Cloud for the Public Sector: Innovating for the Future

An IBM Canada Point of View
In response, Canadian government and healthcare organizations must look to new technologies, systems and operating models that can help them to better meet these new and evolving mandates. In so doing, cloud computing technologies and services are increasingly becoming part of the government IT equation—with the goal of delivering more client value and faster speed to market, as well as enhanced reliability, security and scalability.

**Drivers of Public Sector Cloud Adoption**

For governments facing an explosion of data, tightened regulatory requirements, and diminishing budgets, a successful cloud implementation can pave the way for more workloads being transferred to lower-cost hosting platforms, often without the need to maintain or acquire significant new hardware.¹

According to IDC’s May 2013 Global Technology and Industry Research Organization IT Survey, over 70 percent of government organizations surveyed indicated that they are considering, currently piloting, or already using a private cloud. Responses indicate that similar considerations and usages fall to just over 57 percent for public cloud.²

Public sector interest in cloud technologies lines up with the key drivers of its IT investments overall: reducing organizational cost, improving business processes and productivity, as well as meeting compliance requirements.

Public sector cloud adoption, however, will be driven by the ease and speed to deploy, elastic scaling, and performance improvements that can be delivered through flexible pricing models and a reduction of in-house hardware and support costs. At the same time, it is clear that “as-a-service” is disrupting traditional business models and technology consumption paradigms.

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¹ Similarly, the Government of Canada (GOC) announced in 2012 that it intended to trim 5 to 10 percent in hard costs from its IT budget—approximately $100 million to $200 million per year—over the next three years.²

² According to a recent Canadian CIO study by Gartner, major IT budget restrictions in Canadian government sectors in 2013 contributed towards 43 percent of Canadian CIO respondents indicating that they expected “no increase” in their IT budget, with another 13 percent of organizations expecting an actual “decrease” in their IT budget for the following year.
Although government’s preference is for “private” clouds, clouds of all variations—public, private, or hybrid—can be perceived as business-critical technology that will also change how government evaluates, procures, deploys, consumes, and manages IT assets.\(^5\)

By turning to cloud technologies, forward-thinking organizations are departing from traditional “on-premise,” annuity-based delivery methodologies that are often associated with significant and slow capital expenditure (CapEx) commitments. Instead, by adopting variable, “subscription-based” cloud-based delivery models, these organizations are shifting to more flexible operating expense (OpEx) commitments, thus reducing the need for costly upfront hardware investments while enabling IT simplicity, scalability, as well as improved reliability and security. The realized cost savings and in-house resources are in turn being re-directed towards supporting innovation that can support other mission purposes.

**Public Sector Cloud: Benefits and Challenges**

A significant portion of Canadian government and healthcare IT spending goes towards maintaining aging and duplicate infrastructure. Rather than funding highly efficient IT assets that can enable ministries and agencies to more efficiently deliver their programs and services, much of this spending is characterized by low IT asset utilization, long lead times to acquire new services, and fragmented demand.

Cloud computing offers government organizations the opportunity to transform its IT portfolios by giving them the ability to broadly purchase IT services in a utility-based model that can deliver numerous benefits, among them:

- Increased capabilities such as rapid deployment, easy implementation, access to higher-level information technology (IT) resources, disaster recovery, and remote and mobile access.
- Enhanced efficiencies including scalability, flexibility, agility, just-in-time delivery, resource utilization, automatic updates, fewer duplicative systems, and increased reliability.
- Reduced costs attributed to fewer infrastructure investments (hardware, software, maintenance, upgrade, refresh, day-to-day operation), physical space savings, improved economies of scale, and usage-based pricing.\(^6\)
- Provision of more of a shared services model with more automated charge back.

However, with a burgeoning number of cloud vendors and service availability in the marketplace, public sector organizations must be adept at strategically determining when to use a cloud deployment model.

While budget pressures to decrease operational costs and re-evaluate current data centre leases can typically drive a decision to move to cloud, there are some specific challenges that public sector organizations should be aware of when evaluating such a shift.

For example, cloud adoption in Canadian government and healthcare organizations has been slowed by some legitimate concerns, mostly pertaining to public clouds. Using the Internet as the means to carry government data has both physical and cyber-security risks, and building trusted environments requires thoughtful planning and design of cloud architectures.\(^7\) In some cases, data residency requirements may further dictate that data remains within the geographical boundaries of the entity concerned.
Additional public sector cloud considerations may include:

- Key government stakeholders who have non-negotiable priorities, including projects that are expected to deliver specific outcomes that may be inconsistent with coordinating for overall IT / cloud optimization.
- Departmental or agency-specific private clouds that may already be ubiquitous to the point of constraining many of the intrinsic benefits of cloud due to the duplication of cloud management services.
- Government budget allocations and costing models for cloud computing that may be significantly different from commercial environments, creating distortions in assessing short and long-term trade-offs.
- Potentially lengthy procurement processes and longer budget cycles that prove problematic in terms of vendor contract negotiation; legal issues, combined with compliance, regulatory requirements, and the need for transparency.

Bottom line? The shift to cloud is causing public sector organizations to rethink how they create value and consume IT resources. Some are approaching cloud as part of the public infrastructure, like water and roads. Others are using it to stimulate local economies and develop technology skills among the labor force. And still others are using the cloud as a community enablement platform, in which apps can be developed and shared among citizens.

Forward-thinking governments and healthcare organizations in Canada are pursuing cloud strategies to rethink how they create value and consume IT resources. Some are approaching cloud as part of the public infrastructure, like water and roads. Others are using it to stimulate local economies and develop technology skills among the labor force. And still others are using the cloud as a community enablement platform, in which apps can be developed and shared among citizens.

Why IBM for Cloud in the Canadian Public Sector

Public sector clients are turning to IBM for comprehensive cloud capabilities that are currently ready and available to take on sensitive government workloads. IBM offers a robust, secure and extensive cloud portfolio that is supported by an ongoing commitment to define and comply with cloud computing industry standards.

IBM is one of the world’s top cloud providers, offering an array of capabilities. As of 2014, IBM has invested more than $7 billion in 17 acquisitions to date, aimed at accelerating its cloud initiatives and building a high value cloud portfolio to support clients. According to its May 2014 study, IDC rated IBM the #1 preferred cloud computing provider, according to their survey of U.S. market preferences for infrastructure as a service (IaaS). IDC rated cloud providers on their quality of service for availability, speed of provisioning, simplicity and overall cost. IBM continues to devote a significant percentage of corporate investments to cloud-related R&D, global industry reach and leadership in this domain.

In particular, IBM has invested significantly in new, resilient data centre capacity to meet clients’ emerging workload demands and data centre requirements. Worldwide, IBM manages over 430 data centres, comprising more than 7.4 million square feet of space, including 11 fully managed data centres and more than 300,000 square feet in Canada.

IBM provides access to globally integrated capabilities, giving it the resources, security, and reach to see issues, identify security breaches and solve problems ahead of most local companies.

With the convergence of big data and analytics, as well as mobile and social technologies, governments are moving towards shared services models, which has led to the emergence of government service providers. To strengthen its position in this arena, IBM recently won the contract to provide data centre and cloud
services to all state government agencies and departments for the state of California, under an initiative called CalCloud. In 2014, IBM also announced the availability of two new IBM Cloud Services data centres — in Dallas, Texas and Ashburn, Virginia — for U.S. federal government workloads that meet U.S. Federal Risk and Authorization Management Program (FedRAMP) and Federal Information Security Management Act (FISMA) requirements.

Likewise, the IBM Cloud portfolio is ready for heterogeneous, multi-vendor Canadian public sector environments today. It can be delivered as a managed service, or clients can take the architectural design and have IBM build a private cloud to meet their specific needs.

**IBM SoftLayer: Now in Canada**

In 2013, IBM acquired SoftLayer, a leading cloud “infrastructure as a service” company that has become the galvanizing force behind IBM's rapid acceleration to cloud leadership. Dubbed “one of the most successful hosting companies of all time” by Data Center Knowledge online magazine, IBM SoftLayer enables the delivery of the privacy, reliability and security normally found in private clouds with the economy and speed of a commercial public cloud offering.

With IBM SoftLayer's ability to support highly-available and continuous operations through data replication and multi-site load balancing, public sector objectives of redundancy, resiliency and contingency capabilities are enabled with confidence.

Now, with the availability of two new IBM SoftLayer data centres in Markham, Ontario and Montreal, Quebec, IBM Canada is able to provide in-country, on-demand IT infrastructure as a service, dedicated servers and cloud resources that can help Canadian organizations to build and run their own public, private or hybrid clouds, as well as the applications that run on them while fully meeting Canadian data residency requirements, should they be required.

**IBM Global R&D and Cloud Leadership in Canada**

IBM Canada has invested significant R&D effort and funding to help establish a leadership position in cloud computing and data centre solutions. Outlined below are a number of specific investments that IBM Canada has made in this domain:

- Since 2010, IBM has invested $170 million CAD in cloud computing and data centre R&D in Canada.
- $175 million has been invested in the IBM Canada Research and Development Centre, a virtual collaborative network for IBM research staff to work with Canada’s top academics and scientists to apply massive amounts of data to solve critical world challenges.
- The IBM Canada Leadership Data Centre in Barrie, Ontario and the IBM Western Canada Leadership Data Centre in Acheson, Alberta are the newest of six strategic, multi-client IBM data centre locations in addition to five tactical data centres throughout Canada. Together, these 11 locations offer clients more than 300,000 square feet of space under management, with the ability to scale up to an additional 100,000 square feet of space if needed.
- Additional IBM Canada capabilities on the global stage include the IBM Canada Lab; Bromont Manufacturing Plant, site of IBM’s largest semiconductor packaging and test facility; and the IBM Business Analytics Hub in Ottawa.
- As of 2014, the first IBM SoftLayer data centre opened in Canada (Markham, Ontario), with another set to be opened in Montreal, Quebec. This will allow Canadian customers the in-country data residency they may require as well as access and unmetered migration capability to any IBM SoftLayer data centre on an expanding global network. This global network consists of 40 data centres: 15 new IBM data centres to be opened worldwide, adding to the existing global footprint of 13 global data centres from SoftLayer and the 12 current IBM data centres.
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Using Cloud to Drive Innovation

Cloud is more than a technology shift. It is about innovating to overcome challenging paradigms. Cloud has already been widely adopted as a means of lowering IT operating and capital costs, and some governments have implemented policies to accelerate cloud adoption. Cloud computing can also go beyond cost savings by allowing users to access the latest software and infrastructure offerings to foster innovation.

Deploying cloud-based environments is essential to improving efficiencies, making applications accessible across multiple agencies, and promoting green IT—giving users access only to the resources they need for a particular task, saving on the cost of idle computing resources.

IBM’s strategy for cloud is straightforward: Think it, Build it, Tap into it. By working with public sector clients on their cloud computing needs, IBM can help them to:

- Think it: Strategize on how to integrate cloud computing into their operations—whether migrating government workloads to the cloud to generate savings as well as enabling new systems of engagement with citizens and employees to fuel new growth and innovation.
- Build it: Understand how to build and run their public, private, or hybrid cloud environments, as well as to build new applications in order to better engage with citizens, employees and other stakeholders.
- Tap into it: Quickly tap into the benefits of a cloud environment through analytics and SaaS business applications to better run their operations or business processes in the cloud.

IBM SoftLayer offers a robust cloud foundation for a wide range of government and healthcare missions—providing the infrastructure to meet growing demands, improve services and accelerate transformation and innovation. Clients can choose bare metal, virtualized or hybrid cloud infrastructures without sacrificing performance or ease of use.

Meeting Public Sector Imperatives with IBM Solutions

In order to drive sustainable value for Canadian citizens, public sector leaders are focusing on six imperatives, which are to:

- Improve citizen services
- Manage resources more effectively
- Improve public safety
- Strengthen national security and defence capabilities
- Build intelligent transportation and other public infrastructure systems
- Protect national borders while enabling secure, cost-effective travel and trade

Each of these government imperatives can be addressed with specific industry solutions from IBM that can help government departments, ministries or agencies to achieve their specific operational, business or program goals in these domains.

IBM Cloud Services

To address these imperatives, IBM’s Cloud Services portfolio is quickly growing. As of 2014, it includes a wide range of solutions currently spanning Operations, HR, Finance, and Marketing functions. Through cloud, IBM is now able to deliver its government industry expertise and client value with even more
speed and simplicity through a number of “as a service” IBM Cloud services, procured through an integrated contract and offered via subscription and/or usage-based pricing.

These solutions can run on private or hybrid cloud infrastructure, with the option of ongoing management or of complete business process outsourcing.

More broadly, IBM Cloud offerings are organized into four “as a service” categories. A typical cloud strategy for a government department or agency involves delivering the right cloud solution to the right user by tapping into a combination of these “as a service” categories, each with the architectural design, network security and governance to get the job done in an assured fashion. The categories are:

1. **Infrastructure as a service (IaaS)–for software developers/ IT operations professionals:** Configurable, self-service IT infrastructure or complete managed services to build, manage or host public, private or hybrid clouds. Through **IBM SoftLayer**, clients can benefit from self-service IaaS for complete control, or they can opt for fully managed IaaS (IBM Cloud Managed Services) to deploy and scale virtual and dedicated bare-metal infrastructure, develop applications, and run production-ready workloads. Typical government usage scenarios for SoftLayer include R&D, Security, Disaster Recovery, Collaboration and Access for Constituents, and Compliance and Regulatory Monitoring. Hosted Enterprise private government clouds are ideal for social business applications, production workloads, web applications, mobile, and development.

2. **Development Platforms–Platform as a Service (PaaS)–for application developers:** Powerful services and APIs available through an integrated cloud platform to power the fast development and deployment of applications to the cloud. SAP, Oracle and PeopleSoft are examples of IBM PaaS offerings. **Bluemix** is IBM’s new PaaS solution that combines the power of the Open Source Cloud Foundry (www.cloudfoundry.org) with popular languages and IBM SaaS. Bluemix provides the capability to add scaling, capacity, load balancing, and detailed application status monitoring and reporting to frameworks such as Ruby on Rails, Java, Tomcat, and Joomla. This will enable PaaS solutions to stay current for government departments and agencies.

3. **Software as a Service (SaaS) & Business Process as a Service (BPaaS)–for business users and end users:** Software as a Service (SaaS) is a software model with applications centrally hosted in a cloud computing environment and accessed by users over the Internet. Many business applications use SaaS as a common delivery model because of its ability to help reduce costs and simplify deployment. IBM is one of the world’s largest SaaS providers. SaaS for government includes Social Business, Smarter Cities, business analytics and optimization, and Smarter Commerce. BPaaS is complete business process outsourcing (BPO) services that are sourced from the cloud and constructed for multi-tenancy.

“Of 43 vendor options, the results of this study highlight that the top 5 vendors that U.S. buyers believe would be most effective in providing IaaS, whether private or public, are led by IBM, followed by Cisco, HP, AT&T, and Google”

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Creating Secure, Compliant Clouds
Meeting government standards

IBM Canada is committed to facilitating government cloud adoption and is uniquely positioned to assist in the development of Canadian cloud standards and policies to meet government requirements.

IBM is currently collaborating with a number of standards bodies, associations and public sector industry groups at all levels to support flexible options for secure, robust and open clouds for government. IBM meets or exceeds all industry standards including:

- Support for open clouds: Cloud Standards Customer Council and Object Management Group (OMG)
- Support for open-source directions: OpenStack Foundations Board (OSFB)

CalCloud: Supporting Shared Services

The California Department of Technology (OTech) provides information technology services to many state, county, federal and local government entities throughout California.

OTech was looking to lower IT costs as well as give local government entities direct access to cloud services that they were previously unable to leverage through a government shared services model.

Announced on July 24, 2014, CalCloud is a new technology model powered by cloud computing to build and deliver more innovative government services and savings.

Instead of separate IT systems for each department, the CalCloud service model allows government entities to share a common pool of computing resources and operate much more efficiently than they do today. Immediate access to modern back-end services frees up state department to focus on projects with direct impact on the public.

CalCloud’s shared virtual infrastructure will eliminate the need for capitalized expenditures and will allow its customers to realize cost savings, compared to physical server environments.

“With SoftLayer, IBM is pushing the envelope and driving IaaS ahead. The combination gives buyers more choices and in turn, IDC believes will accelerate the adoption of cloud in Canada. As a result, IDC placed IBM in the leader category for both our Canadian Public and Private IaaS MarketScapes.”

IBM has played an integral leadership role in many of these standards councils, including donating its Cloud Computing Reference architecture to OMG and joining the OpenStack Foundation as a platinum sponsor to further support standards development in the industry.

In the U.S., the IBM cloud strategy and solutions portfolio fully complies with the cloud computing definitions published by the U.S. federal government technology agency National Institute of Standards and Technology (NIST) in October 2011. IBM was also a key reviewer in the development of FedRAMP, a government-wide program that provides a standardized approach to security assessment, authorization and continuous monitoring for cloud products and services.

Just as FedRAMP is an important standard for cloud services providers who wish to supply cloud services to the U.S. federal government, IBM is similarly poised to provide the same leadership to Canadian government entities as they develop similar cloud security standards domestically.

**IBM cloud security and privacy**

As public sector organizations undertake the high-stakes task of integrating cloud technology into their operations, they rely on IBM to help them maintain integrity and reliability. Having been in the data protection business for decades, IBM is recognized by consumers as one of the most trusted companies for privacy. To meet the challenges specific to cloud, IBM offers a broad set of cloud solutions for varying data, security and privacy needs.

The highly secure IBM SoftLayer data centres have initial capacity for 30,000 servers and share an isolated, robust private network with 2,000 gigabytes per second of connectivity. For U.S. federal government clients, IBM SoftLayer data centres support FedRAMP and FISMA workloads. The IBM SoftLayer carrier grade backbone network offers high performance and unmetered traffic across all IBM SoftLayer data centres for redundancy and back up needs as well as to minimize latency.

“Canada needs more knowledge-based industries to diversify our national economic portfolio… [The IBM Canada Research and Development Centre] collaborative initiative takes direct aim at these issues by creating modern research networks that bring advanced computing capacity to bear on important issues such as water monitoring, management and distribution; energy monitoring and management; urban planning and traffic management for intelligent cities; and the cross-walk of brain science and artificial intelligence.”

— Professor David Naylor, President, University of Toronto, April 2010
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**Looking Ahead**

IBM sees trends in government and healthcare cloud procurements that have a bearing on how cloud services are acquired. Departmental and agency mandates must be met at lower cost, while balancing the value of acquired technology versus in-house development. To minimize potential hidden costs of ongoing operations and maximize agility, IBM recommends procuring standards-based but still optimized cloud solutions based on complete, supported offerings, integrated into end-to-end IT solutions. Acquiring cloud capabilities should consider the full range and lifecycle of stakeholder needs.

IBM’s cloud strategy for Canada is built on utilizing superior global insight, innovation and intelligence. IBM is well-positioned to meet the Canadian government’s emerging requirements for security and functionality and offer Canadian organizations the best value offered by a global supply chain of skills, technology and business process expertise. By bringing this investment in Canada to the world, IBM believes we can partner with the Canadian government to showcase new global business platforms and mandates.

As you consider the next steps in your cloud journey, let IBM help you:

- Plan & Prepare: Develop cloud strategy and roadmap
- Pilot & Deploy: Start with recommended cloud entry point and projects
- Extend & Evolve: Roll out cloud across the enterprise

“IBM has one of the most comprehensive cloud portfolios, with the cloud integrated throughout its many lines of business. Moreover, IBM’s consulting arm has put them in touch with numerous early adopters and special use cases—all of which helps the company stay ahead of competitors.”

— Jeff Vance, Datamation, May 17, 2012

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**DARPA Robotics Challenge Switches to SoftLayer Cloud**

- DARPA (Defense Advanced Research Projects Agency) is an agency of the United States Department of Defense and the DARPA Robotics Challenge, which seeks to find innovative ways to use robots for disaster-response operations
- In August 2013, IBM SoftLayer displaced Amazon Web Services (AWS) as the cloud of choice for the DARPA competition, GigaOm. They switched from AWS to IBM’s SoftLayer, citing SoftLayer’s superior performance and scalability.
- The competition demanded that machines exchange data with one another at hyper-fast speeds. SoftLayer, which provided bare metal cloud and high-performance GPU servers, was the only dedicated platform that could shorten the communication loop between machines to 1k/second, thereby offering the power and speed necessary for complex robotics simulation, clearly demonstrating the advantages of SoftLayer dedicated performance versus public cloud structure.
- As the cloud continues to grow into new industries, SoftLayer is pushing the limits of performance by setting the bar for bare metal servers.
Waterfront Toronto Teams with IBM to Build a Smarter City

- Created by the governments of Canada and Ontario and the City of Toronto to oversee and lead the renewal of Toronto’s waterfront, Waterfront Toronto is one of the largest infrastructure projects in North America, and one of the largest waterfront revitalizations ever undertaken.
- Through a first-of-a-kind collaboration with IBM and IBM Business Partner Element Blue, Waterfront Toronto launched the newblueedge.ca, a powerful community portal and platform that residents can use to easily connect with neighbours, businesses and service providers in the surrounding area.
- Leveraging IBM SoftLayer and IBM’s cloud computing and social business software, services and technologies, the portal provides access to city-wide data on mobile or desktop devices using IBM social collaboration tools.
- The newblueedge.ca will serve as the platform for a suite of tools that will help residents make smarter decisions about everything from their daily commute to health and wellness, energy and water use, and more.
- By integrating data, analysis, and coordination across the community, IBM’s flagship Intelligent Operations Centre platform, delivered as a cloud service, helps cities save on IT infrastructure costs and provides a computer dashboard to view community vital signs and instantly identify what’s working and what isn’t.
- The newblueedge.ca portal showcases Toronto’s waterfront as a leading example of how to build a smarter city.

For more information

To learn more about IBM Cloud for the Canadian public sector, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/cloud-computing/ca/en
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