** Cybersecurity Network and Systems Security Administration Occupations**

**Labor Market Information Report**

**Santa Rosa Junior College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

February 2019

# Recommendation

Based on all available data, there appears to be a significant undersupply of Cybersecurity Network and Systems Security Administration workers compared to the demand for this cluster of occupations in the Bay region and in the North Bay sub-region (Marin, Napa, Solano and Sonoma Counties). There is a projected annual gap of about 8,014 students in the Bay region and 248 students in the North Bay Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 0708.10 - Computer Networking 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 Santa Rosa Junior College (SRJC) and in the region.

# Introduction

This report profiles Cybersecurity Network and Systems Security Administration Occupations in the 12 county Bay region and in the North Bay sub-region for a proposed new program at Santa Rosa Junior College.

|  |
| --- |
| * **Network and Computer Systems Administrators (SOC 15-1142):** Install, configure, and supportan 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%* |
|  |
| * **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%* |
|  |
| * **Computer Network Support Specialists (SOC 15-1152):** Analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption. Excludes “Network and Computer Systems Administrators” (15-1142) and “Computer Network Architects” (15-1143).
 |
| *Entry-Level Educational Requirement: Associate's degree* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 41%* |
|  |
| * **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 and Information Systems Managers (SOC 11-3021):** Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Excludes “Computer Occupations" (15-1111 through 15-1199).
 |
| *Entry-Level Educational Requirement: Bachelor's degree* |
| *Training Requirement: None* |
| *Percentage of Community College Award Holders or Some Postsecondary Coursework: 22%* |

# Occupational Demand

**Table 1. Employment Outlook for Cybersecurity Network and Systems Security Administration Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Network and Computer Systems Administrators | 15,623 | 17,418 | 1,795  | 11% | 6,851 | 1,370 | $30.52  | $49.48  |
| Computer Systems Analysts | 32,337 | 36,472 | 4,136  | 13% | 14,989 | 2,998 | $33.10  | $53.23  |
| Computer Network Support Specialists | 6,569 | 7,551 | 982  | 15% | 3,509 | 702 | $22.43  | $37.33  |
| Information Security Analysts | 3,722 | 4,758 | 1,036  | 28% | 2,408 | 482 | $29.67  | $55.81  |
| Computer and Information Systems Managers | 25,897 | 29,357 | 3,461  | 13% | 13,343 | 2,669 | $55.65  | $86.30  |
| **Total** | **84,147** | **95,557** | **11,410** | **14%** | **41,100** | **8,220** | **$38.58**  | **$61.59**  |

*Source: EMSI 2019.1*

**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 Network and Systems Security Administration Occupations in North Bay Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2017 Jobs | 2022 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 10% Hourly Wage | Median Hourly Wage |
| Network and Computer Systems Administrators | 785 | 812 | 27  | 3% | 282 | 56 | $27.16  | $41.12  |
| Computer Systems Analysts | 1,143 | 1,171 | 28  | 2% | 404 | 81 | $27.05  | $41.85  |
| Computer Network Support Specialists | 398 | 420 | 22  | 6% | 171 | 34 | $22.65  | $31.13  |
| Information Security Analysts | 204 | 220 | 16  | 8% | 87 | 17 | $25.79  | $45.62  |
| Computer and Information Systems Managers | 958 | 997 | 39  | 4% | 396 | 79 | $40.79  | $69.49  |
| **Total** | **3,488** | **3,621** | **133**  | **4%** | **1,340** | **268** | **$30.27**  | **$48.27**  |

*Source: EMSI 2019.1*

**North Bay Sub-Region** includes Marin, Napa, Solano and Sonoma Counties

### Job Postings in Bay Region and North Bay Sub-Region

**Table 3. Number of Job Postings by Occupation for latest 12 months (Jan 2018 - Dec 2018)**

| Occupation | Bay Region | North Bay |
| --- | --- | --- |
| Computer Systems Analysts (15-1121.00) | 14,445 | 286 |
| Information Security Analysts (15-1122.00) | 8,517 | 199 |
| Network and Computer Systems Administrators (15-1142.00) | 7,056 | 108 |
| Computer and Information Systems Managers (11-3021.00) | 1,888 | 57 |
| Computer Network Support Specialists (15-1152.00) | 1,117 | 57 |
| Informatics Nurse Specialists (15-1121.01) | 25 | 4 |
| **Total** | 33,048 | 711 |

*Source: Burning Glass*

**Table 4. Top Job Titles for Cybersecurity Network and Systems Security Administration Occupations for latest 12 months (Jan 2018 - Dec 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Common Title | Bay | North Bay | Common Title | Bay | North Bay |
| Business Systems Analyst | 2,424 | 55 | Information Security Analyst | 314 | 2 |
| Security Engineer | 1,760 | 10 | Senior Systems Administrator | 314 | 8 |
| Systems Administrator | 1,584 | 49 | Director of Information Technology | 302 | 22 |
| Developer | 898 | 14 | Information Technology Analyst | 302 | 5 |
| Systems Analyst | 826 | 14 | Director of Technology | 298 | 8 |
| Security Analyst | 613 | 8 | Technical Analyst | 288 | 3 |
| Technical Consultant | 529 | 3 | Network Security Engineer | 275 | 2 |
| Software Development Engineer | 498 | 5 | Security Consultant | 262 | 5 |
| Security Architect | 439 | 1 | Business Analyst | 239 | 2 |
| Linux Administrator | 386 | 0 | Chief Technology Officer | 238 | 5 |
| Network Administrator | 351 | 34 | Oracle Consultant | 203 | 19 |
| Security Manager | 348 | 2 | Information Technology Consultant | 201 | 14 |
| Linux Systems Administrator | 325 | 8 | Information Technology Administrator | 193 | 2 |
| Information Security Engineer | 324 | 2 | Information Technology Business Analyst | 193 | 2 |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Cybersecurity Network and Systems Security Administration Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Industry – 6 Digit NAICS (No. American Industry Classification) Codes | Jobs in Industry (2017) | Jobs in Industry (2022) | % Change (2017-22) | % in Industry (2017) |
| Custom Computer Programming Services (541511) | 17,731 | 18,142 | 17% | 21.1% |
| Computer Systems Design Services (541512) | 11,122 | 11,158 | 12% | 13.0% |
| Internet Publishing and Broadcasting and Web Search Portals (519130) | 5,845 | 6,137 | 38% | 7.2% |
| Corporate, Subsidiary, and Regional Managing Offices (551114) | 4,201 | 4,469 | 12% | 5.2% |
| Software Publishers (511210) | 3,832 | 4,027 | 23% | 4.7% |
| Data Processing, Hosting, and Related Services (518210) | 3,419 | 3,736 | 44% | 4.4% |
| Electronic Computer Manufacturing (334111) | 3,496 | 3,600 | 7% | 4.2% |
| Other Computer Related Services (541519) | 2,506 | 2,551 | 21% | 3.0% |
| Local Government, Excluding Education and Hospitals (903999) | 1,436 | 1,440 | 4% | 1.7% |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715) | 1,314 | 1,372 |  (2%) | 1.6% |
| Colleges, Universities, and Professional Schools (State Government) (902612) | 1,011 | 1,029 | 3% | 1.2% |
| Colleges, Universities, and Professional Schools (611310) | 883 | 892 | 8% | 1.0% |
| Temporary Help Services (561320) | 834 | 830 | 5% | 1.0% |

*Source: EMSI 2019.1*

**Table 6. Top Employers Posting Cybersecurity Network and Systems Security Administration Occupations in Bay Region and North Bay Sub-Region (Jan 2018 - Dec 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Employer | Bay | Employer | Bay | Employer | North Bay |
| Google Inc. | 310 | Wipro | 87 | General Dynamics | 21 |
| Cisco Systems Incorporated | 300 | Techfetch Com | 86 | Scoop Technologies | 14 |
| Accenture | 266 | University California | 78 | Ascent | 11 |
| Apple Inc. | 233 | University Of California Berkeley | 78 | California State University | 10 |
| IBM | 227 | Workday, Inc | 78 | Autodesk Incorporated | 9 |
| Deloitte | 225 | Cynet Systems | 75 | Biomarin Pharmaceutical Incorporated | 8 |
| Wells Fargo | 194 | Servicenow | 74 | Sonoma State University | 8 |
| Salesforce | 148 | Stanford University | 73 | County Sonoma | 7 |
| Facebook | 147 | SAP | 72 | In Shape Health Clubs Incorporated | 6 |
| Vmware Incorporated | 146 | Uber | 70 | Information Systems Solutions | 6 |
| Matchpoint Solutions Incorporated | 132 | Autodesk Incorporated | 69 | Genentech | 5 |
| Kaiser Permanente | 128 | Xoriant | 67 | Patrick Allen | 5 |
| Palo Alto Networks | 117 | Etouch Systems Corporation | 66 | Trinchero Family Estates | 5 |
| Oracle | 111 | Amazon | 65 | Westamerica Bancorporation | 5 |
| Republic Bancorp | 100 | Talbridge Limited | 65 | Accion Labs | 4 |

*Source: Burning Glass*

# Educational Supply

There are 14 community colleges in the Bay Region issuing 206 awards annually (3-year average) on TOP 0708.10 - Computer Networking. SRJC is the only college in the North Bay Sub-Region issuing awards on this TOP code, issuing 20 awards annually (3-year average).

**Table 7. Awards on TOP 0708.10 - Computer Networking in the Bay Region**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| College | Sub-Region | Headcount | Associates | Certificates | Total |
| Contra Costa | East Bay |  216  | 3 | 12 | 15 |
| Deanza | Silicon Valley |  151  | 10 | 10 | 19 |
| Diablo Valley | East Bay |  167  | 5 | 1 | 6 |
| Foothill | Silicon Valley |  n/a  | 1 |  | 1 |
| Gavilan | Silicon Valley |  24  | 4 | 1 | 5 |
| Las Positas | East Bay |  n/a  | 4 | 1 | 5 |
| Los Medanos | East Bay |  n/a  | 7 | 8 | 15 |
| Mission | Silicon Valley |  230  | 12 | 20 | 32 |
| Monterey | Santa Cruz & Monterey |  97  |  | 1 | 1 |
| Ohlone | East Bay |  495  | 3 | 17 | 20 |
| San Francisco | Mid-Peninsula |  1,289  |  | 50 | 50 |
| San Jose City | Silicon Valley |  154  | 6 | 7 | 13 |
| San Mateo | Mid-Peninsula | 38 |  |  |  |
| Santa Rosa | North Bay |  39  |  | 20 | 20 |
| Skyline | Mid-Peninsula |  n/a  | 4 | 1 | 5 |
| **Total Bay Region** |  **2,900**  |  **58**  |  **148**  |  **206**  |
| **Total North Bay Sub-Region** |  **39**  |  **0**  |  **20**  |  **20**  |

# *Source: IPEDS, Data Mart and Launchboard*

NOTE: Headcount of students who took one or more courses is for 2016-17. The annual average for awards is 2014-17 unless there are only awards in 2016-17. The annual average for other postsecondary is for 2013-16.

# Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 8,220 annual openings for the Cybersecurity Network and Systems Security Administration occupational cluster and 206 annual (3-year average) awards for an annual undersupply of 8,014 students. In the North Bay Sub-Region, there is also a gap with 268 annual openings and 20 annual (3-year average) awards for an annual undersupply of 248 students.

# Student Outcomes

**Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 0708.10 - Computer Networking**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2015-16 | Bay (All CTE Programs) | Santa Rosa Junior College (All CTE Programs) | State (0708.10) | Bay (0708.10) | North Bay (0708.10) | Santa Rosa Junior College (0708.10) |
| % Employed Four Quarters After Exit | 74% | 78% | 73% | 74% | 87% | 92% |
| Median Quarterly Earnings Two Quarters After Exit | $10,550 | $20,775 | $26,672 | $28,862 | $14,920 | $14,920 |
| Median % Change in Earnings | 46% | 50% | 40% | 45% | 99% | 95% |
| % of Students Earning a Living Wage | 63% | 62% | 70% | 74% | 83% | 83% |

*Source: Launchboard Pipeline (version available on 2/1/19)*

# Skills, Certifications and Education

**Table 9. Top Skills for Cybersecurity Network and Systems Security Administration Occupations in Bay Region (Jan 2018 - Dec 2018)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Skill | Postings | Skill | Postings | Skill | Postings |
| Linux | 5,692 | Technical Support | 2,472 | Transmission Control Protocol / Internet Protocol (TCP / IP) | 1,749 |
| Python | 4,956 | JavaScript | 2,329 | Quality Assurance and Control | 1,745 |
| Project Management | 4,815 | Systems Analysis | 2,286 | PERL Scripting Language | 1,702 |
| SQL | 4,665 | VMware | 2,138 | Virtualization | 1,640 |
| Information Security | 4,330 | Software Engineering | 2,126 | Software as a Service (SaaS) | 1,540 |
| System Administration | 4,163 | Network Security | 2,104 | DevOps | 1,536 |
| Java | 4,102 | Business Analysis | 2,082 | Change Management | 1,531 |
| Business Process | 3,796 | Budgeting | 1,998 | C++ | 1,447 |
| Oracle | 3,687 | SAP | 1,973 | Authentication | 1,438 |
| Software Development | 3,544 | Microsoft Active Directory | 1,950 | Enterprise Resource Planning (ERP) | 1,405 |
| Information Systems | 3,189 | Cisco | 1,900 | Information Technology Industry Knowledge | 1,348 |
| Customer Service | 3,105 | Scheduling | 1,832 | Customer Contact | 1,328 |
| Business Systems Analysis | 2,844 | Cryptography | 1,773 | Data Analysis | 1,311 |
| Business Systems | 2,717 | Domain Name System (DNS) | 1,751 | Technical Writing / Editing | 1,254 |
| UNIX | 2,572 | Salesforce | 1,749 | Ruby | 1,188 |

*Source: Burning Glass*

**Table 10. Certifications for Cybersecurity Network and Systems Security Administration Occupations in the Bay Region (Jan 2018 - Dec 2018)**

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) | 2,469 | Microsoft Certified Solutions Expert (MCSE) | 218 |
| Certified Information Systems Auditor (CISA) | 1,134 | Microsoft Certified Solutions Associate (MCSA) | 216 |
| SANS/GIAC Certification | 1,039 | Project Management Professional (PMP) | 215 |
| IT Infrastructure Library (ITIL) Certification | 950 | Cisco Certified Security Professional | 191 |
| Certified Information Security Manager (CISM) | 867 | Certified A+ Technician | 169 |
| Cisco Certified Network Associate (CCNA) | 539 | GIAC Certified Intrusion Analyst | 143 |
| Driver's License | 525 | CompTIA Network+ | 138 |
| Project Management Certification | 496 | Microsoft Certified Professional (MCP) | 100 |
| Security Clearance | 459 | GIAC Certified Forensic Analyst | 98 |
| Cisco Certified Network Professional (CCNP) | 432 | Systems Security Certified Practitioner (SSCP) | 98 |
| CompTIA Security+ | 389 | Red Hat Certified Engineer (RHCE) | 94 |
| Information Systems Certification | 378 | Certified Information Privacy Professional (CIPP) | 88 |
| Certified in Risk and Information Systems Control | 299 | Vmware Certified Professional (VCP) | 88 |
| ITIL Certification | 292 | GIAC Web Application Penetration Tester (GWAPT) | 86 |
| Cisco Certified Internetwork Expert (CCIE) | 262 | Certified in The Governance of Enterprise IT (CGEIT) | 81 |
| GIAC Certified Incident Handler (GCIH) | 253 | Check Point Certified Security Expert | 62 |
| GIAC Security Essentials (GSEC) | 225 | GIAC Exploit Researcher and Advanced Penetration Tester (GXPN) | 61 |

*Source: Burning Glass*

**Table 11. Education Requirements for Cybersecurity Network and Systems Security Administration Occupations in Bay Region**

Note: 47% 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 |
| High school or vocational training | 827 (5%) |
| Associate Degree | 517 (3%) |
| Bachelor’s Degree or Higher | 16,207 (92%) |

*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 CCCCO Data Mart.

# Sources

O\*Net Online

Labor Insight/Jobs (Burning Glass)

Economic Modeling Specialists International (EMSI)

CTE LaunchBoard [www.calpassplus.org/Launchboard/](http://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

For more information, please contact:

* Doreen O’Donovan, Data Research Analyst, for Bay Area Community College Consortium (BACCC) and Centers of Excellence (CoE), doreen@baccc.net or (831) 479-6481
* John Carrese, Director, San Francisco Bay Center of Excellence for Labor Market Research, jcarrese@ccsf.edu or (415) 267-6544