International Journal of Engineering, Management, Humanities and Social Sciences Paradigms (IJEMHS)
(Volume 14, Issue 01)
Publishing Month: July 2015
An Indexed and Referred Journal
ISSN: 2347-601X
www.ijemhs.com

Cloud Computing: Public and Private Cloud

Amit Kumar[1] and Manoj Kumar[2]

[1]kherkiamit@gmail.com
[2]mk.rathee001@gmail.com

Publishing Date: July 21, 2015

Abstract

Cloud Computing is an emerging trend to deploy and maintain software and is being adopted by the industry such as Microsoft, IBM, Microsoft and Amazon. Several prototype applications and platforms, such as the IBM—Blue Cloud infrastructure, the Google App Engine, the Amazon Cloud, and the Elastic Computing Platform. In a cloud based computing infrastructure, the resources are normally in someone else's premise or network and accessed remotely by the cloud users. Processing is done remotely implying the fact that the data and other elements from a person need to be transmitted to the cloud infrastructure or server for processing the elements; and the output is returned after completion of required processing. In some cases, it might be required or at least possible for a person to store data on remote cloud servers.

Keywords: *Cloud Computing, Public Cloud, Private Cloud.*

1. Introduction

Cloud computing to put it simply means Internet Computing. The Internet is commonly visualized as clouds; hence the term cloud computing for computation done through the Internet. With Cloud Computing users can access database resources via the Internet from anywhere, for as long as they need, without worrying about any maintenance or management of actual resources. Besides, databases in cloud are very dynamic and scalable[2].

The Cloud has become a new trend for delivering services such as processing and storage to users on demand. Rather than being a new technology in itself, it is a new business model wrapped around new technologies such as server virtualization that take advantage of economies of scale and multi-tenancy to reduce the cost of using information technology resources[9]. Over the last few years, cloud computing paradigm has witnessed an enormous shift towards its adoption and it has become a trend in the information technology space as it promises significant cost reductions and new business potential to its users and providers. The advantages of using cloud computing include:

i) Reduced hardware cost and maintenance cost,
ii) Accessibility around the world,
iii) Flexibility and highly automated processes wherein the customer need not worry about mundane concerns like software up-gradation.

Cloud Computing is perceived as the next progression that will impact organizational businesses and how they manage their IT infrastructures[2]. The technology and design architecture that cloud computing deployment models offer are a key area of research. Even though there are numerous variations on the definition of Cloud Computing, some basic principles characterize this emerging computing paradigm. Cloud Computing provides technological capabilities—generally maintained off premises— that are delivered on demand as a service via the Internet[14]. Given that a third party owns and manages public cloud services, consumers of these services do not possess resources in the cloud model but pay for them on a per-use basis. Thus virtualization of the resources is the key concept in Cloud Computing. In the real scenario, they are renting the physical infrastructure, platforms and applications within a shared architecture. Cloud Computing offers virtual infrastructure, computing platforms, centralized data centers end-user Web-Services and Web applications and other focused computing services[14]. Cloud Computing may be applied to solve problems in many domains of Information Technology like GIS (Geographical Information Systems), Scientific Research , e-Governance Systems, Resource Sharing System, Decision Support Systems, ERP, Web Application Development, Mobile

Technology[15]. This paper aims to explain the private and public cloud.

2. Services of Cloud Computing

(i) Platform as a Service (PaaS):

PaaS is the delivery of a computing or processing platform as a service without downloading softwares or installation of softwares for developers, IT managers or end-users. It provides an infrastructure with a high level of integration in order to implement and test cloud applications[3]. The user does not manage the infrastructure (including network, servers, operating systems and storage), but he just controls deployed applications and, possibly, their configurations. Examples of PaaS includes: Google App Engine, Force.com and Microsoft Azure.

(ii) Infrastructure as a Service (IaaS*)*:

This is where users uses computing resources such as processing or computing power, memory and storage from an IaaS provider and use the resources to run their applications. In contrast to the PaaS model, the IaaS model is a low level of abstraction that allows users to access the underlying infrastructure through the use of virtual machines. IaaS gives users more flexibility than PaaS as it allows the user to deploy any software stack on top of the operating system[11]. However, flexibility comes with a cost and users are responsible for updating and patching the operating system at the IaaS level. Amazon Web Services' EC2 and S37 are popular IaaS examples.

(iii) Data as a Service (DaaS):

Data in various formats and from multiple sources could be accessed via services by users on the network. Users could, for example, manipulate the remote data just like operate on a local disk or access the data in a semantic way in the Internet. Amazon Simple Storage Service (S3) 14) provides a simple Web services interface that can be used to store and retrieve, declared by Amazon, any amount of data, at any time, from anywhere on the Web. The DaaS could also be found at some popular IT services,e.g., Google Docs 22) and Adobe Buzzword 12.

(iv) Software as a Service (SaaS):

SaaS can be described as a process by which Application Service Provider (ASP) provide different software applications or software as service over the Internet. This makes the customer to get rid of installing and operating the application on own computer and also eliminates the load of software maintenance; continuing operation, safeguarding and support. SaaS vendors takes the responsibility for deploying and managing the IT infrastructure (servers, operating system software, databases, data center space, network access, power and cooling, etc) and processes (infrastructure patches/upgrades, application patches/upgrades, backups, etc.) required to run and manage the software application. SaaS features a complete application offered as a service on demand. [7]. Two types of servers used by SaaS: the Main Consistence Server (MCS) and Domain Consistence Server (DCS)[7].

3. Public Cloud

There are three types of Cloud Computing models which companies can choose from, which are public Cloud computing, private Cloud computing and hybrid Cloud computing[10]. Public cloud, the one most commonly referred to, is owned and operated by independent vendors and accessible to the general public. Among the four deployment models, public cloud is what the term 'cloud computing' was initiated for and commonly refers to. Other deployment models are variations of public cloud but share a similar set of technologies and levels of services. Public Cloud computing means relying on third parties to deploy efficient IT services over the Internet as needed by the users[1].

The National Institute of Standards and Technology defines a public Cloud as a Cloud infrastructure that is made available to the general public or a large industry group. Public Clouds are owned by the organization(s) selling Cloud services[1]. Figure 1 below gives a basic illustration of an organization using a public Cloud.

International Journal of Engineering, Management, Humanities and Social Sciences Paradigms (IJEMHS)
(Volume 14, Issue 01)
Publishing Month: July 2015
An Indexed and Referred Journal
ISSN: 2347-601X
www.ijemhs.com

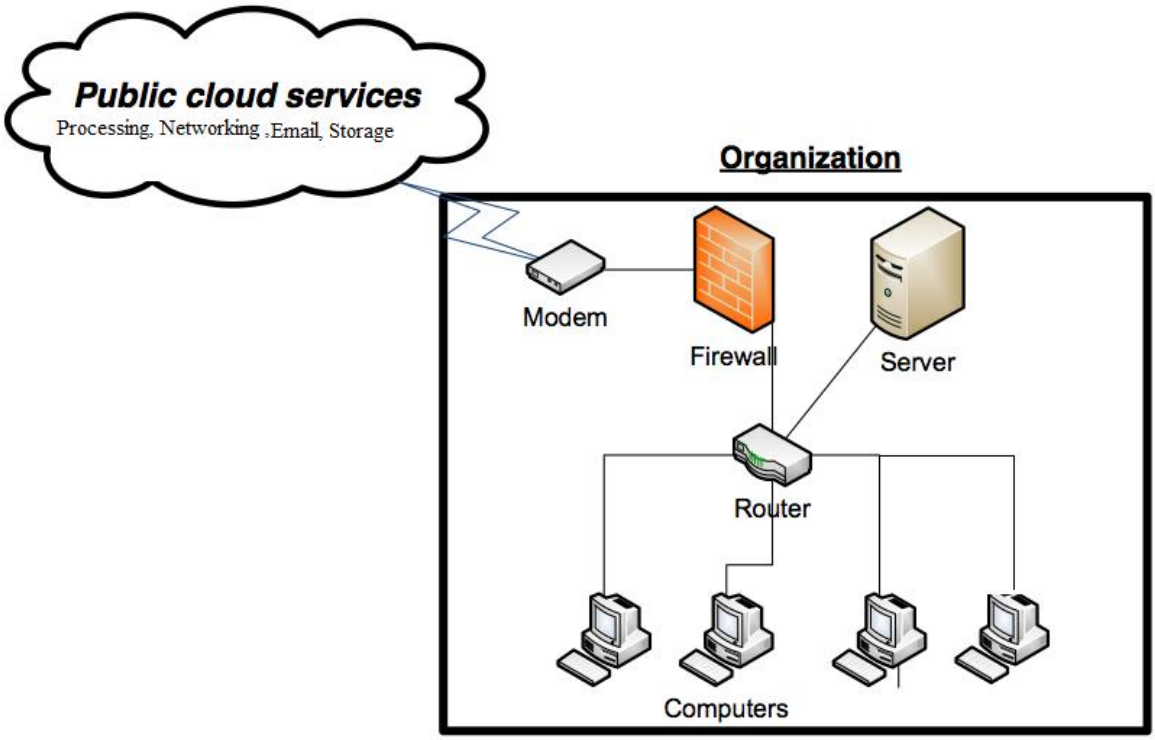

Figure 1: Illustration of an organization using public Cloud services. (Diagram by Delvis Simmonds and Alli Wahab, 2012)

Public cloud is a model which allows users to access to the cloud via interfaces using web browsers. It is typically based on a pay-per-use model basis, similar to a prepaid electricity bill metering system which is flexible enough to cater for spikes in demand for cloud optimization [8]. This helps clients of the cloud to better match their IT uses at an operational level by decreasing its CapEx on IT infrastructure. Public clouds are less secure than other cloud models because it places an additional burden of ensuring all applications and data accessed on the public cloud are not subjected to malicious attacks. Therefore, trust and privacy concerns are rife when dealing with Public clouds with the Cloud SLA at its core [8].

Public Cloud has the following advantages:

- Lower initial fees, variable costs, billed by usage.
- Quick startup time; no capital investment is required.
- Public Clouds Allows outsourcing of non-core functions to a service provider.
- Leverages a highly scalable provider infrastructure.
- Uses a reliable and standard software stack.

4. Private Cloud

Private cloud is an internal utilisation of cloud technologies which is maintained in-house and solely accessible to internal users within an organization[9].

Private cloud is set up within an organization's internal enterprise data centre. It is easier to align with security, compliance, and regulatory requirements, and provides more enterprise control over deployment and use. In the private cloud, scalable resources and virtual applications provided by the Cloud Service Provider (CSP) are pooled together and available for cloud users to share and use[12]. It differs from the public cloud in that all the cloud resources and applications are

managed by the organization itself, similar to Intranet functionality. Utilization on private cloud can be much more secure than that of the public cloud because of its specified internal exposure. Only the organization and designated stakeholders may have access to operate on a specific private cloud [8].

Private cloud is a new term in IT field that some vendors have recently used to describe offerings that emulate cloud computing on private networks[2]. It is used within an organization's internal enterprise datacenter. In the private cloud, scalable resources and virtual applications provided by the cloud vendor are pooled together and available for cloud users to share and use. It is different from the public cloud in that all the cloud resources are managed by the organization itself, similar to Intranet functionality[13]. Utilization on the private cloud can be much more secure than that of the public cloud because of its specified internal exposure. Only the organization and designated stakeholders may have access to operate on a specific Private cloud . One of the best examples of a private cloud is Eucalyptus Systems[7].

Private Cloud has the following advantages:

- Cost savings.
- Quick startup and flexibility of resource allocation.
- Allows control of service levels and operational reporting.
- On-premise data and systems; allows direct support of governance and compliance, security, data privacy.

The cloud infrastructure has been deployed, maintained and operated for a particular organization. The operation may be in-house or with a third party on the premises[12]. This cloud computing environment resides within the boundaries of an organization and is used exclusively for the particular organization's benefits. These types of clouds are also called internal clouds. They are built primarily by IT departments within enterprises who want to optimize utilization of infrastructure resources within the enterprise by provisioning the infrastructure with applications using the concepts of grid and virtualization[2].

5. Conclusion

Cloud Computing paradigms and concepts like Grid Computing, Utility Computing have been controversially discussed in academia and industry. This paper focused on giving a clear distinction between Public Cloud Computing and Private Cloud Computing by identifying a catalogue of criteria and comparing both paradigms. Services of Cloud Computing are also discussed. By specializing some features in both Private Cloud and Public Cloud, these Clouds can be effectively used in business models.

References

[1] Simmonds, Delvis, et al. "Public Cloud Computing vs. Private Cloud Computing: How Security Matters." Research Paper (2012).

[2] Singh Gurmeet, Sachdeva Vineet. "Impact and Challenges of Cloud Computing in Current Scenario" (2012).

[3] Padhy, Rabi Prasad, Manas Ranjan Patra, and Suresh Chandra Satapathy. "Cloud computing: security issues and research challenges." International Journal of Computer Science and Information Technology & Security (IJCSITS) 1.2 (2011): 136-146.

[4] Sriram, Ilango, and Ali Khajeh-Hosseini. "Research agenda in cloud technologies." arXiv preprint arXiv:1001.3259 (2010).

[5] Ahmed, Monjur, and Mohammad Ashraf Hossain. "Cloud computing and security issues in the cloud." International Journal of Network Security & Its Applications 6.1 (2014): 25.

[6] Weinhardt, Christof, et al. "Cloud computing–a classification, business models, and research directions." Business & Information Systems Engineering 1.5 (2009): 391-399.

[7] Nazir, Mohsin. "Cloud computing: overview & current research challenges." IOSR Journal of Computer Engineering (IOSR-JCE), ISSN (2012): 2278-0661.

[8] Tripathi Khushboo "Cloud Computing in Education".Research Gate (2012)

[9] Yang, Haibo, and Mary Tate. "Where are we at with cloud computing?: a descriptive literature review." ACIS 2009 proceedings (2009).

[10] Patidar, Shyam, Dheeraj Rane, and Pritesh Jain. "A survey paper on cloud computing." 2012 Second International Conference on Advanced Computing & Communication Technologies. IEEE, 2012.
[11] Wang, Lizhe, et al. "Cloud computing: a perspective study." New Generation Computing 28.2 (2010): 137-146.
[12] Zhang, Shuai, et al. "Cloud computing research and development trend." Future Networks, 2010. ICFN'10. Second International Conference on. IEEE, 2010.
[13] Nandgaonkar, Suruchee V., and A. B. Raut. "A comprehensive study on cloud computing." International Journal of Computer Science and Mobile Computing 3.4 (2014): 733-738.
[14] A Vouk, Mladen. "Cloud computing–issues, research and implementations." CIT. Journal of Computing and Information Technology 16.4 (2008): 235-246.