

## Intelligroup Point of View

# Cloud Computing: What it Means to the Enterprise

### Introduction

Enterprises today are grappling with the question as to how cloud computing fits in with their IT strategy and the way they deploy infrastructure, develop applications, and deliver IT and business services. While, the concept of the cloud is not entirely new —time sharing and grid computing have been around for a while, cloud computing is now gaining ground due to a confluence of several forces—the Internet as a ubiquitous platform, virtualization, and web services. While the cloud initially became popular with start-ups and the small business segment, CIOs of both large and mid-market companies are now challenging their teams to figure out the cloud in their IT sky. At Intelligroup, we believe that the cloud is relevant to both CEOs and CIOs as it can help enter new markets quickly, launch new products, and reduce IT operating costs, Agility, flexibility, and enhanced user experience will drive the move to the cloud. This will have to be balanced with considerations pertaining to risk, security, and data issues.

### Understanding the Cloud

The cloud means different things to different people. We use the NIST (National Institute of Standards and Technology) definition here. **According to Peter Mell and Tim Grance of NIST, cloud computing is defined as:**

*Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (example: networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.*

#### Essential Characteristics:

**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 each service's 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 (example: mobile phones, laptops, and PDAs).

**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 sense 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.

**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.

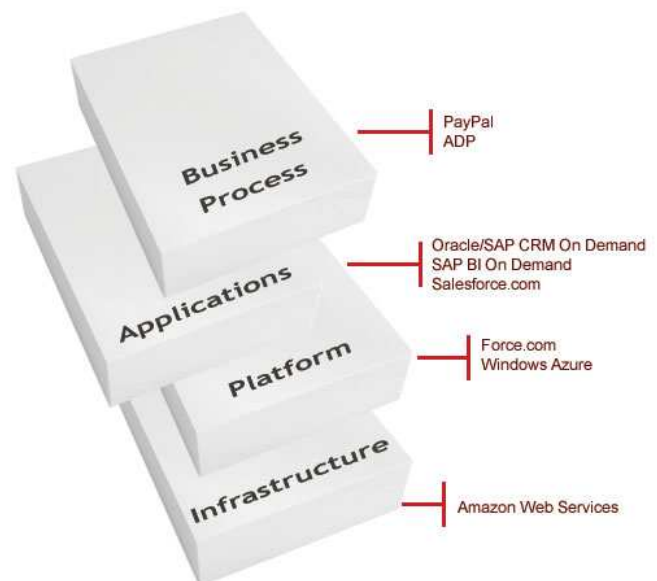


Figure 1

**Measured Service:** Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (example, storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

**The Enterprise IT Stack:**

**The Enterprise IT stack has 4 layers:** Infrastructure, Platform, Applications and Business Process. Cloud computing today offers solutions in each of these stacks. **Figure 1** depicts these 4 layers.

**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 (example: web-based email). Salesforce, NetSuite,

**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. As an example, Microsoft is offering the Windows Azure platform for the creation of web applications and services. It comprises Windows Azure: an operating system as a service; SQL Azure: a fully relational database in the cloud; and .NET Services: consumable web-based services that provide both secure connectivity and federated access control for applications.

**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 (example: host firewalls).

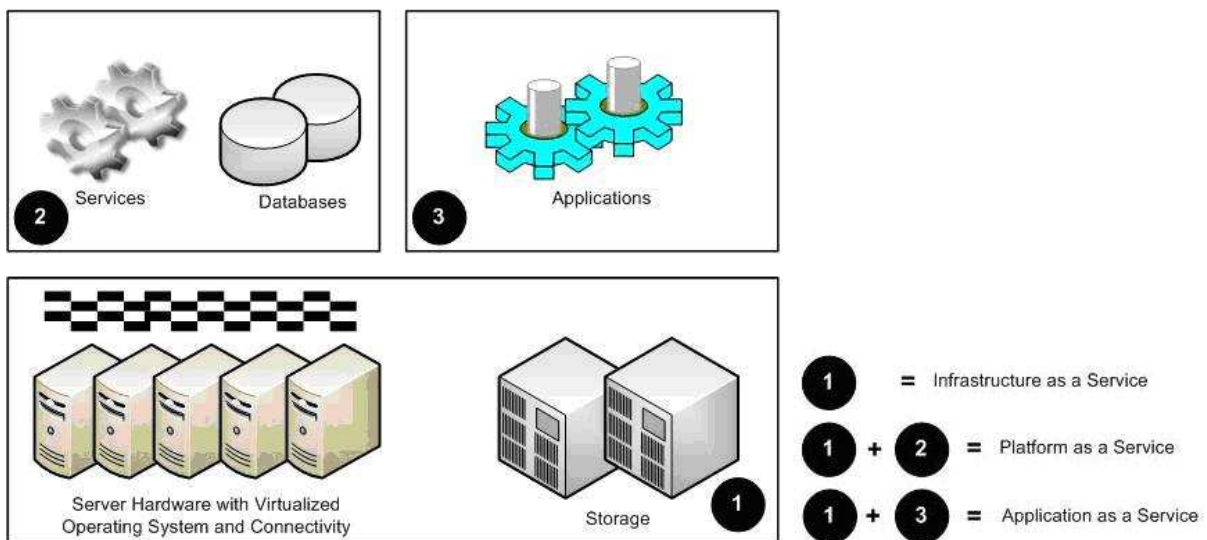
**Figure 2** below shows the above mentioned scenarios.

**Cloud enabled Business Process Outsourcing (BPO):** Entire business processes such as expense management or procurement are being delivered over the cloud. Examples of such providers are PayPal for payment processing and ADP for payroll solutions. The difference from traditional BPO is that cloud enabled BPO uses a common process platform to automate standardized processes.

**Deployment Models: These can be varied as discussed below:**

**Private cloud:** The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise. IBM in June 2009 released a new offering called CloudBurst for IT organizations to deploy and manage internal clouds. VMware, Cisco and EMC have partnered to help enterprises deliver private clouds. Cisco Systems has already deployed a private cloud for some of their IT needs.

**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, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.



**Figure 2**



**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.

**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 (example: cloud bursting for load-balancing between clouds). In fact, companies will likely consume IT services from multiple clouds that will necessitate data integration.

## How is a Cloud different from a typical hosted environment?

A cloud service has three distinct characteristics that differentiate it from traditional hosting.

1. It is sold on demand, typically by the minute or the hour as a unit. In traditional hosting the hardware is dedicated to a customer
2. It is elastic -- a user can have as much or as little of a service as they want at any given time
3. The service is fully managed by the provider (the consumer needs nothing but a client to access the service – a personal computer, laptop or PDA)

## Who is providing Cloud Computing?

Cloud Computing is being provided by a number of software vendors as well as system integrators. These include the pioneers like Salesforce.com and NetSuite, traditional large companies like Cisco, EMC, VMware, HP, Oracle, SAP, and Microsoft to newer entrants like Amazon, OpSource, and Rackspace.

## How does ERP fit into Cloud Computing?

Both the leading ERP vendors including Oracle and SAP provide various cloud computing solutions. These include Software as a Service (SaaS), and Platform as a Service (PaaS). For example, both Oracle and SAP offer CRM-On Demand as SaaS offerings. Also, Oracle Beehive On Demand provides comprehensive enterprise collaboration capabilities. SAP is offering On Demand Business Intelligence solutions leveraging their Business Objects solutions. Oracle also enables enterprises to deploy Oracle technologies in public clouds like the Amazon Web Services environment. Companies can today deploy their Oracle 11g database and Oracle Fusion Middleware solutions to the Amazon Web Services Cloud (AWS).

NetSuite along with Salesforce has been fairly successful in getting customers to adopt cloud based ERP and CRM solutions. Many large corporations have embraced solutions from these two companies.

## Cloud Case Studies



### A Leading US Medical Laboratory

A leading US Medical Lab has embraced cloud computing, and is reaping the benefits:

- Shifted from tape based data back-up to cloud based data back-up: The cloud provider is audited for SAS 70 and is providing adequate data security including **Health Insurance Portability and Accountability Act (HIPAA)** considerations
- Using Google Postini services for email protection
- Currently looking to move security to the cloud
- Kept CRM on-premise
- Decided to NOT go to the cloud for storage due to performance issues



### A US Mid-Market Bank

A Bank with 1,000 employees and about 50 internal IT resources is benefiting from the cloud:

- Delivering better products to customers faster
- Delivering Mobile Banking using cloud resources
- Kept CRM on-premise
- Kept IT infrastructure internal
- Managed Risk by regulating to a process

## CIO Insights

Our conversations with CIOs have revealed some interesting insights:

**Need for New Skills in IT:** Cloud based computing calls for a different set of skills than before. IT departments will need more Account Manager types of resources—people who can manage relationships, navigate organizations to resolve issues, and procure services. As enterprises start utilizing multiple clouds, there will be a need for people who can ensure that the business process is executed across the various clouds and internal IT infrastructure. As business users start accessing some services directly from the cloud, the IT department may be asked to help with procurement of these services.

**Benefits of the Cloud:** The cloud lowers the cost of IT operations, converts more of the costs to variable, and reduces up-front capital expenditures. Software license costs are minimized. You pay as you go with no up-front commitments or investments. Development costs can be reduced significantly. The end-user experience is enhanced as they can provision IT resources quicker and project delays waiting for example to get a physical server are eliminated.

**Challenges:** Security is a concern, but this can be overcome as we mentioned in our Case Study on the Medical lab in the US. Loss of control is another challenge, but it is not preventing the move to the cloud. Data issues surface including data integration, compliance, and location. Service level guarantees are not there as yet, as data has to move through the Internet, thus limiting the move of core applications to the cloud.

## CIO Call to Action

1. **IT Architecture:** CIOs need to include the cloud in their IT Architecture Roadmap. While on-premise IT resources are here to stay, cloud based resources are increasingly becoming a part of the IT landscape for many firms.
2. **Private Clouds:** CIOs of large corporations may want to start looking at developing and deploying their own private cloud.
3. **Examine Specific Areas:** Testing, Software Development, Disaster Recovery including data back-up, and computing intensive tasks like data mining could very well be moved to the cloud. Companies can use Storage Clouds such as Amazon Simple Storage Service (S3) as their next-generation back-up storage destination, avoiding costly tape based back-up.

## Summary

The benefits of cloud computing are many, namely lower costs, increased flexibility, and agility as well as the ability to enter new markets and launch products faster. We believe that various service models will co-exist across the enterprise IT stack—Software, Platform, Infrastructure, and cloud enabled BPO. There may well be industry consolidation and a few large cloud providers will emerge.

Enterprises will not move their core processes/applications that differentiate them into the public cloud anytime soon. However, the IT infrastructure that supports these applications may reside in the cloud. Larger companies may create their own private clouds, as Cisco has done. Hybrid clouds will exist in many cases as companies utilize multiple public clouds as well as their private cloud, and so there will be a need to integrate these clouds to execute an end to end business process. The internal IT department of the future will not be the sole supplier as business users in some cases may directly provision for services in the cloud. All this will call for a newer set of skills in the IT department such as Account Managers to coordinate various cloud providers.

## About Intelligroup Inc.

Intelligroup is an ERP-focused enterprise applications systems integrator providing consulting, implementation, testing, application management, infrastructure management, and other IT services for global corporations. The Company possesses deep expertise and proprietary tools in industry-specific enterprise solutions and has been recognized by clients, partners including SAP and Oracle and IT industry analysts for consistently exceeding expectations. Intelligroup won the 2009 and 2007 global annual Pinnacle Award from SAP, was a finalist in Oracle 2009 and 2007 Titan Awards, and was recognized by NASSCOM as a Top 100 Innovator. Intelligroup's global service delivery model combines onsite teams and offshore development capabilities to deliver solutions that accelerate results, reduce costs and generate meaningful ROI for clients. For more information please visit [www.intelligroup.com](http://www.intelligroup.com).

### For more information, please contact:

**Alok Pant**  
Senior Vice President, Global Marketing and Alliances  
Intelligroup Inc.  
[alok.pant@intelligroup.com](mailto:alok.pant@intelligroup.com)  
(848) 219-7562