Dear NIST NICE Cybersecurity Workforce Framework Team,

Please find attached the comments of ACT | The App Association regarding NIST's request for comments for the update of the NICE Cybersecurity Workforce Framework. If you have any further questions please feel free to reach out using the contact information below. We appreciate all your hard work on this issue!

All the best.

Alex

Alexandra McLeod
Associate Policy Counsel

1401 K St NW (Ste 501)
Washington, DC 20005

January 13, 2020

Cybersecurity Workforce RFI
National Institute of Standards and Technology
100 Bureau Drive, Stop 2000
Gaithersburg, Maryland 20899

RE: ***Comments of ACT | The App Association Regarding Strengthening the Cybersecurity of Federal Networks and Critical Infrastructure: Workforce Development (NIST Special Publication 800-181)***

In response to the National Initiative for Cybersecurity Education (NICE), led by the National Institute of Standards and Technology's (NIST) request for comments on November 19, 2019, ACT | The App Association hereby submits our thoughts to help assess the scope and effectiveness of the NICE Cybersecurity Workforce Framework (NICE Framework).[1]

The App Association represents 5,000 small business software application development companies and technology firms across the United States.[2] As the world has quickly embraced mobile technology, our members have developed innovative, job-creating products and services that improve workplace productivity, accelerate academic achievement, help people lead healthier lives, and drive the global digital economy. Supporting an app ecosystem worth more than $1.7 trillion and responsible for 5.9 million American jobs, our members' innovations will continue to grow and power the rise of the internet of things (IoT).

---

[1] *Strengthening the Cybersecurity of Federal Networks and Critical Infrastructure*, Exec. Order 13800, 82 FR 22391 (May 16, 2017).

[2] *See* http://actonline.org/about.

The app economy creates employment opportunities for people in all parts of the country with a variety of skill sets. From engineers who code to farmers who use sensors to manage their crops to marketing and sales experts, white-collar and blue-collar workers alike are turning to the app economy. According the Bureau of Labor Statistics, the app economy added more than 109,000 software application developer jobs to the U.S. workforce between May 2016[3] and May 2018,[4] and these jobs have a significant multiplier effect. For every high-tech job introduced, approximately five additional jobs are created in local communities across the country.[5] These opportunities are found in rural and urban communities across the country; more than eight out of ten software developers live outside of Silicon Valley.[6]

For example, Project Hosts is a company based in Sunnyvale California, but has a technical operations center in rural Conneautville, Pennsylvania, that provides secure cloud apps for healthcare and government clients. With limited talent available in their rural enclave, Project Hosts took new avenues to train local workers to support their company's growth, while providing high quality, well-paying jobs in their local community. Specifically, Project Hosts started an On-Ramp Training Program[7] near their technical operations facility in Erie and western Pennsylvania to develop and train un- and underemployed members of the local community in cloud technology. The training provides students with the necessary programming skills to be successful at the company.

Despite offering a highly competitive annual salary—upwards of $108,080[8] for an app developer—the app economy is particularly starved for skilled workers with computer science training. At present, more than 700,000 computing jobs are unfilled,[9] and by 2024, it is estimated that more than one million computing jobs will be available and

---

[3] "Occupational Employment and Wages" Bureau of Labor Statistics (May 2016), *available at* https://www.bls.gov/oes/2016/may/oes151132.htm.

[4] "Occupational Employment and Wages," Bureau of Labor Statistics (May 2018), *available at* https://www.bls.gov/oes/2018/may/oes151132.htm#nat.

[5] Cyberstates 2019: State Tech Economic Impact, COMPTIA, *available at* https://www.cyberstates.org/pdf/CompTIA_Cyberstates_2019.pdf.

[6] "Six-Figure Tech Salaries: Creating the Next Developer Workforce," ACT | The App Association (August 2, 2016), *available at* http://www.arcgis.com/apps/MapJournal/index.html?appid=b1c59eaadfd945a68a59724a59dbf7b1.

[7] Educational On-Ramp Program, PROJECT HOSTS, https://www.projecthosts.com/careers/.

[8] "Occupational Employment and Wages," Bureau of Labor Statistics (May 2018), *available at* https://www.bls.gov/oes/2018/may/oes151132.htm#nat.

[9] "Angus Loten, *'Talent War' at Home Prompts U.S. Employers to Take Another Look Abroad*, WSJ, https://www.wsj.com/articles/talent-war-at-home-prompts-u-s-employers-to-take-another-look-abroad-11559257791 (May 30, 2019).

unfilled.[10] Only one in four K-12 schools teach computer science, leaving 75 percent of American students ill-equipped to enter the modern workforce.

Per a study by the Center for Strategic and International Studies, the United States needs between 10,000 and 30,000 cybersecurity specialists to effectively address cybersecurity issues;[11] however, there are only about 1,000 security specialists in the United States with the particular set of skills to operate effectively in cyberspace. Our dynamic, internet-enabled world carries a growing threat of cyber attacks and American workers and students must be prepared to engage in the digital economy in a safe and secure way.

All sectors of the U.S. economy increasingly depend on a workforce equipped with computer science skills; therefore, the growing scarcity of workers with computer science skills is placing America's global leadership in peril and undermining our country's national security. The App Association strongly urges the U.S. government to take steps to provide our current and future workforce with the necessary skillset to succeed in the jobs that will drive our economic development and protect our national security.

The App Association is committed to the development of a competitive American workforce and is a founding member of the Computer Science Education Coalition (CSEC).[12] The nonprofit organization is comprised of businesses and NGOs focused on securing federal funds to provide computer science education for all K-12 students. The CSEC has urged Congress to provide $250 million in federal funding for K-12 computer science education to prepare American students to fill critical jobs and support U.S. global competitiveness. The federal funds would complement computer science projects undertaken at the state level, and we encourage the Administration to join CSEC in a public-private partnership supporting the development of a skilled workforce.

Separately, the App Association observes widespread confusion and misalignment in the public and private sectors regarding workforce categories, specialty areas, work roles, and skill sets. Cybersecurity threats, and the skills needed to combat them, are constantly in flux, and the education and workforce programs needed to address the threats differ between public, private, government, and educational initiatives. We encourage the U.S. government, in partnership with NIST, industry, and public stakeholders, to provide a framework for these programs through the NICE Framework.

---

[10] Kelly Kasulis, *The US desperately needs computer science majors, so keep coding*, MIC, https://www.mic.com/articles/182644/the-us-desperately-needs-computer-science-majors-so-keep-coding (July 21, 2017).

[11] Karen Evans and Franklin Reeder, "A Human Capital Crisis in Cybersecurity," *Center for Strategic and International Studies.* https://www.csis.org/analysis/human-capital-crisis-cybersecurity

[12] *See* http://www.csecoalition.org/.

Currently, cybersecurity professionals have access to a wide variety of valuable education programs to keep them up to date on the latest cybersecurity trends and certifications. Unfortunately, these programs are often prohibitively expensive, creating a barrier for small businesses and their employees. The App Association believes market effects should define the success of certification programs, and strongly discourages the development of a cybersecurity workforce that endorses a particular third-party certification program. Cybersecurity professionals, particularly those in small businesses, should have the flexibility to utilize certifications to build their expertise in any, and all, areas of data security, and updates to the NICE Framework should support this concept.

Beyond the growing need for cybersecurity professionals, we urge the NICE Framework to reflect that, while universities are increasingly offering degrees in computer science and related fields, it is not currently known how well-ingrained cybersecurity is into such computer science curricula across colleges and universities. While we believe the U.S. government should support the university-level development of a U.S. cybersecurity workforce curriculum across classes (as opposed to standalone classes), cybersecurity education programs within public and private sectors will vary in type and effectiveness. There is currently no standard, scalable training, education, or awareness program for the cybersecurity discipline. As a result, industry groups have offered their own solutions to this challenge,[13] and we appreciate the U.S. government's support for cybersecurity education efforts through grants and public-private partnerships.

We have witnessed firsthand that cybersecurity professionals must be well-versed in wide range of technologies and potential risk vectors, including industry-specific skills such as supervisory control and data acquisition (SCADA) the energy industry, or blockchain in the financial industry. We urge the U.S. government to help employers invest in the education and training of their current cybersecurity workforce and to utilize innovative programs, such as apprenticeships, to build the future workforce.

As IoT, cloud-based services, and cognitive computing play an increasingly vital role in our world, the demand for skilled cybersecurity professionals will steadily rise. While artificial intelligence and cognitive computing will greatly assist cybersecurity professionals in predicting and responding to cyber attacks, these technologies will bring their own vulnerabilities that will need to be addressed by security and data professionals.

---

[13] *E.g.,* Microsoft's Virtual Academy, *available at* https://mva.microsoft.com/training-topics/enterprise-security.

The App Association appreciates the opportunity to submit these comments regarding the development of the NICE Framework, and we commit to work with all stakeholders to achieve a competitive and robust cybersecurity workforce in the United States.

Sincerely,

Brian Scarpelli
Senior Policy Counsel

Alexandra McLeod
Policy Counsel

ACT | The App Association
1401 K St NW (Suite 501)
Washington, District of Columbia 20005