

GO VIRGINIA REGION 7: TALENT PIPELINE INITIATIVE EXECUTIVE BRIEF

Center for Regional Economic Competitiveness
& George Mason's Center for Regional Analysis

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VIRGINIA INITIATIVE FOR
**GROWTH &
OPPORTUNITY**
IN EACH REGION

Introduction

Digital technologies are transforming every sector of the nation's economy. Large data exchange and storage, networking, cloud connectivity, and new IT platforms built on artificial intelligence are propelling innovation and national economic growth. New ways of collaborating and learning can also disrupt current systems, and it is critical that area businesses and education systems harness innovations to address immediate and future challenges.

These economic transformations are particularly important to Northern Virginia as a national tech and education hub. Northern Virginia played an important role in the early internet and continues to attract major technology companies and workers, including corporate headquarters. It also hosts the campuses of four major public universities (three of which are R1 research institutions), the second largest community college in the country, and multiple private universities. With additional access to colleges and universities in neighboring Washington, D.C. and Maryland, the region offers an abundance of world-class educational opportunities to the region's highly skilled and well-educated workforce.

The arrival of Amazon's HQ2 and the continued growth of government contracting, data centers, and cybersecurity suggest that tech talent will continue to be in demand. In July 2024, for example, Micron announced that it will leverage Federal CHIPS Act and state incentives to build dynamic random-access memory (DRAM) chips for automobiles at a major manufacturing facility in Manassas. Investments such as this will only increase demand in the region for tech talent, including tech-savvy production workers.

Leaders in northern Virginia harnessed the GO Virginia Talent Pipeline Initiative (GoVA-TPI), launched by the Governor and legislature in 2022, to examine the workforce needs in targeted industry clusters and identify equitable pathways for careers in digital technology within Northern Virginia. By addressing the challenges and opportunities facing these tech talent pathways, Region 7 leaders can ensure young people and career changers gain the valuable skills needed to succeed in the modern workforce, integrate new technologies and business practices, contribute to innovation and entrepreneurship necessary for the region to evolve, and strengthen the region's competitive advantage.

"In Northern Virginia, leading businesses have their pick of highly educated workers and tech-savvy service providers, yet many businesses, large and small, struggle to attract and retain talent. A systematic, sustained, collaborative approach can build support for investments to fill gaps. GoVA Region 7 leaders are looking to co-invest in solutions to expand the talent pool for all."

- Susan Baker, Vice President, GoVirginia Region 7

Background

Region 7's unique population and labor market dynamics present both opportunities and challenges for tech talent attraction, development, and retention. The region has a highly educated workforce, extensive public-private partnerships, and a high concentration of military personnel and veterans— all of which are strengths for building better education and career pathways. However, a high cost of living and Northern Virginia's reliance on federal employment and government contracting also creates obstacles for employers looking to quickly hire or skill-up technology employees. The requirement of security clearances, higher education, and work experience for entry level jobs restricts the labor pool available to meet regional demand.

The TPI report focuses on three industry clusters based on Region 7's *Economic Growth and Diversification Plan 2023 Update*: computer services, emerging technologies, and cybersecurity. CREC and GMU also established four research questions in the initial stages of the project to guide the research and analysis. Those questions were:

- What are priority jobs, career pathways, and recognized labor supply-demand gaps?
- Which industry-related training, recruitment, hiring, and retention programs are the largest in the region and which are the most impactful?
- What changes are needed for employers to recruit and retain critical talent? Which pathways should be expanded/fortified or refined and how?
- How will the region measure progress and evaluate investments to ensure ROI for businesses and economic mobility for residents?

The research for this report was conducted in several stages to answer these questions and better articulate viable career pathways and training opportunities in the region. An industry and government coalition, known as the Region 7 TPI Research Advisory Board, was formed with key stakeholders to inform and advise Region 7's TPI process. This report utilized a mixed methods approach for the analysis, combining a range of public and proprietary sources of quantitative data, with a comprehensive qualitative analysis that engaged employers, education and training providers, and government entities to validate and provide more nuance to the raw numbers.



Region 7 Key Facts



48,000

There will be approximately 48,000 new jobs added to Region 7's economy by 2032 in target technology occupations alone.



x 4.5

The technology employment for targeted industry clusters is 4.5 times more concentrated in Region 7 than the national average.



x 2

Region 7's population is projected to grow almost twice as fast as the rest of the state and more than twice as fast as the country. The population is also aging, however, with fewer available workers aged 25-54.



61%

Region 7 is one of the most well-educated regions in the nation, with 61.1% of the population holding at least a bachelor's degree or higher.



30

Region 7 has thirty education and training providers that deliver technology related curriculum, including 2-year, 4-year, and private providers.

Tech Talent Pathway Assessment

Region 7 faces a unique set of opportunities and challenges when it comes to building and enhancing technology talent in priority industry clusters (computer services, emerging technologies, and cybersecurity). To more effectively develop talent that meet the needs of both employers and workers alike, it is essential to understand the dynamics present within the priority clusters and occupations.

 **Software Developers and Information Security Analysts are top in-demand occupations in the region and make up a significant portion of cross cluster employment (Figure 1).** Trend analysis and interview feedback across stakeholder groups supports this finding. Software developers, analysts, and tester occupations make up a significant share of both the computer services (26%) and emerging technology clusters (13%) compared to the rest of the nation (23% and 6%, respectively). There are also other technology occupations that are important to consider, such as computer hardware engineers, that may not make up significant shares of combined industry employment due to their relatively small size or specialization.

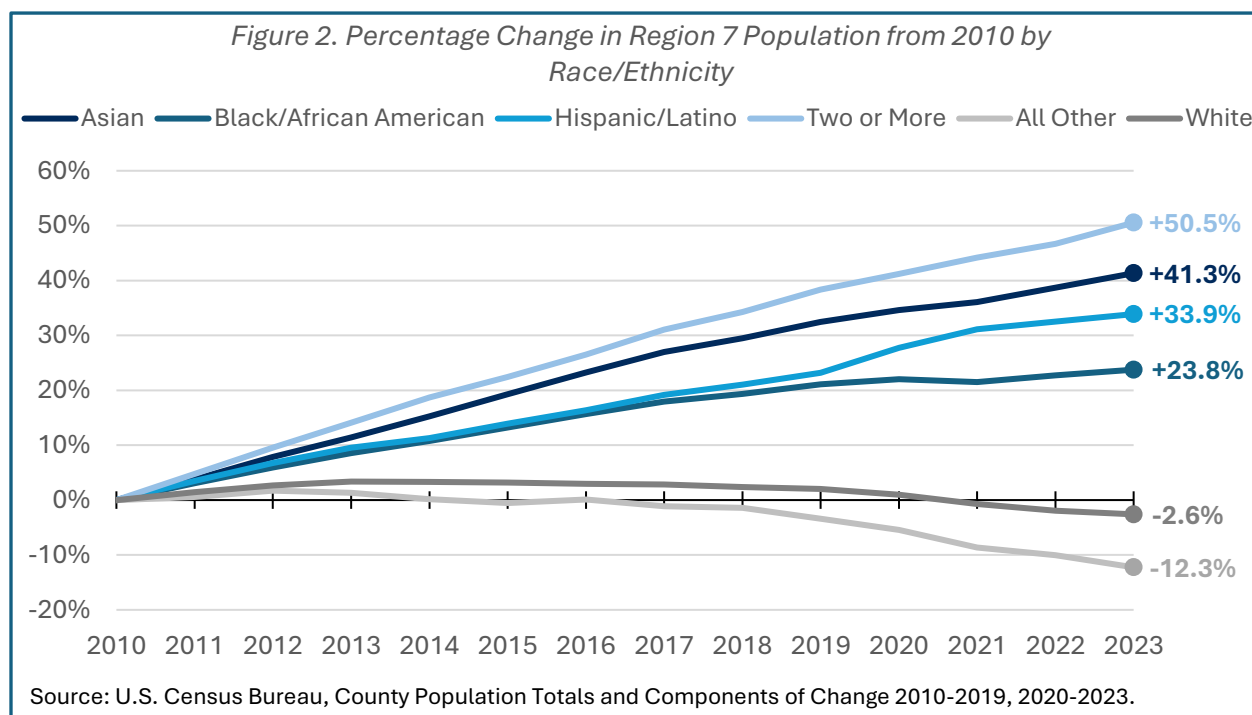
Figure 1. Top 10 Occupations by Regional Share of Employment Across Priority Industry Clusters

Occupation	Share of Cluster Employment, Region 7	Share of Cluster Employment, National
Software Developers and Software Quality Assurance Analysts and Testers	24.6%	22.8%
Computer Systems Analysts	5.2%	5.0%
Information Security Analysts	4.4%	1.6%
Network and Computer Systems Administrators	4.2%	2.3%
Management Analysts	3.9%	2.3%
Computer User Support Specialists	3.6%	6.2%
General and Operations Managers	3.1%	3.6%
Computer and Information Systems Managers	3.1%	4.8%
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	2.7%	4.7%
Project Management Specialists and Business Operations Specialists, All Other	2.6%	3.8%

Source: Virginia Works Economic Information & Analytics Division, Long Term Workforce Area Projections, <https://virginiaworks.com/>.

 **Amongst the selected technical occupations, the portion of the job postings requiring any AI skill is 2 percentage points higher in Region 7 than for the nation at large.** Machine learning, artificial intelligence, and natural language processing as the most sought-after AI skills.

📈 **Women and people of color are under-represented in advanced technical and management roles.** 17% of workers in selected occupations are Black or Hispanic compared to ~30% of the population, and 33% of workers in selected occupations are female compared to ~50% of the population (see *Figure 2* for population breakdown). There are also more women and people of color in entry level roles, suggesting barriers that could be addressed to expand the talent pool for management and leadership positions. Nationally, new women entrants to the data, analytics, and AI field are also significantly lower compared to male entrants.

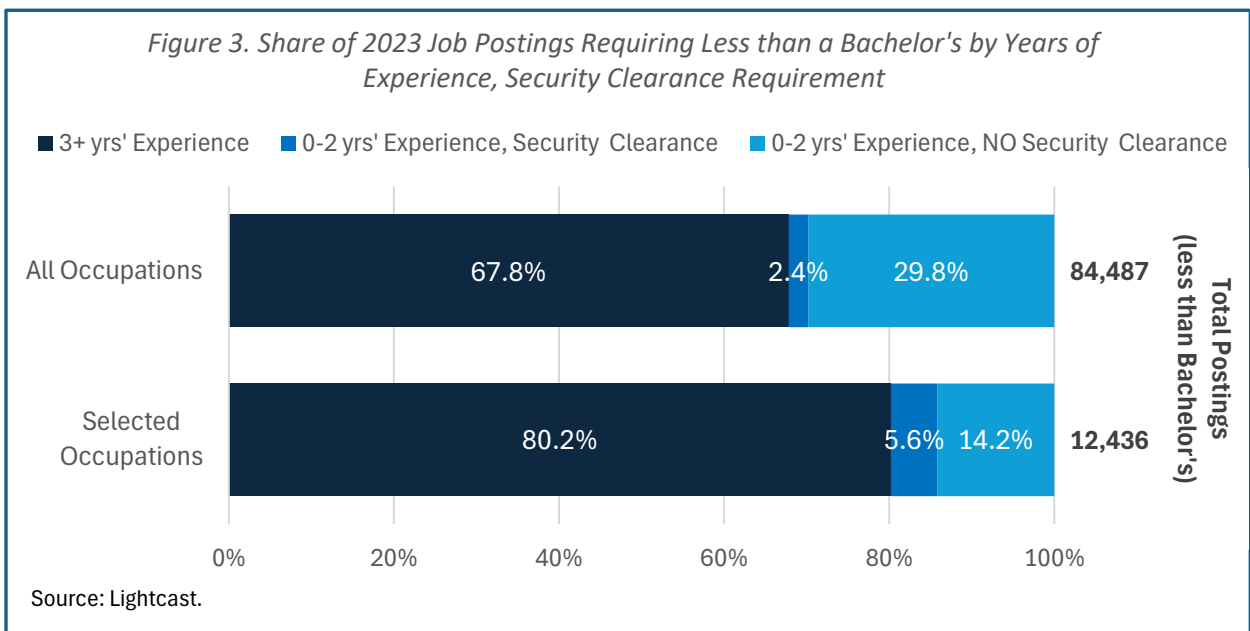


📈 **Veterans make up 9% of the Region 7 population, a higher share than around three-quarters of other metropolitan areas and higher than in any other peer technology industry-heavy metropolitan area.** Veterans also make up 12% of the workers in the selected technology occupations, including 25% of information security analysts and electrical and electronic engineering technologists and technicians, more than any of the other occupations.

📈 **“Mid-level” roles are in high demand and finding “mid-level” talent is a key pain point for employers.** Demand for technology roles in Region 7 tends to be highest among those that may be defined as “mid-level” or “middle-skill” based education and experience requirements. Stakeholder interviews reinforced this finding; smaller employers emphasized an even more critical need for senior level talent, more so than medium or large employers.

📈 **Bachelor's degree requirements are prevalent even for "entry-level" positions.** In fact, only approximately 20% of job postings for selected occupations are "entry-level" positions (no bachelor's degree plus < 2 years' experience – see Figure 3). Additionally, 87% of total job postings for targeted technical occupations require a bachelor's degree in Region 7, and many workers in traditional "entry-level" roles have a bachelor's or above.

📈 **Security clearances are the most in-demand credential in the region, regardless of occupation.** CompTIA Security+ is the top industry certification requested across most technology occupations, although Project Management Professional certification is also in-demand, especially for operational roles like project management specialists, consistent with stakeholder interview findings.

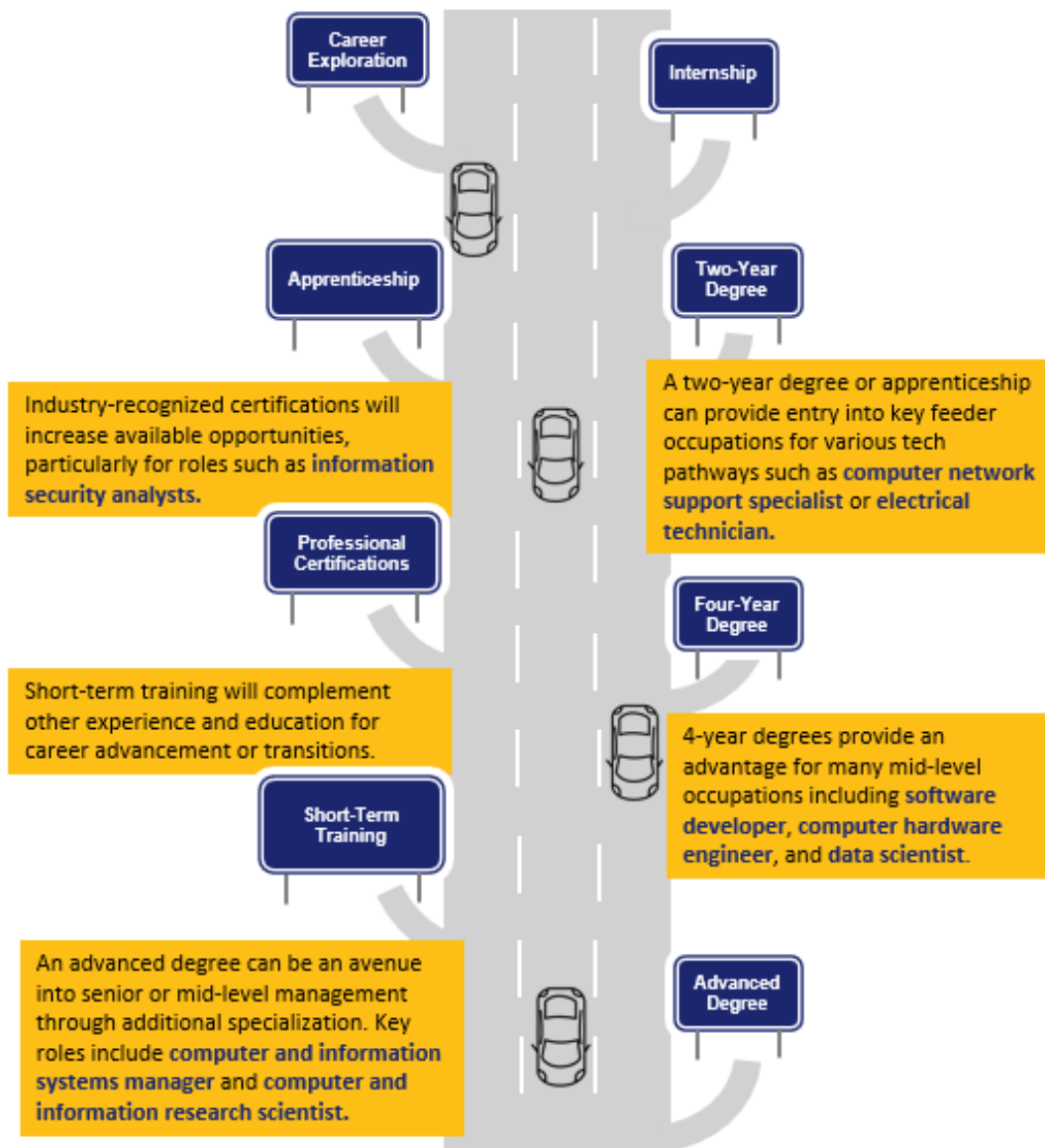


📈 **Public postsecondary providers in Maryland, as well as private institutions in Washington D.C., heavily supplement the tech talent pool available to Region 7 employers.** Private training providers also offer a significant number of programs focused on relevant industry credentials, particularly those in-demand for entry- and mid-level roles like CompTIA A+, Network+, and Security+.

📈 **Work-based learning opportunities such as internships were cited as key sources of entry level talent.** This was particularly relevant for large employers, which draw entry-level talent from Region 7 institutions such as George Mason University, Virginia Tech, and Northern Virginia Community College (NOVA). Large employers often have stronger connections with these educational institutions, whereas medium-sized employers may not have the proper connections to fully leverage this talent source. Smaller employers cited their use of IT staffing firms as key sources of talent given their specific needs for and limited resources to train on the job or onboard interns.

Career Pathways

The Tech Talent Pathway Assessment led to the selection of five tech talent career pathways for closer consideration. **These five pathways are: software development, cybersecurity, data infrastructure, data science, and IT management.** These pathways will be key to filling the upwards of 48,000 new jobs in the selected target tech occupations. The diagram below serves as an illustration of the tech talent development opportunities to help individuals in Region 7 access and advance through these roles. **Effective tech talent development will ensure education and training opportunities are available for both career joiners and changers.** Region 7 stakeholders can make strategic investments to ensure these options are available to everyone.



KEY TAKEAWAYS

-  **The high demand in software development and the critical nature of cybersecurity skills make these both key pathways for improvement.** Pathways to both software development and cybersecurity analyst jobs have potential for more readily accessible entry-points, including entry jobs of user and network support specialists. It will be important, however, to track the effects of AI on these entry-level roles, while focusing on upskilling and preparing mid-level roles for changing skill requirements.
-  **The data infrastructure pathway potentially offers even stronger opportunities for workers looking to enter the technology sector in Region 7.** Although newer titles such as data center technician can be difficult to capture utilizing standard occupational taxonomies, data for a combination of those entry-level occupations suggest a larger share of opportunities for those with less than a bachelor's degree, as well as more sustainable wages for a broader, more equitable, portion of the region's workforce. AI is also likely to enhance the need for both data infrastructure in the region and its associated workforce.
-  **While data science is the highest paying pathway and offers significant opportunities for wage growth, there are fewer entry points available to those without a bachelor's and related work experience, and many entry-level roles can even require graduate degrees.** Given the substantial demand for data science and analytics roles expressed by employers and stakeholders, additional work needs to be done to identify pathway entry points for a broader segment of the workforce (especially those from underrepresented groups).
-  **IT management skills are in demand across all these pathways, but a dedicated IT Management career pathway focus would be too constrained.** While we might assume that non-technical/technology roles in the IT operations pathway would provide greater entry-level opportunities for those without a bachelor's degree, the opposite is the case, with occupations in the pathway requiring higher levels of education and experience for less sustainable wages.
-  **Across pathways, there are opportunities to increase representation among communities of color and women.** While entry-level opportunities are more representative of the region's population, certain groups (especially Black, Hispanic, and female workers) continue to be underrepresented. These disparities only increase as pathways progress to mid- and senior levels.
-  **Even among technology occupations, entry-level wages are generally only sustainable in Region 7 for dual-income households or single-income households without children.** Creating efficient pathways from these roles into better-paying jobs through technical skills training is critical, not only for equity and sustainability, but to meet the most pressing employer demands.

Final Recommendation

To anchor the region's tech talent development efforts, CREC recommends that GoVirginia Region 7 leaders invest in the data infrastructure pathway to expand the number of multi-skilled technicians that advance to mid-level management roles. The data infrastructure installation and maintenance pathways provide promising entry-level and career-change opportunities for both technical and trade-focused roles at a sustainable wage. There is also overlap in roles with several of the other pathways including software development and cybersecurity. **Investing in multi-skilled technicians to upgrade the region's hardware and IT systems is necessary to support more than just data centers and emerging tech businesses. A multi-skilled pathway that addresses these different areas can help strengthen the region's tech talent workforce.**

Based on the analysis in this report, three pathways offer the greatest opportunity for scalability and sustainability in the region: data infrastructure, software development, and cybersecurity. We still do not know the extent to which AI is going to transform these pathways, particularly the latter two. In the

CREC recommends that GoVirginia Region 7 expand the number of multi-skilled technicians in the data infrastructure pathway

short term, there is an opportunity to bolster the region's data infrastructure to support a burgeoning ecosystem of data centers, semiconductor facilities, and emerging technologies, such as AI and quantum computing. There is also a need to fortify pathways into relevant jobs that lead to, but do not require, a bachelor's degree at entry. **Employers are increasingly demanding a sophisticated blend of technical and professional skills for advancement, and many report that important skills can be learned on the job if entry-level talent is motivated and supported.** However, the work experience offered must be aligned with opportunities for advancement in the IT and emerging technologies sectors.

Region 7 can leverage existing academic programming to bolster earn-and-learn models, like apprenticeships, to help key regional employers develop entry- to mid-level technician talent. Given that IT skills are increasingly necessary across the trades, IT skills can be embedded in existing construction and building maintenance programs. These support large businesses in the region. Small and medium-sized businesses will need additional support to develop multi-skilled leaders. Training providers working across large and small companies can ensure multi-skilled workers obtain skills they can translate across several career pathways. NOVA's data center operations and programming can serve as a starting point for this work. Micron is also a leader in this area, providing apprenticeship opportunities for process, equipment, or lab technicians in partnership with NOVA.

GoVirginia Region 7 can utilize this recommendation to demonstrate how initiatives in the region can prioritize employer pain points including both large and mid- to small-sized businesses. Focusing on the data infrastructure builds off the software development and cybersecurity strengths in the region, while the presence and needs of mid-sized businesses in the region will help the area stay on the cutting edge of new and emerging technologies and markets.