



NASHVILLE TECHNOLOGY COUNCIL

2016 Labor and Education Alignment Program (LEAP 2.0)

IT Pathway Collaborative 2.0

Nashville Technology Council

IN PARTNERSHIP WITH

Volunteer State Community College

Sumner County Schools, Robertson County Schools, Metro Nashville Public Schools

ServPro, Hospital Corporation of America (HCA), Bridgestone Americas, Digital Connections, Inc. (DCi), HPA-Cognizant, PLUM Laboratories, Change Healthcare, First Tennessee Bank, Littlejohn Engineering, Sherriff of Sumner County, Upper Middle Tennessee Rural Health Network, Robertson Education Initiative, Workforce Essentials, Gallatin Chamber of Commerce, Portland Chamber of Commerce, Robertson Chamber of Commerce, Hendersonville Chamber of Commerce, Nashville Chamber of Commerce, and City of Westmoreland

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Funding Requested:
\$535,323

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IT Pathway Collaborative 2.0

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SECTION 1: ABSTRACT

The IT Pathway Collaborative 2.0 (ITPC 2.0) seeks to geographically expand a technology workforce-focused, collaborative partnership further north to the area of Middle Tennessee serviced by Volunteer State Community College (hereafter referred to as Vol State). This project seeks to enhance and expand Vol State's current technology programs by creating long-term relationships between local school systems, higher education, and employers. Although all technology education and career opportunities will be promoted, additional specific focus will be on cyber defense education and career opportunities. ITPC 2.0 will also provide the support needed for Vol State to successfully apply for the National Centers of Academic Excellence in Cyber Defense – Two Year Education (CAE2Y) designation.

By looking at Middle Tennessee's current labor market, technology job growth projections, and the ability of the educational institutions and programs to build the future technology talent, the data supports the need for the ITPC 2.0 project. The EMSI data projects that growth rates will increase to an average of 18% for the "Top 5 IT Occupations" in Middle Tennessee between 2014 and 2024. More specifically, the number of known cybersecurity incidents rose by 98 percent last year (<http://www.sec.gov>, 2016), and the need for cybersecurity professionals is growing at a rate three times as fast as those for the technology sector overall (Burning Glass, 2016).

In alignment with the goals of Drive to 55, the ITPC 2.0 project will address the challenge of the job candidate "skills gap" by promoting IT career opportunities in Sumner, Robertson, and Davidson counties, in order to expand current programming by increasing enrollment and graduation rates for technology programs at Vol State. Currently, IT courses at Vol State are drastically under enrolled. In fact, if Volunteer State's technology courses were enrolled to their capacity, **each year an additional 1,682 students would become skilled technology workers**, which would substantially fill the "skills gap".

SECTION 2: IT PATHWAY COLLABORATIVE 2.0 PROGRAM PROPOSAL

1: DEMONSTRATED NEED

In 2014, the LEAP grant program funded the IT Pathway Collaborative project to serve Davidson, Williamson, and Rutherford Counties through a partnership of the Nashville Technology Council (NTC) and Nashville State Community College. The IT Pathway Collaborative 2.0 (ITPC 2.0) seeks to extend this project's programming further north to the area of Middle Tennessee serviced by Vol State. This project expands the community-based, collaborative partnership that is committed to driving the economic success of Middle Tennessee through growing the skilled technology workforce. While the ITPC 2.0 seeks to include all IT career pathways, it will provide additional specific focus on cyber defense education and career opportunities. The proposed ITPC 2.0 project will address the challenge of job candidate "skills gap" by promoting IT career opportunities in Sumner, Robertson, and Davidson counties, in order to increase enrollment and graduation rates in local community colleges. This approach directly aligns with the State's *Drive to 55* goals.

In 2015, there were over seven million jobs in the United States in occupations that value computer science skills. Twenty percent of all "career track jobs" (defined as earning over \$15/hour) seek professionals with computer science skills. Furthermore, half of the jobs in the top income quartile (>\$57,000 annual income) are in occupations that require coding skills – and this is not expected to decrease. Programming jobs are growing the fastest – 50 percent faster than the market overall and 12 percent faster than the market average (Burning Glass, 2016). The EMSI data projects that growth rates will increase an average of 18% for the "Top 5 IT Occupations" in Middle Tennessee between 2014 and 2024. By looking at Middle Tennessee's current labor market, technology job growth projections, and the ability of the educational institutions and programs to prepare tomorrow's technology talent, the data supports the need for the ITPC 2.0 project.

More specifically, the number of known cybersecurity incidents rose by 98 percent last year (<http://www.sec.gov>, 2016), and the need for cybersecurity professionals is growing at a rate three times as

fast as those for the technology sector overall (Burning Glass, 2016). According to the Burning Glass Cybersecurity Jobs Report 2015, there is long term need for cybersecurity professionals that will require a long term strategy to address the shortage of skilled workers. According to Michael Brown, CEO of Symantec, the world's largest security software vendor, the "global need for the [cybersecurity] workforce is expected to rise to six million by 2019, with a projected shortfall of 1.5 million."

A clear path for closing the "skills gap" in technology is increasing enrollment in IT academic programs. A 2011 study published by the Tennessee Higher Education Commission documents one of the greatest current "skills gaps" is in software development (Source: *Academic Program Supply and Occupational Demand Projections: 2008-2018*). Between 2011 and 2018, this study predicts that approximately 678 new software development positions will be needed yearly in Tennessee with only 397 new graduates each year to fill those positions. While this study clearly demonstrates a significant deficit in the supply of skilled and certified workers, it also states that applicants with two years or less of post-secondary education would be viable candidates to fill these positions. This suggests that an effective strategy for closing the "skills gap" would be increasing enrollment in community colleges' IT program.

IT courses at Vol State could enroll many more students. Vol State has the capacity to serve 2,333 students, but current enrollment is only 651 students. Therefore, through community and local school system outreach and the proper marketing of these programs, an additional 1,682 students could become skilled workers and the "skills gap" would be filled.

2: PROGRAM PLAN

PROJECT GOVERNANCE AND ACCOUNTABILITY PLAN: Sandi Hoff with the NTC will serve as the Project Director. The project shall be governed by a Steering Committee that consists of technology leaders representing the following organizations: the NTC, Sumner County Schools, Robertson County Schools, Metro Nashville Public Schools, Dean of Business and Technology at Vol State, Workforce Essentials, ServPro,

Hospital Corporation of America (HCA), and Bridgestone Americas. The Steering Committee shall meet quarterly to review progress on the project metrics and make decisions regarding programming, community outreach strategies, budgeting, and sustainability.

PROJECT OVERVIEW: The ITPC 2.0 project seeks to provide an employer-driven regional, collaborative approach to address the challenge of job candidate “skills gaps” by increasing the local IT workforce pool in Sumner, Robertson, and Davidson counties. The ITPC 2.0 project seeks to enhance and expand Volunteer State Community College’s current technology programs, while also providing important support for Vol State’s effort to meet the National Centers of Academic Excellence in Cyber Defense – Two Year Education (CAE2Y) designation requirements.

In 2017, Vol State is seeking the CAE2Y designation, which is jointly sponsored by the National Security Agency (NSA) and the Department of Homeland Security (DHS). The benefits to a CAE2Y institution are significant: recognition of the quality of the program by industry, professional associations, and academe; seamless program articulation with CAE universities; better job placement and/or transfer opportunities for students; opportunities for collaboration with other CAE2Y and CAE institutions; improved institutional standing in the local, regional, and professional community; opportunities for institutional/program marketing; and monetary support. The CAE2Y designation is currently only held by one community college in the State of Tennessee.

As stated on page 3 of the LEAP 2.0 RFP Guidelines for Submission, this project’s goals will be accomplished via these approaches: 1) enhance the technology-related academic programs at Vol State, including but not limited to meeting the requirements for the CAE2Y including acquiring the necessary equipment to create a CyberCenter Lab at Vol State, 2) expand current, IT academic programs through corporate involvement, community outreach and programming in K-12 schools, and 3) implement collaborative work-based learning programs that prepare workers for rapid entry into the workforce. The primary goal of this project is to continue efforts that create long-term relationships between employers and

educational institutions to address the deficit of IT job candidates in the local workforce.

The ITPC 2.0 will enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and higher education institutions that result in long-term relationships through:

Building Long-Term Relationships Among Partners: Each year, there will be at least one summit of technology industry professionals, and representatives from community colleges, universities, and K-12 schools. Following all summits, documentation of the discussions and action items will be provided to the participants. On July 21, 2016, the NTC hosted its inaugural "We Build Tech Summit." The Summit includes professional development opportunities for educators, meaningful networking opportunities, and a platform for intentional conversations between educators and employers. Over 100 educators and professionals attended and provided excellent evaluations and feedback, ensuring continued growth and quality of content for future events. Creating meaningful partnerships between cybersecurity practitioners and educators meets one of the criteria for the CAE2Y designation.

Increasing Employer/Student Engagement: Employer involvement in classroom activities at the Vol State will be increased by providing guest speakers from the local technology industry. With increased connectivity between employers, educators, and students through the sharing of industry expertise in the classroom, the project anticipates increased student re-enrollment rates and higher graduation rates.

Providing professional development: Externship opportunities will be made available to K-12 and Vol State faculty to provide experiences working side-by-side with knowledgeable and skilled technology employees that will inform future lessons and classroom activities. In addition, CAE2Y-aligned professional development will be offered to Vol State faculty for certifications to include: Certified Ethical Hacker (CEH), Certified Forensics Computer Examiner (CFCE), Computer Hacking Forensic Investigator (CHFI), Network+,

Security+, and Cisco Certified Entry Networking Technician (CCENT), and Cisco Certified Network Associate (CCNA) Security.

Assessing Current Practices: An assessment of local technology industry job specifications, hiring practices, and internship programs will allow the faculty and leadership at Vol State and other community colleges to better align their curriculum with current business needs. Best practices identified will be shared with industry leaders to encourage the re-assessment of antiquated job specifications and ineffective hiring practices. Although difficult to quantify, the outcome is to assist employers with understanding how positions could be filled with a lesser skilled worker. Decreasing requirements from a four-year to a two-year degree and re-evaluating requirements for experience will significantly increase the applicant pool, create jobs, and decrease the “skills gap.”

Acquiring Equipment Needed: A virtual cybersecurity lab and equipment will allow students the opportunity for hands-on learning. The grant-funded “CyberCenter Lab” will provide an opportunity for students to work on ethical hacking case studies and other assignments. The lab will also provide the equipment needed for cyber competitions for Vol State students and high school students in their service area. In addition, the lab will be used for cybersecurity professional development for faculty at Vol State and other community colleges. Vol State was awarded a Perkins Grant to provide cyber-related professional development and would like to open the opportunity to other area community colleges. The CyberCenter Lab will have the appropriate equipment to host these events and is required for the CAE2Y designation.

The ITPC 2.0 will expand current, IT academic programs through corporate involvement, community outreach and programming in K-12 schools and will result in higher enrollment in technology programs by:

Increasing TN Promise Applicants: An immediate, targeted outreach strategy to engage 11th and 12th grade students, especially Tennessee Promise applicants, to promote IT careers will increase enrollment in IT courses at Vol State. One strategy that has proved effective is to coordinate a series of “Job Shadow Day”

field trips that allow students to visit technology companies and IT departments to see first-hand the variety of technology job opportunities and industry cultures available in Middle Tennessee. The “Job Shadow Day” field trips will conclude with a visit to Vol State to discuss the education opportunities locally available through Tennessee Promise.

ITPC 2.0 implements an outreach strategy to engage all types of students and promote technology sector jobs through formalized programming to students through a) classroom activities with volunteers from local technology companies, b) career fairs, c) employer-driven technology after-school programs and summer camps, and d) cybersecurity competitions. In addition, each December during Computer Science Week, the NTC will provide age-appropriate classroom activities for the Hour of Code. The intended outcome is to increase the connectivity of employers with students and faculty and to promote the IT career pathways to students in an age-appropriate, creative, and meaningful ways. CAE2Y requires “K-12 and community outreach that extends beyond the normal boundaries of the community college.”

The ITPC 2.0 will provide internships and mentoring opportunities to keep students enrolled and prepare students for entry into the workplace by:

Providing We Build Tech: A Community Connection Platform: WeBuildTech.com is a community connection platform that provides: 1) intern/employer connections, 2) IT professionals with meaningful volunteer opportunities, such as guest speaking, and 3) online learning to support students. It will also engage students and employers by promoting: specific IT careers, local IT companies and the value of Tennessee Promise and Tennessee Pathways.

Through this grant, a full-service internship toolbox within WeBuildTech.com will be created and provided to employers. Many regional employers are willing to provide paid internships to students; however, they lack the necessary infrastructure to provide those opportunities. The internship toolbox will provide employers with sample job descriptions, work plans, and evaluation/feedback tools to document

student performance. The Internship Coordinator will work with local employers to customize and implement these tools.

In addition, the WeBuildTech.com will be used to create the required website for the CAE2Y designation. The website will be accessible from the Vol State website and through WeBuildTech.com.

Promoting Mentors: The ITPC 2.0 will provide mentors to interested students at both the college and high school level. HCA’s “IT Girls” mentoring provided the foundation for these efforts. In partnership with Vanderbilt University’s Students Consulting for Nonprofit Organizations (SCNO) program, the NTC has created an online toolbox for companies that includes the required background information and paperwork, curriculum for 9th-12th grade mentoring programs, evaluation and feedback forms, and additional activity ideas. The curriculum was created in 2015 in collaboration with the NTC, HCA leaders, and Overton High School in MNPS.

PROJECT TIMELINE: Project milestones have been chosen to align with academic calendars. Project performance measures are identified with the project milestones.

What	When	Performance Measures					
		# of Interns	# of mentors	# of students enrolled	graduation rate	# of jobs filled	# of TN Promise App
PROJECT MILESTONES	30 MONTH GRANT PERIOD						
	S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M						
Project Governance							
Kick off Steering Committee	■						
Steering Committee Meetings	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Enhance an Academic Program							
Annual Summit Meetings	■					■ ■ ■ ■	
Quarterly Advisory Board Mtgs	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Industry in VSCC Classrooms	■ ■ ■ ■ ■ ■ ■ ■ ■ ■					■ ■ ■ ■	
Externships for Faculty	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Prof Dev for Faculty	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Assesment of Industry	■ ■					■ ■ ■ ■	
CyberCenter Lab Equipment	■						
Expand an Academic Program							
Outreach for TN Promise	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						■ ■ ■ ■
Computer Science Week	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
K-12 Programming	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Employers for career fairs	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
"Job Shadow Day" Field Trips	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Internship Program							
Connect students to WBT	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■				■ ■ ■ ■	
Recruit interns	■ ■ ■ ■ ■ ■ ■ ■ ■ ■	■ ■ ■ ■					
Manage internship program	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Internships Data Collection	■ ■ ■ ■ ■ ■ ■ ■ ■ ■						
Recruit mentors/proteges	■ ■ ■ ■ ■ ■ ■ ■ ■ ■		■ ■ ■ ■				

3: STRENGTH OF PARTNERSHIP

Local Economic Development Agencies: Local economic development agencies will serve a vital role in creating long-term relationships and increasing the visibility of this project through their membership. The workforce investment boards, in collaboration with the local chambers of commerce, have been working together over many years to align the skills taught in the classroom with the demands of local business. The chambers of commerce will support this project by marketing this grant and promoting internship placement opportunities to local employers. The Nashville Technology Council will serve as the lead and provide management, staffing, and administrative support to the project.

Employers with Demonstrated Need: The ITPC 2.0 has 10 corporate partners representing more than 2,000 technology workers in the region. These technology industry partners will invest in this project both financially and through the engagement of their employees. These corporations will devote the time needed to work with higher education institutions and local school systems to build long-term relationships and will provide volunteers to work with students and make presentations, host internships, apprenticeships, and job shadowing opportunities, provide mentoring to students, participate in career fairs, and provide case studies for classroom use. These employers will also participate in the evaluation of their job specifications in terms of education, experience, and certifications, in order to ensure that jobs are being filled as quickly as possible.

Higher Education Institutions: The higher education institutions' primary role in this project is to create an educated, credentialed IT workforce in Middle Tennessee. In addition, Vol State has committed to build long-term relationships with local school systems and the technology industry, in order to increase the pipeline of students for their programs. Vol State will provide course credit for students who participate in the internship program. Since Vol State is not currently operating at its capacity, there are numerous opportunities to increase enrollment without increasing the cost of course delivery.

K-12 Education: The participation of local school systems will be key to the success of this project. Local schools will promote internship opportunities, promote and technology-based curriculum and extracurricular activities, and provide opportunities for industry and Vol State to access their K-12 students.

Sumner County Schools, Robertson County School, and Metro Nashville Public Schools are partners for the ITPC 2.0. While Nashville State Community College is traditionally MNPS's community college partner, they do not have the emphasis on cybersecurity programs offered by Vol State. Two of MNPS's STEM academies (Stratford High School and Overton High School) have faculty and students interested in strengthening their cybersecurity focus, including the recent establishment of a Cyber Patriots club at Overton High School.

4: BUDGET PLAN

The IT Pathway Collaborative requests \$595,323 in total funding for the 30 month grant period. Although the Nashville Technology Council will serve as the lead entity for the grant, Volunteer State Community College will serve as the fiscal agent and will receive \$39,653 (8 percent) as the administrative cost for the grant.

PROFESSIONAL FEES/ GRANTS AND AWARDS

Project Staff Salaries/Benefits/Taxes: The project will be staffed with four positions. The **Project Director** (33% FTE) will lead the implementation of the grant including: providing team leadership, managing programmatic and financial reporting, ensuring proper data collection to track performance measures, managing corporate relationships, building school system relationships as needed, making community presentations, and building community partnerships. The **Program Coordinator** (50% FTE) will lead the project in the outreach with local school systems, program development for K-12 students, coordination with individual schools for program delivery, and planning and executing the education/industry summits. The **Internship Coordinator** (50% FTE) will lead the project in the management of the internship program, which

includes promotion of the internship program to local industry, intern placement, tracking intern progress, data collection, developing meaningful content for interns and prospective interns, and creating a toolbox for employers. The **Communications Director** (20% FTE) will develop all communications for the We Build Tech platform, newsletter, and branded project emails. These targeted communications will recruit additional employers in the Vol State service area, promote volunteer opportunities, and communicate with students and parents to promote project activities.

We Build Tech Platform Enhancements: The fees associated with the development and maintenance of the project website are estimated at \$20,000. The enhancements to We Build Tech are estimated to be \$75,000.

Faculty Professional Development: The following faculty professional development needs were identified by Volunteer State Community College: Certified Ethical Hacker (CEH), Certified Forensics Computer Examiner (CFCE), Computer Hacking Forensic Investigator (CHFI), Network+, Security+, and Cisco Certified Entry Networking Technician (CCENT), and Cisco Certified Network Associate (CCNA) Security. Certifications to build faculty skills and enhance their curricula are estimated at \$20,000.

Project Staff Local Travel: Travel will be required for local visits to employers, community colleges, and K-12 schools. Local travel (i.e., mileage and parking expenses) will be reimbursed at the approved government rate and will not exceed \$10,000 for the grant period.

SUPPLIES/PUBLICATIONS

In addition to office supplies (e.g., paper, file folders, pens, printer cartridges, jump drives, DVDs, folders), supplies for the ITPC 2.0 project include marketing and training materials related to the grant objectives. Marketing materials and publications will be purchased from the National Cyber Watch Center for dissemination by all partners. Supplies and publications are estimated at \$30,000 over the 30 month grant period.

TRAVEL

Volunteer State Community College faculty will travel to attend conferences and meetings to ensure they are able to teach the newest technologies. Conference travel is estimated at \$20,000 over 30 months.

EQUIPMENT

The grant will purchase the equipment needed to expand a CyberCenter Lab on the Vol State main campus. The lab will be used in conjunction with the curriculum of Vol State's Cyber Security and Information Technology. This equipment will enhance their program of study by adding digital forensics capability. Digital forensics is a relatively new and emerging academic discipline in information technology that involves the preservation, identification, extraction, and documentation of digital evidence in a format that can be presented in a court of law.

5: SUSTAINABILITY

ITPC 2.0 is uniquely qualified to create and sustain this program because the lead entity, the NTC, has been in the workforce development business since 2008. Deploying volunteer resources, the NTC has positively impacted technology careers by broadening awareness of technology education and careers and by building relationships between K-12 and post-secondary academia and the business community. Since January 2015, the NTC has:

- Enrolled over 500 students in technology summer camps that were taught by NTC trained public school teachers and volunteer industry professionals,
- Coordinated field trips to industry sites and community colleges for over 400 students,
- Hosted 7 one-day educational workshops in partnership with technology professionals,
- Promoted technology careers and Tennessee Promise to over 12,000 students at career fairs,
- Connected teachers from MNPS, Clarksville-Montgomery County, and Williamson County Schools to

technology externships,

- Hosted a sold-out summit bringing technology professional development to teachers and workshops for industry and educators to better align their experiences and expectations, and
- Implemented WeBuildTech.com: a community-based career exploration platform that allows students and teachers to connect to internships and online technology learning.

The ITPC 2.0 will continue to follow a similar project approach and governance structure after the initial grant period. The necessary resources will come from two sources of funding. First, there are traditional fundraising methods. This would include 1) identifying, researching and cultivating high quality prospects based on industry partners in the pipeline and researched suggestions from staff, 2) making visits, assessing, cultivating, and asking for appropriate gifts to reach dollar goals, and 3) building deeper relationships with existing corporations, businesses, foundations and associations that have an affinity to technology education. Based on the estimates from ITPC 1.0, this should yield \$150,000 in annual revenue. The Nashville Technology Council's almost 400 corporate members will be a primary source for the ITPC 2.0's future fund raising efforts. NTC's members, who are experiencing a shortage of qualified technologists in Middle Tennessee, understand the value proposition of investing in the Collaborative where a \$25,000 contribution is equivalent to the recruiting fee for one .NET or Java developer. NTC's members will see their ITPC 2.0 dollars as a prudent investment in building the skilled workforce pipeline.

Second, the ITPC 2.0 will expand the We Build Tech platform. In addition to online training and video content to promote IT jobs and internships in the community, the platform will provide: 1) assessment tools for employers to test potential employees and interns and 2) internship management tools for employers. Following the LEAP Day launch of We Build Tech, the NTC assembled a task force of local employers, including Vanderbilt University Medical Center, HCA, Nissan North America, CTS, and Acklen Avenue Software, to provide guidance on monetizing subscriptions to We Build Tech for the IT community. Early estimates expect We Build Tech subscriptions to yield \$100,000.

SECTION 3: GRANT BUDGET

GRANT BUDGET				
LEAP Program Competitive Grant: IT Pathway Collaborative 2.0				
The grant budget line-item amounts below shall be applicable only to expense incurred during the following Applicable Period: BEGIN: September 14, 2016 END: March 13, 2019				
POLICY 03 Object Line-Item Reference	EXPENSE OBJECT LINE-ITEM CATEGORY ¹	GRANT CONTRACT	GRANTEE PARTICIPATION	TOTAL PROJECT
1, 2	Salaries Benefits & Taxes	0.00	0.00	0.00
4, 15	Professional Fees, Grants and Awards	380,670.00	0.00	380,670.00
5,6,7,8,9,10	Supplies, Telephone, Postage and Shipping, Equipment Maintenance and Rental, Printing and Publications	30,000.00	0.00	30,000.00
11, 12	Travel, Conferences and Meetings	30,000.00	0.00	30,000.00
18	Other Non-Personnel Expenses	0.00	0.00	0.00
20	Capital Purchases	115,000.00	0.00	115,000.00
22	Indirect Cost	39,653.00	0.00	39,653.00
24	In-Kind Expense	0.00	0.00	0.00
25	GRAND TOTAL	595,323.00	0.00	595,323.00

¹ Each expense object line-item shall be defined by the Department of Finance and Administration Policy 03, *Uniform Reporting Requirements and Cost Allocation Plans for Subrecipients of Federal and State Grant Monies, Appendix A.* (posted on the Internet at: <http://www.state.tn.us/finance/act/documents/policy3.pdf>).

² Applicable detail follows this page if line-item is funded.

GRANT BUDGET LINE-ITEM DETAIL:

PROFESSIONAL FEE, GRANT & AWARD	AMOUNT
<u>NTC Project Staff</u>	
Project Director: \$3052/month x 30 months	\$91,560
Program Coordinator: \$1877/month x 30 months	\$56,310
Internship Coordinator: \$1877/month x 30 months	\$56,310
Communications Director: \$1883/month x 30 months	\$56,490
Local Travel Costs for Project Staff	\$10,000
<u>Professional Development for Educators</u>	
ITPC 2.0 will provide professional development to educators in order to enhance academic programs, in the form of the following certifications: The following faculty professional development needs were identified by Volunteer State Community College: Certified Ethical Hacker (CEH), Certified Forensics Computer Examiner (CFCE), Computer Hacking Forensic Investigator (CHFI), Network+, Security+, and Cisco Certified Entry Networking Technician (CCENT), and Cisco Certified Network Associate (CCNA) Security.	\$20,000
<u>Industry Certification Exams for Students</u>	
25 Certification Exam Fees for Volunteer State Community College Students	\$5,000
<u>We Build Tech Platform</u>	
Website for CAE2Y Program	\$20,000
We Build Tech Platform Enhancements, including Employer Internship Toolbox	\$75,000
TOTAL	\$380,670

CAPITAL PURCHASE: EQUIPMENT	AMOUNT
<u>CyberCenter Lab Equipment</u>	
An itemized list of all equipment to be purchased is detailed below.	\$115,000
TOTAL	\$115,000

Item	Qty	Unit Price	Total
Access Data FTK court-cited software suite; 31 user license (\$2500 yr.): 2 yr. lic.	2	\$ 2,500.00	\$ 5,000.00
Access Data Mobile Phone Examiner (MPE) suite, 31-user license	31		\$ 7,500.00
HTCI forensics laptops with at least 1TB hard drive off College network	20	\$ 750.00	\$ 15,000.00
ADF Triage-Examiner to scan computers for digital evidence	10	\$ 1,450.00	\$ 14,500.00
Password recovery software tool	31	\$ 45.00	\$ 1,395.00
500 GB, solid state external hard drives for saving forensically sound (large) images	31	\$ 250.00	\$ 7,750.00
Portable data recovery toolkit for recovering deleted/lost data	2	\$ 539.00	\$ 1,078.00
Android (mobile device) ripping tool (ART)	5	\$ 250.00	\$ 1,250.00
Black hole Faraday bag for preserving evidence	10	\$ 30.00	\$ 300.00
Digital Intelligence hardware write blocker kit for protecting data during imaging process	5	\$ 1,800.00	\$ 9,000.00
Cisco ASA 5506-X Security Plus 1: ASA5506-SEC-BUN-K9	1	\$ 987.00	\$ 987.00
Cisco SmartNet: CON-SNT-ASA550K9 (8X5 NBD)	1	\$ 150.00	\$ 150.00
Rolling 65" Touch Screen w/Adjustable Stand System	1	\$ 5,709.00	\$ 5,709.00
Vilros Raspberry Pi 3 Basic Starter Kit- Clear Case Ed:	60	\$ 50.00	\$ 3,000.00
Official Raspberry Pi 7" screen LCD display	60	\$ 80.00	\$ 4,800.00
iPazzPort Wireless Mini Keyboard & touchpad mouse combo- Raspberry Pi3	60	\$ 20.00	\$ 1,200.00
SONY TDG-500P-3D glasses: TDG500P	60	\$ 13.00	\$ 780.00
SONY BDP-Blu-ray disc player: BDP- S6500	1	\$ 120.00	\$ 120.00
MakerBot 3D printer: Replicator Z18	1	\$ 6,500.00	\$ 6,500.00
MakerBot 3D desktop scanner	1	\$ 800.00	\$ 800.00
MakerBot filament spools (\$48 each)	20	\$ 48.00	\$ 960.00
VmWare software- academic license for Department	1	\$ 250.00	\$ 250.00
Samsung Galaxy Tablet 7" Display; showcase for media extraction	1	\$ 170.00	\$ 170.00
27" iMac Workstation; Mac OS X scenarios	1	\$ 2,950.00	\$ 2,950.00
160GB Desktop IDE HD; Legacy Data storage	2	\$ 30.00	\$ 60.00
Samsung 840 SSD; Data storage; scenarios with SSDs	1	\$ 100.00	\$ 100.00
Kingston16GB Flash Card; external data storage	5	\$ 12.00	\$ 60.00
WD Blue 320GB Mobile HDD; mobile data storage	1	\$ 47.00	\$ 47.00
WD Caviar Blue SATA 500GB HD	5	\$ 55.00	\$ 275.00
CRU WiebeTech Ditto; Digital Forensics Field Kit	1	\$ 1,649.00	\$ 1,649.00
Tableau Full Kit; Write Blocker (prevents altering files)	1	\$ 450.00	\$ 450.00
Ultradock v4	1	\$ 199.00	\$ 199.00
Ultradock v6	1	\$ 99.00	\$ 99.00
H-11 Forensics Tower Computer: workstation for advanced scenarios	1	\$ 8,267.00	\$ 8,267.00
H-11 Digital Forensics: IEF (Internet Evidence Finder)	1	\$ 1,700.00	\$ 1,700.00
H-11 Digital Forensics: Mount Image Pr with Dongle	1	\$ 450.00	\$ 450.00
Passware Kit Forensic 2016.3; all-in-one password recovery & encrypted evidence discovery solution	1	\$ 995.00	\$ 995.00
H-11 Cellebrite: Phone Forensic Software/data transfer kit	1	\$ 500.00	\$ 500.00
EnCase Forensic software	1	\$ 3,000.00	\$ 3,000.00
Digital Intelligence FRED (Forensic Recovery of Evidence Device) SKU:F1110	1	\$ 6,000.00	\$ 6,000.00

**VOLUNTEER
STATE**



**COMMUNITY
COLLEGE**

**Office of
the President**

Main Campus

1480 Nashville Pike
Gallatin, TN 37066-3188
615-452-8600
1-888-335-VSCC (8722)

State at Livingston

113 Windle Community Rd
Livingston, TN 38570
931-823-7065
1-800-563-8220

Vol State at Highland Crest

150 Laureate Avenue
Springfield, TN 37172
615-433-7030
1-855-724-8722

Vol State at McGavock

3150 McGavock Pike
Nashville, TN 37214-1634
615-885-8910

Volunteer State Community College, a Tennessee Board of Regents Institution is an AA/EEO employer and does not discriminate on the basis of race, color, national origin, sex, disability, age, religion, sexual orientation, or veteran status in its program and activities. The following person has been designated to handle inquiries regarding the nondiscrimination policies: Director of Human Resources, Affirmative Action Officer, Title IX Coordinator, 1480 Nashville Pike, Gallatin, TN 37066, 615.230.3592.

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: Tennessee *LEAP Grant Application 2016*

Dear Mr. Johnston:

A primary challenge to the prosperity of the Middle Tennessee economy is the ability of our labor force to meet the skill and competency needs of industry. I believe that business and industry must be engaged with our region's educational institutions to build and maintain a skilled workforce.

For Middle Tennessee, jobs in the information technology and healthcare technology sectors are growing and in need of increasing numbers of skilled and qualified workers. Partnerships between businesses, the workforce system, post-secondary education, and local schools to increase the number of trained job seekers is of critical importance to the economic growth of the region. The partnerships established by the IT Pathway Collaborative 2.0 will create a strong foundation to address the barriers faced by employers in finding qualified workers.

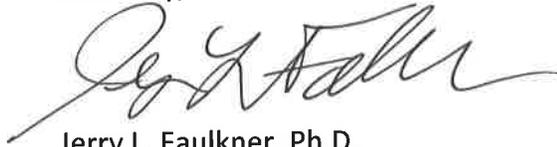
At Volunteer State Community College, we have the capacity to serve 2333 students in the information technology courses. Our current enrollment is 651. The IT Pathway Collaborative 2.0 will provide the marketing and outreach necessary to fill our classrooms – and ultimately increase the number of qualified candidates available for hire. In addition, this project will provide greater connectivity between the technology employers and our students. Through this project, technology companies have volunteered to participate in classroom through case-based learning activities, mentoring, guest speaking, field trips, and internships.

In addition, this grant will help Volunteer State Community College meet the criteria required to achieve the National Centers of Academic Excellence in Cyber Defense – Two Year Education (CAE2Y) designation. If successful, Volunteer State Community College will be the second school in Tennessee to achieve this distinction. The benefits to a CAE2Y institution are significant: recognition of the quality of the program by industry, professional associations, and academe; seamless program articulation with CAE universities; better job placement and/or transfer opportunities for students; opportunities for collaboration with other CAE2Y and CAE institutions; improved institutional standing in the local, regional,

and professional community; opportunities for institutional/program marketing;
and monetary support.

I support this project and believe that these types of public private partnerships
can decrease the technology skills gap and improve student experiences.

Sincerely,

A handwritten signature in black ink, appearing to read "Jerry L. Faulkner". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jerry L. Faulkner, Ph.D.
President

Cc: Patricia Anderson



METROPOLITAN
Nashville
PUBLIC SCHOOLS

July 19, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Metropolitan Nashville Public School's support of the proposed *IT Pathway Collaborative 2.0* (ITPC 2.0) project submitted by the Nashville Technology Council and Volunteer State Community College.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the *ITPC 2.0* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

While Nashville State Community College is traditionally MNPS's community college partner, they do not offer the cybersecurity program offered by Volunteer State Community College. Two of MNPS's STEM academies (Stratford High School and Overton High School) have faculty and students interested in strengthening their cybersecurity focus.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating a Center for Academic Excellence-Cyber Defense that would provide and support opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.

As a partner on this project, we will promote the program to our principals and teachers, assist in selecting student and teacher participants, and coordinate the scheduling needed for the success of the program. This programming will promote technology activities in classrooms and after-school programs and through field trips, as well as increase students' awareness of IT career paths. I am pleased to partner on this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

Donna G. Gilley, Director of Academies of Nashville

Donna G. Gilley
Director of Academies of Nashville
p 615.259.8716 • donna.gilley@mnps.org
2601 Bransford Ave • Nashville, TN 37204

Robertson County Schools

James M. (Mike) Davis, Director
800 M. S. Couts Blvd.
P.O. Box 130
Springfield, Tennessee 37172
Phone: (615) 384-5588 Fax: (615) 384-9749

July 20, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Robertson County Schools support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council and Volunteer State Community College.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

Although the project's goals are three-fold, we are most excited about the opportunity to expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that will ultimately result in higher enrollment and an increased number of credentialed graduates. As a partner on this project, we will provide access to the students and assist in the coordination of activities for the K-12 programming in the IT Pathway Collaborative. This programming will promote technology activities in classrooms and after-school programs, as well as increase students' awareness of IT career paths.

I am pleased to partner on this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,



James M. (Mike) Davis
Director of Schools

SCHOOL BOARD

JERRY CONVERSE • STONEY CROCKETT • CONNIE HOGAN • ALLAN HEARD • LYLE PAYNE • JEFF WHITE



Sumner County Board of Education

Del R. Phillips III, Ph.D.

Director of Schools

695 East Main Street Gallatin, TN 37066-2472

Phone: (615) 451-5200 Fax: (615) 451-5216

July 20, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Sumner County School's support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council and Volunteer State Community College.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

Although the project's goals are three-fold, we are most excited about the opportunity to expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that will ultimately result in higher enrollment and an increased number of credentialed graduates. As a partner on this project, we will provide access to the students and assist in the coordination of activities for the K-12 programming in the IT Pathway Collaborative. This programming will promote technology activities in classrooms and after-school programs, as well as increase students' awareness of IT career paths.

I am pleased to partner on this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

A handwritten signature in blue ink, appearing to read "Del R. Phillips III".

Del R. Phillips, Ph.D.
Director of Schools

Board of Education Members

Alice Bachman - Tim Brewer - David A. Brown - Patricia Brown - Jeff Cordell - Beth Cox - Andy Daniels - Dr. Nancy Glover - Glen Gregory - Tammy Hayes - Ted Wise



BRIDGESTONE AMERICAS, INC.
535 Marriott Drive
Nashville, TN 37214

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Bridgestone's support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

Bridgestone Americas, Inc. (BSAM) is the U.S. subsidiary of Bridgestone Corporation, the world's largest tire and rubber company. BSAM and its subsidiaries develop, manufacture and market a wide range of Bridgestone/ Firestone and associate brand tires to address the needs of a broad range of customers, including consumers, automotive and commercial vehicle original equipment manufacturers, and those in the agricultural, forestry and mining industries. The companies are also engaged in retreading operations throughout the Western Hemisphere and produce air springs, roofing materials, and industrial fibers and textiles. The BSAM family of companies also operates the world's largest chain of automotive tire and service centers. Guided by its One Team, One Planet message, the company is dedicated to achieving a positive environmental impact in all of the communities it calls home.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through



3055 LEBANON PIKE, SUITE 1000
NASHVILLE, TN 37215

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Change Healthcare's commitment to participate in the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

Change Healthcare is one of the largest healthcare IT firms in the United States. We have employees in three locations in Tennessee with more than 1,000 employees in the state. We offer software and analytics, network solutions and technology-enabled services to healthcare providers, payers and pharmacies.

The shortage in IT workers will have a major impact on our ability to meet our objectives. We provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. As referenced above, out of our 1,000 employees in TN, more than 600 are in IT-oriented professions. We hire business analysts, developers/engineers, project managers, web developers, infosec professions, data scientists and many other types of roles. We are not always able to fill these positions locally and have to look to other locations for filling critical positions.

Change Healthcare is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Encourage employees to volunteer in classroom environments to mentor students, promote IT careers and facilitate case-based learning
- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparation activities.
- Host field trips for students as needed for the successful completion of this project.
- Serve as a Mission Partner for the Nashville Technology Council
- Provide internships and job shadow opportunities to IT students. We bear the costs associated with internships to the tune of \$100,000 annually! This summer alone, we had 7 interns in the R&D/IT department.
- Agree to consider hiring as full-time employees qualified candidates who meet our hiring requirements, from a pool of students who have completed their education and training programs via the community colleges in Middle Tennessee or other industry certification providers identified in the grant. Occupations will include those referenced above and may include others based on need.

We are pleased to be part of this project, and look forward to implementing many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

A handwritten signature in cursive script that reads 'Tommy Lewis'.

Tommy Lewis
Senior Vice President



July 20, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to share that Digital Connections, Inc. (DCi) is committed to participate in the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

DCi is an Infrastructure IT firm, headquartered in Gallatin, Tennessee and is one of the top four IT Infrastructure support firms in the State of Tennessee. Current and previous clients include such organizations as HCA, Performance Food Group, Oak Ridge National Labs, the Tennessee Bureau of Investigation, AIG, the University of Tennessee, Auburn University, Western Kentucky University, the City of Nashville, Davidson County, Compass Bank, Bank of America and so on. Please see our website at www.digitalconnections.com for additional information. I held the Presidency of the firm for four years prior to my decade as its Chief Executive Officer and currently serve as an advisor to the firm. I currently hold a 24% stake in DCi.

DCi employs about 70 personnel with approximately 40 of them in IT. One of the challenges DCi has faced since its inception in 1993 has been the acquisition of quality talent, especially in the area of cyber security and virtual technologies. DCi has, and still currently does, employ people outside the state of Tennessee due to the lack of quality talent located within the region and even the State. DCi has a robust virtual server, security, router and switch business along with several wireless technology offerings. We are committed to hiring graduates of Volunteer State Community College if the college can well prepare their students for the ever changing technological challenges they will face in the real world.

DCi is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparation activities.
- Provide internships and job shadowing opportunities to a minimum of four students. Should we find students that would meet DCi's requirements regarding internships, we would bear the associated costs.
- Host field trips for students as needed for the successful completion of this project.



July 20th, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express First Tennessee Bank's commitment to participate in the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

First Tennessee Bank is a premier financial services company committed to being the best at serving our customers, one opportunity at a time – it's what our regional bank, First Tennessee, a part of the First Horizon National Corporation family of companies does each day, serving families and businesses through about 170 locations statewide. We offer an innovative list of products and services that provide value and convenience.

But it's more than just a myriad of products. It is also a promise to back each of the products and services we offer with helpful and friendly people who are committed to providing you with smart, relevant financial advice. From your first checking account to the loan you need to build a home or a business, we are committed to taking good care of your financial needs.

We currently have several Volunteer State Community College graduates working at First Tennessee Bank and are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant.

In Middle Tennessee our digital strategy departments as well as divisions of our IT department are located in downtown Nashville. The IT industry is highly competitive and Nashville and the surrounding area is considered a very desirable place to live. More IT professionals are necessary for all industries.



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: Tennessee *LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express HCA Information Technology and Services' (IT&S) commitment to participate in the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and its Middle Tennessee partners.

HCA is one of the nation's leading providers of healthcare services whose mission is dedicated to the care and improvement of human life and strives to deliver high quality, cost effective healthcare in the communities it serves. Approximately 5% of all US hospital services happen at an HCA facility, and HCA continually seeks ways to improve and expand care, investing \$2.4 billion in new services in those communities in 2015.

HCA IT&S supplies IT systems and services to thousands of healthcare businesses across the US and UK, supporting HCA's portfolio of business. Boldly focused on improving patient care and business operations and leading the transformation of healthcare into a new era of quality and connectivity, we are a unique IT company comprised of a workforce inspired by our noble cause.

Though we have won a number of awards over the years, we are perhaps most proud of those that recognize the kind of workplace we espouse to have, the contribution to society and patient care, and the scale at which we operate in the industry. Since 2009, IT&S has been recognized as one of the Best Places to Work in IT by Computerworld, which bases a ranking on how HCA IT&S employee responses compare to other IT companies on a comprehensive questionnaire about benefits, diversity, career development, training, and retention. Our most notable differences include our mature programs for year-around community involvement, flexible and abundant professional development opportunities, and ongoing wellness activities.

As an Honors Program Laureate, IT&S has been recognized for a number of years for the positive changes that technology has had on business and society through technology projects such as applications for clinical trial research, tools that help cancer patients navigate the continuum of care, flood relief exchange website and most recently a research database for MRSA studies.

Since 2011, we've won the Most Wired award, which is an industry-standard benchmark study that evaluates and recognizes the steady growth and change in the adoption of information technology in US hospitals and health systems.

As we continue to grow and invest in technology it has become apparent that we need to invest in our community and education systems to ensure we grow, retain and attract the most talented technology professionals to Tennessee. HCA IT&S is committed to being part of that journey.

HPA, A Cognizant Company

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express HPA, A Cognizant Company's commitment to participate in the proposed *ITPC 2.0* project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

HPA, A Cognizant Company is a fully owned subsidiary of Cognizant based exclusively in Nashville. HPA is an advanced robotic staffing solution. While traditional Robotic Process Automation (RPA) sells technology based products, HPA is the only company which sells robots as a service. HPA robots are hired the same way that human staff are hired. The result is a faster, higher quality, and lower cost solution than traditional outsourcing.

Despite the challenges of hiring Robotics Engineers, Robotics Business Analysts, and Robotics Production Support, HPA has 20 full time staff. These positions are uncommon both in university, trade schools, or other business training settings. As a result, HPA hires directly out of college, the military, or provides direct job retraining. It is worth noting that our 20 staff are augmented by over 1,000 robotic staff employed internationally on a full-time basis.

HPA's hiring model is non-traditional. We prefer to hire staff with less formal technology backgrounds. Our primary goal is to hire employees with strong problem solving skills that can train our robots to perform manual work.

Our approach to hiring is to provide a simple development challenge that is similar to the type of work that they would be performing. Our challenge can be completed using information readily available on the Internet and candidates are encouraged to even ask HPA staff for help. This approach fosters an understanding of problem solving and communication.

The classic hiring model must be modernized for us to hire more efficiently. Specifically, classic hiring and recruiting is focused primarily on project based experience. The future hiring paradigm is defined by continual change and the ability for individuals to make those changes with confidence.



July 20, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: **LEAP 2.0 Grant Application 2016**

Dear Mr. Johnston:

I am writing to express Littlejohn-An S&ME Company's commitment to participate in the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

We are an engineering consulting firm qualified to provide geotechnical engineering, design, planning, environmental and construction services for the built environment. We are an 1100-person corporation operating from 35 offices across the US.

Our company applies many of the latest technologies and advanced software applications to deliver highly sophisticated project solutions to our clients. Our network is built with products from industry leaders such as Microsoft, Dell, Cisco and HP. We also utilize advanced GIS, mapping and data management solutions for our clients demonstrating our need for IT professionals to keep our network up-to-date and running efficiently and effectively.

Littlejohn is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparation activities.
- Agree to consider hiring as full-time employees qualified candidates who meet our hiring requirements, from a pool of students who have completed their education and training programs via the community colleges in Middle Tennessee or other industry certification providers identified in the grant. Occupations may include: Information Security Analyst, Computer System Analyst, Database Administrator, Computer Support Specialist, System Administrator and may include others based on need.
- Share hiring openings and job postings with the project partners in a timely manner.



July 20, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Plum Laboratories' commitment to participate in the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

Plum Laboratories, LLC is a manufacturer of high end, sophisticated voice and data communications equipment for portable and failover use cases. The company, based in Springfield (a HUBZone) and Robertson County, Tennessee provides its "Plum Case" product line to Federal, State, and local government agencies as well as commercial businesses and institutions such as K-12 and Universities. Please review our website at www.plumlaboratories.com for more information. Plum Laboratories, LLC is also a woman-owned, small business since I hold 99% of the membership.

Since Plum Laboratories, LLC is a "bootstrap" start-up the number of employees is currently 8, with 4 of them involved in IT such as configuration of the router, switch and server; configuration of the firewall and security parameters, and testing equipment for operational deployment. We currently employ 2 of the 4 IT personnel who are previous students at Volunteer State Community College. While our current employees may seem small (the business was only incorporated on January 15, 2016, we have met many prospects that we believe will purchase volumes that could make us a significant employer in Robertson County. Some, but not limited to the people we have met with and have discussed our offering with are Jeh Johnson, Presidential Cabinet Member and Secretary of Homeland Security and twenty-two Directors of State Emergency Management Agencies who each report to the respective Governor in their state. Ten of them have requested trials and several are already underway. Obviously, as the firm grows we could see a significant increase in the need for IT personnel. We hope that our local educational resources, especially Volunteer State College, will be able to prepare IT ready educated students for our needs.

Plum Laboratories, LLC is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

July, 20, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Servpro Industries, Inc.'s commitment to participate in the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

SERVPRO Corporate Headquarters supports over 1,700 franchises Nationwide. We are a leader in the restoration industry and our professionals are faster to any size disaster. SERVPRO services include the following: Water Damage Restoration, Fire Damage Restoration, Mold Remediation, Storm Damage Restoration, and Cleaning Services. SERVPRO Franchise Professionals are available 24 hours/7 days a week and have the training and expertise to help make it "Like it never even happened."

Over the past 3 years, SERVPRO has more than tripled the size of our IT Department. We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. Within our organizational structure, we have over 105 IT employees to date and this number continues to grow as we continue our expansion into the larger commercialized industry.

We operate in a Microsoft Stack environment bringing a huge demand for the knowledge of .NET, C#, SQL Server, etc. Being on the bleeding edge of the Microsoft Technology, it often creates an extensive hiring process. We have to fly qualified candidates in to interview, relocate employees when necessary, and sometimes even offer remote work to candidates who are unable to make the move to the Gallatin/Nashville area. This can be very costly.

SERVPRO's first preference is to grow the local talent here in Gallatin. We offer internships through VolState, sponsor Career Fairs, and work alongside VolState to help better the community. Bringing more grants into VolState to help educate our local talent could make a huge impact on both VolState and the local IT Community as this is the way of the future!

SERVPRO is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

SONNY WEATHERFORD
SHERIFF

STATE OF TENNESSEE



(615) 452-2616
FAX (615) 442-1897

SHERIFF OF SUMNER COUNTY

117 W. SMITH STREET • GALLATIN, TN 37066

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Sumner County Sheriff's Office is in support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.



MACON COUNTY GENERAL HOSPITAL
P. O. BOX 378
LAFAYETTE, TENNESSEE 37083

PHONE 615-666-2147

20 July 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: LEAP 2.0 Grant Application – Volunteer State Community College

Dear Mr. Johnston:

This letter is written to express the Upper Middle Tennessee Rural Health Network's support for the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College and their Middle Tennessee partners.

The Upper Middle Tennessee Rural Health Network (UMTRHN) is a not-for-profit organization based at Macon County General Hospital in Lafayette, TN. It was formed in 2006 including five hospitals and two Federally Qualified Health Clinics. The focus is to collaborate and to improve health care services to the rural citizens of Trousdale, Sumner, Macon, Smith, and Clay counties of Middle Tennessee. My position is the Executive Director which is responsible for coordinating the targeted issues of the Network and to collaborate with other organizations (e.g. Vanderbilt, Tri-Star HCA, Tennessee Hospital Association) that have common interests directed toward improving access to healthcare in this region.

With the advent of the Electronic Medical Record, the requirement for individuals with Information Technology expertise has exploded. Hospitals, physician practices, medical billing, and regulatory requirements demand the coordination of information in ways never before required. Accountable Care Organizations, Medicare, TNcare, now require the quality measures that were previously not available. Beginning 2017- 2019 the measure requirements will become more defined and mandatory.

Health care providers will need the IT expertise to meet these demands and Volunteer State Community College is in a position to assist. Of particular need is the availability of trained staff for the rural areas. Volunteer State provides access to rural citizens to obtain the background to help rural healthcare providers. This is a crucial issue.

The UMTRHN is involved with an grant funded Alpha project to implement a key aspect of the Accountable Care Organization Pay for Value initiative with a physician practice in Macon County in conjunction with an Health Information Network platform provided



Committed to leading the growth and development of the business community, thereby supporting prosperity and quality living for the citizens of Gallatin, Tennessee.

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Gallatin Area

Chamber of Commerce

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Gallatin, TN 37066

Phone: 615-452-4000

Fax: 615-452-4021

Kim Myers

Executive Director

Email: Kim@gallatintn.org

Website: www.gallatintn.org

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July 20, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express the Gallatin Area Chamber of Commerce's support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

As with most Chambers, the Gallatin Chamber exists to support and promote our growing business community. In doing so, we often serve at the 'connector' for our members - connecting them with the resources needed to succeed. One of the biggest needs we continue to hear is the need for a strong and qualified workforce. We believe that the IT Pathway Collaborative 2.0 project is one of the ways we can fill that need and in return, help to aid our businesses and strengthen the community as a whole.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.

I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

Kim Myers

Kim Myers

Executive Director

Gallatin Area Chamber of Commerce



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Hendersonville Area Chamber of Commerce support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

Founded in 1970, the Hendersonville Area Chamber of Commerce is the community's premier advocate and champion for business. Its primary objective is to create a climate of growth and success in the Hendersonville Area by being the premier organization for the connection, advocacy, promotion, and support of local business. By leveraging the support, talent and resources of its diverse businesses and members, the Hendersonville Area Chamber is one of the leading organizations helping to improve the economic vitality and quality of life for everyone. Current membership stands at approximately 750.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.

I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

Amanda Foster
VP of Development

Kathleen Hawkins
president/ceo

Kori Langford*
board chair

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†ex-officio



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express the Nashville Area Chamber of Commerce's support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The Nashville Area Chamber of Commerce is Middle Tennessee's largest business federation, representing more than 2,000 member companies. Belong, engage, lead, prosper embodies the Chamber's focus on facilitating community leadership to create economic prosperity for Middle Tennessee. Together with its affiliates, the Nashville Chamber works to strengthen the region's business climate and to enhance Nashville's position as a desirable place to live, work and visit.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express REdI's support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee was almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

REdI is the Robertson Education Initiative that bridges the gap between business and industry and the K-12 schools in Robertson County. We work to get business involvement in the schools and help drive positive communications regarding our education efforts.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
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Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.

I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

Kathy Gunn

Kathy Gunn
Director, REdI



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Robertson County Chamber of Commerce support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

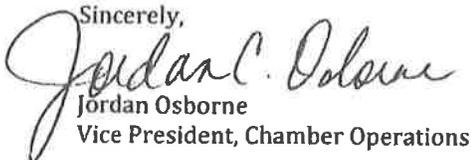
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I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,


Jordan Osborne
Vice President, Chamber Operations

Robertson County Chamber of Commerce
503 West Court Square
Springfield, TN 37172
Office: 615-384-3800
Fax: 615-384-1260
www.robertsonchamber.org



106 Main Street
Portland, TN 37148
www.portlandcofc.com
615.325.9032
Sherri.fergi@gmail.com

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express the Portland Chamber of Commerce support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The chamber is a key player in Workforce Development in Sumner County. We help to build a quality workforce for our members and our community.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
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Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.

I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

Sherri Ferguson
Executive Director



July 15, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Workforce Essential's support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

Workforce Essentials, Inc. is a private, non-profit corporation providing innovative employment programs & training solutions to businesses and opportunities for job seekers.

The IT Pathway Collaborative 2.0 project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers and Volunteer State Community College that results in long-term relationships,
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.

City of Westmoreland

1001 Park Street • P.O. Box 8
Westmoreland, TN 37186

Jerry Kirkman, Mayor
Kelly Moran, City Recorder

Phone: 615.644.3382
Fax: 615.644.3950

July 20, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express the City of Westmoreland support of the proposed IT Pathway Collaborative 2.0 project submitted by the Nashville Technology Council, Volunteer State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee was almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the employer-driven *IT Pathway Collaborative 2.0* project to provide a regional, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

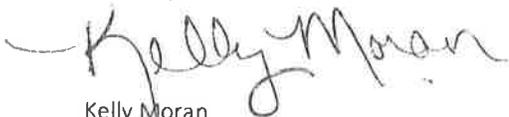
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I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,



Kelly Moran
City Recorder

SECTION 8: DATA LIST

“Beyond Point and Click: The Expanding Demand for Coding Skills.” (June 2016)

Available at: <http://burning-glass.com/research/coding-skills/>

Copy Attached

Jobs Market Intelligence: Cybersecurity Jobs, 2015

Available at: <http://burning-glass.com/research/cybersecurity/>

Copy Attached

National Centers of Academic Excellence in CyberDefense – Two Year Education Criteria for Measurement

Available at: http://cyberwatchwest.org/images/CWW_Downloads/2016_CAE_Requirements/CAE_CD-2Y_Criteria_2016.pdf

Copy Attached

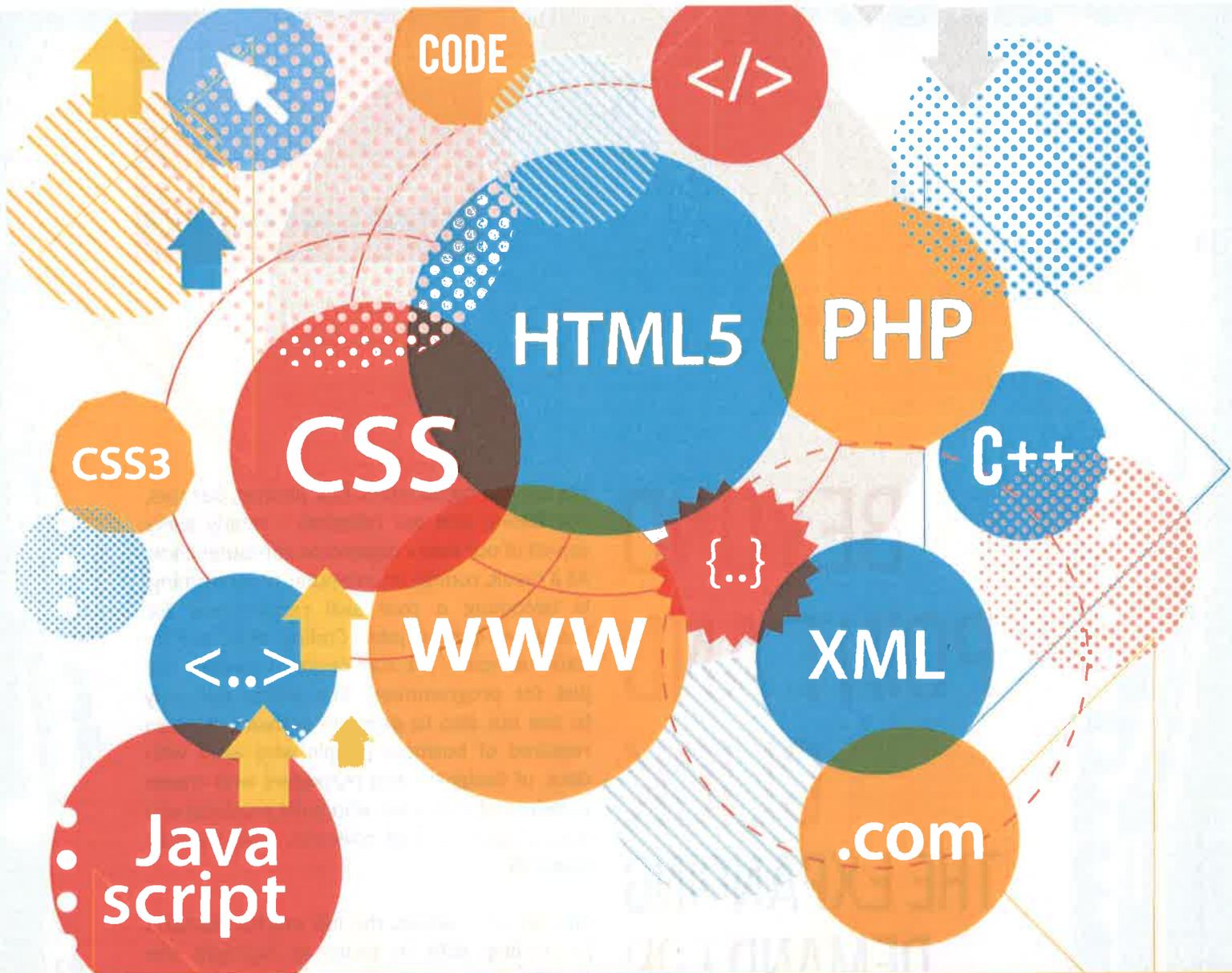
Technology Employment Spotlight: Nashville. (2015)

Developed for the Nashville Technology Council. Prepared by Career Builder using EMSI data.

Available at <https://technologycouncil.com/wp-content/uploads/2016/02/natechcouncilemploymentv342015.pdf>

Copy Attached

Tennessee Higher Education Commission. (2011) “*Academic Program Supply and Occupational Demand Projections: 2008-2018.*”



BEYOND POINT AND CLICK

THE EXPANDING DEMAND FOR CODING SKILLS

BURNING GLASS TECHNOLOGIES
JUNE 2016

ORACLE ACADEMY

 **burningglass**
CAREERS IN FOCUS

BEYOND POINT AND CLICK

THE EXPANDING DEMAND FOR CODING SKILLS

BURNING GLASS
JUNE 2016

We live in a digital world. Our phones, our cars, our banks, and our hospitals – nearly every aspect of our lives – depend on computer code. As a result, coding, or computer programming, is becoming a core skill requirement for many well-paying jobs. Coding skills are in-demand across a broad range of careers, not just for programmers. The ability not only to use but also to program software is often required of business people who work with data, of designers and marketers who create websites, of engineers who build products and technologies, and of scientists who conduct research.

This report analyzes the job market demand for coding skills in order to highlight the breadth and magnitude of employer demand for these skills and the range of opportunities that learning to code can open for students. The intent of this research is to showcase for school counselors and K-12 students alike the importance of learning to code and the value these skills will have in the job market.

The data contained in this report are drawn from 26 million U.S. online job postings collected in 2015 and have been analyzed to determine the specific jobs and skills that employers are seeking.

KEY FINDINGS

BASED ON AN ANALYSIS OF MILLIONS OF JOB POSTINGS ACROSS THE UNITED STATES, WE FOUND:



CODING SKILLS ARE IN HIGH DEMAND

Seven million job openings in 2015 were in occupations which value coding skills. This corresponds to 20% of “career track” jobs, defined as those which pay a national living wage of at least \$15/hour.



CODING SKILLS ARE NOT JUST FOR PROGRAMMERS

Coding skills are of value to candidates across five major job categories:

- Information Technology (IT) workers
- Data Analysts
- Artists and Designers
- Engineers
- Scientists



CODING JOBS PAY MORE

Jobs requiring coding skills pay \$22,000 per year more than jobs that don't: \$84,000 vs \$62,000 per year. (This analysis includes only “career track” jobs.)



CODING SKILLS PROVIDE AN AVENUE TO HIGH-INCOME JOBS

Half of jobs in the top income quartile (>\$57,000 per year) are in occupations which commonly require coding skills from job applicants.



CODING JOBS ARE GROWING FASTER THAN THE JOB MARKET

Programming jobs are growing fastest, 50% faster than the market overall. In general, programming jobs are growing 12% faster than the market average.



INTRODUCTION

BEYOND POINT AND CLICK

In a wide range of careers, having only point-and-click computer skills are as limiting to a job seeker as hunt-and-peck typing skills would have been a few decades ago. Demand for programming or coding skills is large, growing, and not just for IT jobs. Coding skills are now demanded of business people who work with data, of designers and marketers who create websites, of engineers who build products and technologies, and of scientists who conduct research. Many of these are positions that would never be considered science or technology (STEM) jobs in the traditional sense. More than half of set designers, for example, are expected to use 3D modeling software such as AutoCAD, the same tools used to design an iPhone or a new car.

Despite increasing demand for programming skills in the job market, not enough students get an early start in computer science courses. Only 2% of all students in the College Board's AP program took computer science in 2015 and only 22% of those students were female.¹

The good news, however, is that awareness of the importance of these skills is growing. Computer science was the fastest growing AP test between 2014 and 2015, with the number of test takers up 25%.² Online programs have made it easier for people to develop coding skills outside of formal schooling. In recognition of the opportunities associated with coding skills, the Obama administration has launched Computer Science for All, a \$4 billion initiative to expand computer science education.³

This paper is designed to equip school counselors and others offering educational and career advice with the data and information to encourage students to develop these critical 21st century skills by describing the kinds of opportunities that computer science skills make possible. This paper places particular emphasis on programming skills, the part of the computer science discipline which is most directly and broadly sought by employers.

1 CollegeBoard (2015), AP Program Participation and Performance Data 2015: Program Summary Report. Retrieved from <https://secure-media.collegeboard.org/digitalServices/pdf/research/2015/Program-Summary-Report-2015.pdf>.

2 Ibid.

3 <https://www.whitehouse.gov/blog/2016/01/30/computer-science-all>



ABOUT THIS ANALYSIS

How do you define coding skills?

In this analysis, we define coding skills as the use of a computer program where users are writing instructions to a computer as opposed to using pre-written applications to perform prestructured tasks. The programming languages we studied include JavaScript and HTML for building websites, statistical programs such as R and SAS, AutoCAD programs for engineers, and general purpose computer programming languages such as Java, Python, and C++.

How do you define coding jobs?

We define coding jobs as those in any occupation where knowing how to write computer code makes someone a stronger candidate and where employers commonly request coding skills in job postings. In some cases, coding is a prerequisite skill for the role, such as for Database Administrators. In other cases, such as Graphic Designers, knowing how to code may not be required in all cases, but job seekers with relevant programming skills will typically have an advantage. As jobs are typically becoming increasingly technical, and a greater share of jobs required technical expertise, developing coding skills is a way for students and job seekers to “futureproof” their skills.

In this report we compare coding jobs to other “career track” jobs, which we define as the set of occupations where the median wage is greater than \$15 an hour. MIT researchers have determined this pay scale represents a living wage for a family of two adults and two children.⁴

What is the source of the data?

The data in this report, except where noted otherwise, are drawn from Burning Glass’s database of online job postings. We examined the complete set of 26 million unique job postings collected in the United States in 2015. Burning Glass analyzed job postings to determine the occupation, or type of job, requested, the specific skills and credentials required, and the salary offered.

To determine the total number of openings for each occupation, Burning Glass’s team of economists used a combination of job postings and other data from the Bureau of Labor Statistics to estimate the number of available open positions in 2015.

The projected job growth figures are from the Bureau of Labor Statistics.

⁴ See <http://livingwage.mit.edu/>

FINDINGS

What jobs value programming skills?

The job market for programming skills goes far beyond IT and programming, and job seekers with these in-demand skills will have improved job prospects in a changing economy. There are five categories of jobs where employees are typically expected to be able to proficiently write computer code: Data Analysts, Arts & Design, Engineering, Information Technology, and Science. (See Table 1.)

While it is not a surprise that Software Developers need to program, coding skill requirements may be a less obvious in other jobs. Increasingly, graphic designers must be able to design for the web as well as print; over half (51%) of graphic designers require at least one web development skill. Many jobs in business or scientific research require workers to query data from large databases or conduct research using a statistical software package such as R, SAS, or Stata.

These job categories were identified by analyzing the skill requirements that employers advertise in online job ads. Those jobs which are most likely to require coding skills were included in this analysis.

It is important to note that the categories below represent occupations where coding skills are often valued by employers. For any given position, however, coding skills may not be specifically required. Possessing these skills does provide an advantage to job seekers looking for jobs today, and helps them “futureproof” themselves as employers look for workers with increasingly sophisticated technical skills.

TABLE 1: OVERVIEW OF CODING JOBS

Role Type	Description	Common Jobs
Data Analysis	Data Analysts use computer programming to analyze data and solve problems in business and finance. Common coding tasks include estimating how much money a company will earn or determining how many of a particular item a store should put on the shelves.	Business Analyst Financial Analyst Data Analyst
Arts & Design	Designers use digital tools to create websites and design the physical products we buy.	Graphic Designer User Experience Designer Web Designer
Engineering	Engineers use programming to design and test new products and conduct research on how to solve practical technology problems.	Mechanical Engineer Civil Engineer Engineering Technician

Information Technology	Computer programmers and IT professionals write software which can be used to create websites, build computer networks, help doctors treat patients, or even drive a car.	Software Developer Network Administrator Computer Support Specialist
Science	Scientists use computer programming to analyze the results of their experiments and create simulations of real world events.	Medical Researcher Chemist Environmental Scientist

What is the demand for programming skills?

Coding jobs represent a large and growing part of the job market. There were nearly 7 million job openings in the U.S. last year for roles requiring coding skills. This represents 20% of the total market for career-track jobs that pay \$15 an hour or more. Jobs with coding skills are projected to grow 12% faster than the job market overall in the next 10 years. IT jobs are expected to grow even more rapidly: 25% faster than the overall market.¹

Programming skills are in demand across a range of industries. Half of all programming openings are in Finance, Manufacturing, Health Care, and other sectors outside of the technology industry. Programmers are in every industry and, as a result, job prospects and job security are no longer as closely tied to the ups and downs of the tech sector. This has spread demand for these skills throughout the country, beyond the regions usually considered technology centers.

TABLE 2: DEMAND AND GROWTH OF CODING JOBS

Role Type	2015 Openings (Source: Burning Glass)	Projected 10-Year Growth (Source: BLS)
Information Technology	3,747,340	8.8%
Data Analysis	1,452,446	7.7%
Engineering	938,126	2.9%
Science	330,896	6.3%
Arts & Design	300,323	8.2%
All coding jobs	6,769,131	7.2%
Other jobs (occupations paying >\$15/hr)	30,759,008	6.4%

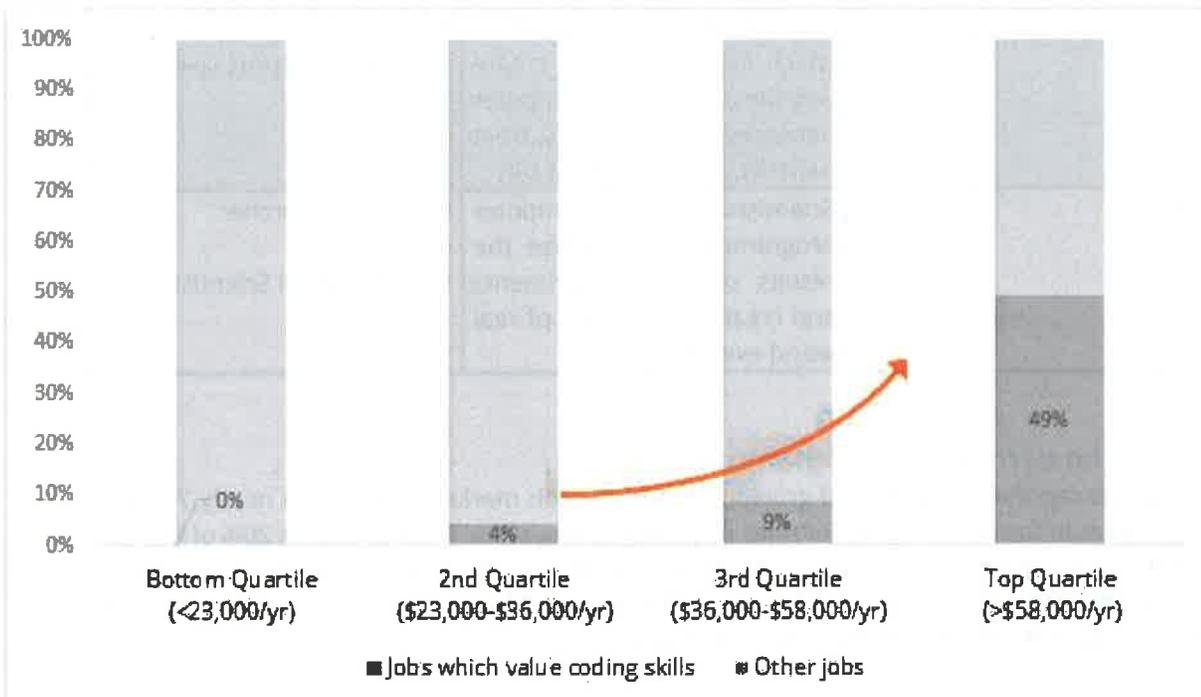
How much do programming skills pay?

Coding skills represent a clear avenue for students to enter well-paying jobs. Jobs valuing coding skills pay \$22,000 per year more, on average, than jobs that don't: \$84,000 vs \$62,000 per year. The value of these skills is striking and, for students looking to increase their potential income, few other skills open the door to as many well-paying careers. Slicing the data another way, 49% of the jobs in the top wage quartile (>\$58,000/yr) value coding skills.

Looking at pay by role type, coding skills are valued in all categories. In each case, jobs valuing

¹ Projections data are from the Bureau of Labor Statistics' Employment Projections program. <http://www.bls.gov/emp/>

PERCENTAGE OF JOB OPENINGS THAT VALUE CODING SKILLS, BY INCOME LEVEL



The demand for coding skills rises with income. Coding skills are almost nonexistent in the lower income quartiles, but half of all top-quartile jobs require the ability to code.

coding skills have average salaries at or above the average for all jobs. The wages associated with each role type correspond with the intensity of programming skill requirements. The highest earning roles are in IT, with an average advertised salary of \$90,000, descending to \$61,000 for Science roles.

TABLE 3: AVERAGE ADVERTISED SALARIES OF CODING JOBS

Role Type	Average Advertised Salary
Information Technology	\$90,000
Data Analysis	\$79,000
Arts & Design	\$78,000
Engineering	\$74,000
Science	\$61,000
All coding jobs	\$84,000
Other jobs (occupations paying >\$15/hr)	\$62,000

What skills should students learn?

Each job category calls for a distinctive set of coding skills based on the computing tasks required. As a starting point, it's most important that students learn the principles of coding, since learning additional languages becomes easier once students have a strong grasp of fundamentals. The coding skills in highest demand are generally programming languages with broad applicability. As students begin to hone in on their career aspirations, they can begin to develop coding skills in line with those career goals, as shown in Table 4.

TABLE 4: TOP CODING SKILLS

Skill	Common Use
SQL	Databases
Java	General purpose programming
Javascript	Web development
Linux	Computer system operations
XML	General purpose programming
C++	General purpose programming, especially in Engineering
C#	General purpose programming
Python	General purpose programming
.NET	General purpose programming

Additionally, certain job categories have more intense coding requirements. Requirements are highest in IT where jobs, by definition, call for a high level of coding proficiency. In other job categories, such as in Science, coding skills are often required, but not necessarily in every job, and coding is typically an ancillary function that may not be a core part of the day-to-day work.

To sort out the proficiency required in different jobs, we calculated the “programming intensity” of coding requirements in various roles. Programming intensity was calculated using an algorithm which accounts for the level of sophistication of programming skills required, the frequency with which those skills were requested in job postings, and the total number of coding skills requested in job postings.

Interestingly, the intensity of programming skill requirements in a role corresponds to salary, with the IT group having both the highest programming intensity and highest salaries, followed by Data Analysis, Arts and Design, Engineering, and Science.

TABLE 5: CODING SKILL REQUIREMENTS IN EACH JOB GROUP

Role Type	Importance of Programming Skills	Common Programming Skill Requirements
Information Technology	Very High	General Programming Languages (Java, C++) Database & Business Intelligence (SQL, Oracle) Web Development (Javascript) Data Science (Hadoop, NoSQL, R)
Data Analysis	High	Data Management (Excel including Visual Basic and Macros) Database & Business Intelligence (SQL, Oracle) Data Science (Hadoop, NoSQL Data, SAS, R)
Arts & Design	High	Design Software (Photoshop) WebDevelopment(Javascript,HTML5)

Engineering	Moderate	Engineering Design (Computer Aided Design) Computer Aided Manufacturing (Programmable Logic Controllers, Computer Numerical Control machines) General Programming Languages (C++, Java)
Science	Moderate/Low	Statistical Software (SAS, R) Mathematical Computing (Python, C++)

Do students need to go to college to get a coding job?

Coding jobs are more common at the bachelor's degree level, but they are accessible to job seekers with sub-baccalaureate credentials as well. Overall, 89% of coding jobs typically require at least a bachelor's degree, compared to 44% of all career-track jobs. For those students looking to utilize coding skills in roles that require short-term credentials, Computer User Support (such as help desk roles), Engineering Technicians, and Drafters are options with considerable demand.

TABLE 6: CREDENTIAL REQUIREMENTS FOR CODING JOBS

Role Type	A.A. or Technical Training Number of 2015 Openings (% of type)	Bachelor's or Master's Number of 2015 Openings (% of type)
Data Analysis	64,005 (4%)	1,388,441 (96%)
Information Technology	400,664 (11%)	3,346,676 (89%)
Science	40,774 (12%)	290,122 (88%)
Arts & Design	40,048 (13%)	260,275 (87%)
Engineering	185,764 (20%)	752,362 (80%)
All coding jobs	731,255 (11%)	6,037,876 (89%)
Other jobs (occupations paying >\$15/hr)	56%	44%

METHODOLOGY

To provide the information contained in this report, Burning Glass has mined its comprehensive database of 26 million online job postings collected in 2015. Burning Glass's spidering technology extracts information from close to 40,000 online job boards, newspapers, and employer sites on a daily basis and de-duplicates postings for the same job, whether it is posted multiple times on the same site or across multiple sites. Burning Glass's proprietary data is supplemented and contextualized by additional indicators from the Bureau of Labor Statistics and other published sources. All data is sourced Burning Glass except where indicated. All Burning Glass data in this report reflects all job postings collected in the United States in 2015.

ABOUT ORACLE ACADEMY

Oracle Academy advances computer science education globally to drive knowledge, innovation, skills development, and diversity in technology fields.

Each year, Oracle Academy reaches more than 2.5 million students in 106 countries, delivering nearly US\$3.3 billion in resources to help prepare students for life and work in our modern technology-driven global economy.

Oracle Academy leverages Oracle's global technology leadership to offer a complete portfolio of computer science education resources to secondary schools; technical, vocational, and two-year colleges; and four-year colleges and universities, with the goal of helping students become college and career ready.

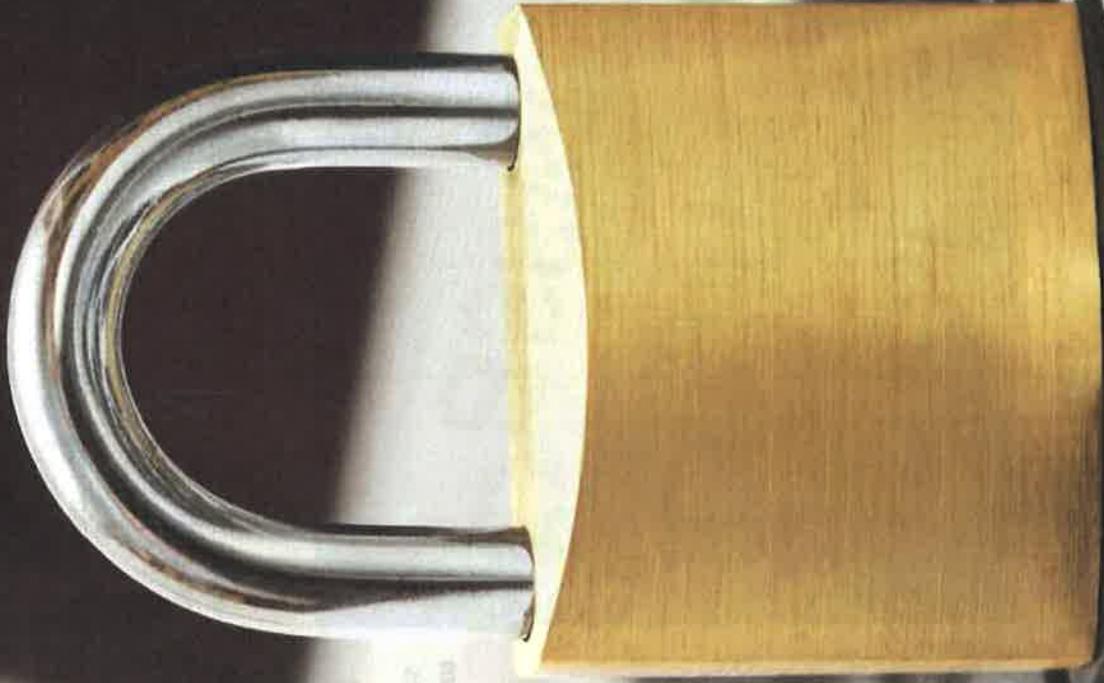
ABOUT BURNING GLASS TECHNOLOGIES

Burning Glass Technologies delivers job market analytics that empower employers, workers, learners, and educators to make data-driven decisions. The company's artificial intelligence technology analyzes hundreds of millions of job postings and real-life career transitions to provide insight into labor market patterns. This real-time strategic intelligence offers crucial insights, such as which jobs are most in demand, the specific skills employers need, and the career directions that offer the highest potential for workers.

Based in Boston, Burning Glass is playing a growing role in informing the global conversation on education and the workforce, and in creating a job market that works for everyone. For more information, visit burning-glass.com.



Job Market Intelligence: Cybersecurity Jobs, 2015



Introduction: Cybersecurity and the Job Market

American employers have realized the vital importance of cybersecurity—but that realization has created a near-term shortage of workers that may require long-term solutions.

Cybersecurity was once the province of defense contractors and government agencies, but in this, the third edition of our annual analysis, we find **hiring has boomed in industries like Finance, Health Care, and Retail**. A glance at the headlines is enough to explain why. In addition to the federal Office of Personnel Management, recent cyber breaches have hit major consumer companies like Chase and Target. According to [PwC's 2015 State of US Cybercrime Survey](#), a record 79% of survey respondents said they detected a security incident in the past 12 months. Many incidents go undetected, however, so the real tally is probably much higher.

Yet we are also seeing multiple signs that demand for these workers is outstripping supply. **Job postings for cybersecurity openings have grown three times as fast as openings for IT jobs overall** and it takes companies longer to fill cybersecurity positions than other IT jobs. That's bad for employers but good news for **cybersecurity workers, who can command an average salary premium of nearly \$6,500 per year**, or 9% more than other IT workers.

Or put another way, there were nearly 50,000 postings for workers with a CISSP certification in 2014, the primary credential in cybersecurity work. That amounts to three-quarters of all the people who hold that certification in the United States—and presumably most of them already have jobs.

This is a gap that will take time to fill. The skills for some IT positions can be acquired with relatively little training, but cybersecurity isn't one of them. For example, five years of experience are required to even apply for a CISSP certification. That doesn't even consider the rising demand for experience in a specific industry, like finance or health care. This suggests that the shortage of cybersecurity workers is likely to persist, at least until the education and training system catches up.



Key Trends in Cybersecurity Demand

Cybersecurity jobs are in demand and growing across the economy

- The Professional Services, Finance, and Manufacturing/Defense sectors have the highest demand for cybersecurity jobs.
- The fastest increases in demand for cybersecurity workers are in industries managing increasing volumes of consumer data such as Finance (+137% over the last five years), Health Care (+121%), and Retail Trade (+89%).

Positions calling for financial skills or a security clearance are even harder to fill than other cybersecurity jobs

- The hardest-to-fill cybersecurity jobs call for financial skills, such as Accounting or knowledge of regulations associated with the Sarbanes-Oxley Act, alongside traditional networking and IT security skills. Because finance and IT skills are rarely trained for together, there is a skills gap for workers who meet the requirements of these “hybrid jobs.”
- More than 10% of cybersecurity job postings advertise a security clearance requirement. These jobs, on average, take 10% longer to fill than cybersecurity jobs without a security clearance.

Cybersecurity positions are more likely to require certifications than other IT jobs

- One third (35%) of cybersecurity jobs call for an industry certification, compared to 23% of IT jobs overall.

Cybersecurity employers demand a highly educated, highly experienced workforce

- Some 84% of cybersecurity postings specify at least a bachelor’s degree, and 83% require at least three years of experience. Because of the high education and experience requirements for these roles, skills gaps cannot easily be resolved through short-term solutions. Employers and training providers must work together to cultivate a talent pipeline for these critical roles.

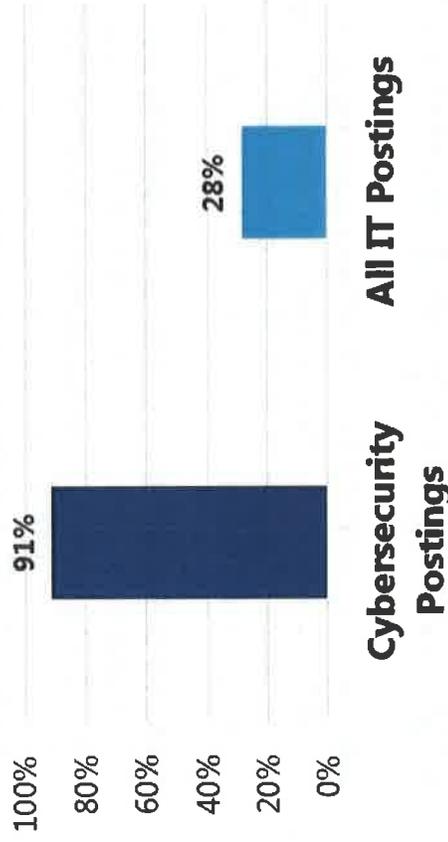
Geographically, cybersecurity jobs are concentrated in government and defense hubs, but are growing most quickly in secondary markets

- On a per capita basis, the leading states are Washington D.C., Virginia, Maryland, and Colorado; all have high concentrations of jobs in the federal government and related contractors.

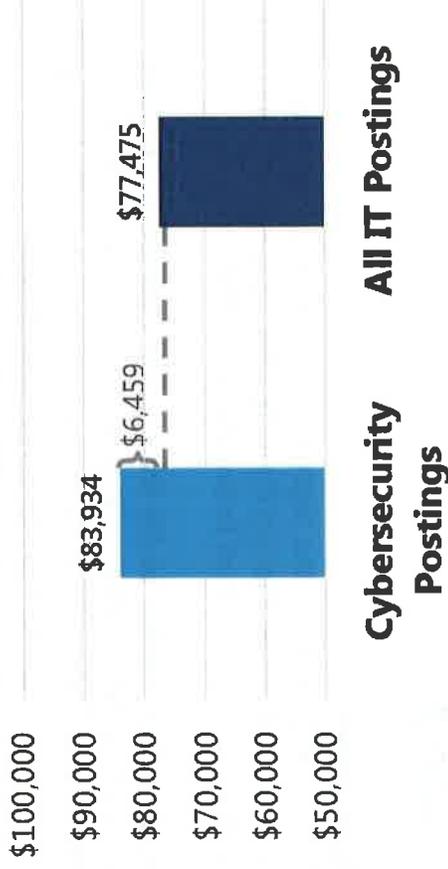
By the Numbers: The Cybersecurity Job Market

- In 2014, there were 238,158 postings for cybersecurity-related jobs nationally. **Cybersecurity jobs account for 11% of all IT jobs.**
- Cybersecurity postings have **grown 91%** from 2010-2014. This growth rate is more than faster than IT jobs generally.
- Cybersecurity posting advertise a 9% salary premium over IT jobs overall.
- Cybersecurity job postings took **8% longer to fill than IT job postings overall.**
- The demand for certified cybersecurity talent is outstripping supply. In the U.S., employers posted 49,493 jobs requesting a CISSP, recruiting from a pool of only 65,362 CISSP holders nationwide.*

Growth in Job Postings (2010-2014)



Cybersecurity Salary Premium



*According to the International Information System Security Certification Consortium, Inc., (ISC)² membership counts as of July 14, 2015

Cybersecurity Demand Grows in Finance, Professional Services

- **Professional Services, Finance, and Manufacturing & Defense** are the leading sectors for cybersecurity professionals.
- Sectors managing increasing volumes of consumer data such as **Finance, Health Care, and Retail Trade** have the fastest increases in demand for cybersecurity workers.
- Within these sectors, demand for cybersecurity professionals is growing rapidly in more specific industry subsectors not typically associated with cybersecurity, including Air Transportation (+221%) and Accommodation (+157%).

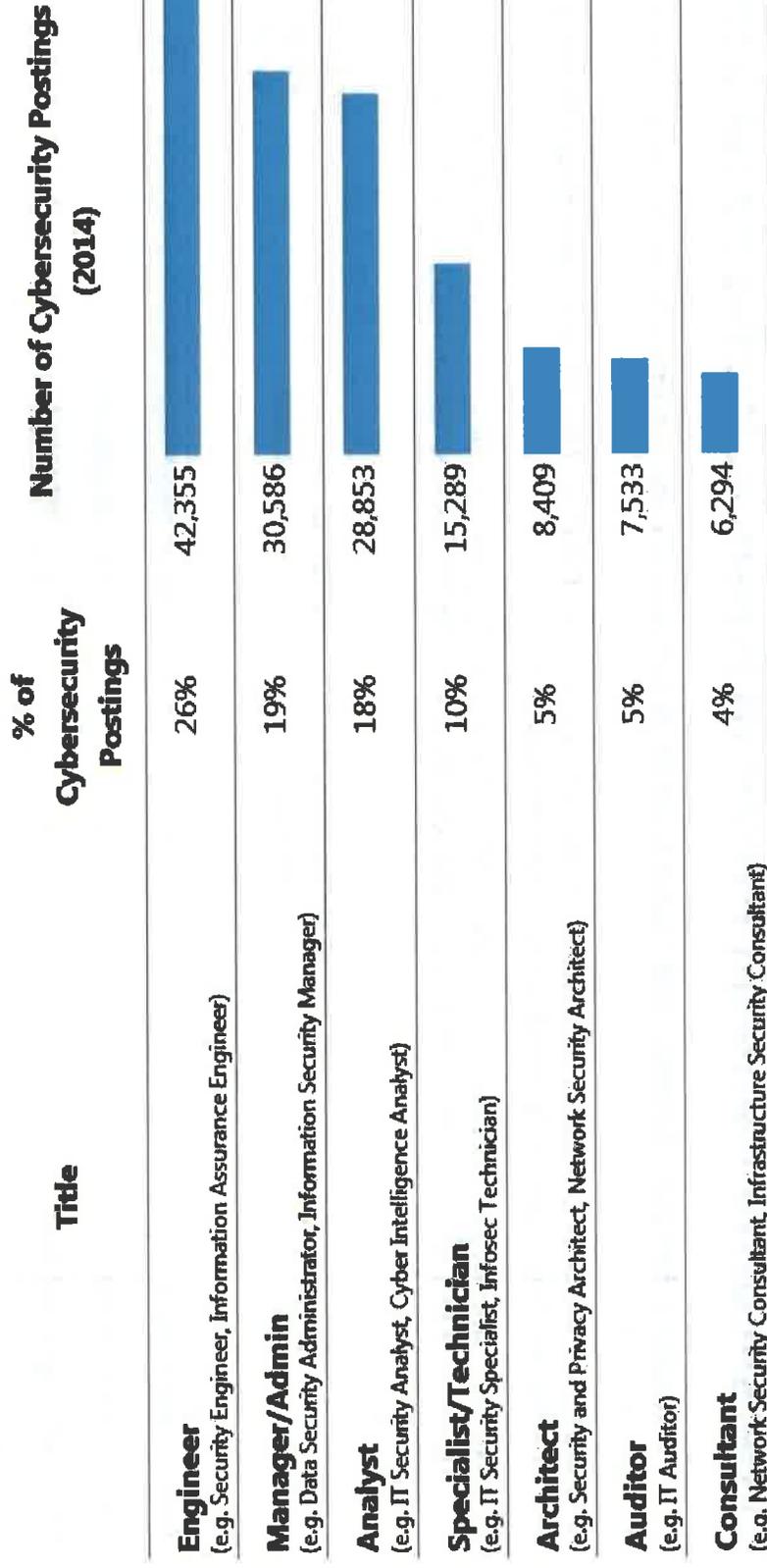
Industry Sector	% of Cybersecurity Postings	Number of Cybersecurity Postings (2014)	2010 - 2014 Posting Growth
Professional Services	37%	49,765	57%
Finance and Insurance	13%	17,873	131%
Manufacturing & Defense*	12%	15,968	57%
Public Administration	7%	9,725	N/A**
Information	6%	8,522	65%
Health Care and Social Assistance	6%	7,915	118%
Retail Trade	3%	3,505	120%
Other	15%	19,983	N/A**

*The Manufacturing Sector includes services divisions of a number of defense contractors (e.g. Raytheon) and computer manufacturers (e.g. Hewlett Packard).

** Industry growth rates are suppressed for the Public Administration and Other industry sectors because a significant portion of labor market demand in these industries exists offline.

Engineers, Managers, and Analysts Dominate the Field

The cybersecurity workforce covers a range of job types and skills. This includes advanced Engineer and Architect roles, Auditors (which are concentrated in Finance) and Specialists, which typically have lower entry level requirements.



Employers Demand More Education, Experience

Cybersecurity jobs require significant education and experience. Some 84% of cybersecurity postings specify at least a bachelor's degree, and just as many (83%) require at least 3 years of experience, with an average of 5.4 years.

High education and experience requirements make skills gaps hard to close. Because cybersecurity jobs require years of training and relevant experience, skills gaps cannot easily be resolved through short-term solutions. Employers and training providers must work together to cultivate a talent pipeline for these critical roles.

Requested Education Level*



Minimum Experience



Certification Shapes the Path to Advancement

The cybersecurity job market is shaped by certifications, and job seekers of all experience levels can improve their employment opportunities by obtaining the relevant credentials. Entry-level workers, for example, can obtain foundational certifications such as Security+, which represents an entry point into the field and is by far the largest cybersecurity certification in terms of total holders. Experienced workers can target more advanced certifications such as CISSP, which requires holders to pass a rigorous exam and possess at least five years of information security experience – common requirements among advanced certifications.

Entry-Level Certifications

Typically require less than 3 years of experience

- Security+
- GIAC Security Essentials (GSEC)
- Certified Information Privacy Professional (CIPP)
- Systems Security Certified Practitioner (SSCP)

Advanced Certifications

Typically require at least 3-5 years of experience

- Certified Information Systems Security Professional (CISSP)*
- Certified Information Systems Auditor (CISA)*
- Certified Information Security Manager (CISM)*
- GIAC Certified Incident Handler (GCIH)
- GIAC Certified Intrusion Analyst (GCIA)

*Requires a minimum of 5 years of information security experience.

Certification is More Common in Cybersecurity Jobs

Cybersecurity jobs are highly certified: More than one in three (35%) of all cybersecurity positions request at least one of the certifications listed below. Only 23% of overall advertised IT jobs request an industry certification.

Certification increases salary: Security+ represents the entry-level certification for cybersecurity roles, and postings requesting it advertise an average salary of \$75,484. This serves as a baseline salary for certified cybersecurity workers, and as workers obtain additional certification they can qualify for ever greater salaries. Postings requesting CISSP, for example, advertised an average salary of \$93,010 – a premium of \$17,526 over the average salary for Security+.

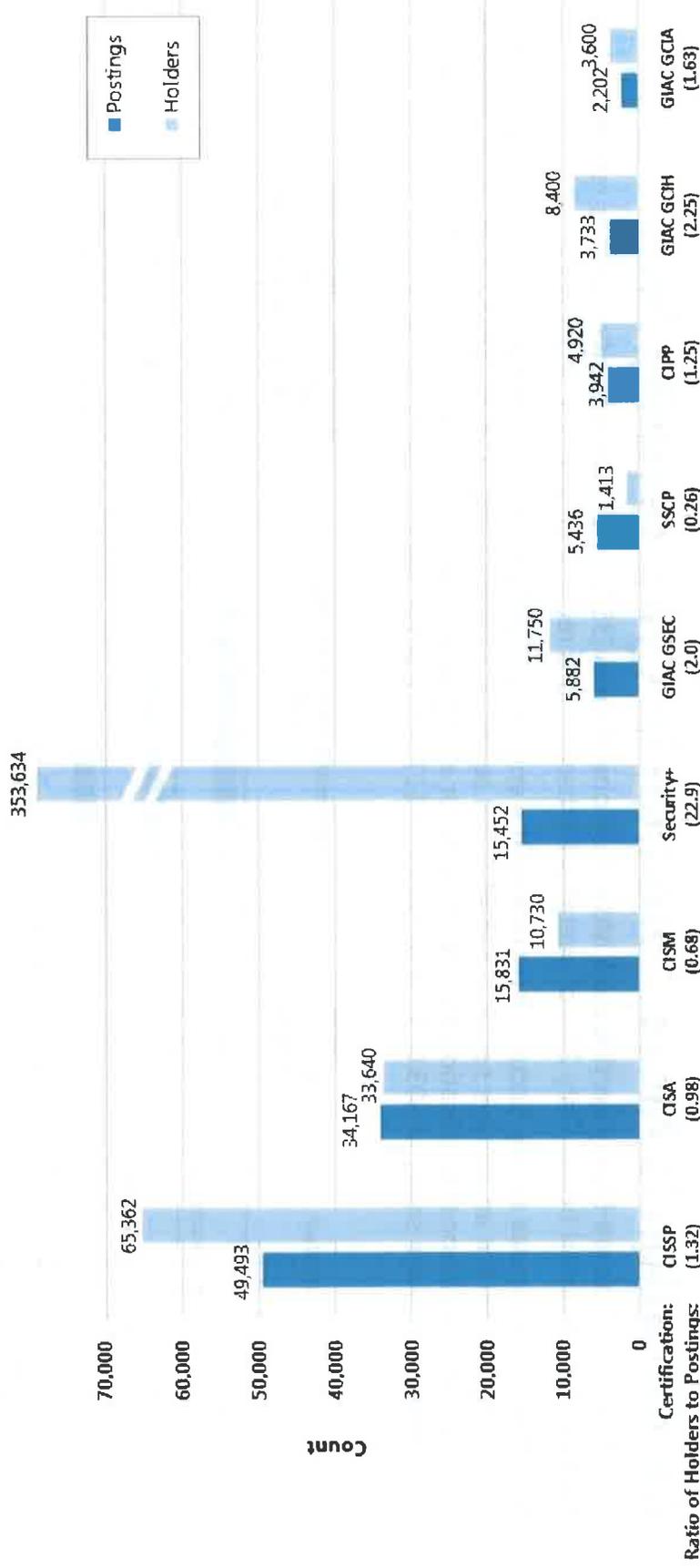
Certification*	% of All Cybersecurity Postings	Number of Cybersecurity Postings (2014)	Average Salary with Certification	Premium Over Security+ Average Salary
CISSP Certified Information Security Professional	21%	49,493	\$93,010	\$17,526
CISA Certified Information Systems Auditor	14%	34,167	\$86,238	\$10,754
CISM Certified Information Security Manager	7%	15,831	\$95,450	\$19,966
Security+ Systems Security Certified Practitioner	6%	15,452	\$75,484	\$0
GIAC GSEC GIAC Security Essentials	2%	5,882	\$81,631	\$6,147
SSCP Systems Security Certified Practitioner	2%	5,436	\$80,718	\$5,234
CPP Certified Information Privacy Professional	2%	3,942	\$90,550	\$15,066
GIAC GCIH GIAC Certified Incident Handler	2%	3,733	\$92,759	\$17,275
GIAC GCIA GIAC Certified Intrusion Analyst	1%	2,202	\$84,392	\$8,908

*Certification Requirements are not mutually exclusive

Certifications: Too Many Openings Chasing Too Few Workers

Employers prefer workers with cybersecurity certifications, but there can be three or more postings for every certificate holder. When you consider that most of these certificate holders are already employed, the situation looks even better for workers. Even the generous supply of Security + holders is somewhat misleading. Security + is an entry level certificate, so many people with more advanced credentials have one, and the openings that require it are relatively low-level.

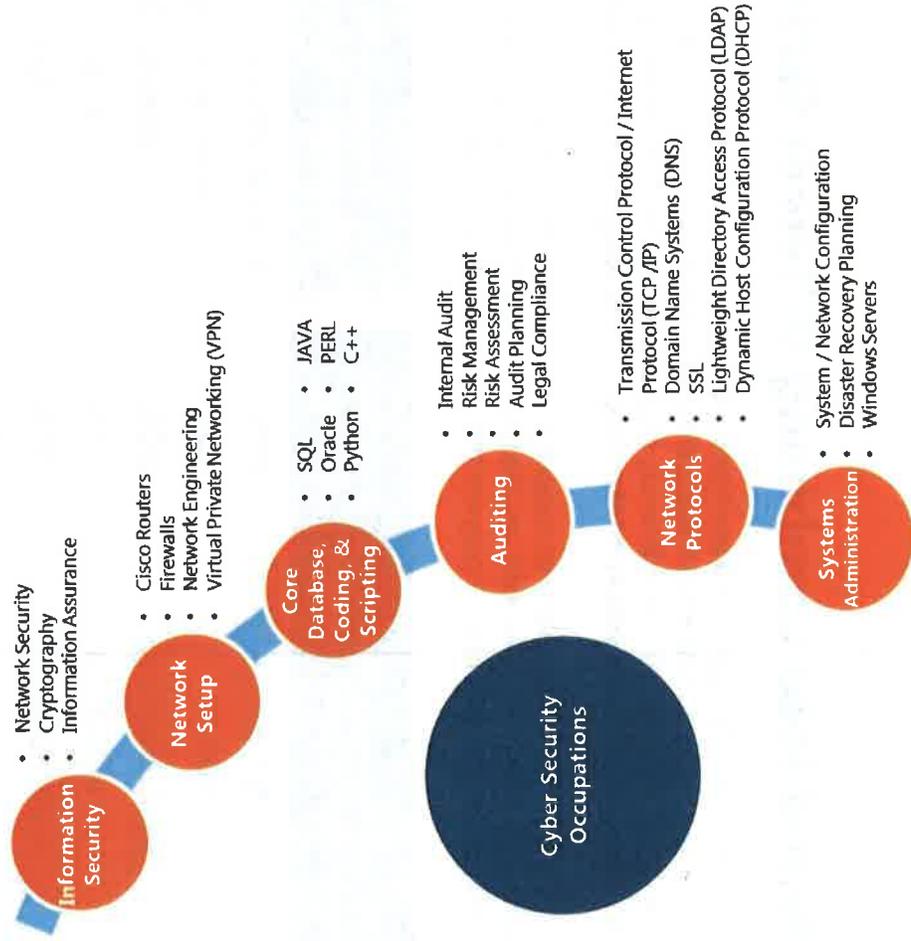
Certification Postings and Holders



Note: Different certifying organizations report slightly different counts of holders. For example, some may report total certifications awarded, while others may report only active certification holders.

Cybersecurity Workers Need to Know IT and Their Industry

The graphic below describes the expertise required for various cybersecurity roles in demand. On top of those skills, job postings often call for additional knowledge in certain information-sensitive industries, such as Health Care; Finance; and Manufacturing and Defense.



Additional Skill and Domain Knowledge Requirements by Industry

Health Care:

- Skills:**
- Generally Accepted Accounting Principles
 - Financial Reporting

Compliance & Standards:

- HIPAA
- HITECH
- Payment Card Industry Data Security Standard (PCI DSS)

Finance & Accounting:

- Skills:**
- Generally Accepted Accounting Principles
 - Financial Reporting

Compliance & Standards:

- Payment Card Industry Data Security Standard (PCI DSS)
- Sarbanes-Oxley Act (SOX)

Manufacturing & Defense:

- Compliance & Standards**
- JAFAN 6/9 & 6/3, DCID 6/3 and DIACAP
 - NERC Reliability Standards

Hybrid Jobs Combining Different Skills are Hardest to Fill

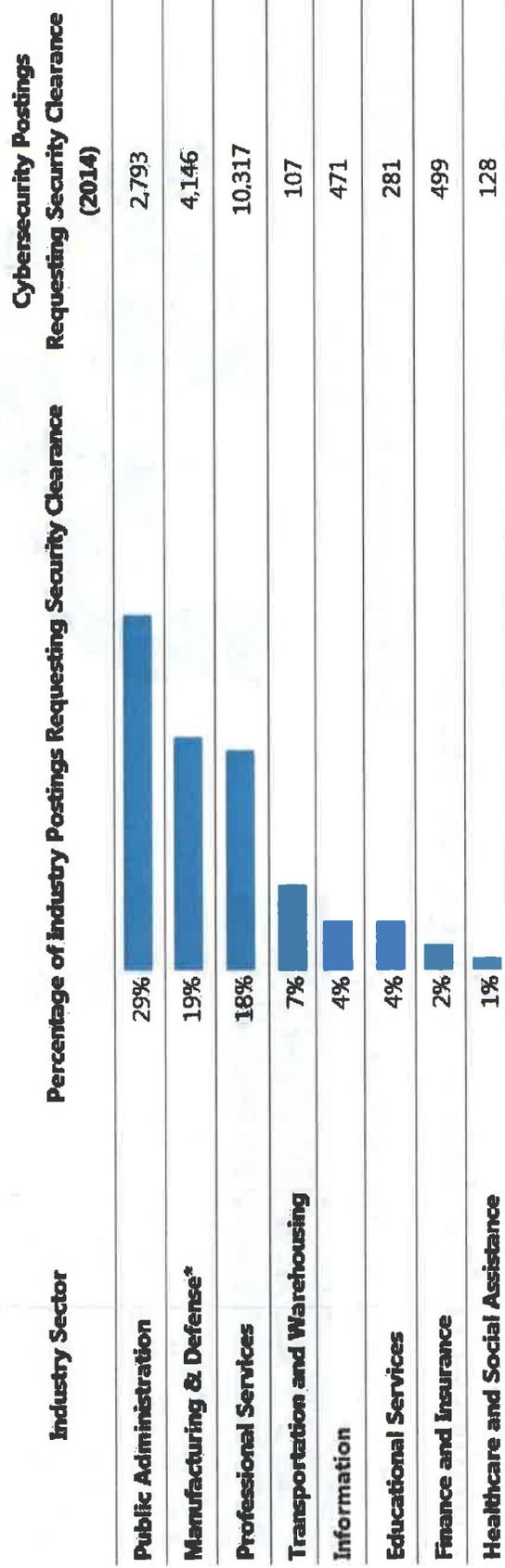
Employers often struggle to fill positions with specialized skill requirements. The fastest-growing skills include industry knowledge areas, such as HIPAA requirements in Health Care and Risk Management, and Accounting in Finance. The hardest-to-fill skills are typically related to finance, such as Information Assurance, Sarbanes-Oxley, and Accounting. **Finding candidates with these unique skill sets can take roughly 17% longer to fill on average than other cybersecurity job openings.**

The difficulties in filling jobs that require a combination of IT security and financial skills reflects a broader trend in the market: hybrid jobs which combine skill sets that are not traditionally trained for together. This often results in skills gaps where employers struggle to find employees that meet these skill needs.

Fastest-Growing Skills in Cybersecurity Job Postings	Five-Year Growth	Hardest to Fill Skills in Cybersecurity Job Postings	Posting Duration	Time to Fill Above Average
Python	309%	Management Information Systems	50 days	+10 days
HIPAA	248%	Information Assurance	47 days	+7 days
Risk Management	209%	Sarbanes-Oxley	47 days	+7 days
Internal Auditing	200%	Accounting	45 days	+5 days
Audit Planning	170%	Python	45 days	+5 days
Risk Assessment	169%	Dynamic Host Configuration Protocol (DHCP)	45 days	+5 days
ITIL	153%	Configuration Management	44 days	+4 days
Management Information Systems	132%	C++	44 days	+4 days
Accounting	121%	Public Accounting	43 days	+3 days
Configuration Management	106%	Internal Auditing	43 days	+3 days

Roles Requiring Security Clearance Take Longer to Fill

Workers with a security clearance—or the ability to get one—have an advantage. In 2014, there were 25,654 cybersecurity postings calling for a government Security Clearance to access classified information, representing 11% of all cybersecurity postings. On average, cybersecurity postings requesting Security Clearance remained open 10% longer than cybersecurity postings overall.

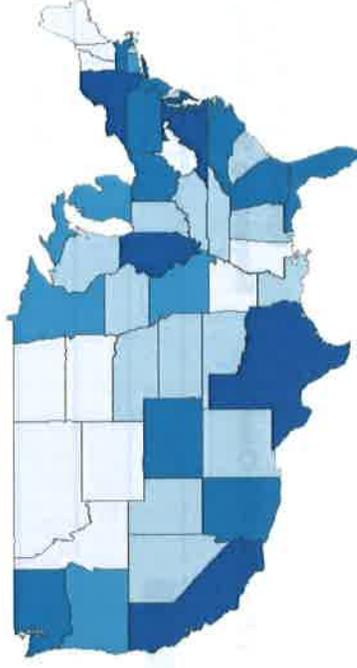


Cybersecurity Job Postings by State

Cybersecurity Job Postings in 2014 By State

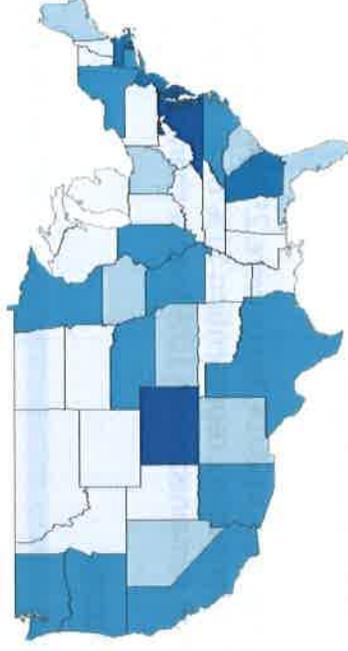
Top States by Total Postings*

State	Total Postings	Location Quotient**	% Growth (2010-2014)
1 California	28,744	1.02	75%
2 Virginia	20,276	3.09	38%
3 Texas	18,525	0.92	113%
4 New York	14,089	0.97	104%
5 Illinois	11,428	1.16	163%
6 Maryland	11,406	2.40	39%
7 Florida	9,847	0.67	135%
8 Georgia	8,757	1.22	121%
9 New Jersey	8,268	1.21	80%
10 Massachusetts	7,911	1.45	92%
11 Colorado	7,688	1.77	111%
12 North Carolina	7,503	1.06	127%
13 Ohio	6,281	0.72	141%
14 Pennsylvania	5,745	0.59	69%
15 Arizona	5,502	1.18	87%



Cyber Postings: 0 to 1,000 1,000 to 2,500 2,500 to 4,000 4,000 to 10,000 10,000+

Cybersecurity Location Quotient in 2014



Cyber Postings Location Quotient: Very Low Low Average High Very High

*See Appendix 1 for state-level data tables on total postings and postings growth.

**Location quotients show how concentrated demand is in a particular geography relative to employment in that area. National location quotient equals 1.0; an LQ of 1.2 indicates that demand is 20% more concentrated than nationally.

Cybersecurity Job Postings by City

Top Cities by Total Postings

	City (MSA)	Total Postings	% Growth (2010-2014)
1	Washington, D.C.	27,246	39%
2	New York	17,982	90%
3	San Francisco / San Jose	13,869	88%
4	Chicago	9,623	164%
5	Dallas	8,694	138%
6	Los Angeles	7,654	47%
7	Boston	6,918	99%
8	Atlanta	6,604	128%
9	Denver	4,744	176%
10	Baltimore	4,643	49%

Top Cities by Growth

	City (MSA)	Total Postings	% Growth (2010-2014)
1	Austin	2,937	209%
2	Columbus	1,916	178%
3	Denver	4,744	176%
4	Portland	2,424	175%
5	Chicago	9,623	164%
6	Miami	2,872	158%
7	Charlotte	3,000	147%
8	Tampa	2,606	145%
9	Dallas	8,694	138%
10	Atlanta	6,604	128%

Methodology

All jobs data in this report are drawn from Burning Glass's database of online job postings, which includes nearly 100M worldwide postings collected since 2007. Each day, Burning Glass visits close to 40,000 online jobs sites to collect postings. Using advanced text analytics, over 70 data fields are extracted from each posting including job title, occupation, employer, industry, required skills and credentials and salary. Postings are then deduplicated and placed in a database for further analysis.

This report classifies cybersecurity jobs as those which have a cybersecurity-related title, require a cybersecurity certification or request cybersecurity-specific skills. Cybersecurity-related titles used to define the roles analyzed in this report include "network security", "information security", "information assurance", and "penetration tester". Cybersecurity skills include information assurance, cryptography, computer forensics, malware analysis, 800-53, and ArcSight.

The data in this report use a broader definition of cybersecurity roles than Burning Glass's 2014 report examining the same topic. That report looked only at those roles with cybersecurity-specific titles, whereas this update includes jobs with cybersecurity titles, certifications or skills.

Appendix 1: State Data

	State	Total Postings	Location Quotient*	% Growth (2010-2014)
1	Alabama	2,159	0.66	31%
2	Alaska	556	1.00	17%
3	Arizona	5,502	1.18	87%
4	Arkansas	989	0.5	117%
5	California	28,744	1.02	75%
6	Colorado	7,688	1.77	111%
7	Connecticut	2,771	0.97	98%
8	Delaware	1,152	1.67	92%
9	Florida	9,847	0.67	135%
10	Georgia	8,757	1.22	121%
11	Hawaii	1,364	1.31	39%
12	Idaho	634	0.53	260%
13	Illinois	11,428	1.16	163%
14	Indiana	2,347	0.48	139%
15	Iowa	1,951	0.74	158%
16	Kansas	1,654	0.71	168%
17	Kentucky	1,753	0.58	209%
18	Louisiana	1,563	0.48	275%
19	Maine	791	0.74	214%
20	Maryland	11,406	2.40	39%
21	Massachusetts	7,911	1.45	92%
22	Michigan	4,225	0.59	117%
23	Minnesota	4,059	0.88	98%
24	Mississippi	827	0.45	161%
25	Missouri	4,004	0.86	88%

	State	Total Postings	Location Quotient*	% Growth (2010-2014)
26	Montana	344	0.43	189%
27	Nebraska	1,603	1.00	68%
28	Nevada	1,462	0.70	89%
29	New Hampshire	581	0.50	134%
30	New Jersey	8,268	1.21	80%
31	New Mexico	1,003	0.72	119%
32	New York	14,089	0.97	104%
33	North Carolina	7,503	1.06	127%
34	North Dakota	322	0.49	341%
35	Ohio	6,281	0.72	141%
36	Oklahoma	1,476	0.53	196%
37	Oregon	2,618	0.89	136%
38	Pennsylvania	5,745	0.59	69%
39	Rhode Island	1,267	1.53	134%
40	South Carolina	2,312	0.69	134%
41	South Dakota	354	0.50	195%
42	Tennessee	2,340	0.51	97%
43	Texas	18,525	0.92	113%
44	Utah	1,371	0.61	146%
45	Vermont	281	0.52	168%
46	Virginia	20,276	3.09	38%
47	Washington	5,119	0.96	94%
48	West Virginia	496	0.41	35%
49	Wisconsin	2,429	0.51	139%
50	Wyoming	176	0.37	245%

*Location quotients show how concentrated demand is in a particular geography relative to employment in that area. National location quotient equals 1.0; an LQ of 1.2 indicates that demand is 20% more concentrated than nationally.

Appendix 2: City (MSA) Data

	MSA	Total Postings	Location Quotient*	% Growth (2010-2014)
1	Atlanta	6,604	1.57	128%
2	Austin	2,937	1.88	209%
3	Baltimore	4,643	2.04	49%
4	Boston	6,918	1.52	99%
5	Charlotte	3,000	1.87	147%
6	Chicago	9,623	1.24	164%
7	Columbus	1,916	1.12	178%
8	Dallas	8,694	1.56	138%
9	Denver	4,744	2.03	176%
10	Detroit	2,753	0.84	112%
11	Houston	3,453	0.69	91%
12	Kansas City	1,884	1.06	111%
13	Los Angeles	7,654	0.78	47%
14	Miami	2,872	0.69	158%
15	Minneapolis	3,285	1.02	93%
16	New York	17,982	1.18	90%
17	Philadelphia	4,519	0.95	75%
18	Phoenix	4,044	1.26	101%
19	Portland, OR	2,424	1.30	175%
20	San Diego	3,068	1.32	94%
21	San Francisco / San Jose	13,869	4.89	88%
22	Seattle	4,105	1.32	100%
23	St. Louis	3,248	1.41	95%
24	Tampa	2,606	1.25	145%
25	Washington, D.C.	27,246	5.25	39%

*Location quotients show how concentrated demand is in a particular geography relative to employment in that area. National location quotient equals 1.0; an LQ of 1.2 indicates that demand is 20% more concentrated than nationally.

About Burning Glass

Burning Glass Technologies delivers job market analytics that empower employers, workers, and educators to make data-driven decisions. Burning Glass is reshaping how the job market works, with data that identify the skill gaps that keep job seekers and employers apart and tools that enable both sides to bridge that gap and connect more easily. The company's artificial intelligence technology analyzes hundreds of millions of job postings and real-life career transitions to provide insight into labor market patterns. This real-time strategic intelligence offers crucial insights, such as which jobs are most in demand, the specific skills employers need, and the career directions that offer the highest potential for workers.

Burning Glass' applications drive practical solutions and are used across the job market: by educators in aligning programs with the market, by employers and recruiters in filling positions more effectively, and by policy makers in shaping strategic workforce decisions. At the same time, Burning Glass' data-driven applications for workers and students help them choose career goals and build the skills they need to get ahead.

Based in Boston, Burning Glass is playing a growing role in informing the global conversation on education and the workforce, and in creating a job market that works for everyone.

For More Information

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Chief Analytics Officer
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www.burning-glass.com

National Centers of Academic Excellence in Cyber Defense – Two-Year Education (CAE2Y) Criteria for Measurement

Jointly Sponsored by the
National Security Agency (NSA) and Department of Homeland Security (DHS)

Goal

Proactively increase our understanding of robust cyber defense (CD) technology, policy and practices that will enable our Nation to effectively prevent and respond to a catastrophic cyber event. This program will contribute significantly to the advancement of state-of-the-art CD knowledge and practice.

Vision

Establish a process that will:

- Provide programs that commit to excellence in the field of Information Assurance and Cyber Defense education at community and technical college and government training institutions.
- Provide innovative, comprehensive and multidisciplinary education and training in the CD field.
- Strengthen the cybersecurity workforce by providing CD education and training through degree and certification programs at community and technical colleges and government training centers.
- Build an effective education pipeline model with K–12 schools to encourage students at an early age to enter CD fields of study.
- Provide the Nation with a pipeline of qualified students poised to become the future skilled technical workforce.
- Continuously improve the quality of CD programs, curriculum, faculty, students and other institutions.

CAE 2Y Program Eligibility and Summary

The CAE2Y Program is open to current regionally accredited two-year community colleges, technical schools, state or federally endorsed Cybersecurity training centers or U.S. Government Cybersecurity training centers. All institutions must hold current regional accreditation as outlined by the Department of Education (<http://ope.ed.gov/accreditation>).

Overall CAE2Y requirements include:

- **Program Criteria** – Demonstration of CD Center establishment and maintenance, CD program of study, CAE2Y curriculum path, student development, CD faculty, and outreach.
- **KU Mapping** – Mapping of the institution’s curriculum to the two-year core Knowledge Units (KUs).

Focus Area (FA) Designation (Optional):

All CAEs have the option to apply for one or more CAE CD Focus Area designations. The criteria includes:

- Successful mapping of the institution’s curriculum to all of the KUs identified in the Focus Area.

National Centers of Academic Excellence in Cyber Defense – Two-Year Education (CAE2Y) Criteria for Measurement

- Demonstration that a student can reasonably complete the necessary course of study to include all KUs identified in the Focus Area.
- The institution must provide student certificates to those that complete the FA course of study. The certificates must clearly identify the specific Focus Area achieved.

Application Submission and Evaluation

Applications should be submitted via the CAE Application website – www.iad.gov/nietp. New applicants can register for an account at the above link under *Login/Join*. **Applications are due no later than 15 January 2016.**

Qualified CD professionals and Subject Matter Experts from NSA, DHS, and other government, academic and industry partners will assess applications. By submitting an application, an institution grants consent to having its application reviewed by assessors approved by the CAE Program Office. New institutions applying for designation will receive at least three independent reviews. Re-designating institutions will receive at least two independent reviews. Institutions not meeting requirements will receive reviewer feedback at the time of notice. Reviewer feedback is available upon request for approved submissions by contacting the program office at AskCAEIAE@nsa.gov.

CAE2Y Designation:

Qualifying applicants will be designated as CAE2Y for a period of five academic years, after which they must successfully re-apply in order to retain the designation. Future criteria (including KUs and FAs) will continue to be reviewed annually and strengthened as appropriate to keep pace with the evolving nature of cyber defense. Designation as a CAE2Y does not carry a commitment of funding from NSA or DHS.

**National Centers of Academic Excellence in Cyber Defense –
Two-Year Education (CAE2Y)
Criteria for Measurement**

CAE2Y Program Criteria

0. **Letter of Intent.** Provide a formal letter stating the institution's intent to apply for CAE2Y. The letter must be on official institution letterhead, signed by a collegiate official at an appropriate level (Dean or higher) and express the university's support of the program, accreditation status and institutional commitment to excellence in the cyber defense field. The letter should be addressed to:

National Security Agency
Attn: CAE Program Office
9800 Savage Road
Ft. Meade, MD 20755-6804

The Letter of Intent must be uploaded within the CAE application. Do not mail.

1. **Center for CD Education.** The institution must have an official "Cyber Center" (whether physical or virtual) established for its CD educational program. The center should provide the following services: program guidance and oversight, general cyber defense information, and collaboration and outreach opportunities among students, faculty, and other institutions. Additionally, the center must be supported by a website that is dynamic, current and visible within the institution and the community at large.

Overall Point Value: 10 points (required)

- a. **Cyber Center.** Show formal documentation of the establishment of a "Cyber Center" within the institution.

Point Value: 5 points (required)

- b. **Cyber Center Website.** Demonstrate that the "Center" website is operational, dynamic and current. It should be easily accessible and serve as a resource that contributes to the institution's excellence in CD education. The website should contain information about the CD program of study, center point of contact and faculty information, student CD activities, CD news (internal and external), and up-to-date links to key CD resources such as other academic institutions, government sites, conferences, workshops and cyber competitions. Provide an url for the site.

Point Value: 5 points (required)

2. **Cyber Defense Program, Student Development and Recognition.** The institution should have a mature program in place that leads to a two year associate's degree or a certificate in a CD discipline. The institution should demonstrate that its academic requirements are aligned with CAE Core KUs and explain how students participate and successfully complete this curriculum.

Overall Point Value: 19 points minimum /36 points maximum

- a. **Cyber Defense Program of Study.** Provide evidence of Cybersecurity degrees/areas of study/tracks or certificates. Evidence should include, but is not limited to: identifying the department that oversees the program; specific identification of CD curriculum path(s)/program(s) offered; identifying courses required for the path(s)/program(s) that satisfy CAE requirements for all core KUs, etc. **(Please note – Only the CD curriculum program(s)/path(s) identified in this criterion, are allowed to be marketed as CAE2Y Curriculum Path(s)/Program(s) at an institution, if application is**

**National Centers of Academic Excellence in Cyber Defense –
Two-Year Education (CAE2Y)
Criteria for Measurement**

approved. If additional curriculum path(s)/program(s) are identified after this application is submitted, the onus is on the institution POC to confirm all core KUs are covered and the POC must identify the additional path(s)/program(s) in the re-designation application).

Point Value: 5 points (required)

- b. **Student Enrollment.** Provide information on the student enrollment over the last 3 years to include current participants and graduates in each curriculum path/program identified in Criterion 2a.
Point Value: 5 points (required)
- c. **Student Recognition Path – CAE2Y.** Provide evidence that students who participate sufficiently in the CD curriculum path(s)/program(s) (i.e., take and pass courses that satisfy all of the mandatory KU requirements) will receive a certificate, or a reference to completing the CAE2Y curriculum on their transcript and/or degree. Provide evidence in the form of a letter, transcript notation, and/or degree (may be redacted).
Point Value: 5 points (required)
- d. **Student Recognition Path – CAE2Y plus Focus Area.** Provide evidence that students who participate sufficiently in the CD curriculum for a Focus Area (i.e., take and pass courses that satisfy all of the mandatory KU requirements for that Focus Area) will receive certificate, or a reference to a focus area on their transcript and/or degree (may be redacted). **(Please note - If your institution does not have or is not applying for a Focus Area Designation, notate 'N/A' in the justification of this criterion).**
Point Value: 5 points (required), if applicable
- e. **Applied Training.** Demonstrate that physical and/or virtual cybersecurity labs and equipment are available and used for hands-on learning (provide examples of student lab projects, exercises, case studies, syllabi, links to assignments, photos of labs, etc.).
Point Value: 2 points per course minimum required/6 points maximum
- f. **Cybersecurity Practitioners/Industry Partnerships.** Evidence that the program is providing students with access to cybersecurity practitioners (e.g., Guest lecturers working in Cybersecurity industry, government, faculty exchange program with industry and/or government, internships, etc.).
Point Value: 2 points minimum required/Up to 5 points
3. **CD Faculty.** The institution must identify the faculty member responsible for the overall CD program of study and sufficient faculty members teaching and developing CD-related material.
Overall Point Value: 11 points minimum/15 points maximum
- a. **Head of CD Program of Study.** Identify, by name, faculty member with overall responsibility for the CD instructional program. Provide evidence, i.e., verification letter and/or job description. Provide link to biography or curriculum vitae (CV).
Point Value: 5 points (required)

**National Centers of Academic Excellence in Cyber Defense –
Two-Year Education (CAE2Y)
Criteria for Measurement**

- b. **Additional CD Faculty.** Identify, by name, additional faculty members teaching CD courses within the department that sponsors the CD curriculum path(s)/programs identified in Criterion 2a. Provide link to biography or CV.
Point Value: 1 point per faculty minimum required/5 points maximum
- c. **Cybersecurity/Information Assurance Qualifications.** Provide evidence in the form of CV supporting the faculty member's qualifications to teach cybersecurity. At least one faculty member is expected to be professionally certified with at least one of the Cybersecurity/Information Assurance certifications listed under DOD Directive 8570, such as CISSP, CISA, CISM, CEH, etc. (see attached DoD 8570 list [here](#)). A minimum of 15 hrs of graduate coursework and/or appropriate experience in a related field could be considered in lieu of a professional certification. (Please Note - Can be same individual as listed in Criteria 3a/b).
Point Value: 5 points (required)
4. **Practice of Cybersecurity Encouraged Throughout the Institution.** The institution must demonstrate it encourages the practice of cybersecurity throughout the institution, not merely that there is a CD program at the institution.
Overall Point Value: 11 points minimum/30 points maximum
- a. **Cyber Defense Topics Taught in Other Fields of Study.** Evidence that CD is taught as modules in existing non-CD courses and that non-technical/non-CD students are being introduced to CD (e.g., business courses teaching Information Security modules, health courses incorporating HIPAA regulations, etc.).
Point Value: 2 points minimum required/Up to 5 points
- b. **Professional Development Courses.** Availability of non-credit/credit professional development CD-related courses (e.g., First responders, K-12 teachers).
Point Value: Up to 5 points
- c. **Institution Information System (IS) Security Plan.** Provide evidence of the institution's IS security plan and/or policies.
Point Value: 2 points minimum required/Up to 5 points
- d. **Institution IS Security Officer.** Provide evidence of institution designated Information System Security Officer or equivalent. Provide name, position and job description for person or persons responsible for information security.
Point Value: 5 points (required)
- e. **Implementation of IS Security Practices.** Provide evidence of the implementation of the institution IS security plan to encourage cybersecurity awareness throughout the campus (e.g., Students, faculty and staff are required to take computer based training or on-line tutorials; a security banner statement present on institution computers; security related help screens are available; institution-wide seminars are held on the importance of cybersecurity, etc.).
Point Value: 2 points minimum (required)/10 points maximum

**National Centers of Academic Excellence in Cyber Defense –
Two-Year Education (CAE2Y)
Criteria for Measurement**

5. **Outreach/Collaboration.** The institution must demonstrate how cybersecurity is extended beyond the normal boundaries of the institution.

Overall Point value: 10 points minimum/27 points maximum

- a. **Shared Curriculum and Faculty.** Shared Curriculum (e.g., Cybersecurity teaching materials provided to technical schools, universities, community colleges, K-12 schools, etc.) or shared faculty (e.g., Faculty on Cybersecurity curriculum development committee for more than one institution).

Point Value: 1 points minimum required/Up to 5 points

- b. **Reciprocity of Credit and Transfer Agreements - 4-year Institutions.** Evidence of Articulation/Transfer agreements with 4 year institutions offering a concentration or cybersecurity degrees/areas of study/track or certificates.

Point Value: 5 points (required)

- c. **Reciprocity of Credit and Transfer Agreements - High Schools.** Evidence of agreements with high schools, preferably cyber-related and not just general pathway programs, to facilitate awareness and training for faculty/administration/students.

Point Value: 2 points per school minimum (required)/6 points maximum

- d. **Cyber Competitions.** Evidence that the institution sponsors and/or participates in cybersecurity competitions.

Point Value: 2 points each/6 points maximum

- e. **Community Outreach.** Sponsor cybersecurity related community events such as cybersecurity education workshops for K-12/adult education centers/senior groups, camps, summer programs, state homeland security, first responder workshops, computer diagnostic check-ups, etc.

Point Value: 2 points minimum required/Up to 5 points

National Centers of Academic Excellence in Cyber Defense – Two-Year Education (CAE2Y) Criteria for Measurement

CAE2Y KU Mapping

The KU mapping will require the institution to demonstrate how it meets each Core and Optional (if applicable) KU. An institution has many ways to demonstrate how a program meets/fulfills a KU. Some examples include: course syllabus, course outline, student assignments, lab assignment, modules in a course/collection of courses, and certifications (CCNA, CISSP, etc.). Required information will include: course syllabi, course outlines and justifications showing where and how the KUs are addressed in the curriculum. One course may fulfill the requirements of multiple KUs, and multiple courses may fulfill the requirements of a single KU. A course to KU ratio of 1:1 is not required.

Available Tools

The following tools are available to assist in gathering the information needed to map to the following KU sets:

- [CAE IA/CD KUs](#)
- [CAE IA/CD Focus Areas](#)
- [CAE KU Mapping Matrix](#)
- [National Cyberwatch Center's KU Mapping Guide](#)

These tools are useful to identify the topic/objective/week/session/project/lab/etc. numbers (whatever is used in the syllabi/course outline) that covers each of the KU topic and/or outcome elements. The spreadsheets consolidate mapping information which expedites entering it in the CAE application website. Many also find the spreadsheets useful in determining program overlaps and gaps. Links to all tools can be found on the CAE Application website under *CAE Requirements and Resources*.

Questions? Please direct any questions or concerns to AskCAEIAE@nsa.gov.



TECHNOLOGY EMPLOYMENT SPOTLIGHT: NASHVILLE

Developed for the Nashville Technology Council

Brought to you by:

careerbuilder[®]
EMPOWERING EMPLOYMENT

TECHNOLOGY EMPLOYMENT SPOTLIGHT: NASHVILLE AREA

MESSAGE FROM THE PRESIDENT

It is an exciting time to be in a technology career or business in Middle Tennessee. Our community has incredible assets for technology companies and IT departments to grow their businesses. Our businesses are making investments to not only attract but also grow talent in this region.

This year's report shows that our technology sector has grown by over 2,200 workers. Annual openings have increased from 872 to 1,548. Our region is aggressively competing seen by the 9% of annual postings. Although already a key resource for reducing the skills gap, area schools have the capacity to engage more students (see page 11). Recruiting students to acquire new skills or obtain degrees and certificates will be key for the development of our technology workforce.

As you review cities across the state and cities of peer size, it is important that this region continues to invest in education so that workforce supply meets business demand.

The growth of our technology workforce and investment of the businesses' is driving regional economic development. Middle Tennessee businesses are investing in long-term solutions to the IT skills gap. Regional businesses came together to support the NTC's IT Pathway Collaborative for 300 paid internships totaling over \$1.6m over two years. The IT Pathway Collaborative and the NTC's leadership with the White House's Tech Hire Initiative will build this region's high-quality technology talent pool.

Finding this scarce talent entails knowing where they are. That's why the Nashville Technology Council has partnered with CareerBuilder and Economic Modeling Specialists International (EMSI), a CareerBuilder company. Together, we provide you access to in-depth data on the current and future state of the technology workforce in our community, delivered in this comprehensive report. From this report, you will get an in-depth look at the state of Nashville's current technology labor market, be able to identify the top educational institutions and programs for future technology talent and compare technology job growth projections within various markets.

As your partner, Nashville Technology Council is committed to delivering data and resources to help you position your business for competitive growth. Use this information to inform your recruiting strategy, get involved to build the talent locally and create a plan to invest in your business' greatest asset – your people.



Sincerely,

BRYAN HUDDLESTON
President and CEO,
Nashville Technology Council

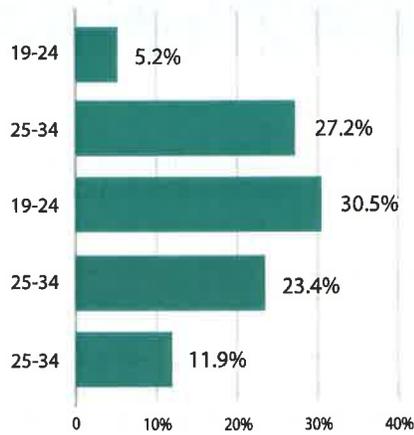
HOW DOES THE NASHVILLE IT WORKFORCE BREAKDOWN?

"Nashville is a unique amalgamation of entrepreneurial energy and established enterprises, fueled by the power of technology in our "can-do" city. The Nashville Technology Council is at the nexus of these two worlds, and must maintain its robust involvement, advancing the healthy balance of emerging talent and tools necessary for smart, sustainable growth."

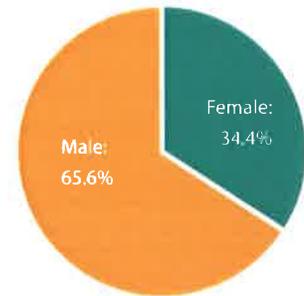
Brian Lapidus
Practice Leader Identity Theft and Breach Notification, Kroll Advisory Solutions



Age



Gender

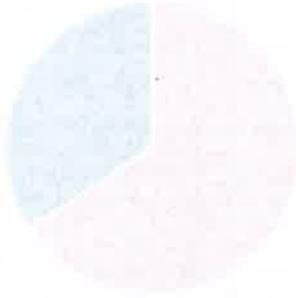


IT JOBS IN NASHVILLE METROPOLITAN AREA (MSA)

23,398
IT jobs in 2014

1,548
2014 Openings

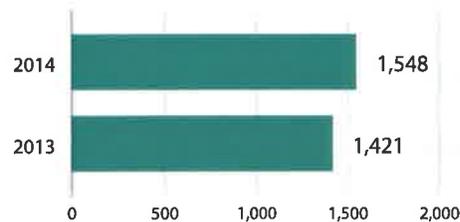
822
2013 Completions
"Educational Supply"



The 23,398 IT Jobs in the Nashville Area comprises several different job categories. Here are some highlights that illustrate how the market is changing.

Annual Change in Jobs

Annual Openings is defined as the estimated employment change and turnover for an occupation over the course of a given year. This is EMSI's estimate of labor market demand for an occupation, and when combined with Related Completions gives a picture of the supply and demand for the occupation in the region. Note that in one year, the growth in IT jobs is almost 9%.



Educational Supply

The 822 Related Completions is the number of people who received either a degree or certificate related to the occupations in 2013, the most recently reported year. This represents the educational supply for an occupation, and when combined with Annual Openings gives a picture of the supply and demand for the occupation in the region.

IS THE SUPPLY OF IT WORKERS MEETING THE DEMAND?

Top 5 IT Occupations in Nashville, Jan 2014 - Feb 2015

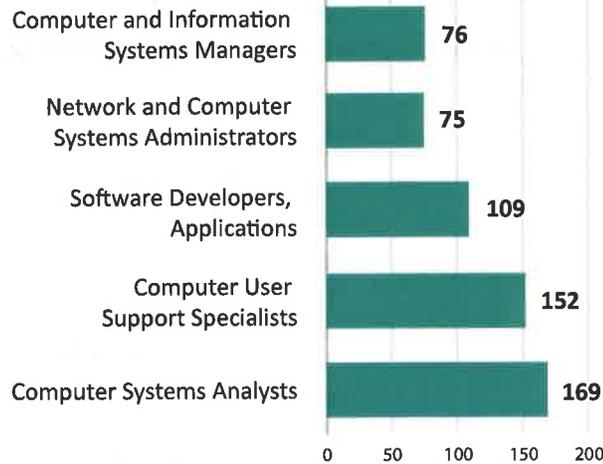
Here is a look at the top 5 IT jobs in Nashville from January 2014 to February 2015 by number of job openings, jobs, average monthly postings and average monthly hires.

"Nashville remains one of the nation's leading hubs for technology innovation and employment growth. Although attracting top IT talent can be a challenge in the current recruitment landscape, leading area organizations are separating themselves by offering a simple, candidate-friendly pre-hire experience. And corporations that stand out are focused on developing their employment brand, sharing positive workplace culture, offering challenging projects and career development opportunities."

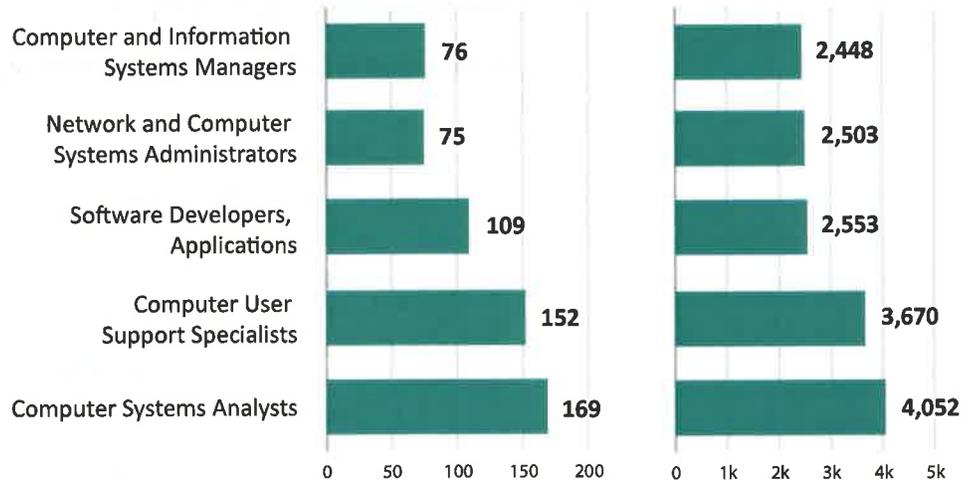
Chuck Branding
Careerbuilder



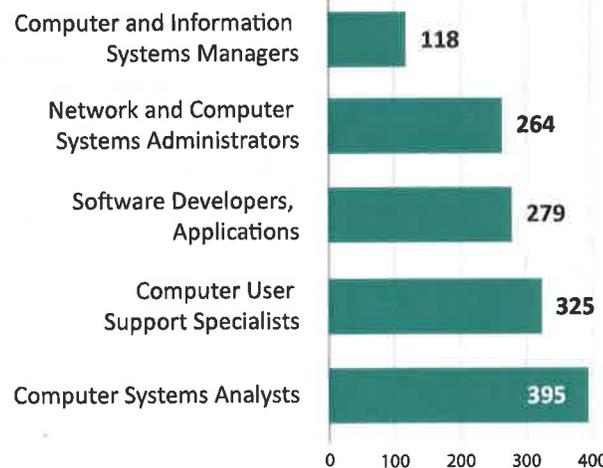
2014 Job Openings



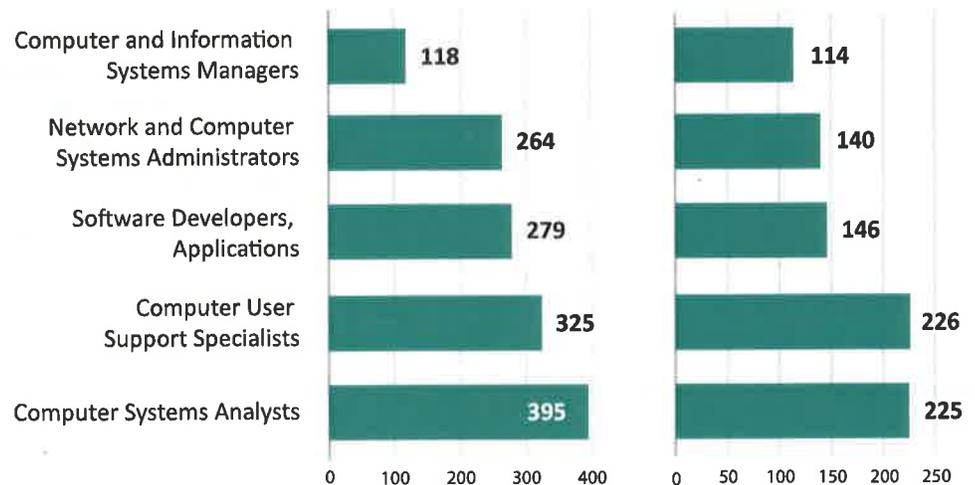
2014 Jobs



2014 Average Monthly Postings



2014 Average Monthly Hires

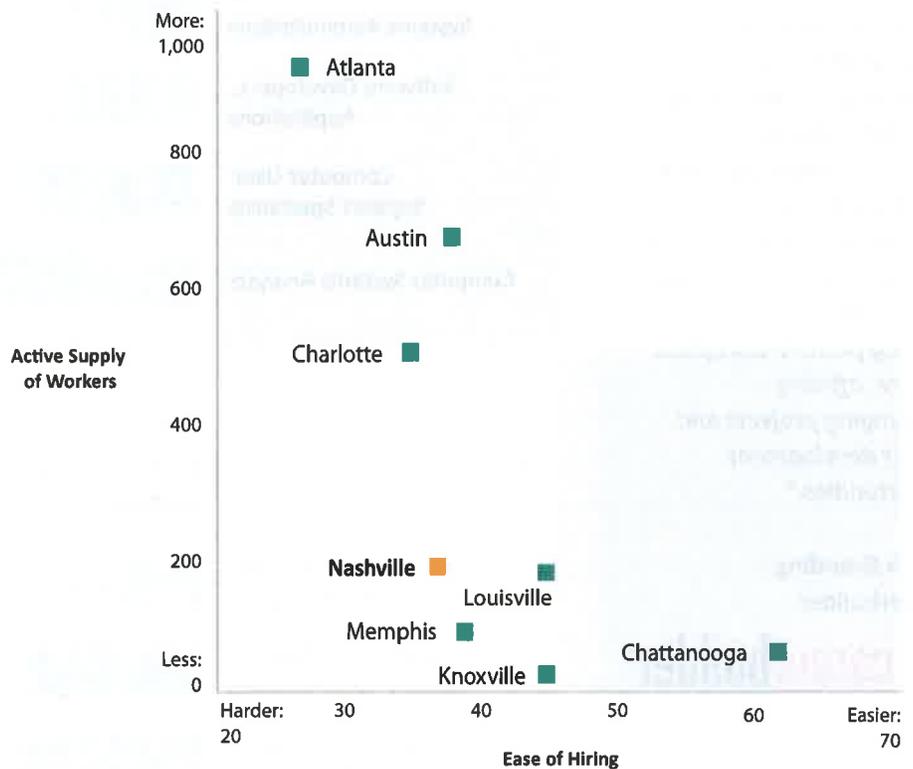


WHAT DOES THE SUPPLY AND EASE OF HIRING LOOK LIKE FOR COMPUTER SYSTEMS ANALYSTS?

The demand for Computer Systems Analysts in Nashville totaled **548 unique job postings** with **compensation ranging between \$73-100k**.

The Top 3 industries for Computer Systems Analysts within 50 miles of Nashville over the past 2 years are:

1. **Colleges, Universities and Professional Schools**
2. **General Medical and Surgical Hospitals**
3. **Other Aircraft Parts and Auxiliary Equipment Manufacturing**



WHAT DOES THE SUPPLY AND EASE OF HIRING LOOK LIKE FOR WEB DEVELOPERS

The demand for Web Developers in Nashville totalled **1,141 unique job postings** with **compensation ranging between \$80-99K**.

The Top 3 industries looking for Web Developers within 50 miles of Nashville over the past 2 years are:

1. Computer Systems Design Services

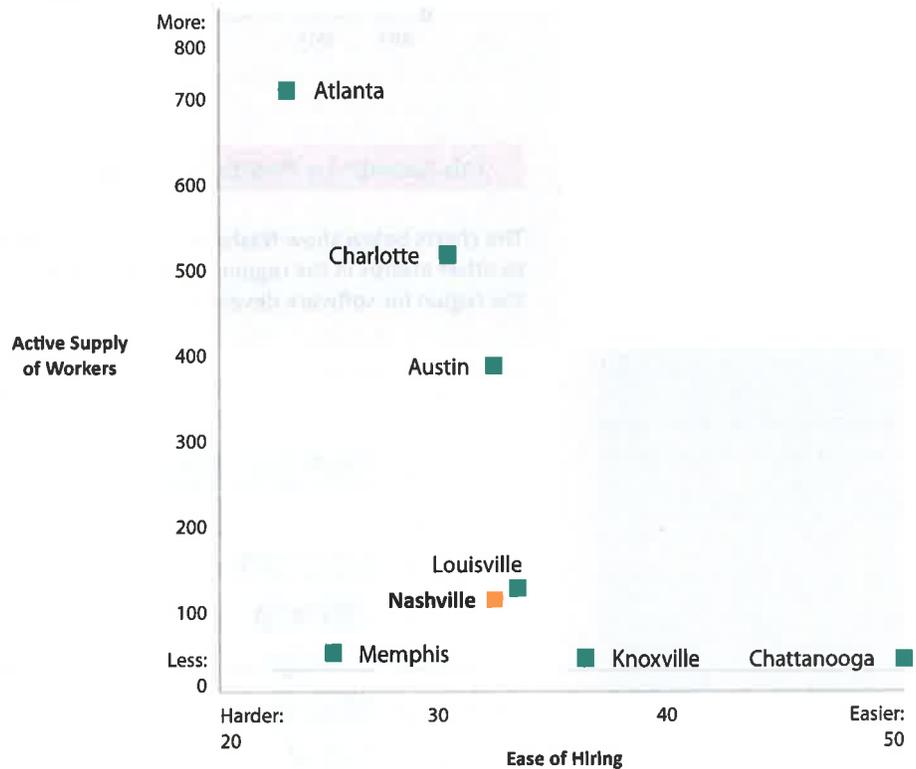
Establishments primarily engaged in planning and designing computer systems that integrate computer hardware, software, and communication technologies.

2. All Other Professional, Scientific, and Technical Services

Establishments primarily engaged in the provision of professional, scientific, or technical services.

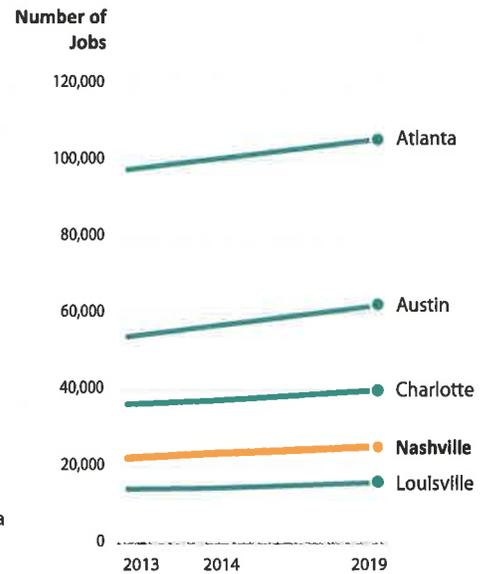
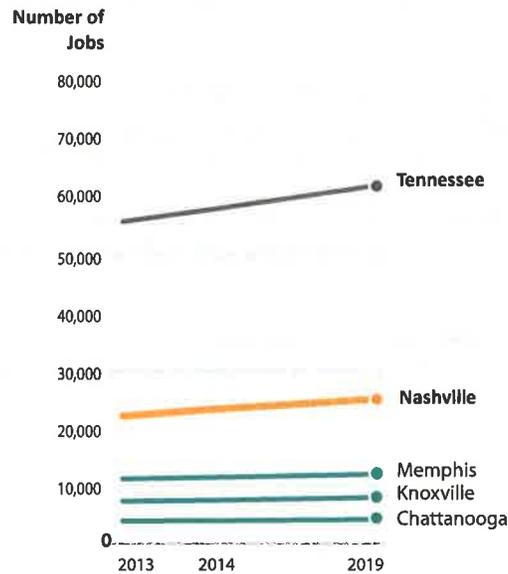
3. Custom Computer Programming Services

Establishments primarily engaged in writing, modifying, testing, and supporting software to meet the needs of a particular customer.



HOW DOES NASHVILLE IT EMPLOYMENT GROWTH COMPARE?

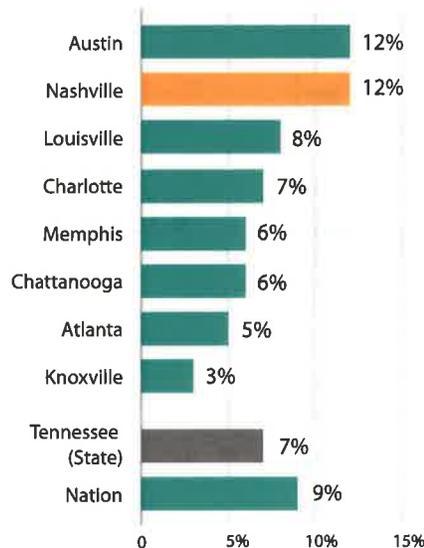
Nashville represents a significant portion of IT employment job growth in Tennessee, projecting 8% growth by 2019 compared to 7% for the state. However it is smaller compared to the larger cities of Louisville (10%) and Austin (10%) as seen in the chart on the far right.



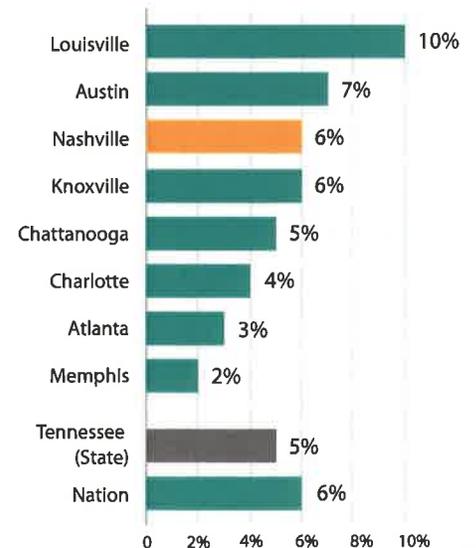
Job Growth by Position

The charts below show Nashville's employment gains in various IT occupations compared to other metros in the region. Note that Nashville is tied for the highest growth rate in the region for software developers.

Computer and Information Systems Managers

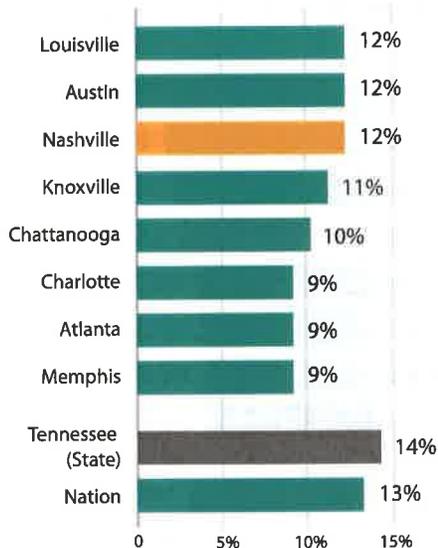


Network and Computer Systems Admin

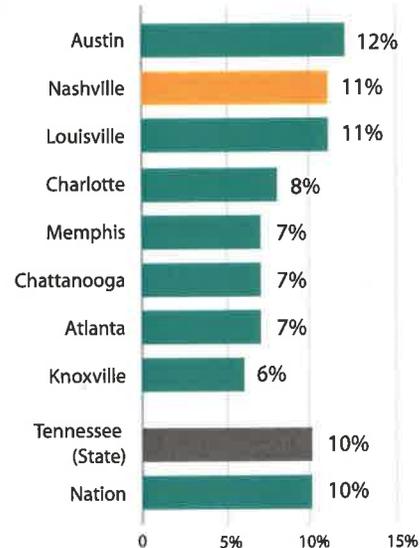


HOW DOES NASHVILLE IT EMPLOYMENT GROWTH COMPARE? (Continued)

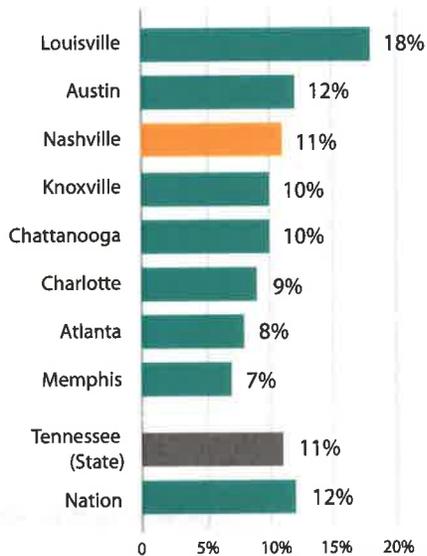
Software Developers, Applications



Computer User Support Specialists



Computer Systems Analysts



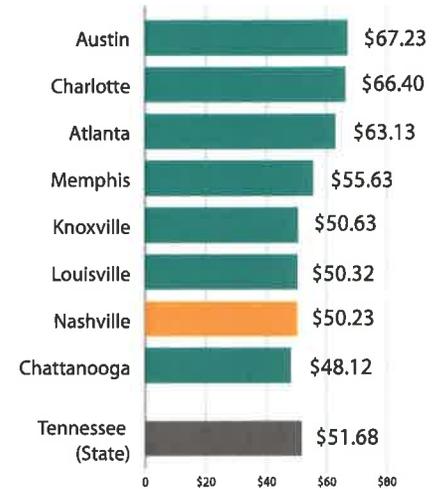
HOW DOES NASHVILLE COMPARE IN TERMS OF COMPENSATION?

The following charts show the top 3 highest paying IT occupations in the Nashville Metro Area with comparisons cities in Tennessee and Nationwide (by 2013 average hourly earnings).

Computer Network Architects



Computer and Information System Managers



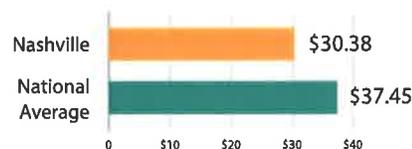
Software Developers, System Software



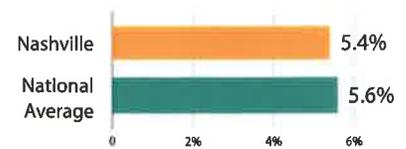
Comparison to National average, 2014 - 2017

In terms of hourly wages and the change in the workforce, note how Nashville IT jobs compare to the national averages over three years.

Hourly Wages

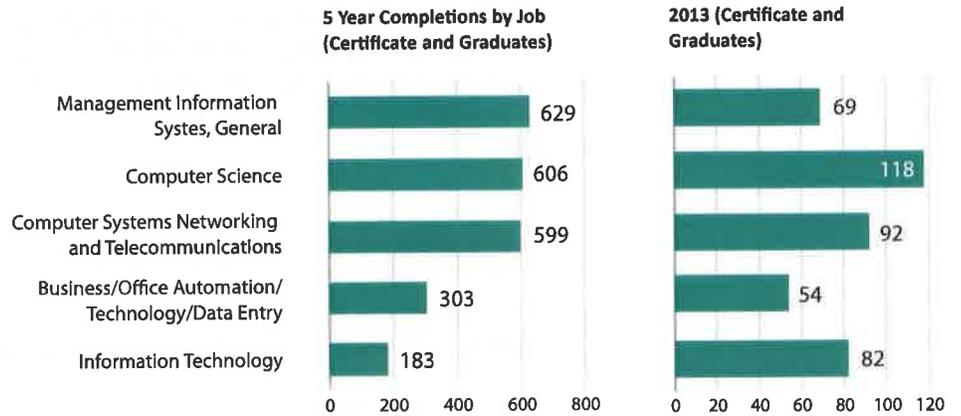


Percent Change in Workforce



HOW ARE LOCAL UNIVERSITIES SUPPORTING LOCAL IT JOB GROWTH?

"Nashville has a fantastic opportunity to lead the country in STEAM (Science, Technology, Engineering, Art, Math) workforce; that need continues to grow with the number of cranes in our skyline. Our Nashville Technology Council's leadership has never been more needed than today, as we continue on this upward trajectory."



Completions by Job and Institution - 2013

	Certificates	Degrees	Total Completions
Computer Systems Networking & TC			
ITT Technical Institute - Nashville	0	58	58
Nashville State Community College	0	34	34
Management Information Systems, General			
Middle Tennessee State University	0	45	45
Tennessee College of Applied Technology - Nashville	18	0	18
Belmont University	0	6	6
Computer Science			
Vanderbilt University	0	54	54
Middle Tennessee State University	0	44	44
Tennessee State University	0	14	14
Lipscomb University	0	0	0

2014.3 – QCEW Employees, Non-QCEW Employees, and Self-Employed



2014.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed

Category	2014.2	2014.3
QCEW Employees	45	45
Non-QCEW Employees	35	35
Self-Employed	25	25
Other	15	15

DATA SOURCES

CareerBuilder’s Supply & Demand Portal, October 2014

2014.3 – QCEW Employees, Non-QCEW Employees, and Self-Employed for all data points except “Demographics (Existing Workforce) – Gender” and “Demographics (Existing Workforce – Age) taken from 2014.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

ADDITIONAL INFORMATION

Information on the President's TechHire Initiative:
<https://www.technologycouncil.com/president-techhire>

IT Pathway Collaborative:
<http://www.technologycouncil.com/education-workforce-development>

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