Cloud Computing –Rendering Virtualization to IT-Sector

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Abstract

Cloud computing is all the rage. Information technology is changing rapidly, and now forms an invisible layer that increasingly touches every aspect of our lives. Power grids, traffic control, healthcare, water supplies, food and energy, along with most of the world's financial transactions, now depend on information technology .Cloud computing is massively scalable, provides a superior user experience, and is characterized by new, internet-driven economics. This paper focuses upon the needs of IT i.e., a way to increase capacity or add capabilities on the fly without investing in new infrastructure, training new personnel, or licensing new software and can significantly reduce IT costs & complexities while improving workload optimization and service delivery.

Keywords: Cloud computing, information technology, internet-driven economics, optimization and service delivery.

1 Introduction

In the past, individual applications ran in the Internet cloud. Now, entire data centers are moving to the cloud, accessible by a wide range of users. Cloud computing is an emerging paradigm where computing resources are offered over the Internet as scalable, on-demand (Web) services[5]. IT departments and infrastructure providers are under increasing pressure to provide computing infrastructure at the lowest possible cost. In order to do this, the concepts of resource pooling, virtualization [6], dynamic provisioning, utility and commodity computing must be leveraged to create a public or private cloud that meets these needs. World-class data centers are now being formed that can provide this Infrastructure-as-a-Service (IaaS) in a very efficient manner.

Customers can then decide to develop their own applications, to run on their own internal private clouds, or leverage Software as a Service (SaaS) applications that run on public clouds. Integration and federation of services across both the public and private cloud, so-called "hybrid clouds," is an emerging area of interest.

ECONOMICS OF CLOUD COMPUTING

Cloud computing describes a grouping of service offerings that includes application software, data storage, and computing. The computing can be delivered over the Internet (public cloud computing) or within an organization (private cloud computing). Cloud computing [8] is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing storage, memory, processing and bandwidth. Cloud computing is broken down into three segments: "applications," "platforms," and "infrastructure." Each segment serves a different purpose and offers different products for businesses and individuals around the world. In June 2009, a study conducted by Version One[7] found that 41% of senior IT professionals actually don't know what cloud computing is and two-thirds of senior finance professionals are confused by the concept, highlighting the young nature of the technology. In Sept 2009, an Aberdeen Group study found that disciplined companies achieved on average an 18% reduction in their IT budget from cloud computing and a 16% reduction in data center power costs[6].

CLOUD COMPUTING APPLICATIONS IN DEPLOYING INTERNET SERVICES

The clouds can be deployed in the following ways:

Public Cloud: In simple terms, public cloud [6] services are characterized as being available to clients from a third party service provider via the Internet. The term "public" does not always mean free, even though it can be free or fairly inexpensive to use. A public cloud does not mean that a user's data is publically visible; public cloud vendors typically provide an access control mechanism for their users. Public clouds provide an elastic, cost effective means to deploy solutions.

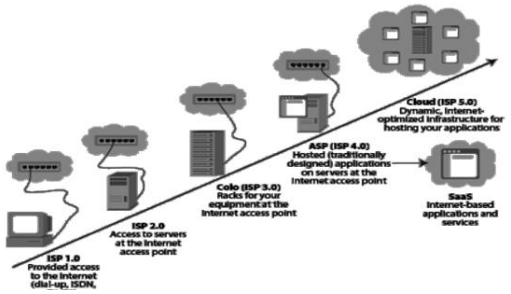

Fig.1 Cloud Computing Providing Internet Based Services[8]

Private Cloud: A private cloud [8] offers many of the benefits of a public cloud computing environment, such as being elastic and service based. The difference between a private cloud and a public cloud is that in a private cloud-based service, data and processes are managed within the organization without the restrictions of network bandwidth, security exposures and legal requirements that using public cloud services might entail. In addition, private cloud services offer the provider and the user greater control of the cloud infrastructure, improving security and resiliency because user access and the networks used are restricted and designated [3].

Community Cloud: A community cloud is controlled and used by a group of organizations that have shared interests, such as specific security requirements or a common mission. The members of the community share access to the data and applications in the cloud.

Hybrid Cloud: A hybrid **cloud [**8] is a combination of a public and private cloud that interoperates. In this model users typically outsource non-business-critical information and processing to the public cloud, while keeping business-critical services and data in their control.

2 Role Of Cloud Computing In Virtualization of IT-Sector

2.1 Clouds over Desktop Software

Many SAAS applications are available at little to no cost. In addition to lower software costs, IT administration labor costs are reduced as software does not need to be installed and constantly patched. SAAS[9] applications tend to be supported by paid advertisers, thus subsidizing the cost to the software user. Another benefit is group collaboration. In the past, software was loaded on many distributed devices. With the Internet cloud, software and data can be stored on centralized servers facilitating access to data by a large group of users. Cloud computing offers almost unlimited storage of applications and data. No longer must users and IT staff be concerned about collecting and archiving volumes of data.

2.2 Incorporation of Clouds in Mobile Applications

Employees want functionality and access to data from a number of different locations. The Internet cloud allows hand held Personal Digital Assistants (PDAs) and laptop users to access applications and data from a variety of locations. Internet cloud computing allows information to be accessed by a number of different devices (desktop, laptop, mobile phone, GPS, etc.) since the applications and data are stored at Internet data centres. Mobile computing will drive more applications to the Internet cloud[10]. The cloud is an ideal way of supplying software and data to small computing devices that don't have the storage and processing power to hold volumes of applications and information.

2. 3. Malware Protection

A cloud computing approach may offer better malware protection [6]. Unlike traditional anti-virus and anti-spyware solutions installed on an organization's servers and desktops, cloud computing malware protection is delivered as a service. Cloud computing may offer better protection over traditional solutions:

No time lag between when a threat surfaces and when the malware service is updated to protect against the threat.

Cloud malware service offers real time protection by combining detection services from a number of different sources. By using a variety of malware protection engines (Symantec, McAfee, Trend Micro, etc.), the cloud service approach increases the ability to detect and prevent malware threats. In recent test, traditional solutions using only one anti-virus application were 83% successful at detecting risks. Success rates using cloud computing malware protection were as high as 98%.

2. 4 E-Business

In e-business [7], scalability can be achieved by making new servers available as needed. For example, during a peak shopping season, more virtual servers can be made available that can cater to high shopper demand. In another example a company may experience high workloads on weekends or evenings as opposed to early mornings and weekdays. If a company has a significantly large cloud, they could schedule computer resources to be provisioned each evening, weekend, or during a peak season. There are more opportunities to achieve efficiencies as the cloud grows. Another aspect of this scenario involves employing business policies to decide what applications receive higher priorities and thus more computing resources.

3 Cloud Computing Service Delivery Considerations

IT managers should take professional care and due diligence when evaluating cloud computing applications [1]:

Service levels - your organization should determine if the outsourced provider has professional, high performance infrastructures that can guarantee levels of performance delivery.

Support – user and technical support must be determined up front. Will first level user support be provided by their staff or yours?

Redundancy – organizations should have redundant solutions that allow systems to continue operating even during single component failure. This includes the Internet software application as well as the organization's connectivity to the Internet.

Contingency plans – business continuity and disaster recovery plans must be updated and tested on a regular basis.

Private clouds – IT departments have the administration costs and responsibilities of acquiring, installing, managing, and securing data centres.

Security – public and private clouds must ensure information availability, confidentiality, and integrity.

4 Executive Summary

Cloud computing is the convergence and evolution of several concepts from virtualization, distributed application design, grid, and enterprise IT management to enable a more flexible approach for deploying and scaling applications.
Cloud promises real costs savings and agility to customers. Through cloud computing, a company can rapidly deploy applications where the underlying technology components can expand and contract with the flow of the business life cycle. Traditionally, once an application was deployed it was bound to a particular infrastructure, until the infrastructure was upgraded. The result was low efficiency, utilization, and flexibility. Cloud enablers, such as virtualization and grid computing, allow applications to be dynamically deployed onto the most suitable infrastructure at run time. This elastic aspect of cloud computing allows applications to scale and grow without needing traditional 'fork-lift' upgrades.
Driven by concerns over security, regulatory compliance, control over Quality of Service (QoS), vendor lock-in, and long-term costs, many larger customers, who have the economies of scale and strong IT competency, will build internal private clouds. These private clouds can provide the same cost and agility benefits as public clouds, while mitigating enterprise
Moreover, for normal end-users, cloud computing is a miracle that can change the quality and lifestyle. Microsoft Hotmail and Skydrive being the most common example of it, cloud computing has provided operating system like numerous facility to normal internet-user. Most of the things for which a user carries a laptop or saves in office desktop can be created, saved and dedicated online anywhere giving portability, security and reliability of data. User can save important Data on Online Hard Drive providing virtually unlimited storage space as compared to an individual HardDrive.Thus, Cloud Computing Is the future of Innovation with an ever-growing future development prospects making computing environment friendly and energy efficient.
Cloud computing enables innovation by alleviating the need of innovators to find resources to develop, test, and make their innovations available to the user community. Innovators are free to focus on the innovation rather than the logistics of finding and managing resources that enable the innovation.

5 Scopes and Future of Concept

Cloud computing infrastructures can allo**w** enterprises to achieve more efficient use of their IT hardware and software investments. This is done by breaking down the physical barriers inherent in isolated systems, and automating the management of the group of systems as a single entity [5]. Cloud computing is an example of an ultimately virtualized system, and a natural evolution for data centers that employ automated systems management, workload balancing, and virtualization technologies. A cloud infrastructure can be a cost efficient model for delivering information services, reducing IT management complexity, promoting innovation, and increasing responsiveness through realtime workload balancing[4]. The Cloud makes it possible to launch Web 2.0 applications quickly and to scale up applications as much as needed when needed.

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