



SPOKANE
WORKFORCE
COUNCIL

IN PARTNERSHIP WITH:

JPMORGAN CHASE & CO.

JUNE 2018

Workforce Roadmap

INFORMATION TECHNOLOGY IN SPOKANE, WASHINGTON



Information Technology Overview

Information technology (IT) is a growing component of many different industries in Spokane, WA. Computer and mathematical occupations can be found at firms in virtually all industries. This occupation group has a total employment of 4,631 people in Spokane County, with an average wage of \$72,400. Computer and mathematical occupations are also adding new jobs at a projected growth rate of 1.2% annually, which is double the projected new job growth rate of the overall Spokane economy (0.6% annually). Approximately 1,110 total job openings are projected over the next three years across all computer and mathematical occupations.

Although IT is not a specific industry itself in the North American Industry Classification System (NAICS), there are multiple sectors which are typically considered to be representative of information technology. Spokane County has a lower location quotient (LQ) for these IT occupations and sectors compared to the national average. This means that the proportion of total employment in Spokane that is represented in IT occupations and IT-related sectors is lower than what is seen across the country.

Other parts of Washington State, mainly the Puget Sound region, has a far more robust and developed information technology cluster of businesses and workers. Expanding IT occupations and related sectors locally is a strong strategy for economic growth, and will be necessary for retaining workforce talent, especially graduates from regional colleges and universities. Many information technology graduates leave the Eastern Washington region upon completion of their education to pursue jobs in Seattle, Portland, and other larger metro areas with more IT employment opportunities.

A number of IT occupations are expanding their presence in the Spokane market in the healthcare, finance and insurance, and education sectors, among others. This is creating more job opportunities locally for those with IT skills and backgrounds, and may help to attract outside talent and businesses that are considering the Spokane area.

The Spokane Workforce Council focuses on Professional, Scientific, and Technical Services as one of its five target industries in Spokane, and develops strategies to help the area workforce obtain IT skills that are sought after by local businesses. This industry is one of the fastest growing in Spokane, and the demand for specific IT skills change rapidly, so making sure workforce development efforts align with business needs is paramount.

COMPUTER & MATHEMATICAL OCCUPATIONS GROUP

4,631

**Total
Employment for
occupation group**

\$72,400

Average Wage

1,110

**Approximate total job
openings projected over
the next three years**

SOURCES: JobsEQ by Chmura Economics and Analytics. Labor market data as of 2018Q1 unless noted. Labor Insights by Burning Glass. Real time job postings data ranges noted in text. Integrated Postsecondary Education Data System (IPEDS). Fall 2016 education award data.

Industry Subsectors

Information technology is not an official NAICS grouping, but what can be considered IT is made up of a wide variety of sectors that have IT-related features. Below is a list of some of the most closely associated sectors for information technology in Spokane County sorted by NAICS code:

Industry Snapshot of IT group in Spokane County, Washington, 2018Q1		CURRENT			5-YEAR HISTORY		3-YEAR FORECAST				
		Four Quarters Ending with 2018Q1			Total Change	AvgAnn% ChginEpl	Separations (Approximate)			Growth	
		Empl	AvgAnn Wages	LQ	Empl	Region	Total New Demand	Exits	Transfers	Empl	AvgAnn Rate
NAICS	Industry										
3341	Computer and Peripheral Equipment Manufacturing	12	\$84,829	0.05	-8	-9.5%	2	1	2	-1	-1.5%
3342	Communications Equipment Manufacturing	258	\$81,631	1.97	-28	-2.1%	40	23	42	-26	-3.4%
3343	Audio and Video Equipment Manufacturing	3	\$65,962	0.11	-4	-14.8%	1	0	1	0	-0.9%
3344	Semiconductor and Other Electronic Component Manufacturing	276	\$58,397	0.50	-71	-4.5%	65	28	48	-11	-1.3%
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	531	\$111,895	0.87	-79	-2.7%	122	50	89	-18	-1.2%
3346	Manufacturing and Reproducing Magnetic and Optical Media	1	\$42,335	0.03	-1	-11.8%	0	0	0	0	0.5%
5112	Software Publishers	280	\$87,179	0.48	23	1.8%	80	20	46	13	1.6%
5173	Wired and Wireless Telecommunications Carriers	572	\$81,098	0.55	-82	-2.6%	139	54	109	-25	-1.5%
5179	Other Telecommunications	26	\$59,330	0.21	-17	-9.5%	6	2	5	-2	-2.1%
5182	Data Processing, Hosting, and Related Services	254	\$63,412	0.50	-20	-1.5%	74	22	44	8	1
5191	Other Information Services	401	\$45,213	0.59	73	4.1%	160	40	73	46	3.7%
5415	Computer Systems Design and Related Services	2,102	\$84,220	0.65	507	5.7%	600	151	340	109	1.7%
5416	Management, Scientific, and Technical Consulting Services	1,266	\$55,045	0.51	138	2.3%	412	128	221	63	1.6%
5417	Scientific Research and Development Services	100	\$62,941	0.10	23	5.3%	29	9	17	4	1.3%
6114	Business Schools and Computer and Management Training	86	\$34,828	0.589	-69	-11.1%	19	10	14	-4	-1.6%
	IT Group	6,168	\$74,657	0.54	385	1.3%	0	0	0	175	0.9%
	Total - All Industries	233,465	\$45,890	1.00	19,854	1.8%	81,549	33,040	44,050	4,459	0.6%

The location quotient (LQ) is a measure of the relative size of the selected region's industry employment compared to the national average. Only one of the listed IT-related sectors has a location quotient above 1, with Communication Equipment Manufacturing at 1.97. LQ's that are above 1.25 are considered to be a competitive advantage for a region, and better allows for industry clustering to occur.

The largest subsector by total employment is Computer Systems Design and Related Services, with 2,102 people employed in Spokane County. Management, Scientific, and Technical Consulting Services is the second largest IT sector by employment at 1,266. Wages across nearly all of the sectors are higher than the Spokane average.

Industry/Occupation Mix

Below are the top 25 detailed occupations by total employment in the IT-related sector group from above. The total number employed for each occupation is estimated based on staffing patterns within the different industries. Totals only include employment by IT-related firms in Spokane County and does not include additional employment from other industries.

Industry/Occupation Mix for IT Group in Spokane County, Washington, Baseline		CURRENT		3-YEAR DEMAND			
SOC	Title	Empl	Regional Average Wage	Labor Exits	Occ Transfers	Growth	Total
15-1132	Software Developers, Applications	491	\$83,600	24	83	47	153
13-1111	Management Analysts	282	\$71,200	28	46	9	84
15-112	Computer Systems Analysts	266	\$82,200	15	38	11	65
43-4051	Customer Service Representatives	234	\$33,800	36	53	0	88
15-1151	Computer User Support Specialists	225	\$49,700	14	37	9	60
41-3099	Sales Representatives, Services, All Other	205	\$49,900	21	56	8	85
11-9199	Managers, All Other	190	\$91,900	16	25	4	44
11-1021	General and Operations Managers	166	\$103,600	11	32	6	49
13-1161	Market Research Analysts and Marketing Specialists	158	\$61,900	14	37	13	64
15-1133	Software Developers, Systems Software	157	\$95,600	7	24	5	36
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	153	\$59,300	14	31	-7	38
11-3021	Computer and Information Systems Managers	136	\$112,500	8	24	6	38
15-1131	Computer Programmers	123	\$61,200	6	16	-1	22
13-1199	Business Operations Specialists, All Other	116	\$65,700	11	21	4	36
15-1142	Network and Computer Systems Administrators	110	\$66,500	5	16	4	25
51-2022	Electrical and Electronic Equipment Assemblers	110	\$29,800	15	19	-11	22
43-9061	Office Clerks, General	107	\$33,700	19	19	1	39
15-1199	Computer Occupations, All Other	95	\$62,800	6	14	4	23
15-1134	Web Developers	83	\$63,400	5	14	4	23
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	77	\$36,400	12	12	-1	24
13-2011	Accountants and Auditors	76	\$65,000	7	14	3	24
15-1152	Computer Network Support Specialists	74	\$59,600	5	12	2	18
43-3031	Bookkeeping, Accounting, and Auditing Clerks	72	\$41,100	14	11	1	25
15-1143	Computer Network Architects	69	\$83,800	3	11	2	15
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	67	\$60,900	7	14	2	23

SOURCE: JobsEQ®, Data as of 2018Q1

Computer & Mathematical Occupations

Traditionally, information technology is associated with computer and mathematical occupations. Although many of those workers can be found in different industries, a significant number work directly in IT. In total, 4,631 people are employed in computer and mathematical occupations in Spokane County. This occupation group has grown by 408 total jobs over the last five years in Spokane, or 1.9% annually. Below are the top occupations by total employment, across all industries:

Occupation Snapshot of Computer and Mathematical Occupations in Spokane County, Washington, 2018Q1		CURRENT			5-YEAR HISTORY		3-YEAR FORECAST				
		Four Quarters Ending with 2018Q1			Total Change	Avg Ann% Chgin Epl	Separations (Approximate)			Growth	
		Empl	AvgAnn Wages	LQ	Empl	Region	Total New Demand	Exits	Transfers	Empl	AvgAnn Rate
SOC	Title										
15-1132	Software Developers, Applications	843	\$83,600	0.64	99	2.5%	242	39	138	65	2.5%
15-1151	Computer Use Support Specialists	760	\$49,700	0.79	66	1.8%	192	48	121	23	1.0%
15-1121	Computer Systems Analysts	714	\$82,200	0.78	73	2.2%	153	40	99	15	0.7%
15-1142	Network and Computer Systems Administrators	452	\$66,500	0.76	42	2.0%	91	19	65	7	0.5%
15-1199	Computer Occupations, All Other	330	\$62,800	0.78	17	1.1%	74	19	47	8	0.8%
15-1133	Software Developers, Systems Software	266	\$95,600	0.39	16	1.2%	59	12	41	7	0.8%
15-1152	Computer Network Support Specialists	227	\$59,600	0.76	18	1.7%	55	14	36	5	0.8%
15-1131	Computer Programmers	223	\$61,200	0.50	22	2.1%	35	11	29	-6	-0.8%
15-1134	Web Developers	204	\$63,400	0.80	14	1.4%	52	12	33	7	1.1%
15-1143	Computer Network Architects	164	\$83,800	0.64	14	1.8%	34	7	25	3	0.5%
15-1141	Database Administrators	122	\$58,700	0.67	10	1.7%	28	8	16	4	1.0%
15-2031	Operations Research Analysts	118	\$77,300	0.67	7	1.2%	31	8	15	8	2.3%
15-1122	Information Security Analysts	104	\$95,200	0.66	11	2.3%	31	6	17	7	2.3%
15-2041	Statisticians	41	\$68,400	0.70	0	0.1%	14	3	7	4	2.8%
15-2011	Actuaries	32	\$87,600	0.98	-1	-0.8%	9	1	5	2	2.3%
15-1111	Computer and Information Research Scientists	23	\$104,300	0.51	2	1.6%	6	1	4	1	1.4%
15-2021	Mathematicians	3	\$93,100	0.60	0	-0.4%	1	0	0	0	2.2%
15-2099	Mathematical Science Occupations, All Other	2	\$58,200	0.74	0	1.8%	1	0	0	0	1.2%
15-2091	Mathematical Technicians	1	\$51,400	0.78	0	-1.1%	0	0	0	0	1.3%
15-0000	Computer and Mathematical Occupations	4,631	\$72,400	0.68	408	1.9%	1,110	249	698	163	1.2%
00-000	Total – All Occupations	233,465	\$47,100	1.00	19,854	1.8%	83,214	34,220	44,536	4,459	0.6%

Although the location quotient is 0.68 for all computer and mathematical occupations in Spokane County, meaning Spokane has a lower concentration of these jobs as compared to the nation average, the wage level and projected new job growth is very strong, compared to the Spokane economy as a whole.

Software Developers, Applications is the largest computer and mathematical occupation by total employment in Spokane, and also projects 65 new jobs added over the next three years in Spokane, or 2.5% average annual growth, more than four times the projected overall average annual growth rate of all jobs in Spokane.

Demographics

The sectors that comprise the IT group follow an age distribution similar to the overall Spokane economy, with the largest concentrations of workers in the 35–44 and 45–54 age groups. However, many of the sectors that comprise the IT group have a significantly higher concentration of male workers than female workers, an observation that is not unique to Spokane, but is a persistent issue with information technology as a whole.

Gender

Gender by total employment across all occupations for the select IT-related sectors, only sectors with unsuppressed demographic data are listed below:

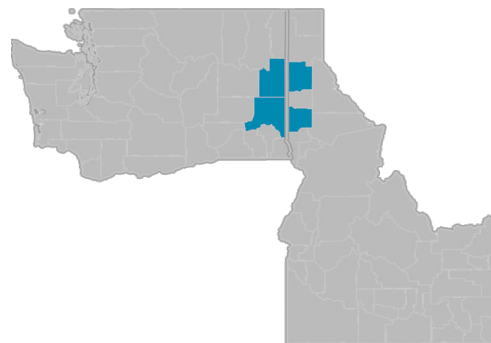
Industry (NAICS)	Female % of Workforce	Male % of Workforce
Communications Equipment Manufacturing (3342)	29.6%	70.4%
Semiconductor and Other Electronic Component Manufacturing (3344)	37.4%	62.6%
Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (3345)	38.5%	61.5%
Software Publishers (5112)	35.1%	64.9%
Wired and Wireless Telecommunications Carriers (5173)	26.4%	73.6%
Other Telecommunications (5179)	20.0%	80.0%
Data Processing, Hosting, and Related Services (5182)	34.8%	65.2%
Other Information Services (5191)	63.0%	37.0%
Computer Systems Design and Related Services (5415)	31.8%	68.2%
Management, Scientific, and Technical Consulting Services (5416)	67.8%	32.2%
Scientific Research and Development Services (5417)	55.0%	45.0%
Business Schools and Computer and Management Training (6114)	61.9%	38.1%
Overall Spokane Economy	50.6%	49.4%

Regional Education Awards

Spokane County is home to three universities and two community colleges: Eastern Washington University, Gonzaga University, Whitworth University, Spokane Community College, and Spokane Falls Community College. 38,967 total students attend these schools. Washington State University and University of Washington also have medical schools located in Spokane.

In the greater region, North Idaho College in Coeur d'Alene, ID has another 5,543 students, and Washington State University and University of Idaho combine for 41,058 total students.

The Spokane region produces many academic awards that are related to information technology. Below are the total awards issued by degree level in the 2015-16 school year, in select fields relevant to IT, across all colleges and universities in Spokane, Whitman, Kootenai (ID), and Latah (ID) Counties:



Title	AA/Cert	BA	Postgraduate	TOTAL
Computer Science	5	160	31	196
Web Page/Digital Design	104	51	0	155
Management Info Systems	0	147	0	147
Mathematics	1	90	7	98
Information Sciences	0	88	4	92
Applied Mathematics	0	61	16	77
System Networking	34	0	0	34
Modeling and Simulation	0	30	0	30
Computer Engineering	0	24	5	29
Computer Programming Apps	29	0	0	29
Statistics	0	5	24	29
Computer Support Specialist	28	0	0	28

Online Job Postings

Over the past year (June 1, 2017 – May 31, 2018), approximately 1,168 de-duplicated job openings were posted online in Spokane County specifically for IT occupations. Below are breakdowns of those postings by top 10 occupations, education required, and top skills asked for in the job description:

Occupations by Total Postings	Minimum Advertised Education
Software Developer (267 online postings)	High School Degree (17.21% of postings)
Computer Support Specialist (225)	Associate's Degree (13.82%)
Network Engineer / Architect (80)	Bachelor's Degree (66.8%)
IT Project Manager (66)	Master's Degree (1.36%)
Systems Analyst (61)	Doctoral Degree (0.81%)
Database Administrator (57)	
Information Security Engineer (55)	
Network Administrator (46)	
Computer Systems Engineer (44)	
Software QA Engineer (41)	

Baseline Skills	Specialized Skills
Communication Skills (456 postings)	SQL (204)
Troubleshooting (399)	Microsoft Office Suite (198)
Problem Solving (272)	Software Development / Engineering (165)
Teamwork / Collaboration (264)	JavaScript (122)
Planning (221)	Linux (113)
Writing (204)	C# (104)
Planning (222)	Oracle (81)
Microsoft Office (198)	VMware (71)
Organizational Skills (163)	Python (71)
Research (150)	Object-Oriented Analysis and Design (67)

66.8%
REQUIRE A
BACHELOR'S DEGREE

The highest number
of postings for an
occupation:

267
SOFTWARE DEVELOPER

39%
OF ALL IT OCCUPATION
POSTINGS REQUEST
COMMUNICATIONS
SKILLS

IT Employer Focus Group

In early June 2018, the Spokane Workforce Council hosted an information technology employer focus group to discuss local workforce challenges and solutions for the region. A number of small- to large-size firms took part in the workforce discussion. Below are some key findings and points of discussion from the focus group:

- Many IT jobs are hard to fill locally, which has led numerous firms to hire contract workers to work remotely from outside the area.
- Many of those contract workers live in larger metro areas like Seattle.
- Wage levels of IT occupations in Spokane may be skewed higher due to 1099 workers.
- Using a recruitment service to find outside talent typically costs 20% of base salary to move a new employee to Spokane.
- Security issues are a concern for personnel who work remotely, and most firms expressed that they only do this as necessary.
- Entry level IT workers are easier to find than those with experience. It typically takes a few years of experience to become highly proficient.
- Firms have trouble retaining IT workers beyond two years.
- Skills in interpreting and manipulating data are lacking in the US workforce; internationally markets like India are oversupplying data analysts, which firms are hiring.
- IT degrees are not deemed necessary by firms at the focus group, but the vast majority of job postings ask specifically for a Bachelor's Degree education level.
- Specialization is very hard to find, and education teaches more broad skills.
- Cisco certificates (CCNA, CCI) are highly desired by firms in attendance.
- Skills like fiber optic line installation has no educational program, and skills must be entirely learned on the job.
- Spokane has lost out on recruiting IT businesses, namely IBM, due to lack of existing IT workforce.
- Female representation in IT roles is a major concern. Typically no more than 25% of applicants for postings are female. Project Management and Engineering roles are the most highly male dominated.
- Retaining the existing IT workforce is very difficult. If a firm goes through a layoff, many workers don't stay in area to find a new job.
- Firms in attendance expressed a strong interest in some sort of local IT workforce network/exchange, to submit openings to and to quickly hire any displaced workers and to fill open recruitments with local talent.



Using a recruitment service to find outside talent typically costs 20% of base salary to move a new employee to Spokane.

Looking Ahead

Computer and mathematical occupations are projected to grow new jobs at an average annual rate twice as fast as overall occupations in Spokane. Area businesses are already experiencing difficulty in filling many information technology roles, and the expansion of more jobs will likely put further stress on local IT firms facing workforce shortages. Recruiting and hiring from outside the area is very expensive, as is hiring contract workers who typically demand higher wages than permanent employees. Therefore developing and retaining local talent with IT skills relevant to local business needs is key to handle the projected job growth.

The underrepresentation of female workers in many of the IT-related sectors is a national trend, and affects recruitment and workplace culture. The lack of female applicants for regional job openings is a result of low female representation in IT educational tracks, including at K-12 levels. Local groups like the Inland Northwest Technologists are actively engaging with students at a younger age through events and showcases to help build interest and awareness in IT careers early in their education.

THE IT INDUSTRY At-A-Glance



Computer and mathematical occupations are projected to grow new jobs at an average annual rate twice as fast as all occupations in Spokane overall.



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A number of technology skillsets are on the rise and growing locally according to firms that attended the Spokane Workforce Council IT employer focus group, such as artificial intelligence, cloud computing, and the internet of things. Networking and development roles are also merging into dual functionality jobs, so IT workers are being asked to know broader skills and have a willingness to learn and adapt to remain competitive in a rapidly changing industry. Education providers will also need to adapt and teach skills that are in demand locally for graduates to fill job openings in the Spokane market.

Although Spokane does not have as high of a concentration of information technology businesses as compared to areas like Seattle, the growing demand for IT skills can be found across many industries. Building a robust IT workforce will be necessary to fulfill broad occupational demand from existing local firms, as well as to help attract new businesses to locate in the area. Local workforce is the primary consideration of economic development efforts, and as Spokane becomes more recognized as an attractive place to live and work, it is vital that the whole workforce development system is aligned in efforts to ensure that in-demand skills and abilities are built into the labor force.

Technology skillsets on the rise:

- ✓ ARTIFICIAL INTELLIGENCE
- ✓ CLOUD COMPUTING
- ✓ INTERNET OF THINGS



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