



AI-NET-PROTECT

Project ID: C2019/3-4

Start Date: 1 June 2020

Closure date: 31 January 2024

Co-ordinator:

Achim Autenrieth

ADVA Optical Networking SE

E-mail: aautenrieth@adva.com

Project Websites

www.celticnext.eu/project-ai-net-protect

<https://protect.ai-net-tech>

Providing Resilient & secure networks (Operating on Trusted Equipment) to CriTical infrastructures

AI-NET-PROTECT is one of three sub-projects of the CELTIC Flagship project **AI-NET (Accelerating Digital Transformation in Europe by Intelligent Network Automation)**, which brings together three technology fields: Communication networks and technologies for 5G and 6G, user-centric data centers, and artificial intelligence (AI). Under the umbrella of the industry-led AI-NET project, researchers from seven European countries have come together in three sub-projects to research novel solutions for the automation of optical communication networks and bring them to application maturity.

The **AI-NET-PROTECT** sub-project will provide automated, resilient and secure networks operated on trusted equipment to critical infrastructures and enterprises. To achieve this goal, the project will develop a scalable transport network infrastructure with network telemetry, intent-based software-defined network control and strong security utilizing artificial intelligence solutions.

Main focus

Digital transformation is ongoing in many areas of today's society, which will impact many aspects of people's lives via means such as smart cities, robotics, transportation, and next-generation industries. At the same time, the current centralized cloud infrastructure is not adequate to serve the transformation's requirements. We believe that three technologies can come together to shape a new secure service and appli-

cation platform: 5G, edge-centric computing, and artificial intelligence. In this context, European industry has a good position in 5G networks, transportation and industrial applications, but needs to strengthen its position in secure cloud, data center and artificial intelligence technologies to be at the forefront of development.

Approach

The **AI-NET-PROTECT** subproject (Providing Resilient and Secure Networks Operating on Trusted Equipment to CriTical Infrastructures) investigates and develops concepts, network architectures and methods for automated and secure network operation in critical infrastructures and in the economy. The focus is on the protection of sensitive and security-relevant data and a high robustness of the network infrastructure. Strong security is ensured by approaches such as proactive anomaly detection, complex cryptographic methods, and quantum-safe algorithms - algorithms that cannot be decrypted by quantum computers. The high-performance and robust network operation is based, among other things, on an easily expandable network architecture, a separation of software and hardware, and artificial intelligence (AI). This enables automated resource allocation and control in the network as well as remote commissioning and maintenance of network devices. Main targets of the project are:



- ◆ Development of a scalable network & node architecture
- ◆ Integration of network telemetry and intelligent control
- ◆ Development of artificial Intelligence (AI) based network automation
- ◆ Ensuring strong automated and quantum-safe security
- ◆ Validation of the developed solutions with proof-of-concept demonstrators and testbeds

New AI methods and solutions will be developed that provide robust and reliable automation, which is not sufficiently supported in current solutions. Most of today's AI algorithms are developed for other domains, and AI-NET-PROTECT will provide algorithms tailored to the needs of carrier-grade edge, metro and core networks.

Main results

AI-NET-PROTECT will provide solutions and new technologies for the automation of network infrastructure and edge-computing to enable better runtime operation, optimized utilization of its resources and lower operational cost. As a result, we will enable new and better services running on top of the base infrastructure, taking full advantage of 5G capabilities.

Intellectual property rights and new or improved products resulting from the project are clear evidence of the economic importance of AI-NET and AI-NET-PROTECT. It is expected that the novel solutions now being developed in AI-NET-PROTECT will in a few years'

time form core functions of network and network management solutions, without which they will no longer be competitive. For SMEs, AI-NET-PROTECT offers, among other things, the potential to develop new software solutions and services and to constantly expand their customer base through new contacts.

Impact

The ambitious objectives of the AI-NET-PROTECT sub-project will enable a new class of applications, which live at the edge, creating truly smart cities and industries for the benefit of European citizens, e.g., improved transportation systems, healthcare and wellness support, factory and critical infrastructure automation.

The project will develop end-to-end automation at network and service level using AI in the European framework with reference to national funding priorities for securing the location using previous project results (especially SENDATE, EU Horizon 2020) in coordination or cooperation with other national projects (BMBF OTB-5G+, 6G-RIC, Gaia-X). The work in the project AI-NET-PROTECT allows the European IT and telecommunications industry to gain more market share with new network solutions and IT services in a market currently dominated by a few non-European players.

The project will also strengthen the European leadership in digital communication and challenge the global competition in cloud, edge and artificial intelligence technologies.

Partners:

Germany

ADVA Optical Networking SE
 AMO GmbH
 BISDN GmbH
 Christian-Albrechts-Universität zu Kiel
 consistec Engineering & Consulting GmbH
 dacoso GmbH
 DFKI (Deutsches Forschungszentrum für Künstliche Intelligenz)
 Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut
 Fraunhofer-Institut für Angewandte Festkörperphysik IAF
 Fraunhofer-Institut für Angewandte Informationstechnik FIT
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 Gesellschaft für wissenschaftliche Datenverarbeitung, Göttingen
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 Qurasoft GmbH
 Technical University Berlin
 Technical University München
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 ysura GmbH

Poland

ADVA Optical Networking sp.z o.o.
 medVC.eu sp. z o.o.
 Poznań Supercomputing and Networking Center

Sweden

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 Lunet AB
 RISE Research Institutes of Sweden AB
 Savantic
 Telia Company AB
 Waystream

The Netherlands

TNO

About CELTIC-NEXT

CELTIC-NEXT is the EUREKA Cluster for next-generation communications enabling the digital society. CELTIC-NEXT stimulates and orchestrates international collaborative projects in the Information and Communications Technology (ICT) domain.

The CELTIC-NEXT programme includes a wide scope of ICT topics based on new high-performance communications networks supporting data-rich applications and advanced services, both in the ICT sector and across all vertical sectors.

CELTIC-NEXT is an industry-driven initiative, involving all the major ICT industry players as well as many SMEs, service providers, and research institutions. The CELTIC-NEXT activities are open to all organisations that share the CELTIC-NEXT vision

of an inclusive digital society and are willing to collaborate to their own benefit, aligned with their national priorities, to advance the development and uptake of advanced ICT solutions.

CELTIC Office

c/o Eurescom, Wieblinger Weg 19/4
 69123 Heidelberg, Germany
 Phone: +49 6221 989 0
 E-mail: office@celticnext.eu
 www.celticnext.eu

