Realising the future of cloud computing

The journey from an excess of choice to everything as a service
The future of cloud computing

What is the future of cloud computing?

The explosive growth of cloud computing may overwhelm some enterprises, as barriers to adoption are removed and more providers and services enter the market. Consumers are trying to find IT services that are flexible and can be managed consistently but don’t require lock-in. Some providers, meanwhile, struggle to stand out from the crowd and identify their ideal target markets.

“SERVICIFICATION” AND THE GROWTH OF CLOUD COMPUTING

The growing presence of cloud computing in business is undeniable, due in large part to the growing “servicification” of almost every aspect of IT, as traditional delivery methods shift to service-based solutions.

Cloud computing offers a way for companies to cut costs, become more agile and exploit new markets quickly and efficiently. The diversity of cloud computing services – prompted in part by competition between providers and in part by new technology – means that companies of all sizes are now able to find solutions that fit their needs and their budgets.

The message is getting through to enterprises. Based on research conducted among 250 senior IT and business decision-makers in 2013, 69 per cent of organisations were formally adopting at least one cloud-based service within their business.1 The same percentage of enterprises with cloud computing already in place were predicting spending increases into 2014.2

Governments are also seeing the potential: in 2012, Neelie Kroes, vice-president of the European Commission responsible for the Digital Agenda, unveiled a package of measures worth €160bn to help the development of cloud in the EU. It was part of an initiative to become “not just cloud-friendly, but cloud-active”, she said.

Despite this positivity, there remains some uncertainty in the market. Among consumers, ignorance about the cloud is striking; in the US, fewer than a quarter of those surveyed...

The key factors driving the future of cloud computing

1. Defining and comparing “service”
2. Enabling next generation data centres
3. Managing a hybrid world
4. Everything as a service
claimed to understand what cloud is and 60 per cent did not realise that well-known services such as Dropbox and Gmail were cloud-based. Most companies are identifying new and existing IT workloads that are suitable for deploying on internal and external clouds. As a result, a “hybrid” cloud world has emerged – requiring a transition to next generation data centres alongside the adoption of hosted services.

It is essential that these ambiguities be addressed and quelled, if the future potential of cloud computing is to be realised.

DEFINING AND COMPARING SERVICES
Perhaps the most daunting challenge for those considering cloud computing is the volume of choice: the number of cloud providers (including many new entrants) and services in the market is growing, leaving consumers with a confusing array of options. They need the right tools to make meaningful comparisons and effective choices.

The fact that there are few or no standards for service classification and definition (such as cost, performance, availability, security, compliance, support, liability and location) makes it all the more complicated. And with no mechanism or registry in place through which consumers can inspect and compare providers and services, finding the best option is largely a manual process and the results can be hit and miss.

Providers themselves struggle to articulate their services in a way that gives them any competitive advantage. It does not help that the cloud computing industry itself is fragmented. There are a few well-known brand names on the market, but most providers are unfamiliar to current and potential clients.

In a recent survey, the top cloud companies recognised by respondents included the well-known infrastructure giants while 300 cloud providers prompted fewer than two per cent of responses each.

The major vendors also lack the reach or capability to engage many SMEs at the moment. This is ironic given that the flexibility of cloud computing and the freedom it offers from major investment means that it is ideal for these smaller and mid-sized enterprises. Instead, the larger providers will have to rely on regional partners, independent software vendors and hosting organisations to reach this important market.

What is needed is an agreed definition language for both functional and non-functional cloud service characteristics, as well as standardised service benchmarks. This will help consumers make informed decisions and suppliers articulate what makes them different. Thankfully, the market is beginning to address these challenges.

Cloud service brokers:
The growing popularity of “cloud service brokerages” or CSBs, is a clear indication of the changes to come. CSBs can take many forms – some are organisations in themselves, while some tech firms are developing software that will help clients find and govern the right services. Fostering a vibrant, competitive CSB community would help businesses to find the service that is right for them and would give cloud computing
The future of cloud

“Cloud-enabled infrastructure will need to adapt and evolve to be open, flexible and configurable”

providers, especially smaller players, a useful new channel to market. CSBs/aggregators can also add value to one or more (generally public or hybrid, but possibly private) cloud services on behalf of a number of consumers of those services.

Creating the right framework for standards:
Most would agree that an industry-wide framework for terminology, service level definitions and standards is needed to help consumers make informed choices about cloud computing services. But there are still questions about who should co-ordinate its development.

For example, the EU has announced significant funding for research into cloud computing, but what role should it play in developing such a framework? Should there be a professional industry body or self-regulated association for CSBs?

Some organisations are avoiding the debate altogether, getting on with the job at hand and, in the process, stepping out as frontrunners.

The National Institute of Standards & Technology, part of the US Department of Commerce, is a strong contender, but some commentators believe that it has been overtaken by the Cloud Standards Customer Council (CSCC)\(^7\), an end-user advocacy group which aims to establish standards in cloud computing. IBM was one of the enterprise founders of the CSCC and has been inviting all its cloud customers to participate so that they can work together to address the challenges that implementing cloud computing can present.

Along with IBM, the steering committee includes representatives from Lockheed Martin, Kroger, Boeing and Aetna, among others. The group is working to lower the barriers for widespread adoption of cloud computing by helping to prioritise key interoperability issues, such as cloud management, reference architecture, hybrid clouds, as well as security and compliance.

Another body leading the way in this field is the Open Data Center Alliance\(^8\), a consortium of leading global IT organisations with senior IT executives from BMW, China Unicom and Deutsche Bank.

Benchmarks and registry:
In conjunction with the above framework, the cloud computing sector needs more independent benchmarks and an accreditation registry, as well as an interface that allows automated queries in this regard. The Standard Performance Evaluation Corporation (SPEC), the organisation that establishes, maintains and endorses computer benchmarks, has already created a cloud benchmarking working group (OSG Cloud), which is making progress.

In the meantime, some consumers are turning to comparison sites, such as Cloudharmony.com, which offers the ability to compare benchmark results across multiple providers.

Security and compliance:
Making it easier to compare security and compliance features across multiple managed service providers would be useful for businesses considering their cloud computing options. This would require a common framework or model to define security and compliance subsystems and processes. It would also be necessary to establish tests and an accreditation mechanism to determine conformance.

The Cloud Security Alliance (CSA), a not-for-profit organisation that promotes the use of best practice for security assurance in cloud computing, has established a cloud security accreditation mechanism and registry in this regard, called STAR. This certification programme is a
third-party independent assessment of the security of a cloud service provider.

The CSCC’s papers on cloud security are a particularly useful resource.⁹

**ENABLING NEXT GENERATION DATA CENTRES**

The cloud-enabled infrastructure used by either service providers or enterprises building their own private cloud will need to adapt and evolve to be as open, flexible and configurable as the virtualised services it supports.

**OpenStack:**

IBM is a founding member and platinum sponsor of the OpenStack Foundation, an open source cloud infrastructure platform established in 2012. Just months after the launch, IBM unveiled an OpenStack-based platform for running cloud installations in customers’ or its own data centres or both. This allows enterprises to manage the computing, storage and networking resources for cloud applications.

With over 260 organisations and more than 13,000 individuals participating, OpenStack is one of the largest active open source cloud project communities in the world, second only to Linux. This massive global collaboration of developers and cloud computing technologists is working to produce a ubiquitous infrastructure as a service open source platform for public and private clouds.

**Software defined networks:**

One of the architectural elements required to enable workload and service flexibility is software-defined-networking (SDN), a virtual platform that enables software-based network control and programmability.

With SDN still in its infancy, there is a need to establish an open reference framework for programmability and control through open standards for SDN solutions. Such a framework would offer flexibility and choice yet mitigate
The future of cloud

many of the risks of adopting early stage technologies and integrating them with existing infrastructure investments. IBM is working closely with a community-led, industry-supported SDN-based project called OpenDaylight. This open framework allows network administrators to manage network services more effectively by decoupling the decision-making system about where traffic is sent from the underlying systems that forward traffic to its destination.

Establishing an open source project in this way is designed to help accelerate the development of technology available to users and enable widespread adoption of SDN. It will create a solid foundation for the virtualisation of network functions, including firewalls and load-balancers.

Overall, simplifying and easing the maintenance of systems with highly virtualised environments that enable service mobility will help to reduce complexity and, in some cases, costs of this new technology.

MANAGING A HYBRID WORLD

Selecting the right cloud for the right job will be essential. Businesses should eventually be able to manage seamlessly a hybrid combination of on- and off-premise services. As the sector matures, this mix of products and services will give clients greater choice.

Ultimately, consumers will expect increasingly agile cloud computing services that can respond with new capabilities to meet business demands. This will involve the rapid creation of innovative new composite services that match the cost of delivery to the capabilities required.

Hybrid cloud environments create complex management challenges. Organisations often struggle to maintain control over the resources that lie outside of their own managed IT scope. Under the circumstances, greater visibility of infrastructure use will be needed, to help reduce costs and ensure that company data and resources are properly handled and secured. Future cloud computing clients will want to know when and how to best flex services between delivery models.

Cloud computing in 2015: service provider perspective
Your roadmap to the cloud

As cloud computing technology develops and new applications are identified, IBM is working to tackle the major industry issues, through consortia and standards bodies as well as with other vendors and clients. In the meantime, enterprises will continue to look for IT services that are flexible and can be managed consistently but don’t require lock-in. This will require trustworthy guidance to help them keep up with the changing marketplace and navigate the flood of providers.

IBM is ideally placed to offer that guidance and to help organisations create a roadmap through the confusion, from building cloud computing adoption strategies encompassing applications, data, infrastructure, governance and processes to helping cloud technology providers collaborate effectively.
IBM Contacts

Mark Tomlinson
CTO Cloud Computing
IBM UK & Ireland
mark_tomlinson@uk.ibm.com

Steve Strutt
CTO Cloud Computing
IBM UK & Ireland UKI
steve_strutt@uk.ibm.com

References


8. The Open Data Center Alliance. http://www.opendatacenteralliance.org

9. CSCC’s papers on cloud security can be found here: http://cloud-council.org/resource-hub.htm