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Computer Infrastructure and Support

Computer Information Technology Programs

June 2018

Research Summary

The Los Angeles/Orange County Center of Excellence (COE) compiled this report to provide regional labor market supply and demand data related to **computer information technology.**

The following list summarizes key findings from this data brief:

- The number of jobs for computer information technology occupations is expected to increase by 5% over the next five years, resulting in **3,352 annual openings**.
- In 2017, there were **9,508 middle-skill job postings for computer information technology occupations** in Los Angeles County.
- Of the employer job postings that specified a required education level, **74% of middle-skill job postings listed a high school diploma or vocational training.**
- Between 2014 and 2017, community colleges in the county conferred an average of **522 awards annually** (associate degrees and certificates) in a related training program.

Occupation Codes and Descriptions

Currently, there are six occupations in the standard occupational classification (SOC) system related to **Computer Infrastructure and Support (TOP 0708)**. The occupation titles, descriptions, and reported job titles are included in Exhibit 1.

Exhibit 1 – Occupations, description, and sample job titles

SOC Code	Title	Description	Sample of Reported Job Titles
15-1122	Information Security Analysts	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.	Computer Security Specialist, Computer Specialist, Data Security Administrator, Information Security Analyst, Information Security Manager, Information Security Officer, Information Security Specialist, Information Systems Security Analyst, Information Technology Security Analyst, Information Technology Specialist
15-1141	Database Administrators	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.	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
15-1142	Network and Computer Systems Administrators	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.	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

15-1143	Computer Network Architects	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.	Network Analyst, Network Consultant, Network Engineer, Network Manager, Networking Systems and Distributed Systems Engineer, System Programmer, Systems Analyst, Systems Engineer, Telecommunications Analyst, Telecommunications Engineer
15-1151	Computer User Support Specialists	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.	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
15-1152	Computer Network Support Specialists	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.	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

Source: O*NET Online

Current and Future Employment

In Los Angeles County, the number of jobs for occupations related to computer information technology is expected to increase by 5% over the next five years. More than 3,350 job opportunities will be available annually for these occupations through 2022 due to new job growth and replacement need (e.g., retirements). Exhibit 2 contains detailed employment projections data for these occupations.

Exhibit 2 – Five-year projections for computer information technology occupations

SOC	Occupation	2017 Jobs	2022 Jobs	2017 – 2022 Change	2017 – 2022 % Change	Annual Openings
15-1151	Computer User Support Specialists	18,997	20,151	1,154	6%	1,637
15-1142	Network and Computer Systems Administrators	10,466	10,842	376	4%	729
15-1152	Computer Network Support Specialists	5,002	5,224	222	4%	412
15-1143	Computer Network Architects	2,960	3,083	123	4%	217
15-1141	Database Administrators	2,666	2,839	173	6%	208
15-1122	Information Security Analysts	1,830	1,950	120	7%	148
	TOTAL	**41,920**	**44,089**	**2,169**	**5%**	**3,352**

Source: EMSI 2018.2 – QCEW, non-QCEW, Self-Employed.

Earnings

In Los Angeles County, the entry-level average wage for all six of the computer information technology occupations in this report is above the MIT Living Wage[1] estimate of $13.54 per hour for a single adult. The average annual earnings for these occupations in the region is in a range between $57,000 and $118,000 per year, assuming full-time employment.

Exhibit 3 contains hourly wages and annual average earnings for the occupations studied in this report. Entry-level hourly earnings is represented by the 10th percentile of wages, median hourly earnings is represented by the 50th percentile of wages, and experienced hourly earnings is represented by the 90th percentile of wages, demonstrating various levels of employment.

[1] MIT Living Wage Calculator. http://livingwage.mit.edu/

Exhibit 3 – Earnings for computer information technology occupations

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings	Average Annual Earnings
15-1151	Computer User Support Specialists	$15.00	$26.44	$41.88	$57,000
15-1152	Computer Network Support Specialists	$20.46	$33.48	$56.83	$75,000
15-1142	Network and Computer Systems Administrators	$22.80	$41.89	$64.77	$89,000
15-1141	Database Administrators	$24.58	$46.95	$69.95	$96,000
15-1122	Information Security Analysts	$30.06	$50.69	$71.91	$105,000
15-1143	Computer Network Architects	$32.11	$56.64	$79.05	$118,000

Source: EMSI 2018.2 – QCEW, non-QCEW, Self-Employed.

Employer Job Postings

In this research brief, real-time labor market information is used to provide a more nuanced view of the current job market, as it captures job advertisements for occupations relevant to the field of study. Employer job postings are consulted to understand who is employing middle-skill computer information technology workers, and what they are looking for in potential candidates. To identify middle-skill job postings related to computer information technology, the following SOC codes were used:

- Information Security Analysts (15-1122)
- Database Administrators (15-1141)
- Network and Computer Systems Administrators (15-1142)
- Computer Network Architects (15-1143)
- Computer User Support Specialists (15-1151)
- Computer Network Support Specialists (15-1152)

Once these computer information technology jobs were identified, postings that require an education level of a bachelor's degree or higher were removed from this brief.

Top Occupations

In 2017, there were 9,508 employer postings in Los Angeles County for middle-skill computer information technology occupations. Nearly half of the postings (42%) were for computer user support specialists (3,970 job postings).

Exhibit 4 – Top occupations in job postings (n=9,508)

SOC Code	Occupation	Job Postings, Full Year 2017
15-1151	Computer User Support Specialists	3,970
15-1142	Network and Computer Systems Administrators	1,690
15-1141	Database Administrators	1,559
15-1122	Information Security Analysts	1,061
15-1143	Computer Network Architects	1,021
15-1152	Computer Network Support Specialists	207

Source: Labor Insight/Jobs (Burning Glass)

Top Titles

The most common titles for middle-skill computer information technology jobs are listed in Exhibit 5. Help desk technician was mentioned in 15% of all relevant job postings (1,434 postings).

Exhibit 5 –Job titles (n=9,508)

Title	Job Postings, Full Year 2017
Help Desk Technician	1,434
Desktop Support Technician	879
Systems Administrator	662
Network Engineer	416
Network Administrator	277
Database Administrator	262
Information Security Technician	262
Data Engineer	154
Security Analyst	149
Security Engineer	147
Network Support Technician	142
Linux Systems Administrator	112

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 6 lists the major employers hiring middle-skill professionals in the field of computer information technology. Top employers postings job ads included Best Buy, KRG Technologies, and SMCI. The top worksite cities in the region for these occupations were Los Angeles, El Segundo, Pasadena, Burbank, and Torrance.

Exhibit 6 – Top employers (n=4,196)

Employer	Job Postings, Full Year 2017
Best Buy	178
KRG Technologies	133
SMCI	108
Advantage Sales & Marketing	95
Calance	48
UCLA Health	41
Mantech International	38
Smartech And Associates	38
Northrop Grumman	35
University of Southern California	33

Source: Labor Insight/Jobs (Burning Glass)

Certifications and Job Skills

Certified A+ Technician is the most sought after certification for these occupations, and was included on 22% of the postings that specified a certification. Other certifications that were largely present on postings were Cisco Certified Network Professional (CCNP) (12% of postings) and IT Infrastructure Library (ITIL) Certification (12%). Job-specific software skills desired by employers include SQL, Linux, VMware, Virtual Private Networking (VPN) and UNIX.

Exhibit 7 –Job certifications (n=2,038) and job skills (n=8,258)

Certifications	Job Postings, Full Year 2017	Software Skills	Job Postings, Full Year 2017
Certified A+ Technician	453	SQL	1,268
Cisco Certified Network Professional (CCNP)	253	Linux	1,122
IT Infrastructure Library (ITIL) Certification	251	VMware	650
Cisco Certified Network Associate (CCNA)	237	Virtual Private Networking (VPN)	527

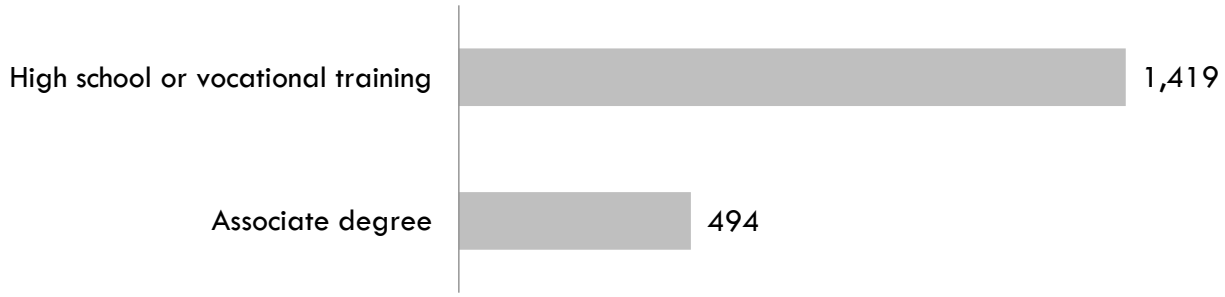
Certified Information Systems Security Professional (CISSP)	235	UNIX	520
CompTIA Network+	188	SQL Server	480
CompTIA Security+	169	Python	476
Microsoft Certified Professional (MCP)	146	Oracle	473
Cisco Certified Internetwork Expert (CCIE)	135	Voice over IP (VoIP)	460
Microsoft Certified Solutions Associate (MCSA)	111	Java	459

Source: Labor Insight/Jobs (Burning Glass)

Advertised Education Levels

Exhibit 8 displays the education level requested by employers in online job ads. The majority of employers were looking for a candidate with a high school diploma or vocational training (74% of postings). Approximately 80% of job postings did not specify a level of education.

Exhibit 8 – Advertised education requirements for middle-skill computer information technology jobs (n=1,913)



Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 9 shows the typical entry-level education requirement for the occupations of interest, along with the typical on-the-job training, and percentage of workers in the field who hold a community college award or have completed some postsecondary courses. Between 23% and 45% of the computer information technology workforce has completed some community college education as their highest level of education.

Exhibit 9 – Education and training requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training	% of Community College Award Holders or Some Postsecondary Coursework
15-1122	Information Security Analysts	Bachelor's degree	None	28%
15-1141	Database Administrators	Bachelor's degree	None	23%
15-1142	Network and Computer Systems Administrators	Bachelor's degree	None	40%
15-1143	Computer Network Architects	Bachelor's degree	None	37%
15-1151	Computer User Support Specialists	Some college, no degree	None	45%
15-1152	Computer Network Support Specialists	Associate degree	None	45%

Source: EMSI, Bureau of Labor Statistics Employment Projections (Educational Attainment)

In Los Angeles County, all 19 community colleges in the county have conferred awards in programs that may train students for the occupations of interest. Between 2014 and 2017, there was an average of 522 community college awards conferred annually across nine related training programs. It is important to note that an award is not equivalent to a single person in search of a job opening, since a student may earn more than one award (e.g. an associate degree and a certificate).

Exhibit 10 – CCC Student Awards (by TOP and College)

TOP Code	Program	College	2014-15 Awards	2015-16 Awards	2016-2017 Awards	3-Year Award Average
0701.00	Information Technology, General	East LA	N/A	4	8	6
		LA Mission	N/A	N/A	4	4
		LA Southwest	N/A	3	N/A	3
		Long Beach	7	10	27	15
		Mt San Antonio	104	83	61	83
		West LA	2	2	3	2
		Subtotal/Average	**113**	**102**	**103**	**106**

0702.00	Computer Information Systems	Citrus	N/A	N/A	5	5
		Compton	2	2	1	2
		East LA	16	14	14	15
		El Camino	12	24	15	17
		Glendale	1	3	2	2
		LA City	2	4	2	3
		LA Harbor	2	N/A	N/A	2
		LA Mission	4	9	3	5
		LA Trade	19	14	22	18
		Pasadena	N/A	N/A	2	2
		Rio Hondo	9	10	10	10
		West LA	11	5	10	9
		Subtotal/Average	**78**	**85**	**86**	**83**
0702.10	Software Applications	Cerritos	2	2	4	3
		LA City	N/A	N/A	2	2
		LA Mission	3	N/A	2	3
		LA Southwest	3	1	2	2
		Mt San Antonio	1	1	2	1
		Pasadena	N/A	N/A	2	2
		Santa Monica	12	21	17	17
		Subtotal/Average	**21**	**25**	**31**	**26**
0707.10	Computer Programming	Cerritos	1	1	1	1
		East LA	8	4	5	6
		Glendale	3	4	1	3
		LA City	N/A	N/A	43	43
		LA Mission	1	1	2	1
		LA Pierce	8	4	5	6
		LA Southwest	1	1	2	1
		LA Valley	7	12	26	15
		Long Beach	1	1	N/A	1
		Mt San Antonio	72	66	68	69
		Pasadena	5	6	1	4
		Santa Monica	24	29	25	26
		Subtotal/Average	**131**	**129**	**179**	**146**

0707.20	Database Design and Development	Mt San Antonio	3	7	11	7
		Santa Monica	1	1	2	1
		Subtotal/Average	**4**	**8**	**13**	**8**
0707.30	Computer Systems Analysis	Cerritos	1	3	6	3
		Subtotal/Average	**1**	**3**	**6**	**3**
0708.00	Computer Infrastructure and Support	Citrus	6	9	N/A	8
		LA Valley	N/A	N/A	3	3
		Long Beach	1	1	1	1
		Mt San Antonio	15	12	16	14
		Subtotal/Average	**22**	**22**	**20**	**21**
0708.10	Computer Networking	Cerritos	5	5	10	7
		LA City	9	6	11	9
		LA Pierce	16	21	32	23
		Long Beach	12	11	25	16
		Mt San Antonio	11	2	9	7
		West LA	35	55	47	46
		Subtotal/Average	**88**	**100**	**134**	**107**
0708.20	Computer Support	Glendale	1	4	2	2
		LA Pierce	6	12	12	10
		Long Beach	2	N/A	N/A	2
		Pasadena	10	12	1	8
		Subtotal/Average	**19**	**28**	**15**	**21**
		Total	**477**	**502**	**587**	**522**

Source: California Community Colleges Chancellor's Office MIS Data Mart

Student Outcomes

The CTE LaunchBoard provides student outcome data on the effectiveness of CTE programs. The following student outcome information was collected from exiters of the Information Technology, General Taxonomy of Program (TOP) code (0701.00) in Los Angeles County for the 2015-16 academic year.

- Median earnings in the second fiscal quarter after program completion is $8,426
- 50% of students are earning a living wage
- 66% of students are employed within six months after completing a program

Computer Information Systems Taxonomy of Program (TOP) code (0702.00):

- Median earnings in the second fiscal quarter after program completion is $10,249
- 44% of students are earning a living wage
- 67% of students are employed within six months after completing a program

Software Applications Taxonomy of Program (TOP) code (0702.10):

- The Median earnings in the second fiscal quarter after program completion is $9,709
- 61% of students are earning a living wage
- 69% of students are employed within six months after completing a program

Computer Programming Taxonomy of Program (TOP) code (0707.10):

- Median earnings in the second fiscal quarter after program completion is $9,282
- 51% of students are earning a living wage
- 57% of students are employed within six months after completing a program

Database Design and Development Taxonomy of Program (TOP) code (0707.20):

- Median earnings in the second fiscal quarter after program completion is $7,984
- 68% of students are earning a living wage
- 69% of students are employed within six months after completing a program

Computer Systems Analysis Taxonomy of Program (TOP) code (0707.30):

- Median earnings in the second fiscal quarter after program completion is $7,877
- 58% of students are earning a living wage
- 86% of students are employed within six months after completing a program

Computer Infrastructure and Support Taxonomy of Program (TOP) code (0708.00):

- Median earnings in the second fiscal quarter after program completion is $8,508
- 54% of students are earning a living wage
- 65% of students are employed within six months after completing a program

Computer Networking Taxonomy of Program (TOP) code (0708.10):

- Median earnings in the second fiscal quarter after program completion is $8,402
- 60% of students are earning a living wage
- 60% of students are employed within six months after completing a program

Computer Support Taxonomy of Program (TOP) code (0708.20):

- Median earnings in the second fiscal quarter after program completion is $7,173
- 44% of students are earning a living wage
- 82% of students are employed within six months after completing a program

Source: CTE LaunchBoard

Sources

O*Net Online, Labor Insight/Jobs (Burning Glass), Economic Modeling Specialists International (EMSI), MIT Living Wage Calculator, Bureau of Labor Statistics (BLS) Education Attainment, California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, CTE LaunchBoard, and Statewide CTE Outcomes Survey

Notes

Data included in this analysis represents the labor market demand for positions most closely related to computer information technology. Standard occupational classification (SOC) codes were chosen based on the national education level required for employment (associate degree and postsecondary certificate) as well as the proportion of current workers who hold a community college award or have had some community college training. This selection process narrows the labor market analysis to the most relevant employment opportunities for students with community college education and/or training.

Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study and should not be used to establish current job openings, because the numbers may include duplicate job postings or postings intended to gather a pool of applicants. Real-time labor market information can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions.