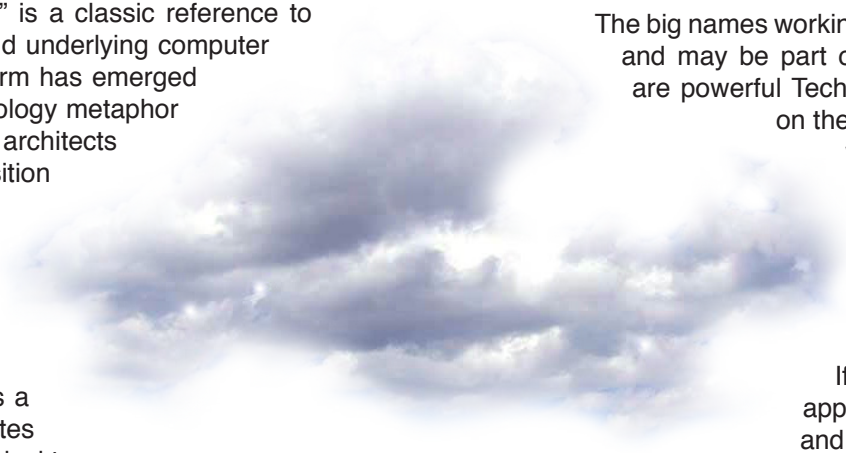
Cloud Computing.

"UNDERSTANDING
the implications."

Cloud Computing and SAAS.
The Massive Appeal of the Cloud.

Cloud Computing, the notion that business and consumer services can be delivered from the "cloud," is a classic reference to the Internet and the abstracted and underlying computer services within that cloud. The term has emerged as a powerful business and technology metaphor in the past year as executives, architects and programmers scramble to position themselves around the hype. For serious IT professionals, it is important to frame Cloud Computing so that meaningful dialogue can continue.



The Cloud Computing paradigm is a general use concept that incorporates the idea of software delivered to desktops, entertainment centers, sensors, handheld devices and all manner of consumer use chip-based hardware through a browser or other thin client, while information and the majority of processing resides or occurs in the "Cloud," or on the Internet. With this definition in mind, Software As A Service, or SAAS, is incorporated into the overall notion of Cloud Computing and the terms are somewhat interchangeable.

While the notion of Cloud Computing has enjoyed massive appeal and vendor hype in the past 12 to 18 months, the realities underlying this development are misunderstood. It has been pointed out by many computer scientists that two core problems exist with the notion of Cloud Computing itself:

1. Nothing happens in the "Cloud" that isn't simply abstracted or hidden by it. At the end of the day, somewhere, someone is responsible for implementing, managing and supporting disks that read and write data, servers that process requests and compute and the shared service infrastructure of routers, hubs, switches and firewalls that allow for connectivity to the computational core.

2. Satisfying the needs of consumers can outpace the need for well considered architectures and delivery models in the SAAS paradigm that address the real infrastructure, software and operational constructs required to support that which has become abstracted or hidden from those consumers.

One thing can be said for certain; the business analysts, systems administrators, database administrators or CIOs whom might be hawking the vision of Cloud Computing and SAAS must demonstrate a full command of what is happening in the "Cloud."

The big names working the Cloud Computing space are hard to ignore, and may be part of the hype-cycle surrounding this trend. They are powerful Tech firms with the wind at their backs and the sun on their faces. Certainly, companies of all sizes would want to emulate their success. Companies like Amazon, Apple and Google come to mind and the details get fuzzy as the allure of Cloud Computing kicks in.

What Cloud Computing is not.
Separating the Noise from the Thunder.

If Cloud Computing is moving consumer applications off the desktop and onto the Internet and we can apply the business model of SAAS to this paradigm, then it is important to understand what Cloud Computing is not.

Cloud Computing is not Grid Computing in which a distributed, highly resilient and clustered sets of virtual machines and massive storage devices are acting in concert to perform a singular and very large task. While components of Grid Computing infrastructure and architecture thinking may come into play while implementing a Cloud Computing scheme, the doing is not the same as the selling and; generally, traditional Grid Computing has been used in render farms, large research centers and game communities to focus on single computational tasks, not the ad-hoc and myriad processor intensive requests of consumer computing.

Cloud Computing is not Utility Computing in which computer resources are packaged as a metered service similar to traditional public utilities or telephony. While the utility pricing model is an oft tempting and deployed tactic in Cloud Computing, the computational, purpose-built infrastructure of Utility Computing is not Cloud Computing and some fantastic and early examples of Cloud Computing did not use centralized computational core or utility-like

pricing model at all. Early examples like Skype, BitTorrent, or SETI@home, which rely on peer-to-peer networks and trusted relationships between users are examples.

What Cloud Computing is...

Architectures and Business Models.

While Cloud Computing continues to grow in popularity and number of implementations, some early indicators of what Cloud Computing *is* have been fairly well established. However, like all emerging technologies, these early signposts will be painted, changed and redirected all together as Cloud Computing continues its evolution.

As previously mentioned, the architectural modalities of Cloud Computing infrastructures mostly consist of large storage pools (or massive monolithic storage implementations), coupled with varying degrees of virtualization technologies. The low power, small form factor, of the blade computer is favored and clustering, snap images and automated scaling are used to meet the high demands of Cloud Computing.

This general purpose architecture, when distributed globally to robust, hardened data centers with multiple network demarcation points allows providers of Cloud Computing services to meet quality of service and service level agreements required by their consumers. Further, open-source software and open standards have grown at pace with Cloud Computing and are critical to continued acceleration in this area. It can be said that Cloud Computing and Web 2.0 standards are coupled.

The business appeal of Cloud Computing is certainly a two-way street. Consumers typically don't own the hardware they are using. They merely access or rent it, and therefore can forego the capital expenditure of purchasing infrastructure and maintaining it. For the customer, Cloud Computing commodifies the high capital expense associated with business-focused application delivery. By sharing perishable and intangible assets in a syndicated, subscription based manner, tenants improve utilization rates and in some cases, reduce their computing costs. Obviously, increased high-speed bandwidth and ubiquitous access points has sped adoption in America and the EU, with China and India quickly coming online.

While originally driven by providers including Amazon, Google and Microsoft, recent corporate implementations of Cloud Computing are notable and include large scale enterprises such as L'Oreal, General Electric, and Procter & Gamble.

On the other side of the street, Cloud Computing has been seen as a boon for both traditional providers of syndicated hardware and data center services (Such as IBM, F7, GoGrid, Skytap and others). Other companies are making a "play" in Cloud Computing such as Dell, HP, Sun, 3PAR, EMC, Dell, 3tera, Hadoop, RightScale, Platespin, VMware and others.

Cloud Computing Standards.

Open Standards Being Used to Help Grow the Niche.

One key to understanding the ongoing Cloud Computing dialogue is a robust knowledge of Web 2.0 methods, delivery systems and the Standards employed and discussed in the W3C. These methods and standards revolve around the use of technologies including AJAX, Ruby on Rails, Java Script (not to be confused with Java code), Jython, Python, the associated Browser wars or standards including how Java Scripts, image formats, AJAX, PHP, SQL and MySQL are handled.

Since most Cloud Computing Software as a Service is implemented on a browser, it is important to know and understand the risk associated with these various languages, code methods and the W3C Standard. Consumers of Cloud Computing who ignore the challenges and risks of moving to a browser-based application delivery model do so at their own risk.

Some basic, lightweight standards have emerged in the Cloud Computing space that are worth understanding. They range across a variety of aspects and components that may or may not appear in a Cloud Computing implementation, including the following:

Applications

- Communication (HTTP, XMPP)
- Security (OAuth, Open ID, SSL/TLS)
- Syndication (Atom)
- Clients (AJAX Browsers or Offline Systems using HTML5)
- Infrastructure (Virtualization OVF)
- Platform (LAMP stacks or space-based architecture)
- Services:
  - Data (XML, JSON)
  - Web Services (REST)

What fits in the Cloud?

Using Basic Criteria to Identify Cloud Computing Opportunity.

With competing interests pushing the Cloud, it is in the interest of the buyer of these services to identify what belongs in the Cloud. That is, what applications and services that lend themselves well to the model, and what does not.

Of course, 3rd party, web-based applications that are architected, managed and optimized for the Internet are good fits. Services like Google Apps, SalesForce and others provide a sound operating environment and have been engineered for Internet delivery. While not without their challenges, they are more readily adapted to the Cloud than some of the applications we might already have in house.

Here are five core questions CIOs, business analysts and other stakeholders should use to evaluate whether or not an application is positioned for the Cloud:

1. Is the application already coded for delivery to a browser internally? Has the internal use of the application proven secure, scalable and stable?
2. Is the application client processor intensive? Does it use image formats, coding standards or client-side data that does not port easily to the W3C Standards?
3. Does the application contain proprietary or internal information that is regulated or could come under scrutiny as a result of a legal or criminal matter?
4. Does the application currently load, balance and use a Disaster Recovery solution that has been proven effective?
5. Will the benefits of moving the application to the Cloud outweigh the cost associated with reprogramming the application and will there be features and functions that will have to be let go or traded out?

While these are not the only considerations one should take under advisement when evaluating the move to the Cloud, they can kick-start the dialogue and quickly move the discussion past the excitement of doing business in the Cloud and into the real world realm of doing business.

Evaluating Cloud Computing Services

How to Identify a Service Provider for Cloud Computing.

Cloud Computing is not "hosting." Service Level Agreements, Security and Disaster Recovery are chief considerations for any 3rd party provider of computational services; however, in Cloud Computing; application up-time, service, delivery and cost must also come into play.

Here are some core questions:

1. What is the cost/benefit of syndicated hardware provisioning vs. capitalized hardware expense? How much of the service is hidden in the hardware and how much of the hardware is hidden in the service?
2. What is the quality of System Administrators, Database Administrators and others that will have access to the data? Do the hiring standards of the Service Provider match or exceed those in-house? Can the customer provide their own dedicated staff?
3. Does the Provider allow for 3rd party audits to assure regulatory compliance and allow for location-based provisioning to avoid unwanted jurisdictional scrutiny?
4. Is data segregated from other subscribers and encrypted? Can the customer provide your own encryption?
5. Does the Service Level Agreement allow for Disaster Recovery tests? Are data centers redundant and out of harms way from a regional event perspective? Can these test be audited by a 3rd party and unannounced? Anyone can fake recovery.
6. Does the provider comply with the US PATRIOT Act? Specifically, do they honor national security letters and the Electronic communications Privacy Act's provision for Stored Communications? If so, is that desirable for the customer, and when will they be notified of legal requests for their data by a governmental agency either in the US or abroad?
7. Are there provisos in the Terms of Service that allow for the customer's data to be returned to them if the Provider sells the company, becomes insolvent or otherwise? How will the data be returned and in what state?

A close look at the legal issues surrounding 3rd party data carriers and providers is sobering. While Burton Asset Management is not a law firm and does not offer legal council and nothing in this document should be construed as legal advice, the following concerns should be addressed when considering moving your company's data to a Cloud Computing model.

Title 18 Section 2703 States That...

"A governmental entity may require the disclosure by a provider of electronic communication service of the contents of a wire or electronic communication, that is in electronic storage in an electronic communications system for one hundred and eighty days or less, only pursuant to a warrant issued using the procedures described in the Federal Rules of Criminal Procedure by

a court with jurisdiction over the offense under investigation or equivalent State warrant. A governmental entity may require the disclosure by a provider of electronic communications services of the contents of a wire or electronic communication that has been in electronic storage in an electronic communications system for more than one hundred and eighty days by the means available under subsection (b) of this section.... without required notice to the subscriber or customer..."

- If the customer are a privately held company and one of their employees is under investigation for any crime, the data in the Cloud is at risk of Government review without notice under this law.
- Other, international laws and precedents are not promising either. Recently, three chinese circumvention tools (Dynaweb, Gpass and Firephoenix) are now publishing aggregate data and offering to sell individual data about the web browsing histories of their users. These tools together represent a big majority of the Chinese circumvention tool market, with a few million users in between them.

Past Performance

What You Can Learn From Companies That Have Moved to the Cloud.

A look across Cloud Computing Incidents in 2008 reveals that even the early adaptors in this space have not been without their mistakes. This data is based on the Cloud Computing Incident Database, and while many of these firms would avoid reporting low to moderate incidents, the database is populated by the Internet community at large, and not governed by any third party.

Among the companies reporting above are Salesforce.com which suffered a network outage they ranked as "high," AWS Services which launched their service with a "man in the middle" security issue, Gmail that suffered a 502 error that impacted an unknown number of users for more than 24 hours, Google Docs which suffered Session Highjacking in Thailand, Google App Engine that suffered from a low performance degradation incident, Google Apps that had a malicious service provider impersonate a user at other service providers, Flexiscale which took a critical extended outage from a Disaster Recovery event, The Linkup which simply closed and caused 20,000 users to lose their data and Amazon S3 which suffered a Critical outage for 8 hours due to a design flaw.

Future Indicators

While cloud computing is in its infancy it will continue to grow. Key concerns are privacy legal issues and Disaster Recovery. Its decision-makers should move towards the cloud with caution.

Large, multinational firms as well as privately held U.S. firms with international clients need to have a keen eye on the legal, geopolitical and ethical implications of storing their data in the **Cloud** using a third party.

Re:Think...

our dependence on others. What are they providing us with? Will they be there when we need them the most?

Contact

Kevin Burton
kevin@thinkbam.com
480.239.9724

Angela McGee
angela@thinkbam.com
480.239.5647