NICE

NATIONAL INITIATIVE FOR CYBERSECURITY EDUCATION

Credentials to Help Grow and Sustain the Nation's Cybersecurity Workforce

Rodney Petersen, Director of NICE
National Institute of Standards and Technology (NIST), U.S. Department of Commerce

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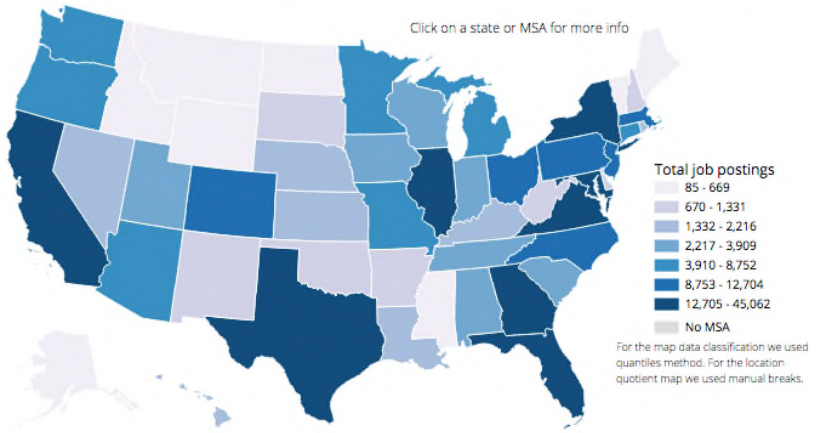
About | Interactive map | Career pathway | Who this tool is for | Project partners

Cybersecurity Supply/Demand Heat Map

Cybersecurity talent gaps exist across the country. Closing these gaps requires detailed knowledge of the cybersecurity workforce in your region. This interactive heat map provides a granular snapshot of demand and supply data for cybersecurity jobs at the state and metro area levels, and can be used to grasp the challenges and opportunities facing your local cybersecurity workforce.

Share

States | Metro Areas | Total job openings | Search State

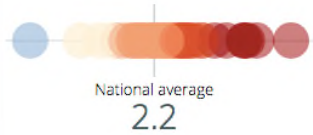


National level

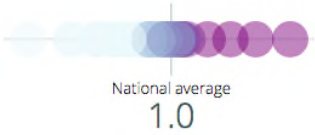
TOTAL CYBERSECURITY JOB OPENINGS
348,975

TOTAL EMPLOYED CYBERSECURITY WORKFORCE
778,402

SUPPLY OF CYBERSECURITY WORKERS
Very Low
CYBERSECURITY WORKFORCE SUPPLY/DEMAND RATIO



GEOGRAPHIC CONCENTRATION
Average
LOCATION QUOTIENT



TOP CYBERSECURITY JOB TITLES

- Cyber Security Analyst / Specialist
- Cyber Security Engineer
- Auditor
- Network Engineer / Architect
- Software Developer / Engineer
- Systems Engineer
- Systems Administrator
- Information Assurance Engineer / Analyst
- Risk Manager / Analyst

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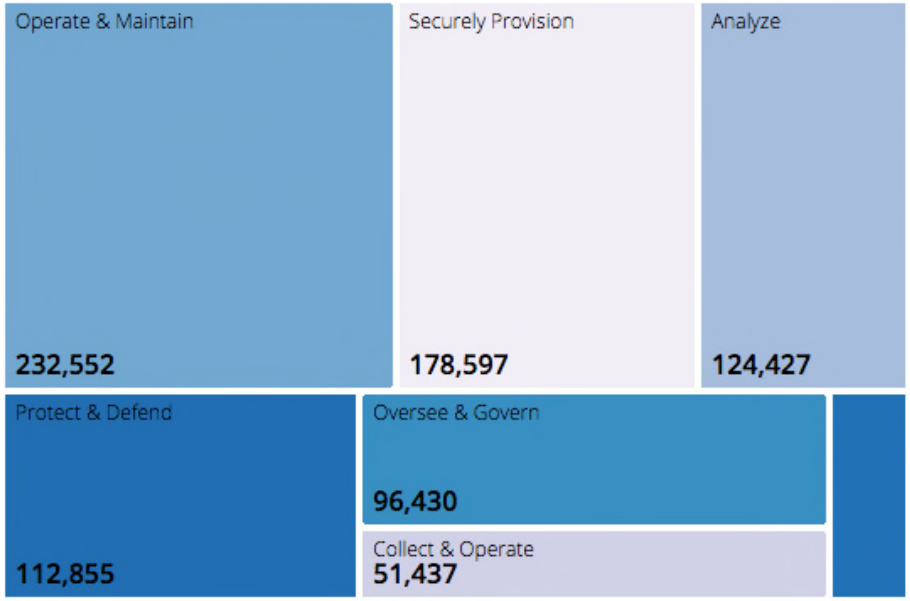
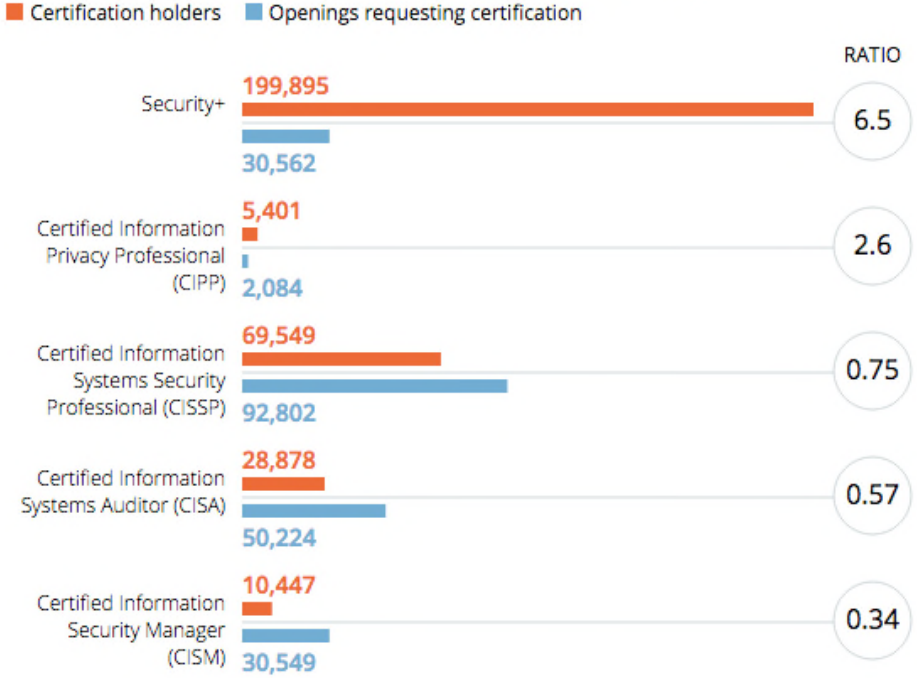
POSTINGS BY NICE CYBERSECURITY WORKFORCE FRAMEWORK CATEGORY



CERTIFICATION HOLDERS / OPENINGS REQUESTING CERTIFICATION



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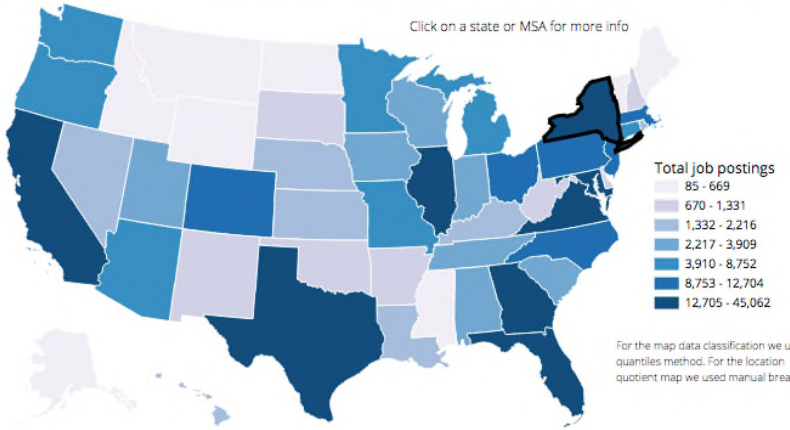

New York

TOTAL CYBERSECURITY JOB OPENINGS
20,223

TOTAL EMPLOYED CYBERSECURITY WORKFORCE
45,215

SUPPLY OF CYBERSECURITY WORKERS
Very Low
CYBERSECURITY WORKFORCE SUPPLY/DEMAND RATIO
NY 2.2
National average 2.2

GEOGRAPHIC CONCENTRATION
Average
LOCATION QUOTIENT
NY 0.90
National average 1.0

TOP CYBERSECURITY JOB TITLES

- Cyber Security Analyst / Specialist
- Auditor
- Cyber Security Engineer
- Network Engineer / Architect
- Systems Engineer
- Risk Manager / Analyst
- Software Developer / Engineer
- IT Director
- Systems Administrator

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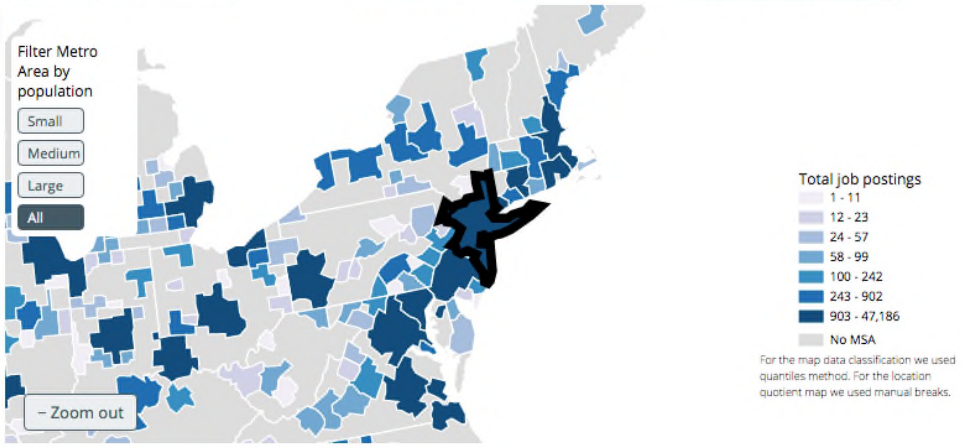
States | Metro Areas

Total job openings

Search Metro Area



New York-Newark-Jersey City, NY-NJ-PA

TOTAL CYBERSECURITY JOB OPENINGS
27,093

TOTAL EMPLOYED CYBERSECURITY WORKFORCE
52,199

SUPPLY OF CYBERSECURITY WORKERS
Very Low
CYBERSECURITY WORKFORCE SUPPLY/DEMAND RATIO
New York-Newark-Jersey City, N
1.9
National average
2.2

GEOGRAPHIC CONCENTRATION
Average
LOCATION QUOTIENT
New York-Newark-Jersey City, NY-NJ-PA
1.2
National average
1.0

TOP CYBERSECURITY JOB TITLES

- Cyber Security Analyst / Specialist
- Auditor
- Cyber Security Engineer
- Network Engineer / Architect
- Risk Manager / Analyst
- Software Developer / Engineer
- Systems Engineer
- IT Director
- Systems Administrator

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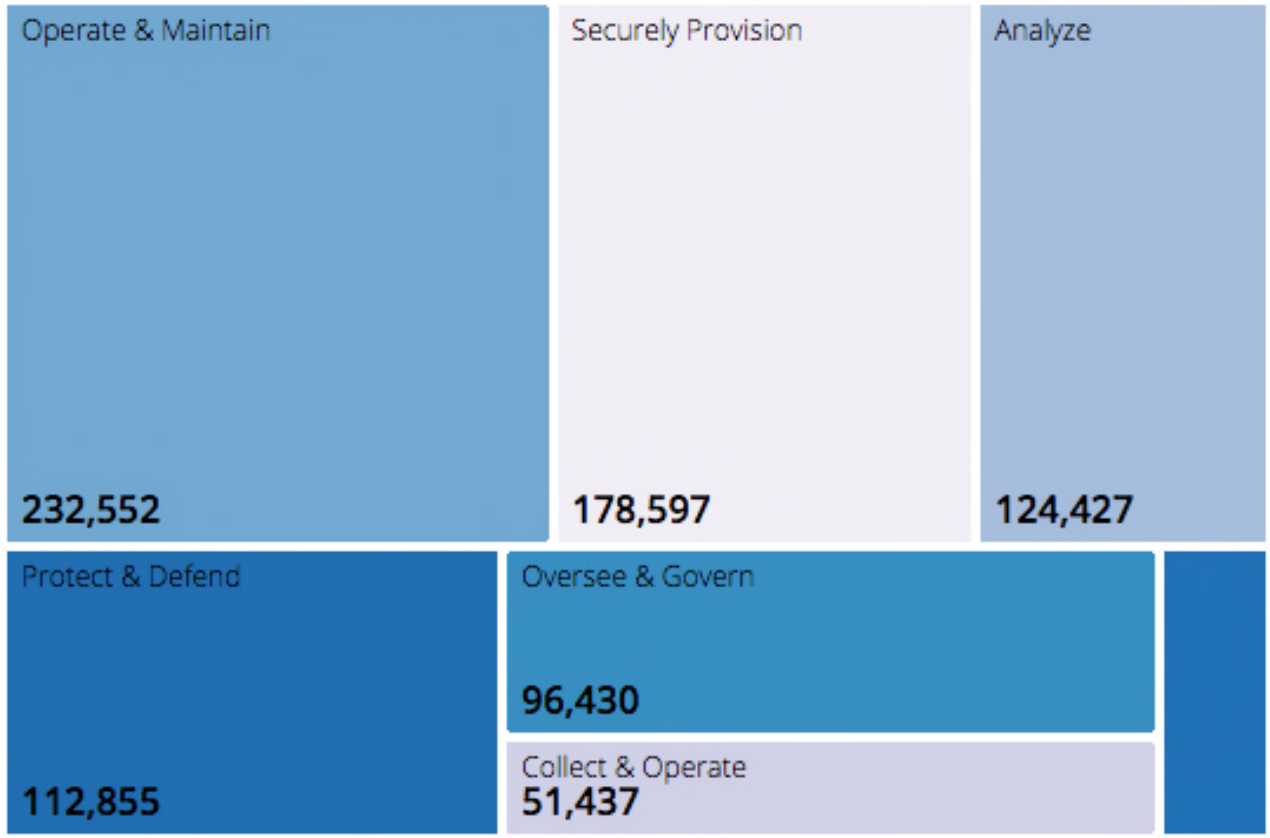
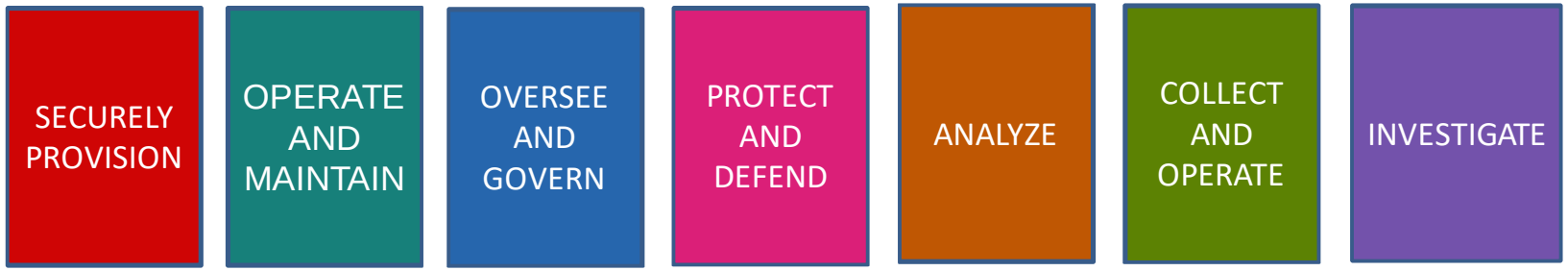
POSTINGS BY NICE CYBERSECURITY WORKFORCE FRAMEWORK CATEGORY



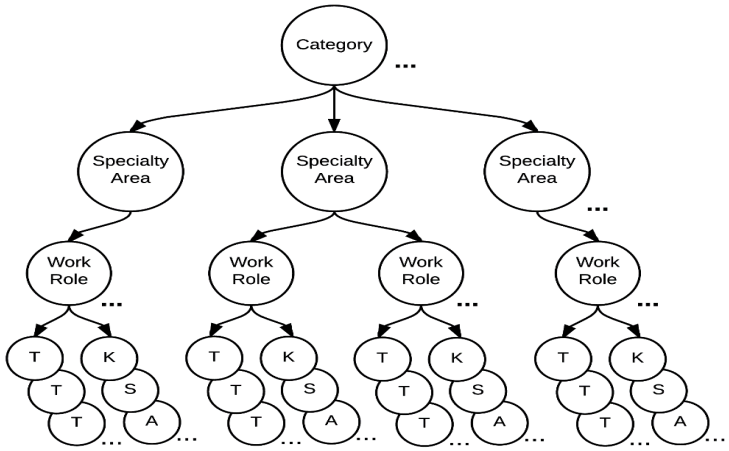
NICE Cybersecurity Workforce Framework – Draft NIST SP 800-181



- Specialty Areas (33) – Distinct areas of cybersecurity work;
  - Work Roles (52) – The most detailed groupings of IT, cybersecurity or cyber-related work, which include specific knowledge, skills, and abilities required to perform a set of tasks.
    - Tasks – Specific work activities that could be assigned to a professional working in one of the NCWF's Work Roles; and,
    - Knowledge, Skills, and Abilities (KSAs) – Attributes required to perform Tasks, generally **demonstrated through relevant experience or performance-based education and training.**

- Audience:
  - Employers
  - Current and Future Cybersecurity Workers
  - Training and Certification Providers
  - Education Providers
  - Technology Providers

- Reference Resource for cybersecurity workforce development



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NCWF Components

As a mechanism to organize information technology (IT), cybersecurity, and cyber-related work, the NCWF helps organizations organize roles and responsibilities through the following components:

Categories – A high-level grouping of common cybersecurity functions;

Specialty Areas – Distinct areas of cybersecurity work;

Work Roles – The most detailed groupings of IT, cybersecurity or cyber-related work, which include specific knowledge, skills, and abilities required to perform a set of tasks.

Tasks – Specific work activities that could be assigned to a professional working in one of the NCWF's Work Roles; and,

Knowledge, Skills, and Abilities (KSAs) – Attributes required to perform Tasks, generally demonstrated through relevant experience or performance-based education and training.

Securely Provision (7 Specialty Areas, 11 Work Roles)

Category	Specialty Area	Work Role
Securely Provision	Risk Management	Authorizing Official/Designating Representative
		Security Control Assessor
	Software Development	Software Developer
		Secure Software Assessor
	Systems Architecture	Enterprise Architect
		Security Architect
	Technology R&D	Research & Development Specialist
	Systems Requirements Planning	Systems Requirements Planner
	Test and Evaluation	Testing and Evaluation Specialist
	Systems Development	Information Systems Security Developer
		Systems Developer

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Operate and Maintain (6 Specialty Areas, 7 Work Roles)

Category	Specialty Area	Work Role
Operate and Maintain	Data Administration	Database Administrator
		Data Analyst
	Knowledge Management	Knowledge Manager
	Customer Service and Technical Support	Technical Support Specialist
	Network Services	Network Operations Specialist
	Systems Administration	System Administrator
	Systems Analysis	Systems Security Analyst

Oversee and Govern (6 Specialty Areas, 14 Work Roles)

Category	Specialty Area	Work Role
Oversee and Govern	Legal Advice and Advocacy	Cyber Legal Advisor
		Privacy Compliance Manager
	Training, Education, and Awareness	Cyber Instructional Curriculum Developer
		Cyber Instructor
	Cybersecurity Management	Information Systems Security Manager
		COMSEC Manager
	Strategic Planning and Policy	Cyber Workforce Developer and Manager
		Cyber Policy and Strategy Planner
	Executive Cyber Leadership	Executive Cyber Leadership
	Acquisition and Program/Project Management	Program Manager
		IT Project Manager
		Product Support Manager
		IT Investment/Portfolio Manager
		IT Program Auditor

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Protect and Defend (4 Specialty Areas, 4 Work Roles)

Category	Specialty Area	Work Role
Protect and Defend	Cyber Defense Analysis	Cyber Defense Analyst
	Cyber Defense Infrastructure Support	Cyber Defense Infrastructure Support Specialist
	Incident Response	Cyber Defense Incident Responder
	Vulnerability Assessment and Management	Vulnerability Assessment Analyst

Analyze (5 Specialty Areas, 7 Work Roles)

Category	Specialty Area	Work Role
Analyze	Threat Analysis	Warning Analyst
	Exploitation Analysis	Exploitation Analyst
	All-Source Analysis	All-Source Analyst
		Mission Assessment Specialist
	Targets	Target Developer
		Target Network Analyst
	Language Analysis	Multi-Disciplined Language Analyst

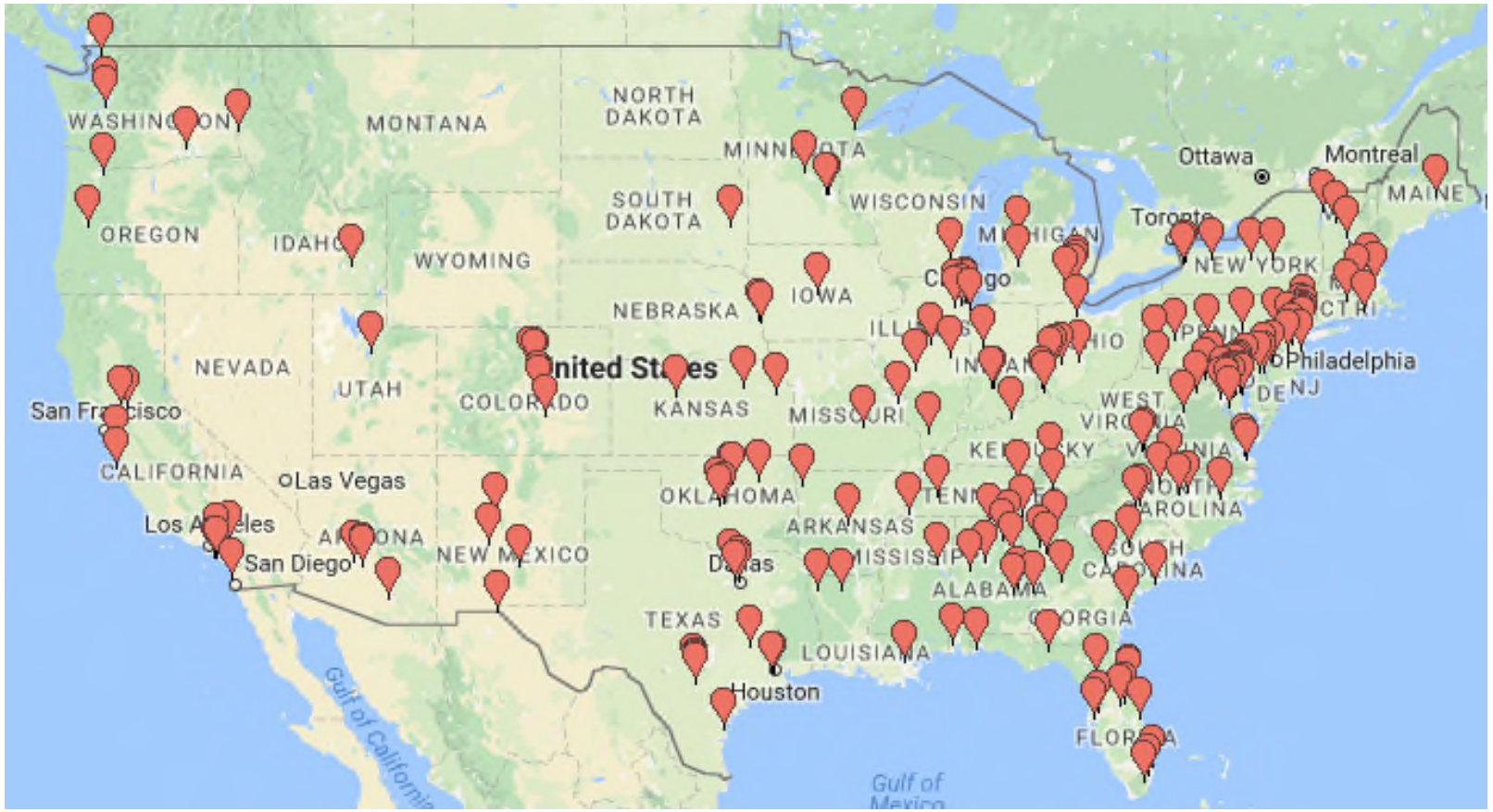
Operate and Collect (3 Specialty Areas, 6 Work Roles)

Category	Specialty Area	Work Role
Collect and Operate	Collection Operations	All Source-Collection Manager
		All Source-Collection Requirements Manager
	Cyber Operational Planning	Cyber Intel Planner
		Cyber Ops Planner
		Partner Integration Planner
	Cyber Operations	Cyber Operator

Investigate (2 Specialty Areas, 3 Work Roles)

Category	Specialty Area	Work Role
Investigate	Cyber Investigation	Cyber Crime Investigator
	Digital Forensics	Forensics Analyst
		Cyber Defense Forensics Analyst

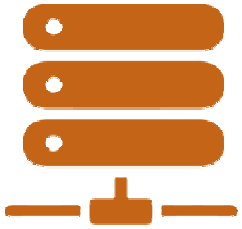
Centers of Academic Excellence in Cybersecurity



NICE Challenge Project Building Blocks

Platform

- We run & host the hardware, no upfront investment required
- Powerful & highly accessible web interface, no installs required
- Enables specialized content development, deployment, & analysis



Environments

- Full scale context rich environments inspired by NICE Cybersecurity Workforce Framework Categories
- Fictional organizations & employees
- Virtualized networks, servers, & employee desktops

Challenges

- Competency based assessments focused on real world problems & context
- Maps to NICE Cybersecurity Workforce Framework Tasks/KSAs & CAE KUs
- Designed to capture useful data for actionable metrics & analytics

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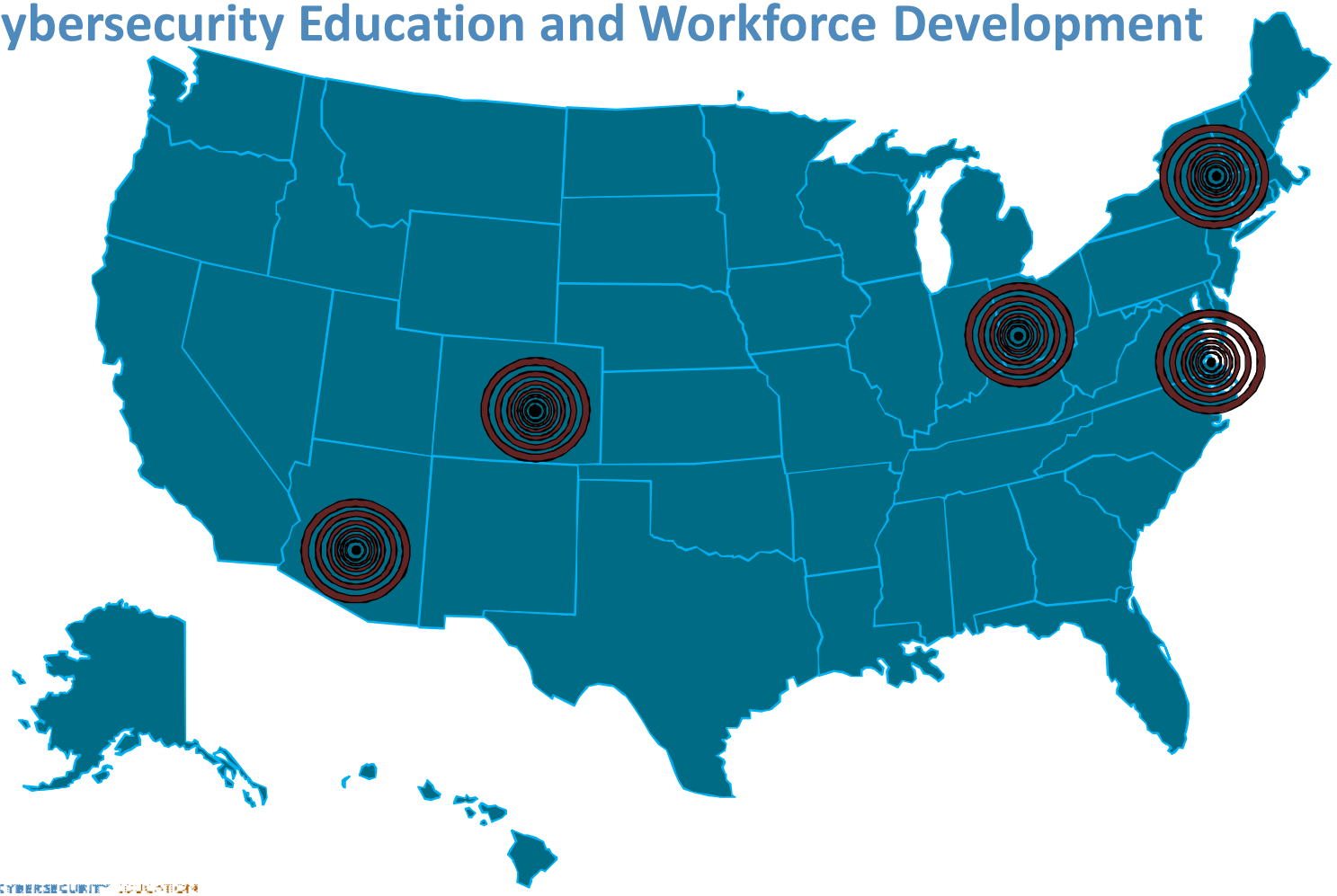
Regional Alliances and Multistakeholder Partnerships Stimulating Cybersecurity Education and Workforce Development



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RAMPS Communities

Southwest Region: Arizona Statewide Cyber Workforce Consortium

Western Region: Cyber Prep Program

Central Region: Cincinnati-Dayton Cyber Corridor (Cin-Day Cyber)

Mid-Atlantic Region: Hampton Roads Cybersecurity Education, Workforce, and Economic Development Alliance (HRCyber)

Northeast Region: The Partnership to Advance Cybersecurity Education and Training (PACET)

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Cybersecurity Career Pathway

There are many opportunities for workers to start and advance their careers within cybersecurity. This interactive career pathway shows key jobs within cybersecurity, common transition opportunities between them, and detailed information about the salaries, credentials, and skillsets associated with each role.

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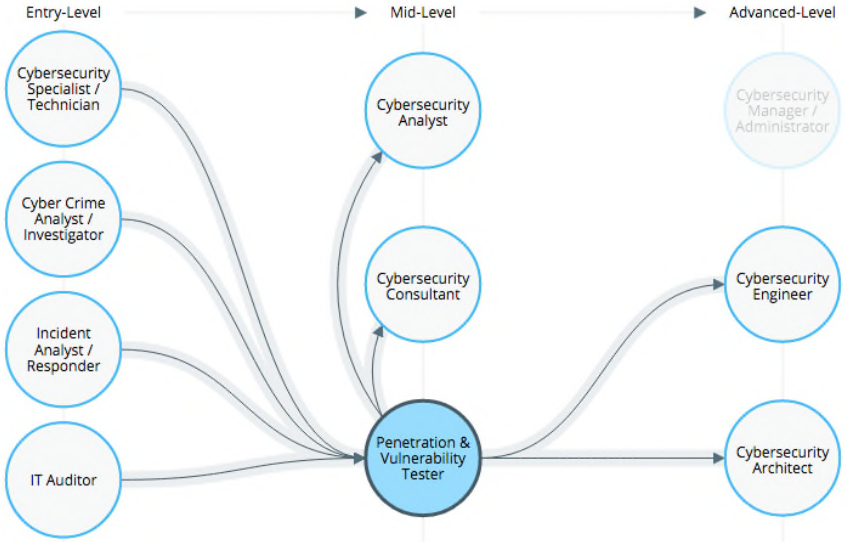


Penetration & Vulnerability Tester

AVERAGE SALARY

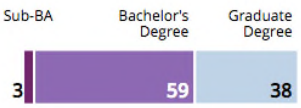
$90,590

Penetration & Vulnerability Tester

COMMON JOB TITLES

- Penetration Tester
- Security Analyst
- Senior Penetration Tester
- Security Penetration Tester
- Vulnerability Analyst

REQUESTED EDUCATION (%)



TOP SKILLS REQUESTED

1. Information Security
2. JAVA
3. LINUX
4. Information Systems

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TOTAL JOB OPENINGS

12,702

Penetration & Vulnerability Tester

COMMON NICE CYBERSECURITY WORKFORCE FRAMEWORK CATEGORIES

- Analyze
- Protect and Defend
  - Cyber Defense Analysis
  - Cyber Defense Infrastructure Support
  - Incident Response
  - **Vulnerability Assessment and Management**

TOP CERTIFICATIONS REQUESTED

- CISSP
- CISA
- CISM
- SECURITY+
- CIPP

5 Python

6 Software Development

7 SQL

8 Troubleshooting

9 Network Security

NICE KNOWLEDGE, SKILLS, AND ABILITIES

- Skill in conducting vulnerability scans and recognizing vulnerabilities in security systems.
- Ability to identify systemic security issues based on the analysis of vulnerability and configuration data.
- Knowledge of application vulnerabilities.
- Skill in conducting application vulnerability assessments.
- Knowledge of cryptography and cryptographic key management concepts.
- Skill in assessing the application of cryptographic standards.
- Knowledge of data backup, types of backups (e.g., full, incremental), and recovery concepts and tools.
- Knowledge of cybersecurity principles and organizational requirements (relevant to confidentiality, integrity, availability, authentication, non-repudiation).
- Knowledge of network access, identity, and access management (e.g., public key infrastructure [PKI]).
- Knowledge of network protocols (e.g., Transmission Critical Protocol/Internet Protocol [TCP/IP], Dynamic Host Configuration Protocol [DHCP]), and directory services (e.g., Domain Name System [DNS])

NICE FRAMEWORK TASKS

- Analyze organization's cyber defense policies and configurations and evaluate compliance with regulations and organizational directives.
- Conduct and/or support authorized penetration testing on enterprise network assets.
- Maintain deployable cyber defense audit toolkit (e.g., specialized cyber defense software and hardware) to support cyber defense audit missions.
- Maintain knowledge of applicable cyber defense policies, regulations, and compliance documents specifically related to cyber defense auditing.
- Prepare audit reports that identify technical and procedural findings, and provide recommended remediation strategies/solutions.
- Conduct required reviews as appropriate within environment (e.g., Technical Surveillance, Countermeasure Reviews [TSCM], TEMPEST countermeasure reviews).
- Perform technical (evaluation of technology) and non-technical (evaluation of people and operations) risk and vulnerability assessments of relevant technology focus areas (e.g., local computing environment, network and infrastructure, enclave boundary, supporting infrastructure, and applications).
- Make recommendations regarding the selection of cost-effective security

NICE Strategic Plan Goals

Accelerate Learning and Skills Development

Inspire a sense of urgency in both the public and private sectors to address the shortage of skilled cybersecurity workers

Nurture A Diverse Learning Community

Strengthen education and training across the ecosystem to emphasize learning, measure outcomes, and diversify the cybersecurity workforce

Guide Career Development & Workforce Planning

Support employers to address market demands and enhance recruitment, hiring, development, and retention of cybersecurity talent

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