

**Program Endorsement Brief: 0708/Computer Infrastructure and Support
Network Infrastructure; Network Services and Applications; Network Technician**
Orange County Center of Excellence, August 2020

Summary Analysis

Program Endorsement:	Endorsed: All Criteria Met	<input checked="" type="checkbox"/>	Endorsed: Some Criteria Met	<input type="checkbox"/>	Not Endorsed	<input type="checkbox"/>
Program Endorsement Criteria						
Supply Gap:	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		
Meets Living Wage: (Entry-Level, 25th)	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		
Typical Entry-Level Education:	HS Diploma or Less	Some College/ Cert./AA	Bachelor's Degree	Graduate Degree		
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Emerging Occupation(s)						
Yes <input type="checkbox"/>			No <input checked="" type="checkbox"/>			

The 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 related to four middle-skill occupations: 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). Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.¹ Although two of the occupations in this report typically require a bachelor's degree (Network and Computer Systems Administrators and Computer Network Architects), they are considered middle-skill because approximately one-third of workers in the field have completed some college or an associate degree. 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 community college programs that align with the relevant occupations.

Based on the available data, there appears to be a supply gap for computer infrastructure and support occupations in the region. Furthermore, the majority of annual openings for the occupations in this report typically require some college or an associate degree, and entry-level wages exceed the living wage in both Los Angeles and Orange Counties. **Therefore, the COE endorses this proposed program.** Reasons include:

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.

Demand:

- Over the next five years, there is projected to be **4,782 jobs available annually** in the region due to new job growth and replacements, **which is more than the 1,491 awards conferred annually** by educational institutions in the region
- The Bureau of Labor Statistics (BLS) lists the typical entry-level education as a bachelor's degree for Network and Computer Systems Administrators (15-1142) and Computer Network Architects (15-1143); an associate degree for Computer Network Support Specialists (15-1152); and some college/no degree for Computer User Support Specialists (15-1151)
 - However, within the LA/OC region, **70% of the annual job openings** for these computer infrastructure and networking occupations **typically require some college or an associate degree.**
 - Furthermore, the national-level educational attainment data indicates **between 34.7% and 41.1% of workers in the field have completed some college or an associate degree.**
- Within Orange County, **all of the annual job openings for these computer infrastructure and networking occupations have entry-level wages above the county's living wage.** (\$17.36)²

Supply:

- There are **25 community colleges** in the region that issue awards related to computer infrastructure and support, conferring an average of **561 awards annually** between 2016 and 2019.
- Between 2014 and 2017, there was an average of **930 awards conferred annually** in related training programs by non-community college institutions throughout the region.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for these computer infrastructure and support 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.

² Living wage data was pulled from California Family Needs Calculator on 7/27/20. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

Exhibit 1: Occupational 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	865	5%	1,442
Total	53,220	55,885	2,665	5%	4,782

Wages—

The labor market endorsement in this report considers the entry-level hourly wages for these computer infrastructure and networking occupations in Orange County as they relate to the county’s living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region. Detailed wage information, by county, is included in Appendix A.

Orange County—All of the annual openings for these computer infrastructure and support occupations have entry-level wages above the California Family Needs Calculator hourly wage (living wage) for one adult (\$17.36 in Orange County).⁴ Typical entry-level hourly wages are in a range between \$20.69 and \$40.42. Experienced workers can expect to earn wages between \$34.72 and \$69.73, which are higher than the living wage estimate. Orange County’s average wages are below the average statewide wage of \$36.48 for these occupations.

Los Angeles County—All of the annual openings for these computer infrastructure and support occupations have entry-level wages above the living wage for one adult (\$15.04 in Los Angeles County). Typical entry-level hourly wages are in a range between \$21.25 and \$41.61. Experienced workers can expect to earn wages between \$34.98 and \$70.38, which are higher than the living wage estimate. Los Angeles County’s average wages are above the average statewide wage of \$36.48 for these occupations.

Job Postings—There were 28,267 online job postings related to computer infrastructure and support occupations listed in the past 12 months. The highest number of job postings were for systems administrators, network engineers, desktop support workers, help desk technicians, and help desk analysts. The top skills were: technical support, customer service, system administration, help desk support, and repair. The top three employers, by number of job postings, in the region were: Northrop Grumman, Anthem Blue Cross, and Best Buy.

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.

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 Living wage data was pulled from California Family Needs Calculator on 7/6/2020. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

Educational Attainment—The Bureau of Labor Statistics (BLS) lists the following typical entry-level education for these computer and infrastructure and support occupations:

- Bachelor's degree: Network and Computer Systems Administrators (15-1142) and Computer Network Architects (15-1143)
- Associate degree: Computer Network Support Specialists (15-1152)
- Some college, no degree: Computer User Support Specialists (15-1151)

In Orange County, the majority of annual job openings (70%) typically require some college/no degree or an associate degree. The national-level educational attainment data indicates between 34.7% and 41.1% of workers in the field have completed some college or an associate degree. Of the 48% of computer infrastructure and support job postings listing a minimum education requirement in Los Angeles/Orange County, 69% (9,357) requested a bachelor's degree, 22% (2,996) requested a high school diploma, and 9% (1,205) requested an associate degree.

Educational Supply

Community College Supply—Exhibit 2, on the following page, shows the three-year average number of awards conferred by community colleges in the related TOP codes: Computer Information Systems (0702.00), Computer Infrastructure and Support (0708.00), Computer Networking (0708.10), Computer Support (0708.20), and World Wide Web Administration (0709.00). The colleges with the most completions in the region are: Coastline, West LA, and Cypress. Over the past 12 months, there were twelve 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		
0702.00	Computer Information Systems	Citrus	5	7	5	6		
		Compton	1	-	1	1		
		East LA	14	16	19	16		
		El Camino	15	18	14	16		
		Glendale	2	-	-	1		
		LA City	3	4	1	3		
		LA Mission	3	9	5	6		
		LA Trade-Tech	23	14	8	15		
		Pasadena	2	1	-	1		
		Rio Hondo	10	19	21	17		
		West LA	13	6	8	9		
		LA Subtotal	91	94	82	89		
		Cypress	5	8	5	6		
		Fullerton	7	20	15	14		
		Orange Coast	-	3	4	2		
		Santa Ana	18	6	4	9		
		Santiago Canyon	2	2	3	2		
		OC Subtotal	32	39	31	34		
		Supply Subtotal/Average			123	133	113	123
		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	

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
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
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
		Cypress	3	1	3	2
		Santa Ana	-	10	9	6
		OC Subtotal	3	11	12	9
Supply Subtotal/Average			20	25	46	30
0709.00	World Wide Web Administration	Glendale	3	9	6	6
		LA Pierce	5	5	9	6
		Long Beach	5	4	22	10
		West LA	8	24	13	15
		LA Subtotal	21	42	50	38
		Saddleback	5	-	-	2
		OC Subtotal	5	-	-	2
Supply Subtotal/Average			26	42	50	39
Supply Total/Average			492	527	664	561

Non-Community College Supply—Since two of these occupations typically require a bachelor’s degree, it is important to consider the supply from four-year and other 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) Codes: Information Technology (11.0103), Computer Systems Networking and Telecommunications (11.0901), Network and Systems Administration/Administrator (11.1001), System, Networking, and LAN/WAN Management/Manager (11.1002), Computer and Information Systems Security/Information Assurance (11.1003), Web/Multimedia Management and Webmaster (11.1004), Information Technology Project Management (11.1005), Computer Support Specialist (11.1006), and Computer Technology/Computer Systems Technology (15.1202). Due to different data collection periods, the most recent three-year period of available data is from 2014 to 2017. Between 2014 and 2017, four-year colleges in the region conferred an average of 930 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
11.0103	Information Technology	Argosy University-Orange County	-	1	-	0
		Bethesda University	1	1	-	1
		Brand College	55	42	28	42
		California Intercontinental University	-	-	1	0
		California State University-Los Angeles	102	92	117	104
		California State University-Northridge	49	48	43	47
		Stanbridge University	29	21	25	25
		Trident University International	96	77	74	82
		University of Phoenix-California	2	3	16	7
		11.0901	Computer Systems Networking and Telecommunications	Advanced Computing Institute	6	5
Brand College	-			1	2	1
DeVry University-California	166			154	135	152

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
11.1001	Network and System Administration/Administrator	ITT Technical Institute-Sylmar	1	-	-	0
		Mt Sierra College	8	6	5	6
		PCI College	1	-	-	0
		University of Phoenix-California	51	55	27	44
		Brand College	16	22	2	13
		University of Phoenix-California	12	2	1	5
11.1002	System, Networking, and LAN/WAN Management/Manager	ABCO Technology	-	16	10	9
		ITT Technical Institute-Orange	78	-	-	26
		ITT Technical Institute-San Dimas	43	-	-	14
		ITT Technical Institute-Sylmar	48	-	-	16
		ITT Technical Institute-Torrance	50	-	-	17
		Azusa Pacific University	8	4	3	5
		ITT Technical Institute-Orange	37	-	-	12
11.1003	Computer and Information Systems Security/Information Assurance	ITT Technical Institute-San Dimas	23	-	-	8
		ITT Technical Institute-Sylmar	19	-	-	6
		ITT Technical Institute-Torrance	6	-	-	2
		Learnet Academy	-	39	48	29
		Mt Sierra College	14	9	8	10
		University of Phoenix-California	111	74	71	85
11.1004	Web/Multimedia Management and Webmaster	ABCO Technology	7	9	12	9
		Pepperdine University	-	1	-	0
		University of Phoenix-California	7	5	4	5
11.1005	Information Technology Project Management	California Intercontinental University	-	-	2	1

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
11.1006	Computer Support Specialist	Palladium Technical Academy	6	-	-	2
		Southern California Institute of Technology	13	32	16	20
		University of Phoenix-California	-	-	1	0
15.1202	Computer Technology/ Computer Systems Technology	Advanced Computing Institute	67	74	92	78
		Learnet Academy	-	13	11	8
Supply Total/Average			1,132	806	852	930

Appendix A: Occupational demand and wage data by county

Exhibit 4. Orange County

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)
Network and Computer Systems Administrators (15-1142)	3,955	4,103	148	4%	313	\$33.35	\$42.67	\$53.26
Computer Network Architects (15-1143)	1,662	1,715	53	3%	130	\$40.42	\$54.22	\$68.32
Computer User Support Specialists (15-1151)	8,258	8,832	574	7%	815	\$20.69	\$26.49	\$34.10
Computer Network Support Specialists (15-1152)	1,980	2,069	89	4%	184	\$24.89	\$31.88	\$41.64
Total	15,855	16,720	865	5%	1,442			

Exhibit 5. Los Angeles County

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)
Network and Computer Systems Administrators (15-1142)	9,598	9,839	241	3%	730	\$34.24	\$43.80	\$54.69
Computer Network Architects (15-1143)	3,646	3,723	77	2%	276	\$41.61	\$55.84	\$70.38
Computer User Support Specialists (15-1151)	19,263	20,531	1,268	7%	1,884	\$21.25	\$27.19	\$34.98
Computer Network Support Specialists (15-1152)	4,858	5,072	214	4%	450	\$25.56	\$32.71	\$42.68
Total	37,365	39,165	1,800	5%	3,340			

Exhibit 6. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Network and Computer Systems Administrators (15-1142)	13,553	13,942	389	3%	1,043
Computer Network Architects (15-1143)	5,308	5,439	131	2%	406
Computer User Support Specialists (15-1151)	27,521	29,363	1,842	7%	2,699
Computer Network Support Specialists (15-1152)	6,838	7,141	303	4%	634
Total	53,220	55,885	2,665	5%	4,782

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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