MEET THE THREAT:

NOVA Confronts the Cyber Challenge through Innovative Solutions

NOVA | Northern Virginia Community College

December 2016

INTRODUCTION

Since 1964, Northern Virginia Community College (NOVA) has offered a quality, demand-driven educational experience. NOVA is the largest public education institution in Virginia and the second-largest community college in the United States. More than 70,000 students and 2,600 faculty and staff members are distributed across six campuses and two centers. With a student body representing 137 countries, NOVA is also one of the most diverse colleges in the nation.

With academic opportunities across a broad range of fields, including information and cybersecurity, healthcare, and business, NOVA provides degrees, certifications, and training programs designed to meet the needs of both students and employers throughout northern Virginia.

The Washington, D.C., metro area is our nation's hub for cybersecurity and information technology jobs, with more than 30% of all cybersecurity job openings across the country last year. NOVA's innovative programs in cybersecurity provide training to the future leaders of this industry sector.

NORTHERN VIRGINIA LABOR MARKET

The Washington-Arlington-Alexandria, DC-VA-MD-WV, metropolitan statistical area covers the District of Columbia, five counties in southern Maryland, 11 counties and six independent municipalities in northern Virginia, and one county in northeastern West Virginia. With approximately 6.1 million residents, it is the sixth largest metro area in the United States. The larger combined statistical area, which includes nearby Baltimore, ranks fourth largest in the U.S. with a regional population of more than 9 million. According to the U.S. Census Bureau, the area boasts the highest population growth rate in the northeast - up approximately 8.2% across 2010-2015.

NOVA serves four counties and five independent cities in northern Virginia, directly southwest of Washington, D.C. This area hosts a population of 2.45 million, approximately ⅓ of the state's total population, with an average annual growth of 1.9%.

The close proximity of northern Virginia to the nation's capital is fundamental to the local economy, attracting government defense contractors, consulting firms, think tanks, trade associations, and Fortune 1000 companies. Many government agencies are also headquartered in the area, including the Central Intelligence Agency, Department of Defense, and the Transportation Security Administration.

Northern Virginia's unique economy remains symbiotically tied to the federal government, creating dynamic workforce characteristics. The higher educational attainment rate (57.7%) and median household income ($107,800) are twice the national average. The poverty level remains less than half of the national average (6.4%), and the labor force participation rate is noticeably higher than the national average (73.6%).

The area's labor market is one of the strongest in the country, in terms of both size and percentage of the population in the workforce. The local unemployment rate of 3.3% (September 2016) is much lower than the rest of Virginia, and the nation. While many metro areas experienced double-digit unemployment rates during the recession of 2008-2010, the region's unemployment rate never exceeded 5.8% during this period.

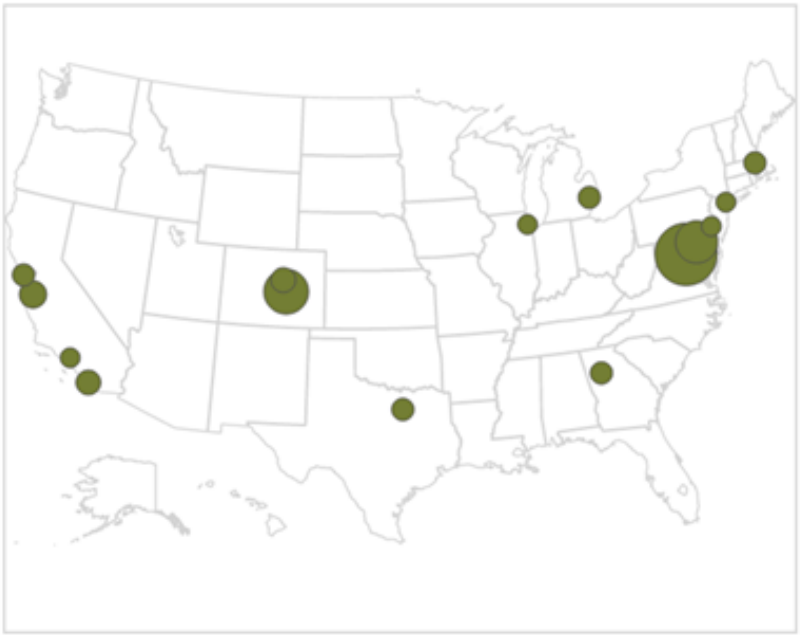
According to Burning Glass Technologies, the metro D.C. area accounted for 3% of all jobs advertised online in the U.S. last year, ranking the area 4th in the nation in terms of both total and per capita postings. Washington, D.C. is the number one metro region for cybersecurity job postings for 2016, and Virginia is the number one state for cybersecurity job postings for 2016. In fact, northern Virginia accounts for over two-thirds of the cybersecurity jobs in the metro D.C. area. (1)

For 2016, Washington, D.C. is the number one metro region for cybersecurity job postings and Virginia is the number one state for cybersecurity job postings.

(1) The Washington Post, New census of cyber businesses reveals what the DMV does well and what we could do better, October 24, 2016.

There were approximately 389,000 jobs advertised in northern Virginia in the last year, with the majority of these positions in cybersecurity, information technology, healthcare, and consulting fields. The top three occupations advertised were software developers (29,000 jobs), computer systems engineers (12,791 jobs), and registered nurses (11,936 jobs). According to a recent survey conducted by the Northern Virginia Technology Council, 55% of all technology jobs in the northern Virginia region are related to cybersecurity.

HEAT MAP OF CYBERSECURITY JOB OPENINGS, 2016



Metro Area	Job Postings
Washington-Arlington-Alexandria, DC-VA-MD-WV	35,059
Baltimore-Columbia-Towson, MD	8,631
New York-Newark-Jersey City, NY-NJ-PA	7,527
Los Angeles-Long Beach-Anaheim, CA	4,086
Boston-Cambridge-Nashua, MA-NH	4,030
Dallas-Fort Worth-Arlington, TX	3,404
Chicago-Naperville-Elgin, IL-IN-WI	3,141
San Francisco-Oakland-Hayward, CA	3,098
San Diego-Carlsbad, CA	2,822
Atlanta-Sandy Springs-Roswell, GA	2,737
San Jose-Sunnyvale-Santa Clara, CA	2,512
Denver-Aurora-Lakewood, CO	2,486
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	1,920
Detroit-Warren-Dearborn, MI	1,919
Colorado Springs, CO	1,859

Source: Burning Glass Technologies

Many of the cybersecurity and IT positions in the region require a government security clearance, which can be a critical barrier for both job-seekers and employers seeking skilled talent. Specific certifications, such as CISSP, Security+, and CCNA, are generally sought by employers. Soft skills are similarly regarded as essential for qualified candidates, with customer service, communication skills, and team-work being particularly identified as desired. (2)

(2) Northern Virginia Technology Council, The Voice of Technology, Fall 2016.

THE ROLE OF NOVA WORKFORCE

NOVA Workforce has identified the need for a comprehensive and cohesive pathway to employment in the local region. Due to workforce needs, there is industry-driven demand for a robust talent pipeline designed to match employers with skilled and motivated jobseekers. An example of the career ladder is included in Appendix A.

NOVA Workforce regularly provides labor market intelligence data to stakeholders throughout the region - including the higher education community, local government agencies, nonprofit organizations, workforce development boards, economic development organizations, and K-12 school systems. NOVA has used this information to develop specialized, demand-driven programs that prepare individuals with skills and credentials to meet specific employer needs in high-demand industry sectors.

NOVA's cybersecurity degree program is one of the fastest-growing in the nation, with more than 850 students enrolled in the program.

CYBERSECURITY EDUCATION: WORKFORCE DEVELOPMENT

NOVA Workforce offers a host of certificate programs provide training for entry, mid-, and advanced level skills in cybersecurity. The programs are designed to provide industry credentials and core skills needed for success in the cybersecurity sector. Areas covered in these programs range from fundamentals of network protection, information assurance, attack prevention, and privacy. Each program ensures students gain an understanding of the ethical, legal, and regulatory world of cybersecurity. By incorporating stackable certifications into our programs, NOVA provides a clear pathway to career advancement, and a comprehensive direction for continued career growth as individuals pursue additional certifications.

NOVA Workforce offers a variety of certifications sought by employers including:

- **Network+**
- **Security+**
- **CIPP/US**
- **CISM**
- **CISSP**
- **CIPP/G**

NOVA Workforce also recently opened the doors to the Workforce Regional Center, a state-of-the-art training facility strategically located between Quantico and Fort Belvoir. The 55,000 square-foot building serves as the epicenter of high-quality cybersecurity and information technology training and education delivery, creating a workforce to meet the technological demands of Northern Virginia businesses, government and military communities. In addition to the training programs, the WRC houses a large professional testing center that proctors hundreds of high-stakes industry certification exams. In addition to programs offered by NOVA,

George Washington University also offers their four-year cybersecurity degree program on-campus at the WRC, providing a seamless transition for individuals to continue their education.

CYBERSECURITY EDUCATION: DEGREE PATHWAYS

NOVA has developed an Associate of Applied Science (AAS) degree in Cybersecurity to meet the critical need for cybersecurity professionals in the field. The purpose of the degree is to prepare students for careers as cybersecurity technicians or analysts, by providing them with the requisite knowledge, skills and abilities identified in the National Initiative on Cybersecurity Education (NICE) Workforce Framework 2.0 and the National Security Agency (NSA) /Department of Homeland Security criteria for Center of Academic Excellence (CAEs). The NSA has recently designated NOVA as the NSA CAE National Resource Center, focused on managing the faculty Peer Review Process for all colleges and universities seeking NSA CAE-CD and CAE2Y designation.

This degree transfers to regional institutions, such as George Mason University's Bachelor of Applied Science in Cybersecurity, the George Washington University College of Professional Studies Bachelor of Science in Integrated Information Science and Technology and Degree Completion program in Cybersecurity, Marymount University Bachelor of Information Technology, and University of Maryland University College Bachelor of Science in Computer Networks and Security. Further transfer agreements are currently in the process of being identified. NOVA graduates more information technology associate degree holders than any community college is the nation.

NOVA also offers a Career Studies Certificate (CSC) in cybersecurity, which designed as an enhanced training module to provide expertise in security to networking specialists. The curriculum prepares networking specialists for employment as network security specialists or Internet security specialists. This career studies certificate also helps prepare students for the Security+ and CISSP certification exams.

NOVA also offers veteran-specific programs, including the MOS to Degree program. This unique program provides individuals with military experience with credit for prior learning for their military training. NOVA also offers a new surge training model for certain cybersecurity classes on local military bases. The program is open to active military and administrative members of the base. This short-term format allows program participants to pursue classes mapped directly with information technology and cybersecurity degrees. Credit is awarded to the participant, putting the individual on an accelerated path to degree completion. NOVA has a career counselor on base to support program participants with their higher education pursuits.

WORKFORCE EDGE: INTERNSHIPS & JOBS

NOVA has partnered with a wide range of employers to enhance on-the-job-experience through our career services programs. The career services management system creates employer access to student talent while providing experiential learning for students. This system also allows employers to tailor their recruiting efforts. Employers can request an on campus recruiting visit, access online student resumes, participate in on campus career events, or create additional unique programming to recruit NOVA students and alumni.

Students also have a range of professional development opportunities with national, regional and local cybersecurity organizations. Through these initiatives, students may also participate in national competitions and hack-a-thon challenges. Students have access to mentorship and networking opportunities, including one supported by the Information Systems Security Association (ISSA-NOVA).

BUILDING THE NEXT GENERATION

NOVA's STEM outreach program, SySTEMic Solutions, works with the community and local school divisions to create opportunities for K-12 students to get hands-on experience in IT and cybersecurity. Students build interest and skills in STEM fields through project-based learning, for example building and coding robots, configuring networks and completing Arduino electronic projects.

NOVA Workforce also collaborates with local high schools' information technology and cybersecurity CTE program leaders, curriculum coordinators, and adult education administrators to offer IT bootcamps for program graduates interested in earning CompTIA A+ certification. Students who complete NOVA Workforce CompTIA A+ and Cyberwatch courses are then offered internships to enhance their skill sets and access on-the-job training.

PARTNERSHIPS

In order to build a strong talent pipeline, NOVA partners with stakeholder organizations to ensure that students are job-ready and equipped with the specific skills sought by local businesses. By building and maintaining relationships with local stakeholders, NOVA is uniquely positioned as a "connector" across the region, allowing for the creation of a seamless pathway for individual success. With a comprehensive, collective approach, NOVA and its partners are successfully working toward closing the skills gap in high-growth industry sectors such as cybersecurity.

SUCCESS SPOTLIGHT

As the largest growing area for jobs in information technology, especially in the fields of cybersecurity and database management, the northern Virginia business community must continually assess its ability to remain globally competitive. It is critical to maintain a talent supply that is readily available for current and prospective employers in the region.

To further grow engagement within the business community, NOVA has partnered with the Northern Virginia Technology Council (NVTC) on several important initiatives. Recently, NOVA and NVTC partnered on a workforce needs assessment project was launched to better identify and define the specific competencies and skill sets sought by NVTC's 1,000 member companies. As a result, NOVA can more accurately align training programs with industry needs, in order to equip students with real-time skill sets and better prepare them for the workforce.

Read the report here: www.nvtc.org/documents/NeedsAssessment.pdf

Results of this survey further amplified the remerging theme that companies struggle to find candidates with strong soft and technical skills. Coding in specific languages was one of the top five skills sought by employers. Responding to business demand, NOVA and NVTC have partnered to launch a new training model, Uncommon Coders (www.nvcc.edu/workforce/uncommon-coders).

Uncommon Coders is an accelerated coding boot camp is launching with a cohort of veterans in early 2017. During the course, and at the conclusion of the training model, program participants will have the opportunity to meet with employers who will sponsor the tuition of the students they ultimately hire.

This model provides just-in-time talent for local employers, and cuts the cost of recruitment and hiring by more than 50%.

CONCLUSION

Cybersecurity is an in-demand field that continues to grow in the Washington, D.C., area. With government spending on cybersecurity projected to rise to $10 billion annually by the year 2020, the cybersecurity hub that currently exists in the D.C. region will continue to grow. Through labor market intelligence, and partnerships with government, industry, and nonprofit stakeholders, NOVA has developed innovative training programs to meet the specific, time-sensitive needs of cybersecurity companies in the northern Virginia region. NOVA continues to lead the workforce development and education efforts in the cybersecurity field.

Information Technology Career Ladder

	PROGRAMMING & SOFTWARE DEVELOPMENT	NETWORKING & CYBER SECURITY	DATA & DATA WAREHOUSING
High School or GED	Customer Service Representatives **$11.20 / hr** 678 Openings	Customer Service Representatives **$11.20 / hr** 678 Openings	Customer Service Representatives, Data Entry Keyers, Computer Monitors & Operators **$10.81 - $16.49 / hr** 814 Openings
Full Certificate or Diploma 1–2 years Diploma / Certificate	Computer User Support Specialists **$17.74 / hr** 4,573 Openings	Computer User Support Specialists, Junior Cyber Analysts, Junior Incident Responders & Handlers, Junior Operations Center Analysts **$17.74 - $28.90 / hr** 6,001 Openings	Computer User Support Specialists, Technical Sales Representatives **$17.74 - $26.49 / hr** 5,618 Openings
Associate Degree 2 years License, Certificate and/or Apprenticeship	Computer Network Support Specialists, Web Developers, Junior Systems Analysts, Software Testers **$45,000 - $60,100** 6,616 Openings	Computer Network Support Specialists, Penetration Testers, Junior Information Assurance Analysts, Incident Responders & Handlers, Cyber Analysts **$45,000 - $60,100** 2,020 Openings	Computer Network Support Specialists, Web Developers **$45,000 - $50,100** 5,348 Openings
BA/BS 4 years	Management Analysts, Computer Systems Analysts, Software Developers, Computer Hardware Engineers, Operations Research Analysts, Network & Computer Systems Administrators, Software Testers, Programmer Analysts **$96,500 - $112,500** 53,817 Openings	Management Analysts, Information Security Analysts, Network & Computer Systems Administrators, Computer Network Architects, Operations Research Analysts, Cyber Engineers, Cyber Forensics Analysts, Information Assurance Analysts, Cyberspace Operations Specialists **$97,100 - $112,500** 33,218 Openings	Management Analysts, Database Administrators, Computer Systems Analysts, Software Developers, Data Analysts, Database Architects, Systems Engineers, Software Engineers, Business Intelligence Analysts **$96,500 - $117,400** 65,937 Openings
Post-Graduate	Computer & Information Research Scientists, Computer & Information Systems Managers, Chief Information Security Officers, Software Architects **$110,500 - $154,200** 1,710 Openings	Computer & Information Research Scientists, Computer & Information Systems Managers, Chief Information Security Officers, Cyber Solutions Architects **$110,500 - $154,200** 1,645 Openings	Statisticians, Data Research Scientists, Big Data Solutions Architects **$98,500 - $123,800** 1,815 Openings

NOVA WORKFORCE

www.nvcc.edu/workforce

Wages represented are the typical entry-level wages for the position within the region for High School, Full Certificate/Diploma, and Associate Degree levels. Wages represented are typical median wages for the position within the region for Bachelor and Post Graduate levels. Job openings derived from Burning Glass' number of positions advertised online from December 1, 2015 through November 30, 2016. Degree level represents the average requirements for the occupation. Job openings are for the occupation and do not represent a particular industry. Wages derived from Bureau of Labor Statistics 2015 report on wages by occupation.