Cloud Hosting and the Enterprise

by Kelly Beardmore, CEO of Carbon$_{60}$ Networks

"Amazon and other Cloud providers have not made the investments necessary to provide the flexibility and control necessary to support enterprise-class IT solutions." – Lori MacVittie, Industry Analyst

As hype about cloud computing crescendos, the gulf between promise and practice is now dangerously wide for enterprises with business-critical applications delivered over the Internet. While the great promise of cloud computing services is the consumption of IT as a utility, like electricity or cable TV, this reality does not exist. And, in fact, the commoditization of IT may never exist to the same degree. For the foreseeable future, you will have to evaluate each vendor's cloud hosting platform carefully to understand if it is right for your business. There are a number of fundamental technical and business aspects around IT Service Management (ITSM) a diligent CIO must consider before committing to a cloud hosting platform. This includes the cloud's:

- Objective
- Architecture
- Tools
- Security
- Support

An overview of these five key aspects is given below with concrete examples of what to look for in an enterprise-class cloud computing solution and how Carbon60's cloud hosting platform delivers against them. Hopefully, this will help CIOs cut through the hype and get a clearer picture of which cloud, if any, is right for their business-critical Internet application. Support
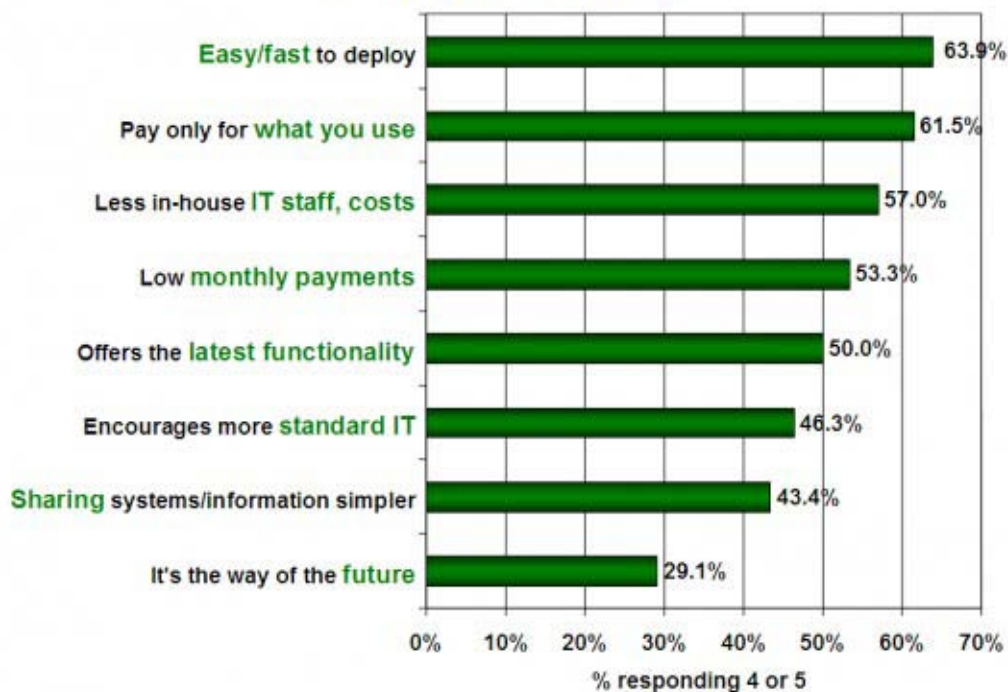
Rather than get caught up in the question, "What is a Cloud?"[1] It is more productive to ask, "Why a Cloud?" The fundamental reason to adopt any IT platform is to achieve the optimal balance between affordability and system availability, capacity, security, scalability, and manageability that is right for your particular business and application requirements. This balance is basic to ITSM best practice and should be forefront in choosing any particular IT platform, including a cloud computing platform. Beware of the cloud buzz-word de jour, such as "elastic scalability". This is only one variable in the equation. An enterprise-class cloud hosting solution must deliver on each of the core ITSM requirements in the context of the company's short and longer term business requirements to be considered an enterprise-grade solution.

The need for cloud hosting vendors to deliver value with respect to each of the core ITSM requirements is consistent with the IDC's survey of IT Executives/CIOs on the benefits and challenges of cloud-based solutions.[2] This survey highlights the remarkably consistent attention given by CIOs to the inability of existing cloud hosting solutions to address the core ITSM requirements demanded by enterprise-class IT.

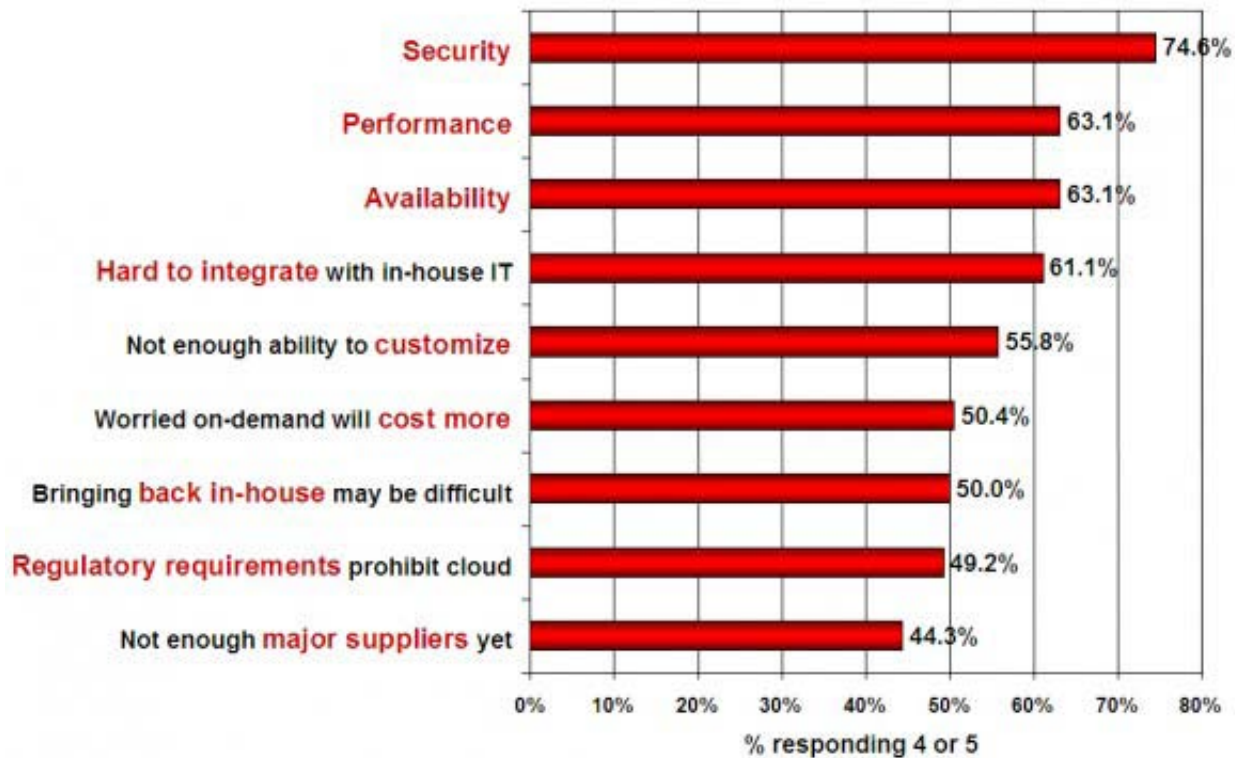## Q: Rate the benefits commonly ascribed to the 'cloud'/on-demand model
(1=not important, 5=very important)

Benefit	% responding 4 or 5
Easy/fast to deploy	63.9%
Pay only for what you use	61.5%
Less in-house IT staff, costs	57.0%
Low monthly payments	53.3%
Offers the latest functionality	50.0%
Encourages more standard IT	46.3%
Sharing systems/information simpler	43.4%
It's the way of the future	29.1%

Source: IDC Enterprise Panel, August 2008 n=244

Q: Rate the challenges/issues ascribed to the 'cloud'/on-demand model
(1=not significant, 5=very significant)

Challenge/Issue	% responding 4 or 5
Security	74.6%
Performance	63.1%
Availability	63.1%
Hard to integrate with in-house IT	61.1%
Not enough ability to customize	55.8%
Worried on-demand will cost more	50.4%
Bringing back in-house may be difficult	50.0%
Regulatory requirements prohibit cloud	49.2%
Not enough major suppliers yet	44.3%

% responding 4 or 5

Source: IDC Enterprise Panel, August 2008 n=244

1. Objective:

Given the functional and technical diversity of business applications as well as the diverse business drivers behind ITSM objectives, it is impossible to engineer a computing platform, cloud or otherwise, that delivers the optimal solution in every use-case. There is always some compromise, some feature versus cost trade off in complex system engineering. From the beginning, a cloud hosting vendor must define the objective, that is, they must engineer their cloud with a target audience and particular price points and margins in mind. Behind the curtain, a multitude of technical tradeoffs will occur to achieve this objective which will impact the cost, the flexibility, and the quality of service delivered by their cloud hosting solution. Performing the due diligence necessary to understand this underlying objective and what it means to the cloud vendor's ability to deliver on the core ITSM requirements (affordability, availability, capacity, security, scalability, and manageability) will often mean the difference between the success and failure of your business-critical project.

Unlike Amazon's EC2 offering or those now out to compete with EC2, such as Rackspace and GoGrid, the objective of Carbon60's cloud hosting platform is not to be a consumer-class cloud. Rather, Carbon60 cloud is specifically engineered to meet the ITSM benchmarks required by large enterprises and government for hosting business-critical applications. This is achieved, as discussed in more detail below, primarily through: the development and integration of enterprise-class IT infrastructure and management tools at every level of Carbon60's cloud architecture; innovative solutions that maximize the utilization of IT resources across each part of the enterprise-class IT environment (development, staging, production, and disaster recovery); a dedication to Information Security best practices; and Carbon60's conviction to support its customers through the entire IT lifecycle and application stack.

2. Architecture

Pulling back the curtain on the architecture of the vendor's cloud hosting platform will help you evaluate if it is right for your business. For companies looking to host business-critical applications, the cloud vendor's underlying datacenter, network, storage, and compute infrastructure should mirror the features of a typical enterprise-class computing platform as well as offer the advanced capabilities associated with cloud computing, such as elastically scalable computing resources.

Key Datacenter Infrastructure should include:

• Fully Independent "A" and "B" Power Systems to all Physical Devices
• Fully Redundant Cooling Systems

Key Network Infrastructure should include:

• Complete Network Redundancy to the Physical Host
• Dedicated Public, Private, Backup, Administrative Networks
• SWIP and RWhois Support (i.e. ability to re-assign IPs to Customers)
• Network Layer Load Balancing
• Network Layer Intrusion Detection and Prevention

- Network Layer Firewalls
- MPLS and Virtual Private Networking Support
- Geographically Redundant DNS Service
- Edge Caching and Routing Service Options (i.e. CDN Services)

Key Storage Infrastructure should include:

- Elastically Scalable Tier0, Tier1 and Tier 2 Enterprise SAN Storage
- Fully Redundant Multi-Gbps Fibre Network
- Proven Ability to Handle High I/O Applications

Key Compute Infrastructure should include:

- Elastically Scalable CPU and Memory Resources
- Live Migration Across Physical Hosts
- Automated Recovery from Failed Physical Hosts
- Support for Oracle, SQLServer, and MySQL Clustering

Commodity cloud offerings – such as Amazon and RackSpace – lack many (if not all) of these building-blocks necessary to support enterprise-class hosting environments.[3] Without these fundamental building blocks, the ability of the vendor's cloud platform to adequately address core ITSM requirements and satisfy the IT requirements of medium to large organizations over the life of the project is compromised. For example, the ability to schedule application-level backups or accessing persistent data storage without impacting network performance and causing application latency is a straight forward requirement of most business-critical applications but are not supported in Amazon's mono-network EC2 architecture.[4]

Integrated policy and workflow engines and other advanced service management toolsets are another way enterprise cloud hosting platforms set themselves apart from their consumer-oriented counterparts. For example, without any customer programming, Carbon60's policy and workflow engines provide automatically scaling network, storage and compute resources to accommodate expected and unexpected spikes in demand. For example, Carbon60's cloud compute and network resources seamlessly scaled over ten (10) times normal for sportsnet.ca during the NHL trade-deadline broadcast.

3. Tools

Do far more, far better, and with far less IT resources! To realize this universal goal, an enterprise-class cloud hosting platform must reinforce the integrity of ITSM best practices around application development, staging, production, and disaster recovery while streamlining the necessary IT resources required to support these best practices. This requires an advanced administrative toolset to drive efficient and effective service delivery (e.g. capacity, continuity, and availability management) and support (e.g. incident, change and release management). Key ITSM tools that should be part of an enterprise-class cloud hosting offering include:

- Web Based Control Panel/Customer Service Center
- Web Based Incident, Change, and Request Management System
- Integrated Change Auditing and Control Systems
- System Templates for Rapid re-deployment of your Application and OS Configuration
- Incremental System Snapshots with Roll Forward and Back Capability
- VM and Application Level Data Backup and Archiving
- System and Application Performance and Availability Monitoring and Reporting Tools
- Local and Remote Data Replication Tools
- Benchmark Performance and Security Testing Tools
- Service Level Agreement (SLA) Management Tools
- Web Services APIs for integration with Cloud Tools and Resources

Few cloud hosting offerings currently include all of these ITSM tools. And while it is possible to combine the services of multiple vendors to create an equivalent suite of management tools, as we saw with Amazon's mono-network architecture, it is not always certain the underlying architecture of the vendor's cloud will support them. Drawing on its technical partners, Carbon60 provides a comprehensive suite of tools that are certified against its cloud hosting platform and are fully supported by Carbon60's technical support staff.

ITSM best-practice also dictates that production systems are replicated to a disaster recovery site to ensure business continuity. Although very important, the cost of implementing and maintain this best practice is extremely high. However, by coupling data replication and virtualization technology to the reserve capacity available on Carbon60's cloud hosting platform, Carbon60 can deliver exceptionally affordable and effective disaster recovery solutions.

4. Security

Information security is the most significant barrier CIOs see to adopting cloud hosting services. While this is a multi-faceted issue, from a technology point of view there are no inherent security risks or benefits associated with cloud computing relative to other Internet accessible computing platforms. The same principles and toolsets apply. CIOs must do the same due diligence with a cloud hosting platform as they would with their own internal IT departments or traditional IT outsourcer to make sure their Information Security Management System (ISMS) is being supported. In fact, a trustworthy enterprise-cloud vendor should enhance an organization's ability to protect the integrity of its business information and navigate ever rougher regulatory waters. Ways this can be achieved include:

A. Requiring the cloud vendor to be certified against internationally recognized information security standards, such as SAS 70/SSAE 16, ISO 27001 and PCI. Certification against one or more of these standards is normally required of IT outsourcers to meet the regulatory requirements governing ecommerce transactions or the management of personal and financial information.

B. Requiring the Cloud vendor to have a multi-layered information security infrastructure integrated into its cloud hosting infrastructure to protect against data intrusion, corruption, and loss. These systems include:

- Flexible Service Agreements that address Risk and Accountability
- Integrated Vulnerability and Compliancy Assessment Tools
- Integrated Change Auditing and Control Systems
- Local and Off-Site Data Backup and Archiving Services
- Integrated Network Layer Intrusion Detection and Prevention
- Integrated Network Layer Firewalls
- Integrated Virtual Private Networking (VPN)
- Support for Private MPLS Network Connections
- Strict Access Control and Acceptable Use Policies
- DDOS Mitigation Tools and Policies

C. Avoiding mass-market Cloud services. At some level, every cloud hosting service, like the Internet itself, is a shared network. As a result, what others do on that network can and will, at some point, affect your business. The risk increases exponentially if the cloud vendor is targeting the mass-market with cheap prices and automated signups. On this type of cloud hosting platform you can be certain that network abuse is a significant issue and customers are routinely sideswiped by Denial of Service (DoS) type attacks and blacklisted IP blocks. This is a well-publicized problem on Amazon EC2 but the problem is universal.[5] The best protection is to choose a vendor who caters to businesses and organizations conducting real business over the Internet and subscribing to sound ISMS principles.

Carbon60 pays special attention to its ISMS and boasts a robust information security infrastructure. Its hosting facilities are SSAE 16 certified and it has achieved "Protected B" security status with the Federal Government of Canada.

5. Support Services

The majority of the cloud hosting offerings on the market are essentially self-help services. At best, organizations can subscribe to a "live" help desk service that is reactive and focused on request and incident management. This may be enough for organizations with solid web hosting experience and adequate IT staffing. However, many organizations need much more. They need a partner who is an expert in the delivery of business-critical applications over the Internet. They need someone to understand their business and application requirements in detail and work proactively through the entire IT lifecycle to achieve their goals. If this is your organization then key things to look for in a managed cloud hosting vendor, include:

• Support for all aspects of service delivery, including the application stack
• Ability to work proactively through the complete IT lifecycle
• Service Level Agreement (SLA) with end-user centric performance objectives
• Adoption of ITIL best-practices, particularly around change management
• Technical Account Managers dedicated to your account
• 24x7x365 Service Desk coverage

Being a great partner is what Carbon60 is all about. Its proactive, end-to-end approach to delivering managed hosting services is geared to achieving the highest standards of service delivery. Along with an industry-leading SLA, each Carbon60 customer is assigned a Technical Account Manager (TAM) to coordinate account activities and be accountable for customer satisfaction through the IT services lifecycle. Of course, Carbon60 also provides the highly responsive 24x7x365 Incident Management services you would expect from a quality managed services provider.

As one would expect, the shape of cloud hosting computing is fuzzy and changing rapidly. It is still early days and new vendors are entering the market regularly with different service philosophies, target markets, and solutions all under the same cloud hosting banner. In this environment, it is particularly important for CIOs to analyze carefully the underlying objective, architecture, tools, security, and support behind a vendor's cloud hosting platform. Only then can they evaluate if a particular cloud can achieve the optimal balance between affordability and system availability, capacity, security, scalability, and manageability that is right for their

[1] For those interested, the NIST has released a fairly comprehensive working definition of Cloud Computing. (http://csrc.nist.gov/groups/SNS/cloud-computing/index.html)

[2] IDC Blog posted by Frank Gens. (http://blogs.idc.com/ie/?p=210)

[3] Lori MacVittie touches on this issue in "Control, choice, and cost: The Conflict in the Cloud" March 18, 2009. (http://devcentral.f5.com/weblogs/macvittie/archive/2009/03/18/control-choice-and-cost-the-conflict-in-the-cloud.aspx). She argues that Amazon and other Cloud providers have not made the infrastructure investments to provide the flexibility and control necessary to support enterprise-class IT solutions. Unfortunately, it is not possible within the scope of this document to provide a detailed comparative analysis of leading Cloud hosting environments. As features also change over time, due diligence is always required.

[4] On Amazon's EC2 Cloud all "instances" have a single network interface through which all traffic flows. This includes storage traffic if you want "persistent" and not "temporary" data storage. Dan Siemon gives a good technical overview EC2 in "Amazon EC2 from a network administration perspective" March 26, 2008. (http://www.coverfire.com/archives/2008/03/26/amazon-ec2-from-a-network-administration-perspective/)

[5] Read about Amazon EC2's spam and malware problems at http://taint.org/2008/07/02/162007a.html.   Other examples of Security issues within Amazon's EC2 cloud architecture are outlined by Craig Balding in "Is Amazon AWS Really HIPAA Compliant", April 8th, 2009. (http://cloudsecurity.org/2009/04/08/is-amazon-aws-really-hipaa-compliant-today/).

About Carbon$_{60}$ Networks

Carbon$_{60}$ is about supporting the software development and delivery life-cycle with the reliability, performance, and security necessary to support mission-critical web sites and applications. Carbon$_{60}$ has a world-class edge/origin cloud hosting platform and specializes in fully managed solutions that include deep application support and "end-to-end" quality of service guarantees.

Carbon$_{60}$ Networks
17705 Leslie Street – Suite 9
Newmarket, ON,
Canada, L3Y 3E3

Email: sales@carbon60.com
Web: www.carbon60.com
Phone: 1.888.227.2666