E-Healthcare Management System Using cloud

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Abstract:In today's world, data management is one of the key issues that is to be taken care of. The reason behind this is the emerge of huge volumes of data from various sources, from various fields which in turn led to the increase in demand for more resources that led to the development of cloud. Cloud is implemented in various fields and is still developing especially in the medical field where the datas including the Personal Health Records (PHR) needs to be maintained .The processing time of these data using present systems is slow which demands a fast processing system. Therefore a survey of various cloud models that have been used for a variety of purposes since now in the medical field has been proposed in this paper.

Keywords: Data management; Cloud; Personal health Record (PHR)

I.INTRODUCTION

Cloud offers various kinds of resources apart from storage such as compute, backup and so on. The cloud not only provides services like storage but also performs virtual resource allocation which is very useful in increasing the flexibility and scalability of the system.

Cloud services usage across several industries has grown widely. In the healthcare department, cloud has been playing a major role in the past few years. However the utilization of cloud services in the healthcare industry is taken a bit more tentatively because of the flexibility of cloud hosting which is one of the merits whereas the secure maintenance of Electronic Health Records (EHR) and cost still remains a point of concern. The Personal Health Record (PHR) maintenance requires high confidentiality. Development of Electronic Health Records is a very useful move since the need to carry the Health records manually to all the places is reduced, maintenance of heath records in paper is reduced thereby increasing the availability and reducing the perishability time of the documents. All time care is provided for elderly people at home from the hospitals by monitoring them twenty-four hours a day by attaching the necessary sensors to the persons. The sensor data is updated in the cloud constantly which is monitored by the hospital system so that any change in the sensor reading indicates that the particular person requires medical assistance.

Many healthcare management systems have been proposed since now based on cloud which are surveyed below in this paper.

II.LITERATURESURVEY

A. SENSOR BASED MODEL

Juliana Chiuchisan et.al [8] developed a model for at-home healthcare system for monitoring and rehabilitation of elderly people in order to approach the diseases effectively has been proposed by the authors. The patient's health records are converted into electronic formats which in turn where stored in centralized databases. The author and et al have dealt with the security issues in development of this model by taking Parkinson's disease as the subject. This paper involves a cloud-based, wireless body area network (WBAN) which has been increasingly popular in pervasive healthcare examining.This paper involves a cloud-based, wireless body area network (WBAN) which has been increasingly popular in pervasive healthcare examining. This framework [13] has been used for real time monitoring of patients in order to help the elderly people who are living independently and are sick. A model for the proposed framework and an implementation of the Electromyography (EMG) healthcare system case study has been done. Although cloud computing is a major breakthrough in information technology, many fields especially the healthcare organizations are yet to be fully inclined towards cloud based data management due to their shortcomings in security.A sensor model [15] along with the hybrid cloud features was developed to safeguard patient's critical details during   transmission.

B.SECURITY BASED APPROACHES

This paper [7] states the distinguishing features of cloud and also the security concerns in single-cloud environment is more when compared to the multi-cloud environment.It also states that single-cloud is more vulnerable to failure of service. This paper [12] extends enactment of virtualised servers with the hybrid cloud environment which is the combination of two different types of cloud namely public and private in the health care centres. Private cloud is for recording critical details whereas public cloud is used for storing other details. An arrangement of cloud that diminishes the cost of hardware with efficient consumption of energy with less space data centre. A virtualised environment uses hyper-V and azure for its public cloud facilities.Android devices with near field communication along with Bluetooth interfaces is used in the smartcard facilities which improves the health care systems in terms of security and record management of each individual data. A noble architecture for secured storage and transfer of data in cloud environment thus the overall solution from the proposed model[10] produces the security based on identity access. Storage includes both the Personal Health Records (PHR) and Electronic Health Records(EHR)among the patients, doctors and other members within the hospitals. Identity federation is an important advantage of the entire model. This paper[3] signifies and equalises the exchange of data mechanism between the Health Information System (HIS) and e-health applications and thus enhances securing the critical information. Entry is made through single point for obtaining the Electronic Medical Records (EMR) from the patients. Proposed structure is implemented among faculty members of the university of Alexandria in Egypt.

C.HYBRID BASED MODELS

This paper [9] illustrates a cloud based system that identifies solutions to data sharing, service integration and confidentiality. Diabetic patient's prototype is taken into account for this demonstration and useful information regarding their health is transferred between them for different purposes. This proposed approach partly solves interoperability and privacy concerns.This architecture[4]using albeit which overcomes the security relates issues and privacy of the cloud infrastructure hence crucial data are stored in an organised manner with access controlling facilities. Albeit is layered structure provides results of enhanced medical data. Hybrid cloud feature facilities data sharing and integrating data which guarantees cost reduced health care systems.

D.INTERCLOUD APPROACHES

In this paper, the authors[1] have put forward an infrastructure for the implementation of family health book which supports cost, flexibility, and a huge storage capacity which was demanded from the healthcare providers that is highly in need since the healthcare sector had large volumes of data in terms of medical records whose processing was slow and returned un-matching results which shall be overcome by using the cloud technology.The cloud infrastructure provided retains the quality of service(QoS) without compromising security by the use of a cloud broker in the inter-cloud environment which greatly reduces the processing time. This model was developed for maintaining information related to Morocco Ministry of Health.This paper [2] states the setbacks concerned with the process of interconnecting multiple cloud providers for providing upgraded services.However an interconnected architecture for combining multiple cloud services from various cloudproviders has been presented and the proposed framework has been validated by an e-health prototype for monitoring a medical device.Smarter healthcare system on cloud (m-healthcare-healthcare) aredeveloped replacing the traditional system for data maintenance and to meet increasing demands in the medical field. These health care systems are developed with greater security features that contribute to cloud computing.

E.CLOUD BASED APPLICATIONS

The author [6] puts forward an approach that these devices are portable in nature and therefore can be used in emergency situations and also in urban areas.This paper [14] demonstrates an Assistive Patient monitoring cloud Platform for Active healthcare applications (AppA) using a specific pattern. This design is extremely scalable and monitors the requirements of various kinds of health care systems with best economic models.TheAuthors[11] advocate the applications of cloud with the e-healthcare. Crucial information regarding the health conditions. Thus a innovative application of healthcare system was developed with complete security designs to overcome the constraints. The resources are distributed into the applications that is hosting cloud.Cloud based telecaresystem[5] that maintains and records patients conditions by keeping the users in both fixed and mobile conditions.an promising method is identified by conducting minor experiments and their effectiveness is measured.

S.NO	TITLE	YEAR OF PUBLICATION	ADVANTAGES OF THE PAPER	LIMITATIONS OF THE PAPER
1	Towards an interCloud architecture in healthcare system[1]	2017	An infrastructure which supports cost, flexibility, and a huge storage capacity and retains the quality of service(QOS)	cloud broker has increased the complexity of the infrastructure's security and also Identity based access must be provided to maintain the confidentiality of data.
2	A Security Approach for Health Care Information Systems[8]	2017	Health care system is developed for elderly patients which monitor's them continuously from home and provides rehabilitation	An advanced communication solution which includes features of the system integration can be adopted in the future.
3	An alternative sensor Cloud architecture for vital signs monitoring[13]	2016	Electromyography (EMG) healthcare system is developed which provides services for the ill and elderly people combining the framework of mobile and cloud computing technology.	Cloud based wireless body area network (WBAN) can be improved with the quality of service requirements.
4	Security Concerns of Cloud-Based Healthcare Systems: A Perspective of Moving from SingleCloud to a Multi-cloud Infrastructure[7]	2015	Various characteristics of cloud computing like confidentiality, availability in terms of security, rust, audit, integrity and compliance is addressed in terms of health care system.	Multi cloud infrastructure can be enlarged with secret sharing algorithm to provide affirmationmechanism to the databases on cloud community
5	Intercloud platform for connecting and managing heterogeneous services with applications for ehealth.[2]	2015	e-health prototype for furnishing scalable and flexible infrastructure that connects dissimilar cloud providers to observe a device (pulse sensor)	Intercloud scenario is based on the concept that it does not have infinite natural resources.
6	Hybrid Cloud Service Based Healthcare Solutions[15]	2015	Health care system with hybrid cloud utility to guard sensed patient data during dispatch	Sensor module can be added with security features like authentication and privacy

7	Layered Storage Architecture for Health System using Cloud[4]	2014	Segmentation algorithm is used to attain efficiency in cloud environment with high level of security standard.	Various issues of cloud include integrity, audit and securing cloud systems
8	Implementing and securing a hybrid cloud for a healthcare information system[12]	2014	Virtualized servers can be executed within the hospitals to expand hybrid cloud which diminishes the cost of hardware, energy consumption.	Discrete virtualization like desktop and server virtualization can be acquired.
9	NFC Based Secure Mobile Healthcare System[6]	2014	Health care systems can be upgraded with the use of android mobile devices with NFC which enhances the portability even to rural areas.	Identity based Encryption and Attribute Based Encryption can be used in future for security threat, cloning and loss of mobile devices
10	A scalable cloud Platform for Active healthcare monitoring applications[14]	2014	Assistive Patient monitoring cloud Platform for Active healthcare applications (APPA) is an real time cloud architecture which identifies various healthcare conditions in early stages.	Payment models between the health care provider and patients can be full time subscription plans.
11	Health Information Exchange for HomeBased Chronic Disease Self-Management -- A Hybrid Cloud Approach[9]	2014	Health information can be interchanged between the patients and multiple stakeholders to achieve interoperability and privacy.	Access control mechanism and data encryption should be focused in the future work to develop an fully functional cloud platform.
12	A new architecture for secure storage and sharing of health records in the cloud using federated identity attributes[10]	2014	This architecture uses the identity federation and facilitates the sharing of data among the doctors, patients and other members within the cloud	Unlike configurations using various protocols can be added to the existing architecture.

13	e-Healthcare cloud computing application solutions: Cloudenabling characteristics, challenges and adaptations[11]	2013	Enables Networking solutions and e-healthcare applications for cloud domain with similar characteristics.	Production estimation can be researched using REST for emerging API's service integration
14	Cloud-based service for secure Electronic Medical Record exchange[3]	2012	Emphasis mainly in data transfer between the health information system (HIS) and e-health application that standardizes the interoperability in the cloud services.	Authentication and privacy features must be added with extra medical services to holdup HIS system
15	Towards the ubiquitous healthcare by integrating active monitoring and intelligent cloud[5]	2010	Cost effective cloud based health based telecare system which tracks mobile and fixed users	Healthcare systems can be prolonged with the help of public transportation and entertainment.

I.Table showing various types of cloud models used in healthcare

KartikMoudgil et.al [19] aims in developing a short, brief model for storing the patients details in a more secured and precise order. In this technique smartcard are used as a medium of authentication and cloud servers are used in the backend. The software used is eucalyptus based open-source software is used for the entire architecture. Medicard is the name of the smartcard which helps the users to securely login in. user friendly android application is developed which enhances easy provider of health data to end users. An website is also developed which provides easy access to doctors and other healthcare professional for uploading and retrieving the medical records.

This application allows all the healthcare professionals like chemist, doctors, and pharmacist etc. to access the health care details in an efficient and quick manner. This technique satisfies both the health care professionals and also the patients in an equal manner. Thus prescriptions and other medicals reports can be stored in a convenient way. KavitaJaiswal et.al [18] propounds a model which uses sensor to observe patients health indications. The composed health data are dispatched to the server through the docker container by using a gateway which can be any Bluetooth devices. Thus by using this approach the healthcare professionals can detect the healthcare issues and also track them continuously. Various shortcomings related to the management of healthcare systems using Internet of Things. This developed prototype deals with how data can be consolidated using docker container and raspberry pie for healthcare systems.

The sensor connected to raspberry pie retrieves and stores the details. User receives their retrieved health details using mobile apps thus enhancing the patient's health. IoT provides convenience to doctors and also maintains the accessing of wide variety of healthcare data especially designed for mobile habitat. Shu-Di Baoet.al [16] explained an promising approach which adds an security protection for various networks. In order to promote the healthcare centres an complete integration of the out-patient records and electronic records has been done .Various healthcare issues related to security mechanism had been identified and a method signal scrambling is used by the applications. The health care data's are scrambled using a piece of tiny data which is an randomly generated number which enhances the approach to be more adaptable. the security and complexity has been investigated to obtain the effectiveness for the

proposed technique and thus applied to all the The medical data which has been scrambled is stored in the cloud storage whereas the tiny data is kept for retrieval. This nominal method can be applied to the different kinds of existing communication models. It has also been verified that this proposed approach has been utilised effectively.

Xiaoliang Wang et.al [20] developed an mobile based cloud solution for monitoring effectively the patient details. Electrocardiograph monitoring is taken for building an mobile based cloud model. The increasing demands of the large health care systems are maintained effectively and enables people to keep track on their healthcare details. Hadealabdulaziz al hamidet.al [17] proposed an security and privacy related demand along with novel approach of microservices. Healthcare based data exchange and managing of data had been dealt. Cloud computing in the field of healthcare applications is investigated. current technologies enhances the life standards and organises the healthcare system by customizing particularly on patients which reduces the operational cost and medical fallacy. Maintaining an socially accepted health records requires proper functioning of security and privacy issue that needs to be examined and addressed orderly. Thus the microservice approach survives with the above mentioned issues mainly due to isolation. Three main solutions called data breaching, preserving the privacy in storage. an a model of accessing control based on the semantics are hosted in this technique. Data breaches can be found by accessing the integrity and authentication of the interchanged data like digital signatures or the watermarking in certain multimedia data.

III.CONCLUSION

With this paper we like to conclude that there are various approaches towards the healthcare in many other domains and different methods of implementation are in existence. But also the efficiency in healthcare remains very low. In order to improve this, the patients medication details are stored in the cloud for efficient access of details from anywhere.This enables networking solutions and e-health care applications for cloud domain. It facilitates the sharing of data among the doctors and patients. Mobile application with various functionalities like authentication and protection can be developed as future enhancement

multiplex networks.

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