

Program Endorsement Brief: 0708.00/Computer Infrastructure and Support & 0708.10/Computer Networking & 0708.20/Computer Support Cyber Security Specialist & Computer Networking & IT Technician

Los Angeles/Orange County Center of Excellence, May 2020

Summary Analysis

The Los Angeles/Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data for seven occupations related to computer infrastructure and support. To illuminate which occupations are accessible to community college graduates, the occupations in this report have been separated into middle-skill and above middle-skill categories. Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.¹

The **middle-skill** cybersecurity occupations include: network and computer systems administrators (15-1142), computer network architects (15-1143), computer user support specialists (15-1151), and computer network support specialists (15-1152). While network and computer systems administrators and computer network architects typically require workers to have bachelor's degrees, between 36.5% and 37.0% of these workers have completed some college or an associate degree. The **above middle-skill** occupations included in this report are computer systems analysts (15-1121), information security analysts (15-1122), and database administrators (15-1141). These occupations typically require workers to obtain a bachelor's degree or higher.

Based on the available data there appears to be a supply gap for middle-skill computer infrastructure and support occupations in the region. **Therefore, the COE endorses this proposed program.** Reasons include:

Demand:

- **Over the next five years, there is projected to be 4,782 middle-skill jobs available annually** in the region due to new job growth and replacements, **which is more than the 860 awards conferred annually** by educational institutions in the region.
- The national-level educational attainment data indicates **between 36.5% and 41.2% of middle-skill workers in the field have completed some college or an associate degree.**
- **Typical entry-level hourly wages** for these middle-skill occupations throughout the region are between **\$21.07 and \$41.22, which are higher than the California Family Needs**

¹ The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

Calculator hourly wage (living wage) for one adult in the region (\$15.04 in Los Angeles County and \$17.36 in Orange County).²

Supply:

- There are **16 community colleges** in the region that have issued awards related to computer infrastructure and support – an average of **399 awards have been conferred annually** between 2016 and 2019.
- Between 2014 and 2017, non-community college institutions conferred an average of **461 awards annually** in related training programs.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for these four middle-skill occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 5% through 2024. There will be nearly 4,800 job openings per year through 2024 due to job growth and replacements.

This report includes employment projection data by Emsi which uses EDD information. 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. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it 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. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.

Exhibit 1: Middle-skill demand in Los Angeles and Orange Counties³

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	37,365	39,165	1,800	5%	3,340
Orange	15,855	16,720	864	5%	1,442
Total	53,220	55,885	2,665	5%	4,782

Wages—Typical entry-level hourly wages for middle-skill computer infrastructure and support positions throughout the region are between \$21.07 and \$41.22.⁴ Entry-level wages for these occupations are higher than the living wage for one adult in the region (\$15.04 in Los Angeles County and \$17.36 in Orange County). Workers can expect to earn a median wage between \$26.98 and \$55.32, which is higher than the living wage estimates for both counties. Regional

² Living wage data was pulled from California Family Needs Calculator on 5/6/20. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>

³ Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

⁴ Entry-level wage is defined as the twenty-fifth percentile hourly wage. Wages for experienced workers are defined as the seventy-fifth percentile hourly wage.

average wages for middle-skill occupations are above the average statewide wage of \$39.54 for these occupations. Wage information, by county, is included in Appendix A.

Job Postings—There were 29,724 online job postings related to middle-skill computer infrastructure and support occupations listed in the past 12 months. The highest number of job postings were for systems administrators, network engineers, help desk technicians, and desktop support technicians. The top skills were: technical support, customer service, system administration, and repair. The top three employers, by number of job postings, in the region were: Northrop Grumman, Best Buy, and The Boeing Company.

During the same time period, there were 26,376 online job postings for the above middle-skill computer infrastructure and support occupations listed in the region. The highest number of job postings were for business systems analysts, data engineers, security engineers, and database administrators. The top specialized skills were project management, information security, information systems, and business processes. The top employers were Northrop Grumman, Deloitte, and The Boeing Company.

It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.

Educational Attainment—The Bureau of Labor Statistics (BLS) lists some college, no degree as the typical entry-level education for computer user support specialists, an associate degree for computer network support specialists, and a bachelor's degree for computer network architects and network and computer systems administrators. The national-level educational attainment data indicates that between 36.5% and 41.2% of middle-skill computer infrastructure and support workers in the field have completed some college or an associate degree. Of the 47% of middle-skill computer infrastructure and support job postings listing a minimum education requirement in Los Angeles/Orange County, 23% (3,174) requested a high school diploma or vocational training, 9% (1,295) requested an associate degree, and 68% (9,603) requested a bachelor's degree.

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for the above middle-skill computer infrastructure and support occupations. BLS data indicates that between 20.9% and 26.9% of these workers have completed some college or an associate degree as their highest level of education. Of the 56% of online job postings listing a minimum education requirement in Los Angeles/Orange County, 9% (1,260) requested a high school or vocational training, 3% (434) requested an associate degree, and 88% (12,961) requested a bachelor's degree.

Educational Supply

Community College Supply—Exhibit 2, on the next page, shows the annual and three-year average number of awards conferred by community colleges in the related TOP codes: Computer Infrastructure and Support (0708.00), Computer Networking (0708.10), and Computer Support (0708.20). The colleges with the most completions in the region were Coastline, West LA, and Cypress. Over the past 12 months, there were three other related program recommendation requests from regional community colleges.

Exhibit 2: Regional community college awards (certificates and degrees), 2016-2019

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
0708.00	Computer Infrastructure and Support	LA Harbor	-	1	1	1
		LA Mission	-	-	2	1
		LA Valley	6	8	5	6
		Long Beach	1	1	3	2
		Mt San Antonio	16	20	24	20
		Pasadena	-	-	1	0
		West LA	-	-	4	1
		LA Subtotal	23	30	40	31
		Coastline	67	65	49	60
		Cypress	1	1	2	1
		OC Subtotal	68	66	51	62
Supply Subtotal/Average			91	96	91	93
0708.10	Computer Networking	Cerritos	10	8	11	10
		Glendale	-	6	3	3
		LA City	11	37	23	24
		LA Pierce	37	23	39	33
		Long Beach	25	27	55	36
		Mt San Antonio	9	2	8	6
		Rio Hondo	-	-	5	2
		West LA	52	43	77	57
		LA Subtotal	144	146	221	170
		Coastline	20	12	38	23
		Cypress	28	37	70	45
		Irvine	19	12	11	14
		Saddleback	21	17	10	16
		Santa Ana	-	7	14	7
		OC Subtotal	88	85	143	105
Supply Subtotal/Average			232	231	364	276
0708.20	Computer Support	Glendale	2	3	10	5
		LA Pierce	14	7	9	10
		Long Beach	-	1	8	3
		Pasadena	1	3	7	4
		LA Subtotal	17	14	34	22

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
		Cypress	3	1	3	2
		Santa Ana	-	10	9	6
		OC Subtotal	3	11	12	9
		Supply Subtotal/Average	20	25	46	30
		Supply Total/Average	343	352	501	399

Non-Community College Supply— It is important to consider the supply from non-community college institutions in the region that provide training programs for computer infrastructure and support occupations. Exhibit 3 shows the annual and three-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Code: Computer Systems Networking and Telecommunications (11.0901), Network and System Administration (11.1001), System, Networking, and LAN/WAN Management/Manager (11.1002), Computer and Information Systems Security/Information Assurance (11.1003), Computer Support Specialist (11.1006), and Computer/Information Technology Services Administration and Management, Other (11.1099). Due to different data collection periods, the most recent three-year period of available data is from 2014 to 2017. Between 2014 and 2017, non-community college institutions in the region conferred an average of 461 awards annually in related training programs.

Exhibit 3: Regional non-community college awards, 2014-2017

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
11.0901	Computer Systems Networking and Telecommunications	Advanced Computing Institute	6	5	98	36
		Brand College	-	1	2	1
		DeVry University-California	166	154	135	152
		Mt Sierra College	8	6	5	6
		PCI College	1	-	-	0
		University of Phoenix-California	51	55	27	44
		Supply Subtotal/Average	232	221	267	240
11.1001	Network and System Administration/Administrator	Brand College	16	22	2	13
		University of Phoenix-California	12	2	1	5
		Supply Subtotal/Average	28	24	3	18
11.1002	System, Networking, and	ABCO Technology	0	16	10	9

	LAN/WAN Management/ Manager					
Supply Subtotal/Average			0	16	10	9
11.1003	Computer and Information Systems Security/ Information Assurance	Azusa Pacific University	8	4	3	5
		Learnet Academy Inc	0	39	48	29
		Mt Sierra College	14	9	8	10
		University of Phoenix- California	111	74	71	85
Supply Subtotal/Average			133	126	130	130
11.1006	Computer Support Specialist	Palladium Technical Academy	6	0	0	2
		Southern California Institute of Technology	13	32	16	20
		University of Phoenix- California	0	0	1	0
Supply Subtotal/Average			19	32	17	23
11.1099	Computer/ Information Technology Services Administration and Management, Other	ABCO Technology	3	9	4	5
		Advanced Computing Institute	5	5	0	3
		California Intercontinental University	2	2	2	2
		Learnet Academy Inc	93	0	0	31
Supply Subtotal/Average			103	16	6	42
Supply Total/Average			515	435	433	461

Appendix A: Occupational demand and wage data by county

Exhibit 4. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Computer User Support Specialists (15-1151)	19,263	20,531	1,268	7%	1,884	\$21.25	\$27.19	\$34.98
Network and Computer Systems Administrators (15-1142)	9,598	9,839	241	3%	730	\$34.24	\$43.80	\$54.69
Computer Network Support Specialists (15-1152)	4,858	5,072	214	4%	450	\$25.56	\$32.71	\$42.68
Computer Network Architects (15-1143)	3,646	3,723	77	2%	276	\$41.61	\$55.84	\$70.38
Middle-Skill Subtotal	37,365	39,165	1,800	5%	3,340			
Computer Systems Analysts (15-1121)	13,806	14,467	661	5%	1,151	\$34.26	\$45.60	\$58.38
Database Administrators (15-1141)	2,545	2,700	155	6%	217	\$30.36	\$45.81	\$61.03
Information Security Analysts (15-1122)	1,816	2,085	269	15%	191	\$36.27	\$48.91	\$61.08
Above Middle-Skill Subtotal	18,167	19,252	1,085	6%	1,560			
Total	55,532	58,417	2,885	5%	4,900			

Exhibit 5. Orange County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Computer User Support Specialists (15-1151)	8,258	8,832	574	7%	815	\$20.69	\$26.49	\$34.10
Network and Computer Systems Administrators	3,955	4,103	148	4%	313	\$33.35	\$42.67	\$53.26

(15-1142)

Computer Network Support Specialists (15-1152)	1,980	2,069	89	4%	184	\$24.89	\$31.88	\$41.64
Computer Network Architects (15-1143)	1,662	1,715	53	3%	130	\$40.42	\$54.22	\$68.32
Middle-Skill Subtotal	15,855	16,720	864	5%	1,442			
Computer Systems Analysts (15-1121)	6,472	6,841	369	6%	554	\$33.08	\$43.99	\$56.30
Database Administrators (15-1141)	1,027	1,098	71	7%	90	\$29.01	\$43.77	\$58.33
Information Security Analysts (15-1122)	862	1,013	151	18%	96	\$34.84	\$46.98	\$58.67
Above Middle-Skill Subtotal	8,360	8,952	591	7%	740			
Total	24,216	25,672	1,455	6%	2,182			

Exhibit 6. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Computer User Support Specialists (15-1151)	27,521	29,363	1,842	7%	2,699	\$21.07	\$26.98	\$34.72
Network and Computer Systems Administrators (15-1142)	13,553	13,942	389	3%	1,043	\$33.97	\$43.47	\$54.28
Computer Network Support Specialists (15-1152)	6,838	7,141	303	4%	634	\$25.36	\$32.47	\$42.38
Computer Network Architects (15-1143)	5,308	5,439	131	2%	406	\$41.22	\$55.32	\$69.73
Middle-Skill Subtotal	53,220	55,885	2,665	5%	4,782			
Computer Systems Analysts (15-1121)	20,277	21,308	1,031	5%	1,705	\$33.87	\$45.07	\$57.71
Database Administrators	3,572	3,798	226	6%	307	\$29.97	\$45.20	\$60.25

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
(15-1141)								
Information Security Analysts (15-1122)	2,678	3,098	420	16%	288	\$35.79	\$48.26	\$60.32
Above Middle-Skill Subtotal	26,527	28,204	1,677	6%	2,300			
Total	79,748	84,089	4,342	5%	7,082			

Appendix B: Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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