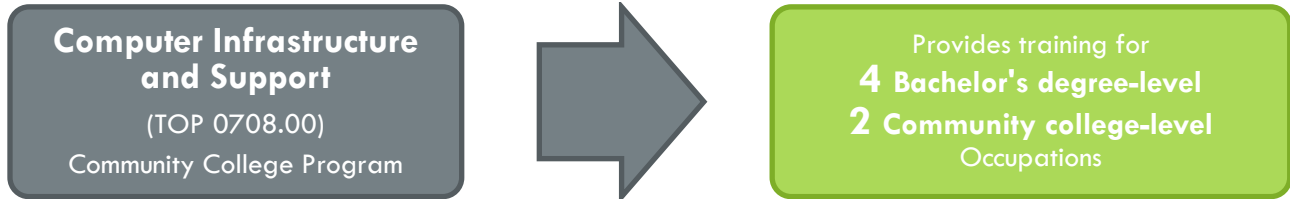


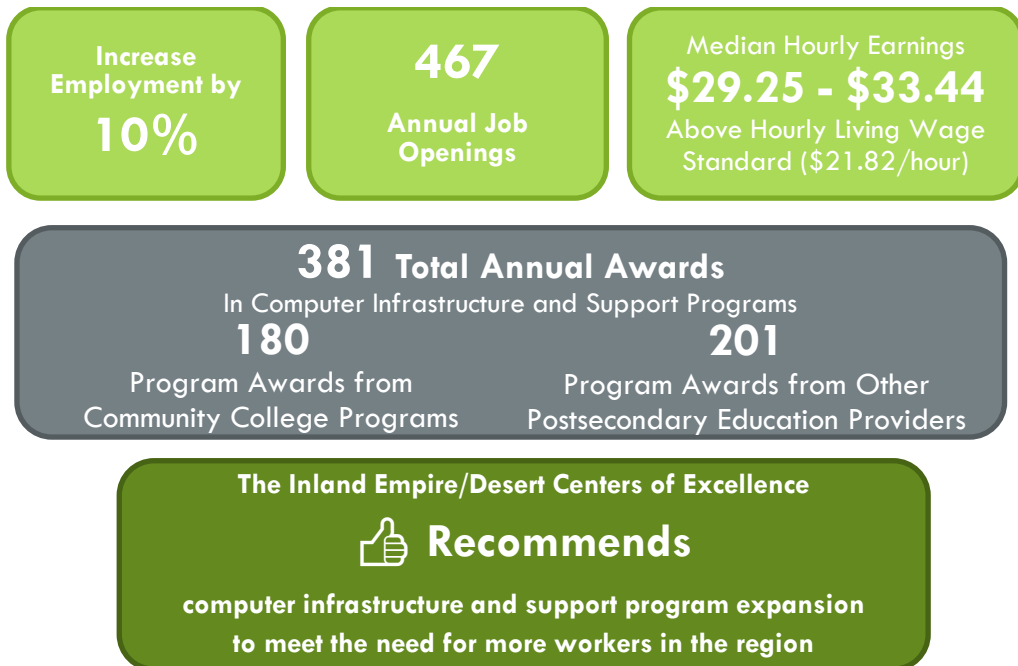
Computer Infrastructure and Support

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

Summary



Over the next five years (2022-2027), community college-level computer support employment is projected to:



Introduction

California Community College computer infrastructure and support programs (TOP 0708.00) prepare students for employment through instruction related to network and operation systems design and administration, including certification preparation (Taxonomy of Programs, 2023). The knowledge, skills, and abilities trained by computer infrastructure and support programs lead to six distinct occupations, collectively referred to as the computer infrastructure and support occupational group in this report.

The computer infrastructure and support occupational group is separated into community college-level and bachelor's degree-level occupations to illuminate job opportunities for individuals with varying education levels. This report's analysis and final recommendation are based on community college-level job opportunities.

The **community college-level computer infrastructure and support occupations** in this report typically require some college or an associate degree. The community college-level occupation included in the computer infrastructure and support occupational group is:

- Computer Network Support Specialists (SOC 15-1232)
- Computer User Support Specialists (15-1231)

The **bachelor's degree-level computer infrastructure and support occupations** included in this report typically require workers to obtain a bachelor's degree before employment. Students enrolled in a computer infrastructure and support program may gain transferable skills. Between 21% and 39% of incumbent bachelor's degree-level workers hold a community college-level of educational attainment. The bachelor's degree-level computer infrastructure and support occupations included in this report are:

- Computer Systems Analysts (SOC 15-1211)
- Information Security Analysts (15-1212)
- Computer Network Architects (15-1241)
- Network and Computer Systems Administrators (15-1244)

This report's educational supply and employment demand portions focus solely on the community college-level jobs students will likely obtain after completing a computer infrastructure and support program.

Job Counts and Projections

In 2022, there were 10,020 total jobs in the computer support occupational group in the region. About 46% (4,585 jobs) of these occupations typically require a community college-level of education to enter employment. Employment for the community college-level computer support occupational group is expected to increase by 10% over the next five years (through 2027), with 467 job openings expected annually to fill new jobs and to backfill jobs that workers are leaving (including occupational transfers and retirements).

Employment in the bachelor's degree-level computer support occupational group is projected to grow 10% over the next five years, the same as the community college-level occupational group. The bachelor's degree-level computer support occupational group will have 500 combined annual job openings through 2027. Exhibit 1 displays the job counts, five-year projected job growth, job openings, and the share of incumbent workers 55 years and older in the region.

Exhibit 1: Five-year projections for the computer support occupational group, Inland Empire/Desert Region, 2022-2027

Occupation	2022 Jobs	2027 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Bachelor's Degree-Level Occupations						
Computer Systems Analysts	2,518	2,768	10%	1,173	235	21%
Network and Computer Systems Administrators	1,743	1,894	9%	763	153	15%
Computer Network Architects	719	775	8%	289	58	15%
Information Security Analysts	454	548	21%	273	55	15%
Bachelor's Degree Total	5,435	5,985	10%	2,499	500	18%
Community College-Level Occupations						
Computer User Support Specialists	3,527	3,902	11%	1,807	361	18%
Computer Network Support Specialists	1,058	1,157	9%	525	105	18%
Community College Total	4,585	5,059	10%	2,333	467	18%
Total	10,020	11,044	10%	4,831	966	18%

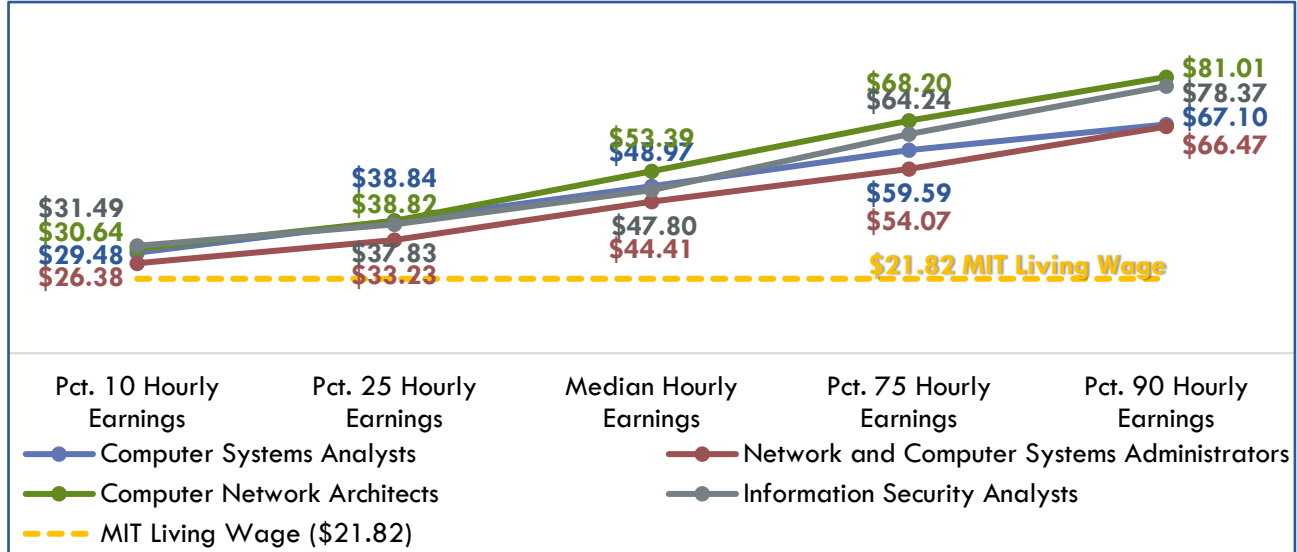
Source: Lightcast 2023.3

Earnings

Community colleges should ensure their training programs lead to employment opportunities that provide a living wage. The MIT living wage calculator estimates that an individual must earn \$21.82 per hour or \$45,386 annually in California to be self-sufficient (Glasmeier, 2023).

Exhibit 2 displays the hourly earnings for the bachelor's degree-level computer support occupational group in the Inland Empire/Desert Region. The 10th percentile hourly earnings for bachelor's degree-level computer infrastructure and support occupations surpass the living wage estimate, indicating that most (at least 90%) of these workers earn a living wage.

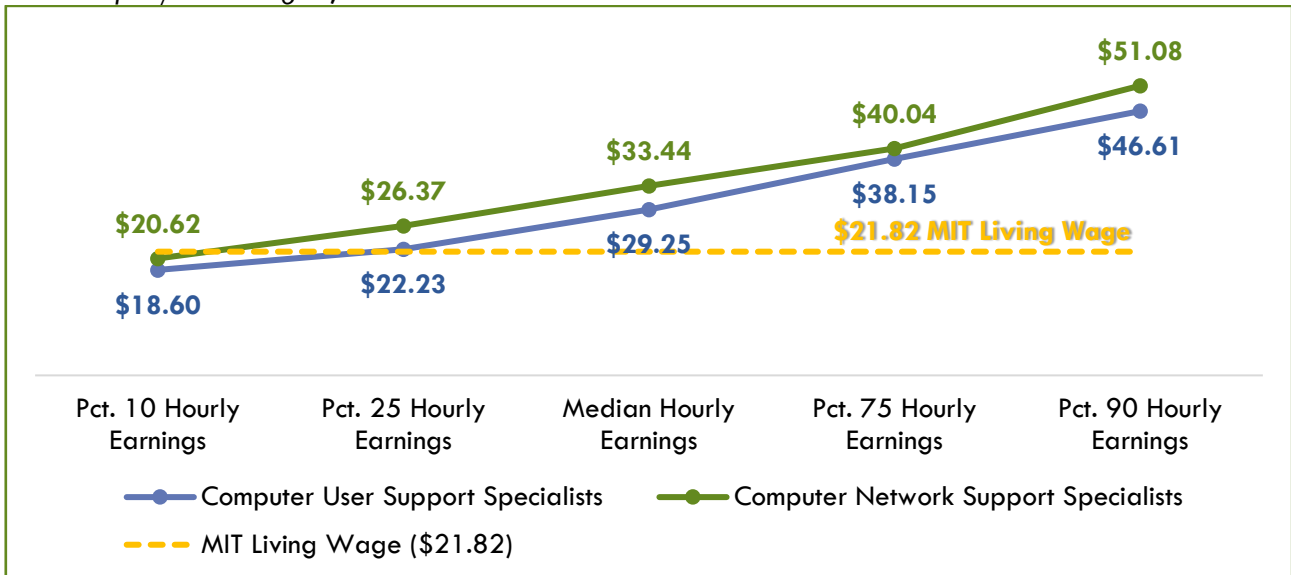
Exhibit 2: Hourly earnings by percentile for the bachelor’s degree-level computer support occupational group, Inland Empire/Desert Region, 2022



Source: Lightcast 2023.3

Exhibit 3 displays the hourly earnings for the secondary computer support occupational group. The 25th percentile hourly earnings for the community college-level computer support occupational group exceed the living wage standard, indicating that at least the top 75% of workers earn a living wage.

Exhibit 3: Hourly earnings by percentile for the community college-level computer support occupational group, Inland Empire/Desert Region, 2022



Source: Lightcast 2023.3

An online job ad search for the computer support occupational group was conducted to reveal the employers seeking these workers, including the median posting duration, earnings information, and in-demand skills.

Exhibit 2 displays the number of job ads posted for the computer support occupational group over the last 12

months and the median posting duration. Over the previous 12 months (August 2022 to July 2023), regional employers posted 1,660 job ads for the computer support occupational group.

On average, regional employers kept online job ads for the computer support occupational group open for 29 days. The average regional online job is open for 30 days, indicating that employers may have similar challenges filling computer support positions as other jobs.

Exhibit 2. Job ads and posting duration, Inland Empire/Desert Region, August 2022 through July 2023

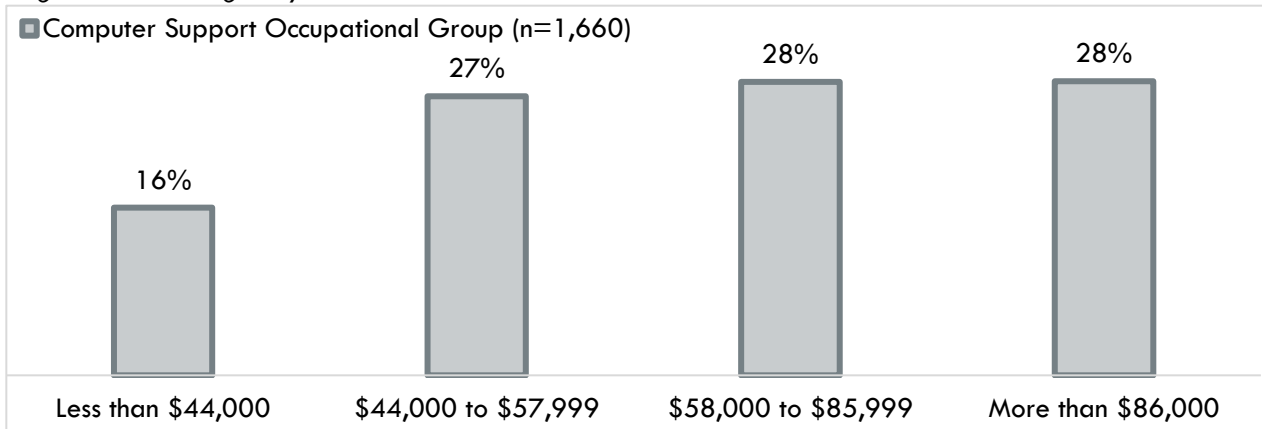
Occupation	Job Ads	Median Posting Duration (Days)
Bachelor's Degree-level Occupations		
Computer Systems Analysts	289	30
Network and Computer Systems Administrators	202	30
Information Security Analysts	136	30
Computer Network Architects	123	37
Bachelor's Degree-level Total	750	31
Community College-level Occupations		
Computer User Support Specialists	873	28
Computer Network Support Specialists	37	34
Community College-level Total	910	28
Total	1,660	29

Source: Lightcast 2023.3

Advertised Salary from Online Job Ads

Exhibit 4 displays the regional online advertised salaries for the computer support occupational group over the last 12 months. Online job ad salary information reveals employers are willing to pay positions in the computer support occupational group \$30.22 per hour or \$62,858 annually, above the region's \$21.82 hourly living wage standard (\$45,386 annually). The median advertised salaries for community college-level computer support occupations, \$25.91 per hour, and bachelor's degree-level occupations, \$43.51 per hour, are above the regional living wage standard.

Exhibit 4. Online advertised salaries for the computer support occupational group, Inland Empire/Desert Region, August 2022 through July 2023



Source: Lightcast 2023.3

Job Titles, Employers, Skills, Education, and Work Experience

Exhibit 5 displays the job titles most frequently used in computer support job ads over the last 12 months.

Displaying advertised job titles may provide insight into the types of positions sought by employers posting job ads. The most frequently requested job title in the region for community college-level positions was help desk specialist, and the most frequent job title among bachelor’s degree positions was network engineers.

Exhibit 5. Job titles most frequently used in computer support job ads, Inland Empire/Desert Region, August 2022 through July 2023

Community College-level Job Titles	Unique Job Ads	Bachelor’s Degree-level Job Titles	Unique Job Ads
Help Desk Specialists	76	Network Engineers	25
IT Specialists	49	Systems Administrators	25
Desktop Support Technicians	37	Quality Systems Analysts	15
IT Technicians	37	IT Administrators	14
Help Desk Technicians	32	Systems Analysts	14
All other job titles	679	All other job titles	657
Total	910	Total	750

Source: Lightcast 2023.3

Exhibit 6 displays the employers posting the most job ads for the computer support occupational group during the last 12 months. Showing employer names provides insight into where students may find employment after completing a program. San Bernardino County posted the most jobs seeking computer support occupational group workers over the last 12 months. Best Buy posted the most job ads for the community college-level computer support occupational group.

Exhibit 6. Employers posting the most job ads for the computer support occupational group, Inland Empire/Desert Region, August 2022 through July 2023

Top Employers	Unique Job Ads	Top Employers	Unique Job Ads
Best Buy	27	San Bernardino County	48
University of California, Riverside	16	California State University, San Bernardino	41
San Bernardino County	14	Inland Empire Health Plan	37
San Bernardino Community College District	11	University of California, Riverside	34
California State University, San Bernardino	9	Esri	19
Victor Valley College	9	Monster Beverage	12
Corona-Norco Unified School District	9	Riverside Community College District	9
All other employers	815	All other employers	559
Total	910	Total	750

Source: Lightcast 2023.3

Exhibit 7 lists a sample of specialized, employability, and software and programming skills employers seek when seeking workers to fill computer infrastructure and support positions. Specialized skills are occupation-specific skills that employers request for industry or job competency. Common skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job ads may be utilized to guide curriculum development.

Exhibit 7. Sample of in-demand skills from employer job ads, Inland Empire/Desert Region, August 2022 through July 2023

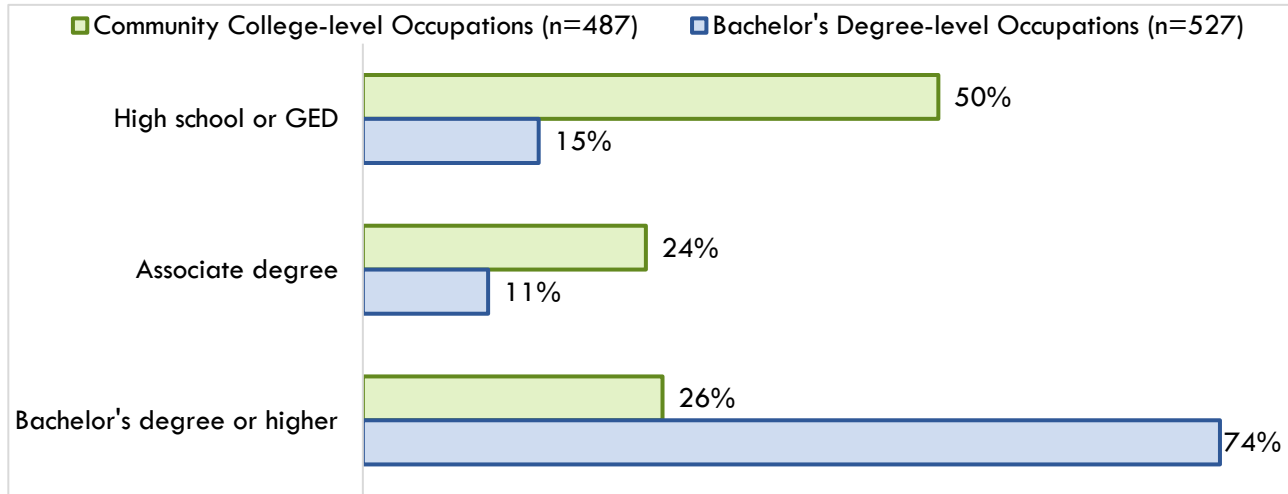
Occupational Group	Specialized skills	Employability skills	Software and Programming skills
Bachelor's Degree-level Occupational Group (n=750)	<ul style="list-style-type: none"> Computer Science Auditing Information Systems Project Management Workflow Management 	<ul style="list-style-type: none"> Communications Management Troubleshooting Information Technology Planning 	<ul style="list-style-type: none"> Operating Systems Microsoft Office Linux SQL Python
Community College-level Occupational Group (n=910)	<ul style="list-style-type: none"> Help Desk Support Technical Support Operating Systems Computer Hardware Computer Science 	<ul style="list-style-type: none"> Troubleshooting Communications Customer Service Management Multitasking 	<ul style="list-style-type: none"> Operating Systems Microsoft Office Apple IOS

Source: Lightcast 2023.3

Exhibit 8 displays the minimum advertised education requirements for the computer support occupational group. According to the Bureau of Labor Statistics, 21% and 40% of incumbent workers in this field hold a community college-level educational attainment; "some college, no degree," and an "associate degree." Nearly 39% of

employer job ads did not include minimum education requirements in job ads for the computer support occupational group. Half of employers seeking community college-level computer support workers sought candidates with a high school diploma or equivalent, and 24% sought candidates with an associate degree. Approximately three-quarters of employers posting job ads for bachelor’s degree-level computer support positions sought candidates with a bachelor’s degree or higher.

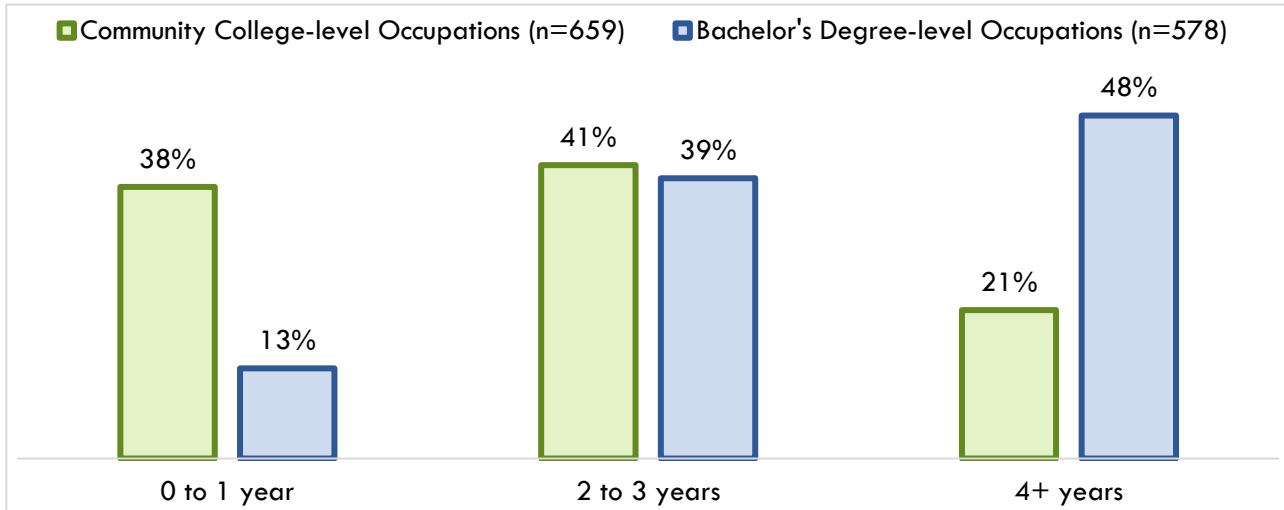
Exhibit 8. Minimum advertised education requirements, Inland Empire/Desert Region, August 2022 through July 2023



Source: Lightcast 2023.3

Exhibit 9 displays the work experience typically required from employer job ads for the computer support occupational group. Nearly 80% of employers posting job ads for community college-level computer support workers sought candidates with three years or less of previous work experience, while almost half of all employers posting job ads for the bachelor’s degree-level occupational group sought candidates with four or more years of prior work experience.

Exhibit 9. Real-time work experience requirements, Inland Empire/Desert Region, August 2022 through July 2023



Source: Lightcast 2023.3

Student Completions and Programs Outcomes

Regional community colleges use three program codes for their computer support programs; computer infrastructure and support (TOP 0708.00), computer networking (0708.10), and computer support (0708.20). Combined, regional community colleges have issued 180 awards annually in programs related to computer support.

Computer Infrastructure and Support (TOP 0708.00): Network and operation systems design and administration, including certification preparation (Taxonomy of Programs, 2023).

Computer Networking (0708.10): Principles of local, metropolitan, and wide area computer networking design, installation, maintenance and troubleshooting (Taxonomy of Programs, 2023).

Computer Support (0708.20): Preparation to provide technical assistance to computer system users. May include use of computer hardware and software, printing, installation, word processing, electronic mail, and operating systems (Taxonomy of Programs, 2023).

Exhibits 10 – 12 display student completions for computer infrastructure and support (TOP 0708.00), computer networking (0708.10), and computer support (0708.20) programs. Program completion and student outcome methodologies can be found in the appendix.

Exhibit 10: Annual average community college awards for computer infrastructure and support programs, Inland Empire/Desert Region, Academic Years 2019-2022

TOP 0708.00 – Computer Infrastructure and Support (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Chaffey College (Cybersecurity Analyst/Cybersecurity Defender/ Cybersecurity Professional)				43
Associate Degree	4	16	14	11
Certificate 16 < 30-semester units	4	36	31	24
Certificate 8 < 16-semester units	14	9	0	8
Copper Mountain College (Computer Ethical Hacking Specialist/Computer Network Specialist/Net Training/Computer Security Specialist/Computer Support Specialist)				0
Certificate 16 < 30-semester units	0	0	0	0
Crafton Hills College (Cloud Technology Specialists/Cybersecurity Specialists)				0
Certificate 16 < 30-semester units	0	0	0	0
Moreno Valley College (Information Technology (IT) Cybersecurity/IT Project Management/IT Technician Pathway: Cybersecurity Analyst/Cybersecurity Healthcare Specialist/Cybersecurity Specialist/IT Systems Specialist)				1
Certificate 8 < 16-semester units	0	0	2	1
Mt. San Jacinto College				0
Certificate 6 < 18-semester units	1	0	0	0
Riverside City College (Cyber Defense/Information Technology)				16
Associate Degree	0	9	9	6
Certificate 16 < 30-semester units	0	12	17	10
Total	23	82	73	59

Source: MIS Data Mart, COCI

Exhibit 11: Annual average community college awards for computer networking programs, Inland Empire/Desert Region, Academic Years 2019-2022

TOP 0708.10 – Computer Networking (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Chaffey College (Network Specialist)				26
Certificate 30 < 60-semester units	3	0	0	1
Certificate 16 < 30-semester units	56	2	1	20

TOP 0708.10 – Computer Networking (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Certificate 8 < 16-semester units	17	0	0	6
Copper Mountain College (Computer Network Supervisor)				1
Certificate 16 < 30-semester units	2	1	1	1
College of the Desert (Computer Information Systems)				6
Associate Degree	1	7	11	6
Moreno Valley College (Information Technology)				1
Certificate 16 < 30-semester units	0	0	2	1
Mt. San Jacinto College (CIS: Networking)				1
Certificate 16 < 30-semester units	0	3	1	1
Riverside City College (Amazon Web Services (AWS) Cloud Computing/CISCO Networking/Information Security and Cyber Defense/Information Systems: Cyber-Skills/Introduction to Python Programming)				68
Certificate 16 < 30-semester units	38	57	48	48
Noncredit award 48 < 96 hours	0	51	9	20
San Bernardino Valley College (Cisco Certified Network Associate/Computer Network Support Specialist)				0
Certificate 16 < 30-semester units	0	0	0	0
Total	117	121	73	104

Source: MIS Data Mart, COCI

Exhibit 12: Annual average community college awards for computer support programs, Inland Empire/Desert Region, Academic Years 2019-2022

TOP 0708.20 – Computer Support (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Chaffey College (Computer Support Technician (A+ Certification Preparation))				12
Certificate 8 < 16-semester units	8	16	11	12
Crafton Hills College (Computer Hardware Technician)				0
Certificate 16 < 30-semester units	0	0	1	0

TOP 0708.20 – Computer Support (Local Program Title)	Academic Year 2019-20	Academic Year 2020-21	Academic Year 2021-22	Total CC Annual Average Awards, Academic Years 2019-22
Moreno Valley College (Computer Maintenance and Security/IT Technician Pathway: IT Systems Support and Sales)				4
Certificate 16 < 30-semester units	0	0	1	0
Noncredit award 48 < 96 hours	0	11	0	4
Palo Verde College (IT Technician)				0
Certificate 16 < 30-semester units	0	0	0	0
Riverside City College (IT Technician Pathway: IT Systems Support and Sales)				0
Certificate 16 < 30-semester units	0	0	0	0
San Bernardino Valley College				1
Certificate 16 < 30-semester units	1	2	1	1
Total	9	29	13	17

Source: MIS Data Mart, COCI

California program outcome data may provide useful insight into the likelihood of success for the proposed program. Community college student outcome information based on the selected TOP code and region is provided in Exhibits 13 – 15.

Exhibit 13: 0708.00 – Computer infrastructure and support strong workforce program outcomes, Inland Empire/Desert Region, Academic Year 2020-2021 (Unless Noted)

Strong Workforce Program Metrics: 0708.00 – Computer Infrastructure and Support	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2021-22)	176	6,600
Completed 9+ career education units in one year (2021-22)	46%	38%
Students who completed a noncredit CTE or workforce preparation course (2021-22)	-	84%
Students who earned a degree, certificate, or attained apprenticeship (2021-22)	52	528
Job closely related to the field of study (2019-20)	100%	71%
Median annual earnings (all exiters)	\$51,712	\$53,844
Median change in earnings (all exiters)	33%	17%
Attained a living wage (completers and skills-builders)	79%	68%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 14: 0708.10 – Computer networking strong workforce program outcomes, Inland Empire/Desert Region, Academic Year 2020-2021 (Unless Noted)

Strong Workforce Program Metrics: 0708.10 – Computer Networking	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2021-22)	948	7,793
Completed 9+ career education units in one year (2021-22)	44%	43%
Students who completed a noncredit CTE or workforce preparation course (2021-22)	40%	59%
Students who earned a degree, certificate, or attained apprenticeship (2021-22)	68	645
Job closely related to the field of study (2019-20)	57%	65%
Median annual earnings (all exiters)	\$42,668	\$55,850
Median change in earnings (all exiters)	20%	19%
Attained a living wage (completers and skills-builders)	68%	69%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibit 15: 0708.20 – Computer support strong workforce program outcomes, Inland Empire/Desert Region, Academic Year 2020-2021 (Unless Noted)

Strong Workforce Program Metrics: 0708.20 – Computer Support	Inland Empire/Desert Region	California
Unduplicated count of enrolled students (2021-22)	132	2,248
Completed 9+ career education units in one year (2021-22)	46%	38%
Students who completed a noncredit CTE or workforce preparation course (2021-22)	-	94%
Students who earned a degree, certificate, or attained apprenticeship (2021-22)	11	222
Job closely related to the field of study (2019-20)	-	61%
Median annual earnings (all exiters)	\$39,084	\$50,092
Median change in earnings (all exiters)	16%	20%
Attained a living wage (completers and skills-builders)	61%	63%

Sources: LaunchBoard Community College Pipeline and Strong Workforce Program Metrics

Exhibits 16-19 display awards for other postsecondary education providers reported in computer and information systems security/auditing/information assurance (CIP 11.1003), computer systems networking and telecommunications (11.0901), network and system administration/administrator (11.1001), computer support specialist (11.1006) programs. Completion data is compiled from the Integrated Postsecondary Education Data System (IPEDS) for the most recent two years. Other regional postsecondary education providers issued a combined total of 201 awards annually over the last two academic years in programs related to computer infrastructure and support.

Exhibit 16: Other educational providers computer and information systems security/auditing/information assurance programs, three-year annual average credentials, Inland Empire/Desert Region, Academic Years 2019-2021

11.1003 - Computer and Information Systems Security/Auditing/Information Assurance	Academic Year 2019-20	Academic Year 2020-21	Other Educational Providers Annual Average Credentials, 2019-2021
California Baptist University			3
Bachelor's degree	1	5	3
University of Phoenix-California			13
Bachelor's degree	3	1	2
Certificates <1 year	14	8	11
Total	18	14	16

Source: IPEDS

Exhibit 17: Other educational providers computer systems networking and telecommunications training programs, three-year annual average credentials, Inland Empire/Desert Region, Academic Years 2019-2021

11.0901 - Computer Systems Networking and Telecommunications	Academic Year 2019-20	Academic Year 2020-21	Other Educational Providers Annual Average Credentials, 2019-2021
DeVry University-California			52
Associate degree	26	10	18
Bachelor's degree	38	29	34
Master's degree	1	0	1
Total	65	39	52

Source: IPEDS

Exhibit 18: Other educational providers network and system administration/administrator programs, three-year annual average credentials, Inland Empire/Desert Region, Academic Years 2019-2021

11.1001 - Network and System Administration/Administrator	Academic Year 2019-20	Academic Year 2020-21	Other Educational Providers Annual Average Credentials, 2019-2021
California Baptist University			3
Bachelor's degree	4	1	3
California Technical Academy			6
Certificates 1 < 2 years	0	12	6
University of Phoenix-California			5
Bachelor's degree	0	0	0
Certificates < 1 year	8	1	5
Total	12	14	13

Source: IPEDS

Exhibit 19: Other educational providers computer support specialist programs, three-year annual average credentials, Inland Empire/Desert Region, Academic Years 2019-2021

11.1006 - Computer Support Specialist	Academic Year 2019-20	Academic Year 2020-21	Other Educational Providers Annual Average Credentials, 2019-2021
California Technical Academy			120
Certificates 1 < 2 years	72	121	97
Certificates < 1 year	30	16	23
Total	102	137	120

Source: IPEDS

Summary of Findings

Community college computer infrastructure and support technology programs provide the knowledge, skills, and abilities that prepare students for employment in two computer support occupations. Employment opportunities for community college-level computer support are projected to increase by 10%, and have 467 annual job openings through 2027. The median hourly earnings for the community college-level computer infrastructure and support occupations range from \$29.25 to \$33.44 per hour, above the region’s \$21.82 per hour living wage standard.

Regional community colleges have issued 180 annual average awards in programs that train computer support workers; computer infrastructure and support (0708.00), computer networking (0708.10), and computer support (0708.20) programs. Other regional postsecondary educational institutions issued 201 annual average awards related to computer infrastructure and support over the last two academic years. Combined, postsecondary education providers in the region issued 381 awards annually in the previous three academic years in programs related to computer support.

The COE recommends expanding computer infrastructure and support training programs due to the relatively high employment demand, earnings that exceed the region’s living wage standard, and low supply of computer infrastructure and support technology program completers. Colleges considering this program should partner with applicable employers to document their demand for more workers in this field.

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August 2023

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Appendix: Occupation definitions, sample job titles, five-year projections, and earnings for computer infrastructure and support occupations

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

Computer Systems Analysts (15-1211)

Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.

Sample job titles: Applications Analyst, Business Systems Analyst, Computer Analyst, Computer Systems Analyst, Computer Systems Consultant, Information Systems Analyst (ISA), Information Technology Analyst (IT Analyst), System Analyst, Systems Analyst

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 21%

Information Security Analysts (15-1212)

Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks and propose and implement risk mitigation strategies. 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: Information Security Officer, Information Security Specialist, Information Systems Security Analyst, Information Systems Security Officer (ISSO), Information Technology Security Analyst (IT Security Analyst), Network Security Analyst, Security Analyst, Systems Analyst

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Work Experience: Less than five years

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 27%

Computer Network Support Specialists (15-1231)

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.

Sample job titles: Computer Network Specialist, IT Consultant (Information Technology Consultant), Network Specialist, Network Support Specialist, Network Technical Analyst, Network Technician, Personal Computer Network Analyst, Systems Specialist

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 40%

Computer User Support Specialists (15-1232)

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.

Sample job titles: Computer Specialist, Computer Support Specialist, Computer Technician, Desktop Support Technician, Help Desk Analyst, Help Desk Technician, Information Technology Specialist (IT Specialist), Support Specialist, Technical Support Specialist

Entry-Level Educational Requirement: Some college, no degree

Training Requirement: None

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 40%

Computer Network Architects (15-1241)

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.

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

Work Experience: Five years or more

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 37%

Network and Computer Systems Administrators (15-1244)

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.

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, Systems Administrator

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 39%

Appendix: Methodology

Exhibits 10-12 display the average annual California Community College (CCC) awards conferred during the three academic years between 2019 and 2022 from the California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. Awards are the combined total of associate degrees and certificates issued during the timeframe, divided by three to calculate an annual average. This is done to minimize the effect of atypical variations that might be present in a single year.

Community college student outcome information is from LaunchBoard and is 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 California's Employment Development Department's Unemployment Insurance database records. 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 link for LaunchBoard's Strong Workforce Program Metrics Data Element Dictionary in the References section (LaunchBoard, 2023a). 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, 2023a).

Table 1. 2022 to 2027 job growth, wages, entry-level education, training, and work experience required for the computer support occupational group in the Inland Empire/Desert Region (Riverside and San Bernardino Counties combined)

Occupation (SOC)	2022 Jobs	5-Year Change	5-Year % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10 th to 90 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Bachelor's Degree-Level									
Computer Systems Analysts (15-1211)	2,518	250	10%	235	\$29.48 to \$67.10	\$48.97	\$103,900	Bachelor's degree & None	None
Network and Computer Systems Administrators (15-1244)	1,743	151	9%	153	\$26.38 to \$66.47	\$44.41	\$96,000	Bachelor's degree & None	None
Computer Network Architects (15-1241)	719	56	8%	58	\$30.64 to \$81.01	\$53.39	\$115,200	Bachelor's degree & None	Five years or more
Information Security Analysts (15-1212)	454	94	21%	55	\$31.49 to \$78.37	\$47.80	\$108,200	Bachelor's degree & None	Less than 5 years
Bachelor's Degree Total	5,435	550	10%	500					
Community College-Level									
Computer User Support Specialists (15-1232)	3,527	375	11%	361	\$18.60 to \$46.61	\$29.25	\$66,200	Some college, no degree & None	None
Computer Network Support Specialists (15-1231)	1,058	100	9%	105	\$20.62 to \$51.08	\$33.44	\$73,600	Associate degree & None	None
Community College Total	4,585	474	10%	467	-	-	-	-	-
Total	10,020	1,024	10%	966	-	-	-	-	-

Source: Lightcast 2023.3