CELTC-NEXT
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CyberWi
Cyber-security in the Wireless Industrial use cases

Harold Linke, HITEC Luxembourg S.A.
Harold.linke@hitec.lu
CyberWi Project Goals

• provide security solutions that integrate seamlessly over different infrastructures such as Cloud Computing, IoT networks and Embedded Systems.

• enable the Industrial Internet, allow small companies to easily deploy secure services operating across different infrastructures.
Project Data

Start date:  1.2.2016
Finish date: 31.12.2018
Budget: 5.17 Mio Euro
Effort (PY): 61.7
Partners

Luxembourg
  HITEC Luxembourg S.A. (Coordinator)

Finland
  Centria University of Applied Sciences (Technical Coordinator)
  Rugged Tooling
  Finnish Meteorological Institute
  Silverskin Information Security
  City of Oulu
  Elektro-Arola
  Dynniq Finland (Imtech Traffic & Infra Oy)
  VIRVE Products and Services

Sweden
  RISE (SICS Swedish ICT AB)
  q2d Solutions AB
  Ericsson AB
  Elsys AB
Example for new and improved products, services and standards generated by CyberWi:

- SenseSec: reliable and secure IoT networks
- RoadWeather Station: secure access to IoT
- HaLi: Traffic Light pre-emption system
- Centria Cyber Security Laboratory
- OSCORE: new standard for secure IoT communication
Examples for new and improved products, services and standards generated by CyberWi:

- SenseSec: reliable and secure IoT networks
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- Centria Cyber Security Laboratory
- OSCORE: new standard for secure IoT communication
HaLi – Pre-emption system for emergency vehicles

The huge financial and human cost was addressed in development of HALI with the benefit of faster response to emergency locations.

HALI connects two safety critical functions – emergency runs and traffic signals – allowing ambulances, fire brigades and police to safely pass traffic signal controlled intersections with green traffic signals.

Within the system the vehicles send their location and status of pre-emption need to automatically switch the traffic signals green.

The request for clear headway is made with connections installed within the vehicle.

Award winning pre-emption system HALI is further developed as one of the use cases in CyberWi-project.

HALI enables a clear headway for emergency vehicles by clearing the other vehicles out of intersection before the vehicle on an emergency run arrives to it.

A software based solution makes joining the system possible without expensive hardware investments.

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Status: over 700 users, over 500 vehicles, 600 traffic lights
55 municipalities

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Cyber security laboratory was developed in CyberWI-project
Services for companies of various size:
• Testing the network vulnerabilities
• Customized cyber security and GDPR training
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Status: 22 commercial customers, 3 EU projects
IoT Features and Challenges

Existing Internet/Web security tools were not always suitable for the Internet of Things, e.g.

• Security overhead challenges in constrained devices and radio
  – High latency and power consumption

• End-to-end security challenges with gateways and proxies.
  – Application layer proxy operations or change transport required terminating security

Need for new standardized enablers for lightweight end-to-end security in constrained environments.
The answer:
Object Security for Constrained RESTful Environments (OSCORE)

OSCORE Basics
- Extension to CoAP
- Protects CoAP messages using the COSE format (COSE_Encrypt0)
- Provides confidentiality, integrity and replay protection
- Binds response to request
- Handles partial loss of security context
- Uses Authenticated Encryption with Additional Data (AEAD)
- AES-128-CCM-8 is mandatory to implement

OSCORE is an Internet Standards Track document RFC 8613
https://tools.ietf.org/html/rfc8613
Other impact

- Open source Software contributions:
  - HaLi (Traffic Light pre-emption system) is open source
  - https://github.com/eclipse/californium/tree/master/cf-oscore (contribution of RFC8613 to the californium library),
  - https://bitbucket.org/marco-tiloca-sics/ace-java (implementation of RFC8747 and other draft standards from the IETF ACE working group),
  - https://github.com/Gunzter/contiki-ng/tree/oscore_dev (contribution of RFC8613 to the contiki-ng library)
The Celtic-Next project CyberWi generated a significant impact in

• Commercial results
• Cyber security improvements and education
• Public safety security
• Standardisation for IoT security
For more information and for interest to participate please contact:

Harold Linke, HITEC Luxembourg S.A.
Harold.linke@hitec.lul
+352 498678 749 Telephone
49, rue Du Baerendall
L-8212 Mamer
Luxembourg
www.hitec.lu

Presentation available via: