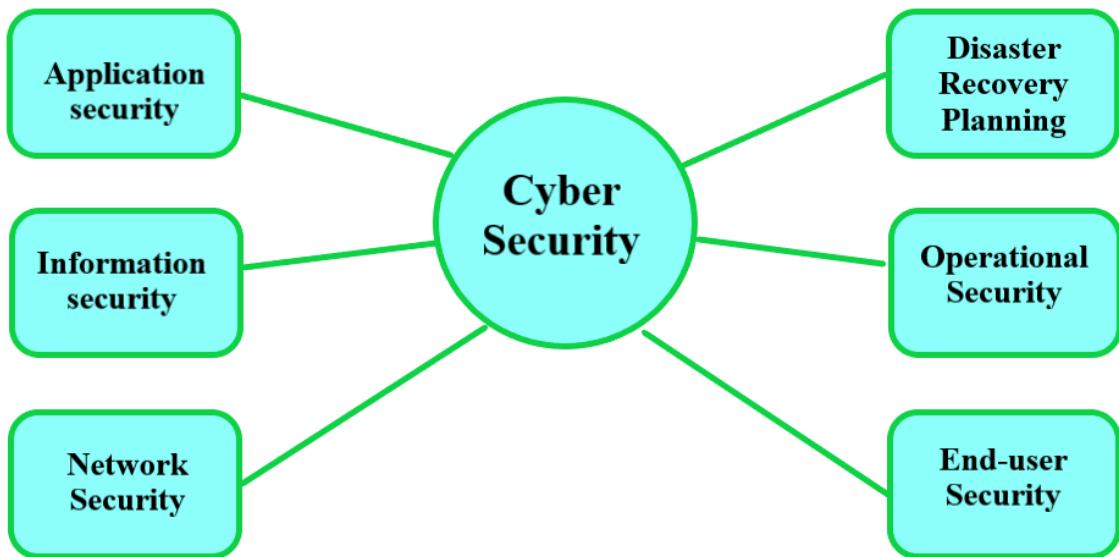


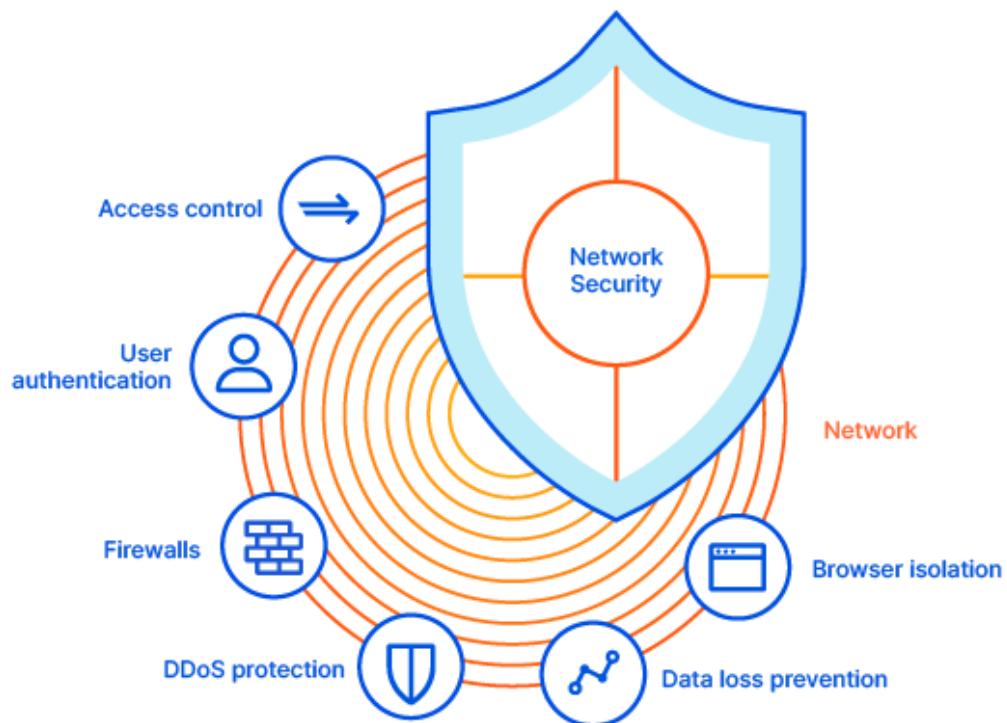
Cyber Security	Ethical Hacking
Cybersecurity is a broad domain that includes a range of security techniques.	Ethical hacking is a subpart of cybersecurity.
It involves safeguarding the system and data from malicious activities by identifying and resolving security issues.	It involves finding vulnerabilities and exploiting them to the system's owner.
The focus is on how to protect the system.	It is focused on how to attack the system.
Cybersecurity experts protect the system by regularly updating it and implementing all potential safeguards.	Ethical hackers hack into the system to find vulnerabilities and keep it safe.
It is a defensive task.	Ethical hacking is an offensive strategy.
Regular maintenance is performed to ensure that the security system is up to date.	Testing is performed regularly to identify and resolve them.
Popular cybersecurity job roles include security analyst and SOC engineer.	Popular ethical hacking job roles include penetration tester and security manager.

Cyber Security	Network Security
It is a part of information security.	It is a part of cyber security.
Cybersecurity safeguards entire digital data in the devices and servers.	Network security protects only the data flowing over the network.
It protects anything in cyberspace.	It protects anything in the network.
Cybersecurity deals with defending an organization's data from cyber-attacks and cybercrimes such as phishing and pretexting.	It deals with the protection from DDoS attacks, Trojans, Viruses, and Worms.
Cybersecurity measures include securing sensitive data, website authentication, and up-to-date information.	Network security includes multi-factor authentication, software updates, and password policies.
Popular job titles include Cyber Security Architect and Cyber Security Analyst.	Popular job titles include Network Security Analyst and Network Security Architect.



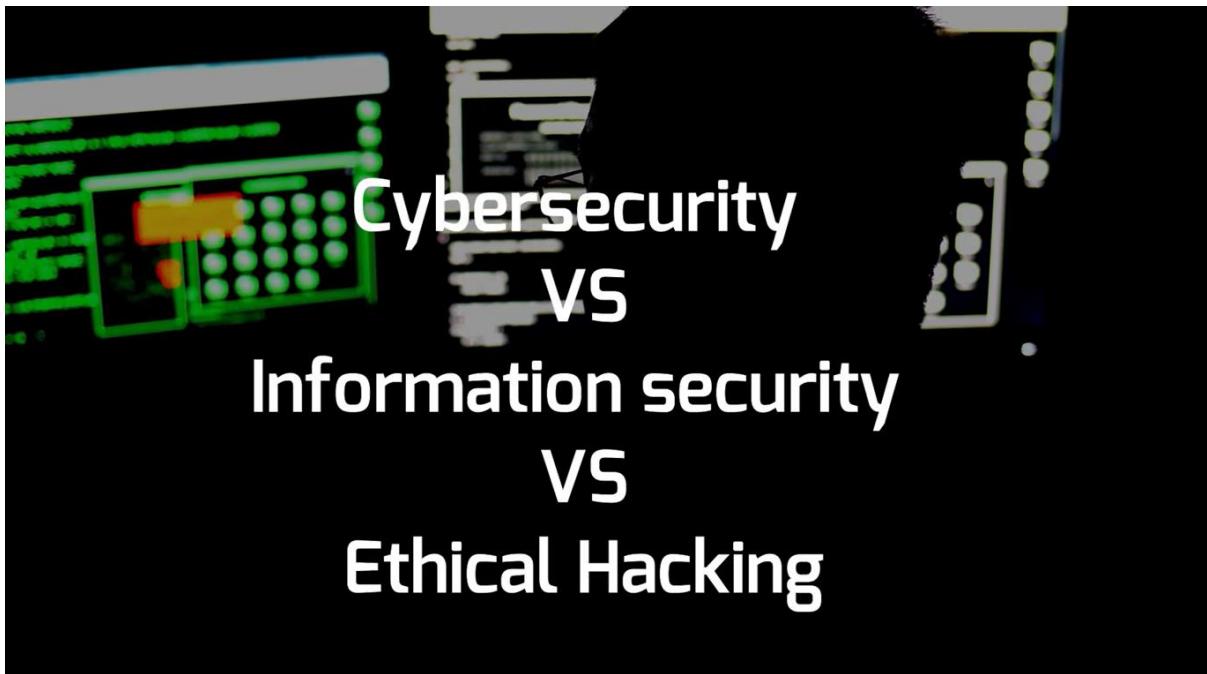
What Do Ethical Hackers Do?







CIA TRIAD



**Cybersecurity
VS
Information security
VS
Ethical Hacking**



Types & Technologies of Cybersecurity



Top 10 Job Roles, Salaries & Certifications



Top Cybersecurity Skills

Secure an Entry Level Job

The Foundation of Cybersecurity

Irfan Shakeel

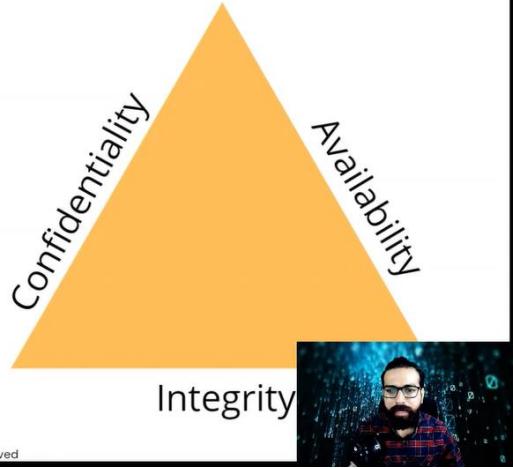
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CIA TRIAD

- 1 Confidentiality, integrity, and availability = CIA
- 2 The foundation of Information Security
- 3 There are other parameters as well



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Confidentiality

It Prevents the disclosure of data to unauthorized people so that only authorized people can access to data. An example would be that your medical history is only available to your doctor and nobody else. We also tend to encrypt data to keep it confidential.

- 1 Encryption is an example that ensures the confidentiality
- 2 Authentication & Authorization (AA)



Integrity

Integrity measures protect information from unauthorized alteration. These measures provide assurance in the accuracy and completeness of data. The need to protect information includes both data that is stored on systems and data that is transmitted between systems such as email.

- 1 Unauthorized user cannot modify the data
- 2 Authorized user cannot unintentionally change the data
- 3 The consistency should preserves



Availability

In order for an information system to be useful, it must be available to authorized users. Availability measures protect timely and uninterrupted access to the system. Some of the most fundamental threats to availability are non-malicious in nature and include hardware failures, unscheduled software downtime, and network bandwidth issues.



Authentication & Authorization – AA

- 1** Authentication is the process of recognizing a user's identity.
- 2** For initiating the process of authentication & authorization, a subject must provide an identity to a system
- 3** Authorization is the next step in the login process, which determines what a user is able to do and see on your website.



Non-Repudiation

- 1 Non-repudiation is the assurance that someone cannot deny something.
- 2 Various controls that can help achieve non-repudiation, for example, digital certificates, transaction logs etc.



Microsoft Whiteboard

Information Security

Cybersecurity Information Protection

Confidentiality

Integrity

Availability

A toolbar at the bottom includes icons for drawing tools like pens, markers, and shapes, along with other standard whiteboard controls.

Small video thumbnails of the same person are located in the bottom right corner of the whiteboard area.

MEASURES THAT PROTECT AND DEFEND INFORMATION AND INFORMATION SYSTEMS BY ENSURING THEIR AVAILABILITY, INTEGRITY, **AUTHENTICATION**, CONFIDENTIALITY, AND **NON-REPUDIATION**. THESE MEASURES INCLUDE PROVIDING FOR RESTORATION OF INFORMATION SYSTEMS BY INCORPORATING PROTECTION, DETECTION, AND REACTION CAPABILITIES.

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Cybersecurity Types & Technologies

Irfan Shakeel

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Cybersecurity Types & Technologies

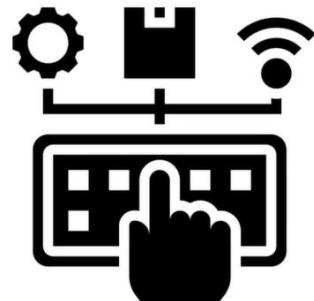
- 1 Industrial Control Systems Cybersecurity – ICS
- 2 Critical Infrastructure Security
- 3 Application Security
- 4 Network Security
- 5 Cloud security
- 6 Internet of things (IoT) Security



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Industrial Control Systems (ICS) & Critical Infrastructure Security

- 1 Critical Infrastructure security deals with all the vital infrastructures that a Government or nation relies on
- 2 Industrial Control Systems Security (ICS) is the area of concern involving the safeguarding of industrial control systems, the integrated hardware, and software designed to monitor and control the operation of machinery and associated devices in industrial environments. - Techtarget.com



Application & Network Security

- 1** AppSec or Application security ensures the protection of the applications, such as web, mobile, and desktop apps.
- 2** AppSec is an essential part of the software development lifecycle – Secure coding
- 3** Network security utilizes various tools and techniques to protect the network from cyberattacks



Cloud & IoT Security

- 1** Cloud security deals with policies, techniques, and procedures to keep the cloud environment secure
- 2** IoT security safeguards the Internet of Things devices and the networks .
- 3** IoT devices are being targeted by hackers and are being used as points of entry into organizations or homes



What are they?

- 1 Penetration Testing
- 2 Incidence Response and Forensics
- 3 DevOps
- 4 SecOps
- 5 Endpoint detection and response (EDR)



Cybersecurity Job roles, Salaries & Certificates

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IE



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Top 10 Cybersecurity Job Roles

★ Chief Information Security Officer - CISO	\$165,839
★ Chief Security Officers (CSOs)	\$147,802
★ Security Architect	\$124,711
★ Information Security Manager	\$118,775
★ Security Assessor	\$102,500
★ Malware Analyst	\$92,880
★ Penetration Tester	\$86,038
★ Incident Manager	\$81,885
★ Security Software Developer	\$74,536
★ Forensic Computer Analyst	\$74,216

Chief Information Security Officer – CISO

- 1 CISO supervises the operational aspects of data protection and management
- 2 Creates the proper security and governance practices
- 3 CISO understands PCI, HIPAA, NIST, GLBA and SOX compliance



- Certified Information Systems Auditor (CISA)
- Certified Information Security Manager (CISM)
- Certified Information System Security Professional (CISSP)



Chief Security Officers (CSOs)

- 1 CSOs play the most important role of ensuring the security of both the physical and digital assets
- 2 CSO functions are HR, Compliance, procurement and team management
- 3 CSO understands PCI, HIPAA, NIST, GLBA and SOX compliance

- Certified Information Systems Auditor (CISA)
- Certified Information Security Manager (CISM)
- Certified Information System Security Professional (CISSP)



Security Architect

- 1 Security architect designs, manages, and maintains the organization's network infrastructure.
- 2 A senior-level position having both technical and management experience.



- Information Systems Security Architecture Professional (CISSP-ISSAP)
- GIAC Defensible Security Architecture (GDSA)

Cybersecurity Manager

- 1 Establishes network security policies and procedures
- 2 Train staff on proper use of information systems and manages the security awareness programs.
- 3 The cybersecurity manager monitors the forensic investigation in case of breach



→ Information Systems Security Management Professionals (CISSP-ISSMP)
→ GIAC Security Leadership (GSLC)

Security Control Assessor

- 1 Assess the overall security posture of the organization as defined in NIST SP 800-37
- 2 Usually, Governments and critical infrastructure hire them
- 3 Less common job role



Press Esc to exit full screen

Top Cybersecurity Skills

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Cybersecurity Skills

- Risk Management
- Technical Expertise
- Social skills
- Ambition to Learn
- Security Architecture Skills
- Automation
- Business Awareness



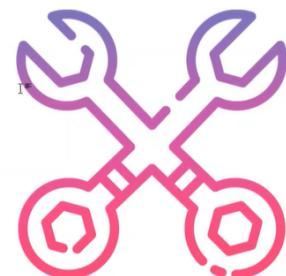
Risk Management

- 1 Cybersecurity professionals should understand the risk management
- 2 Risks are the driving force behind cybersecurity
- 3 Develop skills to identify, manage and present the risks



Technical Expertise

- 1 Learn & understand various technologies, platforms and tools
- 2 You should learn something about everything and everything about something
- 3 Programming, networking, network administration, threat hunting and other skills



Social skills

- 1 The most important, yet underrated skill
- 2 Master the written and oral communication; connect with like-minded people on social platforms
- 3 Learn to converse with non-technical people with confidence



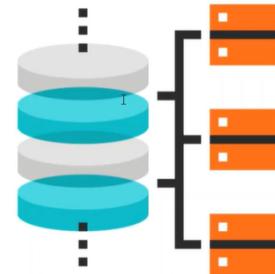
Ambition to Learn

- 1 "Curiosity is the wick in the candle of learning." – William Arthur Ward
- 2 Learn and adopt latest technologies, tools and techniques to defend the network
- 3 Actively read blog posts, articles, research and whitepapers



Security Architecture Skills

- 1 Building secure infrastructures, secure software, and strong defense depend on continuous improvement.
- 2 Learn the skills to build secure systems
- 3 The security architecture in many systems is focused on solid security controls that can prevent or add burden to hackers



Automation

- 1 Incorporate AI to fight the AI based cyber-attacks
- 2 Use scripting to automate the redundant tasks
- 3 Utilize machine learning to train your systems effectively and efficiently



Business Awareness

- 1** Develop skills to find a balance between usability and security
- 2** Understand the business of your organization and suggest solutions accordingly



How to Secure an Entry-Level Cybersecurity Job

Irfan Shakeel
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Roadmap to Secure your First Job

1 Understand Cybersecurity workforce, job roles and demand



2 Mentorship: Learn from an expert

2 Networking: Connect with relevant people



This publication is available free of charge from: <https://doi.org/10.6026/NIST.SP.800-181>

Appendix A – Listing of NICE Framework Elements

A.1 NICE Framework Workforce Categories

Table 1 provides a description of each Category described by the NICE Framework. Each includes a two-character abbreviation (e.g., SP) for quick reference of the Category and to support the creation of NICE Framework work role identifiers (see Table 3 - NICE Framework work roles). This listing will be updated periodically [1]. The definitive source for the most current version of this material can be found in the Reference Spreadsheet for NIST Special Publication 800-181 [4].

Table 1 - NICE Framework Workforce Categories

Categories	Descriptions
Securely Provision (SP)	Conceptualizes, designs, procures, and/or builds secure information technology (IT) systems, with responsibility for aspects of system and/or network development.
Operate and Maintain (OM)	Provides the support, administration, and maintenance necessary to ensure effective and efficient information technology (IT) system performance and security.
Oversee and Govern (OV)	Provides leadership, management, direction, or development and advocacy so the organization may effectively conduct cybersecurity work.
Protect and Defend (PR)	Identifies, analyzes, and mitigates threats to internal information technology (IT) systems and/or networks.
Analyze (AN)	Performs highly-specialized review and evaluation of incoming cybersecurity information to determine its usefulness for intelligence.
Collect and Operate (CO)	Provides specialized denial and deception operations and collection of cybersecurity information that may be used to develop intelligence.
Investigate (IN)	Investigates cybersecurity events or crimes related to information technology (IT) systems, networks, and digital evidence.

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NIST SP 800-181

NICE FRAMEWORK

A.2 NICE Framework Specialty Areas

Table 2 provides a description of each of the NICE Framework Specialty Areas. Each Specialty Area includes a three-character abbreviation (e.g., RSK) for quick reference of the specialty area and to support the creation of NICE Framework work role identifiers (see Table 3 - NICE Framework work roles). This listing will be updated periodically [1]. The definitive source for the most current version of this material can be found in the Reference Spreadsheet for NIST Special Publication 800-181 [4].

Table 2 - NICE Framework Specialty Areas

Categories	Specialty Areas	Specialty Area Descriptions
Securely Provision (SP)	Risk Management (RSK)	Oversees, evaluates, and supports the documentation, validation, assessment, and authorization processes necessary to assure that existing and new information technology (IT) systems meet the organization's cybersecurity and risk requirements. Ensures appropriate treatment of risk, compliance, and assurance from internal and external perspectives.
	Software Development (DEV)	Develops and writes/codes new (or modifies existing) computer applications, software, or specialized utility programs following software assurance best practices.
	Systems Architecture (ARC)	Develops system concepts and works on the capabilities phases of the systems development life cycle; translates technology and environmental conditions (e.g., law and regulation) into system and security designs and processes.
	Technology R&D (TRD)	Conducts technology assessment and integration processes; provides and supports a prototype capability and/or evaluates its utility.
	Systems Requirements Planning (SRP)	Consults with customers to gather and evaluate functional requirements and translates these requirements into technical solutions. Provides guidance to customers about applicability of information systems to meet business needs.
	Test and Evaluation (TST)	Develops and conducts tests of systems to evaluate compliance with specifications and requirements by applying principles and methods for cost-effective planning, evaluating, verifying, and validating of technical, functional and performance characteristics (including interoperability) of systems or elements of systems incorporating IT.
	Systems Development (SYS)	Works on the development phases of the systems development life cycle.
Operate and Maintain	Data Administration (DTA)	Develops and administers databases and/or data management systems that allow



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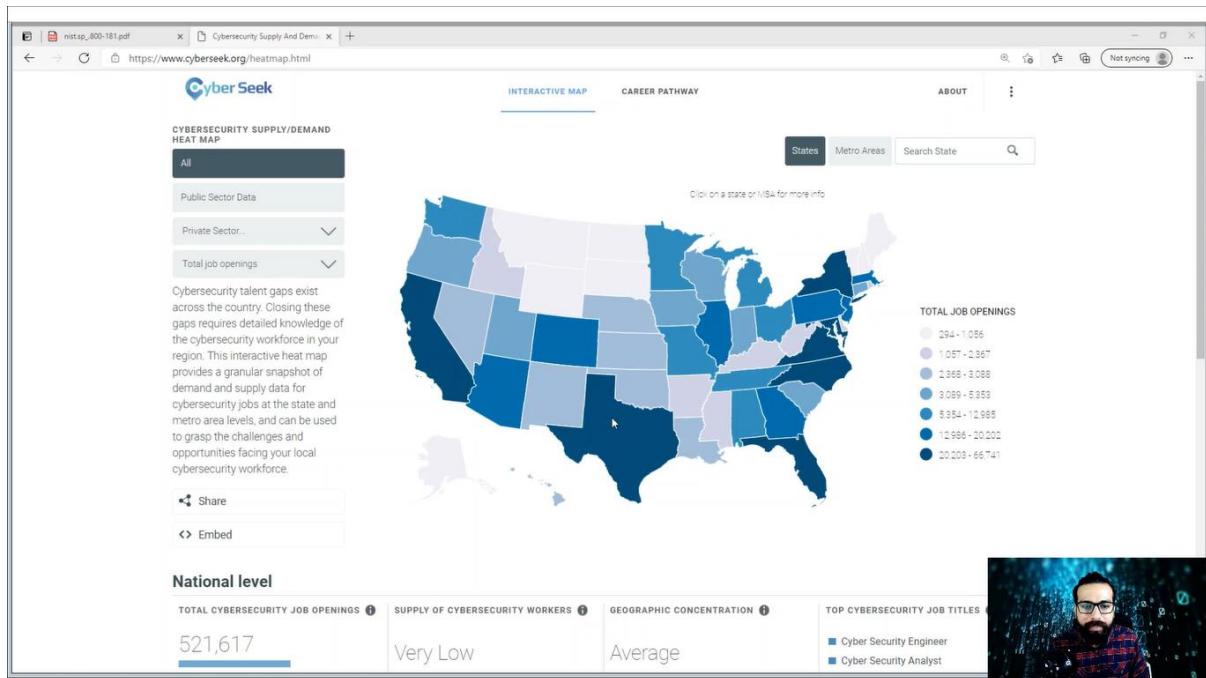
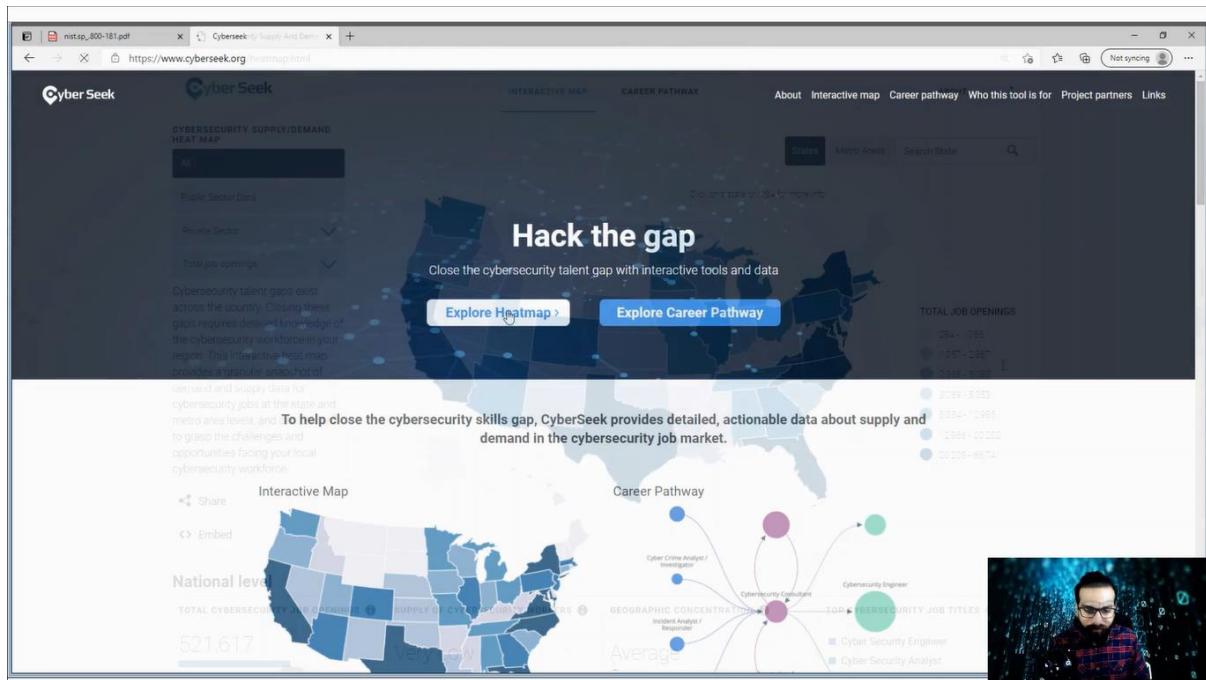
NIST SP 800-181

NICE FRAMEWORK

Table 3 - NICE Framework Work Roles

Category	Specialty Area	Work Role	Work Role ID	Work Role Description
Securely Provision (SP)	Risk Management (RSK)	Authorizing Official/Designating Representative	SP-RSK-001	Senior official or executive with the authority to formally assume responsibility for operating an information system at an acceptable level of risk to organizational operations (including mission, functions, image, or reputation), organizational assets, individuals, other organizations, and the Nation (CNSSI 4009).
		Security Control Assessor	SP-RSK-002	Conducts independent comprehensive assessments of the management, operational, and technical security controls and control enhancements employed within or inherited by an information technology (IT) system to determine the overall effectiveness of the controls (as defined in NIST SP 800-37).
	Software Development (DEV)	Software Developer	SP-DEV-001	Develops, creates, maintains, and writes/codes new (or modifies existing) computer applications, software, or specialized utility programs.
		Secure Software Assessor	SP-DEV-002	Analyzes the security of new or existing computer applications, software, or specialized utility program and provides actionable results.
	Systems Architecture (ARC)	Enterprise Architect	SP-ARC-001	Develops and maintains business, systems, and information processes to support enterprise mission needs; develops information technology (IT) rules and requirements that describe baseline and target





NIST

- 1 Understand Cybersecurity workforce, job roles and demand
- 2 Mentoring: Learn from an expert
- 2 Networking: Connect with relevant people



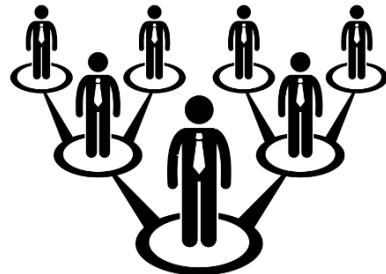
Mentorship & Networking

- 1 Mentors share knowledge and wisdom
- 2 Give insights on where you should improve
- 3 Mentors give unfiltered opinions. They can be good connectors



Mentorship & Networking

- 1 Follow people Twitter and LinkedIn
- 2 Showcase your skills
- 3 Network, talk, engage, demonstrate and win!



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Network Security Architecture



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