Cloud Computing (In Plain English)

Application Service Provider, Software as a Service, Grid Computing, Utility Computing, Platform as a Service...

...all these terms and more, at one time or another have been referred to as “cloud computing.”

With all the confusion in the marketplace today, you may well be wondering: what is cloud computing? What ISN’T cloud computing?
Welcome to Cloud Computing in Plain English, where we try to make cloud a little less cloudy. So what is cloud computing really and what can it do for you?

Cloud computing is the convergence of three major trends:

- **Virtualization**, where applications are separated from infrastructure
- **Utility computing**, where server capacity is accessed across a grid as a variably priced shared service
- **Software as a service**, where applications are available on demand on a subscription basis
Virtualization – Broadly, virtualization refers to the abstraction of computer resources. Specifically, server virtualization is the separation of the operating system from the underlying hardware with the help of a hypervisor. By creating “containers,” the hypervisor allows multiple “guest” operating systems to run concurrently. Server virtualization in the data center arises mostly from the need to reduce IT operating costs and capital expenditure by consolidating hardware. By effectively insulating applications from the underlying operating system, virtualization enables dramatically increased utilization of server capacity (because applications no longer compete for OS and hardware resources). In turn, more applications running on fewer servers means lower capital expense and lower operating and maintenance costs.

Utility computing - The concept of utility computing actually goes back to mainframe days when compute cycles were metered, and departments or business units were charged for the actual amount of computing resources used. In utility computing, applications are typically shared, as on a mainframe or in an application server farm, and variably priced.

Software as a service (SaaS) – SaaS focuses specifically on the shared use of applications that are available on demand, and paid for on a subscription basis. SaaS offers significant benefits to organizations wishing to move specific applications out of the data center entirely by relieving them of the infrastructure and the costs associated with running the application in-house. While SaaS is beneficial to the end customer, it can often prove onerous and expensive to the provider. SaaS demands a specific architecture, known as multi-tenancy, where certain application elements are shared, while data stores remain separated. SaaS also requires significant investment in infrastructure to efficiently serve the application.

Now that you have some of the basic concepts, let’s step back in time to further understand the evolution of cloud computing.

It all started with the Internet...
Then broadband got very cheap and some smart folks realized that not everyone had to build in-house data centers. In fact, they realized that the computer running the application could be pretty far away from the person using it, and only a fast connection was needed between them.

This led us through a progression that started with application service providers – who hosted our individual applications, and led to software as a service providers - who host shared applications. We use their big, fast machines to access an application using our familiar web browser. They own the application and we pay a fixed subscription fee.

Software as a Service

This worked for some applications and some organizations. The machines running the application were the other guy’s problem. But at the same time, the one-size-fits-all approach didn’t work for large enterprises with complex requirements. Some companies didn’t like the idea of data outside of their firewall; and the subscription model didn’t align cost to usage.
And then came virtualization.

With virtualization, applications and infrastructure are independent, allowing servers to be easily shared by many applications, and applications to run virtually anywhere. That is, as long as the application is virtualized. Virtualizing the application involves packaging the application bits with everything it needs to run — including databases, middleware and operating system. This self-contained unit — a virtualized application — can run pretty much anywhere.
Just enough operating system, or JeOS is not a generic, one-size-fits-all operating system. Rather, it refers to a customized operating system that precisely fits the needs of a particular application. It includes only the pieces of an operating system (often Linux) required to support a particular application and any other third-party components contained in the image. This makes the application image more efficient, smaller, more secure and higher performing than an application running under a full general purpose OS.

If a virtualized image can run anywhere, it doesn’t have to run in your data center or in the application provider’s data center. It can run in the cloud. The cloud is a computing service that charges you based only on the amount of computing resources you use. This pay-as-you-go feature is the hallmark of today’s cloud computing and one of the things that sets it apart from software as a service.

Why?

So, why adopt cloud computing? Basically, you can’t afford not to.
Think of it this way. Traditional, licensed software was like buying a premium sedan. For a fixed price you got all the bells and whistles, and support (the extended warranty) whether you used it or not. This required a large cash outlay, or capital expense, up front.

With software as a service, it’s like leasing a car. You get a nice vehicle, but you can’t make any significant changes to it because it doesn’t really belong to you. You pay the same amount monthly and you’re guaranteed a certain level of service on the car. You’ve avoided a capital expense and moved it to your monthly operating budget.
With cloud, it’s like having a metered cab at your disposal whenever you want it; you only pay by the distance you travel. You don’t pay for maintenance, tolls or any costs associated with the cab. You pay based on where you want to go that day, and it’s so economical that you can vary the length of your trips and not have to worry about the cost. You can even trick out the cab the way you want it because you don’t share it with anyone else.

Cloud Computing

Before you hit the road, you might want to take a look under the hood to see what makes your ride go. The engine that powers cloud computing is virtualization. You can’t move without your engine, and you can’t deploy apps to the cloud without virtualization. So the first stop in any cloud initiative is to adapt applications to run as virtualized images.

Virtualization
In a turbulent economy, cloud computing is even more attractive. Why pay for more computing capacity than you need when you can pay only for what you use? Go for the high fuel efficiency of cloud computing and you’ll never own your own car again.

So, that’s it. Cloud computing in Plain English. We’ve covered a lot of miles in just a few pages. We hope it helped make cloud a little less cloudy and helped you understand what all the cloud hype is about.

For more information on cloud computing, visit www.rpath.com/cloud