

**STEM
CAREERS**



INFO TECH CAREERS

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Info Tech Careers

Occupation	Minimum Education Requirements	2016 Median Pay
Computer and information research scientist	Master's degree	\$111,840
Computer and information systems manager	Bachelor's degree	\$135,800
Computer hardware engineer	Bachelor's degree	\$115,080
Computer network architect	Bachelor's degree	\$101,210
Computer support specialist	Associate's degree	\$52,160
Computer systems analyst	Bachelor's degree	\$87,220
Database administrator	Bachelor's degree	\$84,950
Electrical and electronics engineer	Bachelor's degree	\$96,270
Information security analyst	Bachelor's degree	\$92,600
Software developer	Bachelor's degree	\$102,280
Web developer	Associate's degree	\$66,130

Source: US Department of Labor, *Occupational Outlook Handbook*, 2017. www.bls.gov.

a few fundamental skills to satisfy employers. Every IT professional needs to be able to write computer code in several different programming languages, including HTML and C++. Successful coders are logical thinkers and problem solvers who have a strong overall understanding of different technologies and information systems.

Good communication skills are another necessity for survival in the IT world. While the stereotype of an IT professional is an introvert who works long hours wearing earphones and coding into the night, this is not the workplace reality. Successful IT workers are team players who enhance collaboration among their colleagues. They are called upon to translate technical concepts into plain English for multiple stakeholders in a project that might include business executives, sales and marketing associates, and others who are not technically inclined.

Networking is an extension of good communication, as career consultant Alison Doyle explains on the Balance website: “[Networking] requires gathering groups of people in a working environment to share what they know, in order to build a system of knowledge within an organization that is more than the sum of its parts. Knowledge networks require individual IT professionals to be open with their knowledge and to be open and curious about learning new things from their colleagues.”

Ample Job Opportunities

According to the Bureau of Labor Statistics (BLS), employment for information technology professionals is expected to grow by 13 percent through 2026. This projected growth is pegged to an industry that is expanding at warp speed. Mark Smukler, cofounder of the software firm Bixby, put the BLS statistic in perspective in a 2017 *Forbes* article: “Tech isn’t for everyone, but tech is probably the single greatest opportunity that exists for millennials today. There’s still a large shortage of technical expertise across most [industries] and a career in tech can be one of the most rewarding jobs in many ways.” The news could not be better for those who are fascinated by the digital world that is becoming more reliant on the skills of IT professionals every day.

Find Out More

Association of Software Professionals (ASP)

PO Box 1522

Martinsville, IN 46151

website: <http://asp-software.org>

This organization is made up of independent software developers who have created freeware and shareware. Students can access the ASP to learn from successful developers of desktop and laptop programs and cloud computing and mobile apps.

Institute of Electrical and Electronics Engineers (IEEE)

website: www.ieee.org

The IEEE offers students a wide range of learning, career, and employment opportunities. The organization's Standards University offers courses, games, videos, an e-magazine, and an e-learning library. In addition, the IEEE provides certifications for computer professionals.

Software Development Forum

111 W. Saint John St.

San Jose, CA 95113

website: www.sdforum.org

The Software Development Forum is based in Silicon Valley and holds around twenty-five events monthly that are attended by engineers, developers, entrepreneurs, and tech experts. The forum provides information, education, and connections for those seeking to build a career in Silicon Valley.

TopCoder

website: www.topcoder.com

This website with nearly one million highly skilled members hosts bimonthly computer programming contests in which software developers, designers, and student programmers compete for cash prizes while solving real computing problems.

Computer Network Architect

At a Glance

Computer Network Architect

Minimum Educational Requirements

Bachelor's degree

Personal Qualities

Analytical, detail oriented, good interpersonal skills, business acumen

Certification

Cisco Certified Design Expert (CCDE) and Cisco Certified Architect (CCAr)

Working Conditions

Full-time work with some overtime required

Salary

\$101,210 median annual wage in 2016

Number of Jobs

162,700 in 2016

Future Job Outlook

6 percent growth through 2026

What Does a Computer Network Architect Do?

The word *architect* is traditionally associated with people who plan and design buildings. Architects are familiar with construction materials like concrete, wood, and glass, and they understand how these materials fit together to form a sound structure. In the tech world the term *architect* refers to builders of computer networks. These professionals plan, design, and construct data communication networks that range from small intranets used in private organizations to extensive cloud systems. Computer network architects build with materials such as computers, servers, routers, network drivers, cables, and software programs. They draw on their expertise in telecommunications to create local area networks (LANs), wide area networks (WANs), Internet portals, and e-mail networks.

The job of a traditional architect is finished when a building is completed, but the work of computer network architects is ongoing. These technical experts spend their days overseeing firmware updates, analyzing data traffic on the networks, monitoring for security breaches, and planning for future network growth. When expansions or changes are required, computer network architects use network modeling software to build test networks, which are analyzed, tested, and perfected.

Computer network architects rarely work alone. They share their research with managers and work with company executives to plan upgrades and install new equipment. Computer network architects interact with consultants, outside vendors, and financial, marketing, and technical personnel.

David Lef, the principal computer network architect for Microsoft IT, oversees one of the most complex and extensive networks ever created. The Microsoft IT network features networking components that connect 220,000 employees and vendors to nine hundred locations around the world. Lef describes his job on the Microsoft Azure website:

Our network supports over 2,500 individual applications and business processes. We are responsible for providing wired, wireless, and remote network access for the organization, implementing network security across our network, and [ensuring] that the nuts and bolts of network functionality work as they should: IP addressing, name resolution, traffic management, switching, routing, and so on.

How Do You Become a Computer Network Architect?

Education

Computer network architects need at least a bachelor's degree in computer science, information systems, mathematics, physics,

or engineering. High school students considering a career as a computer network architect should take math courses, including calculus, trigonometry, and algebra. Computer science courses that emphasize coding, physics, and communications are also helpful. And, according to network architect Bryian Winner, industrial arts courses can be extremely useful. Students in industrial arts classes use a variety of hand, power, and machine tools to fabricate objects from wood and metal. As Winner states in an interview on the Chegg Internships website: “You have to be able to understand how things are built to be able to work with them.”

Employers of computer network architects sometimes require applicants to have a master of business administration (MBA) in information systems. Obtaining an MBA requires an additional two years of study in business and computer-related courses.

While education is important for becoming a computer network architect, most graduates will not begin working in this role right out of school. Employers typically require five to ten years of experience in related fields such as database administration, computer systems analysis, or network administration. As Winner explains, the majority of computer network architects “have some formalized education but much of it is learned in the field and it almost works like an apprenticeship. You’ll work with other IT people and see how they develop the networks.”

Computer network architects, like other IT professionals, constantly update their knowledge. They read the latest tech articles, attend conferences, and take classes to stay informed about the latest changes in technology. As professor of computer science Peter Steenkiste tells *U.S. News & World Report*: “You will have to constantly learn. You need to be very much aware of not just the technologies available today but about the trends. A lot of the designing of networks is effectively upgrading and expanding the networks.”

Certification

Computer network architects can expect higher salaries, better job assignments, and greater chances for promotions as they advance up the certification ladder. The process starts with basic certifications and moves up to more complex certifications.



Computer network architects design and build data communication networks, both small and large. They work with computers, servers, routers, network drivers, cables, and software programs during their design-and-build projects.

For example, the Cisco Certified Design Associate (CCDA) and Cisco Certified Design Professional (CCDP) certifications can lead to jobs in networking and cloud infrastructure. This type of employment provides experience to those hoping to advance to the position of computer network architect. Once this goal is achieved, computer network architects can continue up the certification ladder by obtaining the Cisco Certified Design Expert (CCDE) certification, which is a prerequisite for the Cisco Certified Architect (CCAr) certification. At this level, a computer network architect can also obtain certifications in Cisco Certified Internetwork Expert (CCIE), Routing and Switching, or Data Center. Other senior network architect certifications include Salesforce Certified Technical Architect (CTA) and Red Hat Certified Architect (RHCA).

Internships

Most high-paying jobs in the tech industry require more than a college degree. Job recruiters are looking for those individuals with previous experience as an intern or employee. This is particularly true for computer network architects who often work in related fields before landing their jobs. Anyone who wishes to become a computer network architect should seek an internship program that focuses on computer, network, or database administration. Professors often link students to internships, but positions can be obtained by e-mailing the numerous tech companies that offer internship programs.

Skills and Personality

For computer network architects, the ability to collaborate with others is as important as knowing the intricate technical aspects of a complex network. Miscommunication with team members and poor relations with vendors can cause critical networks to fail. As network systems consultant James Stanger points out on the Tech-Target website: “What you find is that there’s a tremendous amount of work involved in keeping those systems updated and monitored, and then monitoring the service providers you’ve called in.”

Computer network architects need to be analytical and detail oriented. They have to create comprehensive plans for networks and closely examine network functions. Organizational skills are necessary when creating precisely functioning networks from multiple parts. Computer network architects also need strong business acumen. The overriding job of a computer network architect is to match the most cost-effective and efficient hardware and software with a company’s long-term business goals. This task requires a comprehensive understanding of an employer’s business plans, budgets, and objectives.

While these skills are important, most employers are willing to train computer network architects on the most up-to-date procedures and equipment. And technical ability alone no longer ensures entry into a top job. Employers are less willing to hire someone who lacks soft skills that include tact, the ability to communicate clearly, and leadership skills. As network architect Lee

Other Jobs in Info Tech

Applications engineer
Applications support analyst
Business analyst
Cloud architect
Cloud consultant
Cloud services developer
Cloud software and network
engineer
Cloud systems administrator
Computer and information
research scientist
Computer hardware engineer
Computer programmer
Computer support specialist
Content manager
Data center support specialist
Data quality manager
Digital marketing manager
Director of technology
Electrical and electronics
engineer
Frameworks specialist
Front-end developer
IT analyst
Java developer
Management information
systems director
Mobile developer
Network engineer
Social media manager
Software tester
Systems architect
Systems designer
Technical specialist
Technical support engineer
Telecommunications specialist
User interface designer
Web administrator
Web analytics developer

Editor's note: The US Department of Labor's Bureau of Labor Statistics provides information about hundreds of occupations. The agency's *Occupational Outlook Handbook* describes what these jobs entail, the work environment, education and skill requirements, pay, future outlook, and more. The *Occupational Outlook Handbook* may be accessed online at www.bls.gov/ooh.

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