

Computer Maintenance and Security

Inland Empire/Desert Region (Riverside-San Bernardino-Ontario Metropolitan Statistical Area)

Summary

- Employment for the computer maintenance and security occupational group is expected to increase **9% between 2017 and 2022**. A total of **3,100 job openings, or 620 annual job openings** will be available over the five-year timeframe.
- The entry-level wage for each occupation in the computer maintenance and security occupational group is **above the MIT Living Wage estimate of \$12.30 per hour** for a single adult living in the Inland Empire/Desert Region.
- **There appears to be an opportunity for program growth** based on the average annual number of program completions for the selected community college program in the region (**26 annual average regional credentials**), and the annual openings for computer maintenance and security occupations in the region (**620 average annual openings**).

Introduction

This report details job opportunities that are relevant to computer support programs (TOP 0708.20). Completion of this program provides graduates with the principles and practices to provide technical assistance to computer system users. The computer support program also may include the use of computer hardware and software, printing, installation, word processing, electronic mail, and operating systems.¹ The occupations included in the computer maintenance and security occupational group are:

- Computer Network Support Specialists
- Computer User Support Specialists
- Information Security Analysts
- Network and Computer Systems Administrators

Page six of this report provides additional demand for sales in computer systems design and related services.

¹ The Taxonomy of Programs, 6th Edition, February 2004
http://extranet.cccco.edu/portals/1/aa/credit/2013files/topmanual6_2009_09corrected_12.5.13.pdf

Job Opportunities

In 2017, there were 6,878 computer maintenance and security jobs in the Inland Empire/Desert Region. This occupational group is projecting to increase employment by 9% in the region by 2022. Employers in the region will need to hire 3,100 workers during the same timeframe to backfill jobs that workers are permanently vacating (includes retirements). Appendix A, Table 1 displays job growth, wages, education, training, and work experience required for this occupational group.

Exhibit 1: Five-year projections for the computer maintenance and security occupational group in the Inland Empire/Desert Region

Region	2017 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Inland Empire/Desert	6,878	9%	3,100	620	14%

Source: EMSI 2018.3

On average, local employers fill online job posting for this group within 41 days. When compared to the national average, it takes one week longer for employers to find qualified candidates to fill open positions in the Inland Empire/Desert Region. Exhibit 2 shows the number of job ads posted during the last 12 months for each occupation along with the regional and national average time to fill.

Exhibit 2: Job ads by each of the computer maintenance and security occupations in the Inland Empire/Desert Region and time to fill, September 2017 - August 2018

Occupation	Job Ads	Regional Average Time to Fill (Days)	National Average Time to Fill (Days)
Computer User Support Specialists	674	39	33
Network and Computer Systems Administrators	348	41	34
Information Security Analysts	187	48	40
Computer Network Support Specialists	36	39	32
TOTAL	1,245	-	-

Source: Burning Glass – Labor Insights

Earnings

The entry-level wage for each of the occupations in the computer maintenance and security occupational group is above the MIT Living Wage estimate of \$12.30 per hour for a single adult living in the Inland Empire/Desert Region. Exhibit 3 displays wage information for this occupational group in the Inland Empire/Desert Region.

Exhibit 3: Earnings for the computer maintenance and security occupational group in the Inland Empire/Desert Region

Occupation	Entry to Experienced Hourly Earnings Range*	Median Wage*	Average Annual Earnings
Information Security Analysts	\$29.77 to \$59.87	\$47.46	\$96,700
Network and Computer Systems Administrators	\$28.61 to \$45.86	\$35.93	\$77,700
Computer Network Support Specialists	\$24.74 to \$39.94	\$29.52	\$68,100
Computer User Support Specialists	\$20.27 to \$30.45	\$25.73	\$54,300

Source: EMSI 2018.3

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.

Work Locations, Employers, Skills, and Education

Exhibit 4 displays the top employers posting job ads as well as the top work locations from job ads during the last 12 months.

Exhibit 4: The top employers and work locations for the computer maintenance and security occupational group in the Inland Empire/Desert Region during the last 12 months, September 2017 - August 2018

Occupation	Top Employers
Computer User Support Specialists (n=486)	<ul style="list-style-type: none"> Best Buy Riverside Health System
Network and Computer Systems Administrators (n=265)	<ul style="list-style-type: none"> International Management Systems San Manuel Indian Bingo Casino
Information Security Analysts (n=149)	<ul style="list-style-type: none"> UnitedHealth Group ESRI
Computer Network Support Specialists (n=30)	<ul style="list-style-type: none"> UnitedHealth Group San Bernardino County

Source: Burning Glass – Labor Insights

Exhibit 5 lists a sample of in-demand specialized and soft skills that employers are seeking when looking for workers to fill computer maintenance and security positions. Specialized skills are occupation-specific skills employers are requesting for industry or job competency. Employability skills are general abilities that employers are looking for beyond job-specific skills and work experience to help drive business activity. These are often referred to as “soft skills.”

Exhibit 5: Sample of in-demand skills from employer job ads for computer maintenance and security occupations in the Inland Empire/Desert Region, September 2017 - August 2018

Occupation	Specialized skills	Employability skills	Software and Programming Skills
Computer User Support Specialists (n=625)	<ul style="list-style-type: none"> • Customer Service • Hardware and Software Installation • Customer Contact 	<ul style="list-style-type: none"> • Troubleshooting • Communication Skills • Problem Solving 	<ul style="list-style-type: none"> • Microsoft Office • SQL • Virtual Private Networking (VPN)
Network and Computer Systems Administrators (n=323)	<ul style="list-style-type: none"> • Technical Support • Scheduling • Software Installation 	<ul style="list-style-type: none"> • Troubleshooting • Planning • Communication Skills 	<ul style="list-style-type: none"> • VMware • Microsoft Office Directory • Microsoft Exchange
Information Security Analysts (n=171)	<ul style="list-style-type: none"> • Information Systems • Cryptography • Computer Hardware/Software Knowledge 	<ul style="list-style-type: none"> • Teamwork/ Collaboration • Communication Skills • Research 	<ul style="list-style-type: none"> • Linux • Microsoft Office • Software Development
Computer Network Support Specialists (n=33)	<ul style="list-style-type: none"> • Information Systems • Routers • Project Management 	<ul style="list-style-type: none"> • Planning • Troubleshooting • Communication Skills 	<ul style="list-style-type: none"> • Windows Server • UNIX • Cisco Switching

Source: Burning Glass – Labor Insights

Exhibit 6 displays the entry-level education level education typically required to enter each occupation according to the Bureau of Labor Statistics, educational attainment for incumbent workers with “some college, no degree” and an “associate degree” according to the U.S. Census, and the minimum advertised education requirement requested by employers in online job ads. Education data was not available for the airline pilots, copilots, and flight engineers occupation.

Exhibit 6: Educational attainment and online job ads with minimum advertised education requirements for the computer maintenance and security occupational group in the Inland Empire/Desert Region, September 2017 - August 2018

Occupation	Work Experience Required	Typical Entry-Level Education Requirement	Two-Year Postsecondary Level of Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
				Number of Job Postings (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Computer User Support Specialists	None	Some college, no degree	41%	327	48%	17%	35%
Network and Computer Systems Administrators	None	Bachelor's degree	38%	228	14%	5%	81%
Information Security Analysts	Less than 5 years	Bachelor's degree	27%	142	13%	11%	76%
Computer Network Support Specialists	None	Associate degree	41%	25	36%	12%	52%

Source: EMSI 2018.3, Current Population Survey, Burning Glass – Labor Insights

*Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework

Demand for Sales in Computer Systems Design and Related Services

In 2017, there were more than 1,700 “sales representatives, wholesale and manufacturing, technical and scientific products” jobs in the Inland Empire/Desert Region. This occupation is expected to grow by 7% by 2022. The region will need to hire 1,034 workers during the same timeframe to backfill jobs that workers are permanently vacating (includes retirements). Despite high demand, only 6% of sales representatives, wholesale and manufacturing, technical and scientific products jobs work in the computer systems design and related services industry. Also, over the last 12 months (September 2017 to August 2018), there were 553 job advertisements for this occupation, and none were in the computer systems design and related services industry. Exhibit 7 displays the jobs, 5-year change, annual openings, and percentage of workers over the age of 55% for sale representatives in the Inland Empire/Desert Region.

Exhibit 7: Five-year projections for sales representatives, wholesale and manufacturing, technical and scientific products in the Inland Empire/Desert Region

Occupation	2017 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	1,712	7%	1,034	207	24%

Source: EMSI 2018.3

Student Completions

Exhibits 8 shows the annual average regional community college credentials (associate degrees and certificates) conferred during the three academic years between 2014 and 2017, with the relevant TOP code and the titles used at each college, sourced from the Chancellor’s Office Curriculum Inventory (COCI). Credentials granted from other educational institutions from 2013 to 2016 are displayed in Exhibit 9, along with the relevant CIP code. Please note, a credential is not equivalent to a single person in search of a job opening since a student may earn more than one credential, such as an associate degree in addition to a certificate. Community College student outcome information is from the CTE LaunchBoard based on the selected TOP code and region.

Exhibit 8: Annual average community college student completions for piloting programs in California

0708.20 Computer Support	Annual Community College Headcount (2016-17)	Community College Annual Average Credentials (2014-17)
Chaffey - Computer Support Technician (A+ Certification Preparation)	51	
Certificate 6 to < 18 semester units		*1
Mt. San Jacinto	55	
Total Community College Headcount (2016-17)	106	
Total Annual Average Community College Credentials (2014-17)		*1

Source: LaunchBoard, IPEDS

*Chaffey issued one certificate in 2014-15

0708.20 Computer Support program outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless noted otherwise]:

- Number of course enrollments: 106 (California median: 63) [2016-17]
- Number of students who transferred to a 4-year institution: N/A (CA:11)
- Employed in the second fiscal quarter after exit: 66% (CA: 75%)
- Median earnings in the second fiscal quarter after exit: \$4,006 (CA: \$7,820)
- Employed in the fourth fiscal quarter after exit: 62% (CA: 75%)
- Median annual earnings after exit: \$15,584 (CA: \$29,460)
- The percentage in a job closely related to the field of study: N/A (CA: 50%) [2014-15]
- Median change in earnings: 59% (CA: 56%)
- The proportion of students who attained a living wage: N/A (CA: 61%)

Exhibit 9: Annual average other educational program student completions for Computer Support Specialist programs in the Inland Empire/Desert Region

11.1006 Computer Support Specialist (CIP Program)	Other Educational Institutions Annual Average Certificates or Other Credit Awards (2013-16)
Computer Training Academy	
Award < 1 academic yr	25
Total annual average other awards	25

Source: IPEDS

Sources

- O*Net Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists International (EMSI)
- CTE LaunchBoard
- MIT Living Wage Calculator
- Chancellor’s Office Curriculum Inventory (COCI, version 2.0)
- The Integrated Postsecondary Education Data System (IPEDS)

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Appendix A: Occupation definitions, sample job titles, five-year projections, and earnings for computer maintenance and security occupations

Occupation Definitions (SOC code), Education and Training Requirement, Community College Education Attainment

Information Security Analysts (15-1122)

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

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary

Coursework: 27%



Network and Computer Systems Administrators (15-1142)

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 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

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 38%

Computer User Support Specialists (15-1151)

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

Entry-Level Educational Requirement: Some college, no degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 41%



Computer Network Support Specialists (15-1152)

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

Entry-Level Educational Requirement: Associate's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 41%

Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products (41-4011)

Sell goods for wholesalers or manufacturers where technical or scientific knowledge is required in such areas as biology, engineering, chemistry, and electronics, normally obtained from at least 2 years of post-secondary education.

Sample job titles: Account Development Manager, Account Executive, Account Manager, Channel Sales Director, Distribution Sales Manager, Inside Sales Representative, Marketing Representative, Sales Director, Sales Manager, Sales Representative

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: One to twelve months

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 31%



Table 1. 2017 to 2022 job growth, wages, education, training, and work experience required for the computer maintenance and security occupational group and sales representatives, Inland Empire/Desert Region

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Computer User Support Specialists (15-1151)	3,766	352	9%	353	\$20.27 to \$30.45	\$25.73	\$54,300	Some college, no degree & none	None
Network and Computer Systems Administrators (15-1142)	1,828	144	8%	146	\$28.61 to \$45.86	\$35.93	\$77,700	Bachelor's degree & none	None
Computer Network Support Specialists (15-1152)	1,110	95	9%	102	\$24.74 to \$39.94	\$29.52	\$68,100	Associate degree & none	None
Information Security Analysts (15-1122)	175	31	18%	19	\$29.77 to \$59.87	\$47.46	\$96,700	Bachelor's degree & none	Less than 5 years
Total	6,878	623	9%	620	-	-	-	-	-
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products (41-4011)	1,712	127	7%	207	\$25.74 to \$46.48	\$31.66	\$76,800	Bachelor's degree & 1-12 months	None

Source: EMSI 2018.3

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage