
Impact of IT Infrastructure on the efficient delivery in the health care Industry: A special reference to Cloud Computing

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ABSTRACT

IT Infrastructure is playing a major role in increasing the success rate of any sector. As we can see that IT has modernized healthcare sector to a large extent. With the help of IT infrastructure healthcare sector is blooming. IT has contributed to this sector in all possible way. Many critical records are maintained easily with the help of these technologies. The latest technology of cloud computing has contributed a lot in healthcare sector. Maintaining database has always been an issue in this sector. After implementation of these IT resources, things seem to be quite easy. In healthcare sector IT applications are mostly considered to be an asset rather than an investment. With the emerging technologies like Cloud Computing the healthcare sector has been more effective and fast in terms of providing service. Cloud computing has provided a lot of benefits to the healthcare sector across the globe. Through this critical review, we have tried to identify the attributes of the Cloud Computing which has helped in enhancing the efficiency level in Healthcare delivery. Different research paper have been reviewed related to the Cloud Computing aspects being utilized in the Healthcare sector and to what extent the Healthcare domain in drawing benefits out of it and has been able to provide its customers a higher degree of Customer Satisfaction. Hence, the intent of such a paper is to have an overview of some potential cloud-based technology architecture edge approach along with problems in this software and the underlying reasons for moving health in to cloud technology in India. The paper will also focus on the importance of cloud database which is giving an advantage to the health care units for providing better facilities to the patients. Infrastructure is a crucial component that promotes the underlying purpose of ensuring better quality of treatment and wellbeing for all patients, together with positive health care system experience. At the same time, the healthcare system and staff need to support the effective raise, preventative measures and self-care of the overall population.

KEYWORDS: Cloud Infrastructure, IT Infrastructure, Healthcare, IT Interventions

INTRODUCTION

IT Infrastructure is a basic need of any sector. Every organization takes the help of technology to increase its efficiency and sustainability. As there are many IT-enabled operations taking place in each and every organization so it becomes very essential to build a proper IT infrastructure for the smooth running of the work. Through IT Infrastructure different IT solution and benefits are provided to the employees, customer, and other stakeholders.

IT Infrastructure is the combination of hardware, software, networking, securities and other technological services and resources required for the existence, operation and management of an organization. As there are many IT-enabled operations taking place in each and every organization so it becomes very essential to build a proper IT infrastructure for the smooth running of the work. Through IT Infrastructure different IT solution and benefits are provided to the employees, customer, and other stakeholders. The efficiency of any sector is directly or indirectly dependant on the IT infrastructure because all the components of IT infrastructure provide technological advancement and security. Through registering, the framework for data innovation is composed of virtual resources that help upload, store, prepare and review data. Structure may be distributed within a server farm, or it may be fragmented and spread around a few data centers which are either controlled by the organization or by an outsider, such as a phrasal verb agency or cloud provider. IT is the establishment consists of all factors that in some way play a role in common IT and IT-enabled operations. It can be used for internal commercial enterprise operations or growing patron IT or enterprise solutions.

THE IMPORTANCE OF IT INFRASTRUCTURE IN HEALTHCARE

A powerful department of information and technology is actively searching for best practices, innovating new ways to transform the system to maximize safety and patient care, and making recommendations to hospital budget management executives. IT technology improvements are a significant financial investment for health care facilities, and coordination between IT personnel, doctors and nurses, other frontline clinical / support staff, and hospital managers is a priority in deciding how resources are best distributed. Infection control will still be a concern in hospitals, and awareness of the consequences of any proposed IT technology improvements in terms of their implications for infection control is important. Citizens use their mobile phones more than ever before, which includes physicians and nurses who may spread disease through the hospital and beyond through their mobile phones during their work shifts. Health Information Technology is a broad term describing the technologies and systems used to monitor, interpret, and exchange data on patient safety. Including physical, paper, and electronic health record systems; digital health resources like smart devices and apps; and finally, communities to exchange and discuss information. The aim of Health IT is to give patients treatment and to help create equality in health. Health IT encourages the collection of patient data to enhance

healthcare quality and allows both healthcare professionals and the Ministry of Health to evaluate this information. Health IT enhances the quality of health care delivery, increases patient safety, reduces errors and strengthens patient-to-health care provider service program.

CLOUD COMPUTING AND ITS IMPORTANCE

Cloud computing services provide a lot of benefits in health sector. The efficiency and effectiveness of delivering better service and providing better facilities is maintained. Many general issues faced by hospitals are resolved by the utilization of IT resources amongst which cloud computing is the important one.

There are many aspects associated to cloud computing and it's a wider one. All together are contributing for the development of healthcare sector in India. India has always adopted technologies rapidly for its growth and development. In terms of healthcare sector India has adopted and implemented many new technologies and following IT trends to keep it updated. But now cloud database and use of cloud computing systems is making this issue extinct over time. The probability of facing this sort of issues has been reduced to a large extent. Medical industry and cloud computing partnership has benefited professionals in this area. The hospitals or the medical establishments will accumulate and remotely retrieve data from anywhere Time.

Cloud computing is anticipated to produce a reliable connecting setting for healthcare benefactors, permit easy, instantaneous and omnipresent access to health data. Ratnam and Dominic (2012), came up with a telemedicine solution, in this wireless sensor networks are placed at the patient's bedside to mechanized data assembling and communicating to an exchange service for additional storage, processing and delivery to cloud services. Hoang and Chen (2010), Sharieh et al. (2012), and Berndt et al. (2012) in the FEARLESS and eHealth-MV projects adopted the similar concepts. FEARLESS (Fear Elimination as Resolution for Loosing Elderly's Substantial Sorrows) project presented by Berndt et al. (2012) is utilized to support aged persons in their self-serve activities by noticing an extensive range of hazards by the help of a sensor (e.g., fall); the mobile diabetes (M-Diab) and mobile skin (M-Skin) systems to support the treatment and post-hospital care of patients suffering from diabetes and skin diseases, respectively. The eHealth-MV (eHealthMecklenburg Vorpommern) is generally used to estimate and monitor the stress and fitness level based on physiological signals gathered via wireless sensors. In the prototype by Sharieh et al. (2012), the sensors are attached to the body of the patient to keep track of the oxygenated and deoxygenated haemoglobin concentration fluctuations in the brain and tissues. Hoang and Chen (2010) introduced the MoCAsH (Mobile Cloud for Assistive Healthcare) infrastructure, in this model the collected data are again transmitted to the intelligent context-aware mobile cloud middleware. The authors moreover address scalability, load balancing, security and privacy in an amalgamate cloud service layer, that helps in scheduling distributed clouds with respect to user safety and infrastructural necessities and provides assurance of the ease of service usage via a cloud portal.

Koufi et al. (2010) and Poulymenopoulou et al. (2011) developed an emergency medical system by utilizing the cloud setting on the base of personal health records (PHRs) and other peripheral

systems. Another cloud-based emergency healthcare application was planned by Karthikeyan and Sukanesh (2012) in their model they use palm vein pattern recognition technology to identify the patient and as well as they have created an image processing tool named as DICOM (Digital Imaging and Communications in Medicine) viewer.

Deng et al. (2011) emphasis on home-based healthcare applications, mainly to provide support for the depressed patients, and also came up with a cloud-based system design for home fitness by providing drug therapies, sleep and light, and physical activity management and other services. The researchers originate safety and confidentiality necessities applying occupational lucidity and architecture driven methods, developed a strategy to integrate the planned architecture into a cloud, and give initial recommendations for the safety and protection of the health-related information. Abbadi et al. (2011), Deng et al. (2012), and Berndt et al. (2012) also developed a similar type of Home based healthcare application.

Deng et al. (2012) demonstrate the home intensive care and wellbeing portal applications, to monitor the patient's data uploaded through a mobile device to the cloud and distributing it with medical staffs for added advices on necessity or demand. Vazhenin (2012) presents the architecture of a cloud-based information retrieval service (e.g., DICOM) for a wide range of devices and provides performance measures of the implemented solution. The practical principles of constructing a cloud service can be found in the works by Zhang and Lu (2010), Chiang et al. (2011), and Ratnam and Dominic (2012).

ATTRIBUTES OF CLOUD COMPUTING HELPING IN HEALTHCARE

Adopting technologies for cloud computing will make health-care operations much more efficient and cost effective .The cloud offers on-demand computing through the use of the latest technologies to install, access, and use networked knowledge, software, and resources. Sadly, it also has a complicated network which may be difficult to understand. End users are likely to find in most cases that cloud computing is the best option for their healthcare sector, as it is often less expensive than having several computers in separate medical rooms— each requiring proper equipment, updated software, and connectivity to the network to upload, store, and retrieve patient or other medical data. Healthcare IT technologies have already given the industry many worthy advantages. And now that cloud computing systems, carriers and service providers have improved protection and protections in place, healthcare organizations can be easy to know that they are protected from possible loss of control of some sensitive patient data.

COLLABARATION EFFICIENCY- Cloud computing model gives you the ability to communicate and share more easily outside of the traditional methods. It allows much greater collaboration between patients allowing multiple users to share and work on data and document at the same time. Cloud makes it easy for the healthcare design and construction professionals, who spend much of their time on other clinics or across different locations, to access patient reports related information, files and records quickly and in a secure way and suggest them the medications as quick as possible.

INTEROPERABILITY - A longstanding problem within the healthcare industry is that of interoperability of data. Within healthcare companies, the ability to securely transfer PHI between internal departments is crucial in ensuring efficient operations. Both consumers and the industry at large have expressed a desire for a more connected healthcare industry, where their data can easily be exchanged between organizations as and when it's needed. Cloud computing effectively facilitates this sharing of information and makes it easier for different organizations and businesses to collaborate for the sake of patients. Cloud technology and cloud services encourage businesses to innovate processes, systems, and applications which facilitate and support this necessity for healthcare companies.

AI AND MACHINE LEARNING - The massive amount of data that healthcare providers deal with takes up a lot of time to manage Time that could be spent with patients. Since more cloud platforms are integrating AI and machine learning into their services, they can help alleviate some of that burden. Healthcare providers can use these systems to analyze and respond to the enormous quantity of unstructured data they utilize.

TIME SAVING- The time consumed dealing with one single patient reduces when hospitals use IT technologies. All the reports get generated very fast and records are kept. People can also take online consultation reducing the hustle in the hospital.

TELEMEDICINE CAPABILITIES - Remote accessibility of data is possibly the biggest advantages that cloud storage of data offers. The combination of cloud computing with healthcare has the potential to improve a number of healthcare-related functions such as telemedicine, post-hospitalization care plans, and virtual medication adherence. It also improves access to healthcare services through telehealth.

PATIENT'S OWNERSHIP OF DATA - Cloud computing democratizes data and gives patients control over their own health. It boosts patient participation in decisions pertaining to their own health and leads to informed decision making by acting as a tool for patient education and engagement. Patient records and medical images can be easily archived and retrieved when storing data on the cloud. While cloud security remains a concern, the reliability of cloud for data storage is definitely higher. Data redundancy is reduced with an increase in system uptime. Since the backups are automated and there isn't a single touch point where the data is stored, recovery of data becomes much simpler.

DISCUSSION:

In the last few years, the cost of healthcare service has been gradually increasing. As the prices increase, attracting health-care providers has become difficult. As a result, healthcare organizations were forced to implement information systems which would allow them to automate most of their processes and thus provide more productive services. Cloud computing is one such technology which is being applied by health institutions. Problems with existing systems include high cost of implementation and maintenance, inefficient sharing of patient data, inadequate laws regulating the use of medical data and lack of a standard design framework. By implementing cloud computing, institutions are able to achieve better patient care, lower operating costs, better management of scarce resources, and better service quality for their

customers. Cloud computing also promotes science, facilitates national security, promotes strategic planning and supports financial operations. The key barriers to the adoption of cloud computing are realized to be inadequate safety, security, privacy and protection (Deng et al., 2011; Hoang and Chen, 2010).

In an effort to reduce the workload stress of the ever-increasing burdens present in the health care system, inventors suggested that medical professionals must embrace software-assisted portable healthcare. The emerging software-assisted wearable healthcare systems would help promote health monitoring and direct medical treatment. Healthcare helped by the smart computer, however, faces several obstacles. Human centric device for emotional communication The clinical cloud computing network offers various new digital technology stakeholder tools and facilities. The authors of this article have therefore elaborated a plan for a new mobile web service. The cloud computing platform has been implemented by more than 50% of major health institutions in US and Europe. Based on these statistics and the system are predicted to have been implemented by a significant proportion of health institutions over the next few years.

The researchers address the various opportunities and threats in cloud services based on the adoption of the innovation. According to the report, there are opportunities in cloud computing that include lower operating costs, scalability and versatility. At the other hand, major challenges relate mainly to privacy and protection, downtime in the network and accessibility. (Hucíková and Babić, A, 2016)

Cloud computing is a new and increasingly growing field of healthcare growth. Ubiquitous on-demand access to nearly unlimited services in conjunction with a pay-per-use model allows for the creation, distribution and usage of new forms of operation.

Conclusion

Acceptance of cloud service technology would make healthcare sector more cost-effective and efficient. The cloud offers services as per demand, utilizing emerging technology to install, use networked information, access applications, and resources. But it does have a complex network that can be complicated to understand. End users are likely to find in most cases that cloud computing is the best option for their healthcare sector, as it is often less expensive than having several computers in separate medical rooms— each requiring proper equipment, updated software, and connectivity to the network to upload, store, and retrieve patient or other medical data. Healthcare IT technologies have already given the industry many worthy advantages. And now that cloud computing systems, carriers and service providers have improved protection and protections in place, healthcare organizations can be easy to know that they are protected from possible loss of control of some sensitive patient data. With IT investment on the rise, cloud-based electronic health records (EHRs) are starting to affect the health sector.

Cloud computing has changed the way data is processed and accessed, allowing practically everyone across the globe to make use of data posted from another end of the world by someone else. Making use of data posted on any computer by another machine falls under the large cloud computing concept. Technological advances made cloud computing extremely popular across industries. Once it comes to making the transition from conventional practices, though, healthcare has been a little on the slow track. The key explanation for this was security issues, patient data protection and (to some extent) a reluctance to make the move. However, if properly implemented, cloud computing has a great deal to bring to the healthcare sector.

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