



## Program Endorsement Brief:

Computer Information Systems and Security for College of the Redwoods and Lake Tahoe Community College

**North/Far North Center of Excellence, March 2018**

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### Introduction

College of the Redwoods and Lake Tahoe Community College are exploring certificate opportunities related to Computer Information Systems (CIS). The programs would provide students with base knowledge in networking and cybersecurity in preparation for entry-level and middle-skill employment in the IT industry.

While there is no required licensing in the industry, these certificates would provide training that prepares students to take the exam for the highly regarded Cisco Networking Administration Certificate and/or to further their education in more advanced coursework.

This report provides estimates and indicators of the labor market outlook for students exiting the proposed program.

Key findings include:

- Existing and future demand for individuals with CIS training is strong at all levels along the education spectrum, with more than 21,000 jobs as of 2017.
- The fastest growing occupation is information security analysts in the CIS industry, with more than 14% and 20% growth projected in the North and Far North regions by 2022.
- Wages are varied across all occupations, indicating that there is room for advancement within these specialized fields.
- More than half the available jobs typically require a bachelor's degree for entry-level jobs; however, the high workforce demand is unlikely to be filled solely by university graduates.
- The job posting data suggests the demand for skilled workers is far greater than the available annual supply.

This report uses labor market data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau data from Emsi and job posting data from Burning Glass.

It contains the following sections:

- Occupational demand,
- Wages and job postings,
- Educational supply, and
- Findings and recommendations.

### Occupational Demand

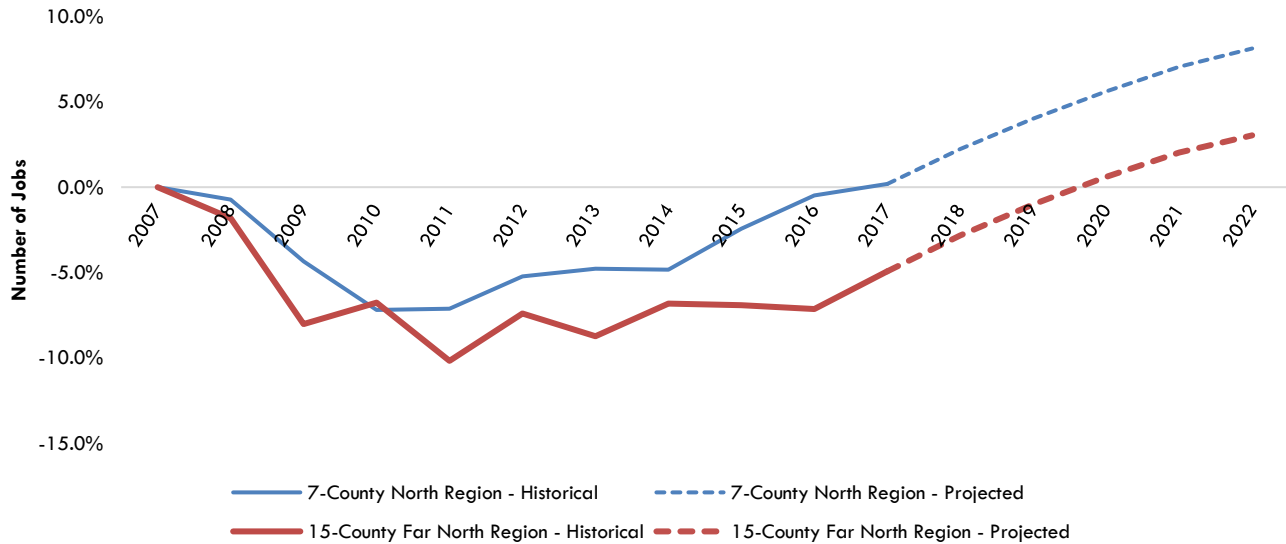
There are seven Standard Occupational Classification (SOC) codes for the CIS occupations contemplated by the colleges that were reviewed in this report (see full listing in table below). Of these, Computer User Support Specialists (15-1151), Computer Network Support Specialists (15-1152) and Computer Occupations, All Other (15-1199) most closely correlate to the anticipated skillset that graduates of the certificate programs will have. Exhibit 1 summarizes job trends per the SOC codes in seven-county North and 15-county Far North regions.

**Exhibit 1: CIS employment, projected occupational demand and education levels<sup>1</sup>**

Industry Segment	SOC	Entry-level Education	2007 Jobs	2017 Jobs	2022 Jobs	2017-22 Jobs % Change	Annual Openings
Computer Systems Analysts	15-1121	Bachelor's	7,846	8,494	9,115	7.3%	648
Information Security Analysts	15-1122	Bachelor's	355	303	346	14.3%	25
Network and Computer Systems Administrators	15-1142	Bachelor's	2,300	1,984	2,117	6.7%	143
Computer User Support Specialists	15-1151	Some college, no degree	4,184	4,247	4,634	9.1%	376
Computer Network Support Specialists	15-1152	Associate	1,362	1,081	1,168	8.1%	98
Computer Occupations, All Other	15-1199	Bachelor's	1,572	1,531	1,623	6.0%	118
Helpers—Installation, Maintenance and Repair Workers	49-9098	High school or equivalent	665	678	766	12.9%	94
<b>7-County North Region</b>	<b>TOTAL</b>		<b>18,284</b>	<b>18,319</b>	<b>19,768</b>	<b>7.9%</b>	<b>1,503</b>
Computer Systems Analysts	15-1121	Bachelor's	614	544	602	10.8%	48
Information Security Analysts	15-1122	Bachelor's	54	35	42	20.2%	4
Network and Computer Systems Administrators	15-1142	Bachelor's	473	416	453	8.9%	34
Computer User Support Specialists	15-1151	Some college, no degree	928	977	1,047	7.2%	94
Computer Network Support Specialists	15-1152	Associate	252	234	256	9.3%	23
Computer Occupations, All Other	15-1199	Bachelor's	340	320	338	5.8%	29
Helpers—Installation, Maintenance and Repair Workers	49-9098	High school or equivalent	274	266	286	7.5%	37
<b>15-County North Region</b>	<b>TOTAL</b>		<b>2,935</b>	<b>2,790</b>	<b>3,024</b>	<b>8.4%</b>	<b>269</b>

Exhibit 2 shows the percentage change in number of jobs between 2007 through 2017 and occupational projections from 2017 through 2022. The rate of change is indexed to the total number of jobs in 2007 as the base year and compares the North and Far North regions.

**Exhibit 2: Rate of change for CIS industry jobs<sup>2</sup>**



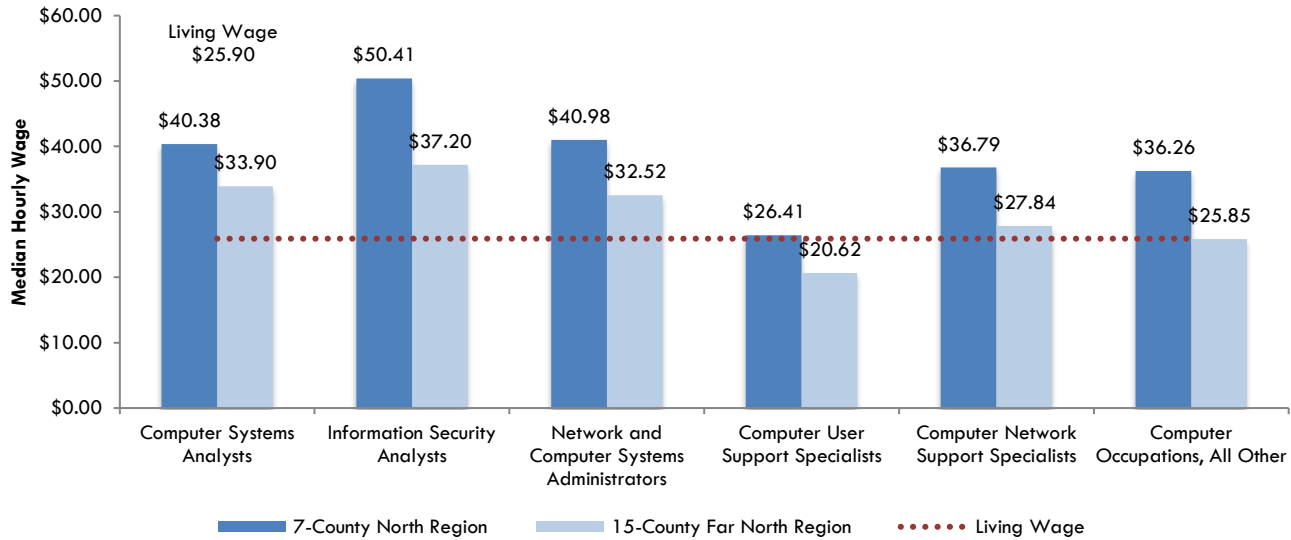
<sup>1</sup> Emsi 2018.1; QCEW Employees, Non-QCEW Employees and Self-Employed. The seven-county North region includes El Dorado, Placer, Nevada, Sacramento, Sutter, Yolo and Yuba. The 15-county Far North region includes Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Tehama and Trinity.

<sup>2</sup> Emsi 2018.1; QCEW Employees, Non-QCEW Employees and Self-Employed.

## Wages and Job Postings

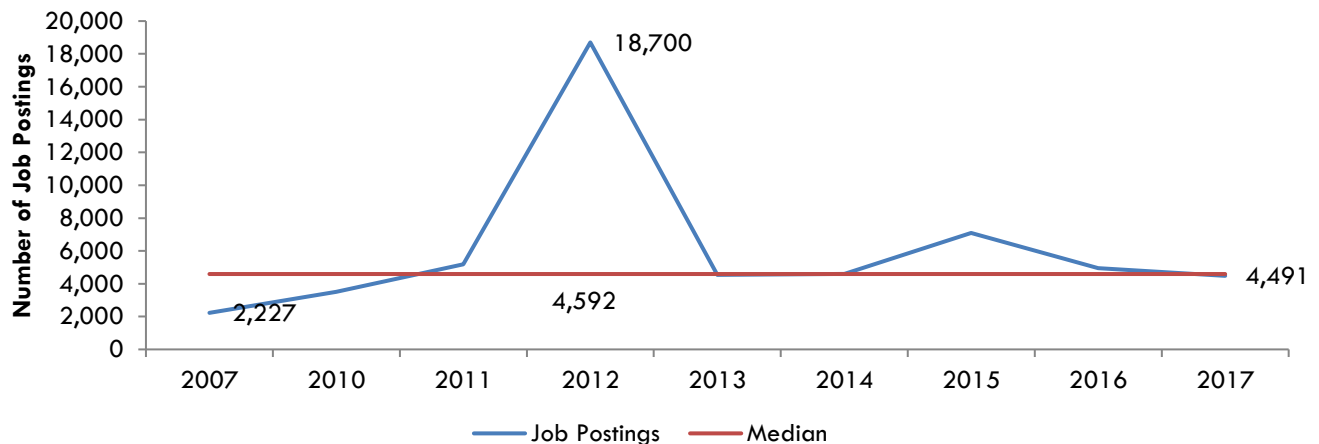
Exhibit 3 displays hourly wages for CIS industry occupations in the North and Far North regions compared to the El Dorado and Humboldt County living wage for a one-adult, one-child household.<sup>3</sup> The living wage in these two counties is effectively equal, \$25.83 and \$25.90 respectively. The chart highlights the difference between the median wage rates of the various occupations. Wages are substantially lower in the 15-county Far North region.

**Exhibit 3: Wages for CIS occupations in the North and Far North Regions<sup>4</sup>**



Burning Glass data on job postings provides information regarding skills, employers, job titles and locations that relate to the CIS industry. This study identified a pool of 4,714 job listings in the North and 246 job listings in the Far North regions. The data was filtered based on the seven identified SOC codes and an education requirement of an associate degree or less (including unspecified postings). Data was pulled for the last year from March 1, 2017 through February 28, 2018. Exhibits 4a and 4b present the job postings trend for CIS jobs over the past 10 years compared to the median during the same period for both the North and Far North regions.

**Exhibit 4a: Job posting trend for CIS occupations in the North region<sup>5</sup>**



<sup>3</sup> Living Wage Calculator: Counties and Metropolitan Statistical Areas in California, <http://livingwage.mit.edu/states/06/locations>.

<sup>4</sup> Emsi 2017.4; QCEW Employees, Non-QCEW Employees and Self-Employed.

<sup>5</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool," 2018.

**Exhibit 4b: Job posting trend for CIS occupations in the Far North region<sup>6</sup>**

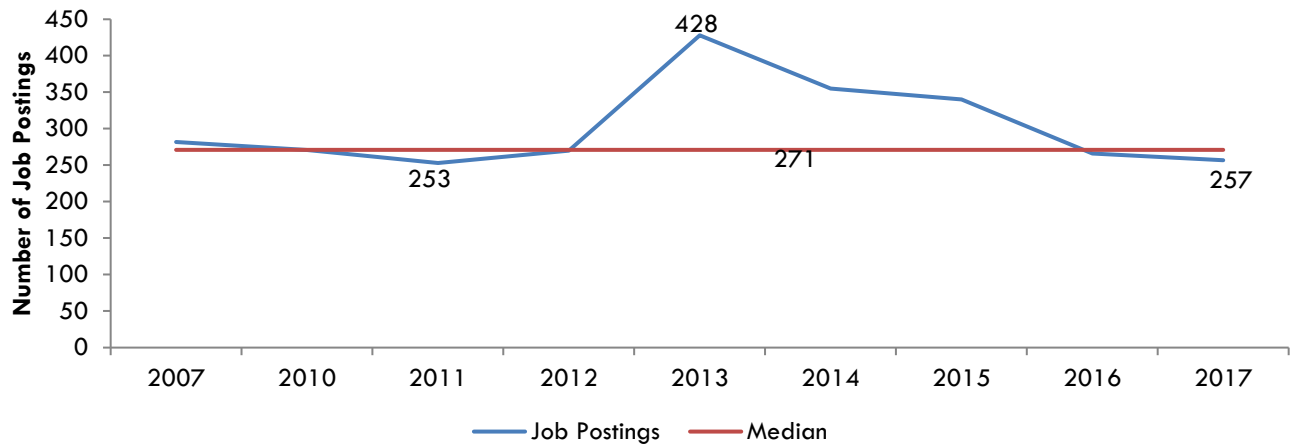


Exhibit 5 shows the top industries that employed CIS professionals that were present in the job postings. Of the 4,714 postings in the North and 246 postings in the Far North, there were only 1,524 and 115 records respectively that included an industry. As a result, the table below may not be representative of the full sample.

**Exhibit 5: Top industries for CIS job postings<sup>7</sup>**

North			Far North		
Top Industries	Number	Percent (n=1,524)	Top Industries	Number	Percent (n=115)
General Medical and Surgical Hospitals	23	20.0%	General Medical and Surgical Hospitals	143	9.38%
Colleges, Universities and Professional Schools	10	8.7%	Insurance Carriers	132	8.66%
Elementary and Secondary Schools	10	8.7%	Management, Scientific and Technical Consulting Services	117	7.68%
Insurance Carriers	9	7.8%	Computer Systems Design and Related Services	97	6.36%
Junior Colleges	8	7.0%	Colleges, Universities and Professional Schools	90	5.91%
Residential Building Construction	7	6.1%	Executive, Legislative and Other General Government Support	80	5.25%
Electronics and Appliance Stores	6	5.2%	Electronics and Appliance Stores	57	3.74%
Depository Credit Intermediation	4	3.5%	Elementary and Secondary Schools	49	3.22%

<sup>6</sup> Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool," 2018.

<sup>7</sup> Ibid.

Exhibit 6 shows the top employers in the North region for CIS industry occupations related jobs.

Of the 4,714 postings in the North and 246 postings in the Far North, there were only 2,371 and 164 records respectively that included an industry. As a result, the table below may not be representative of the full sample.

**Exhibit 6: Top Employers among CIS job postings<sup>8</sup>**

North			Far North		
Top Employers	Number	Percent (n=2,371)	Top Employers	Number	Percent (n=164)
Deloitte	124	6.13%	Best Buy	6	3.7%
Accenture	74	3.66%	Build Com, Inc	6	3.7%
Best Buy	57	2.82%	Butte County Office of Education	6	3.7%
Staff Technical Incorporated	48	2.37%	Elite Tek Services	6	3.7%
University of California	48	2.37%	Oroville Hospital	6	3.7%
California State Controller's Office	47	2.32%	UnitedHealth Group	5	3.0%
Sutter Health	42	2.08%	Conduent Business Services, LLC	4	2.4%
General Electric Company	34	1.68%	Shasta Regional Medical Center	4	2.4%

Exhibit 7 shows the top skills required in job postings in the North and Far North regions for CIS jobs.

Of the 4,714 postings in the North and 246 postings in the Far North, there were only 4,027 and 195 records respectively that included skills. As a result, the table below may not be representative of the full sample.

**Exhibit 7: Top skills listed in CIS job postings<sup>9</sup>**

North			Far North		
Top Industries	Number	Percent (n=4,027)	Top Skills	Number	Percent (n=195)
Technical Support	777	2.5%	Technical Support	74	3.62%
Customer Service	680	2.2%	Customer Service	56	2.74%
Project Management	672	2.2%	Repair	56	2.74%
Microsoft Excel	554	1.8%	Microsoft Office	44	2.15%
Microsoft Office	551	1.8%	Help Desk Support	42	2.06%
SQL	536	1.8%	Hardware and Software Installation	38	1.86%
Repair	431	1.4%	Microsoft Windows	38	1.86%
Staff Management	375	1.2%	Workstations	35	1.71%

<sup>8</sup> Ibid.

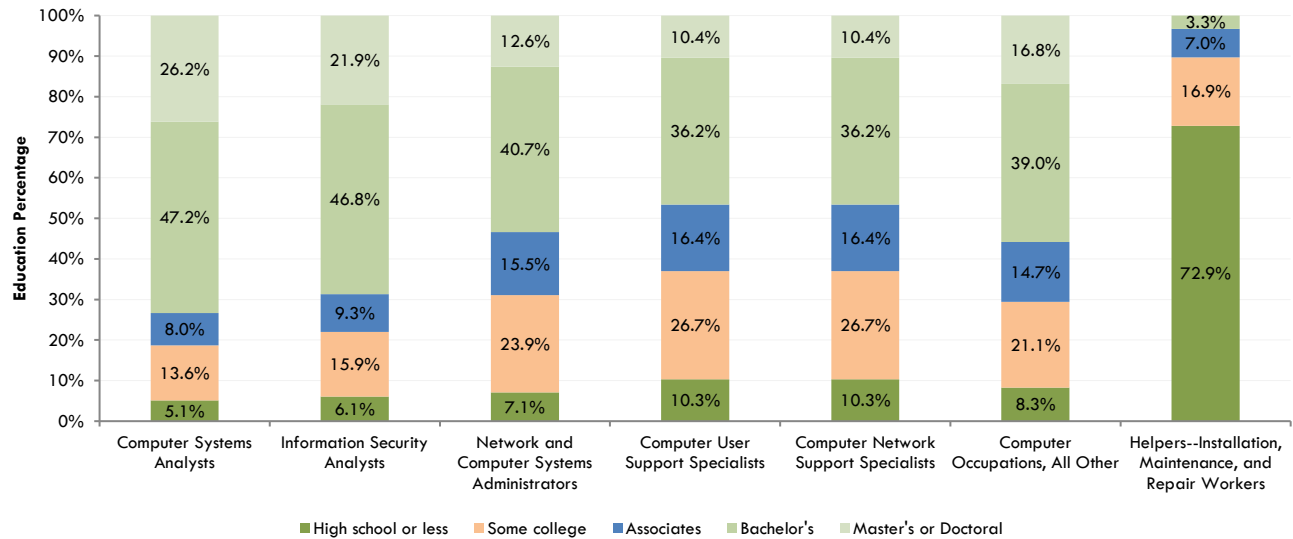
<sup>9</sup> Ibid.

## Educational Attainment and Supply

At the national level, the typical education required for CIS jobs varies based on the exact occupation, but most occupations require a bachelor's degree for entry-level positions.

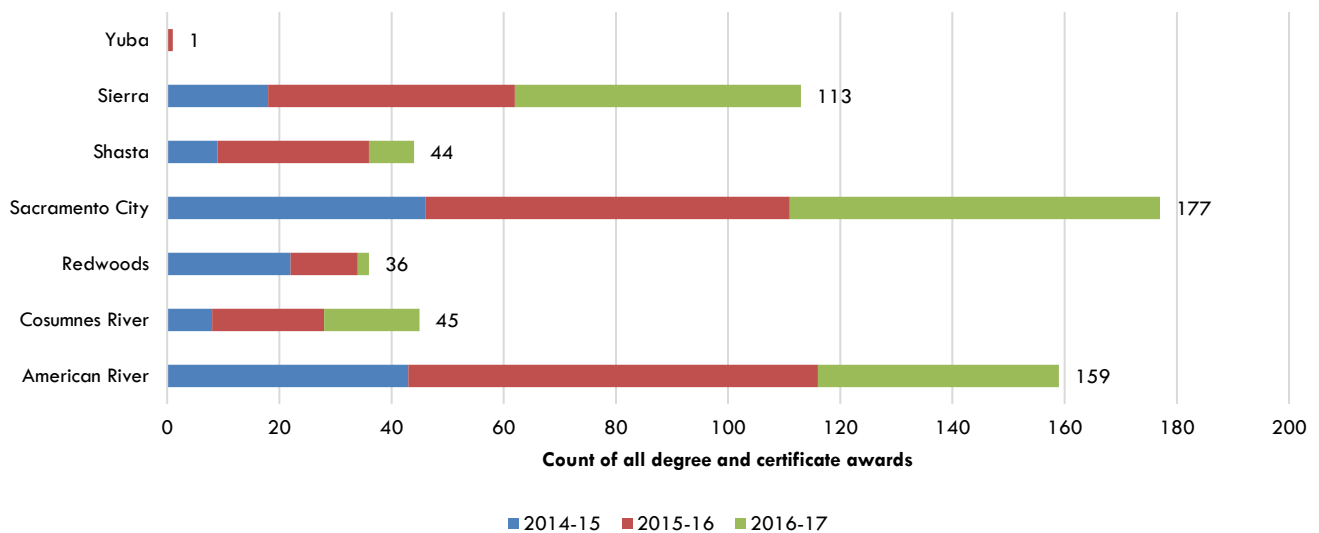
Helpers—installation, maintenance and repair workers was a notable exception, with most workers needing only a high school diploma or less. Exhibit 8 breaks down the educational attainment percentages by degree type.

**Exhibit 8: Typical educational attainment for CIS occupations nationally<sup>10</sup>**



One Taxonomy of Programs (TOP) code was identified that relates directly to the CIS industry: Computer Information Sciences (0708.00). There are seven colleges in the North/Far North region that have a related program. Exhibits 9a and 9b show the number of awards earned at colleges offering CIS programs during the past three academic years.

**Exhibit 9a: Total awards conferred by North/Far North community colleges, 2014-2017<sup>11</sup>**



<sup>10</sup> Current Population Survey, Educational Attainment for Workers 25 Years and Older by Detailed Occupation, 2014-2015, [https://www.bls.gov/emp/ep\\_table\\_111.htm](https://www.bls.gov/emp/ep_table_111.htm).

<sup>11</sup> COE Supply Tables, California Community Colleges Chancellor's Office DataMart, Integrated Postsecondary Education Data System (IPEDS).

**Exhibit 9b: Annual Awards conferred by North/Far North community colleges, 2014-2017<sup>12</sup>**

Institution	Certificate				Associate Degree			
	2014-15	2015-16	2016-17	3-Yr Avg	2014-15	2015-16	2016-17	3-Yr Avg
American River	22	29	17	23	21	44	26	30
Cosumnes River	6	12	8	9	2	8	9	6
Redwoods	10	3	1	5	12	9	1	7
Sacramento City	14	30	23	22	32	35	43	37
Shasta	5	21	2	9	4	6	6	5
Sierra	10	31	34	25	8	13	17	13
Yuba	0	1	0	0	0	0	0	0
<b>TOTAL</b>	<b>67</b>	<b>127</b>	<b>85</b>	<b>93</b>	<b>79</b>	<b>115</b>	<b>102</b>	<b>99</b>

## Findings and Recommendations

- There is strong current and growing demand for individuals with CIS training at all levels along the education spectrum, with more than 21,000 jobs as of 2017. While there was a sharp decline in the number of CIS jobs during the recession, this was largely due to temporary cut backs by firms investing in new IT infrastructure. As the economy recovered and firms reached a point where they outlived the useful life of their technology, the pace of job growth increased and is expected to continue at a healthy 8% rate between 2017 and 2022.
- The fastest growing occupation is information security analysts in the CIS industry, with more than 14% and 20% growth projected in the North and Far North regions by 2022. These positions are also some of the highest paying in the industry.
- There is a wide variation in wages across all occupations studied, except helpers—installation, maintenance and repair workers. This indicates there is room for advancement within these specialized fields. These occupations also generally pay the living wage or above.
- More than half of the available jobs typically require a bachelor’s degree for entry-level positions; however, high workforce demand is unlikely to be filled solely by new university graduates. The remaining gap is an opportunity for workers who have a few years of experience in addition to specific computer networking and security training.
- The job posting data suggests the demand for skilled workers is far greater than the available annual supply. There were more than 4,700 job postings in 2017 which required an associate degree or less; yet, the average annual community college completions for CIS programs in the North/Far North was slightly less than 200 per year.

<sup>12</sup> Ibid.

## Appendix A: Sources

Sources used for data analysis purposes in this report include:

- U.S. Department of Labor/Employment and Training Administration (DOLETA) O\*NET Online
- Burning Glass, Labor Insight/Jobs
- Economic Modeling Specialists, International (EMSI)
- California Employment Development Department, Labor Market Information Division (EDD, LMID)
- Bureau of Labor Statistics, Occupational Employment Statistics (OES)
- California Community Colleges Chancellor's Office, Cal-PASS Plus LaunchBoard
- Santa Rosa Junior College, CTE Outcomes Survey (CTEOS)
- Living Insight Center for Community Economic Development, Self-Sufficiency Standard Tool for California
- California Community Colleges Chancellor's Office Management Information Systems (MIS Data Mart)
- U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS)

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