

Open Government Innovation

Harnessing Collective Intelligence for Public Sector Transformation

An Executive Guide to the Business Value of Microsoft Cloud Computing

Cloud Computing represents one of the most fundamental changes to how technology is procured and delivered, and ultimately what it is capable of achieving. It is often associated with just one main function, of moving an on-site enterprise application into a SaaS model "in the Cloud", but actually it has come to represent a holistic framework for an entire innovation-centric reinvention of the entire enterprise IT environment.

With a specific focus on the Government sector this paper provides a high-level overview of this trend for senior business executives.

Neil McEvoy, November 2010.

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Executive Overview

Before immersing ourselves in the new technologies that Cloud Computing offers it is essential that we first, like we should for any technology, quantify the framework for how the investment it requires will be justified. What business benefits will it bring?

One of the most important functions of identifying this 'Business Value' is to make connections between the technology and the high-level executive policies that shape the strategy for the organization.

Unlocking Social Innovation

Cloud Computing offers many benefits, especially in terms of cost-savings and other similar operational areas, but in more expansive terms it is the ability to unlock "Social Innovation" that is most important to governments.

This is a cutting edge concept making its way into government policy, as demonstrated by this initial [executive policy research brief](#), where the Canadian Government explains that Social Innovation represents a substantial change to the very fabric of society itself, driven by a holistic reorganization of how government itself works.

Utilizing 'Collective Intelligence' models government can transform their processes from 'closed', hierarchically organized methods of providing public services to Open Systems based methods, where members of the public can be more directly involved in their specification and delivery.

This can translate into major societal benefits such as the equalization required to eliminate poverty, and therefore the technology can be directly aligned to major improvements that government is responsible for.

IT Innovation Gridlock

The nature of this change effect is most accurately illustrated through explaining the blockage created by how traditional IT is organized.

[Research from HP](#) describes **Innovation Gridlock**: *"a situation where the IT organization is blocked from driving new business innovation because the majority of funding is consumed in operating the current environment."*

What this means is that many large organizations have been around for so long that they have built up an IT estate that features many different technologies deployed at different times, and they are layered atop one another rather than being replaced.

This ranges right back through old mainframes, client/server and numerous other trends that have occurred, and so a 'complexity cost' grows. As these technologies age they become increasingly obsolete and therefore difficult to change or replace, forcing the IT organization into operating in a 'maintenance mode' only. The core issue at stake here is that the organization runs their business processes on this platform, and so their 'business agility' becomes equally congealed. Changing how they work, improving processes, adopting new technologies, all becomes harder and harder to do.

For organizations like government this is clearly a painful issue, as it means there is less advancement in areas like Healthcare, where a lack of adoption of electronic patient records can mean overall less effective treatment, or a lack of case management tools for social workers means more unmet social needs slip through the net.

Delivering Business Value

Therefore Cloud Computing can be set an immediate challenge of quite considerable needs, to demonstrate how it can deliver real Business Value.

Already there is a plethora of analyst and vendor material to do so. The [Terremark case study](#) is a headline example of how Cloud is ideal for this. The American government is moving their hugely popular USA.gov site to an Enterprise Cloud facility to enjoy "Cloud Bursting Efficiencies" and **reduce costs by up to 90%** by doing so.

The Brookings Institute offers a number of useful documents that build on this further. A presentation on '[Leveraging the Power of Cloud Computing in Government](#)' (12-page PPT) talks through the various business benefits they can enjoy, and '[Saving Money Through Cloud Computing](#)' (14-page PDF).

In '[Steps to Improve Cloud Computing in Government](#)' (13-page PDF) there is a focus on the perceived legal, **privacy** and technical issues that are holding back this adoption; how these are addressed is discussed later in this document.

This will deliver capabilities that enable organizations like government to better achieve strategic objectives set to them. For example it will mean more agencies can e-enable their process, helping achieve compliance with regulations like the [Government Paperwork Elimination Act](#) (GPEA), which specifies improvements through the use of electronic forms, electronic filing, and electronic signatures.

These types of initiatives are fairly pervasive and common throughout all governments elsewhere, and at all levels of government. For example in Canada they have [Red Tape Reduction programs](#) at the provincial level that mirror the GPEA.

Open Government Innovation – Harnessing Collective Intelligence

This focus on streamlining online forms and processes leads us to the heart of the full power of this technology: Open Government Innovation.

[Open Government](#) is an initiative launched by Barak Obama intended to make the government more transparent and accountable to its citizens, and critically, involve them directly in the processes themselves, harnessing the Web 2.0 effect of group participation.

Open Innovation Workflow

Numerous examples are provided via the Whitehouse [innovations gallery](#), with one key example being the [Peer to Patent portal](#). This uses a new Web 2.0 approach for managing the submissions of innovation patents.

It demonstrates that it this advancement is not just about connecting an existing IT system to a web interface, but rather utilizing the nature of the web to entirely re-invent the process itself. In essence it transforms it from 'closed' to 'open', in terms of whom and how others can participate.

This site uses the advanced business management technique called '[Open Innovation](#)' to radically transform how patents are processed. Beth Noveck, the visionary behind the project, provides a detailed case study of the thinking behind her project in this 40 page Harvard [white paper](#). She describes how the agency was building up a huge backlog of patent applications due to a 'closed' approach where only staff from the USPTO could review, contribute and decide upon applications.

Not only did this cause a bottleneck due to the number of resources being utilized but also in terms of the volume and quality of subject matter expertise being applied. With no involvement from outside contributors, such as experts from the scientific community, then awards were being granted for applications based on very limited and often inaccurate knowledge. By moving the workflow online to a Web 2.0 environment they have been able to "open up" the workflow to a distributed community of experts from across many different organizations, and apply collective efforts to increase both quality and speed.

This organizational model is known as 'Collective Intelligence', aka the 'Wisdom of Crowds' and also 'Crowdsourcing'.

Recently MIT published a paper '[Harnessing Crowds: Mapping the Genome of Collective Intelligence](#)' (20-page PDF), that distills the key mechanics of this science. It also represents the core ethos of the principles involved in Open Government.

The Whitehouse [recommends policies](#) that transform government processes to be inherently participative and that harness the public as a collective intelligence the same way, proposing that agencies build 'Public Participation Plans' to engage their local communities more proactively in setting and reporting on policy performance.

Innovation Nation – Next Generation Clusters

Cloud computing can therefore be seen not just as an IT operational efficiency investment, but rather as an innovation platform in general, one that can provide direct benefit to the public too. This can be aligned to government 'Innovation Nation' type initiatives, like the [UK program](#) of the same name.

How the technology can play a critical role in boosting digital innovation this way is demonstrated through the recent UK [Digital Britain innovation policy](#). The critical point it highlights is that government can invest in Cloud infrastructure not only for their own IT use, but as a platform for innovation in general. The report outlined that the government is looking to improve service delivery and reduce costs through adoption of "Government cloud computing, the "G-Cloud", and they also describe the enabling role it would play in making the nation itself more innovative.

"with Cloud building on next generation broadband with high definition video and also more revolutionary applications. These will include tele-presence, allowing for much more [flexible working](#) patterns, e-healthcare in the home and for small businesses the increasing benefits of access to cloud computing which substantially cuts costs and allows much more rapid product and service innovation."

Cisco's vision isn't limited to only technology either, and this innovation theme continues into other thought leadership materials they have published, where they have some compelling ideas for bigger picture thinking, innovation and government transformation too.

They also offer a new white paper intended to identify Government best practices for economic development programs, called [Next Generation Clusters](#) (14-page PDF). Ambitiously they set out to suggest an upgrade to the [original cluster model](#) developed by Michael Porter, a foundation for modern government economic development, and do so by proposing it needs modernized in the following main ways:

- From geographically-based to community-driven
- From locally processed innovation to open, borderless innovation
- From technology-driven to technology-enabled

In essence this updates the model to reflect the new era of Web 2.0 global collaboration, and with this in mind they also identify the insight that often governments simply treat technology as one of the sector industries to develop, rather than also harnessing it as a tool to accelerate the underlying innovation processes themselves. Cloud computing can be deployed as a platform for exactly this purpose, used not only for modernizing internal government processes but also for providing raw innovation capacity for the public and entrepreneurs. IaaS, SaaS and other components could be offered for use in key scenarios like new business product prototyping.

Open Data, Open City

This effect can be further maximized when combined with other programs that unlock innovation the same way.

For example 'Open Data' is a key technical foundation of a broader Open Government initiative. In the USA they operate [Data.gov](#) to *"lead the way in democratizing public sector data and driving innovation"*.

In the UK they are pioneering their own initiative, with the key factor being these data sets are powering [catalogues of Cloud apps](#) that utilizes the data in new ways.

The mechanics of how this works, and how it can enable more social entrepreneurship in collaboration with the government is very nicely illustrated by the City of Toronto, and their [Open Data initiative](#), part of their Open Government initiative to improve [Civic Engagement](#).

The project is discussed in more detail in the white paper '[Open Data, Open City](#)' from the Martin Prosperity Institute, home of [Richard Florida](#). It explores and explains the dynamics of this ecosystem, where software entrepreneurs are enabled to build a new layer of innovative Cloud apps that re-purpose this data in new ways.

It's the ecosystem model that's key, it delivers the win/win/win factor. Government provides the central authority which provides the scale but can be overly bureaucratic and which rarely pioneers new web apps et al, and so by openizing data citizen developers can then tailor the 'long tail' of micro-apps to meet the needs of their fellow citizen users.

This is the same principle effect as the 'App Stores' for Facebook or iPhone, but through the use of legitimate data of value to consumers it also means that these 'City Data Entrepreneurs' are building apps that offer real value, that offer new city services that are sustainable and can support new businesses, rather than yet more games and trivia that are quickly cast aside.

Cloud Business Applications

These new ways of working can be achieved through new software capabilities, demonstrating one of the primary values of Cloud Computing: SaaS (Software as a Service) applications.

Sharepoint Innovation Management

Open Innovation is also described as 'Innovation Process Management', in terms of a more formal business methodology.

As described in [this Salesforce.com white paper](#), Cloud computing platforms offer exactly these tools, providing web 2.0 site features to cater for the 'Open Innovation' processes required to build these types of online clusters.

Microsoft also offers an equivalent '[Innovation Process Management](#)' solution. Based on their Sharepoint content portal this can be delivered via Cloud service providers and offers an extensive range of customizations to tailor it for more intensive enterprise scenarios, such as

- integrating the ideas portal with back-end portfolio budgeting processes.
- adding grant management applications

This Cloud software platform is powerful because it can be reused for multiple business requirements, such as prioritizing and organizing [software development](#) and for planning and management of [major capital expenditures](#), meaning any level of sophisticated 'Idea-to-Launch' cycle can be developed.

Unified Communications

Sharepoint is one product of a suite of software that can help improve business processes, that includes their 'Unified Communications' suite of Exchange and Office Communicator.

These tools offer various ways in which staff can become more productive in their day to day work, and also how business processes can be streamlined. For example the Unified Messaging component of

Exchange lets you receive faxes direct to your email inbox, rather than printed to paper via the fax machine.

Enterprise 2.0 Collaboration

How these new modes of organization and Web 2.0 technologies can be internalized for better staff working has been described as 'Enterprise 2.0'.

Coined by Professor [Andrew McAfee](#) following his MIT white paper '[Dawn of Emergent Collaboration](#)', it describes how organizations can greatly improve their knowledge management capabilities through adopting the social software that powers sites like Facebook, LinkedIn, Twitter et al, where he described a number of points about improving communications, like 'signaling' through RSS feeds.

As well as the technology he also makes the critical point about new, collective intelligence style approaches to dynamic organization, ones that aren't structured in a hierarchical, 'command and control' form but rather as more free-flowing, 'emergent' patterns of self-organization.

Microsoft Sharepoint is a platform that can be used for this type of working. It offers a '[My Site](#)' feature which enables the portal to act like a social network site, so that project work features like document libraries can be enhanced with news feeds and Twitter-like status updates from their colleagues.

The Microsoft approach is an effective one, because the core ethos of this style is that it's very user-centric, it makes things very quick and easy for non-technical users to master advanced forms of collaborative knowledge management.

For example tools like the [Outlook Social Connector](#) enables users to display their social network activity directly within their email, showing their entire social network updates as part of their email messages too. It brings the 'social intelligence' of these sites into the email context, such as showing the profile and activity information for people who are attending a forthcoming meeting.

The tool can also be used to build this type of work interface around legacy applications, integrating them into a much more human-centric approach.

Storage and Security

These benefits and new ways of working also bring with them, and demonstrate the need for, security best practices.

Unstructured content security risks

As the Aberdeen report '[Securing Unstructured Data](#)' (33 page PDF) highlights these tools bring with them increased security risks.

Unstructured data refers to Word documents, Excel spreadsheets, multi-media and all the other raw files that are proliferated across users laptops. The IT organization might secure Sharepoint in terms of technical security, hosting a central server behind the corporate firewall and restricting VPN access to it, but this does nothing to secure the documents that are then downloaded and shared promiscuously via email, Instant Messenger or USB key.

Ultimately enterprise recordkeeping systems like [HP-Trim](#) are used for storing these records, but prior to this step there is considerable workflow and collaboration using tools like Sharepoint. If this 'work in progress' data is stored on user laptops and on single Sharepoint servers, without adequate security measures, then it's at risk of being lost or stolen, impacting both Business Continuity and Security and affecting IM compliance accordingly.

Since these files can also contain sensitive structured data, like customer records, it must be protected as if locked in the central database behind the corporate firewall, although obviously it's not, it's running around wild on users laptops. With an EMC report predicting a [x44 factors explosion](#) in this type of data the problem is only going to grow bigger and uglier.

Hybrid Cloud - Secure Cloud Storage Archiving

The challenge can be addressed through enjoying the scalable, low-cost benefits of Cloud infrastructure, in a highly secure manner.

Hybrid Cloud Storage is an open standards best practice reference from the SNIA, defined in this document – [‘Managing Private and Hybrid Clouds for Data Storage’](#) (12-page PDF). It explains how an IT organization can incorporate storage from Cloud providers into a single framework that includes their own local SAN resource too.

This explains how it can then be applied for scenarios like backup, virtual disks and e-archiving, and how the key to Cloud-based storage services is that they bake in extra value adds, like metering and billing for usage via their CDMI standard (Cloud Data Management Interface).

As [this news article explains](#), one way in which Vivek Kundra, Whitehouse CIO, is pioneering the adoption of Cloud computing is for e-archiving storage facilities for their MS Exchange email aka ‘Cloud Storage’, a great example where the low-cost commodity infrastructure of Cloud services can be utilized for practical application.

The GSA plans to save the agency 30% in costs by migrating 15,000 mailboxes to the cloud and eliminating infrastructure currently located in 17 different places around the world. Other governments such as Canada plan the same rollout.

Security and Compliance best practices

These and other systems can be designed and audited to ensure the high levels of security required.

Governments are one of the largest potential adopters of Cloud Computing, and equally have the most demanding requirements for the levels of security and data privacy it must offer. They’re mandated by policy to ensure the confidentiality, integrity and availability of the data they store, and so it’s no wonder they would be cautious to move it out of the data-centres they directly control.

Pioneering agencies are starting to do so, and so by reviewing what procedures they are using to do this safely, in conjunction with reviews of the best practices developed by the operators themselves notably Microsoft and their Azure service, organizations can develop their own frameworks to meet these needs.

Microsoft themselves runs a number of very large online properties (Windows Live, Hotmail, Bing etc.) as well as their Azure Cloud environment, and have documented the strategy for this scale of operation including security into the white paper [‘Microsoft Compliance Framework for Online Services’](#) (47-page PDF), where they describe how they

adopted best practices from a variety of governance areas including Information Security, Asset Management, Human Resources Security, Physical Security, Access Control, and Incident Management processes.

This has enabled them to run their operations to a level compliant with key standards such as [ISO27002](#), and achieving this goal via the same type of framework is the principle purpose of the [Cloud Security Alliance](#) (CSA). They offer a full Cloud security maturity model which unites a number of existing best practices like ISO27002 and the [NIST series](#), and applies them to Cloud service provider scenarios.

Their body of knowledge brings together processes in areas such as enterprise risk management with technical design best practices for ensuring data privacy within 'multi-tenant' software environments, such that an organization can advance their overall Information Security maturity, in the same manner as Microsoft.

Specifically for MS Azure, this dictates a new heightened level of security that applications require when operating in a multi-tenant environment.

SDLC process: Privacy by Design

In addition to these practices for the operations of the environment, there are also procedures for the phases that lead up to the deployment, with the special needs of Cloud computing highlighted by Microsoft:

"when it comes to cloud-based solutions, it is more important for software designers and developers to anticipate threats at design time than is the case with traditional boxed-product software deployed on servers in a corporate datacenter."

For this purpose they employ the use of their 'SDL' – [Security Development Lifecycle](#). This builds in a number of rigorous checks into an organizations software development process to ensure the required level of security is achieved prior to deployment to the Cloud.

For Governments this can be combined with their own specific compliance checks intended for the same phase. For example in Canada Ann Cavoukian, the current Privacy Commissioner for Ontario has developed the Privacy by Design methodology to ensure compliance with the stringent data privacy laws, and has adapted this specifically for Cloud Computing through the [Privacy by Design Cloud Computing Architecture](#) (26-page PDF) document.

This provides a base reference for how to combine traditional PIAs (Privacy Impact Assessments) with Cloud Computing. Ann comments:

"organizations must rethink their established software development, validation, certification and accreditation processes in response to the need to push or pull applications in the Cloud. They may thus need to re-design their SDLC (Software Development Life Cycle) to build Privacy in."

The state of Michigan has combined all of these types of elements into a simple decision process structure so that project managers can carefully select the right type of Cloud computing service based on these factors.

They have established a MiCloud Delivery Method Decision Tree process where projects can be assessed for criteria like business criticality, security and privacy requirements, and then mapped on to a tiered service catalogue made up of internal government cloud (on-premises), external government cloud (off-premises, cross-boundary partners), external commercial cloud (off-premises vendors) and hybrid cloud (any combination) service options.

MiCloud storage is 90% cheaper than their current lowest-cost storage tier, and features include approval workflow, an online wizard that creates audit records as users manage permissions, an off-site copy option for business continuity purposes, usage-metered billing and storage pools in separate data centers, so it is significantly enhancing IT service delivery.

Conclusion

With the right combination of applications and security procedures, Cloud Computing presents Governments with the potential of the most radical re-engineering they have taken on in decades. It offers huge cost-savings while simultaneously bringing about a holistic transformation of their abilities to address the needs of the public they serve in a profoundly deeper manner than ever before possible.

About the Author

Neil McEvoy is a serial entrepreneur who has been specializing in the SaaS (Software as a Service) approach to technology since the mid 90s'. He has pioneered the development, launch and high-growth sales of numerous Microsoft-based Cloud computing technologies and products, including launching Europe's first 'pure play' ASP (Application Service Provider), the first complex web hosting products in Europe and also the Unified Communications product range for BT.

He is the founder of the Cloud Ventures group, an online virtual incubator intended to help other entrepreneurs launch their own new Cloud Computing start-up.

Neil is also an avid pioneer of Social Innovation, with unique insights into how new Collective Intelligence organizational models can be applied to address systemically the deeper rooted issues of social injustice.

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