

Network Systems Administration

Inland Empire/Desert Region (Riverside-San Bernardino-Ontario Metropolitan Statistical Area)

Summary

- Employment for the network systems administration occupational group is expected to increase **9% between 2017 and 2022** in the Inland Empire/Desert Region. A total of **4,279 job openings, or 856 annual openings** will be available over the five-year timeframe.
- The entry-level wage for each occupation in the network systems administration occupational group is **above the MIT Living Wage estimate of \$12.30 per hour** for a single adult living in the Inland Empire/Desert Region.
- **There appears to be an opportunity for program growth** based on the average annual number of program completions for the selected community college program in the region (**120 annual average regional credentials**), and the annual openings for network systems administration occupations in the local region (**856 average annual openings**).

Introduction

This report details job opportunities that are relevant to the computer networking program. Completion of this program provides graduates with the principles of local, metropolitan, and wide area computer networking design, installation, maintenance, and troubleshooting.¹ The occupations included in the network systems administration occupational group are:

- Computer Network Architects
- Computer Network Support Specialists
- Computer Systems Analysts
- Computer User Support Specialists
- Database Administrators
- Information Security Analysts
- Network and Computer Systems Administrators

¹ The Taxonomy of Programs, 6th Edition, February 2004
http://extranet.cccco.edu/portals/1/aa/credit/2013files/topmanual6_2009_09corrected_12.5.13.pdf

Job Opportunities

In 2017, there were 9,773 network systems administration jobs in the Inland Empire/Desert Region. This occupational group is projecting to increase employment by 9% in the region by 2022. Employers in the region will need to hire 4,279 workers during the same timeframe to backfill jobs that workers are permanently vacating (includes retirements). Appendix A, Table 1 displays job growth, wages, education, training, and work experience required for this occupational group.

Exhibit 1: Five-year projections for the network systems administration occupational group in the Inland Empire/Desert Region

Region	2017 Jobs	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Inland Empire/Desert	9,773	9%	4,279	856	15%

Source: EMSI 2018.3

On average, local employers fill online job posting for the network systems administration occupational group within 43 days. When compared to the national average, it takes one week longer for local employers to find qualified candidates to fill open positions in the Inland Empire/Desert Region. Exhibit 2 shows the number of job ads posted during the last 12 months for each occupation along with the regional and national average time to fill.

Exhibit 2: Job ads by each of the network systems administration occupations in the Inland Empire/Desert Region and time to fill, September 2017 - August 2018

Occupation	Job Ads	Regional Average Time to Fill (Days)	National Average Time to Fill (Days)
Computer User Support Specialists	674	39	33
Computer Systems Analysts	442	45	37
Network and Computer Systems Administrators	348	41	34
Computer Network Architects	259	49	41
Database Administrators	204	45	37
Information Security Analysts	187	48	40
Computer Network Support Specialists	36	39	32
TOTAL	2,150	-	-

Source: Burning Glass – Labor Insights

Earnings

The entry-level wage for each of the occupations in the network systems administration occupational group is above the MIT Living Wage estimate of \$12.30 per hour for a single adult living in the Inland Empire/Desert Region. Exhibit 3 displays wage information for this occupational group in the Inland Empire/Desert Region.

Exhibit 3: Earnings for the network systems administration occupational group in the Inland Empire/Desert Region

Occupation	Entry to Experienced Hourly Earnings Range*	Median Wage*	Average Annual Earnings
Information Security Analysts	\$29.77 to \$59.87	\$47.46	\$96,700
Computer Network Architects	\$32.71 to \$60.01	\$43.97	\$98,200
Database Administrators	\$30.25 to \$51.09	\$41.16	\$85,200
Computer Systems Analysts	\$30.27 to \$45.52	\$37.04	\$79,100
Network and Computer Systems Administrators	\$28.61 to \$45.86	\$35.93	\$77,700
Computer Network Support Specialists	\$24.74 to \$39.94	\$29.52	\$68,100
Computer User Support Specialists	\$20.27 to \$30.45	\$25.73	\$54,300

Source: EMSI 2018.3

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.

Employers, Skills, and Education

Exhibit 4 displays the top local employers posting ads for network systems administration occupations during the last 12 months.

Exhibit 4: Top employers posting job ads for the network systems administration occupational group in the Inland Empire/Desert Region during the last 12 months, September 2017 - August 2018

Occupation	Top Employers
Computer User Support Specialists (n=486)	<ul style="list-style-type: none"> • Best Buy • Riverside Health Systems
Computer Systems Analysts (n=373)	<ul style="list-style-type: none"> • San Bernardino County • San Manuel Indian Bingo Casino
Network and Computer Systems Administrators (n=265)	<ul style="list-style-type: none"> • International Management Systems • San Manuel Indian Bingo Casino
Computer Network Architects (n=162)	<ul style="list-style-type: none"> • San Manuel Indian Bingo Casino • San Bernardino Community College District
Database Administrators (n=137)	<ul style="list-style-type: none"> • ESRI • Advantage Solutions
Information Security Analysts (n=149)	<ul style="list-style-type: none"> • UnitedHealth Group • ESRI
Computer Network Support Specialists (n=30)	<ul style="list-style-type: none"> • UnitedHealth Group • San Bernardino County

Source: Burning Glass – Labor Insights

Exhibit 5 lists a sample of in-demand specialized and soft skills that employers are seeking when looking for workers to fill network systems administration positions.

Exhibit 5: Sample of in-demand skills from employer job ads for network systems administration occupations in the Inland Empire/Desert Region, September 2017 - August 2018

Occupation	Specialized skills	Employability skills	Software and Programming skills
Computer User Support Specialists (n=625)	<ul style="list-style-type: none"> Customer Service Repair Customer Contact 	<ul style="list-style-type: none"> Troubleshooting Communication Skills Problem Solving 	<ul style="list-style-type: none"> Microsoft Office SQL Virtual Private Networking (VPN)
Computer Systems Analysts (n=412)	<ul style="list-style-type: none"> Project Management Business Systems Information Systems 	<ul style="list-style-type: none"> Communication Skills Problem Solving Research 	<ul style="list-style-type: none"> SQL Microsoft Office Soft Development
Network and Computer Systems Administrators (n=323)	<ul style="list-style-type: none"> Technical Support Scheduling Software Installation 	<ul style="list-style-type: none"> Troubleshooting Planning Communication Skills 	<ul style="list-style-type: none"> VMware Microsoft Office Directory Microsoft Exchange
Computer Network Architects (n=246)	<ul style="list-style-type: none"> Network Engineering Telecommunications Technical Support 	<ul style="list-style-type: none"> Communication Skills Troubleshooting Teamwork/ Collaboration 	<ul style="list-style-type: none"> Voice over IP (VoIP) Cisco Switching Virtual Private Networking (VPN)
Database Administrators (n=197)	<ul style="list-style-type: none"> Data Warehousing Business Intelligence Extraction Transformation and Loading (ETL) 	<ul style="list-style-type: none"> Communication Skills Troubleshooting Problem Solving 	<ul style="list-style-type: none"> SQL Teradata DBA Oracle
Information Security Analysts (n=171)	<ul style="list-style-type: none"> Information Systems Cryptography Computer Hardware/Software Knowledge 	<ul style="list-style-type: none"> Teamwork/ Collaboration Communication Skills Research 	<ul style="list-style-type: none"> Linux Microsoft Office Software Development
Computer Network Support Specialists (n=33)	<ul style="list-style-type: none"> Information Systems Routers Project Management 	<ul style="list-style-type: none"> Planning Troubleshooting Communication Skills 	<ul style="list-style-type: none"> Windows Server UNIX Cisco Switching

Source: Burning Glass – Labor Insights

Exhibit 6 displays the entry-level education level education typically required to enter each occupation according to the Bureau of Labor Statistics, educational attainment for incumbent workers with “some college, no degree” and an “associate degree” according to the U.S. Census, and the minimum advertised education requirement requested by employers in online job ads.

Exhibit 6: Educational attainment and online job ads with minimum advertised education requirements for the network systems administration occupational group in the Inland Empire/Desert Region, September 2017 - August 2018

Occupation	Work Experience Required	Typical Entry-Level Education Requirement	Two-Year Postsecondary Level of Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
				Number of Job Postings (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Computer User Support Specialists	None	Some college, no degree	41%	327	48%	17%	35%
Computer Systems Analysts	None	Bachelor's degree	21%	310	12%	12%	76%
Network and Computer Systems Administrators	None	Bachelor's degree	38%	228	14%	5%	81%
Computer Network Architects	5 years or more	Bachelor's degree	35%	172	13%	7%	80%
Database Administrators	None	Bachelor's degree	21%	124	36%	2%	62%
Information Security Analysts	Less than 5 years	Bachelor's degree	27%	142	13%	10%	77%
Computer Network Support Specialists	None	Associate's degree	41%	25	36%	12%	52%

Source: EMSI 2018.3, Current Population Survey, Burning Glass – Labor Insights

*Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework

Student Completions

Exhibits 7 shows the annual average regional community college credentials (associate degrees and certificates) conferred during the three academic years between 2014 and 2017, with the relevant TOP code and the titles used at each college, sourced from the Chancellor's Office Curriculum Inventory (COCI). Credentials granted from other educational institutions from 2013 to 2016 are displayed in Exhibit 8, along with the relevant CIP code. Please note, a credential is not equivalent to a single person in search of a job opening since a student may earn more than one credential, such as an associate degree in addition to a certificate. Community College student outcome information is from the CTE LaunchBoard based on the selected TOP code and region

Exhibit 7: Annual average community college student completions for computer networking programs in the Inland Empire/Desert

0708.10 Computer Networking	Annual Community College Headcount (2016-17)	Community College Annual Average Credentials (2014-17)
Chaffey	173	
Certificate 30 to < 60 semester units		48
Certificate 18 to < 30 semester units		50
Certificate 6 to < 18 semester units		2
Mt. San Jacinto	103	
Certificate 30 to < 60 semester units		2
Riverside	136	
Certificate 6 to < 18 semester units		15
Victor Valley	28	
Total Community College Headcount (2016-17)	439	
Total Annual Average Community College Credentials (2014-17)		117

Source: LaunchBoard, IPEDS

*Chaffey issued one certificate in 2014-15

0708.10 Computer Networking program outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless noted otherwise]:

- Number of course enrollments: 618 (California median: 168) [2016-17]
- Number of students who transferred to a 4-year institution: 22 (CA:15)
- Employed in the second fiscal quarter after exit: 74% (CA: 73%)
- Median earnings in the second fiscal quarter after exit: \$9,057 (CA: \$11,587)
- Employed in the fourth fiscal quarter after exit: 75% (CA: 73%)
- Median annual earnings: \$37,408 (CA: \$41,662)
- Job closely related to field of study: 74% (CA: 75%%) [2014-15]
- Median change in earnings: 29%(CA: 40%)
- The proportion of students who attained a living wage: 61% (CA: 74%)

Exhibit 8: Annual average other educational program student completions for computer support specialist programs in the Inland Empire/Desert Region

11.0901 Computer Systems Networking and Telecommunications (CIP Program)	Other Educational Institutions Annual Average Certificates or Other Credit Credentials (2013-16)
University of Redlands	
Award 1 < 2 academic yrs	3
Total annual average other credentials	3

Source: IPEDS

Sources

Chancellor’s Office Curriculum Inventory (COCI, version 2.0)
 Economic Modeling Specialists International (EMSI)
 The Integrated Postsecondary Education Data System (IPEDS)
 Labor Insight/Jobs (Burning Glass)
 LaunchBoard
 MIT Living Wage Calculator
 O*Net Online
 Taxonomy of Programs, 6th Edition

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Appendix A: Occupation definitions, sample job titles, five-year projections, and earnings for network systems administration occupations

Occupation Definitions (SOC code), Education and Training Requirement, Community College Education Attainment

Computer Systems Analysts (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.

Sample job titles: Applications Analyst, Business Analyst, Business Systems Analyst, Computer Analyst, Computer Systems Analyst, Computer Systems Consultant, Information Systems Analyst (ISA), Information Technology Analyst (IT Analyst), System Analyst, Systems Analyst

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 21%

Information Security Analysts (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.

Sample job titles: Data Security Administrator, Information Security Officer, Information Security Specialist, Information Systems Security Analyst, Information Systems Security Officer, Information Technology Security Analyst (IT Security Analyst), Information Technology Specialist, Network Security Analyst, Security Analyst, Systems Analyst

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 27%



Database Administrators (15-1141)

Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. May plan, coordinate, and implement security measures to safeguard computer databases.

Sample job titles: Data Architect, Database Administration Manager, Database Administrator (DBA), Database Analyst, Database Coordinator, Database Developer, Database Programmer, Information Systems Manager, Management Information Systems Director (MIS Director), System Administrator

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 21%

Network and Computer Systems Administrators (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.

Sample job titles: Information Analyst, Information Systems Manager (IS Manager), Information Technology Specialist (IT Specialist), LAN Specialist (Local Area Network Specialist), Local Area Network Administrator (LAN Administrator), Network Administrator, Network Coordinator, Network Manager, Network Specialist, Systems Administrator

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 38%



Computer Network Architects (15-1143)

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.

Sample job titles: Design Engineer, Network Analyst, Network and Security Engineer, Network Consultant, Network Systems Consultant, Networking Systems and Distributed Systems Engineer, Solutions Architect, Telecommunications Analyst

Entry-Level Educational Requirement: Bachelor's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 35%

Computer User Support Specialists (15-1151)

Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or 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.

Sample job titles: Computer Specialist, Computer Support Specialist, Computer Technician, Desktop Support Technician, Help Desk Analyst, Help Desk Technician, Information Technology Specialist (IT Specialist), Network Technician, Support Specialist, Technical Support Specialist

Entry-Level Educational Requirement: Some college, no degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 41%



Computer Network Support Specialists (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.

Sample job titles: Computer Network Specialist, IT Consultant (Information Technology Consultant), Network Engineer, Network Specialist, Network Support Specialist, Network Technical Analyst, Network Technician, Personal Computer Network Analyst, Senior IT Assistant (Senior Information Technology Assistant), Systems Specialist

Entry-Level Educational Requirement: Associate's degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary

Coursework: 41%

Table 1. 2017 to 2022 job growth, wages, education, training, and work experience required for the network systems administration occupational group, Inland Empire/Desert Region

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage*	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Computer User Support Specialists (15-1151)	3,766	352	9%	353	\$20.27 to \$30.45	\$25.73	\$54,300	Some college, no degree & none	None
Computer Systems Analysts (15-1121)	2,104	146	7%	167	\$30.27 to \$45.52	\$37.04	\$79,100	Bachelor's degree & none	None
Network and Computer Systems Administrators (15-1142)	1,828	144	8%	146	\$28.61 to \$45.86	\$35.93	\$77,700	Bachelor's degree & none	None
Computer Network Support Specialists (15-1152)	1,110	95	9%	102	\$24.74 to \$39.94	\$29.52	\$68,100	Associate degree & none	None
Database Administrators (15-1141)	480	45	9%	41	\$30.25 to \$51.09	\$41.16	\$85,200	Bachelor's degree & none	None
Computer Network Architects (15-1143)	312	34	11%	28	\$32.71 to \$60.01	\$43.97	\$98,200	Bachelor's degree & none	5 years or more
Information Security Analysts (15-1122)	175	31	18%	19	\$29.77 to \$59.87	\$47.46	\$96,700	Bachelor's degree & none	Less than 5 years
Total	9,773	849	9%	856	-	-	-	-	-

Source: EMSI 2018.3

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage