Cloud Enabled Healthcare Services and Its Implications

T.Abinesh, Saravanan.M.S

Abstract: - Ever since the very first cloud service introduced by Amazon Web Services in 2006 the term 'Cloud computing' became buzzing all over the field of Information Technology. Not only in IT field but in all technology related fields and even in business and marketing field began to utilize the Cloud Computing Technology. This technology is so versatile and powerful that apart from running softwares in cloud platform and storing data a whole Operating system can be run. In day-to-day life we are using more cloud based applications involving healthcare, banking, marketing, education and web search engines, etc. In this paper we are specific on healthcare services because it plays a major role in daily operations such as medication, regular health check-up and emergency based services. Especially cutting edge technology can be very useful in emergency situations.

Keywords: Cloud Computing, PaaS, No-Sql, cloud enabled, Online Blood services, No-Sql databases

I. INTRODUCTION

Cloud computing is initially aimed to connect data and people anywhere and anytime. It is believed to be invented by Joseph Carl RobnettLicklider in the 1960s [1]. Cloud Computing is theOn-demand availability of computer required resources like data storage computing power and platforms without any direct management by the user in most cases. The term cloud is a metaphor used for internet which means cloud computing is more like internet based computing. The cloud is not like a network attached storage nor like a server in residence. Cloud computing is growing and is predicted to grow a lot more in a few years with the help of IOT [2].

Fig.1- Cloud computing technology

T.Abinesh, Final year student, Department of Information Technology, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Tamil Nadu.

Dr.Saravanan.M.S, Professor,Department of Data Science and Computational Intelligence, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Tamil Nadu.

The future of computing is in the cloud. Over these past years the cloud services has seen an exponential growth worldwide. This means cloud services are chosen by organizations all over the world to handle the activities that they do [3] On the other hand various leading cloud service offering firms in the information technology sectorpresently contend to convey adaptable cloud services for both general public and organizations [4]. There are many advantages in opting to cloud services, which includes advantages like scalability which allows the users to quickly scale up and down the computing resources to accommodate their changing needs [6]. By using cloud the data is more secure because data in cloud is under industry grade security protocols. Also eventually cloud is affordable because it reduces the cost in upgrading and maintaining. There are various cloud models that have their own set of benefits to the users some are useful in business related services and some are for enterprise uses [7].

II. MODEL OF CLOUD ENABLED SERVICES

2.1 The models of cloud computing

The cloud computing architecture is made of various layers in order to achieve a good efficiency in working. A cloud controller is present in the top to manage and control the servers, network and storage. Cloud computing architecture is comprised of three architectural layers SaaS, PaaSand IaaS. Among these three architectural layers IaaS is the foundation. The SaaS is the top player which is functioning off both PaaS and IaaS. Although SaaS is normally represented in graphics it is the smallest cloud computing architecture [8].

All the three services make up the cloud computing stack with SaaS on top, PaaS in the middle and IaaS on the bottom.
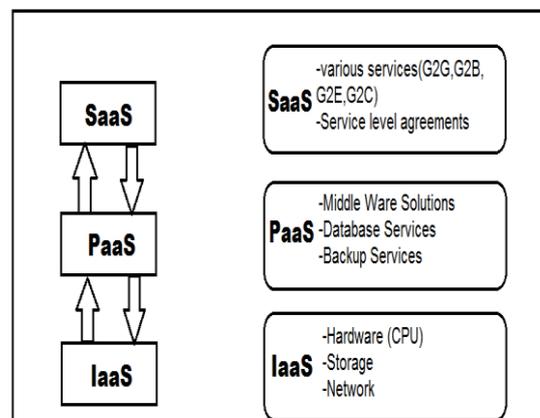

Fig.2.1 – The models of cloud computing

2.1.1 Infrastructure as a Service (IaaS)

IaaS is type of cloud computing model that offers visualized computing resources such as processing or storage, which can be provided as a service over the internet. Mostly IaaS is completelyprovisioned and manage over the internet [9]. This cloud computing model helps the users inavoiding the cost and effort of purchasing and managing their own physical server. All resources offered in IaaS is offered as an individual service component so that the uses can utilize the one that is required. When the users rent the virtual servers and storage the Cloud Service Provider puts everything together by forming a network. Eventually when users rent IaaS cloud service they the hardware along with the software that automates it. So IaaS is simply a service that offers virtual hardware instead of providing physical hardware.

2.1.2 Software as a service (SaaS)

The end users can easily recognize this layer because this layer deals with the actual software applications that is accessed and used by them. SaaS provides a service in which the software is owned and managed remotely by the providers, these software service are mostly offered in pay per use manner [10].

2.1.3 Platform as a Service (PaaS)

In current scenario PaaS is the most popular model with approximately covering 32% of workload in ecommerce business. Platform as service basically provide software and hardware tools over the internet for people who want to develop applications. PaaS users are mostly developers because PaaS provides extensive development tools which save the developer's time on writing extensive codes.
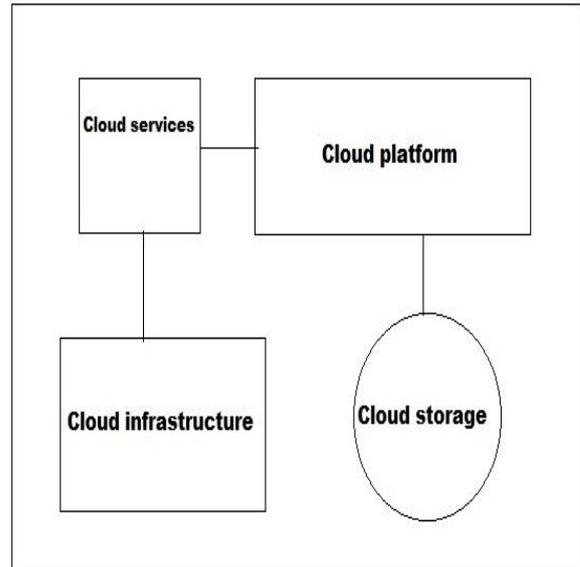

Fig.2.2 - The cloud computing architecture

2.2Cloud computing architecture

Cloud computing architecture basically depicts the components and sub-components used in the process of cloud computing. The cloud computing architecture consists of front-end platforms which are called cloud clients (simply clients). These clients are basically servers, fat or thick clients, thin clients, zero clients, mobile devises. Back-end platforms which is made of storage servers and a network (maybe internet, intranet, intercloud) all of these components combined together make up the cloud computing architecture [11].

The cloud front-end platforms (fat or thick clients, thin clients, zero clients, mobile devises) interact with the cloud data storage through a middleware application, or via a virtual session, or by using a web browser.
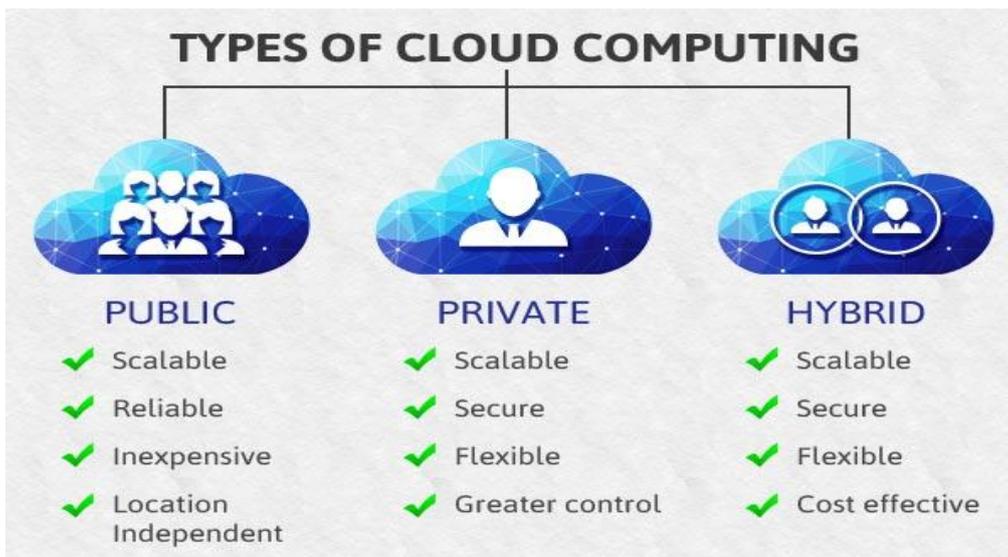

Fig.3 – Cloud Domains

III. DOMAINS OF CLOUD

3.1 Public

In public clouds the provider makes the resources visible and accessible for the public that is for everyone through the internet. Some providers offer these services for free whiles others require subscriptions or pay per use methods to gain access to the public clouds.

3.2 Private

Private clouds are provided for use within only one organization and this is done to isolate the organization's cloud service from others. Mostly private clouds are internally managed and the service is contained within the organization. Enterprise clouds are also Private clouds.

3.3 Hybrid

Hybrid cloud is a combination both Public cloud and Private cloud with few common points co-existing between both the clouds. The goal of hybrid cloud is to combine and unify various cloud data and have better data visibility both public and the private users.

3.4 Community cloud

When a community of organizations with similar infrastructure requirements is in need of cloud service, a community cloud can be used. This is collaborative sharing of cloud infrastructure between several organizations, it may be internally managed or though a third party management it is not a concern in this cloud model.

IV. CLOUD ENABLED HEALTHCARE BLOOD BANK SERVICES

Most of the enterprises have switched to cloud services, with the use of this cloud computing technology they have been able to achieve greater benchmarks than with their previous technologies. Many online services like Amazon web services, Microsoft azure, Google cloud platform, Oracle cloud, Verizon cloud etc provide good cloud services. These cloud services are used in real world in our day to lives, for example the usage of Drop box, Google drive and One Drive are real time examples of cloud storage for both public cloud and private cloud types.

Cloud services are used in many places like marketing where Hubspot and Adobe marketing cloud are two big providers currently. In education for example Slide Rocket where students can do and present slides through online and Ratatype where teachers can test their student in typing.

Also used in healthcare which is very essential and useful in day-to-day life as well as emergency situations. Example ClearDATA, Dell's Secure Healthcare Cloud, IBM Cloudetc these services let Physicians, Nurses, Doctors and even Blood banks and Donors to share information quickly so that many lives can be saved.

Table 1. Analysis of Healthcare Services and its implications on Cloud enabled services

Sl.No.	Healthcare services	Cloud enabled services
1.	Blood bank	Amazon web services
2.	Nursing care	Oracle cloud
3.	Physical, occupational, and/or speech therapy	Google cloud platform
4.	Volunteer care	Microsoft azure
5.	Pharmaceutical services	Alibaba
6.	Laboratory and X-ray imaging	IBM
7.	Care from home health aides	Emc^2
8.	Doctor care	Salesforce

In the above table 1, shown that the healthcare services given by various cloud enables service based vendors. In these vendors the Amazon web services is the top most vendor providing blood bank healthcare services in various regions of the world.

Everyone is aware that the traditional blood bank management system includes paperwork. Its way of working is not efficient enough at the time of emergency situation. . By creating cloud-based blood bank system the blood will be available on time to the people, even in emergency situations. Cloud based technologies may prove to be important in delivery of blood during emergencies. There are many advantages in opting to cloud services, which includes advantages like scalability which allows the users to quickly scale up and down the computing resources to accommodate their changing needs. By using cloud the data is more secure because data in cloud is under industry grade security protocols. Also eventually cloud is affordable because it reduces the cost in upgrading and maintaining.

V. CONCLUSION

Cloud computing a very efficient and useful technology that is adopted and used by several top organizations and enterprises worldwide. The usage of this technology is huge and growing currently, everyone utilizes a part of this technology in their day-to-day life. Cloud computing can be very useful in Healthcare as it is fast and efficient which is very much reliable in agile environments like Hospitals and Blood Banks. So, Cloud computing may become to play a major role in Healthcare in the upcoming future.

REFERENCES

1. David S. Linthicum "Cloud-Enabling Your Software", ISSN: 2325-6095, Vol 16,IEEE 2016.
2. ShyamPatidar, DheerajRane, Pritesh Jain "A Survey Paper on Cloud Computing" 978-0-7695-4640-7/12IEEE 2012.
3. Pierfrancesco Bellini, Daniele Cenni, Paolo Nesi. "A Knowledge Base Driven Solution for Smart Cloud Management."2159-6190/15IEEE 2015.
4. Neetu Mittal, Karan Snotra "Blood Bank Information system using android application." 978-1-5090-3978-4/17 IEEE 2017.
5. Partha Dutta, Tridib Mukherjee, Vinay G. Hegde and Sujit Gujar. "C-Cloud: A Cost-Efficient Reliable Cloud of Surplus Computing Resources"978-1-4799-5063-8/14 IEEE 2014.
6. Mahmud Hossain, Rasib Khan, Shahid Al Noor, and Ragib Hasan. Jugo: A Generic Architecture for Composite cloud as Service",2159-6190/16 IEEE 2016.
7. Muhammad Arif, Sreevas.S, Nafseer k, Rahul .R "Automated Online Blood Bank Database"978-1-4673-2272-0/12IEEE 2012.
8. Saravanan.M.S, V.Shanmukha Reddy, "Cloud-based Messaging to Automate and Secure the Healthcare Information System", Published in International Journal of Applied Engineering Research by Research India Publications, India, Vol.10, Issue.33, May' 2015, pp.24628-24632, ISSN:0973-4562.
9. WijaiBoonyanusith, PhongchaiJittamai "The Development of Web-based System for Blood Requisition within Blood Supply Chain.",978-0-7695-3984-3/10 IEEE 2012.
10. Saravanan.M.S, Y. BhavyaSree. " Modelling a Cloud Storage for Saveetha School of Engineering using Infrastructure as a Service", Published in International Journal of Pharmacy & Technology (IJPT), India, Vol.8, Issue.4, Dec' 2016, pp. 20061-20067, ISSN: 0975-766X.
11. Mr. Shreyas Anil Chaudhari, Ms. Shrutika Subhash Walekar, Ms. Khushboo Ashok Ruparel, Ms. Vrushali Milind Pandagale. "A Secure Cloud Computing Based Framework for the Blood bank."978-1-5386-1186-9/14 IEEE 2018.

Retrieval Number: C5509029320/2020©BEIESP
DOI: 10.35940/ijeat.C5509.029320

938

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication