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ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

16043 OPTIMUM

Project details

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Name: Industrial Internet of Things Platform Architecture (Document)		
Input(s):	Main feature(s)	Output(s):
▪ Data request or commands via MQTT and OPC UA	▪ OPC UA interface to device data and control, retrofit for legacy devices to enable I4.0 communication	▪ Requested data, control status

Unique Selling Proposition(s):	▪ IIoT platform turns any device into an OPC UA device without the need of a gateway
Integration constraint(s):	▪ Support of MQTT
Intended user(s):	▪ Manufacturers of (I)IoT devices ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ Will be provided as part of the open source distribution of the IIoT-Platform with support of University of Rostock (URO).
Contact point:	▪ optimum@ws4d.org
Condition(s) for reuse:	▪ Creative Commons (CC BY 4.0)

Latest update: 12.05.2021

Name: Contribution to the Companion Profile for Material Handling Machines (Standardization)		
Input(s):	Main feature(s)	Output(s):
▪ Knowledge of material handling domain and OPC UA	▪ Standardized OPC UA data model for cranes	▪ Companion Specification for Cranes & Hoists (document and xml file)

Unique Selling Proposition(s):	▪ Enables interoperability between different crane vendors. ▪ Compatibility with OPC UA CS for robots.
Integration constraint(s):	▪ Needs IP capable networks or gateways or OPTIMUM IIoT platform
Intended user(s):	▪ Crane industries ▪ Material handling domain and logistics ▪ TRL 4 – technology validated in lab
Provider:	▪ Joint VDMA Working Group OPC UA for Cranes and Hoists
Contact point:	▪ Link to the VDMA Workgroup: https://opcua.vdma.org/viewer/-/v2article/render/31851036
Condition(s) for reuse:	▪ Companion spec and node set will be freely available to registered OPC UA users

Latest update: 12.05.2021

Name: Extension of OPC UA by lightweight publish/subscribe protocol MQTT (Technology)		
Input(s):	Main feature(s)	Output(s):
▪ Messages containing requests / commands via MQTT or OPC UA	▪ Relay between MQTT and OPC UA communication protocols, broker-based OPC UA data distribution using an MQTT broker	▪ Full support of MQTT in OPC UA publish-subscribe layer of open62541 library

Unique Selling Proposition(s):	▪ Open62541 stack extended with MQTT features for both publisher and subscriber (open62541 offers only the publisher)
Integration constraint(s):	▪ Support of MQTT
Intended user(s):	▪ Manufacturers of (I)IoT devices ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ Will be provided as a fork of open62541 stack via gitlab of University of Rostock (URO). Potentially handed over to open62541 developers.
Contact point:	▪ optimum@ws4d.org
Condition(s) for reuse:	▪ Mozilla public license MPL 2.0

Latest update: 12.05.2021

Name: Extension of OPC UA by lightweight publish/subscribe protocol AMQP (Technology)		
Input(s):	Main feature(s)	Output(s):
▪ Messages containing requests / commands via AMQP or OPC UA	▪ Relay between AMQP and OPC UA communication protocols, broker-based OPC UA data distribution using an AMQP broker	▪ Full support of AMQP in OPC UA publish-subscribe layer of open62541 library

Unique Selling Proposition(s):	▪ Open62541 stack extended with AMQP features for both publisher and subscriber (open62541 offers only the publisher)
Integration constraint(s):	▪ Support of AMQP
Intended user(s):	▪ Manufacturers of (I)IoT devices ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ Will be provided as a fork of open62541 stack via Gitlab of University of Rostock (URO). Potentially handed over to open62541 developers.
Contact point:	▪ optimum@ws4d.org
Condition(s) for reuse:	▪ Mozilla public license MPL 2.0

Latest update: 12.05.2021

Name: OPTIMUM Platform Data Model (Document, Software)		
Input(s):	Main feature(s)	Output(s):
▪ Knowledge of OPC UA standardization activities, OPTIMUM requirements	▪ Common data model for OPTIMUM devices. Additionally, support for OPC UA for Machinery specification that allows all Machinery-conform OPC UA clients to read basic data of OPTIMUM devices	▪ M2M communication between devices using the same data structure

Unique Selling Proposition(s):	▪ One of few open data models including the machinery profile for material handling
Integration constraint(s):	▪ Requires an OPC UA server
Intended user(s):	▪ Manufacturers of (I)IoT devices ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ URO
Contact point:	▪ optimum@ws4d.org
Condition(s) for reuse:	▪ Mozilla public license MPL 2.0
	Latest update: 12.05.2021

Name: Distributed Control Platform Specification		
Input(s):	Main feature(s)	Output(s):
▪ Requirements for control tasks and limits of hardware components	▪ Investigations about efficient communication protocols, design of software components needed for distributed control,	▪ Specification of DCP design
Unique Selling Proposition(s):	▪ DCP concept offers new options for collaborations of machines in production process	
Integration constraint(s):	▪ Requires operating system at embedded device	
Intended user(s):	▪ Manufacturers of controllers with generic or specific applications ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)	
Provider:	▪ IFAK	
Contact point:	▪ matthias.riedl@ifak.eu	
Condition(s) for reuse:	▪ Subject to PCA	
	Latest update:20.05.2021	

Name: Prototypical integration of secured communication		
Input(s):	Main feature(s)	Output(s):
▪ Valuable data (assets) ▪ Data to be cryptographically processed	▪ Secure storage of valuable data (assets), e.g. private key, certificates ▪ Easy integration via different interfaces, mainly I2C ▪ Provide cryptographic functionality to external entities	▪ Secures assets ▪ cryptographic processed data

Unique Selling Proposition(s):	▪ The EdgeLock SE050 product family of Plug & Trust devices offers enhanced Common Criteria EAL 6+ based security, for unprecedented protection against the latest attack scenarios. This ready-to-use secure element for IoT devices provides a root of trust at the IC level and delivers real end-to-end security – from edge to cloud – without the need to write security code.
Integration constraint(s):	▪ SE can only be integrated by using NXP's middleware. Also possible to do without but with much higher effort
Intended user(s):	▪ Manufacturers of (I)IoT devices ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ NXP
Contact point:	▪ EdgeLock SE05x: giuseppe.guagliardo@nxp.com
Condition(s) for reuse:	▪ Hardware: one-time investment ▪ Software: Apache License v2.0
	Latest update: 03.05.2021

Name: Prototypical implementation of Distributed Control Platform		
Input(s):	Main feature(s)	Output(s):
▪ Architecture specification, existing communication system routable via wireless networks	▪ Portable runtime system to execute application specific control programs using more than one controller and establishes communication relations automatically at runtime	▪ Portable runtime for distributed control system running on embedded hardware, IPC or PC, uses secured communication

Unique Selling Proposition(s):	▪ Portable runtime will be provided as customized packages
Integration constraint(s):	▪ Requires an operating system at embedded device
Intended user(s):	▪ Manufacturers of controllers with generic or specific applications, adaptable at runtime ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ IFAK
Contact point:	▪ matthias.riedl@ifak.eu
Condition(s) for reuse:	▪ License to be negotiated
	Latest update: 20.05.2021

Name: Integration of MQTT in DCP		
Input(s):	Main feature(s)	Output(s):
▪ Data requested to be exchanged between DCP and IIoT components via MQTT	▪ Publish or subscribe data by annotating the interfaces of control application	▪ Handable solution to exchange data between IIoT and control application

Unique Selling Proposition(s):	▪ Integral part of DCP runtime, ease the use of MQTT in applications
Integration constraint(s):	▪
Intended user(s):	▪ Manufacturers of controllers with generic or specific applications, connectivity to IIoT ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ IFAK
Contact point:	▪ matthias.riedl@ifak.eu
Condition(s) for reuse:	▪ License to be negotiated

Latest update: 20.05.2021

Name: Improved development tool for DCP engineering, e.g. MQTT configuration		
Input(s):	Main feature(s)	Output(s):
▪ Requirements of support interaction via MQTT, existing configuration tool components	▪ Application interfaces can be annotated to exchange data via MQTT, no programming necessary	▪ Engineering tool configures the distributed control program for MQTT data exchange

Unique Selling Proposition(s):	▪ Data to publish/subscribe can be annotated in control application ▪ Engineering configures runtime automatically
Integration constraint(s):	▪ DCP runtime, operating system at embedded device, MQTT broker
Intended user(s):	▪ manufacturers of controllers with generic or specific applications, connectivity to IIoT ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ IFAK
Contact point:	▪ matthias.riedl@ifak.eu
Condition(s) for reuse:	▪ License to be negotiated
	Latest update: 20.05.2021

Name: Localization Fusion Architecture (Technology)		
Input(s):	Main feature(s)	Output(s):
▪ Movement and Position data from sensors and infrastructure	▪ Abstraction of movement and position data for sensor independent data-fusion	▪ Position and movement data with increased robustness
Unique Selling Proposition(s):	▪ Sensor independent combination of positioning data for increased robustness	
Integration constraint(s):	▪ Computing platform for fusion computation	
Intended user(s):	▪ Manufacturers of mobile machines/devices ▪ TRL 4 – technology validated in lab	
Provider:	▪ COMNOVO, URO	
Contact point:	▪ fabian.hoelzke2@uni-rostock.de	
Condition(s) for reuse:	▪	
	Latest update: 12.05.2021	

Name: Software tool to support layout-based engineering and visualization of overhead travelling cranes		
Input(s):	Main feature(s)	Output(s):
▪ Plans of an existing or ideas for a new shop floor	▪ Easy-to-use software ▪ No deep knowledge in programming or 3D modeling required	▪ Interactive 3D scene, videos, parts list or AML description

Unique Selling Proposition(s):	▪ Consideration of crane applications in factory planning software
Integration constraint(s):	▪
Intended user(s):	▪ Crane manufacturers, crane system operators, planners ▪ TRL 7 – system prototype demonstration in operational environment
Provider:	▪ TARAKOS
Contact point:	▪ klaus.hanisch@tarakos.de
Condition(s) for reuse:	▪ license

Latest update: 27.05.2021

Name: Software module for simulation of complex material handling systems including cranes and corresponding environment		
Input(s):	Main feature(s)	Output(s):
▪ Virtual version of a planned shop floor including cranes, forklifts, AGVs and operators as well as commands from a control system	▪ Virtual behavior models act and communicate like real ones when getting the real commands	▪ Support in the development of new control systems by identifying errors at an early stage of development

Unique Selling Proposition(s):	▪ Special behavior modules for aspects of crane simulation, considering context awareness
Integration constraint(s):	▪ Interface to the control system may have to be implemented
Intended user(s):	▪ Crane manufacturers, crane system operators, planners ▪ TRL 4 – technology validated in lab
Provider:	▪ TARAKOS
Contact point:	▪ klaus.hanisch@tarakos.de
Condition(s) for reuse:	▪ license/service

Latest update: 27.05.2021

Name: Software tool for realtime visualization of digital twins (cranes)		
Input(s):	Main feature(s)	Output(s):
▪ Position data & information about the current state of the real cranes	▪ Connect real world data to visualization using generic plug-ins	▪ Interactive real-time visualization of existing facilities

Unique Selling Proposition(s):	▪ Consideration of crane applications in factory planning software
Integration constraint(s):	▪ Interface to the control system may have to be implemented
Intended user(s):	▪ Crane manufacturers, crane system operators ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ TARAKOS
Contact point:	▪ klaus.hanisch@tarakos.de
Condition(s) for reuse:	▪ license/service

Latest update: 27.05.2021

Name: Enhanced functionalities of collaborative Cranes / Machines		
Input(s):	Main feature(s)	Output(s):
▪ Operator request to Activate/Deactivate Assist-Functions	▪ DCP, Indoor Localization, M2M wireless communication and HMI/GUI enable the realization of new Assist functions	▪ HMI-Devices, Device's and operator's location, Working state, etc.

Unique Selling Proposition(s):	▪ IIoT platform supporting decentralized device control, implemented context awareness and innovative assist functions
Integration constraint(s):	▪ DCP, IIoT-Platform, MQTT, OPC UA, Indoor Localization, wireless realtime network
Intended user(s):	▪ Smart factories, smart manufacturing and advanced material handling ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ DEMAG, IFAK, COMNOVO, NXP, THORSIS, ERSTE
Contact point:	▪ giuliano.persico@demagcranes.com
Condition(s) for reuse:	▪ Licenses to be negotiated

Latest update: 26.05.2021

Name: Prototypical implementation of IIoT platform		
Input(s):	Main feature(s)	Output(s):
▪ Data request or commands via MQTT and OPC UA	▪ Besides DCP, core component to enable semi-autonomous functionality	▪ Requested data, control status
Unique Selling Proposition(s):	▪ IIoT platform turns any device into an OPC UA device without the need of a gateway. Enables the interaction with external distributed control platform (DCP)	
Integration constraint(s):	▪ Support of MQTT	
Intended user(s):	▪ Manufacturers of (I)IoT devices ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)	
Provider:	▪ Will be provided by open source distribution platform (e.g. Github) with support of University of Rostock (URO).	
Contact point:	▪ optimum@ws4d.org	
Condition(s) for reuse:	▪ Mozilla public license MPL 2.0	
	Latest update: 12.05.2021	

Name: Foundation of a cross-company VDMA working group for standardization activities with regards to OPC UA. Exploitable result will be an OPC UA companion profile for cranes as a new standard available in CY 2022.		
Input(s):	**Main feature(s)**	**Output(s):**
▪ Knowledge of material handling domain and OPC UA	▪ Standardized OPC UA data model for cranes	▪ Companion Specification for Cranes & Hoists (document and xml file)

Unique Selling Proposition(s):	▪ Enables interoperability between different crane vendors ▪ Compatibility with OPC UA CS for robots
Integration constraint(s):	▪ Needs IP capable networks or gateways or OPTIMUM IIoT platform
Intended user(s):	▪ Crane industries ▪ Material handling domain and logistics ▪ TRL 4 – technology validated in lab
Provider:	▪ Joint VDMA Working Group OPC UA for Cranes and Hoists
Contact point:	▪ frank.golatowski@uni-rostock.de
Condition(s) for reuse:	▪ Companion spec and node set will be freely available to registered OPC UA users

Latest update: 12.05.2021

Name: Foundation of standardization activities with regards to Safety – Machine Directive (EU-Law) (cross-company working group under the umbrella of FEM). Exploitable results will be updated safety-related standards to include collaborative machines. This is prerequisite for semi-autonomous assistance functions from OPTIMUM		
Input(s):	Main feature(s)	Output(s):
▪ Knowledge of hoists, cranes and material handling domain and related national and international standards	▪ FEM task force: Discussion and joint work with crane experts of different kinds and manufacturers	▪ FEM Guideline for the Implementation of Assist functions in the crane domain

Unique Selling Proposition(s):	▪ Harmonized proposal for new EG-standard
Integration constraint(s):	▪
Intended user(s):	▪ Crane industries ▪ Material handling domain and logistics
Provider:	▪ Joint cross-company FEM Working Group
Contact point:	▪ giuliano.persico@demagcranes.com
Condition(s) for reuse:	▪ Purchase of FEM Guideline

Latest update: 26.05.2021