

## Sector Profile

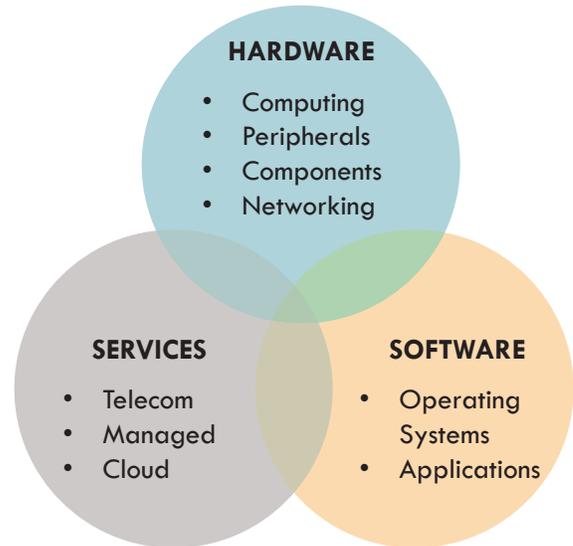
# Information & Communications Technologies (ICT)

### What is ICT?

ICT is an umbrella term, used widely outside the U.S. and by the United Nations, to encompass all rapidly emerging, evolving and converging computer, software, networking, telecommunications, Internet, programming and information systems technologies.

The sector represents a mix of three industry clusters:

- **Hardware** – firms that create, manufacture and distribute computer, peripheral, networking and related equipment.
- **Software** – firms that create, manufacture and distribute computer operating systems and applications.
- **Services** – firms that bundle hardware, software and other services to deliver solutions to business and consumer customers.



### INSIDER PERSPECTIVE

“In the 21st century, we live in knowledge and information economies where Information and Communications Technologies are essential strategic elements for success. We need to support educator efforts to develop competent technicians to implement and maintain key ICT infrastructure and support systems.”

— Tom Burns, President  
Enterprise Solutions Division  
Alcatel-Lucent

### Why ICT?

Over the last generation or so, information and communication technologies have spawned a paradigm shift in modern economies and societies. These technologies have permeated every industry and most organizations, changing ways companies operate and interact with customers and suppliers, how human beings organize and manage their lives, how people communicate, and how most workers do their work. ICT is transformational, and ICT companies in California include many global leaders in this dynamic and quickly evolving space. ICT is strategically important to individual citizens, to governments, to all industries, to most organizations, to all students, and for economic development, at every level.

### Quick Facts

- There are an estimated 46,000 ICT industry-related businesses in California (about 1 for every 28 companies).
- ICT industry-related businesses produce \$172 billion in revenue (approximately 6% of all private sector revenue in California).
- These businesses employ more than one million Californians (1 in 20 private sector jobs).
- California's ICT industry-related firms pay out close to \$76 billion in wages annually (12% of private sector wages and the 2nd highest wage sector in the state).
- For the period 2006-2016, ICT industry-related job growth is projected to increase by almost 20%, outpacing the national growth rate.

### What is Driving Growth?

The growth of the ICT industry sector in California can mainly be attributed to:

- Increasing adoption of information and communication technologies hardware, software and services by consumers and businesses globally.
- The ongoing replacement of ICT hardware, software and services with new and improved solutions

## What are ICT jobs?

ICT industries employ people in all standard business functions, such as accounting, finance, human resources and administration. What is unique to ICT industry jobs are those devoted to developing and distributing ICT goods and services:

1. Hardware and software development roles, including electrical and hardware engineers, computer scientists, software engineers and programmers.
2. Roles related to the development and delivery of ICT technical services.
3. Roles supporting marketing and sales of ICT-related products and services.

## What is the Industry Outlook?

ICT industries expected to continue to add thousands of jobs in California include: computer programming services, computer system design services, Internet companies and web search services, software publishers, and wireless carriers.

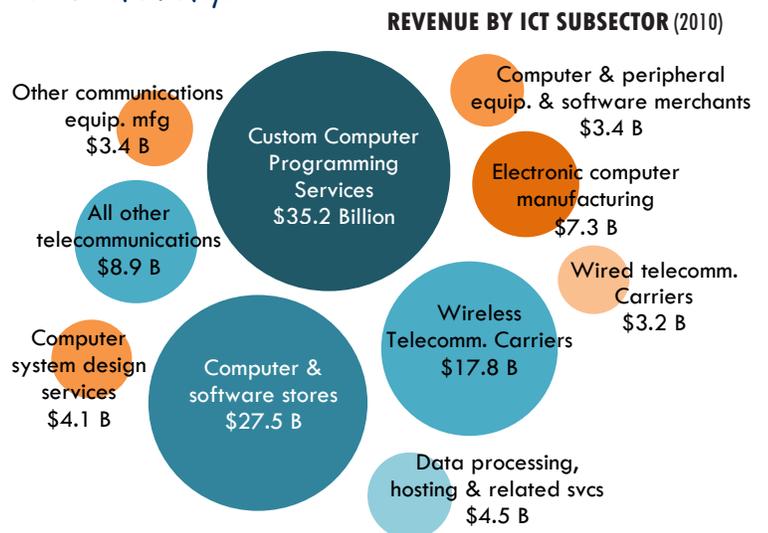
Through 2015, ICT industry sectors are expected to increase employment by as much as 9%, while the overall industry growth rate in the state is estimated to be much slower at just 4%.

ICT Industry Employment	2012 Employment	2015 Employment	Projected Change	% Change
Custom Computer Programming Services	156,570	167,619	11,049	7%
Computer Systems Design Services	103,557	112,020	8,463	8%
Internet Publishing, Broadcasting, and Web Search Portals	58,161	65,568	7,407	13%
Software Publishers	53,795	58,227	4,432	8%
Electronic Shopping	30,262	37,040	6,778	22%
Data Processing, Hosting and Related Services	28,640	29,088	448	2%
Wireless Telecommunications Carriers (except Satellite)	20,724	22,873	2,149	10%
Radio & Television Broadcasting and Wireless Communications	15,938	17,665	1,727	11%
Electronic Auctions	5,029	5,797	768	15%
Digital Printing	3,456	3,715	259	7%
<b>Total</b>	<b>476,132</b>	<b>519,612</b>	<b>43,480</b>	<b>9%</b>

## What Industries are Driving Economic Activity?

ICT industries are strategically important to California for the revenue and wealth they produce, for their high levels of employment and compensation, and for the exports and tax revenue they generate for the state. The two leading industries by sales revenue are Custom Computer Programming Services (\$35.2 billion) and Computer and Software Stores (\$27.5 billion).

However, ICT industries are even more important than that strategically, because information and communication technologies are driving efficiencies, increases in productivity, commerce and competitive advantages for organizations in every industry. ICT is a major engine driving 21st century information, knowledge and innovation economies in all industry sectors across the state.



## Where are the “Hot Spots”?

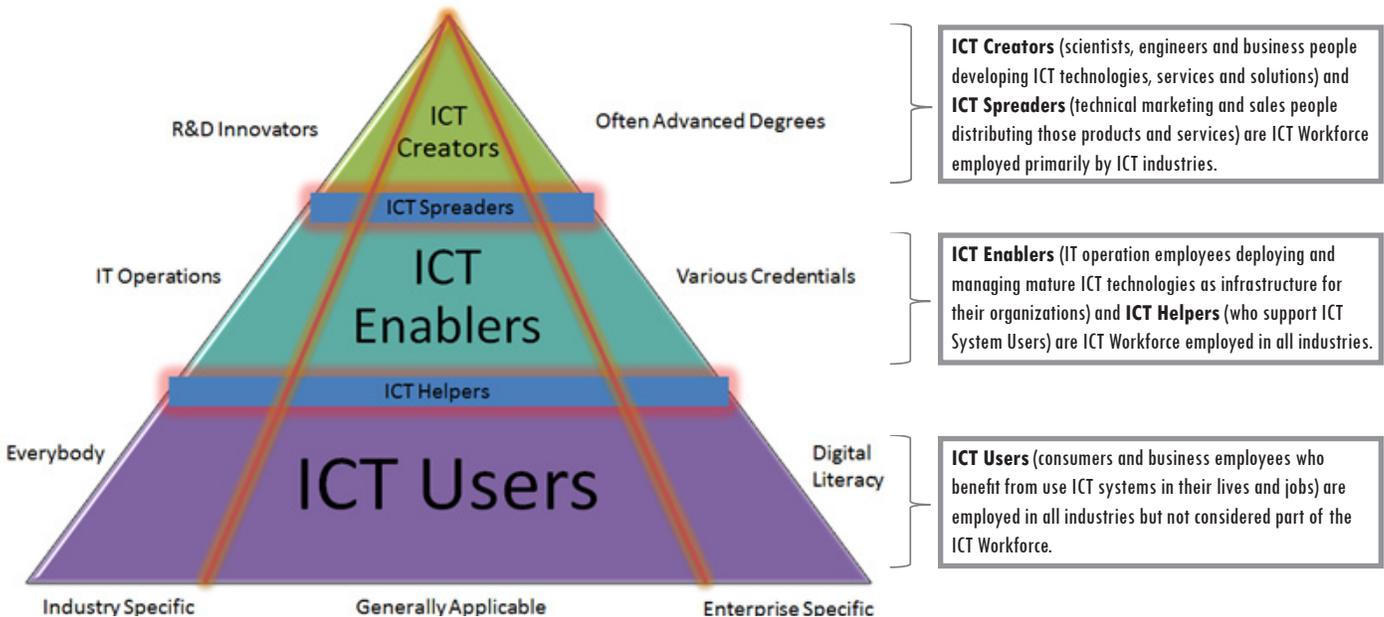
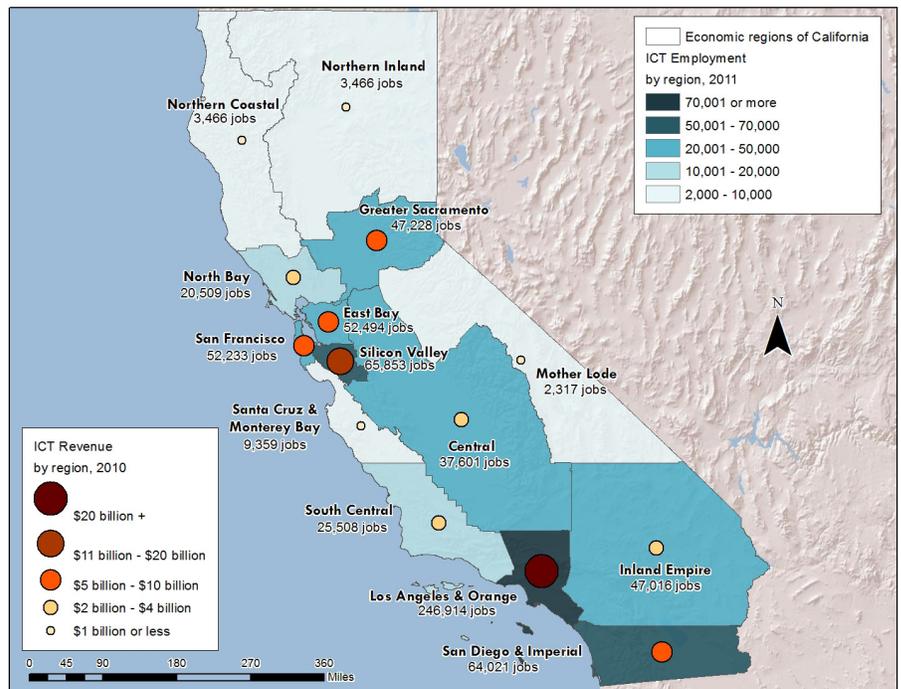
ICT employment is most concentrated in the Los Angeles/Orange region and the Silicon Valley. The Los Angeles/Orange region has the highest sales revenues for ICT firms (over \$73 billion), followed by Silicon Valley (\$22 billion).

## What is the ICT Employment Sector?

Importantly, ICT Workforce employment is not limited to ICT Industries. Information and communication technologies are adopted and applied by most organizations, in every industry. Most organizations, in every industry, employ people in ICT Workforce roles to implement, manage and maintain internal ICT systems.

This is an important distinction. The ICT Workforce is pervasive, across all industries, and in many industries the largest areas of employment growth are within their ICT Workforce. ICT Workforce deploys, manages and maintains strategic ICT infrastructure used for competitive advantages, commerce, growth, productivity, and efficiency by most workers in most workforce roles in all industries in California. Additionally, today and increasingly in the future, some level of ICT knowledge and skills is required by most workers, in most workforce roles, even outside the ICT workforce.

ICT EMPLOYMENT AND REVENUE BY REGION



About 1.2 million people are currently employed in the California ICT Workforce, across all industries. That is roughly one in 20 private sector jobs. California is forecast to create 30,000 new ICT Workforce jobs and more than 80,000 ICT Workforce job openings due to replacements, for a total of more than 110,000 new and replacement jobs between 2012 and 2015.

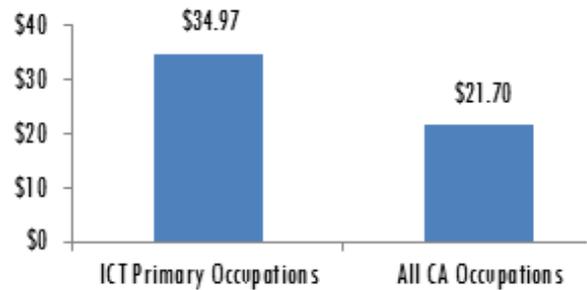
## How Much Does It Pay?

In California, the median ICT Workforce hourly wage is about 60% higher than the median wage for all jobs. Information is the second highest paying industry sector in California, after utilities. With annual earnings per worker of about \$110,000, the information industry sector pays 112% higher wages than the average across all other industries in the state.

## What Jobs are in Demand?

In practice, employers do not generally use consistent ICT Workforce job titles and descriptions. A recent real-time labor market information study of one California market showed that of more than 2,300 de-duplicate job postings, there were more than 1,900 unique job titles, and even when job titles were the same, job descriptions and requirements were typically substantially different. However, following are the standard ICT workforce occupations with strong job opportunities.

**ICT PRIMARY OCCUPATIONS**  
MEDIAN HOURLY WAGE (2012)



**TOP JOB OPPORTUNITIES IN ICT**  
CALIFORNIA, 2012-2015

Job Title	2012 Jobs	3-year Change	% Change	Openings	Median Hourly Wage	Minimum Education Level
Computer Support Specialists	76,948	2,665	4%	8,766	\$27.34	Associate degree
Computer Systems Analysts	72,373	2,886	4%	6,822	\$39.28	Bachelor's degree
Network and Computer Systems Administrators	42,671	2,246	5%	4,134	\$38.23	Bachelor's degree
Telecommunications Equipment Installers and Repairers	26,853	(406)	(2%)	1,704	\$27.59	Postsecondary award
Database Administrators	12,923	1,051	8%	1,677	\$39.72	Bachelor's degree
Computer Hardware Engineers	19,312	122	1%	1,554	\$53.79	Bachelor's degree
Telecommunications Line Installers and Repairers	17,796	276	2%	1,500	\$26.82	Long-term OJT
Switchboard Operators, including Answering Service	16,068	(1,247)	(8%)	951	\$13.38	Short-term OJT
Computer Operators	11,144	(41)	(0.4%)	438	\$22.57	Moderate-term OJT

There were nearly 72,000 online job postings in California for ICT occupations in 2012. Job postings reflected the need for workers in a wide range of skill and education levels. Although many jobs advertised require baccalaureate degrees or higher, occupations that require community college credentials were also in the mix. Select occupations with vacancies posted include the following:

- Computer Systems Analysts (33,029 job postings)
- Network and Computer Systems Administrators (19,287)
- Database Administrators (14,570)
- Computer Hardware Engineers (2,306 postings)
- Telecommunications Equipment Installers & Repairers (997)
- Switchboard Operators (743)

**EMPLOYERS WITH THE MOST JOB POSTINGS**  
(NOVEMBER 2012 - FEBRUARY 2013)

DELOITTE, INC.	916
IBM	654
NORTHROP GRUMMAN	302
UNITED HEALTH GROUP	295
QUALCOMM, INC.	286
GOOGLE, INC.	238
CISCO SYSTEMS, INC.	227

**Data notes and sources:** Data and information included in the Sector Profile were compiled from the following public and proprietary sources: U.S. Bureau of Labor Statistics, CA Employment Development Department; Economic Modeling Specialists, Inc.; The Conference Board - Help Wanted Online; Burning Glass - Labor Market Insight; InfoGroup, Inc.; Mid-Pacific Information & Communications Technologies Center (MPICT); COE/MPICT workforce studies (phase 2 & 3).