

What is Cloud Computing?

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@ Emerging Law & Policy Issues
in Cloud Computing

What is Cloud Computing?

"The interesting thing about Cloud Computing is that we've redefined Cloud Computing to include everything that we already do... I don't understand what we would do differently in the light of Cloud Computing other than change the wording of some of our ads."

- Larry Ellison, Oracle (Sep. 26, 2008).

"Above the Clouds: A Berkeley View of Cloud Computing" (Feb. 10, 2009).

UC Berkeley Reliable Adaptive Distributed Systems Laboratory

<http://radlab.cs.berkeley.edu/publication/285>

Michael Armbrust, Armando Fox, Rean Griffith, Anthony D. Joseph, Randy Katz, Andy Konwinski, Gunho Lee, David Patterson, Ariel Rabkin, Ion Stoica, and Matei Zaharia.

Above the Clouds singles out these essential features of a cloud:

1. Extremely large data centers (econ. of scale)
2. The use of statistical multiplexing to increase utilization (multi-tenant resource pooling)

Above the Clouds singles out these essential features of a cloud provider:

3. Usage-based cost/metering that eliminates up-front commitments
4. The availability of on demand scalability / parallelization

"The NIST Definition of Cloud Computing" (Oct. 7, 2009).

National Institute of Standards & Technology

<http://bit.ly/h2ogas>

Peter Mell & Tim Grance



NIST identifies:

- Five essential characteristics
- Three service models, and
- Four deployment models
of cloud computing.

NIST's 5 essential characteristics of a cloud:

- On-demand self-service provisioning of resource
- Broad network access (mobile, laptop, PDA)
- Resource pooling (multi-tenant)
- Rapid elasticity of resources scales up and down
- Measured service (metering / pay as you go)

NIST's 3 service models of a cloud:

- Cloud Software as a Service (SaaS)
- Cloud Platform as a Service (PaaS)
- Cloud Infrastructure as a Service (IaaS)

NIST's 4 deployment models:

- Public cloud (*for the general public*)
- Private cloud (*solely for 1 organization*)
- Community cloud (*orgs w/ shared concerns*)
- Hybrid cloud (*two+ clouds bound together permitting data and application portability*)

Current examples of public cloud computing:

Amazon Web Services



Google AppEngine



Microsoft Azure

Windows Azure Platform

SaaS has well-understood advantages:

- End users access the service anytime, anywhere, share data, and collaborate more easily.
- Service providers simplify software installation, maintenance, and versioning through centralized control.

What's new in the cloud?

- Nothing except more providers can deploy SaaS without provisioning their own datacenter.

What's new in cloud computing with respect to hardware?

- The illusion of infinite computing resources available on demand.
- The elimination of an up-front commitment by cloud users.
- The ability to pay for use of computing resources on a short-term basis as needed.
 - Above the Clouds.

What has enabled cloud computing? Why now?

"[T]he construction and operation of extremely large-scale, commodity-computer datacenters at low-cost locations was the key necessary enabler of Cloud Computing, for they uncovered the factors of 5 to 7 decrease in cost of electricity, network bandwidth, operations, software, and hardware available at these very large economies of scale."

- Above the Clouds.

Is the "cloud computing" label mere hype or is there something importantly different here?

For instance, can one say that everyone that uses Gmail is a "cloud user" without "cloud computing" becoming a meaningless synonym for network computing or the internet?

Note: IMAP, the remote mailbox protocol, debuted in 1986 as an alternative to POP.

My view:

When "cloud computing" is used as a synonym for SaaS, it's typically not describing a new technology and can border on hype.

But there is something importantly different happening:

The public availability of cloud computing infrastructure is enabling *a lot more* SaaS.

This raises policy issues that cannot be ignored.

My view:

So, Larry Ellison may be (almost) completely right about "cloud computing" from a technology perspective but (almost) completely wrong from a policy perspective.

Today, let's address the important policy questions.

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<http://www.flickr.com/photos/pagedooley/2511369048/>

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