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A Survey on Health Care facilities by Cloud Computing

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***Abstract*— The literaure work tends to increase the awareness about the use of cloud computing in the medical field about the traditional method of storing the data, the extent in using cloud computing in the medical field, about companies that are providing the platform of cloud computing in medical field and how much money is spent on these projects every year. The paper is concerned about the security of the data in cloud network and servers by analysing the state of art in the field, as how can we increase the security and there is also a proposed plan for increasing the security of the data.**

Keywords—cloud computing, medical records, EHR's, AWS, data processing

I. INTRODUCTION

The new internet platform commonly known as Cloud Computing which ensures the storage of all types of data on the internet safely. Here the cloud is a metaphor for internet. Cloud computing research is the new hotspot for the research field, big tech and pharmaceuticals use this platform provided by the companies such as Google, IBM, Sun, Amazon, and Microsoft. Growth of cloud computing is exponential in IT sector.The most important data in today's world is the medical data, and it is a very difficult task to ensure the safety of the data, so in the paper we are going to analyze the present status of the health care medical record storage system using cloud computing and propose our theoretical plan to easily accessing the data, with more security.Cloud computing is a very profitable market if well used. But from the recent data and news it is been seen that as it is growing so fast it is opening more gates for data theft.A recent study reported that the potential of cloud computing will increase in the medical field and proposed different prototypes and frameworks in an attempt to improve health services. The research development panel of cloud computing revealed the automation in which the framework sends the vital data of a patient by a network or group of sensors connected to medical devices, and to deliver data to medical centers cloud for storage, processing, and distribution. The noting benefits of the system are, it provides the users with high accessing of data and correcting the errors if any. Cloud Computing works as a signal processing and security to mobile devices via multimedia sensor,Cloud Computing provides the data storage of the patients in the medical field which provides easy access to information. With its data backup redundancy technology, it provides data security ease storage access. Cloud Computing is becoming the best requirement necessity in the medical field.

II. RELATED RESEARCH

Data processing based on cloud in smart cities, this concept becomes popular as an improvement in lifestyle of urban citizen. The problem addressed was the migration problem of virtual machine and user's mobility, the solution was found to be a proposed model called PRIMIO, which achieves a optimal solution to bring resources closer to the user, despite of the mobility of the user and virtual machine.[1]

The current status of health care in terms of security and legal the challenges and opportunities can be solved using plan to migrate from traditional to cloud based health services. The new model provides more efficiency and flexibility and less expense using. For the security aspect we should take help of main providers such as Microsoft, Google and Amazon, which can be done by the help of already proposed model HC^2SP.[2]

As the lifespan of people will increase with recent advancements in drugs and quality of living, it's vital to watch the health of patients and healthy people on a each day. This is often unattainable with the present health care system. Also they did not had access to the control of data of their health outcomes and monitoring of different wellness, health and fitness factors for trailing process towards their health goals. So there's a desire for wireless devices that

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may be used from home. These devices square measure known as medical specialty wearable, and that they became standard within the last decade. There square measure many reasons for that, however the most ones are: costly health care, longer wait times and a rise publicly awareness concerning rising quality of life.[3]

In the current era, there's a demand of a system with connected devices, persons, time, places and networks that is totally incorporated in what's referred to as Internet of Things (IoT). Earlier real time monitoring of patients health condition from remote areas was not possible. Quality of life, infirm security of systems and processes and privacy issues are some of the important problems that need to be resolved immediately. After looking the methodology for authentication protocol, for access management and for energy economical access management mechanism, a combined methodology is planned to be adopted to pool the gap.[4]

The amount of healthcare data such as different text types , sounds and images are increasing rapidly day by day . So storing and accessing this data has become a major challenge and it is also necessary and challenging issue. They published that presenting model based NpSQL database would be more efficient.[5]

Diseases caused due to air pollution .In this Era Diseases and Deaths due to air pollution have increased rapidly due to Air pollution. They introduced new device called Air Quality Indicators (AQIs).[6]

Challenges faced in m-Health Monitoring System The Framework consists of three modules namely Data Storage Layer, Data Annotation Layer, Data Analyser Layer. In the layer of data storage, a multiple access method was improved to maintain high security. In the Data Analyser Layer, the process mining algorithm is used to support the personalized treatment plan.[7]

Electronic Health System is underlying security and privacy. The security is assessed in three scenarios. The solution to this problem is that SME migration impact the service resilience in cloud computing.[8]

A new way was proposed to maintain the cloud based electronic system with attribute based encryption. This system allows their patients to selectively disclose their PHR's with physician without knowing that the precise description. This mode has also proposed three extension to fill the gap between the proposed and practical application. [9]

Accessing control for electronic health record system to protect patient privacy. There are three classes of model were discussed which are accessing control for electronic health records accessing control for interoperability and control for risk analysis. Role based Meta model to access control with semantic, spatial, temporal, dynamic and probabilistic aspects to provide granular level access control. Interoperability and risk analysis was done for three models analyzed. [10].

III. 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.

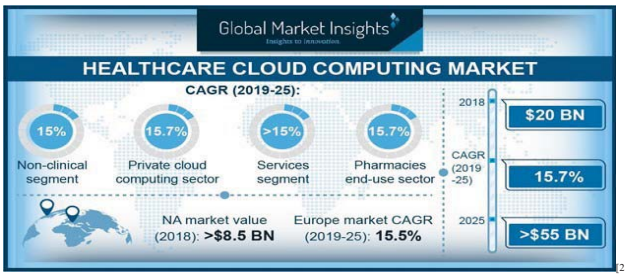


Fig 1. Market of cloud compuing

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 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 hold 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

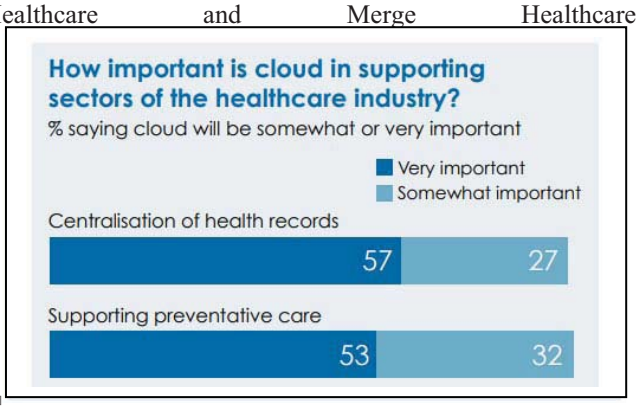


Fig 2. Importance of cloud computing

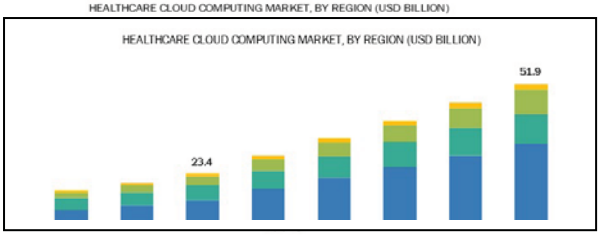


Fig 3. Market by Reigon

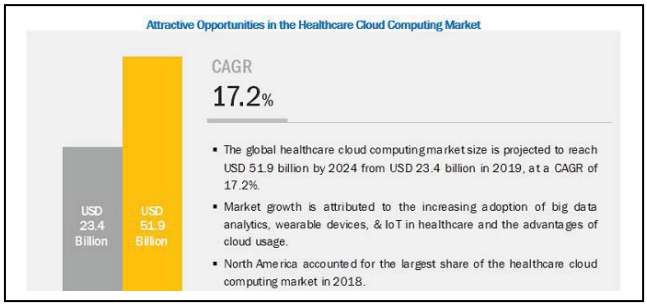


Fig 4. Size of Market

IV. CHALLENGES IN THE PRESENT SOLUTION

Confidentiality: Act of ensuring that the health records of a patient is kept completely undisclosed to unauthorized entities. Giving the access to the cloud computing network increase the risk of data compromise, because now the data is been exposed to more number of parties by giving access to the different number of parties. For an efficacious and constructive relationship between a patient and a doctor, it is important for the patient to have faith in the system to protect the confidentiality of his/her data. If the patient feels that the information about his/her medical records that he/she provides to his/her doctor isn't sheltered and secured and that his/her privacy is intimidated, he/she can be more precisely particular in sharing the data that is required in the future. Due to the compromise of the patient data it can adversely affect the relationship between the doctor and the patient. The confidentiality of the record can be increased by accessing control and utilizing encryption techniques.

Integrity and ownership of healthcare information: Integrity means that the record is precise, stable and error free and cannot be changed or altered in any manner. For good reliability use of important application eHealth cloud is required. Investigator is the owner of the information. Ownership establishment is necessary for protection against the unauthorized access or embezzlement of patient records. Ownership can be secured by the use of encryption and watermark techniques.

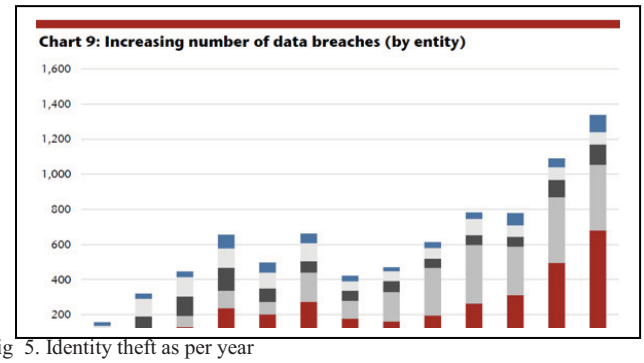


Fig 5. Identity theft as per year

TABLE I.

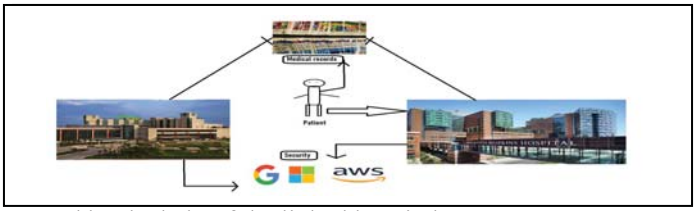
Data Leak Incidents in Recent Years (Data Source Is from the Dataset of World's Biggest Data Breaches

Organization	Records	Breach Date	Type	Source	Industry	Estimated Cost
Anthem insurance	78 million	January 2015	Identify theft	Malicious outsider	Healthcare	$100 million
Yahoo	500 million	December 2014	Account access	State sponsored[1]	Business	$350 million
Home depot	109 million	September 2014	Financial access	Malicious outsider	Business	$28 million
JPMorgan chase	83 million	August 2014	Identify theft	Malicious outsider	Financial	$13 billion
Benesse	49 million	July 2014	Identify theft	Malicious insider	Education	$138 million
Korea credit bureau	104 million	January 2014	Identify theft	Malicious insider	Financial	$100 million
Target	110 million	November 2013	Financial access	Malicious outsider	Business	$252 million
Adobe System	152 Million	September 2013	Financial access	Malicious outsider	Business	$714 Million

SOURCE: AWS NETWORK

V. OUR PROPOSED SOLUTION

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



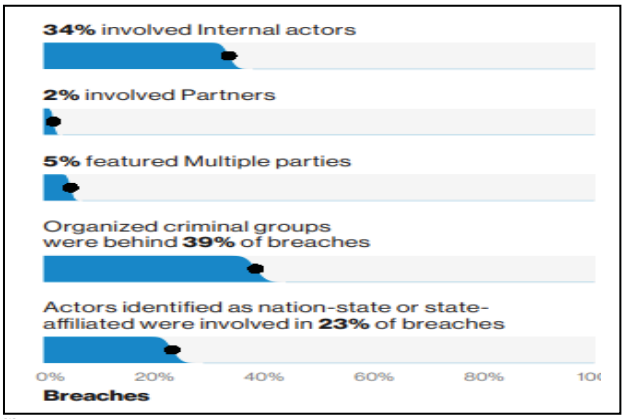
record by the help of the linked hospital.

[6]

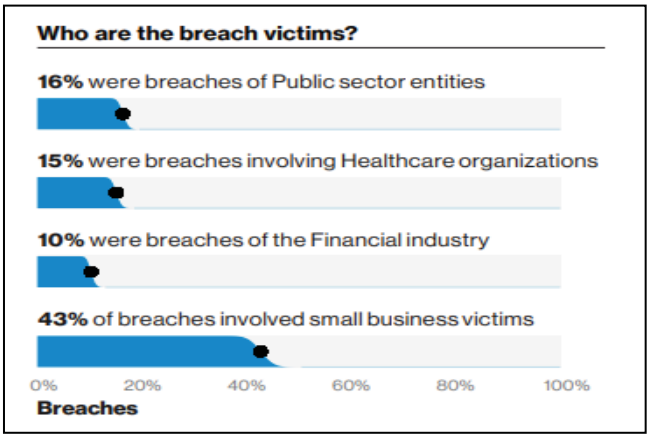
Fig 6. Our proposed plan

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.[10]

Who were behind the attacks?



[8]
Fig 7. Who behind the breach

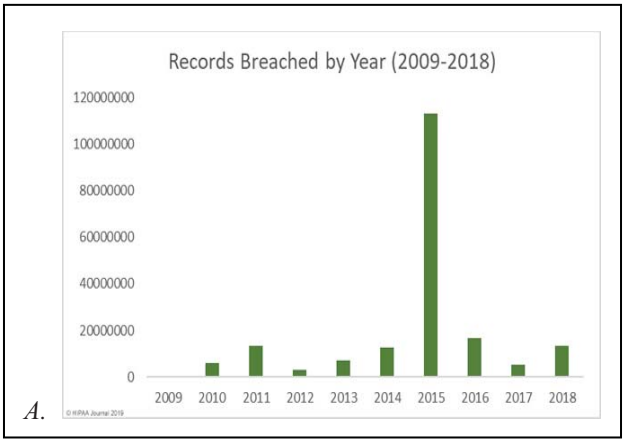


Who were breached?

Fig 8. Victims of breach

How they were breached:

As companies continue to transition from their emails and by simple transition techniques, Criminals simply shift their focus on the most valued information which is health records. Increase in the hacking of cloud based email servers. It doesn't imply that cloud services are less secure;



A.

these are generally the phishing attacks. [11]

[7]
Fig 9. Records of breach by year

SOURCE: AWS NETWORK

These security providers use a technique called LastPass which is a hashed algorithm that cannot be reversed which make it very difficult for the attacker to compromise.

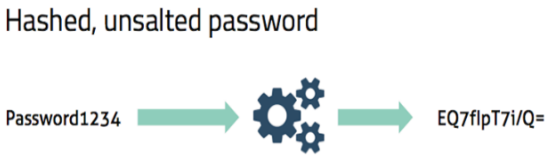


Fig 10. Hashed password

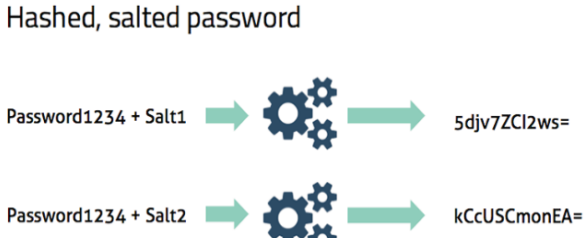


Fig 11. Hashed password

There's no mathematical way to retrace the path of the hashed, unsalted method it, it cannot be reversed.

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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