Review on Data Storage Telecommunication cloud based Model

Mutaz Hamed Hussien [a], H.M, Amin Babiker [b], Magdi B. M. Amien [c], Mohamed Khalaf Alla H.M [d],

[1]Future University, Khartoum, Sudan

[2]Neelain University, Khartoum, Sudan

[3]University of Gezira, Wad Madni, Sudan

[4] Future University, Khartoum, Sudan

ABSTRACT

Cloud Computing is one of very important concept in IT these days, so the Cloud Computing is a more advanced Version of the Data Processing Service Bureaus that we had 40 years ago. Cloud computing is application defined as a type of computing that depend on sharing computing resources rather than having local servers or personal devices to handle applications. Cloud computing is comparable to grid computing, a type of computing where unused processing cycles of all computers in a network are harnesses to solve problems too intensive for any stand-alone machine. Cloud computing allows people the way to sharing distributed resources and services that belong to various organizations and sites. The cloud computing has its own concept, technical, economic and user experience characteristics. The service oriented, loose coupling, strong fault tolerant, business model and ease use are main characteristics of cloud computing. So the cloud computing is use also in telecommunication application and it started to use in Network and data storage application (SaaS)(IaaS) and its growths up this days and there are many new application will be established in next few years show in body of this paper . The data storage is one of the main components of Telecommunication based model so it explained in this paper.

Keywords: Data Storage, cloud Computing, Telecommunication cloud based Model .

1. INTRODUCTION

Historically, the definition of computational clouds has not been fixed, but has changed to accommodate developments developments. At the present time, computational clouds comprise the application(s) used to extract information from in hardware and software; we fully expect its definition to change in adapting to future raw data, the database storing all the information, and the physical storage system and servers. Computational clouds are configured to provide services to end-users (termed "clients") via high speed internet connections. Data security is one of the biggest concerns in adopting Cloud computing. In Cloud environment, users remotely store their data and relieve themselves from the hassle of local storage and maintenance. However, in this process, they lose control over their data. Existing approaches do not take all the facets into consideration viz. dynamic nature of Cloud, computation & communication overhead etc. Cloud components and basic cloud computing [1] [5].
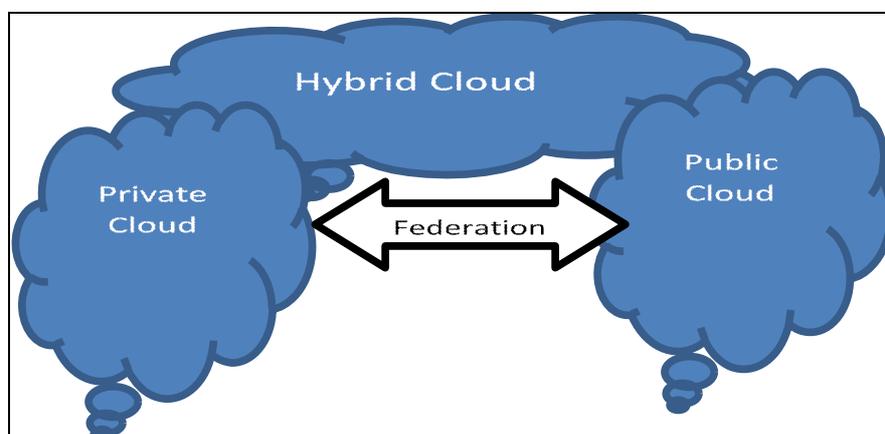

Figure 1, Type of cloud based Model

International Journal of Application or Innovation in Engineering & Management (IJAIEM)
Web Site: www.ijaiem.org Email: editor@ijaiem.org
Volume 6, Issue 12, December 2017   **ISSN 2319 - 4847**

2. PROBLEM STATEMENTS

The benefits include secure and affordable managed hosting, accessibility of data from anywhere at any time, offsite backup, no need of internal IT resources, But there are some limitations as well since it is still an evolving technology. Some limitations and weaknesses of cloud computing which it directly effect in data storage of telecommunication cloud computing model: [14]

- If there is a problem in data center, all virtual machines are affected. There might or might not be a backup of the data if an enterprise relies only on the cloud for its data management needs.
- In a public cloud, the client does not have the control over security of his/ her own data. The clients' data can be susceptible to hacking or phishing attacks. Since the servers on cloud are interconnected it is easy for malware to spread.
- Although cloud computing offers cost benefits, it has some hidden or additional costs as well. Clients are charged extra for data transfer or other services. Initial offerings are priced higher, till economies of scale work out for the service provider.

3. OBJECTIVES

3.1 Main Objective

The data storage is one of the main components of Telecommunication based model so it will study and explained in this paper.

3.2 Specific objective

 Study and review the following:
- Cloud computing applications and types
- Telecommunication cloud based Model
- Telecommunication cloud based services
- Cloud Data storage

Cloud computing applications and types:

4. CLOUD COMPUTING APPLICATIONS AND TYPES

There are several definitions of cloud computing Based on the availability of the datacenter and the related applications to the clients, clouds are of the following three types:

Public Clouds These are clouds owned and operated by third parties, aiming at individual client satisfaction by providing services at lower cost using a pay-as-you-go manner. An identical infrastructure pool is shared by all clients, operating with general constraints such as data security, and limited configuration to data and data variance. All the services are maintained by the cloud providers and may satisfy various needs as per demand. These services may be accessed from within the enterprise (by the user). These cloud services allow for a much greater size than may be possible within the enterprise using the cloud. Amazon's Elastic Compute Cloud (EC2), IBM's Blue Cloud, Sun Cloud, Google's App Engine, and Windows Azure Services are some examples of the few public clouds.

Private Clouds these are clouds that are owned and operated by an enterprise solely for its own use. Data security and control are generally stronger than in public clouds. NASA's Nebula and Amazon's virtual private cloud (VPN) are private clouds. Private clouds are organized into the following two types: On Premise Private Cloud: Clouds falling in this category maintain clouds within the data center of the organization. This provides strong control on data and its flow, and thus best suited for private enterprises requiring high security. They are also known as internally hosted clouds. Off Premise Private Cloud: This type of cloud shares data centers from different enterprises to form clouds. The security level may be a little less stringent, due to the fact that data centers are shared. This is best suited for enterprises who are not interested in sharing physical storage, but that wish not to compromise on security level of data. They are also known as externally hosted clouds.

Hybrid Clouds these are combinations of both public and private clouds. The private cloud providers can use a third-party provider, either in partial or full manner, and provide the service to its enterprise. The augmentation of private

and public clouds via hybrid clouds significantly reduces workloads.[2]Cloud reconfigures, and de-provisions servers as needed. Servers in the cloud can be physical machines or virtual machines. Advanced clouds typically include other computing resources such as storage area networks (SANs), network equipment, firewall and other security computing give the people the way to sharing services and distributed resources that belong to various network organizations and sites. The cloud computing has its own concept, Cloud computing is TCP/IP based high development and integrations of computer technologies such as fast microprocessor, huge memory, high-speed network and reliable system architecture. Without the standard inter-connect protocols and mature of assembling data center technologies, cloud computing would not become reality too. Cloud computing is a term used to describe both a platform and type of application. A cloud computing platform dynamically provisions, configures, devices. Cloud computing also describes applications that are extended to be accessible through the Internet [1].

The explanation of "cloud computing" from the National Institute of Standards and Technology (NIST) [3] is that cloud computing enables ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. According to the explanation, cloud computing provides a convenient on-demand network access to a shared pool of configurable computing resources. Resources refer to computing applications, network resources, platforms, software services, virtual servers, and computing infrastructure. Cloud computing can be considered as a new computing archetype that can provide services on demand at a minimal cost. The three well-known and commonly used service models in the cloud paradigm are software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS). In SaaS, software with the related data is deployed by a cloud service provider, and users can use it through the web browsers. In PaaS, a service provider facilitates services to the users with a set of software programs that can solve the specific tasks. In IaaS, the cloud service provider facilitates services to the users with virtual machines and storage to improve their business capabilities. Cloud computing is closely related to but not the same as grid computing. [4] This cloud essentially has general characteristics, on-demand self-service where consumers can automatically provision computing capabilities based on users requests without requiring human intervention with a cloud service provider. Consumers can easily access the capabilities regardless of the user terminal or platform (e.g. mobile phones, laptops,...etc) .These computing capabilities is provided via the cloud provider's pool of physical hosts and virtual machines which dynamically controlled, optimized, allocated and de-allocated according to the customer requests and agreed service level agreements (SLA) at any time without QoS degradation .There are several Cloud service models as described by NIST SP 800-145.[8]

5. TELECOMMUNICATION CLOUD BASED MODEL

Telecommunication cloud based Model are Internet-based voice and data communications where telecommunications applications, switching and storage are hosted by a third-party outside of the organization using them, and they are accessed over the public Internet. Cloud services is a broad term, referring primarily to data-center-hosted services that are run and accessed over an Internet infrastructure. Until recently, these services have been data-centric, but with the evolution of VoIP (voice over Internet protocol), voice has become part of the cloud phenomenon. Cloud telephony refers specifically to voice services and more specifically the replacement of conventional business telephone equipment, such as a Private branch exchange (PBX), with third-party VoIP service. Cloud communications providers deliver voice & data communications applications and services, hosting them on servers that the providers own and maintain, giving their customers access to the "cloud." Because they only pay for services or applications they use, customers have a more cost-effective, reliable and secure communications environment, without the headaches associated with more conventional PBX system deployment so from this part of definition the Telecom carriers will build cloud based architectures to offer a wider base of applications for SMB and enterprises in a hosted model. They make use of the expertise gained all along in network and data center operations to a great extent in deploying the cloud based solutions. Telecom Carriers may provide hosted enterprise IT / collaboration applications initially and then move on to business process specific applications. Few such examples are mobile field force management, sales force tracking, retail goods delivery tracking, fleet management, location based services, unified communication and collaboration applications using Video conferencing. This offers a great potential not only for increasing the network traffic/usage but also the revenues for company's .The concept of private clouds helps in overcoming any enterprise data security concerns. Cloud based services offer an advantage for enterprise customers in reducing their capital expenditure and use the resources being hosted by a Telecom carrier, in pay per use model. Security, storage needs, computing needs and network managed services for enterprises is another part of offering using clouds as part of "infra as a service" model. Similarly, Telecom carriers will look inward to optimize their various IT estates, data centers comprising different OSS/BSS/SDP/CRM stacks in to a virtualization model, thus bringing OPEX reduction too. Moreover, as the next generation networks are highly componentized, Telecom carriers will find lot of synergy in going for cloud based architectures for their future expansion and deployments.[6][7]
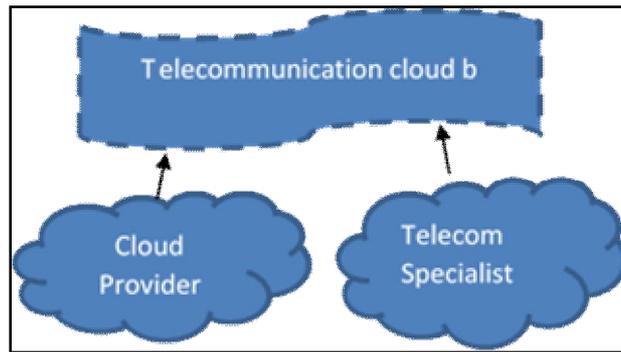
International Journal of Application or Innovation in Engineering & Management (IJAIEM)
Web Site: www.ijaiem.org Email: editor@ijaiem.org
Volume 6, Issue 12, December 2017 **ISSN 2319 - 4847**

Figure 2, Telecommunication cloud based Model

6. TELECOMMUNICATION CLOUD BASED SERVICES

A cloud service is define as any resource that is provided over the Internet. The most common cloud service resources are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).SaaS is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet. PaaS refers to the delivery of operating systems and associated services over the Internet without downloads or installation. IaaS involves outsourcing the equipment used to support operations, including storage, hardware, servers and networking components, all of which are made accessible over a network. SaaS, PaaS and IaaS are sometimes referred to collectively as the model. Cloud services are the same thing as Web services. However, the term cloud services has been more commonly used as cloud computing has become more pervasive.

By other hand for the specific telecommunication services there has been a great deal of discussion about the cloud and its benefits over the last few years, especially in relation to businesses. For example, it promises to offer a shared pool of resources that is quick and easy to deploy, and its elasticity allows it to be scaled up or down depending on business requirements. It also removes the necessity for capital expenditure on infrastructure and software, allowing businesses to pay only for what they use. These benefits can also be applied to the telecommunications industry, but so far the mobile operators have been discussing these benefits in terms of selling cloud services, in the shape of applications and data storage. What isn't being discussed is that mobile operators can actually take advantage of the cloud to deliver key telecommunication services – so how can operators make best use of the cloud for their own benefit, Mobile operators who are looking to take advantage of cloud computing need to implement what we at Open Cloud call Cloud for Telecoms (C4T), a cloud-based technology platform that can deliver telecommunication service applications that constitute the very fabric of the mobile network. These applications are responsible for controlling, and guaranteeing the delivery of telecommunications services, and essentially constitute the "brain of the network". They locate subscribers, implement subscriber preferences and profiles, enable subscribers to make voice calls, send SMS messages, ensure the correct service use in relation to their account balance, perform intelligent routing of calls and regulate the quality and bandwidth of a connection to implement mobile roaming. However, instead of maintaining legacy equipment and installing new hardware and software solutions – particularly as new 4G networks are introduced – to underpin network services and applications, the operators can host the "brain of the network" in one centralized location: the C4Tcan offer operators many of the general benefits that the cloud provides businesses, as well as more specific benefits relating to telecoms and mobility. The scalability and elasticity of C4T provides operators with a more cost-effective approach to service delivery, allowing them to scale up to meet peaks in demand and service adoption when required. [9].

Table 1: Cloud Based Services

Application	SaaS Email, Virtual desktop…
Platform	**PaaS** Database , Webserver , …
Infrastructure	**IaaS** Servers, Storage…

7. CLOUD DATA STORAGE

Cloud storage means the storage of data online in the cloud, wherein a company's data is stored in and accessible from multiple distributed and connected resources that comprise a cloud. [10]Cloud storage can provide the benefits of greater accessibility and reliability; rapid deployment; strong protection for backup, archival and disaster recovery purposes; and lower overall storage costs as a result of not having to purchase, manage and maintain expensive hardware. However, cloud storage does have the potential for security and compliance concerns. There are four main types of cloud storage:

Personal Cloud Storage Also known as mobile cloud storage, personal cloud storage is a subset of public cloud storage that applies to storing an individual's data in the cloud and providing the individual with access to the data from anywhere. It also provides data syncing and sharing capabilities across multiple devices. Apple's iCloud is an example of personal cloud storage.

Public Cloud Storage Public Cloud Storage is where the enterprise and storage service provider are separate and there aren't any cloud resources stored in the enterprise's data center. The cloud storage provider fully manages the enterprise's public cloud storage.

Private Cloud Storage Private Cloud Storage is a form of cloud storage where the enterprise data and cloud storage resources both reside within the enterprise's center and behind the firewall. Also known as internal storage clouds, private cloud storage services are managed inside the data center and as a result almost always carry higher capital and maintenance costs than public cloud storage services due to the enterprise needing to provide the data center space, network connectivity, power and cooling.

Private cloud storage does help resolve the potential for security and performance concerns while still offering many of the benefits of cloud storage such as scalability, reliability, rapid deployment and the option of management by a specialized cloud storage provide

Hybrid Cloud Storage Hybrid cloud storage is a combination of public and private cloud storage where some critical data resides in the enterprise's private cloud while other data is stored and accessible from a public cloud storage provider. From all these types defined in the last paragraph the Cloud Storage can able user to configure and use online storage devices as storage targets. Cloud Storage reduces the need to maintain hardware resources such as tape or disk storage devices at onsite locations. It also provides the ability to easily increase your storage capacity as and when it is required. Cloud Storage provides centralized data access, better failover capabilities and reduces the day-to-day storage administration tasks. As the data gets transferred over the network, protecting the integrity of data is an important aspect of any cloud storage implementation. [11]
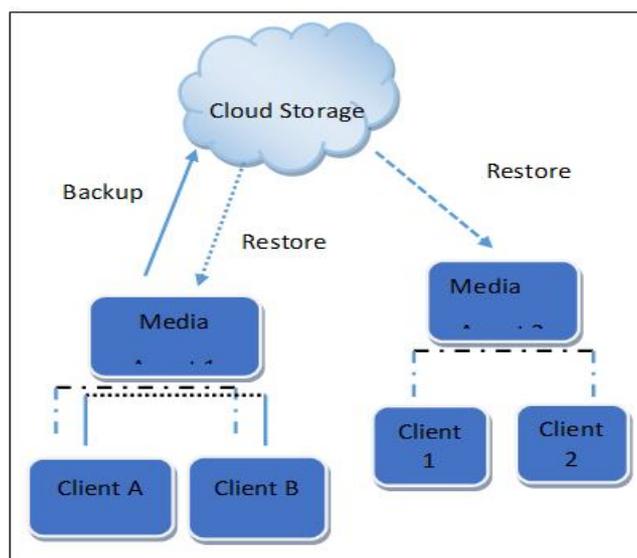

Figure 3, Cloud storage

8. RESULTS

The telecommunication cloud computing based model one of the application of cloud computing and its establish and grows this days so there are still numbers of limitations are present and it have major effect in data storage of cloud

computing, Cloud service providers are continuously evolving solutions to overcome of Cascading effect, Control of data security, Integration and Generic, and there are some groups working in evolving solutions to this limitations.

9. CONCLUSION AND FUTURE DIRECTIONS

In this paper cloud computing, Telecommunication cloud based Mode and data storage of them is study and reviewed so the conclusion and future direction can summarize I the following:

- Cloud computing is one of a really compatible and cheaper way for companies to have all the resources they need in once place.
- It's one of a much better method or application can spread your resources, and it becomes easier to access things from longer distances from anywhere when the connection is available.
- cloud telephony as one of the telecommunication cloud base model could offer a small or medium-sized business services on a lower-cost
- Data storage in cloud computing offering many benefits—including cost savings, flexibility and agility—that have compelled companies to transition to large-scale virtual server environments.

In base of future directions in Cloud Computing and with its interesting characteristics and different service models, is seen as an opportunity for customers but also as a challenge for telecom stakeholders that should more concentrate their activities on this concept (services and application with consideration of security issue).

References

[1] Sanjay Ram M   Vijayaraj A , "Analysis of the characteristics and trusted security of cloud computing" International Journal on Cloud Computing: Services and Architecture(IJCCSA),Vol.1, No.3, November 2011.
[2] Caporaso, J. G., Lauber, C. L., Walters, W. A., Berg-Lyons, D., Huntley, J., Fierer, N., et al. (2012). Ultra-high-throughput microbial community analysis on the illumina hiseq and miseq platforms. ISME J 6, 1–4.
[3] P. Mell and T. Grance, "The nist definition of cloud computing," National Institute of Standards and Technology, vol. 53, no. 6, article 50, 2009. View at Google Scholar
[4] F s. Berman, G. Fox, and A. J. G. Hey, Grid Computing: Making the Global Infrastructure a Reality, Volume 2, John Wiley and ons, 2003.
[5] Hiren B. Patel , Dhiren R. Patel, Bhavesh Borisaniya and Avi Patel 17. S.P. College of Engineering, Visnagar, India18. S.V. National Institute of Technology, Surat, India19. City University, London, UK Data Storage Security Model for Cloud Computing
[6] Arnold, Jon. "Why businesses need to think differently about cloud communications", Focus, April 16, 2010.
[7] Whitemore, James. "Unified communications for the enterprise: hosted VoIP or cloud communications", Smoothstone IP Communications, June 4, 2009.
[8] P. Mell and T. Grance, "The NIST Definition of Cloud Computing,2011" NIST Special Publication 800-145, p. 7, [Online].http://csrc.nist.gov/publications/PubsSPs.html#800-145
[9] http://www.theguardian.com/media-network/media-network-blog/2012/jul/26/cloud-expand-telecoms-mobile-operatos.
[10] Vangie Beal, cloud storage, http://www.webopedia.com/author/Vangie-Beal
[11] http://documentation.commvault.com/hds/release_9_0_0/books_online_1/english_us/features/cloud_storage/cloud_storage.htm#Overview. G. Caryer, T. Rings, J.
[12] Gallop, S. Schulz, J. Grabowski, I. Stokes-Rees, and T. Kovacikova, 2009 , "Grid/cloud computing interoperability, standardization and the Next Generation Network (NGN)," in Intelligence in Next Generation Networks, 2009. ICIN 2009. 13th International Conference on, pp. 1–6, .DO1: 10.1109/ICIN.2009.5357099
[13] ITU-ZNIIS ,ITTC, (2011) "Innovative research directions in the field of telecommunications in the world" within ITU-ZNIIS ITTC joint project Moscow, Russia
[14] J.-L. Chen, S.-L. Wuy, Y. Larosa, P.-J. Yang, and Y.-F. Li, 2011 "IMS cloud computing architecture for high-quality multimedia applications," in Wireless Communications and Mobile Computing Conference (IWCMC), 2011 7th International, pp. 1463–1468,. DOI: 10.1109/IWCMC.2011.5982754.
[15] ITU-T,2001, "Global Information Infrastructure, Internet Protocol Aspects and Next Generation Networks, Frameworks and functional architecture models, general overview of NGN," Tech. Rep. ITU-T Recommendations.
[16] S. Esaki, A. Kurokawa, and K. Matsumoto,June 2007 "NTT Technical Review – Overview of Next Generation Network,"Tech.Rep.Vol.5,NTT

AUTHOR

Mutaz Hamed Hussien received the B.S. from Future University in 2002 and M.S. degrees in Electrical Engineering from Linkoping University in 2007, PhD Student at University of Technology Malaysia (UTM) respectively. During 2002 -2007 since now He worked at Future University as a Lecturer in Faculty of Engineering and director of Information technology Department