

A Framework for Mobile Cloud Solution for Sharing Healthcare Information

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Abstract - The patient information like Hospital id, name, appointment date, treatments taken is stored in the database and then retrieves the patient information. Here interoperability is one of the big issues when we share healthcare information among primary health centers and hospitals. Two major issues in e-health are described respectively as Problems in communication among healthcare professionals. Problems in communication with different healthcare data among different organization. Presently sharing healthcare information becomes one of the necessary requirements for electronic health development. To face this gap, different solutions are presented through different technologies. In this paper we proposed mobile cloud solution for sharing health care information based on Wamp server to run html and PHP coding, using Mobione to display the test results, we reach interoperability among different healthcare professional and between healthcare providers and receivers.

Keywords --- *E-health, Healthcare information, Interoperability, Mobione, Own cloud, Monitoring*

I. INTRODUCTION

Along with the development of technology and people, need for healthcare services have increased. With new requirements for healthcare services such as ageing population and increased mobility of people, e-health will develop on the trends related to “Monitoring”, “Accessibility”, “Knowledge and decision making”. Interoperability is one of the big issues when we share healthcare information among healthcare centers and hospitals. There are two major issues which are created in interoperability in e-health are described respectively as Problems in communication among healthcare professionals and Problems in communication with different healthcare data among different organization. The importance of providing interoperability among different healthcare centers is important.

Cloud is a good approach that is based on deliver software, infrastructure and the entire computation platform as a service. It offers pay-as-you-go services. It means users only have to pay for the resources they use over time. These services are offered over the internet by large data and computing centers. It is a good solution to integrate e-health services. From the technical point of view, the main focus is to provide safe, fast, reliable and efficient healthcare information. From medical point of view, cloud offers special channel to easily access electronic medical records. This ability of quick access to personal medical history can speed up treatment, help to avoid complications, and even

saves lives. Cloud also can make it easy for the patients to locate and keep track of their own health record.

The emergence of cloud computing promises to solve some of concerns facing mobile computing since the cloud is regarded as an unlimited resource that can be accessed anytime and anywhere in the world. Mobile healthcare, which is known as the practice of medical and public health supported by mobile devices for delivering medical and healthcare services is one of the applications that can benefit from offloading the computationally intensive operation onto the cloud.

II. LITERATURE SURVEY

Wesam dawoud, Ibrahim Takouna, Christoph menial “Infrastructure as a service security: challenges and Solutions” state cloud computing represents a new computing model that poses many demanding security issues at all levels like network, host, application. It delivers QoS; this paper presents an elaborated study of IaaS components security and determines vulnerabilities and counter measures and proposed SMI (Security model for IaaS). [1]

Jun Feng, Yu Chen, Pu Liu “Bridging the missing link of cloud data storage security in AWS” state the security of data stored in the cloud is one of challenges to address before the novel pay-as-you-go business model is applied widely. In this research, we revealed the vulnerability in the

Amazon’s AWS cloud and discussed technical approaches towards potential effective solutions. [2]

Gottlieb, L.K “Regulatory and policy barriers to effective clinical data exchange: Lessons learned from meds info-ED” state meds info-ED is a proof-of-concept clinical data exchange project that uses prescription claims data to deliver patient medication history to emergency department clinicians at the point of care. [3]

Jim Grogan “EHRs and Information Availability: Are You at Risk?” EHR (Electronic health record) in the United State took a major step forward. President Bush called for the creation, at the federal level, of a national coordinator of healthcare information technology within the department of health and human services. The goal is to see if by using standards-based architectures, information can be effectively shared across what, in essence, will be competing commercial solutions. [4].

M. Armbrust, A. Fox, R. Griffith and others “Above the clouds: A Berkeley view of cloud computing” state cloud computing the long-held dream of computing as a utility, has the potential to transform a large part of the IT industry. Cloud computing refers to both the applications delivered as services over the internet and the hardware and systems software in the datacenters that provide those services. Here focus on SaaS providers (cloud users) and cloud providers, which have received less attention than SaaS users. [5].

Y.Guo, Y.Hu, J.Afzal and G.Bai “Using P2P technology to achieve E-Health interoperability”, state e-health is an emerging area that boots up with advancement in information and communication technology (ICT). Then a peer-to-peer (P2P) model based on JXTA platform is implemented to solve the identified E-Health interoperability problems. According to the result of the prototype, the suggested syntactic level interoperability among healthcare organizations has been achieved. [6]

Huaming wu, Qiushi wang “Mobile healthcare systems with multi-cloud offloading” state A mobile healthcare system with cloud offloading is considered in the IT field. Here divided in two stages: sensor network and cloud offloading. Sensor network information collected by body sensor should be transmitted to a remote mobile device. Offloading schemes called self-reliant multi-cloud offloading system are proposed. [7]. Mr.Khyamling and et.al “Cloud based intelligent healthcare monitoring system” states cloud based health care is the integration of cloud computing and health monitoring. The computing device enables the delivery of accurate medical information anytime anywhere by means of internet. Cloud based healthcare system consists of a computing device and number of sensors mounted on patient’s body. (CIHMS) which can provide medical feedback to the patient through cloud or hospital. [8].

Tipporn Laohakangvalvit, Tiranee Achalakul “Cloud-based data exchange Framework for healthcare services states Currently healthcare data cannot be shared and exchanged among different healthcare institutes effectively. Also with the increasing in the amount of healthcare data, infrastructure that can handle data processing and storage is in need. Here EHR framework data exchange will be happen based upon (Paas) concept [9]. Qinghua shen, Xiaohui Liang, shen, lin and Henry Luo “RECCE : A Reliable and efficient cloud cooperation scheme in E-healthcare” states e-health is an increasing medical demand from aging population and private, public cloud will be used and also scalability and accessibility is proposed to be integrated in the e-health system. Here private and public problems will be solved. [10]

III. PROPOSED METHODOLOGY

3.1 Over view of the mobile cloud solution

Comparing to existing studies interoperability can be achieved. But some difficulties we will faced. So that can able to use Mobione Emulator. Mobione user friendly and interface that enables you run apps and games without any hassle.

Mobione Studio is built on the html 5 that is using open source Cordova Framework. The application also best for developers who want to test their iOS or Andriod app on the desktop platform. For example when you are searching patient id it will show the exact patient information. But when you are searching by disease we will not get exact patient information. So that to overcome this problem we can use Mobione emulator. More security purpose for future we can able to use RAC Algorithm encryption and decryption will be used while retrieving information.

Sharing health care information between clouds sharing service. In this cloud sharing service hospital1, hospital2 and healthcare center information stored in the cloud, from the cloud patients or doctors can access the information through Mobile, Laptop, and PDA.

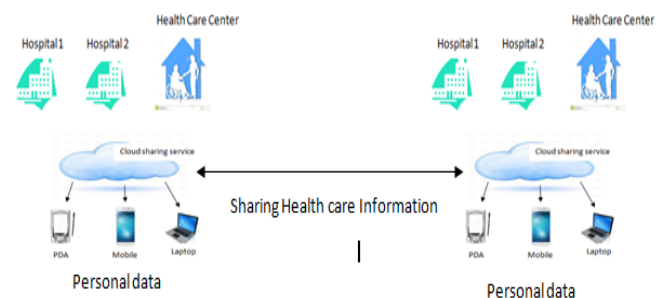


Figure 3.1 Sharing healthcare information between Cloud sharing service

Figure 3.1 describes Hospital 1 and hospital 2 to maintain the patient information and to store the patient information

in the database. This database maintain a separate cloud or separate organization network within the cloud or network to sharing the patient information like that healthcare center also to maintain and store the patient information. Hospital and healthcare center patient information stored in the cloud database. From that cloud we can retrieve through PDA, mobile using patient id, name, location based upon this we can view the patient details and also to see the patient discharge summary, laptop here also using local host we can access the patient information. These processes are used by doctors, nurses, and patient.

3.2 Basic structure of Proposed Solution

We define three sources of healthcare information- hospital, healthcare center (care providers) and home. In this case, hospital and health care center also want to directly access and get information from each other.

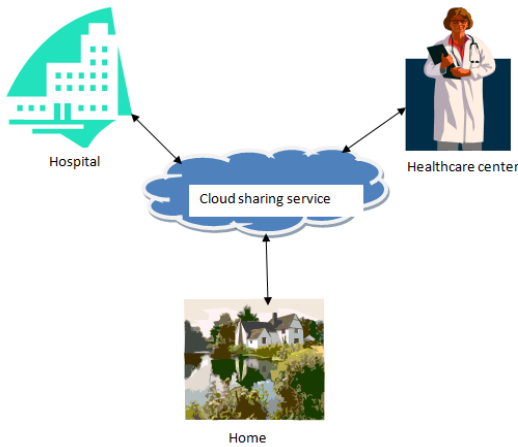


Figure 3.2 Cloud sharing service between hospitals, healthcare center and home

Figure 3.2 describes the activity of home is uploading basic health information of the citizen to support healthcare planning and treatment. Also users are allowed to maintain their records at home. We use Php cloud/own cloud to display the result in Mobione. All the users can access the information through mobile services. Using the Mobione to run this process by local host.

3.3 Healthcare professionals cloud

Figure 3.3 Describes doctors and nurses access the patient information through cloud like patient name, id, treatments to be taken, results, and so on using that information at the present what is the condition for the particular patient



Figure 3.3 Doctor and Nurse retrieving information from cloud

3.4 Patient data storage

Figure 3.4 describes patient information like patient id, name, x-ray, ECG, blood result, ultra sound scan and so on access through cloud. Communicating the information and share more than one organization using cloud.

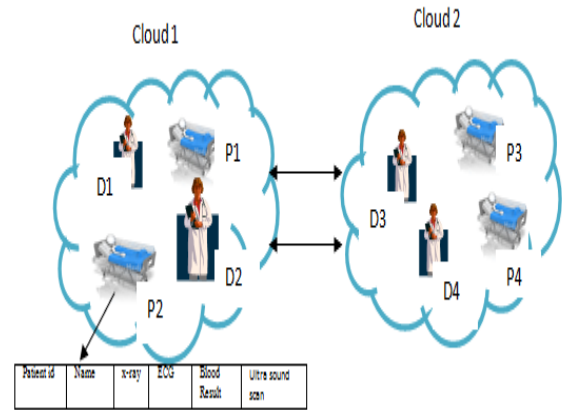


Figure 3.4 Patient result stored in cloud and exchange, between two or more clouds

3.5 Patient history

Figure 3.5 describes Patient history like patient id, patient name, and patient location patient disease. This information sent to the patient history database here date, admission date, discharge date, what are the treatments to be taken. All these information stored in the cloud from the cloud we can access by using doctor id, nurse id, patient id.

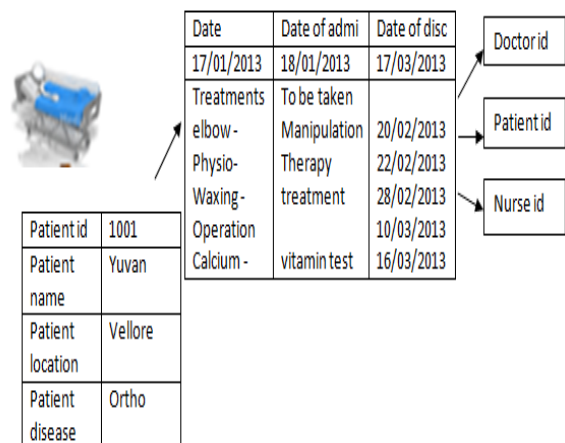


Figure 3.5 Patient history

3.6 Flow chart

Figure 3.6 describes to start the process, have to register the patient id, name, location, disease. This information to store in the database. Based upon the patient id to retrieve the patient discharge summary. Check the database if it is yes it will display success to register otherwise failed to register. Again based upon the patient id to retrieves patient

information like id, location, name using that retrieves patient information.

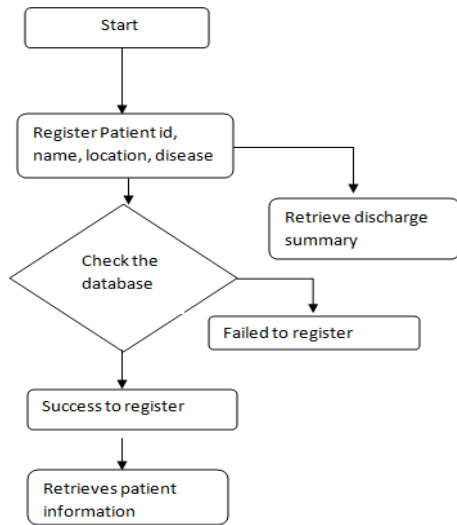


Figure 3.6 Flowchart for retrieving patient information

3.7 Cloud storage

Figure 3.7 here all the information stored in the cloud are selected own cloud software which can be used for developing apps and sharing files. Below snapshots show login by admin, sharing files with others, link will be available

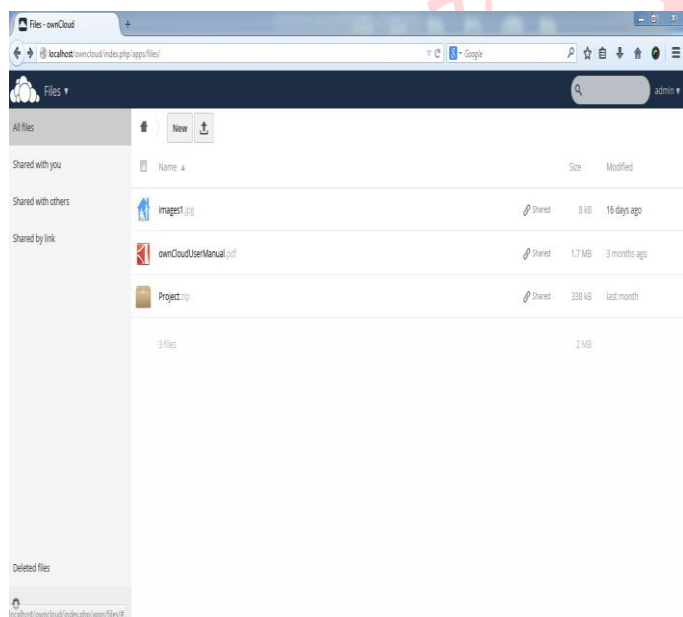


Figure 3.7 Share files using owncloud

To upload the files to select new, choose the path which can be upload.

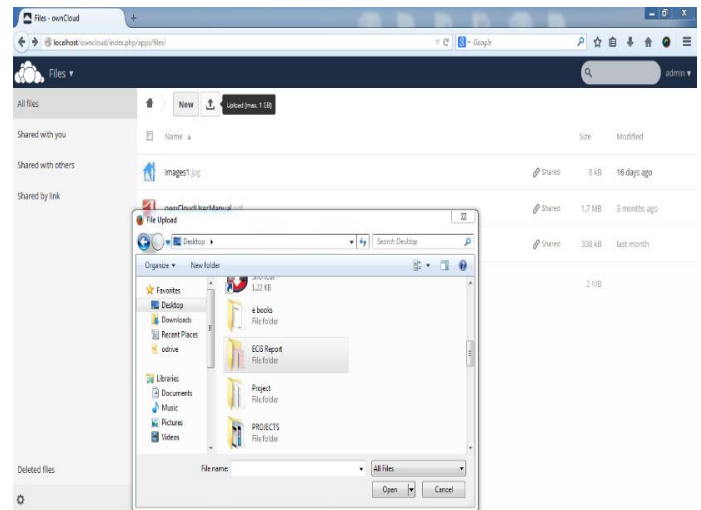


Figure 3.7.1 Upload the patient reports

Figure 3.7.1 describes the file will be uploaded and then it shares by someone and also it will be decided whether accessing person can edit or can share, and also link will be shared. X-ray files will be shared, download option will be there so that patient ECG; x-ray will be download from cloud. Click admin menu it shows Personal, users, and so on. In that personal data are stored in this place, more than one user can create and sharing the patient information. Finally log out and re login with some other account.

3.8 Snap shots

Here the Mobione tool will be used for mobile environment. In that all the programs will be running based on local host. From the local host we can access the information through Google, type the program name and which extension you want type it will show the information

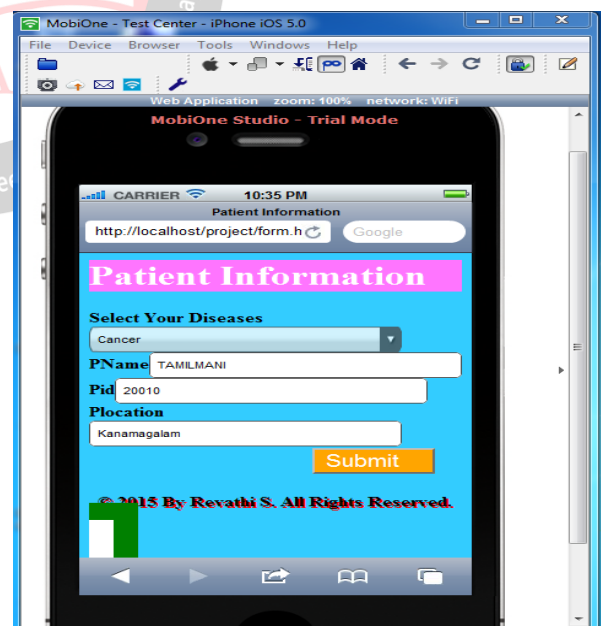


Figure 3.8 Mobione Patient Environment

3.8.1 Patient details

Figure 3.8 and 3.8.1 describes Patient information like select the disease, patient name like entered and submits it. It will be stored in the database it shows registration success

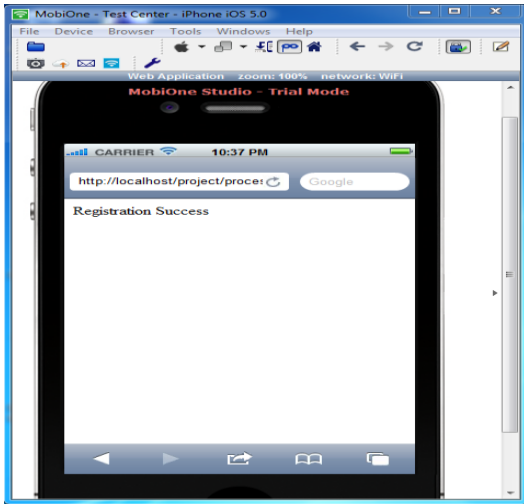


Figure 3.8.1 Mobione Registration Success environment

Figure 3.8.2 describes to see patient details use this patient id and it shows patient information



Figure 3.8.2 Mobione Search patient information environment

Figure 3.8.3 describes while you search with patient id it shows the below screenshot and also we have option to search patient name and location based upon the search requirement result will show

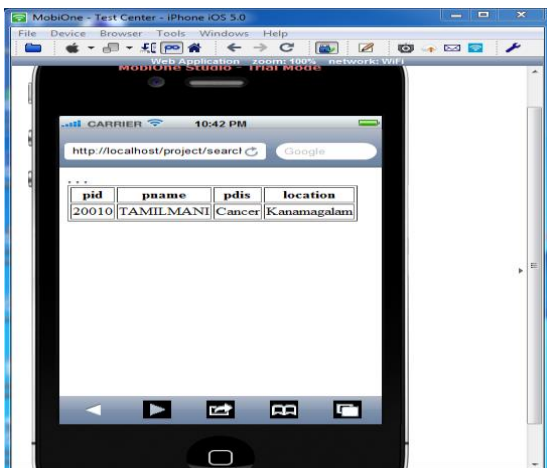


Figure 3.8.3 Mobione based upon requirement

The file will be uploaded and then it shares by someone and also it will be decided whether accessing person can edit or can share and also link also will be shared. X-ray files will be shared, download option will be there patient ECG; x-ray will be download from cloud. Click admin menu it shows Personal, users, and so on. In that personal data are stored in this place, users more than one user can create and sharing the patient information. Finally log out and re login with some other account.

IV. IMPLEMENTATION METHODOLOY

Here we are used html, PHP, database connections, to implement and then we used wampserver for storing the database information and programming, as well running environment. To display the results Mobione emulator is used. Existing studies pay-as-you-go business model applied. Sensor network and cloud offloading model are applied. And this Mobione we can able to use day by day usage.

V. RESULT AND DISSCUSSION

Mobione environment run through local host, first select your disease, patient name, id and location. And give summit and it is stored in the database. Then whenever you want you will search by name or id or location. It will show the patient information. Own cloud this is what ever patient information like ECG, Scan, Images, Patient related thing stored in this place. Same as Mobione we can able retrieve whenever they want.

In existing studies interoperability can able to achieve in P2P cloud architecture using JXTA platform that is used E-health interoperability. But we faced some difficulties while retrieving patient information among two or more clouds. So that while we are using Mobione emulator can be achieved some difficulties. For example when you are searching by disease it will show whatever we have in database it will show as per our record or database. Using Mobione we find exact keyword and easily find exact patient information. Previously we are not supposed to achieve exact result. Using Mobione we can able to find exact information about the patient.

VI. CONCLUSION

In this paper we can achieve the interoperability when we share healthcare information among primary health centers and hospitals. And also to achieve the two major issues like problems in communication among healthcare professionals, Problems in communication with different healthcare data among different organization. And also to achieve sharing health care information through mobile and cloud.

Mobile cloud solution for sharing health care information will be a mobile application. It will be downloading from online installing to mobile and accessing the patient information. And also have an option to open a patient information laptop or personal computer. In future we can

able to use this Mobione emulator and this concept will perform in Library management, Banking, and Student forum.

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