

**COMPARATIVE STUDY BETWEEN EXISTING CLOUD SERVICE PROVIDERS**

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Abstract: Cloud computing is emerging as one of the latest field of information technology. Basically, cloud computing is the phenomenon of providing the computing services using a network of remote servers that are hosted over the internet which is related to storing, managing and processing the data, rather than a local server or a personal computer [1]. The computer-centered world today is opting for pay-for-use models and due to evolution of the cloud computing over the years it can handle such massive data as per on demand. This paper contains descriptive information about the basic services provided by cloud computing and also the cloud service providers that are present in the market these days. It holds different features that are provided by the cloud services and also gives a brief description about the list of cloud services that are present in the marker for a user.

Keywords: Cloud computing, cloud service provider, IaaS, PaaS, SaaS.

1. INTRODUCTION

Cloud computing consists of two words which are cloud and computing. The term cloud in cloud computing refers to the internet whereas computing refers to usage or operation of computers. Providing computing services over the internet is called as cloud computing.

The cloud computing model allow users to access the information and computer resources from anywhere in the world provided they have internet connection. There are three types of model that are possible for providing computing services to the user via internet and for the services the user may pay either monthly or annually to gain access to the services which will be delivered by the providers as Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). [2]

SaaS:

Software as a Service (SaaS) as the name suggests provides software applications which can be accessed by the clients through an internet web browser. Example of SaaS can be different email-based applications such as Gmail, Yahoo etc.

PaaS:

Platform as a Service (PaaS) is similar to SaaS but the difference is that PaaS provides a platform and environment to the developers such that they can develop or build services over the internet and as these applications are hosted in the cloud it can be accessed by the users simply via the web browser. Microsoft Azure is one of the examples of PaaS.

IaaS:

Infrastructure as a Service (IaaS) allows the client to use the hardware and resources through the web. In IaaS model, a third-party provider hosts hardware, software, servers, storage and other infrastructure components on behalf of its users.[3] Amazon Web Services (AWS) is an example of IaaS.

2. LITERATURE SURVEY

Cloud computing is a model that is based on duration factor and services usage quantity. There are number of cloud service providers for providing cloud services. Different clouds have different storage capacities, features, methods and billing systems. Problem that is faced in recent times is that people are not aware which cloud will fulfill their requirements and thus cannot choose appropriate cloud for their service amongst different clouds that is operated by different cloud providers. [4] Selected cloud platforms were compared on the basis of market-oriented cloud computing by R. Buyyaa. The study was based on the requirements and development of methods for market-based cloud management as per required by customer and also the risk management.[5]

Q. Zhang gives his view of comparison between four cloud platforms and gave a conclusion that diverse range of services is provided by the existing platforms. Different levels of abstraction are provided in different layers of the platform when the service is being provided. So more than one platform should be chosen by the user according as per requirements which will satisfy their business needs. [6]

According to C.N. Hofer, different cloud systems were portrayed on the basis of their characteristics in the form of tree-based taxonomy. The classification of the cloud providers was based on the taxonomy that was proposed. Characteristics that were considered were cost model, development tools, service models, supported languages, virtualization mechanisms, license type and operating systems etc. [7]

Similarly, B.P. Rimal described a taxonomy which was

based on features that the provider provides and also used it for making a comparison between the existing providers. The attributes that were taken under consideration for making comparison were services provided, fault tolerance, security, interoperability, mechanism for load balancing, provider’s architecture, programming languages and software and virtualization mechanism etc. [8] Whereas in certain studies, quantitative comparisons were done between different providers.

Lipika Bose describes a method to make decision process for selecting the best service possible as required by the user according to the business needs based on the characteristics and advantages each cloud providers have and also gives a brief comparative description about different cloud service providers. [9]

Comparison of cloud service providers:

Cloud Service Providers	Advantages	Disadvantages	Remark
Amazon Web Services (AWS)	<ul style="list-style-type: none"> • Computing capacity is five times more than other cloud service providers. • There are various data-centers is available in various places like U.S., Ireland, Japan, Singapore, Brazil and Australia called as “regions”. • Provides ability to configure their security firewall according to requirement either private or public. 	<ul style="list-style-type: none"> • AWS does not provide hardware level change, by means that if applications need some hardware changes to improve its performance, then it is not possible by AWS. • Major disadvantages of AWS are that it does not provide Multicast Network. • It has higher operational cost. 	<ul style="list-style-type: none"> • AWS is suitable for those applications, which does not require hardware changes to process. It is also suitable for those organizations, which wants to provide their services in various regions.
Microsoft Azure	<ul style="list-style-type: none"> • Speed of Microsoft Azure is fast in the key areas thus giving an edge in competitive business. • Microsoft Azure can work under challenging environment. • It provides superior disaster recovery system. 	<ul style="list-style-type: none"> • One of the drawbacks of Microsoft Azure is that it requires management and maintenance. • Microsoft supports only the applications that are based upon windows for technical assistance. 	<ul style="list-style-type: none"> • All those applications which are based on windows can use Microsoft Azure assist processing speed is very high and Microsoft Azure is dedicated to windows-based application, which makes it more convenient.
Google Cloud Platform	<ul style="list-style-type: none"> • Google cloud provides full access of information from anywhere through web-based applications that are powered by Google cloud. • This cloud platform provides better pricing than other cloud platforms, so a user has to pay for only the compute time they use. • Based on good security system that has been built over past 15 years, and secures services like Gmail, Search, etc. 	<ul style="list-style-type: none"> • GCP lacks behind AWS on the basis of features provided. Every year a new feature is added to AWS which is then followed by Google cloud. • In Google cloud the network pricing is expensive. • It is far behind AWS and Azure in terms of product range. Google is moving in a fast pace but there is a way to go. 	<ul style="list-style-type: none"> • The cost of Google Cloud is cheap when compared to other clouds as it only charge for computing process based on user’s computing time and requirements. It can be used to provide services and information in various ranges.

<p>IBM Cloud</p>	<ul style="list-style-type: none"> • IBM cloud recovers from disaster pretty quickly. This is here IBM cloud has upper hand over others. • Workload is distributed in a systematic way such that the users get good response to their applications. 	<ul style="list-style-type: none"> • IBM cloud lacks security when compared to other cloud platforms. • This cloud is not free for all also for the first month, which might be helpful for students and companies professionally as well as for learning purposes. 	<ul style="list-style-type: none"> • IBM is very good in disaster recovery as compared to others which establishes IBM in market. Its working mechanism is very good. It processes the task in distributed manner.
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3. CONCLUSION

This paper gives a brief description about Cloud Computing and also gives comparative survey of major cloud service providers. The survey is based on services and features provided by cloud vendors. The paper also compares four major cloud vendors on the basis of their advantages and disadvantages. These four major cloud vendors are - AWS (Amazon Web Services), Microsoft Azure, Google Cloud Platform and IBM Cloud. There are various cloud service providers is present in the market. Some providers is focused on providing different services, some are focused on providing services in minimum cost and some are focused on providing good security, protection and privacy of user’s data as security and privacy is the most important factor for user. This paper helps readers to understand the basic concept of cloud computing, features provided by various cloud vendors and their advantages and disadvantages. So that user can select the best cloud service provider based on their requirements.

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