C·O·E CENTERS OF EXCELLENCE FOR LABOR MARKET RESEARCH

Computer Networking

Labor Market Analysis for San Diego College of Continuing Education

September 2021

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED LEVEL OF EDUCATION
Proceed with New Program	☑	☑	☑ Bachelor's Degree+ ☐ Associate Degree ☐ Some College or Certificate ☐ HS Diploma or Equivalent ☐ Less than a HS Diploma ☐ Apprenticeship

SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS
☑	HIGH	LOW

This report provides labor market information for an occupation selected by San Diego College of 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, *Computer Network Architects* in San Diego County have a labor market demand of 134 annual job openings (while average demand for a single occupation in San Diego County is 242 annual job openings). On average, five institutions supply 61 for-credit awards and one institution supplies 17 noncredit awards in San Diego County for this occupation. In short, the region supplies 78 for-credit and noncredit awards for 134 annual job openings, suggesting that there is a supply gap in the labor market. Entry-level and median wages are above the living wage for this occupation. This brief recommends proceeding with developing a new program or a program modification because 1) there is a supply gap; and 2) entry-level and median wages are above the living wage. The college should note that **the typical entry-level education for this occupation is a bachelor's degree**.

Introduction

This report provides labor market information in San Diego County for an occupation related to the six-digit Taxonomy of Programs (TOP)[1] code, Computer Networking (TOP 0708.10). The purpose of this brief is to assist noncredit program providers in the region, such as San Diego College of Continuing Education (SDCCE), with program development and review. SDCCE 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 15-1241): 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. May also design network and computer security measures. May research and recommend network and data communications hardware and software. Sample reported job titles include:

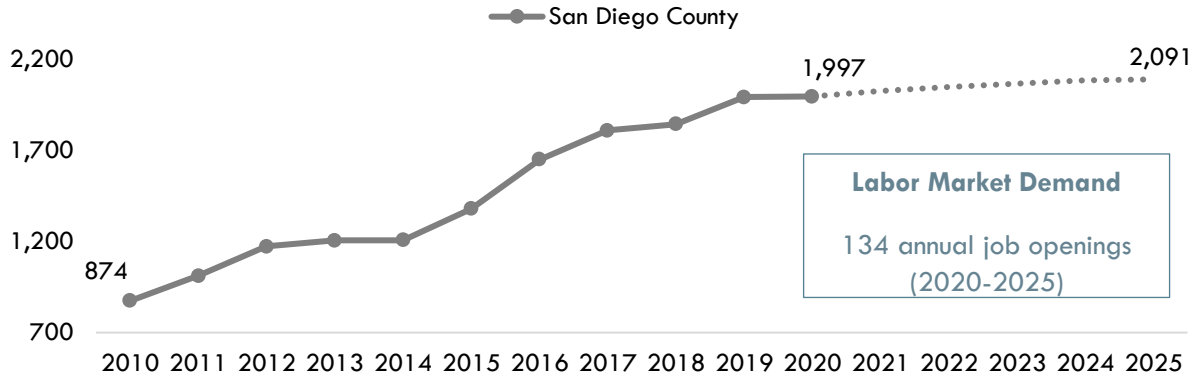
- Network Analyst
- Network Consultant
- Solutions Architect
- Telecommunications Consultant
- Telecom Network Manager
- Network Engineer
- Telecommunications Analyst
- Telecommunication Engineer
- Telecommunication Systems Designer
- Senior Telecommunications Consultant

[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.

Projected Occupational Demand

Between 2020 and 2025, *Computer Network Architects* is projected to increase by 94 net jobs or five percent (Exhibit 1). Employers in San Diego County will need to hire 134 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

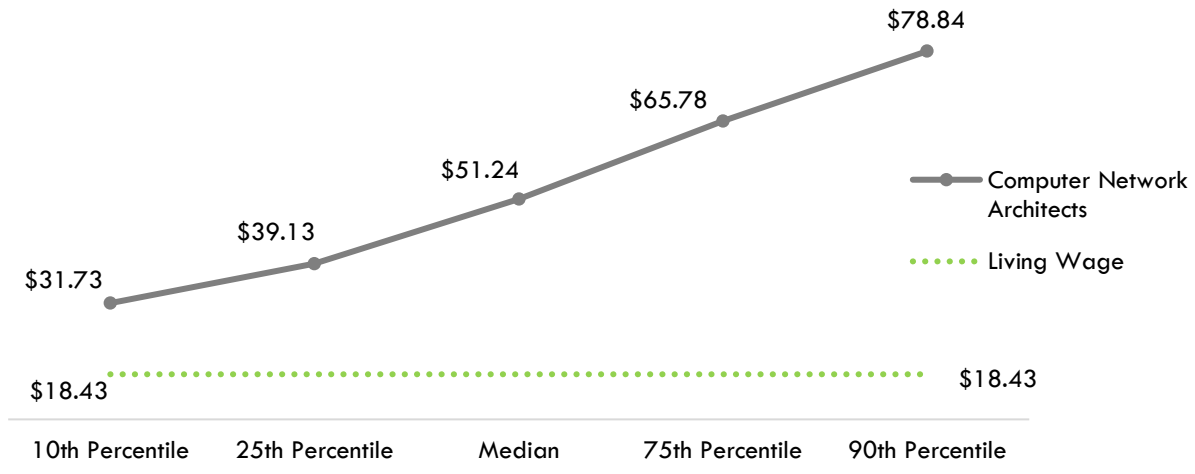
Exhibit 1: Number of Jobs for *Computer Network Architects* (2010-2025)[3]



Earnings

Computer Network Architects receive entry-level hourly earnings of $39.13; this is more than the living wage for a single adult in San Diego County, which is $18.43 per hour (Exhibit 2).[4]

Exhibit 2: Hourly Earnings[5] for *Computer Network Architects* in San Diego County[6]



[3] EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.
[4] "Family Needs Calculator (formerly the California Family Needs Calculator)," Insight: Center for Community Economic Development, last updated 2021. insightcced.org/family-needs-calculator/.
[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 2021.2; QCEW, Non-QCEW, Self-Employed.

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] According to TOP and CIP[8] data, five community colleges supply the region with for-credit awards for Computer Networking (TOP 0708.10): Cuyamaca College, Grossmont College, MiraCosta College, Palomar College, and Southwestern College (Exhibit 3a).

Exhibit 3a: Number of For-Credit Awards (Certificates and Degrees) Conferred by Postsecondary Institutions (Program Years 2017-18 through 2019-20)

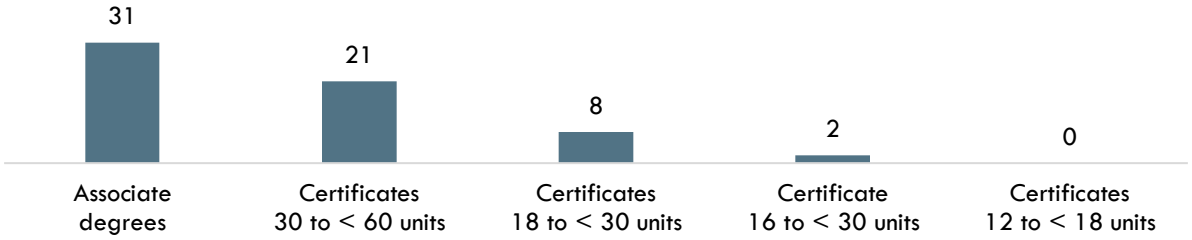
College	Award Type	PY 17-18	PY 18-19	PY 19-20	3-Yr Total Average
Cuyamaca	Associate Degree	5	9	7	7
	Certificate 30 to < 60 units	3	2	0	2
	Total	**8**	**11**	**7**	**9**
Grossmont	Associate Degree	5	3	3	4
	Certificate 30 to < 60 units	4	3	2	3
	Certificate 16 to < 30 units	0	0	1	0
	Total	**9**	**6**	**6**	**7**
MiraCosta	Associate Degree	10	5	3	6
	Certificate 18 to < 30 units	13	10	0	8
	Certificate 16 to < 30 units	0	0	4	1
	Certificate 12 to < 18 units	1	0	0	0
	Total	**24**	**15**	**7**	**15**
Palomar	Associate Degree	15	15	8	13
	Certificate 30 to < 60 units	23	16	9	16
	Total	**38**	**31**	**17**	**29**
Southwestern	Associate Degree	1	2	1	1
	Certificate 30 to < 60 units	0	1	0	0
	Total	**1**	**3**	**1**	**2***
	Total	**80**	**66**	**38**	**61**

Note: The numbers may not add up exactly due to rounding.

[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).
[8] There are five CIP codes related to Computer Networking (TOP 0708.10): Computer Systems Networking and Telecommunications (CIP 11.0901), Network and System Administration/Administrator (CIP 11.1001), System, Networking, and LAN/WAN Management/Manager (CIP 11.1002), Computer and Information Systems Security/Information Assurance (CIP 11.1003), and Information Technology Project Management (CIP 11.1005).

By award type, the colleges supplied the most awards for associate degrees based on the three-year average (program years 2017-18 through 2019-20) (Exhibit 3b).

Exhibit 3b: Total Number of For-credit Awards by Type for Computer Networking (TOP 0708.10) in San Diego County (3-Yr Average)



In terms of noncredit awards, only San Diego College of Continuing Education provides noncredit awards for Computer Networking (TOP 0708.10), with a three-year average of 17 noncredit awards (program years 2017-18 through 2019-20) (Exhibit 4).

Exhibit 4: Number of Noncredit Awards Conferred by SDCCE (Program Years 2017-18 through 2019-20)

Program Title	Award Type	PY 17-18	PY 18-19	PY 19-20	3-Yr Total Average
Virtual Datacenter	Noncredit	20	0	30	17

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply[9] suggests that there is a supply gap in San Diego County, with 134 annual openings and 78 for-credit and noncredit awards supplied by the region (Exhibit 5).

Exhibit 5: 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 0708.10)	134	17	61	**56**

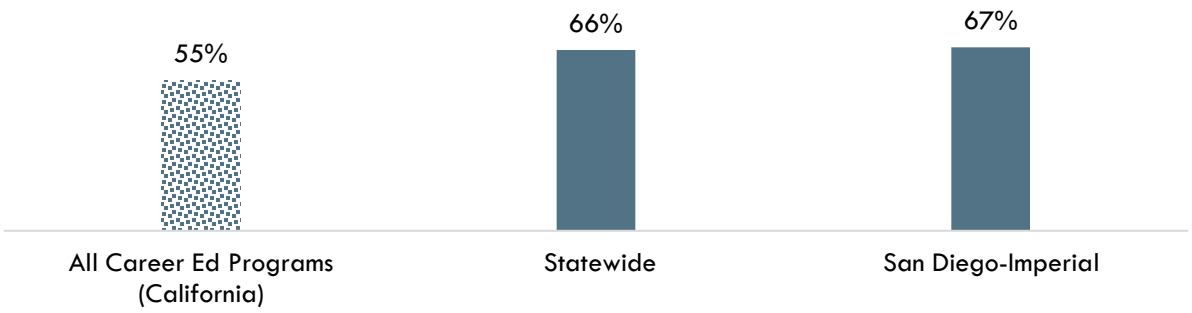
Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers;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

[9] 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.

Student Outcomes and Regional Comparisons

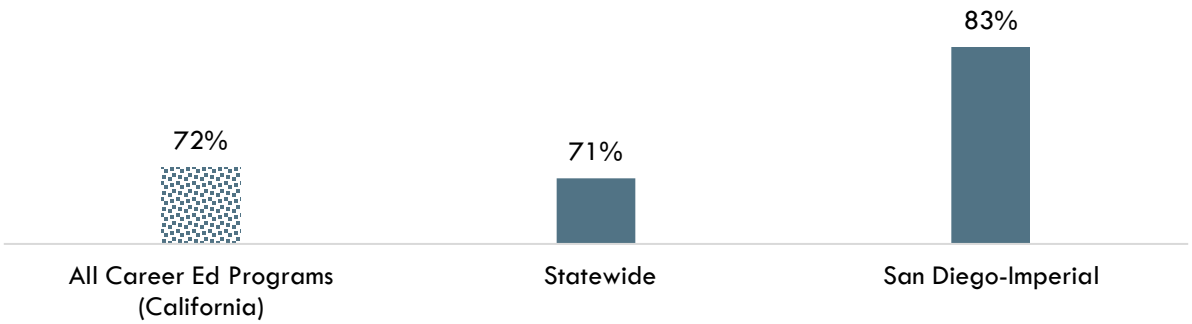
According to the California Community Colleges LaunchBoard, 67 percent of students in the San Diego-Imperial region earned a living wage after completing a Computer Networking (0708.10) program, compared to 66 percent statewide and 55 percent of students in Career Education programs in general across the state (Exhibit 6a).[10]

Exhibit 6a: Percentage of Students Who Earned a Living Wage by Program (Computer Networking, PY 2017-18)[11]



According to the California Community Colleges LaunchBoard, 83 percent of students in the San Diego-Imperial region obtained a job closely related to their field of study after completing a Computer Networking (0708.10) program, compared to 71 percent statewide and 72 percent of students in Career Education programs in general across the state (Exhibit 6b).[12]

Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study by Program (Computer Networking, PY 2016-17)[13]

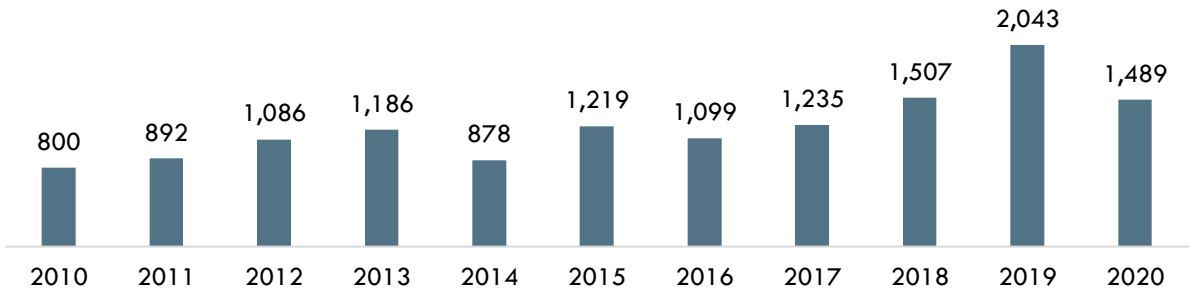


[10] "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.
[11] Among completers and skills builders who exited, the proportion of students who attained a living wage.
[12] "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.
[13] Most recent year with available data is Program Year 2016-17. 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.

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 that are not captured by historical data. Between 2010 and 2020, there was an average of 1,221 online job postings per year for *Computer Network Architects* in San Diego County (Exhibit 7). Please note that online job postings do **not** equal labor market demand; demand is represented by annual job openings (see Exhibit 1). Employers may post a position multiple times for various reasons, such as increasing the pool of applicants, for example.

Exhibit 7: Number of Online Job Postings for *Computer Network Architects* in San Diego County (2010-2020)[14]



Top Employers

Between January 1, 2018 and December 31, 2020, the top five employers in San Diego County for this occupation were Booz Allen Hamilton, Northrop Grumman, Viasat, Qualcomm, and Leidos based on online job postings (Exhibit 8).

Exhibit 8: Top Employers for *Computer Network Architects* in San Diego County[15]

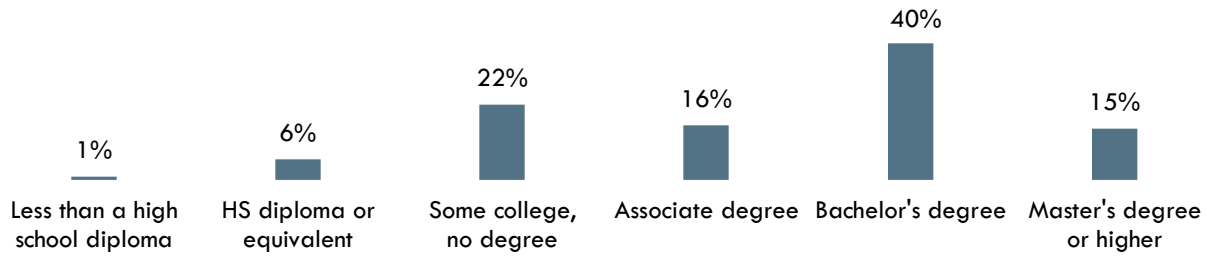
Top Employers	
• Booz Allen Hamilton, Inc. • Northrop Grumman • Viasat • Qualcomm • Leidos	• General Dynamics • SAIC • CACI • Apple, Inc. • Teradata Operations, Inc

[14] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2020.
[15] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Education, Skills, and Certifications

Exhibit 9 indicates the educational attainment for this occupation found currently in the national labor force. The typical entry-level education is an bachelor's degree.[16]

Exhibit 9: National Educational Attainment of *Computer Network Architects*[17]



*may not total 100 percent due to rounding

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 10: Top Skills for *Computer Network Architects* in San Diego County[18]

Specialized Skills	Soft Skills	Software Skills
• Network Engineering • Cisco • Routers • Wide Area Network • Border Gateway Protocol • System/Network Configuration • OSPF • Open Shortest Path First • Project Management • Network Troubleshooting • Transmission Control Protocol / Internet Protocol • Cisco Switching • Network Administration • VMware • Network Security	• Troubleshooting • Communication Skills • Planning • Teamwork / Collaboration • Problem Solving • Research • Writing • Verbal / Oral Communication • Written Communication • Organizational Skills • Detail-Oriented • Creativity • Presentation Skills • Time Management • Physical Abilities	• Linux • Cisco Switching • Virtual Private Networking • EIGRP • Enhanced Interior Gateway Routing Protocol • Python • Voice over IP • UNIX • Cisco Routers • SQL • Microsoft Excel • Wireshark • Windows Server • Java • Microsoft Visio

[16] EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.
[17] "Educational Attainment for Workers 25 Years and Older by Detailed Occupation," Bureau of Labor Statistics, last modified April 4, 2021. bls.gov/emp/tables/educational-attainment.htm.
[18] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Exhibit 11 lists the top certifications that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 11: Top Certifications for *Computer Network Architects* in San Diego County[19]

Top Certifications in Online Job Postings
1. Security Clearance
2. Cisco Certified Network Associate (CCNA)
3. Cisco Certified Network Professional (CCNP)
4. CompTIA Security+
5. Cisco Certified Internetwork Expert (CCIE)
6. Certified Information Systems Security Professional (CISSP)
7. IT Infrastructure Library (ITIL) Certification
8. Microsoft Certified Solutions Associate (MCSA)
9. Cisco Certified Design Professional (CCDP)
10. CompTIA Network+
11. Juniper Networks Certified Internet Expert
12. Microsoft Certified Solutions Expert (MCSE)
13. SANS/GIAC Certification
14. Certified A+ Technician
15. CompTIA Linux+

[19] Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

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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.

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.