



# Cybersecurity Workforce Alliance

## *“Tackling Tech RISK Skills Shortages”*

Aligning Industry With Education

Using Standards

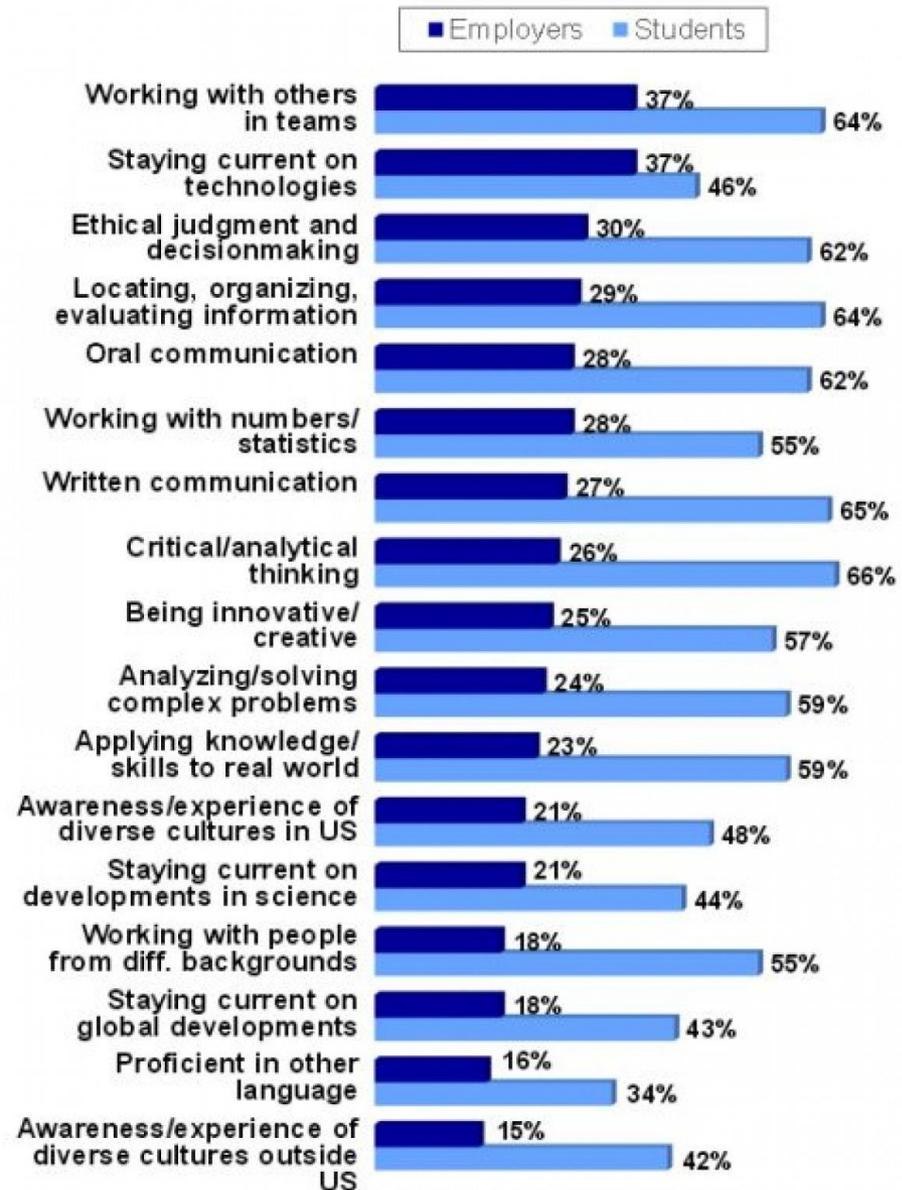


# “We Have A Failure To Communicate”

- Students rate themselves as well prepared to start work
- Employers disagree

*2.5mm CS jobs – US  
xmm Global*

*(NIST not implemented yet)*



\*8-10 ratings on zero-to-ten scale

# Cybersecurity Workforce Development Platform



Business Framework



Academic Framework

*Virtual Projects*

Operation  
Functions

Real-World Education  
Applied Learning

Academic  
Learning

STUDENTS WORKFORCE READY

# Talent – The Next Supply Chain

## Workforce Skills Development

### Talent: The next supply chain

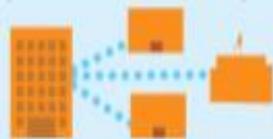
1

Map future talent needs  
Improve forecasting and planning to better understand talent needs.



2

Build talent pipeline  
Companies must work with community colleges to develop curricula that build the skills and experience they require.



3

Develop talent pool relationships  
Businesses must work with a vast network of partners to establish themselves as "employers of choice."



4

Reinvigorate talent development  
Train entry-level and new employees. Offer internships and apprenticeships, then hire strong performers.



Source: Accenture survey of more than 800 human resources executives from U.S. companies, half of which had revenues exceeding \$1 billion.

# CUNY Vice Chancellor Student Affairs & CISO's Risk & Cybersecurity

*Aligning Education With Industry's Context and Needs*



- NYU
- Federal Reserve
- Morgan Stanley
- Goldman Sachs
- Bank NY Mellon
- Fidelity Investments
- Express Scripts
- RANE Network
- Perkins Coie
- Capgemini
- NASA
- National Student Clearinghouse



Digital Skills “Passport” And Workforce Development Platform

# To Make It Work ... Ingredients!

- 1. *Hands-on*** membership committed to project success (process, industry frameworks, programs, resources, outcomes)
- 2. *Strategic***, a partnership intent to work in the spirit of co-development
- 3. *Scalable***, create a program that will scale as a “plug and play”

# CWA – Addressing Industry Issues

- **Federal Reserve** – “Near systemic risk in Financial Services”
  - “Skills shortage – all sectors and getting worse”
  - “Takes 12-18 months to train students after graduation”
  - “Hired at \$60K – leave 9-months later at \$120K”
- “Students need to understanding business risk & industry knowledge”
- “Cybersecurity is a multidisciplinary problem”
- “The war for talent creates a Poverty Line!”



## Purpose

*Improve the cyber security skills and scale the college student workforce, so they are more attractive to hire and can provide almost immediate value to the public & private sector by improving a company's Cyber Security capabilities.*

## Focus

**Reduce the amount of initial training required by employers for college hires.**

**Create the "perfect candidate profile" for a College Hire in Cyber Security**

**Create and run the "the Epic Challenge"**

**Increase understanding of and interest in a career in Cyber security**

**Align & Enhance curricula to develop the skills needed for a career in Cyber Security**

# Who Does What - Effort Required

Participant	Effort
CWA	Workstreams for Profiles, Taxonomy, Epic Challenges , Promotion for curriculum, certificates, digital badge, timing, promotion
CUNY	<ul style="list-style-type: none"><li>• Align academics/schools for multi-discipline participation</li><li>• Issue digital badges/certificates</li><li>• Outcomes to drive industry alignment</li></ul>
Industry	<ul style="list-style-type: none"><li>• Resource challenges, SME's, Alumni (e.g. 2-4 days over 6-weeks)</li><li>• Mentors and assessors – launch “projects”, discussions, lessons, assignments and content, (10-20 minutes a day)</li></ul>
Students	Sign up, complete Skills Profiles, upload content
iQ4	Manage CWA activities and provide technology as part of Alliance subscription



**> \$100mill ROI**

**... Reduce Training by 25% ... Accelerate Productivity**

**Find the Best Talent – Align with Real-World Challenges  
Assess / Track KSAs Proficiency – Reward – Hire !**

**Cast a Wide Net** – reach every school every student

**Awareness-** Promote industry opportunity / needs

**Extend Brand-** showcase “Perfect Candidate” career pathways

**Matching** – based on competencies, credentials and KSA’s

**Accelerate Employer Education** – while students are still in school

**Retention** – better alignment ... better results

# NIST/NICE Workforce Framework

“Know [PROFILE} your talent, identify and fill the skills gaps and develop unrivaled Cyber workforce”

<b>Collect and Analyze Data</b>	Capture cybersecurity workforce and training data to understand capabilities and needs.
<b>Recruit and Retain</b>	Incentivize the hiring and retention of highly skilled and adaptive professionals needed for a secure digital nation.
<b>Educate, Train, and Develop</b>	Expand the pipeline for and deliberately develop an unrivaled cybersecurity workforce.
<b>Engage</b>	Educate and energize all cybersecurity workforces and the American public to strengthen the nation's front lines of cybersecurity.

Any company doing business with USA will be examined as to their effectiveness with NIST-CA and NICE for Cyber Risk and Assurance

NATIONAL INITIATIVE FOR CYBERSECURITY EDUCATION (NICE)

## THE NATIONAL CYBERSECURITY WORKFORCE FRAMEWORK

**INTRODUCTION**  
The ability of academia and public and private employers to prepare, educate, recruit, train, develop, and retain a diverse, qualified cybersecurity workforce is vital to our nation's security and prosperity.  
[\[full text version\]](#)

**DEFINING CYBERSECURITY**  
Defining the cybersecurity population using common, standardized labels and definitions is an essential step in ensuring that our country is able to educate, recruit, train, develop, and retain a highly-qualified workforce. The National Initiative for Cybersecurity Education (NICE), in collaboration with federal government agencies, public and private experts and organizations, and industry partners, has published version 1.0 of the *National Cybersecurity Workforce Framework* ("the Framework") to provide a common understanding of and lexicon for cybersecurity work.  
[\[full text version\]](#)

**THE CALL TO ACTION**  
Only in the universal adoption of the *National Cybersecurity Workforce Framework* can we ensure our nation's enduring capability to prevent and defend against an ever-increasing threat. Therefore, it is imperative that organizations in the public, private, and academic sectors begin using the Framework's lexicon (labels and definitions) as soon as possible.  
[\[full text version\]](#)

**OPERATE AND MAINTAIN**

**PROTECT AND DEFEND**

**OVERSIGHT AND DEVELOPMENT**

**INVESTIGATE**

**SECURELY PROVISION**

**ANALYZE**

**COLLECT AND OPERATE**

Home | Using This Document | Sample Job Titles | Securely Provision | Operate and Maintain | Protect and Defend | Investigate | Collect and Operate | Analyze | Oversight and Development

## Tier 6-8 Sector/Occupation Specific Skills - Financial Services Example



## Tier 5 [Specific] Industry Wide Technical Competencies



## Tier 4 (NICE) Industry Wide Technical Competencies



## Tier 3 Workplace Competencies



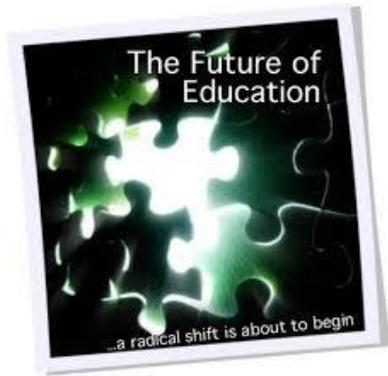
## Tier 2 Academic Competencies (SKILLS)



## Tier 1 Personal Effectiveness – i.e. Essential Soft Skills - Including



# “Passport”= Core Data Model



**You**  
Personal  
Qualities

**Learned**

Competencies / KSA's

**Projects**

Proficiency Assessments

***SKILLS HAVE A CAREER LIFE CYCLE AND CONTINUUM***



# “Perfect Candidate” Student Profile

## Seven Roles

- **SOC, GRC, IT Risk Specialist / Analyst / Manager, Forensic Investigator, Business Risk Modeling**

### **SOC- Security Operations Center**

- **Category: Protect & Defend**
- **Specialty Area: Computer Network Defense Analysis**
- **KSA Competencies: 3, 4, 49, 59, 61, 66, 81, 87,**
- **KSA Statement:** Uses defensive measures and information collected from a variety of sources to identify, analyze, and report events that occur or might occur within the network in order to protect information, information systems, and networks from threats.

### **GRC- Governance Risk and Compliance**

- **Category: Securely Provision**
- **Specialty Area: Test and Evaluation**
- **KSA Competencies: 22, 38, 40, 53, 63, 81, 83, 127, 144, 169, 176, 182, 239**
- **KSA Statement:** 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 information

# Applying the NICE Framework

## DHS SPECIFIC CYBER ROLE

**Cybersecurity Tester:** The Cybersecurity Tester provides compliance-based security testing leveraging automated tools. The Cybersecurity Tester assists in the preparation, development, modification, and management of security products in support of the C&A process. The Cybersecurity Tester provides technical analysis and automated scans to assess their completeness and identify system vulnerabilities and weaknesses.

### SPECIALTY AREAS

- ▶ Systems Requirements Planning
- ▶ Test and Evaluation
- ▶ Investigation
- ▶ Computer Network

Selected by Component SMEs from NICE Framework Specialty Areas

### BEHAVIORAL INDICATORS

**THREAT ASSESSMENT:** Identifies the impact of circumstances or events with the potential to harm the enterprise information technology communications, operations, and systems. Analyzes Cyber threats to determine the likelihood of occurrence and the potential for damage.

**VULNERABILITY ASSESSMENT:** Uses knowledge of the types and techniques of Cyber exploitation and attack (e.g., viruses, worms, Trojan horses, botnets, sniffers) to identify specific weaknesses and control vulnerabilities in enterprise information technology systems. Identifies weaknesses and control vulnerabilities in enterprise information technology systems.

**TESTING:** Performs in-depth, end-to-end testing to ensure secure design and development are in alignment with enterprise information technology systems. The organization is responsible for ensuring the test results are accurate and complete.

Built by SMEs with alignment to respective NICE Framework KSAs

Proficiency Level 1	Proficiency Level 2	Proficiency Level 3
<ul style="list-style-type: none"> <li>▶ Performs technical planning, system integration, verification and validation, and supportability and effectiveness analyses for total systems</li> <li>▶ Analyzes all levels of total system products to include: acquisition, concept, design, test, installation, operation, maintenance, and disposal</li> <li>▶ Translate operational requirements into technical requirements</li> <li>▶ Organizes and analyzes stated requirements into categories throughout the system lifecycle such as functionality, usability, performance, operational, security, etc.</li> <li>▶ Proficient at using a requirements management tool (e.g., DOORS)</li> <li>▶ Identifies and documents security requirements</li> </ul>	<ul style="list-style-type: none"> <li>▶ Leads the definition and flow-down functional, performance, and design requirements</li> <li>▶ Performs functional analysis, timeline analysis, requirements allocation, and interface definition studies to translate customer requirements into hardware and software specifications</li> <li>▶ Distinguishes testable requirements</li> <li>▶ Conducts gap analyses between requirements and proposed architecture to identify security performance and other weaknesses in the system</li> <li>▶ Verifies security requirements through collaboration with DAA/IA/Engineering &amp; Systems Administration</li> <li>▶ Conducts vulnerability &amp; risk assessment analyses</li> </ul>	<ul style="list-style-type: none"> <li>▶ Advises on new techniques and estimated costs associated with new or revised programs and utilities, taking into consideration personnel, time, and hardware requirements</li> <li>▶ Interprets mission objective and applies knowledge to requirements and implementations</li> <li>▶ Advises customer of gaps in security policy and guidance; provides recommendations</li> <li>▶ Monitors industry developments and evolving instruction/policy/guidance on IT security concerns</li> <li>▶ Oversees large-scale requirements development and management efforts to include the definition of new requirements and the implementation of changes to existing requirements.</li> </ul>

### PERFORMANCE STANDARDS

CYBER SKILL & PROFICIENCY STANDARDS	PERFORMANCE LEVEL		
	INT	EXP	FEL
Systems Requirements Planning	2	3	3
Test and Evaluation	2	3	3
Investigation	1	2	3
Computer Network Defense	2	2	2

# Maturity Assessment Process

## *for IT Risk and NICE Framework*

- **Risk Components**
  - Examples, does the student understand?
- **Risk Assessment**
  - Values and Risk Statement, how they apply
- **Risk Mitigation**
  - Explain how they apply to a given situation
- **Applied Learning**
  - Use cases (eg. Retail Payment mobile app) how to do it and what are the risk exposures

# Competencies - Assessments / Proficiencies

TOTAL CRITERIA

TOTAL ASSIGNMENTS

YOU HAVE **6** COMPETENCIES in this course

■ NON-PERFORMANCE ■ BASIC ■ PROFICIENT ■ DISTINGUISHED



**COMPETENCY – 1**  
Examine the basic business models for e-business. **MORE >>**  
■ BASIC



**COMPETENCY – 2**  
Relate the importance of e-business infrastructure to the economic impact of a business. **MORE >>**  
■ BASIC



**COMPETENCY – 3**  
Examine the relationship of basic e-business strategies to business success. **MORE >>**  
■ PROFICIENT



**COMPETENCY – 4**  
Apply effective e-business planning and implementation. **MORE >>**  
■ DISTINGUISHED



**COMPETENCY – 5**  
Develop a technology and management e-business plan. **MORE >>**  
■ DISTINGUISHED



**COMPETENCY – 6**  
Evaluate the management implications of e-business. **MORE >>**  
■ NON-PERFORMANCE

What is  
map?

How do  
map w

What is  
purpos  
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# NICE Extension Requirements

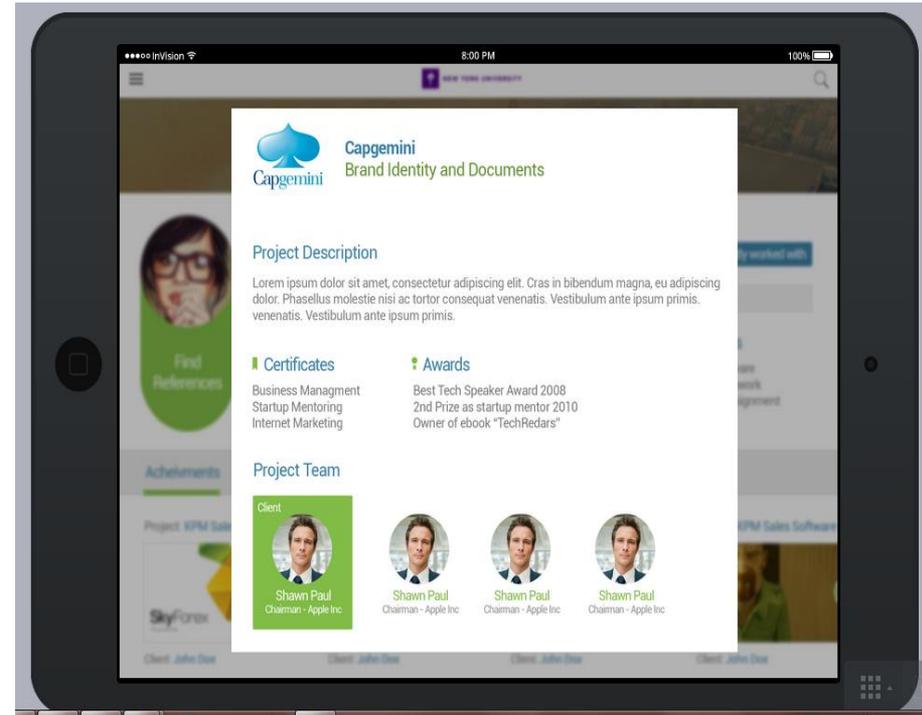
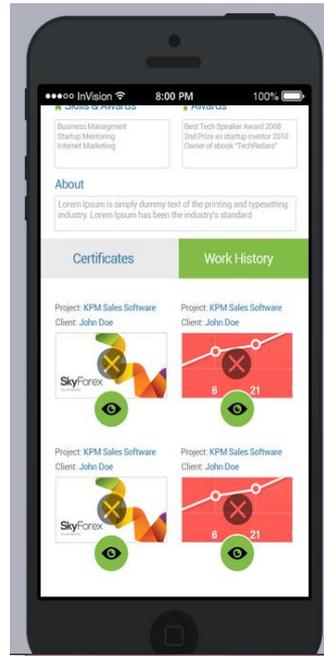
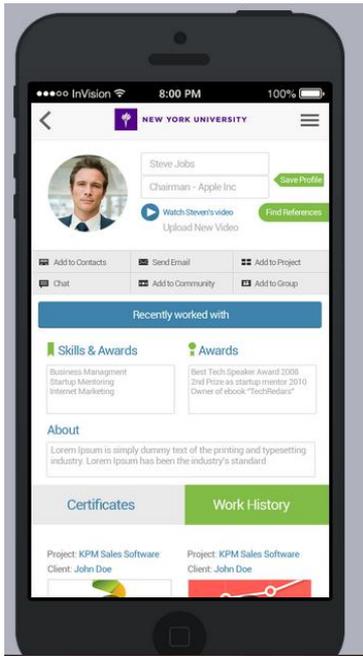
- **Need to expand Competencies and KSA's for Collect and Operate, Analyze**
- **Add Assessment Criteria & Proficiency**  
*Credentialed Digital Badge*
- **Add Personal Qualities to Competency and KSA**  
*Oversight group for WF Framework extensions*

# Epic Challenge

## Mobile App Payment

Enterprise Passports & Matching

Epic Challenges Engagements



Skills Match, Developed, Assessed, Validated

# Experience - Recognition Certificates

The Collaboratory  
For Conceptual Design & Engineering

## CERTIFICATE OF PARTICIPATION

THIS CERTIFICATE IS PRESENTED TO:

**SAM CICIO**

*In recognition for your collaborative contributions in the design of an autonomous vehicle to explore lava tubes on Mars. This certificate verifies the completion of the S.T.E.M. summer program held at Stevens Institute of Technology Summer 2011*

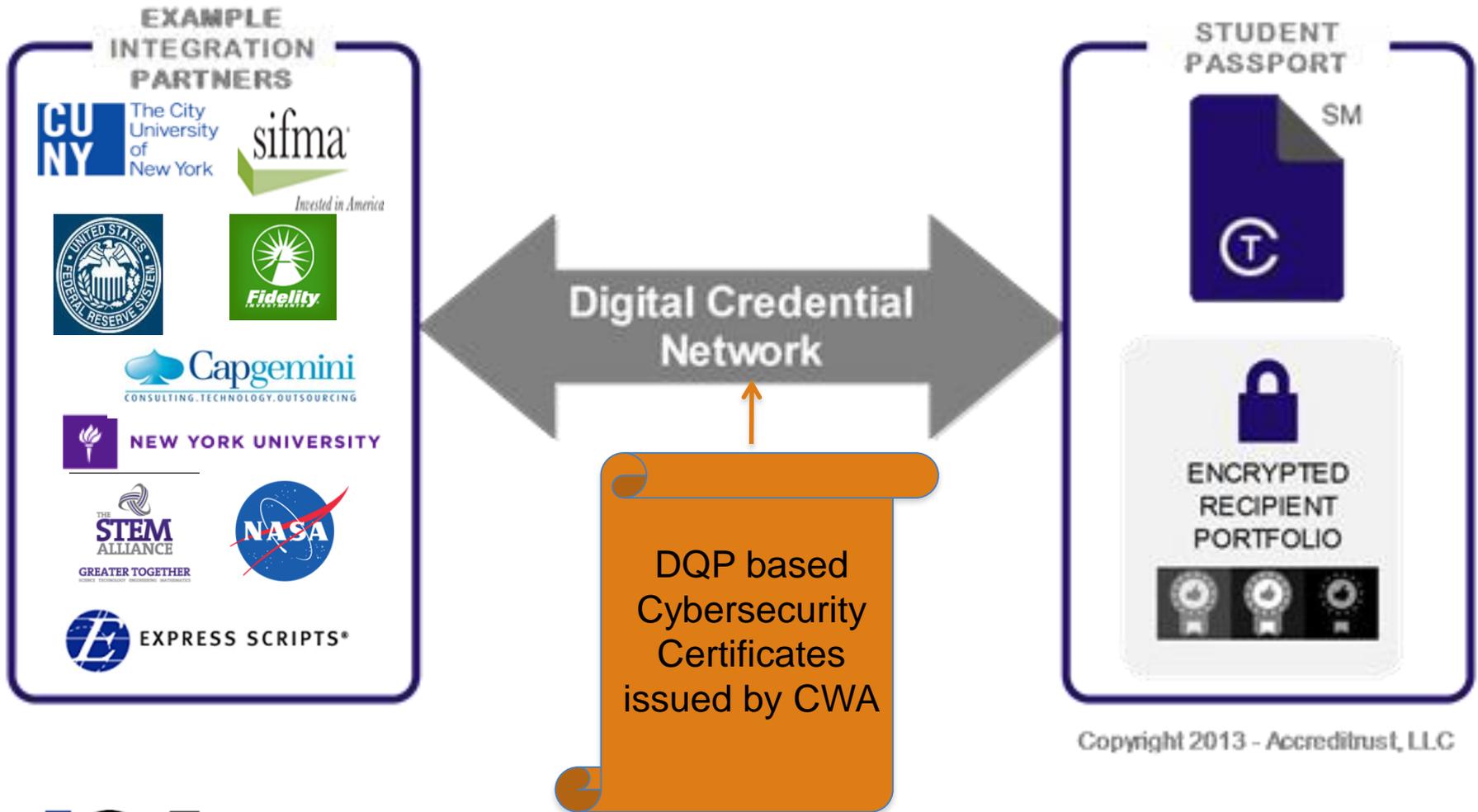


*Charles J. Camarda 10/19/11*

DR. CHARLES CAMARDA, ASTRONAUT STS-114 MISSION SPECIALIST  
NASA SENIOR ADVISOR FOR INNOVATION OFFICE OF THE CHIEF ENGINEER



# DQP Student “Enterprise Passport”



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# Student "Enterprise Passport"



Passport



Projects



Match



**Kyle Hamilton**  
Cooper Union

[Watch Kyle's video](#)

[Invite](#) [Send Email](#) [Add to Contacts](#) [Chat](#)

## Skills

Computer Architecture, Software Engineering, Algorithms and Theory, Web Engineering, Computer Scienc ... [more](#)

## Personal Highlights

Phi Theta Kappa



All Skills

Education

Experience

Certificates

Personal Highlights

Computer Architecture  
Computer Engineering  
★★★★☆

Web Engineering  
Computer Science  
★★★★☆

Software Engineering  
Computer Engineering  
✓★★★★☆ 10 yrs

Computer Science and Mathematics  
Arts & Science  
✓★★★★☆

Algorithms and Theory  
Computer Science  
★★★★☆ 10 yrs

Accounting  
Business  
★★★★☆ 15 yrs

# Next Generation Digital Resume

## “*Competency*” Profiling

### “*What Students Know and Can Do*”

#### Skills Continuum

Transcripts, Degrees, Enrollment, Certifications

#### Progression Mapping

Time Windows: Challenges, Innovation, Accomplishments

#### Pathways Roadmap

Stackable Credentials: Career Opportunities

“*Trusted Data – Validated Credentials*”

## Framework Provided Basis for all Human Capital Actions

- Workforce Baseline Studies – Understand Capabilities (strengths and gaps)
- Position Descriptions
- Hiring Actions (vacancy notices, interviews, assessments, etc.)
- Organizing Training Inventories/Catalogs
- Identify Training Gaps and Needs
- Curriculum and Certification Program Development
- Professional Development Roadmaps
- Professional Standards
- Succession Management

# Closing The Skills Gap – USA & UK

## CUNY Workforce Alliance Cybersecurity Initiative



- NYU
- Federal Reserve
- Morgan Stanley
- Goldman Sachs
- Bank NY Mellon
- Fidelity Investments
- Express Scripts
- RANE Network
- Perkins Coie
- Capgemini
- NASA
- National Student Clearinghouse
- 



## Mirror - UK Initiatives



Cabinet Office

Cyber Workforce Dev't  
MoD  
GCHQ  
Business Innovation &  
Skills (BIS)



The Sector Skills Council for  
Science, Engineering and  
Manufacturing Technologies



GREATER TOGETHER  
SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS



# The New York Times

[SundayReview](#)|Op-Ed Columnist

## How to Get a Job at Google *“Project Based Interviews”*

FEB. 22, 2014

Laszlo Bock, the senior vice president of people operations for Google — i.e., the guy in charge of hiring for one of the world’s most successful companies — noted that Google had determined that “G.P.A.’s are worthless as a criteria for hiring, and test scores are worthless. ... We found that they don’t predict anything.”

Bock is saying something important to them, too: Beware. **Your degree is not a proxy for your ability to do any job. The world only cares about — and pays off on — what you can do with what you know (and it doesn’t care how you learned it).** And in an age when innovation is increasingly a group endeavor, it also cares about a lot of soft skills — **leadership, humility, collaboration, adaptability and loving to learn and re-learn.** This will be true no matter where you go to work