be fairly easy for ManageX as most businesses today still employ traditional systems to go about daily activities. With an early bird gets the worm approach, the product should be able to secure a strong foothold in the market. However, **constant research and product development** will be the go to approach for ManageX for it to outdo any potential future competitors.

ManageX will be primarily distributed by well-endowed salesmen directly to businesses. This would involve the latter starting direct communication with business owners where a strong presentation will convince them of the vast benefits our product will offer to their organisation. Moreover, **business expo's** will provide an optimal platform for our product to be presented. The cost of developing highly skilled salesmen and finding room in major

expos can be burdening in terms of cost. However, our secure foothold in the market and **USP (Unique Selling Proposition)** in the market should help us recover the same.

Since reports are generated real time and everything can be accessed on mobile as well, the dependency on staff is reduced and a tighter vigil can be kept while eliminating the possibility of data tampering and internal theft. Reports can be analyzed with a quicker understanding and can help make data driven decisions for the business with ease.

## 6. MARKETING STRATEGY

As we've examined previously, competition doesn't seem to be a very strong concern for ManageX. This, however, is offset by the fact that people have little to no awareness about our product. Without a doubt, our approach will be based on tackling the very same problem.

The primary marketing strategy would include targeting **sole traders and small to medium sized business owners**. This will be done by collecting data bases for the above mentioned and then sending in information through **mailers, SMS, and/or business based social media**. Building relationships with entrepreneurial workshop providers can be a great way for us to showcase our product and make the masses aware of what it is that it does. Furthermore, our marketing and sales staff can be strongly trained on providing effective and promising presentations to convince potential clients.

Overall, it goes without saying that ManageX has a ton of potential for success. A comprehensive implementation strategy that includes all the above should be slow but steady pathway to being a profitable business.

## 7. ORGANIZATION AND STAFFING

The real-time monitoring system is not anticipated to significantly affect the organizational structure of the company. There are, however, several staffing additions required to successfully implement the system.

**Restaurant Billing Concierge** - Responsible for data entry to the local system as a when a new order comes in.

**Inventory management staff** - To keep track of how many orders to place and do the needful.

## 8. SCHEDULE

The project is expected to take 2 months to complete. The following is a high-level schedule of some significant milestones for this initiative:

<b>Sep 1, 2017</b>	:	Initiate Project and basic design ideas
<b>Sep 10, 2017</b>	:	Get required data. Finish setup of cloud service and database.
<b>Sep 25, 2017</b>	:	Decide on design ideas for the front end
<b>Oct 10, 2017</b>	:	Work on front end interface for the user
<b>Oct 20, 2017</b>	:	Complete basics of front end interface
<b>Oct 30, 2017</b>	:	Connection of front end to database and cloud
<b>Nov 10, 2017</b>	:	Analytics on the real-time data coming in

**Nov 20, 2017** : Complete project for demonstration

Upon approval of this project a detailed schedule will be created by the assigned project team to include all tasks and deliverables.

## 9. FINANCIAL PROJECTIONS

- **Revenue** – We would operate as a **Software as a Service** to our clients and they would have to pay an **ongoing subscription fee** that includes our ongoing expense costs.
- **Expenses** – Our expenses would be **ongoing** including the **Cloud server costs**, our **Employee costs** and our **R&D** and **Marketing costs**.

**Note:** For the purpose of this demo, we will be using cloud services with student ids, and will be working for free, so there should be no ongoing costs at this time. So financial projections at this time will **not be relevant**.

## 10. ISSUES

**Issues that may affect the development and operation of the system are:**

- The whole system consists of multiple subsystems, failure of one subsystem might cause the whole system to fail.
- Database could crash or get corrupted or be compromised.
  - Unauthorized users getting access.
  - If the software doesn't have proper security features then it is possible for external attackers to steal archives including database backups, or perform SQL injection and mess with the database.
- System should be able to process a heavy workload of multiple bills getting generated at the same time and updated with consistency.
- Large storage space volume required.
- The software will not run in case of an Internet outage.

## 11. ASSUMPTIONS AND CONSTRAINTS

**This section presents the assumptions or constraints that will affect the proposed system, such as:**

1. The first assumption made is that restaurants have made all their information computerized.
2. We require an active internet connection to send new data to the cloud.
3. Availability of resources and information for different implementations to make the system more generic.
4. The end user must be having an android device with him.



## 12.ALTERNATIVES

### 12.1 Alternative: Same Existing System

One alternative is the continuation of the existing system, which is manually maintaining physical records of every transaction. This method is simple in nature and does not carry any extra cost other than the labor of the billing and the management staff.

The proposed system incurs the cost of buying and maintaining a local server machine, maintaining and updating the software, the database, etc. The current system does not possess the risk of corruption of database as they are handled manually, nor security risks as no networking is involved.

But the proposed system does have its benefits in the long run. Though the initial setup costs for the new system is high, it will prove its mettle in the long run. It makes the task of maintenance easier. Because the current system cannot easily collaborate with the different departments within the organization, the proposed system which provides real time monitoring bridges the communication gap and hence resolve any losses that may have occurred.

As in the current system, it is possible to lose the physical records, the proposed system helps maintain the integrity of the transactions. The current system also helps identify any fraudulency that might take place as it keeps record of every activity. So, the proposed system eliminates the need for too much manual labor that the current system requires.

## 13.FINDINGS AND RECOMMENDATIONS

The findings of this feasibility study show that this initiative will be highly beneficial to **Hotel Owners** to manage and monitor their hotels effectively and efficiently.

### 13.1 Project objectives

- We have been able to establish the importance of the product to the customer and its rightful place in the market. But there are certain issues regarding the development and implementation of the product. Development of the product requires a sound knowledge on progressive web app development and also android application development. Finding a cloud storage system with utmost security and which is cost effective. The product when implemented requires access to the internet at all times with local storage system.
- The system mainly consists of three parts:
  - **The Management End:**  
Here the data is being accumulated and transferred within and outside the system. It consists of the local database (**MySQL or MongoDB**) where the data first gets stored before being pushed onto the cloud.
  - **The Cloud Storage:**  
The centralised system where all the data across the chains of hotels gets stored (**Amazon AWS or Azure**). Here analytics on the data is performed to generate reports. The new updates are sent to the android application.

- **The Monitoring End:**  
Two applications would be provided to our clients to monitor their hotels. An **android app** that provides the client with real time updates and a **progressive web app** that shows the reports on the data gathered and all the logged data.
- With the facilities provided by the product, its popularity will surely rise. With less competitors in its market place it has a very high chance of being a great success and generating high revenues.

## **PROJECT PLAN**

**(Typically, not part of feasibility Study but being done as a supplement for the class project)**

### **1. Deliverables of the Project**

- a. A web application that is used as a management system
- b. An Android application which provides with live updates
- c. A progressive web app that shows reports from the analytics performed and logged data
- d. A cloud computing system that stores information data and performs analytics on it

### **2. Process Model which you intend to follow**

- a. Scrum Model

### **3. Identification of the upstream-downstream partners needed for the product**

- a. Upstream Partners
  - i. The cloud computing system design team
  - ii. Analytics Team
- b. Downstream Partners
  - i. Web development team
  - ii. Android app development team

### **4. Resources needed for the project/product**

- a. Logged data from a hotel (Hotel Nisarga)

### **5. How are you organizing your team in the project?**

- a. Management Web App Team
- b. Cloud Engineering Team
- c. Android App Development Team
- d. Report Generating Progressive Web App Dev Team

**6. Standards-Guidelines-Procedures**

**7. Communication Mechanism**

- a. Slack
- b. Google Groups
- c. WhatsApp

**8. Risks**

**9. Quality Criteria**

- a. Time taken for a real-time update at the monitoring app < 2 seconds

**10. Work Packages**

**11. Budget and Schedule**

**High level schedule is already present in Feasibility Study.**

**Detailed work breakdown with individual ownership**

**12. Delivery means**