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Cloud Computing Utility and Applications

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Abstract

Cloud Architecture provides services on demand basis via internet (WWW) services. Application design in cloud computing environment or the applications which support cloud paradigm are on demand on the basis of user requirement. Those applications provide the support on various hardware, software and other resource requirement on demand. API used in the cloud computing provide the greater advantage to provide industrial strength, where the complex reliability and scalability logic of the underlying services remains implemented and hidden in the cloud environment. Cloud Computing provide the highest utilization in terms of utilization, resource sharing, requirement gathering and utility to the other needful resources. In this paper we discuss several utility and their applications. We provide a broad discussion which is useful for cloud computing research.

Keywords

Cloud computing, API, WWW, cloud architecture

1. Introduction

In Internet Technology cloud computing is a great revolution. Cloud Computing is delivery of pooled network resources such as CPU, RAM, Storage, and Software over the web. These services provided on demand on the basis of the user requirement. The companies are providing cloud servers, cloud storage, software hosted on the cloud environment. Cloud computing helps the business to get the required computing resources at very minimal cost. Once the work is done you can release the Cloud resources. You will be charged only for your usage. This ways business can save lot of money.

The most common service that the user needs from the cloud computing is the connection from the virtual servers. The Cloud hosting services is good for small as well as big businesses. You can even go for hosted exchange, hosted email, hosted accounting services. We can pay for these services which we used on demand. The new area of Computing starts with Cloud Computing. We can explore the main computation of cloud computing by showing different drives or folders which act like a cloud provider and we can provide sharing between them. There is no need to maintain any hardware or software. There are hundreds of apps (applications) of very low cost are available running in cloud. We also discuss some applications which are run on the cloud computing. If we want to use the capability of clouding from the internet then we can use by the registration to the cloud provider and done the basic formalities of registration, and then we can use the services.

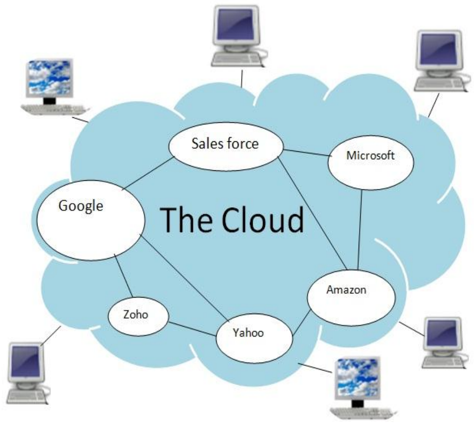

Figure 1 the Cloud

a. Chat
b. CRM – Customer Relationship Management
c. Word Processor
d. Spreadsheet
e. Online Presentation
f. Mail
g. Wiki
h. Image Editing
i. Accounting
j. Docs

The applications are upgraded very easily through internet. The user no needs to do it manually using the upgraded version software. The motive of Cloud Computing is serving On Demand means when the need arises; it's very easy to get extra resource instantly. Any small amount of resource can be used from the cloud.

We provide here an overview of cloud computing. The rest of this paper is arranged as follows: Section 2 introduces types of cloud; Section 3 describes about cloud architecture; Section 4 shows the computing complexity; Section 5 shows the recent scenario. Section 6 describes Conclusion and outlook.

2. Types of Cloud

We can define cloud on the basis of applicability and the use. Below description shows different possible clouds.

Public Clouds
In Public cloud the computing infrastructure is hosted by the cloud vendor at the vendor's premises. The customer has no visibility and control over where the computing infrastructure is hosted. The computing infrastructure is shared between any organizations (Figure 2). Public clouds are most often hosted away from customer premises, and they provide a way to reduce customer risk and cost by providing a flexible, even temporary extension to enterprise infrastructure. If a public cloud is implemented with performance, security, and data locality in mind, the existence of other applications running in the cloud should be transparent to both cloud architects and end users. Indeed, one of the benefits of public clouds is that they can be much larger than a company's private cloud might be, offering the ability to scale up and down on demand, and shifting infrastructure risks from the enterprise to the cloud provider, if even just temporarily.

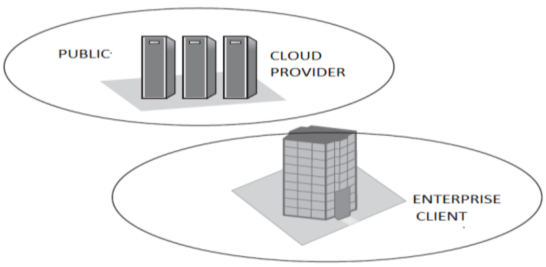

Figure 2 Public Cloud

Public clouds become revolutionary innovation in IT which is not just for small and medium-sized businesses. At the moment, most companies are experimenting with public clouds as a resource for development and testing or for production applications with low requirements for security, protection of personal data and service levels. It is believed that large companies of public clouds may be of interest only in a specific niche, given their large investments in legacy systems and the critical role of such systems for their business. Nevertheless, a number of these companies see great potential in public clouds. They feel an urgent need to make a choice between pro-active work with the public and the clouds behind the competition.

Private Clouds
These are the types of clouds which exist within the boundaries (firewall) of an organization. It is totally managed by an enterprise and has all the features of Public Clouds with a major difference that it has to take care the underlying IT infrastructure. They are more secure as they are internal to an organization and they shuffle resources according to their business needs.

Private clouds are built for the exclusive use of one client, providing the utmost control over data, security, and quality of service (Figure 3). The company owns the infrastructure and has control over how applications are deployed on it. Private clouds may be deployed in an enterprise datacenter, and they also may be deployed at a collocation facility. Private clouds can be built and managed by a company's own IT organization or by a cloud provider. In this "hosted private" model, a company such as Sun can install, configure, and operate the infrastructure to support a private cloud within a company's enterprise datacenter.

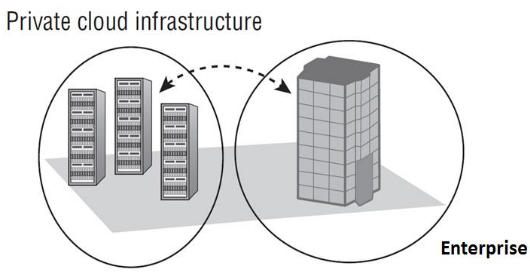

Figure 3 Private Cloud

This model gives companies a high level of control over the use of cloud resources while bringing in the expertise needed to establish and operate the environment.

Hybrid Clouds
They consist of external and internal providers, via mix of public and private clouds. Secure & critical apps are managed by an organization and the not-so-critical & secure apps by the third party vendor. They have a unique identity, bound by standard technology, thus enabling data and application portability. They are used in the situations like Cloud Bursting.
Hybrid clouds combine both public and private cloud models (Figure 4). They can help to provide on-demand, externally provisioned scale. The ability to augment a private cloud with the resources of a public cloud can be used to maintain service levels in the face of rapid workload fluctuations. This is most often seen with the use of storage clouds to support Web 2.0 applications. A hybrid cloud also can be used to handle planned workload spikes. Sometimes called "surge computing," a public cloud can be used to perform periodic tasks that can be deployed easily on a public cloud.

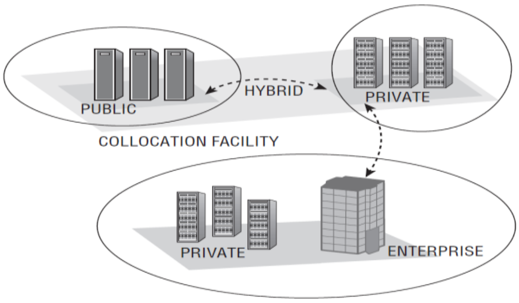

Figure 4 Hybrid Cloud

3. Architecture of Cloud Computing Based on Service Offered

In practice, cloud service providers tend to offer services that can be grouped into three categories: software as a service, platform as a service, and infrastructure as a service. These categories group together the various layers illustrated in Figure 5, with some overlap.

Software as a Service (SaaS)
If provide software services on demand. The use of single instance of the application runs on the cloud services and multiple end users or client organizations. The most widely known example of SaaS is salesforce.com, though many other examples have come to market, including the Google Apps offering of basic business services including email and word processing. Although salesforce.com preceded the definition of cloud computing by a few years, it now operates by leveraging its companion force.com, which can be defined as a platform as a service.

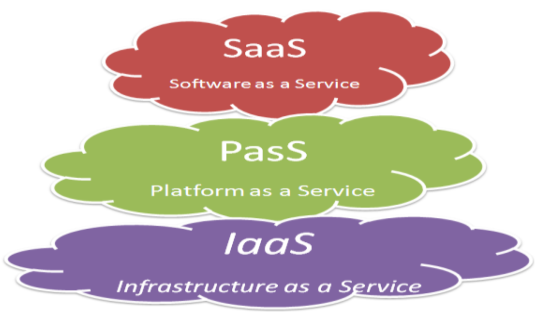

Figure 5 Cloud Services and Application

Platform as a Service (PaaS)
Platform as a service encapsulates a layer of software and provides it as a service that can be used to build higher-level services. There are at least two perspectives on PaaS depending on the perspective of the producer or consumer of the services:

- Someone producing PaaS might produce a platform by integrating an OS, middleware, application software, and even a development environment that is then provided to a customer as a service. For example, someone developing a PaaS offering might base it on a set of Sun xVM hypervisor virtual machines that include a Net Beans integrated development environment, a Sun Glassfish Web stack and support for additional programming languages such as Perl or Ruby.

- Someone using PaaS would see an encapsulated service that is presented to them through an API. The customer interacts with the platform through the API, and the platform does what is necessary to manage and scale it to provide a given level of service. Virtual appliances can be classified as instances of PaaS. A content switch appliance, for example, would have all of its component software hidden from the customer, and only an API or GUI for configuring and deploying the service provided to them.

Infrastructure as a Service (IaaS)
It provides the storage and other compute capabilities as a standard way to use over the network. All the High performance computing storage shares the workload over the networking capabilities. Commercial examples of IaaS include Joint, whose main product is a line of virtualized servers that provide a highly available on-demand infrastructure.

The main thing is to how we decompose an application into its various components and then how to deploy those components on separate servers in order to optimize non-functional requirements including scalability, availability, manageability, and security. In today's era we can decomposed application architecture while actually deploying onto a consolidated architecture that uses virtualization.

4. Computing Complexity

Cloud computing emphasizes on the efficiency of the whole system, so adopting a small number of standards and standard configurations helps to reduce maintenance and deployment costs. Following different standards it makes the scalability easier in every job. Virtual Machine Types: Consider the impact of virtual machine choice on the application to be supported. For a social networking application, isolation for security, and a high level of abstraction for portability, would suggest using Type II virtual machines. This shifts the economics from costly, one-off implementations to choosing the building blocks that can be used in the largest volume. There will continue to be specialization; however the starting point should be with a standard.

For a high-performance computing or visualization applications, the need to access hardware directly to achieve the utmost performance would suggest using Type I virtual machines. For an enterprise shifting to cloud computing, standards may include the type of virtual machine, the operating system in standard virtual machine images, tools, and programming languages supported.

Preinstalled Preconfigured Systems: The software on virtual machines must be maintained just as it does on a physical server. Operating systems still need to be hardened, patched, and upgraded. Having a small, standard set of supported configurations allows developers to use the current supported virtual machine. When the supported configuration is updated, the model dictating customizations should be designed so that it's easy to re-apply changes to a new virtual machine image. The same is true for appliances, where the current version can be configured through their standard APIs.

5. Recent Scenario

In 2010, Cynthia Taylor et al. [1] analyses that developing a new enhanced cloud-based computing architecture, called the Proximal Workspace architecture to allow access and interaction between lightweight devices, e.g., video glasses, earphones, wrist displays, body sensors, etc., and applications that represent a new generation of Computation and-data-intensive programs in areas such as augmented reality. While lightweight devices offer an easy way for these applications to collect user data and offer feedback, the applications cannot be run natively and completely on these devices because of high resource demands. More generally, the workspace is designed to run any subset of activities that cannot be run on a user's device due to computation speed or storage size, and cannot be run on a cloud server due to network latency. Ultimately, the goal is to produce a set of middleware utilities that when run in the workspace with highly-interactive, computation/data intensive applications will result in better user-perceived performance.

In 2010, Rajkumar Buyya [2] analyses that Computing is being transformed to a model consisting of services that are commoditized and delivered in a manner similar to utilities such as water, electricity, gas, and telephony. In such a model, users access services based on their requirements without regard to where the services are hosted. Several computing paradigms have promised to deliver this utility computing vision and they include Grid computing, P2P computing, and more recently Cloud computing. The latter term denotes the infrastructure as a Cloud in which businesses and users are able to access applications from anywhere in the world on demand. Cloud computing delivers infrastructure, platform, and software (application) as services, which are made available as subscription-based services in a pay-as-you-go model to consumers. These services in industry are respectively referred to as Infrastructure as a Service (Iaas), Platform as a Service (PaaS), and Software as a Service (SaaS). To realize Cloud computing potential, vendors such as Amazon, Google, Microsoft, and IBM are starting to create and deploy Clouds in various locations around the world.

In 2010, Ashwin Manjunatha [3] focuses on exploiting the capabilities of the mobile and cloud landscape by defining a new class of applications called cloud mobile hybrid (CMH) applications and a Domain Specific Language (DSL) based methodology to develop these applications. They define Cloud-mobile hybrid as a collective application that has a Cloud based back-end and a mobile device front-end. Using a single DSL script, their toolkit is capable of generating a variety of CMH applications.

In 2011, Yu Wu et al. [4] introduce a queueing network based model to characterize the viewing behaviors of users in a multichannel VoD application, and derive the server capacities needed to support smooth playback in the channels for two popular streaming models: client-server and P2P. They then propose a dynamic cloud resource provisioning algorithm which, using the derived capacities and instantaneous network statistics as inputs, can effectively support VoD streaming with low cloud utilization cost.

In 2011, Naidila Sadashiv et al. [5] present an end to end comparison between Cluster Computing, Grid Computing and Cloud Computing, along with the challenges they face. This could help in better understanding these models and to know how they differ from its related concepts, all in one go. They also discuss the ongoing projects and different applications that use these computing models as a platform for execution. An insight into some of the tools which can be used in the three computing models to design and develop applications is given. This could help in bringing out the innovative ideas in the field and can be explored to the needs in the computing world.

6. Conclusion and Outlook

In this paper we discuss about cloud computing. We also provide a detail view of their types. We discuss their usages and benefit. In today's computational demand it is very fruitful and in future we can apply those aspects in real world environment.

References

[1] Cynthia Taylor and Joe Pasquale," Towards a Proximal Resource-based Architecture to Support Augmented Reality Applications", 2010 Cloud-Mobile Convergence for Virtual Reality Workshop.

[2] Rajkumar Buyya, "Cloud Computing: The Next Revolution in Information Technology", 2010 1st International Conference on Parallel, Distributed and Grid Computing (PDGC - 2010).

[3] Ashwin Manjunatha, Ajith Ranabahu, Amit Sheth and Krishnaprasad Thirunarayan," Power of Clouds In Your Pocket: An Efficient Approach for Cloud Mobile Hybrid Application Development", 2nd IEEE International Conference on Cloud Computing Technology and Science, 2010.

[4] Yu Wu∗, Chuan Wu, Bo Li, Xuanjia Qiu, Francis C.M. Lau , "CloudMedia: When Cloud on Demand Meets Video on Demand", 2011 31st International Conference on Distributed Computing Systems.

[5] Naidila Sadashiv and S. M Dilip Kumar, "Cluster, Grid and Cloud Computing: A Detailed Comparison", the 6th International Conference on Computer Science & Education (ICCSE 2011) August 3-5, 2011. SuperStar Virgo, Singapore.