

Cloud Oriented Architecture

By Raju Alluri, Principal Architect, Business Technology Services, Wipro

"The cloud" is emerging at the convergence of three major trends — service orientation, virtualization and standardization of computing through the Internet. Associated – Gartner*

(*Gartner Report Cloud Computing Confusion Leads to Opportunity Publication Date: 19 June 2008)

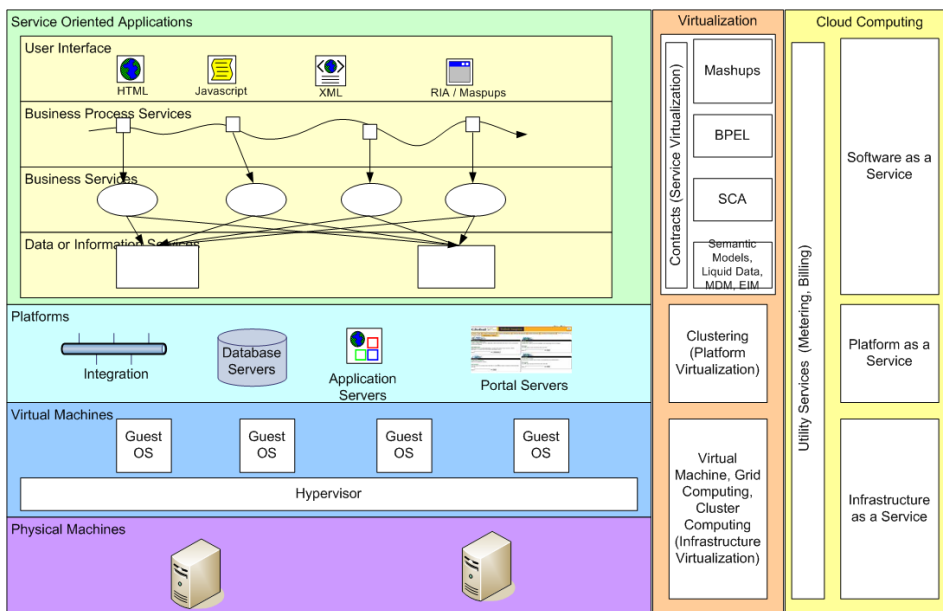
The emergence of Service Oriented Architecture (SOA) as a practice of defining and delivering an Enterprise Architecture, has enabled a high degree of collaboration and reuse across organizational and technology boundaries. One of the fundamental objectives of SOA is provide better alignment between the business and IT. SOA enables IT to be flexible and responsive to the changing business needs and not constrained by the existing implementations.

Virtualization at a very high level is an abstraction of the IT resources, and they can be hardware, OS, network, platforms, data, services, business processes and applications. The abstraction / separation of concerns for each of these enables better sharing of the resources and allows the organizations to build better solutions using different sourcing and delivery models.

Standardization plays an important role in improving the accessibility of an IT resource via interoperability and portability of the solutions. The powerful capabilities of solutions enabled by SOA when combined with emerging paradigms including virtualization and cloud computing define the evolving architectural model for next generation IT solutions.

CLOUD ORIENTED ARCHITECTURE

The diagram below depicts logical view of cloud-oriented architecture showing different layers in the architecture and the various architectural building blocks and/or techniques used in each of the layers.



Cloud Oriented Architecture

At infrastructure layer, virtualization is provided by techniques such as virtual machines, hypervisors and grid computing. If one technique builds two or more logical virtual computers from a single physical machine, the other technique builds a single large virtual computer from a group of heterogeneous servers.

At middleware layer and at platform level, virtualization is achieved through the clustering technique. A group of servers are put into the cluster and provide a single large server experience to provide better scalability, reliability and failover services.

The SOA application at a high level can be divided into sub-layers like data or information services, services implementing the business logic, business process flows built by combining services and the presentation layer. Service contract provide abstraction over the service implementation. Service registry provides abstraction over the actual location of the service implementation. Similarly at the business process layer, business processes implemented using BPEL abstract the consumer from understanding which services/systems the processes is interacting with for providing the end to end functionality. At the presentation layer, Mashups is one example where it can aggregate the content from different sources. The consumer is unaware of the actual source of data. All these techniques are meant to provide abstraction over the underlying implementations.

Until now, we discussed about the solutions for developing the applications. Now comes the service delivery. This is where cloud computing brings the long held goal of providing computing and IT services as utility more close to the reality. It transforms a large part of how IT is designed, delivered and purchased today enabling a real time delivery of products, services and solutions over the internet.

Cloud computing refers to providing hardware/OS/Storage, applications, and software as a service. Cloud computing solutions are offered in a pay as you go model to the consumers. Utility computing offers this service of metering & billing the consumers in a more fine-grained or in a pay-as-you-go model.

ENABLING CLOUD ARCHITECTURE

Cloud Oriented Architecture, described as a next-generation service development & delivery model, is a combination of these different techniques including the cloud computing, virtualization, SOA and providing standards based interoperable solutions. Cloud Oriented Architecture enables better reuse, agility to the IT implementations, allow to reduce the capital expenses and pay-per-use.