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ROLE OF CLOUD COMPUTING IN HEALTHCARE: A REVIEW

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ABSTRACT

Nowadays as the growth in the use of recent information and communication technologies increased, there is persistently growing healthcare data over the Internet. There are several challenges in web based systems like scalability, availability, etc. There are several categories of services offered on demand over the web. Cloud computing is internet-based computing paradigm, where shared servers can provides storage, computing power, development stages and software to computers and other devices if required. Cloud healthcare, interestingly, tries to change the healthcare delivery model: from doctor-centric to patient-centric, from acute reactive to nonstop preventive, and from inspecting to monitoring.

KEYWORDS: *scalability, Cloud, Internet, healthcare, doctor-centric to patient-centric.*

INTRODUCTION:

Cloud computing reduces the investment on hardware, software and professional aptitudes. It helps user requisitions to access different computing resources to any specified area. This technology also permits consumers and businesses to use provision without establishment and access their personal files at any computer with Internet access. In the early a piece of the twentieth century, medical care was delivered at home, through visiting family physicians who packed the necessary medical technology into a specialist's pack. Later, advanced medical technology and specialist providers must be centralized in hospitals to make their usage effective. In the current century, the absence of sufficient hospitals in rural and resource-poor areas, the exponential complexity of lifestyle (predominantly urban) and the increasing of interminable diseases make healthcare a serious issue. Driven by quality and expense metrics, the healthcare systems have to change fundamentally in the near future from current healthcare professional-centric systems to one of distributed network and mobile healthcare systems. In this movement, the leading part is attributed to the cloud computing technologies.

LITERATURE REVIEW:

Cloud Computing is a quickly developing trend that includes several categories of service, all offered on demand over the Internet in a pay-as-you-go model, it promises to increase the velocity with which requisitions are deployed, increase improvement, and lower requires, all while increasing system agility. Utilizing a Cloud Computing strategy for Information Support Systems will help in directing core business activities with less hassle and greater

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efficiency. Associations can maximize the use of their existing hardware to anticipate and serve specific peaks in usage. Many virtual machines and provisions might be managed more easily utilizing a cloud-like environment. Businesses can likewise save on power sets back the ol' finances as they reduce the number of servers required. What's more with IT staff spending less time overseeing and monitoring the data center, IT teams are well placed to further streamline their operations as staff complete more take a shot at fewer machines. Information Support Systems in Cloud might refer to a collection of technologies that include hosted infrastructure (IaaS), like virtual servers, network equipment and circle space; hosted operating systems (PaaS), like Windows Azure and Google App Engine; and requisition level services (SaaS). [1]

In year 2010 auther [2] presented a system to automate the process of collecting patients' vital data through a network of sensors connected to legacy medical devices. This cloud-based system expects to transport the data to medical centers to be stored, processed, and distributed likewise to the needs at the time. The creators assert that their system may be beneficial as it can provide clients with 7-days-a-week, automated, real-time data collection, in an error prone easy deployment process.

Furthermore Nkosi et al., in year 2011 [3] only proposed a bio-sensor based framework that can advance far off diagnostics and healthcare information gathering. The creators report that Bio-sensor based systems might be used to gather relevant multimedia health information and improve the quality of remote indicative both for walking and constant monitoring of endless diseases. In more detail, they address bio-sensor sign processing and secure communication of sensor indicators based on next generation mobile technology and bio sensors, with the expect to facilitate the development of secure and innovative m-health services.

One of the key benefits will be the ability to exchange data between disparate systems. This capability is something healthcare IT is desperately needs. For instance, cloud computing can support healthcare organizations to share information such as EHR, doctor's references, prescriptions, insurance information, test results stored across different information systems. This is already happening in the radiological area, where many institutions have moved to the cloud to lower their storage costs and facilitate the exchange of images. [4]

The Smart Clinical Decision Support System (Smart CDSS) designed and developed by Hussain et al., [5] in 2013, takes information from diverse modalities, for example, sensors, user profile information, social networking, clinical knowledge bases, and medical experts to generate guidelines based personalized recommendations. The creators include Smartphone-based, accelerometer-based, environment-based activity-recognition algorithms in order their system to recognize users' everyday life activities. For example, online networking data are captured for a diabetic patient from his/her social interactions on Twitter, e-mail, and Trajectory and after that combined with clinical observations from real encounters in health-care facilities. The information is converted into standard interface emulating Hl7 vmr benchmarks and submitted to the Smart CDSS for it to generate recommendations. The creators tested the system for 100 patients and utilized the Azure cloud infrastructure for their research.

A cloud based framework proposed in 2015 [6] offers personalized recommendations about the health insurance plans. They used the Multi-attribute Utility Theory to help users for comparing different health insurance plans based on coverage and cost criteria. They have used a ranking algorithm to find the order priority of services to be offered. The model developed is useful for making a final decision by considering the benefit offered by an insurance plan.

In year 2015, Zhen Huang et al. [7] have developed a storage allocation scheme that not only achieves good data reliability but also minimizes the data redundancy as well. They come with a practical and efficient storage allocation scheme for effective storage of health records based on generating function, which is able to minimize the data redundancy. They have proved analytically the

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features of their system and their model is capable of providing reduction in the search space and the acceleration computation.

Considerable benefits are provided by Cloud computing to the healthcare sector are doctor's clinics, hospitals, etc. require quick access to computing and large storage facilities which are not provided in the traditional settings. Healthcare data is also needs to be shared across various settings and locations. There are requirements to improve services for their customers, the patients, to share information easily than before. By using cloud we can improve operational efficiency at the same time in the healthcare organizations at the same time [8].

Healthcare provider systems having benefits in comparison to in-house client-server systems are including economic, operational and functional.

The above literature can be summarized as given Table1:

S. No.	Author	Year	Model/Framework/Proposal
1.	Rolim, C et. al.	2010	Presented a system to automate the process of collecting patients' vital data through a network of sensors connected to legacy medical devices
2.	Nkosi et al	2011	Proposed a bio-sensor based framework that can advance far off diagnostics and healthcare information gathering.
3.	Hussain et al.	2013	Developed model to take information from diverse modalities, like sensors, social networking, clinical knowledge bases, and medical experts to generate guidelines based personalized recommendations.
4.	Assad Abbas et al.	2015	Proposed a cloud based framework that offers personalized recommendations about the health insurance plans.
5.	Zhen Huang et al.	2015	Developed a storage allocation scheme that provides data reliability and minimizes the data redundancy too.

TABLE 1: SUMMARY OF LITERATURE REVIEW

CONCLUSION:

In this paper, we presented cloud computing as a media and technology for improving the healthcare sector domain for medical data storage and sharing in cloud environments. Cloud Computing is a trend that offers several categories of service over the Internet on demand. The use of recent information technology services are resulted in exponential increase in data volumes over the web. The paper discusses few such models and proposals of recent past that include health care services using Cloud services.

REFERENCES
[1] Dinesha H. A. and Agrawal V. K. "Multi-level Authentication Technique for Accessing Cloud Services". In Proceeding of International Conference on Computing, Communication and Application, DOI:10.1109/ICCCA.2012.6179130, February 2012.
[2] Rolim, C., Koch, F., Westphall, C., Werner, J., Fracalossi, A. and Salvador, G. In 2nd International Conference on eHealth, Telemedicine, and Social Medicine(Ed,^ St. Maarten, Netherlands Antilles pp. 95-99, 2010.
[3] Nkosi, M., Mekuria, F. and Gejibo, S. "Challenges in mobile bio-sensor based mHealth development", In (Eds), Proceedings of e-Health Networking Applications and Services (Healthcom), 2011 13th IEEE International Conference on, 21-27. pp.13-15 June 2011.

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[4] Terry, K. (2012) "Cloud computing in healthcare: the question is not if, but when. Retrieved from http://www.fiercehealthit.com/story/cloud-computing-healthcare-question-not-if-when/2012-01-09

[5] Hussain, M., et. al. "Cloud-based Smart CDSS for chronic diseases", Health and Technology, 2013, 3(2): pp. 153-175.

[6] Assad Abbas, Kashif Bilal, Limin Zhang & Samee U. Khan. (2015). A cloud based health insurance plan recommendation system: A user centered approach. Future Generation Computer Systems, 43(44), 99–109.

[7] Zhen Huang, Jinbang Chen, Yisong Lin, Pengfei You & Yuxing Peng. (2015). Minimizing data redundancy for high reliable cloud storage systems. Computer Networks, 81, 164–177.

[8] Impact of Cloud Computing on Healthcare, November, 2012, 2012 Cloud Standards Customer Council.

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