EUROPEAN CYBER SECURITY ORGANISATION

Towards a resilient digital Europe

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The 2nd ECSCI Workshop on Critical Infrastructure Protection

28 April 2022

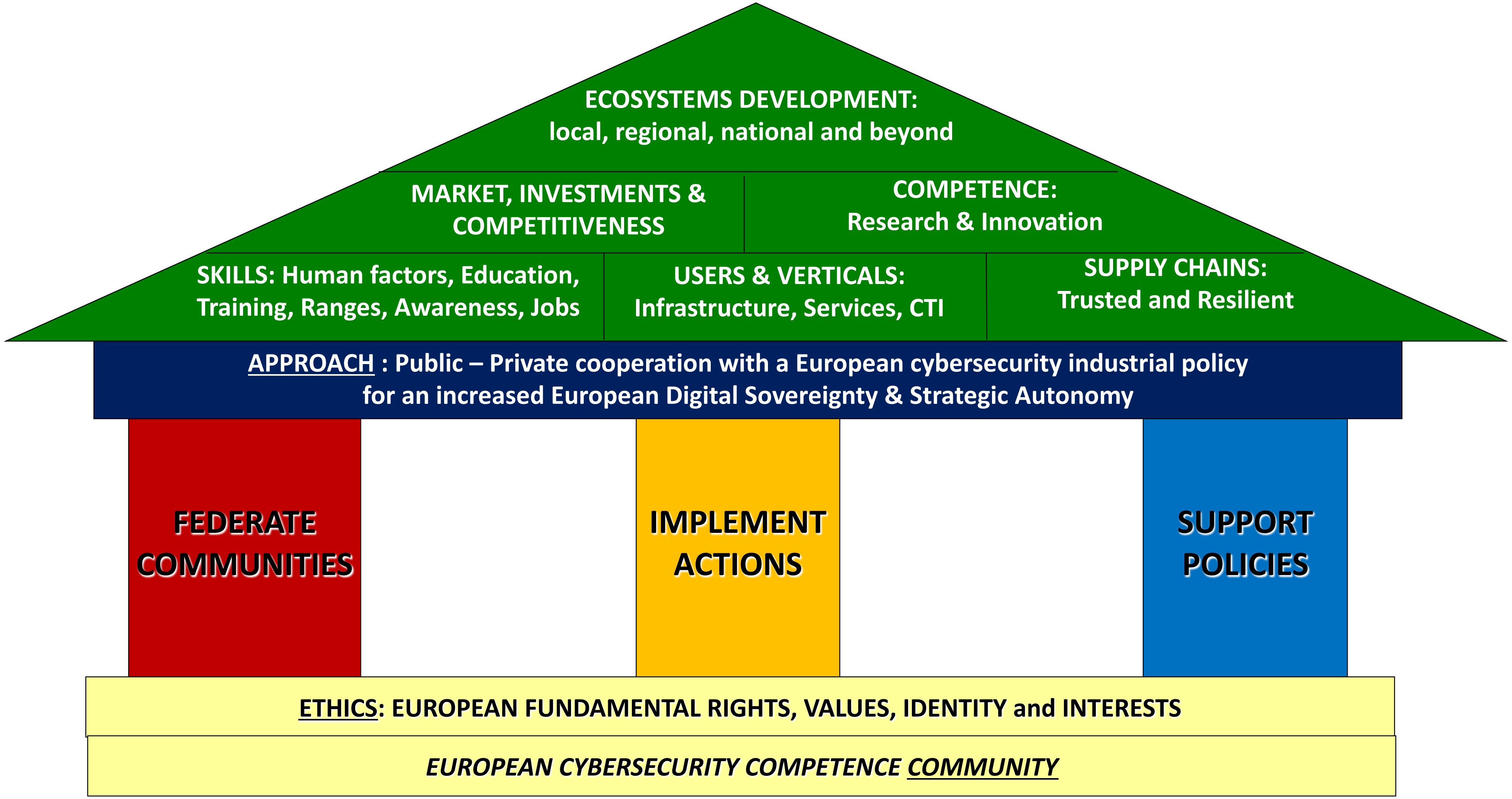
ECS
EUROPEAN CYBER SECURITY ORGANISATION

Created in 2016 as the contractual counterpart to the European Commission for implementing Europe's unique Public-Private Partnership in Cybersecurity.

Today, ECSO positions itself as the obvious partner to the European Cybersecurity Competence Centre in driving the European Cybersecurity Community with more than 26O members across 29 countries, connecting more than 2000 organisations in Europe.

Vision To achieve a Cyber resilient digital Europe and increase European Digital Sovereignty & Strategic Autonomy through the establishment of trusted & resilient supply chains for cybersecurity solutions and services.

ECSO Strategy



ECOSYSTEMS DEVELOPMENT:
local, regional, national and beyond

MARKET, INVESTMENTS & COMPETITIVENESS

COMPETENCE:
Research & Innovation

SKILLS: Human factors, Education, Training, Ranges, Awareness, Jobs

USERS & VERTICALS:
Infrastructure, Services, CTI

SUPPLY CHAINS:
Trusted and Resilient

APPROACH : Public – Private cooperation with a European cybersecurity industrial policy for an increased European Digital Sovereignty & Strategic Autonomy

FEDERATE COMMUNITIES

IMPLEMENT ACTIONS

SUPPORT POLICIES

ETHICS: EUROPEAN FUNDAMENTAL RIGHTS, VALUES, IDENTITY and INTERESTS

EUROPEAN CYBERSECURITY COMPETENCE COMMUNITY

Digital Economy and Digital transformation

- Growing digitalisation of the Society and of the EU Industry / Economy

- Digital transformation and increase reliance on new technologies

  ➔IoT, AI, cloud, 5G and beyond…

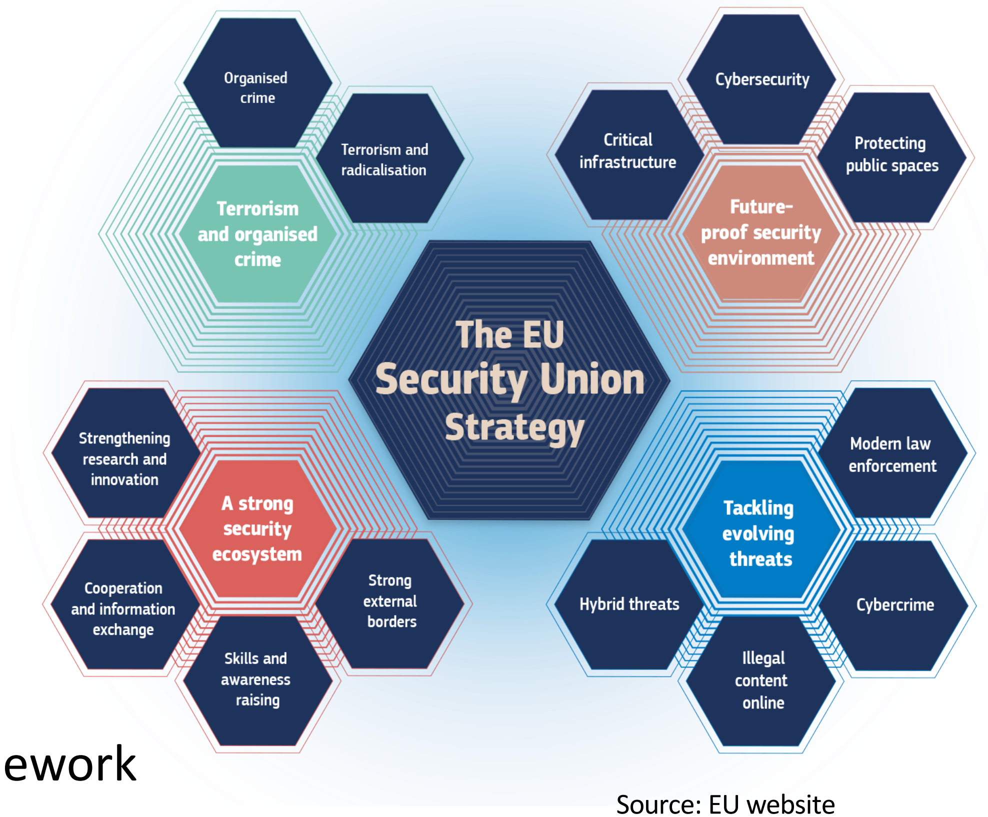
End of 2019 the main issues in Europe were the Digital Transformation and the Green Deal

- Data driven society

- Cyber threats evolving very quickly: approaches and organisations should be very flexible

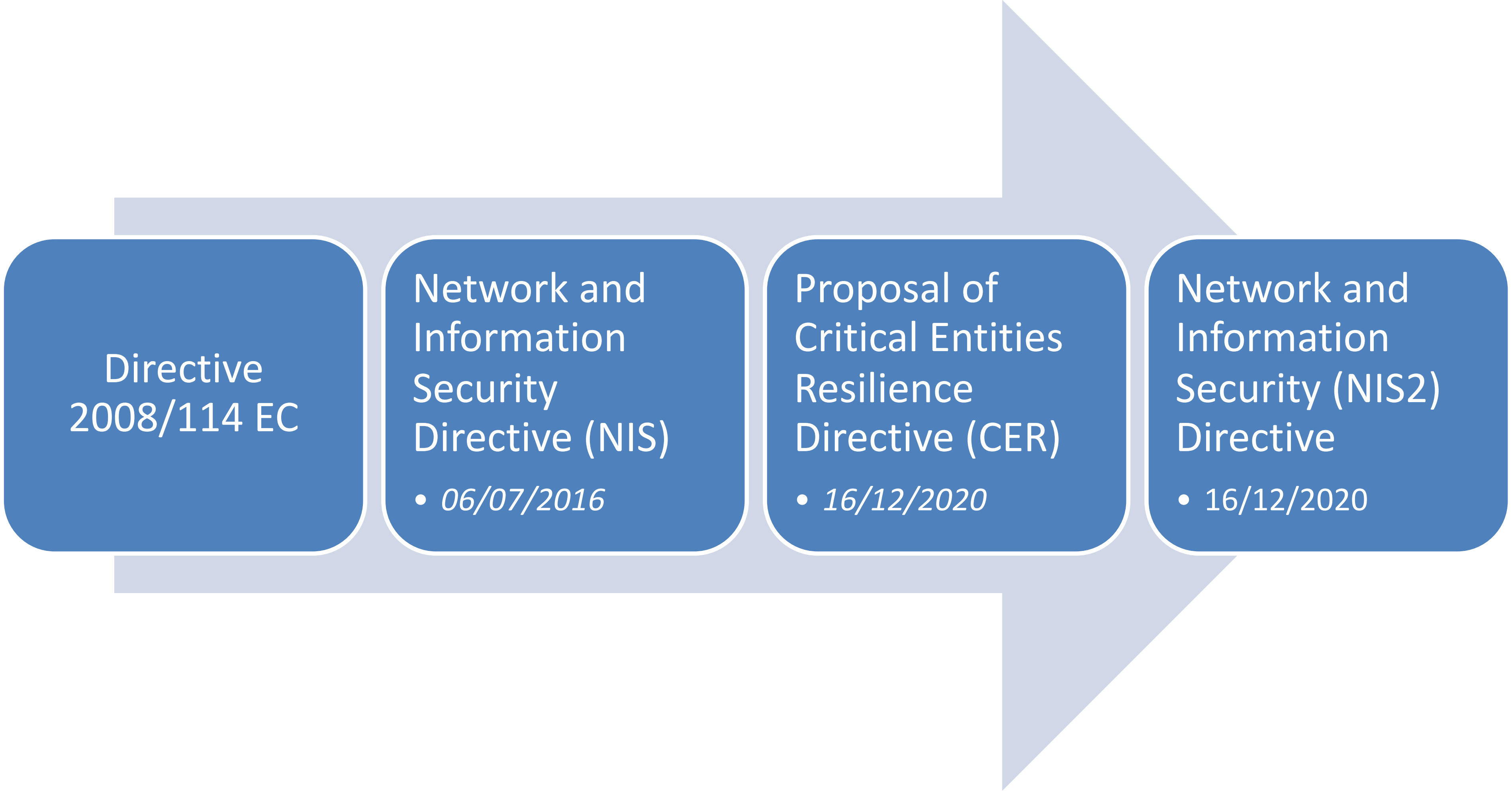
Cybersecurity policies

- ➢ The EU Security Union Strategy (July 2020)
- ➢ The EU Cybersecurity Strategy (December 2020)
  - ➢ resilience, technological sovereignty and leadership;
  - ➢ operational capacity to prevent, deter and respond;
  - ➢ cooperation to advance a global and open cyberspace.
- ➢ Legislations and certification
  - ➢ Revision of the NIS Directive
  - ➢ Cybersecurity Act and EU cybersecurity certification framework
  - ➢ ....
- ➢ European Cyber Resilience Act (ongoing consultation)


The EU Security Union Strategy
Organised crime
Terrorism and radicalisation
Terrorism and organised crime
Cybersecurity
Critical infrastructure
Protecting public spaces
Future-proof security environment
Strengthening research and innovation
A strong security ecosystem
Cooperation and information exchange
Strong external borders
Skills and awareness raising
Modern law enforcement
Tackling evolving threats
Hybrid threats
Cybercrime
Illegal content online

Source: EU website https://ec.europa.eu/info/strategy/priorities-2019-2024/promoting-our-european-way-life/european-security-union_en

Legislation protecting European Critical Infrastructures (ECI)



Directive 2008/114 EC

Network and Information Security Directive (NIS)

- *06/07/2016*

Proposal of Critical Entities Resilience Directive (CER)

- *16/12/2020*

Network and Information Security (NIS2) Directive

- 16/12/2020

Directive on the Resilience of Critical entities (CER)

Goal of the proposal: The Directive, a Revision of Council Directive 2008/114, was outlined to overcome the sector-by-sector analysis.

- Member States would be required to adopt a **national strategy** for ensuring the resilience of critical entities and carry out regular risk assessments in order to identify critical entities
- Critical entities would have to carry out **risk assessments** of their own and to take technical and organizational measures to ensure their resilience, as well as to report disruptive incidents
- A **Critical Entities Resilience Group**, gathering Member States and the Commission, will evaluate national strategies and facilitate cooperation and exchange of best practices
- To enforce rules, Member States should enable national authorities to conduct **on-site inspections** of critical entities and introduce penalties in case of non-compliance
- The Commission would provide support to Member States and critical entities, for instance by developing **a Union-level overview of cross-border and cross-sectoral risks**, best practices, methodologies, cross-border training activities and exercises to test the resilience of critical entities

Expanding the scope of Council Directive 2008/114

Energy

Transport

Space

Banking

Financial Markets

Health

Drinking water

Waste water

Digital infrastructure

Public administration

Network and Information Security (NIS) Directive 2

Goal of the proposed NIS 2 expected to be enforced by the end of 2022: boost national cybersecurity capabilities and ensure higher levels of cyber resilience

- Security requirements will be strengthened with a list of focused measures, including **incident response** and **crisis management**, vulnerability handling and disclosure, **cybersecurity testing**, and effective use of encryption
- The **cybersecurity of the supply chain** of key information and communication technologies will be strengthened
- Management **responsibility for compliance** with cybersecurity risk management measures
- Streamlined **incident reporting obligations** with more precise provisions on the reporting process, content and timing

Removing difference between Operators of Essential Services and Digital Service Providers

Twin Directive of CER

Expanding the scope of NIS Directive

NIS Directive

Healthcare

Transport

Banking

Digital Infrastructure

Water Supply

Digital Service Providers

+

NIS 2 Directive

Food

Postal & Courier

Electronic Communications Providers

Space

Public Administrations

Digital Services

Water Management

Manufacturers

Need to develop capability and capacity in Europe

➔ Foster a **resilient society** by developing **digital capabilities** with reliable strategic technologies, solutions and skills **(increase of strategic autonomy)**

➔ Develop **trusted supply chains,** with solutions assessed as trusted by national agencies **(digital sovereignty)**

Latest digital (/data) strategic priorities for the EC as in the "State of the Union":

- **High performing computers**
- **Connectivity**
- **Cloud**

Are these the only key strategic technologies for EU?

Path to the Digital Decade

On September 2021 the Commission proposed a **Path to the Digital Decade** to achieve the digital transformation of our society and economy by 2030

Areas targeted for Europe's digital transformation by 2030… data infrastructure, low-power processors, 5G communication, high-performance computing, secure quantum communication, public administration, blockchain, digital innovation hubs, and people's digital skills

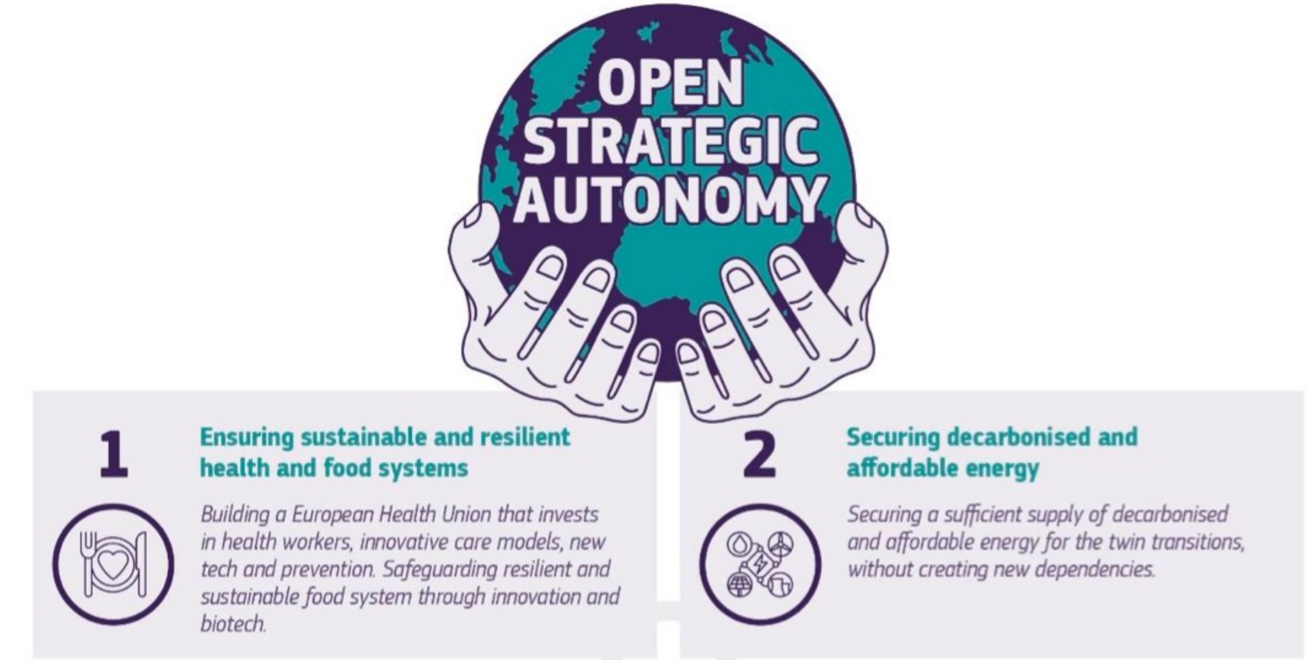
Europe’s Digital compass - objectives

- Digitally skilled citizens and highly skilled digital professionals (80% adults with basic digital skills – more women)
- Secure, performant and sustainable digital infrastructures (full 5G coverage, production of 20% semiconductors in EU, first quantum computer)
- **Digital transformation of businesses (75% using cloud, big data, AI - >90% SMEs)**
- Digitalisation of public services (available online and 80% citizens using eID solutions)

Digitalisation offers many new opportunities on the European marketplace, where more than 500,000 vacancies for cybersecurity and data experts remained unfilled in 2020

<u>Strategic autonomy</u> as an **enabler of sovereignty …** some challenges ahead

Strong links with **<u>Digital sovereignty</u>**



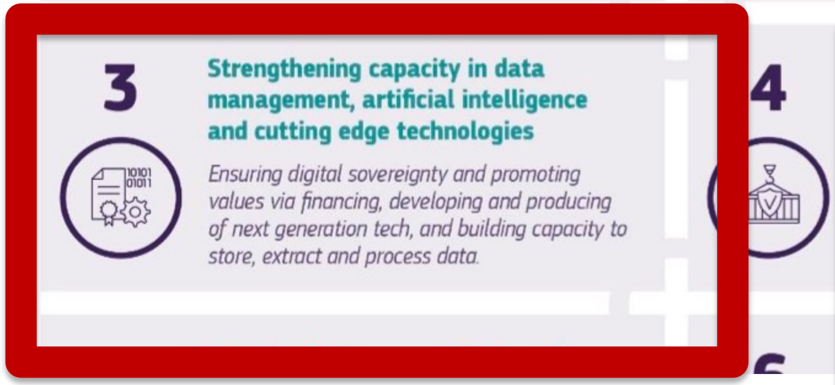
OPEN STRATEGIC AUTONOMY

1 **Ensuring sustainable and resilient health and food systems**

Building a European Health Union that invests in health workers, innovative care models, new tech and prevention. Safeguarding resilient and sustainable food system through innovation and biotech.

2 **Securing decarbonised and affordable energy**

Securing a sufficient supply of decarbonised and affordable energy for the twin transitions, without creating new dependencies.

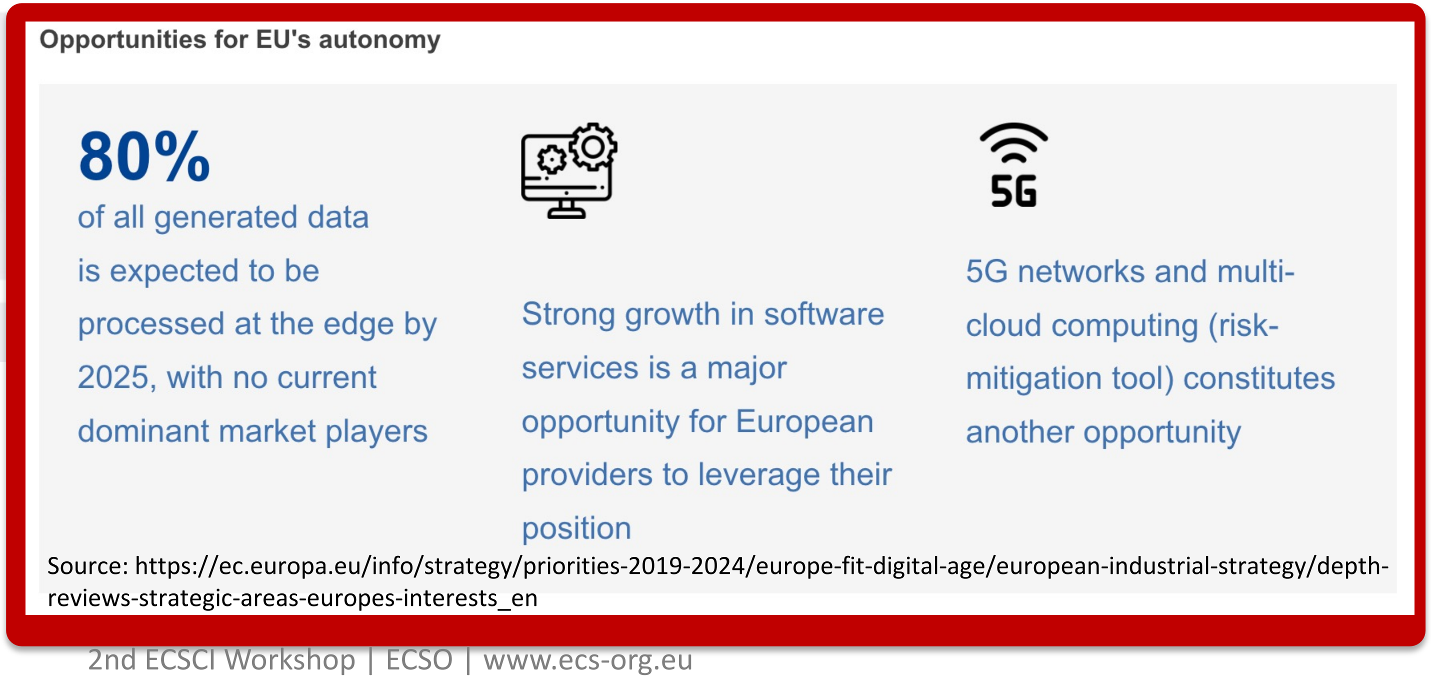


3 **Strengthening capacity in data management, artificial intelligence and cutting edge technologies**

Ensuring digital sovereignty and promoting values via financing, developing and producing of next generation tech, and building capacity to store, extract and process data.

4

Source: EC 2021 Strategic Foresight Report The EU's capacity and freedom to act



Opportunities for EU's autonomy

80% of all generated data is expected to be processed at the edge by 2025, with no current dominant market players

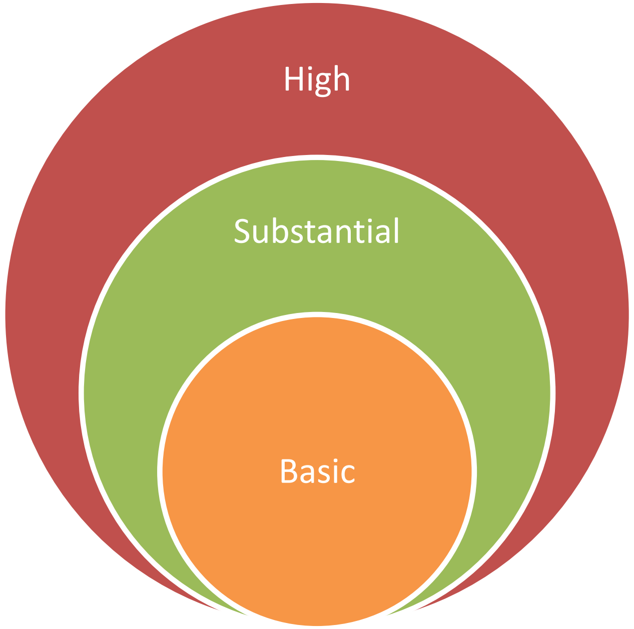
Strong growth in software services is a major opportunity for European providers to leverage their position

5G networks and multi-cloud computing (risk-mitigation tool) constitutes another opportunity

Source: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy/depth-reviews-strategic-areas-europes-interests_en

Cloud computing / edge – which role?

It is key to increase assurance that data is secure wherever they are stored or processed



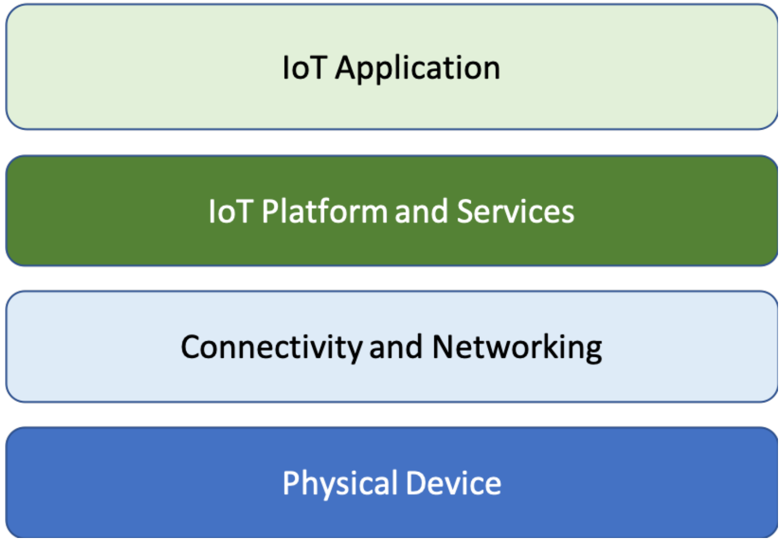
European cybersecurity certification scheme for cloud services

Towards a more secure and trusted resilient infrastructures in Europe

- Cloud services meeting high requirements for data protection, security, portability, interoperability, ….
- ICT supply chain complexity
- Interconnection of heterogeneous technologies (including IT, OT, edge / cloud computing, IoT, etc.)

IoT – which role?

It is a central element in the global digitalisation trend that is reaching our industry, our economy, and our society



IoT Application

IoT Platform and Services

Connectivity and Networking

Physical Device

General purpose vs. intended use

Challenges ahead

- ➢ Interplay between regulation, certification and technology
- ➢ Developing and maturing IoT cybersecurity technologies
- ➢ A pervasive cyber-insecure IoT calls for generous multi-stakeholder effort

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ECSO Technical Paper on Internet of Things (IoT)

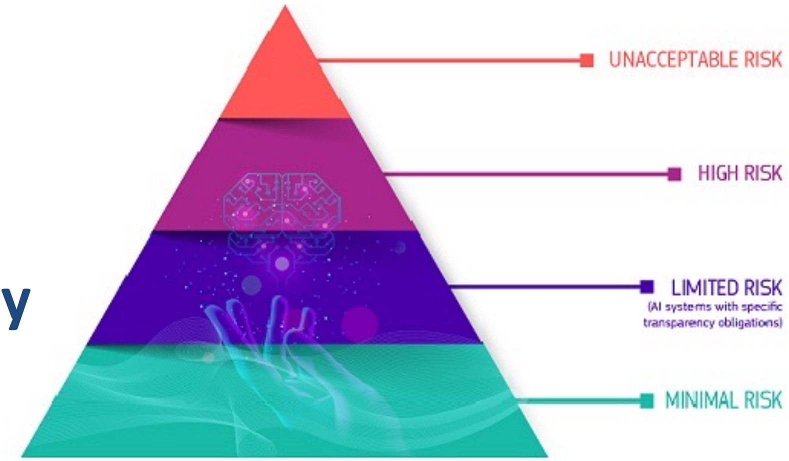
February 2022 – v0.9

www.ecs-org.eu

Artificial Intelligence – which role?

…. but creates new challenges

A risk-based approach to regulation



Source: https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai

A resilient AI is a key enabler for the digitisation of the industry

Challenges ahead

- Use of AI for improving cybersecurity
- Security of AI systems
- Use of AI by attackers and resilience against AI-powered cyberattacks

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ECSO Technical Paper on Artificial Intelligence, Big Data & Cybersecurity (AI)

April 2021

www.ecs-org.eu

AI and European digital autonomy & sovereignty

IRIS Motivation

As existing and emerging **smart cities** continue to **expand their IoT and AI-enabled platforms**, **novel and complex dimensions to the threat intelligence landscape are introduced**. These, are linked with identifying, responding and sharing data related to attack vectors, based on emerging IoT and AI technologies, whose architecture and behaviour are **not currently well understood** by security practitioners, such as CERTs and CSIRTs.

This lack of experience as well as of tools, for detecting and reporting IoT & AI attack vectors is further aggravated by potentially greater safety risks caused by such attacks.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 101021727. This material reflects only the authors' view and European Commission is not responsible for any use that may be made of the information it contains.

IRIS Vision

The **H2020 IRIS project** aims to deliver a framework that will support European CERT and CSIRT networks **detecting, sharing, responding and recovering from cybersecurity threats and vulnerabilities of IoT and AI-driven ICT systems,** in order to **minimize the impact of cybersecurity and privacy risks.**

The IRIS platform will be made available, **free of charge**, to the European national CERT and CSIRTs, by the end of the project.

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Digital transformation and Cybersecurity

- Not a simple transformation, need to ensure integration with existing infrastructure/products

- Digital transformation is bringing a paradigm shift in business operations and changing cybersecurity requirements

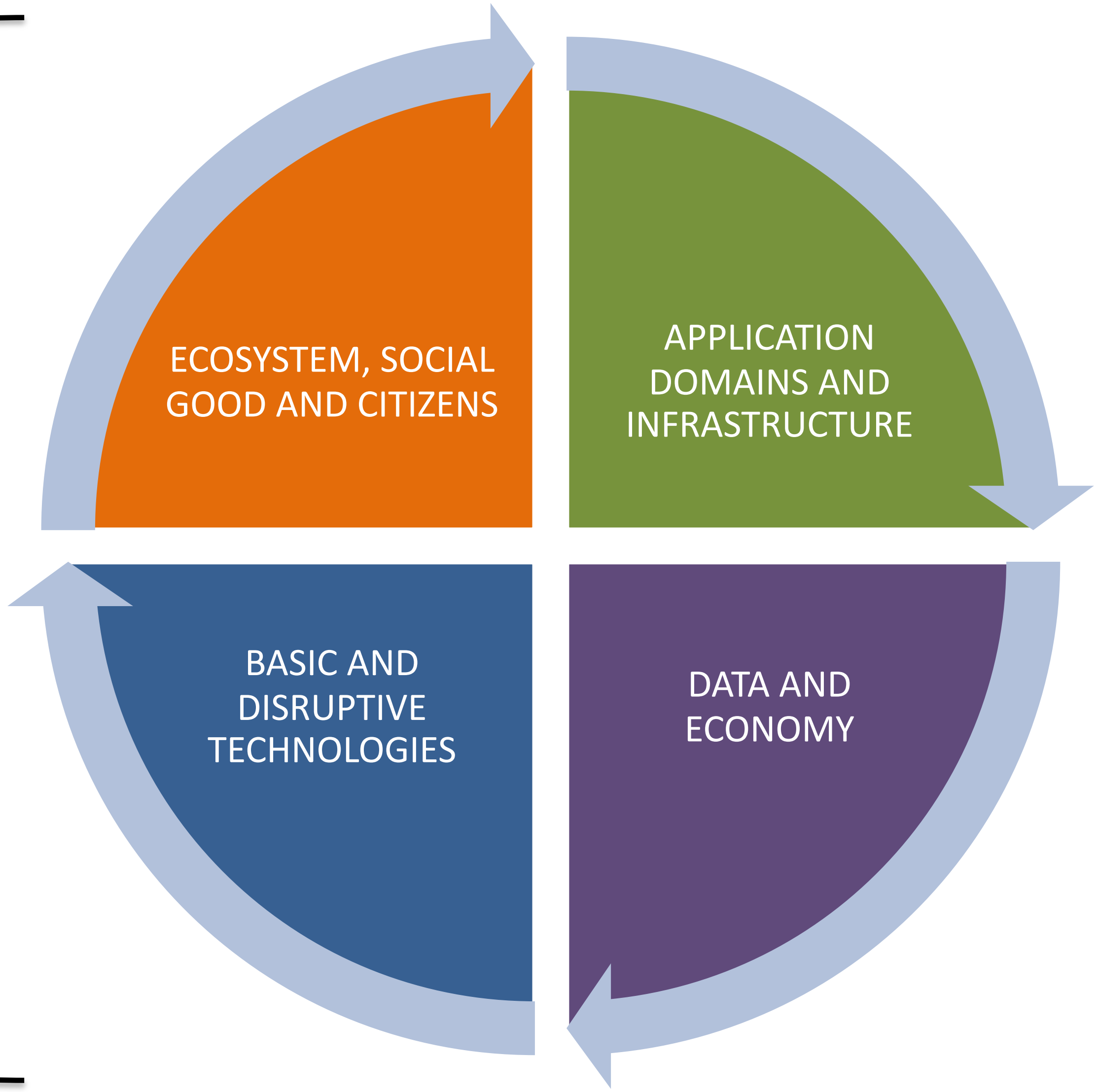
- A forward thinking cybersecurity strategy is necessary to meet forthcoming digital challenges and solutions to face threats (known and unknown – hence, resiliency)

At stake business continuity and resilient digital services and infrastructures

Cybersecurity is critical in the digital transformation era

ECSO cybersecurity priorities for Horizon Europe and Digital Europe Programme

- Risks / Threat management
- Data & AI (including privacy)
- Cyber secure HW & SW (including crypto) supply chains
- Infrastructure resilience
- Skills
- Support to European competitiveness



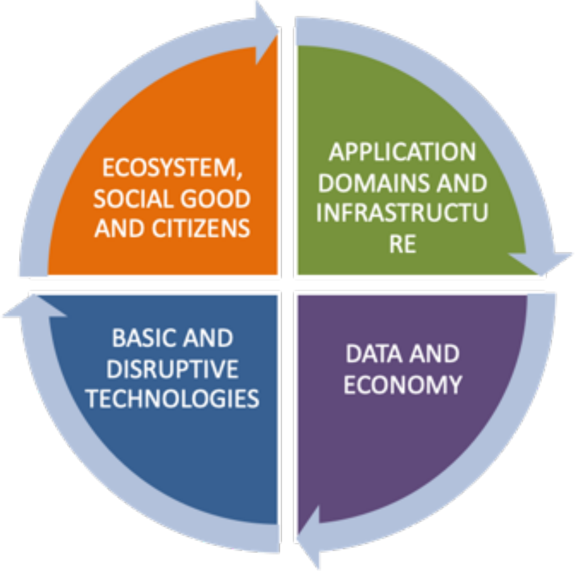
ECOSYSTEM, SOCIAL GOOD AND CITIZENS

APPLICATION DOMAINS AND INFRASTRUCTURE

DATA AND ECONOMY

BASIC AND DISRUPTIVE TECHNOLOGIES

ECSO cybersecurity priorities for Horizon Europe and Digital Europe Programme


ECOSYSTEM, SOCIAL GOOD AND CITIZENS
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Infrastructure resilience

- Cyber resilient digitised infrastructures
- Secure Quantum Infrastructures
- Cyber secure future communication systems and networks
- Vertical sectors cyber challenges: Industry 4.0 and ICS; Energy (oil, gas, electricity) and smart grids; Transportation (road, rail, air; sea, space); Financial Services, e-payments and insurance; Public services, e-government, digital citizenship; Healthcare; Smart cities and smart buildings (convergence of digital services for citizens) and other utilities; Robotics; Agrifood
- Deploying resilient digital infrastructures in the field

Areas for possible investments to capabilities under RRF: a ECSO analysis

- Cybersecurity for the digital transformation of strategic sectors: cyber resilient critical infrastructures and essential services
- Cyber secure communication systems / networks and secure connectivity of products and associated services including secure digital services for B2C
- Secure data (end-to-end data protection and secure data management) and protection from manipulation (fake news)
- Secure and trusted digital identity management – self-sovereign identity
- Cyber security aware citizens / decision makers and highly skilled workforce

Cybersecurity for the digital transformation of strategic sectors

Resilience in infrastructures and services means being able to prevent, detect and respond to disruptions

- Threat intelligence and risk management to ensure safe, secure and resilient European societies and economies with improved capabilities to cope with known and unknown cascading infrastructure failures
- Integrity and trustworthiness of interconnected physical-digital EU infrastructures: resilient cross-vertical platforms to exchange information
- Securing integrity and availability of the global DNS root system

System Security and Certification Considerations

***Systems are mission specific**, and the risk is managed for its full dimension crossing all life cycle stages from design, procurement, testing, integration, implementation, operation, maintenance, retrofit and decommissioning.*

Aspects to consider

- High-level risk assessment defining a cyber security risk perimeter and providing important risk comprehension for all subsequent actions in a coherent framework
- Interoperability is a point of importance for secure operations as systems are often composed of a very large number of subsystems and products
- Lots of actors with a very variable background are involved
- Different standards and certification schemes can be used, each one adapted to the specific needs from the lifecycle
- Supply chain must be adapted to cover the needs of the system lifecycle

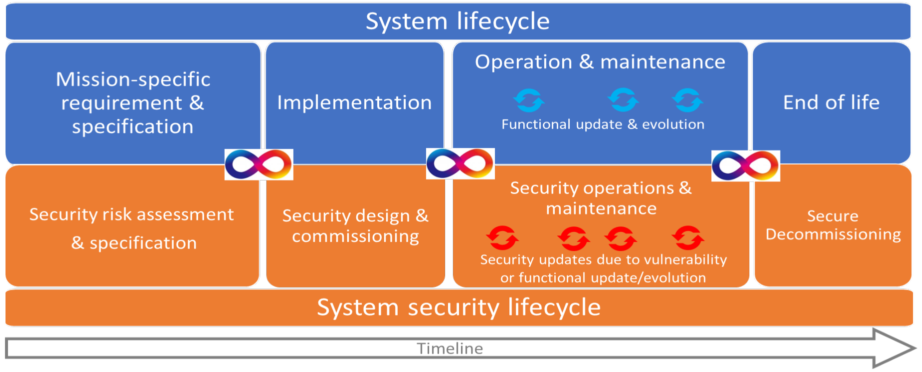
Waters systems (Source: Schneider Electric)

Webinar available

https://www.youtube.com/watch?v=mXiytFIOXeI

System lifecycle and stakeholders’ roles

- Full life cycle of the system
- Importance of high-level risk assessment & secure architecture
- Governance
- Secure operation is key all during the operational life of the system, including decommissioning
- Different needs and stakeholders at each phase



System lifecycle

Mission-specific requirement & specification

Implementation

Operation & maintenance

Functional update & evolution

End of life

Security risk assessment & specification

Security design & commissioning

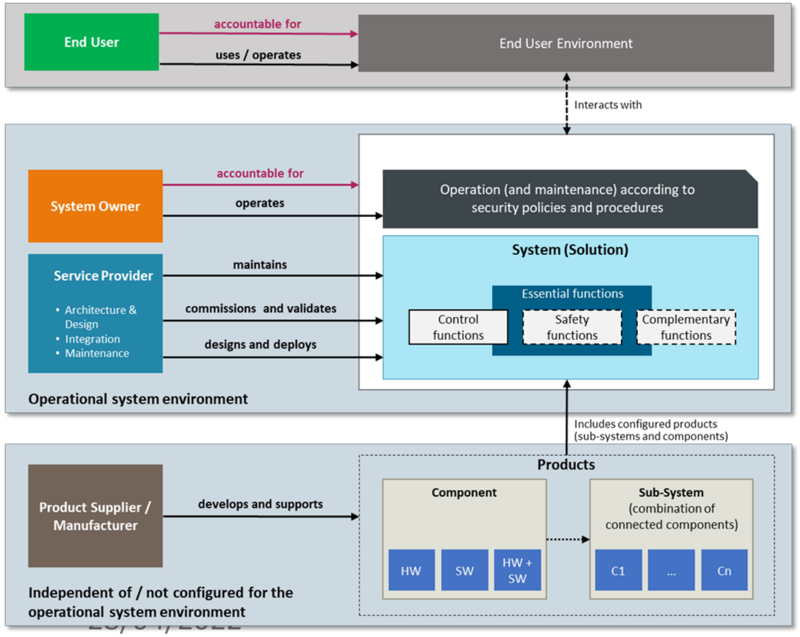
Security operations & maintenance

Security updates due to vulnerability or functional update/evolution

Secure Decommissioning

System security lifecycle

Timeline



End User

accountable for

uses / operates

End User Environment

Interacts with

System Owner

accountable for

operates

Operation (and maintenance) according to security policies and procedures

Service Provider

- Architecture & Design
- Integration
- Maintenance

maintains

commissions and validates

designs and deploys

System (Solution)

Essential functions

Control functions

Safety functions

Complementary functions

Operational system environment

Includes configured products (sub-systems and components)

Products

Product Supplier / Manufacturer

develops and supports

Component

HW

SW

HW + SW

Sub-System (combination of connected components)

C1

...

Cn

Independent of / not configured for the operational system environment

- Various stakeholders: End user, system owner, service provider, manufacturer,…
- Evolving of stakeholders at each phase, all along the lifetime of the system
- Evolving of perimeter according to the area of responsibility of each stakeholder

It leads to a formal transfer of risk and responsibilities

The way forward

A comprehensive approach to security is needed…

…technology, people, processes, … innovation for a trustworthy and resilient cybersecurity ecosystem

> *Being prepared is half of the victory*
>
> Miguel de Cervantes

Miguel de Ceruantes Saauedra
Juan de Jaurigui Pinxit año 1600

Slide adapted and courtesy of Ana Ayerbe (TECNALIA)

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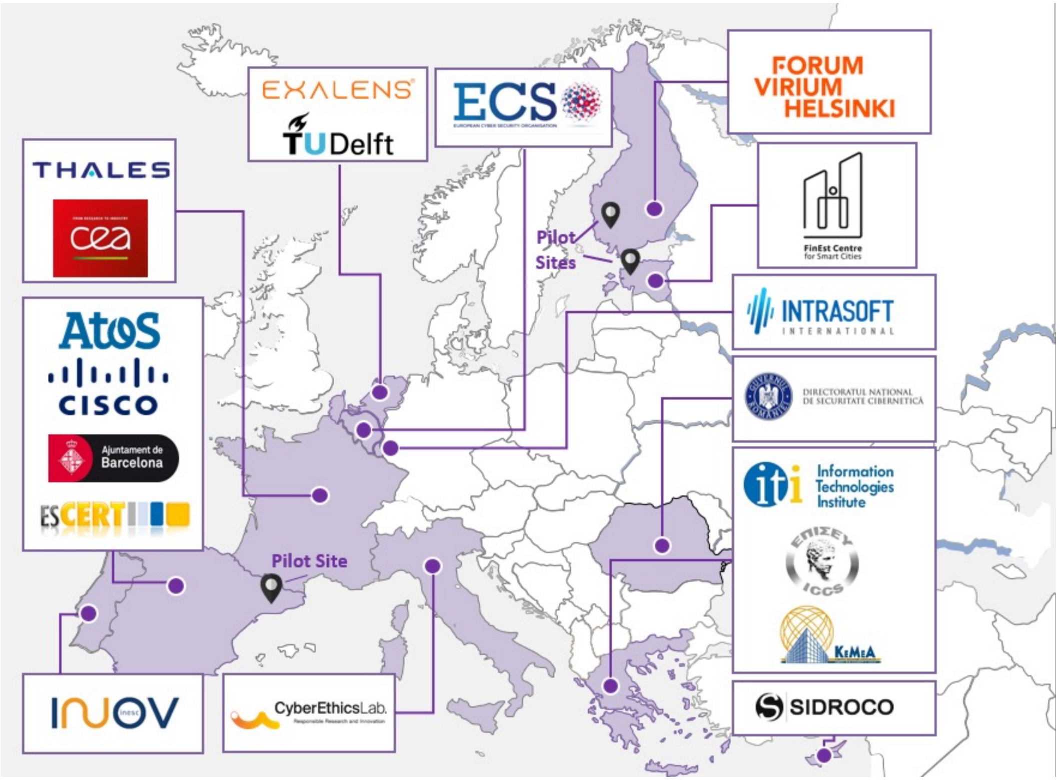
Join the Community

Project at a Glance



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Topic: SU-DS02-2020 Intelligent security and privacy management

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Consortium: 19 partners

Coordinator: INOV - Instituto de Engenharia de Sistemas e Computadores, Inovacão, (INOV), Portugal

Learn More: www. iris-h2020.eu

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IRIS H2020 Project

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3 SMEs
4 Large ICT industries
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