

ANALYSIS OF CLOUD VENDORS IN INDIAN ENVIRONMENT

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ABSTRACT

Grid Computing emerged in the early 1990s, as high performance computers were inter-connected via fast data communication links, with the aim of supporting complex calculations and data-intensive scientific applications. Cloud Computing has resulted from the convergence of Grid Computing, Utility Computing and SaaS, and essentially represents the increasing trend towards the external deployment of IT resources, such as computational power, storage or business applications, and obtaining them as services. The cloud industry is undergoing a major technological upheaval. It is a model for enabling 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. In this paper, we carry out a survey of major cloud service providers which is best suited for Indian scenario.

Keywords: *Cloud Computing, IaaS, PaaS, SaaS*

I. INTRODUCTION

Cloud Computing is a new term for a long-held dream of computing as a utility, which has recently emerged as a commercial reality. Cloud computing is a model for enabling on-demand network access in order to share computing resources such as network bandwidth, storage, applications, etc. that is able to be rapidly scalable with minimal service provider management. Though the concept of clouds is not new, it is undisputable that they have proven a major commercial success over recent years and will play a large part in the ICT (Information and Communication Technology) domain over the next upcoming years to boost up the data transmission even more drastically in our wide network. Cloud Computing provides internet-based services, computing, and storage for users in all markets including financial, healthcare, and government and those underlying computing infrastructure is used only when it is needed. For example, in order to process a user request, a service provider can draw the necessary resources *on-demand*, perform a specific job and then relinquish the unneeded resources and often dispose them after the job is done.

II. CLOUD DEPLOYMENT MODELS

There are three types of cloud deployment models offered, namely, a public, private and hybrid cloud. **Public Cloud:** A public cloud is a model which allows users' access to the cloud via interfaces using mainstream web browsers. It's typically based on a pay-per-use model, similar to a prepaid electricity metering system which is flexible enough to cater for spikes in demand for cloud optimization. **Private Cloud:** A private cloud is set up within an organization's internal enterprise datacenter. It is easier to align with security, compliance, and

regulatory requirements, and provides more enterprise control over deployment and use. **Hybrid Cloud:** A hybrid cloud is a private cloud linked to one or more external cloud services, centrally managed, provisioned as a single unit, and circumscribed by a secure network. It provides virtual IT solutions through a mix of both public and private clouds.

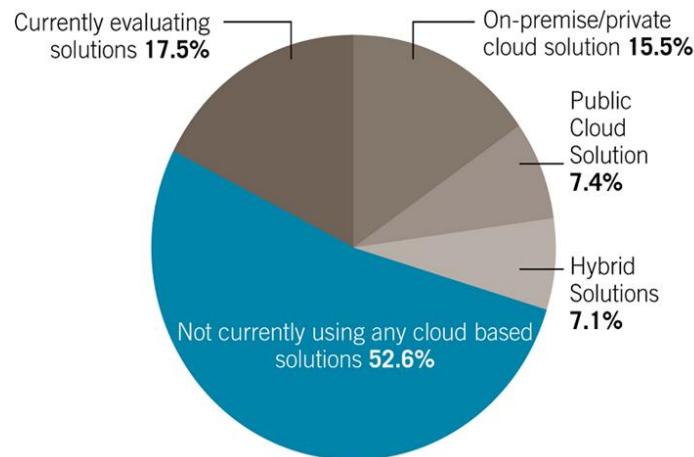


Fig 1: an overview of the usage of cloud based solutions

TYPES OF CLOUD SERVICES

1. IaaS (Infrastructure as a Service)

Infrastructure-as-a-Service (IaaS) is a model of software deployment whereby the basic computing infrastructure of servers, software, and network equipment is provided as an on-demand service upon which a platform to develop and execute applications can be established. Its main purpose is to avoid purchasing, housing, and managing the basic hardware and software infrastructure components, and instead obtain those resources as virtualized objects controllable via a service interface. The cloud subscriber generally has broad freedom to choose the operating system and development environment to be hosted. Security provisions beyond the basic infrastructure are carried out mainly by the cloud subscriber. In other words, they basically provide enhanced virtualization capabilities. Accordingly, different resources may be provided via a service interface. Example: *Amazon EC2*

2. PaaS (Platform as a Service)

Platform-as-a-Service (PaaS) is a model of software deployment whereby the computing platform is provided as an on-demand service upon which applications can be developed and deployed. Its main purpose is to reduce the cost and complexity of buying, housing, and managing the underlying hardware and software components of the platform, including any needed program and database development tools. The development environment is typically special purpose, determined by the cloud provider and tailored to the design and architecture of its platform. The cloud subscriber has control over applications and application environment settings of the platform. Security provisions are split between the cloud provider and the cloud subscriber.

Example: *Google App Engine, Windows Azure (Platform).*

2. SaaS (Software as a Service)

Software-as-a-Service (SaaS) is a model of software deployment whereby one or more applications and the computational resources to run them are provided for use on demand as a turnkey service. Its main purpose is to reduce the total cost of hardware and software development, maintenance, and operations. Security provisions are carried out mainly by the cloud provider. The cloud subscriber does not manage or control the underlying cloud infrastructure or individual applications, except for preferences elections and limited administrative application settings.

Example: *Google Docs*

CLOUD USAGE IN INDIAN SCENARIO

Cloud computing moved away from personal computers and the individual enterprise application server to services provided by the cloud of computers. The emergence of cloud computing has made a tremendous impact on the Information Technology (IT) industry over the past few years. Currently IT industry needs Cloud computing services to provide best opportunities to real world. Cloud computing was in initial stages, with many issues still to be addressed. The objective of that was to explore the different issues of cloud computing and identify important research opportunities in this increasingly important area. A detailed study of the different cloud providers and its services is given below.

1. Microsoft:

Microsoft's cloud computing solution is called *Windows Azure*, an operating system that allows organizations to run Windows applications and store files and data using Microsoft's datacenters. It's also offering its Azure Services Platform, which are services that allow developers to establish user identities, manage workflows, synchronize data, and perform other functions as they build software programs on Microsoft's online computing platform. Key components of Azure Services Platform include *Windows Azure* provides service hosting and management and low-level scalable storage, computation, and networking. *Microsoft SQL Services* provides database services and reporting. *Microsoft .NET Services* provides service-based implementations of .NET Framework concepts such as workflow. *Live Services* used to share, store, and synchronize documents, photos, and files across PCs, phones, PC applications, and websites. *Microsoft Share Point Services and Microsoft Dynamics CRM Services* used for business content, collaboration, and solution development in the cloud. Microsoft plans the next version of office to offer a browser-based option so that user can read and edit documents online as well as offer the ability for users to collaborate using web, mobile, and client versions of office. Microsoft is a little late to the cloud party and isn't a leader in cloud computing. That honor goes to Google and Amazon, and more and more companies are offering cloud services.

2. Amazon:

Amazon was one of the first companies to offer cloud services to the public, and they are very sophisticated. Amazon offers a number of cloud services, including - *Elastic Compute Cloud (EC2)* offers virtual machines and extra CPU cycles for organization. *Simple Storage Service (S3)* allows storing items up to 5GB in size in Amazon's virtual storage service. *Simple Queue Service (SQS)* allows the machines to talk to each other using message-passing API. *Simple DBA* web service is used for running queries on structured data in real time. This

service works in close conjunction with Amazon Simple Storage Service (AmazonS3) and Amazon Elastic Compute Cloud (Amazon EC2), collectively providing the ability to store, process, and query data sets in the cloud. These services can be difficult to use, because they have to be done through the command line. Amazon is the most extensive cloud service to date.

3. Google

On Amazon we get root privileges, but on GoogleApp Engine, we can't write a file in our own directory. Google removed the file write feature out of Python as a security measure, and to store data, must use Google's database. Google offers online documents and spreadsheets, and encourages developers to build features for those and other online software, using its Google App Engine. Google reduced the web applications to a core set of features, and built a good framework for delivering them. Google also offers handy debugging features. Groups and individuals will likely get the most out of App Engine by writing a layer of Python that sits between the user and the database.

4. IBM

IBM SmartCloud Enterprise—IBM's enterprise-class public cloud infrastructure-as-a-service (IaaS)—delivers secure and scalable hosted IT infrastructure with on-demand access to virtual server and storage resources. Well suited for development and test activities, as well as other dynamic workloads. IBM SmartCloud Enterprise is part of IBM's larger SmartCloud framework, which also includes cloud architecture for private and hybrid cloud, as well as Software as a Service (SaaS) business solutions.

5. HP

HP Public Cloud is a public cloud service from Hewlett-Packard (HP) that offers compute, storage, and platform services that are accessible via the public Internet to developers, independent software vendors (ISVs), SMBs, and enterprises of all sizes (including public sector). **Collaboration as a Service** enables organizations to manage data and enable file/information sharing with minimal latency. **PC and Mobile Backup and Synchronization** enable enterprise and SMB workers to use multiple devices to create, share and access data. **Big Data Processing** is to analyze and index large data volumes in the hundreds of petabytes in size, as well run distributed queries across multiple data sets and then returned in near real time.

6. Oracle

The Oracle Database Cloud Service is built on Oracle Database technology, running on the Oracle Exadata Database Machine, the best performing database platform in the world. The Database Cloud Service has three main components – *RESTful Web service access*, which allows access to the data in the Database Cloud Service through simple URIs, *Oracle Application Express*, for creating and deploying all varieties of applications in a browser based environment, and a set of business productivity applications that can be installed with just a few clicks. These components deliver a set of key benefits such as simplicity, portability, enterprise strength, productivity. The Oracle Database Cloud Service supports the Oracle Java Cloud Service, providing the full power of Oracle SQL and PL/SQL for Java application deployment in the Cloud.

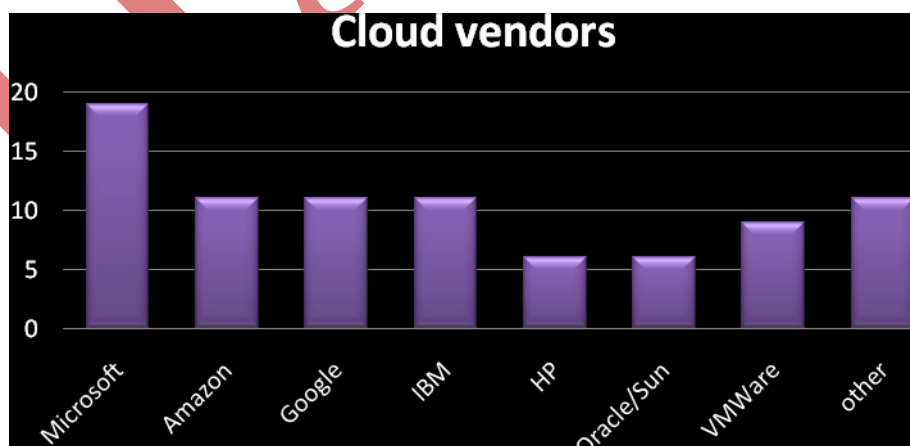
7. Sun

Sun Cloud was an on-demand cloud computing service operated by Sun Microsystems prior to its acquisition by Oracle Corporation. It was based on and supported open source technologies such as Solaris 10, Sun Grid Engine, and the Java platform. Sun Cloud delivered enterprise computing power and resources over the Internet, enabling developers, researchers, scientists and businesses to optimize performance, speed time to results, and accelerate innovation without investment in IT infrastructure.

7. VMware

VMware helps IT organizations build the highest-impact capabilities to successfully operate a cloud organization: on-demand services, automated provisioning and deployment, incident and problem management, security, compliance and risk management, IT financial management. VMware cloud solutions enables to address the immediate needs of business while ensuring that cloud has the broadest impact on how IT services are built, delivered and consumed.

CLOUD VENDORS	SUITABILITY (IN PERCENTAGE)
Microsoft	19%
Amazon	14%
Google	11%
IBM	11%
HP	6%
Oracle/Sun	6%
VMware	9%
Other	11%



CONCLUSION

Cloud computing moved away from personal computers and the individual enterprise application server to services provided by the cloud of computers. The emergence of cloud computing has made a tremendous impact on the Information Technology (IT) industry over the past few years. Currently IT industry needs cloud computing services to provide best opportunities to real world. Cloud computing was in initial stages, with many issues still to be addressed. The objective of this paper was to explore the different providers of cloud computing and identify important research opportunities in this increasingly important area. In this paper, we have analyzed the major services provided and best suited cloud vendor which are present in current cloud computing environments.

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