Cloud Computing

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# Cloud Computing

## Introduction

"Cloud Computing", by definition, refers to the on-demand delivery of IT resources and applications via the Internet with pay-as-you-go pricing.

Whether you are running applications that share photos to millions of mobile users or you’re supporting the critical operations of your business, the “cloud” provides rapid access to flexible and low cost IT resources. With cloud computing, you don’t need to make large upfront investments in hardware and spend a lot of time on the heavy lifting of managing that hardware. Instead, you can provision exactly the right type and size of computing resources you need to power your newest bright idea or operate your IT department. You can access as many resources as you need, almost instantly, and only pay for what you use.

## How does it work?

Cloud Computing provides a simple way to access servers, storage, databases and a broad set of application services over the Internet. Cloud Computing providers such as Amazon Web Services own and maintain the network-connected hardware required for these application services, while you provision and use what you need via a web application.

## Advantages

### Pay as you go

### On-Demand Services

### Scaling easy

### Easy management & administration

## Service Models

### IaaS

Cloud infrastructure services, known as Infrastructure as a Service (IaaS), are self-service models for accessing, monitoring, and managing remote datacenter infrastructures, such as compute (virtualized or bare metal), storage, networking, and networking services (e.g. firewalls). Instead of having to purchase hardware outright, users can purchase IaaS based on consumption, similar to electricity or other utility billing.

Compared to SaaS and PaaS, IaaS users are responsible for managing applications, data, runtime, middleware, and OSes. Providers still manage virtualization, servers, hard drives, storage, and networking. Many IaaS providers now offer databases, messaging queues, and other services above the virtualization layer as well. Some tech analysts draw a distinction here and use the IaaS+ moniker for these other options. What users gain with IaaS is infrastructure on top of which they can install any required platform. Users are responsible for updating these if new versions are released.

IaaS Examples: Amazon Web Services (AWS), Cisco Metapod, Microsoft Azure, Google Compute Engine (GCE), Joyent

Common IaaS Use-Case: Extends current data center infrastructure for temporary workloads (e.g. increased Christmas holiday site traffic)

Technology Analyst Examples: Kyle Hilgendorf (Gartner), Drue Reeves (Gartner), Lydia Leong (Gartner), Doug Toombs (Gartner), Gregor Petri (Gartner EU), Tiny Haynes (Gartner EU), Jeffery Hammond (Forrester), James Staten (Forrester)

### PaaS

Cloud platform services, or Platform as a Service (PaaS), are used for applications, and other development, while providing cloud components to software. What developers gain with PaaS is a framework they can build upon to develop or customize applications. PaaS makes the development, testing, and deployment of applications quick, simple, and cost-effective. With this technology, enterprise operations, or a third-party provider, can manage OSes, virtualization, servers, storage, networking, and the PaaS software itself. Developers, however, manage the applications.

Enterprise PaaS provides line-of-business software developers a self-service portal for managing computing infrastructure from centralized IT operations and the platforms that are installed on top of the hardware. The enterprise PaaS can be delivered through a hybrid model that uses both public IaaS and on-premise infrastructure or as a pure private PaaS that only uses the latter.

Similar to the way in which you might create macros in Excel, PaaS allows you to create applications using software components that are built into the PaaS (middleware). Applications using PaaS inherit cloud characteristic such as scalability, high-availability, multi-tenancy, SaaS enablement, and more. Enterprises benefit from PaaS because it reduces the amount of coding necessary, automates business policy, and helps migrate apps to hybrid model. For the needs of enterprises and other organizations, Apprenda is one provider of a private cloud PaaS for .NET and Java.

Enterprise PaaS Examples: Apprenda

Common PaaS Use-Case: Increases developer productivity and utilization rates while also decreasing an application’s time-to-market

Technology Analyst Examples: Richard Watson (Gartner), Eric Knipp (Gartner), Yefim Natis (Gartner), Stefan Ried (Forrester), John Rymer (Forrester)

### SaaS

Cloud application services, or Software as a Service (SaaS), represent the largest cloud market and are still growing quickly. SaaS uses the web to deliver applications that are managed by a third-party vendor and whose interface is accessed on the clients’ side. Most SaaS applications can be run directly from a web browser without any downloads or installations required, although some require plugins.

Because of the web delivery model, SaaS eliminates the need to install and run applications on individual computers. With SaaS, it’s easy for enterprises to streamline their maintenance and support, because everything can be managed by vendors: applications, runtime, data, middleware, OSes, virtualization, servers, storage and networking.

Popular SaaS offering types include email and collaboration, customer relationship management, and healthcare-related applications. Some large enterprises that are not traditionally thought of as software vendors have started building SaaS as an additional source of revenue in order to gain a competitive advantage.

## Deployment Models

### Public Clouds

A public cloud is basically the internet. Service providers use the internet to make resources, such as applications (also known as Software-as-a-service) and storage, available to the general public, or on a ‘public cloud. Examples of public clouds include Amazon Elastic Compute Cloud (EC2), IBM’s Blue Cloud, Sun Cloud, Google AppEngine and Windows Azure Services Platform.

For users, these types of clouds will provide the best economies of scale, are inexpensive to set-up because hardware, application and bandwidth costs are covered by the provider. It’s a pay-per-usage model and the only costs incurred are based on the capacity that is used.

There are some limitations, however; the public cloud may not be the right fit for every organization. The model can limit configuration, security, and SLA specificity, making it less-than-ideal for services using sensitive data that is subject to compliancy regulations.

### Private Clouds

Private clouds are data center architectures owned by a single company that provides flexibility, scalability, provisioning, automation and monitoring. The goal of a private cloud is not sell “as-a-service” offerings to external customers but instead to gain the benefits of cloud architecture without giving up the control of maintaining your own data center.

Private clouds can be expensive with typically modest economies of scale. This is usually not an option for the average Small-to-Medium sized business and is most typically put to use by large enterprises. Private clouds are driven by concerns around security and compliance, and keeping assets within the firewall.

### Hybrid Clouds

By using a Hybrid approach, companies can maintain control of an internally managed private cloud while relying on the public cloud as needed. For instance during peak periods individual applications, or portions of applications can be migrated to the Public Cloud. This will also be beneficial during predictable outages: hurricane warnings, scheduled maintenance windows, rolling brown/blackouts.

The ability to maintain an off-premise disaster recovery site for most organizations is impossible due to cost. While there are lower cost solutions and alternatives the lower down the spectrum an organization gets, the capability to recover data quickly reduces. Cloud based Disaster Recovery (DR)/Business Continuity (BC) services allow organizations to contract failover out to a Managed Services Provider that maintains multi-tenant infrastructure for DR/BC, and specializes in getting business back online quickly.

## Providers

Amazon Web Services

Microsoft Azure

VMWare vCloud

Google Compute