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Enhancing the Privacy in Medical Data Using Cloud Computing

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Abstract: **The Medical data accessibility using cloud computing provides the patients and doctor to access the Health record using Electronic Health Record (EHR)system .83% of health care organizations using cloud services,9.3% plan to adopt cloud .In the proposed system, the cloud based application provides the privacy for both patients as well as doctors through secure sharing of information using private cloud. Electronic Health Record facilitates providing the information among authorized physicians and patients in various geographic areas providing more timely access to life saving in formation and reduces the need for duplicate testing. The evaluation of the medical data shows that ability to analyse and track information and avoids the sniffing across the network by providing encryption and decryption techniques using Advanced Encryption Standard algorithm. The potential of using cloud computing in delivering 21st century healthcare offers many exciting possibilities for professional, organization working in this field. Furthermore, there are also valid concerns relating to the security, governance of the integration issues and the ability of cloud computing to cope with business process change.**

Keywords: **EHR (Electronic Health Record), HIS (HealthCare Information System),Integrity, confidentiality, Cloud security and Trust.**

I. INTRODUCTION

Cloud computing is the utility computing is an emerging new computing designed to deliver numerous computing services through network media such as the Web. This approach offers the several advantages to potential users such as "metered" use (i.e., pay as you go) which offers the online delivery of software and virtual hardware services e.g., virtual servers, virtual storage devices in which it will enable organizations to obviate the need to own, maintain and update their software and the hardware infrastructures. The flexibility of the emerging computing service has opened many possibilities for organizations that does not exist before. Among those organizations are those engaged in healthcare provision. The aim of the article is to shed some of light on the development and explore some of the potential (and future) of cloud computing in contribute to the advance development of the health care provision. The term cloud is often described as a metaphor for the Internet. Cloud computing services can be provided by the cloud vendors through their data centers (public clouds) and end users (client organization) using the cloud software installed on their own data centers (private clouds) or installed on their own system (and other cloud vendors) data centers as server (hybrid clouds). A new type of the cloud computing service (community clouds) is also together as another possible addition to the other modes of cloud based delivery.

Two of the most fundamental technology that under the could computing are open source in cloud and grid computing. The recent technology in the cloud computing is a technology that masks the physical characteristics of computing resources (e.g., a data center a Server) in order to simplify the way in which other systems, applications of the end users interact with them. For example, a PC that is running Windows in the host operating system and using the application software can also run Linux(as the guest operating system). Furthermore, the technology also enable the single physical resources (e.g., a server, an operating system of an application or storage device) appear as multiple logical resources.

Public, Private, Hybrid and community Cloud:

Cloud services are known as public clouds which offered by the commercial cloud providers. In order to distinguish them from the private cloud which also known as the internal or corporate cloud where the cloud infrastructure (e.g., data center, servers etc) and the services are provided by owners and maintained internally by the end users themselves. Organizations are becoming themselves the providers and consumers of cloud services. Organizations are those can have the direct control of security of their data and systems actually defeats the whole utility oriented purpose of cloud computing which is supposed to guarantee the flexibility and cost effectiveness.

A number of security conscious public cloud providers are now coming up with solutions which enables their clients to use their public clouds while providing them with a gateway (i.e., a communication system) which help them to manage the security of their data as if they were managing their own physical networks. The term hybrid cloud is often used to describe the type of cloud solution. In the view, this is a an important part for the cloud. A user controlled public cloud is probably the more appropriate description to the use for such solution. One of the early cloud providers of the cloud types the cloud solutions is the Amazon.

The remaining section organized as follows. Section II reviews some existing work within the Medical system, Section III reviews the architecture design and its explanation Section IV reviews the implementation result of the project. The paper concludes in section v with conclusion and future work.

II. LITERATURE SURVEY

A. Secure Health Care system:

A framework for Healthcare Information Systems (Health Information System) based on big data analytic in mobile cloud computing environments. It provides a high level of integration, availability and sharing of healthcare data among the healthcare service providers, patients, and practitioners. Electronic Medical Records of patients dispersed among different Care Delivery Organizations are integrated and stored in the Cloud storage area, this creates an Electronic Health Records for each patient. Mobile Cloud allows fast Internet access and provision of from anywhere and at any time via different platforms. Due to the massive size of health care data the exponential increase in the speed in which this data was generated and the complexity of healthcare data type the proposed framework employs big data analytic to find the useful insights that help the practitioners take critical decisions in the right time. In addition, our proposed framework applied in the set of security constraints and access control that guarantee integrity, confidentiality, and privacy of the medical information. It will believe that the proposed framework paves the way for a new generation of lower cost, more efficient healthcare systems.

B. Cloud Addresses Privacy and Security Challenges:

Cloud addresses the privacy and security for the medical data that emerging technology named as cloud computing that is expected to support the internet scales critical applications which could be essential to the healthcare sector. The cloud provides the resilience, adaptability, connectivity, cost reduction, and high performance features have high potential to lift the efficiency and quality of the healthcare data. However, it is also important to understand specific risk were related to the security and privacy that cloud technology brings. It focuses on a home healthcare system based on cloud computing. It introduces several use cases were drawn as an architecture based on the cloud.

A comprehensive methodologies were used to integrate the security and privacy engineering process into the software development life cycle. In particular, security and privacy challenges were identified in the proposed cloud based home healthcare system. The cloud computing functional infrastructures was used to plan the demonstration of data integration between the proposed application architecture with the cloud infrastructure. The mitigation techniques putting the focus on patient center control and policy enforcement via cryptographic technologies and consequently on the digital rights management and attribute based encryption technologies.

III. ARCHITECTURE DESIGN

The System function separated in to tasks to further increase reuse opportunities for services. The function used as patient module to find and view patient record. creating and updating the patient record and other business activities completed during the registration process. The task create and update patient record used by the admission.

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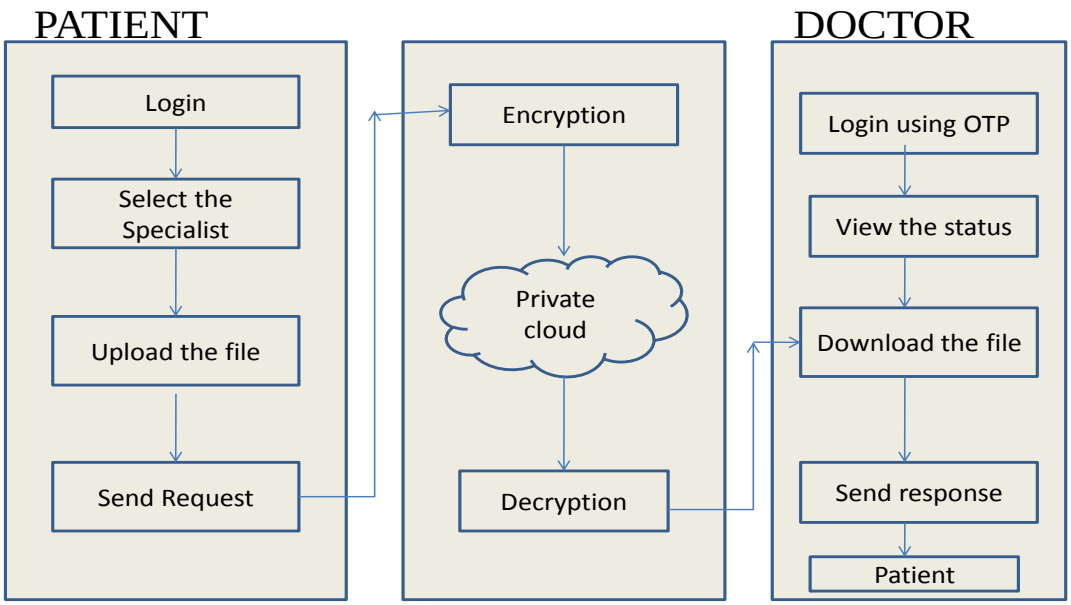

Figure 1:Represents the architecture diagram for medical data using cloud computing

Exchange of patient's electronic medical record between one provider and another.Electronically order and monitor consumption of prescriptions. The processing of Electronic Health Record where the input is taken as symptoms of the patient and the output is obtained as response from the doctor. The data are stored in the private cloud. The processing was done by the server where the data were stored in the cloud after encrypt was carried out. The decryption part was done by the client and server by sharing the key .Both encryption and decryption was carried out by the Advanced Encryption Standard algorithm.

IV. IMPLEMENTATION RESULTS

The cloud application and an architecture has been created. A reliable system to reduce the death rate in emergency care. Data encryption is important to ensure data privacy as well as secure data transmission using HTTP. It result obtained as improving the data privacy and reducing confidentiality risks by authentication and authorization.

Figure 2: Represents the home page for E-health

The home page of the health care system provides both the doctor and patient login separately and the administrator manage the records of the patient by entering the username and password

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OTP GENERATION FOR LOGIN THE E-HEALTH APPLICATION:

Figure 3: Represents the OTP generation

ALGORITHM: PseudoRandom Generation

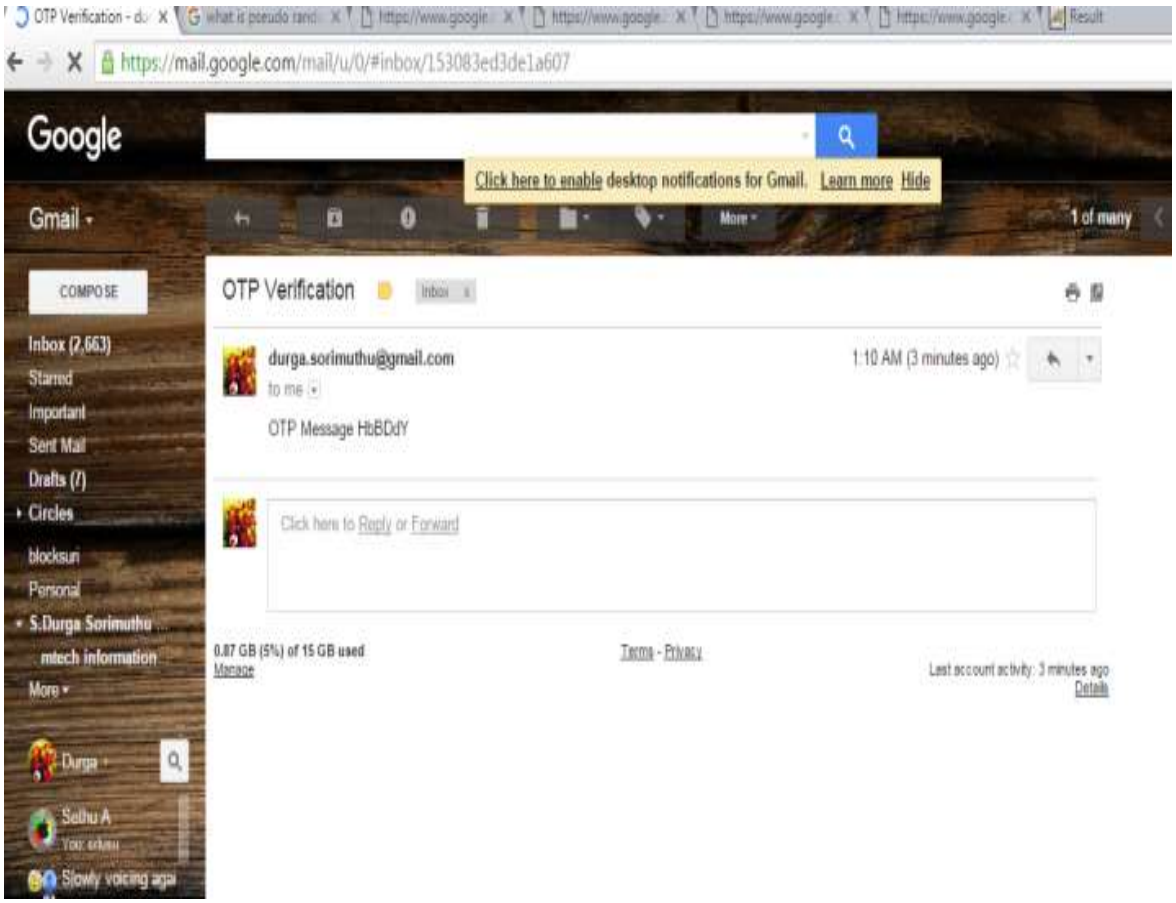

Figure 4:Represents the verifying of g-mail for OTP

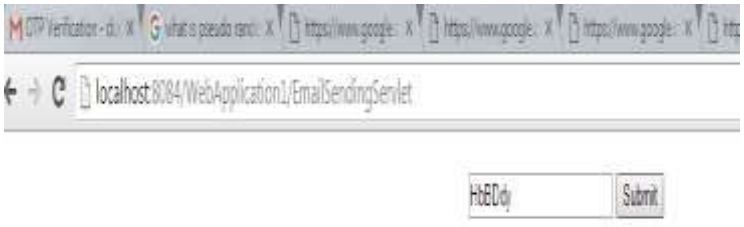

Figure 5:Represents the submission of random number for viewing ,sending response and receiving response

The profile of the particular patient shows the patient can select the doctor based on symptoms also the patient can view his/her status ,history,and queries.

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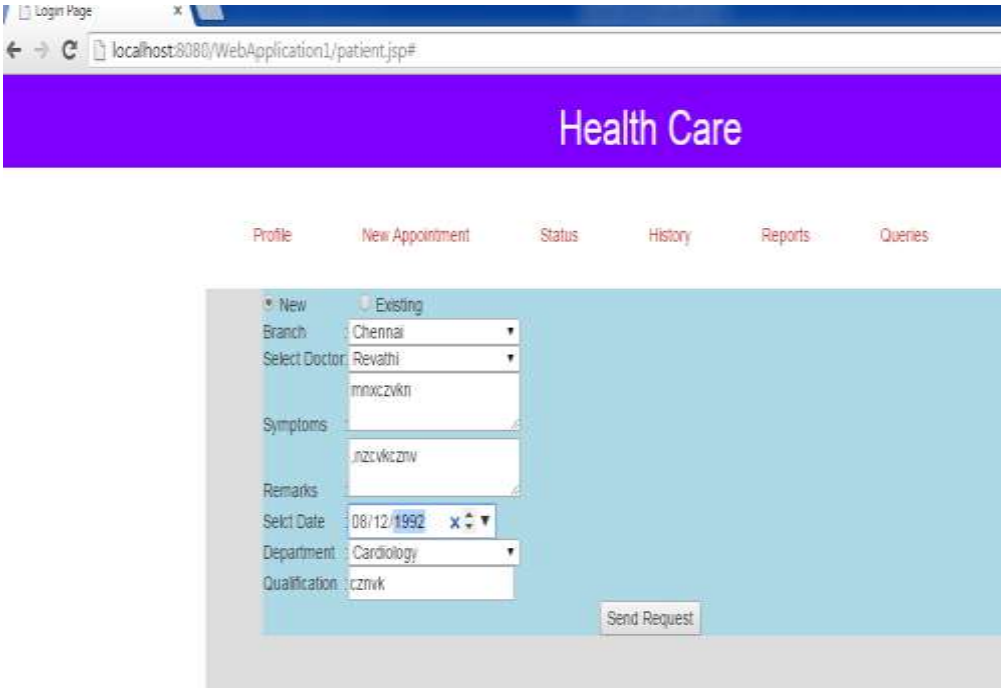
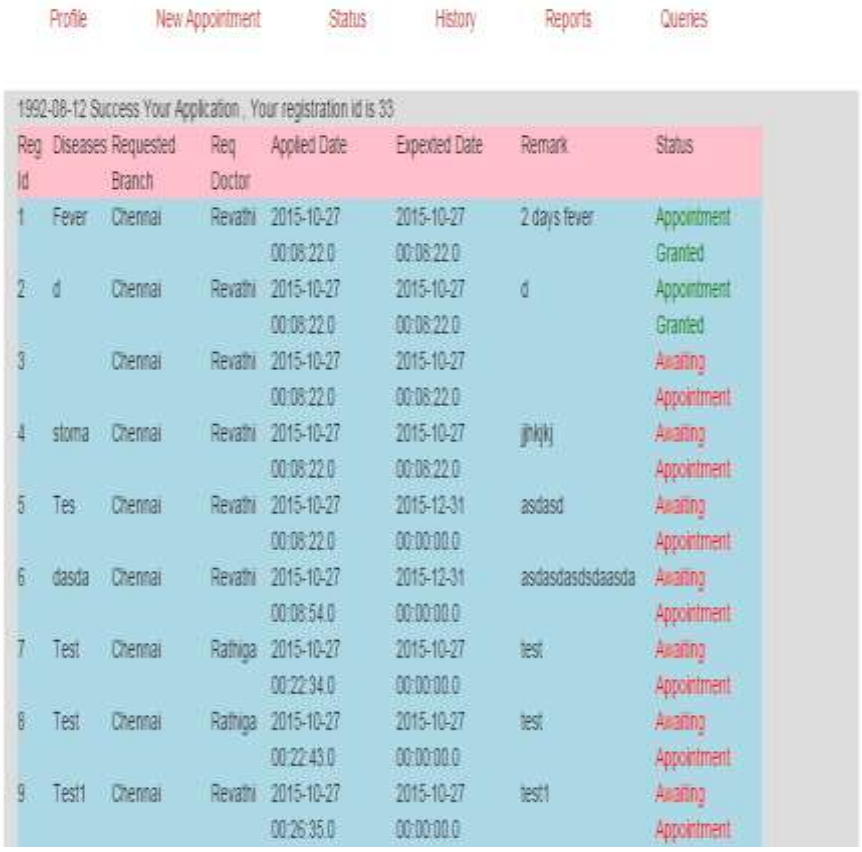


Figure 6: Represents the sending request to the respective doctor

The patient can view the appointment details.Based on the registration id the patient will be appointed by the doctor.The response will be send by the doctor



Reg Id	Diseases	Requested Branch	Req Doctor	Applied Date	Expected Date	Remark	Status
1	Fever	Chennai	Revathi	2015-10-27 00:08:22.0	2015-10-27 00:08:22.0	2 days fever	Appointment Granted
2	d	Chennai	Revathi	2015-10-27 00:08:22.0	2015-10-27 00:08:22.0	d	Appointment Granted
3		Chennai	Revathi	2015-10-27 00:08:22.0	2015-10-27 00:08:22.0		Awaiting Appointment
4	stoma	Chennai	Revathi	2015-10-27 00:08:22.0	2015-10-27 00:08:22.0	jhkjkj	Awaiting Appointment
5	Tes	Chennai	Revathi	2015-10-27 00:08:22.0	2015-12-31 00:00:00.0	asdasd	Awaiting Appointment
6	dasda	Chennai	Revathi	2015-10-27 00:08:54.0	2015-12-31 00:00:00.0	asdasdasdsdaasda	Awaiting Appointment
7	Test	Chennai	Rathiga	2015-10-27 00:22:34.0	2015-10-27 00:00:00.0	test	Awaiting Appointment
8	Test	Chennai	Rathiga	2015-10-27 00:22:43.0	2015-10-27 00:00:00.0	test	Awaiting Appointment
9	Test1	Chennai	Revathi	2015-10-27 00:26:35.0	2015-10-27 00:00:00.0	test1	Awaiting Appointment

Figure 7: Represents the details of patients list for verifying whether the patients are appointed or not appointed.

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V. CONCLUSION AND FUTURE WORK

An application of cloud computing for healthcare and addresses its security and privacy challenges. In particular, both business-logic driven and architecture driven strategies are applied to instrument the threat analysis and requirements elicitation focusing on security and privacy.

A mitigation solution, with a focus on facilitating patient- and data center protection for electronic health data, and highlighted its main components that allow patients to encrypt their own (health or physical activity) data prior to uploading the data to the cloud.

A future work focuses on the patient's detail was given by his/her fingerprint. Once the fingerprint was entered by patient the details of the patient will be displayed in the front end of the administrator.Instead of entering the username and password the fingerprint login brings more security to the patient as well as for the protection of records.The fingerprint login was also applicable to doctor in order to protect the patient request.The proposed work suggested two promising strategies to address the protection and distribution of the secret key, namely applying the Advance Encryption Standard schemes.

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