

# Cloud Computing - Are You Ready?

September 24, 2010, 1:00 PM to 5:30 PM

## What Is Cloud Computing?

Cloud computing ('cloud') is an evolving term that describes the development of many existing technologies and approaches to computing into something different. Cloud separates application and information resources from the underlying infrastructure, and the mechanisms used to deliver them. Cloud enhances collaboration, agility, scaling, and availability, and provides the potential for cost reduction through optimized and efficient computing.

More specifically, cloud describes the use of a collection of services, applications, information, and infrastructure comprised of pools of compute, network, information, and storage resources.

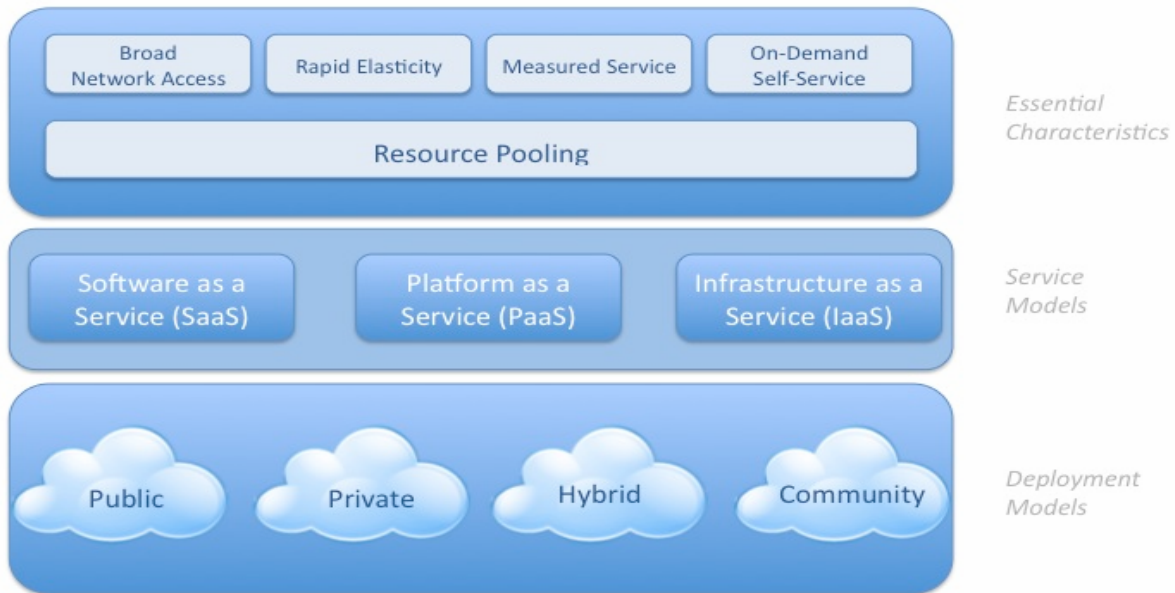
These components can be rapidly orchestrated, provisioned, implemented and decommissioned, and scaled up or down; providing for an on-demand utility-like model of allocation and consumption.

NIST defines cloud computing by describing five essential characteristics, three cloud service models, and four cloud deployment models. They are summarized in visual form in figure and are explained in detail below.

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### Visual Model Of NIST Working Definition Of Cloud Computing

<http://www.csrc.nist.gov/groups/SNS/cloud-computing/index.html>



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## Cloud Characteristics:

Cloud services exhibit five essential characteristics that demonstrate their relation to, and differences from, traditional computing approaches:

- **On-demand self-service.** A consumer can unilaterally provision computing capabilities such as server time and network storage as needed automatically, without requiring human interaction with a service provider.
- **Broad network access.** Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and PDAs) as well as other traditional or cloudbased software services.
- **Resource pooling.** The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a degree of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources, but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines. Even private clouds tend to pool resources between different parts of the same organization.
- **Rapid elasticity.** Capabilities can be rapidly and elastically provisioned — in some cases automatically — to quickly scale out; and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.
- **Measured service.** Cloud systems automatically control and optimize resource usage by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, or active user accounts). Resource usage can be monitored, controlled, and reported — providing transparency for both the provider and consumer of the service.

## Cloud Services:

Cloud service delivery is divided among three archetypal models and various derivative combinations. The three fundamental classifications are often referred to as the "SPI Model," where 'SPI' refers to Software, Platform or Infrastructure (as a Service), respectively — defined thus:

- **Cloud Software as a Service (SaaS).** The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or

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even individual application capabilities, with the possible exception of limited user specific application configuration settings.

- **Cloud Platform as a Service (PaaS).** The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.
- **Cloud Infrastructure as a Service (IaaS).** The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

## Deployment Models:

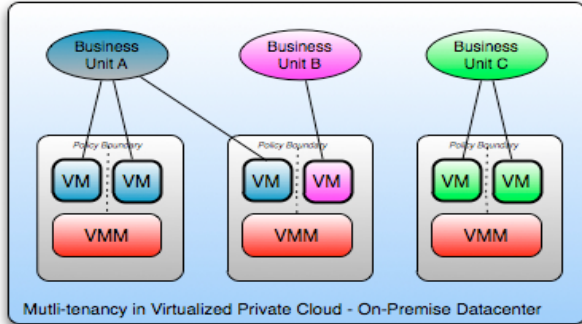
Regardless of the service model utilized (SaaS, PaaS, or IaaS) there are four deployment models for cloud services, with derivative variations that address specific requirements:

- **Public Cloud.** The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.
- **Private Cloud.** The cloud infrastructure is operated solely for a single organization. It may be managed by the organization or a third party, and may exist on-premises or off premises.
- **Community Cloud.** The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, or compliance considerations). It may be managed by the organizations or a third party and may exist on-premises or off-premises.
- **Hybrid Cloud.** The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).
- It is important to note that there are derivative cloud deployment models emerging due to the maturation of market offerings and customer demand. An example of such is virtual private clouds — a way of utilizing public cloud infrastructure in a private or semi-private manner and interconnecting these resources to the internal resources of a consumers' datacenter, usually via virtual private network (VPN) connectivity.

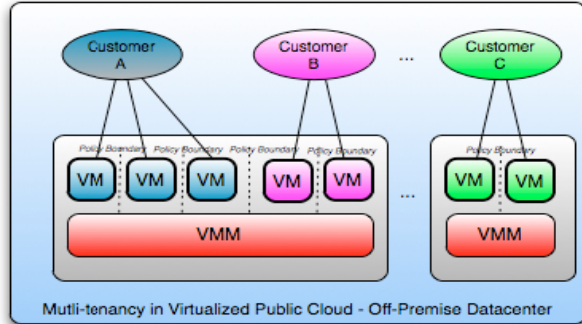
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## Example of Cloud Architecture:



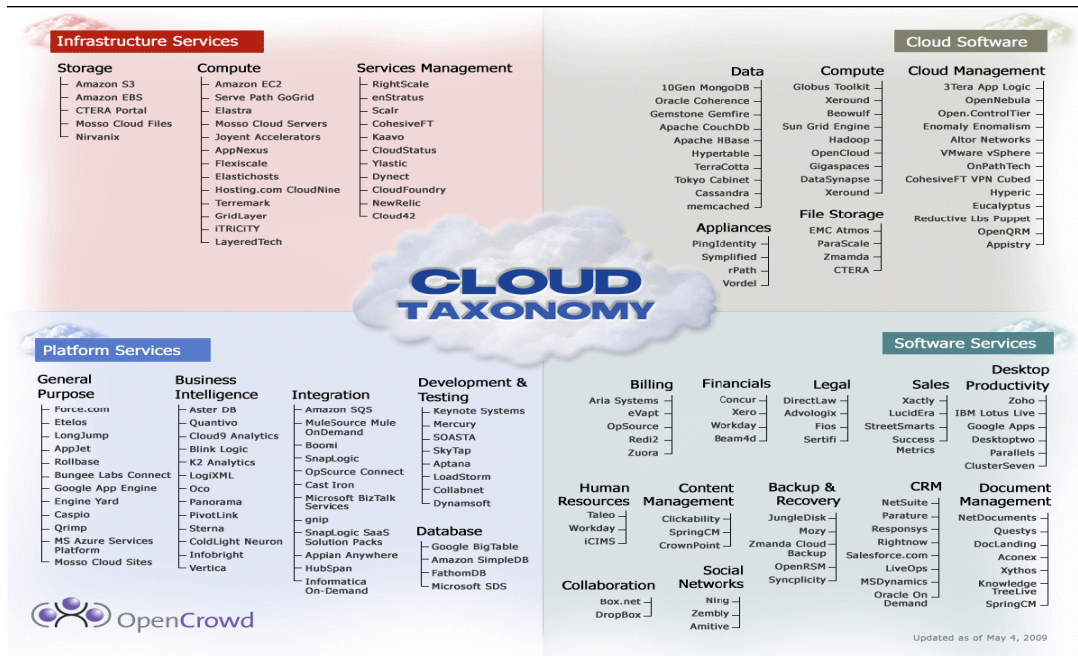
Private Cloud of Company XYZ with 3 business units, each with different security, SLA, governance and chargeback policies on shared infrastructure



Public Cloud Provider with 3 business customers, each with different security, SLA, governance and billing policies on shared infrastructure

## Taxonomy:

- While a broader review of the growing set of cloud computing solutions is outside the scope of this document, the OpenCrowd Cloud Solutions taxonomy in the figure below provides an excellent starting point. The OpenCrowd taxonomy demonstrates the swelling ranks of solutions available today across each of the previously defined models.
- It should be noted that the RMIMA does not specifically endorse any of the solutions or companies shown below, but provides the diagram to demonstrate the diversity of offerings available today.



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## References:

To be added

## **RMIMA Membership** - <http://www.rmima.org/join.htm>

We keep the membership process simple. If you use PayPal we will pick up your information from the payment. If you mail us a check, please include your contact information, including e-mail address and company. Membership is for 12 months from the time you pay.

Email [membership@rmima.org](mailto:membership@rmima.org) for more information.

### ***Individual \$50***

- Discount on lunches
- Special members events
- network/marketing opportunities

### ***Corporate \$250***

- Same as individual but all employees get discount on lunches and conference

**Rocky Mountain Information Management Association**

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