

Cloud Computing: A Status Report

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Executive Summary

Cloud Computing (CC) and software as a service (SaaS) have gained a lot of attention in recent times in the media—print, social networks, TV, blogs—and even driven the U. S. Government to lose some of its fat so it could fly in the clouds. So, what does the year 2010 hold for CC? Is it just another hype driven by hungry vendors who want to gain lost revenues during the Great Recession? Or, will 2010 really be *the* year of CC? In this paper we emphasize CC is here to stay and discuss some motivators and inhibitors in embracing it.

Introduction

Cloud computing is making inroads and changing the entire IT landscape. However, every year for the past three years was forecast to be the Year of Cloud Computing, just as every year in the mid- to late-90s was the Year of Object-Oriented Databases (OODBs) and Service Providers (SPs). OODB was a \$0 billion-a-year market growing at 25% a year! Remember Gemstone, Objectivity, Ontos, and Versant? Cloud computing is here to stay, will not go the way of OODBs, and has a bright future, but customers should be aware of excessive marketing hype by zealous vendors.

Cloud Computing will Change the IT World

One scenario presumes you will own no IT infrastructure—servers, operating systems, networks, storage, middleware, applications—and everything goes to the clouds. You don't worry about software versions and patches, never-ending hardware and software upgrades, QoS, SLAs...your CC vendor will take care of them. Why do you believe in this scenario? Well, one forecast is for cloud IT spending to grow from US\$17 billion in 2009 to US\$44 billion in 2013 (Figure 1). This chart is very suspicious to us: Does IT spending here include hardware, software, applications, network, storage, networking gear, and professional services? These figures are too low to be credible, because worldwide IT spending in 2010 alone is expected to exceed US\$3.2 trillion.¹

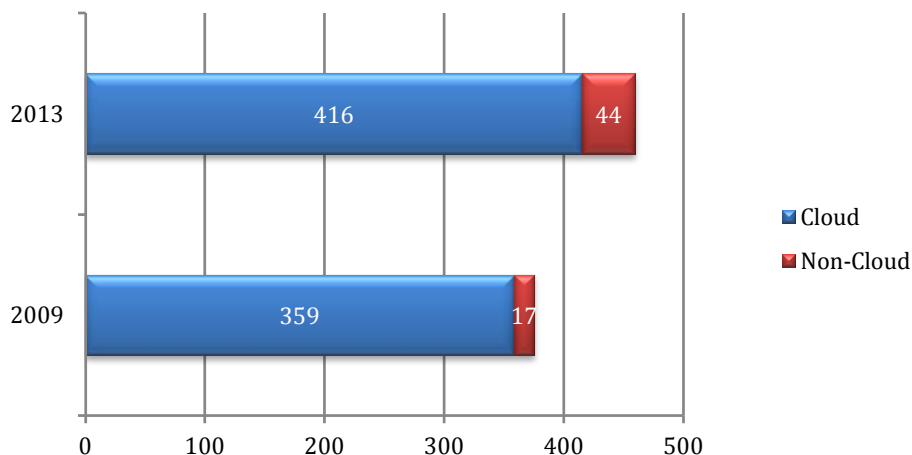


Figure 1. Worldwide IT Spending² (US\$ billions)

¹ ["Gartner expects IT spending to fall 6% in 2009,"](#) InfoSecurity, July 7, 2009.

² ["Security in the Ether,"](#) David Talbot, MIT *Technology Review*, January/February 2010.

More optimistic CC market estimates run anywhere from US\$120 billion³ to US\$160 billion⁴ by 2011. In a recent [survey](#) by *InformationWeek*, 46% of the companies said they will use or are likely to use cloud CPU, storage, or other infrastructure services. A year ago, only 31% had that view. For SaaS, 56% will use it or are likely to.

Motivators for Cloud Computing

There is a wide variety of reasons that attract enterprises, especially small and medium ones (SMEs), to CC. Traditional IT is complex and carries high overhead costs (Figure 2).

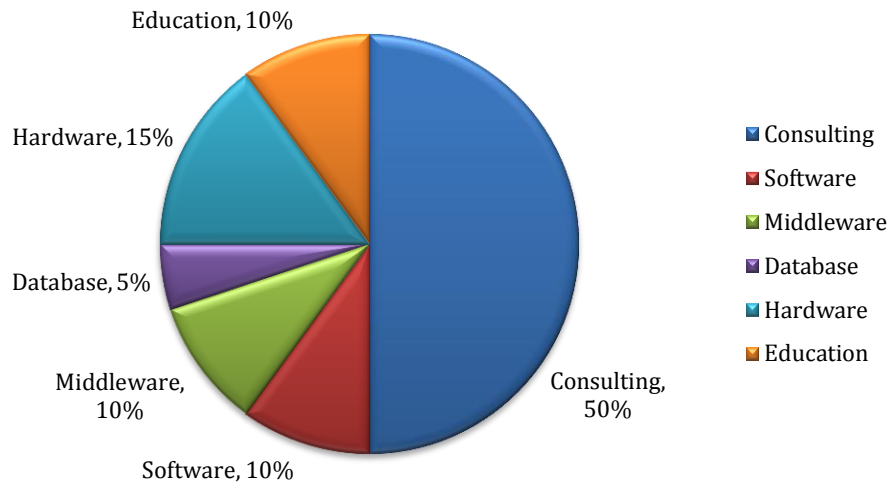


Figure 2. IT Cost Breakdown⁵

Cloud computing delivers a host of advantages:

- Reduced upfront costs, shifting CapEx spending to OpEx
- Reduced OpEx, you don't need an army of in-house network, storage, or system administrators to run your IT infrastructure.
- You don't worry about *-ilities* (reliability, availability, serviceability, manageability, scalability); your cloud vendor does.
- Clouds are virtualized environments; the expertise your IT has gained over the years in x86 and virtualization is transferable.
- You can pretty much live off of Google Apps, Google Docs, Gmail, Zoho, or other free software and your employees' laptops will be 'light', with most files living in the cloud. At least, that is the vision.
- You don't need to keep enriching the Redmondians every time a new Windows version or an Office update is released. You also could use Office Live from Microsoft.
- Your cloud vendor can live off of the open-source LAMP stack and open-source, massively scalable databases ([Bigtable](#), [CouchDB](#), [Hadoop](#), [HyperTable](#)), resulting in reduced TCO and huge cost savings, passing on the savings to you.
- Continued effects of Moore's Law delivering powerful servers at commodity prices and lower cost of storage—storage densities keep rising while prices and costs spiral downwards—result in lower CapEx for cloud vendors.
- If you have managed outsourcing projects, managing your cloud vendor is very similar, such as defining QoS and SLAs. Some folks compare outsourcing to renting a house and the cloud to getting a room at a hotel.

³ "IBM Ready for Cloud Computing War in 2010," Paul Lilly, *MaximumPC*, December 22, 2009.

⁴ "Merrill Lynch: Cloud Computing Market Will Reach \$160 Billion...Really?," Alex Williams, ReadWrite Enterprise, November 25, 2009.

⁵ David Talbot, *op. cit.*

Inhibitors to Cloud Computing

There is a variety of reasons enterprises cite for holding back on adopting CC or implementing CC only on a limited basis. We'll discuss each of these concerns below.

Security

This appears to be the top issue among those evaluating CC, the concerns being whether others, including your competitors, can access your data and how safe is your data in the cloud. In a survey conducted by IDC over a year ago, security was the most important challenge/issue for almost 75% of those surveyed (Figure 3).

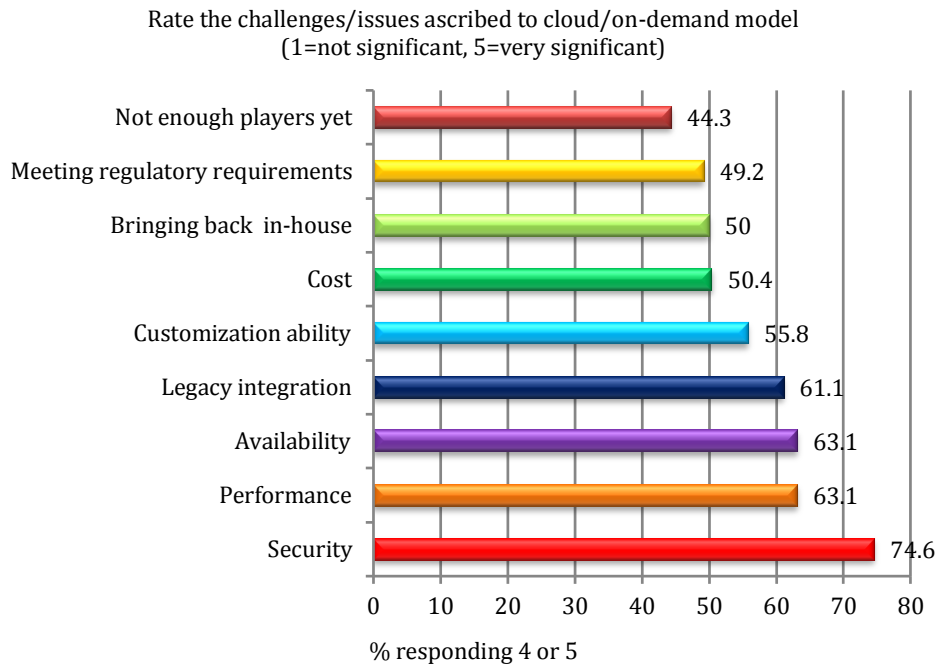


Figure 3. Top Challenges/Issues in Cloud Computing⁶

In a more recent article⁷ on cloud security, David Talbot discusses, *inter alia*, how three scientists at the University of California—San Diego and one at MIT demonstrated that the very advantages of cloud computing—ease of access, affordability, centralization, and flexibility—could give rise to new kinds of insecurity. This shouldn't surprise anyone. In 'olden' days, hackers, for instance, could attack a datacenter and possibly bring one company's IT to a screeching halt. But today, with mega-datacenters hosting hundreds of companies, hackers can bring them ALL down with one bad act. Sure, some cloud vendors boast of having seven layers of firewalls, but we suspect hackers have eight ways of attacking them!

Security is the reason banks, financial services institutions, and healthcare providers seem to be reluctant to embrace CC, although they may have put some applications in internal clouds. Visa, for instance, operates [VisaNet](#), the world's largest retail electronic payments processing network, handling an average of 10,000 transactions per second every day. In total, more than US\$4.3 trillion in global consumer spend is transacted on Visa-branded payment products annually. This is all done on IBM mainframes running Linux and TPF, enabling customers to use their Visa cards worldwide for purchases, debits, and cash withdrawals, completing their transactions in seconds. No CC vendor today can deliver that kind of performance and we doubt Visa will ever move its applications to the cloud.

⁶ "Effectively and Securely Using the Cloud Computing Paradigm," Peter Mell and Tim Grance, NIST, Information Technology Laboratory, October 7, 2009.

⁷ David Talbot, *op. cit.*

Privacy

Sun Microsystems' Scott McNealy used to say, "You have zero privacy, get over it." He was right, but truth hurts, and privacy in the U. S. is a joke, unlike in many European and Asian countries where executives are sent to jail for breaking privacy laws. (In some countries convicted executives commit suicide...ouch!) Acts such as HIPAA and laws passed by forward-looking U. S. states such as California, Minnesota, Nevada, and Utah protecting privacy are steps in the right direction, but what is needed are stricter Federal laws protecting customers and consumers.

Applications and Data Interoperability, Loss, and Portability

Once you've signed up with one CC vendor, how easy is it for you to switch vendors and move your applications and data—possibly hundreds of terabytes, if not petabytes—to a different vendor if you are unhappy with your current one? Also, can you have your applications and data hosted by different cloud vendors that enable interoperability? Sure, there are initiatives such as the [Open Cloud Manifesto](#) with over 300 members signed up dedicated to the belief that the cloud should be open. These are moves in the right direction, assuming they succeed and are not hijacked by dominant vendors.

Finally, do cloud providers, many of them still in their infancy and still teething, have the maturity to appreciate the importance of backup/restore, disaster recovery, business continuity, and data deduplication and replication? Most of them still guarantee 'three-nines' (99.9%) availability—that's over eight hours of downtime per year! Recent outages at [Amazon](#), [Gmail](#), [Blackberry](#), and [Rackspace](#) have turned skeptics out of their loyal customers.

Data Location

It's 11 PM, do you know where your data is? Which country? Which data center? Which disk farm? Are you complying with industry best practices and all state and Federal (central) government laws regarding governance, risk management, compliance, privacy, security, and access-control policies of your own organization? Are you aware that many governments are required by law to keep data on servers in their own country?

Vendor Viability

Despite all the hype surrounding it, CC is still new (but 35+ years old if you can remember time-sharing and service bureaus), and many vendors are re-labeling themselves and jumping on the CC bandwagon. The question remains: Will they be in business three years from now? Can they compete with newcomers (Amazon EC2, Google, and Microsoft), challengers (Cisco) and entrenched IT vendors (HP and IBM)? Make sure you go with a vendor you trust.

Summary

There are a host of other inherent benefits and yet-unseen risks in CC. Will enterprises' perceptions change over time and are there other risks lurking in the background? Are any of the risks discussed above showstoppers? We don't believe so and do not discourage anyone from embracing CC. But, as with every new technology, don't be sold by vendors' marketing hype. Look at your IT needs, see if they are met by CC, check out the vendors and their capabilities, have them deploy a pilot project for you, discuss all the issues we dwelt on above, move to the cloud graciously, and then fly on Cloud Nine! The notion that everything will move to the cloud is crazy. As an AT&T executive recently surmised, it's akin to saying we will all move to rented apartments, drive only rental cars, and eat out every day at junk-food restaurants. No, people will still live in homes they own, but stay in a hotel or motel while travelling, drive their own cars, but rent cars on business trips or while on vacation, and cook their own food, but eat out as they wish. The notion that everything will stay in-house is equally crazy. Why would you want to do bookkeeping, payroll or CRM in-house if you can use Intuit Online, ADP or Salesforce.com?