

Cloud computing: The next Era of Enterprise IT

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ABSTRACT

The paper is about cloud computing which focus on understanding the entire scope of the entire cloud computing spectrum from storage to security. In this paper, cloud computing is presented as an emerging business model, taking in view its evolution and its changing approach in society and reinvention of present technologies in commercial ways. It highlights this technology as certainly a compelling alternative to running all applications within a traditional corporate data centre and its distinctive features in terms of its architecture, models, reliability which are helping IT enterprise professionals to maximize performance, minimize cost and improve the scalability of their Enterprise IT endeavors.

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Introduction

Cloud computing is a model for enabling readily available, 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. Cloud computing is becoming one of the next industry buzz words. It overlaps some of the concepts of distributed, grid and utility computing. The conceptual overlap is partly due to technology changes, usages and implementations over the years. Trends in usage of the terms from Google searches how Cloud Computing is a relatively new term introduced in the past year. There has also been a decline in general interest of Grid, Utility and Distributed computing. But Cloud computing has become the new buzz word driven largely by marketing and service offerings from big corporate players like Google, IBM and Amazon. It differs from the classic client-server model by providing applications from a server that are executed and managed by a client's web browser, with no installed client version of an application required.

Centralization gives cloud service providers complete control over the versions of the browser-based applications provided to clients, which removes the need for version upgrades or license management on individual client computing devices. The phrase "software as a service" (SaaS) is sometimes used to describe application programs offered through cloud computing. Common shorthand for a provided cloud computing service (or even an aggregation of all existing cloud services) is "The cloud". One very notable difference however is the concepts of mass consumption of data (text and binary), scalability, new abstraction layers, strong APIs and SOA web service offerings and a proliferation of heavy attention being focused to solve new issues for cross domain security imposed by the web browsers and boxes. Single sign on with SAML is now the standard for cross platform, and cross framework and SaaS offerings are the key to making the link work. Any computer or web-friendly device connected to the internet may access the same pool of computing power, applications and files in a cloud-computing environment. Users may remotely store and access personal files

such as music, pictures, videos and bookmarks, play games or do word processing on a remote server. Data is centrally stored, so the user does not need to carry a storage medium such as a DVD or USB flash drive. Desktop applications that connect to internet-host email providers may be considered cloud applications, including web-based email services. Cloud computing really is accessing resources and services needed to perform functions with dynamically changing needs. An application or service developer requests access from the cloud rather than a specific endpoint or named resource. What goes on in the cloud manages multiple infrastructures across multiple organizations and consists of one or more frameworks overlaid on top of the infrastructures tying them together. Frameworks provide mechanisms for self-healing, self monitoring, resource registration and discovery, service level agreement definitions, automatic reconfiguration.

History

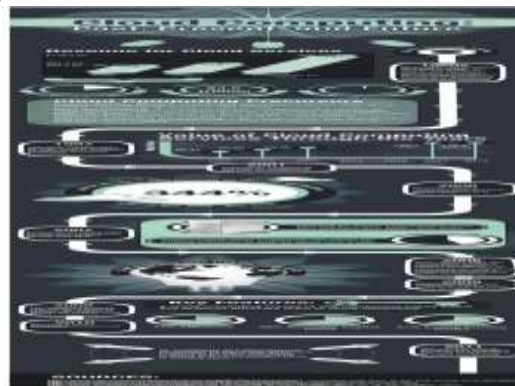


Fig: Past to present in cloud computing

The actual term "cloud" borrows from telephony in that telecommunications companies, who until the 1990s offered primarily dedicated point-to-point data circuits, began offering Virtual Private Network (VPN) services with comparable quality of service but at a much lower cost. By switching traffic to balance utilization as they saw fit, they were able to utilize their overall network bandwidth more effectively. The cloud symbol was used to denote the demarcation point between that which was the responsibility of the provider and that which was the

responsibility of the user. Cloud computing extends this boundary to cover servers as well as the network infrastructure.

After the dot-com bubble, Amazon played a key role in the development of cloud computing by modernizing their data centres, which, like most computer networks, were using as little as 10% of their capacity at any one time, just to leave room for occasional spikes. Having found that the new cloud architecture resulted in significant internal efficiency improvements, Amazon initiated a new product development effort to provide cloud computing to external customers, and launched Amazon Web Service (AWS) on a utility computing basis in 2006. In early 2008, Eucalyptus became the first open-source, AWS API-compatible platform for deploying private clouds. In early 2008, Open Nebula, enhanced in the "RESERVOIR" European Commission-funded project, became the first open-source software for deploying private and hybrid clouds, and for the federation of clouds.

Cloud computing is gaining traction in Europe and elsewhere. Ms. Nellie Kroes, the Vice President of the European Commission, summarized Europe's ambition when she declared that "the goal is to make Europe not just cloud-friendly but also cloud-active."

Vivek Kundra, previously the Obama administration's Chief Information Officer, recently declared that U.S. government agencies can gain significant economic benefits by moving their IT services to the cloud.

According to a recent study from Professor Federico Eto of the University of Venice, cloud computing in the EU will contribute 0.4% of GDP and create a million jobs by 2016

Working

Cloud Computing uses Information Technology as service over the network. It consists of Infrastructure as a service (IaaS), Platform as a service (PaaS), Hardware as a Service (HaaS) and Software as a service (SaaS). It also possesses the service of renting a server or servers and of running a geophysical modeling application that can be made available anywhere. It also enables the user to rent a virtual

Server, loaded with software and turn it on and off according to the sweet will of the user and it can also be cloned to meet an immediate workload demand. It also stores a large amount of data that can be accessed by the authorized users with the authorized applications. A base is being provided by the cloud that supports this technique and on this base regular changing workload is being dealt with by an automatic change in the scale according to the requirement of the workload. Since cloud services are

Web-based, they work on multiple platforms, including Linux, Macintosh, and Windows computers. Smart phones, pads and tablet devices with Internet and World Wide Web access also provide cloud services to telecommuting and mobile users. A cloud is used as a storage medium which handles applications, business, and personal data also. It also possesses the ability by which only a few web services are being used to coordinate photos, maps, and GPS information to present the front page in users web browsers.

It has an important feature of workload shift so personal computers are no more required to run these applications. There is a network of computers that handles the cloud itself. It significantly decreases the use of hardware as well as software on the front of user as all the processing and handling of data is done by the cloud. All the applications are being run by the interface software that is the only thing that the user's computer

ought to know. The latest interface software used in today's world is Internet Explorer 9 apart from previous versions that are Mozilla Firefox and Internet Explorer8.

Cloud Models

Public cloud describes cloud computing whereby resources are made available to the general public on a fine-grained, self-service basis over the Internet, via web applications/web services, from an off-site third-party provider who bills on a fine-grained utility computing basis. Public Cloud providers like Azure offer a combination of hosting and built-in software component that reduces efforts of software developers, to write, maintain and publish new software to production environments

Community cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether managed internally or by a third-party and hosted internally or externally with costing more than public services elaborated.

Hybrid cloud is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together, offering the benefits of multiple deployment models.

Private cloud is infrastructure operated solely for a single organization, whether managed internally or by a third-party and hosted internally or externally. Most rarely used due to less quality and enhanced prices.

Evolution

Cloud computing providers deliver applications via the internet, which are accessed from a Web browser, while the business software and data are stored on servers at a remote location. It can be described as an extension of distributed and parallel computing in which a super and virtual computer consists of a number of networked and loosely coupled computers that act together to perform huge tasks. In some cases, legacy applications (line of business applications that until now have been prevalent in thin client Windows computing) are delivered via a screen-sharing technology while in other cases, entire business applications have been coded using web-based technologies such as AJAX. Most cloud computing infrastructures consist of services delivered through Shared data-centres and appearing as a single point of access for consumers computing needs. Commercial offerings may be required to meet service level agreements (SLAs), but specific terms are less often negotiated by smaller companies. Cloud computing provides computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. The resources which are used in computing process are packaged as a metered service.

Reliability

Cloud computing describes a new supplement, consumption, and delivery model for IT services based on Internet protocols, and it typically involves provisioning of dynamically scalable and often virtualized resources, those systems that are capable of self management. Reliability is improved if multiple redundant sites are used, which makes well-designed cloud computing suitable for business continuity and disaster recovery. It is a by-product and consequence of the ease-of-access to remote computing sites provided by the Internet. Maintenance is easy as far compared to other grid related services.

Architecture

Cloud Computing architecture is similar to that of a

personal computer memory management architecture. The only difference occurs in that of an extra billing sector introduced for the benefit of various companies that are coming upfront for the issuing of licenses by the developers of cloud computing. Once an Internet Protocol connection is established among several computers, it is possible to share services within several layers

□ Client: A cloud client consists of computer hardware and/or computer software that relies on cloud computing for application delivery and that is in essence useless without it such as mobile phones or browsers.

Application: Cloud application services or "Software as a Service (SaaS)" deliver software as a service over the Internet, eliminating the need to install and run the application on the customer's own computers and simplifying maintenance and support.

Platform: Cloud platform services, also known as Platform as a Service (PaaS), deliver a computing platform and/or solution stack as a service, often consuming cloud infrastructure and sustaining cloud applications. It facilitates deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers.

Infrastructure: Cloud infrastructure services, also known as Infrastructure as a Service (IaaS), deliver computer infrastructure – typically a platform virtualization environment – as a service, along with raw (block) storage and networking. Rather than purchasing servers, software, data-centre's pace or network equipment, clients instead buy those resources as a fully out sourced service. Suppliers typically bill such services on a utility computing basis; the amount of resources consumed (and therefore the cost) will typically reflect the level of activity.

Server: The server layer consists of computer hardware and/or computer software products that are specifically designed for the delivery of cloud services.

Conclusion

Cloud computing is a technology that has rapidly evolving peppered with a lot of hype along the way and pave a new way for the enterprise IT Professionals in terms of its economies and strategies. New infrastructure and operations technologies such as cloud services and virtualization are the most often and are the top-two technologies for 2011. Overall this technology is forming a world always connected through online in a more enhanced cloud concept. But there are several factors that can't be reminisced.

Rules and regulations are yet to be formatted in a user and corporate sector society. The technology is bound with the concept of high speed internet bandwidth which is a big and major concern to be sought out. Security and legalities are yet to be managed and defined. Thus if such drawbacks are sought out quick enough then it is possible that this technology might bring enormous change in the field of networking.

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