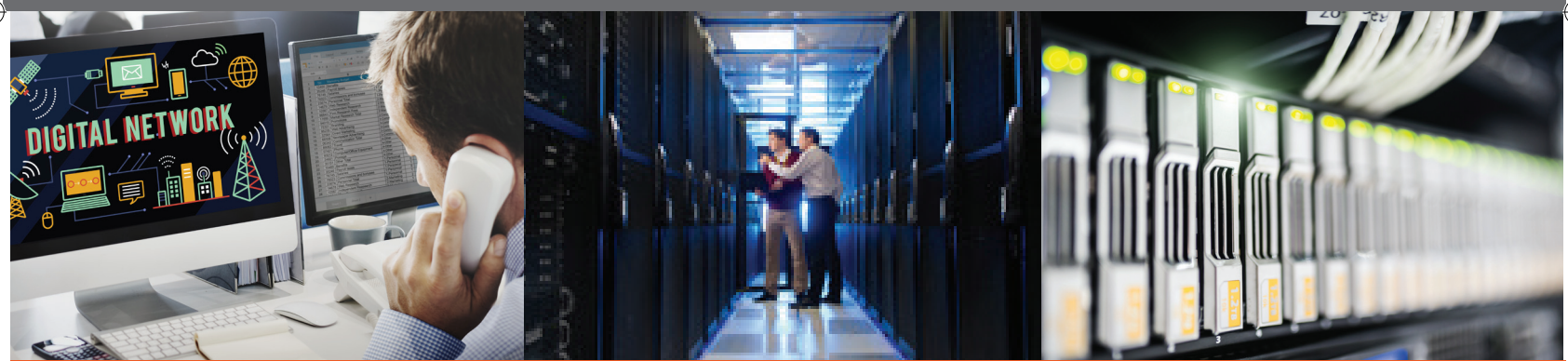


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INVEST IN CANADA



VIRTUALIZATION & CLOUD COMPUTING IN CANADA

As organizations around the world continue to move away from traditional in-house hardware and software solutions, the importance of virtualization will continue to grow, both internationally and in Canada, with Canadian firms' budgets for dedicated private cloud solutions set to double between 2015 and 2017.¹

Foreign direct investment in Canada's Information and Communications Technology (ICT) sectors has been a priority for the Government of Canada. Under the national digital economy strategy, foreign investors are supported in their creation of innovative new products and services. In the cloud virtualization space, foreign investors such as Microsoft, IBM, EMC, Google, etc. have also invested in pursuing their R&D activities here, making their Canadian operations core to their global cloud strategies.

CANADA'S POSITION IN THE GLOBAL CLOUD/VIRTUALIZATION VALUE CHAIN

With the explosion of data usage globally, virtualization is transforming the way computing at almost every level is done. According to analyst firm IDC, the shift from traditional in-house Information Technology (IT) software and services in Canada, the United States (US) and Europe continues, and the share of IT budgets dedicated to in-house software and services is dropping from 36.7% in 2015 to a projected 28.6% by 2017.²

This shift away from traditional software (physical or digital goods) and ICT services is due to increased adoption of virtualization and marks clear growth in the global market for Infrastructure, Platform and Software "as a service" (IaaS, PaaS and SaaS) offerings—key areas in which foreign investors are actively developing solutions in Canada.

Canadian industry and foreign investors benefit from Canada's favourable regulatory environment in this sector. Canada's jurisdictional policy around online

environments, especially privacy (e.g., no US Patriot Act), is considered a model for many nations and contributes to the strength of Canadian industry in this area. Global companies in the virtualization space are also taking advantage of Canada's highly-skilled IT workforce, low data centre operating costs, low labour costs, competitive tax rates and a compelling business environment, as well as its R&D clusters.

As a world leader in this sector, Canada is a natural fit for organizations looking to expand their virtualization and cloud-based offerings, both in terms of R&D and as a base for accessing the North American market. Public IaaS services, such as Amazon, EC2, Azure and Softlayer, have experienced uptake in Canada, as have dedicated private cloud services. Canadian organizations also have the highest rate of deployment plans and virtualization services evaluations in North America,³ demonstrating the clear demand for virtualization services in Canada.

THE VIRTUALIZATION/CLOUD SERVICES ECOSYSTEM IN CANADA



1 IDC. Adoption of Cloud in Canada: A Global Perspective, 2015.
 2 Ibid.
 3 Ibid.

IBM'S CLOUD INVESTMENTS IN CANADA CONTINUE TO DRIVE ITS INNOVATION AND GROWTH

IBM is a global leader in virtualization and cloud services. The organization has been a world leader in delivering cloud virtualization services around the world, and has made global investments totaling over \$1.2 billion to innovate and deliver market-leading cloud services from 40 data centres in 15 countries, with major IT infrastructure investments in North America.

Q What are IBM's core cloud and virtualization activities in Canada?

IBM Canada's key cloud and virtualization activities in Canada include the operation of data centres, which provide virtualization and cloud services to a wide range of our customers operating in financial services, insurance, retail, the public sector, and a number of Canadian start-up companies. In addition, IBM Canada provides IT infrastructure services to its Canadian customers, which include analytics and visualization tools for industrial applications.

Q What are some of your key data centre locations in Canada?

Our key locations in Canada include our cloud data operations centres in Toronto, Ontario and Drummondville, Quebec, which began operations in 2014 and 2015, respectively. These centres are a product of our global investment initiative to deliver market-leading cloud services around the world.

Our additional flagship investments in Canada include the IBM Canada Leadership Data Centre, located in Barrie, Ontario, which opened in 2012, with an investment cost of \$96 million. This flagship centre was followed by the IBM Western Canada Leadership Data Centre in Acheson, Alberta, which opened in 2014 with an investment cost of \$62 million.

Q Why did IBM choose Canada for its investments in virtualization?

With IBM's large customer base in Canada, the choice to invest in Canadian virtualization and cloud services was aligned with client preferences for keeping their data hosted in-country. As a result, IBM Canada has been able to provide our Canadian customers with

cutting edge virtualization services, and expand our product and service offerings to meet the evolving needs of our cloud customers.

Q Have the skills of the Canadian workforce met IBM's needs?

Canada has been undergoing a significant transformation to adapt to the new market trends of virtualization and cloud operations. The Canadian workforce has, therefore, provided IBM Canada with personnel capable of supporting the evolving applications of virtualization services, covering a range of applications such as data analytics, mobile and social computing.

Q Why should foreign organizations invest in Canada?

Canada is known globally as a progressive and competitive marketplace that has well-established telecommunications, financial and business infrastructures.

All of this makes it an excellent destination for organizations looking for opportunities in technology industry verticals such as virtualization and cloud services. Canada has the necessary supports, for example, a high-quality workforce backed by post-secondary educational institutions. These are all very important factors that will dictate the success or failure of business operations in the cloud / virtualization space, and Canada has all the right ingredients in place.



Simo Vujovich,
Director, Cloud Services, IBM Canada

IBM has become a global leader in the cloud and data centre virtualization space, offering a host of different cloud offerings, including IaaS, hybrid cloud for both on- and off-premises clouds, and PaaS to its clients in the financial services, retail, insurance, public sector and telecommunications space. IBM has recently established several cloud data centres in Canada to support the current transformation to virtualized solutions by Canadian companies.

VIRTUALIZATION: KEY BUSINESS ATTRACTION FACTORS IN CANADA

Canada is a hotbed of virtualization activity: Cloud services and associated software and technological developments among key Canadian organizations continue apace, and Canada has one of the best test and innovation environments for software and IT companies in the world. Another important factor is well-established software and IT-focused university and technical programs, with over 2 million Canadians holding a degree or certificate from a science, engineering or mathematics and computer science-related discipline.⁴ This ensures that a supply of high-calibre talent is readily available to foreign investors for their development efforts in Canada.

32,000

Number of software and computer services companies operating in Canada⁵

\$169.9 billion

Revenue of the Canadian information and communication technology (ICT) sector at the end of 2014⁶

\$4.9 billion

Annual R&D expenditures in Canada's ICT sector at the end of 2014⁷

1st



Canada's rank amongst the G7 nations for lowest costs in software development operations⁸

1st



Canada's rank amongst the G7 nations for the lowest labour costs in the software design/development industry⁹

2nd



Canada's rank amongst the G7 nations for facility lease and power costs in major cities¹⁰

4 Statistics Canada. *Education in Canada: Attainment, Field of Study and Location of Study*.

5 Industry Canada. *Canadian ICT Sector Profile 2014*.

6 Ibid.

7 Ibid.

8 KPMG. *Competitive Alternatives 2016*.

9 Ibid.

10 Ibid.

CANADA HAS BECOME A “CLOUD-FIRST” MARKET

Over the past year, Canada has become a “Cloud-First” market, where cloud services are the first choice for technology leaders when replacing or implementing new systems.¹¹

With the increasing investments in Cloud and IoT, these two markets alone will represent over \$6 billion in spending in Canada in 2015.¹²

Foreign investors in the cloud virtualization space are taking advantage of this demand transformation in the Canadian market, establishing operations that range from public and private cloud infrastructure and cloud provisioning to Enterprise SaaS application development, storage and data infrastructure, and hypervisor/virtual machine and OS development.

INDUSTRY VERTICALS USE CASES

Canadian organizations in the retail, healthcare, financial services, IT and telecoms verticals are investing heavily in cloud infrastructure and related solutions.

Key use cases where cloud services have been deployed in Canada include: personalized, location-based and mobile display advertising; social network analytics for marketing; customer segmentation analytics; proactive customer care for churn reduction; large event management and fraud management.

In the telecoms industry—a major source of demand for cloud services—use cases have included network optimization, cloud-based service refinery, data warehouse optimization, pre-paid and bundle plan optimization, and security-related virtualization applications.

CLOUD VIRTUALIZATION R&D FUNDING ACTIVITY IN CANADA

Supporting Canada’s cloud leadership are R&D funding and resources provided to firms through institutions such as: the Canadian Innovation Commercialization Program (CICP), which helps businesses get their innovations to market; MaRS, which provides venture services and funding consultation services; and the Canadian Capital and Private Equity Association, which provides investors with specialized investment services in ICT sectors.

Other resources include CANARIE’s Digital Accelerator for Innovation and Research (DAIR) program, which provides free cloud compute and storage resources that help speed time to market by enabling rapid and scalable product design, prototyping, validation and demonstration of cloud-based solutions.

LEADING FOREIGN INVESTORS WITH OPERATIONS IN CANADA

Canada continues to be a desirable location for foreign investment projects in the cloud services and virtualization fields. Recent investments include:

- Microsoft opening two new data centres in Toronto and Quebec City in 2016
- HP opening of its Security Operations Centre (SOC) in Mississauga
- Amazon opening a Public Cloud Data Centre in Montréal
- IBM’s Leadership Data Centres in Acheson, Alberta and Barrie, Ontario, as well as a Cloud Centre in Drummondville Quebec
- EMC’s data centre operations in Edmonton and Google’s expansion of cloud research and development facilities in Kitchener, Ontario.

¹¹ IDC. *Canadian ICT 2015-2019 Forecast*.

¹² *Ibid.*

VIRTUALIZATION ACTIVITY IN CANADA



R&D CLUSTERS

Canada excels in cloud and virtualization R&D capabilities. Research centres, incubators and accelerators across the country provide foreign investors with leading-edge innovations and start-ups with crucial funding. Some examples include:

British Columbia

- GrowLab
- WaveFront (Vancouver)

BCTIA The Hub and BCTIA Centre4Growth

Alberta

- TEC and Cybera (Edmonton)

Saskatchewan

- High Performance Computing Centre (University of Saskatchewan, Saskatoon)

Ontario

- The Accelerator Centre® (Waterloo)
- Centre for Computational Mathematics in Industry and Commerce (University of Waterloo)
- Institute for Computer Research & Institute for Quantum Computing (University of Waterloo)
- Canadian Photonics Fabrication Centre (National Research Council Canada, Ottawa)
- CANARIE's Digital Accelerator for Innovation and Research (DAIR) program (Ottawa)
- MaRS (Toronto)

Quebec

- Laboratory of Combinatorial Mathematics and Computing Science (Université du Québec à Montréal)
- Laboratoire de vision et systèmes numériques (Université Laval, Québec)
- The CEFRIO Network (Montréal)
- Founder Fuel (Montréal)

New Brunswick

- The Institute for Information Technology (National Research Council Canada, Fredericton)
- Launch36 (Moncton)

RECENT VIRTUALIZATION ACTIVITIES IN CANADA

- In 2015, **Microsoft** announced plans to establish two data centres in Canada that will provide cloud services to its more than 80,000 enterprise customers in the country. The data centres will be located in Toronto and Québec City.
- In 2015, **HP** opened its first Security Operations Centre (SOC) in Mississauga, Ontario, to provide security management services to its enterprise clients in Canada.
- In 2016, **Amazon** announced that it will establish a data centre in Montréal to service the Canadian public cloud market.
- Ottawa-based **CENX**, a global leader offering lifecycle service orchestration solutions for software-defined and virtualized networks, announced an equity investment of US\$12.5 million USD by its venture capital partners.¹³
- **RANOVUS**, a leading provider of multi-terabit interconnect solutions for data centre and communications networks, with operations in Ottawa, recently announced a US\$24 million investment to expand and accelerate product delivery to a global customer base.¹⁴

¹³ CENX. CENX Closes \$12.5 Million Investment, August 11, 2015.

¹⁴ RANOVUS. RANOVUS Announces \$24 Million USD Expansion in Financing Round.

WHY CANADA FOR R&D AND INNOVATION?

KPMG shows that Canada has emerged once again as the most cost-competitive country in the G7 in which to do business, with a **14.6%** cost advantage over the US.

In software design, firms operating in Canada enjoy a **22.1%** overall cost advantage over their US-based counterparts. In electronic systems development and testing this Canadian cost advantage rises to **27.8%** over the United States. These cost advantages are significant for foreign investors in the cloud/virtualization industry, where system design, development and testing are important operating and development cost elements.

CANADA-WIDE PROGRAMS



NATIONAL RESEARCH COUNCIL CANADA—INDUSTRIAL RESEARCH ASSISTANCE PROGRAM (IRAP)

This program provides innovative help for small and medium-sized enterprises in Canada. Advisory services, funding for innovation, networking and youth employment, among other benefits are offered. This program is available to a wide variety of sectors and industries, and in 2012-2013, IRAP provided \$173.2 million in support to qualified organizations.

http://www.nrc-cnrc.gc.ca/eng/irap/services/financial_assistance.html



SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT (SR&ED) PROGRAM

The SR&ED program provides both a business income tax deduction and an investment tax credit. The tax deduction enables a business to reduce its tax liability in the current year, or carry these expenditures forward indefinitely to reduce its tax liability in future years. A business can also receive an SR&ED investment tax credit that may be refundable, or can be used to reduce taxes payable.

<http://www.cra-arc.gc.ca/txcrdt/sred-rsde/menu-eng.html>



MITACS

MITACS is a government-funded not-for-profit organization that funds technology-specific internships and fellowships through Canadian universities. With over 10,000 research collaborations involving Canadian universities and colleges, and over \$90 million in funding provided, this program is just one of the links between Canada's world-leading post-secondary institutions and the software/IT industries.

<https://www.mitacs.ca/>



EXPORT DEVELOPMENT CANADA (EDC) AND BUSINESS DEVELOPMENT BANK OF CANADA (BDC)

These organizations provide flexible financing programs and solutions tailored to support foreign direct investment in Canada. They provide insurance and bonding, financing, equity and venture capital, as well as a variety of consulting and advisory services to facilitate foreign trade.

<http://www.edc.ca/>
<http://www.bdc.ca/>

For a comprehensive list of programs, please visit:
www.investincanada.com



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