



2022

# TECHNOLOGY SECTOR LABOR REPORT

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



workforce  
SOUTHWEST WASHINGTON

work.  
systems

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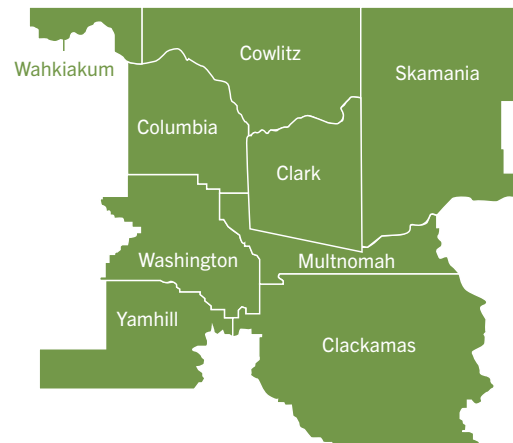
## ABOUT THE COLUMBIA-WILLAMETTE WORKFORCE COLLABORATIVE

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

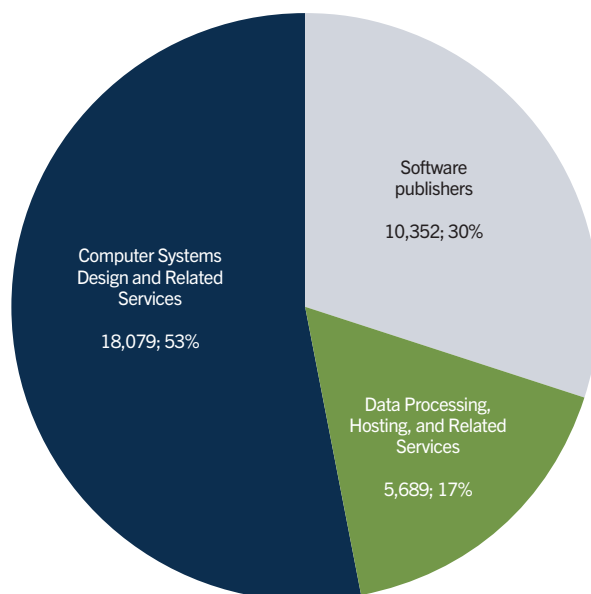
With 34,100 jobs and a payroll of \$5.1 billion, the Software/IT industry accounts for 3.6% of the greater PVMA's private-sector employment and 4.7% of payroll.

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**



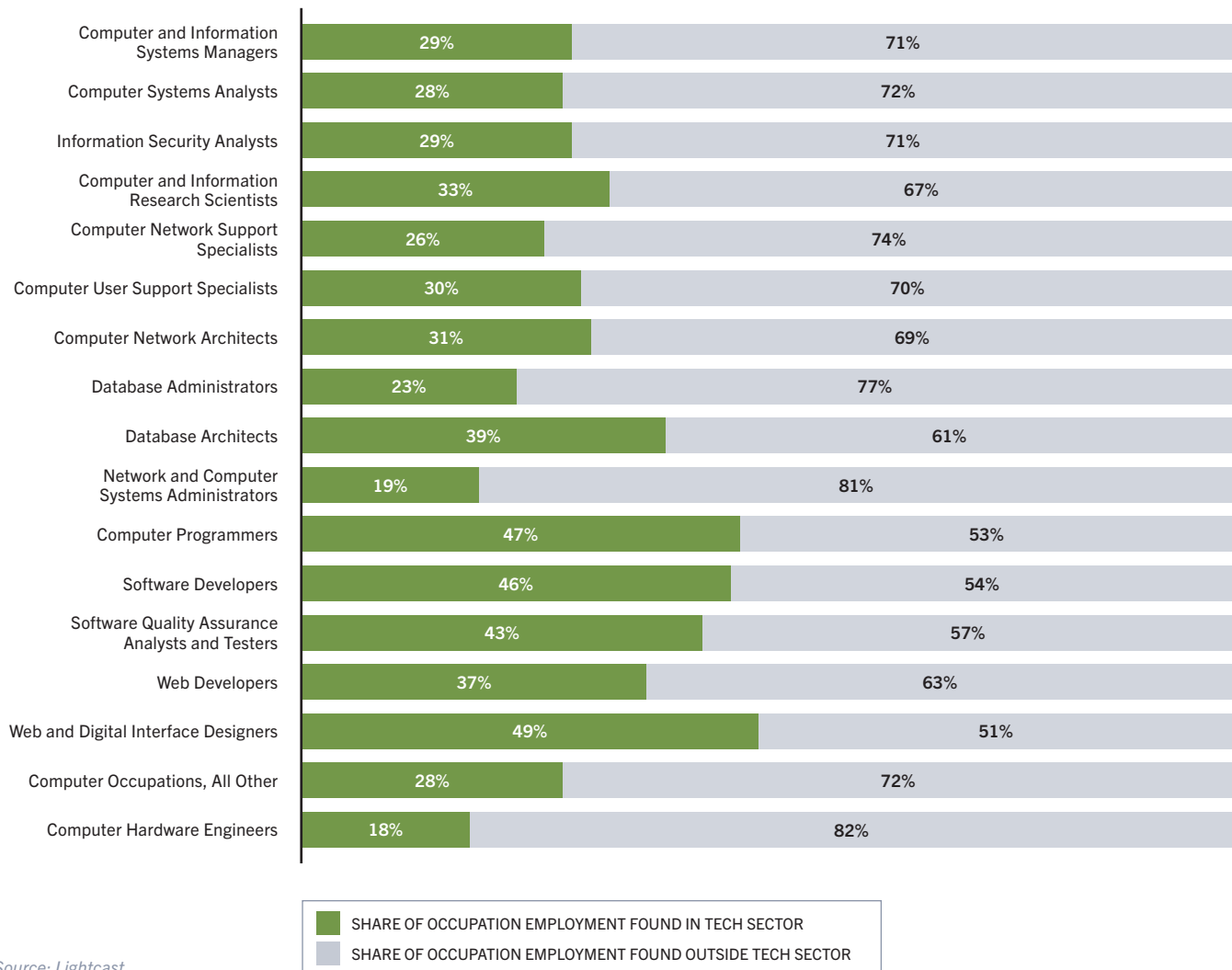
Source: Lightcast

**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              |
|         | <b>Total</b>                                    | <b>61,584</b> | <b>20,468</b>           | <b>60%</b>                 | <b>33%</b>  | <b>\$49.76</b>       |

Source: Lightcast

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



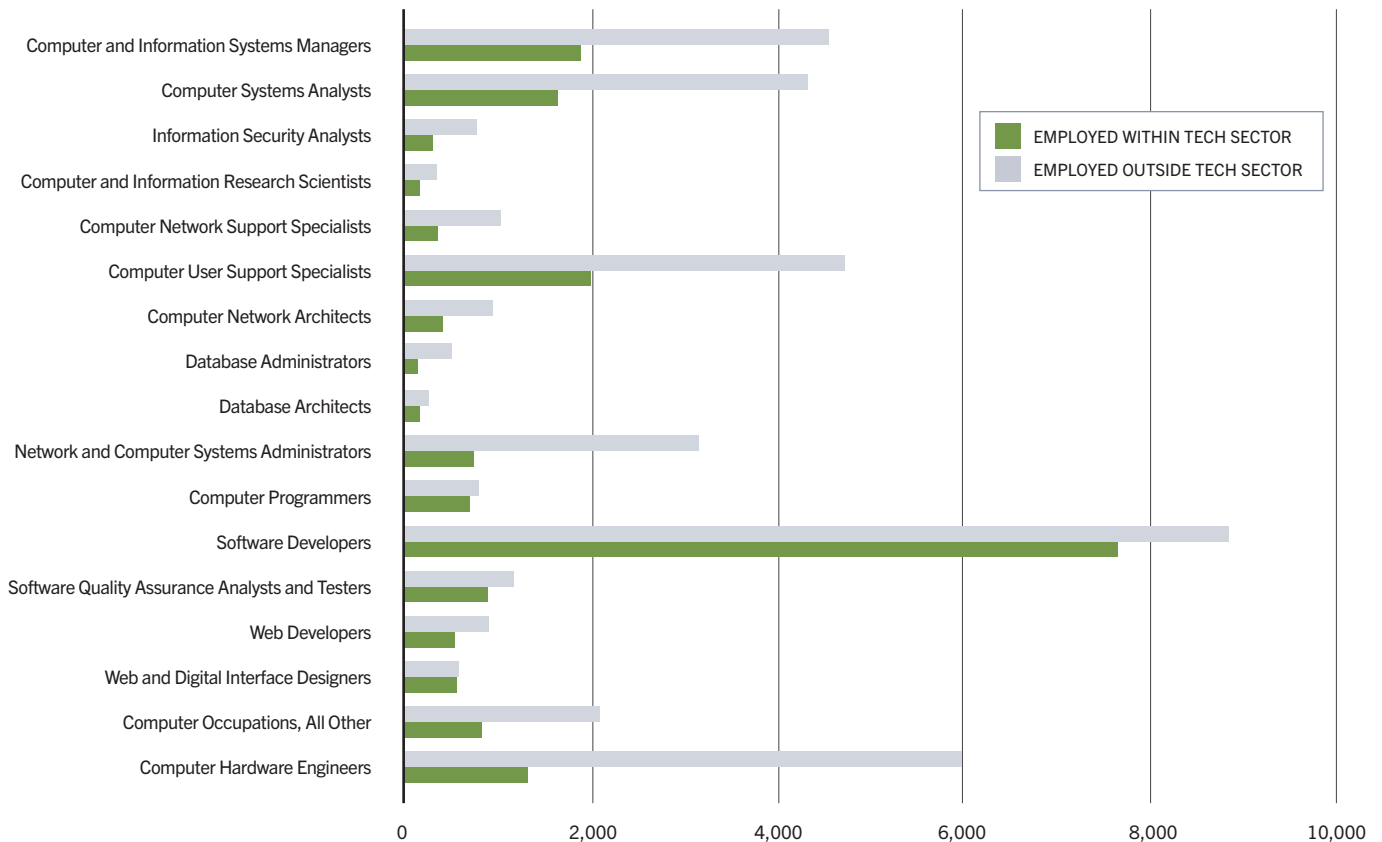
Source: Lightcast

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 education (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.

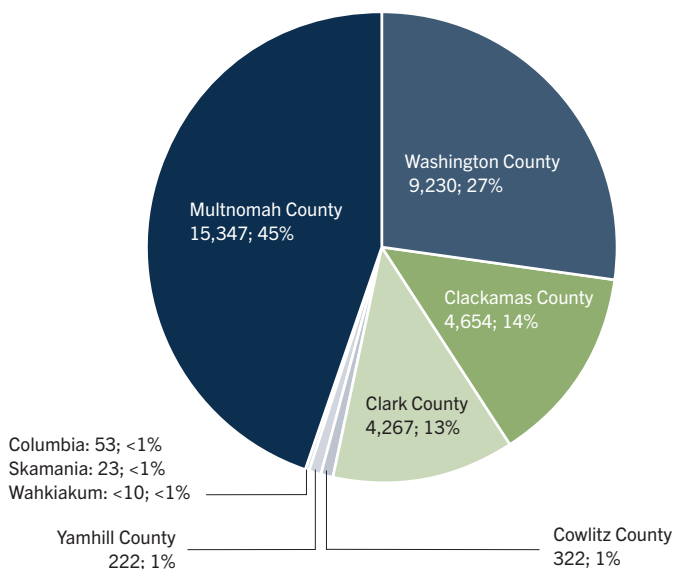
Consequently, this report provides data on both the Software/IT industry and technology occupations. The term "Tech sector" throughout this report indicates that the data or information pertains to both.

**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

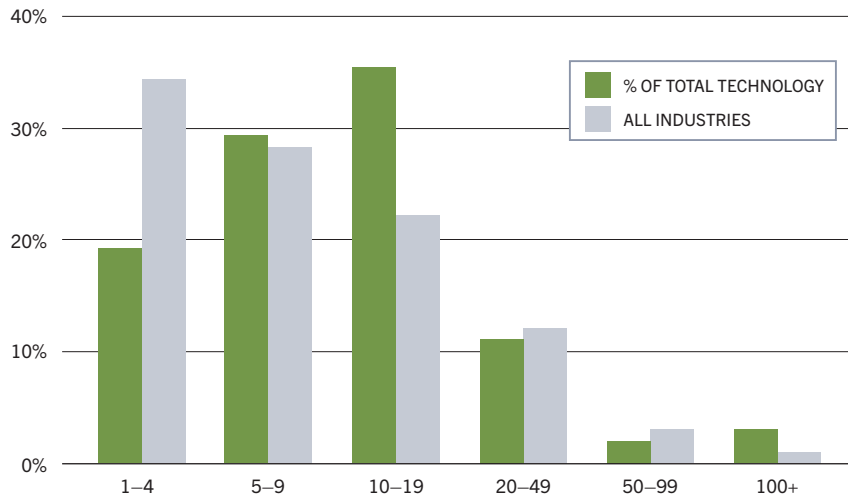
Tech employment is growing in every county in the PMVA. Multnomah and Washington counties hold a disproportionate share of the region's Software/IT industry employment (72%). Employment tends to cluster in downtown Portland and along Highways 26 and 217. The two-county share of employment, however, has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



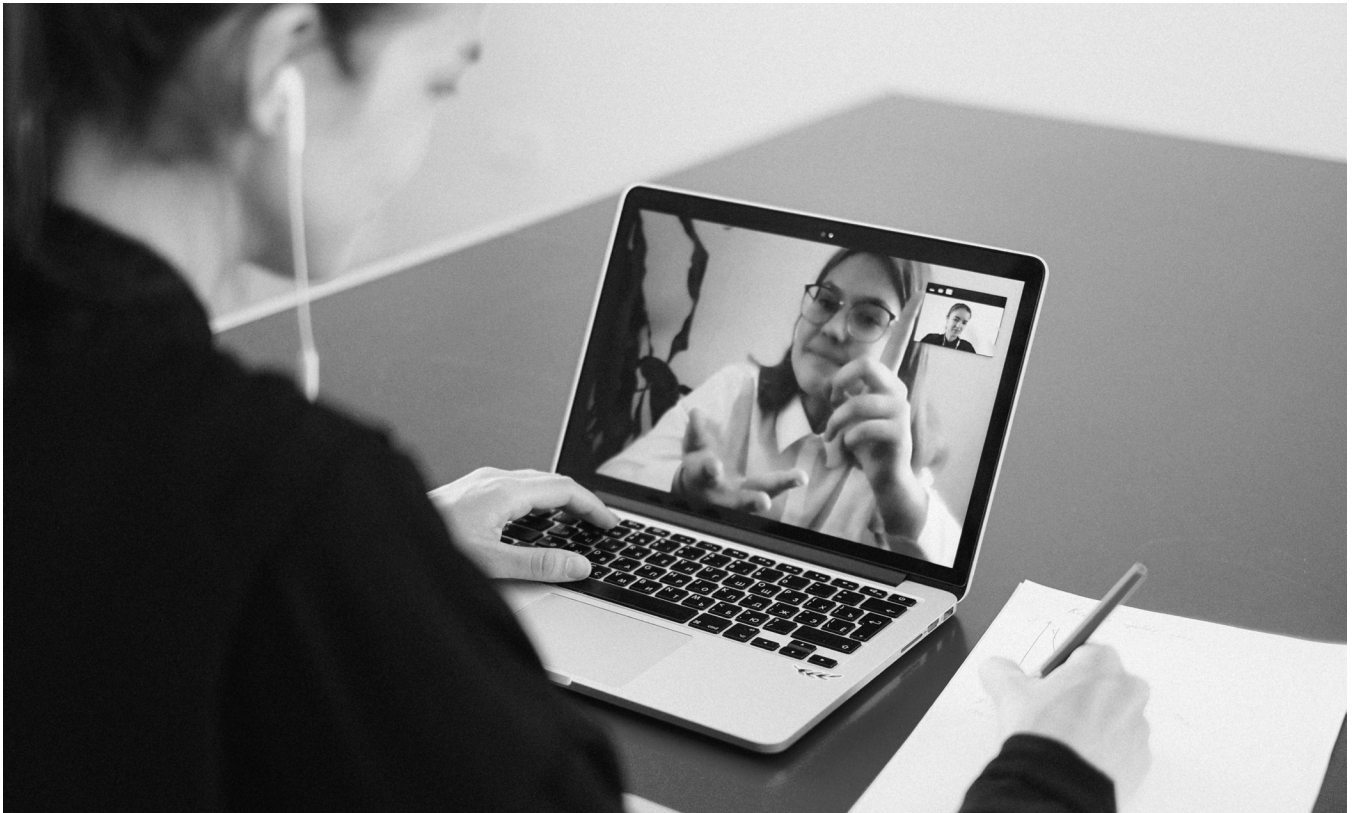
## FIRM CHARACTERISTICS

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

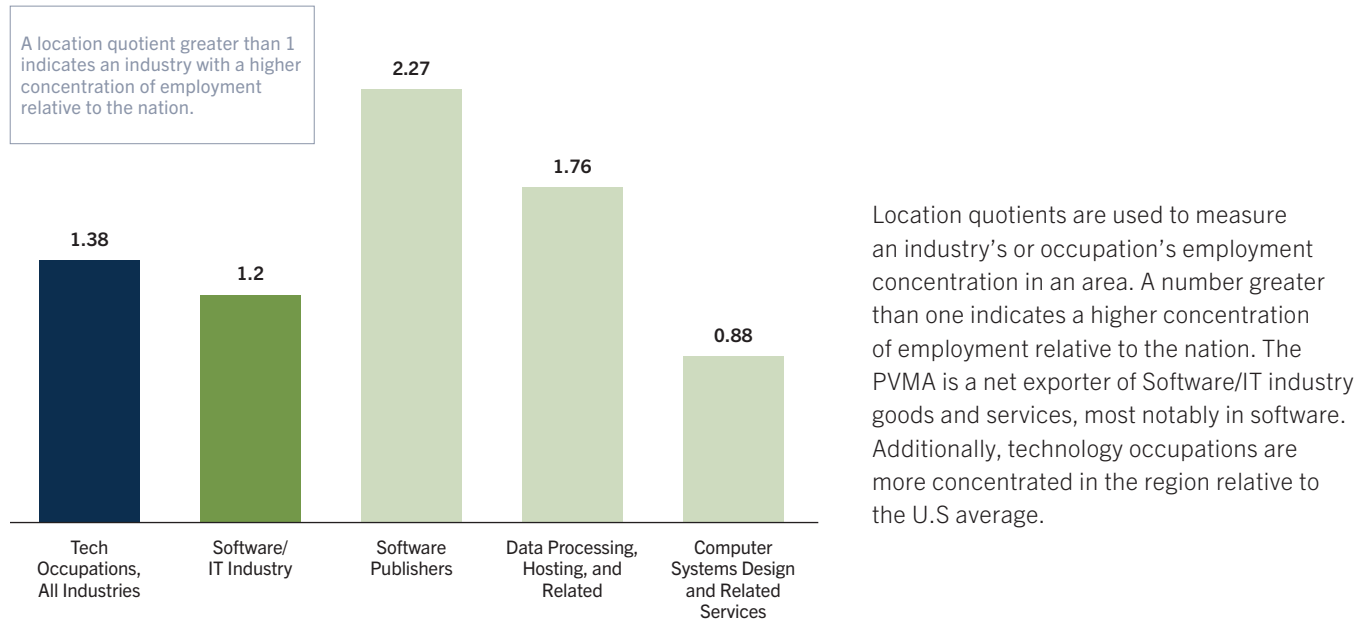
TABLE 2: Major Employers, 2021

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

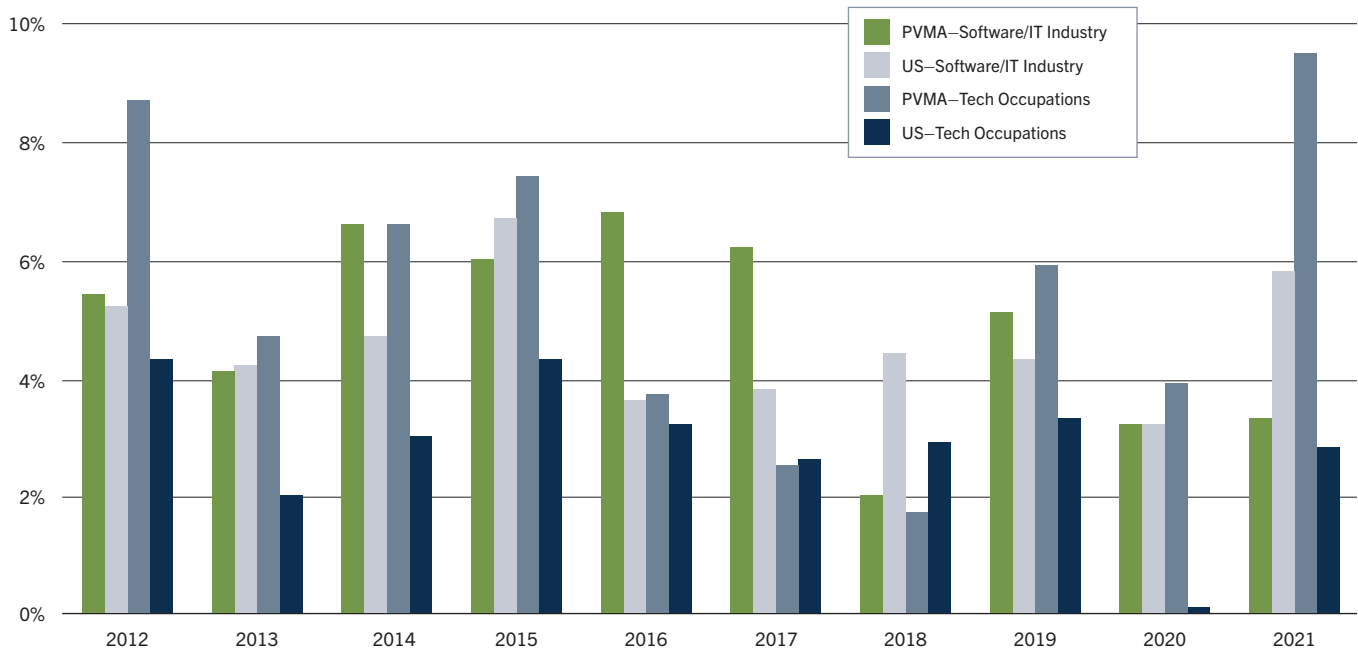
**FIGURE 6: Location Quotients Technology Occupations, Software/IT Technology and Subindustries, Portland-Vancouver Metro Area, 2021**



Source: Lightcast

## EMPLOYMENT TRENDS

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



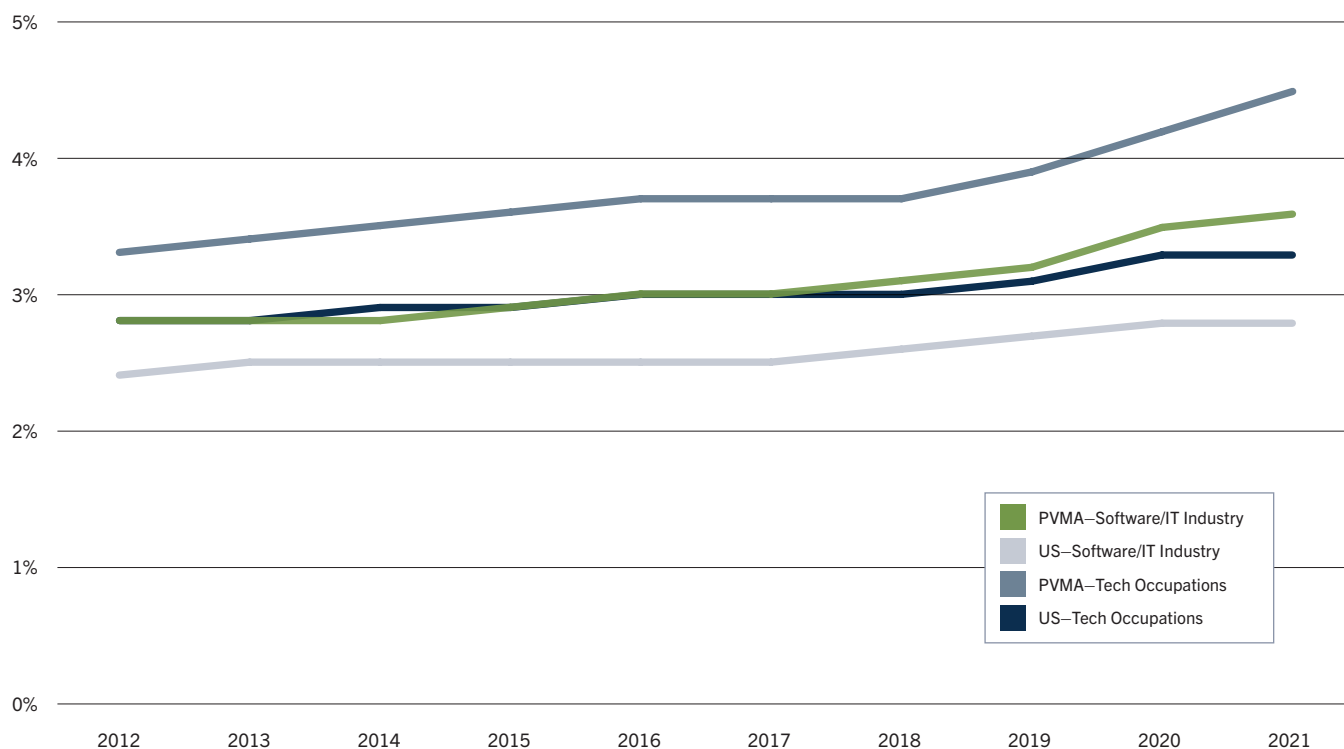
Source: Lightcast

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**

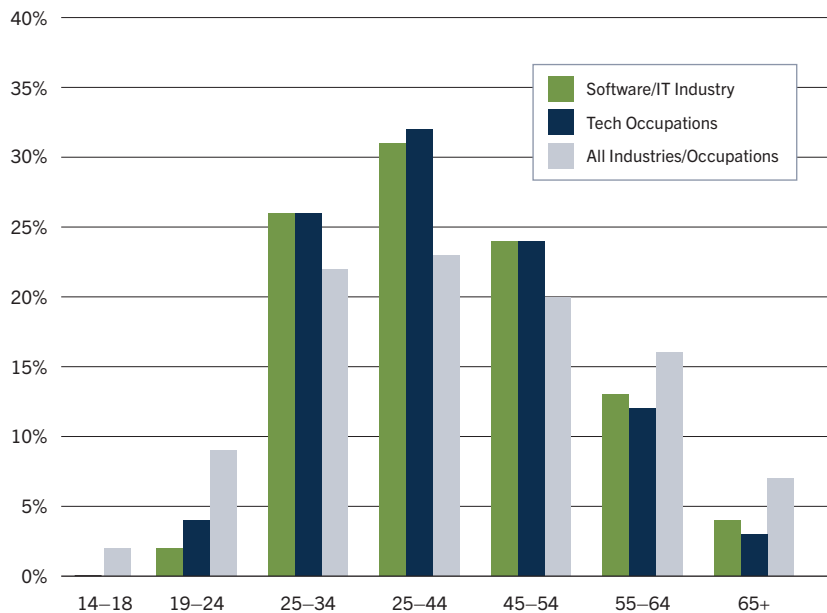


Source: Lightcast

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**

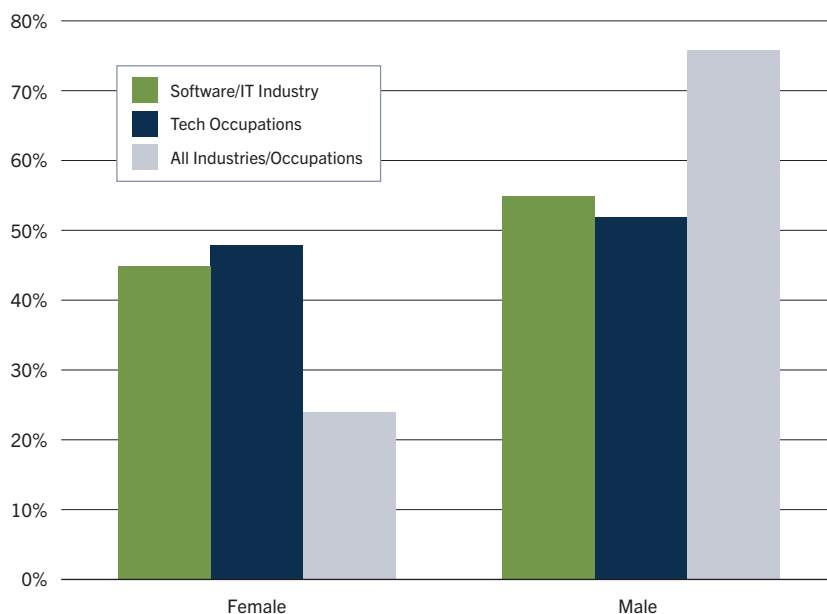


Overall, the workers in the tech sector trend young. Nearly 60% of tech workers are aged 25 to 44, compared to 45% across all industries.

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.

Source: Lightcast

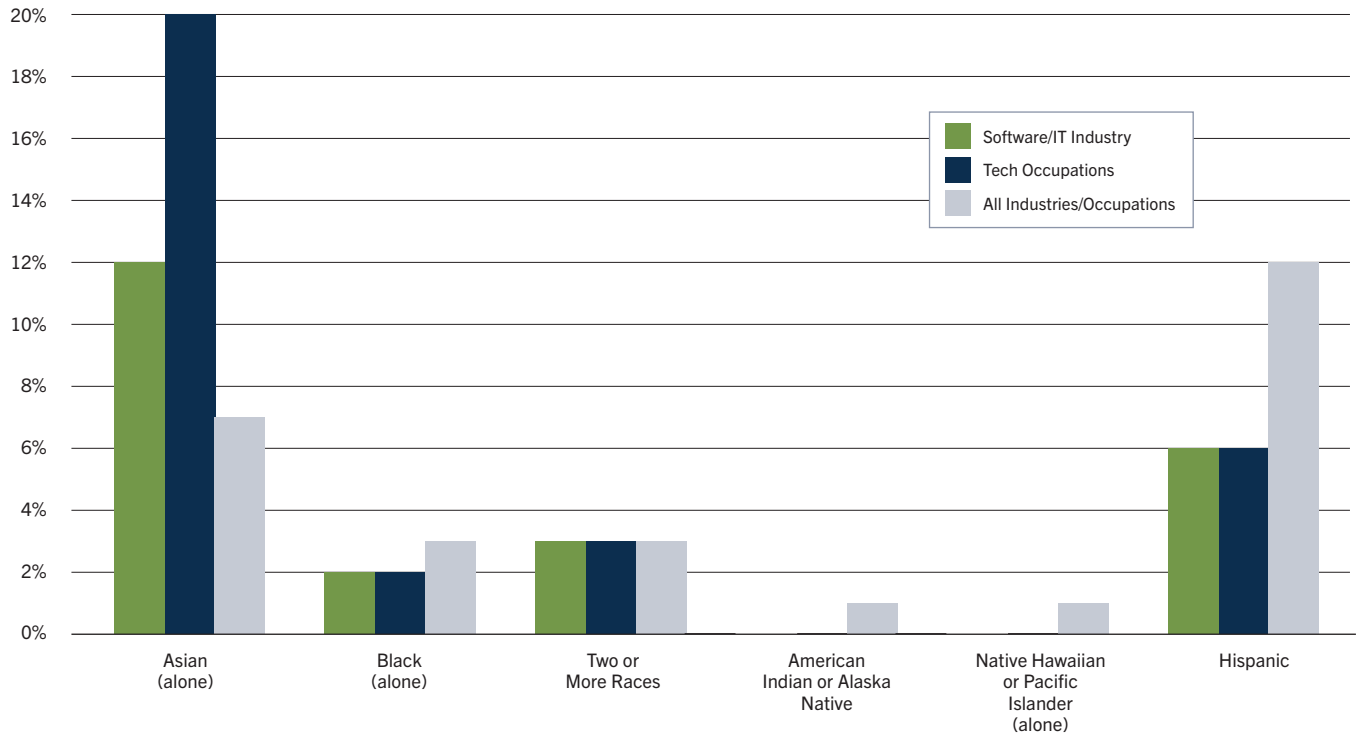
**FIGURE 10: Tech Sector Employment by Sex, Portland-Vancouver Metro Area, 2021**



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%.

Source: Lightcast

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



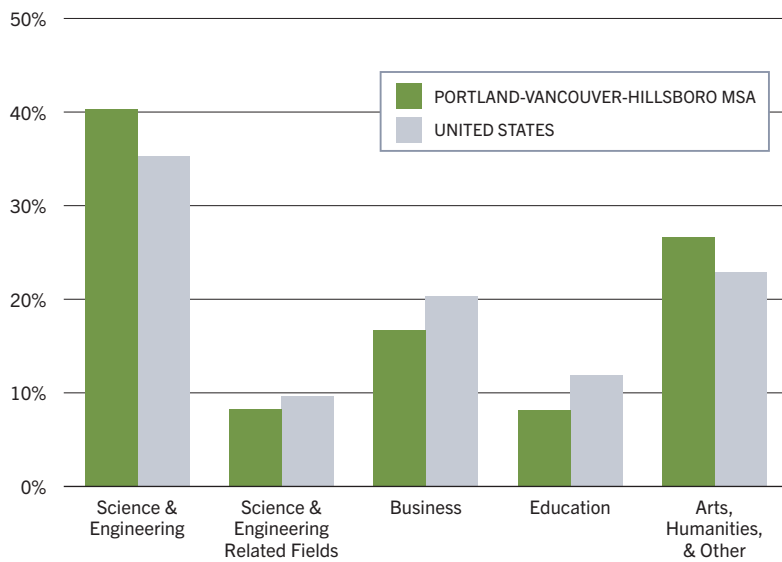
Source: Lightcast

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                                |
| <b>Total</b>                                    | <b>61,584</b>   | <b>69,530</b>   | <b>5,441</b>              | <b>826</b>                       |

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**

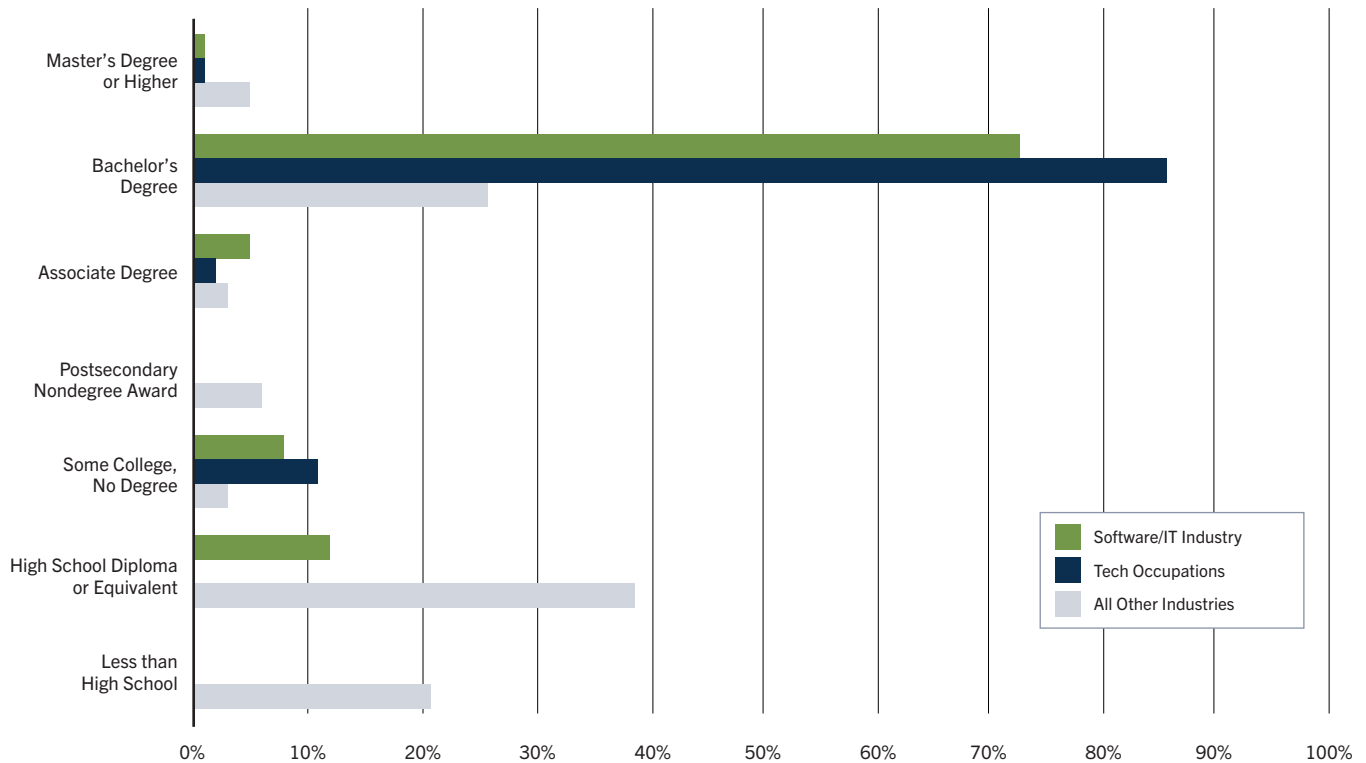
| OCCUPATION                                      | 2021 Industry Employment | % of Industry Employment | 2021 Median Wage | % of Median Wage for All Occupations | Location Quotient | Typical Entry Level Education |
|---|--------------------------|--------------------------|------------------|--------------------------------------|-------------------|-------------------------------|
| 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**

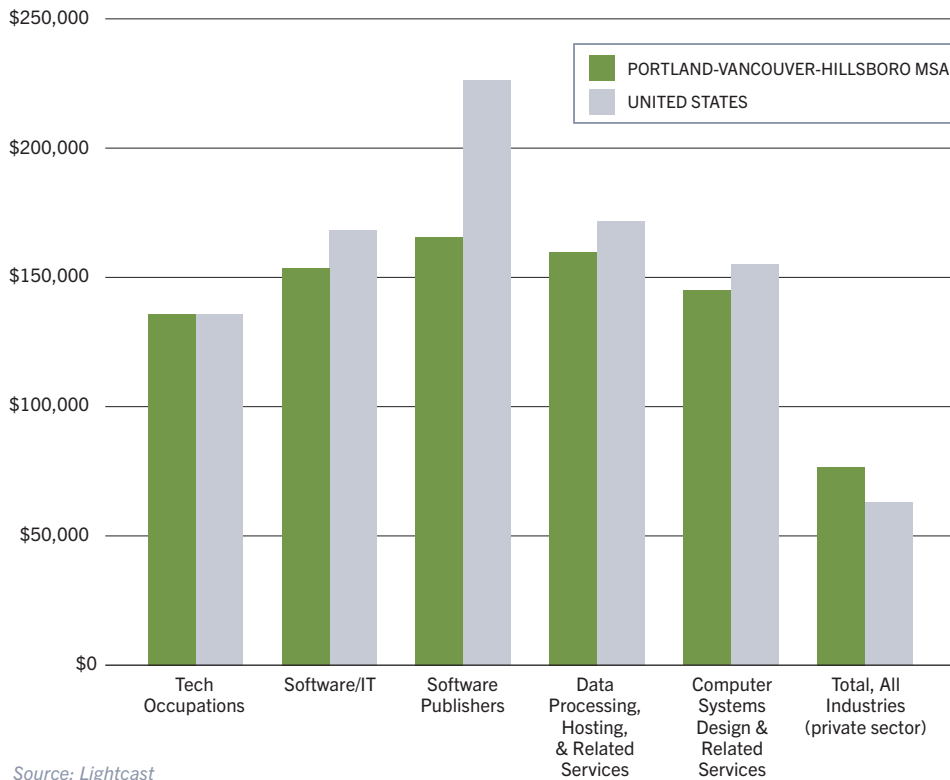
| OCCUPATION   | 2020 Completers | Award less than 2 years | Associate Degree | Bachelor's Degree | Postbac Certificate | Master's   | Doctorate |
|--|-----------------|-------------------------|------------------|-------------------|---------------------|------------|-----------|
| Computer and Information 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         |
| <b>Total</b>   | <b>1,229</b>    | <b>512</b>              | <b>239</b>       | <b>334</b>        | <b>30</b>           | <b>102</b> | <b>12</b> |

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.

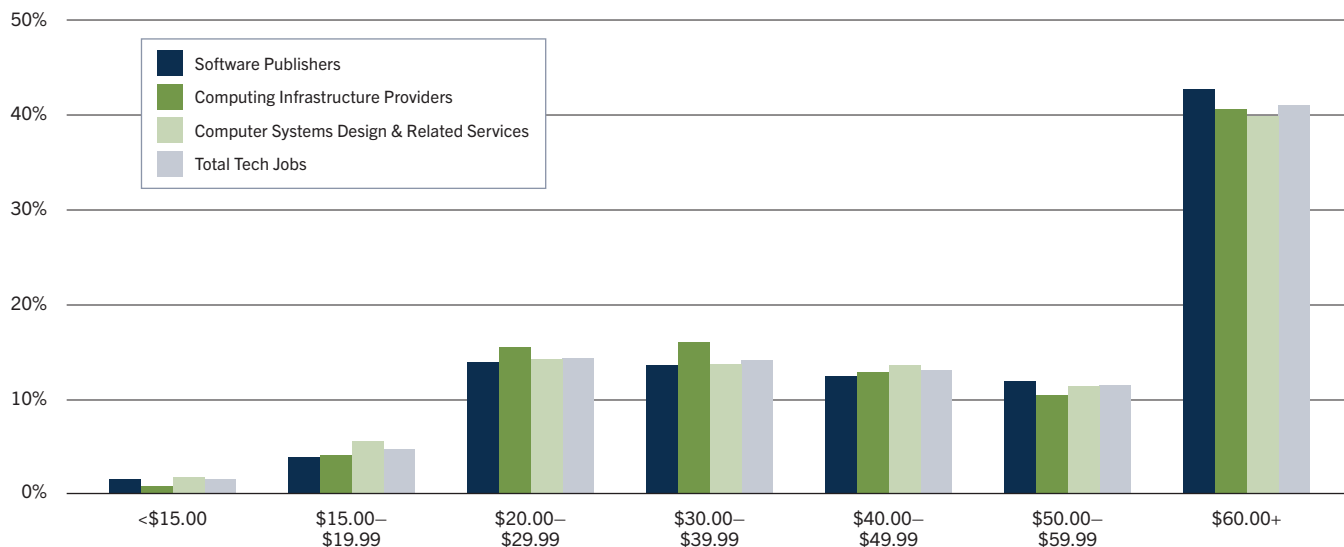
The average Software/IT wage in the PVMA (\$153,381) is 91% of the national average wage (\$167,997). The largest gap is in software publishing. In the PVMA, the average wage in this industry (\$165,215) is just 73% of the national average wage (\$225,698).

**TABLE 6: Tech Sector Average Annual Wages, 2021**

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

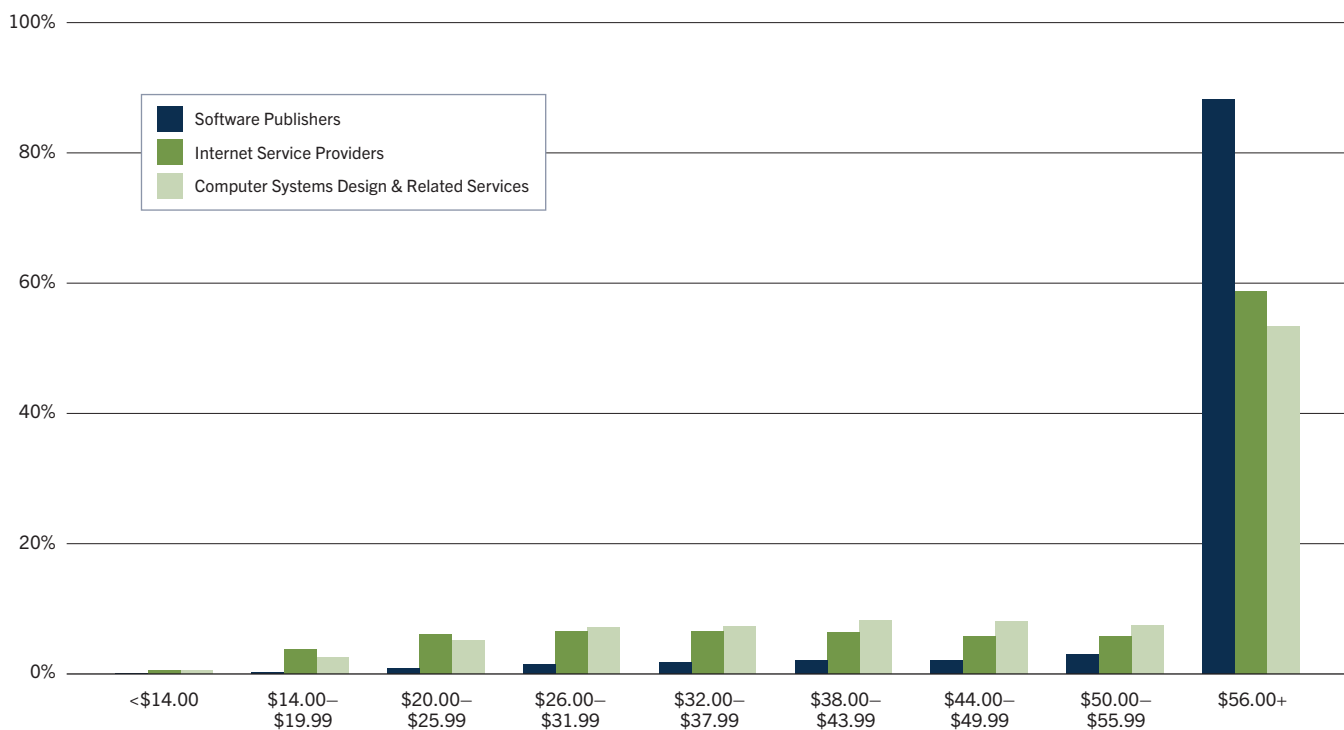
Source: Lightcast

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



Source: Oregon Employment Department

**FIGURE 16: Tech Sector Share of Employment 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   |
|--|-------------------------------|------------|------------|---------------|-------------|----------------|------------|
| <b>TOTAL, SOFTWARE/IT INDUSTRY</b>           | 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%        |
| <b>TOTAL, ALL PRIVATE SECTOR INDUSTRIES</b>  | <b>63%</b>                    | <b>59%</b> | <b>71%</b> | <b>46%</b>    | <b>63%</b>  | <b>57%</b>     | <b>43%</b> |

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   |
| <b>Total Across All Occupations</b>                                     | <b>827</b>  | <b>2,724</b>  |

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                         |
| <b>Total</b>                                 | <b>2,352</b>              |

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%             |
| <b>Total</b>     | <b>2,461</b>              | <b>100%</b>    |

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).<sup>1</sup> 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                                     |
|---|---|
| <b>Management Occupations</b>                   |   |
| 11-3021   | Computer and Information Systems Managers       |
| <b>Computer and Mathematical Occupations</b>    |   |
| 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                 |
| <b>Architecture and Engineering Occupations</b> |   |
| 17-2061   | Computer Hardware Engineer                      |

Source: Bureau of Labor Statistics

<sup>1</sup> 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



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