

A Review on Health Care amenities by Cloud Computing

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***Abstract:** Nowadays, Cloud computing technology is one of the most important trends in information systems (IS). It is an important alternative that ensure high performance data processing, storing and exchange. Cloud computing is a new paradigm in the healthcare field, it facilitates the exchange of electronic medical records in hospitals and clinics as well as a storage and exchange centre for medical records. Although there are many publications in the context of cloud computing in the healthcare sectors, there is no systematic review of the classification of current research to date. The purpose of this paper is to conduct a survey on adopting cloud computing in the healthcare sectors. It addresses the different adoption frameworks, case studies, as well as related security and privacy issues adopting cloud computing in the healthcare sectors.*

Keywords: Health care, Cloud computing, Information system, Security, privacy issues.

I. INTRODUCTION

The new web platform, usually known as cloud computing, ensures that all types of data are stored in the network completely. Here the cloud is a metaphor for the internet. Cloud computing research is a new hotspot for the research discipline. Big tech and drugstores are using this platform provided with the help of companies including Google, IBM, Sun, Amazon, and Microsoft. The growth of cloud computing is exponential in the information technology sector. The most important data in today's world is clinical data, and it is a very difficult task to ensure

the integrity of facts. In the article, we will investigate the current situation of using clinical record storage devices for medical care. Cloud computing and propose our theoretical plan to access the facts smoothly, with more security. Cloud computing is a very worthwhile market if used properly. But from the current records and information, it has been seen that since it is developing so fast, it opens more doors for stat theft. A recent observer said that the power of cloud computing would increase in the scientific field and proposed unique prototypes and frameworks in an effort to improve fitness

offerings. The Cloud Computing, Research Improvement Committee, discovered automation in which a framework sends critical patient data through a community or group of sensors related to scientific devices and sends the data to clinical facilities in the cloud for storage, processing, and distribution. The notable benefits of the device are that it gives users high access to information and fixes errors, if any. Cloud computing serves as signal processing and security for mobile devices through a multimedia sensor. Cloud computing provides patient statistics recording in the medical field, enabling clean access to information. With data backup technology, it provides easy access to stats protection. Cloud computing has become the need for high-quality requirements in the medical field.

organizations by offering a wide range of easily accessible virtual computer resources. Cloud computing also facilitates economic growth by providing cloud computing infrastructure with low investment capital [1]. Cloud computing also offers different advantages such as rapid flexibility, resource pooling, and access to an extensive network . This phenomenon has been developed from the idea of unifying and sharing resources in a central environment. Adopting cloud

computing technology will help many organizations gain competitive advantage and become more efficient and productive .[1]Cloud computing in the health sector will provide easy access and storage for the patient's medical record anytime, anywhere, and this will improve the ability of physicians to provide better patient care[2] . We discuss the different frameworks, case studies, as well as related security and privacy issues to adoption of cloud computing in hospital.

II. FRAMEWORKS OF CLOUD COMPUTING IN HEALTHCARE

The work in [3] proposed the secure Health Information Systems (HIS) framework based on big data analytics in the mobile cloud computing environment, the framework can provide a high level of interoperability, integration and sharing of Electronic Health Records(HER) among patients , healthcare providers and practitioners.. The big data analytics helps analyze patients' data in order to provide right intervention to the right patient on time .The proposed framework also applies a set of security's constraints and access controls that ensure the confidentiality, integrity and privacy of health data. The main objective of this framework was to introduce a new generation of Electronic

Health Records (EHR) capable of providing low-cost , high-quality health services to patients using a combination of cloud computing , mobile cloud computing and big data.

The researchers in [4] proposed a cloud-based framework for information integration and informatics in health care application. The framework consists of Data Access, Data Analytics, Data Integration, Data Orchestration, Data Storage. The framework will allow the analysis, storage and integration of health care data in cloud. It also helps in rapid interaction between healthcare providers and patients. As well as the development of advanced healthcare application with integrated data in another database. The efficiency of the framework has been clarified with patient records and Health Mapper. The framework developed using the Aneka cloud platform.

The framework introduced in [5] for predicting health shocks based on a wide range of health informatics dataset. The proposed framework was developed using cloud services based on Amazon's web services integrated with geographical information systems (GIS) services to facilitate the collection, indexing and storage of big data, as well as the visualization of data by smart devices to

various stakeholders. It will facilitate the collection of population based on the socio-economic level, cultural and geographical criteria of Pakistan. These big amounts of data can be collected continuously for processing, storage and retrieval on the cloud. Thus, this framework will be able to help in understanding the various criteria such as socio-economic, cultural and environmental. which cause health shocks either directly or indirectly, But the researchers did not expand this study to form the first public available health information tool in Pakistan that can help health professionals and government to form health care policies and reforms.

The researchers [6] introduced the cloud-based collaborative media service corresponding framework, where collaborative media are used to access various areas such as education, health care, defence, and other areas. Cloud computing has been used with this framework because of the need for an infrastructure that provides on demand access to a shared set of computing resources such as networks, servers, stores, services, and applications. This framework was provided to the cooperative service for effective cooperation between health care professionals and caregivers. This

framework was used to detect voice diseases, and with the emergence of multimedia communication techniques such as (voice mail, video conferencing, web conferencing), the doctors, patients and caregivers were able to collaborate with each other. The proposed system is capable of providing adaptive collaborative services based on user's preferences, device's sensors capabilities and processing. The researchers used an external database Massachusetts Eye and Ear Infirmary (MEEI subset) to examine their own approach, giving their proposed framework features of agility, full scalability, flexibility and ubiquity, but their database was not deployed on the Amazon cloud.

The researchers in [7] discussed some of the difficult issues facing traditional healthcare services in Saudi Arabia, such as the complexity of e-health projects, the high cost, the lack of staff's skills of information and communication technologies and the obstacles to electronic health. Due to, shortage of health professionals, and the increase of chronic diseases such as hypertension, diabetes and heart disease, the researchers presented a strategic framework for cloud computing for decision-making based on a Holistic Approach framework. The

framework is comprehensive, and covers five main aspects that are "Organisation, Technology, Environment, Human and Business". There is still a need for further improvements in the near future to cover all factors affecting the adoption of cloud computing in the health sector in Saudi Arabia. Critical health care patients in remote and rural areas and some urban health facilities do not have the same level of access to intensive specialist support as patients in higher care level urban critical care units (CCUs).

The researchers in [8] presented a cloud computing framework for real-time urban, rural and remote service of critical care. Here, the researchers introduced Artemis Cloud, a cloud computing based Data-as-a-Service and Software-as-a-Service approach to provide remote real-time monitoring of patients, as well as support for clinical research. The research proved that support is great possible for patients within critical centers units (CCUs) in those areas, without the immediate need to transfer patients to urban centers. The researcher demonstrated this research through a case study within the neonatal intensive care unit (NICU). For this purpose, they were currently using the Cross Industry Standard Process for Temporal Data Mining (CRISPTDM) and

the Service based Multidimensional Temporal Data Mining (STDMn0) temporal data mining technique to support the clinical research study.

The researchers in [9] proposed a framework that contains the most important security processes associated with cloud computing technology in the health care , such as information security risk assessment , information security risk treatment , information security incident management, the control of outsourcing processes , and requirements management. All of these processes are key to ensuring the security of required information. Because of the limited resources, all an information security management system (ISMS) processes are not recommended to be established. And their interaction at an activity level to ensure an appropriate interaction of the ISMS processes. While not every ISMS process needs the same level of maturity, also an approach should be developed to identify the appropriate level of maturity using a proper maturity level model. So health care organizations have used cloud computing technology and focused on those processes mentioned above, since these processes needed at an adequate level of maturity. However, there is still a need to develop a detailed framework of (ISMS) (input, output, and

interfaces) processes , and their interaction at an active level . Since all the processes of SMS do not need the same level of maturity , an approach should be developed to determine the desired level of maturity using a maturity level model

III. CASE STUDIES OF CLOUD COMPUTING IN HEALTHCARE

The researchers[12] in introduced a cloud-based health care system. In this system, researchers integrated an informal care system (Microsoft HealthVault). With a formal care system called the Data Capture and Auto Identification Reference (DACAR). The advantages of this integrated system were to provide high levels of privacy and security within the cloud environment, also allowing sharing of both Health records and access rights. The researchers also identified a case study that helped assess and demonstrate the convenience of a cloud-based integrated health care system.

The researchers in [13] introduced the knowledge-as-a-service model, a new model of service in cloud computing technology. This model was designed as a framework for the knowledge cloud system. This system is characterized by facilitating interoperability among

members of the knowledge network. The aim of this model was to develop cooperative networks in the medical services industry. This framework was applied in a case study in the field of medical radiotherapy Dynamic treatment service in China.

Researchers in [14] proposed a new solution for hybrid mobile cloud computing for the most effective personal medical monitoring. The researchers studied a case to demonstrate the efficacy and effectiveness of the proposed approach (mobile-cloud based electrocardiograph) by monitoring, analyzing and develop a mobilecloud prototype. The advantages of the proposed system, as shown by the results, are that the system significantly improves conventional mobile-based medical monitoring in terms monitoring, in terms of accuracy of diagnosis, energy efficiency and efficiency of implementation, and holds the potential in addressing future large-scale data analysis in personalized healthcare.

The researchers [15] discussed the strategic value of applying cloud computing solutions in the Saudi hospital based on The Balanced Scorecard (BSC) approach. In this research, the researchers presented the strategic map as well as the Key Performance Indicators(KPIs)used

by the Saudi hospital. The expected results of this research were the possibility that the KPIs and strategy map were used by the Electronic Health Department (EHD).

IV. CURRENT STATUS IN MEDICAL FIELD AND CLOUD COMPUTING

The health market of India can increase to 8.6 trillion Rs. by 2022, which means that scope of betterment of healthcare services increases, considering the increase in GDP. The government expenditure has been increased from 1.2% to 1.4% in FY14, which India is planning to increase to 2.5%by 2025. Sector of Indian Indian healthcare growth is about 20 percent a year. In the year 2000 and direct investment in hospitals and diagnostics in 2011 centre’s was USD 1.1 billion

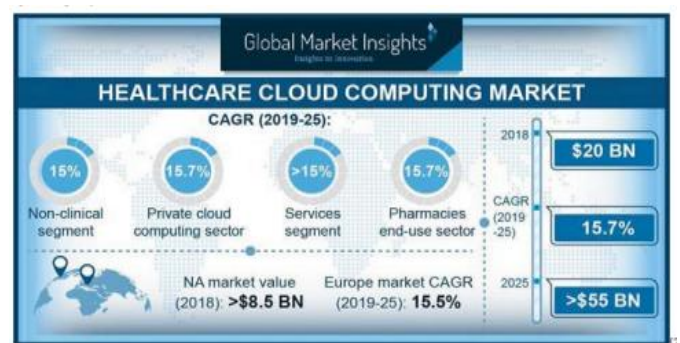


Fig.1 Market of cloud computing

SOURCE: AWS NETWORK By 2025, healthcare cloud computing market is set to surpass USD 55 billion according to Global market Insights. The North

American accounted for the largest share of the cloud computing market in 2018, by increase in the use of Electronic Health Records in professional medical field, also because of the active participation of private sector in the industrial development. In the year 2011, the use of cloud computing in the health care industry rise from 4% to 20.5% according a report of Markets and Markets. Each cloud holder holds only less than a 5% share in health care market, according to the report. Some of the health care providers are Agfa Healthcare, CareCloud, Dell, GE Healthcare and Merge Healthcare

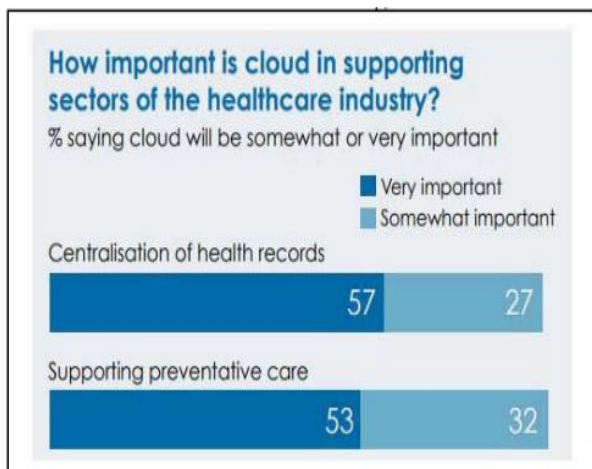


Fig.2 Importance of cloud computing

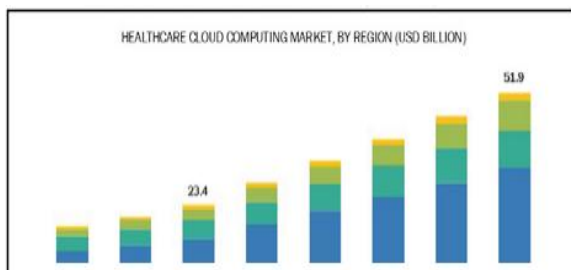
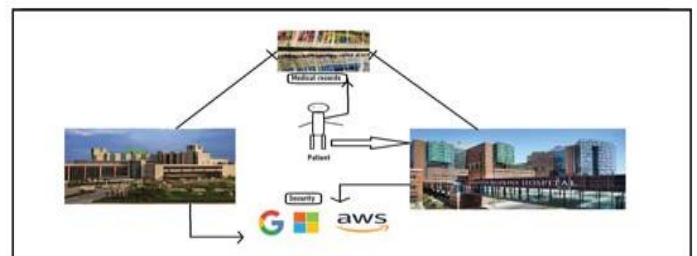


Fig.3 Health cared cloud computing market by region

V. PROPOSED SYSTEM

As from the traditional method is that the patient and the doctor can access the records of the patient by simple login id and the password, which is more prone to hacking. Our proposed solution as in fig 1 is that assuming a person living in India moves to abroad taking example California. Now he wants to access his records which are linked to an Indian hospital, we will establish a link between hospitals one in California with one in India, whose security will be managed by the security providers like Google, Microsoft and AWS, which is not available for the patient alone, and also it is less prone to get hacked. So, there is been increase in the security of medical records and the patient can easily access the record by the help of the linked hospital.



The security providers like Google, Microsoft and AWS provides the best data security against the data stealth and hacking, which is being proved by the

statistical data of the breach in security in the previous years.

VI. CONCLUSION

As from the discussion above we have concluded that, the traditional ways are more prone to hacking as they are using the simple techniques as login and accessing the medical records by the patient or the doctor, what we have proposed is less prone to hacking because the way for accessing the medical record of the patient is between the hospitals not directly to the patient, who is more vulnerable to hacking as it is not protected with security of tech companies such as Google, Microsoft, and AWS etc. The only drawback in this new technique is that it is not that efficient as that for a long distance idea, because for short distance the person still have to go the nearest hospital to get the data, as it was shown in the earlier section that this kind of problem were addressed but not in the same manner and with not the same proposed plan as of this paper, but the most important thing is that we have proposed an implementable plan with the help of the best security providing agency in the world which almost solve the problem of the breach in accessing the medical files by the patient.

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