

CTE LABOR MARKET TOOL

This resource provides data snapshots and insights about the overall information technology (IT) labor market, and a closer focus on the Computer Support Specialists, Database Administrators, and Software Developers occupations as those are popular areas for CTE IT programs. It also includes some guiding questions to help apply the data to your school’s CTE program.

Careers in IT include many different kinds of jobs. Some focus on working directly with individual clients to help them set up and maintain their personal computers, while others involve designing, supporting, and providing security for the technology infrastructure of organizations. People with these occupations primarily work in office settings, though some may have the option to work remotely. The three largest IT occupations in New York City are Software Developers and Software Quality Assurance Analysts and Testers****, Computer User Support Specialists, and Computer Systems Analysts. Chart 1 below shows the many different kinds of NYC organizations hiring professionals in IT.

Why use this resource?

- Use as a critical tool with your school’s self study group to guide program planning and improvement aligned to labor market data
- Use as a critical tool to prepare students for postsecondary planning towards high-demand careers
- Feel prepared and confident when responding to NYSED questions about incorporating labor market data into your work

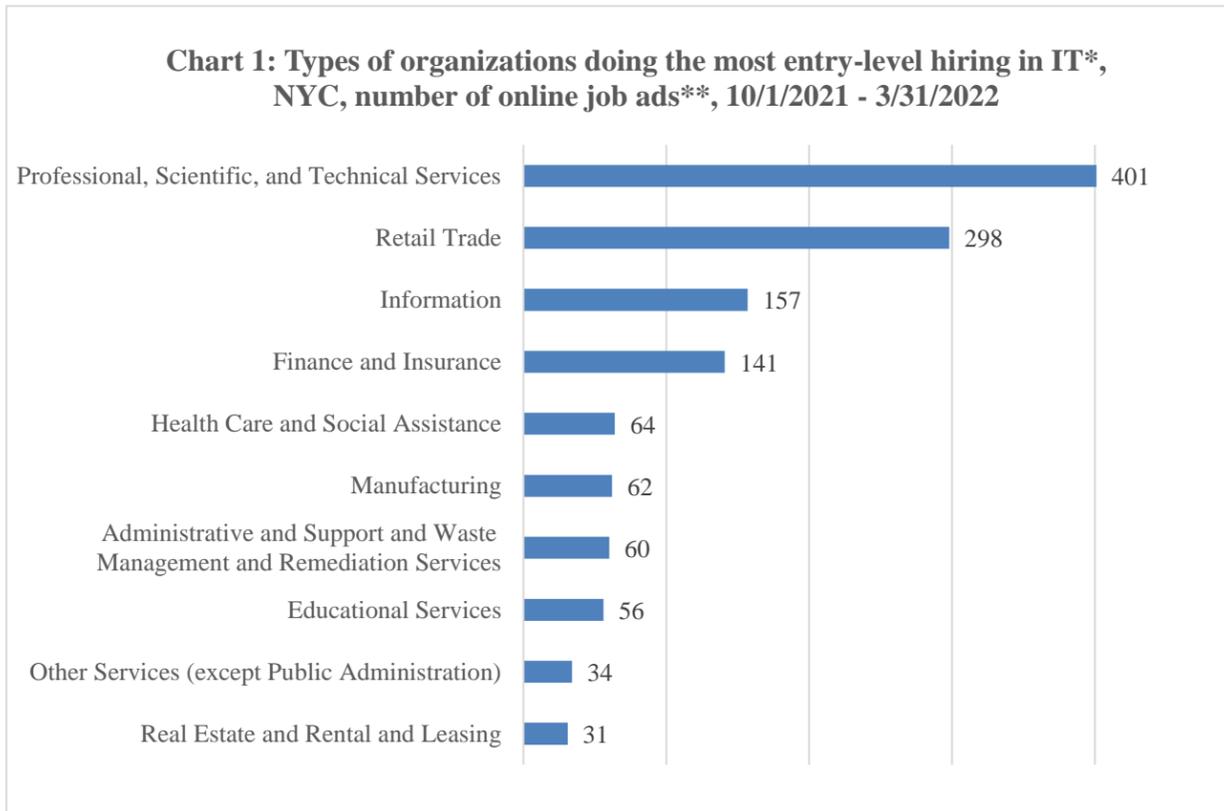


Chart 2 provides an overview of New York City employment in each of the three focus occupations. As you can see, the number of jobs in each of the occupations is expected to grow by 2028, with both the predicted *percentage increase* (30.4%) and *size of the occupation* (67,380 jobs) largest for the software developers occupation. It’s important to keep in mind that even though these predictions help us understand the labor market’s trajectory, things like new technologies or innovations, shifts in the economy, or major unexpected shocks like the COVID-19 pandemic can impact their accuracy.

Chart 2: Current & projected employment for 3 focus occupations, NYC, 2018 – 2028

	# Employed in NYC****	Projected NYC Employment***		Change Over Time (2018-2028)	
	2020	2018	2028	Net	Percent
Computer Support Specialists	25,150	33,250	39,020	5,770	17.4%
Database Administrators	5,220	4,320	4,830	510	11.8%
Software Developers	52,890	51,680	67,380	15,700	30.4%



IN THIS RESOURCE...

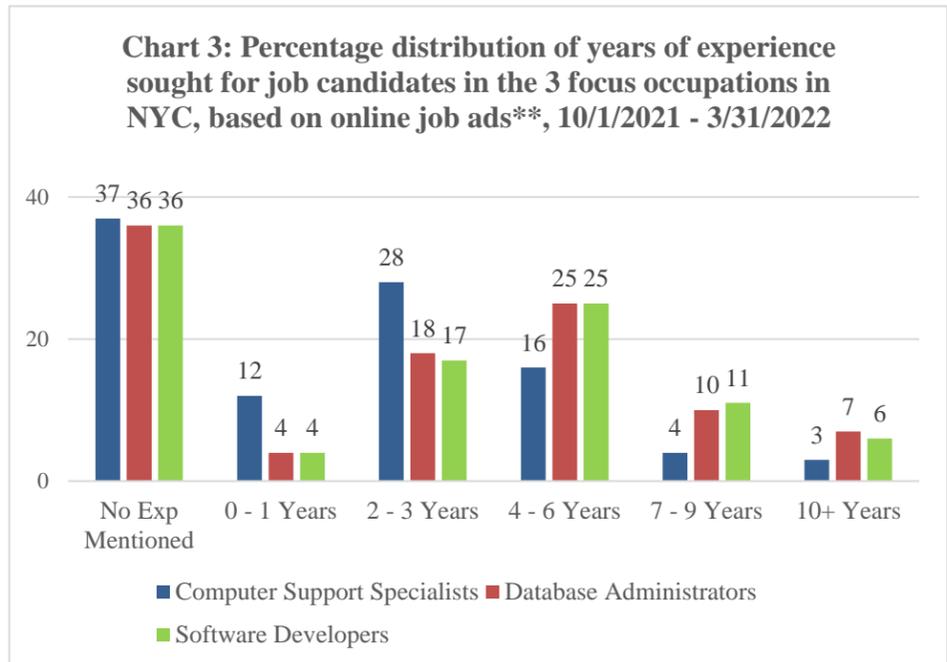
LOOKING DEEPER: WHO’S BEING HIRED IN THIS FIELD? (P.2)

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Looking Deeper: Who's Being Hired in This Field?

- Approximately one-third of job ads for each of the three focus occupations did not specify years of experience or level of education sought. For those that did, a mid-range of experience – between 2-6 years – and a bachelor's degree was most common for all three occupations.
- There is some overlap in the employability skills that organizations look for in job candidates, with communication, problem-solving, and management skills in-demand for all three focus occupations. Notably, no certifications met the criteria of in-demand – mentioned in at least 10% of job posts – for any of the three occupations.
- Entry-level wages for all three focus occupations very nearly meet or exceed the living wage for a single adult in NYC (\$48,320*****).



The chart below reflects entry-level wages****, as well as the most in-demand (i.e., among the five most frequently requested and in at least 10% of online job ads*****) employability skills, technical skills, and certifications** for entry-level jobs in the three focus occupations from 10/1/2021 – 3/31/2022. Values in parentheses reflect the percentage of online job ads in which each skill is mentioned.

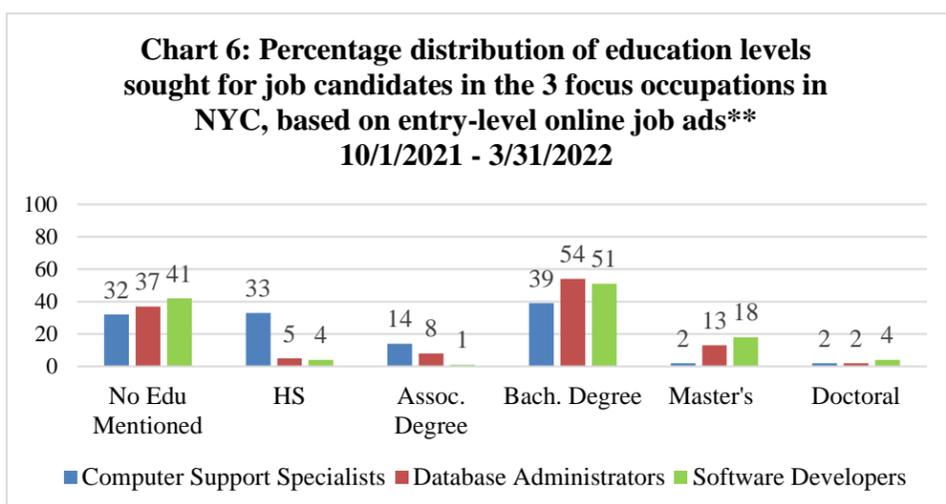
Chart 4: Entry-level wages & in-demand skills for 3 focus occupations

Occupation	Entry-level Wage	In-demand Employability Skills	In-demand Technical Skills	In-demand Certifications
Computer Support Specialists	\$47,424	Troubleshooting (59%), Customer Service (54%), Communications (49%), Problem Solving (28%), and Management (27%)	Help Desk Support (42%), Technical Support (29%), Operating Systems (22%), Active Directory (17%), and Computer Science (17%)	N/A
Database Administrators	\$71,350	Communications (38%), Problem Solving (28%), Detailed Oriented (27%), Management (26%), and Operations (21%)	SQL (Programming Language) (43%), Computer Science (34%), Python (Programming Language) (34%), Data Engineering (28%), and Data Management (26%)	N/A
Software Developers	\$87,850	Communications (43%), Problem Solving (22%), Operations (19%), Innovation (17%), and Management (17%)	Java (Programming Language) (41%), Software Development (40%), Computer Science (40%), Software Engineering (34%), and Amazon Web Services (33%)	N/A

Chart 5 shows the ethnicity and sex of people who work in the three focus occupations in NYC****. As you can see, more males than females are employed in all three focus occupations. The most common ethnicity for workers in all three occupations is White, followed by Asian/Pacific Islander.

Chart 5: Sex and ethnicity distributions for 3 focus occupations

Occupation	Ethnicity %						Sex %	
	American Indian/Alaska Native	Asian/Pacific Islander	Black	Hispanic	White	Multi-ethnic/Other	Female	Male
Computer Support Specialists	0.00	26.67	14.15	18.44	38.79	1.96	18.98	81.02
Database Administrators	2.06	31.63	10.01	8.84	43.89	3.59	30.13	69.87
Software Developers	0.04	39.95	4.04	7.92	45.12	2.92	15.05	84.95



Post-secondary Planning

CTE students are encouraged to pursue education and training after graduation from high school in order to enter into an in-demand career with family-sustaining wages in NYC. The following is a list of CUNY degree programs aligned with the IT industry as well as non-degree programs that result in an industry-endorsed certification and/or college credits. Some CTE programs have robust partnerships with CUNY programs that are codified by an articulation agreement. These agreements provide a range of student benefits such as advanced standing, early college credit, and preferential placement. CTE school leaders, teachers and work-based learning coordinators are encouraged to connect with the school counseling teams at their school to determine strong postsecondary options for their students. Please reach out to your Industry Engagement Manager for more information about the articulation agreements.

- Chart 7 is a sample of the over 50 CUNY programs focused on IT spread across the five boroughs, ranging from certificate programs up through PhD degree opportunities. It is helpful to keep in mind the data from Chart 6, above, which suggests that having a post-secondary educational credential is valuable for job candidates in this field.
- Chart 8, on the following page, provides a list of non-degree IT occupation-focused training opportunities available through a variety of different NYC-based organizations.

Chart 7: CUNY post-secondary programs related to IT

Borough	School	Academic program	Credential*****	Existing articulation agreements: benefits
Bronx	Bronx CC	Cybersecurity and Networking	Certificate	
Bronx	Bronx CC	Computer Information Systems and Cybersecurity and Networking	AAS	
Bronx	Bronx CC	Digital Design	AAS	
Bronx	Bronx CC	Computer Science	AS	
Bronx	Hostos CC	Digital Design and Animation	AAS	
Bronx	Hostos CC	Computer Science	AS	
Bronx	Lehman College	Digital Technology and Electronics	Certificate	
Bronx	Lehman College	Computer Science	BA	
Bronx	Lehman College	Computer Graphics and Imaging, Computer Information Systems, and Computer Science	BS	
Bronx	Lehman College	Computer Science	MS	
Brooklyn	Brooklyn College	Computer Science and Information Systems	BS	
Brooklyn	Brooklyn College	Computer Science	MA	
Brooklyn	Brooklyn College	Health Informatics and Information Systems	MS	
Brooklyn	Kingsborough CC	Computer Information Systems and Website Development	AAS	
Brooklyn	Kingsborough CC	Computer Science	AS	
Brooklyn	Medgar Evers College	Computer Applications	AAS	
Brooklyn	Medgar Evers College	Computer Science	AS	
Brooklyn	Medgar Evers College	Computer Information Systems and Computer Science	BS	
Brooklyn	NYC College of Tech	Computer Information Systems	AAS	
Brooklyn	NYC College of Tech	Computer Science	AS	
Brooklyn	NYC College of Tech	Biomedical Informatics	BS	
Manhattan	Baruch College	Computer Information Systems	BBA	
Manhattan	Baruch College	Information Systems	Executive MS and MS	
Manhattan	Borough of Manhattan CC	Computer Science	AS	
Manhattan	Borough of Manhattan CC	Computer Network Technology	AAS	Prior Learning Credit: 6 credits
Manhattan	Borough of Manhattan CC	Computer Information Systems and Health Information Technology	AAS	
Manhattan	City College of New York	Computer Engineering	BE	
Manhattan	City College of New York	Computer Science	BS	
Manhattan	City College of New York	Computer Engineering, Computer Science, Cybersecurity, and Information Systems	MS	
Manhattan	Graduate Center	Computer Science	PhD	
Manhattan	Guttman CC	Information Technology	AAS	
Manhattan	Hunter College	Computer Science	BA	
Manhattan	Hunter College	Computer Science	MS	
Manhattan	John Jay School	Computer Science and Information Security	BS	
Manhattan	John Jay School	Applied Digital Forensic Science and Computer Science for Digital Forensic Science	Advanced Certificate	
Manhattan	School of Professional Studies	Health Information Management and Information Systems	BS	

Manhattan	School of Professional Studies	Health Information Management	MS	
Queens	LaGuardia CC	Network and Information Security	Certificate	
Queens	LaGuardia CC	Computer Technology, Network Administration & Information Security, and Programming and Software Development	AAS	
Queens	LaGuardia CC	Computer Science	AS	
Queens	Queens College	Computer Science	BA	
Queens	Queens College	Computer Science	BA/MA and BS	
Queens	Queens College	Computer Science	MA	
Queens	Queensborough CC	Computer Information Systems and Internet and Information Technology	Certificate	
Queens	Queensborough CC	Computer Engineering Technology, Computer Information Systems, and Internet and Information Technology	AAS	
Queens	Queensborough CC	Computer Science and Information Security	AS	
Queens	York College	Computer Science and Information Systems Management	BS	
Staten Island	College of Staten Island	Computer Technology	AAS	
Staten Island	College of Staten Island	Computer Science and Information Systems and Informatics	BS	
Staten Island	College of Staten Island	Computer Science	MS	

Chart 8: Non-degree IT training opportunities

Bronx Youth Center’s TechBridge Program
Career Discovery NYC's Web Developer Program
COOP Tech's IT Programs
CUNY's Continuing and Professional Education
Data Analyst Training Accelerator with Galvanize
Fedcap's Computer Service Technician Program
Fullstack Academy's Future Code
Knowledge House's Innovation Fellowship
N Power's Cybersecurity Program
NYC Web Development Fellowship through the Flatiron School
OBT's Cloud Support Engineering Training Program
Per Scholas
Pursuit
Workforce1 Career Center System
Year Up

What Next? Guiding Questions & Web Resources

“Describe how current labor market data has informed program design and choice of technical assessment.”

The prompts below are designed to promote discussion and ideas for program planning, and to help you answer the question above from the CTS self study tab and the NYSED CTE application (Part 2, Section C).

How can we incorporate this report’s data insights into our...	Data points to consider:
...program focus?	Introductory paragraph overviews on page 1 and charts 1, 2, 3, 4
...technical and employability skills?	Chart 4
...articulation agreement?	Charts 6, 7
...technical assessments?	Chart 4
...career pathway options?	Charts 1, 2, 7, 8

Consider the questions below keeping in mind the labor market data points you’ve explored in this report and the questions that you’ve answered above.

Select three ways that you might adjust your program in response to labor market data:

- Program focus
 Articulation agreement
 Technical assessments
 Career pathway options
 Technical and employability skills
 Other:

Which one of these three adjustments could most easily be implemented this school year?

Which one of the three would make the biggest difference for the quality of your program? Why?

Curious to explore more? Check out these web resources:

- CTE NYC website: www.cte.nyc
- CTE Industry Commission resources: bitly.com/CTEIndustryEngagement
- CTE College and Career Planning Team's postsecondary milestones toolkit: <https://bit.ly/35uglcc>
- CareerOneStop labor market data explorer: www.careeronestop.org

Technical Notes & Data Sources:

* “IT” occupations have been operationalized as occupations with a 2018 Standard Occupation Classification (SOC) code starting with the four-digit “15-12XX” (“Computer Occupations”) and SOC code “49-2010/11”, “Computer, Automated Teller, and Office Machine Repairers”.

** These analyses were conducted using the EMSI Burning Glass Analyst proprietary web-based research platform. Please note that some intra-occupation percentage totals may equal >100% if the employer indicated a range of minimum/preferred years of experience or education-attainment level. “Entry-level” jobs are considered to be those with job advertisements that specified 0-1 year of experience. For Database Administrators (15-1242) and Software Developers (15-1252), EMSI only includes more generalized occupations: Database Administrators and Architects (OEWS hybrid code 15-1245) and Software Developers and Software Quality Assurance Analysts and Testers (OEWS hybrid code 15-1256). Hence, we manually excluded job postings with titles related to architects and software quality assurance and testers to narrow down the results. This affects the data in Chart 3, Chart 4, and Chart 6.

*** New York City 2018-2028 long-term employment projections are determined by New York State Department of Labor (NYSDOL). Please note that these estimates include self-employed workers, which is not always true of other estimates such as the OEWS estimates. The long-term employment projections are based on the 2010 SOC classification system, and some 2010 occupation titles do not align with the 2018 occupation titles. The 2018 occupations “Software Developers” and “Software Quality Assurance Analysts and Testers” are a reclassification of jobs from the 2010 occupations “Software Developers, Applications” and “Software Developers, Systems Software”. The projections in row three of Chart 2 reflect the aggregate estimates for Software Developers, Applications and Software Developers, Systems Software.

**** NYSDOL, Occupational Employment and Wage Statistics (OEWS) estimates for New York City (July 2021 release). NYSDOL adjusted wages to reflect levels in the first quarter of 2021. NYSDOL operationalizes “Entry Wage” as the average of the bottom third of wages. For Database Administrators (15-1242) and Software Developers (15-1252), OEWS only includes the more general occupation titles Database Administrators and Architects (OEWS hybrid code 15-1245) and Software Developers and Software Quality Assurance Analysts and Testers (OEWS hybrid code 15-1256). Hence, the NYC employment and entry-wage of these two occupations reflect estimates in broader job families, and these broader job categories are also used to identify the largest IT occupations in New York City.

***** Demographics based on U.S. Census, American Community Survey (ACS) estimates, NYC 2015-2019 5-year sample, IPUMS release February 2021. Please note that the ACS does not ask for respondents’ gender, only biological sex. As a result, there are only results available for male and female categories. To learn more about this, please see here:

<https://www.census.gov/acs/www/about/why-we-ask-each-question/sex/>

Most ACS occupation titles align with 2018 SOC titles, but some do not. For Database Administrators, ACS has the occupation title at a higher level so the demographic breakdowns in row 2 of Chart 5 reflect the ethnicity and sex distributions of a broader occupation group that includes both database administrators and database architects.

***** AAS denotes Associate in Applied Science; AS denotes Associate in Science; BA denotes Bachelor of Arts; BBA denotes Bachelor of Business Administration; BE denotes Bachelor of Engineering; BS denotes Bachelor of Science; MA denotes Master of Arts; MS denotes Master of Science; PhD denotes Doctor of Philosophy.

***** Massachusetts Institute of Technology’s (MIT) Living Wage calculator, 2020 estimate for the five counties of New York City, NY (<https://livingwage.mit.edu/metros/35620>; data accessed April 2022), adjusted to the first quarter of 2021 using the U.S. Bureau of Labor Statistics Consumer Price Index for All Urban Consumers (New York-Newark-Jersey City metropolitan area, not seasonally adjusted).

***** Additional skills that are in-demand as measured by being mentioned in at least 10% of online job ads for entry-level workers but not among the top 5 most frequently requested are:

Computer Support Specialists: Additional in-demand employability skills include Microsoft Office, detail oriented, multitasking, operations, information technology, written communication, research, interpersonal communications, organizational skills, Microsoft Windows, time management, planning, Microsoft Excel, verbal communication skills, professionalism, and sales. Additional in-demand technical skills include issue tracking, peripheral devices, Microsoft Windows 10, Microsoft Office 365, desktop support, Mac OS, computer hardware, and customer support.

Database Administrators: Additional in-demand employability skills include Microsoft Excel, research, sales, planning, troubleshooting (problem solving), basic math, presentations, customer service, innovation, verbal communication skills, written communication, prioritization, organizational skills, information technology, and self starter. Additional in-demand technical skills include data analysis, Extract Transform Load (ETL), data modeling, workflow management,

finance, Apache Spark, dashboard, Agile methodology, Amazon Web Services, automation, Java (programming language), big data, application programming interface (API), Scala (programming language), data governance, data warehousing, scalability, data structures, scripting, and data science.

Software Developers: Additional in-demand employability skills include leadership, planning, detail oriented, troubleshooting (problem solving), mentorship, customer service, and written communication. Additional in-demand technical skills include Python (programming language), scalability, C++ (programming language), JavaScript (programming language), C# (programming language), Agile methodology, code review, application programming interface (API), SQL (programming language), architectural design, systems design, software development life cycle, object-oriented design, algorithms, Cascading Style Sheets (CSS), automation, data structures, version control, full stack development, and web services.