

Cybersecurity Occupations

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Imperial County



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

COMMUNITY COLLEGES
SAN DIEGO & IMPERIAL COUNTIES
CAREER EDUCATION



California
Community
Colleges

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Summary and Findings

In 2018, the Centers of Excellence for Labor Market Research (COE) published a statewide study on *Cybersecurity Occupations*.¹ This report includes updated labor market information for *Cybersecurity Occupations* in Imperial County to assist the community college system with program development and strategic planning. Due to the complexity in this industry, the San Diego-Imperial COE analyzed traditional labor market information (LMI) and online job postings (real-time LMI) for *Cybersecurity Occupations* and grouped them into two categories from the statewide study: 1) information technology or information systems (IT/IS) jobs requiring cybersecurity skills and 2) specialized cybersecurity jobs. Based on the available LMI, the San Diego-Imperial COE found that:

- There is a labor market supply gap for *Cybersecurity Occupations* in Imperial County.
- Entry-level and median wages for *Cybersecurity Occupations* are above the living wage for Imperial County. This suggests that with enough education and experience, workers in these positions could earn sustainable wages.
- Employers posted a minimum of a bachelor's degree for *Cybersecurity Occupations*.
- Programs in the following Taxonomy of Programs (TOP) codes had a higher proportion of students earn a living wage than Career Education programs in general across the region: *Computer Infrastructure and Support (0708.00)*, *Computer Networking (0708.10)*, *Computer Software Development (0707.00)*, *Computer Support (0708.20)*, *Software Applications (0702.10)*, and *World Wide Web Administration (0709.00)*.
- Similarly, programs in the following TOP codes had a higher percentage of students who obtained a job closely related to their field of study than Career Education programs in general across the region: *Computer Information Systems (0702.00)*, *Computer Infrastructure and Support (0708.00)*, *Computer Networking (0708.10)*, and *Software Applications (0702.10)*.

¹ coeccc.net/reports/cybersecurity

Introduction

To address the statewide cybersecurity labor shortage, the California Community Colleges Centers of Excellence for Labor Market Research (COE) analyzed two key types of *Cybersecurity Occupations* in 2018²: 1) information technology or information systems (IT/IS) jobs requiring cybersecurity skills and 2) specialized cybersecurity jobs. In this updated study, the San Diego-Imperial COE analyzed **traditional**³ labor market information for the following occupational codes in the Standard Occupational Classification (SOC)⁴ system and grouped them into these two categories.

IT/IS jobs requiring cybersecurity skills include:

- [Computer User Support Specialists](#) (SOC 15-1232): Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, via telephone, or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.
- [Computer Network Support Specialists](#) (SOC 15-1231): Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption.
- [Network and Computer Systems Administrators](#) (SOC 15-1244): Install, configure, and maintain an organization's local area network (LAN), wide area network (WAN), data communications network, operating systems, and physical and virtual servers. Perform system monitoring and verify the integrity and availability of hardware, network, and server resources and systems. Review system and application logs and verify completion of scheduled jobs, including system backups. Analyze network and server resource consumption and control user access. Install and upgrade software and maintain software licenses. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software.
- [Software Developers and Software Quality Assurance Analysts and Testers](#) (SOC 15-1256): Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance existing software capabilities. May work with computer hardware engineers to

² coeccc.net/reports/cybersecurity

³ Traditional labor market research consists of a longitudinal analysis of historical and projected occupational data.

⁴ The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. bls.gov/soc.

integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team. Develop and execute software tests to identify software problems and their causes. Test system modifications to prepare for implementation. Document software and application defects using a bug tracking system and report defects to software or web developers. Create and maintain databases of known defects. May participate in software design reviews to provide input on functional requirements, operational characteristics, product designs, and schedules.

Specialized cybersecurity jobs include:

- [Information Security Analysts](#) (SOC 15-1212): Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks and propose and implement risk mitigation strategies. 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.

In the 2018 statewide study, the COE used the following job titles, which are representative of the occupational titles from the SOC system analyzed in this updated report.

Job Titles in 2018 Statewide Study	Occupational Titles in Updated Report
Technical Support Specialists	Computer User Support Specialists
Network Operations Specialists	Computer Network Support Specialists
System Administrators	Network and Computer Systems Administrators
Software Developers	Software Developers and Software Quality Assurance Analysts and Testers
Systems Security Analysts	
Cyber Defense Analysts	
Cyber Defense Infrastructure Support Specialists	Information Security Analysts
Vulnerability Assessment Analysts	
Cyber Defense Forensic Analysts	

Collectively, these occupations are referred to as *Cybersecurity Occupations*. The following sections provide an overview of their labor market need, wages, and knowledge, skills and abilities.

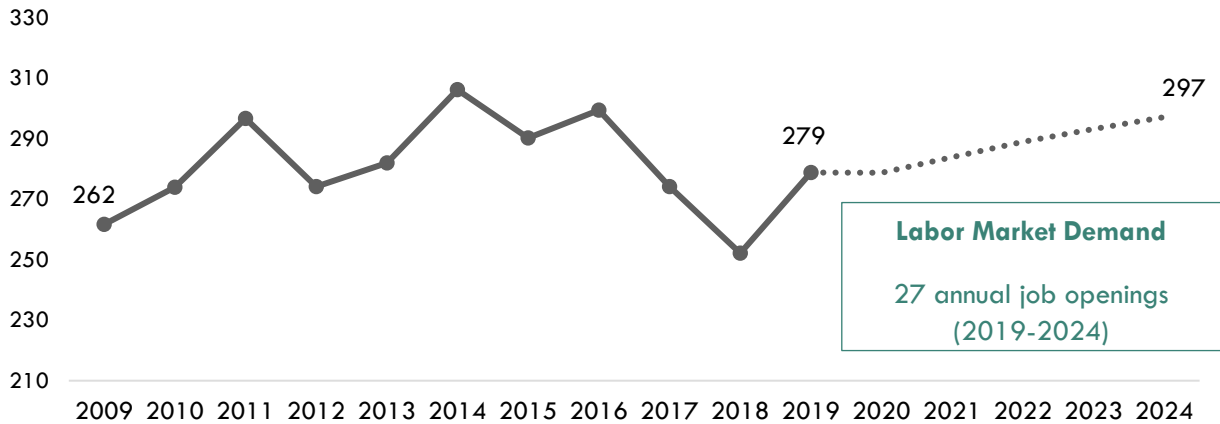
Supply Gap Analysis

The following sections provide details on employer demand, educational supply, and supply gap analysis. A supply gap suggests that employers have more labor market demand than workers supplied by educational institutions.

EMPLOYER DEMAND

Between 2019 and 2024, *Cybersecurity Occupations* are projected to increase by 18 net jobs or six percent (Exhibit 1). During this period, employers in Imperial County are projected to hire 27 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

Exhibit 1: Number of Jobs (Employment) for Cybersecurity Occupations in Imperial County, 2009-2024⁵



⁵ Emsi 2020.04; QCEW, Non-QCEW, Self-Employed.

The following exhibit provides more detailed information for each occupation, including projected employment change and labor market demand between 2019 and 2024. Labor market demand is defined by the number of job openings that employers expect to fill due to attrition (caused by turnover and retirement, for example). Employers in Imperial County are projected to hire 27 workers annually between 2019 and 2024 *Cybersecurity Occupations*.

Exhibit 2: Number of Jobs for Cybersecurity Occupations in Imperial County (2019-2024)⁶

Occupational Title	2019 Jobs	2024 Jobs	2019 - 2024 Net Jobs Change	2019-2024 % Net Jobs Change*	Annual Job Openings* (Demand)
Computer User Support Specialists	139	146	7	5%	13
Software Developers and Software Quality Assurance Analysts and Testers	55	61	6	12%	6
Network and Computer Systems Administrators	49	51	2	3%	4
Computer Network Support Specialists	29	30	1	5%	3
Information Security Analysts	7	9	2	29%	1
Total Projected (2019-2024) Annual Job Openings					27

*Percentages and numbers are rounded up

⁶ Emsi 2020.04; QCEW, Non-QCEW, Self-Employed.

EDUCATIONAL SUPPLY

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes.⁷ There are 11 TOP codes and 36 CIP codes related to *Cybersecurity Occupations* (Exhibit 3).

Exhibit 3: Related TOP and CIP Codes for *Cybersecurity Occupations*

Cybersecurity Occupations
TOP 070100: Information Technology, General
TOP 070200: Computer Information Systems
TOP 070210: Software Applications
TOP 070710: Computer Programming
TOP 070730: Computer Systems Analysis
TOP 070800: Computer Infrastructure and Support
TOP 070810: Computer Networking
TOP 070820: Computer Support
TOP 070900: World Wide Web Administration
TOP 093430: Telecommunications Technology
TOP 210540: Forensics, Evidence, and Investigation
CIP 11.0101 Computer and Information Sciences, General
CIP 11.0102 Artificial Intelligence
CIP 11.0103 Information Technology
CIP 11.0104 Informatics
CIP 11.0199 Computer and Information Sciences, Other
CIP 11.0201 Computer Programming/Programmer, General
CIP 11.0202 Computer Programming, Specific Applications
CIP 11.0299 Computer Programming, Other
CIP 11.0401 Information Science/Studies
CIP 11.0501 Computer Systems Analysis/Analyst
CIP 11.0601 Data Entry/Microcomputer Applications, General
CIP 11.0701 Computer Science
CIP 11.0801 Web Page, Digital/Multimedia and Information Resources Design

⁷ TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data).

Cybersecurity Occupations

CIP 11.0802 Data Modeling/Warehousing and Database Administration

CIP 11.0899 Computer Software and Media Applications, Other

CIP 11.0901 Computer Systems Networking and Telecommunications

CIP 11.1001 Network and System Administration/Administrator

CIP 11.1002 System, Networking, and LAN/WAN Management/ Manager

CIP 11.1003 Computer and Information Systems Security/Information Assurance

CIP 11.1004 Web/Multimedia Management and Webmaster

CIP 11.1005 Information Technology Project Management

CIP 11.1006 Computer Support Specialist

CIP 11.1099 Computer/Information Technology Services Administration and Management, Other

CIP 11.9999 Computer and Information Sciences and Support Services, Other

CIP 15.1201 Computer Engineering Technology/Technician

CIP 15.1202 Computer Technology/Computer Systems Technology

CIP 15.1203 Computer Hardware Technology/Technician

CIP 15.1204 Computer Software Technology/Technician

CIP 15.1299 Computer Engineering Technologies/Technicians, Other

CIP 29.0207 Cyber/Electronic Operations and Warfare

CIP 43.0116 Cyber/Computer Forensics and Counterterrorism

CIP 43.0301 Homeland Security

CIP 43.0303 Critical Infrastructure Protection

CIP 52.1201 Management Information Systems, General

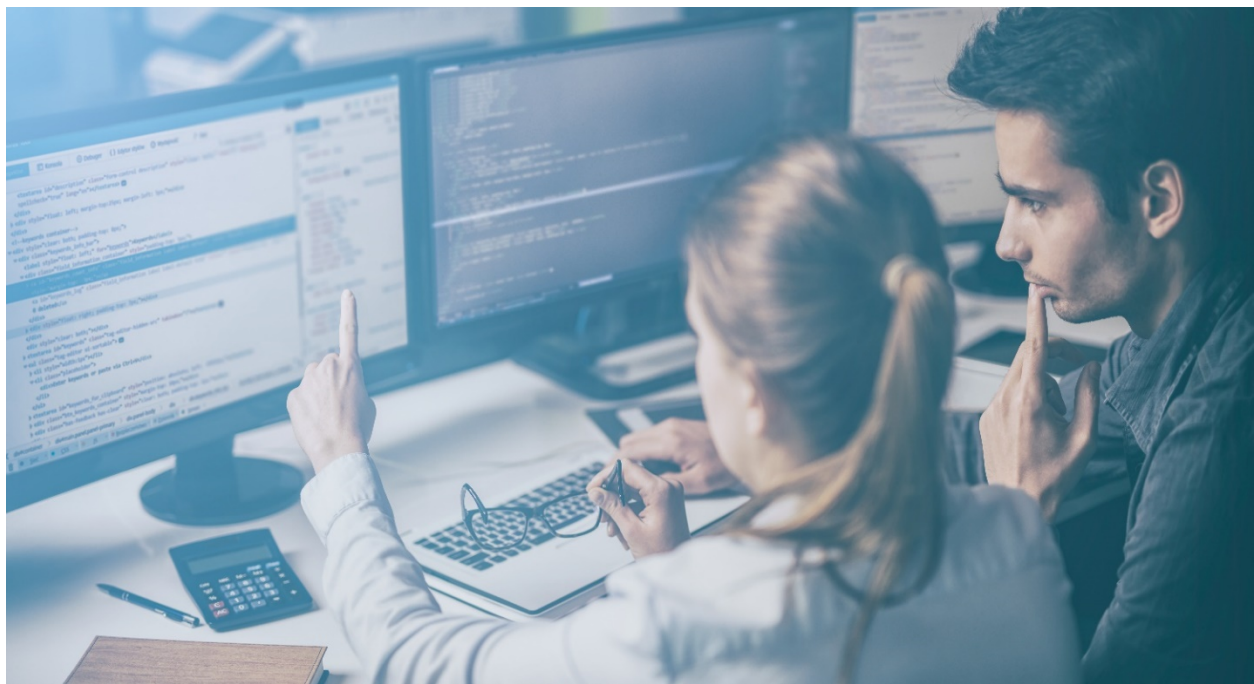
CIP 52.1206 Information Resources Management

CIP 52.2101 Telecommunications Management

According to TOP data, one community college could supply the region with awards for these occupations, Imperial Valley College. According to CIP data, no non-community-college institution supplies Imperial County with awards (Exhibit 4).

Exhibit 4: Number of Awards (Certificates and Degrees) Conferred by Postsecondary Institutions (Program Year 2014-15 through PY2018-19 Average)⁸

TOP6 or CIP	TOP6 or CIP Title	3-Yr Annual Average CC Awards (PY16-17 to PY18-19)	Other Educational Institutions 3-Yr Annual Average Awards (PY14-15 to PY16-17)	3-Yr Total Average Supply (PY14-15 to PY18-19)
0702.00	Computer Information Systems	7	0	7
	• Imperial Valley	7	0	
0708.00	Computer Information Systems	3	0	3
	• Imperial Valley	3	0	
			Total	10

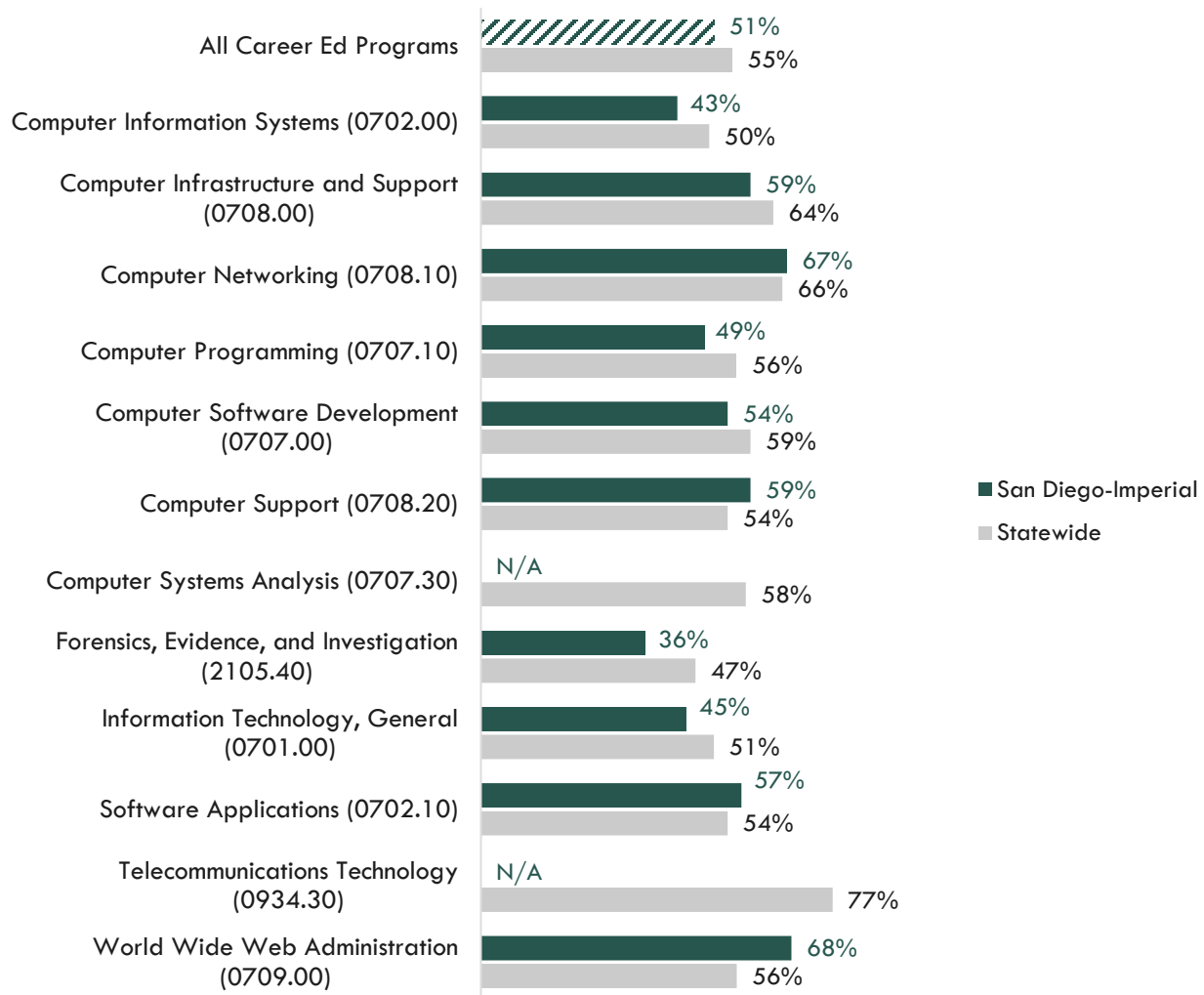


⁸ coeccc.net/Supply-and-Demand.aspx. Derived from the California Community Colleges Chancellor's Office (CCCCO) MIS Data Mart.

STUDENT OUTCOMES

According to the California Community Colleges LaunchBoard, programs in the following TOP codes had a higher proportion of students earn a living wage than Career Education programs in general across the region: *Computer Infrastructure and Support (0708.00)*, *Computer Networking (0708.10)*, *Computer Software Development (0707.00)*, *Computer Support (0708.20)*, *Software Applications (0702.10)*, and *World Wide Web Administration (0709.00)* (Exhibit 5).⁹

Exhibit 5: Proportion of Students Who Earned a Living Wage, PY2017-18¹⁰



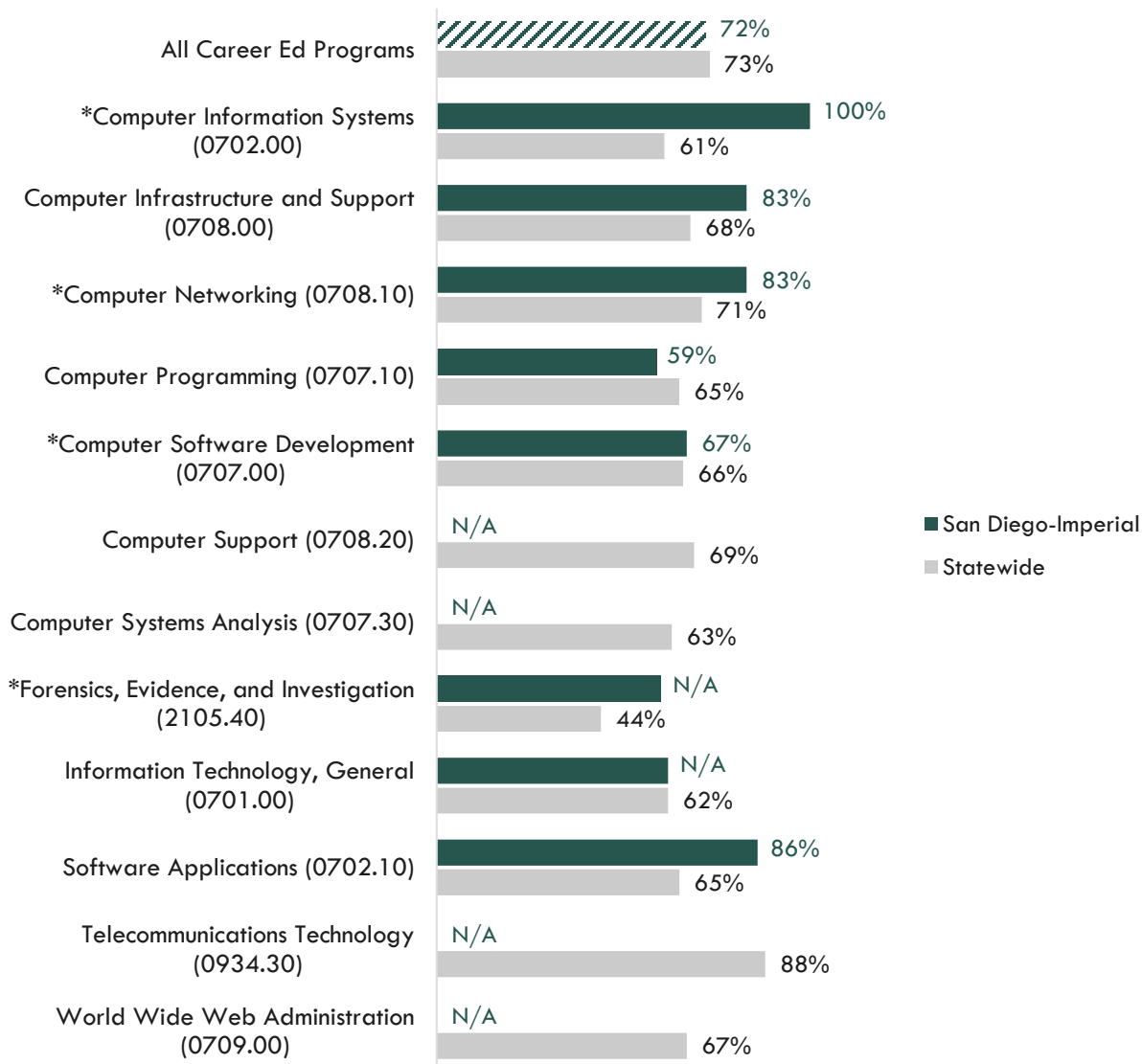
*sample size had fewer than 10 students
 "N/A" indicates insufficient data

⁹ California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹⁰ Among completers and skills builders who exited, the proportion of students who attained a living wage.

Similarly, according to the California Community Colleges LaunchBoard, programs in the following TOP codes had a higher percentage of students who obtained a job closely related to their field of study than Career Education programs in general across the region: *Computer Information Systems (0702.00)*, *Computer Infrastructure and Support (0708.00)*, *Computer Networking (0708.10)*, and *Software Applications (0702.10)* (Exhibit 6).¹¹

Exhibit 6: Percentage of Students in a Job Closely Related to Field of Study, PY2016-17¹²



*sample size had fewer than 10 students
 "N/A" indicates insufficient data

¹¹ California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹² Most recent year in which data is available. Percentage of Students in a Job Closely Related to Field of Study: Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.

DEMAND VS. SUPPLY

Comparing labor demand (annual openings) with labor supply¹³ suggests that there is a **supply gap** for these occupations in Imperial County, with **27** annual openings and **10** awards. Comparatively, there are **43,911** annual openings in California and **4,804** awards, suggesting that there is also a supply gap across the state (Exhibit 7).

Exhibit 7: Demand (Annual Openings) vs. Supply (Average Annual Awards)¹⁴

	Demand (Annual Openings)	Supply (Total Annual Average Supply)	Supply Gap or Oversupply
Imperial	27	10	17
California	43,911	4,804	39,107

NOTE: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether a program should be developed.

¹³ Labor supply can be found from two different sources: EMSI or the California Community Colleges Chancellor's Office MIS Data Mart. EMSI uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

¹⁴ Supply and demand tables. coecc.net/Supply-and-Demand.aspx.

Occupational Overview

Due to the complexity of the industry, the San Diego-Imperial COE analyzed both *traditional labor market information* and *online job postings* for the educational requirements, wages, skills, etc. for these occupations. The following sections provide a comparison of these two data sources.

TYPICAL ENTRY-LEVEL EDUCATION

Traditional labor market information indicates that more than half of *Cybersecurity Occupations* identified in the SOC system require a bachelor's degree (Exhibit 8a).

**Exhibit 8a: Typical Educational Requirements for Cybersecurity Occupations in Imperial County
(Traditional Labor Market Information for SOC Occupational Titles)**

SOC Code	Occupational Title	Typical Entry-Level Education
15-1212	Information Security Analysts	Bachelor's degree
15-1244	Network and Computer Systems Administrators	Bachelor's degree
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	Bachelor's degree
15-1231	Computer Network Support Specialists	Associate's degree
15-1232	Computer User Support Specialists	Some college, no degree

As previously mentioned, the San Diego-Imperial COE also analyzed online job postings for *Cybersecurity Occupations*. The San Diego-Imperial COE's primary data source for online job postings is Burning Glass Technologies (BGT), which has its own taxonomy of occupations. The only BGT job title available for *Cybersecurity Occupations* is "Cyber / Information Security Engineer / Analyst." Based on online job postings data, employers require a minimum educational requirement of a bachelor's degree for most of these occupations (Exhibit 8b).

Exhibit 8b: Typical Educational Requirements for "Cyber / Information Security Engineer / Analyst" in Imperial County (Percentage* of Online Job Postings, Jan 2015 - Oct 2020)¹⁵

BGT Job Title	Associate Degree or Less	Bachelor's Degree+
Cyber / Information Security Engineer / Analyst	40.0%	60.0%

*May not add up to 100% due to rounding

¹⁵ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." Jan 1, 2015-Oct 31, 2020.

WAGES

According to traditional LMI, entry-level hourly earnings of *Cybersecurity Occupations* range from \$17.58 to \$48.22 (Exhibit 9a). This is more than the living wage for two adults and two children (school-age) in Imperial County, which is \$13.20 per hour.¹⁶

**Exhibit 9a: Hourly* Earnings for Cybersecurity Occupations in Imperial County
(Traditional Labor Market Information for SOC Occupational Titles)¹⁷**

SOC Code	SOC Occupational Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings
15-1256	Software Developers and Software Quality Assurance Analysts and Testers	\$48.22	\$63.20
15-1244	Network and Computer Systems Administrators	\$32.01	\$41.06
15-1231	Computer Network Support Specialists	\$24.15	\$31.51
15-1232	Computer User Support Specialists	\$17.58	\$24.63
15-1212	Information Security Analysts	Insf. Data	Insf. Data

*To annualize these salaries, multiple by 2080 hours; however, not all employers offer full-time employment for these occupations

Exhibit 9b provides average salary estimates in online job postings for “Cyber / Information Security Engineer / Analyst,” between January 01, 2015 and October 31, 2020. According to Burning Glass Technologies, the data source for online job postings, “actual compensation may vary based on individual employer salary practices and experience. Market salary is calculated using a machine learning model built off of millions of job postings every year, and accounting for adjustments based on locations, industry, skills, experience, education requirements, among other variables. Market salary provides insight into the likely salary of workers within a specific occupation, as well as further detail on the impact of additional skills on salary.”¹⁸

Exhibit 9b: Estimated Market Salary and Hourly Wage for “Cyber / Information Security Engineer / Analyst” in Imperial County (Online Job Postings, Jan 2015 - Oct 2020)¹⁹

Occupational Title	Market Annual Salary (Median)	Estimated Hourly Wage*
Cyber / Information Security Engineer / Analyst	\$88,475	\$42.54

*The San Diego-Imperial COE derived hourly wages by dividing the median market annual salaries by 2080 hours.

¹⁶ “California Family Needs Calculator (formerly the Self-Sufficiency Standard),” Insight: Center for Community Economic Development, last updated 2018. insightccd.org/2018-self-sufficiency-standard.

¹⁷ Emsi 2020.04; QCEW, Non-QCEW, Self-Employed.

¹⁸ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” Jan 1, 2015-Oct 31, 2020.

¹⁹ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” Jan 1, 2015-Oct 31, 2020.

KNOWLEDGE, SKILLS AND ABILITIES

Based on the SOC occupational titles from traditional LMI, Exhibit 10a lists the top specialized, soft and software skills in online job postings between January 1, 2015 and October 31, 2020.

**Exhibit 10a: Top Skills for Cybersecurity Occupations in Imperial County
(Online Job Postings for SOC Occupational Titles)²⁰**

Specialized Skills	Soft Skills	Software Skills
1. Repair	1. Troubleshooting	1. Microsoft Excel
2. Customer Service	2. Communication Skills	2. Microsoft PowerPoint
3. Information Systems	3. Computer Literacy	3. Microsoft Word
4. Technical Support	4. Research	4. Voice over IP (VoIP)
5. Software Installation	5. Microsoft Windows	5. Linux
6. Hardware and Software Installation	6. Problem Solving	6. Word Processing
7. IT Support	7. Physical Abilities	7. Macintosh OS
8. Scheduling	8. Planning	8. UNIX
9. Printers	9. Multi-Tasking	9. Windows Server
10. Computer Hardware/Software	10. Writing	10. SCADA
11. Computer Repair	11. Written Communication	11. Enterprise Resource Planning (ERP)
12. Help Desk Support	12. Building Effective Relationships	12. Microsoft SQL
13. Retail Industry Knowledge	13. English	13. NetApp
14. System/Network Configuration	14. Prioritizing Tasks	14. Cisco Routers
15. Cisco	15. Detail-Oriented	15. Cisco Switching
16. Consumer Electronics	16. Oral Communication	16. Computer Engineering
17. Customer Contact	17. Teamwork / Collaboration	17. Hyper-V
18. Computer Networking	18. Typing	18. Hypertext Preprocessor
19. Hardware and Software Configuration	19. Creativity	19. Java
20. Technical Writing / Editing	20. Organizational Skills	20. Microsoft Azure
21. Electronics Knowledge	21. Preparing Reports	21. Microsoft Exchange
22. Network Administration	22. Editing	22. Microsoft Office 365
23. Computer Installation/ Setup	23. Analytical Skills	23. Symantec Packages
24. Network Support	24. Bilingual	24. VMware
25. Network Troubleshooting	25. Energetic	25. VMware vSphere

²⁰ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." Jan 1, 2015-Oct 31, 2020.

Exhibit 10b lists the top specialized, soft and software skills in online job postings between January 1, 2015 and October 31, 2020 for the BGT job title, “Cyber / Information Security Engineer / Analyst.”

**Exhibit 10b: Top Skills for “Cyber / Information Security Engineer / Analyst” in Imperial County
(Online Job Postings, Jan 2015 - Oct 2020)²¹**

Specialized Skills	Soft Skills	Software Skills
1. Information Security	1. Communication Skills	1. Microsoft Excel
2. Customer Service	2. Problem Solving	2. Agile Development
3. Information Systems	3. Detail-Oriented	3. Ansible RHEL
4. Authentication	4. Microsoft Excel	4. COBIT
5. Computer Forensics	5. Bilingual	5. Enterprise Resource Planning
6. Electronic Key Management System	6. Computer Literacy	6. IBM Cloud
7. Host Based Security Systems	7. English	7. OpenShift
8. Information Assurance	8. French	8. OpenStack
9. Intrusion Prevention System	9. Oral Communication	9. Red Hat Linux
10. Intrusion Detection	10. Organizational Skills	10. S-Plus
11. Mainframe	11. Presentation Skills	11. Tableau
12. Network Intrusion Protection	12. Self-Starter	12. Vulnerability Assessment
13. Network Security	13. Teamwork / Collaboration	
14. Public Key Infrastructure (PKI)	14. Time Management	
15. Risk Assessment	15. Writing	
16. Security Operations		
17. Agile Development		
18. Asset Protection		
19. Audit Planning		
20. Business Continuity & Disaster Recovery		
21. Business Continuity Planning		
22. Data Modeling		
23. Data Security		
24. Disaster Recovery Planning		
25. Vulnerability Analysis		

²¹ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” Jan 1, 2015-Oct 31, 2020.

TOP CERTIFICATIONS

Based on the SOC occupational titles from traditional LMI, Exhibit 11a lists the top certifications that appeared in online job postings between January 1, 2015 and October 31, 2020.

Exhibit 11a: Top Certifications for Cybersecurity Occupations in Imperial County (Online Job Postings for SOC Occupational Titles, Jan 2015 - Oct 2020)²²

Top Certifications in Online Job Postings

- | | |
|--|---|
| 1. Driver's License | 7. MECP Advanced Certification |
| 2. Certified A+ Technician | 8. IT Infrastructure Library (ITIL) Certification |
| 3. Security Clearance | 9. CDL Class C |
| 4. CompTIA Network+ | 10. Microsoft Certified Solutions Expert (MCSE) |
| 5. Mobile Electronics Certified Professional | 11. CompTIA Security+ |
| 6. MECP Basic Installation | 12. Information Technology Certification |

Exhibit 11b lists the top certifications that appeared in online job postings between January 1, 2015 and October 31, 2020 for the BGT job title, "Cyber / Information Security Engineer / Analyst."

Exhibit 11b: Top Certifications for "Cyber / Information Security Engineer / Analyst" in Imperial County (Online Job Postings, Jan 2015 - Oct 2020)²³

Top Certifications in Online Job Postings

1. Security Clearance
2. IT Infrastructure Library (ITIL) Certification
3. Driver's License
4. CompTIA Security+

While Exhibit 11a and Exhibit 11b show the top certifications for *Cybersecurity Occupations*, the 2018 statewide cybersecurity study indicated that employers prefer the following certifications: Microsoft Certified System Administrator (MCSA), CISCO Certified Network Professional (CCNP), CISCO Certified Network Associate (CCNA), Certified Information Systems Security Professional (CISSP), Certified Information Security Manager (CISM), Network+, Certified Information Systems Auditor (CISA), Security+, Security Clearance, and SANS/GIAC Certification.

²² Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." Jan 1, 2015-Oct 31, 2020.

²³ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." Jan 1, 2015-Oct 31, 2020.

Based on online job postings between Jan 2015 and Oct 2020, employers in Imperial County do not often post online job postings for certifications identified in the statewide cybersecurity report (Exhibit 12). Employers tend to post more frequently for specific occupations or skills when they have difficulty filling them.

**Exhibit 12: Number of Cybersecurity Certifications from Statewide Report in Online Job Postings
(Imperial County, Jan 2015 - Oct 2020)²⁴**

Cybersecurity Certifications Identified in Statewide Report	Number of online job postings (2015)	Number of online job postings (2016)	Number of online job postings (2017)	Number of online job postings (2018)	Number of online job postings (2019)	Number of online job postings (Jan-Oct 2020)
Microsoft Certified System Administrator (MCSA)	0	0	0	0	0	1
CISCO Certified Network Professional (CCNP)	0	0	0	0	0	0
CISCO Certified Network Associate (CCNA)	0	0	2	0	0	0
Certified Information Systems Security Professional (CISSP)	0	0	0	0	0	0
Certified Information Security Manager (CISM)	0	0	0	0	0	0
Network+	0	0	0	2	2	1
Certified Information Systems Auditor (CISA)	0	0	0	0	1	0
Security+	0	0	0	2	0	0
Security Clearance	91	92	31	65	80	40
SANS/GIAC Certification	0	0	0	0	0	0
Total Number of Online Job Postings	4,911	5,844	4,959	4,510	5,918	5,216

²⁴ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." Jan 1, 2015-Oct 31, 2020.

TOP EMPLOYERS

Based on the SOC occupational titles from traditional LMI, Exhibit 13a lists the top employers who posted online job postings between January 1, 2015 and October 31, 2020.

Exhibit 13a: Top 25 Employers for Cybersecurity Occupations in Imperial County (Online Job Postings for SOC Occupational Titles, Jan 2015 - Oct 2020)²⁵

Top Employers in Online Job Postings	
1. Best Buy	14. IBM
2. El Centro Regional Medical Center	15. Safran
3. Imperial Irrigation District	16. Lukos
4. Textron	17. Imperial Valley College
5. Central Union High School District	18. Imperial Community College District
6. Imperial County Office Of Education	19. Holtville Unified School District
7. Heber Elementary	20. Food Safety Net Services
8. County Imperial	21. El Centro Elementary School District
9. Imperial Unified School District	22. AECOM Technology Corporation
10. Ukpeaġvik Iñupiat Corporation	23. Worldwide Tech Services
11. Ormat Technologies Incorporated	24. USG Corporation
12. Management & Training Corporation	25. U.S. General Service Administration
13. Indian Health Service	

Exhibit 13b lists the top employers who posted online job postings between January 1, 2015 and October 31, 2020 for the BGT job title, “Cyber / Information Security Engineer / Analyst.”

Exhibit 13b: Top Employers for “Cyber / Information Security Engineer / Analyst” in Imperial County (Online Job Postings, Jan 2015 - Oct 2020)²⁶

Top Employers in Online Job Postings
1. Lukos
2. IBM
3. US Government
4. Rabobank
5. El Centro Regional Medical Center

²⁵ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” Jan 1, 2015-Oct 31, 2020.

²⁶ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” Jan 1, 2015-Oct 31, 2020.

Appendix A: Most Commonly Used Job Titles

Using the SOC occupational titles in this updated report and the 2018 statewide study's job titles, the San Diego-Imperial COE examined online job postings to determine which ones were most commonly used by employers. Between January 1, 2015 and October 31, 2020, there were 31,358 job postings in Imperial County, and the job title with the most online job postings was "Cyber / Information Security Engineer / Analyst" (Exhibit A).²⁷

Exhibit A: Occupational Titles and Job Titles for Cybersecurity Occupations by Number of Online Job Postings in Imperial County (Jan 2015 - Oct 2020)

SOC Occupational Title	#	Job Title	#
Computer Network Support Specialists	9	Cyber Defense Analysts	0
Computer User Support Specialists	142	Cyber Defense Forensic Analysts	0
Information Security Analysts	10	Cyber Defense Infrastructure Support Specialists	0
Network and Computer Systems Administrators	34	Cyber / Information Security Engineer / Analyst	10
Software Developers and Software Quality Assurance Analysts and Testers	89	Network Operations Specialists	0
		Software Developers	0
		System Administrators	0
		Systems Security Analysts	0
		Technical Support Specialists	0
		Vulnerability Assessment Analysts	0

²⁷ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." Jan 1, 2015-Oct 31, 2020.

Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

This workforce demand report uses state and federal job projection data that was developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.

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