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A Comparative Study on SaaS, PaaS and IaaS Cloud Delivery Models in Cloud Computing

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ABSTRACT: Cloud computing is a technical and social reality and one of the rapidly growing technology in computer science. Basically cloud is a group of computer resources and provides a million of services to its user simultaneously. Cloud computing makes its greatest impact on the IT field. It refers to the delivery of services like hardware, software, storage and infrastructure over the internet. The main advantage of cloud computing is that user do not have to pay for infrastructure, its installation, required man power to handle such infrastructure and maintenance. This paper is an attempt to analyze the cloud Delivery models such as SaaS, PaaS and Iaas.

Keywords: Cloud computing, SaaS, IaaS, PaaS, Deployment model of Cloud Services.

I. INTRODUCTION

Cloud computing provides internet based platform which are widely used for computer technology. Cloud computing is a new concept of traditional distributed computing and grid computing. Cloud computing is nearly tied to parallel and distributed computing [1]. Cloud computing is a type of internet-based computing that provides computer processing resources and data to computers and other devices on demand. . Scientific and engineering applications, data mining, computational financing, gaming, and social networking as well as many other computational and data-intensive activities can benefit from cloud computing [2]. Now a day's World relies on Cloud computing to store their public as well as personal information. The development of cloud computing is still facing enormous challenges like data security, that is, how to protect data from unauthorized users and leakage [3].

Cloud computing had become a highly demanded service due to the advantages of high computing power, cheap cost of services, high performance, scalability, accessibility as well as availability. A cloud provides the vast amounts of storage and computing cycles demanded by many applications.

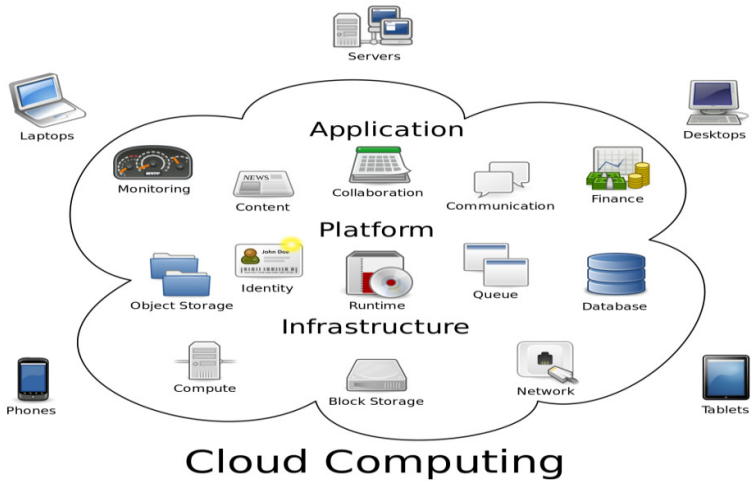

Fig. 1. The Basic Infrastructure of a cloud computing.

II. SOFTWARE AS A SERVICE

Software-as-a-service is the service where the original development of software and applications takes place on the platforms provided by the PAAS layer. [4] SAAS is mainly concerned with end users platform because end users can use and access these applications which were developed by cloud providers. Customers need not Purchase or install the software on their own data centers they can just use them from cloud via

SAAS. In Saas model a software provider license a software application to be used and purchased on demand and applications can be accessed via network from various users (browser, mobile etc) by application use. It is the application that provides business value for users. SaaS moves the task of managing software and its deployment to third-party services. The application can be customized to the degree it was designed for based on a set of already available configuration options [5].

III. PLATFORM-AS-A-SERVICE

Platform-as-a-service provides the platform or the environment in which the developers can write and develop the software and applications. The developers can write the codes according to the particular platform's specifications. PAAS layer is a type of abstraction layer which is present in between the IAAS and SAAS layers. The latest examples of PAAS are **GOOGLE APPLICATION ENGINE** and **MICROSOFT AZURE**. It is based on cloud application development and used by deployers and developers. It has highly scalable multi layer architecture e.g. Azure and salesforces.com. In this model, the consumer developed the application using tools and/or libraries which provided by the platform as a service. The consumer also manages software deployment and configuration settings [6]. The service provider provides the networks, servers, storage, and many services that are needed to host the consumer's application. PaaS offerings facilitate the deployment of applications without the cost and complexity of purchasing and managing the underlying hardware and software and provisioning hosting capabilities. There are various kind of PaaS vendors; however, all provide application deployment and hosting, environment, along with various integrated services.

IV. INFRASTRUCTURE-AS-A-SERVICE

Infrastructure-as-a-service provides computing resources like storage, server and other peripherals which can be acquired as a service. Now a day's customers prefers to buy the resources, rather than having set's up servers, software, and data centres space themselves, and get billed based on resources consumed. Basically it provides the raw hardware and virtualized infrastructures [2]. Today IAAS services are provided by **AMAZON EC2** and **SIMPLE STORAGE SERVICE (S3).** IaaS model offer a service to get a virtual server in few seconds and pay only for the resources that they use. In IaaS model users can directly access infrastructure components (storage, firewall, network etc). Example is Amazon EC2) provides consumers with physical or virtual resources including CPU, memory, OS and storage, sever, to meet the requirements of the customers. IaaS as a service provider offer virtual server with one or more central processing unit running several choices of operating (IaaS) is a standardized, highly automated offering, where compute resources, complemented by storage and networking capabilities are owned and hosted by a service provider and offered to customers on-demand.

V. COMPARATIVE STUDY OF SAAS, PAAS AND IAAS

Table 1.

Attributes	SaaS	PaaS	IaaS
Service providers	Google apps, office live.	Azure, Netsuite	IBM, Amazon.
Runtime management	By the customers	By the vendor	By the vendor
Data management	By the customers	By the developer	By the vendor
Application management	By the customers	By the developer	By the vendor
Used by	Business Users	Developers and deployers	System Manager
Visibility	End users	Application developers	Network architects
Type of services	Dynamic infrastructure service	Integration as a service	Dynamic application services
No of providers	Large numbers of application in the cloud	Few cloud platforms	Elite group of providers
Server management	By the vendor	By the vendor	Small

VI. DEPLOYEMENT MODELS

As we know that the cloud computing has three types of services which also called deployment models. There are 3 deployment models that cloud computing have - Public clouds, Private clouds and Hybrid cloud. They are used according to the user's requirements [4]. Table 2 gives the description and examples of these three deployment models.

Table 2.

DEPLOYEMENT MODELS	DESCRIPTION	EXAMPLES
PUBLIC	Public clouds are not restricted to any particular users or organizations. They offer services to the public all over the world without any limitations. But they are not highly secure as private clouds.	Blue Cloud by IBM and Azure services Platform by Windows
PRIVATE	Private clouds provide services to the users of the particular organizations for the security and confidentiality of their private data. The fact is that these private clouds are generally owned and managed by users but they are actually developed and installed by another organization.	VMware, Amazon EC2
HYBRID	The combinations of both public and private clouds know as Hybrid cloud. Many organizations and customers can take benefits of both public and private cloud by using hybrid clouds.	CTERA, Red hat open hybrid cloud

VII. CONCLUSION

After studying the number of computing articles and case studies, I come to know that cloud computing is the largest buzz in the world of computer now a day. It gains Popularity in almost every field like in information technology and in educational systems. This paper gives the basic idea of cloud computing introduction, its concepts, models and services. This paper also discussed the comparison of three popular clouds delivery models- SaaS, PaaS and IaaS in the form of a table. No doubt cloud computing has a vast future scope but still it suffers from many security issues. Now the next step is to add some new features and enhances delivery models which can detect and prevent the various threats, attacks and other security related issues which continuously depletes the efficiency and the productivity of the cloud.

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