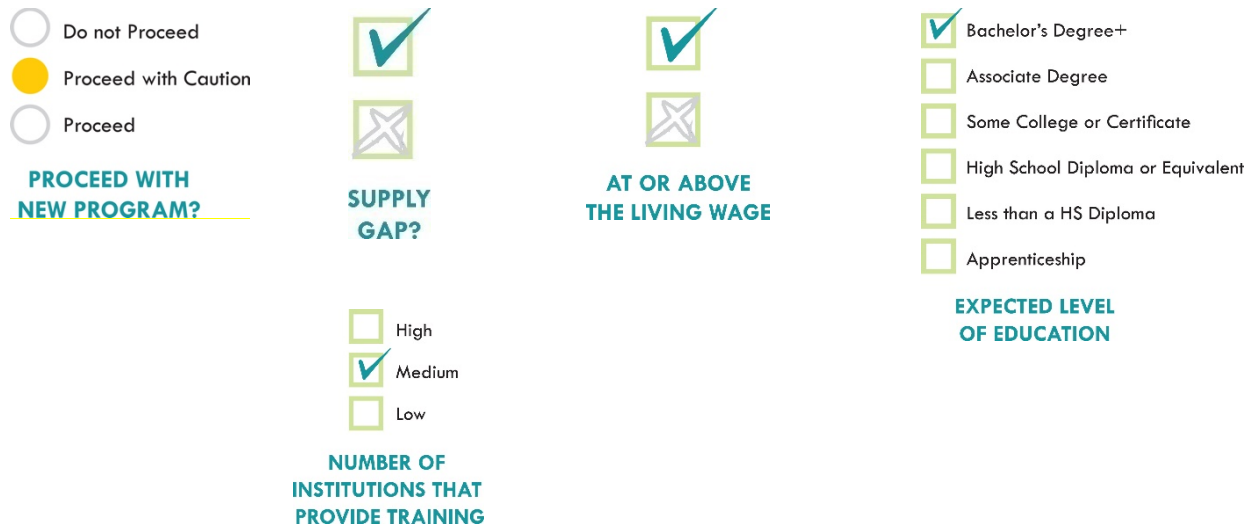


Computer Networking

Labor Market Analysis for San Diego Continuing Education

September 2019

Summary



This report provides labor market information for occupation(s) selected by San Diego Continuing Education for its *Computer Networking* program. The training provided by this program is likely to lead to employment as *Computer Network Architects*. According to available labor market information, the occupation has a labor market demand of 121 annual job openings, while average demand for an occupation in San Diego County is 277 annual job openings. Six community colleges supply the region with 85 for-credit awards (31 associate degrees, 29 certificates with 30 to < 60 units, and other certificates with varying numbers of units): Cuyamaca College, Grossmont College, MiraCosta College, Palomar College, San Diego City College, and Southwestern College. Only San Diego Continuing Education supplies noncredit awards for this occupation, which averaged seven awards over the last three program years. In short, the region supplies 92 for-credit and noncredit awards for 121 annual job openings, suggesting that there is a labor market supply gap. Additionally, 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. However, this brief recommends to proceed with caution because the expected level of education for this occupation is a bachelor's degree.

Introduction

This report provides labor market information (LMI) in San Diego County for occupations related to the six-digit Taxonomy of Programs¹ (TOP) code, Computer Networking (TOP 070810). The purpose of this brief is to assist noncredit program providers in the region, such as San Diego Continuing Education (SDCE), with program development and review. SDCE identified one occupation from the Standard Occupational Classification (SOC)² system for *Computer Networking*, which will be the focus of this report:

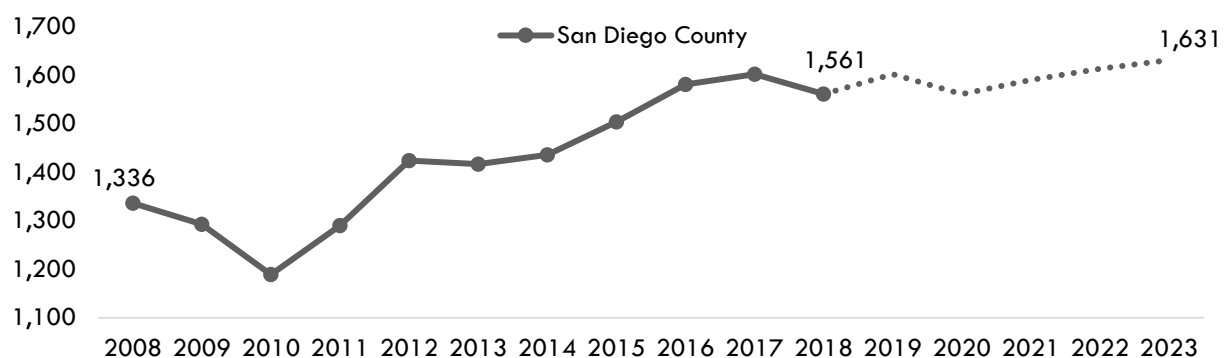
Computer Network Architects (SOC 15-1143): Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning. May also design network and computer security measures. May research and recommend network and data communications hardware and software. Sample reported job titles include:

- Network Analyst
- Network Consultant
- Solutions Architect
- Telecommunications Consultant
- Telecom Network Manager (Telecommunication Network Manager)
- Network Engineer
- Telecommunications Analyst
- Telecommunication Engineer
- Telecommunication Systems Designer
- Senior Telecommunications Consultant

Projected Occupational Demand

Between 2018 and 2023, *Computer Network Architects* are projected to increase by **70** net jobs or **four** percent (Exhibit 1). Employers in San Diego County will need to hire **121** workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

Exhibit 1: Number of Jobs for Computer Network Architects (2008-2023)³



¹ Taxonomy of Programs (TOP) is a system of codes used by the California Community Colleges for the purpose of collecting, calculating, or disseminating data about similar training programs.

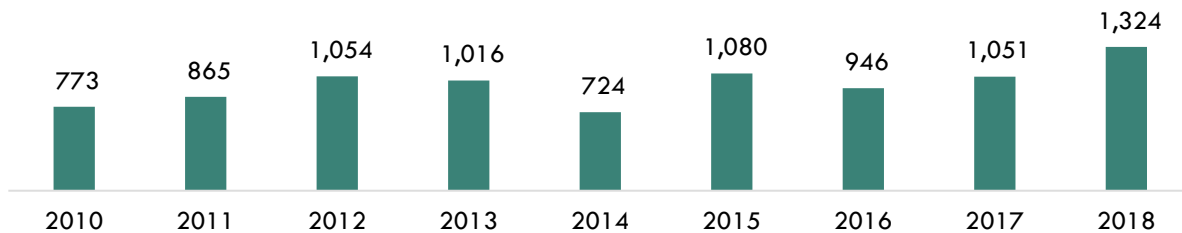
² The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. [bls.gov/soc](https://www.bls.gov/soc).

³ Emsi 2019.03; QCEW, Non-QCEW, Self-Employed.

Online Job Postings

This report analyzes not only historical and projected (traditional LMI) data, 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 981 online job postings per year for *Computer Network Architects* in San Diego County (Exhibit 2).

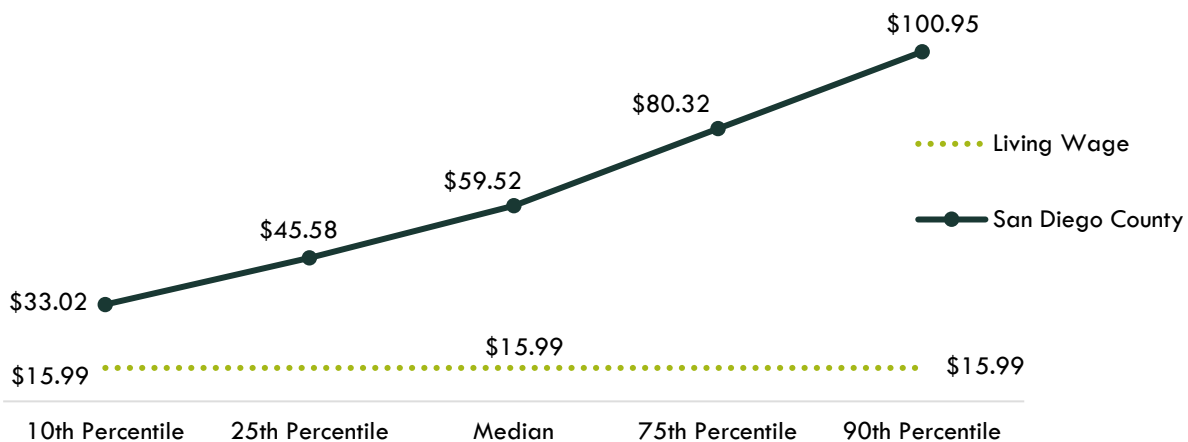
Exhibit 2: Number of Online Job Postings for Computer Network Architects in San Diego County (2010-2018)⁴



Earnings

Computer Network Architects have median hourly earnings of \$59.52; this is more than the living wage for a single adult in San Diego County, which is \$15.99 per hour (Exhibit 3).⁵

Exhibit 3: Hourly Earnings⁶ for Computer Network Architects in San Diego County⁷



⁴ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2018.

⁵ "California Family Needs Calculator." Insight Center for Community Economic Development, last updated 2018. insightccd.org/2018-family-needs-calculator.

⁶ 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.

⁷ Emsi 2019.03; QCEW, Non-QCEW, Self-Employed.

Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards conferred by a course or program in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes.⁸ According to TOP and CIP⁹ data, six community colleges supply the region with for-credit awards for Computer Networking (TOP 070810): Cuyamaca College, Grossmont College, MiraCosta College, Palomar College, San Diego City College, and Southwestern College (Exhibit 4a).

Exhibit 4a: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions (Program Years 2015-16 through 2017-18)

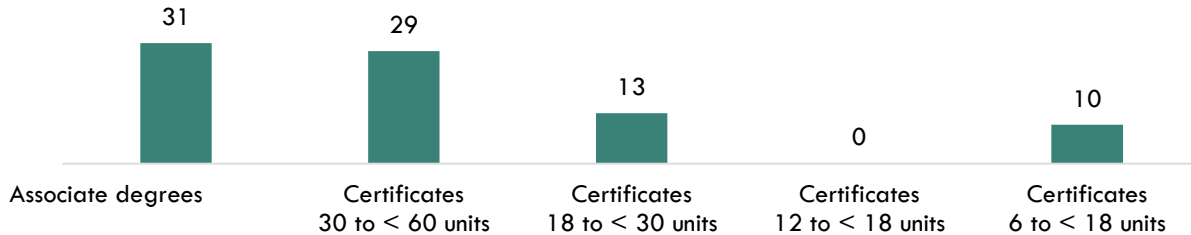
College	Award Type	PY 15-16	PY 16-17	PY 17-18	3-Year Avg
Cuyamaca	Associate of Science (A.S.) degree	9	10	5	8
	Certificate 30 to < 60 units	1	5	3	3
	Total	10	15	8	11
Grossmont	Associate of Science (A.S.) degree	3	2	5	3
	Certificate 30 to < 60 units	3	3	4	3
	Total	6	5	9	6
MiraCosta	Associate of Arts (A.A.) degree	0	6	10	5
	Certificate 18 to < 30 units	16	10	13	13
	Certificate 12 to < 18 units	0	0	1	0
	Total	16	16	24	18
Palomar	Associate of Science (A.S.) degree	0	18	15	11
	Associate of Arts (A.A.) degree	10	0	0	3
	Certificate 30 to < 60 units	15	27	23	22
	Certificate 6 to < 18 units	0	1	0	0
	Total	25	46	38	36
San Diego City	Certificate 6 to < 18 units	8	23	0	10
	Total	8	23	0	10
Southwestern	Associate of Science (A.S.) degree	3	0	1	1
	Certificate 30 to < 60 units	2	0	0	1
	Total	5	0	1	2
Total		70	105	80	85

⁸ 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)

⁹ There are five CIP codes related to Computer Networking (TOP 070810): Computer Systems Networking and Telecommunications (CIP 110901), Network and System Administration/Administrator (CIP 111001), System, Networking, and LAN/WAN Management/Manager (CIP 111002), Computer and Information Systems Security/Information Assurance (CIP 111003), and Information Technology Project Management (CIP 111005).

Broken down by award type, the six colleges supplied the most awards in associate degrees (31), followed by certificates with 30 to < 60 units (29), and so forth (Exhibit 4b).

Exhibit 4b: Total Number of Awards by Type for Computer Networking (TOP 070810) in San Diego County (Three-Year Average 2015-16 through 2017-18)



In terms of noncredit awards, only San Diego Continuing Education provides noncredit awards for Computer Networking (TOP 070810), with an average of **seven** noncredit awards (Exhibit 5).

Exhibit 5: Number of Noncredit Awards (Certificates and Degrees) Conferred by SDCE (Program Years 2015-16 through 2017-18)

Program Title	Award Type	PY 15-16	PY 16-17	PY 17-18	3-Year Avg
Virtual Datacenter	Program Award	0	0	20	7

Demand vs. Supply

In short, the region supplies 92 for-credit and noncredit awards for 121 annual job openings, suggesting that there is a labor market supply gap (Exhibit 6).

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

TOP6 Program	Demand (Annual Openings)	Supply (Total Annual Average Supply)		Supply Gap or Oversupply
		Noncredit	For-Credit	
Computer Networking (TOP 070810)	121	7	85	29

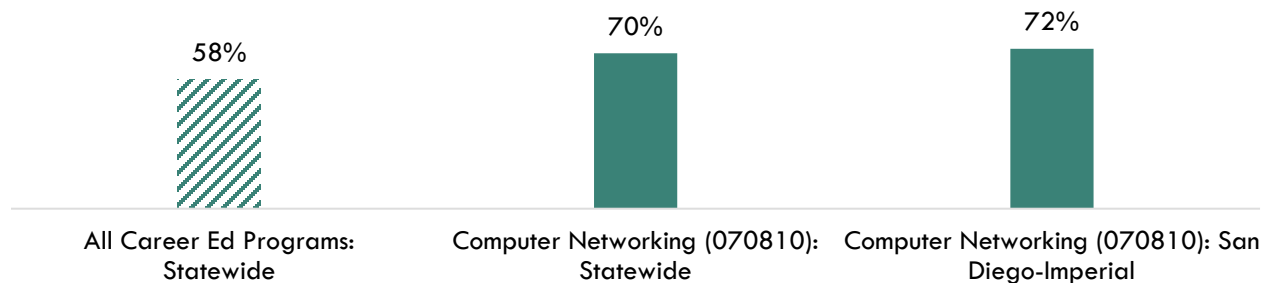
Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly

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.

Student Outcomes and Regional Comparisons

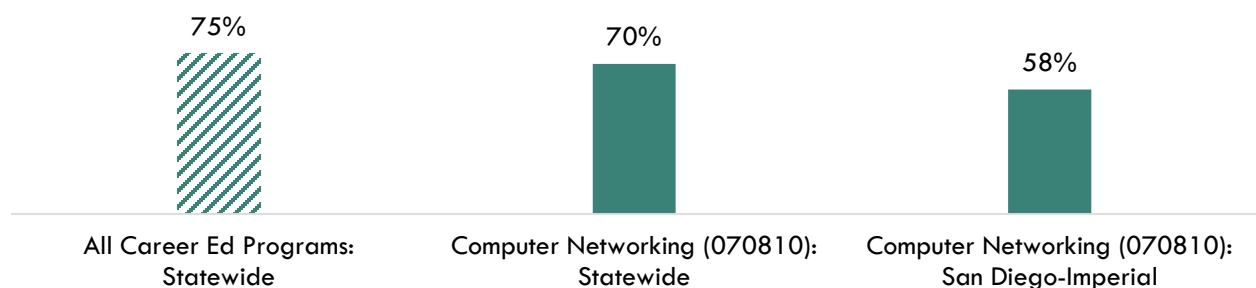
According to the California Community Colleges LaunchBoard, 72 percent of students in the San Diego-Imperial region earned a living wage after completing a Computer Networking (070810) program, compared to 70 percent statewide and 58 percent of students in Career Education programs in general across the state (Exhibit 7a).

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



According to the California Community Colleges LaunchBoard, 58 percent of students in the San Diego-Imperial region obtained a job closely related to their field of study after completing a Computer Networking (070810) program, compared to 70 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 this occupation were [Booz Allen Hamilton](#), [SAIC](#), [ViaSat](#), [Northrop Grumman](#), and [Qualcomm](#) (Exhibit 8).

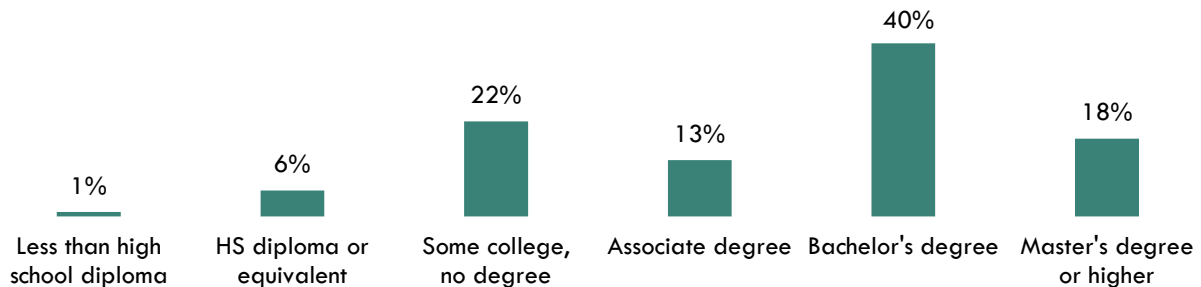
Exhibit 8: Top Employers in San Diego County for Computer Network Architects¹²

Top Employers	
<ul style="list-style-type: none"> Booz Allen Hamilton Inc. SAIC ViaSat Northrop Grumman Qualcomm 	<ul style="list-style-type: none"> Teradata Operations, Inc. Solute General Atomics Accenture AT&T

Skills, Education, and Certifications

Exhibit 9a indicates the educational attainment for the occupation found currently in the national labor force. There is no typical on-the-job training for this occupation. Employers report that the typical entry-level education is a [bachelors' degree](#).¹³

Exhibit 9a: National Educational Requirements for Computer Network Architects¹⁴



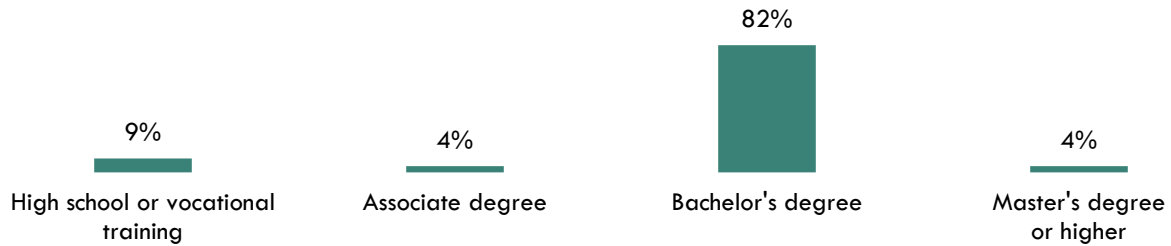
¹² Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2016-2018.

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

¹⁴ Emsi 2019.03; QCEW, Non-QCEW, Self-Employed.

Similarly, based on online job postings between January 1, 2016 and December 31, 2018, the top listed educational requirement for *Computer Network Architects* was a **bachelor's degree** (Exhibit 9b).¹⁵

Exhibit 9b: Educational Requirements for *Computer Network Architects* in San Diego County in Online Job Postings¹⁶



*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 *Computer Network Architects* in San Diego County¹⁷

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> • Network Engineering • Cisco • Routers • Wide Area Network (WAN) • System Network Configuration 	<ul style="list-style-type: none"> • Troubleshooting • Communication Skills • Planning • Teamwork / Collaboration • Problem Solving 	<ul style="list-style-type: none"> • Linux • Border Gateway Protocol • Cisco Switching • Virtual Private Network • VMware

¹⁵ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2016-2018.

¹⁶ "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.

¹⁷ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2016-2018.

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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.