Program Endorsement Brief: 0707.30/Computer Systems Analysis
Digital Forensics and Incident Response
Orange County Center of Excellence, May 2019

Summary
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 digital forensics and incident response occupations: Computer and Information Managers (SOC 11-3021); Computer Systems Analysts (SOC 15-1121); Information Security Analysts (SOC 15-1122); and Computer Network Support Specialists (SOC 15-1152). To provide an accurate view of the supply and demand for cyber-related occupations in the region, the COE has included a focused look at job postings while at the same time increasing the TOP codes researched in order to accurately report on all cyber-related community college programs and awards. For instance, in addition to traditional labor market demand information for these four digital forensics and incident response occupations, a real-time job postings filter for industry-recognized cybersecurity certifications is used in this report to identify job postings most closely related to digital forensics and incident response.

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 these relevant occupations. The following summarizes key findings from this data brief:

- The number of jobs for the digital forensics and incident response occupations in this report is projected to **increase by 4% through 2023**. Over **3,500 job openings** will be available annually due to new job growth and replacement need.

- In the past 12 months, there were 4,015 online job postings for the digital forensics and incident response occupations in this report throughout Los Angeles and Orange Counties. Of those, **2,592 postings requested an industry-recognized cybersecurity certification**.

- While there are two community colleges in the region (Cerritos and Cypress) that have programs listed under the same TOP Code (0707.30), there are six additional TOP codes related to cybersecurity. Inclusive of all seven cyber-related TOP Codes, **27 community colleges in the region offer cyber-related programs**.

- Between 2015 and 2018, community colleges in the region conferred an average of 9 awards annually (associate degrees and certificates) in related training programs under the same TOP Code. However, community colleges in the region conferred an average of **585 awards annually in cyber-related programs** under seven different TOP Codes.

- Zero related program recommendation requests under the same TOP Code (0707.30) were received between January 2018 and April 2019. However, a total of **11 program recommendation requests were received for cybersecurity programs** listed under five different TOP Codes.

Occupational Demand
Exhibit 1 shows the five year occupational demand projections for the four digital forensics and incident response occupations included in this report. In Los Angeles/Orange County, the number

of jobs related to these occupations is projected to increase by 4% through 2023. There will be 3,577 job openings per year through 2023.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties[1]

Geography	2018 Jobs	2023 Jobs	2018-2023 Change	2018-2023 % Change	Annual Openings
Los Angeles	32,370	33,470	1,100	3%	2,445
Orange	14,072	14,814	742	5%	1,132
Total	**46,443**	**48,284**	**1,841**	**4%**	**3,577**

Wages—Average entry-level and median hourly wages for these four digital forensics and incident response occupations throughout the region are $31.05 and $52.11, respectively. Average entry-level wages for these occupations are higher than the MIT Living hourly wage estimate for one adult in the region ($14.36 in Los Angeles County, $15.85 in Orange County). On average, experienced workers earn between $57.53 and $148.04, which is higher than the living wage estimates for both counties. Regional average wages are below the average statewide wage of $59.19 for these occupations. Wage information, by county, is included in Appendix A.

Job Postings—There were 4,015 online job postings related to these four digital forensics and incident response occupations within the past 12 months. To narrow the search to job postings most closely related to cybersecurity, digital forensics, and incident response, a filter for industry-recognized certifications, including CompTIA Security+, CISCO Certificated Network Associate Security (CCNA-S), and Certified Ethical Hacker (CEH), was used. The list of certifications was based on results from a statewide cybersecurity employer survey conducted in 2018; the full list of certifications is listed in Appendix B.[2] After applying these filters, there were 2,592 postings. The highest number of job postings were for security engineer, security analyst, and information security engineer. The top specialized skills were: information security, information systems, network security, and Linux. The top certifications were: Certified Information Systems Security Professional (CISSP), SANS/GIAC Certification, and Certified Information Systems Auditor (CISA). The top three employers, by number of job postings, in the region were: Northrop Grumman, Deloitte, and IBM.

Educational Attainment—The Bureau of Labor Statistics (BLS) lists bachelor's degree as the typical entry-level education required for all digital forensics and incident response occupations except computer network support specialists, which typically requires an associate degree. The national-level educational attainment data indicates that between 21.2% and 41.1% of workers in the field have completed some college or an associate degree. Of the 2,592 job postings in Los Angeles/Orange County that request an industry-recognized certification, 78% (2,033) list a minimum education requirement; 92% (1,865) request a bachelor's degree, 6% (121) request a high school diploma or vocational training, and 2% (47) request an associate degree.

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[1] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.
[2] John Carrese et al., "Cybersecurity: Labor Market Analysis and Statewide Survey Results" California Community Colleges Centers of Excellence for Labor Market Research, June 2018, accessed April 22, 2019, http://coeccc.net/reports/Cybersecurity_Labor_Market_Analysis_And_Statewide_Survey_Results_1.

Community College Supply

Exhibit 2 shows the three-year average number of awards conferred by community colleges in cyber-related TOP codes: Computer Systems Analysis (0707.30), Information Technology, General (0701.00), Computer Information Systems (0702.00), Computer Software Development (0707.00), Computer Infrastructure and Support (0708.00), Computer Networking (0708.10), and Other Information Technology (0799.00). Mt. San Antonio had the most completions in the region across all seven TOP Codes. Between January 2018 and April 2019, there were no other related program recommendation requests under the same TOP Code from regional community colleges. However, there were a total of 11 program recommendation requests for cybersecurity-related programs listed under the following TOP Codes: Computer Information Systems (0702.00), Computer Infrastructure and Support (0708.00), Computer Networking (0708.10), and Other Information Technology (0799.00).

Exhibit 2: Regional community college awards (certificates and degrees), 2015-2018

TOP Code	Program	College	2015-16 Awards	2016-17 Awards	2017-18 Awards	3-Year Award Average
0701.00	Information Technology, General	Cypress	-	1	-	0
		East LA	4	8	15	9
		LA Harbor	-	7	6	4
		LA Mission	-	4	1	2
		LA Swest	3	-	-	1
		Long Beach	10	27	25	21
		Mt San Antonio	83	61	79	74
		West LA	2	3	4	3
		Subtotal/Average	**102**	**111**	**130**	**114**
0702.00	Computer Information Systems	Citrus	-	5	7	4
		Compton	2	1	-	1
		Cypress	4	5	8	6
		East LA	14	14	16	15
		El Camino	24	15	18	19
		Fullerton	7	7	20	11
		Glendale	3	2	-	2
		LA City	4	3	4	4
		LA Mission	9	3	9	7
		LA Trade	14	23	14	17
		Orange Coast	-	-	3	1
		Pasadena	-	2	1	1
		Rio Hondo	10	10	19	13
		Santa Ana	5	18	6	10

TOP Code	Program	College	2015-16 Awards	2016-17 Awards	2017-18 Awards	3-Year Award Average
		Santiago Canyon	2	2	2	2
		West LA	5	13	6	8
		Subtotal/Average	**103**	**123**	**133**	**120**
0707.00	Computer Software Development	Cypress	2	1	1	1
		Golden West	4	7	3	5
		Orange Coast	4	5	7	5
		Pasadena	4	4	-	3
		Saddleback	3	3	3	3
		Subtotal/Average	**17**	**20**	**14**	**17**
0707.30	Computer Systems Analysis	Cerritos	3	6	4	4
		Cypress	8	-	5	4
		Subtotal/Average	**11**	**6**	**9**	**9**
0708.00	Computer Infrastructure and Support	Citrus	9			3
		Coastline	93	67	65	75
		Cypress	7	1	1	3
		LA Harbor	-	-	1	0
		LA Valley	-	6	8	5
		Long Beach	1	1	1	1
		Mt San Antonio	12	16	20	16
		Subtotal/Average	**122**	**91**	**96**	**103**
0708.10	Computer Networking	Cerritos	5	10	8	8
		Coastline	14	20	12	15
		Cypress	27	28	37	31
		Glendale	-	-	6	2
		Irvine	12	19	12	14
		LA City	6	11	37	18
		LA Pierce	21	37	23	27
		Long Beach	11	25	27	21
		Mt San Antonio	2	9	2	4
		Saddleback	23	21	17	20
		Santa Ana	-	-	7	2
		West LA	55	52	43	50
		Subtotal/Average	**176**	**232**	**231**	**213**

TOP Code	Program	College	2015-16 Awards	2016-17 Awards	2017-18 Awards	3-Year Award Average
0799.00	Other Information Technology	LA Harbor	-	1	1	1
		Mt San Antonio	13	9	5	9
		Subtotal/Average	13	10	6	10
		Total/Average	544	593	619	585

Appendix A: Occupational demand and wage data by county

Exhibit 3. Los Angeles County

Occupation (SOC)	2018 Jobs	2023 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
Computer and Information Systems Managers (11-3021)	10,555	10,979	424	4%	860	$44.37	$72.88	$149.50
Computer Systems Analysts (15-1121)	15,044	15,367	323	2%	1,028	$25.70	$43.19	$67.82
Information Security Analysts (15-1122)	2,210	2,390	180	8%	187	$27.35	$50.53	$69.95
Computer Network Support Specialists (15-1152)	4,561	4,734	173	4%	369	$20.12	$33.15	$58.48
	32,370	33,470	1,100	3%	2,445			

Exhibit 4. Orange County

Occupation (SOC)	2018 Jobs	2023 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
Computer and Information Systems Managers (11-3021)	5,160	5,413	253	5%	431	$39.29	$70.33	$143.87
Computer Systems Analysts (15-1121)	5,871	6,147	276	5%	438	$28.06	$44.21	$67.48
Information Security Analysts (15-1122)	884	1,001	117	13%	85	$26.07	$45.21	$71.33
Computer Network Support Specialists (15-1152)	2,157	2,254	97	4%	178	$17.58	$34.04	$55.11
	14,072	14,814	742	5%	1,132			

Exhibit 5. Los Angeles and Orange Counties

Occupation (SOC)	2018 Jobs	2023 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
Computer and Information Systems Managers (11-3021)	15,716	16,392	676	4%	1,291	$42.80	$72.17	$148.04
Computer Systems Analysts (15-1121)	20,915	21,514	599	3%	1,466	$26.53	$43.48	$68.01
Information Security Analysts (15-1122)	3,094	3,391	297	10%	273	$26.92	$49.20	$70.27
Computer Network Support Specialists (15-1152)	6,718	6,988	270	4%	547	$19.51	$33.43	$57.53
	46,443	48,284	1,841	4%	3,577			

Appendix B: List of certifications used in online job postings filter
- Certified Information Systems Security Professional (CISSP)
- Microsoft Certified Solutions Associate (MCSA)
- Cisco Certified Network Professional (CCNP)
- Cisco Certified Network Associate (CCNA)
- Certified Information Security Manager (CISM)
- Certified Information Systems Auditor (CISA)
- SANS/GIAC Certification
- CompTIA Security+
- Certified Ethical Hacker (CEH)
- CompTIA Network+
- CompTIA IT Fundamentals
- GIAC Penetration Tester (GPEN)
- CompTIA Server+
- Computer Hacking Forensic Investigator (CHFI)
- Systems Security Certified Practitioner (SSCP)

Appendix C: 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
- Employment Development Department, Unemployment Insurance Dataset
- Living Insight Center for Community Economic Development

- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- MIT Living Wage
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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