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

Program Endorsement Brief: 0702.00/Computer Information Systems
Cybersecurity Associate of Science

Orange County Center of Excellence, September 2020

Summary Analysis

Program Endorsement:	Endorsed: All Criteria Met	☒	Endorsed: Some Criteria Met	☐	Not Endorsed	☐

Program Endorsement Criteria				
Supply Gap:	Yes	☑	No	☐
Meets Living Wage: (Entry-Level, 25th)	Yes	☑	No	☐
Typical Entry-Level Education:	HS Diploma or Less ☐	Some College/ Cert./AA ☑	Bachelor's Degree ☐	Graduate Degree ☐
Emerging Occupation(s)				
	Yes ☐		*No* ☑	

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 occupations: Information Security Analysts (15-1122), Network and Computer Systems Administrators (15-1142), Computer Network Architects (15-1143), and Computer User Support Specialists (15-1151)). Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.[1] Although three of the occupations in this report typically require a bachelor's degree (Information Security Analysts, 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 cybersecurity occupations in the region. Furthermore, the majority of annual openings for the occupations in this report typically require some college/no degree, and entry-level wages exceed the living wage in both Los Angeles and Orange Counties. **Therefore, the COE endorses this proposed program.** Detailed 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 **4,436 jobs available annually** in the region due to new job growth and replacements, **which is more than the 1,437 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 Information Security Analysts (15-1122), Network and Computer Systems Administrators (15-1142) and Computer Network Architects (15-1143) and some college/no degree for Computer User Support Specialists (15-1151).
    - However, within the LA/OC region, **61% of the annual job openings** for these cybersecurity occupations **typically require some college/no degree.**
    - Furthermore, the national-level educational attainment data indicates **between 28.1% 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 cybersecurity 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 cybersecurity, conferring an average of **522 awards annually** between 2016 and 2019.
- Between 2014 and 2017, there was an average of **915 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 cybersecurity occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 6% through 2024. There will be more than 4,400 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 9/16/20. 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 Counties[3]

Geography	2019 Jobs	2024 Jobs	2019-2024 Change	2019-2024 % Change	Annual Openings
Los Angeles	34,323	36,178	1,855	5%	3,081
Orange	14,737	15,663	926	6%	1,355
Total	**49,060**	**51,841**	**2,781**	**6%**	**4,436**

Wages

The labor market endorsement in this report considers the entry-level hourly wages for these cybersecurity 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 cybersecurity 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 $34.10 and $68.32, which are higher than the living wage estimate. Orange County's average wages are below the average statewide wage of $40.68 for these occupations.

Los Angeles County—All of the annual openings for these cybersecurity 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 below the average statewide wage of $40.68 for these occupations.

Job Postings

There were 31,218 online job postings related to cybersecurity occupations listed in the past 12 months. The highest number of job postings were for systems administrators, network engineers, desktop support technicians, help desk analysts, and help desk technicians. The top skills were: technical/help desk support, customer service, Microsoft Active Directory, system administration, and Linux. The top three employers, by number of job postings, in the region were: Northrop Grumman, The Boeing Company, and Anthem Blue Cross.

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.

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[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 9/16/2020. 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 a bachelor's degree as the typical entry-level education for Information Security Analysts, Network and Computer Systems Administrators, and Computer Network Architects, and some college/no degree for Computer User Support Specialists. In the LA/OC region, the majority of annual job openings (61%) typically require some college/no degree. The national-level educational attainment data indicates between 28.1% and 41.1% of workers in the field have completed some college or an associate degree. Of the 51% of cybersecurity job postings listing a minimum education requirement in Los Angeles/Orange County, 74% (11,737) requested a bachelor's degree, 19% (3,014) requested a high school diploma, and 7% (1,157) requested an associate degree.

Educational Supply

Community College Supply—Exhibit 2 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), and Computer Support (0708.20). The colleges with the most completions in the region are: Coastline, West LA, and Cypress. Over the past 12 months, there were fourteen 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**

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**
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**	**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

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
		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**
		Supply Total/Average	**466**	**485**	**614**	**522**

Non-Community College Supply—Since three 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 cybersecurity 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), 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 915 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

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
		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	98	36
		Brand College	-	1	2	1
		DeVry University-California	166	154	135	152
		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
11.1001	Network and System Administration/ Administrator	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
11.1003	Computer and Information Systems Security/ Information Assurance	ITT Technical Institute-Orange	37	-	-	12
		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

CIP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
11.1005	Information Technology Project Management	University of Phoenix-California	111	74	71	85
		California Intercontinental University	-	-	2	1
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	**1,118**	**791**	**836**	**915**

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)
Information Security Analysts (15-1122)	862	1,013	151	18%	96	$34.84	$46.98	$58.67
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
Total	**14,737**	**15,663**	**926**	**6%**	**1,355**			

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)
Information Security Analysts (15-1122)	1,816	2,085	269	15%	191	$36.27	$48.91	$61.08
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
Total	**34,323**	**36,178**	**1,855**	**5%**	**3,081**			

Exhibit 6. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Information Security Analysts (15-1122)	2,678	3,098	420	16%	288
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
Total	**49,060**	**51,841**	**2,781**	**6%**	**4,436**

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)

For more information, please contact:

Jesse Crete, Ed. D, Director
Center of Excellence, Orange County
crete_jesse@rsccd.edu

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