March 2020

Labor Market Analysis

Information Systems Management

California Community Colleges

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Prepared by the Central Valley/Mother Lode Center of Excellence

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Summary

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for information systems management. Five occupations related to information systems management were identified for Reedley College:

- Computer User Support Specialists (SOC 15-1151)
- Network and Computer Systems Administrators (SOC 15-1142)
- Computer Network Support Specialists (SOC 15-1152)
- Database Administrators (SOC 15-1141)
- Information Security Analysts (SOC 15-1122)

Key findings:

- **Occupational demand —** Nearly 4,000 workers were employed in jobs related to information systems management in 2018 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is computer user support specialists with 2,077 workers in 2018, a projected growth rate of 10% over the next five years, and 218 annual openings.
- **Wages —** Information security analysts, have the highest earnings, a median wage of $41.42/hour in the subregion and $24.39/hour in the region.
- **Employers —** Employers with the most job postings in the subregion are Lockheed Martin Corporation, US Government, and Best Buy.
- **Job titles —** The most common occupational title in job postings in the subregion is computer user support specialist. The most common job title is systems administrator.
- **Skills and certifications —** The top baseline skill is troubleshooting, the top specialized skill is customer service, and the top software skill is Microsoft Office. The most in-demand certification is a driver's license.
- **Education —** Some college, no degree is typically required for computer user support specialists and an associate degree is typically required for computer network support specialists. The three remaining occupations typically require a bachelor's degree.
- **Supply —** Analysis of postsecondary completions in the region shows that on average 44 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 312 trained workers in the subregion and 570 workers in the region. The Center of Excellence recommends that Reedley College work with the ICT/DM Regional Director, the college's advisory board, and local industry in the development of programs to address the shortage of information systems management workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Reedley College to provide labor market information for information systems management. Review of the Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP) found the following programs are appropriate for this analysis:

- Computer Infrastructure and Support-070800 (TOP)
- Computer Networking-070810 (TOP)
- 11.0901 - Computer Systems Networking and Telecommunications (CIP)
- 11.1006 - Computer Support Specialist (CIP)

The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) 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 South Central Valley/Southern Mother Lode (SCV/SML) subregion is $10.30/hour.[1]

Analysis of the program and occupational data related to information systems management resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System titles and codes used in this report are:

- Computer User Support Specialists (SOC 15-1151)
- Network and Computer Systems Administrators (SOC 15-1142)
- Computer Network Support Specialists (SOC 15-1152)
- Database Administrators (SOC 15-1141)
- Information Security Analysts (SOC 15-1122)

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, or 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.

Sample Job Titles: Computer Specialist, Computer Support Specialist, Computer Technician, Desktop Support Technician, Help Desk Analyst, Help Desk Technician, Information Technology Specialist (IT Specialist), Network Technician, Support Specialist, Technical Support Specialist

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

Network and Computer Systems Administrators

Job Description: Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Monitor network to ensure network availability to all system users and may perform necessary maintenance to support network availability. May monitor and test Web site performance to ensure Web sites operate correctly and without interruption. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software. May supervise

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[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/.

computer user support specialists and computer network support specialists. May administer network security measures.

Sample Job Titles: Information Analyst, Information Systems Manager (IS Manager), Information Technology Specialist (IT Specialist), LAN Specialist (Local Area Network Specialist), Local Area Network Administrator (LAN Administrator), Network Administrator, Network Coordinator, Network Manager, Network Specialist, Systems Administrator **Knowledge:** Computers and Electronics, English Language, Customer and Personal Service, Engineering and Technology, Mathematics
Skills: Critical Thinking, Judgment and Decision Making, Reading Comprehension, Systems Analysis, Active Listening

Computer Network Support Specialists

Job Description: Analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption.
Sample Job Titles: Computer Network Specialist, IT Consultant (Information Technology Consultant), Network Engineer, Network Specialist, Network Support Specialist, Network Technical Analyst, Network Technician, Personal Computer Network Analyst, Senior IT Assistant (Senior Information Technology Assistant), Systems Specialist
Knowledge: Computers and Electronics, Telecommunications, Customer and Personal Service, Engineering and Technology, English Language
Skills: Critical Thinking, Active Listening, Judgment and Decision Making, Reading Comprehension, Active Learning

Database Administrators

Job Description: Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. May plan, coordinate, and implement security measures to safeguard computer databases.
Sample Job Titles: Data Architect, Database Administration Manager, Database Administrator (DBA), Database Analyst, Database Coordinator, Database Developer, Database Programmer, Information Systems Manager, Management Information Systems Director (MIS Director), System Administrator
Knowledge: Computers and Electronics, English Language, Telecommunications, Mathematics, Clerical
Skills: Critical Thinking, Complex Problem Solving, Active Learning, Active Listening, Judgment and Decision Making

Information Security Analysts

Job Description: Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses.
Sample Job Titles: Data Security Administrator, Information Security Officer, Information Security Specialist, Information Systems Security Analyst, Information Systems Security Officer, Information Technology Security Analyst (IT Security Analyst), Information Technology Specialist, Network Security Analyst, Security Analyst, Systems Analyst
Knowledge: Computers and Electronics, English Language, Administration and Management, Engineering and Technology, Telecommunications
Skills: Reading Comprehension, Critical Thinking, Active Listening, Complex Problem Solving, Speaking

Occupational Demand

The South Central Valley/Southern Mother Lode subregion employed 3,991 workers in information systems management occupations in 2018 (Exhibit 1). The largest occupation is computer user support specialists with 2,077 workers in 2018. This occupation is projected to grow by 10% over the next five years and has the greatest number of projected annual openings, 218.
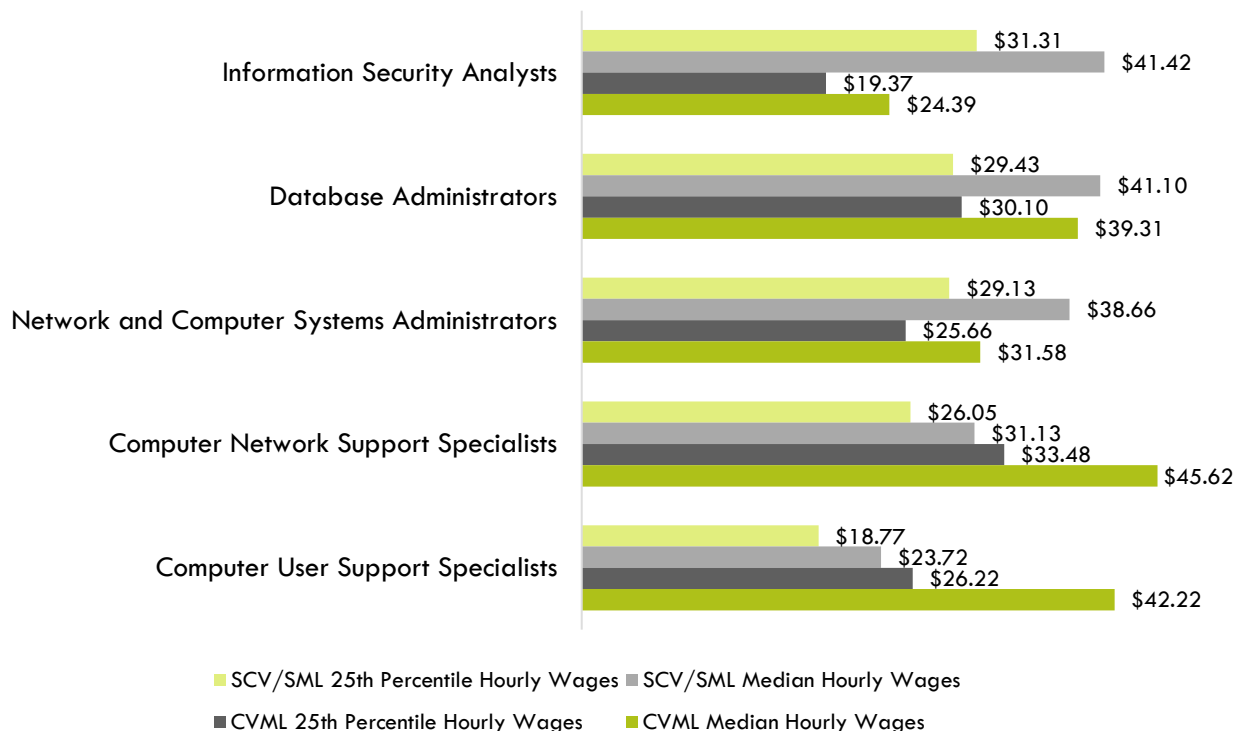
Exhibit 1. Information systems management employment and occupational projections in the SCV/SML subregion

Occupation	2018 Jobs	2023 Jobs	5-year Change	5-year % Change	Annual Openings
Computer User Support Specialists	2,077	2,276	199	10%	218
Network and Computer Systems Administrators	984	1,039	55	6%	83
Computer Network Support Specialists	561	601	40	7%	55
Database Administrators	213	235	22	10%	20
Information Security Analysts	155	186	31	20%	18
Total	3,991	4,337	346	9%	395

Wages

Exhibit 2 compares the entry-level and experienced wages of the information systems management occupations. Information security analysts, have the highest earnings, a median wage of $41.42/hour in the subregion and $24.39/hour in the region.

Exhibit 2. Entry-level and experienced wage comparison in the SCV/SML subregion and region

Information Security Analysts
- $31.31
- $41.42
- $19.37
- $24.39

Database Administrators
- $29.43
- $41.10
- $30.10
- $39.31

Network and Computer Systems Administrators
- $29.13
- $38.66
- $25.66
- $31.58

Computer Network Support Specialists
- $26.05
- $31.13
- $33.48
- $45.62

Computer User Support Specialists
- $18.77
- $23.72
- $26.22
- $42.22

■ SCV/SML 25th Percentile Hourly Wages ■ SCV/SML Median Hourly Wages
■ CVML 25th Percentile Hourly Wages ■ CVML Median Hourly Wages

Job Postings

There were 1,496 job postings for the five occupations in the SCV/SML subregion from August 2019 to January 2020. The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of information systems management by number of job postings

Employer	Job Postings
Lockheed Martin Corporation	44
US Government	24
Best Buy	22
Dignity Health	19
Northrop Grumman	19
Anthem Blue Cross	17
US Department of Treasury	17
Arctic Slope Regional Corporation	16
General Dynamics	16
Smartronix Incorporated	15

Job posting analysis also included the top industries hiring positions related to information systems management (Exhibit 4).

Exhibit 4. Top industries for information systems management by number of job postings

Industry	Job Postings
Employment Services	140
Aerospace Product and Parts Manufacturing	65
Executive, Legislative, and Other General Government Support	53
General Medical and Surgical Hospitals	45
Elementary and Secondary Schools	38
Insurance Carriers	32
Colleges, Universities, and Professional Schools	30
Computer Systems Design and Related Services	28
National Security and International Affairs	26
Electronics and Appliance Stores	24

Job Titles

Exhibit 5 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across five O*NET OnLine occupations. The occupational title computer user support specialists is listed in the most job postings, 704, followed by network and computer systems administrators, 364 job postings. Note that job postings are heavily dominated by the occupational title computer user support specialists.

Exhibit 5. Top occupational titles in job postings for information systems management

Occupational Title	Job Postings
Computer User Support Specialists	704
Network and Computer Systems Administrators	364
Information Security Analysts	183
Database Administrators	156
Computer Network Support Specialists	89

Analysis of the 1,496 advertised job titles for the targeted occupations reveals the top title is systems administrator, occurring in 116 job postings, followed by information technology specialist, 89 job postings (Exhibit 6).

Exhibit 6. Top job titles by number of job postings for information systems management

Job Title	Job Postings
Systems Administrator	116
Information Technology Specialist	89
Network Administrator	59
Information Technology Technician	48
Help Desk Technician	46
PC Technician	43
Computer Technician	39
Field Service Technician	37
Help Desk Analyst	26
Technical Support Specialist	26

Salaries

Exhibit 7 shows the "Market Salaries" for information systems management 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.

Exhibit 7. Salaries for information systems management

Market Salary Percentile	Salary Amount
10th Percentile	33,143
25th Percentile	38,236
50th Percentile	55,587
75th Percentile	77,160
90th Percentile	95,390

Education

Of the 1,496 job postings, 819 listed an education level preferred for the positions being filled. Of those, 36% requested a high school diploma or vocational training, 19% requested an associate degree, and 67% requested a bachelor's degree (Exhibit 8).

Exhibit 8. Education levels requested in job postings for information systems management

Education level	% of Job Postings
Bachelor's degree	67%
High school or vocational training	36%
Associate's degree	19%
Master's degree	14%
Doctoral degree	7%

Baseline and Specialized Skills

Exhibit 9 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are troubleshooting, 45% of job postings, communication, 36%, and problem solving, 26%. The top three specialized skills are customer service, 26% of job postings, technical support, 25%, and repair, 23%.

Exhibit 9. In-demand information systems management baseline and specialized skills
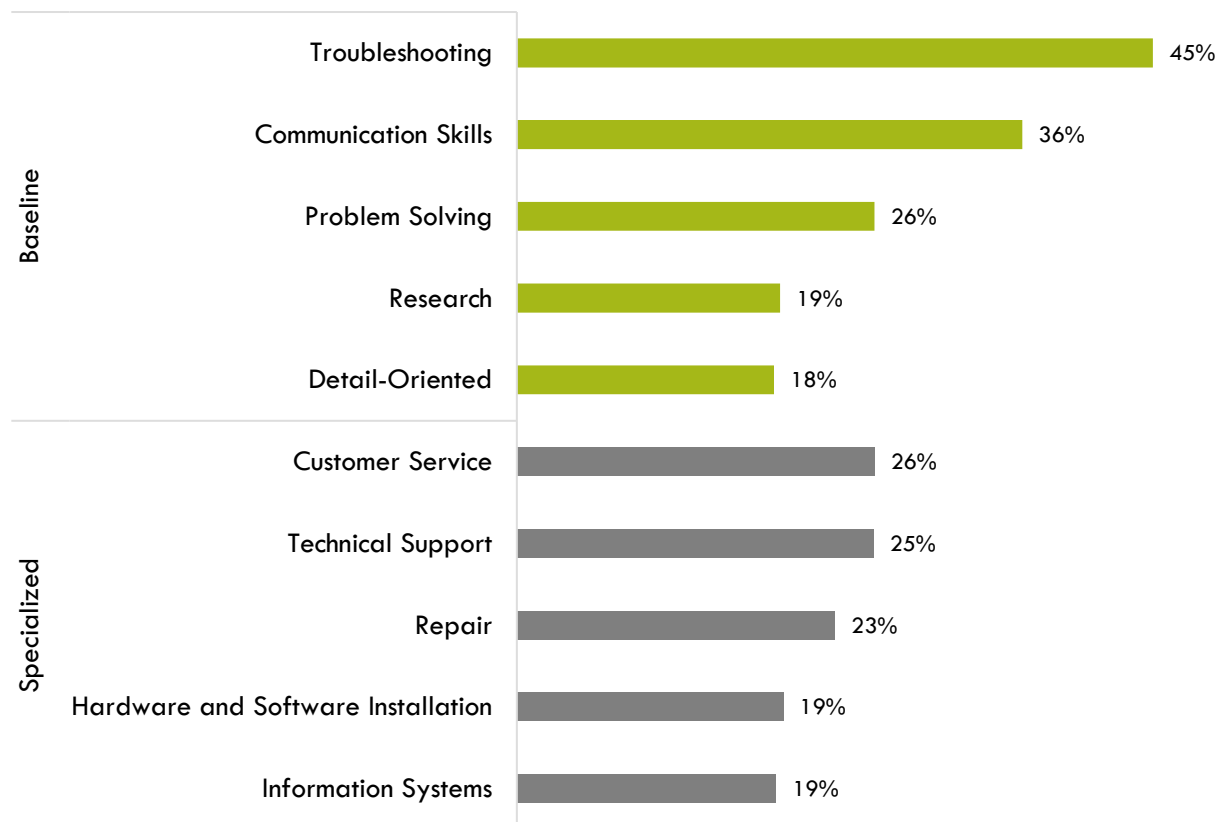
Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Office and Windows rank first and second (Exhibit 10).
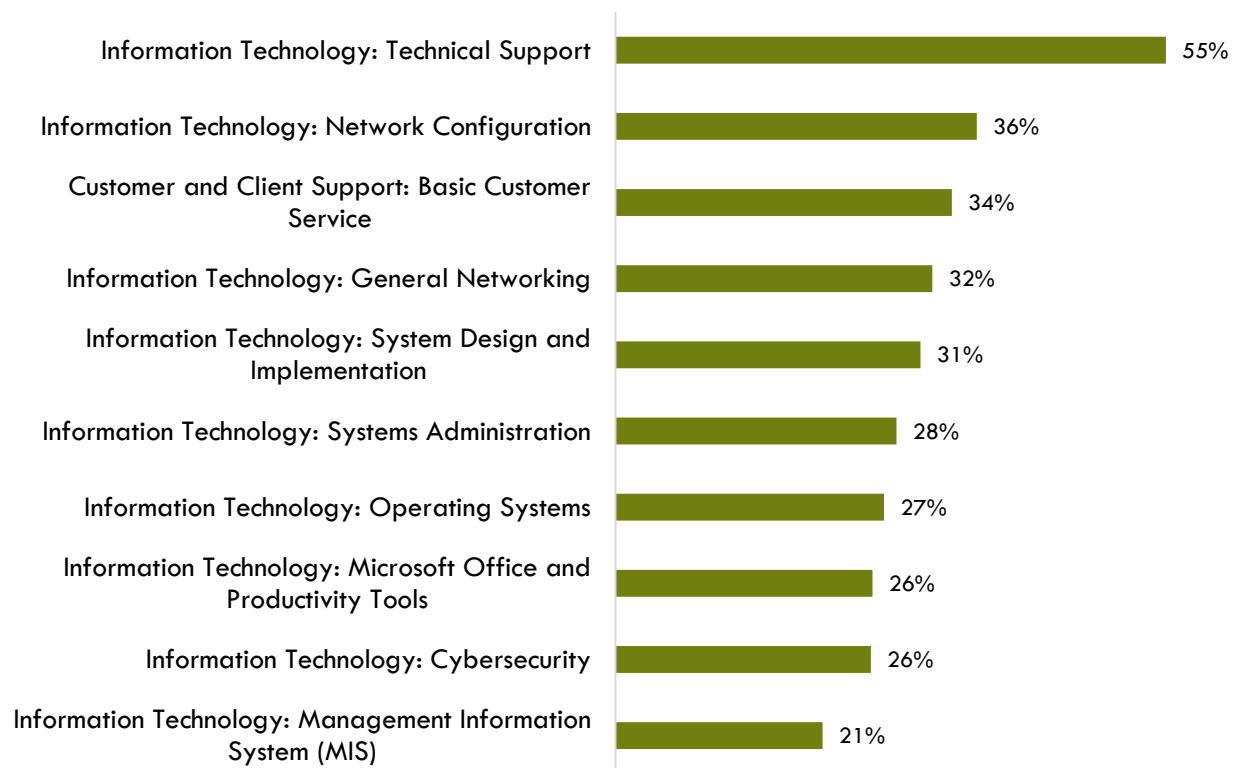
Exhibit 10. In-demand information systems management software skills

17%	16%	11%	10%	10%
Microsoft Office	Microsoft Windows	Windows Server	Linux	SQL
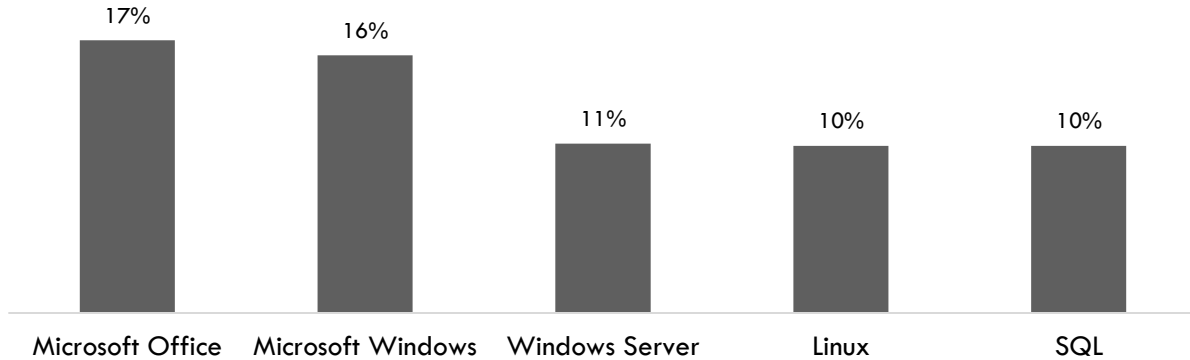
Skill Cluster Projections

Of the 1,496 job postings, 1,382 postings contained skill projections. An evaluation of the skill clusters that will have the greatest gains in level of importance shows that the top areas are Information Technology: Technical Support, 55%; Information Technology: Network Configuration, 36%; and Customer and Client Support: Basic Customer Service, 34% (Exhibit 11).

Exhibit 11. Skill cluster projections for information systems management

Skill Cluster	Percent
Information Technology: Technical Support	55%
Information Technology: Network Configuration	36%
Customer and Client Support: Basic Customer Service	34%
Information Technology: General Networking	32%
Information Technology: System Design and Implementation	31%
Information Technology: Systems Administration	28%
Information Technology: Operating Systems	27%
Information Technology: Microsoft Office and Productivity Tools	26%
Information Technology: Cybersecurity	26%
Information Technology: Management Information System (MIS)	21%

Certifications

Of the 1,496 job postings, 660 contained certification data. Of those, 31% indicated a need for a driver's license. The next top certifications are security clearance and CompTIA Security+ (Exhibit 12). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 12. Top information systems management certifications requested in job postings
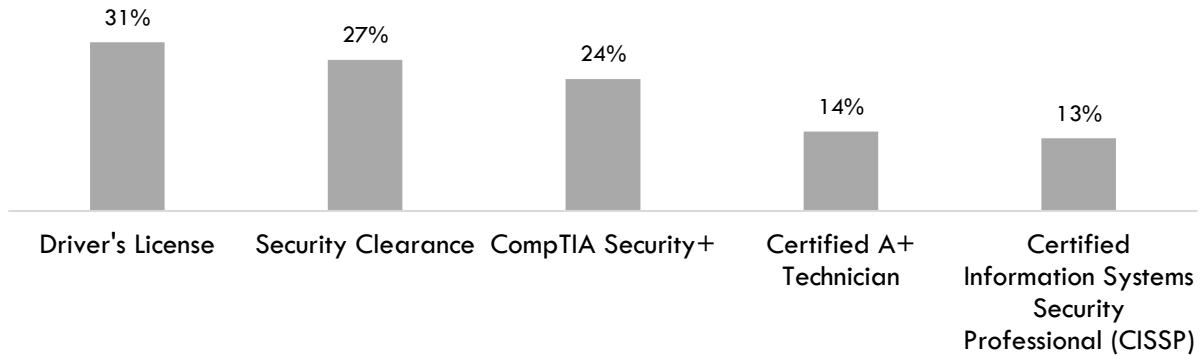
Education, Work Experience & Training

Some college, no degree is typically required for computer user support specialists and an associate degree is typically required for computer network support specialists (Exhibit 13). Three occupations typically require a bachelor's degree, but about a third of workers in two of the occupations have less than a bachelor's degree, making these middle-skill occupations that are relevant to community college education.

Exhibit 13. Education, work experience, training and Current Population Survey results for information systems management occupations[2]

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Information Security Analysts	Bachelor's degree	Less than 5 years	None	26.9%
Database Administrators	Bachelor's degree	None	None	22.0%
Network and Computer Systems Administrators	Bachelor's degree	None	None	36.5%
Computer User Support Specialists	Some college, no degree	None	None	41.2%
Computer Network Support Specialists	Associate degree	None	None	41.2%

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[2] "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 and CIP codes: Computer Infrastructure and Support-070800; Computer Networking-070810; 11.0901 - Computer Systems Networking and Telecommunications; and 11.1006 - Computer Support Specialist. Analysis of the last three years of TOP code data shows that, on average, 44 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 14).

Exhibit 14. Postsecondary supply for information systems management occupations in the region

TOP/CIP Title - Code	Colleges	Certificates	Degrees	Subtotal
Computer Infrastructure and Support-070800	Bakersfield	2		2
	Fresno City	3		3
	Sequoias	2		2
Computer Networking-070810	Clovis Community		0	0
	Reedley College	4	2	6
Computer Systems Networking and Telecommunications-11.0901	Institute of Technology	16		16
Computer Support Specialist-11.1006	San Joaquin Valley College-Visalia	16		16
Total		**42**	**2**	**44**

Gap Analysis

There is an undersupply of 312 information systems management workers in the SCV/SML subregion and 570 workers in the region (Exhibit 15).

Exhibit 15. Information systems management workforce annual demand and supply in the SCV/SML subregion and region

■ Demand ■ Gap ■ Supply

	Demand	Gap	Supply
SCV/SML	356	312	44
CVML	614	570	44
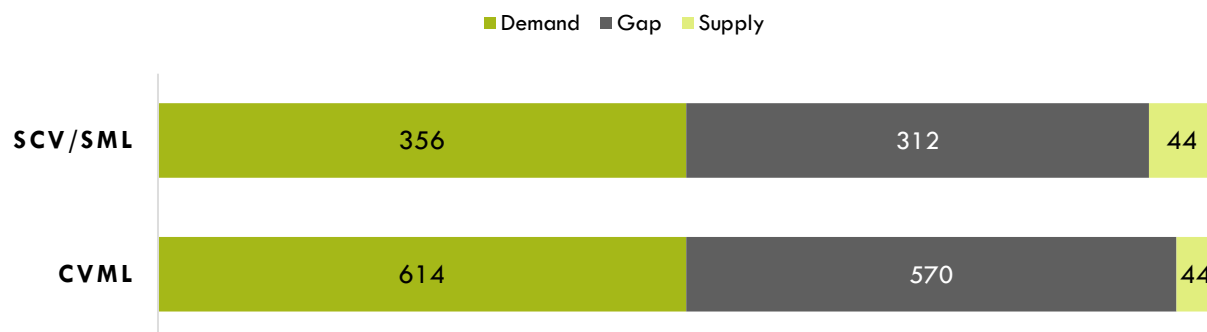
Student Outcomes

Exhibit 16 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to information systems management. Across the region, 76 computer networking students received a degree or certificate, and 12 computer infrastructure and support students transferred. Of the computer networking students who completed a program, 15% reported a median change in earnings, and 74% attained a living wage.

Exhibit 16. Regional metrics for the TOP codes related to information systems management

Metric	Computer Infrastructure & Support 070800	Computer Networking 070810
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	13	76
Number of Students Who Transferred	12	*
Job Closely Related to Field of Study	60%	71%
Median Change in Earnings	22%	15%
Attained a Living Wage	59%	74%
* denotes data not available.		

Conclusion

The median wages of the five occupations exceed the SCV/SML subregion's average living wage. There were 1,496 job postings in the past 12 months for occupations related to information systems management 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 customer service.
- 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 312 in the SCV/SML subregion and 570 in the region.

Recommendation

Based on these findings, it is recommended that Reedley College work with the ICT/DM Regional Director, the college's advisory board, and local industry in the development of programs to address the shortage of information systems management in the region.

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.