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

Program Endorsement Brief

CLOUD COMPUTING IN THE GREATER SACRAMENTO REGION

North/Far North Center of Excellence

MARCH 2021

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COVID-19 Statement: This report includes employment projection data by EMSI. EMSI's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

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Summary

The North/Far North Center of Excellence for Labor Market Research prepared this report to provide regional labor market supply and demand data related to video game design and technology occupations in the North (Greater Sacramento) subregion. This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from existing community college programs.

Key findings include:

- The North (Greater Sacramento) area held 14,931 jobs for cloud computing occupations in 2019. Jobs for cloud computing occupations in Greater Sacramento are projected to increase by 4% over the next five years, adding 538 new jobs to the area.
- Over the next five years, cloud computing occupations are projected to have 1,097 annual openings across Greater Sacramento.
- Wage data shows that these occupations earn $11 to $44 above the subregion's living wage of $13.18 per hour.
- Skill analysis revealed a low level of demand for workers with associated cloud computing skills.
- Analysis of educational attainment data shows between 21% and 40% of incumbent workers in cloud computing occupations have education levels consistent with community college offerings (some college or associate degrees). Between 37% and 48% of workers in these occupations have a bachelor's degree.
- Community colleges conferred an average of 331 certificates and degrees each year over the last three academic years.

Introduction

The North/Far North Center of Excellence was asked to provide labor market information for a proposed program at a regional community college. This report focuses on the following Standard Occupational Classification (SOC) occupations and codes:

- Computer and Information Systems Managers (11-3021)
- Computer Systems Analysts (15-1211)
- Information Security Analysts (15-1212)
- Computer Network Support Specialists (15-1231)
- Computer Network Architects (15-1241)
- Network and Computer Systems Administrators (15-1244)
- Computer Occupations, All Other (15-1299)

A review of related programs revealed the following program(s) and Taxonomy of Programs (TOP) code(s) are appropriate for inclusion in this report:

- Information Technology, General (0701.00)
- Computer Information Systems (0702.00)
- Computer Science - Transfer program (0706.00)
- Computer Systems Analysis (0707.30)
- Computer Infrastructure and Support (0708.00)
- Computer Network (0708.10)
- Computer Support (0708.20)
- E-Commerce, technology emphasis (0709.10)

The corresponding Classification of Instructional Programs (CIP) code(s) are:

- Computer and Information Sciences, General (11.0101)
- Information Technology (11.0103)
- Computer Science (11.0701)
- Computer Systems Analysis/Analyst (11.0501))
- Computer and Information Systems Security/Information Assurance (11.1003)
- Computer Systems Networking and Telecommunications (11.0901)
- Computer Support Specialist (11.1006)

The SOC titles, SOC codes, and job descriptions from the Bureau of Labor Statistics (BLS) and O*Net OnLine are shown below.

Computer and Information Systems Managers (11-3021)

Plan, direct, or coordinate activities in electronic data processing, information systems, systems analysis, and computer programming.

Computer Systems Analysts (15-1211)

Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex application 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.

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.

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.

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.

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.

Computer Occupations, All Other (15-1299)

This occupation group includes Web Administrators (15-1299.01), Geographic Information Systems Technologists and Technicians (15-1299.02), Document Management Specialists (15-1299.03), Penetration Testers (15-1299.04), Information Security Engineers (15-1299.05), Digital Forensics Analysts (15-1299.06), Blockchain Engineers (15-1299.07), Computer Systems Engineers/Architects (15-1299.08), and Information Technology Project Managers (15-1299.09). Please visit ONet OnLine for the complete descriptions of the emerging occupations included in this group.

Occupational Demand

Exhibit 1 summarizes the five-year projected job growth for the North (Greater Sacramento) selected occupations, North/Far North, and California.

Exhibit 1. Employment and projected demand, 2019-2024[1]

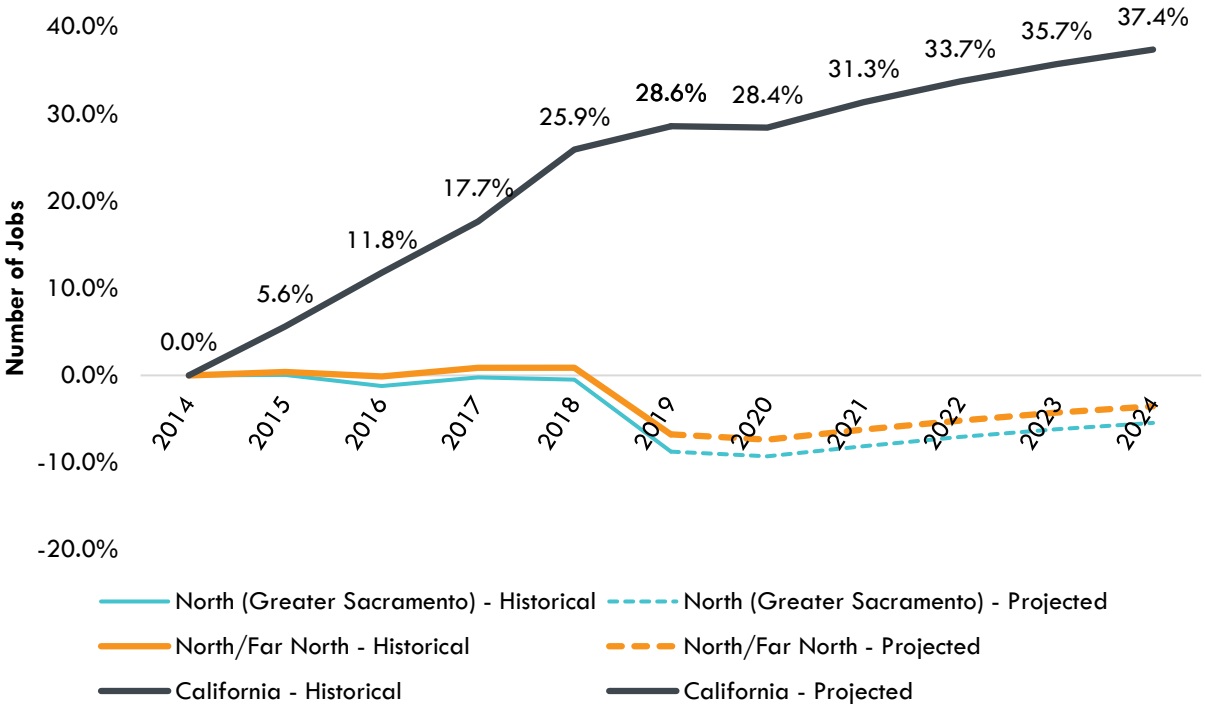
Occupation	2019 Jobs	2024 Jobs	2019-2024 Jobs Change	2019-2024 Jobs % Change	2019-2024 Annual Openings
Computer and Information Systems Managers	3,622	3,752	131	4%	273
Computer Systems Analysts	3,345	3,474	128	4%	241
Information Security Analysts	470	547	77	16%	48
Computer Network Support Specialists	1,033	1,078	45	4%	80
Computer Network Architects	677	697	20	3%	44
Network and Computer Systems Administrators	1,819	1,881	62	3%	122
Computer Occupations, All Other	3,964	4,039	75	2%	289
North (Greater Sacramento)	**14,931**	**15,469**	**538**	**4%**	**1,097**
Computer and Information Systems Managers	3,962	4,111	149	4%	300
Computer Systems Analysts	3,849	3,995	146	4%	278
Information Security Analysts	547	633	86	16%	55
Computer Network Support Specialists	1,237	1,283	46	4%	96
Computer Network Architects	832	841	9	1%	53
Network and Computer Systems Administrators	2,086	2,157	71	3%	141
Computer Occupations, All Other	4,553	4,636	83	2%	333
North/Far North	**17,065**	**17,656**	**590**	**3%**	**1,256**
Computer and Information Systems Managers	75,748	80,980	5,232	7%	6,197
Computer Systems Analysts	66,173	71,751	5,577	8%	5,408

[1] EMSI 2021.1; QCEW, Non-QCEW, and Self-employed.

Occupation	2019 Jobs	2024 Jobs	2019-2024 Jobs Change	2019-2024 Jobs % Change	2019-2024 Annual Openings
Information Security Analysts	9,679	11,767	2,088	22%	1,095
Computer Network Support Specialists	17,586	18,937	1,351	8%	1,493
Computer Network Architects	17,945	19,011	1,066	6%	1,264
Network and Computer Systems Administrators	34,670	36,701	2,031	6%	2,492
Computer Occupations, All Other	85,854	89,567	3,714	4%	6,661
California	**307,656**	**328,714**	**21,058**	**7%**	**24,610**

Exhibit 2 compares the percent change in the number of jobs between 2014 through 2019 and the projected changes through 2024. The rate of change is indexed to the total number of jobs in 2014.

Exhibit 2. Changes in employment, 2014-2024[2]

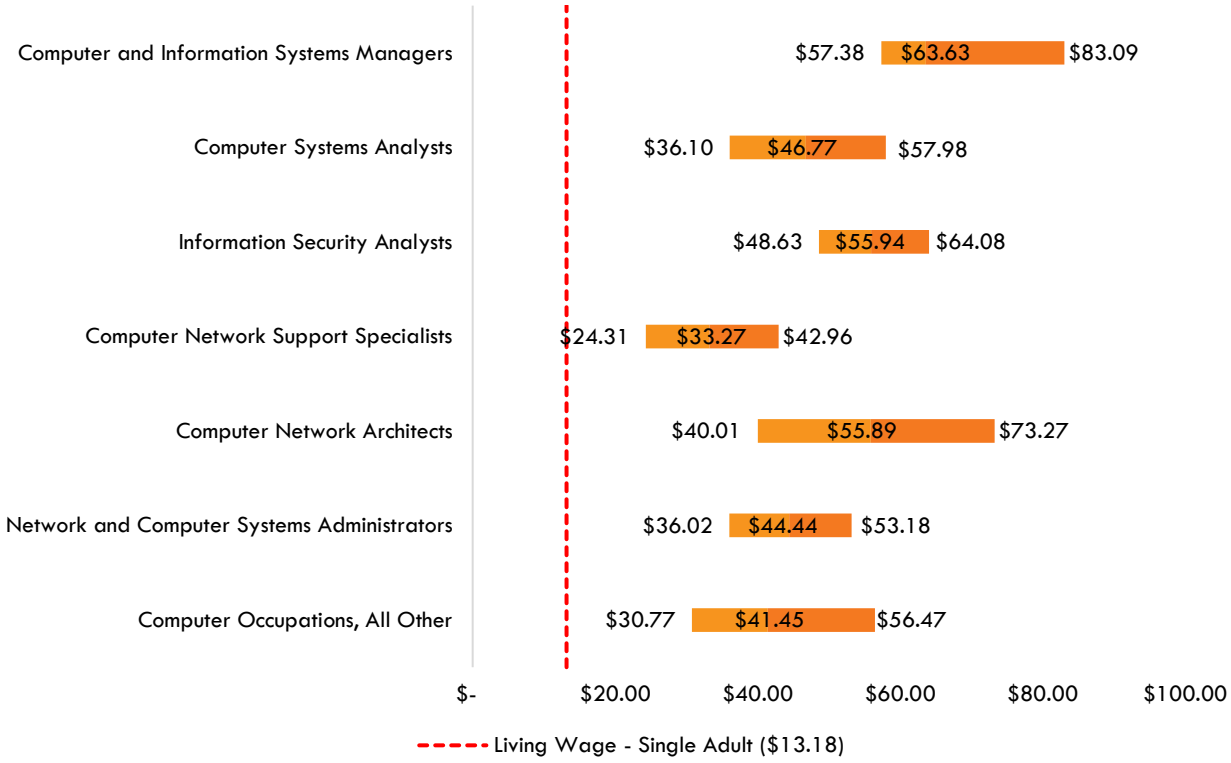


[2] Ibid.

Wages

Exhibit 3 compares the entry-level, median, and experienced wages for the selected occupations to the North (Greater Sacramento) living wage for a single adult - $13.18 per hour.[3]

Exhibit 3. Comparison of wages by occupation, 2019[4]



[3] Living wage is defined as the level of income a single adult with no children must earn to meet basic needs, including food, housing, transportation, healthcare, taxes, and other miscellaneous basic needs. The 25th-percentile and 75th-percentile hourly wages are used as proxy for entry-level and experienced-level wages.

[4] Ibid.

Job Postings

This section of the report analyzes recent data from online job postings (real-time LMI). Online job postings may provide additional insight into recent changes in the labor market that are not captured by historical data. Job postings data comes from Burning Glass Labor Insights and represents new listings posted online within the last year, from March 1, 2020, to February 28, 2021. The NFN COE identified 7,216 new online job postings for the selected occupations in the North (Greater Sacramento) region.

Occupations and Job Titles

Exhibit 4 details the number of online job postings for the selected occupations. Please note that Burning Glass occupational searches use the 2010 Bureau of Labor Statistics Standard Occupational Codes. Results have been filtered to ensure alignment with the selected occupations for this report.

Exhibit 4. Number of job postings by occupation

SOC Code	Occupation	Job Postings	Share of Job Postings
15-1199.00	Computer Occupations, All Other	3,394	47%
15-1121.00	Computer Systems Analysts	1,527	21%
15-1122.00	Information Security Analysts	777	11%
15-1142.00	Network and Computer Systems Administrators	719	10%
15-1143.00	Computer Network Architects	435	6%
11-3021.00	Computer and Information Systems Managers	208	3%
15-1152.00	Computer Network Support Specialists	156	2%
	Total Job Postings	**7,216**	**100%**

Exhibit 5 shows the top 10 job titles with the most job postings and the share of job postings. All 7,216 job postings included a job title.

Exhibit 5. Top jobs titles for selected occupations in North (Greater Sacramento)

Job Title	Job Postings	Share of Job Postings
Enterprise Architect	87	1%
Business Systems Analyst	84	1%
IT Project Manager	81	1%
Systems Administrator	76	1%
Network Engineer	74	1%
Project Manager	68	1%

Job Title	Job Postings	Share of Job Postings
Systems Engineer	67	1%
Scrum Master	48	1%
Senior Systems Engineer	43	1%
Solutions Architect	42	1%

Employers

Exhibit 6 shows the top 10 employers for job postings related to the selected occupations. Twenty-one percent of job postings did not include an employer.

Exhibit 6. Top employers for selected occupations in North (Greater Sacramento)

Employer	Job Postings	Share of Job Postings
Anthem Blue Cross	215	3%
Blue Cross Blue Shield of California	171	2%
Deloitte	153	2%
Centene Corporation	111	2%
Accenture	89	1%
University of California	85	1%
Ernst & Young	75	1%
Intel Corporation	69	1%
University of California, Davis	58	1%
UC Davis Health	50	1%

Skills and Certifications

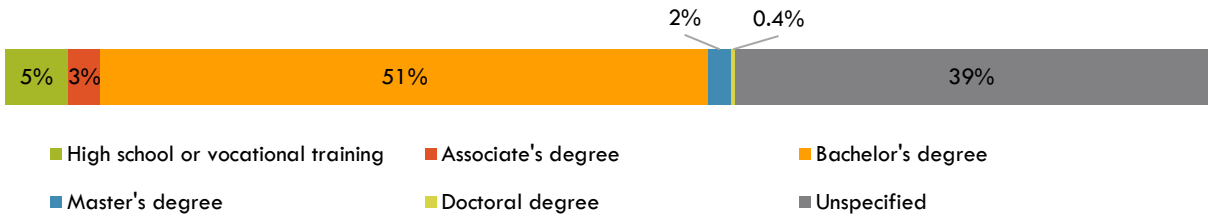
Exhibit 7 shows the specialized skills most requested by employers for the selected occupations.

Exhibit 7. Top skills for selected occupations in North (Greater Sacramento)

Specialized Skill	Job Postings	Share of Job Postings
Project Management	1,715	24%
SQL	1,027	14%
Business Process	915	13%
Budgeting	913	13%
Information Systems	868	12%
Software Development	809	11%
Scheduling	788	11%
Customer Service	779	11%
Linux	722	10%
Python	645	9%

Exhibit 8 shows the minimum level of education required by employers for job postings within the selected occupations.

Exhibit 8. Employer-preferred minimum education levels for selected occupations



Skill Analysis

Skills analysis is based on Burning Glass Labor Market Insight's framework, categorizes skills based on type and similarities with other skills, and aligns it to market-relevant data. This section differs from the job postings section in that occupations are replaced with skills as the analysis unit. This skills analysis is an attempt to quantify job demand through the skills most desired by employers.

This section of the report examines the demand for the cloud computing skill cluster in the North (Greater Sacramento) subregion. Using Burning Glass, the NFN COE identified 1,042 job postings between March 1, 2020, and February 28, 2021, that included any cloud computing-related skill in the job posting. The list of skills included in the cloud computing skill cluster is shown in exhibit 9.

Exhibit 9. The "Cloud Computing" skill cluster

Cloud Computing	Amazon Virtual Private Cloud (VPC)
	AWS direct connect
	Cloud architecture
	Cloud builder
	Cloud computing
	Cloud-based design and manufacturing
	Cloudera
	CloudStack
	Cloud-to-Cloud
	Deployment models
	Edge computing
	Fog computing
	Google Compute Engine (GCE)
	Rackspace
	Tosca

Exhibit 10 shows the top occupations associated with cloud computing, based on the number of job postings that required skills from the cloud computing cluster in the North (Greater Sacramento) area. Please note that 51 of the 1,042 job postings were not included in the list.

Exhibit 10. Top occupations associated with Cloud Computing skill cluster

Occupation	Job Postings Requesting Skill	Total Job Postings	Share of Job Postings Requesting Skill
Software Developers, Applications	262	6,076	4.3%
Computer Systems Engineers/Architects	204	1,479	13.8%
Web Developers	167	1,383	12.1%
Computer Network Architects	43	435	9.9%

Occupation	Job Postings Requesting Skill	Total Job Postings	Share of Job Postings Requesting Skill
Information Security Analysts	41	777	5.3%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	24	8,329	0.3%
Information Technology Project Managers	24	1,391	1.7%
Database Administrators	18	841	2.1%
Management Analysts	15	2,243	0.7%
Database Architects	15	283	5.3%
All other occupations (n=40)	*178*	*67,687*	*0.3%*
Totals	**991**	**90,924**	**1.1%**

Exhibit 11 shows the top co-occurring skills, by type, for cloud computing. Co-occurring skills with larger percent values were more likely to be requested in addition to the cloud computing skill family by local employers.

Exhibit 11. Top co-occurring skills for cloud computing in North (Greater Sacramento)

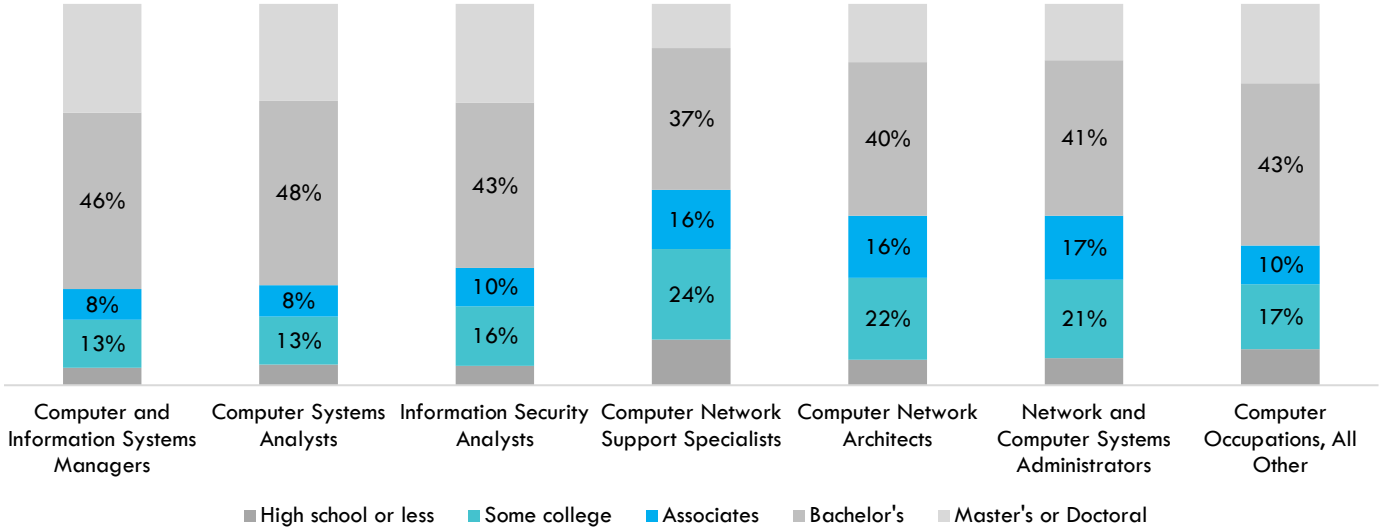
Co-occurring Specialized Skills	Job Postings	% Co-occurring with skill cluster
Cloud Computing	601	58%
Python	454	44%
SQL	411	39%
Java	405	39%
Git	318	31%
Microsoft Azure	292	28%
Linux	287	28%
Cloud architecture	269	26%
Software Engineering	235	23%
DevOps	230	22%

Co-occurring Foundational Skills	Job Postings	% Co-occurring with skill cluster
Communication Skills	384	37%
Problem Solving	352	34%
Writing	305	29%
Teamwork / Collaboration	269	26%
Creativity	232	22%
Planning	192	18%
Time Management	190	18%
Troubleshooting	137	13%
Research	131	13%
Presentation Skills	105	10%
Co-occurring Software Skills	**Job Postings**	**% Co-occurring with skill cluster**
Python	454	44%
SQL	411	39%
Java	405	39%
Git	318	31%
Microsoft Azure	292	28%
Linux	287	28%
Software Engineering	235	23%
Docker Software	221	21%
Microsoft C#	219	21%
Ruby	218	21%

Education and Training Requirements

The U.S. Census Bureau and Bureau of Labor Statistics collected data on education achieved by workers employed in occupations. Exhibit 11 shows the national-level educational attainment of the current workforce in the selected occupations.

Exhibit 11. Educational attainment for selected occupations, 2019



The Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which the BLS publishes projections data. Exhibit 12 shows the entry-level job requirements for the selected occupations.

Exhibit 12. Typical education, training, and work experience for selected occupations

Occupation	Typical Entry-Level Education Required	Work Experience Required	Typical On-the-job Training Required
Computer and Information Systems Managers	Bachelor's degree	5 years or more	None
Computer Systems Analysts	Bachelor's degree	None	None
Information Security Analysts	Bachelor's degree	Less than 5 years	None
Computer Network Support Specialists	Associate's degree	None	None
Computer Network Architects	Bachelor's degree	5 years or more	None
Network and Computer Systems Administrators	Bachelor's degree	None	None
Computer Occupations, All Other	Bachelor's degree	None	Moderate-term

Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards issued in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes. Exhibit 13 shows the TOP and CIP codes related to the selected occupations.

Exhibit 13. Related TOP and CIP programs and codes for the selected occupations

TOP Programs and Codes	Aligned CIP Programs and Codes
Computer Information Systems (0702.00)	Information Technology (11.0103)
Computer Infrastructure and Support (0708.00)	Computer and Information Systems Security/Information Assurance (11.1003)
Computer Network (0708.10)	Computer Systems Networking and Telecommunications (11.0901)
Computer Science - Transfer (0706.00)	Computer Science (11.0701)
Computer Support (0708.20)	Computer Support Specialist (11.1006)
Information Technology, General (0701.00)	Computer and Information Sciences, General (11.0101)
E-Commerce, technology emphasis (0709.10)	Computer Systems Analysis/Analyst (11.0501)

Community College Supply

Exhibit 14 compares the average number of certificates and degrees conferred by North (Greater Sacramento) community colleges in the selected programs over the last three academic years.

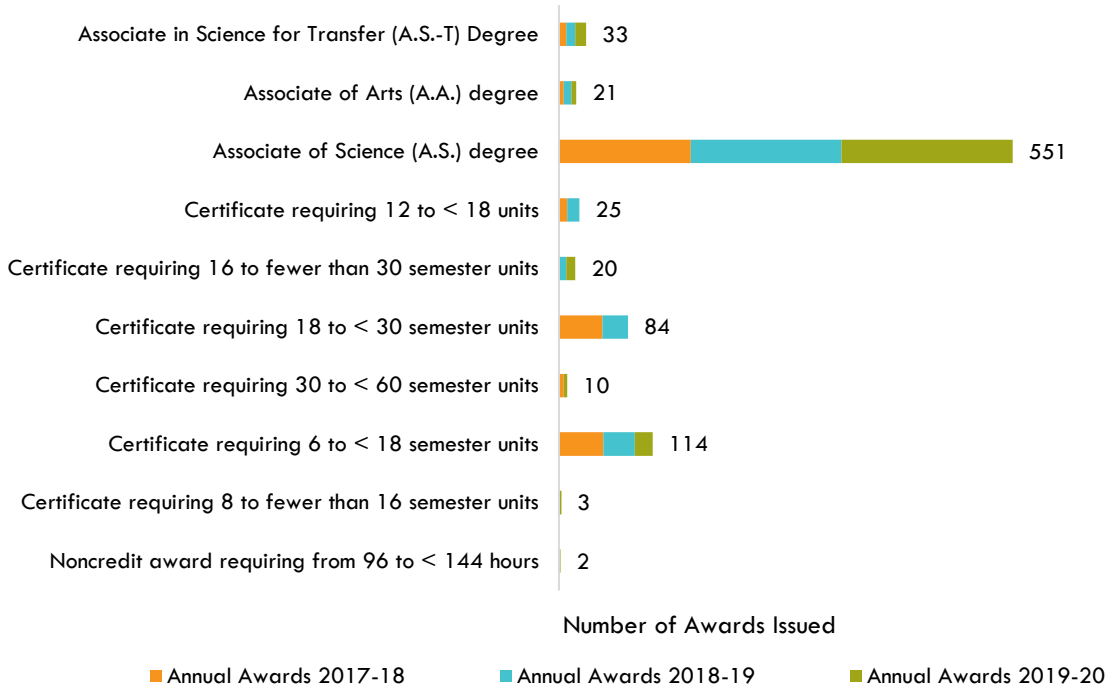
Exhibit 14. Regional community college awards (certificates and degrees), 2017-18 through 2019-20

Program	College	Annual Awards 2017-18	Annual Awards 2018-19	Annual Awards 2019-20	3-Year Annual Awards Average
Computer Information Systems-070200	Cosumnes River	12	13	9	12
	Sacramento City	12	6	13	12
	Sierra	5	5	6	7
	Subtotal	***29***	***24***	***28***	***32***
Computer Infrastructure and Support-070800	American River	18	21	13	22
	Cosumnes River	8	4	5	8
	Sacramento City	24	17	18	21
	Sierra	54	38	22	38
	Subtotal	***104***	***80***	***58***	***89***

Program	College	Annual Awards 2017-18	Annual Awards 2018-19	Annual Awards 2019-20	3-Year Annual Awards Average
Computer Networking-070810	American River	19	29	14	26
	Cosumnes River	10	3	6	10
	Sacramento City	36	38	25	40
	Sierra	22	32	22	32
	Subtotal	***87***	***102***	***67***	***107***
Computer Science (Transfer)-070600	American River	22	29	36	29
	Cosumnes River	16	7	17	13
	Folsom Lake	18	28	26	24
	Sierra	9	11	12	11
	Yuba			1	1
	Subtotal	***65***	***75***	***92***	***78***
Computer Support-070820	American River	7	5	7	9
	Cosumnes River	3	2	1	4
	Sacramento City			1	1
	Subtotal	***10***	***7***	***9***	***14***
Information Technology, General-070100	Cosumnes River	3	8	12	9
	Folsom Lake			3	3
	Subtotal	***3***	***8***	***15***	***12***
	Grand Totals	**298**	**296**	**269**	**331**

Exhibit 15 shows the distribution of issued awards by type.

Exhibit 15. Regional community college awards by type, 2017-18 through 2019-20



Other Postsecondary Supply

It is crucial to consider the supply from non-community college institutions in the region that provides training for the selected occupations. As the studied occupations typically require a bachelor's degree for entry-level work, supply includes all four-year educational institutions that issue degrees in related programs (Exhibit 16).

Exhibit 16. Regional bachelor degree awards, 2016-17 through 2018-19

Program	College	Annual Awards 2016-2017	Annual Awards 2017-2018	Annual Awards 2018-2019	3-Year Annual Awards Average
Computer Science (11.0701)	UC Davis*	294	326	301	307
	CSU Sacramento*	143	156	236	178
	William Jessup University*	--	--	4	4
	Subtotal	***437***	***482***	***541***	***489***
Computer Systems Networking and Telecommunications (11.0901)	Charles A Jones Career and Education Center	--	22	11	17
	Subtotal	***--***	***22***	***11***	***17***

Program	College	Annual Awards 2016-2017	Annual Awards 2017-2018	Annual Awards 2018-2019	3-Year Annual Awards Average
Computer Support Specialists - 11.1006	MTI College	62	38	34	45
	Asher College	76	44	39	53
	Subtotal	***138***	***82***	***73***	***98***
Information Technology (11.0103)	Asher College	11	6	9	9
	Subtotal	***11***	***6***	***9***	***9***
	Grand Totals	**586**	**592**	**634**	**604**

The asterisk (*) denotes colleges and universities that issued bachelor's degrees.

Findings

- The North (Greater Sacramento) area held 14,931 jobs for cloud computing occupations in 2019. Nearly three-quarters of these jobs were concentrated in three occupations: computer and information systems managers (n = 3,622 jobs), computer system analysts (n = 3,345), and computer occupations, all other (n = 3,964).
    - Computer occupations, all other, consist of emerging and different positions that do not have traditional labor market data assigned to the detailed individual occupation. This group includes web administrators, geographic information systems technologists and technicians, document management specialists, penetration testers, information security engineers, digital forensics analysts, blockchain engineers, computer systems engineers/architects, and information technology project managers.
- Jobs for cloud computing occupations in Greater Sacramento are projected to increase by 4% over the next five years, adding 538 new jobs to the area.
- Over the next five years, cloud computing occupations are projected to have 1,097 annual openings across Greater Sacramento. Most of the projected job openings (58%) are for computer and information systems managers (n = 273 openings), computer system analysts (n = 241), and computer occupations, all other (n = 289).
- Wage data shows that these occupations earn $11 to $44 above the subregion's living wage of $13.18 per hour. Entry-level pay ranges from $24 for a computer network support specialist to $57 an hour for computer and information systems managers.
- According to real-time labor market information, there were 7,216 online job postings for cloud computing occupations between March 1, 2020, and February 28, 2021. Over the last 12 months, occupations with the most job postings were computer occupations, all other (n = 3,394 job postings), computer systems analysts (n = 1,527), and information security analysts (n = 777).
- Employers with the most job postings for cloud computing occupations included insurance companies (Anthem, Blue Cross/Blue Shield, and Centene), management and consulting firms (Deloitte, Accenture, and Ernest & Young), and educational institutions (the University of California and UC Davis).
- While 40% of the job postings did not specify a minimum educational level, only 8% of job postings required an education level consistent with community college offerings. Fifty-one percent of job postings had employers that requested a minimum of a bachelor's degree.
- Skill analysis revealed a low level of demand for workers with cloud computing skill sets.
    - Skills analysis allows us to use a skill (or a cluster of skills) to understand which jobs require a particular skill for work and estimate the demand level for those workers. Analysis at the skill level also allows us to capture a broad range of occupations that might need a particular skill set.
    - Over the last 12 months, 1,042 job postings specifically called for workers to have cloud computing skills in the Greater Sacramento area. This represented just over 1% of all job postings across the same group of occupations.
    - Occupations with the largest share of job postings requesting cloud computing as a skill include computer systems engineers/architects (SOC 15-1299.08, n= 14%), web

developers (SOC 15-1254, n = 12%), computer network architects (SOC 15-1241, n = 10%), information security analysts (SOC 15-1212, n = 5.3%) and database architects (SOC 15-1243, n = 53%).

- Analysis of educational attainment data shows between 21% and 40% of incumbent workers in cloud computing occupations have education levels consistent with community college offerings (some college or associate degrees). Between 37% and 48% of workers in these occupations have a bachelor's degree.
- Typical work requirements indicate that most cloud computing occupations require a bachelor's degree for entry-level work. The exception is for computer network support specialists, which requires an associate's degree. Certain cloud computing occupations also require previous work experience or on-the-job training.
- Analysis of postsecondary awards in the Greater Sacramento region revealed many existing programs that provide training for these occupations. Community colleges conferred an average of 331 certificates and degrees each year over the last three academic years.
- Supply from private postsecondary providers and public four-year universities was also considered because both educational attainment levels and work requirements emphasize bachelor's degrees as requirements for entry-level work in cloud computing occupations. Other postsecondary providers conferred an average of 604 certificates and degrees each year between 2016-17 and 2018-19. Supply data from non-community college training providers typically lags one year behind community college data.

Recommendations

- A comparison of the three-year average of annual awards in related North (Greater Sacramento) region programs (935 certificates and degrees) to projected yearly openings (1,097 openings) suggests that the region is near parity between supply and demand. However, awards supply is heavily driven by bachelor degrees in computer science, and this program links to a broader range of computer occupations not included in this report. If we exclude bachelor degrees from the supply, we see a larger gap between supply and demand (annual averages of 446 awards vs. 1,097 openings) and that there seems to be space for training related to the studied occupations
- The North/Far North Center of Excellence recommends moving forward with program development.
- The NFN COE also suggests an in-depth study focused on computer occupations and training needs in the region.

COE Recommendation		
Move forward with the program	Proceed with caution	Program is not recommended
☒	☐	☐

Appendix A. Methodology and Sources

Occupations in this report were identified using O*Net. This report's findings were determined using labor market data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau data from Emsi, and jobs posting data from Burning Glass.

Sources used for data analysis purposes in this report include:

Cal-PASS Plus LaunchBoard. California Community Colleges Chancellor's Office. https://www.calpassplus.org/LaunchBoard/Home.aspx.

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