

Cybersecurity Occupations Labor Market Information Report Hartnell College

Prepared by the San Francisco Bay Center of Excellence
for Labor Market Research
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Recommendation

Based on all available data, there appears to be an undersupply of Cybersecurity workers compared to the demand for this cluster of occupations in the Bay region and in the SC-Monterey sub-region (Monterey, San Benito, and Santa Cruz Counties.) There is a projected annual gap of about 4,227 students in the Bay region and 79 students in the SC-Monterey Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0708.00 - Computer Infrastructure and Support in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at Hartnell College and in the region.

Introduction

This report profiles Cybersecurity Occupations in the 12 county Bay region and in the SC-Monterey sub-region for a proposed new program at Hartnell College.

- **Information Security Analysts (SOC 15-1122):** Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses. Excludes “Computer Network Architects” (15-1143).
Entry-Level Educational Requirement: Bachelor's degree
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 27%
- **Computer Systems Analysts (SOC 15-1121):** Analyze science, engineering, business, and other data processing problems to implement and improve computer systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, workflow, and scheduling limitations. May analyze or recommend commercially available software.
Entry-Level Educational Requirement: Bachelor's *degree*
Training Requirement: None
Percentage of Community College Award Holders or Some Postsecondary Coursework: 21%
- **Network and Computer Systems Administrators (SOC 15-1142):** Install, configure, and support an organization’s local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Monitor network to ensure network availability to all system users and may perform necessary maintenance to support network availability. May monitor and test Web site performance to ensure Web sites operate correctly and without interruption. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software. May supervise computer user support specialists and computer network support specialists. May administer network security measures. Excludes “Information Security Analysts”(15-1122), “Computer User Support Specialists” (15-1151), and “Computer Network Support Specialists” (15-1152).
Entry-Level Educational Requirement: Bachelor's *degree*

Training Requirement: None

Percentage of Community College Award Holders or Some Postsecondary Coursework: 38%

Occupational Demand

Table 1. Employment Outlook for Cybersecurity Occupations in Bay Region

Occupation	2018 Jobs	2023 Jobs	5-Yr Change	5-Yr % Change	5-Yr Openings	Average Annual Openings	25% Hourly Wage	Median Hourly Wage
Information Security Analysts	3,298	4,169	871	26%	2,073	415	\$41.35	\$55.30
Computer Systems Analysts	29,219	32,865	3,646	12%	13,306	2,661	\$43.74	\$55.71
Network and Computer Systems Administrators	14,165	15,762	1,597	11%	6,126	1,225	\$38.24	\$49.06
Total	46,683	52,797	6,114	13%	21,506	4,301	\$41.90	\$53.66

Source: EMSI 2019.3

Bay Region includes Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for Cybersecurity Occupations in SC-Monterey Sub-Region

Occupation	2018 Jobs	2023 Jobs	5-Yr Change	5-Yr % Change	5-Yr Openings	Average Annual Openings	25% Hourly Wage	Median Hourly Wage
Information Security Analysts	82	91	9	11%	38	8	\$24.02	\$33.20
Computer Systems Analysts	557	588	31	6%	214	43	\$31.70	\$43.53
Network and Computer Systems Administrators	394	412	18	5%	143	29	\$31.78	\$40.04
TOTAL	1,033	1,091	58	6%	396	79	\$31.12	\$41.38

Source: EMSI 2019.3

SC-Monterey Sub-Region includes Monterey, San Benito, and Santa Cruz Counties

Job Postings in Bay Region and SC-Monterey Sub-Region

Table 3. Number of Job Postings by Occupation for latest 12 months (January 2019 - December 2019)

Occupation	Bay Region	SC-Monterey
Computer Systems Analysts	18,656	182
Information Security Analysts	9,379	125
Network and Computer Systems Administrators	7,972	160
Informatics Nurse Specialists	11	1
Total	36,018	468

Source: Burning Glass

Table 4a. Top Job Titles for Cybersecurity Occupations for latest 12 months (January 2019 - December 2019)
Bay Region

Common Title	Bay	Common Title	Bay
Business Systems Analyst	3,245	Security Manager	352
Security Engineer	2,141	Information Security Analyst	349
Systems Administrator	1,723	Network Administrator	341
Developer	1,384	Business Analyst	305
Systems Analyst	1,020	Information Technology Business Analyst	302
Security Analyst	767	Oracle Consultant	299
Software Development Engineer	656	Information Technology Consultant	299
Technical Consultant	641	Information Security Engineer	298

Security Architect	457	Network Security Engineer	276
Senior Systems Administrator	437	Security Consultant	266
Linux Administrator	410	Aem Developer	259
Information Technology Analyst	375	Mulesoft Developer	240
Linux Systems Administrator	366	Information Technology Administrator	217
Technical Analyst	362	Oracle Functional Consultant	212

Table 4b. Top Job Titles for Cybersecurity Occupations for latest 12 months (January 2019 - December 2019) SC-Monterey Sub-Region

Common Title	SC-Monterey	Common Title	SC-Monterey
Systems Administrator	33	Window Systems Administrator	7
Systems Analyst	30	Team Lead	7
Business Systems Analyst	25	Information Security Analyst	7
Information Security Specialist	21	Applications Analyst	7
Network Administrator	19	Systems Operator	5
Linux Systems Administrator	17	Sharepoint Administrator	5
Security Engineer	16	Senior Vmware Administrator	5
Security Analyst	14	Linux Administrator	5
Senior Systems Administrator	12	Information Technology Administrator	5
Information Technology Specialist	11	Electronic Data Interchange Analyst	5
Information Technology Consultant	11	Computer Systems Analyst	5
Developer	11	Software Analyst, Healthcare Industry	4
Technical Analyst	10	Security Specialist	4
Information Technology Business Analyst	9	Country Lead Monitor	4

Source: Burning Glass

Industry Concentration

Table 5. Industries hiring Cybersecurity Workers in Bay Region

Industry – 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2018)	Jobs in Industry (2022)	% Change (2018-22)	% in Industry (2018)
Custom Computer Programming Services (541511)	10,705	12,653	18%	23%
Computer Systems Design Services (541512)	6,529	7,416	14%	14%
Internet Publishing and Broadcasting and Web Search Portals (519130)	2,617	3,367	29%	6%
Corporate, Subsidiary, and Regional Managing Offices (551114)	2,495	2,652	6%	5%
Data Processing, Hosting, and Related Services (518210)	2,073	2,845	37%	4%
Electronic Computer Manufacturing (334111)	1,961	2,129	9%	4%
Software Publishers (511210)	1,656	2,076	25%	4%
Other Computer Related Services (541519)	1,486	1,818	22%	3%
Local Government, Excluding Education and Hospitals (903999)	903	925	2%	2%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715)	808	877	9%	2%
Temporary Help Services (561320)	609	638	5%	1%
General Medical and Surgical Hospitals (622110)	501	485	-3%	1%
Research and Development in Biotechnology (except Nanobiotechnology) (541714)	451	612	36%	1%
Commercial Banking (522110)	436	431	-1%	1%
Engineering Services (541330)	457	496	9%	1%

Colleges, Universities, and Professional Schools (State Government) (902612)	459	444	-3%	1%
Administrative Management and General Management Consulting Services (541611)	445	528	19%	1%

Source: EMSI 2019.3

Table 6. Top Employers Posting Cybersecurity Occupations in Bay Region and SC-Monterey Sub-Region (January 2019 - December 2019)

Employer	Bay	Employer	Bay	Employer	SC-Monterey
Google Inc.	332	Visa	97	General Dynamics	25
Cisco Systems Incorporated	248	NTT Data	91	Northrop Grumman	19
Accenture	236	University California	89	University California	16
Deloitte	192	Workday, Inc	85	Looker Group	10
Wells Fargo	189	Oracle	85	UC Santa Cruz	9
Apple Inc.	179	Genentech	82	US Army	8
Vmware Incorporated	161	Pacific Gas and Electric Co	79	US Department Army	6
Lockheed Martin Corporation	156	Northrop Grumman	79	SAIC	6
Wipro	147	Splunk	74	Monterey Bay Aquarium	5
Facebook	135	Xoriant Incorporated	70	Indrasoft Incorporated	5
Anthem Blue Cross	125	Uber	68	Dole Food Company Inc	5
Splunk, Inc	122	University Of California Berkeley	67	Deloitte	5
Kaiser Permanente	121	Idc Technologies	67	Central California Alliance For Health	5
Salesforce	108	Amazon	65	22nd Century Technologies	5
Infosys	104	Intelliswift Software	64	US Government	4
IBM	101	Republic Bancorp	63	Threshold Enterprises Limited	4
Palo Alto Networks	100	General Dynamics	62	Target	4

Source: Burning Glass

Educational Supply

There are four (4) community colleges in the Bay Region issuing 74 awards on average annually (last 3 years) on TOP 0708.00 - Computer Infrastructure and Support. There are no colleges in the SC-Monterey Sub-Region issuing awards on average annually (last 3 years) on this TOP code.

Table 7. Awards on TOP 0708.00 - Computer Infrastructure and Support in Bay Region

College	Sub-Region	Associates	Certificate 18+ units	Certificate Low unit	Total
City College of San Francisco	Mid-Peninsula	44		14	58
College of San Mateo	Mid-Peninsula	1		1	2
Los Medanos College	East Bay	6	4	3	13
Ohlone College	East Bay			1	1
Total Bay Region		51	4	19	74
Total SC-Monterey Sub-Region		0	0	0	0

Source: Data Mart

Note: The annual average for awards is 2015-16 to 2017-18.

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 4,301 annual openings for the Cybersecurity occupational cluster and 74 annual (3-year average) awards for an annual undersupply of 4,227 students. In the SC-Monterey Sub-Region, there is also a gap with 79 annual openings and no annual (3-year average) awards for an annual undersupply of 79 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0708.00 - Computer Infrastructure and Support

2015-16	Bay (All CTE Programs)	Hartnell College (All CTE Programs)	State (0708.00)	Bay (0708.00)	SC-Monterey (0708.00)	Hartnell College (0708.00)
% Employed Four Quarters After Exit	74%	81%	66%	72%	57%	n/a
Median Quarterly Earnings Two Quarters After Exit	\$10,550	\$19,867	\$10,986	\$13,156	\$10,432	n/a
Median % Change in Earnings	46%	23%	37%	47%	64%	n/a
% of Students Earning a Living Wage	63%	77%	62%	68%	65%	n/a

Source: Launchboard Pipeline (version available on 1/3/20)

Skills, Certifications and Education

Table 9. Top Skills for Cybersecurity Occupations in Bay Region (January 2019 - December 2019)

Skill	Postings	Skill	Postings	Skill	Postings
SQL	5,754	JavaScript	2,909	Software as a Service (SaaS)	1,837
Linux	5,622	Business Analysis	2,687	Cryptography	1,806
Python	5,435	SAP	2,589	Budgeting	1,790
Project Management	5,169	Technical Support	2,557	DevOps	1,735
Oracle	4,691	UNIX	2,337	Transmission Control Protocol / Internet Protocol (TCP / IP)	1,726
Java	4,686	VMware	2,239	Change Management	1,624
Information Security	4,584	Software Engineering	2,152	Data Analysis	1,611
System Administration	4,561	Salesforce	2,069	Authentication	1,575
Business Process	4,510	Network Security	2,038	PERL Scripting Language	1,559
Software Development	3,905	Enterprise Resource Planning (ERP)	2,035	Virtualization	1,504
Business Systems Analysis	3,753	Microsoft Active Directory	2,025	Atlassian JIRA	1,486
Business Systems	3,550	Quality Assurance and Control	1,947	Customer Contact	1,380
Information Systems	3,482	Domain Name System (DNS)	1,943	Scrum	1,380
Customer Service	3,451	Scheduling	1,921	Technical Writing / Editing	1,365
Systems Analysis	3,091	Cisco	1,863	Systems Development Life Cycle (SDLC)	1,363

Source: Burning Glass

Table 10. Certifications for Cybersecurity Occupations in Bay Region (January 2019 - December 2019)

Note: 81% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

Certification	Postings	Certification	Postings
Certified Information Systems Security Professional (CISSP)	2,478	Cisco Certified Network Professional (CCNP)	343
Certified Information Systems Auditor (CISA)	1,266	Microsoft Certified Solutions Expert (MCSE)	317
SANS/GIAC Certification	1,160	GIAC Certified Incident Handler (GCIH)	315
Certified Information Security Manager (CISM)	994	ITIL Certification	289
IT Infrastructure Library (ITIL) Certification	884	Microsoft Certified Solutions Associate (MCSA)	280
Security Clearance	729	GIAC Security Essentials (GSEC)	265
CompTIA Security+	634	Cisco Certified Security Professional	258
Cisco Certified Network Associate (CCNA)	622	Project Management Professional (PMP)	201
Project Management Certification	509	GIAC Certified Intrusion Analyst	198
Driver's License	491	Cisco Certified Internetwork Expert (CCIE)	176
Information Systems Certification	460	Systems Security Certified Practitioner (SSCP)	169
Certified in Risk and Information Systems Control	400	Certified A+ Technician	123

Source: Burning Glass

Table 11. Education Requirements for Cybersecurity Occupations in Bay Region

Note: 48% of records have been excluded because they do not include a degree level. As a result, the chart below may not be representative of the full sample.

Education (minimum advertised)	Latest 12 Mos. Postings	Percent 12 Mos. Postings
High school or vocational training	833	4%
Associate Degree	535	3%
Bachelor's Degree or Higher	16,386	93%

Source: Burning Glass

Methodology

Occupations for this report were identified by use of skills listed in O*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCC Data Mart.

Sources

O*Net Online

Labor Insight/Jobs (Burning Glass)
Economic Modeling Specialists International (EMSI)
CTE LaunchBoard www.calpassplus.org/Launchboard/
Statewide CTE Outcomes Survey
Employment Development Department Unemployment Insurance Dataset
Living Insight Center for Community Economic Development
Chancellor's Office MIS system

Contacts

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