Cloud Computing

Los Angeles and Orange Counties

June 2020

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 **cloud computing.** The following summarizes key findings from this data brief:

- Over the next five years, there is projected to be **11,088 jobs available annually** in the region for computer occupations related to Cloud Computing due to new job growth and replacement needs.
- There were **155,840 job postings** over the last 12 months for occupations associated with Cloud Computing.
- On average, regional community colleges conferred **1,299 awards** (associate degrees + certificates) annually in information technology programs, between 2016 and 2019.

Cloud computing

The introduction of cloud computing to the ever-growing world of information technology is introducing significant changes not only to technology processes but to the workforce. Cloud computing allows for the storage, management, and processing of data using internet technologies ("the cloud"). Some of the leading cloud computing providers include Amazon Web Services (AWS), Google Cloud, Microsoft Azure, and IBM. Advantages of this ever-changing technology include[1]:

1. Payment for data center and server-type resources on an as needed basis or pay-as-you-go
2. Cost savings due to economies of scale
3. No more physical infrastructure and associated costs
4. Global reach and access
5. Deployment of technology services quickly

Uses of cloud computing

Cloud computing is utilized by a wide variety of organizations, including small businesses, large global corporations, government agencies and not-for-profits. Services available through cloud computing include[2]:

[1] https://aws.amazon.com/what-is-cloud-computing/

[2] https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/

- Creation of new apps and services
- Storage, back up, and recovery of data
- Website and blog hosting
- Audio and video streaming
- Delivery of software on demand
- Analyzation of data for patterns and predictions

One emerging technology intertwined with cloud computing is Artificial Intelligence (AI). The convergence of cloud computing and AI allows users and machines to analyze and gather larger quantities of data at a faster rate. While this ability reduces time and cost, it requires additional resources to protect and maintain information security and safeguard against cyber threats. It is projected that the number of information security analyst jobs will grow by 12% in the region through 2022.[3] In response to this uptick in demand for security-related IT jobs, community colleges are developing and expanding programs that prepare students to meet industry needs.

Impact on workforce and training

With the introduction and implementation of cloud computing and AI into the information technology workforce, community colleges and other training providers will need to integrate these skills and technologies into the current curricula and training. Local community colleges currently offer several programs that train students in databases, programming, Linux, DevOps, quality assurance, and information security. Individual colleges are attempting to stack or leverage certificates for cloud computing career paths with related disciplines, including small business, computer science, web development, business analytics, IT and mobile developers.

The emergence of cloud computing has preempted incumbent IT workers to upskill based on workforce and employer needs. With the right training, workers with traditional IT skills—such as data engineers, enterprise architects, web developers, and networking engineers—can expand their knowledge, skills, and abilities within the ever-changing field of information technology.

Occupational outlook for cloud computing (Los Angeles and Orange counties combined)

Businesses that employ cloud computing workers use various job titles, which are explored below. In the region, major cloud computing employers include Northrop Grumman, Raytheon, Anthem Blue Cross, The Boeing Company, IBM, Deloitte, Disney, and Amazon. Traditional occupations with cloud computing elements in their expanding job descriptions, as well as the labor market demand are provided in the table below.

[3] Data Source: Emsi

Los Angeles/Orange County demand for cloud computing workers

SOC/O*NET	Occupation	Annual openings (2019-2024)	Sample job titles	Job Postings (April 2019-April 2020)
15-1132	Software Developers, Applications	2,965	Application developer; software architect; software engineer	59,596
15-1151	Computer User Support Specialists	2,367	Network technician; computer specialist	17,137
15-1199.02	Computer Systems Engineers/Architects*	1,676*	Applications analyst; computer analyst; system analyst	15,047
15-1199.09	Information Technology Project Managers*	1,676*	Network engineer; system architect	11,893
15-1121	Computer Systems Analysts	1,477	IT manager; project manager	11,978
15-1142	Network and Computer Systems Administrators	909	Information analyst; network administrator; network manager; systems administrator	7,758
15-1134	Web Developers	819	Web architect; webmaster; web design specialist	13,420
15-1143	Computer Network Architects	364	Network consultant; design engineer network analyst	4,080
15-1141	Database Administrators	270	Data architect; database coordinator; database programmer; database developer	8,388
15-1122	Information Security Analysts	242	Data security administrator; network security analyst; systems analyst	6,543
	Total Annual Openings	**11,088**	**Total Job Postings**	**155,840**

*The data presented for this occupation are based on the 6-digit SOC code for Computer Occupations, all other (15-1199). Number is counted once in the total.

Existing community college training programs

The following table shows the three-year average number of awards conferred by community colleges in the related TOP codes: Information Technology, General (0701.00), Computer Information Systems (0702.00), Software Applications (0702.10), Computer Science (Transfer) (0706.00), Computer Software Development (0707.00), Computer Programming (0707.10), Database Design and Administration (0707.20), Computer Systems Analysis (0707.30), Computer Infrastructure and Support (0708.00), Computer Networking (0708.10), Computer Support (0708.20), World Wide Web Administration (0709.00), E-Commerce (0709.10), and Other Information Technology (0799.00). The college with the most completions in the region is Mt. San Antonio College. Over the past 12 months, there was one other related program recommendation request from a regional community college.

TOP Code	Program name	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Yr Average
0701.00	Information Technology, General	East LA	8	15	23	15
		LA Harbor	7	6	-	4
		LA Mission	4	1	1	2
		Long Beach	27	25	34	29
		Mt San Antonio	61	79	74	71
		Santa Monica	-	-	39	13
		West LA	3	4	4	4
		LA Subtotal	110	130	175	138
		Cypress	1	-	-	0
		OC Subtotal	**1**			0
		Supply Subtotal	**111**	**130**	**175**	**139**
0702.00	Computer Information Systems	Citrus	5	7	5	6
		Compton	1	-	1	1
		East LA	14	16	19	16
		El Camino	15	18	14	16
		Glendale	2	-	-	1
		LA City	3	4	1	3
		LA Mission	3	9	5	6
		LA Trade-Tech	23	14	8	15
		Pasadena	2	1	-	1
		Rio Hondo	10	19	21	17
		West LA	13	6	8	9
		LA Subtotal	91	94	82	89
		Cypress	5	8	5	6
		Fullerton	7	20	15	14
		Orange Coast	-	3	4	2
		Santa Ana	18	6	4	9
		Santiago Canyon	2	2	3	2
		OC Subtotal	32	39	31	34
		Supply Subtotal	**123**	**133**	**113**	**123**

TOP Code	Program name	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Yr Average
0702.10	Software Applications	Cerritos	4	3	9	5
		LA City	2	-	-	1
		LA Mission	2	7	2	4
		LA Southwest	2	2	1	2
		Mt San Antonio	2	3	1	2
		Pasadena	2	-	-	1
		Santa Monica	17	10	18	15
		LA Subtotal	31	25	31	29
		Coastline	9	4	9	7
		Fullerton	1	-	-	0
		Irvine	28	22	39	30
		Saddleback	9	3	2	5
		OC Subtotal	47	29	50	42
		Supply Subtotal	**78**	**54**	**81**	**71**
0706.00	Computer Science (Transfer)	Cerritos	6	15	12	11
		Compton	-	1	1	1
		El Camino	28	26	37	30
		Glendale	2	2	7	4
		LA City	7	14	6	9
		LA Mission	-	-	3	1
		Long Beach	-	7	27	11
		Santa Monica	22	17	19	19
		LA Subtotal	65	82	112	86
		Fullerton	9	18	-	9
		Golden West	-	-	5	2
		Irvine	4	26	40	23
		Orange Coast	10	28	95	44
		Saddleback	13	19	23	18
		Santa Ana	10	7	12	10
		Santiago Canyon	15	17	7	13
		OC Subtotal	61	115	182	119
		Supply Subtotal	**126**	**197**	**294**	**206**
0707.00	Computer Software Development	LA City	-	-	1	0
		Pasadena	4	-	-	1
		LA Subtotal	4	-	1	2
		Cypress	1	1	1	1
		Golden West	7	3	4	5
		Orange Coast	5	7	7	6
		Saddleback	3	3	13	6
		OC Subtotal	16	14	25	18
		Supply Subtotal	**20**	**14**	**26**	**20**

TOP Code	Program name	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Yr Average
0707.10	Computer Programming	Cerritos	1	4	-	2
		East LA	5	6	8	6
		Glendale	1	2	2	2
		LA City	43	-	-	14
		LA Mission	2	5	6	4
		LA Pierce	6	9	18	11
		LA Southwest	2	1	-	1
		LA Valley	26	10	7	14
		Long Beach	-	2	4	2
		Mt San Antonio	68	62	119	83
		Pasadena	1	8	11	7
		Santa Monica	25	42	44	37
		West LA	-	-	1	0
		LA Subtotal	180	151	220	184
		Cypress	27	18	22	22
		Fullerton	-	-	16	5
		Irvine	16	10	8	11
		Orange Coast	29	29	31	30
		Santa Ana	-	1	13	5
		Santiago Canyon	-	30	9	13
		OC Subtotal	72	88	99	86
		Supply Subtotal	**252**	**239**	**319**	**270**
0707.20	Database Design and Administration	Citrus	-	-	1	0
		Long Beach	-	1	3	1
		Mt San Antonio	11	4	11	9
		Santa Monica	2	2	1	2
		LA Subtotal	13	7	16	12
		Santa Ana	-	4	1	2
		OC Subtotal	-	4	1	2
		Supply Subtotal	**13**	**11**	**17**	**14**
0707.30	Computer Systems Analysis	Cerritos	6	4	2	4
		LA Subtotal	6	4	2	4
		Cypress	-	5	2	2
		OC Subtotal	-	5	2	2
		Supply Subtotal	**6**	**9**	**4**	**6**

TOP Code	Program name	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Yr Average
0708.00	Computer Infrastructure and Support	LA Harbor	-	1	1	1
		LA Mission	-	-	2	1
		LA Valley	6	8	5	6
		Long Beach	1	1	3	2
		Mt San Antonio	16	20	24	20
		Pasadena	-	-	1	0
		West LA	-	-	4	1
		LA Subtotal	23	30	40	31
		Coastline	67	65	49	60
		Cypress	1	1	2	1
		OC Subtotal	68	66	51	62
		Supply Subtotal	**91**	**96**	**91**	**93**
0708.10	Computer Networking	Cerritos	10	8	11	10
		Glendale	-	6	3	3
		LA City	11	37	23	24
		LA Pierce	37	23	39	33
		Long Beach	25	27	55	36
		Mt San Antonio	9	2	8	6
		Rio Hondo	-	-	5	2
		West LA	52	43	77	57
		LA Subtotal	144	146	221	170
		Coastline	20	12	38	23
		Cypress	28	37	70	45
		Irvine	19	12	11	14
		Saddleback	21	17	10	16
		Santa Ana	-	7	14	7
		OC Subtotal	88	85	143	105
		Supply Subtotal	**232**	**231**	**364**	**276**
0708.20	Computer Support	Glendale	2	3	10	5
		LA Pierce	14	7	9	10
		Long Beach	-	1	8	3
		Pasadena	1	3	7	4
		LA Subtotal	17	14	34	22
		Cypress	3	1	3	2
		Santa Ana	-	10	9	6
		OC Subtotal	3	11	12	9
		Supply Subtotal	**20**	**25**	**46**	**30**
0709.00	World Wide Web Administration	Glendale	3	9	6	6
		LA Pierce	5	5	9	6
		Long Beach	5	4	22	10
		West LA	8	24	13	15
		LA Subtotal	21	42	50	38
		Saddleback	5	-	-	2

TOP Code	Program name	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Yr Average
		OC Subtotal	5	-	-	2
		Supply Subtotal	**26**	**42**	**50**	**39**
0709.10	E-Commerce (Technology emphasis)	East LA	-	-	1	0
		LA Subtotal	-	-	1	0
		Saddleback	-	-	6	2
		OC Subtotal	-	-	6	2
		Supply Subtotal	**0**	**0**	**7**	**2**
0799.00	Other Information Technology	LA Harbor	1	1	-	1
		Mt San Antonio	9	5	13	9
		LA Subtotal	10	6	13	10
		Supply Subtotal	**11**	**13**	**10**	**11**
		Grand Total/Average	**1,108**	**1,187**	**1,600**	**1,299**

Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- Chancellor's Office Curriculum Inventory (COCI 2.0)

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