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Cloud Based ERP Tool For Hospitals

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Abstract – "*The purpose of the project entitled as "Cloud-Based ERP Tool for Hospitals" is to computerize the Front Office Management of Hospital to develop software, which is user friendly simple, fast, and cost – effective. It deals with the collection of patient's information, diagnosis details, management for hospital staff, etc. Traditionally, it was done manually. The major purpose of this tool is to register and save patient and doctor information"* ***[1],*** *management of day-to-day activities of the hospitals and to manipulate these details meaningfully. The patient information and diagnosis information are entered into the system and the information is shown on the screen via the system output. System input contains patient details, diagnosis data which is shown on the display by the system output. "This ERP Tool is custom built to meet the specific requirement of the mid and large size hospitals across the globe. All the required mods and features have been particularly built to just fit in to your requirement. This package has been widely accepted by the clients in India and overseas"* ***[9].*** *Not stopping only to this but they are highly satisfied and appreciating.*

Key Words**: 1) Employee Details 2) Data Extraction 3) Microsoft 4) Networking 5) Hospital**

1. INTRODUCTION:

"The health care industry is one of the largest industries in the world, and it has a direct effect on the quality of life of people in each country. Health care (or healthcare) is the diagnosis, treatment, and prevention of disease, illness, injury, and other physical and mental impairments in humans. Health care is delivered by practitioners in medicine, chiropractic, dentistry, nursing, pharmacy, allied health, and other care providers. The health care industry, or medical industry, is a sector that provides goods and services to treat patients with curative" **[2]**, preventive, rehabilitative or palliative care**.** During this pandemic, this industry faced lots of challenges such as, bed management, patient management, billing and accounting, medical equipment breakdown/malfunction. In this system we overcome all the issues faced during the pandemic and provided centralized solution which can be used among multiple places. We have used cloud-based technology which will help both patient and hospital industry to maintain the data securely from anywhere. In the fields of clinical process analysis and activity-based pricing, this cloud-based ERP technology is aimed to improve the quality and administration of hospitals. "This tool enables you to develop your organization and improve its effectiveness and quality of work. Managing the key processes efficiently is critical to the success of the hospital helps you manage your processes" **[3].**

1.1 PROBLEM DEFINITION

We chose to work on this project since hospital is related with the lives of ordinary people and their daily activities. The manual handling of the record takes a long time and is prone to mistakes. The purpose of this project is to automate or make online, "the process of day-to-day activities like Room activities, Admission of New Patient, Discharge of Patient, assign a doctor and nurse" **[5]**, and finally compute the bill etc. We've done our best to make the hard task of healthcare administrative and financial as easy as possible by employing an organized and designed primarily as well as a menu-oriented layout. We attempted to develop the program in such a way that users would have no problem being used and that any extension would be simple. Despite the fact that we cannot claim that this work is exhaustive, the major aim of the project is to computerized rather than individually conduct every Hospital's action. We are optimistic that non-programmers will be able to operate this software suite without difficulty, reducing the mortal mistake chances.

1.2 PROJECT OBJECTIVE

We have designed the given proposed system in the Dot Net core and React Js to automate the process of day-to-day hospital operations such as ward actions, general practitioner registration, release, assigning a surgeon, and eventually computing the payment, etc., and to provide online services to numerous users, etc.

"Cloud Based ERP Tools for Health Sector" refers to the entire collection of systems and regulations associated to a hospital's day-to-day operations and report generation. Our application gives a perspective of computerized healthcare activities at a greater extent. "During past several decades, the hospital management system is supposed to maintain manual handling of all the hospital daily activities. The manual handling of the record is time consuming and highly prone to error. To improve the performance of the

hospital management system, the computerized hospital management system is to be undertaken. The computerized hospital project is fully computerized and user friendly even that any of the hospital's members can see the patient's report and the doctor's report. The basic need of the project is efficiency. The project should be efficient so that whenever a new patient is admitted, and automatically a bed is assigned and also a doctor is assigned to the patient according to the patient's disease. And if any patient is getting discharged, the bed assigned to him/her should automatically free in the computer" **[5]**. "The complete control of the project is under the hands of authorized person who has the password to access this project and illegal access is not supposed to deal with. All the control is under the administrator and the other members have the rights to just see the records not to change any transaction or entry. Security is the main criteria for the proposed system. Since illegal access may corrupt the database and it will affect not only the hospital but also it also affects the patient's life. So, security must be given in this project" **[5].**

2. LITERATURE SURVEY:

Due to digital INDIA, we have to connect every-field with the digital India, we have to provide an online platform in field of finding a trainer. It will provide the searching facilities based on various factors such as trainers. Different trainers who provide such facilities can also be the part of web portal. Through react native, this would deliver a good online experience. Making a web-based solution user-friendly across multiple platforms and screen sizes is far simpler and less costly.

2.1 HOSPITAL INFORMATION SYSTEMS

A Hospital Management Information System (HMIS) is a complete, integrated data software that handles all areas of a hospital's organizational, economic, and medical operations. Quality control efforts are aided by such systems in a variety of ways. They analyze basic quality care, monitor quality indicators, and assist health-care assessment studies, for instance. There are three different types of healthcare data: i) Consumer informatics, ii) bioinformatics and iii) medical and clinical informatics

2.2 BENEFITS OF HOSPITAL MANAGEMENT INFORMATION SYSTEMS

Hospital Information Systems improve workflow and bridge the gap in the availability of patient care between urban and rural communities by increasing patients' access to health care. "Electronic health technologies enable effective networking by physicians, allows the online review of patients' treatment, and support accurate drug prescriptions. These systems support the capability for multi-site review of patients' records and improved physicians' collaboration in inpatient care. They also enable decreased transmit time of test results by reducing the time taken to deliver paper versions. Similarly, clinical information systems capture clinical data to enhance prompt and efficient decision making" **[4].**

2.3 AIM OF PROJECT

The advantages of using a cloud-based ERP tool for a hospital system include simplified processes, greater management and governance, enhanced patient safety, rigorous cost management, and increased desirability. HMS is a strong, adaptable, and user-friendly system that has been built and built to provide real-world advantages to hospitals and HOSPITALS. This program is intended for multispecialty hospitals and addresses a vast range of administrative and management tasks. It is a properly connected edge hospital management that seamlessly flows essential data across the hospital to assist successful decision making for patient care, healthcare administrators, and important financial accountancy. This tool is custom built to meet the specific requirement of the "mid and large size hospitals across the globe. All of the necessary modules and features have been particularly built to just fit in to your requirement" **[9].** The software programme is web-based and was created using cutting-edge technology and web service design. The user's solid dataset makes it more user-friendly and extensible. "It covers all the required modules right from Patient Registration, Medicine details, Doctor, Wards, Admin, Store, Patient appointment, bill payment, record modification, discharge details, etc." **[11]**

3. SCOPE OF PROJECT

"The proposed software product is the Hospital Management System (HMS). The system will be used in any Multi speciality Hospital, Clinic, Dispensary or Pathology labs in any Hospital, Clinic, Dispensary or Pathology labs to get the information from the patients and then storing that data for future usage. The current system in use is a paper-based system. It is too slow and cannot provide updated lists of patients within a reasonable timeframe. The intentions of the system are to reduce over-time pay and increase the number of patients that can be treated accurately. Requirements statements in this document are both functional and non-functional" **[6].**

4. PROBLEM STATEMENT

"Analysis is concerned with understanding and modeling the application and domain within which it operates. The initial input to the analysis phase is problem statement, which describes the problem to be solved, and provides a conceptual view of the proposed system" **[7].** Subsequent dialog with the customer and real-world background knowledge are additional inputs to analysis. The output from analysis is a formal model that captures the three essential aspects of the system: the assets and their interactions, the dynamical intake of authority, and the constraint-based functional transformation of information.

The necessary research bridges the gap between system engineering and software analysis architecture. System requirements study include gathering, classifying, organizing, prioritizing, and validating requirements. Requirement analysis consists of user specifications, the goal of research is to comprehend and evaluate the application and area in which it functions. The initial input to the analysis phase is problem statement, it outlines the problem to be solved and gives a conceptual representation of the suggested system.

SOFTWARE PROCESS MODEL

Each piece of software generated is unique and necessitates a unique SDLC strategy depending on internally and externally considerations. We chose the Waterfall Model as our development system design because

- it works effectively for tasks with well-defined constraints
- it has sequential nature.

"A waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases Waterfall model is the earliest SDLC approach that was used for software development. The waterfall Model illustrates the software development process in a linear sequential flow" **[8].** As a result, it is also known as a linear-sequential life cycle model.

The sequential phases in Waterfall model are:

Feasibility Study: Feasibility study is performed by, considering the factors such as development cost, operating cost, response time, development time, accuracy and reliability.

- **Requirement Analysis:** This stage captures all feasible needs for the system to be created and documents them in a need project identification.
- **System Design:** The needs requirement specifications from the initial stages are analyzed in this stage, and a suggested system is constructed. System design aids in designing architectural framework as well as describing hardware and system requirements.
- **Implementation:** The system is first constructed as tiny programs called units, which are then combined in the following step, using insights from design process. Unit testing refers to the process of developing and testing each unit for its functioning.
- **Integration and Testing:** After every module has been tested, every one of the units built during the implementation phase are merged into the systems. The entire system is then checked for any flaws or errors after it has been integrated.
- **Deployment of system:** "The system is deployed in the client side or launched into the public once the functional and non-functional testing is completed" **[8]**.
- **Maintenance:** There seem to be various issues that emerge on the client side. Updates have been provided to address these problems. Additionally, improved versions of the software have been launched in order to improve the software. Maintenance is carried out in order to bring about these modifications in the user's environment.

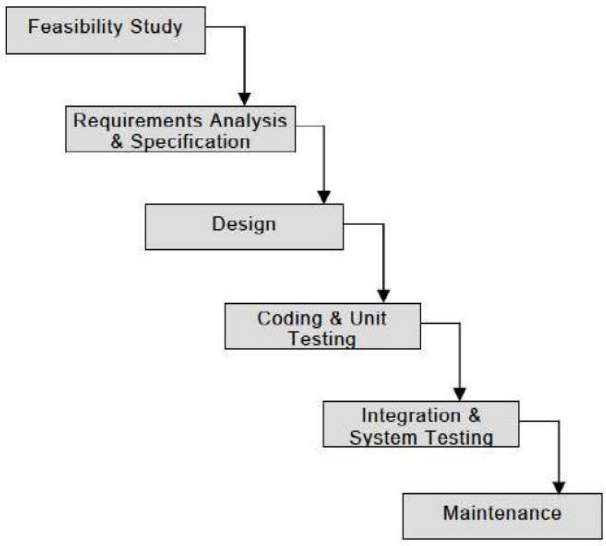

Figure 1. Classical Waterfall Model

5. METHODOLOGY

The project 'Cloud Based ERP Tool for Hospital and Healthcare Industry is based on the database, object oriented and networking techniques. As there are many areas where we keep the records in database for which we are using Microsoft SQL Server software which is one of the greatest and most user-friendly tools for storing our data. The whole front-end framework for this application is React Js, an accessible front-end framework built on JavaScript. For backend we will develop Restful API in Dot Net Core. The Project will follow the microservice architect and will be deployed to Cloud Services. This tool is also using Software as a service "(SaaS) is a software distribution paradigm in which a cloud provider hosts and makes programs available to target consumers through the network. An independent software vendor (ISV) may hire a third-party cloud provider to host the application in this manner. Or, in the case of larger corporations like Microsoft, the cloud provider could also be the software supplier" **[10].**

6. ARCHITECTURE

Consists of below Component

1. Client App: Web App + Mobile App
2. Api Gateway
3. Micro-services
4. Rabbit MQ
5. Database

API Gateway: API Gateway is API management tool. Through the API gateways, the client app communicates with the API. It provides single entry point for client app and calls appropriate api service required to fulfill them and return appropriate result to end user

Rabbit MQ: Rabbit MQ is a message-queuing application that is also described as a message broker. Message brokers operate as a go-between for multiple providers. Rabbit MQ allows server to respond to request. For ex. When Account and Billing service add the pharmacy bill to invoice, message is sent to patient management service and Patient management service sends notification/test message to end user.

Docker: Docker is service platform which provides OS based virtualization to deliver the software in the form of package. Through Docker, we may deploy web services in the form of containers.

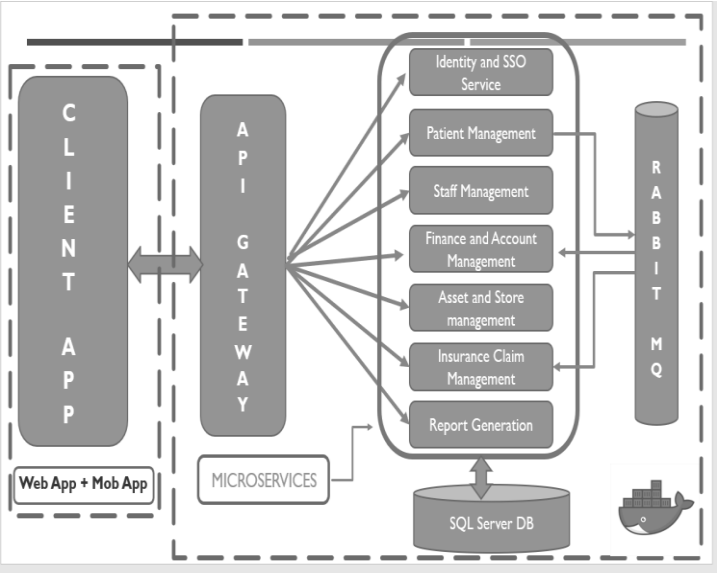

Figure 2 Architecture of Project

7. FUTURE SCOPE

"The proposed software product is the Hospital Management System (HMS). The system will be used in any Multi speciality Hospital, Clinic, Dispensary or Pathology labs in any Hospital, Clinic, Dispensary or Pathology labs to get the information from the patients and then storing that data for future usage" **[6].**

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