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CLOUD COMPUTING: AN OVERVIEW

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Abstract- "Cloud" is a collective term for a large number of developments and possibilities. It is not an invention, but more of a "practical innovation", combining several earlier inventions into something new and compelling. Much like the iPod is comprised of several existing concepts and technologies (the Walkman, MP3 compression and a portable hard disk), cloud computing merges several already available technologies: high bandwidth networks, virtualization, Web 2.0 interactivity, time sharing, and browser interfaces.
Cloud Computing is a popular phrase that is shorthand for applications that were developed to be rich Internet applications that run on the Internet (or "Cloud"). Cloud computing enables tasks to be assigned to a combination of software and services over a network. This network of servers is the cloud. Cloud computing can help businesses transform their existing server infrastructures into dynamic environments, expanding and reducing server capacity depending on their requirements.
A cloud computing platform dynamically provisions, configures, reconfigures, and deprovisions servers as needed. Servers in the cloud can be physical machines or virtual machines. Advanced clouds typically include other computing resources such as storage area networks (SANs), network equipment, firewall and other security devices.

Keywords: Characteristic, Component, Types of Cloud.

INTRODUCTION

Cloud Computing

A cloud is a pool of virtualized computer resources. A cloud can Host a variety of different workloads, including batch-style back-end jobs and interactive, user-facing applications, Allow workloads to be deployed and scaled-out quickly through the rapid provisioning of virtual machines or physical machines, Support redundant, self-recovering, highly scalable programming models that allow workloads to recover from many unavoidable hardware/software failures, Monitor resource use in real time to enable rebalancing of allocations when needed. 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.

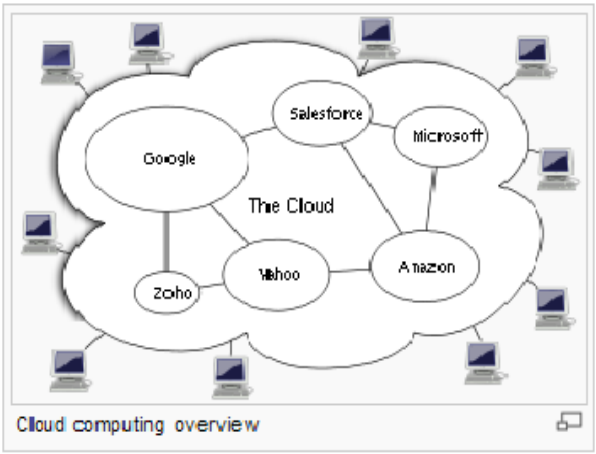
Necessity

Cloud computing infrastructures can allow enterprises to achieve more efficient use of their IT hardware and software investments. They do this by breaking down the physical barriers inherent in isolated systems, and automating the management of the group of systems as a single entity. 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. Businesses can also save on power costs as they reduce the number of servers required And with IT staff spending less time managing and monitoring the data centre, IT teams are well placed to further streamline their operations as staff complete more work on fewer machines.

Objectives

A cloud is more than a collection of computer resources because a cloud provides a mechanism to manage those resources. Management includes provisioning, change requests, reimaging, workload rebalancing, deprovisioning, and monitoring.

CONCEPT



Cloud computing is Internet ("cloud") based development and use of computer technology ("computing"). It is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet. Users need not have knowledge of, expertise in, or control over the technology infrastructure "in the cloud" that supports them.

The concept incorporates infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS) as well as Web 2.0 and other recent technology trends which have the common theme of reliance on the Internet for satisfying the computing needs of the users. Examples of SaaS vendors include Salesforce.com and Google Apps which provide common business applications online that are accessed from a web browser, while the software and data are stored on the servers.

The term *cloud* is used as a metaphor for the Internet, based on how the Internet is depicted in computer network

diagrams, and is an abstraction for the complex infrastructure it conceals.

KEY CHARACTERSTICS

Cost

Cost is greatly reduced and capital expenditure is converted to operational expenditure. This lowers barriers to entry, as infrastructure is typically provided by a third-party and does not need to be purchased for one-time or infrequent intensive computing tasks. Pricing on a utility computing basis is fine-grained with usage-based options and minimal or no IT skills are required for implementation.

Device and Location Independence

Device and location independence enable users to access systems using a web browser regardless of their location or what device they are using, e.g., PC, mobile. As infrastructure is off-site (typically provided by a third-party) and accessed via the Internet the users can connect from anywhere.

Multi-Tenancy

Multi-tenancy enables sharing of resources and costs among a large pool of users, allowing for:
1. Centralization of infrastructure in areas with lower costs (such as real estate, electricity, etc.)
2. Peak-load capacity increases (users need not engineer for highest possible load-levels)
3. Utilization and efficiency improvements for systems that are often only 10-20% utilized.

Reliability

Reliability improves through the use of multiple redundant sites, which makes it suitable for business continuity and disaster recovery. Nonetheless, most major cloud computing services have suffered outages and IT and business managers are able to do little when they are affected.

Scalability

Scalability via dynamic ("on-demand") provisioning of resources on a fine-grained, self-service basis near real-time, without users having to engineer for peak loads. Performance is monitored and consistent and loosely-coupled architectures are constructed using web services as the system interface.

Security

Security typically improves due to centralization of data, increased security-focused resources, etc., but raises concerns about loss of control over certain sensitive data. Security is often as good as or better than traditional systems, in part because providers are able to devote resources to solving security issues that many customers cannot afford. Providers typically log accesses, but accessing the audit logs themselves can be difficult or impossible.

Sustainability

Sustainability comes about through improved resource utilization, more efficient systems, and carbon neutrality. Nonetheless, computers and associated infrastructure are major consumers of energy.

COMPONENTS

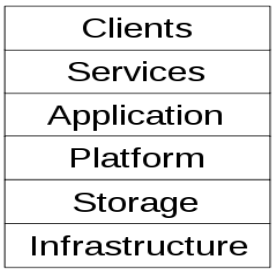


Figure 1: Components

A **cloud application** leverages the Cloud in software architecture, often eliminating the need to install and run the application on the customer's own computer, thus alleviating the burden of software maintenance, ongoing operation, and support.

Example: Bittorrent, BOINC Projects, Skype, Facebook, Google Apps, SAP and Salesforce

A **cloud client** consists of computer hardware and/or computer software which relies on **cloud computing** for application delivery, or which is specifically designed for delivery of cloud services and which, in either case, is essentially useless without it.
Example: Android, iPhone, Windows Mobile, Google Chrome, Mozilla Firefox.

Cloud infrastructure, such as Infrastructure as a service, is the delivery of computer infrastructure, typically a platform virtualization environment, as a service.
Example: GoGrid, Skytap, Amazon Elastic Compute Cloud, Force.com.

A **cloud platform**, such as Platform as a service, the delivery of a computing platform, and/or solution stack as a service, facilitates deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers.
Example: Google App Engine, Mosso.

A **cloud service** includes "products, services and solutions that are delivered and consumed in real-time over the Internet".
Example: Alexa**,**FPS**,** MTurk **,**SQS, Google Maps, Yahoo! Maps.

Cloud storage involves the delivery of data storage as a service, including database-like services, often billed on a utility computing basis, e.g., per gigabyte per month**.**
Example: Amazon SimpleDB, Google App Engine's BigTable datastore, Live Mesh *Live Desktop* component, MobileMe push functions.

ARCHITECTURE

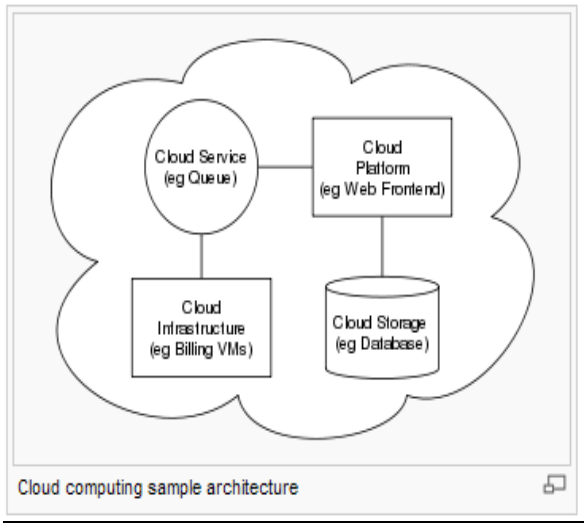


Figure 2: Architecture

Cloud architecture, the systems architecture of the software systems involved in the delivery of cloud computing, comprises hardware and software designed by a cloud architect who typically works for a cloud integrator. It typically involves multiple cloud components communicating with each other over application programming interfaces, usually web services.

Cloud architecture extends to the client, where web browsers and/or software applications access cloud applications.

Cloud storage architecture is loosely coupled, where metadata operations are centralized enabling the data nodes to scale into the hundreds, each independently delivering data to applications or user.

TYPES OF CLOUD

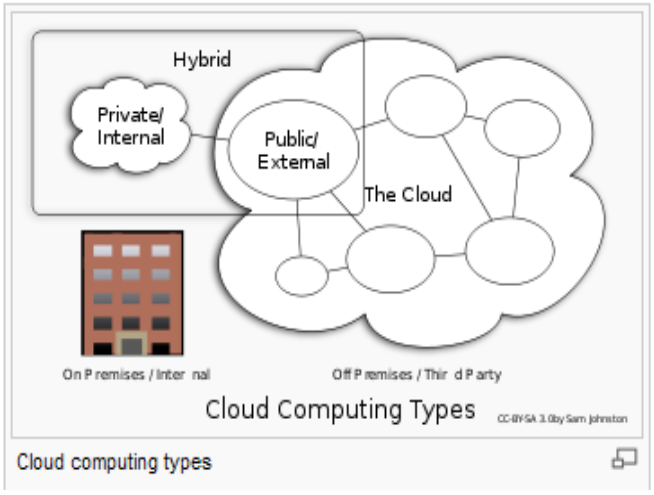


Figure 3: Types of Cloud

Public Cloud

Public cloud or external cloud describes cloud computing in the traditional mainstream sense, whereby resources are dynamically provisioned on a fine-grained, self-service basis over the Internet, via web applications/web services, from an off-site third-party provider who shares resources and bills on a fine-grained utility computing basis.

Private Cloud

Private cloud also referred to as 'corporate' or 'internal' cloud. A term used to denote a proprietary computing architecture providing hosted services on private networks. This type of cloud computing is generally used by large companies, and allows their corporate network and data centre administrators to effectively become in-house.

Hybrid Cloud

A hybrid cloud environment consisting of multiple internal and/or external providers "will be typical for most enterprises".

CONCUSION

Cloud Computing is a vast topic It is certainly not possible in the limited space of a report to do justice to these technologies. What is in store for this technology in the near future? Well, Cloud Computing is leading the industry's endeavor to bank on this revolutionary technology.

Cloud Computing Brings Possibilities……..

1. Increases business responsiveness
2. Accelerates creation of new services via rapid prototyping capabilities
3. Reduces acquisition complexity via service oriented approach
4. Uses IT resources efficiently via sharing and higher system utilization
5. Reduces energy consumption
6. Handles new and emerging workloads
7. Scales to extreme workloads quickly and easily
8. Simplifies IT management
9. Platform for collaboration and innovation
10. Cultivates skills for next generation workforce

Cloud Computing is a technology which took the software and business world by storm. The much deserved hype over it will continue for years to come.

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