

Hello

Please find attached the submission form iQ4 Copr for your consideration.:

We look forward to hearing from you regarding our input and initiative soon.

Sincerely

Peter Meehan

SVP International & Partnerships

Co-Founder Cybersecurity Workforce Alliance (CWA)

FCC CSRIC WG7 Cybersecurity Workforce NCWF

iQ4 Transforming the Learning Economy

12th January 2020

From: iQ4 Corp

To: NICE Leadership team

Submission for consideration in planned updates to the NICE Cybersecurity Workforce Framework, NIST Special Publication 800-181.

Submission Overview

iQ4 Corp makes this submission from three perspectives:

1. As past co-chair of the NICE workforce workgroup on taxonomy for the Private Sector;
2. As an interested party that utilizes the NICE taxonomy in its (1) Workforce Development and Optimization platform, and (2) The Cybersecurity Workforce Alliance (CWA) acceleration model, which uses the NICE taxonomy to describe learning outcomes delivered via the CWA virtual Cyber and Risk internships and apprenticeships.
3. iQ4 Corp has know-how, expertise and systemized capabilities that we are prepared to make available to the NIST/NICE executive, as outlined below, following discussion and agreement.

Executive Summary

Current situation

NICE is trying to serve the global Cyber Community by providing a standardized Cyber skills taxonomy which can flexibly be aggregated into “role definitions” or competencies based on Private Sector requirements. The method of delivering KSAs, competency and role definitions is via spreadsheets and/or via suggested standardized role models, such as the NIST/NICE reference document SP 800-181.

Problem Statement

The problems for anyone wishing to adopt the role/competency definitions is that:

1. SP 800-181 revisions frequently do not exactly match to their specific organisation or sector requirements – because 800-181 is a reference and example guide, and the spreadsheet/tables are not easy to flex.
2. To flex from the recommended ‘standard’, requires searching through the current (December 2016 revision) of 1,300+ rows to find additional/suitable KSAs to fit the requirement.
3. Users, even domain experts, are overwhelmed and confused by the sheer number and variety of KSAs, with no easy way that enables them to more easily and rapidly search for, compile and flex roles.
4. NICE needs to maintain framework to include Role/Specialty/competency/KSA plus Tasks and Context

Ease of adoption questions

How can NIST/NICE:

1. Provide more frequent revisions of the “off-the-shelf” open source NICE spreadsheets or SP 800-181 revisions?
2. More rapidly ingest input from different sectors, disciplines, regions and countries, if it wishes to have the Framework and taxonomy adopted globally?
3. Economically access a proven CYBER skills taxonomy to roles matching “engine” which allows for flexible re-combinations of skills into role definitions based on unique enterprise requirements?

Potential/Proposal for NIST/NICE – Productivity Sooner

iQ4 offers to engage in discussions with NIST/NICE regarding the use of relevant taxonomy and role compilation engines in the iQ4 Enterprise Platform, with:

1. A UI for ease of KSA induction, role generation and flexing.
2. The potential for iQ4 to also act as a service partner with domain expertise with proven capabilities. For example, the Platform roles engine has 137 [mainly] IT roles – including those in SP 800-181 - made up from 67,000 KSAs
3. KSA induction into the Platform from CSV files or parsing.
4. NIST /NICE becoming able to issue more frequent guidance and open source spreadsheets, in-line with the changing Cyber/Risk landscape.
5. The addition to auto Role iQ4 would like to discuss adding a free Skills Passport which would tie into the White House initiative on the Interoperable Learning Record (ILR), as it would establish a skills registry for NICE. iQ4 is offering an opportunity to discuss with NICE a pilot in-line within the Department of Commerce award for the proposed ILR, with iQ4's offer to include a focus on cybersecurity based on NIST/NICE.
6. A proposed discussion on the National Student Clearinghouse' Myhub and the ILR (iQ4 3.0) proposes that iQ4 can establish an individual's registry of experiential and academic learning. This would help the chair of the American Workforce Advisory Board is the Secretary of Dept of Commerce.
7. A potential agreement to work with iQ4 to scale cross sector and cross discipline (IT, healthcare, engineering etc)

By contributing to the chairs of the workforce workgroup on taxonomy, iQ4 is offering to lead/contribute the taxonomy/spreadsheet wider adoption. We propose discussing the provision of an application specific license of the iQ4 platform and taxonomy engine to compile roles from KSAs for the NIST/NICE organization, and perhaps beyond. This will enable NIST/NICE to economically: -

1. Take advantage of the iQ4 GUI and platform's taxonomy automation used for assembling 'standardized' roles, made up from KSAs and competencies;
2. Assistance in producing, the next revision(s) of taxonomy in spreadsheet form as open source free-ware for publication during 2020 and beyond.
3. Extend the NICE taxonomy/KSAs across additional sectors yet to be captured into the Framework.

The addendums are intended to support the proposition above by providing context on iQ4's experience, the ways in which Compliance and Regulation will drive the need for taxonomies of roles. It also uses some of the "Chat" extracts from the 3rd December 2019 on-line NICE workshop for the call for input to the next revision of SP 800-181.

We respectfully request a meeting with the NICE leadership to discuss the above ideas and initiative.

Peter Meehan
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Addendums follow.

Addendum 1. Aims

This initiative is aimed at helping NIST/NICE:

1. Deliver benefits sooner, including additional/new roles the wider community that NIST/NICE serves.
2. Enable consumers of the NIST/NCWF and NICE taxonomy to expand role definitions and more rapidly benefit from NIST/NICE direction and subject matter leadership.
3. Provide a way to deliver more/better standardized role profile templates for NICE taxonomy users/consumers, to then flex them to meet their needs
4. Inform and assist O*NET with feedback on job roles - more frequently than “every 12-months or more”.
5. Provide service support to Booze Allen Hamilton for their work with NICE in building a new role baseline with easier/quicker ways of flexing to new roles.
6. Flexibly and more inexpensively maintain the taxonomy updates (being updated in a taxonomy engine instead of spreadsheets)
7. Enable NIST/NICE offer advice to countries and international organizations looking to adopt the NIST/NCWF Frameworks, either directly or through the in-country US State Department efforts targeting Economic Development in those countries.

Addendum 2. Input sources for this document

1. iQ4 Corp’s USA National and International experience reveals that, while many we are in discussion with are aware of and/or are adopting the NIST Framework, few have heard of the NCWF SP 800-181 and its purpose/value, and even fewer are aware of the NICE taxonomy and what it is for.
2. The [anonymized] chat comments below, which are from the NICE Workgroup Session of December 3rd, 2019, reveals that many of those interested enough to join the NICE workgroup for on-line updates are unaware of the taxonomy and its suitability for the Private Sector.
3. iQ4 Corp and the CWA are in discussions globally with Enterprise Organizations, in Country Cybersecurity Councils e.g. UK, Germany, Japan, Greece, etc.....), the Heads of State representatives on behalf of a country President (supported by the USA State Department for Economic development), who is personally driving in-country skills and education to underpin economic development for that country. Their input has help form the iQ4 opinions in this document.
4. This submission describes some of the landscape and offers iQ4 and the CWA’s support to expand and deliver on the potential the Frameworks and the taxonomy offers cheaper, faster and with greater ease to flex role profiles.

Addendum 3. Speaker and “chat” extracts - NICE Workgroup Meeting held 3rd December 2019

Speakers

1. **Dr Stephanie Shively** – Booze Allen Hamilton. *“We are looking at using the NICE as the baseline and then flexing it to fit the range of roles”.*
2. **Pamela Frugoli**, O*Net/CareerOneStop/Competency Assessment Team Lead. Manpower Analyst Employment and Training Administration DoL. *“To keep pace with technology change, O*NET updates tech terminology for roles every 3-months but roles every 12-months or more”.*

Anonymized chat dialogue:

1. *We’ll need to capture new roles, like security automation*

2. *Cloud is missing*
3. *[Ben Scribner responding to:] "Can it cover disciplines like cloud, 5 G, AI, Quantum?"Answer: "It's a potential opportunity to adapt to emerging tech"*
4. *I like the message to evolve the framework to include the emerging tech workforce and requirements (e.g. quantum, IoT, 5G, AI, nano, etc.).*
5. *I'll take another look at the NICCS, perhaps a little UX design would be helpful for the resources. e.g. **I should be able to go to a role and have an immediate like to the competencies/KSAs without calling up a spreadsheet.** (I know pretty demanding for a Canadian!)*
6. *The list of work roles will have to grow, especially if cybersecurity is professionalized. There are more areas to add like cloud and perhaps more in the intel side and cybersecurity support areas*
7. *Did/does NICE have a "roadmap" for really engaging with the private sector on CWF to encourage understanding & adoption?*
8. *That is a great question. I cannot tell you how many times I have heard people say that the NICE CWF is for gov't/military only, not for industryThis revision provides an opportunity to change that legacy, clearly.*
9. *If we do better on next version of 800-181- I can use it with many fortune100/global1000 customers.*
10. *Does anyone outside of DoD actually understand the differences between Knowledge, Skills and Abilities?*
11. *@Rodney - is there a roadmap / plan for continuing to socialize NCWF with private sector?*
12. *I was one of the industry SMEs who was interviewed when creating the NCWF, and at the time there did not appear to be a lot of industry participation in that effort, and I think that legacy lives on in the NCWF contents and visibility.*
13. *I think the beauty of the framework is that the work roles can be combined in any given JOB or POSITION - they are not the same thing. An organization needs to not just specify the work role, but which KSAs are relevant for each position*
14. *Speaking as one in the private sector I would welcome being brought into the conversation to help provide the industry perspective. Edison Electrical Industry (EEI) is a good point for the utilities.*
15. *Are there any systems in place to help recruit individuals who have degrees in Cybersecurity?*
16. *In dealing with the non-government sector, how will the NICE project managers coordinate their efforts with industry and who are the points of contact for each industry*

The chat comments above give a clear indication that:

1. There is a lack of understanding of the current taxonomy framework, its availability and value for the private sector;
2. There is demand for widespread inclusion of job roles not already described as Cyber roles by have cyber/risk implications involved e.g. Cloud, AI/DS...
3. A UI interface to the taxonomy would make life easier for workforce/training/planning managers to more rapidly and flexibly assemble roles. iQ4 already has this capability/GUI.

Addendum 4. Marketplace Observations on Risk and Resilience

The following is intended as market feedback/analysis as a representation of our experience of adoption, leading to why NICE taxonomy has yet to gain traction.

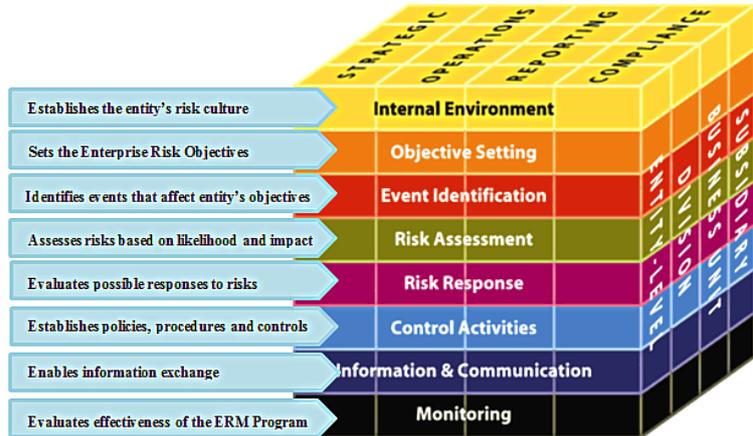
The NICE organization has consistently advised that the NCWF and Taxonomy is not a prescription for how to describe job roles within [NICE/NIST] competency areas, it is a Framework from which users could build competencies and roles to meet their specific needs.

Addendum 5. C-Suite Controls on Risk and Reliance

Driven by compliance and internal audit, which is being strengthened by legislation, the C-suite are typically focused on BUSINESS RISK. The

COSO framework is an example of a top-down approach to managing risk and, with the support of audit, providing assurance to the stakeholders and regulators that best practices, frameworks and controls are in place and are measurable and auditable. Graphic

Source: [NCUA.org](http://www.ncua.org)



The eight components of business risk management encompass the five previous components of the Integrated Internal Control Framework while expanding the model to meet the growing demand for risk management.

COSO and the hidden link to the NIST Framework and NICE

Increasingly, compliance regulations are providing teeth to internal audit to ensure the C-Suite and the organization are operating within compliance as desired. For example: The Board/C-suite is obliged to report to the regulator(s) within 48-hours when an attack has occurred. Internal audit has recently been strengthened to not only ensure that appropriate action was taken when an incident has occurred, but also:

1. Auditing/Reporting is required for what is was a *potential* incident (false positives), not just real ones. Audit needs to verify:
 - a. That there really was *no* delay in reporting within the required 48-hours (or other timeframe). This is deigned to avoid situations where an incident – or a potential one - was worked on for “N” days/weeks before the incident reporting date was declared to the information commissioners as if, “it happened within the last 48-hours”, when clearly it was days or weeks old. The potential of an audit exposing that the organization had an incident in play for many days before it was declared to the information commissioners could potentially wipe value from the organizations stock price. Investors/shareholders might feel that the organization that they had invested in was not properly managed and protected.
 - b. How many hands the investigation and reporting went through to report it, with some auditors advising that they will be looking at the competency level of the individuals investigating the incident. This is to ensure that busy security and risk managers don’t simply delegate to an unskilled intern or others and lay the organization, stakeholders and its clients or supply chain at further risk from the threat or the regulators.

The above delivers the link from the business risk/management world and language to the NIST Framework and therefore NCWF and NICE Taxonomy; i.e. organizations must to ensure the appropriate roles/skills/competencies are applied - wherever and when required. *The point in making this reference to roles and competencies relates to such factors as:*

1. Even if the C-Suite and auditors realize that they need the right skills in place, a wide community of potential beneficiaries appear unaware of the NICE Framework/taxonomy and how it could help them;
2. The initiative in this document invites NICE to discuss how we can collectively drive the adoption and value delivery from the taxonomy to support Critical Infrastructure operations.

Addendum 6. NICE taxonomy framework experiences – historical and future perspective

iQ4 adopted the NICE taxonomy when the Cybersecurity Workforce Alliance (CWA) was formed in January 2015. The founding CISOs and SIFMA had decided that the Cybersecurity virtual-internship model and courses would be wrapped around experiential learning courses, with the NIST Framework and real-world scenarios at the core. This meant that the learning outcomes for the job roles the courses are developed for are based on the KSA for those roles. In April 2015 Frank Cicio, CEO, was asked to become chair of the workforce workgroup on taxonomy. This was prior to the release of SP 800-181. In the Fall of 2015, Frank Cicio invited Leo Van Duyn, as a domain expert to co-chair the workforce workgroup.

The challenges faced at that time was that there were and absence of KSAs for Essential/soft skills, Mobility/BYOD, European/International compliance and there was no standardized way of curating or assembling KSAs to competences to job roles. The fact that few people outside of NIST and the NICE leadership team knew of the NICE Framework, so iQ4 leveraged its relationship with CWA members to co-opt them in to review the then current revision for what was missing. By December 2016, we had added:

1. 77-rows of Essential/soft skills, which are generally recognized by policy makers and behavioral experts;
2. 32-rows around governance and compliance, including “Knowledge of how compliance investigations need to be handled in different European countries (because of workers’ rights)
3. 161 rows from the output of the Federal Communications Commission CSRIC7 workforce workgroup, including KSAs for submarine cables, microwave, carrier compliance and RF communications.

The outcome is a more comprehensive representation in 1,314 rows for the private sector, a basis for conversation with interested parties and a foundation for further development.

How iQ4 has leveraged the NICE taxonomy

Current situation

iQ4 sits at the intersection between Education (and external talent supply) and the Enterprise, where (from the left in the graphic) the student or candidate can identify their career pathways into an employer and the employers can look within their enterprise for the skills they need or look back into the supply chain for the skills, or the learning outcomes from education, they need to find/build their ideal future talent.

Attraction, Engagement Up Skilling, Optimization, Mobility Agility and Retention

1. External Pipeline

Attract



Selection



Hiring



2. Internal Acceleration

On-board & Up-Skill



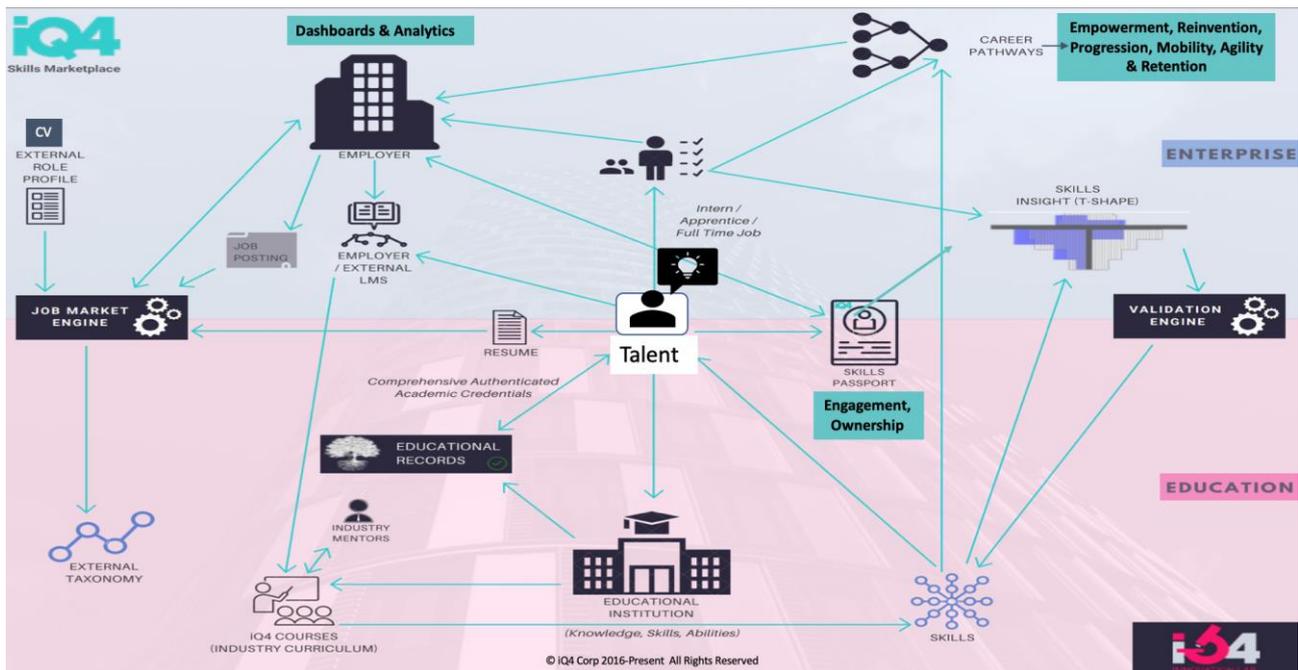
3. Optimization

Enterprise M.I.

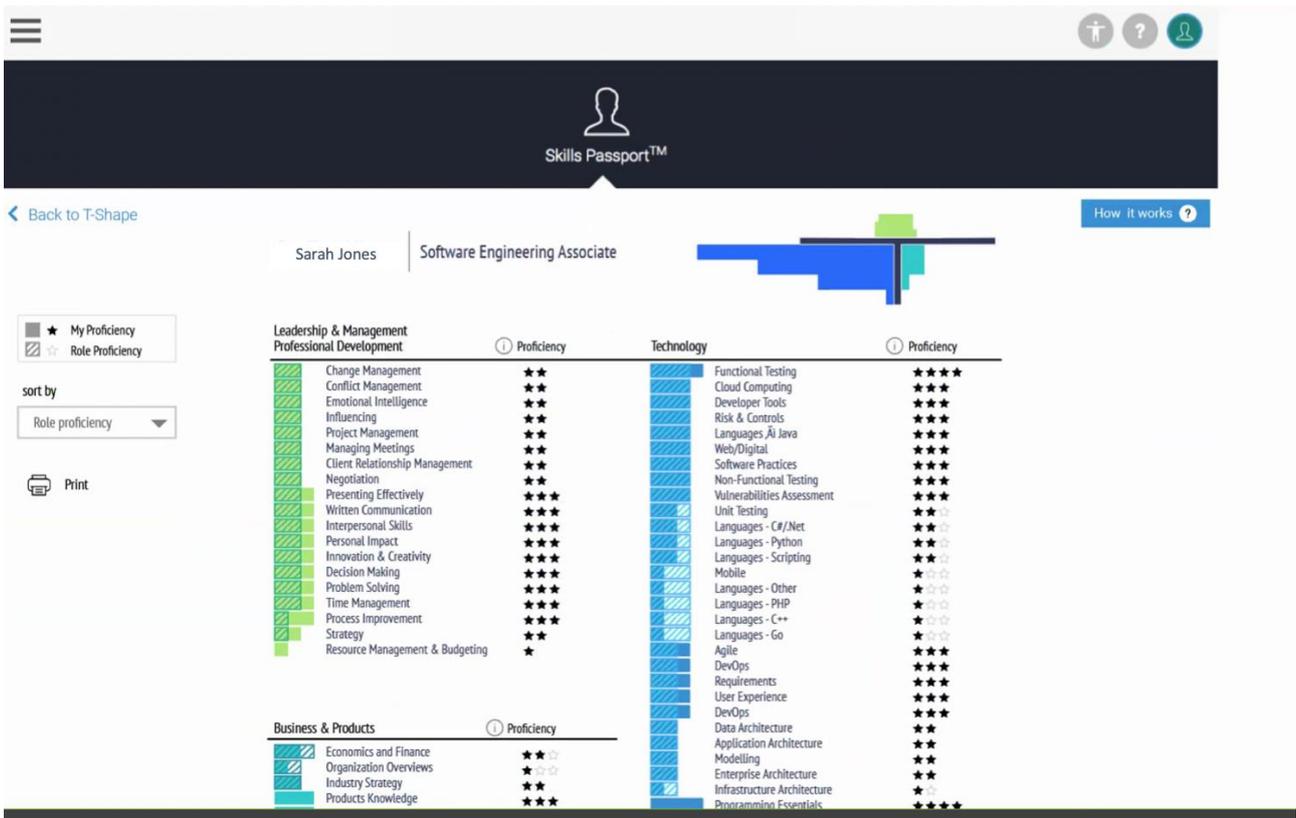
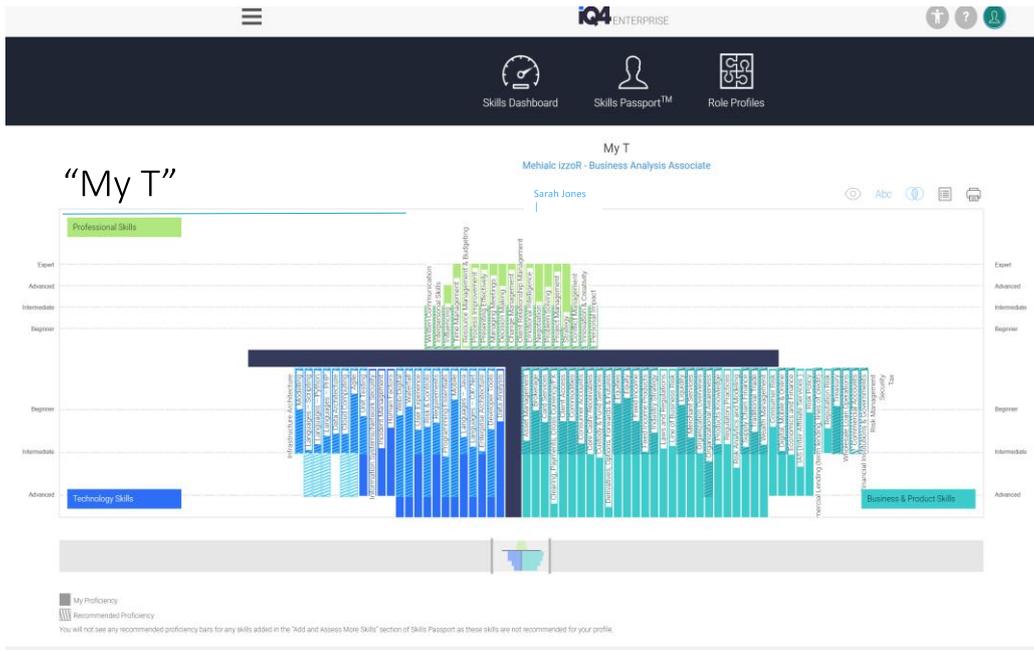


The NIST/NICE/other taxonomies are used to align to the individual's KSAs and competencies to the role requirements, as seen overleaf.

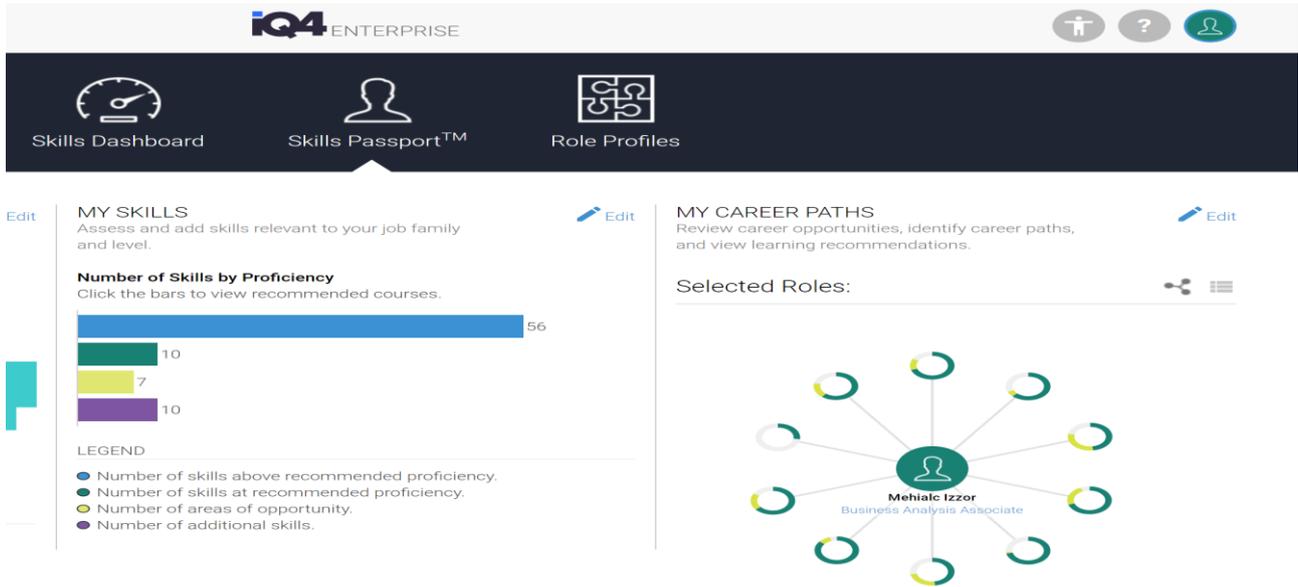
Talent at the centre of the workforce of the future



The NICE taxonomy has been absorbed within the iQ4 Platform taxonomy engine. It ingests NICE and other taxonomies, primarily to describe workforce needs and to match people to job-roles. The taxonomy engine has a User Interface, which is used to search for KSAs and flexibly compile job roles; thereby simplifying the tasks and efforts of those developing their job families and roles. This greatly reduces creation and management of roles with far less effort than associated with “spreadsheet nightmare”. KSAs and competencies for the individual are visualized in the iQ4 Universal Skill Passport.



The Platform also presents the users with career pathways and learning opportunities for up-skilling and progression aimed at building retention. Including the 52 job roles described on SP 800-181, the platform currently includes 137 job roles across cyber/Risk and IT/Ops and 67,000 KSAs



Future, soon to be released NICE taxonomy enhancements/benefits

The most recent iteration is a result of a very few domain experts’ efforts. The outcome includes de-duplication, simplification and additions; thereby making life easier for the spreadsheet user community to create standardized roles, which can also be more easily flexed/customized. These benefits will naturally cascade into the iQ4 Platform and GUI.

A major step forward in this new revision of SP 800-181 is the reintroduction the Skill Categories (Competencies). In the broader enterprise IT and operations world - and on iQ4’s platform - these Categories are interpreted for “Job Roles”, made up from KSAs with an assessment, from which users can flexibly create an ideal job role profile.

Product/capability route map

iQ4’s innovation laboratory and engineering teams are working with NICE/other taxonomy domain experts to use machine learning and AI to identify KSAs and skill-sets from cross sector source that will be useful in flexibly curating cross sector/discipline KSAs into standardized roles yet have the ability to flex them. This will augment the existing ability to ingest taxonomy from (say) SFIA (Skills For the Information Age), Institute of Information Security Professionals (IISP) and ESCO - the multilingual classification of European Skills, Competences, Qualifications and Occupations, or other taxonomies to deliver a systemized and industrialized approach to simplifying taxonomy use-cases and harnessing best practices from around the world. Such automation avoids the spreadsheet taxonomy user’s spreadsheet nightmare or simply not use the NICE elements because it is overwhelming, especially for SMBs or those without domain expertise.

Continued iQ4 support for NIST/NICE initiatives

1. CWA Virtual-internships – >2,750 CWA Alumni entering the workforce with 10,000 more planned in the next 3 years; ~43% of CWA Alumni are women without any bias applied to recruiting women into the program.
2. iQ4 runs DoL approved Virtual [pre] Apprenticeships, where the learning outcomes meet NICE KSAs, and those required to within the University CAE program courses, to ensure that the course hours qualify for On-The- Job (OJT) learning/hours.

3. The current White House and Department of Commerce initiative Interoperable Learning Record (ILR).
 - a. This is a program where iQ4 is embedded within the National Student Clearinghouse (NSC) collaboration in a consortium including IBM (Blockchain), Walmart, Apple, Workday and others, to capture, verify and curate both academic learning records and present the holistic verifiable record I the iQ4 Universal Skills Passport™.
 - b. The NSC verified academic records can/will be combined with the experiential learning and assessments and be available on the NSC's MyHub portal of student records, which is based on the iQ4 Platform and Passport
4. Continued R&D in AI & Data Science for taxonomy use cases will source, parse and ingest EMSI and other taxonomy descriptors to provide analytics and metrics for job roles.
5. iQ4 will expand the delivery of expert services on taxonomy and framework use cases.

Acknowledgements

Without the vision and tenacity of the taxonomy workgroup Co-Chair, Leo Van Duyn, VP Corp Infrastructure Risk, Cyber Security Training & Education at JPMorgan Chase, much of the contribution to the progressive development, simplification and augmentation of the NICE taxonomy spreadsheets would not be possible. We also acknowledge those who recently worked in the mini task force on the taxonomy simplification and augmentation revision, yet to be published.