

# NEW HAMPSHIRE SECTOR PARTNERSHIP

## State of the Sector

### Tech Talent

May 2020



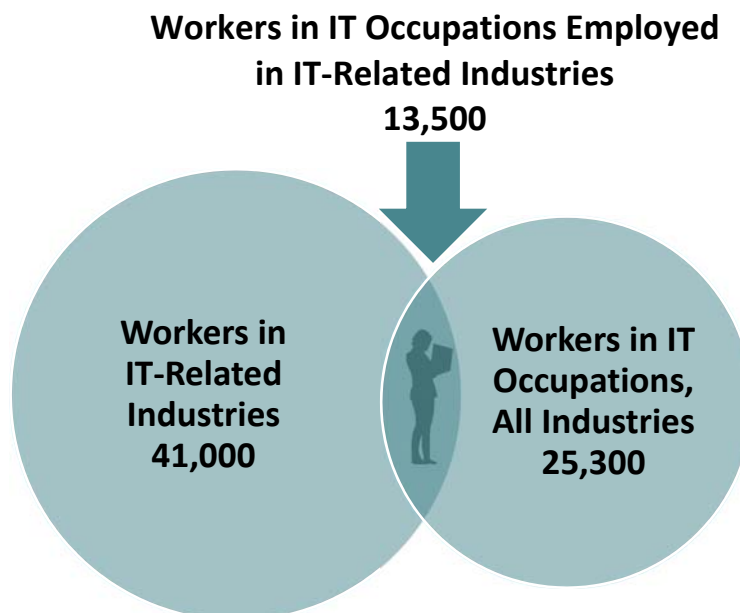
This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This product is copyrighted by the institution that created it. Internal use by an organization and/or personal use by an individual for non-commercial purposes is permissible. All other uses require the prior authorization of the copyright owner.

## THE STATE OF THE SECTOR: TECH TALENT

Information technology is not a defined industry sector like *Manufacturing* or *Healthcare and Social Assistance*, with a standardized business definition based on common goods produced or services provided. Instead, the information technology workforce is better defined by workers in information technology occupations, who may be employed in any industry. While there is a defined *Information* industry sector in the North American Industrial Classification System (NAICS), these businesses may or may not employ information technology workers.

Information technology workers are responsible for implementing, monitoring, and maintaining information technology systems. This includes hardware, virtualization and automation tools, operating systems and software, user devices, and peripherals, as well as architectures and methodologies on using and storing data. These occupations all have similar knowledge and skill requirements, which are the same regardless of the employer.

In 2018, there were more workers in IT-related industries than there were IT workers in all industries.<sup>1</sup> In New Hampshire, there were about 41,000 workers in IT-related industries<sup>2</sup> and about 25,300 workers in IT occupations.<sup>3</sup> There were about 13,500 IT workers employed in IT-related industries in New Hampshire, about one-third of all workers in IT-related industries.



<sup>1</sup> This measure depends on the industries selected as “IT-related industries” and occupations selected as “IT occupations.”

<sup>2</sup> CompTIA, Cyberstates 2019, Appendix B.6. U.S. Tech Sector Employment Gender Ratios. New Hampshire data based on 2018 annual covered employment from the Quarterly Census of Employment and Wages, calculated by ELMI.

<sup>3</sup> New Hampshire Occupational Employment Statistics (OES), May 2018

For purposes of this analysis, occupations identified as “information technology occupations” primarily include those in the computer occupations classification (SOC 15-1100). Related computer occupations classified as managers, engineers, postsecondary instructors, repairers, artists, and machine programmers and operators who require similar skills and knowledge are included.

**Table 1: Location Quotient, Information Technology Occupations**

“Location quotient” is the concentration of an industry or occupation in a region compared with the national average. A value above 1 indicates an above average concentration. Industries highly concentrated in an area are usually critical to the health of its economy and serve as a guide to what makes an area’s labor market unique.

SOC	Information Technology Occupation Title	Estimated Employment	2018 Median Wage		Location Quotient
			Hourly	Annual	
11-3021	Computer and Information Systems Managers	2,495	\$66.68	\$138,690	1.39
15-1111	Computer and Information Research Scientists	31	\$62.66	\$130,320	0.23
15-1121	Computer Systems Analysts	2,630	\$42.63	\$88,670	0.95
15-1122	Information Security Analysts	501	\$46.29	\$96,270	1.01
15-1131	Computer Programmers	1,410	\$35.51	\$73,850	1.30
15-1132	Software Developers, Applications	6,663	\$52.24	\$108,650	1.61
15-1133	Software Developers, Systems Software	1,559	\$61.29	\$127,470	0.82
15-1134	Web Developers	744	\$30.96	\$64,400	1.10
15-1141	Database Administrators	351	\$46.35	\$96,400	0.69
15-1142	Network and Computer Systems Administrators	2,414	\$40.25	\$83,730	1.44
15-1143	Computer Network Architects	424	\$59.86	\$124,500	0.60
15-1151	Computer User Support Specialists	3,266	\$24.20	\$50,330	1.12
15-1152	Computer Network Support Specialists	497	\$30.09	\$62,590	0.59
15-1199	Computer Occupations, All Other	1,041	\$54.70	\$113,770	0.59
17-2061	Computer Hardware Engineers	235	\$55.15	\$114,720	0.81
25-1021	Computer Science Teachers, Postsecondary	111	*	\$90,500	0.76
27-1014	Multimedia Artists and Animators	31	NP	NP	NP
43-9011	Computer Operators	210	\$23.86	\$49,630	1.29
49-2011	Computer, ATM, and Office Machine Repairers	642	\$22.87	\$47,570	1.25
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	298	\$28.05	\$58,340	2.74

## Information Technology Worker Employment

Nearly every industry sector employs IT workers. In 2018, over 80 percent of New Hampshire IT workers were employed in six industry sectors: *Professional, scientific, and technical services* (31.8 percent), *Information* (13.7 percent), *Finance and insurance* (12.7 percent), *Manufacturing* (10.1 percent), *Wholesale trade* (7.9 percent), and *Educational services* (6.8 percent).<sup>4</sup>

Over 90 percent of IT workers were employed in half of New Hampshire's counties. About 42 percent of IT workers were employed in Hillsborough County and 25 percent in Rockingham County. Another 25 percent were employed in Grafton, Merrimack, or Strafford Counties.

## Educational Attainment

Most IT workers need at least some postsecondary education to qualify for an entry-level position. Computer and information systems managers, Information security analysts, and Computer network architects typically require work experience in a related occupation with a baccalaureate. Computer operators, Computer, ATM, and office machine repairers, and CNC machine tool programmers usually require on-the-job training to gain proficiency in the occupation in addition to educational attainment.

SOC	Occupation Title	Usual Entry-Level Education, Experience, OJT <sup>5</sup>
11-3021	Computer and Information Systems Managers	Bachelor's degree; 5+ years of experience
15-1111	Computer and Information Research Scientists	Master's degree
15-1121	Computer Systems Analysts	Bachelor's degree
15-1122	Information Security Analysts	Bachelor's degree; up to 5 years of experience
15-1131	Computer Programmers	Bachelor's degree
15-1132	Software Developers, Applications	Bachelor's degree
15-1133	Software Developers, Systems Software	Bachelor's degree
15-1134	Web Developers	Associate's degree
15-1141	Database Administrators	Bachelor's degree
15-1142	Network and Computer Systems Administrators	Bachelor's degree
15-1143	Computer Network Architects	Bachelor's degree; 5+ years of experience
15-1151	Computer User Support Specialists	Some college, no degree
15-1152	Computer Network Support Specialists	Associate's degree
15-1199	Computer Occupations, All Other	Bachelor's degree
17-2061	Computer Hardware Engineers	Bachelor's degree
25-1021	Computer Science Teachers, Postsecondary	Doctorate or professional degree
27-1014	Multimedia Artists and Animators	Bachelor's degree
43-9011	Computer Operators	High school diploma or equivalent plus moderate (up to 12 months) on-the-job training
49-2011	Computer, ATM, and Office Machine Repairers	Some college, no degree, plus short (one month or less) on-the-job training
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	Postsecondary non-degree award plus moderate (up to 12 months) on-the-job training

<sup>4</sup> New Hampshire Occupational Employment Statistics (OES), Occupational Staffing Patterns, May 2018

<sup>5</sup> New Hampshire Occupational Employment Projections by Industry and Occupation

## Information Technology Worker Demand: Online Job Postings

Employers rarely describe positions using an occupational title. Job titles in online postings vary widely, and this is especially so for information technology occupations, which frequently specify a software package in the job title.

During the first four months of 2020, engineers were in high demand. Job postings for engineers represented 53 percent of the 5,339 New Hampshire IT job ads from January through April.

Workers Highest in Demand by IT Occupation Job Title Online Job Postings, January 1 - April 30, 2020	
Job Title	Job Postings
Software Development Engineer	1,629
Front End Engineer	240
Engineer	150
Software Developer	96
Java Developer	92
Systems Engineer	91
Senior Engineer	89
Applications Analyst	50
Systems Administrator	50
DevOps Engineer	43
Mobile App Developer	41
Network Engineer	41
Systems Analyst	40
Java Engineer	39
Help Desk Analyst	34
Principal Systems Engineer	34
Quality Assurance Engineer	33
.Net Developer	32
Applications Developer	31
Principal Software Engineer	31
Senior Systems Engineer	31
Data Engineer	30
Business Systems Analyst	29
Front End Developer	29
Help Desk Technician	29

Source: Labor Insight Jobs (Burning Glass Technologies). Job ad data for selected Information Technology occupations, January-April 2020. Data extracted May 28, 2020.

## Skills in Demand

Most employers are looking for workers with some basic skills and abilities, those learned regardless of a person's occupation. For IT occupations, specialized skills are frequently synonymous with software skills.

### Skill Type Definitions

- **Baseline:** include crosscutting or foundational skills found across industries and occupations. These include things like organizational skills, communication skills, and project management.
- **Specialized:** include professional and occupation-specific skills requested in job postings, which can run the gamut from accounting and sales to database administration and welding.
- **Software and Programming:** include specific computer programs requested in job postings as well as programming skills (including languages such as Java and Perl).

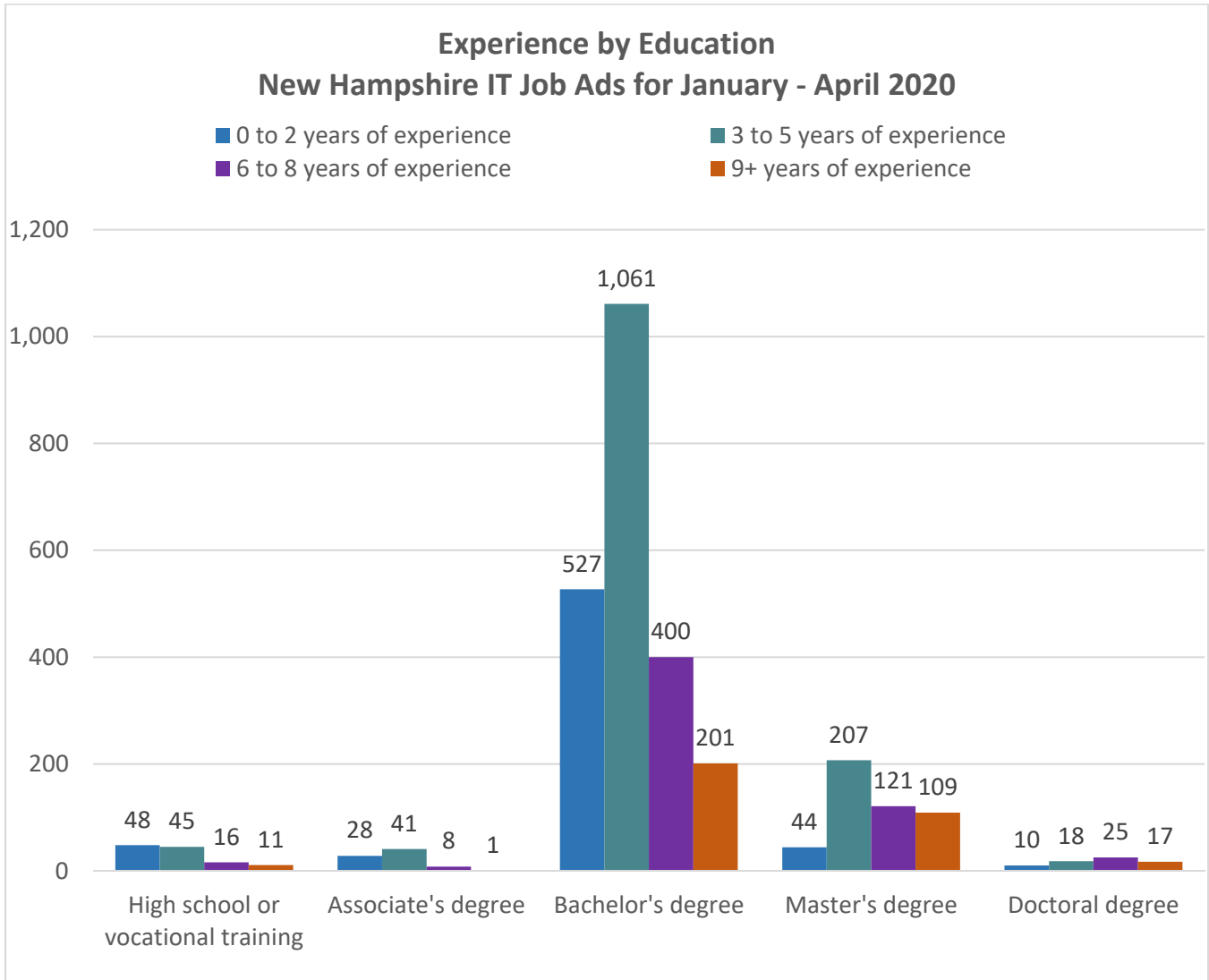
Skills Highest in Demand in IT Occupation Job Ads Online Job Postings, January 1 - April 30, 2020		
Baseline Skills	Specialized Skills	Software Skills
Communication Skills	Software Engineering	Software Engineering
Creativity	Java	Java
Teamwork / Collaboration	SQL	SQL
Problem Solving	JavaScript	JavaScript
Writing	Git	Git
Troubleshooting	Web Development	Ruby
Planning	Version Control	NoSQL
Time Management	Ruby	Node.js
Organizational Skills	NoSQL	Ruby on Rails
Research	SSL	Docker Software
Microsoft Office	Server Configuration	.NET
Detail-Oriented	Node.js	Active Server Pages (ASP)
Written Communication	Ruby on Rails	ASP.NET
Microsoft Excel	Docker Software	Swift (Programming Language)
Verbal / Oral Communication	Software Installation	ASP.NET MVC
Microsoft Windows	.NET	Python
Building Effective Relationships	Active Server Pages (ASP)	Software Development
Leadership	ASP.NET	AngularJS
Presentation Skills	Swift (Programming Language)	Microsoft C#
Self-Starter	ASP.NET MVC	Linux
Analytical Skills	Python	Oracle
Multi-Tasking	Software Development	C++
Mentoring	IT Industry Knowledge	Amazon Web Services (AWS)
Computer Literacy	AngularJS	Scrum
Physical Abilities	Microsoft C#	Computer Engineering

Source: Labor Insight Jobs (Burning Glass Technologies). Job ad data for selected Information Technology occupations, January-April 2020. Data extracted May 28, 2020.



## Education and Experience in Demand

Between January and April 2020, there were 5,339 IT New Hampshire occupation job ads posted online. Over two-thirds of these ads specified an educational level and experience qualifications for desired applicants. The largest number of job ads by far specified a Bachelor's degree and three to five years of experience, with double the number of job ads of the next largest category, a Bachelor's degree with zero to two years of experience.



Source: Labor Insight Jobs (Burning Glass Technologies). Job ad data for selected Information Technology occupations, January-April 2020. Data extracted May 28, 2020. Data include both the preferred and minimum/required education levels listed in job postings. For this reason, a job posting may be counted in more than one of the educational categories shown. Neither education nor experience were specified in 1,582 postings.



## Certifications in Demand

Professional certifications benefit both employers and employees. For employers, an employee with a professional certification has demonstrated a commitment to knowledge and obtaining specialized skills. For employees, certification provides professional credibility and an opportunity to connect with others in the same specialization. Certification may lead to higher compensation as well.

Certifications Highest in Demand in IT Occupation Job Ads Online Job Postings, January 1 - April 30, 2020	
Certification	Job Postings
Security Clearance	330
Certified Information Systems Security Professional (CISSP)	116
CompTIA Security+	111
IT Infrastructure Library (ITIL) Certification	98
Driver's License	87
Certified A+ Technician	56
Project Management Certification	48
Cisco Certified Network Associate (CCNA)	43
Cisco Certified Network Professional (CCNP)	31
Automation Certification	30
Project Management Professional (PMP)	28
Microsoft Certified Solutions Associate (MCSA)	28
Microsoft Certified Solutions Expert (MCSE)	24
CompTIA Network+	16
Certified Scrum Master (CSM)	16
Certified Information Security Manager (CISM)	15
Certified Information Systems Auditor (CISA)	13
Lean Six Sigma Certification	13
Six Sigma Black Belt Certification	11
Microsoft Certified Professional (MCP)	11
VMware Certified Professional (VCP)	11
SANS/GIAC Certification	9
Cisco Certified Security Professional	9
Cisco Certified Internetwork Expert (CCIE)	7
Certified Scrum Trainer (CST)	7
Certified Scrum Professional (CSP)	7
Information Systems Certification	6
Certified Salesforce Administrator	6
Capability Model Maturity Integration (CMMI) Certification	6

Source: Labor Insight Jobs (Burning Glass Technologies). Job ad data for selected Information Technology occupations, January-April 2020. Data extracted May 28, 2020. Note: 85 percent of postings were excluded, as they did not specify a certification. Data may not be representative of the full sample.

## IT Occupation Job Ads by Industry

Information technology workers work in nearly every industry, though they are not evenly distributed. Job ads for IT workers by industry show a similar pattern, with larger numbers of ads for industries employing the largest shares of IT workers.

Note that job postings data do not include self-employed workers, and government job postings are limited to establishments classified in sector 92, Public Administration. Estimated employment for Government is based on ownership of the employing establishment by a government entity, either federal, state, or local.

Industry	2018 Estimated IT Employment	2018 Percent of all IT Workers	Jan – April 2020 Job Postings
Professional, Scientific, and Technical Services	8,040	31.8%	1,111
Information	3,477	13.7%	189
Finance and Insurance	3,219	12.7%	616
Manufacturing	2,548	10.1%	605
Wholesale Trade	2,001	7.9%	15
Educational Services	1,715	6.8%	85
Healthcare and Social Assistance	902	3.6%	143
Administrative and Support and Waste Management Services	698	2.8%	163
Government	665	2.6%	71
Retail Trade	595	2.4%	36
Management of Companies and Enterprises	582	2.3%	3
Self-Employed	568	2.2%	na
Other Services (Except Government)	145	0.6%	4
Construction	44	0.2%	12
Transportation and Warehousing	42	0.2%	9
Real Estate	39	0.2%	6
Accommodation and Food Services	13	0.1%	13
Utilities	12	0.0%	15
Arts, Entertainment, and Recreation	11	0.0%	10
Mining	2	0.0%	1

Source: New Hampshire Occupational Employment Survey Staffing Patterns and Labor Insight Jobs (Burning Glass Technologies). Job ad data for selected Information Technology occupations, January-April 2020. Data extracted May 28, 2020. Note: 45 percent of postings were excluded, as they did not specify the employer's industry. Data may not be representative of the full sample.

# Appendix A. 2018 Standard Occupational Classification (SOC) Dictionary of Information Technology Occupations

The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers and jobs into occupational categories for the purpose of collecting, calculating, analyzing, or disseminating data. The SOC classifies all occupations in which work is performed for pay or profit. The SOC covers all jobs in the national economy, including occupations in the public, private, and military sectors.

The 2018 SOC system contains 867 detailed occupations, aggregated into 459 broad occupations. In turn, the SOC combines these 459 broad occupations into 98 minor groups and 23 major groups. Of the 867 occupations in the 2018 structure, 391 remained completely unchanged from the 2010 SOC, 355 had at least a definition change, 131 had at least a title change, and 115 had at least a code change. Occupational groups with significant revisions and additions included Information Technology and Healthcare.<sup>1</sup>

The following SOC codes and descriptions are for computer occupations and select occupations related to information technology activities. These codes are used in the 2019 release of Occupational Employment and Wages, and will be incorporated into other occupational data moving forward.

## Computer Occupations

### 11-3021 Computer and Information Systems Managers

Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Excludes “Computer Occupations” (15-1211 through 15-1299).

*Illustrative examples: Chief Technology Officer, Information Technology Systems Director, Management Information Systems Director*

### 15-1211 Computer Systems Analysts

Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.

*Illustrative examples: Applications Analyst, Data Processing Systems Analyst, Information Systems Analyst, Systems Architect*

---

<sup>1</sup> Standard Occupational Classification Manual, United States, 2018. Executive Office of the President, Office of Management and Budget. Available at <https://www.bls.gov/soc/2018/home.htm>

### **15-1212 Information Security Analysts**

Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks, and propose and implement risk mitigation strategies. 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. Excludes “Computer Network Architects” (15-1241).

*Illustrative examples: Computer Security Specialist, IT Risk Specialist, Network Security Analyst*

### **15-1221 Computer and Information Research Scientists**

Conduct research into fundamental computer and information science as theorists, designers, or inventors. Develop solutions to problems in the field of computer hardware and software.

*Illustrative examples: Computational Theory Scientist, Control System Computer Scientist, Programming Methodology and Languages Researcher*

### **15-1231 Computer Network Support Specialists**

Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption. Excludes “Computer Network Architects” (15-1241) and “Network and Computer Systems Administrators” (15-1244).

*Illustrative examples: Network Diagnostic Support Specialist, Network Support Technician, Network Technician*

### **15-1232 Computer User Support Specialists**

Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, 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. Excludes “Network and Computer Systems Administrators” (15-1244).

*Illustrative examples: End-User Support Specialist, Help Desk Technician, IT Support Specialist*

### **15-1241 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, including analysis of capacity needs for network infrastructures. May also design network and computer security measures. May research and recommend network and data communications hardware and software. Excludes “Information Security Analysts” (15-1212), “Computer Network Support Specialists” (15-1231), and “Network and Computer Systems Administrators” (15-1244).

*Illustrative examples: Computer Network Engineer, Network Designer, Network Developer*

### **15-1242 Database Administrators**

Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. Identify, investigate, and resolve database performance issues, database capacity, and database scalability. May plan, coordinate, and implement security measures to safeguard computer databases. Excludes “Information Security Analysts” (15-1212) and “Database Architects” (15-1243).

*Illustrative examples: Database Programmer, Database Security Administrator*

### **15-1243 Database Architects**

Design strategies for enterprise databases, data warehouse systems, and multidimensional networks. Set standards for database operations, programming, query processes, and security. Model, design, and construct large relational databases or data warehouses. Create and optimize data models for warehouse infrastructure and workflow. Integrate new systems with existing warehouse structure and refine system performance and functionality. Excludes “Database Administrators” (15-1242).

*Illustrative examples: Data Architect, Data Integration Specialist, Data Warehousing Specialist, Database Developer*

## **15-1244 Network and Computer Systems Administrators**

Install, configure, and maintain an organization's local area network (LAN), wide area network (WAN), data communications network, operating systems, and physical and virtual servers. Perform system monitoring and verify the integrity and availability of hardware, network, and server resources and systems. Review system and application logs and verify completion of scheduled jobs, including system backups. Analyze network and server resource consumption and control user access. Install and upgrade software and maintain software licenses. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software. Excludes "Information Security Analysts" (15-1212), "Computer Network Support Specialists" (15-1231), and "Computer User Support Specialists" (15-1232).

*Illustrative examples: Network Analyst, Network Coordinator, Wide Area Network Administrator*

## **15-1251 Computer Programmers**

Create, modify, and test the code and scripts that allow computer applications to run. Work from specifications drawn up by software and web developers or other individuals. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.

*Illustrative examples: Applications Programmer, Computer Language Coder, IT Programmer, Systems Programmer*

## **15-1252 Software Developers**

Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance existing software capabilities. May work with computer hardware engineers to integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team.

*Illustrative examples: Computer Applications Engineer, Computer Systems Engineer, Mobile Applications Developer, Software Applications Architect, Software Engineer, Systems Software Developer*

### **15-1253 Software Quality Assurance Analysts and Testers**

Develop and execute software tests to identify software problems and their causes. Test system modifications to prepare for implementation. Document software and application defects using a bug tracking system and report defects to software or web developers. Create and maintain databases of known defects. May participate in software design reviews to provide input on functional requirements, operational characteristics, product designs, and schedules.

*Illustrative examples: Applications Tester, Software Quality Assurance Technician, Software Quality Control Specialist, Software Quality Engineer, Software Test Engineer*

### **15-1254 Web Developers**

Develop and implement websites, web applications, application databases, and interactive web interfaces. Evaluate code to ensure that it is properly structured, meets industry standards, and is compatible with browsers and devices. Optimize website performance, scalability, and server-side code and processes. May develop website infrastructure and integrate websites with other computer applications. Excludes “Special Effects Artists and Animators” (27-1014).

*Illustrative examples: Intranet Developer, Web Applications Developer, Web Architect*

### **15-1255 Web and Digital Interface Designers**

Design digital user interfaces or websites. Develop and test layouts, interfaces, functionality, and navigation menus to ensure compatibility and usability across browsers or devices. May use web framework applications as well as client-side code and processes. May evaluate web design following web and accessibility standards, and may analyze web use metrics and optimize websites for marketability and search engine ranking. May design and test interfaces that facilitate the human-computer interaction and maximize the usability of digital devices, websites, and software with a focus on aesthetics and design. May create graphics used in websites and manage website content and links. Excludes “Special Effects Artists and Animators” (27-1014) and “Graphic Designers” (27-1024).

*Illustrative examples: Digital Designer, Graphic Web Designer, Web Content Specialist*



## **15-1299 Computer Occupations, All Other**

All computer occupations not listed separately. Excludes “Computer and Information Systems Managers” (11-3021), “Computer Hardware Engineers” (17-2061), “Electrical and Electronics Engineers” (17-2070), “Computer Science Teachers, Postsecondary” (25-1021), “Special Effects Artists and Animators” (27-1014), “Graphic Designers” (27-1024), “Health Information Technologists and Medical Registrars” (29-9021), and “Computer, Automated Teller, and Office Machine Repairers” (49-2011).

*Illustrative examples: Computer Console Operator, Computer Laboratory Technician, Data Center Operator*

## **15-2051 Data Scientists**

Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. Apply data mining, data modeling, natural language processing, and machine learning to extract and analyze information from large structured and unstructured datasets. Visualize, interpret, and report data findings. May create dynamic data reports. Excludes “Statisticians” (15-2041), “Cartographers and Photogrammetrists” (17-1021), and “Health Information Technologists and Medical Registrars” (29-9021).

*Illustrative examples: Business Intelligence Developer, Data Analytics Specialist, Data Mining Analyst, Data Visualization Developer*

## **17-2061 Computer Hardware Engineers**

Research, design, develop, or test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components. Excludes “Software Developers” (15-1252) and “Web Developers” (15-1254).

*Illustrative examples: Computer Hardware Designer, Computer Hardware Developer*

## **Other Information Technology Occupations**

### **25-1021 Computer Science Teachers, Postsecondary**

Teach courses in computer science. May specialize in a field of computer science, such as the design and function of computers or operations and research analysis. Includes both teachers primarily engaged in teaching and those who do a combination of teaching and research.

*Illustrative examples: Computer Information Systems Professor, Information Technology Professor, Java Programming Professor*

### **27-1014 Special Effects Artists and Animators**

Create special effects or animations using film, video, computers, or other electronic tools and media for use in products, such as computer games, movies, music videos, and commercials.

*Illustrative examples: 3D Animator, Special Effects Artist*

### **29-9021 Health Information Technologists and Medical Registrars**

Apply knowledge of healthcare and information systems to assist in the design, development, and continued modification and analysis of computerized healthcare systems. Abstract, collect, and analyze treatment and follow up information of patients. May educate staff and assist in problem solving to promote the implementation of the healthcare information system. May design, develop, test, and implement databases with complete history, diagnosis, treatment, and health status to help monitor diseases. Excludes "Medical Records Specialists" (29-2072).

*Illustrative examples: Cancer Registrar, Health Informatics Specialist, Health Information Analyst*

### **49-2011 Computer, Automated Teller, and Office Machine Repairers**

Repair, maintain, or install computers, word processing systems, automated teller machines, and electronic office machines, such as duplicating and fax machines.

*Illustrative examples: ATM Servicer, Cash Register Servicer, Data Processing Equipment Repairer*

### **51-9162 Computer Numerically Controlled Tool Programmers**

Develop programs to control machining or processing of materials by automatic machine tools, equipment, or systems. May also set up, operate, or maintain equipment.

*Illustrative examples: Computer Numerically Controlled (CNC) Programmer, Numerical Control Programmer, Numerical Tool Programmer*