Amazon Web Services & Cloud Computing IT Support

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Prepared by the Los Angeles/Orange County Center of Excellence for Labor Market Research

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Program Recommendation

The Los Angeles/Orange County Center of Excellence (COE) compiled this report to provide regional labor market data for the program recommendation of Amazon Web Services (AWS) and cloud computing IT support. This report intends to determine whether there is demand in the local labor market that is not being met by the supply from programs of study.

Based on the labor market supply and demand data, the COE has determined that **there seems to be an unmet need** for the AWS and cloud computing IT support program in Los Angeles County.

Here are a few important notations to consider:

- The number of jobs that are most likely to use Amazon Web Services and/or cloud computing **will increase by 6% over the next five years,** and average annual earnings for these occupations range between $57,000 and $118,000.
- The typical education most workers need to enter the workforce varies for each occupation studied in this report. Of the six, four typically require a bachelor's degree; the **remaining two typically require some type of community college training.**
- For the four occupations that typically require a bachelor's degree**, between 23% and 40% of the workforce has completed some community college education as their highest level of education,** signaling that some may not be relevant to community college students.
- There were over **4,800 ads in 2017 for jobs** related to Amazon Web Services and/or cloud computing.
- Between 2014 and 2017, community colleges in Los Angeles County **conferred an average of 149 annual awards** for programs related to computer and network programming, signaling a possible undersupply of qualified candidates to fill new positions.

Occupation Codes and Descriptions

Cloud computing refers to the practice of delivering computing services, such as servers, storage, databases, networking, software, analytics, etc., over the internet (cloud), rather than using a local server or personal computer. Amazon Web Services (AWS) provides a platform for cloud computing services. Knowledge and experience with cloud computing and/or AWS are technical skills that employers are looking for, rather than job titles or occupation codes. Therefore, this data brief will narrow in on traditional information technology (IT) occupations that are most likely to use cloud computing and/or AWS as the technology becomes more prevalent.

Real-time labor market information will provide information on which employers are searching for employees with knowledge of cloud computing and/or AWS, based on the use of the keywords in job postings. This data brief will focus on six occupations in the standard occupational classification (SOC) system and one new and emerging O*NET occupation[1]. 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
15-1121	Computer Systems Analysts	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.	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
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
15-1142	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	Information Analyst, Information Systems Manager (IS Manager), Information Technology Specialist (IT Specialist), LAN Specialist (Local Area Network Specialist), Local Area

[1] New and emerging occupations (N&E) are incorporated into the O*NET-SOC classification system based on the evolving nature of workforce requirements stemming from changes in technology, society, law, and business practices. Incorporating N&E occupations into the O*NET system makes O*NET information more beneficial and responsive. https://www.onetcenter.org/reports/NewEmerging.html

		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.	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
15-1199.02	Computer Systems Engineers/ Architects	Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions.	Electronic Data Interchange System Developer (EDI System Developer), System Architect, Systems Engineer

Source: O*NET Online

Current and Future Employment

In Los Angeles County, the number of jobs for occupations related to IT support and administration is expected to increase by 6% over the next five years. Nearly 4,400 job opportunities will be available annually for this occupation group 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 IT support occupations, 2017-2022

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
15-1121	Computer Systems Analysts	15,667	16,757	1,090	7%	1,240
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
15-1122	Information Security Analysts	1,830	1,950	120	7%	148
	TOTAL	**54,921**	**58,006**	**3,085**	**6%**	**4,384**

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

Earnings

In Los Angeles County, the entry-level average wage for the occupations studied is between $15.00 and $32.11 per hour, which is above the MIT Living Wage[2] estimate of $13.54 per hour for a single adult. The average annual earnings for occupations below range between $57,000 and $118,000 per year, assuming full-time employment.

Note: four of the six occupations typically require at least a have a bachelor's degree, which explains the high hourly wages.

Exhibit 3 contains hourly wages and annual average earnings for the occupation group 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.

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

Exhibit 3 – Earnings for IT support occupations, 2017-2022

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
15-1121	Computer Systems Analysts	$24.60	$42.59	$67.41	$92,000
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 data 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 searching for employees with knowledge of cloud computing and/or AWS and what they are looking for in potential candidates. To identify postings for IT support jobs with knowledge of cloud computing and/or AWS, the following search terms were applied:

- Skill level: High School or vocational training; associate degree; no education specified
- Keywords: Cloud, Amazon Web Service*, AWS

Top Titles

The most common job titles for IT support jobs with knowledge of cloud computing and/or AWS are listed in Exhibit 4. Software Development Engineer was mentioned in 7% of all relevant job postings (345 postings).

Exhibit 4 –Job titles (n=4,817)

Title	Job Postings, Full Year 2017
Software Development Engineer	345
DevOps Engineer	282
Java Developer	116

Systems Administrator	109
Solutions Architect	108
Systems Engineer	98
Developer	91
Senior DevOps Engineer	90
Data Engineer	77
PHP Developer	70
Network Engineer	67
Java Engineer	65
Senior Systems Engineer	65
Front End Developer	60
Security Engineer	56
Python Developer	55
Architect/Administrator	53
Senior Developer	53
Applications Developer	47
Web Developer	45

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 5 lists the major employers hiring IT support professionals with knowledge of cloud computing and/or AWS. Top employers postings job ads included Deloitte, KRG Technologies, and Automatic Data Processing Incorporated. The top worksite cities in the region for these occupations were Los Angeles, Santa Monica, El Segundo, Burbank, and Pasadena.

Exhibit 5 – Top employers (n=2,232)

Employer	Job Postings, Full Year 2017
Deloitte	96
KRG Technologies	83
Automatic Data Processing Incorporated	73
SMCI	66
Portal Technology Incorporated	53
Accenture	51
Odesus Incorporated	33
NTT Data	28
SADA Systems Incorporated	25
NBC	23

Source: Labor Insight/Jobs (Burning Glass)

Job Skills

While all jobs in this real-time labor market search included "cloud" or "AWS" as keywords, employers were also searching for other technical knowledge, skills and abilities in potential employees. Exhibit 6 lists other software and/or specialized skills mentioned in job postings.

Exhibit 6 –Software and technical skills (n=4,613)

Software/Specialized Skills	Job Postings, Full Year 2017	Software/Specialized Skills	Job Postings, Full Year 2017
Java	1,281	Microsoft C#	429
Linux	1,267	Puppet	428
Python	1,198	Ruby	423
SQL	1,193	AngularJS	421
JavaScript	1,111	Scrum	421
MySQL	699	UNIX	378
Git	690	Ansible	363
Hypertext Preprocessor (PHP)	528	Bash	354
NoSQL	514	SQL Server	354
Oracle	439	HTML5	352

Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 7 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. About 45% of the workforce in computer support occupations [computer user support specialists (15-1151) and computer network support specialists (15-1152)] has completed some community college education as their highest level of education.

Exhibit 7 – Education and training requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training	% of Community College Award Holders or Some Postsecondary Coursework
15-1121	Computer Systems Analysts	Bachelor's degree	None	23%
15-1122	Information Security Analysts	Bachelor's degree	None	28%
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, ten community colleges have conferred awards in programs that train students in the field of computer networking, infrastructure, and support. Between 2014 and 2017, there was an average of 149 community college awards conferred annually across three programs: computer infrastructure and support (0708.00), computer networking (0708.10) and computer support (0708.20). 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 8 – CCC Student Awards (by TOP and College)

TOP Code	Program	College	2014-2015 Awards	2015-2016 Awards	2016-2017 Awards	3-Year Award Average
0708.00	Computer Infrastructure and Support	Citrus	6	9	-	8
		LA Valley	-	-	3	3
		Long Beach	1	1	1	1
		Mt. San Antonio	15	12	16	14
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
0708.20	Computer Support	Glendale	1	4	2	2
		LA Pierce	6	12	12	10
		Long Beach	2	-	-	2
		Pasadena	10	12	1	8
		TOTAL	**129**	**150**	**169**	**149**

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 three computer networking and support programs: Computer Infrastructure and Support (0708.00), Computer Networking (0708.10) and Computer Support (0708.20) in Los Angeles County for the 2015-16 academic year.

Computer Infrastructure and Support (0708.00)

- The median annual wage after program completion is $24,568
- 51% of students are earning a living wage
- 63% of students are employed within six months after completing a program

Computer Networking (0708.10)

- The median annual wage after program completion is $32,871
- 60% of students are earning a living wage
- 60% of students are employed within six months after completing a program

Computer Support (0708.20)

- The median annual wage after program completion is $28,366
- 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 Amazon Web Service (AWS) and cloud computing IT support.

Traditional labor market information was used to show current and projected employment based on data trends, as well as annual 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.