**Computer Networking Occupations**

**Labor Market Information Report**

**Las Positas College**

Prepared by the San Francisco Bay Center of Excellence

for Labor Market Research

November 2020

# Recommendation

Based on all available data, there appears to be an undersupply of Computer Networking workers compared to the demand for this cluster of occupations in the Bay Region and in the East Bay Sub-Region (Alameda and Contra Costa Counties). There is a projected annual gap of about 3,228 students in the Bay Region and 455 students in the East Bay Sub-Region.

**Introduction**

This report provides student outcomes data on employment and earnings for TOP 0708.00-Computer Infrastructure and Support programs 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 Las Positas College and in the region.

This report profiles Computer Networking Occupations in the 12 county Bay Region and in the East Bay Sub-Region for a proposed new program at Las Positas College.

|  |
| --- |
| * **Computer Network Architects (15-1143 / 15-1241):** Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning. May also design network and computer security measures. May research and recommend network and data communications hardware and software. Excludes “Information Security Analysts” (15-1122), “Network and Computer Systems Administrators” (15-1142), 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: 35% |
|  |
| * **Computer Network Support Specialists (15-1152 / 15-1231):** 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 (15-1122 / 15-1212):** 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% |
|  |
| * **Network and Computer Systems Administrators (15-1142 / 15-1244):** 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 Computer Networking** **Occupations in Bay Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2019 Jobs | 2024 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 25% Hourly Wage | Median Hourly Wage |
| Computer Network Architects |  7,689  |  8,688  | 999 | 13% |  3,897  |  779  | $53.17 | $70.04 |
| Computer Network Support Specialists |  6,417  |  7,464  | 1,048 | 16% |  3,896  |  779  | $29.20 | $39.11 |
| Information Security Analysts |  3,718  |  4,953  | 1,234 | 33% |  2,759  |  552  | $44.50 | $59.44 |
| Network and Computer Systems Administrators |  12,699  |  14,417  | 1,718 | 14% |  6,483  |  1,297  | $38.45 | $49.94 |
| **TOTAL** |  **30,523**  |  **35,522**  | **4,999** | **16%** |  **17,035**  |  **3,407**  | **$41.33** | **$54.63** |

*Source: EMSI 2020.3*

**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 Computer Networking Occupations** **in East Bay Sub-Region**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Occupation  | 2019 Jobs | 2024 Jobs | 5-Yr Change | 5-Yr % Change | 5-Yr Open-ings | Average Annual Open-ings | 25% Hourly Wage | Median Hourly Wage |
| Computer Network Architects |  1,366  |  1,387  | 20 | 1% |  515  |  103  | $47.87 | $60.42 |
| Computer Network Support Specialists |  1,304  |  1,384  | 80 | 6% |  633  |  127  | $27.41 | $35.72 |
| Information Security Analysts |  723  |  863  | 140 | 19% |  420  |  84  | $39.61 | $51.42 |
| Network and Computer Systems Administrators |  2,532  |  2,628  | 96 | 4% |  1,004  |  201  | $34.12 | $43.18 |
| **TOTAL** |  **5,925**  |  **6,262**  | **336** | **6%** |  **2,572**  |  **515** | **$37.25** | **$47.68** |

*Source: EMSI 2020.3*

**East Bay Sub-Region includes** Alameda and Contra Costa Counties

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

**Table 3. Number of Job Postings by Occupation for latest 12 months (November 2019 - October 2020)**

| **Occupation** | **Bay Region** | **East Bay Sub-Region** |
| --- | --- | --- |
| Information Security Analysts | 8,351 | 1,349 |
| Network and Computer Systems Administrators | 6,018 | 1,298 |
| Computer Network Architects | 4,376 | 822 |
| Computer Network Support Specialists | 1,058 | 162 |
| Telecommunications Engineering Specialists | 452 | 152 |
|  **TOTAL** | **20,255** | **3,783** |

*Source: Burning Glass*

**Table 4a. Top Job Titles for Computer Networking** **Occupations for latest 12 months (November 2019 - October 2020) Bay Region**

|  |  |  |  |
| --- | --- | --- | --- |
| **Common Title** | **Bay** | **Common Title** | **Bay** |
| Data Engineer | 1,604 | Linux Systems Administrator | 138 |
| Senior Data Engineer | 768 | Informatica Developer | 116 |
| Network Engineer | 632 | Lead Data Engineer | 114 |
| Systems Administrator | 602 | Senior Systems Administrator | 113 |
| Big Data Engineer | 399 | Network Architect | 103 |
| Senior Network Engineer | 287 | Senior Big Data Engineer | 94 |
| Security Engineer | 287 | Information Security Analyst | 91 |
| Salesforce Administrator | 258 | Network Security Engineer | 86 |
| ETL Developer | 184 | Windows Systems Administrator | 83 |
| Data Center Technician | 159 | Database Engineer | 83 |
| Senior Security Engineer | 153 | Cloud Security Engineer | 82 |
| Security Analyst | 151 | Network Administrator | 81 |
| Information Security Engineer | 143 |  |  |

**Table 4b. Top Job Titles for Computer Networking** **Occupations for latest 12 months (November 2019 - October 2020) East Bay Sub-Region**

|  |  |  |  |
| --- | --- | --- | --- |
| **Common Title** | **East Bay** | **Common Title** | **East Bay** |
| Data Engineer | 174 | Data Center Technician | 30 |
| Network Engineer | 135 | Hadoop Engineer | 27 |
| Systems Administrator | 113 | Security Analyst | 26 |
| Senior Data Engineer | 88 | Salesforce Administrator | 26 |
| Etl Developer | 75 | Windows Systems Administrator | 25 |
| Senior Network Engineer | 62 | SQL Developer | 23 |
| Big Data Engineer | 56 | Pl/Sql Developer | 23 |
| Security Engineer | 50 | Azure Data Engineer | 23 |
| Informatica Developer | 41 | Installation Coordinator | 20 |
| Network Architect | 40 | Etl Informatica Developer | 19 |
| Information Security Engineer | 33 | Disclosure Specialist | 19 |
| Senior Systems Administrator | 30 |  |  |

*Source: Burning Glass*

# Industry Concentration

**Table 5. Industries hiring Computer Networking** **Workers in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Industry – 6 Digit NAICS (No. American Industry Classification) Codes** | **Jobs in Industry (2019)** | **Jobs in Industry (2024)** | **% Change (2019-24)** | **% Occupation Group in Industry (2019)** |
| Custom Computer Programming Services | 6,908 |  8,497  | 23% | 19% |
| Computer Systems Design Services | 3,955 |  4,655  | 18% | 11% |
| Internet Publishing and Broadcasting and Web Search Portals | 2,223 |  2,774  | 25% | 6% |
| Data Processing, Hosting, and Related Services | 1,982 |  2,686  | 35% | 6% |
| Software Publishers | 1,771 |  2,294  | 30% | 5% |
| Corporate, Subsidiary, and Regional Managing Offices | 1,710 |  1,676  | -2% | 5% |
| Electronic Computer Manufacturing | 1,355 |  1,422  | 5% | 4% |
| Other Computer Related Services | 986 |  1,269  | 29% | 3% |
| Local Government, Excluding Education and Hospitals | 743 |  771  | 4% | 2% |
| Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) | 695 |  789  | 14% | 2% |
| Wired Telecommunications Carriers | 699 |  602  | -14% | 2% |
| Colleges, Universities, and Professional Schools (State Government) | 609 |  632  | 4% | 2% |
| Temporary Help Services | 515 |  522  | 1% | 1% |
| Colleges, Universities, and Professional Schools | 479 |  523  | 9% | 1% |
| Research and Development in Biotechnology (except Nanobiotechnology) | 430 |  563  | 31% | 1% |
| Commercial Banking | 377 |  419  | 11% | 1% |
| Engineering Services | 379 |  402  | 6% | 1% |

*Source: EMSI 2020.3*

**Table 6. Top Employers Posting Computer Networking** **Occupations in Bay Region and East Bay Sub-Region (November 2019 - October 2020)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Employer** | **Bay** | **Employer** | **Bay** | **Employer** | **East** **Bay** |
| Vmware Inc | 317 | Xoriant Inc | 105 | Wells Fargo | 83 |
| Wells Fargo | 305 | Anthem Blue Cross | 104 | Pacific Gas and Electric Co | 58 |
| Amazon | 288 | Salesforce | 92 | Facebook | 56 |
| Apple Inc. | 264 | KPMG | 90 | Lawrence Livermore National Laboratory | 55 |
| Facebook | 249 | Nsys Design Systems | 86 | Tesla | 45 |
| Cisco Systems Inc | 212 | Oracle | 83 | Amazon | 40 |
| IBM | 192 | Allied Universal | 81 | UC Berkeley | 36 |
| Deloitte | 174 | K Tek Resourcing LLC | 76 | Anthem Blue Cross | 31 |
| Google Inc. | 162 | Cynet Systems | 73 | Kaiser Permanente | 30 |
| Microsoft Corporation | 157 | Intelliswift Software | 71 | Blue Cross Blue Shield of Calif | 30 |
| Palo Alto Networks | 148 | Dell | 71 | UC Office Of The President | 29 |
| Pacific Gas and Electric Co | 145 | Wipro | 70 | Profile500 Corporation | 26 |
| Nvidia Corporation | 144 | Primus Global Services Inc | 70 | Tesla Motors | 25 |
| Infobahn Softworld Inc | 140 | Paypal | 68 | Matchpoint Solutions Inc | 24 |
| Accenture | 139 | SAP | 64 | Ascent Technology Services | 24 |
| Splunk | 110 | Matchpoint Solutions Inc | 64 | Workday, Inc | 23 |
| Lockheed Martin Corp | 107 | Capital One | 63 | Lockheed Martin Corporation | 23 |

*Source: Burning Glass*

# Educational Supply

There are three (3) community colleges in the Bay Region issuing 71 awards on average annually (last 3 years ending 2018-19) on TOP 0708.00-Computer Infrastructure and Support. In the East Bay Sub-Region there are two (2) colleges that issued 12 awards on average annually (last 3 years) on this TOP code.

There are five (5) other CTE Educational Institutions in the Bay Region issuing 53 awards on average annually (last 3 years ending 2016-17) on TOP 0708.00-Computer Infrastructure and Support. In the East Bay Sub-Region there are three (3) colleges that issued 48 awards on average annually (last 3 years) on this TOP code.

There is one (1) institution in the Bay Region issuing 55 Bachelor’s Degrees on TOP 0708.00-Computer Infrastructure and Support. In the East Bay Sub-Region there are no institutions issuing Bachelor’s Degrees on this TOP code.

**Table 7a. Community College Awards on TOP 0708.00-Computer Infrastructure and Support in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **College** | **Sub-Region** | **Associates** | **Certificate Low Unit** | **Total** |
| Los Medanos | East Bay | 6 | 5 | 11 |
| Ohlone | East Bay |  | 1 | 1 |
| San Francisco | Mid-Peninsula | 46 | 13 | 59 |
| **Total Bay Region** | **52** | **19** | **71** |
| **Total East** **Bay Sub-Region** | **6** | **6** | **12** |

# Source: Data Mart

Note: The annual average for awards is 2016-17 to 2018-19.

**Table 7b. Other CTE Institution Awards on TOP 0708.00-Computer** **Infrastructure and Support in Bay Region**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **College** | **Sub-Region** | **Associate Degree** | **Award < 1 academic yr** | **Grand Total** |
| Academy of Art University | Mid-Peninsula | 4 |  | 4 |
| Golden Gate University-San Francisco | Mid-Peninsula |  | 1 | 1 |
| ITT Technical Institute-Concord | East Bay | 6 |  | 6 |
| ITT Technical Institute-Oakland | East Bay | 4 |  | 4 |
| Unitek College | East Bay |  | 38 | 38 |
| **Total Bay Region** | **14** | **39** | **53** |
| **Total East Bay Sub-Region** | **10** | **38** | **48** |

# Source: Data Mart

Note: The annual average for awards is 2014-15 to 2016-17.

**Table 7c. Bachelor’s Degree Awards on TOP 0708.00-Computer Infrastructure and Support in Bay Region**

|  |  |  |
| --- | --- | --- |
| **College** | **Sub-Region** | **Bachelor’s Degree** |
| University of California-Santa Cruz | Monterey - Santa Cruz | 55 |
| **Total Bay Region** | **55** |
| **Total East** **Bay Sub-Region** | **0** |

# Source: Data Mart

Note: The annual average for awards is 2014-15 to 2016-17.

# Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay Region with 3,407 annual openings for the Computer Networking occupational cluster and 179 annual (3-year average) awards from community colleges and other institutions for an annual undersupply of 3,228 students. In the East Bay Sub-Region, there is also a gap with 515 annual openings and 60 annual (3-year average) awards from community colleges and other institutions for an annual undersupply of 455 students.

# Student Outcomes

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

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **2017-18** | **Bay** All CTE Programs | **Las Positas College** All CTE Programs | **State** 0708.00 | **Bay** 0708.00 | **East Bay** 0708.00 | **Las Positas College** 0708.00 |
| % Employed Four Quarters After Exit | 67% | 70% | 63% | 65% | 65% | 71% |
| Median Quarterly Earnings Two Quarters After Exit | $11,466 | $11,069 | $11,161 | $14,106 | $11,222 | $11,222 |
| Median % Change in Earnings | 31% | 30% | 21% | 21% | 26% | 26% |
| % of Students Earning a Living Wage | 53% | 52% | 64% | 61% | 53% | 55% |

*Source: Launchboard Pipeline (version available on August 2020)*

# Skills, Certifications and Education

**Table 9. Top Skills for Computer Networking** **Occupations in Bay Region (November 2019 - October 2020)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Skill** | **Postings** | **Skill** | **Postings** | **Skill** | **Postings** |
| Python | 9,745 | Customer Service | 2,629 | Scala | 1,856 |
| SQL | 7,896 | Network Engineering | 2,614 | Performance tuning | 1,816 |
| Linux | 6,245 | Data Warehousing | 2,552 | Virtualization | 1,807 |
| Java | 5,003 | Information Systems | 2,457 | PERL Scripting Language | 1,699 |
| Information Security | 4,304 | Software Engineering | 2,374 | Shell Scripting | 1,651 |
| Extraction Transformation and Loading (ETL) | 3,756 | Network Security | 2,227 | Machine Learning | 1,642 |
| System Administration | 3,574 | Apache Kafka | 2,190 | Database Administration | 1,638 |
| Big Data | 3,321 | Domain Name System (DNS) | 2,151 | NoSQL | 1,624 |
| Oracle | 3,289 | VMware | 2,149 | Data Engineering | 1,612 |
| Cisco | 3,138 | Data Science | 2,116 | Data Modeling | 1,601 |
| Software Development | 3,018 | Transmission Control Protocol / Internet Protocol (TCP / IP) | 2,104 | Microsoft Active Directory | 1,591 |
| Apache Hadoop | 3,010 | DevOps | 2,055 | Cryptography | 1,588 |
| UNIX | 2,991 | Technical Support | 2,018 | Good Clinical Practices (GCP) | 1,587 |
| Project Management | 2,952 | Apache Hive | 1,876 | Bash | 1,571 |
| Pipeline (Computing) | 2,727 | Kubernetes | 1,857 | Tableau | 1,562 |

*Source: Burning Glass*

**Table 10. Certifications for Computer Networking** **Occupations in Bay Region (November 2019 - October 2020)**

Note: 79% 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) | 2,339 | Certified in Risk and Information Systems Control | 410 |
| Certified Information Systems Auditor (CISA) | 1,078 | Project Management Certification | 296 |
| Cisco Certified Network Associate (CCNA) | 963 | Cisco Certified Security Professional | 274 |
| Cisco Certified Network Professional (CCNP) | 926 | Microsoft Certified Solutions Expert (MCSE) | 262 |
| Certified Information Security Manager (CISM) | 905 | Microsoft Certified Solutions Associate (MCSA) | 260 |
| SANS/GIAC Certification | 884 | GIAC Security Essentials Certification | 212 |
| IT Infrastructure Library (ITIL) Certification | 674 | GIAC Certified Incident Handler (GCIH) | 207 |
| Information Systems Certification | 623 | CompTIA Network+ | 184 |
| Security Clearance | 616 | Certified Salesforce Administrator | 172 |
| CompTIA Security+ | 599 | GIAC Certified Intrusion Analyst | 149 |
| Driver's License | 529 | Project Management Professional (PMP) | 139 |
| Cisco Certified Internetwork Expert (CCIE) | 501 | Microsoft Certified Professional (MCP) | 121 |

*Source: Burning Glass*

**Table 11. Education Requirements for Computer Networking** **Occupations in Bay Region**

Note: 51% 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 | 1,017 | 6% |
| Associate Degree | 411 | 3% |
| Bachelor’s Degree or Higher | 14,139 | 91% |

*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

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