JOBSEQ

Occupation Report

Computer Hardware Engineers

Sacramento-Roseville-Folsom, CA MSA

Occupation Snapshot

6-Digit Occupation	Empl	Avg Mean Wages	LQ	3-Year Empl Change	Annual Demand	Forecast Ann Growth
Computer Hardware Engineers	584	$177,900	1.03	-17	43	0.8%
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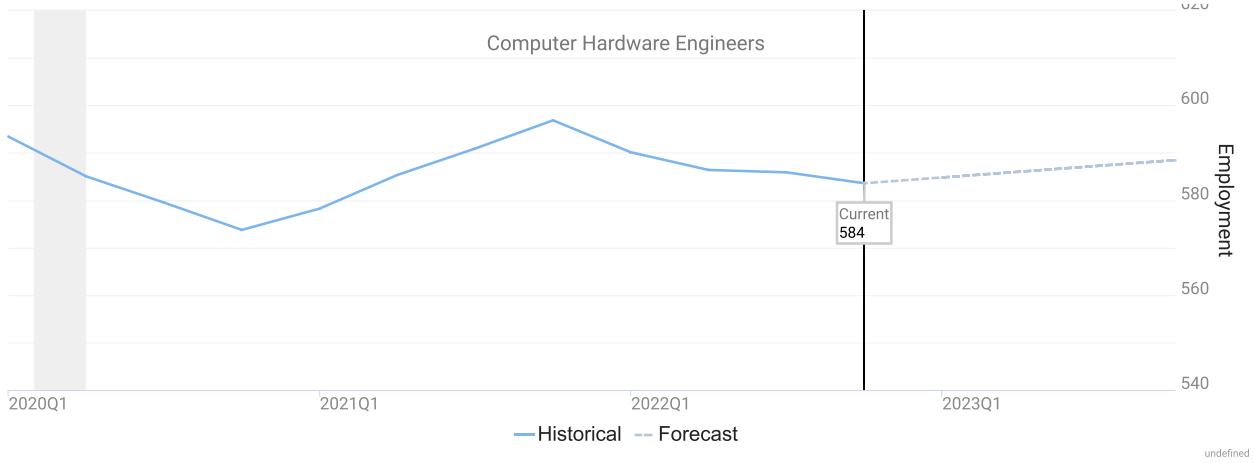


"Annual Demand" is the projected need for new entrants into an occupation. New entrants are needed due to expected growth and to replace workers who left the occupation due to factors such as retirement or switching careers.

"Forecast Ann Growth" is the expected change in jobs due to national, long-term trend projections (per the BLS) as well as local factors such as industry mix and population growth (as computed and modeled by Chmura).

Employment by Industry

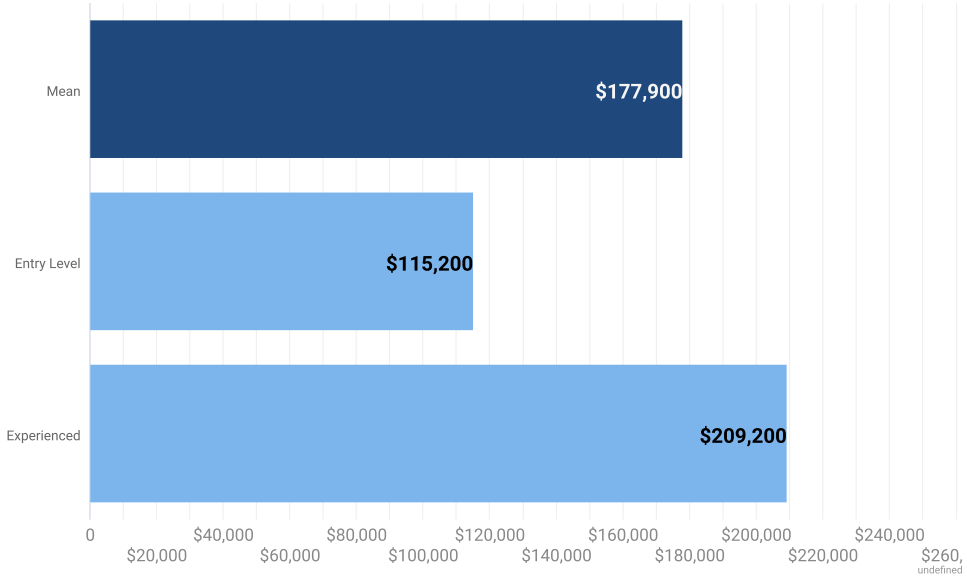
Industry Title	% of Occ Empl	Empl	10-Year Separations	10-Year Empl Growth	10-Year Total Demand
Scientific Research and Development Services	28.9%	169	113	24	137
Computer and Peripheral Equipment Manufacturing	19.3%	112	74	10	84
Computer Systems Design and Related Services	15.6%	91	56	-3	54
Architectural, Engineering, and Related Services	6.5%	38	25	2	26
Semiconductor and Other Electronic Component Manufacturing	5.7%	33	22	3	25
Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services	3.1%	18	13	4	16
Colleges, Universities, and Professional Schools	3.1%	18	12	2	14
Employment Services	1.7%	10	6	1	7
Management, Scientific, and Technical Consulting Services	1.6%	9	6	2	8
Professional and Commercial Equipment and Supplies Merchant Wholesalers	1.4%	8	5	1	6
Wired and Wireless Telecommunications (except Satellite)	1.3%	8	5	0	5
Software Publishers	1.1%	7	4	1	5
Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	1.0%	6	4	0	4
Management of Companies and Enterprises	1.0%	6	4	0	4
Administration of Environmental Quality Programs	0.7%	4	3	0	3
Justice, Public Order, and Safety Activities	0.6%	4	2	0	2
Aerospace Product and Parts Manufacturing	0.5%	3	2	0	2
All Others	6.8%	40	26	3	29

The industry distribution indicates the industries in which workers in the occupation(s) are primarily found.

"10-Year Empl Growth" may show industries with positive as well as negative growth; this would indicate that the occupation(s) being examined are expected to expand within some industries while contracting in others.

Source: JobsEQ®, http://www.chmuraecon.com/jobseq

Wages



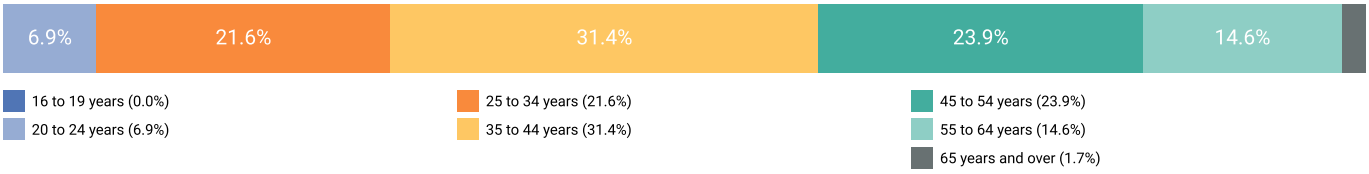
Occupation	Mean	Median	Entry Level	Experienced
Computer Hardware Engineers	$177,900	$172,100	$115,200	$209,200

Occupation wages here utilize BLS OEWS data, imputed and brought forward by Chmura.

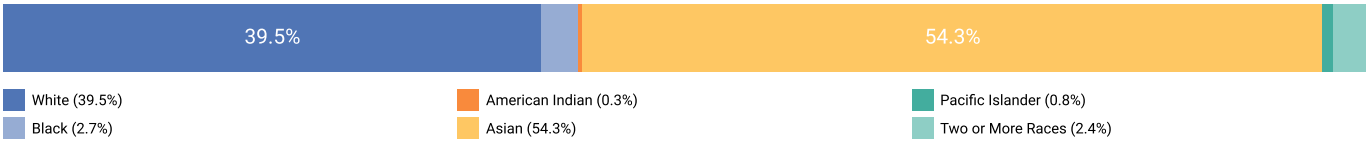
When this report is run for an occupation group, the table above displays up to the top ten detailed occupations which have the highest average wages within the occupation group.

Occupation Demographics

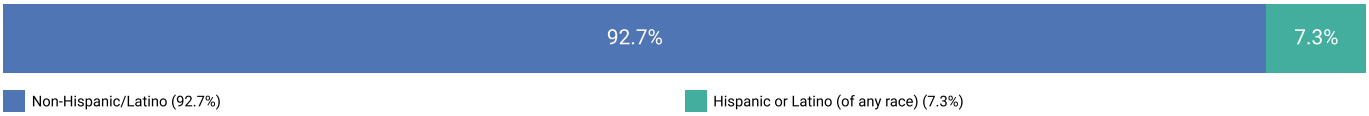
Age



Race

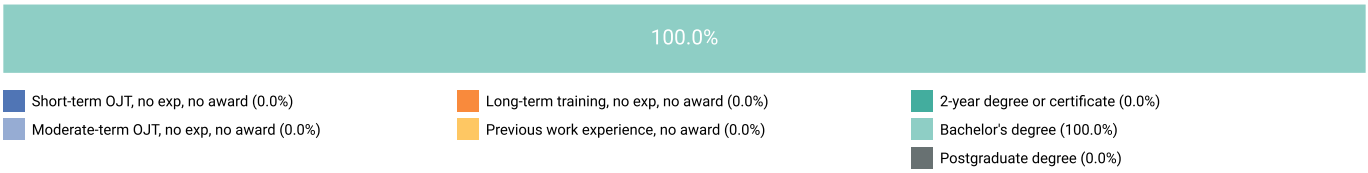


Ethnicity



Gender

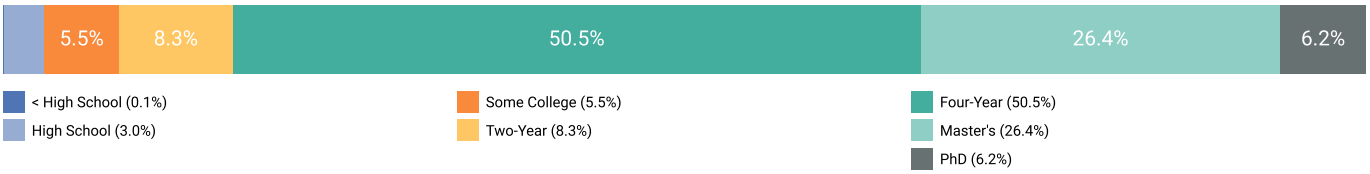
Education and Training Requirements



Source: JobsEQ®, http://www.chmuraecon.com/jobseq

Education Profile

Educational Attainment



Occupation	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
Computer Hardware Engineers	Bachelor's degree	None	None

The stacked bar chart here illustrates the estimated mix of educational attainment of the workers in this occupation(s) in aggregate.

The table indicates typical education and training requirements rather than the mix of attainment of workers in such positions.

Postsecondary Programs Linked to Computer Hardware Engineers

Program	Awards
California State University-Sacramento	
Computer Engineering, General	74
Electrical and Electronics Engineering	113
University of California-Davis	
Computer Engineering, General	100
Electrical and Electronics Engineering	69

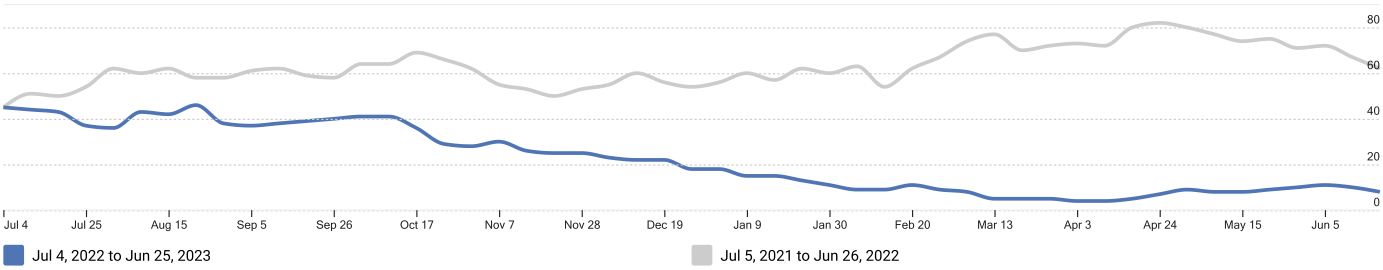
The number of graduates from postsecondary programs in the region identifies the pipeline of future workers as well as the training capacity to support industry demand.

Among postsecondary programs at schools located in the Sacramento-Roseville-Folsom, CA MSA, the sampling above identifies those most linked to Computer Hardware Engineers. For a complete list see JobsEQ®, http://www.chmuraecon.com/jobseq

Source: JobsEQ®, http://www.chmuraecon.com/jobseq

RTI (Job Postings)

Active Job Ads by Date



Online job ads are a timely indicator of local demand. Occupation assignments shown below are made by Chmura based upon analysis of job titles and job descriptions. Top employers and listed job requirements are shown on the following pages.

Occupations

SOC	Occupation	Active Job Ads	
17- 2061.00	Computer Hardware Engineers	139	

Locations

Location	Active Job Ads
Folsom, California	97
Sacramento, California	15
Roseville, California	13
Folsom, California 95630	2
Folsom, California 95763	2
Folsom, California, 95630, United States	2
Folsom 6 (FM6), California, 95630, United States	1
Folsom, CA 95630	1
Folsom, CA, 95762	1
Folsom, California 95762	1

Employers

Employer Name	Active Job Ads
Intel Corporation	49
Intel	29
Encore Semi Inc.	13
AMD	7
Cynet Systems	6
Oracle	5
Jobot	3
Solidigm	3
ADVANCED MICRO DEVICES INC	2
Cybercoders	2

Hard Skills

Skill Name	Active Job Ads
Python	89
Verilog	72
Perl	65
Computer Programming/Coding	64
Linux	42
Architecture	38
Field Programmable Gate Array (FPGA)	35
Graphics Processing Unit (GPU)	30
C++	24
Graphics Software	24

Job Titles

Job Title	Active Job Ads
Graphics Hardware Engineer	13
CORE CPU Pre-Si Validation/Verification Engineer	6
CPU Core Logic Designer	4
Hardware Engineer	4
CORE CPU Pre-Si Validation/Verification Eng	3
CPU Core Structural Design Engineer	3
Firmware Engineer	3
Senior ASIC Design Engineer - CA	3
SoC Design Engineer	3
Staff GPU ASIC Engineer	3

Education Levels

Minimum Education Level	Active Job Ads
Bachelor's degree	87
Master's degree	21
Doctoral or professional degree	3
Unspecified/other	28

Programs

Program Name	Active Job Ads
Computer Science	62
Computer Engineering	48
Electrical Engineering	41
Electrical	11
Engineering	5
Mathematics	3
Science	3
Electronics	2
Technology	2
Chemical Engineering	1

Top Skill and Certification Gaps

Top 10 Skill Gaps in Sacramento-Roseville-Folsom, CA MSA

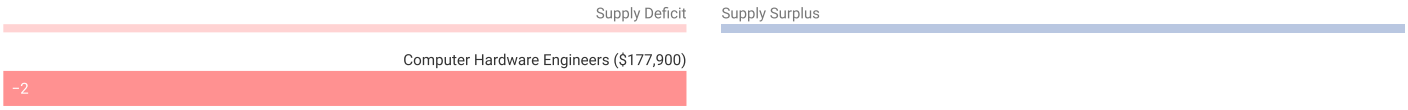
Name	Candidates	Openings	Gap
Linux	10	29	-20
Field Programmable Gate Array (FPGA)	9	28	-19
Python	11	23	-12
Graphics Processing Unit (GPU)	3	14	-11
UNIX	2	6	-4
Perl	15	18	-3
Architecture	8	11	-3
Microsoft Visual Basic	0	3	-2
Java	1	3	-2
Emulators	2	4	-2

Top 10 Certification Gaps in Sacramento-Roseville-Folsom, CA MSA

Name	Candidates	Openings	Gap
Secret Clearance	2	0	2

Skill and certifications gaps can help inform employee development programs, as well as provide a comparison of the needs of regional employers to the supply.

Occupation Gaps

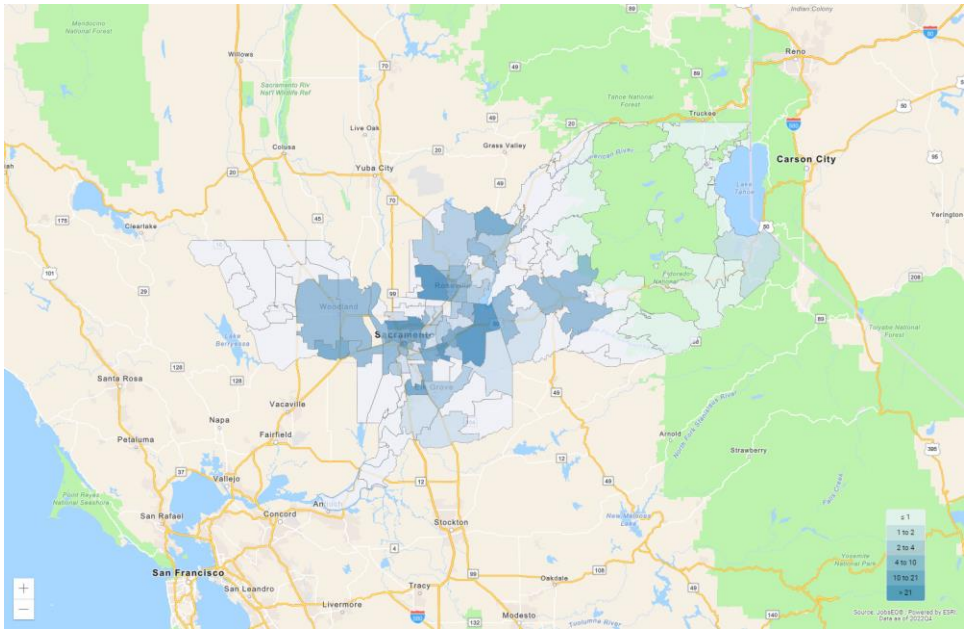


The above are the potential average annual gaps over 10 years. Many variables go into this analysis, but at its core it is based on a forecast comparing occupation demand growth to the local population growth and the projected educational attainment of those residents. When an area, for example, has an occupation expected to grow quickly but the educational requirement for the occupation does not match well with the educational attainment of its residents, there is a high potential for an occupation shortfall in the region. Alternatively, slow-growing or contracting occupations often represent potential supply surpluses.

The potential supply shortfall is an underlying force that the market needs to resolve one way or another, such as by employers recruiting from further distances for these occupations, wages going up to attract more candidates, and/or increased demand and wages enticing more local residents to get training for these occupations. While this an important analysis for determining local occupation needs, the occupation gap should be considered along with other regional data including growth and separation forecasts, unemployment rates, wage trends, and award and skill gap analyses.

Source: JobsEQ®, http://www.chmuraecon.com/jobseq

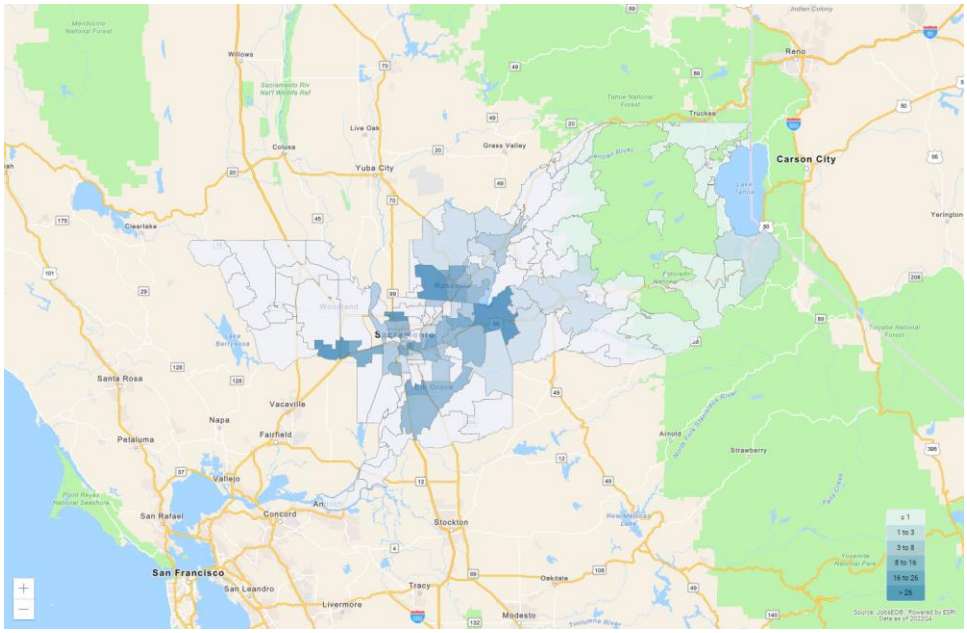
Geographic Distribution



Top ZCTAs by Place of Work for Computer Hardware Engineers, 2022Q4

Region	Employment
ZCTA 95630	54
ZCTA 95827	50
ZCTA 95814	46
ZCTA 95834	40
ZCTA 95742	31
ZCTA 95838	27
ZCTA 95747	21
ZCTA 95815	20
ZCTA 95670	19
ZCTA 95616	17

Source: JobsEQ®, http://www.chmuraecon.com/jobseq

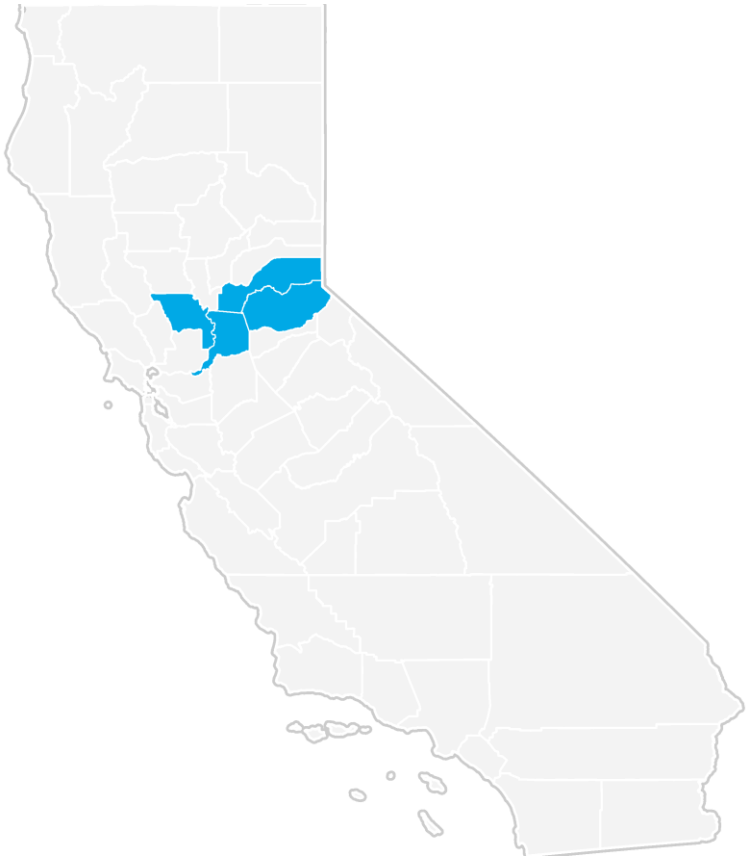


Top ZCTAs by Place of Residence for Computer Hardware Engineers, 2022Q4

Region	Employment
ZCTA 95630	60
ZCTA 95747	41
ZCTA 95616	38
ZCTA 95835	30
ZCTA 95816	28
ZCTA 95762	26
ZCTA 95765	25
ZCTA 95618 (Yolo County, CA portion)	24
ZCTA 95819	22
ZCTA 95818	21

"Place of work" employment is based upon the location of employers for these workers. "Place of residence" data refers to the home locations of the workforce, which is typically the preferred data set to use when calculating labor availability within a drive-time or radius of a potential worksite.

Sacramento-Roseville-Folsom, CA MSA Regional Map



Source: JobsEQ®, http://www.chmuraecon.com/jobseq

Data Notes

- Occupation employment by default indicates employment by place of work. Occupation employment is as of 2022Q4 and is based on industry employment and local staffing patterns calculated by Chmura and utilizing BLS OEWS data. Employment forecasts are modeled by Chmura and are consistent with BLS national-level 10-year forecasts. Wages by occupation are as of 2022Q4, utilizing BLS OEWS data, imputed and brought forward by Chmura. Entry-level and experienced wages are derived from these source data, computed by Chmura.
- Industry employment is as of 2022Q4 and is based upon BLS QCEW data, imputed by Chmura where necessary, and supplemented by additional sources including Census ZBP data.
- Education and training requirements are from the BLS. Educational attainment mix and other occupation demographics data are modeled by Chmura for 2022Q4 using regional occupation employment from JobsEQ, ZCTA-level demographics data from the Census Bureau, and national occupation-demographics patterns from the BLS.
- Postsecondary awards are per the NCES and are for the 2020-2021 academic year. Any programs shown are linked with the occupation(s) being analyzed via the program-occupation crosswalk, which may not be comprehensive. Any programs shown reflect only data reported to the NCES; reporting is required of all Title IV schools. Training providers that do not report data to the NCES are not reflected.
- Job ads data are online job posts from the Real-Time Intelligence (RTI) data set, produced wholly by Chmura and gleaned from over 40,000 websites. Data reflect ads active during the last twelve month period ending 06/29/2023 and advertised for any Zip Code Tabulation Area in or intersecting with the region for which this report was produced. Historical ad volume is revised as additional data are made available and processed. Since many extraneous factors can affect short-term volume of online job postings, time-series data can be volatile and should be used with caution. All ad counts represent deduplicated figures.
- For skill and certification gaps, openings and candidates are based upon regional occupation demand (growth plus separations) and the percent of skill demand and supply. Skill demand mix data are per a one-year sample of RTI data; skill supply data are estimated using a five-year sample of resumes data; both data sets compiled as of August 2021. Data may be based, at least in part, on data from broader geographies; see the Skill Gaps analytic export for more details.
- Occupation gaps are modeled by Chmura, indicating long-term potential supply and demand mismatches in a region due, in part, to job demand and labor pool dyanamics, including educational attainment and projected growth.
- Occupation employment by place of residence is as of 2022Q4 and modeled by Chmura based upon occuaption employment by place of work and commuting patterns. Commuting patterns are derived from source data from the Census Bureau, occupation-specific commuting tendancies, and updated to reflect more recent population and employment estimates.
- Figures may not sum due to rounding.

Region Definition

Sacramento-Roseville-Folsom, CA MSA is defined as the following counties:

El Dorado County, California	Sacramento County, California
Placer County, California	Yolo County, California

FAQ

What is (LQ) location quotient?

Location quotient is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an industry (or occupation) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation.

What is annual demand?

Annual demand is a of the sum of the annual projected growth demand and separation demand. Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand does not include all turnover—it does not include when workers stay in the same occupation but switch employers. Growth demand is the increase or decrease of jobs expected due to expansion or contraction of the overall number of jobs.