

# Virtualisation ... a step to Cloud Computing

VIRTUALISATION, in IT terminology, is a technique of resource sharing that is based on the principles of dividing physical resources (HW) or operating systems (SW) for cost control measures and more efficient utilisation of the resources.

Significantly, companies appreciate the business case for optimising the flexibility, agility and speed of the Virtualised server, storage and network to maximise efficiency by harnessing the power of automation across their evolving IT infrastructure. In turn, companies can reduce the total cost of ownership beyond acquisition and operational costs.

A leading IT research firm indicates 18% of server workloads in 2009 ran on Virtualised servers; that share is expected to grow to 28% this year and reach almost half by 2012.

As a consequence of widespread adoption of Virtualisation concepts and technology, Virtualisation solutions are getting more sophisticated and forming a key ingredient for Cloud Computing.

Some of the key Virtualisation technological concepts are:

**Full-Virtualisation technique:** A technique used to provide a certain kind of virtual machine environment, namely, one that is a complete simulation of the underlying hardware. In such an environment, any software capable of execution on the raw hardware can be run in the virtual machine\*. Since this is a complete simulation of underlying hardware, it does not require any assistance from the hardware or the Operating System to Virtualise certain privileged instructions.

**Para-Virtualisation technique:** A technique that presents a software interface to virtual machines that is similar but not identical to that of the underlying hardware. ParaVirtualisation requires the guest operating system to be explicitly ported for the Para-Application Program Interface (API)\*.

**Hardware-assisted technique:** This is a platform Virtualisation approach that enables efficient full Virtualisation using help from hardware capabilities, primarily from the host processors. Hardware-assisted Virtualisation was recently (2006) added to x86 processors (Intel VT or AMD-V)\*.

## Cloud Computing

Cloud computing is a paradigm of computing in which dynamically scalable and often Virtualised resources are provided as a service over the Internet\* i.e., computing resources, including SaaS, offered from remote highly consolidated Data Centres, as depicted in the above-mentioned diagram, generally owned and operated by a third-party provider.

Gartner Group defines cloud computing as an infrastructure utility that is open, flexible, predesigned and standardised, Virtualised, and highly automated, as well as secure and reliable.

The words "often Virtualised resources" would need to be comprehended as a thought process. Availability of high-speed internet, significant innovations in Virtualisation have helped push cloud computing to great heights.

Some cloud-computing offerings employ the utility computing model (such as water, electricity etc.,) whereas others bill on a subscription-based model. Such a concept would need to consider occasional or frequent increase in demand and "Virtualised resources" are expected to have the flexibility to accommodate such requests.

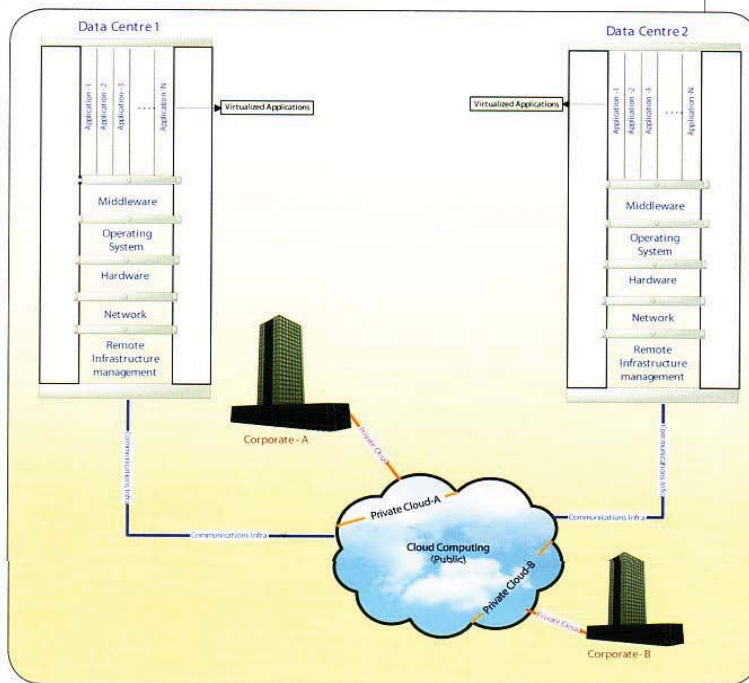
Thus, the concept Virtualisation is the significant technological concept for all cloud architectures. Some examples of Cloud Computing include Google, Amazon, Facebook, Salesforce.com and others.

Cloud Computing includes IaaS (Infrastructure-as-a-Service), PaaS (Platform-as-a-Service), SaaS (Software-as-a-Service) and WaaS (Web-as-a-Service). Among these, let us define the two key significant items:

**Infrastructure-as-a-Service:** IaaS deals with the delivery of computer infrastructure (generally a Virtualised Server environment) as a service. Rather than purchasing Servers, Software, Data Centre space or network equipment, clients instead buy those resources as a fully outsourced service. The service is typically billed on a utility computing basis and amount of resources consumed (and therefore the cost) will typically reflect the level of activity.

**Software-as-a-Service:** SaaS is a model of software deployment whereby a provider licenses an application to customers for use as a service on demand.

## Cloud Computing Architecture & Virtualisation – A Sample



SaaS software vendors may host the application on their own web servers or download the application to the consumer device, disabling it after use or after the on-demand contract expires;

## Technological prospects

The advent of Cloud computing has further enhanced the prospects of Virtualisation technologies. To offer Cloud Computing services, implementation of Virtualisation technologies are just one part of the equation – the other is the infrastructure aspect namely, a resilient and robust Data Centre such as Basis Bay's flagship "Green Data Centre", solid network connectivity, security infrastructure, besides the ability to offer Cloud for various spectrum such as, Private and Public cloud, are all of significant importance.

\*Source: wikipedia



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