
CLOUD COMPUTING- A NEW EDGE TO TECHNOLOGY

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The Cloud Computing model appeared after the evolution of parallel computing, distributed computing and grid computing. This concept of computing comes from grid, public computing and SaaS. It is a new method that shares public framework and the basic principle of cloud computing is based on the cloud of resource pool and virtualization. This paper introduces the principles and merits of the cloud computing. The merits include reduction in user level cost and no need of user's high level equipment. Hence due to cloud computing users can enjoy the service even he knows nothing about the technology and the professional knowledge in this field.

Keywords- Cloud Computing, SaaS, PaaS, IaaS, virtualization.

INTRODUCTION

The cloud computing is one kind of emerging computing model. It is an extend of changing with the need , that is to say the manufacturer provide relevant hardware, software and service according to the need that users put forward. In actual, cloud computing is an extend of grid computing, distributed computing and parallel computing [1]. It provides secure, quick, convenient data storage and net computing services centered by internet. The factors that impel the occurring and development of cloud computing include the development of grid computing, the appearance of high quality technology in storage and data transportation, and the appearance of web2.0, especially the development of virtualization [2].

Cloud computing concept depends on the resource pool called as "The cloud". "The cloud" is virtual computation model that maintain and manage itself. The cloud computing will concentrate all the computation resources and can be managed automatically through the software without intervene. This make users not to worry about doing the awful things like storing data and killing virus, this kind of task can be done by professional. Each participant in the computation constitutes a "node", but the entire computation is composed one by thousand of nodes called as grid.

Grid is the basic computing model on which the cloud computing depends moreover the character of cloud computing is in the virtualization, distribution and dynamic extendibility. Virtualization is the main character and most software and hardware have provided support to virtualization. We can virtualizes many IT resources such as software, hardware, operating system and storage, and manage them in the cloud. Distributional means the physically distributed computational nodes. Dynamic expendability refers to the dynamic extension of virtualization level. But there are also some threats and risk associated with cloud computing like issue of data privacy, server failure, server downtime, etc. and the merits include reduction in user cost and maintenance.

WHAT IS CLOUD COMPUTING?

Background

Currently there is no standard definition or specification of cloud computing. It may take some time to define the key characteristics of Cloud Computing based on practices in the field. Cloud Computing involves a set of key technologies to address resource sharing based on business requirements. Based on our practices in the areas of service provisioning and solution design, there are two key enabling technologies could play very important roles in this revolutionary phase: virtualization technology and Service-Oriented Architecture (SOA).

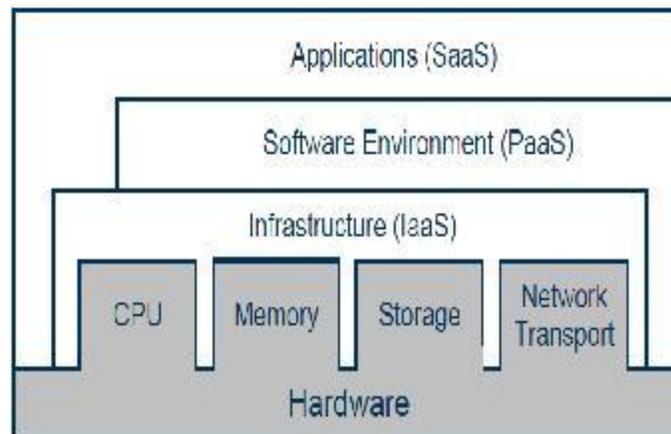
The virtualization technology handles how images of the operating systems, middleware, and applications are pro- created and allocated to the right physical machines or a slice of a server stack. The images could be moved around and put into production environment on demand. On the other hand, virtualization technology can also help reuse licenses of operating systems, middleware, or software applications, once a subscriber releases his/her service from the Cloud Computing platform.

The SOA is the evolution of a system or software architecture for addressing componentization, reusability extensibility, and flexibility. In order to construct scalable Cloud Computing platforms, we need to leverage SOA to build reusable components, standard-based interfaces, and extensible solution architectures. Creating a so-called Cloud Computing platform is easy as long as it can enable sharing of at least one of the resources. However, building a unified,

scalable and reusable Cloud Computing architecture to support sharing of all types of resources still faces challenges in the areas of technology breakthrough and best industry practices.

Cloud computing 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 [3].

Figure 1 – Cloud Computing Overview



Cloud Computing Principle

It provides computing resources in the pool for users through internet. Integrated cloud computing is a whole dynamic computing system. It provides a mandatory application program environment [4]. It can deploy, allocate or reallocate computing resource dynamically and monitor the usage of resources at all times. Generally speaking cloud computing has a distributed foundation establishment, and monitor the distributed system, to achieve the purpose of efficient use of the system [5]. Cloud computing collects all the computing resources and manages them automatically through software. In the process of data analysis, it integrates the history data and present data to make the collected information more accurate and provide more intelligent service for users and enterprises [6]. The users need not care how to buy servers, softwares, solutions and so on. Users can buy the computing resource through internet according to their own needs.

Cloud computing does not depend on special data center, but we can look it as the inevitable product of grid computing and efficiency computing. However, compared with general network

service, cloud computing is easy to extend, and has an simple management style. Cloud is not only simply collect the computer resource, but also provides a management mechanism and can provides services for millions of users simultaneously. Nowadays, virtualization is entering every field of data center [7]. It has become useful tool and improved service capacity. When the storage and computing capacity of the server cluster are surplus, we need not purchase servers, all we need to do is to add a virtual machine running on the server. If the cluster is large enough, the request of adding server will have marginal effect, and then we can save the money that should be used in purchasing new servers. At the same time, cloud computing provides powerful supports for SAAS (software as a service) [7]. It integrates all the companies that provide similar services in the internet in order that users can compare and select service providers. Cloud computing provides dependable and secure data storage center, provides immense possibility for internet application, provides infinite space for storing and managing data, provides powerful computing capacity for users to complete all kinds of application. Future computer may only be used for connecting internet to implement services based on cloud computing. Users will change their habit of using computer totally, from services centered by desktop to services centered by Web.

On-demand self-service: A consumer with an instantaneous need at a particular timeslot can avail computing resources (such as CPU time, network storage, software use, and so forth) in an automatic (i.e. convenient, self-serve) fashion without resorting to human interactions with providers of these resources.

Broad network access: These computing resources are delivered over the network (e.g. Internet) and used by various client applications with heterogeneous platforms (such as mobile phones, laptops, and PDAs) situated at a consumer's site.

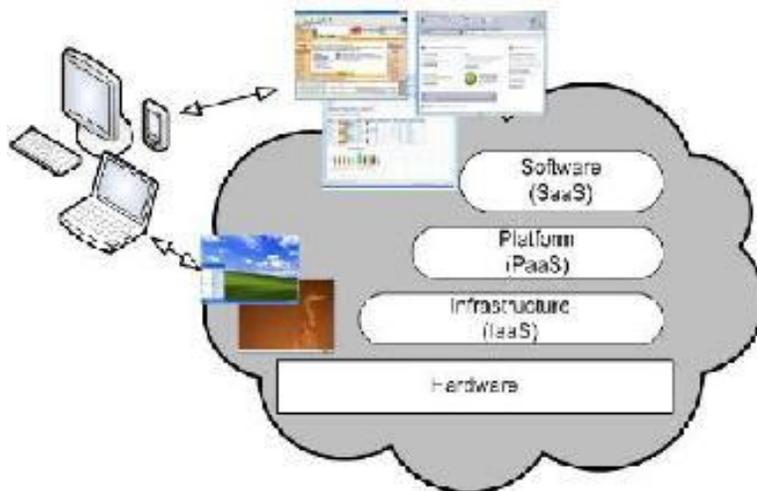
Resource pooling: A cloud service provider's computing resources are 'pooled' together in an effort to serve multiple consumers using either the *multi-tenancy* or the *virtualization* model, "with different physical and virtual resources dynamically assigned and reassigned according to consumer demand". The motivation for setting up such a pool-based computing paradigm lies in two important factors: *economies of scale* and *specialization*. The result of a pool-based model is that physical computing resources become 'invisible' to consumers, who in general do not have control or knowledge over the location, formation, and originalities of these resources (e.g.

database, CPU, etc.) . For example, consumers are not able to tell where their data is going to be stored in the Cloud.

Rapid elasticity: For consumers, computing resources become immediate rather than persistent: there are no up- front commitment and contract as they can use them to scale up whenever they want, and release them once they finish to scale down. Moreover, resources provisioning appears to be infinite to them, the consumption can rapidly rise in order to meet peak requirement at any time.

Measured Service: Although computing resources are pooled and shared by multiple consumers (i.e. multi- tenancy), the cloud infrastructure is able to use appropriate mechanisms to measure the usage of these resources for each individual consumer through its metering capabilities.

Figure 2 - Cloud Computing Architecture and user's access



CLOUD COMPUTING STYLE

Though people have different views on the cloud computing, they have already reached an agreement on the basic style on it. Its style is as follows:

SAAS (Software as a service)

This kind of cloud computing transfer programs to millions of users through browser. In the user's views, this can save some cost on servers and software. In the provider's views, they only need to maintain one program, this can also save cost. Salesforce.com is so far the most famous

company that provides this kind of service. SAAS is commonly used in human resource management system and ERP(Enterprise Resource Planning). Goole Apps and Zoho Office is also providing this kind of service.

Utility Computing

Recently Amazon.com, Sun, IBM and other companies that provide storage services and virtual services are appearing. Cloud computing is creating virtual data center for IT industry to make it can provide service for the whole net through collecting memory, IO equipment, storage and computing power to a virtual resource pool.

Network service

Net service has a close relation with SAAS. The service providers can help programmers develop applications based on internet instead of providing single machine procedure through providing API(Application Programming Interface).

PAAS(Platform as a service)

Platform as a service, another SAAS, this kind of cloud computing providing development environment as a service.

You can use the middleman's equipment to develop your own program and transfer it to the users through internet and servers.

MSP (management service provider)

This is one of the ancient applications of cloud computing. This application mostly serves the IT industry instead of end users. It is often used in mail virus scanning and program monitoring.

Commercial service platform

The commercial service platform is the mixture of SAAS and MSP(Mixed signal Processor), this kind of computing provides a platform for the interaction between users and service provider. For instance, the user individual expense management system can manage user's expense according user's setting and coordinate all the services that users purchased.

Integrating internet

It can integrate all the companies that provide similar services, so that users can compare and select their service provider.

CLOUD COMPUTING DEPLOYMENT LEVEL

More recently, four cloud deployment models have been defined in the Cloud community:

Private cloud: The cloud infrastructure is operated solely within a single organization, and managed by the organization or a third party regardless whether it is located premise or off premise. The motivation to setup a private cloud within an organization has several aspects. First, to maximize and optimize the utilization of existing in-house resources. Second, security concerns including data privacy and trust also make Private Cloud an option for many firms. Third, data transfer cost from local IT infrastructure to a Public Cloud is still rather considerable. Fourth, organizations always require full control over mission-critical activities that reside behind their firewalls. Last, academics often build private cloud for research and teaching purposes.

Community cloud: Several organizations jointly construct and share the same cloud infrastructure as well as policies, requirements, values, and concerns. The cloud community forms into a degree of economic scalability and democratic equilibrium. The cloud infrastructure could be hosted by a third-party vendor or within one of the organizations in the community.

Public cloud. This is the dominant form of current Cloud computing deployment model. The public cloud is used by the general public cloud consumers and the cloud service provider has the full ownership of the public cloud with its own policy, value, and profit, costing, and charging model. Many popular cloud services are public clouds including Amazon EC2, S3, Google AppEngine, and Force.com.

Hybrid cloud: The cloud infrastructure is a combination of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds). Organizations use the hybrid cloud model in order to optimize their resources to increase their core competencies by margining out peripheral business functions onto the cloud while controlling core activities on-premise through private cloud. Hybrid cloud has raised the issues of standardization and cloud interoperability.

CLOUD COMPUTING ADVANTAGES

1. Cloud computing do not need high quality equipment for user, and it is easy to use.
2. Cloud computing provides dependable and secure data storage center. You don't worry the problems such as data loss or virus [7]
3. Cloud computing can realize data sharing between different equipments.
4. Cloud provides nearly infinite possibility for users to use internet.

CONCLUSION

The main purpose of this paper is to investigate the basic principles behind the cloud computing environment and what is the cloud computing. This paper discusses the various computing style in cloud computing and the advantages of cloud computing. As the cloud computing announced low- cost super-computing services to provide the possibility, while there are a large number of manufacturers behind, there is no doubt that cloud computing has a bright future.

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