

March 2022

# Labor Market Analysis

## Information Systems, Networking (Cisco CCNA)



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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](mailto: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 information systems, networking (Cisco CCNA). Four occupations related to information systems, networking (Cisco CCNA) were identified for Reedley College:

- 15-1231, Computer Network Support Specialists
- 15-1232, Computer User Support Specialists
- 15-1241, Computer Network Architects
- 15-1244, Network and Computer Systems Administrators

## Key findings:

- **Occupational demand** — Nearly 3,990 workers were employed in jobs related to information systems, networking (Cisco CCNA) in 2020 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is computer user support specialists with 2,143 workers, a projected growth rate of 2% over the next five years, and 170 annual openings.
- **Wages** — Network and computer systems administrators earn the highest entry-level wage, \$35.28/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Anthem Blue Cross, Lockheed Martin Corporation, and Best Buy.
- **Occupational titles** — The most common occupational title in job postings in the subregion is Computer User Support Specialists. The most common job title is Systems Administrator.
- **Skills and certifications** — The top baseline skill is troubleshooting, the top specialized skill is technical support, 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. An associate degree is typically required for computer network support specialists. A bachelor's degree is typically required the two remaining occupations.
- **Supply** — Analysis of postsecondary completions shows that on average 151 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 212 trained workers in the subregion and 319 workers in the region. The Center of Excellence recommends that Reedley College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of information systems, networking (Cisco CCNA) 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, networking (Cisco CCNA). 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 SCV/SML subregion is \$11.91/hour.<sup>1</sup> Analysis of the program and occupational data related to information systems, networking (Cisco CCNA) resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 15-1231, Computer Network Support Specialists
- 15-1232, Computer User Support Specialists
- 15-1241, Computer Network Architects
- 15-1244, Network and Computer Systems Administrators

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 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, Judgment and Decision Making, Reading Comprehension, Active Learning

## **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, Customers and Personal Service, English Language, Telecommunications, Engineering and Technology

**Skills:** Active Listening, Reading Comprehension, Speaking, Complex Problem Solving, Critical Thinking

## **Computer Network Architects**

**Job Description:** Design and implement computer and information networks, such as local area networks (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, Judgment and Decision Making

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<sup>1</sup> 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://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

## **Network and Computer Systems Administrators**

**Job Description:** Install, configure, and maintain an organization's local area network (LAN), wide area network (WAN), data communications network, operating systems, and physical and virtual servers. Perform system monitoring and verify the integrity and availability of hardware, network, and server resources and systems. Review system and application logs and verify completion of scheduled jobs, including system backups. Analyze network and server resource consumption and control user access. Install and upgrade software and maintain software licenses. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software.

**Knowledge:** Computers and Electronics, Customers and Personal Service, English Language, Customer and Personal Service, Engineering and Technology, Mathematics

**Skills:** Active Listening, Reading Comprehension, Judgment and Decision Making, Systems Analysis, Critical Thinking

## Occupational Demand

The SCV/SML subregion employed 3984 workers in information systems, networking (Cisco CCNA) occupations in 2020 (Exhibit 1). The largest occupation is computer user support specialists with 2,143 workers. This occupation is projected to grow by 2% over the next five years and has the greatest number of projected annual openings, 170.

**Exhibit 1. Information systems, networking (Cisco CCNA) employment and occupational projections in the SCV/SML subregion**

Occupation	2020 Jobs	2025 Jobs	5-Year Change	5-Year % Change	Annual Openings
Computer User Support Specialists	2,143	2,187	44	2%	170
Network and Computer Systems Administrators	918	937	19	2%	66
Computer Network Support Specialists	610	619	9	2%	48
Computer Network Architects	313	318	5	2%	20
<b>TOTAL</b>	<b>3,984</b>	<b>4,061</b>	<b>77</b>	<b>2%</b>	<b>304</b>

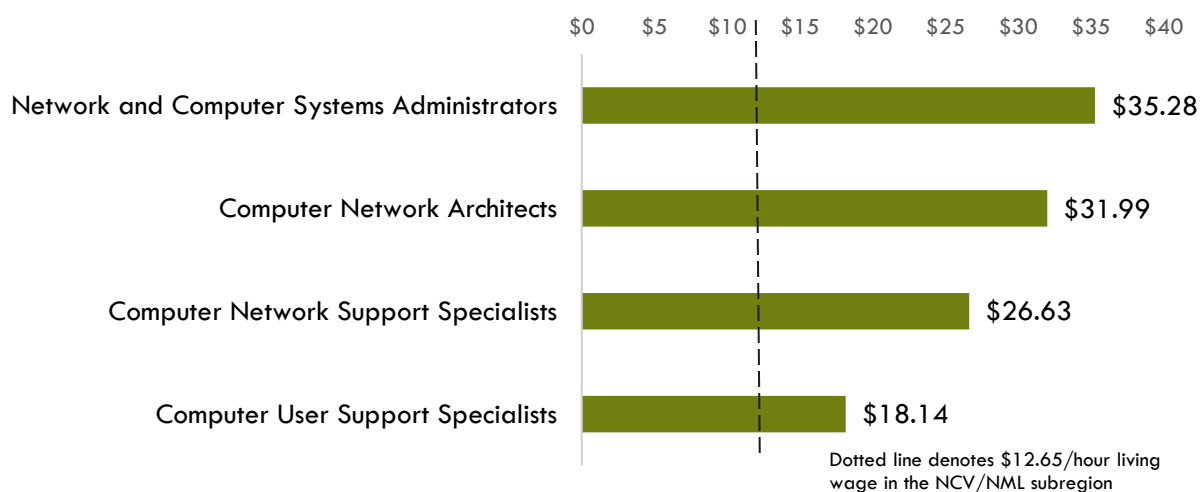
## Wages

Exhibit 2 shows the entry-level hourly wages of the information systems, networking (Cisco CCNA) occupations. Network and computer systems administrators earn the highest entry-level wage, \$35.28/hour in the subregion<sup>2</sup>.

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<sup>2</sup> Entry-level wages are derived from the 25<sup>th</sup> percentile.

**Exhibit 2. Information systems, networking (Cisco CCNA) entry-level wages in the SCV/SML subregion**



## Job Postings

There were 1,236 job postings for the four occupations in the SCV/SML subregion from September 2021 to February 2022.<sup>3</sup> The employers with the most job postings are listed in Exhibit 3.

**Exhibit 3. Top employers of information systems, networking (Cisco CCNA) by number of job postings**

Employer	Job Postings	% Job Postings
Anthem Blue Cross	46	5%
Lockheed Martin Corporation	17	2%
Best Buy	15	2%
Resource Management Concepts	11	1%
Cazador Consulting Group	10	1%
Internal Revenue Service	10	1%
Ndti	9	1%
Cargill Incorporated	8	1%
Raytheon	8	1%
Deloitte	7	1%

Exhibit 4 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 736 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Systems Administrator in 37 job postings, It Support Specialist in 29 job postings, and Help Desk Specialist - Home in 28 job postings.

<sup>3</sup> 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 4. Top occupational titles in job postings for information systems, networking (Cisco CCNA)**

Occupational Title	Job Postings	% of Job Postings
Computer User Support Specialists	736	60%
Network and Computer Systems Administrators	301	24%
Computer Network Architects	91	7%
Computer Network Support Specialists	72	6%
Telecommunications Engineering Specialists	36	3%

**Salaries**

Exhibit 5 shows the “Market Salaries” for information systems, networking (Cisco CCNA) occupations. These are calculated by Burning Glass using a machine learning model built off of millions of job postings every year. This accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

**Exhibit 5. Salaries for information systems, networking (Cisco CCNA) occupations**

Market Salary Percentile	Salary Amount
10th Percentile	\$31,832
25th Percentile	\$38,171
50th Percentile	\$50,288
75th Percentile	\$69,728
90th Percentile	\$85,739

**Education**

Of the 1,236 job postings, 741 listed an education level preferred for the positions being filled. Among those, 63% requested a bachelor’s degree, 40% requested high school or vocational training, and 22% 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%.

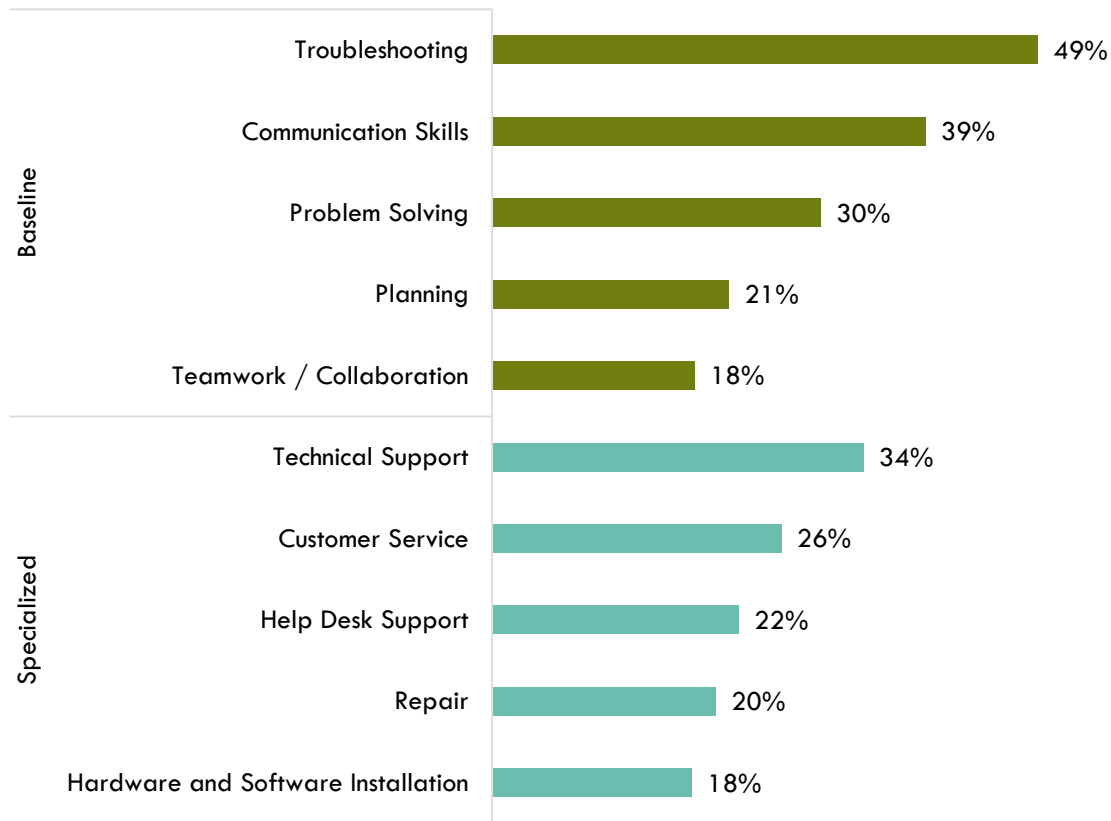
**Exhibit 6. Education levels requested in job postings for information systems, networking (Cisco CCNA)**

Education Level	Job Postings	% of Job Postings
Bachelor's degree	470	63%
High school or vocational training	298	40%
Associate's degree	163	22%
Master's degree	42	6%
Doctoral degree	13	2%

**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, 49% of job postings, communication skills, 39%, and problem solving, 30%. The top three specialized skills are technical support, 34% of job postings, customer service, 26%, and help desk support, 22%.

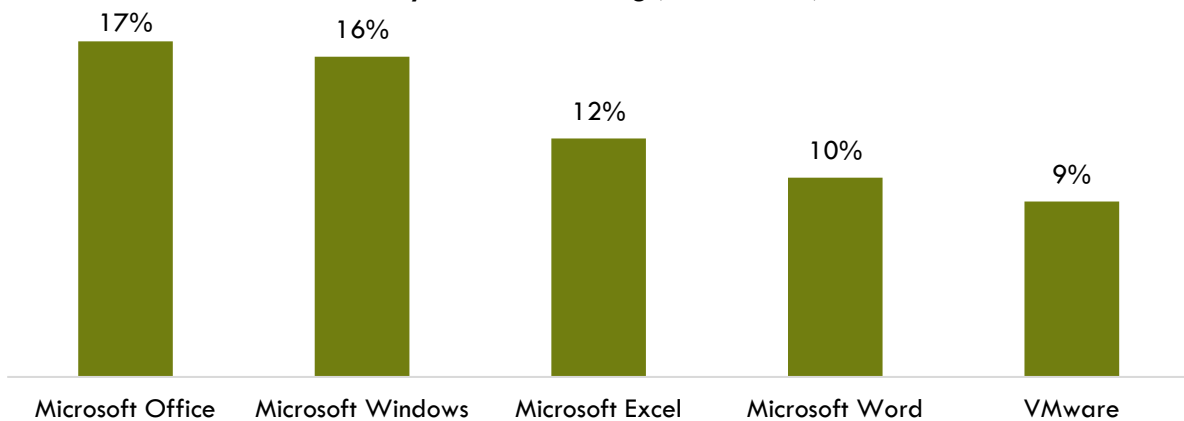
**Exhibit 7. In-demand information systems, networking (Cisco CCNA) baseline and specialized skills**



**Software Skills**

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

**Exhibit 8. In-demand information systems, networking (Cisco CCNA) software skills**

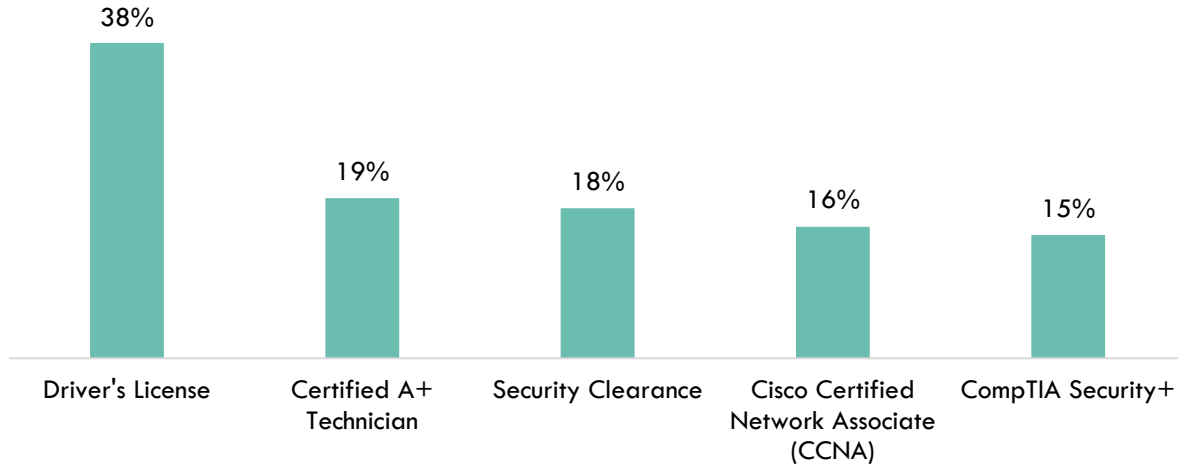




## Certifications

Of the 1,236 job postings, 491 contained certification data. Among those, 38% indicated a need for a driver's license. The next top certifications are certified A+ technician and security clearance (Exhibit 9).

**Exhibit 9. Top information systems, networking (Cisco CCNA) certifications requested in job postings**



## Education, Work Experience & Training

A high school diploma or equivalent is typically required for the two occupations (Exhibit 10).

**Exhibit 10. Education, work experience, training, and Current Population Survey results for information systems, networking (Cisco CCNA) occupations<sup>4</sup>**

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Computer User Support Specialists	Some college, no degree	None	None	39.2%
Network and Computer Systems Administrators	Bachelor's degree	None	None	37.4%
Computer Network Support Specialists	Associate's degree	None	None	39.2%
Computer Network Architects	Bachelor's degree	5 years or more	None	37.7%

<sup>4</sup> "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

# Supply

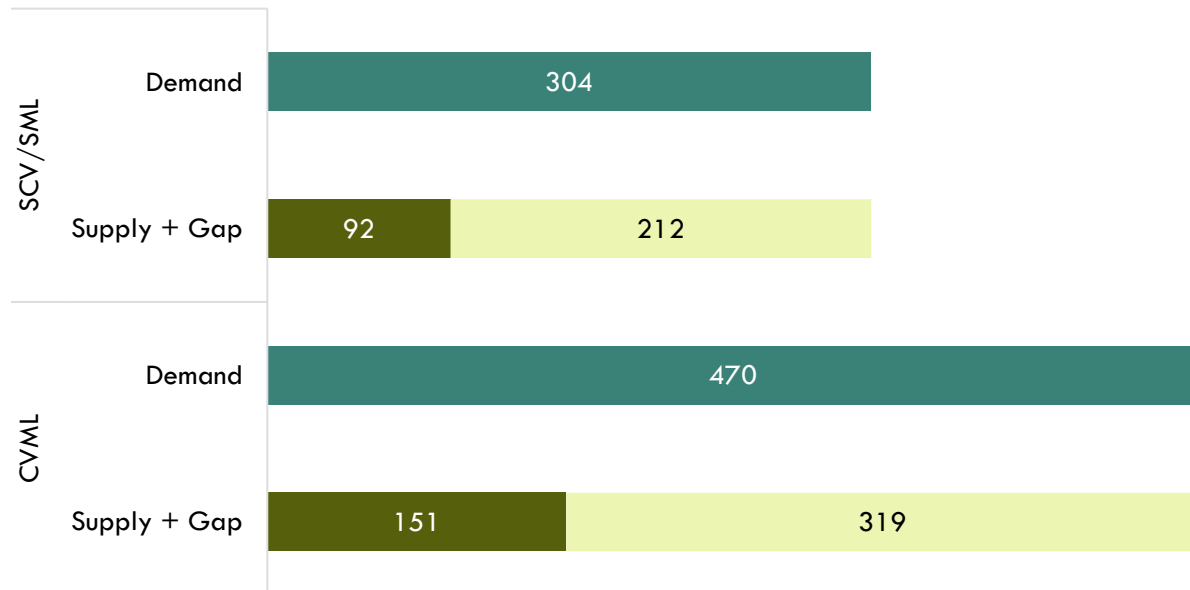
Analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) included the TOP and CIP codes and titles: 070810 - Computer Networking and 11.0901 - Computer Systems Networking and Telecommunications. Analysis of the last three years of data shows that, on average, 151 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

**Exhibit 11. Postsecondary supply for information systems, networking (Cisco CCNA) occupations in the region**

TOP/ CIP Code- Title	College	Associate Degree	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 8 < 16 Semester Units	Subtotal
<b>070810 - Computer Networking</b>	Cerro Coso	9					10			18
	Clovis	2				1				3
	Fresno City	22					22			45
	Modesto			7					1	8
	Reedley College	4			9	7				20
	San Joaquin Delta	15				18	3			37
	Sequoias	1						5		6
	West Hills Lemoore					0	1			1
<b>11.0901 - Computer Systems Networking and Telecommunications</b>	Institute of Technology		13							13
<b>TOTAL</b>		<b>53</b>	<b>13</b>	<b>7</b>	<b>9</b>	<b>26</b>	<b>35</b>	<b>5</b>	<b>1</b>	<b>151</b>

There is an undersupply of 212 information systems, networking (Cisco CCNA) workers in the SCV/SML subregion and 319 workers in the region (Exhibit 12).

**Exhibit 12. Information systems, networking (Cisco CCNA) workforce demand (annual job openings), postsecondary supply of students (awards), and additional students needed to fill gap in the SCV/SML 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 code related to information systems, networking (Cisco CCNA). Of note, 86 students received a degree or certificate or attained apprenticeship journey status; 19 students transferred; 73% of students obtained a job closely related to their field of study; 19% had a median change in earnings; and 71% of students attained a living wage.

**Exhibit 13. Subregional metrics for the TOP code related to information systems, networking (Cisco CCNA)**

Metric	Computer Networking 070810
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	86
Number of Students Who Transferred	19
Job Closely Related to Field of Study	73%
Median Change in Earnings	19%
Attained a Living Wage	71%
* denotes data not available.	

## Conclusion

The entry-level wages of the four occupations exceed the SCV/SML subregion's average living wage. There were 1,236 job postings in the past six months for occupations related to information systems, networking (Cisco CCNA) 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 technical support.
- 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 212 in the SCV/SML subregion and 319 in the region.

## Recommendation

Based on these findings, it is recommended that Reedley College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of information systems, networking (Cisco CCNA) workers 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: <a href="http://economicmodeling.com">economicmodeling.com</a> .
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: <a href="https://www.bls.gov/emp/tables/educational-attainment.htm">https://www.bls.gov/emp/tables/educational-attainment.htm</a> .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: <a href="http://labormarketinfo.edd.ca.gov">labormarketinfo.edd.ca.gov</a> .
Job Posting and Skills Data	Burning Glass: <a href="http://burning-glass.com/">burning-glass.com/</a> .
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: <a href="http://onetonline.org">onetonline.org</a> .

## 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.