Celtic-Plus
Smart Connected World

Project Achievements

CyberWI

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Partners:

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City of Oulu, Finland

Dynniq Oy, Finland

Elektro-Arola Oy, Finland

Elektroniksystem i Umeå AB, Sweden

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Project Website

www.celticplus.eu/project-cyberwi

Cyber-security in the Wireless Industrial use cases

The CyberWI project worked on standardized security solutions integrating seamlessly over different infrastructures such as Cloud Computing and Wireless Sensor Networks enabling the Industrial Internet, allowing small companies to easily deploy secure services operating across different infrastructures.

Use cases covered were building automation, industrial control systems, traffic applications and health care.

Main focus

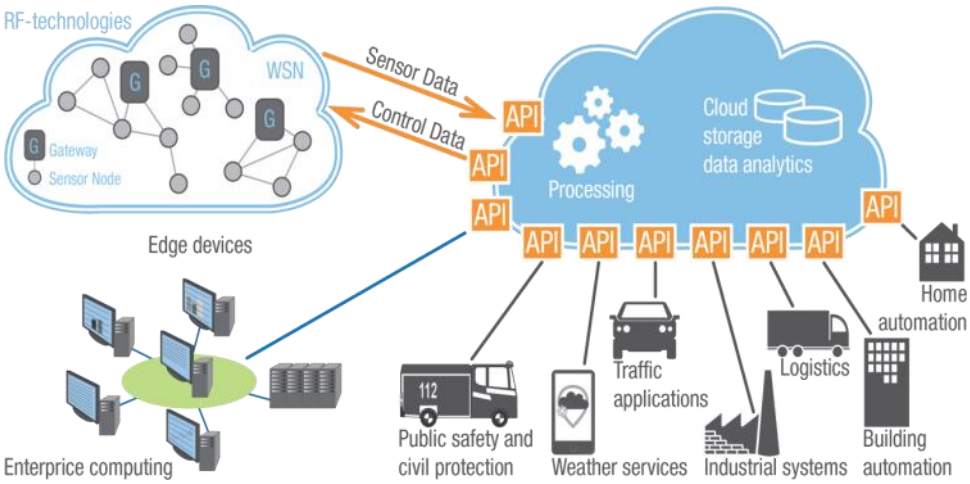
The CyberWI project addressed following concrete security problems:

- protect communications between IoT networks (sensors/actuators) and back-end client systems from eavesdropping, message forgery and replay attacks
- provide access control for IoT devices (sensors/actuators) to protect exposed services.
- prevent, detect, protect ZigBee network from eavesdropping and false data sending.
- prevent and counter attack ZigBee network overloading, flooding and secure ZigBee communications.
- avoid Man in the middle attacks to transfer data to “False” server, to avoid privileges gain
- prevent Denial of service attack at a central server level
- detect password brute force attacks and avoid privileges gaining
- ensure safe road weather station operation as a service hotspot for multiple vehicles.
- ensure safe operation of traffic signal pre-emption system for civil protection.

Based on these use cases and requirements, the project worked on intrusion detection, encrypted databases, authentication and access control, secure data transfer, and security testing tools for the different target infrastructures. Furthermore the project worked on how to seamlessly integrate such services across the different infrastructures.

Approach

The project team has selected a representative set of use cases targeting to fulfil the requirements of representing reference usage of different target areas. Use cases are categorised for building automation, home automation, logistics, indus-



trial systems, traffic applications, weather services and public safety & protection services use cases. Logistics, weather services and public safety & protection use cases consists of several sub-use cases, in order to present scenarios as unambiguous as possible.

For each use case requirements have been specified and solutions have been defined for specific scenarios. These scenarios covered, secure data transfer, IP load and denial of service (DoS) testing, traffic light pre-emption service for emergency vehicles, standardization of authentication and access control mechanisms and IoT security lifecycle management.

With proof of concepts the usefulness of the solutions was demonstrated.

Achieved results

The main achievements of the project are:

- a software prototype for managing IoT security in wireless sensor networks during the whole life cycle.
- Standardization of the communication security protocol OSCORE (Object Security for Constrained RESTful Environments) at the Internet Engineering Task Force (IETF) (including open source reference implementations)
- Standardization of the access control protocol ACE-OAuth (Authorization for Constrained Environments, based on the web access control protocol OAuth 2.0) at the IETF (including open source reference implementation)
- Improved and highly secure traffic light pre-emption system for emergency vehicles
- An IoT testing platform
- local weather measurement database, research road weather station entity and mobile road weather application tailored for vehicular use. Road weather station connectivity procedures have been defined and tested with combined virtual and real fleet, to be later loaded with different kind of disturbance tests.
- set up of a Cyber security laboratory at Ylivieska Campus (Finland). A secure remote connection between the laboratory and the test system makes it possible to use testing facilities at an external network

Impact

As a result the CyberWI project had as a result 4 new products and improved 7 products and 1 patent. The main impact is expected from the new cyber security laboratory implemented during the project and the standardization work on object security and access control at IETF. The developed Traffic light pre-emption system is an open platform for city authorities. Quicker response by ambulances and fire trucks save lives and reduces losses in case of accidents. Built laboratory environment offer its services for companies for validate and test their software and hardware product security level.

The results of CyberWI will allow the partners to improve the security of their services and solutions.

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World“ paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the intergovernmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

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