What is ‘cloud’? And why does it matter?

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October 2012
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Without any doubt, cloud computing is the ‘hottest’ term in the IT industry: 2011 was “the year of the cloud” – so was 2012 – and it appears that 2013 will be “the year of the cloud” some more, again, v3...

But – what is ‘cloud’? Like many terms that appeal to buyers, the concept of cloud has been stretched in several different directions. In its simplest form, cloud is a method of delivering and consuming information technology (IT) resources over the internet “as a service” – an approach that maximizes the efficiency of the supply systems. But nothing that is as prominent as cloud is likely to be simple in its definition and application: a Google search on the term “cloud computing definition” (an action which is itself a cloud-based activity) finds 12,000,000 references. The definition from the National Institute of Standards and Technology holds that the “essential characteristics” of cloud include: on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service, and these characteristics are found in many cloud models. However, this kind of approach is akin to describing a rainbow in terms of the refractive properties of raindrops rather than by its colours or emotional or aesthetic appeal. It’s easiest – best – and most accurate to understand cloud in terms of how it is used in today’s business environment.

At one primary level, a business can choose to use one or both of ‘private cloud’ or ‘public cloud.’

Private clouds are, for the most part, the preserve of very large enterprises. These businesses work with their hardware, software, and services suppliers to deliver “cloud services” – access to IT resources and applications – in the same way that these users can obtain cloud services from public suppliers; in the words of the NIST, on-demand.

Typically, a private cloud starts with the “resource pooling” aspect of the NIST’s definition: an IT department uses server virtualization to create pooled computing capability, and Storage Area Networks (SANs) to create pooled storage. The IT department then looks to ‘cloudify’ this infrastructure by adding some of the other NIST definitional elements: the ability for individual users to provision servers, for example, and for their departments to be charged for provision of a service – the ability to build and run an application – rather than for the discrete hardware servers and software licenses.

Private clouds are popular within industries that have stringent security standards (such as government and financial services) because they allow the organization to maintain control over all aspects of the cloud, including the location of the data it contains, and the security standards and policies used to protect the data and applications.

While private clouds are theoretically able to host any kind of workload, the most common use of private clouds is to deliver resources to IT developers for the development and testing of new applications (a function generally known as “test/dev”). This approach yields substantial benefits to organizations with large development staffs – but is not directly relevant to mainstream business users.

1 The NIST Definition of Cloud Computing, National Institute of Standards and Technology, NIST Special Publication 800-145 (September 2011)
Instead, most business users focus on the public cloud, which delivers IT capabilities – including applications designed to handle specific business tasks – as on-demand services. When commentators talk about “cloud,” they are generally referring to public cloud.

### What kind of cloud are you using?

- **This data** – from 2012 surveys of Canadian IT and non-IT managers – makes it clear that cloud is consumed differently within large and small organizations.
- **In small companies**, most cloud is public cloud, while in most large companies, private cloud is the dominant approach.
- **The data also shows** that non-IT managers have a different view of cloud than their IT counterparts. In small business, non-IT management probably doesn’t know how the services are delivered. In the large enterprises, this could be the case as well – but it’s also possible that the non-IT managers are using public cloud resources (such as SaaS applications) that are not managed by IT.

The public cloud in turn divides into many different “flavours” of service delivery, all of which are designated by acronyms ending in “aaS” – meaning, “(delivered) as a Service.” In its definition of cloud computing, Wikipedia offers 10 different “aaS” segments of cloud, plus the overarching “IT as a Service” (ITaaS) which refers to internal delivery of (private) cloud services. However, most of the “aaS” definitions that pop up in IT-related marketing and editorial coverage belong to one of three main categories:

- **Software as a Service (SaaS)** – SaaS – the delivery of applications as a service via the cloud – is the defining cloud delivery model. Market estimates from major IT research firms like Gartner Group find that SaaS accounts for more than half of IT spending on public cloud services. As you will see in cloudfingr, there are many Canadian firms that have developed applications that can be purchased as SaaS services, addressing a wide range of corporate operational needs.
- **Infrastructure as a Service (IaaS)** – The delivery of basic compute capability (server and storage) as a service over the Internet. Some of the largest web services companies (such as Amazon Web Services) focus on IaaS delivery; and many (just over 50%) of the SaaS companies profiled

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2 For example, see “Public Cloud Services Forecast, 2Q12 Update,” sourced from this link: [http://lcolmus.files.wordpress.com/2012/08/high-growth-expected-in-cloud-infrastructure-services.jpg](http://lcolmus.files.wordpress.com/2012/08/high-growth-expected-in-cloud-infrastructure-services.jpg)
in cloudfingr base their applications on IaaS services that they purchase from other cloud suppliers.

- **Platform as a Service (PaaS)** – Platform as a Service is a somewhat hazily-defined middle ground between IaaS and SaaS. With PaaS, a customer gets the core compute capabilities of IaaS, plus the development environment needed by software developers. By most market estimates, PaaS represents a relatively small part of the overall public cloud “pie.”

**Why is cloud important?**

Once you’ve absorbed the various descriptions and definitions of cloud, you might be tempted to ask, “why does anyone care about this? Isn’t it just another way of doing things that we’re already doing?” And the answer would likely be, “yes, but...” In some sense, cloud is just “doing what we’re already doing” – but it does so in ways that open up new opportunities for both users and sellers of technology.

*Cloud enables business agility*

If you simply ask IT management why they might adopt cloud, the most common answer is likely to be “to reduce our costs.” This is a sensible answer, especially when we consider the perspectives of companies that are just investigating cloud for the first time: demands on IT are growing faster than the budgets available to meet these needs, and cloud is often seen as a way of bridging this cost/capacity gap.

However, there is another reason to adopt cloud: the ability to use a flexible approach to technology to increase business agility. In 2011, the U.S. trade media company Ziff-Davis Enterprise conducted research with uses of both public and private cloud, asking respondents to specify the benefits that they expected from their cloud investments. In the chart below, We’ve separated the responses in two ways: we have grouped the various response options into four broad benefit categories (agility, cost, productivity, and management reporting and control), and also colour-coded answers into categories based on the group that focused on each answer: responses that are much more likely to be selected by users of private cloud are shaded in green, responses that are much more likely to be selected by users of public cloud are shaded in red, and responses that are relatively equally appealing to users of both public and private cloud are shaded in blue (in all cases, the darker bar illustrates responses from public cloud users, and the lighter shade, responses from private cloud users).

Several trends are apparent when we look at the chart. First off, agility is the top benefit expected from cloud; this is true of users of both public and private cloud, as can be seen from the fact that both “agility” categories – increased business flexibility/versatility, which is the #1 response overall, and “increased scalability” (or the ability to increase or decrease IT resources in response to business demand) – are important to users of both public and private cloud.
Benefits of cloud

Cost, which is often seen as a primary reason to adopt cloud, is actually the second-rated benefit in this research. Cost is particularly important to users of public cloud, though, suggesting that it may be an important factor in deciding to use public cloud resources.

Users of private cloud, on the other hand, are especially interested in management issues – increased security of data, increased access to IT resources, better management of fixed assets, and improved compliance reporting processes. It’s possible to see all of these as being “big company” issues – which makes sense, given that (as we discussed earlier in this chapter) private clouds are primarily the preserve of large enterprises.

Cloud changes the IT/business relationship

Cloud also has the potential to initiate profound cultural changes within public and private-sector organizations. In the early days of automation, corporate IT was the preserve of specialists; a team of IT professionals determined where IT should be applied, when, and how, while business unit managers submitted requests for applications and lobbied for timely support. This situation changed somewhat with the adoption of PCs, and more recently, the widespread use of smartphones with their own appstores; individual workers gained more control over the tools that they used on a daily basis, though they still were beholden to a central IT group for enterprise-wide applications, and for access to corporate data.

With cloud, though, business unit managers – many of whom have grown up with technology, and are comfortable making IT decisions – have direct access to enterprise-grade IT resources. Witness the adoption of Salesforce.com: sales professionals, even those with small companies, found that they could get first-class capabilities by submitting a credit card and then inputting information as they collect it.
Senior management isn’t likely to object; it no longer has to arbitrate resource debates between the (revenue-generating) sales force and the (cost-centre) IT department. IT will object, with a fair amount of justification, to corporate information being stored outside of the company’s secure systems (and outside of Canada), pointing out that the organization is losing opportunities for data integration and increasing its exposure to possible compliance penalties...but are these arguments enough to stem the tide towards use of an increasingly-diverse and sophisticated set of cloud-based applications?

The answer to this question seems likely to be “no.” There is a second question, though – will cloud actually increase the business unit manager’s need for IT support? This is a more complicated issue. Most business users, management included, don’t really want to manage IT – they want to use it to achieve business objectives. Using a credit card to source a single application is a benign enough action, but sourcing several applications – for example, marketing, social analytics, and customer service applications that complement the sales automation package – integrating the flow of data between these applications, and aligning the various service level agreements (SLAs) that govern issues like uptime guarantees, security, data backup, and the ability to move data in and out of a provider’s facility, are far outside the scope of most non-IT managers’ interests or capabilities. Does this create an opportunity for IT to partner with IT to support use of cloud services? The data below shows that IT management, especially in large organizations, believes this to be the case. However, it’s important to remember that this group also tends to view “cloud” as “private cloud,” which would definitely increase the importance of IT in delivering effective support to business users. Readers looking to understand how the rich and expanding universe of cloud-based applications might impact business users should probably look more closely at the findings from the small business respondents. Here, both IT and business management agree – in about 45% of cases – that cloud increases the ability of business management to make decisions on applications. Another 30% of respondents believe that IT will be more important in this new environment, while the remaining 25% believe that cloud will have no impact on the IT/business relationship.

Over time, we believe that only this last 25% will be proven to be wrong. With cloud, business management will have the ability to source IT-based capabilities that make them, and the organizations that they represent, more competitive. Some IT departments will find ways to support this new flexibility, and some will not – but in both cases, the relationship between traditional IT practices and IT-dependent business units will be changed by the cloud.
How will cloud affect the relationship between IT and business unit management?

The impact of cloud on the IT/business relationship

- This data, drawn from 2012 surveys of Canadian IT and non-IT managers, provides a fascinating perspective on how cloud changes corporate perspectives on IT.
- In small companies, both IT and non-IT managers believe that cloud delivers greater IT autonomy to business unit management.
- In large organizations, IT believes that cloud will increase its importance to the business unit management; those managers are themselves less persuaded, with 35% believing that cloud will result in more autonomy.

Cloud is important to business users – and it’s also important within IT

Given the discussion above, it’s possible to see cloud as a negative factor in the evolution of IT departments and careers: it encourages business unit managers to act independently, and forces IT to play a subordinate role in supporting the IT enablement of user-defined business processes. It’s indisputable that these changes are occurring, and that they have an impact on the roles of traditional IT departments and their employees. It’s also true, though, that the increased use of cloud creates some new options for IT departments and their staffs. Here are three reasons why cloud should be seen as an opportunity, rather than merely as a threat, by Canadian IT departments and employees:

- **Cloud matters to cost.** Over time, IT has become an essential aspect of business operations across the economy – and it has grown as a proportion of total revenue (or total operating budgets in the public sector) as well, accounting for 5-9% of business income across major industry sectors. Demand for IT capabilities continues to expand tremendously, but IT budgets can’t increase at the same rate, so IT management needs to find efficiencies that help bridge this gap. Cloud offers some real financial advantages: it can provide cost-effective options for back up storage, or for accommodating applications that have periodic peak demands (the classic example is the huge spike in orders that florists experience on Mother’s Day, but other industries have similar time-defined demand spikes). In many environments, cloud has been
shown to be an efficient way to host and support email. And cloud services can reduce the cost of delivering test/development environments and niche applications.

- **Cloud matters to career paths.** In a December, 2011 article entitled “How Cloud Computing is Changing Many Job Descriptions,” Forbes magazine said “As a result of the shift to cloud, there is growing demand for professionals and managers that are more focused on business development than they are in application development. There will be greater opportunities for enterprise architects, and some offshoots will include cloud architects, cloud capacity planners, cloud service managers and business solutions consultants. Jobs being created may not always bear the term “cloud” in their titles, but cloud will form the core of their job descriptions.” In 2012, CanadaIT.com ran a piece based on Robert Half research identifying “six surprising six-figure jobs,” including two – business systems analyst and information architect – that tie directly into the Forbes piece. The bottom line is – the more cloud is embraced by businesses, the more opportunity there will be for IT professionals who can support business management in its use of the cloud to evolve into higher-profile, higher-paying positions; and the more cloud is seen as an on-ramp to higher-paying positions, the more IT professionals are likely to support its use within their organizations.

- **Cloud shapes perceptions.** Cloud dominates the IT trade press – and increasingly, it is a subject of discussion within the business press. Do a search for “cloud computing” on the Globe and Mail site, and you get (as of late summer, 2012) more than 400 results. Try the same search on the New York Times site or the Bloomberg Business Week site, and you find over 6,000 references. The downside to this prominence is that when an IT issue is the subject of this much scrutiny and discussion, IT needs to have a perspective/position on how/whether it applies within their organization’s operations. The upside, though, is that cloud brings computing strategy into the purview of senior management – which gives IT departments and staff the opportunity to discuss how capitalizing on cloud can deliver IT-enabled benefit to the business as a whole.

Additionally, there is an entire class of SaaS applications – as we see in cloudfingr – that are geared specifically towards IT operations. Cloud is not just a catalyst for change around the IT department, or a means of effecting change within IT – it’s both.
Glossary

This glossary provides “plain language” definitions of some of the key terms that appear in the text of this document. Each term contained here is highlighted in blue when it first appears in the text of the Cloud Computing Handbook.

Cloud computing: a method of delivering and consuming information technology (IT) resources over the internet “as a service” – an approach that maximizes the efficiency of the supply systems

cloudfingr: a website launched in 2012 to provide a central source of profiles of Canadian cloud service providers, and to deliver associated content (including this white paper); “the definitive directory of Canadian cloud resources.” The site was launched by research firm IT Market Dynamics and its media affiliate IT in Canada; as of the publication of this whitepaper, sponsors included Canada’s Venture Capital & Private Equity Association (CVCA) and Telus.

IaaS (Infrastructure as a Service): The delivery of basic compute capability (server and storage) as a service over the Internet. Some of the largest web services companies (such as Amazon Web Services) focus on IaaS delivery; and many (just over 50%) of the SaaS companies profiled in this handbook base their applications on IaaS services that they purchase from other cloud suppliers.

PaaS (Platform as a Service): Platform as a Service is a somewhat hazily-defined middle ground between IaaS and SaaS. With PaaS, a customer gets the core compute capabilities of IaaS, plus the development environment needed by software developers. By most market estimates, PaaS represents a relatively small part of the overall public cloud “pie.”

Private cloud: Private clouds are, for the most part, the preserve of very large enterprises. These businesses work with their hardware, software, and services suppliers to deliver on-demand “cloud services” – access to IT resources and applications

Public cloud: Public cloud is the term used to describe IT capabilities – including applications designed to handle specific business tasks – that are delivered as on-demand services to individual or business consumers. Public cloud services in turn are divided into several different categories – IaaS, PaaS, SaaS, etc. – which describe the type of service that they offer to customers.

SaaS (Software as a Service): SaaS – the delivery of applications as a service via the cloud – is the defining cloud delivery model. Market estimates from major IT research firms like Gartner Group find that SaaS accounts for more than half of IT spending on public cloud services.

SLAs (service level agreements): The contracts between suppliers of external IT services – including cloud services – and customers, governing issues like uptime guarantees, security, data backup, and the ability to move data in and out of a provider’s facility or application. SLAs are critical to effective management of cloud resources, but relatively few companies have expertise in managing these types of contractual agreements.
**Virtualization:** An approach to increasing the utilization of IT units by mounting numerous “virtual” machines on a single physical product. Virtualization is most commonly found on servers, where a single physical server can host 5-50 virtual servers (and in so doing, increase typical utilization rates for the hardware from 5%-10% to above 50%). Virtualization can also be applied to PCs (generally referred to as “VDI,” for virtual desktop infrastructure”) and other aspects of IT infrastructure, including networking and storage.

**Workload:** a term used to describe the applications run on a server, within a data centre, or in the cloud. “Email” is a workload; so is any other type of application you might run, such as your financial systems, your customer relationship management (CRM) system, etc.