CLOUD COMPUTING: AN INTRODUCTION AND APPLICATION OF MOBILE CLOUD COMPUTING WITH ADOPTION CHALLENGES

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ABSTRACT

Cloud computing is developing not only in parallel computing but in virtualization technologies as well which is defining the new edge in this technological era. Though the term 'cloud computing' is recent but the idea for the centralizing the computing and storage in distributed data centres. It came in way back in 1990s along with distributed computing approaches like grid computing. However, despite the fact that cloud computing offers huge opportunities to IT companies, cloud computing is still in the development phase, there are still some issues to be addressed. In this paper, we present a survey of cloud computing with its important features, architectural principles, we have identifies many challenges from the cloud computing acceptance. However, security and privacy issue represent a powerful obstacle for the users to adapt the cloud system.

*Keywords***:** *Cloud Computing, Virtualization, Research Issues.*

I INTRODUCTION

It's irrefutable that Cloud Computing is developing day-by-day in field of technical and business organizations but this can also be beneficial for solving social issues. Its development of parallel computing, distributed computing grid computing, and is the combination and evolution of Virtualization, Utility computing, Software-as-a-Service (SaaS),Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS). In a cloud computing situation, the traditional role of service provider is divided into twoportions :first is the infrastructure providers who manages cloud platforms and lease re-sources according to a usage-based pricing model, and second one is service providers, who rent resources from one or many infrastructure providers to serve the consumers.

The cloud computing has gained globally acceptance. Cloud computing providers can build large data centres at low cost due to their expertise in organizing and provisioning computational resources. The economies of scale increase revenue for cloud providers and lower costs for cloud users. The resulting on-demand model of computing allows providers to achieve better resource utilization through statistical multiplexing, and enables users to avoid the costs of resource over-provisioning through dynamic scaling[1, 2]

Indeed, cloud computing provides several compelling features that make it attractive to businessowners, as shown below:

No up-front investment: Cloud computing uses a pay-as-you-go pricing model. Nowadays, a service provider need not toinvest in the infrastructure to start gaining benefit from cloudcomputing. It simply rents resources from the cloud according to its own needs and pay for the usage.

Lowering operating cost: Resources in a cloud environment can be rapidly allocated and de-allocated on demand.Hence, a service provider no longer needs to provision capacities according to the peak load. This provides huge savings since resources can be released to save on operatingcosts when service demand is low.

Highly scalable: Infrastructure providers pool largeamount of resources from data centres and make them easilyaccessible. A service provider can easily expand its serviceto large scales in order to handle rapid increase in servicedemands (e.g., flash-crowd effect). This model is sometimescalled surge computing. [3]

1.1 Architecture

Model of cloud service is divided into SaaS, PaaS, and IaaS Figure 1 elaborates the reference architecture of cloud[4]

1.1.1   Software as a Service (SaaS)

As the name itself shows that Saas stands for Software as a Service In the market there are so many cloud consumer which provides the various applications in a hosting environment, that can be used by different clients and users. The person who is using the cloud he doesn't have control over the cloud infrastructure.
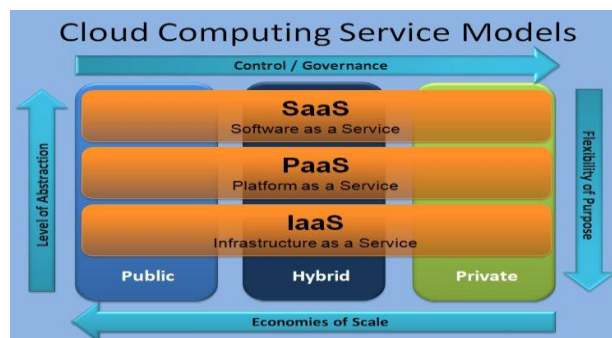

Figure 1

1.1.2   Platform as a Service(PaaS)

It's a development platform which supports the full 'Software Lifecycle' which allows cloud consumers to develop the cloud services. It means that SaaS which just host the cloud application whereas PaaS provides the development platform which hosts fully developed and under-progress cloud applications. For an instance, deploying a typical business tools we need a IT team which can buy and install the h/w, OS and other required things, apart from this IT team will maintain the whole environment as well. But, a PaaS provider supports all the underlying hardware and software, consumer just need to login and to start using the system.

1.1.3 **Infrastructure as a Service(IaaS)**

Cloud consumers directly use IT infrastructures (processing, storage, networks and other fundamental computing resources) provided in the IaaS cloud. Infrastructure as a Service (IaaS) is the next step down from Platform as a Service (PaaS) and two steps down from Software as a Service (SaaS) in the Cloud Computing Stack. Instead of pre-developed applications or services, development tools, databases, etc., IaaS provides the fundamental operating systems, safety, networking, and servers to help in the development of such applications, services.

II CLOUD V/S GRID COMPUTING

The comparison can be seen as follows.[5]

- ✓ Construction of the grid is to complete a specified task, such as biology grid, Geography grid, national educational grid, while Cloud computing is designed to meet general application and there are not grid for a special field.
- ✓ Grid emphasizes the resource sharing to form a virtual organization. Cloud is often owned by a single physical organization (except the community Cloud, in this case, it is owned by the community), who allocates resources to different running instances.
- ✓ Grid aims to provide the maximum computing capacity for a huge task through resource sharing. Cloud aims to suffice as many small-to-medium tasks as possible based on users' real-time requirements. Hence,multi-tenancy is a very important factorfor the Cloud computing.
- ✓ Grid trades re-usability for (scientific) high performance computing. Cloud computing is directly pulled by immediate user needs driven by various business requirements.
- ✓ Grid strives to achieve maximum computing. Cloud is after on-demand computing Scale up and down, in and out at the same time optimizing the overall computing capacity.[6]

III APPLICATION OF MOBILE CLOUD COMPUTING

Mobile applications are getting increased share in a global mobile market. In the market there are so many mobile applications which have taken the advantages of MCC. Here we will see some typical Mobile Cloud Computing :

3.1 Mobile Healthcare

The main reason of MCC in healthcare stream is to minimize the problems which were faced during the traditional treatment methods. Moreover, m-healthcare provides the smartphone users to access resources for instance, patient health record.

Following are some features or benefits provided by MCC applications:

- ✓ Some devices are having sensors which detects the pulse-rate, blood pressure.

- ✓ Some comprehensive health monitoring services enables patients to be monitored via broadband wireless connections.
- ✓ The access to healthcare information allows the patient to access for current and previous medical information.

3.2 Mobile Gaming

In terms of Mobile gamming we need huge hardware and graphics requirements to run the game smoothly. To overcome this problem some games are launched which can be played on cloud and gamers only interact with the screen interface on their devices. presents a new cloud-based mobile-game using a translation adaptation technique to dynamically adjust the game rendering factors according to communication restrictions and gamers' demands. The rendering adaptation technique mostly depends on the idea to decrease the number of objects in the display list since not all objects in the display list created by game engine are essential for playing the game and scale the difficulty of rendering operations. The objective is to maximize the user practice given the communications and computing costs. [7]

3.3 Mobile Learning

Mobile Learning also stands for m-learning which is based on electronic learning and mobility learning. Since, the traditional methods of learning were having limitations of high cost, limited resources[8], apart from this Cloud-based m-learning applications are introduced to solve these limitations. For example, using a cloud with the large storage volume and powerful processing ability, the applications provide learners with much richer services in terms of data size, faster processing speed, and longer battery life. Through a web site built on Google Apps Engine, students connect with their teachers at anytime. Also, the teachers can obtain the information about student's knowledge level of the course and can answer students' questions in time. In addition to this, a contextual mobile-learning system based on IMERA platform [9] shows that a cloud-based mobile-learning system helps learners access learning resources remotely.

IV CHALLENGES IN ADOPTION OF CLOUD COMPUTING

Followings are some prospective which are based on a survey conducted by IDC in 2008[10]

4.1 Confidentiality

There are many cloud computing vendors which are extensively adopting this confidentiality methods. It means it will keep the user's data secret into the cloud so that unauthorized user won't be able to access that data.

4.2 Control

The cloud system means to regulate the use of system, the control of whole cloud is depends on its different services.

4.3 Security

The main security problem is with data misuse, phishing, botnet ect. The multi - tenancy model and the pooled computing resources on cloud computing has introduced new security challenges such as shared resources (hard

disk, data, VM) on the same physical machine requests surprizing side channels between a malicious resource and a steady resource. And, the issue of "reputation fate-sharing" will severely harm the reputation of many good Cloud "citizens" who happen to, unfortunately, share the computing resources with their fellow tenant - a notorious user with a criminal mind.

4.4 Data integrity

In the cloud system means to preserve information integrity (i.e., not lost or modified by unauthorized users). As data are the base for providing cloud computing services, such as Data as a Service, Software as a Service, Platform as a Service, keeping data integrity is a fundamental task

V CONCLUSION

This paper discussed the architecture, popular platforms for cloud computing. Apart from this, in the paper applications of mobile cloud computing also been addressed. In spite ofvarious limitations and need for better processes, cloud computing is becoming a great and attractive paradigm.

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