

Cloud Computing: A New Era in the Field of Information Technology Applications and its Services

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Abstract Cloud computing is the computing that provides virtualized IT resources as a service by using Internet technology. In cloud computing, a customer lends IT resources as needed, uses them, get a support of real-time scalability according to service load, and pays as he/she goes. Cloud computing is becoming an adoptable technology for many of the organizations with its dynamic scalability and usage of virtualized resources as a service through the Internet. Cloud computing uses the Internet and central remote servers to maintain data and applications. As know that at present the e-commerce services opportunity to utilize pay-as-you-go resources together with their own and shared resource in the fields of IT. In this paper shows that the cloud computing plays an important role in the fields of Information Technology services and its applications and it is helpful to provide the data to the customer. The results show that the comparison of cloud services and normal services of Information Technology applications.

Keywords: cloud computing, SasS, distributed data base, cloud storage, big data

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1. Introduction

Cloud computing has been an important term in the world of Information Technology (IT). Cloud computing is a kind of computing which is highly scalable and use virtualized resources that can be shared by the users. Users do not need any background knowledge of the services. A user on the Internet can communicate with many servers at the same time and these servers exchange information among themselves. The concept of cloud computing offers in the IT sector a way to increase IT capacity and add on the fly capabilities without investing in new infrastructure, new training, or licensing new software. There is no need to setup, configure and manage large physical installations of hardware and networks. This technology allows much more efficient computing by centralizing storage, memory, processing and bandwidth. In cloud computing big data tool utilize the big data and provide the solutions. Cloud computing techniques to estimate costs for service dependency and to monitor costs associated with typical scientific applications. Recently, cloud computing has been considered as an emerging model which aims at allowing customers to utilize computational resources and software hosted by service providers. Cloud computing promises to eliminate obstacles due to the management of IT resources and to reduce the cost on infrastructure investments. Cloud Computing refers to both the applications delivered as services over the Internet and the

hardware and systems software in the datacenters that provide those services. The services themselves have long been referred to as Software as a Service (SaaS), so we use that term. Providers apply online ordering and payment via browser-based applications for selling Utility Computing and Application Service Providing . Hence, a very important aspect in Cloud Computing is E-commerce applied to the above-mentioned services. Other works introduce the service types infrastructure, platform and software for cloud-based services. Cloud-based infrastructure provides access to virtualized hardware located on the Internet.

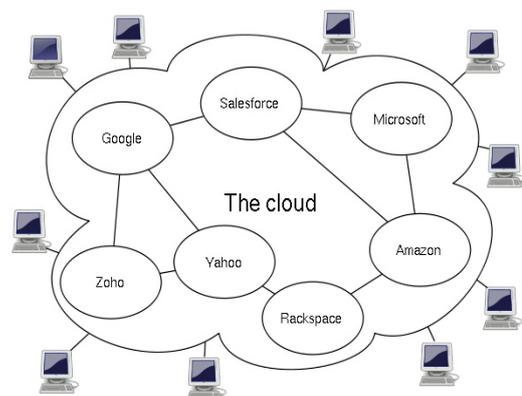


Figure 1. Cloud Computing and its Service Provider

It can be the ability to rent a virtual server, load software on it, turn it on and off at will, or clone it ten

times to meet a sudden workload demand. It can be storing and securing immense amounts of data that is accessible only by authorized applications and users. the nature of cloud computing and how it builds on established trends while transforming the way that enterprises everywhere build and deploy applications.

2. Cloud Characteristics

This are some features, commonly associated with clouds. A customer can be an individual lab, a consortium participant, or a consortium.

- **Resource outsourcing:** Instead of a consumer providing their own hardware, the cloud vendor assumes responsibility for hardware acquisition and maintenance.
- **Utility computing:** The consumer requests additional resources as needed, and similarly releases these resources when they are not needed. Different clouds offer different sorts of resources, e.g., processing, storage, management software, or application services [6].
- **Large numbers of machines:** Clouds are typically constructed using large numbers of inexpensive machines. As a result, the cloud vendor can more easily add capacity and can more rapidly replace machines that fail, compared with having machines in multiple laboratories. Generally speaking these machines are as homogeneous as possible both in terms of configuration and location.
- **Automated resource management:** This feature encompasses a variety of configuration tasks typically handled by a system administrator. For example, many clouds offer the option of automated backup and archival. The cloud may move data or computation to improve responsiveness. Some clouds monitor their offerings for malicious activity.
- **Virtualization:** Hardware resources in clouds are usually virtual; they are shared by multiple users to improve efficiency. That is, several lightly-utilized logical resources can be supported by the same physical resource.
- **Parallel computing:** Map/Reduce and Hadoop are frameworks for expressing and executing easily-parallelizable computations, which may use hundreds or thousands of processors in a cloud.

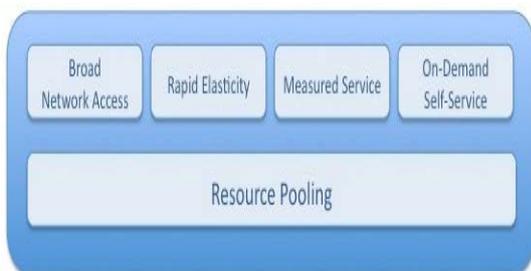


Figure 2. Essential characteristics of Cloud Computing

3. Layers of Cloud Computing

To understand the cloud computing three layers are described:

3.1. Software As A Service (SaaS) As Application Layer

SaaS provider dispose the applied software unified on their server, the user can subscribe applied software service from the manufacturer through Internet .The Provider supply software pattern through Browser, and charge according to the quantity of software and using time. The advantage of this kind of service pattern is that the provider maintains and manages software, supplies the hardware facilities, the users can use software everywhere when they own the terminal which can log in Internet. Under this pattern, the users can use the corresponding hardware, the software and the maintenance service via the Internet, by paying some rents rather than liking traditional pattern which made users to spend much funds on them. This is the most benefit business pattern of the network application. For small business, SaaS is the best way to use advanced technology. At present, Salesforce.com is famous company for providing these services, so as Google Doc and Google Apps.

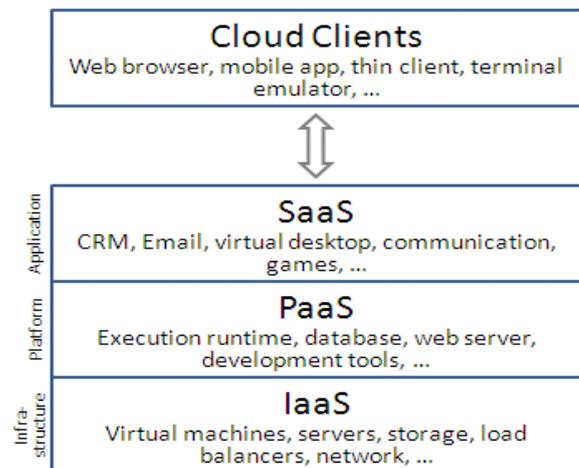


Figure 3. Architecture layers of Cloud Computing

3.2. Platform As A Service (PaaS) As Platform Layer

PaaS takes develop environment as a service to supply. This layer provides a platform for creating applications. PaaS solutions are essentially development platforms for which the development tool itself is hosted in the Cloud and accessed through a browser. With PaaS, developers can build Web applications without installing any tools on their computers and then deploy those applications without any specialized systems administration skills. It is a kind of distribution platform server, the manufacturers supply service to the users, such as develop environment, server platform and hardware resources, and the users customize and develop their own application and transfer to other customers. Google App Engine is the representative product through their server and Internet.

3.3. Infrastructure As A Service (IaaS) As Infrastructure Services Layer

In this layer of IaaS, servers, network devices, and storage disks are made available to organizations as services on a need-to basis. IaaS takes infrastructure

which is made of many servers as a measurement service to the customers. It integrates memory and I/O devices, storage and computing ability into a virtual resources pool, and provides storage resources and virtualization service for the whole industry. This is a way of hosted hardware, and the customer pays when they use the hardware. For example, Amazon Web Service and IBM Blue Cloud all rent the infrastructure as a service. The advantage of IaaS is that the user only need low cost hardware and rent computing ability and storage ability according to his need, greatly reduced cost of the hardware. Currently, Microsoft has been offering IaaS services, either through its own infrastructure or that of its partners.

4. Technologies Used in Cloud Computing

Cloud computing systems use many technologies of which the programming model, data management, data storage, virtualization are the key technologies:

4.1. Virtualization

Virtualization is a method of deploying computing resources. It separates the different levels of the application system including hardware, software, data, networking, storage and so on, breaks the division among the data center, servers, storage, networking, data and the physical devices, realize dynamic architecture, and achieves the goals of managing centralized and use dynamically the physical resources and virtual resources, improving the flexibility of the system, reducing the cost, improving the service and reducing the risk of management. In computing, virtualization means to create a virtual version of a device or resource, such as a server, storage device, network or even an operating system where the framework divides the resource into one or more execution environments. Even something as simple as partitioning a hard drive is considered virtualization because you take one drive and partition it to create two separate hard drives. Devices, applications and human users are able to interact with the virtual resource as if it were a real single logical resource.

4.2. Distributed Storage

In order to ensure high credibility and economy, cloud computing adopts distributed storage to save data, using redundancy storage to ensure the reliability of stored data and using high credible software to make up the readability of the hardware, therefore providing the cheap and credible mass distributed storage and computing system. The data storage system of cloud computing are Google File System (GFS) and Hadoop Distributed File System (HDFS) which is developed Hadoop team. GFS is a distensible distributed file system. It is used in large and distributed applications which need to access mass data. HDFS is a distributed file system which is applicable to running on commodity hardware. It is very similar to the existing distributed file system, but also with a significant difference.

4.3. Parallel Programming Model

To enable users efficiently to use cloud computing resources and more easily enjoy services that cloud computing adopts Map Reduce programming model,

which decomposes the task into multiple subtasks, and through two steps (Map and Reduce) to realize scheduling and allocation in the large-scale node. Map Reduce is a parallel programming system developed by Google. It puts parallelism and fault tolerance, data distribution, and load balance in a database. Map Reduce system mainly consists of three modules: client, master and worker. The client is responsible for submitting parallel processing assignments composed by the users to master node. Map Reduce is mainly used in mass data processing. One of the features of the task scheduling strategy is scheduling priority the task the node which the data belong.

4.4. Data Management

Cloud computing needs to process and analyze mass and distributed data, therefore, data management technology must be able to efficiently manage large data sets. Data items are ordered according to the sequence of keyword in the dictionary, with each row dynamically delivered to Tablets. To ensure the high scalability of data structure, adopts three-level hierarchical way to store location information.

5. Service offered of Cloud Computing

Various services offered cloud computing in different fields like e. IT Education Sector, Storage, Govt. Organization, Online marketin, E-Commerce etc. Cloud computing can describe services being provided at any of the traditional layers from hardware to applications. Clouds shift the responsibility to install and maintain hardware and basic computational services away from the customer (e.g., a laboratory or consortium) to the cloud vendor.

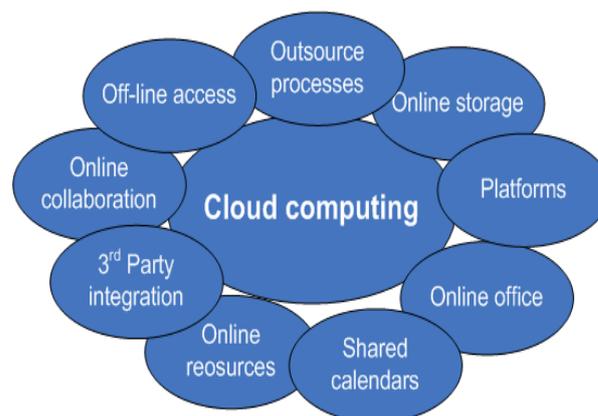


Figure 4. Services of Cloud Computing

To compete with open source products leading vendors like VMware now include higher-level services, such as configuration management, workload orchestration, policy-based allocation, and accounting.

6. Conclusion and Results

This paper introduces the definition of could computing and its main service offered in IT and other fields, summarizes the characteristics, and focused on the key technologies such as the data storage, data management

and programming model. The ultimate goal of cloud computing is to provide calculation, services and applications as a public facility for the public, So that people can use the computer resources just like using water, electricity, gas and telephone. Cloud computing is a kind of computing paradigm that can access conveniently a dynamic and configurable public set of computing resources (e.g. server, storage, network, application and

related service), provided and published rapidly and on-demand with least management and intervention. And in this paper we also show how cloud computing is better in various aspects like cost, customer and employee. The success of the cloud computing model depends hugely on the ability of cloud providers to keep promises made to users.

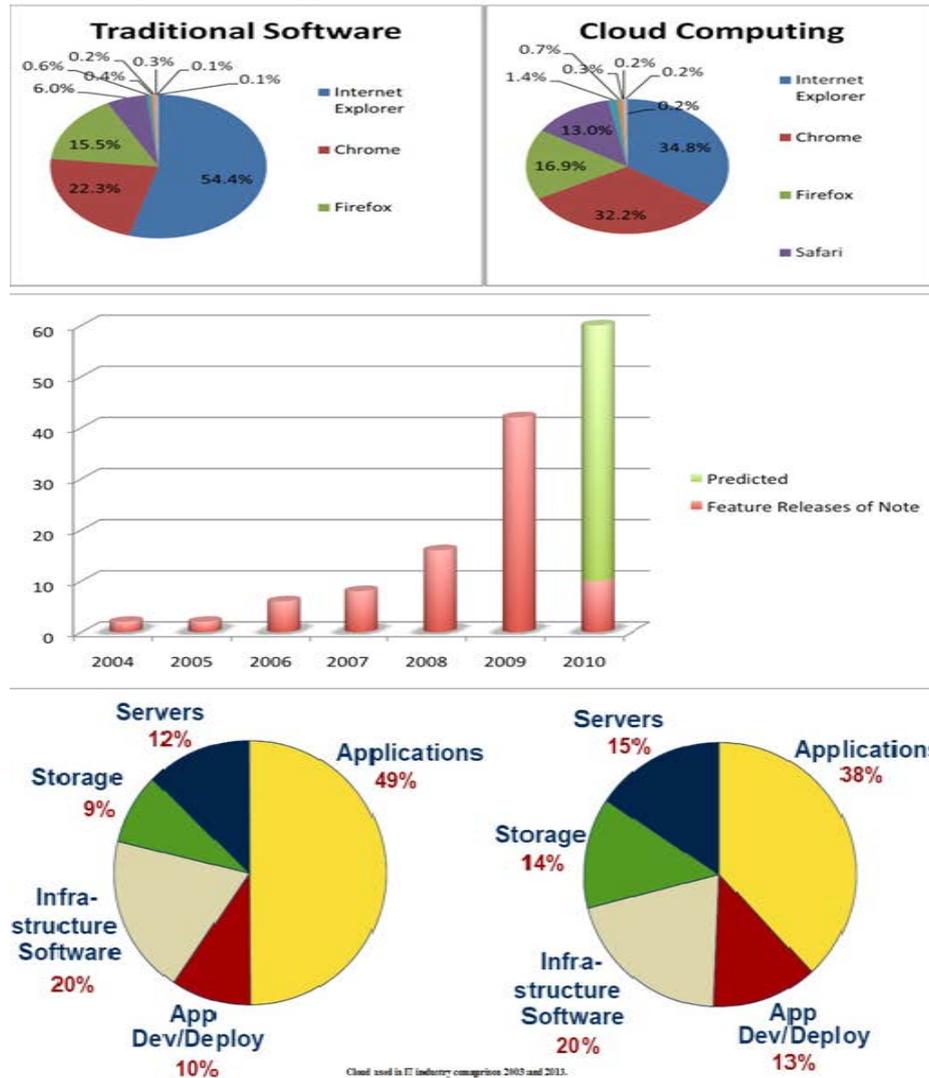


Figure 5. Results

The above result shows the industry results of cloud computing uses over 2009 to 2013 is improve the revenue by product/service types using IT infrastructures. As a survey of for cloud computing application in 2009 17.5 billion revenue and in 2013 45 billion revenue generated by using cloud IT product/service.

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