2022

TECHNOLOGY SECTOR LABOR REPORT

THE COLUMBIA-WILLAMETTE WORKFORCE COLLABORATIVE
Working together to develop and support regional talent

Clackamas Workforce Partnership
WORKFORCE DEVELOPMENT BOARD

workforce
SOUTHWEST WASHINGTON

work systems

TABLE OF CONTENTS

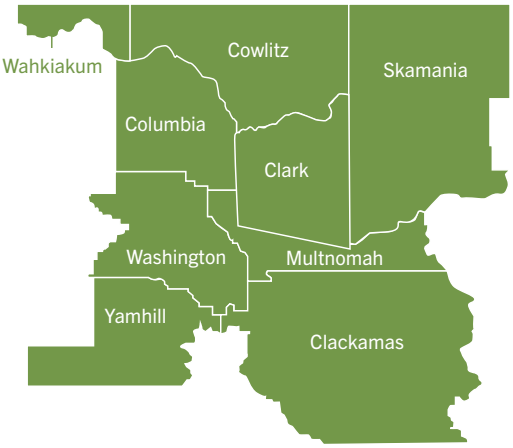
ABOUT THE COLUMBIA-WILLAMETTE WORKFORCE COLLABORATIVE

The Columbia-Willamette Workforce Collaborative (Collaborative) is a partnership between Clackamas Workforce Partnership, Workforce Southwest Washington and Worksystems: the three Workforce Development Boards covering the Portland-Vancouver Metropolitan Area. The Collaborative delivers a unified approach to serving industry, supporting economic development, and guiding public workforce training investments to better address the needs of our combined labor shed. We know that people are willing to travel throughout the region for the best opportunities and that employers need the most qualified workers regardless of where they live. By working together, we can cultivate our regional talent pool and build the foundation for a strong economy.

ABOUT THE GEOGRAPHIES

Throughout this report, data is often provided for all nine counties found on the map at right. These nine counties, when combined, are referred to as the Portland-Vancouver Metro Area (PVMA). The PVMA is a combination of the seven-county Portland-Vancouver-Hillsboro Metro Statistical Area (MSA) and two additional counties served by the Collaborative—Cowlitz and Wahkiakum counties in Southwest Washington.

Columbia, Yamhill, and Skamania counties are not a part of the Collaborative's geography, however, remain an important part of this report as they are included with the Portland MSA. In instances where data is not available for the nine-county region combined, data instead is provided for the seven-county MSA.



ABOUT THIS REPORT

The Collaborative is focused on aligning and investing resources to support the workforce needs of four sectors: Advanced Manufacturing, Healthcare, Technology, and Construction. Sectors are chosen based on factors such as their economic significance to the region, current number of openings and job growth projections, average wages that support self-sufficiency, and career ladder opportunities across the skill continuum. By examining labor market intelligence (such as the data contained in this report) and vetting the information with business partners, we are able to better understand industry trends, identify current and emergent workforce needs, and develop customized solutions for each sector.

INTRODUCTION

In 2016, the Columbia-Willamette Workforce Collaborative (CWWC) published its first data report about the Software/IT industry. This report introduced the community to Software/IT as a high growth industry in the Portland-Vancouver Metro Area (PVMA), and led the CWWC to build a workforce plan, TechTown, which launched in June 2017.

Unlike the other CWWC designated sectors, Software/IT is unique in that more than 60% of technology jobs lay outside of the industry, which means that there are more software developers, network administrators, and data analysts working for hospitals, school districts, and financial institutions than there are working for tech companies. Consequently, this report will provide data on both the Software/IT industry and technology occupations. Combined, these will be referred to as the Tech Sector.

Since the 2016 report (which included data from 2013, 2014, and 2015), growth in the Software/IT industry has continued to climb, reaching more than 33,600 individuals as of 2021. For all occupations in the industry, there were over 40,800 online job postings each month in 2021, and 2,700 monthly postings for technology occupations across all industries. The overall economy is expected to grow at 13% over the next decade while the Software/IT industry is expected to double that pace at a rate of 25%, adding 6,500 jobs. Technology occupations will grow 18%, adding 8,300 jobs. To keep pace with the high-demand of these occupations, over 2,300 workers were granted H-1B visas for tech-related occupations in 2021.

Software/IT firms continue to have notable concentrations in software publishing for the region, at a rate that is 120% higher than the national average. Technology occupations are 16% more concentrated locally than throughout the country. High wage salaries are particularly appealing in both the Software/IT industry (average $153,000) and among Tech occupations (average $100,000).

Under the guidance of local companies, the three-point workforce plan that emerged focused on cultivating a diverse, homegrown talent pipeline, and a more inclusive work environment. The strategies included in the plan seek to attract and cultivate more local, under-represented candidates; develop tools and resources to increase access to information and training to help under-represented populations pursue tech careers; and develop and share industry working models which increase hiring, retention and advancement of women and people of color.

The CWWC works with employers and industry experts throughout the two-year plan, utilizing their skills and abilities to educate influencers with data-driven outlooks for careers in technology, to target outreach and cultivate partnerships with diverse communities and organizations, foster inclusive working environments, and facilitate partnership between employers and curriculum development. Meeting with employers quarterly allows the CWWC to regularly engage the industry to ensure that workforce development strategies adapt as the industry changes.

The 2022 report shows continued fast-paced growth for the industry and indicates that workforce development efforts are helping to support the industry's success. The CWWC will continue to support regional employers, partners, industry experts, job seekers, and youth in the future.

OVERVIEW

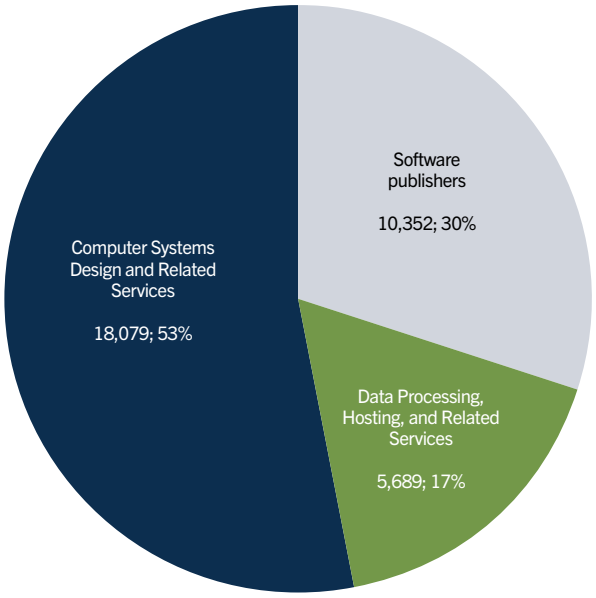
With 34,100 jobs and a payroll of $5.1 billion, the Software/IT industry accounts for 3.6% of the greater PVMA's private-sector employment and 4.7% of payroll.

The Software/IT industry includes software publishers, computer systems design, and data processing services. This includes companies that develop and publish packaged software; develop customized software; and design computer systems to meet the needs of customers. Data centers, internet service providers, and web hosting companies are also part of this industry.

Computer systems design and related services is the largest of the three subsectors. It added nearly 600 jobs between 2017 and 2021 for a growth rate of 3%. The other sectors, grew at a faster rate and added more jobs during this period. Software publishers added more than 2,100 jobs with a growth rate of 26%. Data processing had the largest growth rate, 38%, adding more than 1,500 jobs between 2017 and 2021. During this period, the region did not experience overall job growth. This is likely a reflection of job losses during the COVID-19 recession.

More than six in ten of the industry's jobs are in the computer-related occupations found in Table 1, including computer analysts, programmers, and software developers. These 17 technology occupations account for nearly 61,500 jobs across all industries.

FIGURE 1: Software/IT Employment by Subindustry, Portland-Vancouver Metro Area, 2021



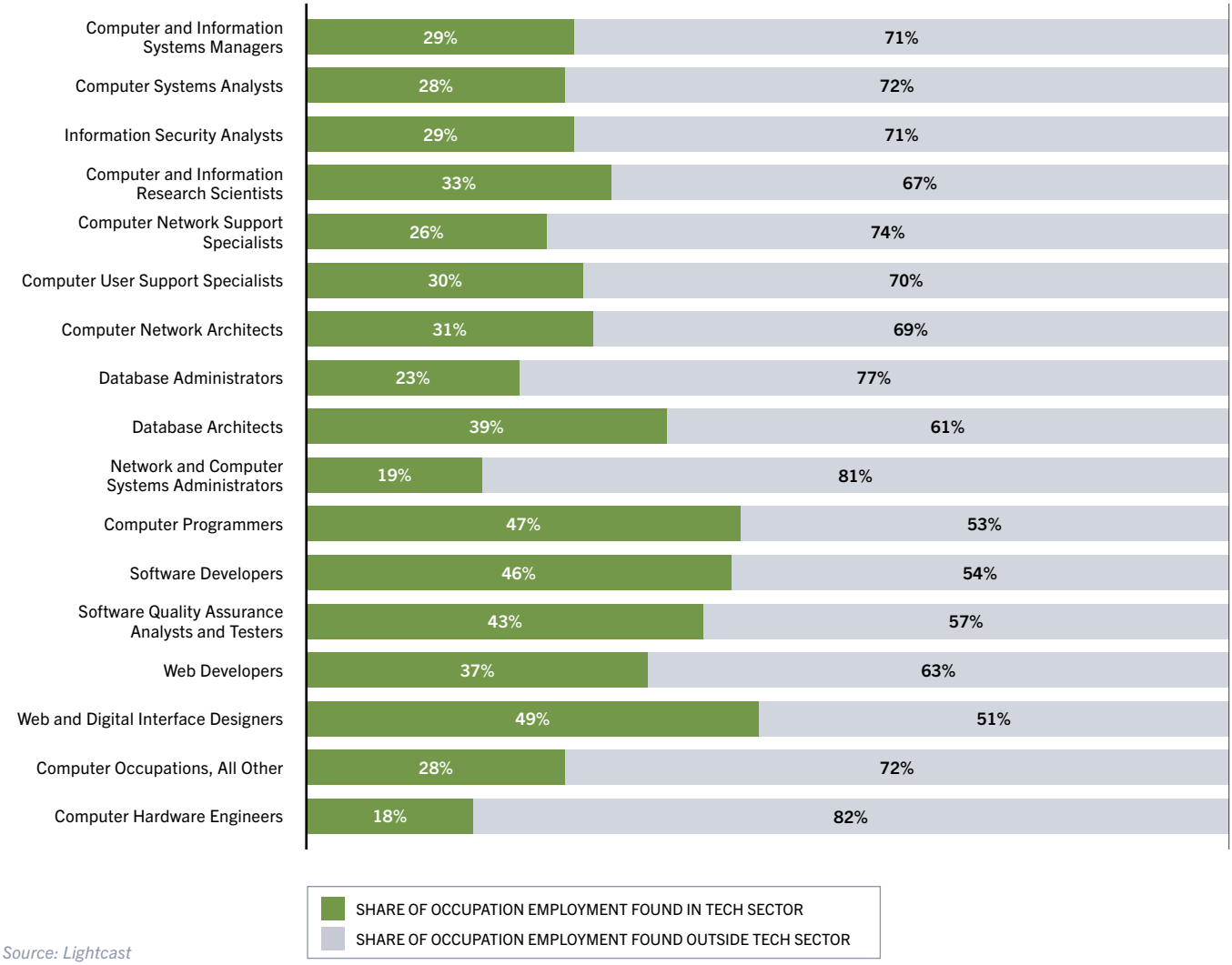
Source: Lightcast

TABLE 1: Technology Occupations, Portland-Vancouver Metro Area, 2021

SOC	OCCUPATION	Total Jobs	Employed in Tech Sector	Share of Sector Employment	Share of Occupation Employment Found in Tech Sector	Median Hourly Income
11-3021	Computer and Information Systems Managers	6,448	1,897	5.6%	29%	$61.67
15-1211	Computer Systems Analysts	5,986	1,654	4.8%	28%	$49.11
15-1212	Information Security Analysts	1,100	318	0.9%	29%	$51.49
15-1221	Computer and Information Research Scientists	528	172	0.5%	33%	$79.56
15-1231	Computer Network Support Specialists	1,411	370	1.1%	26%	$29.88
15-1232	Computer User Support Specialists	6,737	2,007	5.9%	30%	$28.62
15-1241	Computer Network Architects	1,370	419	1.2%	31%	$51.85
15-1242	Database Administrators	673	152	0.4%	23%	$48.76
15-1243	Database Architects	436	171	0.5%	39%	$60.94
15-1244	Network and Computer Systems Administrators	3,916	751	2.2%	19%	$46.10
15-1251	Computer Programmers	1,518	712	2.1%	47%	$47.10
15-1252	Software Developers	16,499	7,654	22.4%	46%	$54.63
15-1253	Software Quality Assurance Analysts and Testers	2,092	908	2.7%	43%	$39.34
15-1254	Web Developers	1,460	547	1.6%	37%	$28.95
15-1255	Web and Digital Interface Designers	1,160	567	1.7%	49%	$35.54
15-1299	Computer Occupations, All Other	2,938	834	2.4%	28%	$43.21
17-2061	Computer Hardware Engineers	7,311	1,336	3.9%	18%	$63.25
	Total	**61,584**	**20,468**	**60%**	**33%**	**$49.76**

Source: Lightcast

FIGURE 2: Technology Occupations Share of Employment within Industry vs. Outside of Industry, Portland-Vancouver Metro Area, 2021



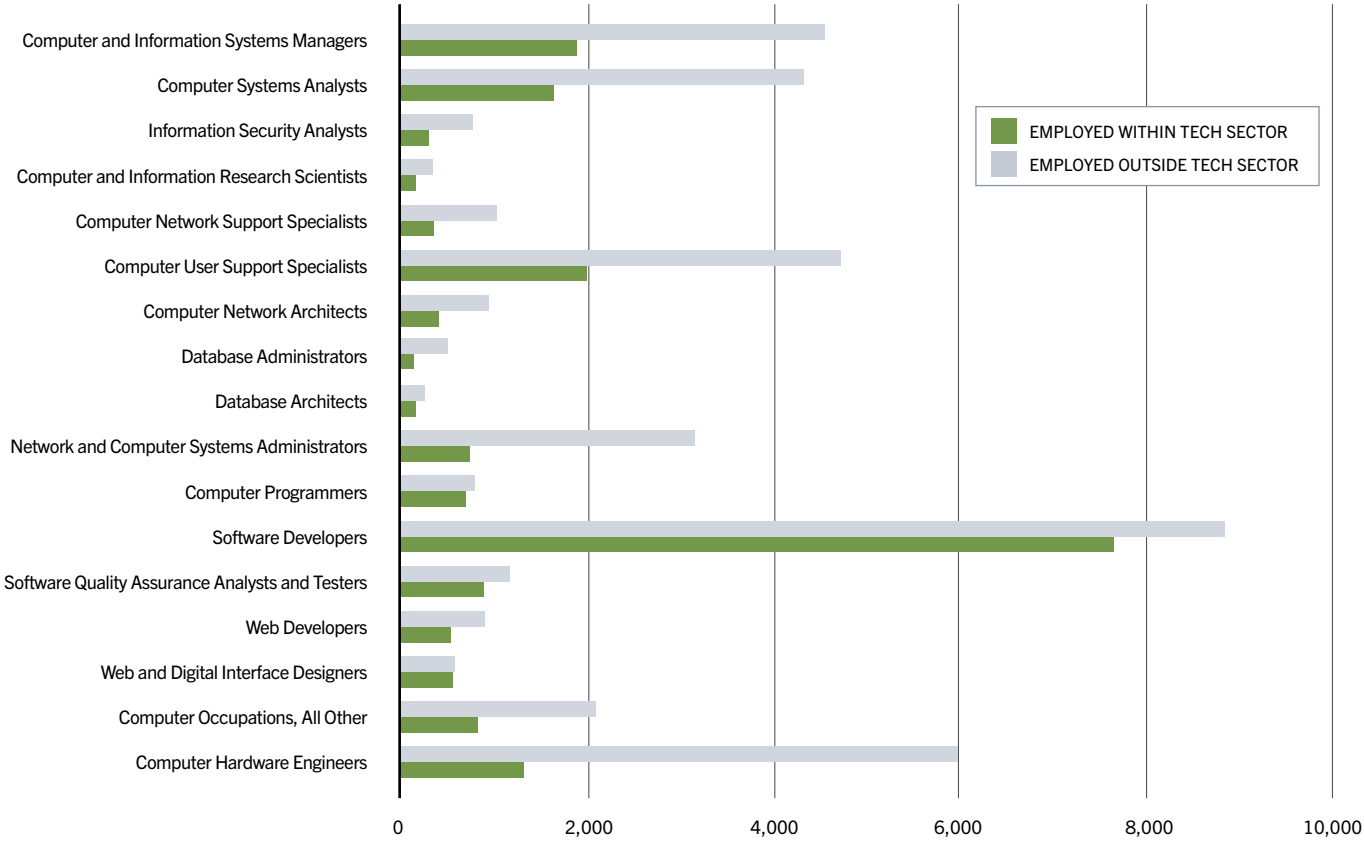
Source: Lightcast

Despite making up most of the jobs found in the Software/IT industry, none of the 17 technology occupations have a majority of their employment within the Software/IT industry. Since an array of companies in every industry use some form of computer technology in their day-to-day operations, just 33% of those employed in technology occupations are found in the Software/IT industry. The most common industries outside the Software/IT industry that tend to employ the additional 67% of workers found in these occupations include management of companies and enterprises, management, semiconductor and other electronic component manufacturing, and educauton (local government).

The industry's largest occupation is software developers. Forty-six percent of these workers are employed outside the Software/IT industry. Nearly every other technology occupation has a substantial share of employment outside the industry, often more than double the amount employed within the industry.

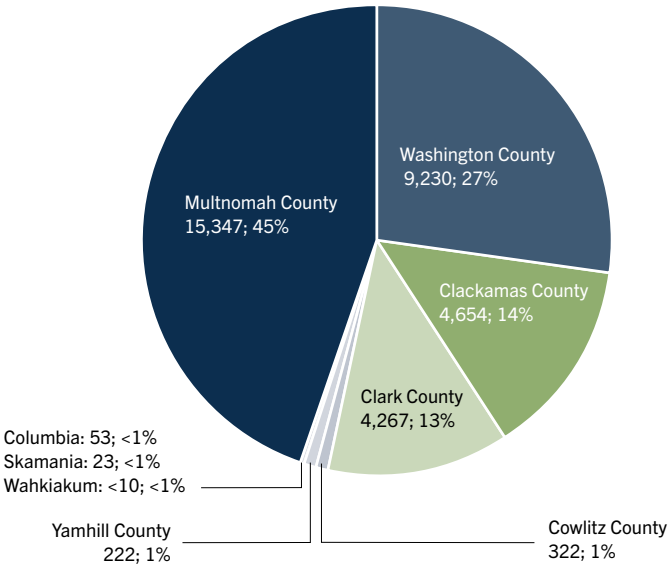
Consequently, this report provides data on both the Software/IT industry and technology occupations. The term "Tech sector" throughout this report indicates that the data or information pertains to both.

FIGURE 3: Technology Occupations Share of Employment with Industry vs. Outside of Industry, Portland-Vancouver Metro Area, 2021



Source: Lightcast

FIGURE 4: Software/IT Industry Employment by County, Portland-Vancouver Metro Area, 2021



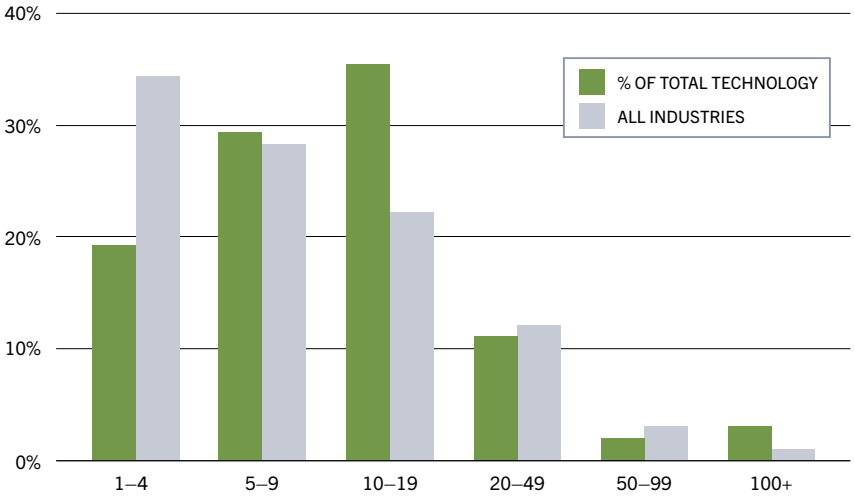
Source: Lightcast

Tech employment is growing in every county in the PMVA. Multnomah and Washington counties hold a disproportionate share of the region's Software/IT industry employment (72%). Employment tends to cluster in downtown Portland and along Highways 26 and 217. The two-county share of employment, however, has decreased by eight percentage points compared to 2015.

Multnomah and Washington counties experienced four-figure increases in employment since 2017. Clark, Cowlitz, and Yamhill Counties each experienced a growth rate of more than 50%.

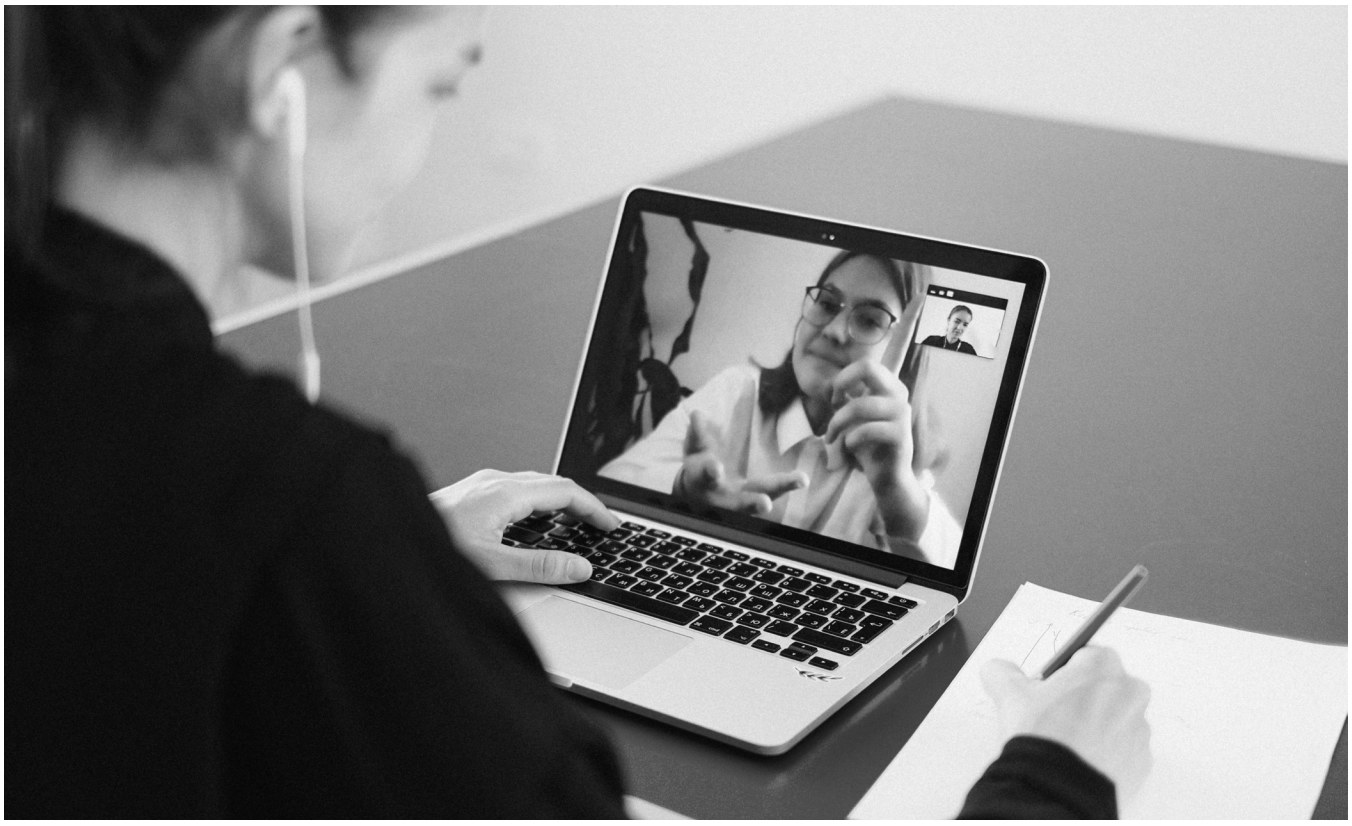
FIRM CHARACTERISTICS

FIGURE 5: Software/IT Firms by Class Size, Portland-Vancouver Metro Area, 2021



Source: Lightcast

Nearly half of Software/IT industry firms employ nine or fewer workers. Despite the skew, larger firms (50+ employees) account for over 46% of the total employment. This represents a significant decrease from 2017 when 56% of tech workers were employed by companies with 50 or more employees.



MAJOR EMPLOYERS

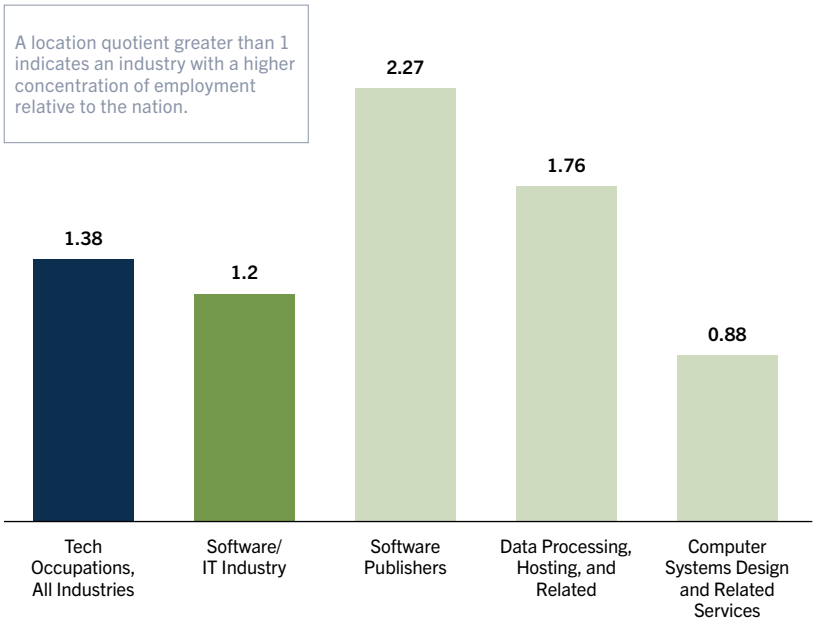
TABLE 2: Major Employeers, 2021

AIRSHIP
AMPERE COMPUTING
AUTODESK
BRANDLIVE
DIGIMARC
FORMFACTOR INC.
INCOMM INCENTIVES
INTEL
JAMA SOFTWARE
LAM RESEARCH CORP.
MOBILE TECH INC.
NAVEX
NEW RELIC
PLANAR
PUPPET
QORVO
RUBY
SAGE SOFTWARE
SIEMENS (FORMERLY MENTOR GRAPHICS)
SILICON FOREST ELECTRONICS INC.
SLALOM
SMARSH
THERMO FISHER SCIENTIFIC INC.
VANGUARD EMS INC.
VERNIER SOFTWARE & TECHNOLOGY
VIEWPOINT
ZAPPROVED
ZOOMINFO

Source: Oregon Employment Department

CONCENTRATION

FIGURE 6: Location Quotients Technology Occupations, Software/IT Technology and Subindustries, Portland-Vancouver Metro Area, 2021

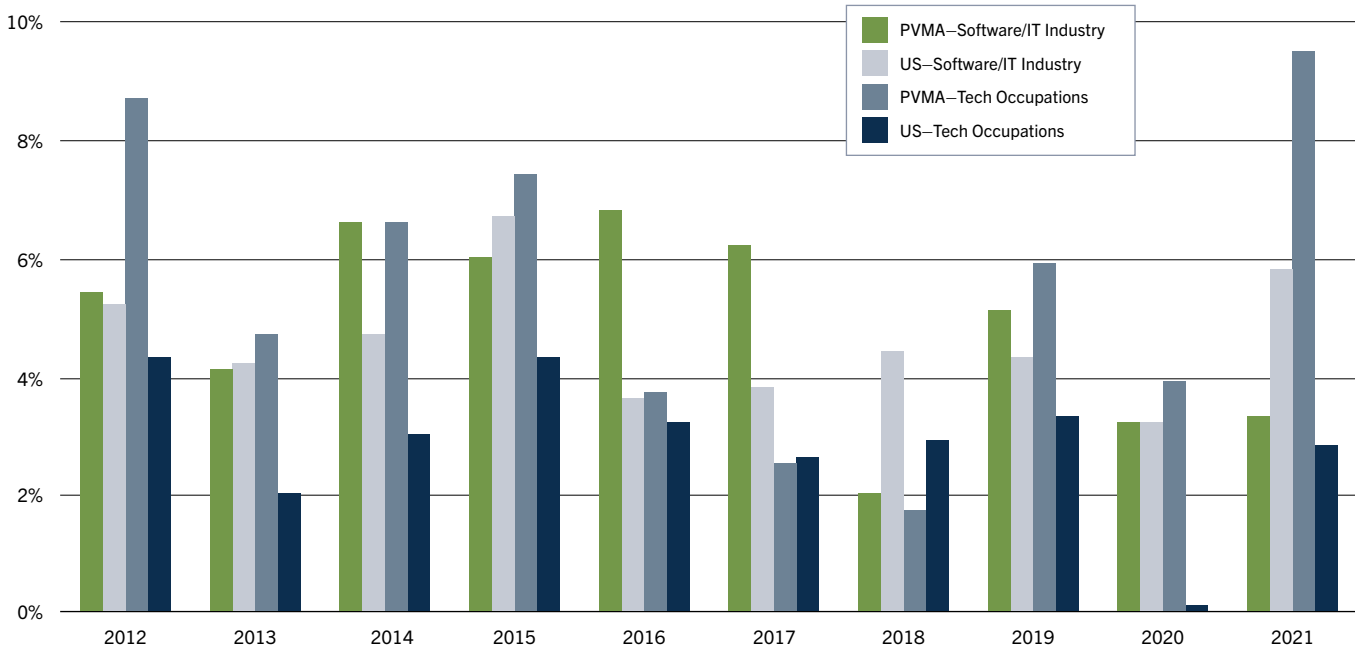


Source: Lightcast

Location quotients are used to measure an industry's or occupation's employment concentration in an area. A number greater than one indicates a higher concentration of employment relative to the nation. The PVMA is a net exporter of Software/IT industry goods and services, most notably in software. Additionally, technology occupations are more concentrated in the region relative to the U.S average.

EMPLOYMENT TRENDS

FIGURE 7: Tech Sector Annual Growth Rates, Portland-Vancouver Metro Area vs. United States, 2021



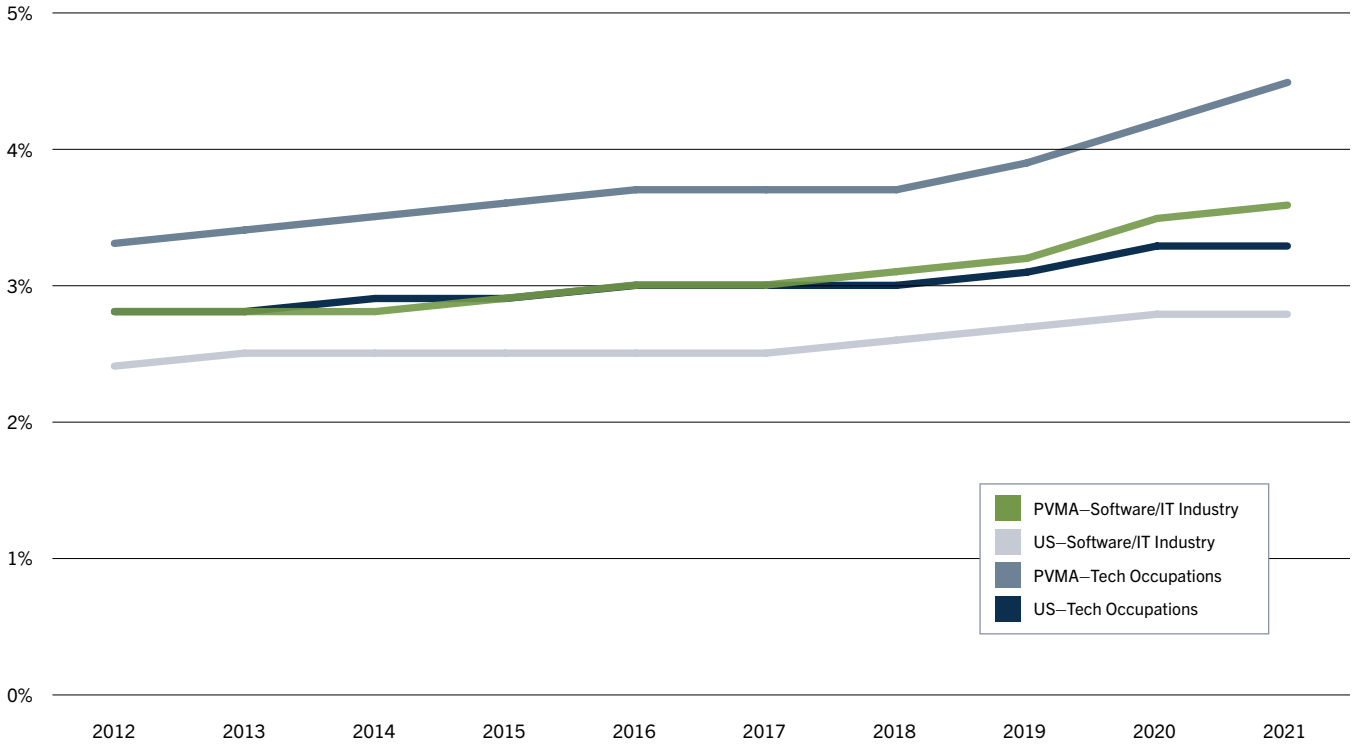
Source: Lightcast

Job growth in the region's Software/IT industry has overperformed the nation in half of years over the last decade. Growth for technology occupations in the region is stronger, outpacing their national counterparts in eight of the past ten years.

Growth was down across the board in 2020 due to the COVID-19 economic crisis. Growth in tech occupations rebounded in 2021, making up for losses during the first year of the pandemic.

The international chip shortage is expected to negatively impact growth in the future.

FIGURE 8: Tech Sector Share of Employment, Portland-Vancouver Metro Area and US, 2012-2021

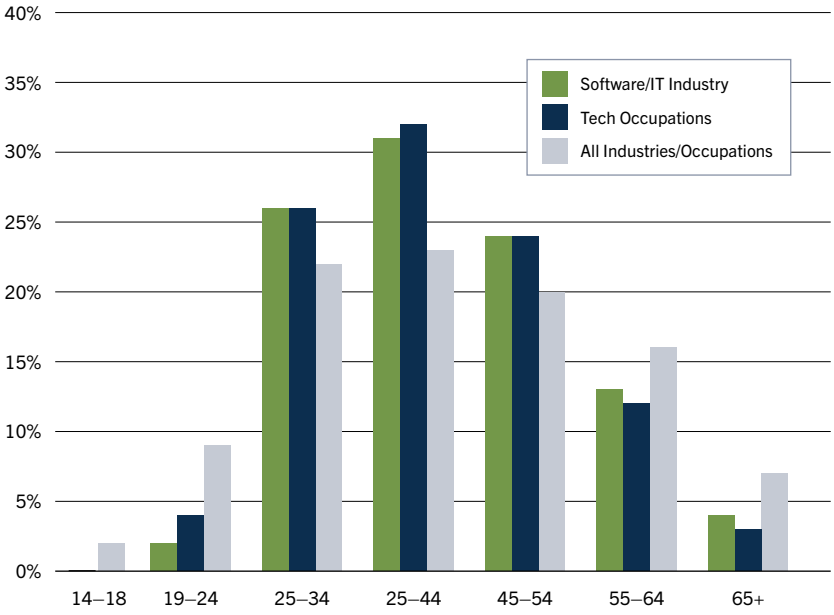


Source: Lightcast

Proportionally, the tech sector represents a larger share of the region's workforce compared to the nation. Technology occupations now represent nearly 4% of total employment while the Software/IT industry employs 3.6% of region's workforce.

CHARACTERISTICS OF THE WORKFORCE

FIGURE 9: Tech Sector Employment by Age, Portland-Vancouver Metro Area, 2021

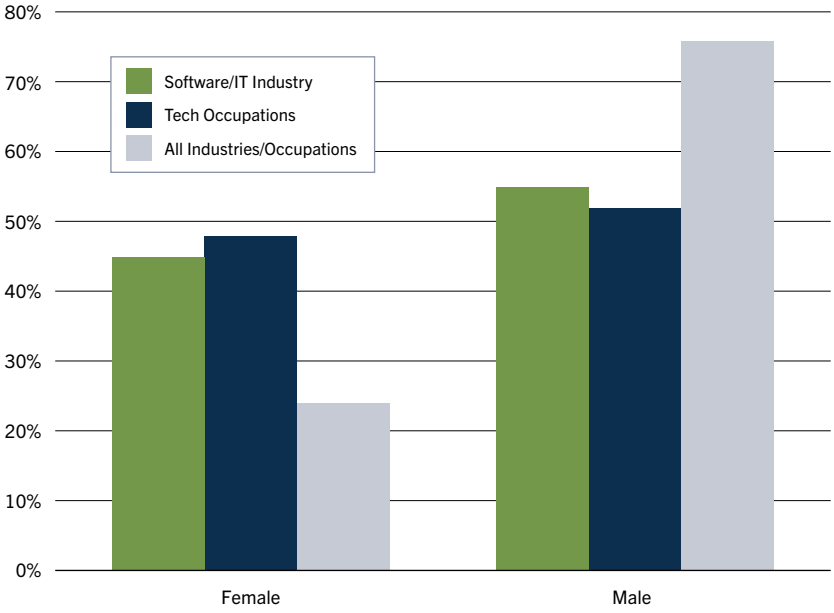


Source: Lightcast

Overall, the workers in the tech sector trend young. Nearly 60% of tech workers are aged 25 to 44, compared to 45% across all industries.

The younger workforce reflects the sector's relative newcomer status along with its rapid growth and technical skills requirements. The technical skill requirements and high levels of education generally needed, however, create employment barriers for younger workers. Consequently, the share of tech workers under the age of 25 is less than half of the proportion across all industries.

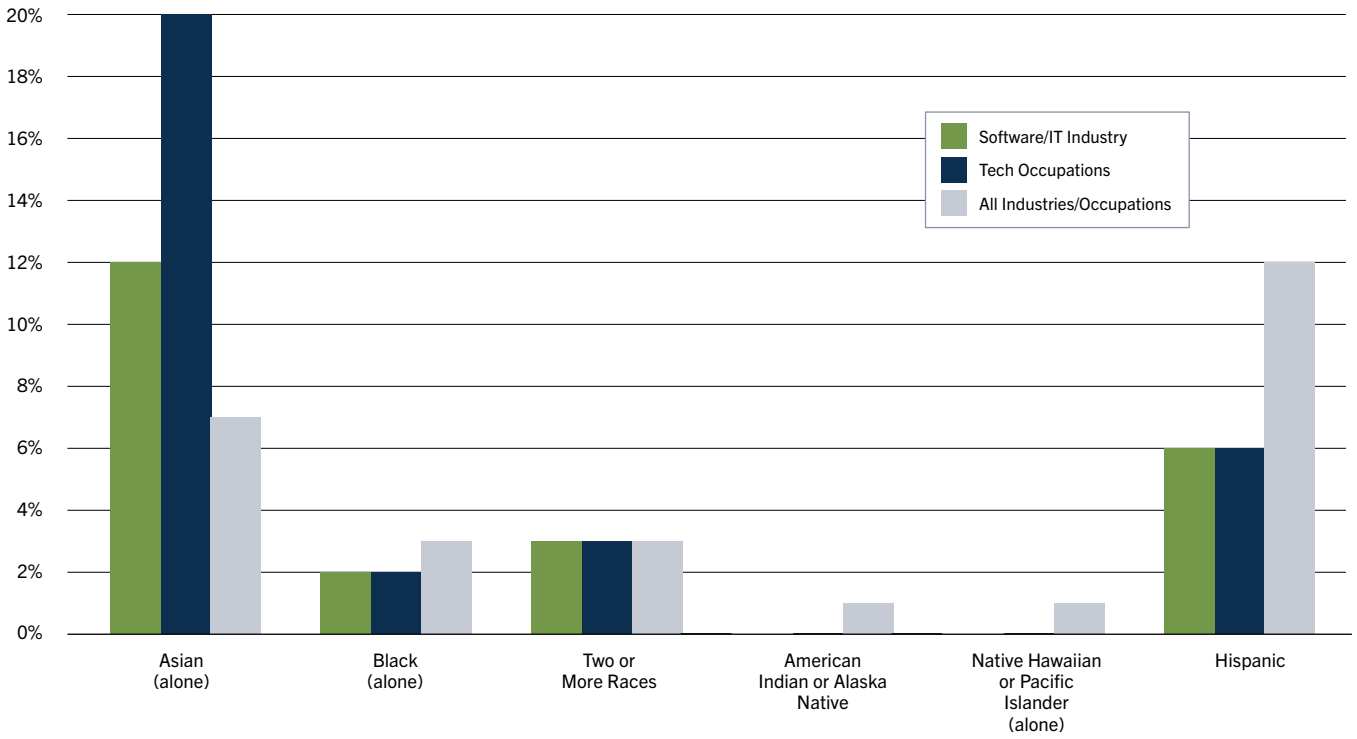
FIGURE 10: Tech Sector Employment by Sex, Portland-Vancouver Metro Area, 2021



Source: Lightcast

Workers who identify as male comprise a strong majority of the technology workforce, more so in the occupation group than the industry. The share of workers identifying as female has increased since 2017, up from 32% to 45%. In tech occupations, the workers identifying as female remained consistent at 24%.

FIGURE 11: Tech Sector Employment by Race (Nonwhite) and Ethnicity, Portland-Vancouver Metro Area, 2021



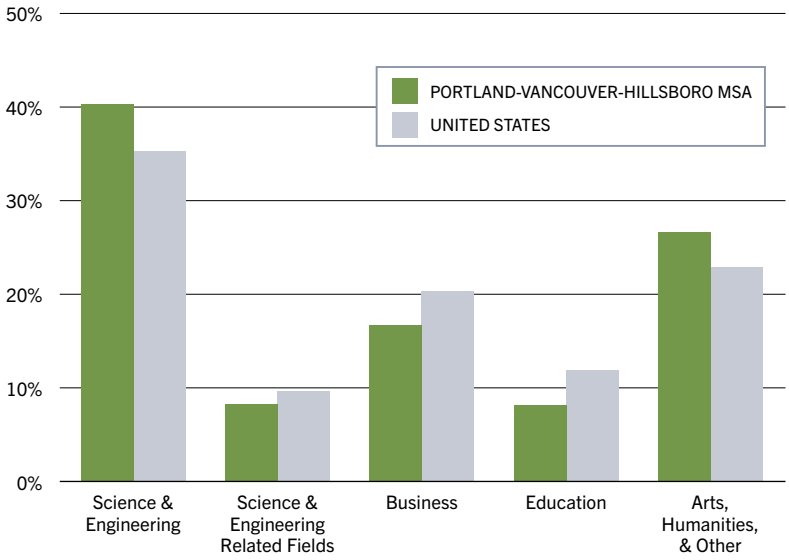
Source: Lightcast

Workers who identify as white make up the vast majority of the both the Software/IT industry and technology occupation group workforce (77% and 76%, respectively). Workers who identify as Asian are overrepresented compared to the total workforce. Across the region, 7% of all workers identify as Asian compared to 20% of workers in technology occupations and 12% of workers in the tech sector.

Workers who identify as Hispanic are 12% of the total workforce but just 6% of the Software/IT industry and 6% of technology occupations.

Although numerous programs have sprung in recent years with missions focused on addressing the underrepresentation of women and communities of color in technology occupations, they continue to be underrepresented in industry employment.

FIGURE 12: Population (25+) by Field of Bachelor's Degree, Portland-Vancouver-Hillsboro MSA and US, 2020 5-year Estimate



Source: US Census, American Community Survey, Table C15010

Nearly 705,000 of the region's residents over the age of 25 hold a Bachelor's degree or higher. Nearly half of these degrees are in science, engineering, and related fields.

Residents of the Portland-Vancouver-Hillsboro MSA are more likely to hold a degree in Science and Engineering compared to the nation.

TABLE 3: Technology Occupations (All Industries): Portland-Vancouver Metro Area, 2021-2031

OCCUPATION	2021 Employment	2031 Employment	Estimated Annual Openings	Estimated Annual Growth Openings
Computer and Information Systems Managers	6,448	7,094	561	66
Computer Systems Analysts	5,986	6,359	465	38
Information Security Analysts	1,100	1,497	132	40
Computer and Information Research Scientists	528	622	49	9
Computer Network Support Specialists	1,411	1,545	121	15
Computer User Support Specialists	6,737	7,375	579	70
Computer Network Architects	1,370	1,466	94	10
Database Administrators	673	765	61	10
Database Architects	436	510	42	7
Network and Computer Systems Administrators	3,916	4,128	280	23
Computer Programmers	1,518	1,440	100	2
Software Developers	16,499	20,444	1,730	395
Software Quality Assurance Analysts and Testers	2,092	2,611	222	52
Web Developers	1,460	1,652	132	19
Web and Digital Interface Designers	1,160	1,347	110	19
Computer Occupations, All Other	2,938	3,360	272	44
Computer Hardware Engineers	7,311	7,316	491	8
Total	**61,584**	**69,530**	**5,441**	**826**

Source: Lightcast

An estimated 240 different occupations make up the total workforce of the Software/IT industry. More than three in five industry jobs are employed within the 17 technology occupations. Each year, there are more than 5,400 openings in Tech occupations. Roughly 820 are new jobs and the rest are created with workers leave their current positions.

TABLE 4: Technology Occupations: Portland-Vancouver Metro Area, 2021

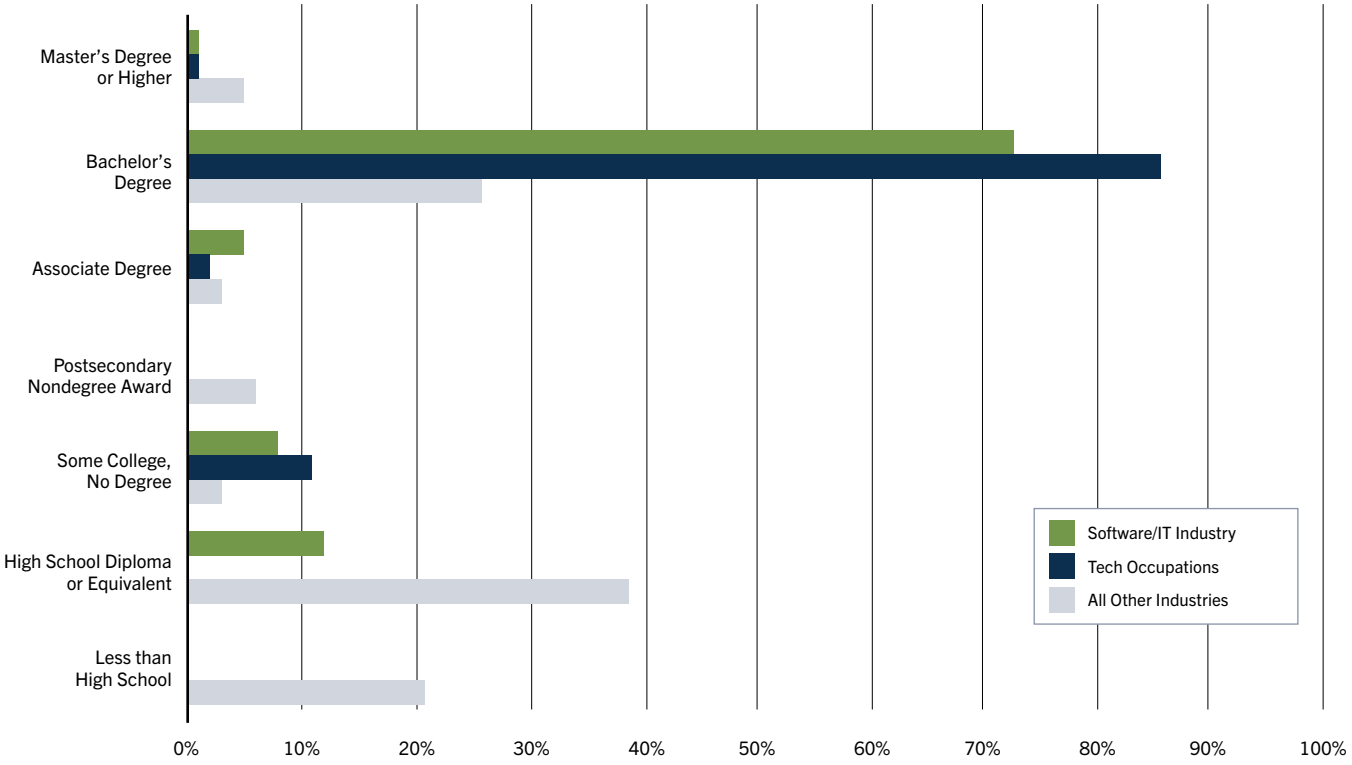
OCCUPATION	2021 Industry Employment	% of Industry Employment	2021 Median Wage	% of Median Wage for All Occupations	Location Quotient	Typical Entry Level Education
Computer and Information Systems Managers	1,897	5.6%	$61.67	265.1%	1.50	Bachelor's Degree
Computer Systems Analysts	1,654	4.8%	$49.11	211.1%	1.33	Bachelor's Degree
Information Security Analysts	318	0.9%	$51.49	221.4%	0.78	Bachelor's Degree
Computer and Information Research Scientists	172	0.5%	$79.56	342.0%	1.85	Master's Degree
Computer Network Support Specialists	370	1.1%	$29.88	128.4%	0.89	Associate's Degree
Computer User Support Specialists	2,007	5.9%	$28.62	123.1%	1.13	Some college, no degree
Computer Network Architects	419	1.2%	$51.85	222.9%	0.93	Bachelor's Degree
Database Administrators	152	0.4%	$48.76	209.6%	0.89	Bachelor's Degree
Database Architects	171	0.5%	$60.94	262.0%	1.01	Bachelor's Degree
Network and Computer Systems Administrators	751	2.2%	$46.10	198.2%	1.39	Bachelor's Degree
Computer Programmers	712	2.1%	$47.10	202.5%	1.05	Bachelor's Degree
Software Developers	7,654	22.4%	$54.63	234.9%	1.36	Bachelor's Degree
Software Quality Assurance Analysts and Testers	908	2.7%	$39.34	169.1%	1.27	Bachelor's Degree
Web Developers	547	1.6%	$28.95	124.5%	1.62	Bachelor's Degree
Web and Digital Interface Designers	567	1.7%	$35.54	152.8%	1.33	Bachelor's Degree
Computer Occupations, All Other	834	2.4%	$43.21	185.8%	0.83	Bachelor's Degree
Computer Hardware Engineers	1,336	3.9%	$63.25	271.9%	11.06	Bachelor's Degree

Source: Lightcast

In 2021, just three of the Tech occupations has a median wage below $30/hr.: computer network support specialists, computer user support specialists, and web developers. All 17 occupations had a median wage above the regional median wage. The highest, computer hardware engineers, had a regional median wage 272% higher than the regional median.

EDUCATIONAL REQUIREMENTS

FIGURE 13: Technology Employment by Typical Entry-Level Education, Portland-Vancouver Metro Area, 2021



Source: Lightcast

Innovating, designing, coding, and supporting the wide array of dynamic and complex technology products requires a well-educated and highly-skilled workforce. Three quarters of the jobs found in the tech sector typically require a Bachelor's degree.

All of the technology occupations typically require some form of post-secondary education.

TABLE 5: Training and Degree Graduate Completer Data for Technology-Related Programs, Portland-Vancouver Metro Area, 2020

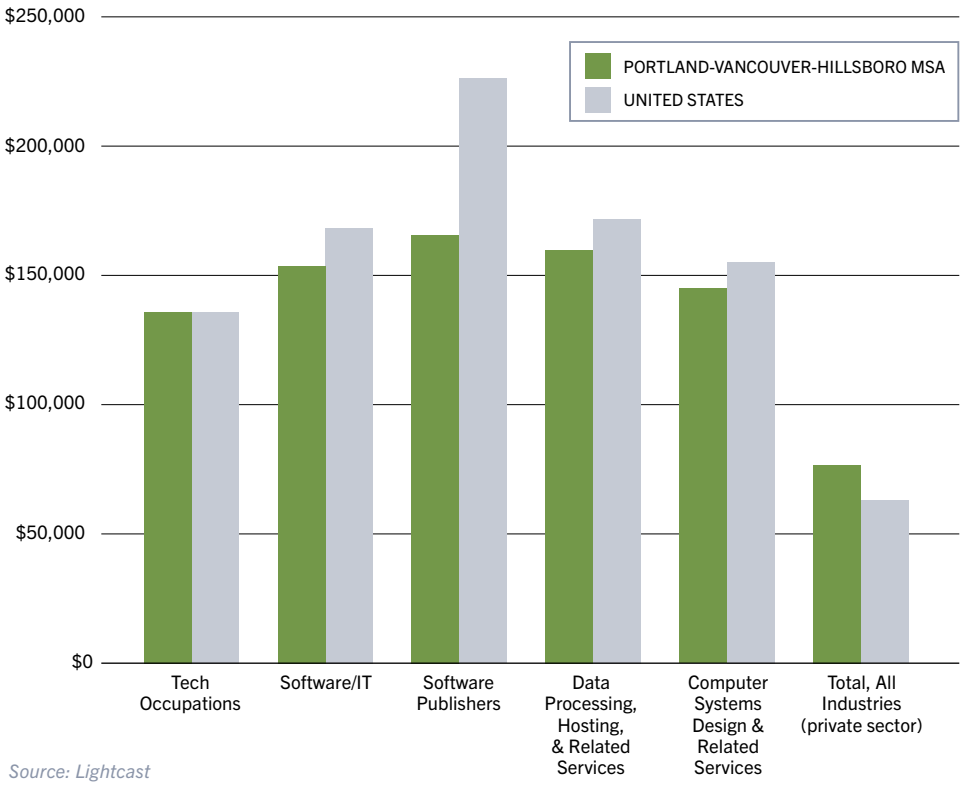
OCCUPATION	2020 Completers	Award less than 2 years	Associate Degree	Bachelor's Degree	Postbac Certificate	Master's	Doctorate
Computer and Information Sciences, General	44	0	8	36	0	0	0
Information Technology	7	3	4	0	0	0	0
Computer Programming/Programmer, General	0	0	0	0	0	0	0
Computer Programming, Specific Applications	177	113	64	0	0	0	0
Information Science/Studies	8	0	0	8	0	0	0
Computer Science	323	0	12	231	0	73	7
Web Page, Digital/Multimedia and Information Resources Design	197	166	31	0	0	0	0
Data Modeling/Warehousing and Database Administration	21	2	5	0	14	0	0
Computer Systems Networking and Telecommunications	0	0	0	0	0	0	0
Computer Graphics	0	0	0	0	0	0	0
Network and System Administration/Administrator	37	0	37	0	0	0	0
System, Networking, and LAN/WAN Management/Manager	1	1	0	0	0	0	0
Computer and Information Systems Security/Auditing/Information Assurance	225	160	57	4	4	0	0
Web/Multimedia Management and Webmaster	16	1	15	0	0	0	0
Computer Support Specialist	15	15	0	0	0	0	0
Computer Engineering, General	31	0	0	25	0	4	2
Bioinformatics	27	0	0	2	7	15	3
Mathematics and Computer Science	24	0	0	24	0	0	0
Medical Informatics	15	0	0	0	5	10	0
Operations Management and Supervision	16	10	6	0	0	0	0
Management Information Systems, General	45	41	0	4	0	0	0
Total	**1,229**	**512**	**239**	**334**	**30**	**102**	**12**

Source: Lightcast

In 2020, more than 1,200 students completed tech related training and education programs at colleges and universities across the PVMA. Sixty-one percent of students completed programs that required no more than two years of post-secondary education.

WAGES

FIGURE 14: Annual Average Wages for Technology Occupations, Software/IT Industry, and Subindustries: Portland-Vancouver Metro Area and United States, 2021



Source: Lightcast

Compared to all industries, the tech sector offers high paying jobs. When comparing to their national counterparts, however, the average wages in the region tend to be lower.

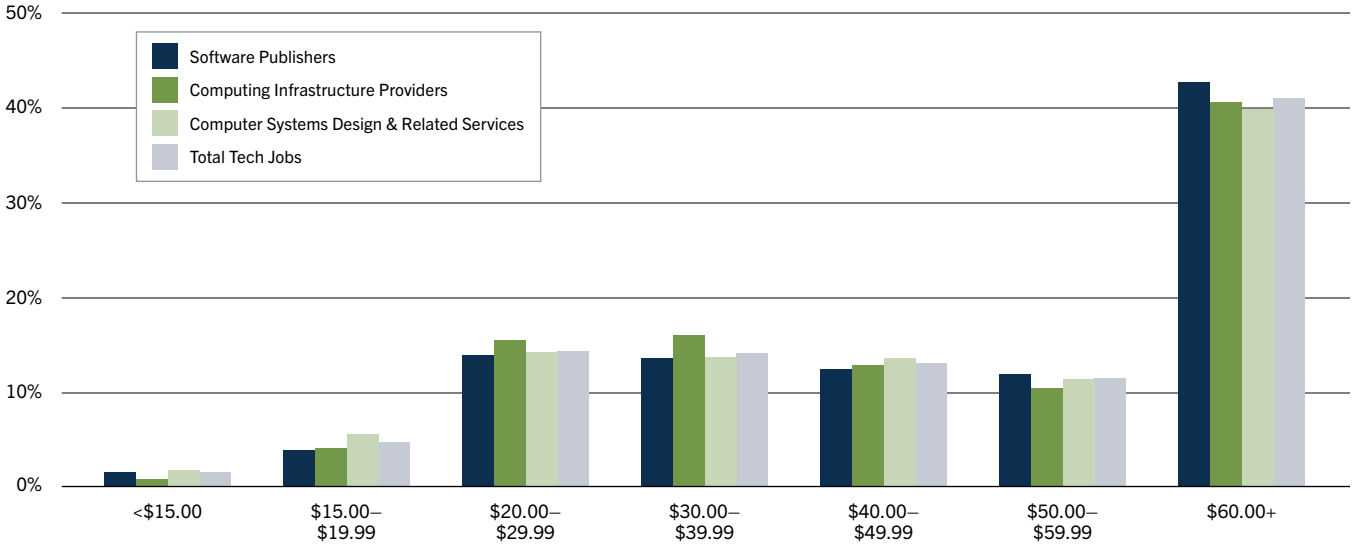
The average Software/IT wage in the PVMA (%153,381) is 91% of the national average wage ($167,997). The largest gap is in software publishing. In the PVMA, the average wage in this industry ($165,215) is just 73% of the national average wage ($225,698).

TABLE 6: Tech Sector Average Annual Wages, 2021

	PORTLAND-VANCOUVER METRO AREA	UNITED STATES
TECH OCCUPATIONS	$135,616	$135,595
SOFTWARE/IT	$153,381	$167,997
Software Publishers	$165,215	$225,698
Data Processing, Hosting, & Related Services	$159,501	$171,448
Computer Systems Design & Related Services	$144,724	$154,787
TOTAL, ALL INDUSTRIES	$76,600	$62,800

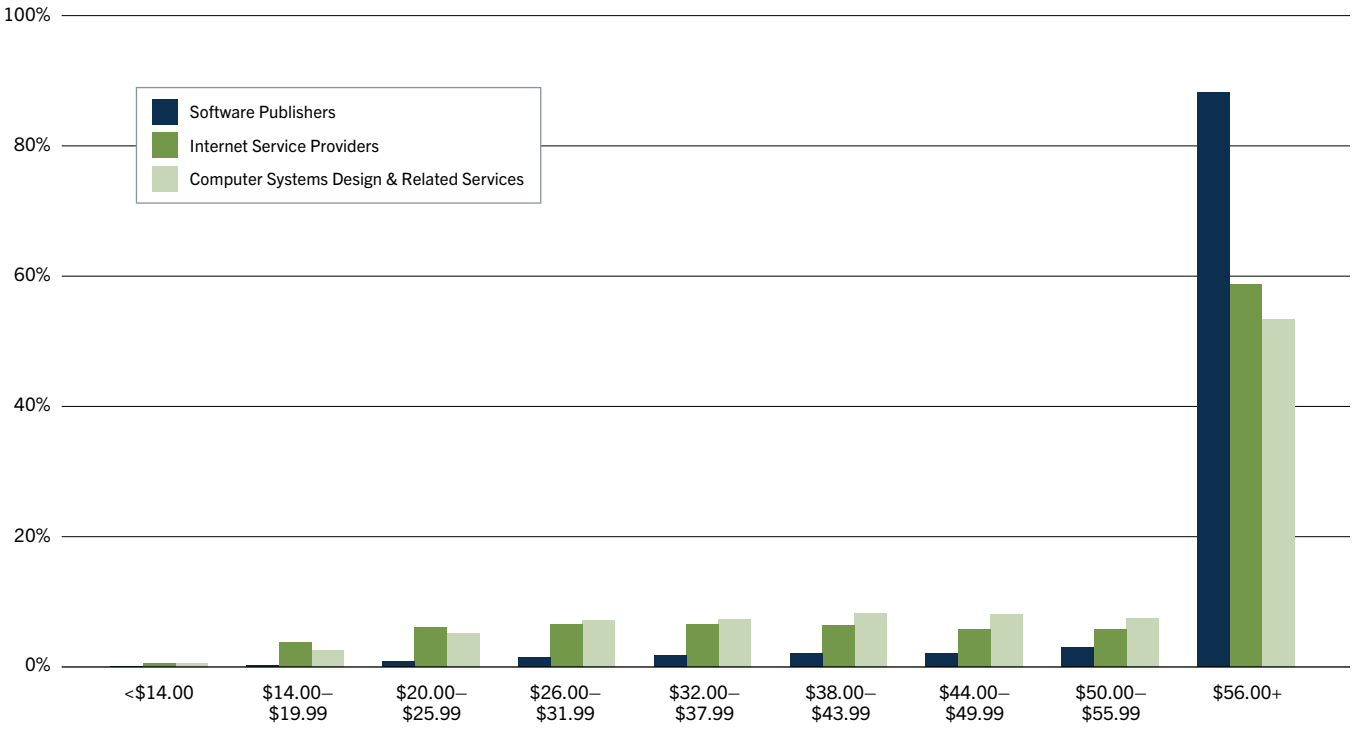
Source: Lightcast

FIGURE 15: Tech Sector Share of Employment by Hourly Wage, Oregon, 2020



Source: Oregon Employment Department

FIGURE 16: Tech Sector Share of Emploment by Hourly Wage, Washington, 2020



Source: Washington Office of Employment Security

TURNOVER

TABLE 7: Turnover Rate in Software/IT Industry, Portland-Vancouver Metro Area, 2021

	PORTLAND-VANCOUVER METRO AREA	AUSTIN	DENVER	SAN FRANCISCO	MINNEAPOLIS	SALT LAKE CITY	SAN JOSE
TOTAL, SOFTWARE/IT INDUSTRY	31%	35%	38%	37%	31%	37%	33%
Software Publishers	36%	33%	33%	31%	30%	39%	27%
Data Processing, Hosting, & Related Services	22%	37%	33%	31%	24%	38%	30%
Computer Systems Design & Related Services	31%	35%	40%	40%	33%	35%	33%
TOTAL, ALL PRIVATE SECTOR INDUSTRIES	**63%**	**59%**	**71%**	**46%**	**63%**	**57%**	**43%**

Source: Lightcast

Turnover refers to the change in the workforce due to employee separations and hiring. The Software/IT industry experiences a lower turnover than the private sector as a whole.

Workers in data processing are more likely to stay at their current jobs while workers in computer systems design tend to move between companies and industries more frequently.

The PVMA region has higher turnover than Austin, San Francisco, Minneapolis, San Jose, and Salt Lake. It's slightly lower than Denver. The Washington portion of the region has higher rates of turnover than the Oregon portion.

CURRENT DEMAND

TABLE 8: Technology Occupations: Frequency of Online Job Postings, Portland-Vancouver Metro Area

OCCUPATION	Average monthly online job postings, Software/IT Industry, 2021	Average monthly online job postings, all industries, 2021
Computer and Information Research Scientists	3	8
Computer and Information Systems Managers	5	25
Computer Hardware Engineers	4	16
Computer Network Architects	22	72
Computer Network Support Specialists	7	31
Computer Occupations, All Other	140	456
Computer Programmers	13	52
Computer Systems Analysts	51	194
Computer User Support Specialists	85	316
Database Administrators and Architects	52	185
Information Security Analysts	24	82
Network and Computer Systems Administrators	27	112
Software Developers and Software Quality Assurance Analysts and Testers	343	1,012
Web Developers & Digital Interface Designers	46	179
Total Across All Occupations	**827**	**2,724**

Source: Lightcast

There were 84,607 total job postings in the PVMA from January 2021 to December 2021, of which 32,903 were unique. For every three job postings, there was one unique job. More than a third of all Tech job postings were for software developers and software quality assurance analysts and testers.

TABLE 9: Top Fifteen Technology Occupations, Hard Skills, Frequency in Job Postings vs. Workforce Profiles, Portland-Vancouver Metro Area, 2021

SKILLS	Postings	% of Total Postings	Profiles	% of Total Profiles
Computer Science	5,124	21%	662	1%
Agile Methodology	3,723	15%	5,300	7%
Project Management	3,044	12%	11,272	15%
Automation	2,952	12%	3,479	5%
SQL (Programming Language)	2,816	12%	7,000	10%
Python (Programming Language)	2,665	11%	2,806	4%
Operating Systems	2,488	10%	3,205	4%
Amazon Web Services	2,335	10%	1,497	2%
Workflow Management	2,188	9%	2,826	4%
Technical Support	2,100	9%	6,442	9%
Microsoft Azure	1,926	8%	845	1%
Scripting	1,860	8%	1,359	2%
Linux	1,854	8%	4,529	6%
Scrum (Software Development)	1,819	7%	3,223	4%
JavaScript (Programming Language)	1,762	7%	4,148	6%
Application Programming Interface (API)	1,667	7%	1,275	2%
Software Development	1,634	7%	5,554	8%
Business Requirements	1,632	7%	1,121	2%
Data Analysis	1,621	7%	5,145	7%
Business Process	1,600	7%	2,976	4%
Marketing	1,598	7%	7,851	11%
Active Directory	1,591	7%	3,976	5%

Source: Lightcast

Aggregate data from online job postings can provide insights to hiring trends in the region. There appears to be a mismatch between in-demand hard skills and the availability of these skills in workforce profiles. For example, over 21% of technology occupation online postings in the region mention computer science as a skill, however, just 1% of the regional workforce has this skill listed in their profile.

Mismatches also exist in common skills such as communications and problem solving.

Job posting data is a valuable source of information about employers' needs. Training providers and job training programs can use them to inform education and training programs. They can also help future workers and career coaches identify skills and experiences to highlight in resumes and job seeker profiles.

TABLE 10: Top Technology Occupations, Soft Skills, Frequency in Job Postings vs. Workforce Profiles, Portland-Vancouver Metro Area, 2021

SKILLS	Postings	% of Total Postings	Profiles	% of Total Profiles
Communications	11,298	46%	8,868	12%
Management	7,783	32%	18,202	25%
Troubleshooting (Problem Solving)	5,699	23%	9,171	13%
Problem Solving	5,503	23%	3,221	4%
Leadership	5,303	22%	12,366	17%
Customer Service	5,053	21%	16,489	22%
Operations	4,514	18%	9,127	12%
Planning	4,329	18%	5,080	7%
Detail Oriented	3,567	15%	659	1%
Research	2,950	12%	9,516	13%
Information Technology	2,885	12%	4,445	6%
Verbal Communication Skills	2,877	12%	137	0%
Microsoft Office	2,647	11%	13,346	18%
Written Communication	2,640	11%	331	0%
Coordinating	2,609	11%	3,424	5%
Interpersonal Communications	2,386	10%	622	1%
Microsoft Excel	2,321	10%	9,208	13%
Sales	2,291	9%	11,481	16%
Prioritization	2,086	9%	739	1%
Presentations	2,053	8%	3,093	4%
Innovation	1,945	8%	3,584	5%
Influencing Skills	1,791	7%	352	0%

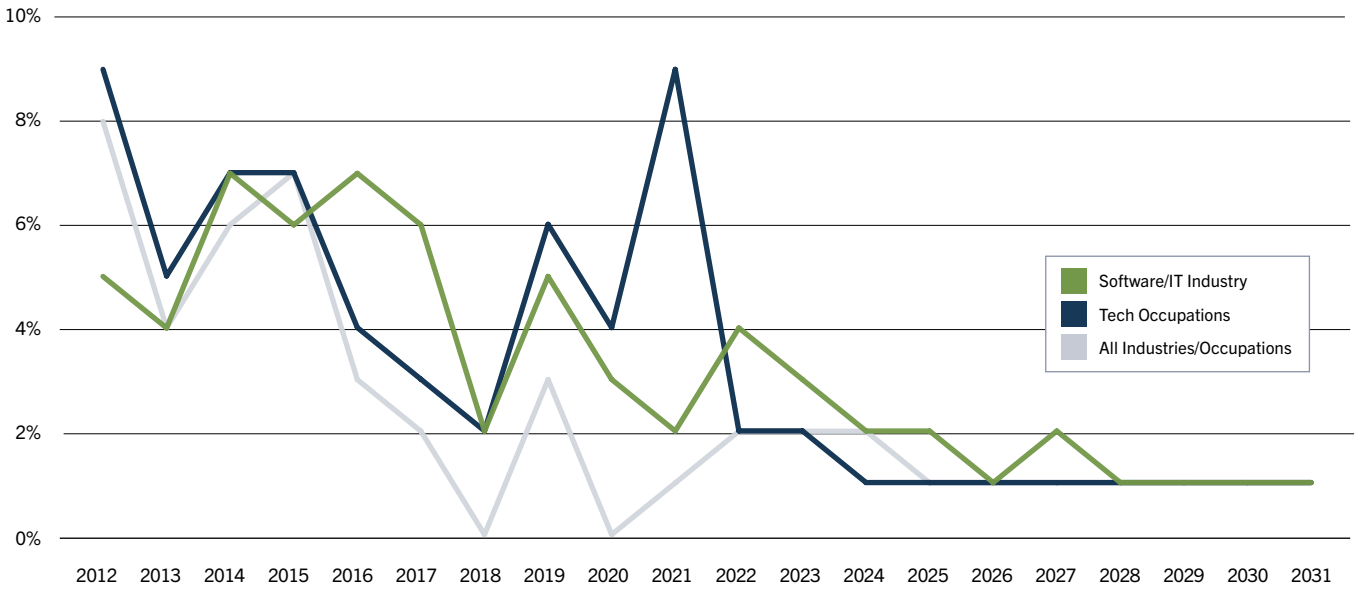
Source: Lightcast

TABLE 11: Top Technology Occupations, Software Skills, Frequency in Job Postings vs. Workforce Profiles, Portland-Vancouver Metro Area, 2021

SKILLS	Postings	% of Total Postings	Profiles	% of Total Profiles
SQL (Programming Language)	2,816	12%	7,000	10%
Python (Programming Language)	2,665	11%	2,806	4%
Microsoft Office	2,647	11%	13,346	18%
Operating Systems	2,488	10%	3,205	4%
Amazon Web Services	2,335	10%	1,497	2%
Microsoft Excel	2,321	10%	9,208	13%
Microsoft Azure	1,926	8%	845	1%
Linux	1,854	8%	4,529	6%
JavaScript (Programming Language)	1,762	7%	4,148	6%
Application Programming Interface (API)	1,667	7%	1,275	2%
Active Directory	1,591	7%	3,976	5%
Java (Programming Language)	1,437	6%	3,431	5%
Help Desk Support	1,386	6%	3,385	5%
Microsoft Outlook	1,262	5%	2,473	3%
JIRA	1,213	5%	1,436	2%
Microsoft PowerPoint	1,184	5%	5,513	8%
Firewall	1,130	5%	1,672	2%
Cascading Style Sheets (CSS)	1,068	4%	3,195	4%
HyperText Markup Language (HTML)	974	4%	4,641	6%
Windows Servers	931	4%	3,643	5%
RESTful API	899	4%	550	1%
Git (Version Control System)	856	4%	1,471	2%

Source: Lightcast

FIGURE 17: Historical & Projected Growth, Portland-Vancouver Metro Area



Source: Lightcast

Technological innovation and mounting demand will continue to fuel strong growth in the tech sector. Software functionality continues to dig deeper into every aspect of commercial and consumer life, indicating the likelihood of the strong growth trend continuing across the sector. Additionally, expanding technology budgets in firms across all industries will drive growth in technology occupations.

Between 2021 and 2031, the Software/IT industry is projected to add more than 6,700 jobs for a growth rate of 20%—a third higher than the overall economy (15%). The technology occupation group will also sustain higher-than-average growth with an estimated 7,900 jobs added over the next decade (13%).

TABLE 12: Occupations Adding the Largest Number of Jobs: Software/IT Industry, Portland-Vancouver Metro Area

DESCRIPTION	2021	2031	Growth	Percent Growth	Share of Sector Growth	Projected Annual Growth Opening
Software Developers	7,654	9,867	2,214	29%	27.9%	395
Computer User Support Specialists	2,007	2,400	393	20%	5.0%	70
Computer and Information Systems Managers	1,897	2,172	276	15%	3.5%	66
Software Quality Assurance Analysts and Testers	908	1,178	269	30%	3.4%	52
Computer Systems Analysts	1,654	1,906	252	15%	3.2%	38
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	931	1,130	198	21%	2.5%	93
Market Research Analysts and Marketing Specialists	735	918	183	25%	2.3%	192
General and Operations Managers	919	1,089	169	18%	2.1%	324
Computer Occupations, All Other	834	996	162	19%	2.0%	44
Information Security Analysts	318	467	148	47%	1.9%	40
Project Management Specialists	1,021	1,166	144	14%	1.8%	128
Network and Computer Systems Administrators	751	864	113	15%	1.4%	23
Web and Digital Interface Designers	567	679	112	20%	1.4%	19
Management Analysts	465	564	99	21%	1.2%	136
Web Developers	547	641	94	17%	1.2%	19
Managers, All Other	416	501	85	20%	1.1%	121
Customer Service Representatives	789	871	83	10%	1.0%	38
Data Scientists	220	301	81	37%	1.0%	33
Computer Network Support Specialists	370	447	77	21%	1.0%	15
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	514	587	73	14%	0.9%	23

Source: Lightcast

The top six occupations will represent half of the sector's growth over the next decade. More than a quarter of sector growth is expected to come from software developers.

Eight of the twenty occupations listed above are not directly computer related, however, they require technical understanding of technology in some capacity such as sales representatives, managers, and analysts.

TABLE 13: H-1B Visas for Technology-Related Occupations, Portland-Vancouver Metro Area, 2021

OCCUPATION	# of Certified H-1B Visas
Business Intelligence	44
Computer and Information Research Scientists	31
Computer Network Architects	1
Computer Occupations, All Other	85
Computer Programmers	56
Computer Systems Analyst	259
Computer Systems Engineer	121
Database Administrator	38
Information Security Analyst	1
Information Technology	78
Network and Computer Systems Administration	31
Software Developer	1,508
Software Quality Assurance	100
Software Systems Engineer	11
Web Developers	4
Total	**2,352**

Source: Department of Labor

Oregon remains an attractive place for technology employment.

Technology talent also comes from the H-1B Visa program, which allows employers to temporarily employ foreign workers in specialty occupations including engineering, math, and medicine. Jobs filled by H-1B Visa workers typically require a Bachelor's degree or higher.

More than 4,710 H-1B visas were certified in Oregon in 2021. This represents a sharp decrease from previous years. The COVID-19 pandemic and the Trump administration's anti-immigration policies depressed immigration to Oregon between 2016 and 2020.

Two in three of issued visas went towards jobs within the technology occupations group. The top five technology occupations listed represent 88% of visas issued for the group.

TABLE 14: H-1B Visas for Technology-Related Occupations, Portland-Vancouver Metro Area, 2021

CITY	# of Certified H-1B Visas	Share of Total
Hillsboro	907	37%
Portland	709	29%
Beaverton	543	22%
Lake Oswego	98	4%
Vancouver	83	3%
Wilsonville	35	1%
Aloha	25	1%
Gresham	20	1%
Camas	13	1%
All Other Cities	28	1%
Total	**2,461**	**100%**

Source: Department of Labor

Eighty-eight percent of certified visas were filed by companies in just three cities—Hillsboro, Portland, and Beaverton.

A small handful of large employers drive most of the demand for H-1B visas in the region. The top six employers in terms of certified visas represent a third of the visas issued for technology occupations in the PVMA.

APPENDIX

Computer and technology occupations represent a subset of the Software/IT industry. These are occupations where workers are engaged with technology as a central part of their role on a daily basis. In many industries the largest occupations tend to be concentrated within the industry. For example, the two largest occupations in healthcare, registered nurse, and home health care aide, are almost exclusively employed within the Healthcare sector. The relationship is different between technology occupations and the software/IT industry.

There are seventeen occupations identified by the Bureau of Labor Statistics (BLS) as Computer Occupations (Table A1).[1] The seventeen occupations are from three occupational groups, management, computer and mathematical occupations, and architectural and engineering occupations. For the purposes of the sector report, we refer to these occupations as *technology occupations*.

Together, the technology occupations represent roughly 60% of all jobs within the Software/IT sector. However, the sector employs just 33% of workers in technology occupations.

TABLE A1: Computer Occupations

SOC	Occupations
Management Occupations	
11-3021	Computer and Information Systems Managers
Computer and Mathematical Occupations	
15-1211	Computer Systems Analysts
15-1212	Information Security Analysts
15-1221	Computer and Information Research Scientists
15-1231	Computer Network Support Specialists
15-1232	Computer User Support Specialists
15-1241	Computer Network Architects
15-1242	Database Administrators
15-1243	Database Architects
15-1244	Network and Computer Systems Administrators
15-1251	Computer Programmers
15-1252	Software Developers
15-1253	Software Quality Assurance Analysts and Testers
15-1254	Web Developers
15-1255	Web and Digital Interface Designers
15-1299	Computer Occupations, All Other
Architecture and Engineering Occupations	
17-2061	Computer Hardware Engineer

Source: Bureau of Labor Statistics

[1] Computer and Information Technology Occupations, Bureau of Labor Statistics, https://www.bls.gov/ooh/computer-and-information-technology/home.htm

APPENDIX

Comparing Data Across Time

The BLS revised the SOC system in 2018. Individual occupational codes could be changed in one or more of the following ways:

- No Change
- Code Change
- Title Change
- Definition Content Change/New Coverage
- Definition Editing/ Clarification Change
- Illustrative Examples/DMTF Change

The technology occupations were impacted by the 2018 redesign. All of the SOC codes used for the 2018 sector report were revised during this period. Table A2 shows the specific changes each of the technology occupations underwent during the 2018 SOC revision.

TABLE A2: SOC Change by Type, 2010–2018

2018 SOC Code	2018 SOC Detailed Occupation	Code Change	Title Change	Definition Content Change / New Coverage	Definition Editing / Clarification Change	Illustrative Examples / DMTF Change
11-3021	Computer and Information Systems Managers				X	
15-1211	Computer Systems Analysts	X			X	X
15-1212	Information Security Analysts	X			X	X
15-1221	Computer and Information Research Scientists	X				
15-1231	Computer Network Support Specialists	X			X	
15-1232	Computer User Support Specialists	X			X	X
15-1241	Computer Network Architects	X			X	
15-1242	Database Administrators	X		X		X
15-1243	Database Architects	X	X	X		X
15-1244	Network and Computer Systems Administrators	X			X	X
15-1251	Computer Programmers	X			X	X
15-1252	Software Developers	X	X	X		X
15-1253	Software Quality Assurance Analysts and Testers	X	X	X		X
15-1254	Web Developers	X		X		X
15-1255	Web and Digital Interface Designers	X	X	X		X
15-1299	Computer Occupations, All Other	X		X		X
17-2061	Computer Hardware Engineer				X	X

Source: Bureau of Labor Statistics

APPENDIX

In some cases, occupations were split up or combined during the redesign. In 2010, *software developers, applications* (15-1132) and *software developers, systems software* (15-1133) were classified as separate occupations. In 2018, those occupations were combined into one occupation, *software quality assurance analysts and testers* (15-1253). The new occupational also included some, but not all, of the workers who had previously been classified as *computer occupations, all other* (15-1199).

Due to the revision, it's difficult to compare data from the 2010 SOC structure with data from the 2018 structure. Table 3 shows the changes from the 2010 to the 2018 technology occupations.

During the revision, *computer occupations, all other* (SOC 15-1199) was split into five separate occupations. Two of the occupations, *database architects* (15-1243) and *software quality assurance analysts and testers* (15-1253) include workers who were previously classified under other occupations. One of the occupations, *project management specialists* (13-1082) is not included in the 2022 sector report. In 2022, more than 11,200 project management specialists were employed in the Portland-Vancouver Metro Area. Their work is not specific to computers or technology, and they are employed throughout a wide range of sectors.

TABLE A3: Crosswalk of technology occupations, 2010 to 2018

2010		2018	
SOC	**Occupations**	**SOC**	**Occupation**
11-3021	Computer and Information Systems Managers	11-3021	Computer and Information Systems Managers
15-1111	Computer and Information Research Scientists	15-1221	Computer and Information Research Scientists
15-1121	Computer Systems Analysts	15-1211	Computer Systems Analysts
15-1122	Information Security Analysts	15-1212	Information Security Analysts
15-1131	Computer Programmers	15-1251	Computer Programmers
		15-1252	Software Developers
15-1132	Software Developers, Applications	15-1253	Software Quality Assurance Analysts and Testers
15-1133	Software Developers, Systems Software		
15-1134	Web Developers	15-1254	Web Developers
15-1141	Database Administrators	15-1242	Database Administrators
		15-1243	Database Architects
15-1142	Network and Computer Systems Administrators	15-1244	Network and Computer Systems Administrators
15-1143	Computer Network Architects	15-1241	Computer Network Architects
15-1151	Computer User Support Specialists	15-1232	Computer User Support Specialists
15-1152	Computer Network Support Specialists	15-1231	Computer Network Support Specialists
15-1199	Computer Occupations, All Other	13-1082	Project Management Specialists
		15-1243	Database Architects
		15-1253	Software Quality Assurance Analysts and Testers
		15-1255	Web and Digital Interface Designers
		15-1299	Computer Occupations, All Other
		17-2061	Computer Hardware Engineer

Source: Bureau of Labor Statistics

Clackamas Workforce Partnership
WORKFORCE DEVELOPMENT BOARD

workforce
SOUTHWEST WASHINGTON

work systems

These programs funded in whole or part through the U.S. Department of Labor. We are equal opportunity employers/programs.
Auxiliary aids and services are available upon request to individuals with disabilities. Oregon and Washington Relay 711.