SERVICE MODELS IN CLOUD COMPUTING

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Abstract: Cloud was a generalized term that was used to infer atmosphere, nature or water droplets. Today, the term cloud has been modified to internet-based computing or type of computing. This is driven by rapid technological revolutions that have changed the era of technology and computing. In the novel technology enhancements, cloud computing is used as a simile for internet. With the advent of cloud computing, Information Technology (IT) sector has witnessed drift from personalized computing systems to cloud-based computing or virtualized computing environment that offers everything from computational power, storage, software, hardware etc. The heterogeneity in user demands is persistently rising. This has been handled by variable cloud service models including Infrastructure-as-a-Service, Platform-as-a-Service and Software-as-a-Service. This research paper focuses on analyzing the cloud service models and includes a comparative study on the same.

Keywords: Infrastructure-as-a-Service, IaaS, Platform-as-a-Service, PaaS, Software-as-a-Service, SaaS, Service oriented, Security, Privacy, Cloud benefits

1. CLOUD COMPUTING
Cloud computing involves replacement of desktop and personal systems with increased computational and storage capacity by moving the data and information, services and applications. The use of virtualized infrastructure reduces the need for new or existing hardware and enables sharing of infrastructure, thus, embellishing the delivery of internet-based value added services. The prominent cloud service models include infrastructure, platform, and software-as-a-service. These models have opened novel opportunities with stupendous capabilities and benefits [1-5].

2. CLOUD SERVICE MODELS
Cloud computing has three primary service models, that is, Software-as-a-Service, Platform-as-a-Service and Infrastructure-as-a-Service [1-5]. These models are represented in Figure 1 and discussed below [6].

a. SaaS (Software as a Service) - Software-as-a-Service enables the internet-based software delivery to the users using the pay-per-use or subscription based access. SaaS facilitates software accesses to variable software anywhere over the internet with no need to download them on personal workstations [7-11].

The important features of SaaS include:
• SaaS services are accessible over the internet
• Services are hosted on remote servers and managed by third-party providers.
• SaaS services and applications are scalable as per the business tiers including small, medium and enterprise-levels.
• SaaS applications and services are security-compliant and are managed for the same by service providers.
• SaaS maintenance costs are also concern of service providers.
Advantages of SaaS:

• SaaS eliminates the need to install or download any software for running on personal computers or other computing systems.
• A user who wants to access a service or application just requires to have an account and related credentials to login and access the service.
• The services and applications are accessible from anywhere and anytime and that too device-independent.
• An enterprise can have a same software access for its staff who can access their software accounts with a personal login credentials as per the access permissions being allowed or conferred on them.

Examples of SaaS: Google Apps such as Google Classroom, Google Forms, Google Docs, Google Calendar, Dropbox, Zoho, Hubspot etc.

b. PaaS (Platform as a Service) - Platform-as-a-Service (PaaS) providers facilitate hardware and software tool access on the internet and enable the developers to build, host and test their applications [7-11]. Figure 2 illustrates the PaaS scenario.

PaaS Characteristics: PaaS platforms are highly volatile and can be:

• Accessed by multiple users across multiple domains.
• PaaS environment is scalable and enables the users to choose for suitable resources as per the business or personal requirements.
• Concurrent building, development is feasible owing to the virtualization support.
• The ease of access and implementation is predominant and requires minimal administrative knowledge.
PaaS = Platform as a Service

A Cloud Application Platform

Advantages of PaaS:
• Principally, PaaS supports software developers and builders to build their software and applications in pre-configured environment. Therefore, the developers do not need to build their applications from scratch. Subsequently, it helps to save time and money whilst minimizing the extensive code writing efforts.
• PaaS is highly popular cloud service model that allows formation of idiosyncratic applications with minimal costs and efforts. This can be related to utilizing the pre-established services and infrastructure instead of actually building and establishing a novel one.

PaaS examples: AWS Cloud9, Beanstalk, Microsoft Azure, GitHub, Heroku, Force.com, Magento Commerce Cloud [13].

c. IaaS (Infrastructure as a Service) - Infrastructure-as-a-Service (IaaS) offers utility model based storage, computational power, networking and virtualized environment to the consumers [7-11]. IaaS provides cloud-based alternative solutions to the users to access on-site infrastructure vested in the data centers, thus, averting expensive on-site resource costs either acquisition or operational [12-17].
IaaS Characteristics: IaaS platforms are:
• Flexibility and scalability
• Accessible and available for large number of users
• Low costs inducing

Advantages of IaaS:
• IaaS in cloud is highly scalable, flexible and must facilitate continuous availability, fault tolerance capabilities.
• IaaS cloud capabilities helps the users to induce customized control over the infrastructure.
• The users or customers have the liberty to access and oversee the IaaS platforms by themselves without the intervention of any external service vendor or contractor.

IaaS examples: Amazon Web Services Elastic Compute Cloud (EC2), AWS Simple Storage Service (S3), Google Compute Engine.
3. COMPARATIVE ANALYSIS OF CLOUD SERVICE MODELS

Figure 3 depicts the comparative illustration for IaaS, PaaS and SaaS. It can be observed that in case of on-premise application hosting or infrastructure vesting, the users have to manage all. This is vice-versa in case of cloud service models where the service provider manages, provides everything from data, applications, security, storage for the users [16-18].

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Figure 3: Comparative Illustration of IaaS, PaaS and SaaS [18]

4. CONCLUSION

Cloud computing is a revolution that has been significantly adopted by major Information Technology giants. Cloud computing is based on three prime service models that facilitate cloud services and application delivery. Prominently, it includes SaaS, PaaS and IaaS. Each of the cloud service model offers variable offerings, benefits and advantages. Cloud service models have been delivered and provided by big It giants including Google, Amazon, Microsoft, Salesforce, Facebook etc.

REFERENCES