"Cloud computing an overview"

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Abstract

Cloud Computing is one of the emerging technologies in all fields and is called as the type of computing relayed on the internet. The main functions of Cloud Computing are hosting and delivering of various software and services using the internet. Depending on the demands and requirements of the user, the cloud computing affords the main computational resources to users as service. The main computational resources are larger storage space, server with high performance, various operating systems for various platforms and Network. The demand for these resources by the user is increasing day by day with the main drawback of security and is considered as a very serious problem in cloud computing. This paper has surveyed the various concepts related to cloud computing such as, the architecture, types and models for deployment, applications, advantages and disadvantages. The main goal of this paper is to provide a better knowledge about the cloud computing and its issues in the research on various domains.

Keywords: *Cloud Computing; Deployment; Software Services; Security Issues.*

1. Introduction

Cloud computing is an Internet-based computing using which the shared computer processing resources and data to computers and other devices are delivered to end users on demand. As well as, it encapsulates the organizations to focus on the essential businesses instead of wasting the time and money on the infrastructure of computer. In the other terms, cloud computing means accessing and storing of data and programs over the Internet instead of user's computer's hard drive. The cloud is just an allegory for the Internet [1]. Some of the examples of cloud computing are Google, Amazon, Microsoft etc…The following figure fig.1 gives a detailed description of the basics of cloud computing.
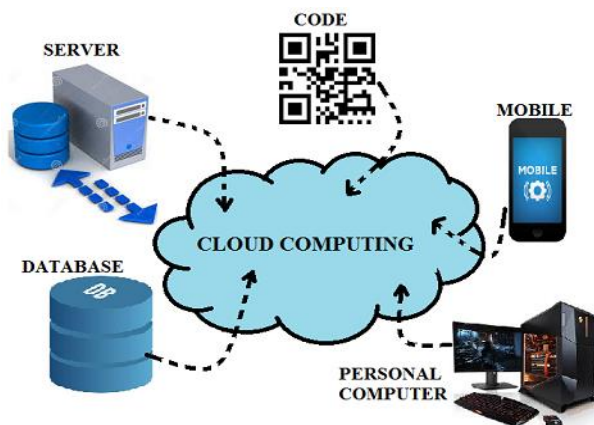
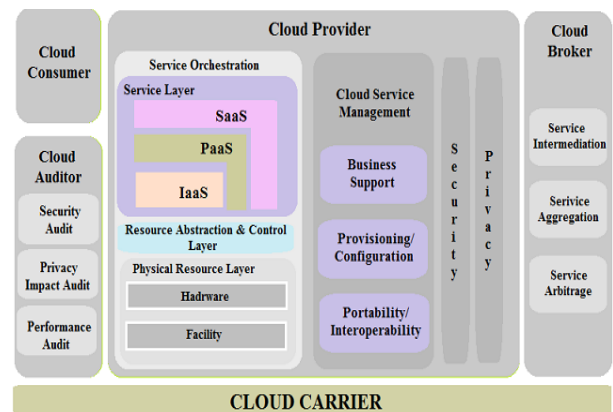

Fig. 1: Basics of Cloud Computing.

Fig. 2: The Conceptual Reference Model.

2. Architecture of cloud computing

The cloud computing architecture includes the conceptual reference model that is represented as in the below figure Fig.2 [2]. The Conceptual reference model of Cloud Computing functions in coordination with the following [13];

- Cloud Carrier
- Cloud Provider
- Cloud Consumer
- Cloud Auditor and
- Cloud Broker.

The relation between them is represented with the help of a diagram as in fig. 3
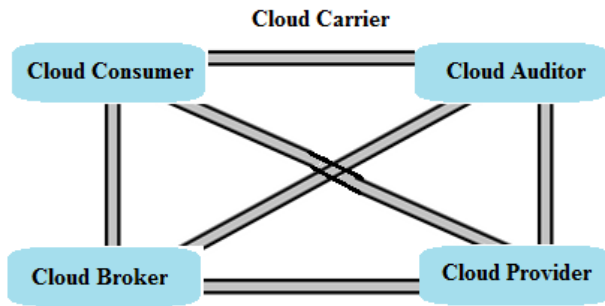
Fig. 3: Relation between the Models of Cloud Computing.

3. Services provided by cloud computing

Cloud computing is a very broad domain that provides many services which include SaaS, IaaS, PaaS and so on [4-6][9]. Cloud computing is regularly called as the stack which is responsible for providing many services as mentioned in the figure Fig. 4, and are;

SaaS (Software as a Service): is mainly described for end-users. All the required software are deployed over the internet and with the help of license provided by the SaaS, end-user download the service on demand with the subscription, "pay-as-you-go" or at free of cost when there is an opportunity to get profit from various streams like advertisement other than end-users [3]. It has become a common place for all the users within an organization which indicated the fast growth of this SaaS provided by Cloud Computing. The main characteristics of SaaS are;

Commercial Software that are accessed through web

From the central location all the software are managed.

Cloud computing will itself manage the software upgrades and other patches.

The relation among various softwares is possible through APIs (Application Programming Interfaces.

SaaS is a rapidly growing method for providing the technology.

PaaS (Platform as a Service): is a collection of tools services that are designed for providing the services for end-users.: This service of Cloud Computing provides the benefits that SaaS provided for applications. PaaS is defined as a platform which allows for the web created applications to access fast and in simple way without any difficulties of purchasing and maintaining software underneath it. PaaS is similar to SaaS except that, PaaS is a platform for developing software and delivery of the software to the end-users rather than being delivered to the web [7] [10]. The main characteristics of PaaS are;

Provides the services that develop, deploy, test, host and maintain the applications in the same combined environment.

PaaS provides the services that are helped to create, modify, test and deploy in various scenarios.

PaaS provide Billing and management tools.

PaaS functions in similar to IaaS in many aspects that are discussed in the below section.

IaaS (Infrastructure as a Service): provides the operating system Software, hardware for the end-users.: This is a method of cloud computing infrastructure delivery such as- servers, network, operating systems and storage on-demand by the end-users. Apart from purchasing software, storage, servers, datacenter space or any equipment's related network. End-users purchase these resources as outsources service on demand [7][10]. The main characteristics of IaaS are; all the resources are scattered as a service.

IaaS provide the dynamic scaling for software.

The price of this IaaS is reasonable.

It provides single piece of software or hardware for multiple end-users simultaneously.

The relation among these three services is as in the figure shown below, Fig. 4.
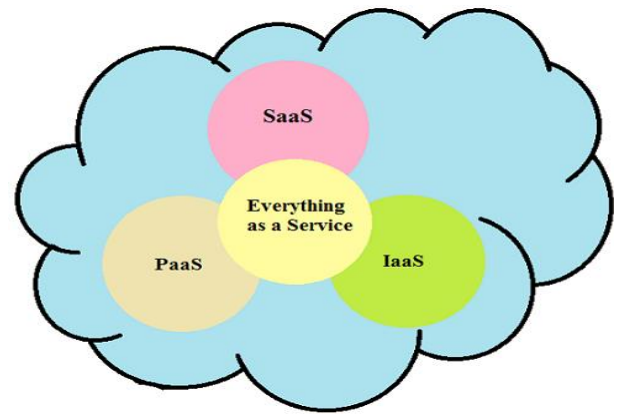

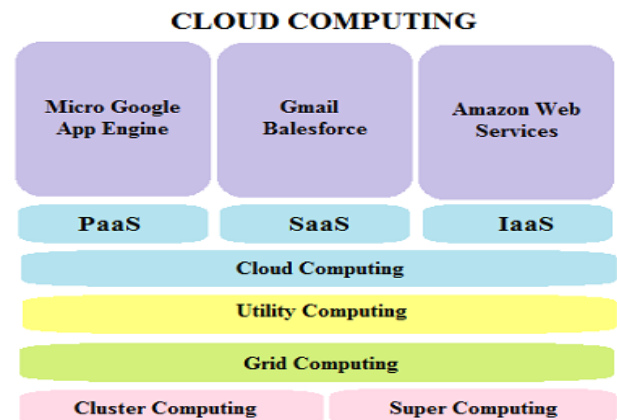**Fig. 4:** Relation among the Services of Cloud Computing.

Fig. 5: Cloud Computing Along with the Services, Examples.

Apart from these three services cloud computing also provides many services as in the below figure, Fig. 5, with the different examples [14].

4. Classifications of cloud computing

Typically, the Cloud Computing is classified in three ways as below [8-15];
  a) Public Cloud
  b) Private Cloud and
  c) Hybrid Cloud.
These classifications are explained with the figure as below in Fig. 6a and 6b.
  a) Public Clouds: Public cloud is basically considered as an Internet. This type of cloud is primarily used to apply the developed resources, called as Applications such as, Software-as-a-Service. Public cloud is also made available for storage purpose to the public. Examples of such public clouds are Amazon, Yahoo, and Google etc. Public cloud reduces the maintenance and investment for the resources by the organization. Hence it can be considered as an economic cloud based on the applications.
One of the main advantages of this Public cloud is, it increases the scalability by which the user demands and the workloads are satisfied. By using the Public cloud, the users have to pay only for the resources that are used by them.
The main disadvantage of public cloud is, the Public cloud may not be used by all the Organizations, as it will limit the security and configuration. The figure 6 indicates the adoption of IaaS by the growing industries. The public cloud offers the method to end-users called as "Pay-per-Usage", and the users adopt the services called as "Self-Service-Model".
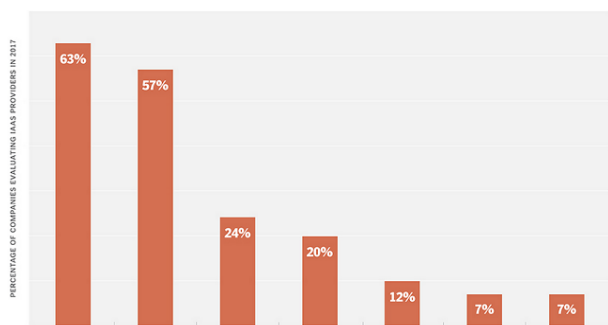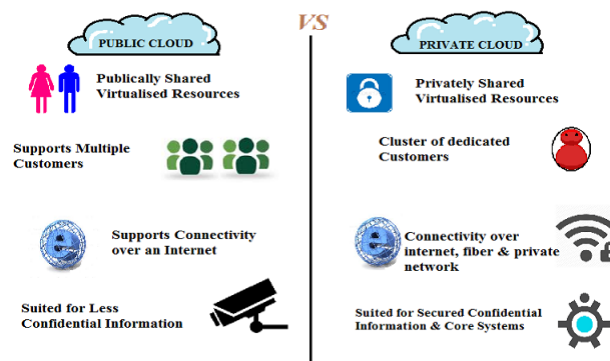
Fig. 6: IAAS Adoption.

Fig. 7:B. Differences between Clouds.

b) Private Clouds: The Private cloud provides the same advantages like scalability, self-service, that the Public cloud provides to the end-users and it is through the architecture called as proprietary architecture. Private cloud fulfills the need of every single organization. Private cloud functions to reach the security issues of cloud computing, as this cloud is created by a single organization. The private cloud is mainly related with the infrastructure and the resources which are already inbuilt in the cloud by the enterprises or by an independent organization. When there are inadequate or the inappropriate needs are accomplished by the public cloud then the private cloud will satisfy the needs of an individual organization.

The following are the some of the advantages of private cloud [17]

a) One 0f the important properties of cloud is "on-demand ability" and is provided by the private cloud by which, it enables an organization to develop, deploy and test solutions fast that would otherwise delay the operations in a non-cloud environment. At this time duration, the organization has to fill the online request application or demand form and virtual machines by the appropriate computing abilities– all without the snooping of the private cloud controlling team.

b) The hasty springiness capability enables to save money on network, compute, storage, network, and memory resources because these resources upgrade and are unconfined when needed. When projects start, the resources are made used by the consumers of the cloud service, and after the completion of the project, these used resources are given back into the resource pool of cloud infrastructure.

c) The "on-demand" service or capability of private cloud makes it possible for IT to be seen as a true service provider and moves IT from a cost-center to a business enabler by monitoring cloud infrastructure resource usage by cloud service consumers and then providing comprehensive reports on usage and charge back to the departments consuming the cloud service.

The private cloud is considered as a part of "the Journey to Hybrid Cloud".

d) Hybrid Clouds: Hybrid cloud is one of the cloud computing environments, which make use of, mix of on-locations, public cloud, private cloud and third-party services with organization between the two platforms.
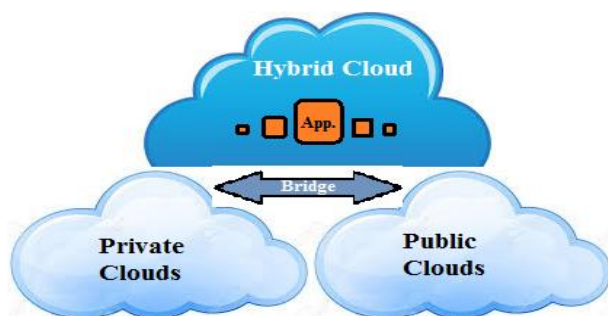

Fig. 7: A. Hybrid Cloud Structure.

5. Advantages & disadvantages of cloud computing

The main advantages of Cloud Computing are;
Reliability
Cost Savings
Manageability
Strategic Edge
The main disadvantages of Cloud Computing are;
Downtime
Security
Vendor Lock-In
Limited Control

6. Issues in cloud computing

Security & Privacy: One of the main issues in Cloud Computing is Security & Privacy. Cloud computing provides a reliable security for the end-user. Every time the end-user has to be authenticated for storing & accessing the data to the cloud & from the cloud respectively. The queries that are raised to the cloud provider considering the security are [8-15];
Data Encryption
Data residing
Data movement from the end-user
Security governance procedures & policies.
Service Quality: Based on the recent survey 48% of the decision makers are thinking of investing on cloud computing. Hence the cloud provider should assure that the company's data is to be secured and should be available in time maintaining the reliability of data. Hence for the same reason the cloud provider should answer for the following queries [8-15];
The Infrastructure & Security standards
- Identifying & Solving the problems
- Escalating Process
- Termination Process of the Data

7. Conclusion

While cloud computing is not without its risks, the truth remains that these risks are definitely manageable with some effort taken on the part of the company involved. Once the above issues are resolved, the rest of the process should go on smoothly, thereby providing immense benefits for the said company

References

[1] Mandeep Kaur, Manish Mahajan "Using encryption Algorithms to enhance the Data Security in Cloud Computing", "International journal of communication and Computer technology", Volume1, Issue3, Jan 2013.

[2] Dr.A.Padmapriya, P.Subhasri, "Cloud Computing: Reverse Caesar Cipher Algorithm to Increase Data Security", "International Journal

of Engineering Trends and Technology (IJETT)", Volume4, Issue4-April 2013.

[3] Aarti P Pimpalkar, Prof. H.A. Hingoliwala , 'A Secure Cloud Storage System with Secure Data Forwarding', "International Journal of Scientific & Engineering Research",Volume4,Issue6, June-2013, page no-3002-3010.

[4] Sanjoli Singla, Jasmeet Singh, "Cloud Data Security using Authentication and Encryption Technique", "International Journal of Advanced Research in Computer Engineering & Technology (IJARCET)",Volume2, Issue 7, July 2013.

[5] L. Arockiam1, S. Monikandan, "Data security and privacy in cloud storage using hybrid symmetric encryption algorithm", "International journal of advance research in computer and communication engineering", Voumel2, Issue 8, August 2013.

[6] Anitha Y , "Securiy Issues in cloud computing", "International Journal of Thesis Projects and Dissertations (IJTPD) Vol. 1, Issue 1, PP: (1-6), Month: October 2013.

[7] Parsi Kalpana ,"Data security in cloud computing using RSA" , International Journal of Research in Computer and Communication technology,ISSN 2278-5841, Volume 1, Issue 4, September 2012.

[8] Chittaranjan Hota, Sunil Sanka, Muttukrishnan Rajarajan,SrijithK.Nair,"Capability-based Cryptographic Data Access Control in Cloud Computing", "Int. Journal of Advanced Networking and Applications" Volume: 03; Issue: 03; Pages:1152-1161 (2011) .*Book*.

[9] Jinesh varia," AWS Cloud Security Best Practices","White Paper", November 2013.

[10] Alexa Huth and James Cebula,"Basics of cloud computing", "United States of emergency leading teams",2012.

[11] Luit Infotech Private Limited,"What is cloud computing".

[12] Qi. Zhang ·Lu. Cheng, Raouf Boutaba, "Cloud computing: state-of-the-art and research challenges", "The Brazilian Computer Society", April 2010.

[13] C. Wang, Q. Wang, K. Ren, and W. Lou, "Privacy- preserving public auditing for data storage security in cloud computing," in INFOCOM, 2010, page no- 1–9. *Proceeding published regularly online*

[14] *Vmware*, "Securing the cloud, A review of cloud computing, security implications and best practices" Miklau and D. Suciu, "Controlling access to published data using cryptography," in Proceedings of the 29th international conference, 2011, page no-31-46.

[15] H. Narayanan and M. Gunes, "Ensuring access control in cloud provisioned Healthcare systems," in Consumer Communications and Networking Conference (CCNC), 2011, page no-.247–255.

[16] http://en.wikipedia.org/wiki/Cloud_computing.

[17] https://social.technet.microsoft.com/wiki/contents/articles/4670.overview-of-private-cloud-architecture.aspx