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# Cyberprovinces

The definitive province-by-province analysis of the Canada tech industry and tech workforce



Jobs / Tech concentration / Business Establishments / Industry sectors / Innovation / Wage differential / Wages

#### **CYBERPROVINCES 2018<sup>™</sup>**

IS PRODUCED BY The Computing Technology Industry Association (CompTIA)

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Published in the U.S. June 2018

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Cyberprovinces can be accessed online at CompTIA.org.

CompTIA 3500 Lacey Road, Suite 100 Downers Grove, IL 60515 Phone: (630) 678-8300



#### **ABOUT THIS REPORT**

The Computing Technology Industry Association (CompTIA) presents the 2018 edition of *Cyberprovinces*. CompTIA designed this report to serve as a reference tool, making national and province-level data accessible to a wide range of users. *Cyberprovinces* quantifies the size and scope of the tech industry and the tech workforce across multiple vectors. To provide additional context, *Cyberprovinces* includes time-series trending, average wages, business establishments, job postings, emerging tech metrics, and more.

As with any sector-level report, there are varying interpretations of what constitutes the tech sector and the tech workforce. Some of this variance may be attributed to the objectives of the author. Is the goal to depict the broadest possible representation of STEM and digital economy fields, or a more narrowly defined technology subset? Is the goal to capture all possible knowledge workers, or a more narrowly defined technology subset? For the purposes of this report, CompTIA focuses on the more narrowly defined technology subset. See the methodology section for details of the specific NAICS codes and occupation codes CompTIA uses in its definitions of the tech sector and the tech workforce.

#### **ABOUT COMPTIA**

With more than 1600 corporate members and 145,000 registered users, CompTIA is the global technology association for all who build, sell, distribute and influence the adoption of technology business solutions. Led by a network of member-led communities and councils, CompTIA brings together the entire tech ecosystem; from Fortune 500 companies to mid-market and small technology solution providers, software and service firms, consultants and innovators. Backed by a powerful portfolio of industry insight and research, education and events, business tools and resources, CompTIA's sole focus is to drive member success and industry growth in a rapidly evolving market place.

See CompTIA's Canadian Business Technology community for more: https://www.comptia.org/communities/canadian-business-technology





## TABLE OF CONTENTS

5
6
7
8
9
11
12
22



A scan of the horizon reveals an era that appears to be on the cusp of profound change. And yet, the closer a major leap forward seems, the more one is reminded of the last-mile challenges associated with next generation innovation. While there continues to be a sense of excitement for a future that is rapidly becoming reality, increasingly, questions and concerns are part of the mix as well. The trends unfolding will do so in an environment of higher expectations; namely, for business value, security, transparency, and equal access to opportunity. Against this backdrop, CompTIA explores the forces shaping the information technology industry, its workforce, and its business models in the year ahead. CompTIA's *IT Industry Outlook 2018* outlines the key trends in the tech sector and tech workforce in the year ahead. See www.comptia.org to access the full report.



#### The Insights Economy Comes Into Focus

The ongoing digitization of information, and more recently, the mass deployment of sensors, are ushering in what can be characterized as the insights economy. Enabled by machine learning, artificial intelligence and other emerging tools, raw data can more efficiently and effectively be converted into value, which may take the form of pattern recognition, predictive analytics, natural language processing, computer vision, or other output.



#### Internet of Things Expands Technology Footprints

IoT devices are rapidly making their way into corporate spaces. From gathering new data to automation of infrastructure, companies are finding many benefits from adding connectivity and intelligence to physical infrastructure. Adding digital capabilities to everyday components drastically increases the scope of IT responsibilities, which means new skills will be needed and the further refining of IoT strategies to ensure proper alignment with business needs.



## Businesses Race to Upgrade Digital Expertise in the Boardroom

Increasingly, organizations recognize the importance of having a tech-savvy boardroom. This doesn't necessarily mean having deep technical knowledge, but rather having a feel for the tech landscape, knowing the types of questions to ask, and being able to push back when necessary. Additionally, with the consequences of a single digital misstep becoming more severe, board-level engagement with cybersecurity and data governance is no longer optional.



#### 'New Collar' Jobs Mindset Gains Momentum, but Challenges Persist

The concept of 'new collar' jobs is a call to action to recognize the changing nature of middle-skill jobs and the need for new approaches to training and preparing the workforce of tomorrow. This change is largely a function of the intersection of technology and just about everything in the economy, from products and workflows to supply chains and job roles. More alternatives to the traditional 4-year college degree are needed, especially skills-centered training and certification approaches resulting in a jobs-ready candidate.



#### The Democratization of Technology Leads to Breakthrough Models

The toolset for building technology has been steadily growing more accessible. In 2018, though, a tipping point will be reached. As software becomes the driving force of many solutions, open source concepts allow far more people to build applications around blockchain, natural language processing, or contextaware computing. Hardware is also more of an open toolbox, as makers explore novel use cases using drones, robotics, and 3D printing.



#### **Cloud Enters New Phase of Maturity**

Over the past decade, organizations of all sizes have steadily moved through the stages of the cloud adoption progression framework. Many are now reaching the final stage – transformed IT, where the architecture is rebuilt to maximize cloud characteristics. Unlike the first two stages, later-stage challenges are not primarily technical. Instead, companies must build or reconfigure the appropriate policies and workflow for a cloud-based approach.



## Artificial Intelligence Adds a New Layer to the Solution Stack

Amid the wave of emerging technologies, artificial intelligence stands out as the one most likely to drive revolutionary changes to the technology ecosystem. Al requires significant compute resources (which can be procured in the cloud), various algorithms that allow learning (which can be baked into products or provided as a service), and contextual awareness (which can come from massive collections of data). By adding a layer of intelligence, companies are better positioned to solve a broader range of problems.

#### Growing Up: Tech May No Longer Automatically Be Given the Benefit of the Doubt

Signs point to changing expectations and a different environment unfolding for the tech industry. Questions surrounding security, privacy, screen time, and toxic corporate cultures continue to intensify. Concerns over market concentration, the power imbalances of gatekeepers, and the threat of automation loom. To be clear, technology will continue to overwhelmingly be viewed as a force for good, but the industry will need to spend more time looking at itself in the mirror to ensure this sentiment continues.



## BACKGROUND – DEFINING NET TECH EMPLOYMENT

The tech workforce consists of two primary components. New to *Cyberprovinces* for 2018 is a single metric that encompasses both components, making it easier to describe the tech workforce. The foundation is the set of technology professionals working in technical positions, such as IT support, network engineering, software development and every related roles. Many of these professionals work for technology companies (52.6 percent), but many others are employed by organizations across every industry sector in the Canadian economy (47.4 percent).

The second component of the discussion consists of the business professionals employed by technology companies. These professionals play an important role in supporting the development and delivery of the technology products and services used throughout the economy. Thirty-four percent of the net tech employment total consists of tech industry business professionals.

One final segment involves workers classified as self-employed. For the purposes of this report, only dedicated, full-time self-employed technology workers are counted towards net tech employment. Workers that are characterized as "gig" workers, which may entail working on the side for supplementary income, are excluded from this analysis due to a number of uncertainties with the data and to minimize the possibility of double counting.



**1,035,610 = Technology professionals employed by organizations across the economy** (e.g. software developers, network architects, database admins, etc.)



**124,300 = Self-employed technology professionals** (e.g. freelance developer, IT consultancy sole-proprietorship, etc.)



**385,180 = Support/business professionals employed by tech companies** (e.g. sales, marketing, finance, HR, etc.)



**79,350 = Self-employed support/business professionals working in the tech industry** (e.g. freelance graphic designer, channel program consultant, etc.)



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#### **KEY POINTS**

- → Net tech employment in Canada- as described on the previous page, reached an estimated 1.62 million workers in 2017, an increase of nearly 45,000 new jobs and a growth rate of 2.8 percent.
- → Since 2010, net tech employment increased by an estimated 223,000 new jobs. Net tech employment growth has been steady during this span, averaging approximately 32,000 new jobs per year.
- → As the largest component of net tech employment (71 percent), technology occupations are the primary driver of job growth. Just 5 of 25 tech occupation categories accounted for the majority (67 percent) of job gains during the 2010-2017 time period.
- → Largest tech occupation contributors to job gains, 2010-2017:
  - $\rightarrow$  Systems analysts and consultants: +65,433
  - → Programmers and media developers: +28,489
  - → Information systems managers: +27,105
  - → Software engineers and designers: +23,773
  - → User support technicians: +17,814
- → On a percent change basis, the occupation category covering industrial engineering and manufacturing technologists and technicians grew by +115% percent, the largest increase among tech occupations during 2010-2017. Software engineers (+75%) was next, followed by database analysts and administrators (+56%)
- → Most occupation categories experienced positive job gains during the 2010-2017 time period, although a few were negative. The category covering electronics assemblers, fabricators, inspectors, and testers lost nearly -3,400 jobs, while electronics service technicians lost -3,324 jobs.
- → Largest tech industry contributors to job gains, 2010-2017:
  - → IT Services and Custom Software Services: +85,034
  - → Engineering Services: +12,199
  - → Software [packaged]: +11,773
  - → Data processing, hosting, and related services: +5,010
  - → Telecommunications carriers (wired + wireless): +4,015
- → The steepest decline occurred in the communications equipment manufacturing category where -10,720 jobs were shed during the 2010-2017 time period. Other industry categories with notable drops in employment include, R&D services (-9,647 jobs) and computer and communications wholesalers (-4,212 jobs)
- → Looking ahead, the overall base of employment is projected to increase by nearly 8 percent between 2018 and 2026. The growth projections for many technology occupation categories exceed the national benchmark, and in some cases, by a significant amount. For example, database analysts and administrator roles are projected to grow at three times the rate as the national average. Software, systems analysts, which includes cybersecurity roles, and user support technicians will also experience notable gains through 2026.



#### **NET TECH EMPLOYMENT TRENDING**

#### TECH INDUSTRY EMPLOYMENT TRENDING



#### **OCCUPATION OUTLOOK: 2018-2026**



Sources: EMSI | Statistics Canada | CompTIA

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#### **KEY POINTS**

- → The average also referred to as the mean is a useful starting point in data analysis. However, it should not be used in isolation. Averages are affected by the distribution of data, especially points at the very high or very low end of the range.
- → In the case of tech sector and tech occupation wages, there are data points that fall into the category of being on the high end of the range, thereby affecting the average.
- → Ontario accounts for 45 percent of the national tech sector payroll and 43 percent of tech sector workers. The province is so large relative to the others, that it exerts a significant upward pull on tech sector wages. As depicted in the chart to the right, Ontario sits above the average tech sector wage of \$76,180. Alberta is the only other province with an average tech sector wage exceeding the national average.
- → The government agency, Statistics Canada, notes "in addition to regular remuneration, wages includes directors' fees, bonuses, commissions, gratuities, income in kind, taxable allowances, retroactive wage payments and stock options." The highest paid tech CEO in Canada in 2016 reportedly earned \$24.6 million in total compensation, partially due to stock options. This is another example of an outlier data point that elevates average tech sector wage data.
- → Wages should always be viewed in the context of cost of living. The buying power of a salary in Toronto will vary greatly with the buying power in Lloydminster. According to the The Toronto Real Estate Board, the average selling price for all housing in Toronto (all types) during 2017 was \$822,681.
- → Beyond location, the other important variables to consider when reviewing wage data are job role, areas of expertise, job experience, industry sector, and company size. A skilled employee in a hot field such as machine learning, working for a Fortune 500 company, will earn on average far more than a tech worker in an established field such as IT support, working for a small non-profit museum.
- → Relatedly, the tech sector average wage reflects technical and non-technical positions. The average for technical roles tends to exceed non-technical roles when accounting for job level and experience. For example, a mid-tier software developer may earn substantially more than a mid-tier marketing professional or operations manager.
- → Within tech occupations, a comparison of workers at the 90<sup>th</sup> percentile of compensation and the 10<sup>th</sup> percentile yields a differential of 155 percent. The 10<sup>th</sup> and 25<sup>th</sup> percentile wages are often entry-level wages, while the 75<sup>th</sup> and 90<sup>th</sup> percentile wages may reflect seniority and significant expertise developed from years on the job.



#### TECH INDUSTRY AVERAGE WAGE VS. OVERALL AVERAGE WAGE MATRIX

#### TECH OCCUPATION HOURLY WAGE DISTRIBUTION, CAD



Sources: EMSI | Statistics Canada | CompTIA



#### CANADIAN NET TECH EMPLOYMENT

- → Canadian net tech employment totaled an estimated 1.62 million in 2017, an increase of more than 44,000 workers over the 2016 base of 1.58 million. Net tech employment grew an estimated 2.8 percent year-over-year.
- → Net tech employment accounted for approximately 8.4 percent of the overall Canadian workforce in 2017. As noted previously, because of the blurring of lines across industries, there is likely a degree of undercounting in tech sector employment as a percentage of Canadian employment.

#### CANADIAN TECH INDUSTRY EMPLOYMENT

- → Canadian tech industry employment totaled an estimated 813,00 in 2017, an increase of 20,400 workers from 793,000 in 2016. Tech industry employment grew an estimated 2.6 percent year-over-year.
- → Tech manufacturing employment totaled an estimated 98,800 in 2017, a decrease of a little more than 2,000 jobs when compared to the previous year. The other sector that experienced a decline when compared to the previous year was Engineering Services, R&D and Testing.
- → The IT services and custom software services subsector generated the largest numerical gain in employment, adding nearly 19,700 net-new jobs in 2017. This gain is a 7.4 percentage increase over 2016. This growth reflects the ongoing digital transformations occurring across the Canadian economy and the corresponding need for expertise in areas such as cloud computing migration, application integration, business process automation, data analytics, artificial intelligence, and cybersecurity.

#### CANADIAN TECH OCCUPATION EMPLOYMENT

- → Tech occupation jobs reached an estimated 1.04 million workers in 2017, an increase of 47,700 workers. On a percent change basis, it represents a 4.8 percent increase over 2016.
- → Since 2011, over 200,000 new tech occupation jobs were added; a function of the demand for tech talent across every industry sector in the Canadian economy.
- → The core IT occupations component of tech occupations accounts for 67 percent of the total. IT occupations added about 46,900 net-new jobs in 2017, a year-over-year growth rate of 7.2 percent. On a numeric basis, Information systems analysts and consultants and computer and information systems managers added the most jobs when compared to 2016.

#### TECH BUSINESS ESTABLISHMENTS, WAGES, AND EMPLOYER DEMAND

- → There are approximately 69,000 tech business enterprises with payroll located throughout Canada. This is supplemented by self-employed tech workers, which are classified separately by Canadian government sources.
- → Tech wages averaged \$76,200 CAD in 2017, 51% higher than the average private sector wage of \$50,400 CAD.
- → According to data from Burning Glass Technologies Labor Insights, the number of job postings by Canadian employers for tech occupations reached nearly 114,000 during 2017. This figure was roughly in line with the rate from the previous year.
- → While still a relatively small subset of overall job postings, employer demand for emerging technology skills in areas such as machine learning, robotics, AR/VR, blockchain, internet of things, and related, increased nearly 44 percent in 2017.

#### CANADA NET TECH EMPLOYMENT

 
 Z016
 Z017 est.
 Change

 Tech employment net of industry, occupation, and selfemployed
 1,579,670
 1,624,440
 +44,770

Total 1,579,670 1,624,440 +44,770

	CANADA TECH INDUSTRY EMPLOYMENT			
		<u>2016</u>	<u>2017 est.</u>	Numeric <u>Change</u>
	Tech Manufacturing	100,800	98,800	-2,100
	Telecommunications and Internet Services	146,500	148,100	+1,700
-	Software [packaged]	39,100	41,900	+2,800
	IT Services and Custom Software	266,800	286,500	+19,700
	Engineering Services, R&D, and Testing	239,300	237,600	-1,700
	Total	793,000	813,000	+20,400
		CANADA EN	TECH OCCL IPLOYMEN	JPATION T
		<u>2016</u>	<u>2017 est.</u>	Numeric <u>Change</u>
÷	IT Occupations	649,500	696,400	+46,900
	Engineering and Technician Occupations	338,400	339,300	+800
ł	Total	987 900	1 035 600	+47 700
÷	Total	567,500	1,035,000	147,700
		TOP TE C	CH OCCUPA	ATION
į	Information systems		<u>2017 est.</u>	<u>% Change</u>
	analysts and consultants		173,460	8.7%
	Computer programmers and interactive media developers		146,400	6.7%
	User support technicians		98,010	4.6%
:	Source: EMSL   Statistics (	Canada   Con	AITan	

Some numeric changes affected by rounding



#### **PROVINCE NET TECH EMPLOYMENT**

- → The top provinces when it comes to Net Tech Employment are Ontario and Quebec. The greatest number of jobs were also added in these provinces when compared to 2016. Tech employment also represents about 10% of the total employment in these provinces.
- → When compared to the other provinces Ontario stands apart for the number of jobs in tech with 44.6 percent of Canadian net tech employment coming from this province. This is consistent with Ontario's population ratio (about 37 percent of the country), and economic impact (about 39 percent).
- → Anchored by Canada's most populous city, Toronto, the province of Ontario also accounted for a significant portion of tech employment gains during 2017.

#### **PROVINCE AVERAGE TECH INDUSTRY WAGES**

- → On average, tech industry wages are highest in Alberta, followed by Ontario and British Columbia. Figures below presented in CAD.
  - → Alberta \$80,630
  - → Ontario \$79,400
  - → British Columbia \$76,040
  - → Newfoundland and Labrador \$72,380
  - → Saskatchewan \$71,920
  - → Quebec \$71,260
  - → Manitoba \$68,690
  - → New Brunswick \$68,500
  - → Nova Scotia \$65,490
  - → Prince Edward Island \$62,760

#### BUSINESS LOCATIONS, ECONOMIC IMPACT, AND EMPLOYER DEMAND

- → Tech business establishments tend to be concentrated in population centers and in locations that are close to the customers they serve. Combined, Ontario and Quebec account for nearly two-thirds of the total tech business establishments with payroll in the country.
  - → Ontario 31,660
  - → Quebec 12,460
  - → Alberta 10,560
  - → British Columbia 9,210
- → Beyond numerical measures based on size, relative measures based on the size of the province economy reveal additional insight. Overall, an estimated 5.4 percent of Ontario's economy is attributed to the tech sector, as defined by this report. In comparison, approximately 2.5 percent of Saskatchewan's economy is attributed to the tech sector.
- → Employer demand for tech talent as measured by online job postings follows a similar pattern to tech employment with Ontario having approximately 60,700 postings in 2017. In second place is British Columbia with approximately 17,460 postings. Quebec and Alberta are third and fourth respectively in terms of tech job postings.
- $\rightarrow$  Growth in postings for emerging technology positions and skills:
  - $\rightarrow$  Ontario +40%
  - $\rightarrow$  Quebec +128%
  - $\rightarrow$  Alberta +26%
  - → British Columbia +4%

#### CYBERPROVINCES BY NET TECH EMPLOYMENT

1.	Ontario	723,950
2.	Quebec	389,850
3.	British Columbia	194,050
4.	Alberta	173,460
5.	Manitoba	39,400
6.	Nova Scotia	32,800
7.	Saskatchewan	28,340
8.	New Brunswick	22,140
9.	Labrador	13,150
10.	Prince Edward Island	4.670

#### CYBERPROVINCES BY NET TECH EMPLOYMENT JOB GAINS

1.	Ontario	+32,860
2.	Quebec	+6,270
3.	British Columbia	+3,210
4.	Manitoba	+1,510
5.	Prince Edward Island	+600
6.	Alberta	+540
7.	Saskatchewan	+370
8.	Nova Scotia	+90
9.	New Brunswick	+20
10.	Labrador	-780

#### CYBERPROVINCES BY NET TECH EMPLOYMENT AS % OF TOTAL JOBS

1.	Ontario	9.6%
2.	Quebec	9.2%
3.	British Columbia	7.2%
4.	Alberta	7.2%
5.	Nova Scotia	6.7%
6.	New Brunswick	6.0%
7.	Prince Edward Island	5.9%
8.	Manitoba	5.6%
9.	Newfoundland and Labrador	5.3%
10.	Saskatchewan	4.7%

Source: EMSI | Statistics Canada | CompTIA Some numeric changes affected by rounding

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# Canada

#### STATE OF TECHNOLOGY SUMMARY

- 1,624,440 NET TECH EMPLOYMENT<sup>1</sup>
  - 44,770 NET TECH JOB GAINS [2017 vs. 2016]
  - 8.4% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
  - 68,970 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
  - 113,630 TECH OCCUPATION JOB POSTINGS [2017 total]
  - 43.6% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

#### <sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

Information Systems Analysts and Consultants	
	173,460 +8.7% YoY
Computer Programmers and Interactive Media Developed	rs
	146,400
	+6.7% YoY
User Support Technicians	
	98,010
	+4.6% YoY

#### **ECONOMIC IMPACT**



Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



#### **TECH INDUSTRY EMPLOYMENT**



#### LEADING TECH INDUSTRY SECTORS [by employment]

N-N0/

	2017	Change
IT Services + Custom Software Services	286,460	7.4%
R&D, Testing, and Engineering Services	237,630	-0.7%
Telecommunications and Internet Services	148,150	1.2%
Tech Manufacturing	98,770	-2.1%
Software [package]	41,860	7.2%

#### **TECH INDUSTRY WAGES**



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# Alberta



#### STATE OF TECHNOLOGY SUMMARY

- 173,460 NET TECH EMPLOYMENT<sup>1</sup>
  - 540 NET TECH JOB GAINS [2017 vs. 2016]
  - 7.2% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
- 10,560 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 10,650 TECH OCCUPATION JOB POSTINGS [2017 total]
- 26.0% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

#### <sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES



#### **ECONOMIC IMPACT**



Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 4<sup>th</sup> NET TECH EMPLOYMENT RANK
- 6<sup>th</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 4<sup>th</sup> NET EMPL AS % OF WORKFORCE RANK

#### TECH INDUSTRY EMPLOYMENT



#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
R&D, Testing, and Engineering Services	43,170	-4.9%
IT Services + Custom Software Services	24,200	1.1%
Telecommunications and Internet Services	12,660	2.7%
Tech Manufacturing	2,900	-6.3%
Software [package]	2,100	-4.2%

#### **TECH INDUSTRY WAGES**

CAD





# British Columbia

#### STATE OF TECHNOLOGY SUMMARY

- 194,050 NET TECH EMPLOYMENT<sup>1</sup>
  - 3,210 NET TECH JOB GAINS [2017 vs. 2016]
  - 7.2% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
  - 9,210 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 17,460 TECH OCCUPATION JOB POSTINGS [2017 total]
- 4.1% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

#### <sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

Computer Programmers and Interactive Media Devel	opers
	16,880
	-2.4% YoY
Information Systems Analysts and Consultants	
	13,840
	+7.6% YoY
User Support Technicians	
	12,510
	-0.9% YoY

#### **ECONOMIC IMPACT**



Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 3<sup>rd</sup> NET TECH EMPLOYMENT RANK
- 3<sup>rd</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 3rd NET EMPL AS % OF WORKFORCE RANK



#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
R&D, Testing, and Engineering Services	36,210	0.5%
IT Services + Custom Software Services	32,240	5.2%
Telecommunications and Internet Services	18,030	15.6%
Software [package]	8,590	7.1%
Tech Manufacturing	7,400	5.5%

#### **TECH INDUSTRY WAGES**



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# Manitoba

#### STATE OF TECHNOLOGY SUMMARY

- 39,400 NET TECH EMPLOYMENT<sup>1</sup>
- 1,510 NET TECH JOB GAINS [2017 vs. 2016]
- 5.6% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
- 1,190 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 1,710 TECH OCCUPATION JOB POSTINGS [2017 total]
- 13.5% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

#### <sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

Information Systems Analysts and Consultants		
	3,900	
	+17.6% YoY	
User Support Technicians		
	3,680	
	+37.0% YoY	
Computer Programmers and Interactive Media Developers		
	2,870	
	-2.3% YoY	

#### **ECONOMIC IMPACT**



## Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 5<sup>th</sup> NET TECH EMPLOYMENT RANK
- 4<sup>th</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 8<sup>th</sup> NET EMPL AS % OF WORKFORCE RANK

+ 560 jobs +3.2% 10,000 0 2011 2012 2013 2014 2015 2016 2017 est.

**TECH INDUSTRY EMPLOYMENT** 

#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
Telecommunications and Internet Services	5,760	8.6%
Tech Manufacturing	4,310	-6.4%
R&D, Testing, and Engineering Services	4,180	0.1%
IT Services + Custom Software Services	3,350	11.3%
Software [package]	420	13.9%

#### **TECH INDUSTRY WAGES**

CAD



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# New Brunswick

#### STATE OF TECHNOLOGY SUMMARY

- 22,140 NET TECH EMPLOYMENT<sup>1</sup>
  - 20 NET TECH JOB GAINS [2017 vs. 2016]
  - 6.0% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
  - 810 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 1,890 TECH OCCUPATION JOB POSTINGS [2017 total]
- 264.1% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

<sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

User Support Technicians	
	2,580 -20.3% YoY
Information Systems Analysts and Consultants	
	2,130 +22.8% YoY
Computer Programmers and Interactive Media Develope	rs
	2,020 +3.1% YoY

**ECONOMIC IMPACT** 



economy

Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 8<sup>th</sup> NET TECH EMPLOYMENT RANK
- 9<sup>th</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 6<sup>th</sup> NET EMPL AS % OF WORKFORCE RANK

+ 360 jobs +3.6% 5,500 0 2011 2012 2013 2014 2015 2016 2017 est.

**TECH INDUSTRY EMPLOYMENT** 

#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
Telecommunications and Internet Services	4,140	-1.8%
R&D, Testing, and Engineering Services	3,240	13.0%
IT Services + Custom Software Services	2,580	3.1%
Tech Manufacturing	260	-13.9%
Software [package]	210	10.5%

**TECH INDUSTRY WAGES** 

CAD



CompTIA

## Newfoundland and Labrador

#### STATE OF TECHNOLOGY SUMMARY

- 13,150 NET TECH EMPLOYMENT<sup>1</sup>
  - -780 NET TECH JOB GAINS [2017 vs. 2016]
  - 5.3% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
  - 610 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
  - 600 TECH OCCUPATION JOB POSTINGS [2017 total]
- 140.0% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

<sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

User Support Technicians	
	1,300
	-2.3% YoY
Information Systems Analysts and Consultants	
	1,070
	+7.1% YoY
Computer Programmers and Interactive Media Develope	rs
	650
	+55.1% YoY

#### **ECONOMIC IMPACT**



#### **2.6%** Estimated direct contribution of the tech sector to the Newfoundland and Labrador economy

Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 9<sup>th</sup> NET TECH EMPLOYMENT RANK
- 10<sup>th</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 9th NET EMPL AS % OF WORKFORCE RANK

+ 130 jobs +1.7% 4,000 0 2011 2012 2013 2014 2015 2016 2017 est.

**TECH INDUSTRY EMPLOYMENT** 

#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
Telecommunications and Internet Services	3,340	5.3%
R&D, Testing, and Engineering Services	2,880	-5.0%
IT Services + Custom Software Services	1,120	15.4%
Tech Manufacturing	100	-24.3%
Software [package]	70	7.8%

#### **TECH INDUSTRY WAGES**



CompTIA

# Nova Scotia

#### STATE OF TECHNOLOGY SUMMARY

- 32,800 NET TECH EMPLOYMENT<sup>1</sup>
  - 90 NET TECH JOB GAINS [2017 vs. 2016]
- 6.7% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
- 1,080 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 2,180 TECH OCCUPATION JOB POSTINGS [2017 total]
- 368.6% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

<sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

Information Systems Analysts and Consultants		
	2,590	
	-5.9% YoY	
User Support Technicians		
	2,460	
	+11.5% YoY	
Computer Programmers and Interactive Media Developers		
	2,340	
	+5.7% YoY	

**ECONOMIC IMPACT** 





- 6<sup>th</sup> NET TECH EMPLOYMENT RANK
- 8<sup>th</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 5<sup>th</sup> NET EMPL AS % OF WORKFORCE RANK



#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
Telecommunications and Internet Services	4,520	-2.7%
IT Services + Custom Software Services	4,710	10.7%
R&D, Testing, and Engineering Services	3,400	-1.0%
Tech Manufacturing	2,490	-2.7%
Software [package]	440	0.2%

#### **TECH INDUSTRY WAGES**

CAD



Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



# Ontario



#### STATE OF TECHNOLOGY SUMMARY

723,950	NET TECH EMPLOYMENT <sup>1</sup>
32,860	NET TECH JOB GAINS [2017 vs. 2016]
9.6%	NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
31,660	TECH BUSINESS ESTABLISHMENTS [firms with payroll]
60,700	TECH OCCUPATION JOB POSTINGS [2017 total]
40.2%	EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

<sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

Information Systems Analysts and Consultants		
	87,630 +12.5% YoY	
Computer Programmers and Interactive Media Developers		
	71,710	
	14.3% YoY	
User Support Technicians		
	47,950	
	+16.6% YoY	

**ECONOMIC IMPACT** 



Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 1<sup>st</sup> NET TECH EMPLOYMENT RANK
- 1<sup>st</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 1st NET EMPL AS % OF WORKFORCE RANK



#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
IT Services + Custom Software Services	140,740	8.0%
R&D, Testing, and Engineering Services	86,260	-1.1%
Telecommunications and Internet Services	62,440	-2.7%
Tech Manufacturing	41,170	0.9%
Software [package]	20,430	13.6%

#### TECH INDUSTRY WAGES



CompTIA

# Prince Edward Island

#### STATE OF TECHNOLOGY SUMMARY

- 4,670 NET TECH EMPLOYMENT<sup>1</sup>
- 600 NET TECH JOB GAINS [2017 vs. 2016]
- 5.9% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
- 190 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 240 TECH OCCUPATION JOB POSTINGS [2017 total]
- 211.1% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

#### <sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES



#### **ECONOMIC IMPACT**

Appendix for full methodology and data tables



Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See

- 10<sup>th</sup> NET TECH EMPLOYMENT RANK
- 5<sup>th</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 7<sup>th</sup> NET EMPL AS % OF WORKFORCE RANK



#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
Telecommunications and Internet Services	480	-1.2%
IT Services + Custom Software Services	570	13.0%
Tech Manufacturing	500	5.7%
R&D, Testing, and Engineering Services	410	5.4%
Software [package]	80	-8.5%

#### **TECH INDUSTRY WAGES**





# Quebec



#### STATE OF TECHNOLOGY SUMMARY

- 389,850 NET TECH EMPLOYMENT<sup>1</sup>
- 6,270 NET TECH JOB GAINS [2017 vs. 2016]
- 9.2% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
- 12,460 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 14,830 TECH OCCUPATION JOB POSTINGS [2017 total]
- 128.6% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

#### <sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

Information Systems Analysts and Consultants		
	42,560 -3.7% YoY	
Computer Programmers and Interactive Media Developers		
	38,020 +2.7% YoY	
Computer Network Technicians		
	17,270 +1.4% YoY	

#### **ECONOMIC IMPACT**



## **5.0%** Estimated direct contribution of the tech

sector to the Quebec economy

Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 2<sup>nd</sup> NET TECH EMPLOYMENT RANK
- 2<sup>nd</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 2<sup>nd</sup> NET EMPL AS % OF WORKFORCE RANK

TECH INDUSTRY EMPLOYMENT + 5,000 jobs +2.5% 105,000 0 2011 2012 2013 2014 2015 2016 2017 est.

#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
IT Services + Custom Software Services	74,070	8.9%
R&D, Testing, and Engineering Services	52,600	1.9%
Tech Manufacturing	38,600	-5.1%
Telecommunications and Internet Services	30,700	0.9%
Software [package]	9,400	-2.2%

#### **TECH INDUSTRY WAGES**





# Saskatchewan

#### STATE OF TECHNOLOGY SUMMARY

- 28,340 NET TECH EMPLOYMENT<sup>1</sup>
  - 370 NET TECH JOB GAINS [2017 vs. 2016]
- 4.7% NET EMPLOYMENT AS A % OF OVERALL WORKFORCE
- 1,090 TECH BUSINESS ESTABLISHMENTS [firms with payroll]
- 3,180 TECH OCCUPATION JOB POSTINGS [2017 total]
- 146.3% EMERGING TECH JOB POSTINGS % CHANGE [2017 vs. 2016]

#### <sup>1</sup>net of tech industry + tech occupation + self-employed [see methodology for details]



#### LEADING TECH OCCUPATION CATEGORIES

Information Systems Analysts and	l Consultants				
		3,060 +12.8% YoY			
Computer Programmers and Interactive Media Developers					
		1,810 +5.7% YoY			
User Support Technicians					
		1,710 -13.0% YoY			

#### **ECONOMIC IMPACT**



Primary data sources: EMSI | Statistics Canada | CompTIA | Burning Glass Technologies Labour Insights. All data are estimates covering the 2017 time period, unless specified as earlier | See Appendix for full methodology and data tables



- 7<sup>th</sup> NET TECH EMPLOYMENT RANK
- 7<sup>th</sup> NET TECH EMPLOYMENT JOBS ADDED RANK
- 10th NET EMPL AS % OF WORKFORCE RANK

+ 380 jobs +2.8% 7,500 0 2011 2012 2013 2014 2015 2016 2017 est.

**TECH INDUSTRY EMPLOYMENT** 

#### LEADING TECH INDUSTRY SECTORS [by employment]

	2017	YoY % Change
Telecommunications and Internet Services	5,540	0.4%
R&D, Testing, and Engineering Services	4,740	2.2%
IT Services + Custom Software Services	2,750	8.9%
Tech Manufacturing	680	2.4%
Software [package]	110	11.9%

#### **TECH INDUSTRY WAGES**





## APPENDIX – METHODLOGY

#### **CLASSIFICATION SYSTEM**

*Cyberprovinces* utilizes the North American Industrial Classification System (NAICS) to define the tech industry. The NAICS is a hierarchical system, with six-digit numbers assigned to the most specific industries. The NAICS is constructed around the concept of production and is able to reflect advances in technology, including many new service-oriented businesses. Economic units with similar production processes are classified in the same industry. Because *Cyberprovinces* analyzes the tech industry by using industry classifications, the report in general focuses on companies and sectors, not individual occupations.

NAICS was devised by the United States, Canada, and Mexico to allow industry analysis across all three nations. NAICS codes are revised periodically to reflect the emergence of new industry sectors or sub-sectors. The *Cyberprovinces'* NAICS definition of the tech industry has evolved over the years to reflect these changes. Consequently, the data in this report may not be entirely comparable with previous reports.

For occupation analysis, *Cyberprovinces* utilizes National Occupational Classification (NOC) System, which is a standard used by federal agencies to classify workers into occupational categories.

#### NET TECH EMPLOYMENT

The tech workforce consists of two primary components. New to *Cyberprovinces* for 2018 is a single metric that encompasses both components, making it easier to describe the tech workforce. The foundation is the set of technology occupation professionals working in technical positions, such as IT support, network engineering, software development and every related roles. Many of these professionals work for technology companies (53 percent), but many others are employed by organizations across every industry sector in the Canadian economy (47 percent).

The second component of the discussion consists of the business professionals employed by technology companies. These professionals play an important role in supporting the development and delivery of the technology products and services used throughout the economy. Thirty-four percent of the net tech employment total consists of tech industry business professionals.

See page 6 of this report for more details on the concept of Net Tech Employment.

#### **TECH INDUSTRY DEFINITION**

There are a number of considerations when developing a definition of the technology industry. In some cases, NAICS codes do not perfectly reflect industry dynamics. This can be especially challenging in times of rapid innovation, when new tech sectors emerge in a short period of time. More recently, the degree to which technology has become core to so many industry sectors poses new questions. For example, a technology platform designed to facilitate the online sale of goods may have traditionally been viewed as a retailer, although given the intense use of technology, an argument could be made to classify it as a technology firm.

Conceptually, *Cyberprovinces* focuses on the sectors involved in making, creating, enabling, integrating, or supporting technology, whether as a product or service. At this time, *Cyberprovinces* does not include industry sectors categorized primarily as users of technology.

*Cyberprovinces* includes 18 NAICS codes in its definition of the tech industry. Broadly these can be thought of in two broad categories: tech manufacturing and tech services. These industries sufficiently represent the technology industry within the framework provided under the NAICS system.

#### **TECH OCCUPATION DEFINITION**

The occupations covered by *Cyberprovinces* are broadly categorized into core information technology (IT) positions and then engineering, repair, technician, and assembly positions. In total, 25 distinct NOCs are used to define the tech occupations found across every industry sector of the economy.



For more details on the North American Industry Classification System (NAICS), https://www.statcan.gc.ca/eng/subjects/standard/naics/2017/index

#### **TECH MANUFACTURING**

3341	Computer	and pe	ripheral	equipment	manufacturing
00.1	00111001001	aa p c		equipe	

- 3342 Communications equipment manufacturing
- 3343 Audio and video equipment manufacturing
- 3344 Semiconductor and other electronic component manufacturing
- 3345 Navigational, measuring, medical and control instruments manufacturing
- 3346 Manufacturing and reproducing magnetic and optical media
- 3364 Aerospace product and parts manufacturing

#### **IT SERVICES**

- 4173 Computer and communications equipment and supplies merchant wholesalers
- 8112 Computer systems design and related services

#### TELECOMMUNICATIONS AND INTERNET SERVICES

- 5171 Wired telecommunications carriers
- 5172 Wireless telecommunications carriers (except satellite)
- 5174 Satellite telecommunications
- 5179 Other telecommunications
- 5182 Data processing, hosting, and related services

#### SOFTWARE

5112 Software publishers

#### R&D, TESTING, AND ENGINEERING SERVICES

- 5413 Architectural, engineering and related services
- 5417 Scientific research and development services

For more detail on the the National Occupational Classification (NOC) system, see: <u>https://www.statcan.gc.ca/eng/subjects/standard/noc/2016/index</u>

#### **IT OCCUATIONS**

- 213 Computer and information systems managers
- 2147 Computer engineers (except software engineers and designers)
- 2171 Information systems analysts and consultants
- 2172 Database analysts and data administrators
- 2173 Software engineers and designers
- 2174 Computer programmers and interactive media developers
- 2175 Web designers and developers
- 2281 Computer network technicians
- 2282 User support technicians
- 2283 Information systems testing technicians

#### **ENGINEERING AND OTHER OCCUPATIONS**

- 131 Telecommunication carriers managers
- 0211 Engineering managers
- 2132 Mechanical engineers
- 2133 Electrical and electronics engineers
- 2141 Industrial and manufacturing engineers
- 2146 Aerospace engineers
- 2148 Other professional engineers, n.e.c.
- 2232 Mechanical engineering technologists and technicians
- 2233 Industrial engineering and manufacturing technologists and technicians
- 2241 Electrical and electronics engineering technologists and technicians
- 2242 Electronic service technicians (household and business equipment)
- 5224 Broadcast technicians
- 5225 Audio and video recording technicians
- 7246 Telecommunications installation and repair workers
- 9523 Electronics assemblers, fabricators, inspectors and testers

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