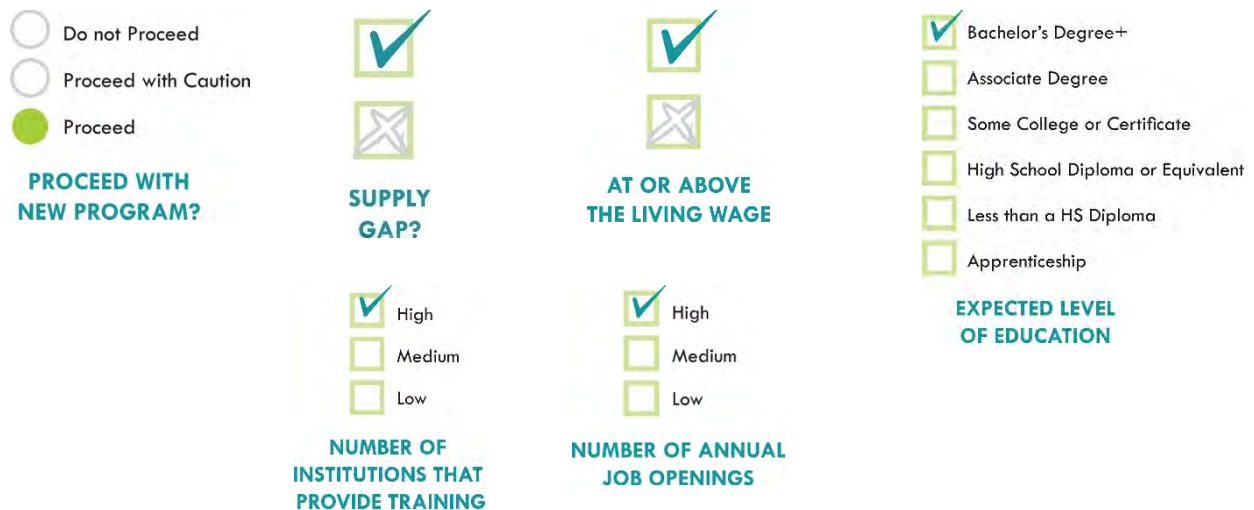


Cloud Technician Occupations

Labor Market Analysis: San Diego County

October 2019

Summary



The brief provides labor market information about *Cloud Technician Occupations* to assist the San Diego and Imperial Counties Community Colleges with program development and strategic planning. *Cloud Technician Occupations* include “Computer and Information Systems Managers,” “Computer Occupations, All Other,” “Computer User Support Specialists,” and “Software Developers, Systems Software.” According to available labor market information, *Cloud Technician Occupations* in San Diego County have a labor market demand of 2,389 annual job openings, and 12 educational institutions in San Diego County supply 732 awards for these occupations, suggesting that there is a supply gap. These occupations’ entry-level and median wages are above the living wage, suggesting that students who successfully complete a program and obtain employment in a related field may earn a living wage. According to the California Community Colleges’ outcomes data, with the exception of Computer Support (070820), the percentage of students who complete programs related to *Cloud Technician Occupations* and earn a living wage are at or above the state average for students who complete Career Education programs in general. Workers in this occupation typically have an educational requirement of a bachelor’s degree which aligns with the top listed educational requirement for *Cloud Technician Occupations* in online job postings. This brief recommends to proceed with a new program, but caution that all these occupations require a bachelor’s degree or higher.

Introduction

This report provides labor market information in San Diego County for the following occupational codes in the Standard Occupational Classification (SOC)¹ system:

- **Computer and Information Systems Managers** (SOC 11-3021): Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming.
- **Software Developers, Systems Software** (SOC 15-1133): Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software. Apply principles and techniques of computer science, engineering, and mathematical analysis.
- **Computer User Support Specialists** (SOC 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.
- **Computer Occupations, All Other** (SOC 15-1199): All computer occupations not listed separately. "All Other" titles represent occupations with a wide range of characteristics which do not fit into one of the detailed SOC occupations. For this report, some sample occupations for Computer Occupations, All Other include:
 - **Computer Systems Engineers/Architects** (15-1199.02): Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions.
 - **Information Technology Project Managers** (15-1199.09): Plan, initiate, and manage information technology (IT) projects. Lead and guide the work of technical staff. Serve as liaison between business and technical aspects of projects. Plan project stages and assess business implications for each stage. Monitor progress to assure deadlines, standards, and cost targets are met.

For the purpose of this report, these occupations are referred to as *Cloud Technician Occupations*.

¹ The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. [bls.gov/soc](https://www.bls.gov/soc).

Projected Occupational Demand

Between 2018 and 2023, *Cloud Technician Occupations* are projected to increase by 2,120 net jobs or eight percent (Exhibit 1a). Employers in San Diego County will need to hire 2,389 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

Exhibit 1a: Number of Jobs for Cloud Technician Occupations (2008-2023)²

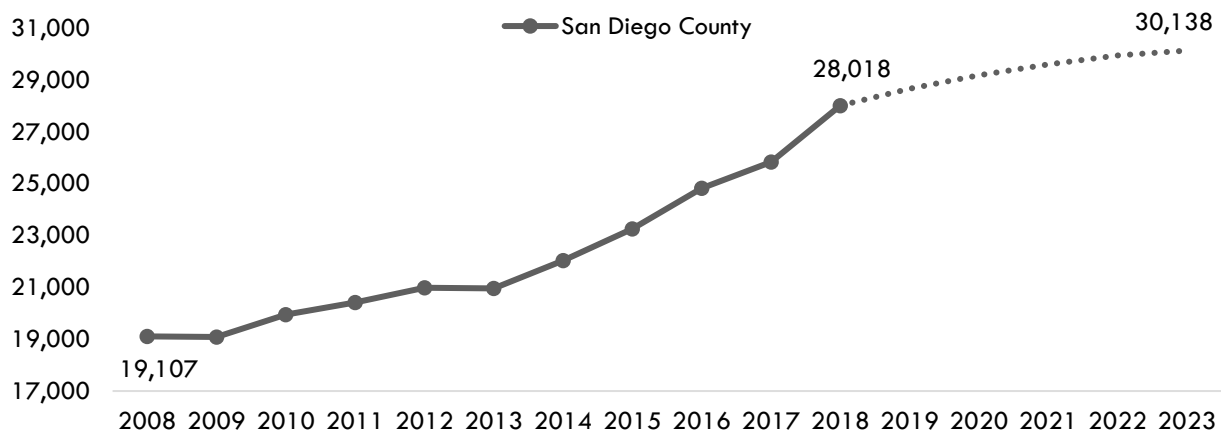


Exhibit 1b breaks down the projected number of jobs change by occupation more specifically. As Exhibit 1b shows, labor market demand for *Software Developers, Systems Software* is projected to increase by 710 total jobs between 2018 and 2023.

Exhibit 1b: Number of Jobs for Cloud Technician Occupations in San Diego County (2018-2023)

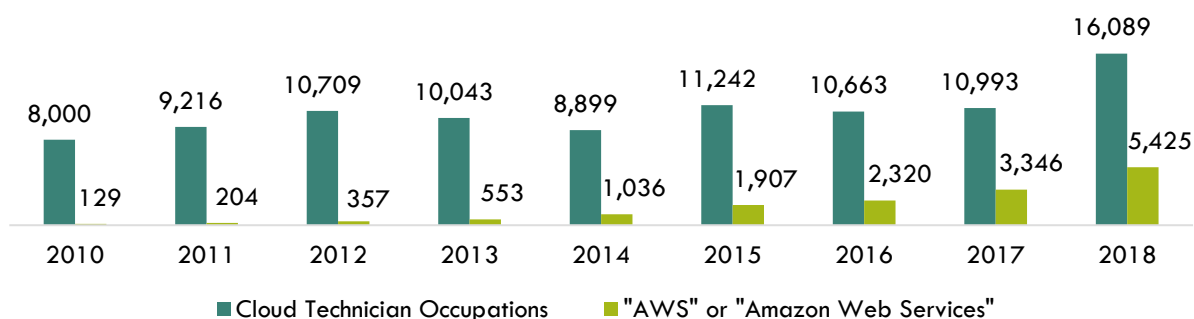
Occupational Title	2018 Jobs	2023 Jobs	2018 - 2023 Net Jobs Change	2018-2023 % Net jobs Change	Annual Openings (Demand)
Software Developers, Systems Software	8,257	8,967	710	9%	685
Computer Occupations, All Other	8,665	9,123	458	5%	680
Computer User Support Specialists	5,594	6,133	539	10%	530
Computer and Information Systems Managers	5,502	5,916	414	8%	494
Total	28,018	30,139	2,120	8%	2,389

² Emsi 2019.03; QCEW, Non-QCEW, Self-Employed.

Online Job Postings

This report analyzes not only historical and projected data (traditional labor market information), but also recent data from online job postings (real-time LMI). Online job postings may provide additional insight about recent changes in the labor market demand that are not captured by historical data. Between 2010 and 2018, there was an average of 10,650 online job postings per year for *Cloud Technician Occupations* in San Diego County. There was an average of 1,697 online job postings per year listing “Amazon Web Services” or “AWS” as a keyword (Exhibit 2).

Exhibit 2: Number of Online Job Postings for *Cloud Technician Occupations* in San Diego County (2010-2018)³



Earnings

The median hourly earnings of *Cloud Technician Occupations* range from \$28.17 to \$70.90 (Exhibit 3a). On average, the median hourly earnings for *Cloud Technician Occupations* is \$49.24; this is more than the living wage for a single adult in San Diego County, which is \$15.99 per hour (Exhibit 3b).⁴

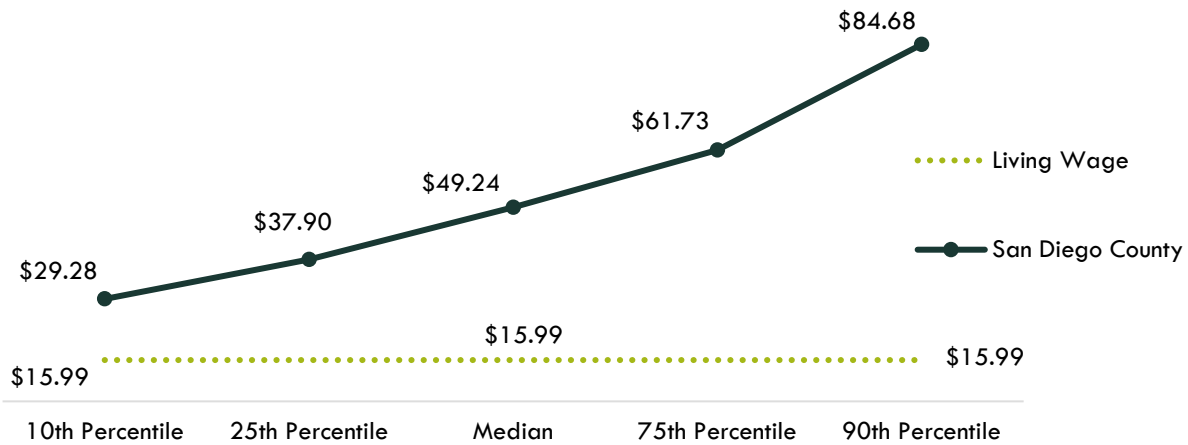
Exhibit 3a: Hourly Earnings for *Cloud Technician Occupations* in San Diego County

Occupational Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Computer and Information Systems Managers	\$56.37	\$70.90	\$86.71
Software Developers, Systems Software	\$41.95	\$55.01	\$69.78
Computer Occupations, All Other	\$30.18	\$42.90	\$55.78
Computer User Support Specialists	\$23.10	\$28.17	\$34.63

³ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” 2010-2018.

⁴ “California Family Needs Calculator (formerly the Self-Sufficiency Standard),” Insight: Center for Community Economic Development, last updated 2018. insightcced.org/2018-self-sufficiency-standard.

Exhibit 3b: Hourly Earnings⁵ for Cloud Technician Occupations in San Diego County⁶



Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes.⁷ There are 14 TOP codes and 17 CIP codes related to *Cloud Technician Occupations* (Exhibit 4).

Exhibit 4: Related TOP and CIP Codes for Cloud Technician Occupations

Cloud Technician Occupations

- TOP 061420: Electronic Game Design
- TOP 070100: Information Technology, General
- TOP 070200: Computer Information Systems
- TOP 070210: Software Applications
- TOP 070700: Computer Software Development
- TOP 070710: Computer Programming
- TOP 070730: Computer Software Development
- TOP 070800: Computer Infrastructure and Support
- TOP 070810: Computer Networking
- TOP 070820: Computer Support

⁵ 10th and 25th percentiles could be considered entry-level wages, and 75th and 90th percentiles could be considered experienced wages for individuals who may have been in the occupation longer, received more training than others, etc.

⁶ Emsi 2019.03; QCEW, Non-QCEW, Self-Employed.

⁷ TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data).

Cloud Technician Occupations

TOP 079900: Other Information Technology

TOP 093410: Computer Electronics

TOP 093430: Telecommunications Technology

TOP 220610: Geographic Information Systems

CIP 11.0103: Information Technology

CIP 11.0201: Computer Programming/Programmer, General

CIP 11.0202: Computer Programming, Specific Applications

CIP 11.0203: Computer Programming, Vendor/Product Certification

CIP 11.0299: Computer Programming, Other

CIP 11.0601: Data Entry/Microcomputer Applications, General

CIP 11.0602: Word Processing

CIP 11.0899: Computer Software and Media Applications, Other

CIP 11.0901: Computer Systems Networking and Telecommunications

CIP 11.1001: Network and System Administration/Administrator

CIP 11.1002: System, Networking, and LAN/WAN Management/Manager

CIP 11.1003: Computer and Information Systems Security/Information Assurance

CIP 11.1005: Information Technology Project Management

CIP 11.1006: Computer Support Specialist

CIP 15.0305: Telecommunications Technology/Technician

CIP 15.1202: Computer Technology/Computer Systems Technology

CIP 15.1204: Computer Software Technology/Technician

According to TOP data, **nine** community colleges supply the region with awards for this occupation: [Cuyamaca College](#), [Grossmont College](#), [Palomar College](#), [MiraCosta College](#), [San Diego City College](#), [San Diego Continuing Education](#), [San Diego Mesa College](#), [San Diego Miramar College](#), and [Southwestern College](#). According to CIP data, **three** non-community college supplies the region with awards: [Coleman University](#), [California College San Diego](#), and [California Miramar University](#) (Exhibit 5).

**Exhibit 5: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions
(Program Year 2013-14 through PY2016-17 Average)**

TOP6 or CIP	TOP6 or CIP Title	3-Yr Annual Average CC Awards (PY14-15 to PY16-17)	Other Educational Institutions 3-Yr Annual Average Awards (PY13-14 to PY15-16)	3-Yr Total Average Supply (PY13-14 to PY16-17)
061420	Electronic Game Design	5	0	5
	• Palomar	1	0	
	• Southwestern	4	0	
070100	Information Technology, General	7	0	7
	• Southwestern	7	0	
070200	Computer Information Systems	52	0	52
	• MiraCosta	0	0	
	• Palomar	15	0	
	• San Diego City	5	0	
	• San Diego Mesa	18	0	
	• San Diego Miramar	11	0	
	• Southwestern	3	0	
070210	Software Applications	21	0	21
	• Grossmont	2	0	
	• MiraCosta	10	0	
	• San Diego Cont. Ed.	6	0	
	• San Diego City	0	0	
	• San Diego Miramar	2	0	
	• Southwestern	1	0	
070700	Computer Software Development	20	0	20
	• Palomar	20	0	
070710	Computer Programming	35	0	35
	• Grossmont	8	0	
	• MiraCosta	3	0	

	• Palomar	3	0	
	• San Diego City	18	0	
	• San Diego Mesa	1	0	
	• Southwestern	2	0	
070800	Computer Infrastructure and Support	21	0	21
	• San Diego City	9	0	
	• San Diego Cont. Ed.	12	0	
070810	Computer Networking	88	0	88
	• Cuyamaca	12	0	
	• Grossmont	4	0	
	• MiraCosta	14	0	
	• Palomar	36	0	
	• San Diego City	19	0	
	• Southwestern	3	0	
070820	Computer Support	33	0	33
	• Palomar	0	0	
	• San Diego Cont. Ed.	28	0	
	• Southwestern	5	0	
079900	Other Information Technology	334	0	334
	• San Diego Cont Ed	334	0	
093410	Computer Electronics	6	0	6
	• San Diego City	5	0	
	• Southwestern	1	0	
220610	Geographic Information Systems	28	0	28
	• Palomar	18	0	
	• San Diego Mesa	8	0	
	• Southwestern	2	0	
11.0901	Computer Programming/Programmer, General	0	26	26
	• California College San Diego	0	8	
	• Coleman University	0	18	

11.0901	Computer Systems Networking and Telecommunications	0	45	45
	• Coleman University	0	45	
11.1003	Computer and Information Systems Security/Information Assurance	0	11	11
	• California Miramar University	0	0	
	• Coleman University	0	11	
			Total	732

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply⁸ suggests that there is a **supply gap** for these occupations in San Diego County, with **2,389** annual openings and **732** awards. Comparatively, there are **28,098** annual openings in California and **5,835** awards, demonstrating that there is a potential supply gap across the state⁹ (Exhibit 6).

Exhibit 6: Labor Demand (Annual Openings) Compared with Labor Supply (Average Annual Awards)

Community Colleges and Other Postsecondary Educational Institutions	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or OverSupply
San Diego	2,389	732	1,657
California	28,098	5,835	22,263

Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed.

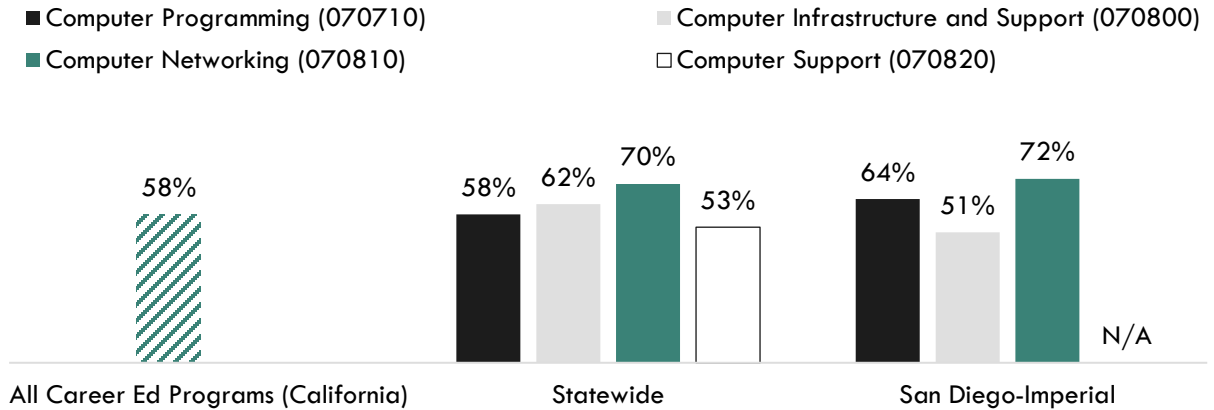
⁸ Labor supply can be found from two different sources: EMSI or the California Community Colleges Chancellor's Office MIS Data Mart. EMSI uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

⁹ "Supply and Demand," Centers of Excellence Student Outcomes, coecc.net/Supply-and-Demand.aspx.

Student Outcomes and Regional Comparisons

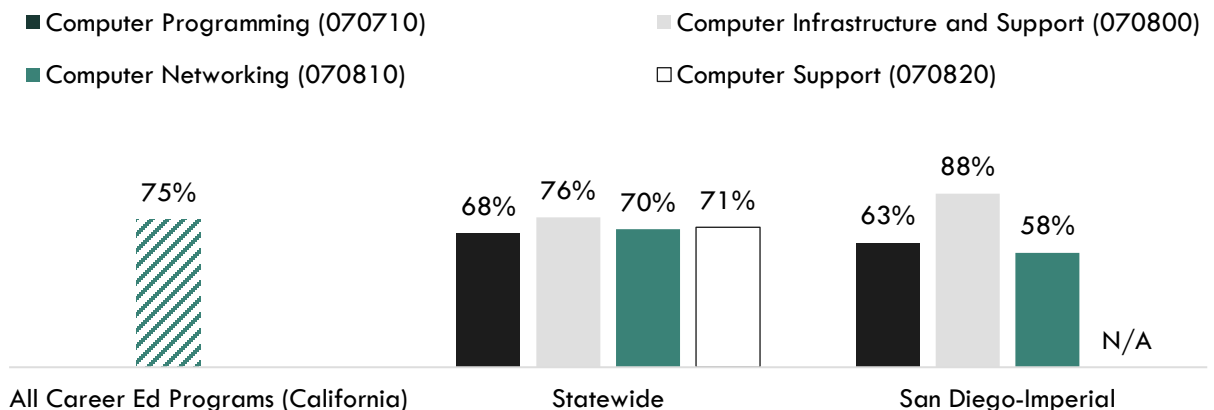
According to the California Community Colleges LaunchBoard, between 53 and 70 percent of students earned a living wage in programs related to *Cloud Technician Occupations*, compared to 58 percent of students who earned a living wage in Career Education programs across the state (Exhibit 7a).

Exhibit 7a: Proportion of Students Who Earned a Living Wage, PY2015-16¹⁰



According to the California Community Colleges LaunchBoard, 58 to 88 percent of students in the San Diego-Imperial region obtained a job closely related to their field of study after completing a related program, compared to 68 to 76 percent statewide and 75 percent of students in Career Education programs in general across the state (Exhibit 7b).

Exhibit 7b: Percentage of Students in a Job Closely Related to Field of Study, PY2014-15¹¹



¹⁰ Among completers and skills builders who exited, the proportion of students who attained a living wage.

¹¹ Most recent year with available data is Program Year 2014-15. Percentage of Students in a Job Closely Related to Field of Study: Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.

Top Employers and Work Locations

Between January 1, 2016 and December 31, 2018, the top five employers in San Diego County for these occupations were [Qualcomm](#), [General Atomics](#), [Northrop Grumman Booz Allen Hamilton](#), and [Accenture](#) (Exhibit 8).

Exhibit 8: Top Employers in San Diego County for Cloud Technician Occupations¹²

Top Employers	
<ul style="list-style-type: none">• Qualcomm• General Atomics• Northrop Grumman• Booz Allen Hamilton Inc.• Accenture	<ul style="list-style-type: none">• Teradata Operations, Inc.• Viasat• BAE Systems• Deloitte• SAIC

Skills, Education, and Certifications

Cloud Technician Occupations have a national educational requirement ranging from [some college, no degree](#) to a [bachelor's degree](#) (Exhibit 9a).

Exhibit 9a: National Educational Attainment for Cloud Technician Occupations¹³

Occupational Title	Typical Entry-Level Education
Software Developers, Systems Software	Bachelor's degree
Computer Occupations, All Other	Bachelor's degree
Computer and Information Systems Managers	Bachelor's degree
Computer User Support Specialists	Some college, no degree

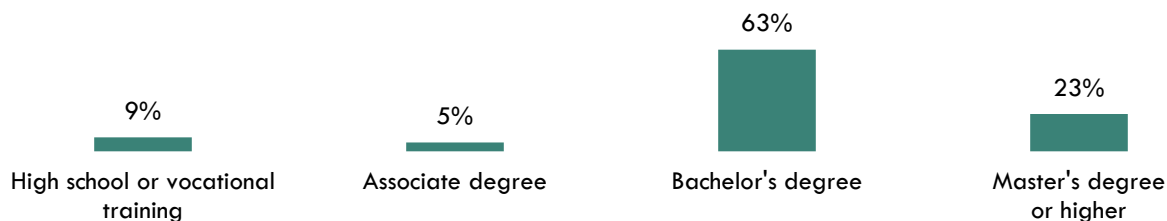
Based on online job postings between January 1, 2016 and December 31, 2018 in San Diego County, the top listed educational requirement for *Cloud Technician Occupations* is a [bachelor's degree](#) (Exhibit 9b).¹⁴

¹² Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2016-2018.

¹³ Emsi 2019.03; QCEW, Non-QCEW, Self-Employed.

¹⁴ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2016-2018.

Exhibit 9b: Educational Requirements for Cloud Technician Occupations in San Diego County¹⁵



*May not add to 100% due to rounding.

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2016 and December 31, 2018.

Exhibit 10: Top Skills for Cloud Technician Occupations in San Diego County¹⁶

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> • Project Management • Technical Support • Customer Service • SQL • Software Development 	<ul style="list-style-type: none"> • Communication Skills • Troubleshooting • Teamwork / Collaboration • Problem Solving • Planning 	<ul style="list-style-type: none"> • SQL • Software Development • Microsoft Excel • Linux • Java

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¹⁵ "Educational Attainment for Workers 25 Years and Older by Detailed Occupation," Bureau of Labor Statistics, last modified October 18, 2018. bls.gov/emp/tables/educational-attainment.htm.

¹⁶ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2016-2018.

Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.