Computer Hardware Technician

Inland Empire/Desert Region (Riverside and San Bernardino counties combined)

This workforce demand report uses state and federal job projection data that was developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.

Summary

- The knowledge, skills, and abilities provided by community college *computer support* programs lead to four distinct middle-skill occupations, collectively referred to as the *computer support occupational group* in this report.

- IEDR employment for the *computer support occupational group* is expected to **increase by 8% between 2019 and 2024**. A total of **695 annual job openings** will be available each year over the five-year timeframe.

- The entry-level, 25th percentile wages for the *computer support occupations* are between $19.54 and $30.39 per hour; three of the four occupations in this group exceed the $21.78 per hour self-sustainable hourly wage estimate for a single adult with one child.

- There were **no credentials issued** from regional community college *computer support* programs over the last three academic years.

Introduction

This report provides data on programs and occupations related to the California Community College the computer support (TOP 0708.20) program. The computer support program prepares students to provide technical assistance to computer system users. This program may include the use of computer hardware and software, printing, installation, word processing, electronic mail, and operating systems (Taxonomy of Programs, 2012). The knowledge, skills, and abilities trained by these programs lead to the following four middle-skill occupations, collectively referred to as the *computer support occupational group* in this report:

- *Computer Network Architects* (SOC 15-1143)

- *Computer Network Support Specialists* (15-1152)

- *Computer User Support Specialists* (15-1151)

- *Network and Computer Systems Administrators (15-1142)*
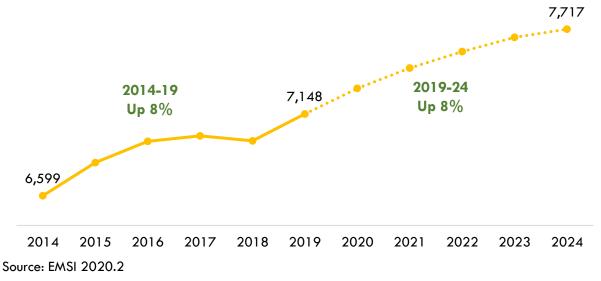
Job Opportunities

In 2019, there were 7,148 jobs in the *computer support occupational group* in the Inland Empire/Desert region (IEDR). This occupational group is projected to increase employment by 8% through 2024. Employers are expected to have 3,477 job openings over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes occupational transfers and retirements). Exhibit 1 displays five-year projected job growth, and Exhibit 2 displays historical (2014 to 2019) and projected (2019-2024) jobs for the *computer support occupational group.*

Exhibit 1: Five-year projections for each occupation in the computer support occupational group

Occupation	2019 Jobs	2024 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Computer User Support Specialists	3,792	4,123	9%	1,952	390	16%
Network and Computer Systems Administrators	1,822	1,948	7%	788	158	14%
Computer Network Support Specialists	1,089	1,167	7%	541	108	16%
Computer Network Architects	446	478	7%	196	39	~11%
Total	**7,148**	**7,717**	**8%**	**3,477**	**695**	**16%**

Source: EMSI 2020.2

Exhibit 2: Historical and projected jobs for the computer support occupational group, 2014 − 2024

2014-19 Up 8%

2019-24 Up 8%

7,717

7,148

6,599

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Source: EMSI 2020.2

Job Postings

Exhibit 3 displays the number of job ads posted during the last 12 months, along with the regional and statewide average time to fill for the *computer support occupational group*. Using a combination of job title, keyword, and employer filters, this job posting search aims to determine the real-time regional demand for the *computer support occupational group*.

In the IEDR, there were sufficient job postings for *computer user support specialists* and *network and computer systems administrators* from which to obtain real-time labor market information. Still, there were too few regional postings for *computer network architects* and *computer network support specialists* to obtain reliable information. To increase the number of job postings from which to pull real-time labor market information, the job posting search for *computer network architects* and *computer network support specialists* was expanded to include the Los Angeles/Orange County (LA/OC) region. Over the last 12 months, there were approximately 14 times more job postings listed in the LA/OC region than in the IEDR. Please visit the appendix section of this report to view the limitations of online job posting searches.

On average, local employers fill online job postings for the *computer support occupational group* within 36 days. This regional average is two days shorter than the statewide average of 38 days, indicating that local employers face similar challenges filling open positions as other employers in California as a whole.

Exhibit 3: Job ads and time to fill, June 2019 – May 2020, IEDR (unless noted)

Occupation	Job Ads	Regional Average Time to Fill (Days)	California Average Time to Fill (Days)
Computer User Support Specialists	1,033	32	33
Network and Computer Systems Administrators	302	45	46
Computer Network Architects*	1,460	40	48
Computer Network Support Specialists*	361	28	33
Total	**3,156**	**36**	**38**

Source: Burning Glass – Labor Insights *Includes job posting information from LA/OC and IEDR combined

Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide a self-sustainable level of income. The Brookings Institute in their Advancing Opportunity in California's Inland Empire report found that a "good job" wage in the region is above $18.00 per hour, or $37,440 per year (Shearer, Shah & Gootman, p. 25). The Family Needs Calculator estimates that a self-sustainable wage for a single adult with one school-age child is $21.78 per hour (Pearce & Manzer, 2020).

Nearly all of the occupations in the *computer support occupational group* surpass the Brookings Institute's "good job" wage at the entry-level, except for *computer user support specialists*. Wages for *computer user support specialists* do not exceed the good job wage until the median-level. Median wages for the *computer support occupational group* are above the Family Needs Calculator self-sustainability rate. Exhibit 4 displays the entry-level and median hourly earnings for each occupation in the IEDR.
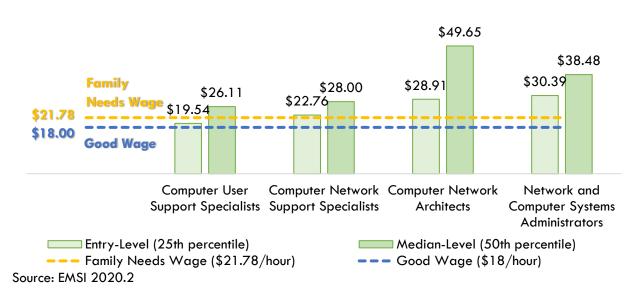
Exhibit 4: Hourly earnings for the computer support occupational group

Source: EMSI 2020.2

According to the occupational guides developed by the California Labor Market Information Division, the *computer support occupational group* typically receives medical, vision, and dental benefits as well as many others (Detailed Occupational Guides, 2020).

Employers, Skills, Education, Work Experience, and Certifications

Exhibit 5 displays the employers posting the most job ads for the *computer support occupational group* during the last 12 months in the IEDR and LA/OC combined.

Exhibit 5: Employers posting the most job ads for computer support occupations, June 2019 – May 2020

Occupation	Employers	
Computer User Support Specialists (n=624)	• Best Buy • VSolvit LLC • Riverside County • XPO Logistics	• Prime Healthcare Services • Nexgrill Industries, Inc. • Kaiser Permanente • Co-Op Financial Services

Occupation	Employers	
Network and Computer Systems Administrators *(n=201)*	• University of California, Riverside • Northrop Grumman • VSolvit LLC	• Loma Linda University Health • Riverside County
Computer Network Architects* *(n=891)*	• The Aerospace Corporation • The Boeing Company • Northrop Grumman	• Peraton • Allscripts
Computer Network Support Specialists* *(n=257)*	• Northrop Grumman • H&R Block • Select Medical	• BAE Systems • Abacus Technology

Source: Burning Glass – Labor Insights *Includes job posting information from LA/OC and IEDR combined

Exhibit 6 displays a sample of specialized, employability, and software and programming skills that employers are seeking when looking for workers to fill positions in the *computer support occupational group*. Specialized skills are occupation-specific skills that employers are requesting for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job postings may be utilized as a helpful guide for curriculum development.

Exhibit 6: Sample of in-demand skills from employer job ads, June 2019 – May 2020

Occupation	Specialized Skills	Employability Skills	Software and Programming Skills
Computer User Support Specialists *(n=1,023)*	• Repair • Customer Service • Hardware and Software Installation	• Troubleshooting • Problem Solving • Communication Skills	• Microsoft Office • Virtual Private Networking (VPN) • Linux
Network and Computer Systems Administrators *(n=301)*	• Hardware and Software Configuration • Repair • Software Installation	• Troubleshooting • Problem Solving • Communication Skills	• VMware • Windows Service • Linux
Computer Network Architects* *(n=1,455)*	• Network Engineering • Network Infrastructure • Network Hardware	• Troubleshooting • Communication Skills • Planning	• Border Gateway Protocol • Cisco Switching • Voice over I.P. (VoIP)
Computer Network Support Specialists* *(n=360)*	• Repair • Technical Support • Hardware Troubleshooting	• Troubleshooting • Communication Skills • Problem Solving	• Microsoft Office • Microsoft Windows • Linux

Source: Burning Glass – Labor Insights *Includes job posting information from LA/OC and IEDR combined

Exhibit 7 displays the entry-level education typically required to enter each occupation according to the Bureau of Labor Statistics (BLS), educational attainment for incumbent workers with "some college, no degree" and an "associate degree" according to the U.S. Census (2016-17) and the real-time minimum advertised education requirement from employer job ads.

Exhibit 7: Typical entry-level education, educational attainment, and minimum advertised education requirements for the computer support occupational group, June 2019 – May 2020

Occupation	Typical Entry-Level Education Requirement	CC-Level Educational Attainment*	Real-Time Minimum Advertised Education Requirement			
			Number of Job Ads	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Computer User Support Specialists	Some college, no degree	41%	532	50%	26%	24%
Network and Computer Systems Administrators	Bachelor's degree	37%	237	13%	8%	79%
Computer Network Architects**	Bachelor's degree	37%	924	7%	4%	89%
Computer Network Support Specialists**	Associate degree	41%	242	41%	11%	48%

Source: EMSI 2020.2, Burning Glass – Labor Insights *Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework **Includes job posting information from LA/OC and IEDR combined

Exhibit 8 displays the work experience typically required to enter each occupation and the real-time work experience requirements from employer job ads.

Exhibit 8: Work experience required and real-time work experience requirements, June 2019 – May 2020

Occupation	Work Experience Typically Required	Real-Time Work Experience			
		Number of Job Ads	0 – 2 years	3 – 5 years	6+ years
Computer User Support Specialists	41%	771	65%	32%	3%
Network and Computer Systems Administrators	37%	232	13%	59%	28%
Computer Network Architects*	37%	1,163	17%	49%	34%
Computer Network Support Specialists*	41%	217	29%	48%	23%

Source: EMSI 2020.2, Burning Glass – Labor Insights *Job posting information from LA/OC and IEDR combined

Exhibit 9 displays the certifications most frequently required by employers posting job ads for the *computer support occupational group*. The Certified A+ Technician (CompTIA A+) certification was the most frequently required certification across occupations in the *computer support occupational group*. The CompTIA A+ certification validates that an I.T. professional has mastered hardware, operating systems, software troubleshooting, networking, security, operational procedures, and cloud computing (CompTIA, 2020). To obtain this certification, individuals must pass two exams, Core 1 and Core 2. For more information regarding CompTIA certifications, visit their website (CompTIA, 2020).

Exhibit 9: Certifications required by employer job ads for computer support occupational group, June 2019 – May 2020

Occupations	Certifications
Computer User Support Specialists *(n=506)*	• Certified A+ Technician • CompTIA Network+
Network and Computer Systems Administrators *(n=161)*	• Cisco Certified Network Associate (CCNA) • CompTIA Security+
Computer Network Architects* *(n=828)*	• Cisco Certified Network Professional (CCNP) • Cisco Certified Network Associate (CCNA) • Cisco Certified Internetwork Expert (CCIE)
Computer Network Support Specialists* *(n=226)*	• Certified A+ Technician

Source: Burning Glass – Labor Insights *Job posting information from LA/OC and IEDR combined

Student Completions and Program Outcomes

While regional computer support (0708.20) programs offered at Chaffey, Moreno Valley, Riverside, and San Bernardino, none of the colleges have conferred awards over the last three academic years. While completion information is not available for computer support programs in the region, program outcome information is available. California program outcome data may provide a useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP codes and region is provided in Exhibit 10. Dashes indicate that there were too few program completers to obtain accurate outcome information. The outcome methodology is available in the appendix section of this report.

Exhibit 10: 0708.20 – Computer support strong workforce program outcomes

Strong Workforce Program Metrics: 0708.20 – Computer Support Academic Year 2016-17, unless noted otherwise	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2017-18)	109	1,959
Completed 9+ career education units in one year (2017-18)	41%	37%
Economically disadvantaged students	83%	74%
Students who attained a noncredit workforce milestone in a year (2017-18)	-	67%
Students who earned a degree, certificate, or attained apprenticeship (2017-18)	-	149
Transferred to a four-year institution (transfers)	-	19
Job closely related to the field of study (2015-16)	-	91%
Median annual earnings (all exiters)	$26,182	$34,584
Median change in earnings (all exiters)	7%	29%
Attained a living wage (completers and skills-builders)	57%	51%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Recommendation

Computer support community college programs lead to four occupations, collectively referred to as the *computer support occupational group*. These four *computer support occupations* are projected to have 695 combined annual job openings over the next five years. *Computer user support specialists* will have the most annual job openings, 390, and *computer network architects* are expected to have the fewest annual job openings, 39. The entry-level, 25th percentile wages for the *computer support occupations* are between $19.54 and $30.39 per hour. Three of the four *computer support occupations* exceed the $21.78 per hour self-sustainable hourly wage estimate for a single adult with one child at the 25th percentile. The hourly wages for *computer user support specialists* was above the self-sustainable standard at the median, 50th percentile.

Computer support (TOP 0708.20) program award data is not available for the 12 IEDR community colleges. However, there were an annual average of 109 enrollments over the last three academic years from four local colleges.

The Centers of Excellence recommends expanding computer support programs due to the lack of supply of qualified workers needed to meet the regional need for more workers (695 annual job openings). It is important to note that a credential is not equal to a qualified worker because students may exit programs with multiple awards. It should also be noted that students will be competing for these jobs with incumbent

workers, and an unknown supply of qualified workers that may travel from other areas for these jobs. Colleges should focus this program on the skills that lead to the *computer network support specialist* occupation. This occupation is expected to have a relatively high number of annual job openings (158 annual job openings), the entry-level wages offered ($22.76 per hour), and employer demand for an associate degree or less of educational attainment. The *computer support specialist* occupation is also a good option, with the understanding that some students will only gain self-sustainable wages after years of experience in the job role. Colleges should meet with relevant employers to understand their demand for more workers and the specific skills, licensing, and credentials needed for gainful employment in this field.

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June 2020

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Appendix: Occupation definitions, sample job titles, five-year projections for the computer hardware occupations

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

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 (I.S. Manager), Information Technology Specialist (I.T. 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
Incumbent workers with a Community College Award or Some Postsecondary Coursework: 37%

Computer Network Architects (15-1143)

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. May also design network and computer security measures. May research and recommend network and data communications hardware and software.

Sample job titles: Design Engineer, Network Analyst, Network and Security Engineer, Network Consultant, Network Systems Consultant, Networking Systems and Distributed Systems Engineer, Solutions Architect, Telecommunications Analyst

Entry-Level Educational Requirement: Bachelor's degree
Training Requirement: None
Incumbent workers with a Community College Award or Some Postsecondary Coursework: 37%

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 (I.T. Specialist), Network Technician, Support Specialist, Technical Support Specialist

Entry-Level Educational Requirement: Some college, no degree
Training Requirement: None
Incumbent workers with a Community College Award 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, I.T. Consultant (Information Technology Consultant), Network Engineer, Network Specialist, Network Support Specialist, Network Technical Analyst, Network Technician, Personal Computer Network Analyst, Senior I.T. Assistant (Senior Information Technology Assistant), Systems Specialist

Entry-Level Educational Requirement: Associate degree
Training Requirement: None
Incumbent workers with a Community College Award or Some Postsecondary Coursework: 41%

Methodology and Data Notes

Community college student outcome information is from LaunchBoard and based on the selected TOP code and region. These metrics are based on records submitted to the California Community Colleges Chancellor's Office Management Information Systems (MIS) by community colleges, which come from self-reported student information from CCC Apply and the National Student Clearinghouse. Employment and earnings metrics are sourced from records provided by California's Employment Development Department's Unemployment Insurance database. When available, outcomes for completers are reported to demonstrate the impact that earning a degree or certificate can have on employment and earnings. For more information on the types of students included for each metric, please see the web link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2020a). Finally, employment in a job closely related to the field of study comes from self-reported student responses on the CTE Employment Outcomes Survey (CTEOS), administered by Santa Rosa Junior College (LaunchBoard, 2020a).

Job postings data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014).

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Table 1: 2019 to 2024 job growth, wages, education, training, and work experience required for the computer support occupational group, IEDR

Occupation (SOC)	2019 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage Range (25th to 75th percentile)	Median Hourly Wage (50th percentile)	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Computer User Support Specialists (15-1151)	3,792	331	9%	390	$19.54 to $34.08	$26.11	$58,400	Some college, no degree & None	None
Network and Computer Systems Administrators (15-1142)	1,822	126	7%	158	$30.39 to $50.43	$38.48	$84,700	Bachelor's degree & None	None
Computer Network Support Specialists (15-1152)	1,089	78	7%	108	$22.76 to $37.23	$28.00	$66,700	Associate's degree & None	None
Computer Network Architects (15-1143)	446	32	7%	39	$28.91 to $62.90	$49.65	$101,100	Bachelor's degree & None	5 years or more
Total	**7,148**	**569**	**8%**	**695**	-	-	-	-	-

Source: EMSI 2020.2