June 2021

Labor Market Analysis

Computer Systems and Networking Professionals

POWERED BY

California Community Colleges

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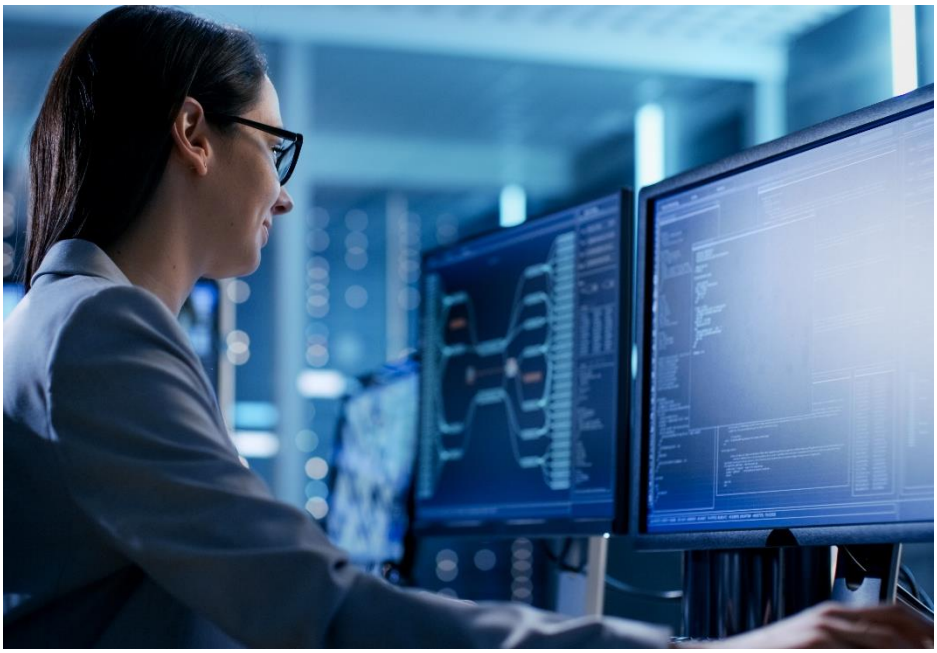

Prepared by the Central Valley/Mother Lode Center of Excellence

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COVID-19 Statement: This report includes employment projection data by Emsi. Emsi's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

If for any reason this document is not accessible or if you have specific needs for readability, please contact us and we will do our utmost to accommodate you with a modified version. To make a request, contact Nora Seronello by phone at (209) 575-6894 or by email seronellon@mjc.edu.

Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for computer systems and networking professionals. Four occupations related to computer systems and networking professionals were identified for Merced College:

- 15-1232, Computer User Support Specialists
- 15-1211, Computer Systems Analysts
- 15-1231, Computer Network Support Specialists
- 15-1241, Computer Network Architects

Key findings:

- **Occupational demand —** Nearly 2,200 workers were employed in jobs related to computer systems and networking professionals in 2019 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is computer user support specialists with 1,029 workers in 2019, a projected growth rate of 5% over the next five years, and 86 annual openings.

- **Wages —** Computer network architects earn the highest entry-level wage, $34.77/hour in the subregion and $32.53/hour in the region.

- **Employers —** Employers with the most job postings in the subregion are Anthem Blue Cross, Best Buy, and General Dynamics.

- **Occupational titles —** The most common occupational title in job postings in the subregion is computer user support specialists. The most common job title is IT technician.

- **Skills and certifications —** The top baseline skill is troubleshooting, the top specialized skill is Microsoft Office, and the top software skill is Microsoft Office. The most in-demand certification is a driver's license.

- **Education —** An associate degree is typically required for computer network support specialists and some college, no degree is typically required for computer user support specialists.

- **Supply —** Analysis of postsecondary completions in the region shows that on average 100 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 122 trained workers in the subregion and 377 workers in the region. The COE recommends expanding existing computer systems analysis programs to meet the regional need for more workers in this field. To be clear, community college program completers will likely need to transfer to a four-year college or university to obtain a bachelor's degree before entering employment. Colleges considering this program should partner with a four-year postsecondary institution and local employers to ensure their training provides the skills and certifications needed to transfer to a four-year institution of higher education and obtain a job in this field.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Merced College to provide labor market information for computer systems and networking professionals. The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the NCV/NML subregion is $12.65/hour.[1] Analysis of the program and occupational data related to computer systems and networking professionals resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 15-1232, Computer User Support Specialists
- 15-1211, Computer Systems Analysts
- 15-1231, Computer Network Support Specialists
- 15-1241, Computer Network Architects

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Computer User Support Specialists
Job Description: Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, via telephone, or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.
Knowledge: Computers and Electronics, Customer and Personal Service, English Language, Telecommunications, Engineering and Technology
Skills: Active Listening, Reading Comprehension, Speaking, Complex Problem Solving, Critical Thinking

Computer Systems Analysts
Job Description: Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.
Knowledge: Computers and Electronics, English Language, Customer and Personal Service, Mathematics, Administration and Management
Skills: Active Listening, Critical Thinking, Reading Comprehension, Speaking, Systems Analysis

Computer Network Support Specialists
Job Description: Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption.
Knowledge: Computers and Electronics, Telecommunications, Customer and Personal Service, Engineering and Technology, English Language
Skills: Critical Thinking, Active Listening, Judgement and Decision Making, Reading Comprehension, Active Learning

Computer Network Architects
Job Description: Design and implement computer and information networks, such as local area networks

[1] The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: https://insightcced.org/tools-metrics/self-sufficiency-standard-tool-for-california/.

(LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning, including analysis of capacity needs for network infrastructures. May also design network and computer security measures. May research and recommend network and data communications hardware and software.
Knowledge: Computers and Electronics, Telecommunications, Engineering and Technology, English Language, Design
Skills: Critical Thinking, Active Listening, Complex Problem Solving, Reading Comprehension, Judgement and Decision Making

Occupational Demand

The North Central Valley/Northern Mother Lode subregion employed 2,152 workers in computer systems and networking occupations in 2019 (Exhibit 1). The largest occupation is computer user support specialists with 1,029 workers in 2019. This occupation is projected to grow by 5% over the next five years and has the greatest number of projected annual openings, 86.

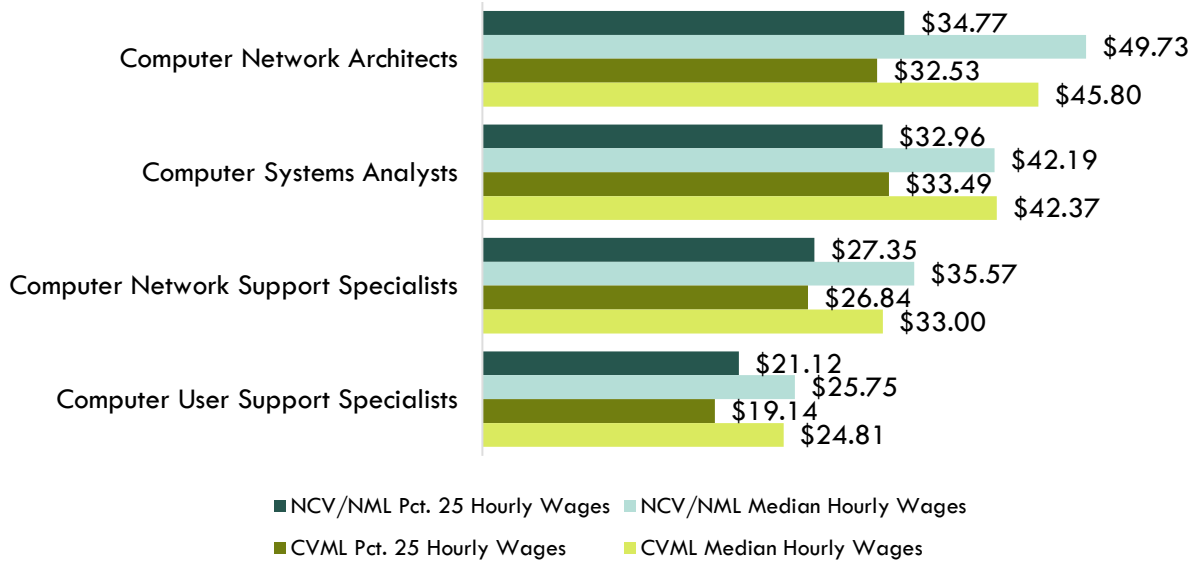
Exhibit 1. Computer systems and networking employment and occupational projections in the NCV/NML subregion

Occupation	2019 Jobs	2024 Jobs	5-Year Change	5-Year % Change	Annual Openings
Computer User Support Specialists	1,029	1,082	53	5%	86
Computer Systems Analysts	680	693	13	2%	54
Computer Network Support Specialists	331	285	(46)	(14%)	22
Computer Network Architects	112	138	26	23%	13
TOTAL	**2,152**	**2,198**	**46**	**2%**	**176**

Wages

Exhibit 2 compares the entry-level and experienced wages of the computer systems and networking professionals. Computer network architects earn the highest entry-level wage, $34.77/hour in the subregion and $32.53/hour in the region.

Exhibit 2. Entry-level and experienced wage comparison in the NCV/NML subregion and region



Job Postings

There were 572 job postings for the four occupations in the NCV/NML subregion from December 2020 to May 2021.[2] The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of computer systems and networking professionals by number of job postings

Employer	Job Postings	% Job Postings
Anthem Blue Cross	20	4%
Best Buy	18	4%
General Dynamics	11	2%
Amazon	8	2%
The Save Mart Companies	7	2%
Adventist Health	6	1%
Danaher Corporation	6	1%
Health Plan San Joaquin	6	1%
Telecare Corporation	6	1%
Vw Services Incorporated	6	1%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across six O*NET OnLine occupations. The occupational title computer user support specialists is listed in 375 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include IT Technician in 14 job postings, IT Support Specialist in 12 job postings, and Desktop Support Technician in 11 job postings.

Exhibit 4. Top occupational titles in job postings for computer systems and networking professionals

Occupational Title	Job Postings	% of Job Postings
Computer User Support Specialists	375	66%
Computer Systems Analysts	120	21%
Computer Network Architects	46	8%
Computer Network Support Specialists	17	3%
Telecommunications Engineering Specialists	13	2%
Informatics Nurse Specialists	1	0%

Salaries

Exhibit 5 shows the "Market Salaries" for computer systems and networking professionals occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

[2] Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Exhibit 5. Salaries for computer systems and networking professionals occupations

Market Salary Percentile	Salary Amount
10th Percentile	$30,636
25th Percentile	$35,776
50th Percentile	$45,065
75th Percentile	$64,738
90th Percentile	$88,362

Education

Of the 572 job postings, 339 listed an education level preferred for the positions being filled. Of those, 56% requested a bachelor's degree, 47% requested high school or vocational training, and 19% requested an associate degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below may total more than 100%.

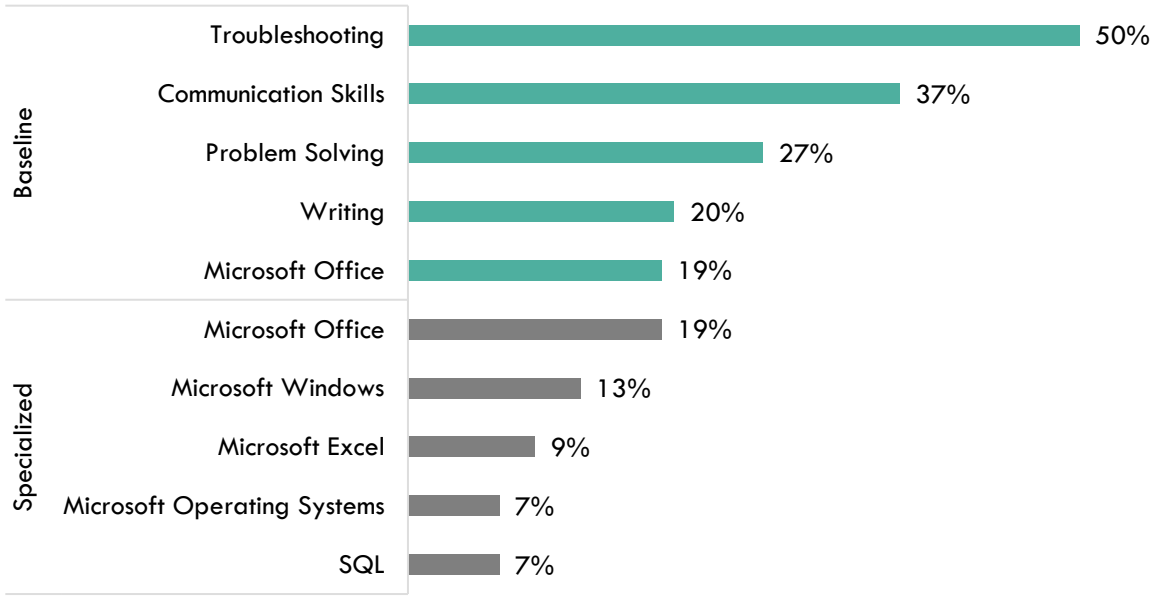
Exhibit 6. Education levels requested in job postings for computer systems and networking professionals

Education Level	Job Postings	% of Job Postings
Bachelor's degree	191	56%
High school or vocational training	160	47%
Associate degree	65	19%
Master's degree	22	6%
Doctoral degree	22	6%

Baseline and Specialized Skills

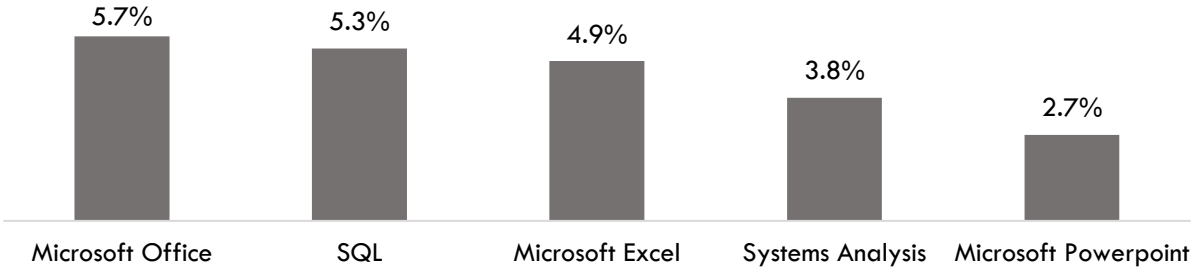
Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are troubleshooting, 50% of job postings, communication, 37%, and problem solving, 27%. The top three specialized skills are Microsoft Office, 19% of job postings, Microsoft Windows, 13%, and Microsoft Excel, 9%.

Exhibit 7. In-demand computer systems and networking professionals baseline and specialized skills



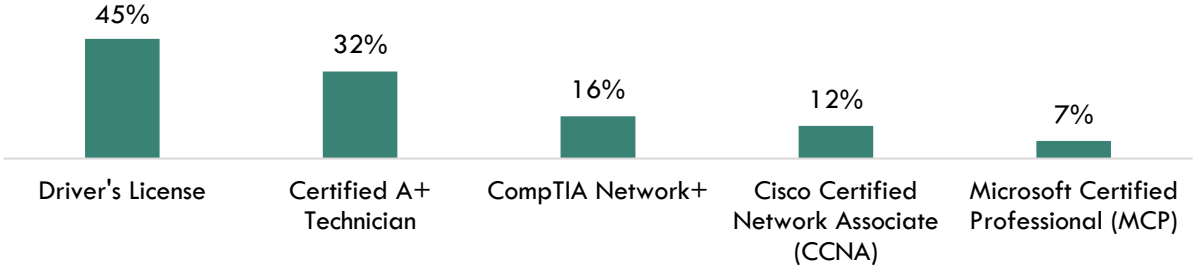
Software Skills
Analysis also included the software skills most in demand by employers. Microsoft Office and SQL were the top two software skills identified in job postings (Exhibit 8).

Exhibit 8. In-demand software skills for computer systems and networking professionals



Certifications
Of the 572 job postings, 197 contained certification data. Among those, 45% indicated a need for a driver's license. The next top certifications are Certified A+ Technician and CompTIA Network + (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 9. Top certifications for computer systems and networking professionals in job postings



Education, Work Experience & Training

An associate degree is typically required for computer network support specialists, and some college, no degree is typically required for computer user support specialists (Exhibit 10). The remaining two occupations typically require a bachelor's degree.

Exhibit 10. Education, work experience, training, and Current Population Survey results for computer systems and networking professionals[3]

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Computer Systems Analysts	Bachelor's degree	None	None	20.8%
Computer Network Support Specialists	Associate degree	None	None	39.2%
Computer User Support Specialists	Some college, no degree	None	None	41.2%
Computer Network Architects	Bachelor's degree	5 years or more	None	37.7%

[3] "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, https://www.bls.gov/cps/.

Supply

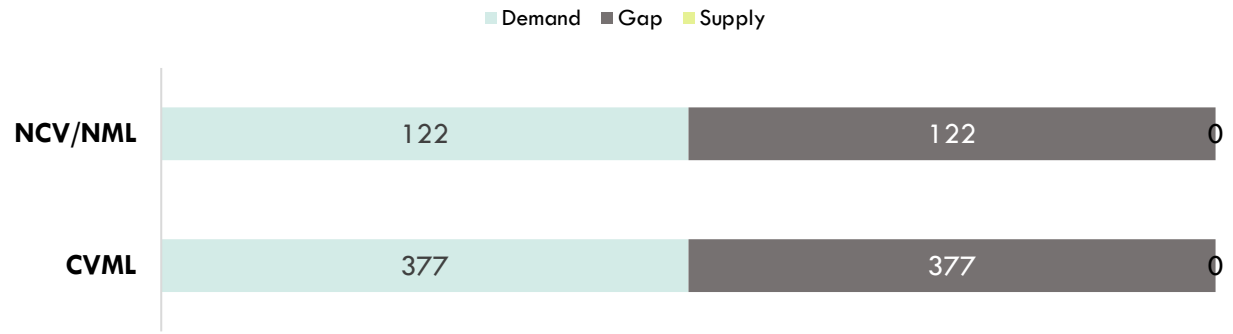
Analysis of program data from the California Community Colleges Chancellor's Office Data Mart included the TOP code and title: 070810 - Computer Networking. Analysis of the last three years of data shows that, on average, 100 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for computer systems and networking professionals occupations in the region

TOP Code - Title	Colleges	Associate Degree	Certificate 12 < 18 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Subtotal
070810 - Computer Networking	Cerro Coso	3			3		6
	Clovis	1		1			1
	Fresno City	14			12		26
	Modesto		10				10
	Reedley College	4		7			12
	San Joaquin Delta	14		25			38
	Sequoias					4	4
	West Hills Lemoore			3			3
TOTAL		**36**	**10**	**35**	**15**	**4**	**100**

There is an undersupply of 122 computer systems and networking professionals in the NCV/NML subregion and 377 workers in the region (Exhibit 12).

Exhibit 12. Computer systems and networking professionals workforce annual demand and supply in the NCV/NML subregion and region



Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP codes related to computer systems and networking professionals. Of note, there were 69 computer networking students who received a degree or certificate or attained apprenticeship journey status; 57% of students obtained a job closely related to their field of study; 15% reported a median change in earnings; and 82% attained a living wage.

Exhibit 13. Regional metrics for the TOP codes related to computer systems and networking professionals

Metric	Computer Systems Analysis 070730	Computer Networking 070810
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	*	69
Number of Students Who Transferred	*	*
Job Closely Related to Field of Study	*	57%
Median Change in Earnings	22%	15%
Attained a Living Wage	75%	82%
* denotes data not available.		

Conclusion

The entry-level wages of the four occupations exceed the NCV/NML subregion's average living wage. There were 572 job postings in the past six months for occupations related to computer systems and networking professionals in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is troubleshooting, and the top specialized skill is Microsoft Office.
- The top software skill is Microsoft Office.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 122 in the NCV/NML subregion and 377 in the region.

Recommendation

The COE recommends expanding existing computer systems analysis programs to meet the regional need for more workers in this field. To be clear, community college program completers will likely need to transfer to a four-year college or university to obtain a bachelor's degree before entering employment. Colleges considering this program should partner with a four-year postsecondary institution and local employers to ensure their training provides the skills and certifications needed to transfer to a four-year institution of higher education and obtain a job in this field.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com.
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm.
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov.
Job Posting and Skills Data	Burning Glass: burning-glass.com/.
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org.

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.

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