



# REWIRE - Cybersecurity Skills Alliance A New Vision for Europe

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# R.4.6.2 Cybersecurity Skills Qualification Standards CISO



<b>Title</b>	R.4.6.2 Cybersecurity Skills Qualification Standards – CISO
<b>Document description</b>	This document is the Cybersecurity Skills Qualification Standard (i.e., Certification scheme) for the role profile of the Chief Information Security Officer.
<b>Nature</b>	Public
<b>Task</b>	T4.6 Design of Certification Schemes for selected Cybersecurity Occupational Profiles
<b>Status</b>	Final
<b>WP</b>	WP4
<b>Lead Partner</b>	APIROPLUS SOLUTIONS
<b>Partners Involved</b>	CCC, LRQA
<b>Date</b>	31/07/2023

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## 1. EXECUTIVE SUMMARY

“Certification for persons is one means of providing assurance that the certified person meets the requirements of the certification scheme. Confidence in the respective certification schemes for persons is achieved by means of a globally accepted process of assessment and periodic re-assessments of the competence(s) of certified persons.”<sup>1</sup>

To achieve the above-mentioned goals, and have a truly valid, comparable and value adding certification, this document has been created. This document is the Cybersecurity Skills Qualification Standard (i.e., Certification scheme) for the role profile of the Chief Information Security Officer.

The contents of this document are well aligned with ISO/IEC 17024:2012, Conformity assessment — General requirements for bodies operating certification of persons and to the CONCORDIA Cybersecurity Skills Certification Framework<sup>2</sup>.

The document provides information on what the REWIRE CISO certification scheme covers in terms of tasks, skills and knowledge. It outlines describes the different roles involved in the certification process, and comprehensively describes the examination mechanism and the system of rules, procedure and management for carrying out certification. Finally, the document presents how the basic principles of the certification scheme are fulfilled.

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<sup>1</sup> <https://www.iso.org/standard/52993.html>

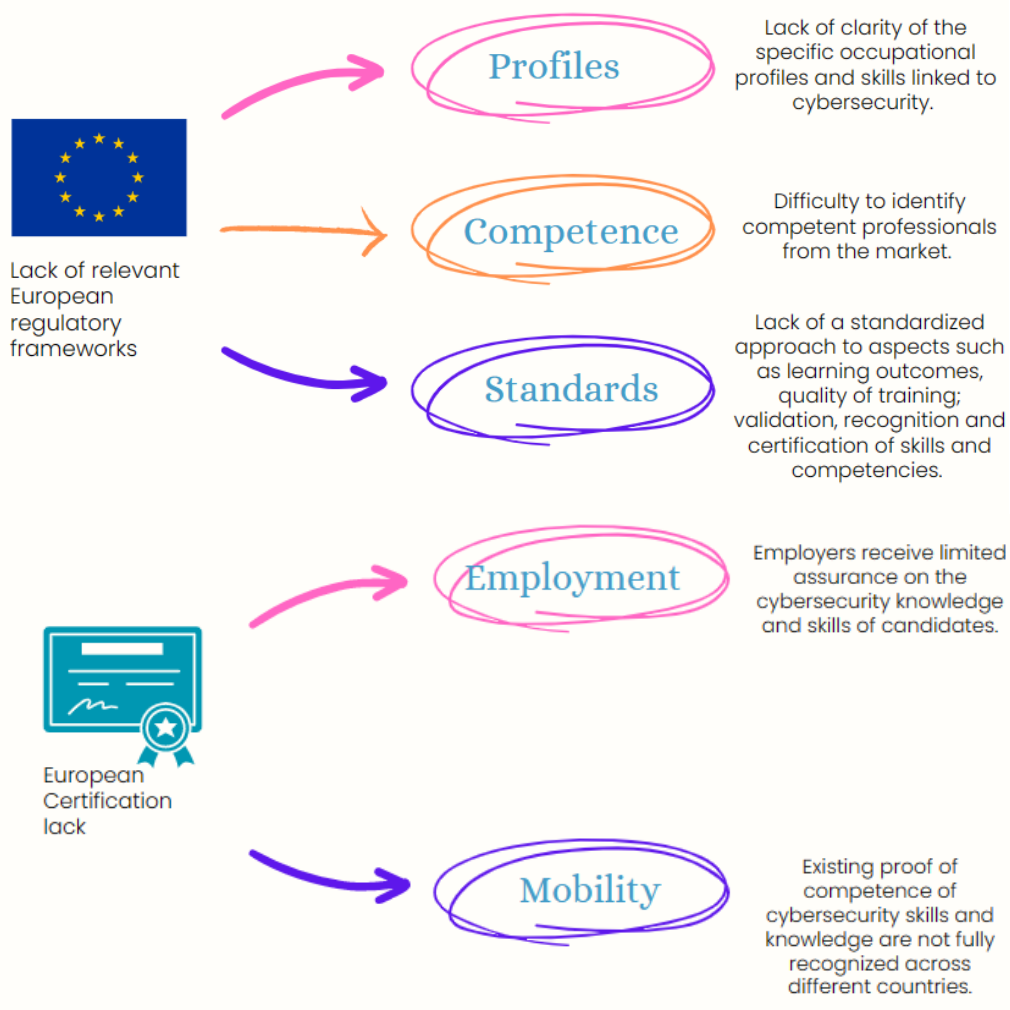
<sup>2</sup> [https://www.concordia-h2020.eu/wp-content/uploads/2022/12/CONCORDIA\\_Certification\\_Framework\\_1.0.pdf](https://www.concordia-h2020.eu/wp-content/uploads/2022/12/CONCORDIA_Certification_Framework_1.0.pdf)

## 2. INTRODUCTION

### 2.1. Purpose

The cybersecurity skills gap has been evidenced now for many years and in various qualitative and quantitative studies such as surveys. Recent surveys and publications (e.g. ISACA<sup>3</sup>, (ISC)<sup>24</sup>, Fortinet<sup>5</sup>, World Economic Forum<sup>6</sup> and others), indicate that although actions are being implemented to address the cybersecurity skills gap, the gap still persists and presents a barrier to cybersecurity resilience.

In the REWIRE deliverable R.2.1.1. PESTLE analysis results<sup>7</sup>, the REWIRE team, through the implementation of a relevant PESTLE analysis, identified the following factors influencing cybersecurity education:



<sup>3</sup> <https://www.isaca.org/go/state-of-cybersecurity-2022>

<sup>4</sup> <https://www.isc2.org/-/media/ISC2/Research/2022-WorkForce-Study/ISC2-Cybersecurity-Workforce-Study.ashx>

<sup>5</sup> <https://www.fortinet.com/content/dam/fortinet/assets/reports/report-2022-skills-gap-survey.pdf>

<sup>6</sup> <https://www.weforum.org/agenda/2020/01/why-closing-the-cybersecurity-skills-gap-starts-from-the-top/>

<sup>7</sup> [https://rewireproject.eu/wp-content/uploads/2022/04/R2.1.1-PESTLE-analysis-results\\_FINAL-v1.1\\_compressed.pdf](https://rewireproject.eu/wp-content/uploads/2022/04/R2.1.1-PESTLE-analysis-results_FINAL-v1.1_compressed.pdf)

**Figure 1 PESTLE analysis related factors**

Taking into consideration the above-mentioned factors, the REWIRE project has proposed a strategy (Deliverable R2.3.1. Cybersecurity Skills Strategy<sup>8</sup>) and concrete actions, with the final aim to tackle the cybersecurity skills gap. Specifically, within the activities to improve cybersecurity skills development in a better structured and more simplified manner, the following have been identified:

<b>Lack of common regulatory framework</b>	<b>6. Establish common cybersecurity training standards</b>
	6.1. Design of a European skills framework for cybersecurity
	6.2. Develop cybersecurity skills and degrees certification scheme

**Figure 2 Extract from R2.3.1. Cybersecurity Skills Strategy**

A skills certification scheme contains the technical requirements and methods through which a specific skills certification activity is implemented.

## **2.2. About ISO/IEC 17024:2012**

ISO/IEC 17024:2012<sup>9</sup> is an international standard developed jointly by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). This International Standard has been developed with the objective of achieving and promoting a globally accepted benchmark for organizations operating certification of persons.

Certification for persons is one means of providing assurance that the certified person meets the requirements of the certification scheme. Confidence in the respective certification schemes for persons is achieved by means of a globally accepted process of assessment and periodic re-assessments of the competence of certified persons.

ISO/IEC 17024:2012 can serve as the basis for the recognition of the certification bodies for persons and the certification schemes under which persons are certified, in order to facilitate their acceptance at the national and international levels. Only the harmonization of the system for developing and maintaining certification schemes for persons can establish the environment for mutual recognition and the global exchange of personnel.

<sup>8</sup> [https://rewireproject.eu/wp-content/uploads/2022/05/R2.3.1-Cybersecurity-Skills-Strategy\\_FINAL-v1-compressed.pdf](https://rewireproject.eu/wp-content/uploads/2022/05/R2.3.1-Cybersecurity-Skills-Strategy_FINAL-v1-compressed.pdf)

<sup>9</sup> <https://www.iso.org/standard/52993.html>

ISO/IEC 17024:2012 specifies requirements which ensure that certification bodies for persons operating certification schemes for persons operate in a consistent, comparable and reliable manner.

The requirements in ISO/IEC 17024:2012 are considered to be general requirements for bodies providing certification of persons. Certification of persons can only occur when there is a certification scheme. The certification scheme is designed to supplement the requirements included in ISO/IEC 17024:2012 and include those requirements that the labour market needs or desires, or that are required by governments.

### **2.3. The CONCORDIA Cybersecurity Skills Certification Framework**

The CONCORDIA Cybersecurity Skills Certification Framework<sup>10</sup> provides information on the minimum requirements that a certifying organization should comply with when implementing certification schemes for cybersecurity skills.

These requirements can be seen as an expansion and specialization of a selection of the ones included in ISO/IEC 17024:2012 Conformity Assessment — General Requirements For Bodies Operating Certification Of Persons, especially in the area of certification principles.

As mentioned above, the requirements in ISO/IEC 17024:2012 are generic and should be further customized to meet the specific needs of the interested parties through the design and implementation of a suitable certification scheme.

The CONCORDIA Cybersecurity Skills Certification Framework acts as a high level customization of the principles of ISO/IEC 17024:2012 within the area of cybersecurity skills.

Specifically, the CONCORDIA Cybersecurity Skills Certification Framework includes a number of requirements and information on the certification principles of:

- Impartiality – 8 Requirements
- Responsiveness – 5 Requirements
- Confidentiality – 8 Requirements
- Responsibility – 5 Requirements
- Competence – 18 Requirements

The REWIRE project has decided to adopt the principles and guidelines of the CONCORDIA Cybersecurity Skills Certification Framework, in the implementation of the relevant cybersecurity skills certification schemes.

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<sup>10</sup> [https://www.concordia-h2020.eu/wp-content/uploads/2022/12/CONCORDIA\\_Certification\\_Framework\\_1.0.pdf](https://www.concordia-h2020.eu/wp-content/uploads/2022/12/CONCORDIA_Certification_Framework_1.0.pdf)



## 2.4. The CISO certification scheme

This document, builds on the requirements of ISO/IEC 17024:2012 and the CONCORDIA Cybersecurity Skills Certification Framework and presents the technical requirements and processes to be implemented in order to support the certification of knowledge and skills of individuals for the role of the Chief Information Security Officer (CISO).

This CISO certification scheme has been developed by the certification related partners of the REWIRE project and as such these partners share the ownership of this certification scheme. These partners are also identified in the beginning of the document but are also provided hereunder for clarity purposes.



Cyprus Certification Company



LRQA Group Limited



APIROPLUS Solutions Ltd.

The responsibilities of the co-owners of the certification scheme are precisely described within the various sections of this document.

This document provides a comprehensive description of the tasks and competencies of the CISO role, the scheme's technical committee, the examination mechanism, the process leading to certification, the principles and relevant processes to support the certification mechanism.

## 3. CHIEF INFORMATION SECURITY OFFICER (CISO)

The REWIRE project has analyzed the European Cybersecurity Skills Framework<sup>11</sup> (ECSF) profile for the Chief Information Security Officer as part of the activities for WP4 (specifically, for R4.2.1 REWIRE Curricula and Training Framework and R4.2.2 Training courses material). This analysis resulted in the formulation of the tasks, skills, knowledge and pre-requisites for the role. This section includes information about the mission, the tasks, the skills and knowledge for the role of the Chief Information Security Officer (CISO).

### 3.1. CISO Mission

The Chief Information Security Officer (CISO) is a senior executive responsible for overseeing and ensuring the security of an organization's information systems and assets. With the increasing prevalence of cyber threats and the critical role of data and technology in modern

<sup>11</sup> <https://www.enisa.europa.eu/topics/education/european-cybersecurity-skills-framework>

business operations, the CISO plays a vital role in safeguarding the confidentiality, integrity, and availability of information.

### 3.2. CISO professional level

In general, the role of the CISO resides at e-CF level 4 and 5 and EQF level 7 and 8.

This would mean:



e-4		
e-cf level descriptor	Influence	Autonomy
Extensive scope of responsibilities deploying specialized integration capability in complex environments; Full responsibility for strategic development of staff working in unfamiliar and unpredictable environments.	Provides executive leadership	Demonstrates leadership and innovation in unfamiliar, complex and unpredictable environments. Addresses issues involving many interacting factors.
e-5		
e-cf level descriptor	Influence	Autonomy
Overall accountability and responsibility; recognized inside and outside the organization for innovative solutions and for shaping the future using outstanding leading edge thinking and knowledge.	Determines strategy	Demonstrates substantial leadership and independence in contexts which are novel requiring the solving of issues that involve many interacting factors.
<b>Complexity for 4,5</b>	Unpredictable - unstructured	
<b>Behaviour for 4,5</b>	Conceiving, transforming, innovating, finding creative solutions by application of a wide range of technical and/or management principles.	

Table 1. e-cf levels



Level 7		
Knowledge	Skills	Responsibility and authority
Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research Critical awareness of knowledge issues in a field and at the interface between different fields	Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches; take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
Level 8		
Knowledge	Skills	Responsibility and authority
Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	The most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	Demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

Table 2. EQF levels

### 3.3. CISO Main Tasks

The tasks of a Chief Information Security Officer (CISO) can vary depending on the organization's size, industry, and specific security needs.

The main tasks that have been identified by ENISA and been updated and enriched by REWIRE project are the following:

Tasks	e-CF level
Advise the top Management on the economics of cybersecurity.	Level 3
Advise, support and coordinate with internal stakeholders on subjects related to cybersecurity and privacy compliance requirements.	Level 3
Assist in the design, development, implementation and management of disaster recovery, business continuity and incident response policies, procedures, plans, standards and guidelines.	Level 4

Tasks	e-CF level
Assist in the design, development, implementation and management of Risk Management within the organization. Have ownership and overview of the Risk Management process.	Level 4
Design, develop, implement and manage cybersecurity policies, processes, procedures, standards, plans, guidelines and frameworks (including roles and responsibilities) in alignment with the business strategy to support the organizational objectives.	Level 4, Level 5
Design, develop, implement, manage and continually improve the information security management system.	Level 3
Design, document and implement cyber incident management policies, procedures and plans.	Level 3, Level 4
Document and communicate effectively to Top Management as needed on cybersecurity incidents, risks, findings.	Level 3
Document and communicate to Top Management as needed on cybersecurity incidents, risks, findings.	Level 3, Level 4
Document, report and communicate (for information and approval where needed) the cybersecurity vision, strategy and risks (risk appetite, residual risk etc) to top management.	Level 5
Educate, monitor and assess the awareness of organization members as needed.	Level 4
Establish relationships, collaborate and communicate with stakeholders as needed (including cybersecurity-related authorities and communities).	Level 4
Monitor advancement in cybersecurity and the internal and external context.	Level 4
Monitor, analyse, assess and evaluate the current cybersecurity status of the organization	Level 4
Monitor, analyse, assess and evaluate the cybersecurity compliance of the organization.	Level 4, Level 5
Oversee, monitor and safeguard the quality of related assessments.	Level 5
Secure and manage the budget for cybersecurity.	Level 4, Level 5

The profiles already included information of the e-cf e-competences and their levels, so the above table, has transferred the information of the professional levels to the tasks and from there, they are propagated to the skills and knowledge.

### **3.4. CISO Skills**

#### **3.4.1. REWIRE project Skills Groups**

<b>REWIRE project Skills Groups</b>	
Collaborate and Communicate	Policy Development
Data, Asset and Inventory Management	Problem Solving and Critical Thinking

REWIRE project Skills Groups	
Digital Forensics	Project Management
Enterprise Architecture and Infrastructure Design	Risk Management
Incident Management	Strategic Relationship Management
Information Security Controls Assessment	Technology Fluency
Intelligence Analysis	Testing and Evaluation
Law, Policy, and Ethics	Threat Analysis
Organizational Awareness	Workforce Management

*Table 3. REWIRE project Skills Groups*

### 3.4.2. Skills Based on ESCO Mapping

Skills based on ESCO mapping	
Analyse and implement best practices	Implement ICT recovery system
Apply change management	Implement ICT risk management
Apply ICT system usage policies	Investigate security issues
Apply information security policies	Lead a team
Apply security principles	Lead others
Build networks	Maintain plan for continuity of operations
Calculate probabilities	Manage a team
Communicate and promote the organisation's risk analysis outcomes and risk management processes	Manage an ISMS
Communicate with stakeholders	Manage outsourced security
Communication	Manage relationships with stakeholders
Comply with legal regulations	Manage resources
Coordinate efforts of stakeholders	Manage system security
Create cyber incident reports	Manage the organization's information security strategy
Create risk reports	Monitor assessment
Define maturity models for cybersecurity management	Monitor developments in field of expertise

Skills based on ESCO mapping	
Define risk policies	Monitor ICT research
Develop information security strategy	Monitor security measures
Develop predictive models	Motivate others
Disseminate internal communication	Perform document review
Draw up risk assessment	Perform risk analysis
	Preserve the integrity of forensics / digital investigation evidence

*Table 4. Skills based on ESCO mapping*

### 3.5. CISO Knowledge

#### 3.5.1. REWIRE project Knowledge Groups

REWIRE project Knowledge Groups	
Data Privacy	Risk Management
Data, Asset and Inventory Management	Software Development
Enterprise Architecture and Infrastructure Design	System Administration
Incident Management	Technology Fluency
Law, Policy, and Ethics	Testing and Evaluation
Operating Systems	Threat Analysis
Policy Development	Workforce Management

*Table 5. REWIRE project Knowledge Groups*

#### 3.5.2. Knowledge based on ESCO

Knowledge based on ESCO mapping	
Cloud Technologies	Disaster Recovery Plans
Data Warehouse	Documentation Types
ICT Capacity Planning Strategies	Emergent Technologies
ICT Infrastructure	Financial Management
ICT Security Standards	GDPR
Manage Digital Identity	Human Resources Department Processes

<b>Knowledge based on ESCO mapping</b>	
Mobile Device Management	ICT architectural frameworks
Mobile Device Software Frameworks	ICT network security risks
Organisational Resilience	ICT problem management techniques
Security Of Assets Legislation	ICT security legislation
Service-Oriented Modelling	ICT security standards
Applications And Related Architecture	Incident Handling Standards, Methodologies And Frameworks
Attack Vectors	Information Security Strategy
Budgetary Principles	Internal Auditing
Business Continuity	Knowledge Of Vulnerability And Misuse Testing
Business Continuity Details	Management Department Processes
Business Knowledge	Monitoring And Logging
Business Management Principles	Offensive Security Practices
Context Of The Organization	Organisational Policies
Cost Management	Participatory Decision-Making
Cyber Attack Counter-Measures	Process-Based Management
Cyber Security	Project Management Principles
Cybersecurity Frameworks	Risk Management
Cybersecurity Certifications	Secure Systems Development Life-Cycle
Cybersecurity Ethical Requirements	Security Regulations
Cybersecurity Maturity Models	Service Level Agreements
Cybersecurity Planning And Investment	Systems And Services Provisioning
Cybersecurity Policies	Testing Types And Procedures
Database	Threat Modelling Techniques
Database Security Standards	

**Table 6. Knowledge based on ESCO mapping**

## 4. HUMAN RESOURCES

### 4.1. Scheme's Technical Committee

A Certification scheme's Technical Committee, is a group of people, formed before the activation of the certification scheme and remain active as long as the certification scheme is active.

The Certification scheme's Technical Committee is essential body responsible for the adequate implementation and operation of the certification scheme and has the following responsibilities and authorities:

- The Certification scheme's Technical Committee defines the main principles and content for the certification scheme to fulfil the technical requirements for each specific Certification Scheme and develops the scheme, taking into account the interests of relevant interested parties.
- The Certification scheme's Technical Committee takes into consideration the various developments and makes proposals and suggestions for changes and improvements to the certification scheme.
- The Certification scheme's Technical Committee keeps necessary records / documented information to support accountability and traceability of changes to the certification scheme.
- The Certification scheme's Technical Committee decides on the dates and methods that the examinations of the certification scheme are carried out.
- The Certification scheme's Technical Committee evaluates and analyzes the results from the "beta" testing of the examination for the certification scheme and decide if anything within the design and operation of the certification scheme needs to be revised or proactively improved.
- The Certification scheme's Technical Committee, before the start of an examination period makes sure that all necessary supporting materials are in place exists and implemented within the systems as required.
- The Certification scheme's Technical Committee coordinates the announcement of the examination period(s), providing the necessary information to all audiences and effectively responding to request for information to relevant interested stakeholders.
- The Certification scheme's Technical Committee shall authorize the activation / opening of the application process and shall review the received applications against the pre-requisites identified as part of the certification scheme.
- The Certification scheme's Technical Committee shall implement automatic responses to be sent through the system for every step of the application, examination and certification process.
- The Certification scheme's Technical Committee is responsible for receiving and responding to complaints or objections from the interested parties in a timely manner. The Certification scheme's Technical Committee shall involve in the response other REWIRE partners or interested parties if deemed necessary.
- The Certification scheme's Technical Committee shall evaluate the examination mechanism, the conduct of the examinations and assessment procedure, shall review



the performance and results of the examination for quality assurance purposes as well as shall propose and implement necessary changes

- The Certification scheme's Technical Committee shall make sure that the examination mechanism is valid, objective, reliable and suitable for use in future examinations.
- The Certification scheme's Technical Committee is responsible for the decision-making process of certification.

To achieve the above, the Certification scheme's Technical Committee, shall convene as appropriate and at least once a year to ensure adequate operation of the certification scheme. These meetings can take place either in person or remotely. The Certification scheme's Technical Committee shall keep minutes of the decisions taken during each meeting. The Certification scheme's Technical Committee may invite other interested parties to participate in these meetings if deemed necessary.

The Certification scheme's Technical Committee shall be comprised of 3 (three) people, each one representing the "certification related" partners of the REWIRE project. All members of the Certification scheme's Technical Committee, shall bound by non-disclosure agreements for the entire duration of their engagement within the committee and for a period of 10 years after the termination of the engagement.

## **4.2. Personnel related to the assessment material**

The Certification scheme's Technical Committee is sustained by the partners of the REWIRE project in the creation of the databank of examination items to support the theoretical and practical part of the examination mechanism.

The REWIRE project has created a specific guideline (Guidelines: Theoretical assessment Questions), which provides guidance to all involved parties:

- on the types of questions that can be technically implemented in the theoretical examination platform,
- on the difficulty levels of questions and
- on the applicability of the different types of questions per level of skills or knowledge (taking into consideration REWIRE deliverable: R4.6.5 Cybersecurity Skills Assessment Recommendation).

For the practical examination scenarios, directions have been provided in collaboration with the team responsible for the creation of the Cyberange platform.

The creation of the examination items (theoretical and practical) has been assigned to partners taking into consideration their competence on the role profile the certification scheme is covering, to make sure that they are suitable and will ensure a high level of quality of the examination and the produced certification.

The Certification scheme's Technical Committee collects, reviews and uploads the examination material in the relevant platforms. If during the various stages of the certification process, changes need to be undertaken on the examination items, the Certification scheme's Technical Committee shall make the relevant communications and assign the implementation of the changes to the appropriate competent parties.

Individuals participating in the development, change, assessment, review or evaluation of examination items are not allowed to undertake the exams (participation in the examination) and are bound by non-disclosure agreements for the entire duration of their engagement as members of the committee and for a period of 10 years after the termination of the engagement.

### **4.3. Examiners**

Examiners are individuals responsible for assessing learner's achievements and for the grading of an exam. Based on the design of this certification scheme, examiners are only responsible for the practical exam administered through the REWIRE project cyberange.

The examiners shall have the following minimum competency:

- Certified Educational Proficiency Generally (depending on country requirements)
- Minimum 100 hours teaching experience in the cybersecurity domain
- Minimum 5 years of professional experience in the cybersecurity domain
- Degree at a university level on Information Technology, Computing, Computer Science, Computer Engineering, Information Technology and Information Systems, Computer Networking and other similar fields of study.

Following the completion of the practical exam period, the examiners shall be assigned examination attempts and will grade them based on the design of the examination scenario. If an examiner has a potential conflict of interest in the examination of a candidate, the Certification scheme's Technical Committee shall take the necessary measures to ensure that the confidentiality and impartiality of the examination are not compromised. These measures shall be duly recorded.

All examiners shall be bound by non-disclosure agreements for the entire duration of their engagement and for a period of 10 years after the termination of the engagement.

### **4.4. Invigilators**

As defined within ISO 29996:2021 (Education and learning services — Vocabulary)<sup>12</sup>, Invigilator is the authorised person who administers or supervises an assessment, ensuring fair and proper conduct of examinations.

Invigilators shall be involved in the certification mechanism process to ensure that the confidentiality, integrity and impartiality of the examination is not compromised. The invigilators are not required to have specific qualifications. The invigilator may be administrative staff member of any partner of the REWIRE project. During the examination, the invigilators will verify the identity of the candidates based on relevant documents, supervise the applicants to ensure compliance with the examination procedure, closely work with the Head of examination to resolve any issues that may arise during the examination, prevent fraud involving the behaviors and actions of candidates during the examinations and complete the necessary paperwork (if applicable) etc.

If an invigilator has a potential conflict of interest in the examination of a candidate, the Certification scheme's Technical Committee shall undertake the necessary measures to

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<sup>12</sup> <https://www.iso.org/standard/54664.html>

ensure that the confidentiality and impartiality of the examination are not compromised. These measures shall be duly recorded.

All invigilators shall be bound by non-disclosure agreements for the entire duration of their engagement and for a period of 10 years after the termination of the engagement.

#### **4.5. Other personnel supporting the certification process**

Some of the supporting activities in relation to the operation of the certification mechanisms may be assigned to outsourced partners (e.g. the support of the online platform). In such cases, the partner responsible shall have a formal agreement with a clear scope and definition of responsibilities for the third parties. To the extent that such parties may have access to the examination content, the agreement shall include also a non-disclosure clause bounding the organization to confidentiality for the entire duration of their engagement and for a period of 10 years after the termination of the engagement.

## **5. EXAMINATION MECHANISM**

### **5.1. General**

Examination mechanisms are designed to assess candidates' qualifications based on, and consistent with, the profession, by any reliable and objective mean as written, oral and/or practical exams, observation etc. The examination requirements must ensure the comparability of results of each single examination, both in content and difficulty, including the validity of fail/ pass decisions.

The examination mechanism includes a method which can assess and verify that the candidate possesses the knowledge and skills that have been described by certification scheme requirements, either acquired by work experience, formal or non-formal learning outcomes or other means.

The examination mechanism for this certification scheme is split into two parts: theoretical and practical. In the sections below, information is provided for each one of these two parts. Since certification is not a spontaneous process, from the candidate point of view, the process starts with the application.

For the first implementations of the certification scheme, the language of all the related material shall be English. The project partners will re-consider the linguistic dimension after initial operation of the certification scheme to see if parts or all of the information related to the certification need to be translated also into other languages.

### **5.2. The application**

To facilitate the easy and consolidated experience of the examination process, the REWIRE project has decided to utilize a customized on-line platform owned by the REWIRE project partner CCC.

This platform is a specially customized Learning Management System (hereafter referred as LMS).

To begin the application process, the candidate needs to first create an account in the LMS. The information regarding where and how the account can be created, shall be provided to the applicant with the rest of the information when the activation of the certification scheme and the examination period is published.

By entering the requested information into the system, the applicant will automatically receive an email to activate their account (User activation).

With the effective activation of the account, the applicant will be able to register for the desired examination by completing the relevant application form on the platform (Course application) under the 'Certification of persons' section of the platform.

The applicant must provide all personal information during the application process and, by accepting the relevant fields, affirms compliance with this regulation and all pertinent procedures.

In addition, the applicant uploads electronic proof of identity and academic credentials, or qualifications as required by the certification scheme (see below section 5.3. Prerequisites for applicants).

The application form includes the following information and data for each applicant:

- Name, surname, Father's name (optional), date of birth (optional), address, Telephone Number, Email, tax identification number (optional), special requests and contact details of the candidate (optional) and
- Evidence of pre-requisites as required by the certification scheme

The applicant receives an automated message confirming that their application has been received and that they will be notified as to whether or not it has been accepted.

If the application is approved, an email is automatically sent to the candidate with the application's status.

Any application for Certification that does not satisfy all prerequisites will be denied. In such event the applicant is notified prior to the examinations that their application has been rejected.

As mentioned above, the Certification Schemes Technical Committee undertakes the evaluation of the existence of the prerequisites based on the specified requirements of the certification scheme.

The system has the ability to assign specific number of applications to different members of the Certification Schemes Technical Committee. In the end of this evaluation process, the Certification Schemes Technical Committee convenes to reach the final decisions.

The applicant has the option of submitting new documents through a new application before the exams are held and up until the deadline for submitting applications in order to be reconsidered for the examination.

After the evaluation of completeness and approval of the application by the technical committee, each candidate can find personal information, the unique candidate number, and the exam in which they desire to participate in their personal account.

### **5.3. Prerequisites for applicants**

The professionals should already have a level of IT / IS knowledge and skills at e-CF level 2 - 3 (EQF levels 5-6). Such knowledge could be substantiated by the following educational and professional experiences:

- Degree at a university level on Information Technology, Computing, Computer Science, Computer Engineering, Information Technology and Information Systems, Computer Networking and other similar and Fulltime practical experience of at least 4 years in Information Security.
- Vocational Education Degree on Information Technology, Computing, Computer Science, Computer Engineering, Information Technology and Information Systems, Computer Networking and other similar and experience of at least 6 years in IT or IS.
- Professional Certification in an IS/IT subject related to cybersecurity (systems administration, operational procedures, network management, monitoring tools management etc) and fulltime practical experience of at least 6 years in IT or IS.
- Fulltime practical experience of at least 10 years in IT or IS.

To ensure the integrity of the process and that the certificates are awarded to specific natural persons, it is mandated that the person also submits a valid personal identification document during the prerequisites phase. This document will be also used during the theoretical and practical exams, as a proof of identity.

## **5.4. Theoretical examination**

For the theoretical examination of skills and knowledge the following apply:

- The theoretical examination is conducted through a dedicated platform owned by the CCC partner of the REWIRE project.
- To ensure the integrity of the examination, the examination session is monitored through an invigilator. The invigilator, using the ZOOM tool, will guide the applicant on the steps to take, in order to have a view of the candidate's screen, a view (video) and sound from the candidate. These measures have been deemed mandatory in order to ensure the high value, quality and integrity of the examination mechanism and certificate.
- Information, instructions for use and encouragement for testing shall be sent to candidates prior to their examination slot.
- Each candidate may only have one attempt. For this attempt, 1 hour and 40 minutes shall be allocated.
- The theoretical examination consists of a quiz with sixty five (65) multiple choice questions, of two levels of difficulty (Basic and Advanced), selected randomly from the Examination Questions Bank.
- The Questions Bank includes approximately 300 different multiple-choice questions for evaluating the knowledge and skills described in Section 3. above. To ensure consistency of the questions, a special guideline has been provided to all examination items authors.
- For each examination item, there is a direct mapping on the Task of the role it relates to, the grades awarded, the level of difficulty and the professional level of the skills and knowledge assessed.
- In each examination attempt, the examination items shall be selected from all different tasks and all different levels equally.
- The pass mark for the quiz is 60% and is derived automatically from the platform.

- The score achieved by the candidate shall be displayed at the end of the examination attempt to the candidate. If there is a problem with the integrity of the exam, the invigilator has the right to stop the process at any time before the final score is provided.
- A quality review process on the databank shall be implemented at regular intervals or if complaints exist. If deficiencies are identified appropriate corrective actions shall be implemented in a timely manner.

## **5.5. Practical examination**

The practical examination is administered through an online platform (cyber range). A transparent and user friendly instruction guide and video are provided to use the system.

The security measures implemented within the platform are at same high level and aligned with the requirements related to the theoretical exam.

The practical exam incorporates the verification of the relevant skills under one or more comprehensive scenario(s). The questions / tasks requested to be performed by the candidate do not reference or provide the solution or provide an indication of the skills being evaluated. (E.g. The question should be “identify the devices that reside in your network and create the relevant network map” and not “Run the NMAP application, in order to find other assets within your network”).

Information about the use of the platform and its abilities, at the latest when the candidate enters the practical examination environment for the first time.

The performance of the candidate, the activities implemented and the responses to the questions are recorded and timed.

With the help of the examiners, each attempt is graded based on a baseline created with each examination scenario. The system has the ability to provide hints to the candidates, but they are limited in number, do not cover the entirety of the examination scenario and for each use, a defined number of grades are deducted.

A collection of scenarios covering the same exam, fulfilling the above. Enough scenarios exist to ensure adequate coverage based on the number of iterations per period.

A quality review process on the scenarios collection shall be implemented at regular intervals or if complaints exist. If deficiencies are identified appropriate corrective actions shall be implemented in a timely manner.

As in the case of the theoretical exam, the practical exams are administered in specific time slots and have assigned invigilators who with the help of the ZOOM platform, monitor each attempt.

Each candidate may only have one attempt. For this attempt, 1 hour shall be allocated.

The practical examination consists of a series of 20 questions incorporated within one scenario selected randomly from the Examination Scenarios Bank.

The Scenarios Bank includes approximately 5 different scenarios for evaluating the skills described in Section 3. above.

For each question, there is a direct mapping on the Task of the role it relates to, the grades awarded, the level of difficulty and the professional level of the skills assessed.

The pass mark for the quiz is 80%.

## 5.6. Grading

A candidate's result in the examination is deemed positive if they successfully pass both the theoretical and practical exams. Conversely, if a candidate does not pass either of the exams, the result is considered negative. The Certification Scheme Technical Committee shall announce the final results for both successful and unsuccessful candidates within 30 calendar days from the date of the examination.

In the event that a candidate disagrees with their final result, they have the opportunity to submit an appeal within five (5) working days from the announcement of the result, following the procedures outlined by the Certification Scheme Technical Committee. The Certification Scheme Technical Committee is then required to carefully consider the appeal and provide a response to the individual within a specific timeframe (refer to paragraph 7.4, "Objections, Complaints, and Appeals") regarding the decision made regarding the filed appeals.

Participation in the examination mechanism is not limited, allowing individuals to participate as frequently as desired until they successfully pass the exam and obtain certification.

## 6. CERTIFICATION

### 6.1. Issue and award of Certificate

The Certification Scheme's Technical Committee is responsible for assessing the registration and examination procedure and validating the certification decision.

The Certification Scheme's Technical Committee must evaluate the following at a minimum:

- That the participant(s) is/are included in the participant list incorporated in the 'Results Report'.
- That the Pass/Fail results for every candidate, is recorded in the 'Results Report' for every part of the examination.
- That the examination personnel have signed the required Non-disclosure agreements and have declared no conflicts of interest exist.
- And confirms the registration for the examination, completion of candidate information, documentation of participation requirements, candidate acceptance declarations, and application approval.

If all above have been verified, the Certification Scheme's Technical Committee reaches their decisions and documents them appropriately. If the decision to issue a certificate is positive, the authorised person handling the examination platform prepares the "Certificate Terms of Use" contract, which is issued to the candidate. Since the "Certificate Terms of Use" has been returned signed, the certificate is then issued via the platform. Certificates are generated automatically, emailed to the Certified Person, and archived in their platform account.

If the decision is negative following evaluation by the Certification Scheme's Technical Committee, it is recorded in the Results Report and then the person handling the platform notifies the candidate in writing.

Each certificate issued shall include the following information:

- The certification scheme owners
- The name of the certification scheme
- The name and surname of the Certificate Holder
- A unique Uid of the Certificate Holder
- A reference to the version of the applicable certification scheme under which the certificate is issued
- A unique Certificate Number
- The date the certificate is issued
- The expiration date of the certificate
- The contact details within the owners of scheme, where people may address requests, complaints or any other relevant issue
- A disclaimer regarding the usage of the certificate.
- A QR code directing the interested parties to the verification website.

A sample of the certificate template is included in Annex 1.

To ensure traceability and validation capability of certificates, a register of certificates shall be maintained with at least the following information:

- Certification Scheme
- Certificate Number
- Name, Surname of the Certificate Holder
- Date of certificate acquisition
- Date of certificate expiration
- The pre-requisites

The certificates shall have a validity of 3 years. More information on how a certified person may retain the certification is included in section 6.3.

The information related to certification process shall be retained by the relevant involved partners of the REWIRE project for a period of 6 years. Indicative information of this kind may be included: the application form, the examination notifications, the results, the various decisions of the Certification Scheme Technical Committee (including the ones related to certification), information regarding performance evaluation, appeals, complaints etc.

## **6.2. Validation of certification information**

The REWIRE project provides the public an opportunity to verify the validity of a certificate at any point of time. This process shall be anonymous for the requester.

The validation and provision of information process is designed in a way that allows for the protection of the availability, confidentiality and integrity of the information.

This activity, as a first step shall be provided through a relevant minisite within the REWIRE project website.

Each certificate (as mentioned in 6.1. above) shall have attached a QR code, which will direct any interested party to the relevant minisite within the REWIRE project website. Through this website, a query can be performed based on the number of the certificate.

The query shall provide the following results:



- Status of certificate: VALID / Invalid
- Name of certificate holder: xxx\*\*\*\* (some of the letters will be displayed only)
- Date of issue: xx/xx/xxxx

### **6.3. Certificate's maintenance**

The certificate shall have a validity of three years. Since the cybersecurity domain is changing at a fast pace, it is crucial that certified cybersecurity professionals maintain their knowledge and skills up to date during the period of validity of the certificate.

In order for the certified professionals to maintain their certification, they need to submit (before the expiration of the certificate) to the owner of the certification scheme evidence of the implementation of suitable Continuing Professional Education activities.

A guideline shall be drafted by the scheme owners in due time regarding the type of the suitable Continual Professional Education activities, the number of suitable Continuing Professional Education (CPE) credits / points that need to be accumulated before the expiration and a method to calculate the CPEs.

This document shall include amongst others: The definition of CPEs, the activities that are eligible to provide CPEs, the correspondence between the duration of these activities and the earned CPEs, the method of reporting CPEs and the method of CPEs validation.

The owners of the certification scheme shall use the LMS platform used for administering the examination to allow the cybersecurity professionals to view, submit, change, delete, report, access, and object their CPEs per certificate.

This system also allows for the management, access and maintenance of the information needed by the certificate holder at any time. Suitable and adequate measures are enforced for the protection of the private information of the involved individuals.

### **6.4. Suspension and withdrawal of the Certificate**

If at any point there is valid and validated proof that the certified person does not abide to the Certificate Terms of Use, or uses the certificate in a fraudulent, misleading or offensive manner, the certificate can be suspended. To suspend a certificate, the Certification Scheme Technical Committee need to convene, examine the relevant evidence and extract a majority vote for the decision to suspend the certificate.

Before reaching this point, the certified professional shall be contacted and become aware of the situation. Opportunities to remedy the situation shall be provided. In case the problems are not solved and following the decision of the Certification Scheme Technical Committee, the Certificate is suspended for a six months period. If after the six months period, the problems have still not been solved, then the Certification Scheme Technical Committee withdraws the Certificate. In case of a withdrawal, the professional has no longer the right to participate to another examination of this Scheme. The list of withdrawn certificates will be maintained by the responsible Organization.

### **6.5. Recertification**

In the event that a certified person desires to extend their certification beyond the initial 3 year period, it is necessary for them to submit a new application to the organization responsible, clearly indicating their intention to continue, no later than three months prior to the certification's expiration date.

The certified professional needs to attach evidence of the CPEs required as mentioned in 6.3. section of this document The Certification Scheme Technical Committee shall review the application and decide if the professional shall be re-certified.

After a positive relevant decision, the certificate will be reissued, retaining the same registration number, date of initial certification, date of re-certification, and a new 3-year validity period.

## **7. PRINCIPLES**

### **7.1. Certificate Terms of Use (CCC)**

Certified persons have to comply with the current Regulation. Certified persons must follow any revisions or additions to the Regulations if they occur in order for them to always be in compliance with the applicable obligations. Any revisions or additions to the Regulations will be communicated to certified persons in writing, and the responsible Organization, in its sole discretion, will designate a transitional period during which the certified person must abide by them.

Each Certificate is issued to the certified person (beneficiary) but remains as property of the responsible Organization until it expires or, under extraordinary circumstances, until the certified person (beneficiary) is asked to return it for the following reasons:

- at the time of application for the examination, they had submitted information which it has been found to be false or misleading,
- misleading use of the certificate by certified persons,
- a dispute or complaint regarding the certified person,
- a request by the certificated person to discontinue the use of the granted certificate

The Certificate belongs to the certified person, who must only use it for themselves and only for the certification for which they were certified. It must not be utilized in any way that would be deceptive, and the holder must present it upon demand.

Whether for any reason the certified person is unable to maintain the level of competence for which they have been certified, they must notify the responsible Organization promptly.

### **7.2. Confidentiality**

The personal data of applicants and certified professionals remain confidential throughout the whole Certification process (from receiving the application until the issue of the certificate and its maintenance).

The owners of the certification scheme, upon request, provide information about the validity and the scope of the Certificates issued. In case the owners of the certification scheme are

legally forced to reveal any confidential information, then the person interested will be informed.

Measures and procedures exist in all related partners of the REWIRE project regarding the response to information security incidents and personal data breaches.

Backups and any other measures deemed necessary are undertaken to ensure the availability, confidentiality and integrity of the information and the systems.

### **7.3. Data privacy and data retention policy**

The information regarding the request of a person towards the certification scheme owner shall be collected, processed as needed, disclosed only to the roles needed and retained as needed based on a specific retention policy. A data retention policy has been designed taking into consideration amongst others the purposes of processing and the current applicable legal and regulatory requirements.

Since the information related to the certification process is personal, a data privacy policy has been created for this purpose and is provided to candidates before they enroll to the LMS system.

The policy contains the following information:

- the identity and contact details of the joined data controllers – owners of the certification scheme
- the contact details of the DPOs, where applicable
- the intended purpose of the personal data processing as well as the legal basis for processing
- the recipient or categories of recipients of the personal data, if any
- the details of any transfer, where the owners of the certification scheme intend to transfer personal data to a third country and what additional safeguards are in place.
- the period for which the personal data will be stored, or the criteria used to determine this period
- the process for the candidate to request access to and rectification or erasure of personal data or to restrict or object to processing, as well as data portability.
- the process for the candidate to withdraw consent
- the right for the candidate to lodge a complaint with the relevant supervisory authorities.
- Whether the provision of personal data is a statutory or contractual requirement or a requirement necessary to enter into a contact, as well as whether the candidate is obliged to provide the personal data and the possible consequences of the failure to do so.
- The fact that there is no use of automated decision-making, including profiling.

### **7.4. Objections, complaints and appeals**

An interested party (candidate, examinee, certified professional, employer, third party, etc.) may wish to challenge the results of an examination at any stage of the examination process.

In this case, the interested party has the option of submitting its request digitally to the Certification Scheme Technical Committee responsible for the exams. Within 30 calendar days, the Certification Scheme Technical Committee must investigate the request, take corrective action if necessary, and notify the complainant in a digital manner.

The effective resolution of complaints and appeals is an important means of protecting the Certification Scheme Technical Committee responsible for the examinations and interested parties from errors, omissions or inappropriate behaviors.

## **7.5. Updating the assessment materials**

The periodic update of assessment materials within a certification scheme is a crucial aspect of maintaining its effectiveness and relevance. Recognizing the ever-evolving nature of the cybersecurity domain, it is essential to ensure that the assessment material aligns with current industry standards, best practices, and emerging trends.

The Certification Scheme Technical Committee responsible for the certification scheme undertakes a diligent process to review and update the assessment material. This process involves engaging subject matter experts, industry professionals, and stakeholders to gather insights and relevant data regarding the knowledge, skills, and competencies required for individuals in their respective fields.

Through comprehensive analysis and validation, the assessment material is refined and updated to accurately assess the proficiency and capabilities of individuals seeking certification. This includes the review and revision of theoretical knowledge assessments, practical examinations, case studies, and any other assessment components relevant to the certification scheme.

Furthermore, the Certification Scheme Technical Committee ensures transparency and quality in the update process by adhering to established guidelines, protocols, and standards. The updated assessment material is reviewed, validated, and approved by the Certification Scheme Technical Committee to ensure its integrity and reliability.

By regularly updating the assessment material, the certification scheme not only reflects the current industry landscape but also promotes continuous professional development and maintains the credibility and value of the certification. This commitment to staying up-to-date with evolving industry demands contributes to the professional growth and proficiency of individuals holding the certification, ultimately benefiting the industry as a whole.

## **8. CLOSING REMARKS**

The document provides information on what the REWIRE CISO certification scheme covers in terms of tasks, skills and knowledge. It outlines describes the different bodies and roles involved in the certification process, and comprehensively describes the examination mechanism and the system of rules, procedure and management for carrying out certification i. Finally, the document presents how the basic principles of the certification scheme are fulfilled.

The various requirements as described within this document, shall be implemented when the certification scheme is activated and will remain active as long as the scheme is operational.

During the life-time of the certification schemes, changes will be implemented in a controlled manner, as described within the document.

## 9. LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation	Explanation/ Definition
ISO	International Organization for Standardization
IEC	International Electrotechnical Commission
CISO	Chief Information Security Officer
ISACA	Information Systems Audit and Control Association
(ISC) <sup>2</sup>	International Information Systems Security Certification Consortium
FORTINET	Global Leader of Cybersecurity Solutions and Services
PESTLE	Political, Economic, Social, Technological, Legal and Environmental factors
CONCORDIA	Cyber security cOMpeteNCe fOR Research and InnovAtion
e-CF	European e-Competence Framework
EQF	European qualifications framework
ESCO	European Skills, Competences, Qualifications and Occupations
LMS	Learning Management System
ZOOM	Is a proprietary videotelephony software program developed by Zoom Video Communications
CPE	Continuing professional education

*Table 7. List of abbreviations and acronyms*

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## 12. ANNEXES

### ANNEX 1. Certificate Template




The REWIRE project Certification Scheme technical Committee certifies that

**Surname, Name**  
Uid: xxxxxxxxxxxx

has successfully met all requirements and is qualified as

**Chief Information Security Officer.**

The requirements include prerequisite knowledge, skills, and experience as defined within the REWIRE CISO Certification Scheme (version 1, 01/08/2020), the "Certificate Terms of Use", and the successful (Pass mark) of both of the parts of the certification exam.

 **Certificate No:**  
**Date of Certification:**  
**Expiration date:**

The REWIRE project  
Certification Scheme Technical Committee

This certificate is issued and owned by the REWIRE project.

Contact Person: \_\_\_\_\_ Email: \_\_\_\_\_

A certificate that circulates and is transacted on the market but does not comply with the above standard must be reported to the REWIRE project so that the appropriate actions can be taken. If there is a reason, it is recommended to contact the REWIRE project to verify the validity and authenticity of the certificate. This certificate is not a substitute for credentials or other qualifications mandated by local law.

