CLOUD-BASED SERVICE FOR ELECTRONIC MEDICAL RECORD EXCHANGE

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Abstract: The importance of healthcare information technology has increased dramatically during the past few years. This information requires a large storage space. Cloud computing is known for its fast computation capability. Through cloud computing, the Electronic Medical Record (EMR) system in a hospital can be integrated, to facilitate the exchange and sharing of electronic medical records. It raised the importance of interoperability and data exchange between e-health applications and Health Information Systems, which resulted in increased concerns for securing sensitive data and data exchange. This data can be accessed by various Hospitals, Insurance companies and Patients. This project emphasizes standardizing a data exchange mechanism and interoperability between Health Information Systems (HIS) and e-health applications across a cloud-based service. The proposed service provides an entry for retrieving Electronic Medical Records among the various Health Information Systems that a patient record is stored in and for any e-health application seeking such information. Moreover, this proposes a unified secure platform that provides developers, health care providers, and organizations access to a framework to retrieve and manage medical records and Personal Health Records (PHR) among various subscribers.

Keywords: E-health, eHealth Record(eHR), Cloud Computing.

I. INTRODUCTION

The use of modern communication infrastructures in medicine and the present provision of health care services are in general considered as ‘eHealth’. eHealth Record refers to an electronic record of health-related information regarding an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one health care organization. The absence of e-health data like eHealth Record may result in loss of information, misdiagnoses, repetitive drug prescriptions etc. With the use of eHRs, the need for security has increased, making patient confidentiality a priority, as well as a high concern. eHealth Records (eHR) has emerged as a patient-centric model of health information exchange. An eHR service allows a patient to create, manage, and control their personal health data in one place through the web, which has made the storage, retrieval, and sharing of the medical information more efficient. Each patient is promised the full control of their medical records and can share their health data with a wide range of users, including health care providers, family members or friends. eHRs have sensitive data that should be secured while also having multiple applications simultaneously accessing the Hospital Information Systems. Such fact results in difficulties for developers and hospitals to guarantee the environment security knowing that having any personal health data accessed or viewed accidently or intentionally by the wrong person could lead in charge health professionals to face severe penalties. As a result, numerous difficulties face the end-developers regarding accessing the system, data exchange and eHR storage. Providing a solution allowing interoperability and data exchange between healthcare applications and hospital information systems on the cloud makes it easier for developers, companies and researchers to retrieve electronic medical records from various hospitals that deal with the patient easily and securely. In this paper, analysis, design, and evaluation of a Cloud based Service for eHealth Record Exchange will be presented and discussed. This proposed service offers healthcare providers, organizations, physicians, patients; health insurance companies a single platform for accessing their medical and personal health records. Using a cloud-based intermediate service to exchange data securely, the system allows the related parties to share data without the inconvenience of implementing new ehealth application as a result the proposed solution ensures its flexibility allows for easy integration among multiple parties.

II. RELATED TERMS

A. Cloud Computing
Cloud computing is defined the practice of using a network of remote servers hosted on the Internet to store, manage and process data, rather than a local server or a personal computer. It is a technology that supports state of being everywhere at once, it is convenient, supplies on demand access to the network for sharing computing resources (e.g., networks, servers, storage, applications and services) can be launched and developed quickly with minimal management and without service provider interaction.

B. Cloud Computing in healthcare
In the medical field, instant access to updated medical information is extremely important. Quick access to a patient’s medical records could not only ensure a
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speedy diagnosis and better quality treatment, but also help doctors avoid complications and in turn, save lives. Additionally, patients having the ability to access their medical records would personalize healthcare, allowing them to seek quality treatment anywhere in the world. All this becomes a possibility with cloud computing. Since Health IT infrastructure is quite complicated, it is necessary to take extra steps to ensure the patient’s privacy. It is necessary to maintain the confidentiality and integrity of stored information is essential. In addition, data backup is provided, as are recovery processes in extreme cases. Increased security and privacy levels are required, and in order to achieve this, cloud computing technology must be carefully managed.

The Cloud Based Service for eHealth Record Exchange (CBSeHRE) allows healthcare providers a single, secure point of entry to access medical records. The proposed solution, illustrated in Fig.1, will result in helping to decrease the gaps that exist in various healthcare information systems, as well as relieve developers, researchers, and e-health third party application development companies from the difficulty of implementing medical protocol and securing the infrastructures.

III. LOGICAL VIEW OF SYSTEM

A logical view of the proposed solution is illustrated in Figure 1. Security is always a top priority issue when a cloud computing healthcare system is developed. In order to eliminate this issue, our suggested solution consists of a cloud that acts as a means of data exchange, as opposed to the storage of eHealth records. The patients’ health records will remain stored at various hospital information systems, so that developers do not need to implement new eHealth applications from scratch. Hospitals will be able to exchange data with other hospitals, healthcare organizations, health insurance providers, healthcare practitioners, pharmacies, and other third parties. In addition, patients will also be able to access their medical records, give access to healthcare providers, and create their own personal health records.

Patient’s medical record data from subscribed hospital information systems is exchanged through the proposed service, sending digitally signed XML documents with encrypted attributes and values through an encrypted channel with 128 bit

IV. SYSTEM WORKFLOW

Step 1 Subscription to service: Different healthcare providers subscribe to CBSeHRE and begin sharing PKI keys.
Step 2 Authentication: Healthcare providers develop a “circle of trust”. The circle of trust is customized by the user, allowing different organizations, practitioners, and patients which they regularly deal with to access information.
Step 3 Access EMRs: When a healthcare provider needs to access a medical record, a request is sent to the CBSeHRE and if he is authenticated user then he will get to access the information. In case of Patients, he has to login or signup to CBSeHRE for accessing the information. For Insurance Company, they will have specific id from that they will access only the particular part of data which is allowed by system.

V. CLOUD AS A STORAGE

In the medical field quick access to patient’s medical record, instant access to upload information is extremely important. Along with that scalable storage space, redundancy and durability is also necessary. All this become possible with cloud as storage. Since patient’s health information is important so it is necessary to maintain confidentiality and integrity. In addition data backup and recovery of data. Below are the features and benefits of cloud as storage.

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VI. SECURITY

EMRs have sensitive data that should be secured while also having multiple applications simultaneously accessing the Hospital Information Systems. Such fact results in difficulties for developers and hospitals to guarantee the environment security knowing that having any personal health data accessed or viewed accidently or intentionally by the wrong person could lead to charge health professionals to face severe penalties. As a result, numerous difficulties face the end-developers regarding accessing the system, data exchange and eHR storage. Providing a solution allowing interoperability and data exchange between healthcare applications and hospital information systems on the cloud makes it easier for developers, companies and researchers to retrieve electronic medical records from various hospitals that deal with the patient easily and securely. In addition, it results in creating a single point of entry to hospital information systems through an intermediate layer resulting in concentrating and focusing the security on solution end points.

The system allows patient to edit their personal details but they cannot change their medical records. For changing their medical record they have to take help of doctor and doctor also cannot change patients medical records by themselves.

VII. FUTURE SCOPE

The extension to our project is to make it available for patient with disability like blind patient or handicapped patient, mentally retarded patient. Patient health information is very sensitive thus it is necessary to provide more security. In this we can add various organization like blood pathology, X-Ray centre etc.

CONCLUSION

In this paper, we discussed the importance of healthcare information technology, and the efforts that previous researchers and developers have exerted in developing a secure health information system. Through the proposed Cloud-based service for secure electronic health record exchange between Patient and Health Insurance Company and Hospitals, we showed how standardizing a data exchange mechanism between various health systems. In addition, the proposed system allows for the creation, storage, and access of eHRs by patients, secure access to these records by healthcare professionals and health insurance company. Additionally, various issues were addressed such as accessibility and integration.

REFERENCES