

Cloud 101 The Cloud Defined

By Jesse Cryderman

Everyone is talking about cloud-delivered services and cloud computing these days. In fact, the term "cloud" has become so popular, that you're just as likely to hear it used by your mother to describe where she keeps her e-books, as you are to hear it used by a meteorologist on the morning weather report. But, as Robert Plant sang in the Led Zeppelin classic "Dazed and Confused," "Lots of people talk and few of them know."

Clouds are nebulous by their very nature, so it's no wonder that extending the term to an abstracted interface component of IT virtualization would prove similarly hard to describe.

A good analogy is varying types of fog, which take on different names depending on the formative constituents. In Michigan, it's plain old fog. Mix in industrial particulate matter, and you get smog, which makes the view of Los Angeles from Griffith Observatory, on most days, quite unsavory. Replace industrial ash with the volcanic type, and you have vog, which floats across the Hawaiian Islands. Whether smog, fog, or vog, all three make driving through mountain passes and general visibility a chore, but they're not exactly the same.

Similarly, not all clouds are equal. That's probably a good thing, however, because "when it comes to the cloud, one size does not fit all," as John Potter, vice president of service solutions with AT&T Business Solutions says.

Cloud is an adjective, which refers to how a service is delivered, consumer or enabled, as well as a concept that abstracts on-site resources out to the internet. Here's a closer look at the essential components of a cloud offering, the service types (XaaS), and the deployment models available in order to provide some visibility into our opaque subject. There are also some innovative applications on the horizon for cloud computing, and how it may evolve in the future.

Cloud is an Adjective

I heard an attendee say that the "cloud is an adjective" while attending a breakout session at the Pacific Telecom Council Conference last month, and it's stuck with me ever since, because it clears a lot of the fog (or vog, or smog, as it were) surrounding the discussion. We can talk about resources,



services, access and security, and enablement from a cloud perspective, and though they have essential differences, they all exist on the cloud continuum.

I contacted Director Communications Industry at Oracle Brian Kracik, and he agrees, "The definition of cloud is not binary, but rather a continuum," he explained. "And most organizations are gradually evolving toward a cloud model by adopting shared resources (e.g., consolidation), elastic scale-out architectures, greater automation, and self-service capabilities, and improved measurement, monitoring, and billing of services."

It is important to point this out while we attempt to define cloud offerings, because there are several continuums upon which they rest.



Sam Johnston

As you can see in figure 1, the cloud touches many devices, network components, applications.

For instance, the amount of self-service, or the amount of configurability is not inherently described by the "name" of the cloud, and unique offering capabilities that must be evaluated by each customer based on their particular business needs. Eddie Arrage. market development manager, IXIA, agrees. "Certainly clouds are not all equal," Arrage says. "The acronyms IaaS, PaaS, SaaS are commonly used to classify cloud offerings, but aren't always the best way to describe cloud types since cloud solutions vary. Many providers that would be considered PaaS or IaaS offer different configurability for network and application designers."

Essential Components

One of the core advantages of cloud computing is the reduction of IT costs achieved by offloading infrastructure, application, and management expenses to a third-party. The oft-used example used to convey the value of migrating to a cloud environment is owning a car versus renting a car, or even better, owning a car versus subscribing to a service like IGo or Zipcar. The minute a car is purchased and driven off the lot, the depreciation cycle begins, and a long-term commitment to maintenance and lifecycle is initiated. Cloud computing promises to remove cost constraints of upkeep, utility (power, HVAC), operation, licensing, insurance, management, and maintenance from the equation. In this manner, the cost savings can be OPEX, CAPEX, or both.

The NIST defines a cloud computing as being comprised of five essential components:

On-demand service: The ability for a customer to

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provision services, as needed, per-use, without the need for human interaction. Cloud services offer 24x7 service that would be very costly in a traditional IT environment.

- Broad network access: A cloud offering can be managed from many virtual points, from mobile and terrestrial networks and multiple devices. This "allows non-IT users to provision their own resources and access them from many devices and locations," says Sanjay Kumar, vice president of communications and media at Progress Software.
- Resource pooling: This is where we often see the phrase "multi-tenancy," which refers to multiple users sharing the compute power of a single resource, through virtual or physical provisioning. In a private cloud, this might mean several business units within a company share one database server, while in a public cloud, multiple customers might share the computing power of one multi-core blade server. In this manner, hardware components are utilized to their fullest, instead of sitting idle.
- Rapid elasticity: Put simply, the ability to rapidly scale with demand. Time-to-market is a critical competitive metric, and rapid scalability is a key enabler.

Solutions click to make cloud a REALITY CHISOLUTION

 Measured service: Transparency in usage and billing. Cloud services must have the ability to provide granular activity and usage date to the customer, along with transparent billing and charging procedures. Again, a common gripe made about traditional IT organizations is that they always show up to the party with an open hand asking for resources that.

When a computing solution is outfitted with these essential components, it is a cloud solution, and offers significant advantages to users. Most vendors and service providers who operate in the cloud adhere to this definition, perhaps fudging emphasis slightly to fit their solution.

David Frattura, senior director, strategy-cloud solutions for Alcatel-Lucent, simplified the definition. "Cloud means I have the dynamic ability to consumer IT resources where it makes the most sense," Frattura says. "From a provider point of view, I can allocate resource for other customers when in not use."

If the business needs and the cloud service are properly matched, the impact to businesses of this model are profound, says Duane Edwards, SVP Product Development at Globys. "Instead of licensing a software package, acquiring the necessary hardware, and paying consultants to get it all up and running, a business can subscribe to a cloud service and be using it the same day for a fraction of the time, effort, and cost. And if it doesn't meet their needs, they can unplug it without the loss of that same investment in time, effort, and cost."

Service Types

This is where we get into <blank>-as-a-Service, or XaaS. In general, there are three types of cloud services.

Software-as-a-service (SaaS): In a recent white paper, Gartner defined SaaS as "software that's owned, delivered and managed remotely by one or more providers. If the vendor requires user organizations to install software on-premises using their infrastructure, then the application isn't SaaS." SaaS offerings are often broken into three categories, explained Nava Levy, vice president, SaaS/Cloud Solutions from cVidya. "1. Employee productivity apps – as web conferencing and e-mail. 2. IT-centric apps as security as a service, and back-up as a service. 3. Enterprise Software apps as CRM and HRM." Examples: Dropbox, GoogleApps, Microsoft Office365, SalesForce.com

Platform-as-a-service (PaaS): "This type of service is a computer platform abstracted from the underlying

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infrastructure," John Landau, senior vice president of global managed services at TATA Communications explained. "The customer develops and deploys their script-based application - such as java, .net, PHP on a self-scaling platform, abstracted by the PaaS software from the underlying configuration and lowlevel infrastructure software." The user has control over applications deployed and perhaps configuration settings, but cannot provision network components, like processing and storage. Examples: Microsoft Azure, Google AppEngine, Heroku. Infrastructureas-a-Service (laaS): Forrester research outlays four core components of an laaS offering: self-service, standardization, automation, and pay-per-use. laaS typically provides storage, servers, network, and security data center infrastructure on demand to a customer, and the customer owns the deployment, configuration and operation of the platform and applications software. Examples: Amazon EC2, Tata InstaCompute, Verizon (Terremark).

Deployment Models

Generally speaking, there are three deployment models that are of interest; Public, Private, and Hybrid. (The NIST definition describes an additional fourth deployment model, community, but that's a bit outside of our scope.)

- Public: In a public cloud, resources (servers, storage, network, computing) are shared and provisioned across multiple users. The public cloud is generally less expensive for this reason. The most popular public cloud is Amazon Web Services EC2, and for this reason, most public cloud offerings integrate with the Amazon service. Despite attractive pricing, many public cloud offerings aren't replete with the kinds of measures needed to meet enterprise-level security and compliance requirements.
- Private: One cloud, one customer-that's the easiest way to explain private cloud. In a private cloud, the infrastructure is provisioned for one, individual customer. The management of said infrastructure might be handled by a third-party (perhaps the cloud provider itself). Most large enterprises choose private solutions for the amount of control they can retain. All private cloud solutions today, at their heart, are

laaS solutions, says Forrester research. Why? Because by definition they give the customer control of configuration and operation of their applications platform.

 Hybrid: As you might imagine, hybrid cloud is a mix of public and private, so resources are provisioned in both across a public environment, and privately. This is sometimes used to balance loads between clouds when demand reaches critical levels. Other times it refers to when a vendor outsources a portion of the cloud services to the public cloud. Hybrid cloud claims to offer the best of both worlds--the price and rapid scalability advantages of the public cloud and the private security required for mission critical systems.

Although there might be marketing forces who say otherwise, not all processes require a private cloud. You can see in figure 2 below, that enterprise customers value the highly secure and configurable private cloud for processes like CRM and accounting, but see the public cloud as sufficient for office applications, sales force automation, and human resources. From this data, one could construct a hybrid cloud offering that placed the aforementioned processes in the desired public or private domains to achieve cost-savings as well as meet customer needs in a balanced fashion.

Clouds of the Future

Outlining the main types of clouds and their delivery methods by no means creates an exhaustive list, and there are several offerings that fall outside of our taxonomy yet still fall squarely on the cloud continuum, and certainly others yet to be imagined.

Communications as a Service (CaaS) is one such example, where cloud computing and unified communications are joined to create a single bill solution that encompasses both IT and Communications traditionally. Testing as a Service (TaaS) offerings from HP, AppLabs and others allow customers to rapidly test new environments, applications, or services without incurring the costs associated with traditional methods of testing. Some experts consider this wave of technology the biggest tsunami since the advent of the internet itself.



Top Customer Cloud Priorities by Application Type: Private Versus Public

Source: IDC, 2011

A variety of other computing processes can be imagined that would enable customers to use little more than a \$100 monitor and a \$100 thin-blade client to accomplish everything from advanced video rendering to large-scale distributed database management. Truly, the sky is the limit, and when we imagine the advances that will come from multiple clouds interacting, we see why some experts consider this wave of technology the biggest tsunami since the advent of the internet itself, and this is just the beginning.