MANUFACTURING·INDUSTRY
DIGITAL·INNOVATION·HUBS

Grant Agreement No. 767498
Innovation Action Project
H2020-FOF-12-2017

D1.10 Open Call Package

WP1 - Project Coordination, kPI Definition and Risk Assessment

Version:	1.0.
Due Date:	31/05/2018
Delivery Date:	31/05/2018
Type:	Report (R)
Dissemination Level:	PU
Lead partner:	INNO
Authors:	Carmen Polcaro (INNO), Susanne Kuehrer, Angelo Giuliana (EIT) Sergio Gusmeroli (ENG)
Internal reviewers:	All Partners (See List of Contributors below)

Disclaimer

MIDIH has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 767498.

Version Control:

Version	Date	Author	Author's Organization	Changes
1	31/05/2018	Carmen Polcaro	INNO	Gathering of the documents issued for the 1st open call

Annexes:

№	File Name	Title

Contributors:

Contributor	Partner
Carmen Polcaro	INNO
Susanne Kuehrer	EIT
Angelo Giuliana	EIT
Sergio Gusmeroli	ENG

Deliverable Title:	D1.10 Open Call Package
Deliverable Number D.x.x.	D1.10
Keywords: …	Open call, I4MS, CPS, IoT, Big Data

Executive Summary:

This deliverable gathers all the documents issued by the MIDIH consortium for the 1st Call for Proposals for Data driven applications and experiments in CPS/IOT. The call for proposal opened on March 29th and closes on June 29th 2018.

The information provided to the applicants is included in the following documents

1. MIDIH OC 1 guide for applicants

This document presents information about MIDIH project, objectives and topics of the call, the available budget, submission details, and eligibility and evaluation criteria.

2. MIDIH Call 1 template

This document is a template of the proposal

3. MIDIH Reference Architecture

This document presents the architecture of the MIDIH platform, specifying the open source components included in the different blocks.

4. Information about Competence Center

This document contains information about expertise of the competence centers of the MIDIH ecosystem that will provide support to the open call's winners in the deployment of their experiment

5. Slides for dissemination purpose

This document contains the slides prepared to disseminate the open call during the events and seminars organized by the project partners

6. Leaflet

This document contains the leaflet distributed in fairs and events (e.g. FIWARE Summit in Oporto May 7-9th, IoT week in Bilbao 4-7th June)

Detailed report on dissemination activities to promote open call will be issued in the next project report, due on month 18.

These documents have been published on March 29th on the MIDIH website, (http://midih.eu/open-call.php) on the website for the application, EMS Evaluation management system (https://midih.ems-innovalia.org/), and on the I4MS channels (http://i4ms.eu/opencalls). ENG and INNO, with the collaboration of I4MS, are organizing a webinar with interested applicants to be held on June 14th.

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1 MIDIH OC 1 guide for applicants

Grant Agreement No. 767498

Innovation Action Project

H2020-FOF-12-2017

MIDIH First Open Call

Data driven applications and experiments in CPS/IoT

(Call for Experiments, Guidelines and Rules for Participation)

Table of Content

1 Introduction

MIDIH is funded under the European Commission's Horizon 2020 Framework Programme for Research and Innovation through the Factories of the Future Call for Proposals (addressing the Topic "ICT Innovation for Manufacturing SMEs (I4MS)" (topic identifier: H2020-FOF-12-2017) and is part of the phase 3 of the I4MS (ICT Innovation for Manufacturing SMEs) – www.i4ms.eu – initiative.

MIDIH "Manufacturing Industry Digital Innovation Hubs" will be jointly working as a "one stop shop" of services, providing industry with access to the most advanced digital solutions, the most advanced industrial experiments, pools of human and industrial competencies and access to "ICT for Manufacturing" market and financial opportunities.

MIDIH Call-1 targets the development of data driven applications, by IT SMEs as technology providers, and experiments in CPS/IoT by Manufacturing SMEs.

The open call aims at complementing functionalities around MIDIH reference architecture and performing experiments in CPS/IOT based on the components provided by the architecture. The experiments must cover one of the three main scenarios: Smart Factory or Smart Product or Smart Supply chain.

Inside the MIDIHs ecosystem there are **9 Competence Centres**, each specialised in peculiar aspects of the CPPS/IIOT technologies and able to mentor IT SMEs, as technology providers, and manufacturing SMEs towards Industry 4.0 projects and cross-border experiments and business.

CC1) CPS/IOT Networks / M2M Communication Germany at **Fraunhofer FOKUS**
CC2) CPS/IOT Trust Management and Cybersecurity in France at **Institute Mines-Telecom**
CC3) CPS/IOT Modelling, Simulation and Digital Twin in Germany at **Fortiss**
CC4) CPS/IOT Real Time Stream Data Analytics in Finland at **VTT Technical Research Center**
CC5) CPS/IoT in Smart production systems and services in Slovakia at **Technical University of Kosice TUKE**
CC6) Cloud Industrial Analytics Architectures and Tools in Italy at **CEFRIEL**
CC7) CPS based distributed edge-fog computing architectures in Sweden at **Lulea University of Technology** LTU
CC8) CPS/IOT Data Sovereignty solutions in Germany at at **Fraunhofer IML**
CC9) CPS/IOT HPC-based Cloud Manufacturing in Poland at **PSNC (Poznan Supercomputing and Networking Centre)**

2 Open Call Objectives

2.1 Technological topics

Addressing the technologies around the MIDIH architecture

Expected applicants are IT SMEs as technology providers

T1. Modeling and Simulation innovative HPC/Cloud applications for highly personalised Smart Products

The Smart Products MIDIH reference architecture defines reference functions and reference implementations for innovative applications acquiring and processing data from the Product Lifecycle, from its design to its operations to its end of life. Modelling and Simulating complex one-of-a-kind products in the different configurations (e.g. as-designed. as-manufactured, as-maintained, as-recycled or re-manufactured) requires the availability of huge and sophisticated computational IT resources, that just modern Cloud-HPC datacenters could offer.

The **T1** topic looks for product-oriented industrial modelling & simulation IT experiments, which are using the MIDIH "Data in Motion" and "Data at Rest" architectures and reference implementations and the MIDIH Data Infrastructures. Candidates are required to provide advanced algorithms / applications based on the MIDIH architecture and to provide the correspondent datasets to be experimented in MIDIH HPC/Clouds

T2. Smart Factory Digital Twin models alignment and validation via edge clouds distributed architectures

Edge / Fog computing reference architectures and distributed local clouds frameworks aim at inserting a new computational layer between the Real World and the Cloud. Smart factory Digital Twins are digital representations of a real-world artefact in a production site (a machine, a robot, or even the whole production line). Traditionally such models run on the cloud but when real-time (or near real time) performance is required, they can be moved and deployed on a reduced scale closer to the real world.

The **T2** topic looks for factory-oriented Digital Twin IT experiments, which are using the MIDIH "edge / fog" computing architecture and reference implementations and the MIDIH Didactic Factories in Milano and Bilbao. Candidates are required to provide advanced Factory digital models and to deploy them onto the MIDIH edge/fog framework available in our two didactic factories.

T3. Advanced applications of AR / VR Technologies for Remote Training / Maintenance Operations (Smart Product and Smart Factory)

Virtual and Augmented reality applications are suitable to enhance both Smart Factory and Smart Product scenarios. In Smart Factory scenarios, production systems, machineries, robots, warehouses, AGVs need to be properly virtualised, while in Smart Product scenarios, virtual models are needed for complex products such as airplanes, vessels, trucks. Typical applications are concerned with remote training, virtual design and commissioning, maintenance operations involving both engineers, workers and even citizens.

The **T3** topic looks for product-oriented or factory-oriented virtual / augmented reality IT experiments, which are using the MIDIH "Data in Motion" and "Data at Rest" architectures and reference implementations and the MIDIH Training Facilities. Candidates are required to provide advanced VR/AR applications based on the MIDIH architecture and to experiment such systems in one of our two Training Factories in Milano and Bilbao

T4. Machine Learning and Artificial Intelligence advanced applications in Smart Supply Chains management and optimisation

According to EC Digitising EU Industry communication and subsequent working groups (especially the WG 2 about Digital Platforms for Manufacturing), Industrial IoT, Industrial Analytics and Artificial Intelligence are the three major pillars for Industry 4.0 Digital Transformation. MIDIH is focussing on providing Open Source "Data in Motion" and "Data at Rest" reference implementations as development (API and SDK) platforms for innovative applications. The MIDIH Smart Supply Chain scenario is particularly suitable for advanced ML /AI distributed applications due to its inherent heterogeneity of models, ontologies, systems which makes it very difficult for a mere statistical Data Analytics solution to meet its requirement.
The **T4** topic looks for ML/AI applications on multi-stakeholders' owned heterogeneous datasets justifying Data Sovereignty and Smart Contracts requirements. Optionally, MIDIH could also provide candidates with the needed IoT-Cloud Infrastructure (SIEMENS MINDSPHERE based) in order for them to join the MINDAPPS Business Ecosystem

2.2 Experimentation topics

The experiments must cover at least one of the three main scenarios:

- **Smart Factory**
- **Smart Product**
- **Smart Supply chain**

The usage of components of the reference architecture is mandatory.
Expected applicants are manufacturing SMEs.

E1. Integrating CPS / IOT subtractive production technologies in Additive Manufacturing experimental facilities

Additive Manufacturing includes different technologies for products manufacturing through the addition of layers of materials (polymer, metals, composites or ceramics) to obtain complex shapes, functional or semi functional prototypes from data models (typically CAD).
The **E1** topic looks for CPS/IOT data-driven experiments to explore the design challenges and opportunities of additive manufacturing combined with traditional subtractive technologies, aspects of products customization, rapid manufacturing, design concepts, assembly strategies, combinations of components, cybersecurity etc. Experiments must use the MIDIH reference architectures and reference implementations and the MIDIH Data Infrastructures.
In alignment with AMABLE, the I4MS project which facilitates digital design and solution for secure data chain in additive manufacturing, experiments results will be shared publicly in dissemination events and through the I4MS tools.

E2. Integrating CPS / IOT factory automation technologies in Robotics experimental facilities

Robots are used in manufacturing to execute mainly these types of operations: material handling (pick up and place, movements), processing operations (tool manipulation, welding), assembly and inspection. Current challenges for robotics in manufacturing are related to efficiency, human-robot collaboration, and cognitive operations.

The **E2** topic looks for CPS/IOT data-driven experiments for sensor data collection, data analytics, and machine learning for the implementation of factory automation technologies supported by robotics which must use MIDIH reference architectures and reference implementations and the MIDIH Data Infrastructures.

Candidates are required to provide experiments based on the MIDIH architecture and to provide the correspondent datasets to be experimented in MIDIH HPC/Clouds.

In alignment with Horse, the I4MS project which proposes a flexible model of smart factory involving collaboration of humans, robots, AGV's (Autonomous Guided Vehicles) and machinery in the manufacturing environment, experiments results will be shared publicly in dissemination events and through the I4MS tools.

E3. Integrating CPS / IOT discrete manufacturing technologies in Process Industry experimental facilities

The manufacturing industry can essentially be classified into two main categories: process industry and discrete product manufacturing. The process industry transforms material resources into a new material with different physical and chemical properties. This material is then usually shaped by discrete manufacturing into an end user product or intermediate component.

The **E3** topic looks for CPS/IOT data-driven experiments involving all actors along the full value chain – from different types of raw material suppliers, through industrial transformation into intermediate products and applications, with the goal of reducing the environmental footprint and increase industrial efficiency. The experiments must use MIDIH reference architecture and reference implementations and the MIDIH Data Infrastructures.

Candidates are required to provide experiments based on the MIDIH architecture and to provide the correspondent datasets to be experimented in MIDIH HPC/Clouds.

In alignment with SPIRE, the EU Public-Private Partnership dedicated to innovation in resource and energy efficiency enabled by the process industries, experiments results will be shared publicly in dissemination events and through the SPIRE tools.

E4. Integrating CPS / IOT factory logistics technologies in Warehouse management experimental facilities

CPS/IoT play a fundamental role in the factory internal logistics: innovative IT applications need to be developed specifically for planning, scheduling and monitoring raw materials and finite products inside the production system.

The **E4** topic looks for CPS/IOT data-driven experiments involving the integration of the different actors and stakeholders of the supply chain that will guarantee a total coordination and alignment between all the value chain phases. The experiments must use MIDIH reference architecture and reference implementations and the MIDIH Data Infrastructures.

Candidates are required to provide experiments based on the MIDIH architecture and to provide the correspondent datasets to be experimented in MIDIH HPC/Clouds.

In alignment with L4MS, the I4MS project that will develop deployment of small and flexible logistics solutions to make logistics automation extremely attractive for manufacturing SMEs, experiments results will be shared publicly in dissemination events and through the I4MS tools.

3 Open Call Information

Call for Proposals for Data driven applications and experiments in CPS/IOT

Project Acronym: MIDIH

Project full name: Manufacturing Industry Digital Innovation Hubs

Grant agreement number: 767498

Call Identifier: MIDIH OC1

Call title: MIDIH first Open call: Data driven applications and experiments in CPS/IOT

Publication Date: 29th March 2018

Deadline: 29th June 2018**,** at 17:00 Brussels local time

Expected duration: 6 Months

Total budget: € 960,000

Maximum funding request per proposal: € 60,000

Project web address: http://www.midih.eu

Proposal full call information: midih.eu/open-call.php

Submission site: https://midih.ems-innovalia.org/

A contact tool is available inside the submission site.

Mail: midih_opencall@innovalia.org

4 MIDIH Open Call Requirements

4.1 Eligibility criteria

1. Applicants must be legal entities established in countries eligible for participation in EC H2020 projects, as indicated in the following documents:
   https://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-a-countries-rules_en.pdf
   http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-list-ac_en.pdf
2. Each proposal must be submitted by a single applicant, consortia are not allowed
3. Applicants can be selected only for funding for one proposal (even if the proposer submitted multiple proposals that are ranked high enough to be selected for funding).
4. Applicants shall not have any potential conflict of interest with the selection process and during the implementation of the project. All cases of potential conflict of interest will be assessed case by case.
5. MIDIH consortium members cannot apply to this call

4.2 Additional Requirements

1. Cross border experimentation: each applicant must explicitly select one of the competence center, located in another member state, to provide them support, knowledge or facilities to their development or experiment
2. The proposal must be submitted in English

4.3 KPIs

Applicants must clearly indicate in their proposal the results they intend to achieve and how to measure them providing a set of measurable Key Performance Indicators (KPIs) to be validated during the contract negotiation phase. This is a **mandatory** requirement for any proposal.

5 Submission of proposals

5.1 General information

Submission deadline: All submissions must be made by 17:00 Brussels local time, 29th June 2018.

Electronic submission: Proposal submission is exclusively in electronic form using the proposal submission tool accessible via the MIDIH open call web-site: https://midih.ems-innovalia.org/

The central component of proposal submission is the uploading of a PDF-document (whose size must not exceed 5.0 MB) compliant with the instructions on the proposal structure given below.

Proposal format and structure: Proposals must be submitted in English. The main section of the proposal must not exceed 10 pages in length (with text no smaller than 11 point Arial font). Thus, with the inclusion of the cover page and administrative pages (discussed below), the maximum page count is 13 pages. **Proposals will be truncated to this page count and the independent expert evaluators will only be provided with the truncated version.**

The structure of the proposal (and indicative length per section) should be as follows:

1. Summary (0.5 pages)
2. Industrial relevance, potential impact and exploitation plans (3.5 pages)
3. Description of the work plan and concept (3 pages)
4. Quality of the consortium as a whole and of the individual proposers (2 pages)
5. Justification of costs and resources (1 page)

As indicated above, the overall length of the above 5 sections must not exceed 10 pages.

In addition to the 10-page proposal description, a cover page and 2 pages of administrative data for statistics analysis, including, when available, the Participant Identification Code (PIC) issued by the European Commission
(http://ec.europa.eu/research/participants/portal/desktop/en/organisations/register.html).

5.2 Submission process

Proposals must be submitted electronically in PDF format ONLY at https://midih.ems-innovalia.org/

If you discover an error in your proposal, and provided that the call deadline has not passed, you may submit a new version. Only the last version received before the call deadline will be considered in the evaluation.

Proposals must be received by the closing time and date of the call. Late proposals – including force majeure circumstances – or proposals submitted in any other way than through the online submission tool, will not be evaluated.

5.3 Acknowledgement of receipt

As soon as possible after the close of call, an Acknowledgment of receipt will be emailed to you by MIDIH. The sending of an Acknowledgement of receipt does not imply that your proposal has been accepted as eligible for evaluation.

6 Indicative budget for MIDIH OC1:

MIDIH will make use of the H2020 Cascade Funding method to support the winners of the open calls. The funding budget for Third Parties for MIDIH OC1 is 960,000€

The funding of Third Parties must follow the same principles as used for existing project beneficiaries of MIDIH, which receives European Commission funding as an “Innovation Action”. Thus, Third Parties will receive 70% funding of eligible costs arising (except for non-profit organisations which receive 100% funding).

The funding for an individual proposal may not exceed 60,000 €. Proposers should consider their actual needs and not target this upper limit mandatorily. The evaluation will take into account the appropriateness of the requested resources.

7 Evaluation Criteria

The evaluation criteria and the scoring scale used are very well aligned with H2020 Programme, but enhanced to favour the integration of CPS/IoT technology, aimed by objective FoF-12-2017. The ranking of selected projects will be created assessing:

1. Soundness of service concept (weight 2);
2. Innovation potential (weight 2)
3. Impact including industrial relevance and business strategy (weight 3)
4. Quality of workplan and resource deployment (weight 1)

Thus, the market impact will have a slightly higher relevance than the Innovation Technical Excellence of the service, while the use of resources and the implementation will have a lesser impact in the final remark.

Each criterion will carry a score ranging from 0 to 5 as usual for H2020:

- 0: The proposal fails to address the criterion under examination or cannot be judged due to missing or incomplete information
- 1 (Poor): The criterion is addressed in an inadequate manner, or there are serious inherent weaknesses
- 2 (Fair): While the proposal broadly addresses the criterion, there are significant weaknesses;
- 3 Good The proposal addresses the criterion well, although improvements would be necessary
- 4 (Very good): The proposal addresses the criterion very well, although certain improvements are still possible
- 5 (Excellent): The proposal successfully addresses all relevant aspects of the criterion in question.

There will be a threshold score of 3 for all criteria.

Funding is then awarded to most highly ranked proposals as long as there is available budget. MIDIH financial support will be granted to projects up to the limits indicated below, on the condition that the service reaches the excellence level requested and till the budget available for each phase is exhausted. If the call budget is not exhausted, the remainder will be diverted to the second call.

The priority order for proposals with the same score is handled as follows:

These proposals will be prioritised according to the scores they have been awarded for the criterion impact.

- If these scores are also equal, priority will be based on scores for excellence.
- If these scores are also equal, priority will be based on scores for the criterion implementation of the workplan with a final reference to the use of resources.

All proposers (successful and unsuccessful) are contacted with the results of their evaluation.

8 Relationship with MIDIH consortium and funding scheme

8.1 Administrative Duties

Selected organizations will become a Third Party of the consortium using Cascade Funding (also known as sub-granting). In the remainder of this document a 'Third Party using Cascade Funding' is referred to as Subgrantee.

Contracts with the Subgrantee will be done by MIDIH's coordinator, EIT Digital IVZW.
Any legally binding commitment from the side of EIT Digital IVZW shall be subject to the entering into a written contractual agreement between EIT Digital IVZW and the Subgrantee

The administrative tasks for the Subgrantee, including cost and activity reporting obligations and related documents will be provided during the negotiation and contracting phase.
The Subgrantee will be requested to submit, at M3, a "Midterm Review" and, at the end of the project, a "Final Report" consisting of:

- Progress of the experiments
- Technical results including KPI
- Dissemination and exploitation activities
- Cost statement

Besides these two mandatory reports, Subgrantee are free to define and issue other deliverables or documents to present the results of the project.

Eligible costs consist of

- Activities
- Personnel Costs
- Equipment Costs
- Travel expenses
- Software licenses
- Indirect cost (25% of direct costs

Subgrantees have to comply with the rules and the principles mentioned in Section I, Article 6 (Eligible and ineligible costs) of the H2020 AMGA – Annotated Model Grant Agreement (see http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/amga/h2020-amga_en.pdf), in the same way as the beneficiaries of the MIDIH project. The rules concerning eligibility of costs, identification of direct and indirect costs and upper funding limits can be found in Section I, Article 22 of the H2020 AMGA. Following other articles of the AMGA apply: 23, 35, 26, 38 and 46.

8.2 Funding scheme

The following payment scheme will apply:

- 30% negotiated contribution upfront, upon contract signature,
- 30% at the end of the project, once the third party has produced all the relevant documentation specified in the contract, including cost statements, deliverables, milestones, etc. and the contractor (EIT Digital), after discussion with the consortium, has accepted them
- 40% final installation upon approval of the experiment outcomes by the Commission

8.3 Intellectual property rights

The IP of the experiment's results generated by the Subgrantee will be owned by it.

Subgrantees grant the MIDIH consortium partners access to the results, for the pursuance of the objectives of the Project and the exploitation of the Project results in accordance with the GA. Details will be defined during the negotiation phase.

Subgrantees shall respect the intellectual property rights, including copyright, and abide by data protection legislation, that apply to software and data available or part of the MIDIH platform.

9 Support to Experimenters

9.1 Call Helpdesk

For further information on the call, contact: midih_opencall@innovalia.org ;

For more general information, please refer to info@midih.eu

9.2 Useful Documents

- MIDIH Open Call document (this document)
- MIDIH Architecture details

Please refer to http://www.midih.eu/open-calls.php for the complete documentation.

2 MIDIH Call 1 template

Manufacturing Industry Digital Innovation Hubs

Grant Agreement Number: 767498

MIDIH Open Call 1

Call for Proposals for Data driven applications and experiments in CPS/IoT

Full Title of your proposal

Acronym of your proposal (optional)

Main target of proposal	"Technological" or "Experimental"
Date of preparation of your proposal:	dd/mm/2018
Version number (optional):	
MIDIH Topic addressed	Topic
Your organization(s) name(s):	Your organization(s) name(s)
Name of the coordinating person:	Name of the coordinating person
Coordinator telephone number:	Coordinator telephone number
Coordinator email: [This is the email address to which the Acknowledgment of receipt will be sent]	Coordinator email

Note: Grey highlighted areas need to be filled. Word template can be downloaded from MIDIH project website (see http://www.midih.eu/open-calls.php)

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Statistical Information for the European Commission`s I4MS Initiative

1 Participant (Organisation name)	2 Participant short name	3 Country	4 Type (SME /MID /IND / AC / OTHER)	5 First time EU project? (Y/N)	6 PIC number	7 Total cost	8 Requested funding
TOTAL							

Instruction

[Please delete these instruction in the submitted version]

1. Participant: Insert the name of the organisation.
2. Participant short name
3. Country: Insert the 2-letter country code (using the Eurostat country codes: http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Country_codes).
4. Type: Insert
    a. SME for an SME,
    b. MID for a mid-cap enterprise,
    c. IND for large industrial enterprise,
    d. AC for academia (universities and research institutes),
    e. OTHER for any other organisation type (e.g. governmental agencies, industry consortia etc.)
5. Fill in Y if this would be the first European project for that partner, N otherwise.
6. Provide the PIC number here if available.
7. Specify the total costs in Euros (0 decimal places)
8. Specify the requested funding in Euros (0 decimal places[1])

[1] i.e. rounded to the nearest Euro

Summary

(Guideline: 0.5 pages)

Industrial relevance, potential impact and exploitation plans

(Guideline: 3.5 pages)

Instruction

[Please delete these instruction in the submitted version]

MIDIH Call-1 targets the development of data driven applications, by IT SMEs as technology providers, and experiments in CPS/IoT by Manufacturing SMEs.

The open call aims at complementing functionalities around MIDIH reference architecture and performing experiments in CPS/IOT based on the components provided by the architecture. The experiments must cover one of the three main scenarios: Smart Factory or Smart Product or Smart Supply chain.

Please, choose one of the following topics

Technological topics

T1. Modelling and Simulation innovative HPC/Cloud applications for highly personalised Smart Products
T2. Smart Factory Digital Twin models alignment and validation via edge clouds distributed architectures
T3. Advanced applications of AR/ VR Technologies for Remote Training / Maintenance Operations

Experimentation Topics

E1. Integrating CPS / IOT subtractive production technologies in AM experimental facilities
E2. Integrating CPS / IOT factory automation technologies in Robotics experimental facilities
E3. Integrating CPS / IOT discrete manufacturing technologies in Process Industry experimental facilities
E4. Integrating CPS/IOT factory logistics technologies in Warehouse management experimental facilities

Description of the work plan and concept

(Guideline: 3 pages)

Introductory text & explanation of the experiment concept.

In this section applicants are required to provide an adequate description of the experimental facilities provided by the manufacturing SME.

Experiment Title
Role of the applicant[2]:
Description: •
Workplan **Task 1 Task name** Task description. *Note: If your experiment consists of different tasks, please insert a description of each task.* ***Deliverable**: Deliverable short description (Experiment Month nn (i.e. within months 1 to 6 of the experiment))*
Impact and Outputs *(Output = concrete results from the experiments, such as, but not limited to, application release, business case, analyses/reports of the experiment, validation report.* *Impact = explanation of the use of project results and the related business impact, enhanced capabilities or potential for service offerings, etc.)* The output of experiment will be: • The results of the experiment will be reported in 2 mandatory deliverables, one at M3 and one at M6. Applicants are free to issue more deliverables if needed.
Efforts (PM):

PM = Person Months

[2] Examples of roles: End-user, application or technology expert, developer.

Background and qualification

(Guideline: 2 pages)

This section describes the proposer and includes an overview of the activities, the proposer's qualifications, technical expertise and other information to allow the reviewers to judge the proposer's ability to carry out the Experiment.

Justification of costs and resources

(Guideline: 1 page)

Cost breakdown per Participant; Funding for Third Parties

	Total PM	Cost (€)
1. Direct Personnel costs		
2. Other direct costs[1]		
3.Total direct costs (sum of row 1 and row 2)		
4. Indirect costs[2] (25% of row 3)		
5. Total costs (sum of row 3 and row 4)		
6. Requested funding[3] (up to 60000 EUR)		

[1] Costs for experimental facilities of the applicants, if any, are included in "Other direct costs". Costs for subcontracting and other direct costs need to be clearly explained.

[2] Indirect costs are to be calculated as 25% of direct costs (i.e. personnel costs + other direct costs).

[3] Funding rate 70% of eligible costs (100% for non-profit organisations).

3 MIDIH Reference Architecture

Grant Agreement No. 767498
Innovation Action Project
H2020-FOF-12-2017

D4.1.

Functional and Modular Architecture of MIDIH CPS/IOT System v1

WP4 - Open Platform architecture, development, integration and testing

PUBLIC VERSION

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Executive summary

The D4.1 “Functional and Modular Architecture of MIDIH CPS/IOT System v1” is a confidential document delivered in the context of WP4, Task WP4.1: Functional and Modular Architecture, Open Platforms. Task WP4.1 aims at the definition of a functional and modular architecture that supports IoT, Big Data and Artificial Intelligence technologies, which are expected to drive the change in Manufacturing Industry by enabling smart products (digital inside), smart processes and smart business models.

Based on the description of a Reference Architecture specified in the International Standard *ISO/IEC/IEEE 42010 Systems and software engineering — Architecture description*

A Reference Architecture ***describes the structure of a system with its elements types and their structures, as well as their interaction types, among each other*** *and with their environment. Describing this, a Reference Architecture defines restrictions for an instantiation (concrete architecture). Through abstraction from individual details, a Reference Architecture is universally valid within a specific domain. Further architectures with the same functional requirements can be constructed based on the reference architecture. [ISO/IEC42010]*

A reference architecture is a reference model capturing the main architectural characteristics of a set of systems in the same domain, that is mapped onto the software elements that implement the functionality defined in the model, providing indications and guidelines for the design of architectures for a specific system. Therefore, the design of the MIDIH Reference Architecture aimed to identify and define at high-level the functionalities that can enable all the cross-border experiments covered in the CPS/IOT domain, and consequently, to identify and structure through different functional layers a set of logical components to cover these functionalities and their interactions.

As a starting point of the design of the MIDIH RA, a detailed review and analysis of the reference models and architectures for IIoT systems such as IIRA, IVRA and RAMI4.0, as well as an analysis of IoT standard technologies applied in manufacturing domain have been made. In the same way, relevant projects developed in some European initiatives providing Digital Industrial Platforms, have been identified (BEinCPPS, ArrowHead, FAR-EDGE, C2Net and SymbIoTe) and the logical layers that made up their Reference Architectures have been reviewed. This high-level analysis has mainly focused on identify commonalities among them, both at the level of functionalities and technologies, covering standards, interoperability, connectivity, analytics, security and mechanisms to access information.

The document describes the MIDIH RA based on FIWARE for Industry solution, but following a data-driven approach, empowered by Industrial IOT and Industrial Analytics new functions and by specific solutions to interoperate with the Factory Automation real world and with the brownfield of legacy and proprietary systems, which will allow industries making strategic decisions based on data analysis and interpretation in real or near real-time. For this purpose, the core of the MIDIH RA will cover a unified analytics framework interconnected contemplating the Data in Motion (Industrial IOT) and the Data at Rest (Industrial Analytics).

Access and authentication will play a relevant role in the MIDIH RA, based on rules ensuring that only the right person gets the right data at the right time.

Finally, the document proposes two different lines to implement the MIDIH RA (based on FIWARE4Industry and APACHE), identifying for it several components as possible candidate to implement the logical architectural components and satisfy their functionalities. This initial selection will be refined for the second iteration of the D4.1.

This document has been elaborated by the main partners involved in the definition, development, integration and testing of the MIDIH Open Platform architecture (WP4), assisted by the experiment leaders (WP5), either directly or indirectly through the specification of functional components and refining the functional layers of the MIDIH RA.

1 FIWARE4Industry Reference Architecture

FIWARE for Industry (F4I) is a multi-project initiative aiming at developing an ecosystem of FIWARE-enabled software components, suitable to meet the challenges of Manufacturing Industry business scenarios, as indicated by Industry 4.0 vision. F4I originates at the end of 2015 as the exploitation booster of the FITMAN FP7 FI PPP project (www.fiware4industry.com) which developed Open Source reference implementations of Smart-Digital-Virtual Factory scenarios by integrating 14 FIWARE Generic Enablers with 15 original Manufacturing Industry Specific Enablers.

Starting from these 29 components, more than 15 new projects are developing their Smart Manufacturing solutions in several R&I domains. In the Factories of the Future H2020 cPPP, the recent projects CREMA, C2NET, PSYMBIOSYS, BEinCPPS, some of the ongoing FoF11 Connected Factories projects (e.g. FAR EDGE, AUTOWARE, vfOS and NIMBLE) RIAs and two I4MS Phase III Innovation Actions (MIDIH in the domain of CPS/IOT, L4MS in the domain of Mobile Robotics and Industrial Shop-floors’ Logistics) are contributing in kind to the picture here below which includes 17 Enablers: 8 enhancements of FITMAN SEs, 3 enhancements of FIWARE GEs, 2 new specific enablers and 4 new releases of FIWARE GEs. Moreover, the EIT DIGITAL High Impact Initiative called OEDIPUS (Operate European Digital Industry with Products and Services) is developing platforms and components FIWARE based for the Smart Manufacturing Industry, in close collaboration with SIEMENS (OEDIPUS coordinator) and its platforms (e.g. MINDSPHERE). In the near future, the EU-Brasil FASTEN project and some National / Regional projects will give their contributions as well to the F4I ecosystem.

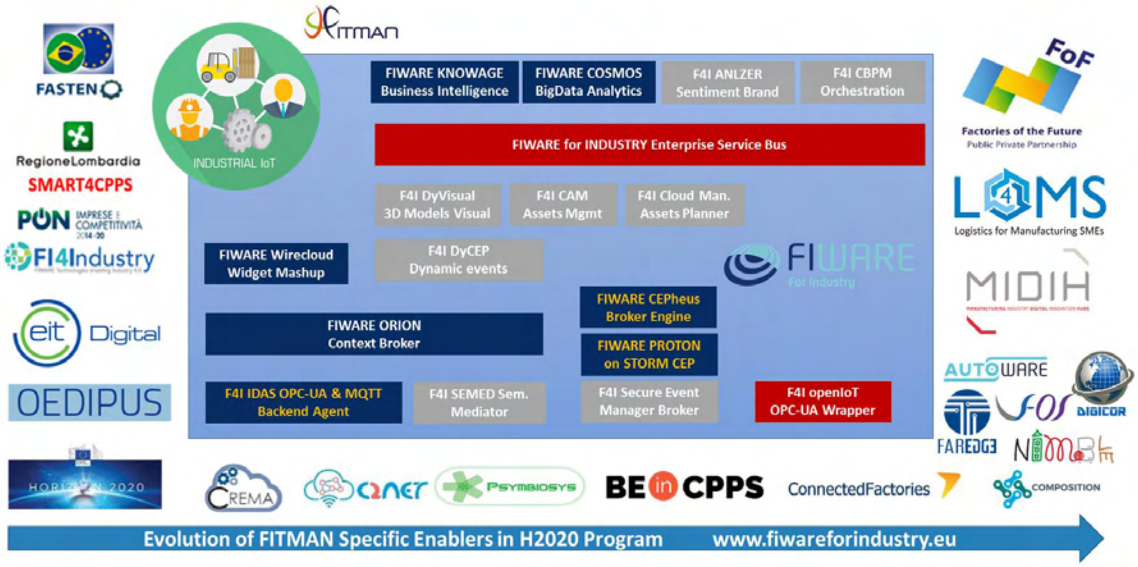


Figure 1. FIWARE4Industry Ecosystem

On the basis of F4I bottom-up success in many projects, the FIWARE Foundation Smart Manufacturing Domain Committee decided to develop a Reference Architecture which could be the common top-down basis for building successful applications on top of both FIWARE GEs and F4I SEs. Following a data-driven approach, the F4I RA is based on the Data in Motion (Industrial IOT) and the Data at Rest (Industrial Analytics) processing modality, what basic components they envisage and how to interconnect them (Lambda architecture) in a unique RA.

2 MIDIH RA for Smart Factory, Smart Product and Smart Supply Chain scenarios

Driven by the requirements of our Industrial Experiments (CRF NECO and IDSA) in the domains of Smart Factory, Smart Product and Smart Supply Chain, MIDIH has elaborated its RA, extending and complementing the F4I RA.

In the domains of Smart Factory and Smart Product we have in fact identified the Real World assets at the bottom of the RA and the Application Ecosystem at the top of the RA. **Data in Motion** is in fact generated by different Real World assets being them in the Smart Factory (Machine Tools, Robots, Warehouses, Human Workspaces) or in the Smart Product (Fleet of Vehicles, Product Service Systems, Smart Objects). **Data at Rest** need to be processed in order to feed AI-based advanced applications in the field of Factory and Product condition monitoring, health diagnosis, predictive maintenance, zero defect quality, energy and waste management, human-machine interaction, Virtual and Augmented reality.

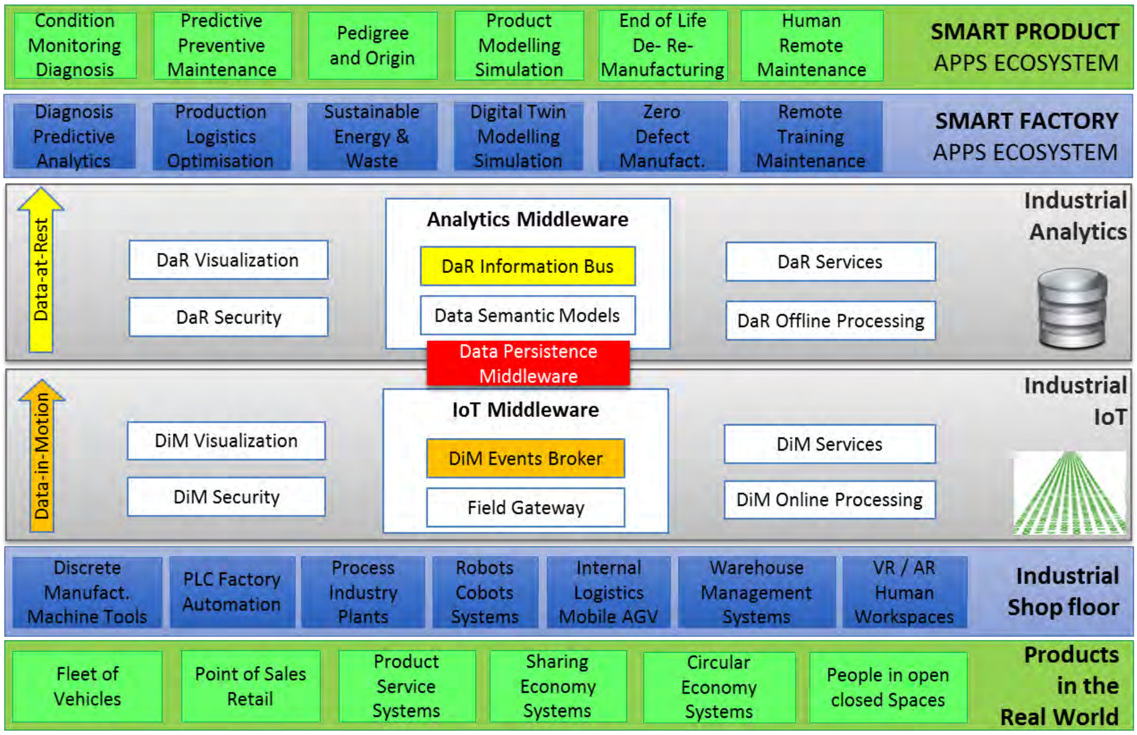


Figure 2. MIDIH RA for Smart Factory and Smart Product

By adopting the IIRA Layered Databus Architectural Pattern and its Machine-Unit-Site and Intersite layers, we've developed the following Data in Motion and Data at Rest model, as a reference for MIDIH Smart Factory and Smart Product industrial scenarios to be implemented in WP5 industrial cases.

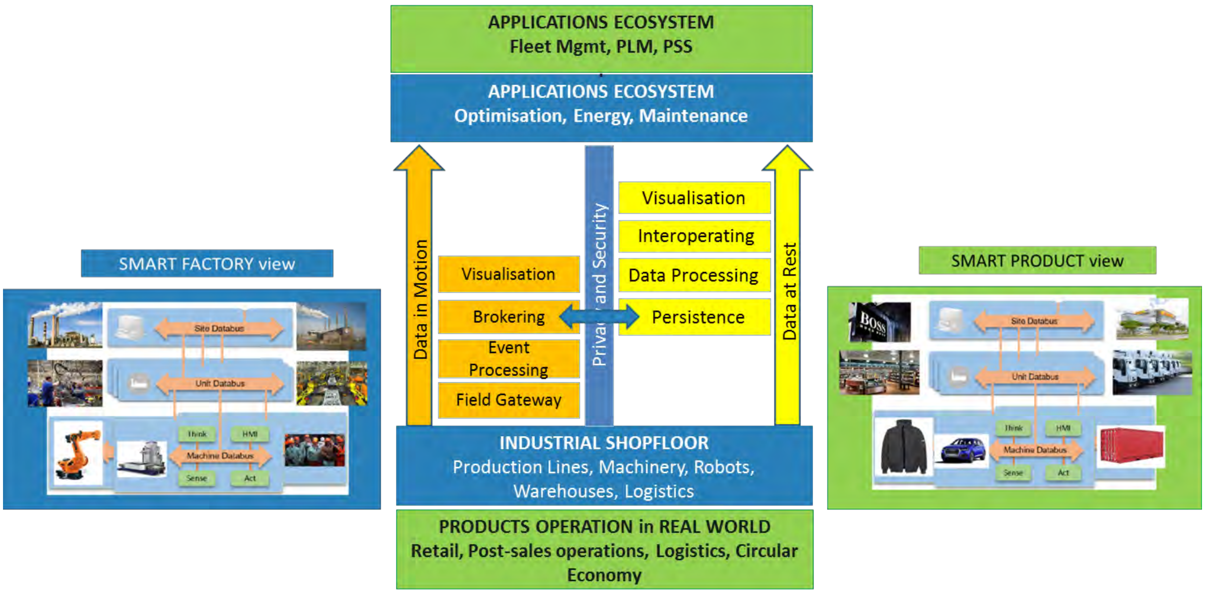


Figure 3. Data in Motion and Data at Rest Model

By leveraging on the mapping between FIWARE GEs, F4I SEs and some further Open Source DiM and DaR components, we have finally compiled an open source reference implementation, which will drive the developments of MIDIH about Data Analytics. This model has two basic lanes, one FIWARE-based and the other based on worldwide known Open Source projects and Foundations, such as APACHE. The main challenge will be to find an interoperability model and implementation between the two Lanes.

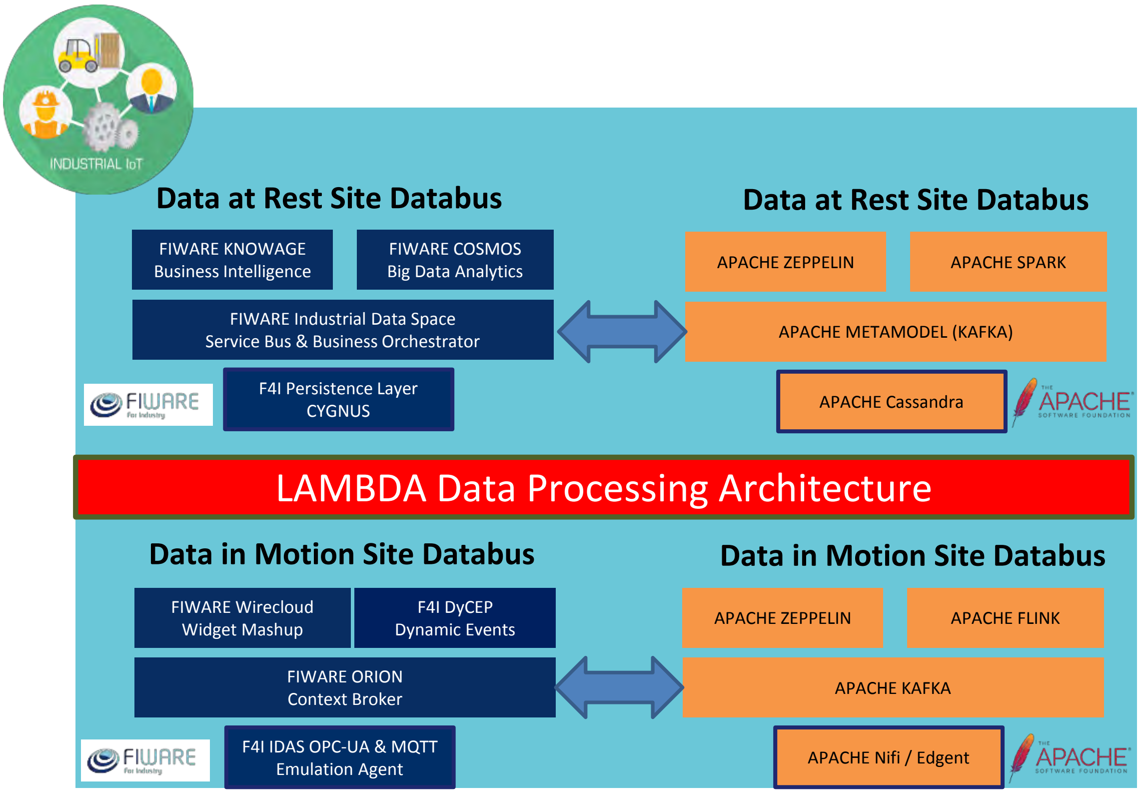


Figure 4. MIDIH Open Source Reference Implementation

In the domain of **Smart Supply Chain**, MIDIH will leverage on the existing open source FIWARE implementation of the IDS RA and extend it with a Distributed Ledger layer to trace and control B2B transactions along the value chains, as required by some of our MIDIH Industrial Cases.

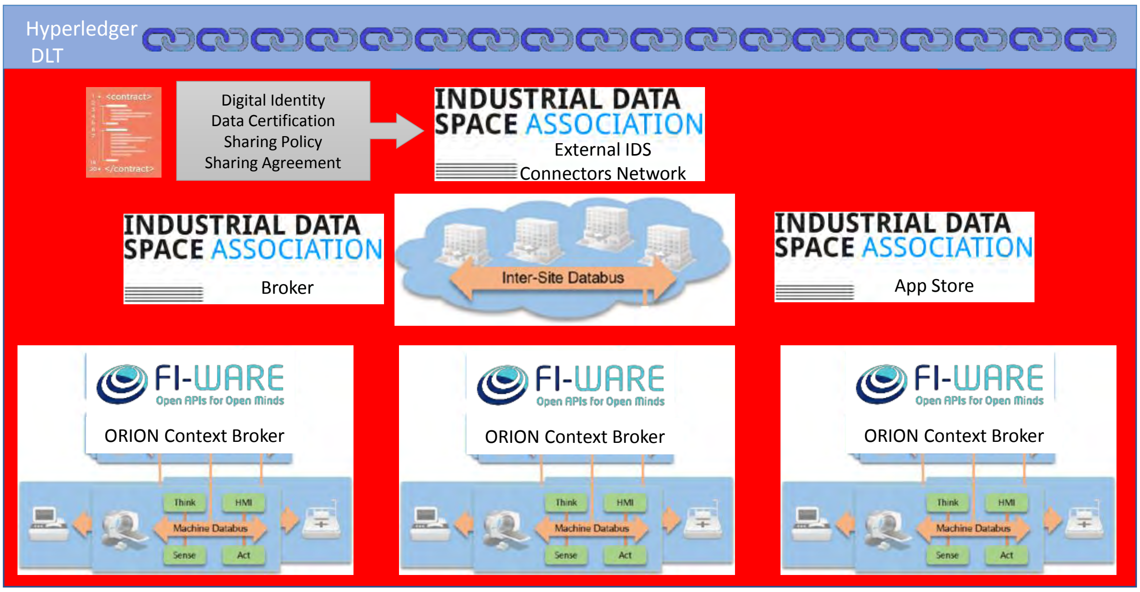


Figure 5. MIDIH RA for Smart Supply Chain

3 MIDIH Modular and Functional Architecture

Considering the RAMI4.0, the IIC reference architecture model (IIRA) and starting on the premise that the MIDIH Reference Architecture will include a "platform" or "middleware" which collects data from multiple sources, stores it, makes it available to various applications such as for analytics, display, and reporting etc. And having special focus on how manage the data-in-motion and the data-at-rest to have a data-driven architectural approach, the objective has been pick the Layered Databus pattern which is an specific instance of the three-tier architecture pattern, and go through the different layers bottom-up identifying functional components or building blocks to later map them to technology that covers these functionalities. In parallel security along the different layers will be taken into account. The requirements coming from the different experiments specified in the three different scenarios: Smart Factory, Smart product and Smart Supply chain have contributed to define some of the functional components that will made up the open and modular MIDIH Reference Architecture.

Leaving the lower layer defined in the *layered databus pattern* which comprises the machine databus, out of the scope of the project, the mapping of the other defined databuses with the three-tier architecture pattern (see *Figure 6*) is as follows:

- The *MIDIH Field or Edge Tier* is mapped with the Unit Databus.
- The *MIDIH Platform and Enterprise Tiers* are mapped with the Site Databus.
- The *MIDIH Business Ecosystem Tier* is a new layer entrusted to the three-tier architecture pattern to enable inter-factory communications that will allow the creation of a reliable MIDIH business ecosystem, and it is mapped with the Inter-Site Databus.

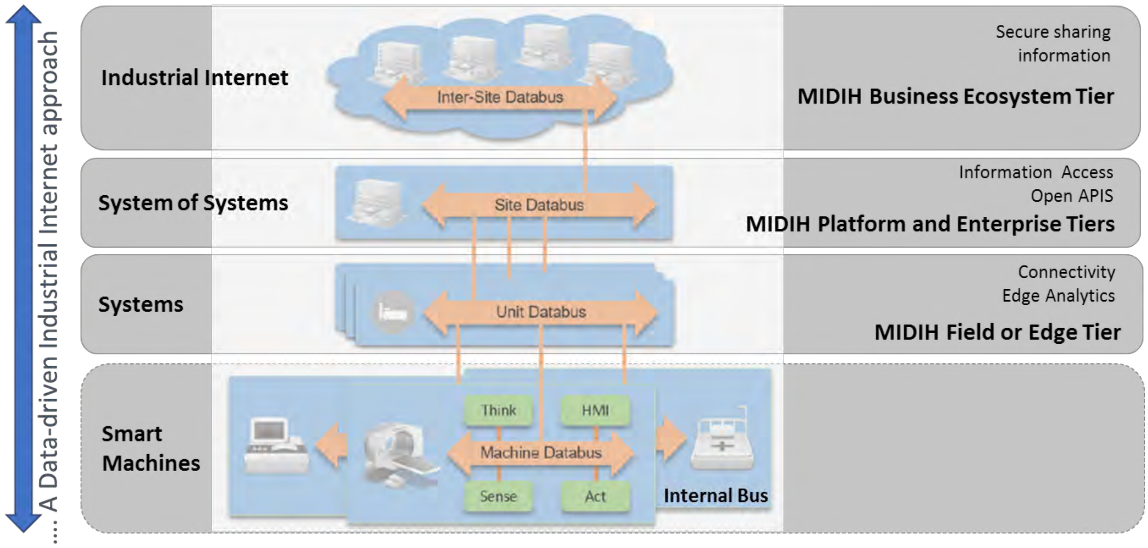


Figure 6. Databuses of layered databus pattern mapping to the Three-tier Architecture

3.1 MIDIH Field or Edge Tier

The Field or Edge tier is mainly used to gather the sensor and machine data from the deployed machines (the sources of data) using various connection types. The edge tier contains intelligent devices and special and general-purpose computers. Edge computing enables some data management and analysis functions to be performed in this tier, in small datasets, using data, applications, and services contained in the edge. Therefore, deciding whether all the data collected is forwarded to the platform tier or data aggregation or processing is needed. By performing small-scale pre-processing and analytics in the edge, where fast decision making is paramount, larger-scale or big data processing in higher tiers becomes easier to manage.

Therefore, the MIDIH edge tier must be modular in its support to multiple protocols for data ingestion, allowing customization of existing and development of new means of communicating with connected assets or devices. Then, it will support a wide ecosystem of heterogeneous devices, with the objective of gather machine data and make it available to the upper layers and IoT systems. In the same way, it must cover security aspects, providing mechanisms for encryption, authentication and data protection functionalities to address elevated enterprise security requirements of connected mission-critical hardware.

3.2 MIDIH Platform Tier

Every industrial company has hundreds of event streams continuously flowing through its networks, conveying sensor data, web clickstreams, copies of business transactions, geolocation data, tweets, market data, weather data, social media activity and other data. The number and volume of streams are growing quickly, driven by the Internet of Things and other market forces. Leveraging the processing of this data enables making smarter, and sometimes faster, business decisions, which is the task of the Platform tier.

According to IIRA, the platform tier receives the data, and ingests and organizes it before storing it in the appropriate data store, and also receives, processes and forwards control commands from the enterprise tier to the edge tier. It consolidates processes and analyzes data flows from the edge tier and other tiers. It provides management functions for devices and assets. It also offers non-domain specific services such as data query and analytics.

Components from all functional domains may leverage the same data and use analytic platforms and services to transform data into information for their specific purposes.

The main role of this tier is to enable different types of information processing since business intelligence (BI) and analytics modernization programs are undertaking an increasing number of projects that deal with streaming data.

This tier should enable the usage multiple kinds of products to support the diversity of stream analytics applications. Such products include event stream processing (ESP) platforms, stream analytics platforms, business activity monitoring (BAM) platforms, operations intelligence platforms, smart data discovery products and data science platforms.

3.3 MIDIH Enterprise Tier

The MIDIH Enterprise Tier receives the data and integrates it with data from other systems, to perform analysis across business silos, carrying out industry domain-specific business applications, related decision support and business intelligence systems. This tier provides interfaces to human consumers of the information, such as business end users, operators like field service technicians, or the monitoring and diagnostics operation specialists. The enterprise tier may often receive the data flows from the edge and platform tier. At the same time, this tier may also execute control commands on the edge or platform tier.

Therefore, this layer deals with the information architecture, supporting information integration and services capability, and enabling a virtualized information data layer assuring the quality of the data and information.

3.4 MIDIH Business Ecosystem Tier

The MIDIH Business Ecosystem Tier is devoted to enable inter-factory communications that will allow the creation of a reliable MIDIH business ecosystem. Therefore, the main objective of this tier is to provide the mechanisms that allow the exchange of data between different stakeholders within a secure infrastructure, using shared reference architecture and common governance rules covering ownership, access and usage of the data.

3.5 MIDIH Modular and Functional Architecture

With the objective of having a data-driven architecture and starting from the draft of the MIDIH architecture reported in the Description of Work (*Figure 7*), which extends the Open Source BEinCPPS Platform with new components and functionalities mainly focused on support edge-oriented factory automation architectures including Local Clouds and IEC61499 standard according to the ARTEMIS Arrowhead project; brownfield integration with legacy systems and proprietary platforms in the domain of IOT, PLM, ERP through open APIS, and the integration of state-of-the-art Open Source components from worldwide spread communities especially in the field of Industrial analytics, Enterprise Application Integration and Business

Intelligence; together with the alignment with the relevant RA for IIoT existing nowadays, will be the basis for characterize the open and modular MIDIH RA.

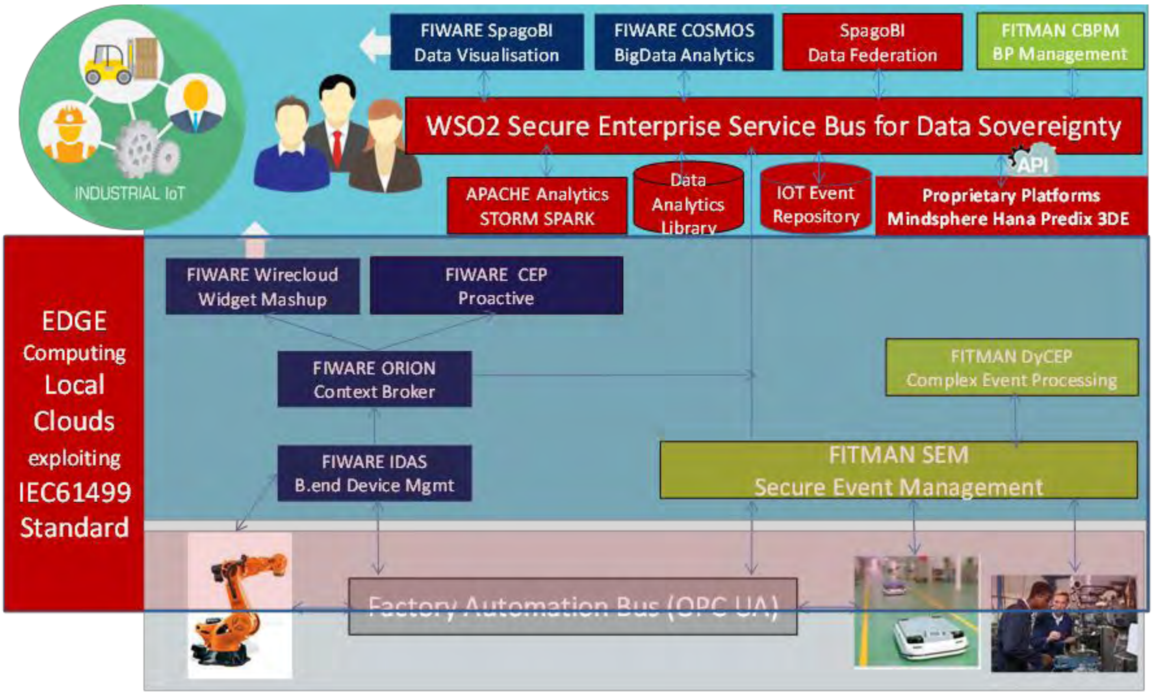


Figure 7. Draft of the MIDIH architecture

Therefore, in the implementation of the MIDIH RA, the Arrowhead distributed automation platform, the FIWARE Data in Motion and Data at Rest platforms and the IDS RA open source implementation via Blockchain Smart Contracts will be integrated into a unique open and modular architecture for Smart factory, Smart Products and Smart Supply Chains industrial scenarios. This architecture will allow integrating and providing solutions in the field of software components, data value chains and innovation business models, giving support to the three main advanced technologies which are expected to drive the change in Manufacturing Industry: IoT, Big Data and Artificial Intelligence. All of this, with some additional open source solutions in order to allow enough flexibility and agility to developers, system integrators and users and avoiding being lock-in to technologies or proprietary solutions.

The final MIDIH RA follows a data-driven approach, based on the Layered Databus pattern defined by IIRA, which foresees four main Databus layers where data exchange / sharing processes are taking place. The Machine Databus is the real world databus, to be implemented in a factory shopfloor, in the operations of a product or in transportation-logistics scenarios and which is outside of the scope of the MIDIH project. The Unit Databus is usually implemented by dedicated edge-fog data gateways as a bridge between Real and Digital worlds. The Site Databus implements the databus of a single administrative domain, being it a company, an IT department, a plant, a fleet of logistics vehicles. On top of that, the Inter-site Databus materializes B2B data exchange / sharing business processes across at least two different administrative domains.

The implementation of the reference architectures in the three scenarios described above shows that Smart factory and Smart Product scenarios are implemented by the first three Databus layers, while the Supply Chain one by the top Intersite Databus.

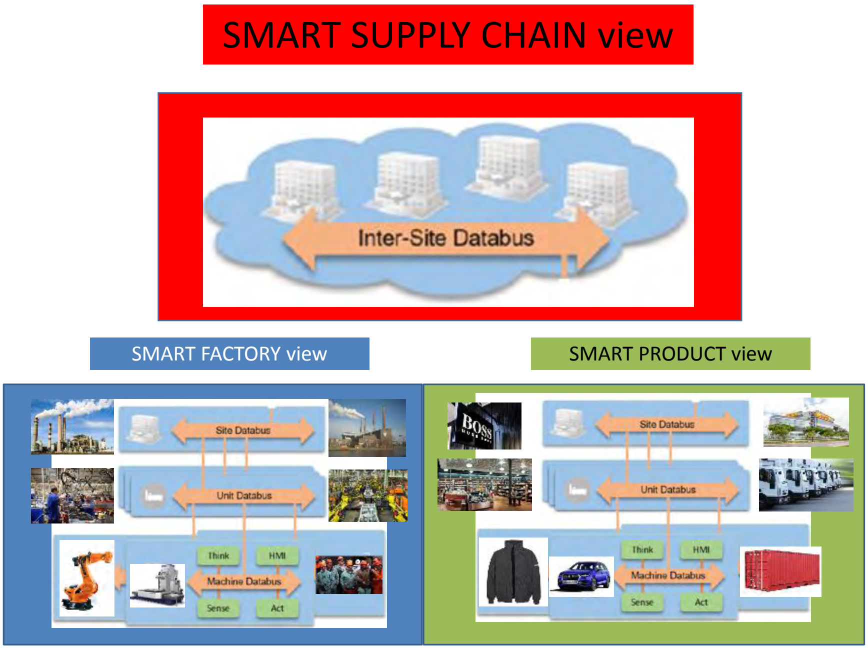


Figure 8. MIDIH Smart Factory, Smart Product and Smart Supply Chain implementation overview

Thus, the Unit Databus will be covered by Arrowhead Data-bus, the Site Databus is instead to be implemented by the FIWARE Orion Context Broker, which is the aggregation point of the FIWARE IoT architecture (data in Motion) and the major Publish /Subscribe broker for FIWARE Analytics applications (data at Rest). And finally, the Inter-Site Databus will be implemented by the FIWARE implementation of the IDS RA extended with a Distributed Ledger layer to trace and control B2B transactions along the value chains. *Figure 9* shows graphically the different databuses and their implementation.

For the implementation of the data analytics framework of the MIDIH RA and with the aim of offering greater flexibility and interoperability, in addition to the implementation based on FIWARE4Industry components, a parallel implementation line based on open source Apache components has been considered. Referring to the different databuses reflected in the previous paragraph, the Apache Kafka which is a high scalable and distributed publish-subscribe messaging system integrating applications/data streams is the selected component to materialize the Unit and Site databuses.

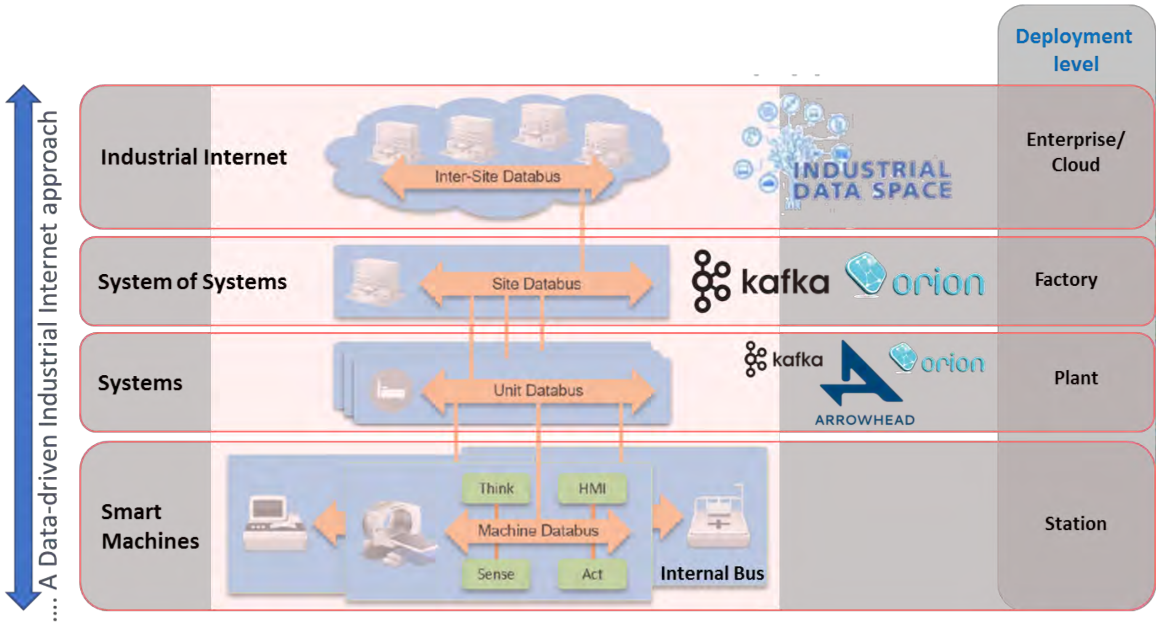


Figure 9. MIDIH Reference Implementation of the Layered Databus pattern

The following picture reflects the core components of the MIDIH data-driven Reference Architecture, focuses on the two layers that made up the MIDIH data analytics framework. The lowest layer is responsible for the data in motion, including the interaction through the Field gateway and specific IoT Agents with multiple devices that use diverse standards and/or protocols, making the gathered data compatible and available to the MIDIH platform. This layer is charge of analysing the streaming data and offering services on these as well as mechanisms for their visualization.

The upper layer is in charge to deal with the Industrial Analytics or data at rest, then responsible to analyse the persisted data either in databases or file systems. It offers as well as the Industrial IoT layer, services that use this data and visualization tools.

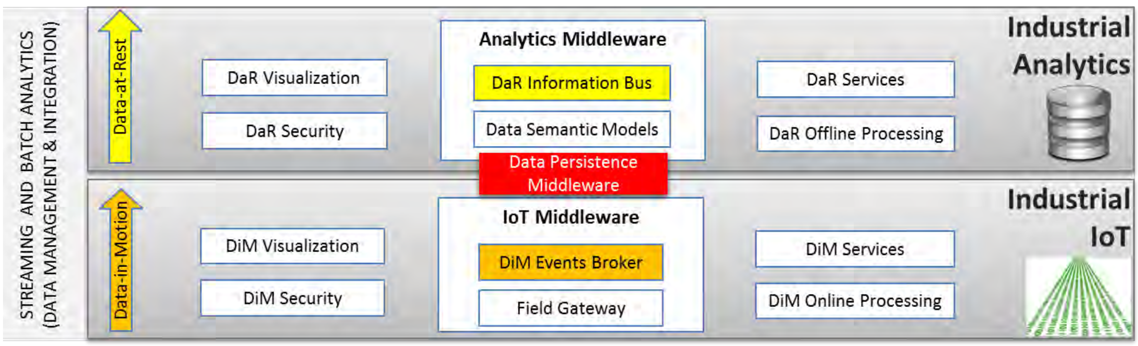


Figure 10. MIDIH Data Analytics Framework for data-in-motion and data-at-rest

Figure 11 shows the different modules on top of the data analytic framework, heart of the data-driven Reference Architecture that made up the final Open and Modular MIDIH RA:

- ***Data Access / Information module,*** this module deals with the information architecture, supporting information integration and services capability, and enabling a virtualized information data layer assuring the quality of the data and information. Therefore, it provides several capabilities of which we can highlight the ability to retrieve data from heterogeneous information sources, transform it into a common format, and expose it to consumers using different protocols and formats, assuring at the same time the security and protection of information. Consequently, it is responsible for basic information management concerns such as metadata and unstructured data management. Furthermore, it can be considered an interoperability point because it is the entry point for external applications to interact with the MIDIH platform in order to access the information.
  To cover all these functionalities, it offers:
  - A set of uniform APIs providing the MIDIH platform functionalities that will be used by the final end-user applications such as business applications and services.
  - Interoperability functionalities, in charge to harmonize the access to the data.
  - Data models, representing the objects and events associations for describing and manipulating data, relationships between data, and constraints on the data in the MIDIH platform.

  For this purpose, The **WSO2**[1], an Open source Enterprise Service Bus (ESB) can be a valid solution in order to provide integration of enterprise applications and services. It enables diverse applications, services, and systems to talk to each other through a common communication bus, using lightweight and standard messaging protocols such as SOAP and JSON.
- ***Business Apps and services,*** these are the applications and services that have to make use of the data provided by the platform through an unified the data access / information layer
- ***Inter-Site Secure Data-bus,*** this module is responsible to materialize B2B data exchange / sharing business processes across at least two different stakeholders or administrative domains. Then, provides mechanisms to trace and control B2B transactions along the value chains.
- ***Third Party Applications,*** refer to applications provided by vendors either as an open source or as a commercial product and generally specialized in specific domains. Regarding MIDIH RA, it is focused on brownfield integration and interoperability with proprietary solutions and standards in the field of IOT.
- ***Security***, is a transversal module responsible to cover all the security aspects along the MIDIH RA, including Security, Privacy and Governance. This module supports both data, infrastructure, and the services offered. So, main functionalities provided cover authentication, authorization, access control and confidentiality.

[1] https://wso2.com/

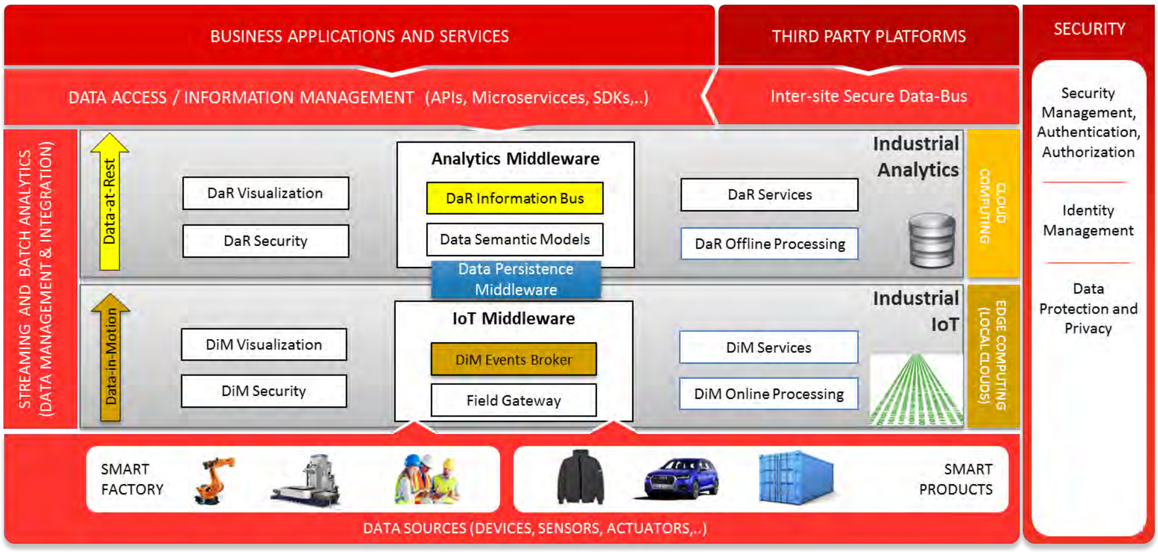


Figure 11. Data-driven MIDIH Reference Architecture

The *Figure 12* sketches an envisaged FIWARE and Apache components to cover the functionalities of the MIDIH Reference Architecture. At the moment a first selection has been made that will be refined according to the needs of the use cases.

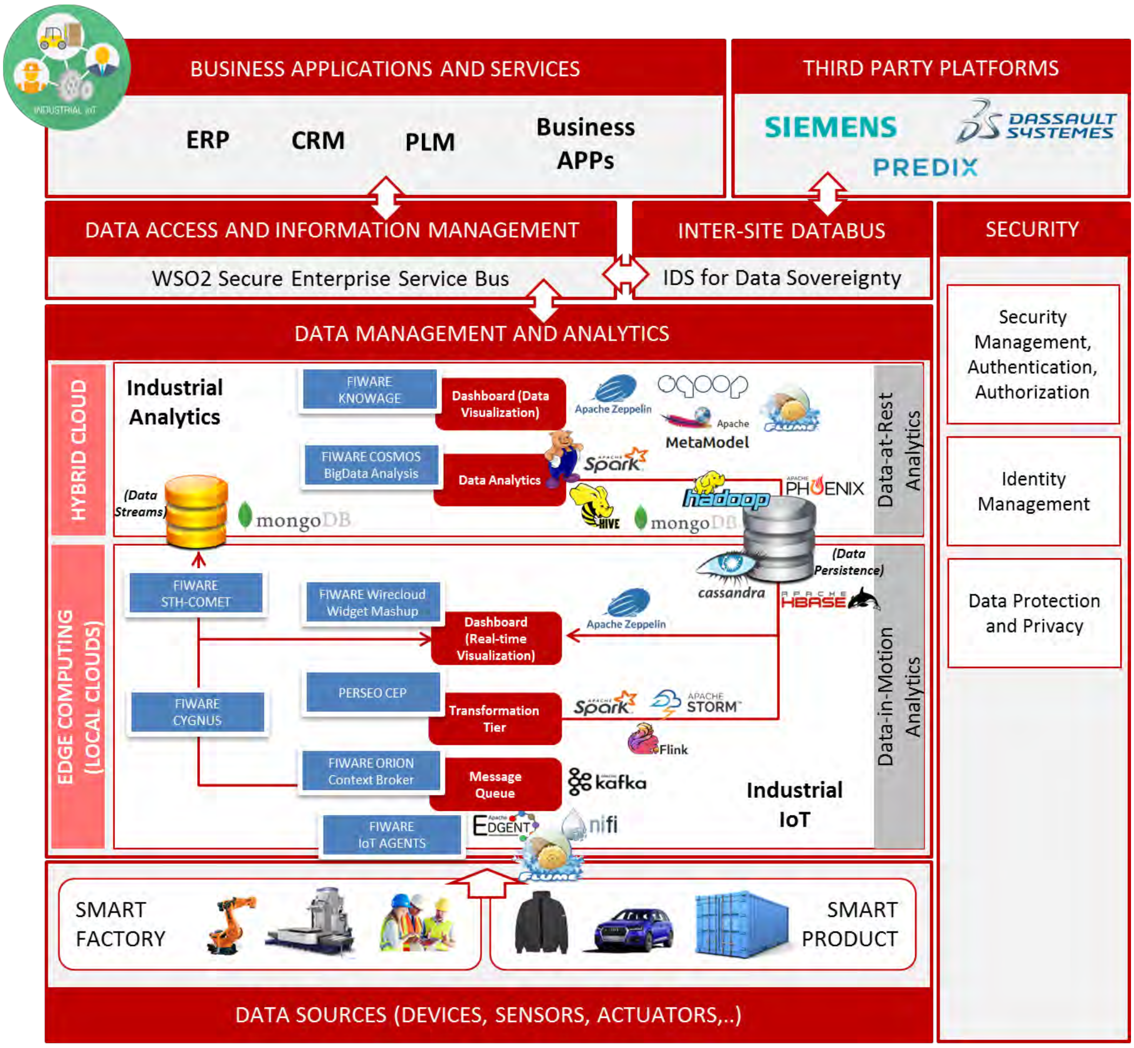


Figure 12. MIDIH RA data analytics framework implementation overview

4 Slides for dissemination purpose

MIDIH

MANUFACTURING·INDUSTRY DIGITAL·INNOVATION·HUBS

MIDIH – the Scope

Susanne Kuehrer, Sergio Gusmeroli

PROJECT BACKGROUND

EC Communication April 19th 2016

EUROPEAN COMMISSION

Brussels, 19.4.2016
COM(2016) 180 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Digitising European Industry
Reaping the full benefits of a Digital Single Market

{SWD(2016) 110}

The purpose of this Communication is **to reinforce the EU's competitiveness in digital technologies and to ensure that every industry in Europe, in whichever sector, wherever situated, and no matter of what size can fully benefit from digital innovations.**

Facilitated by a dynamic framework for coordination and experience sharing between public and private initiatives at EU, national and regional level, the proposed actions are expected to mobilise close to **50 B€** of public and private investment in the next 5 years, explore and adapt when needed the legislative framework and reinforce coordination of efforts on skills and quality jobs in the digital age.

DEI Communication Four PILLARS

Broadly disseminate digital innovations **for all:**

Setting up a **pan-European network of Digital Innovation Hubs**

Strengthen **competitiveness** by developing **partnerships and platforms**

Standardisation

HPC/cloud

A framework for the coordination of national and European initiatives

A regulatory framework adapted to the digitisation of industry

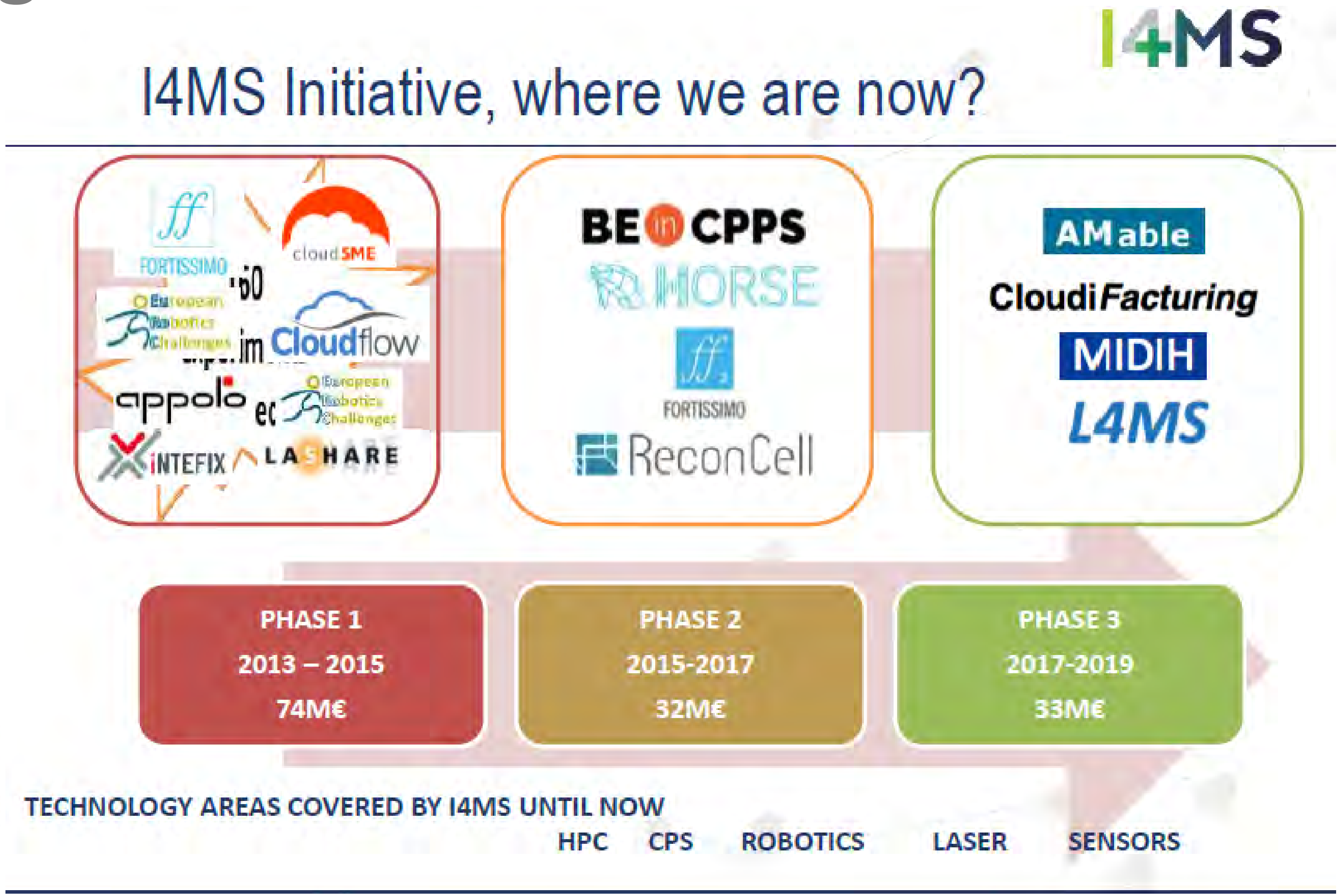
Data: flow, access, exploitation

safety, responsibility (liability)

Prepare Europeans for the digital age

Training, education, new work environment

Background and Motivations

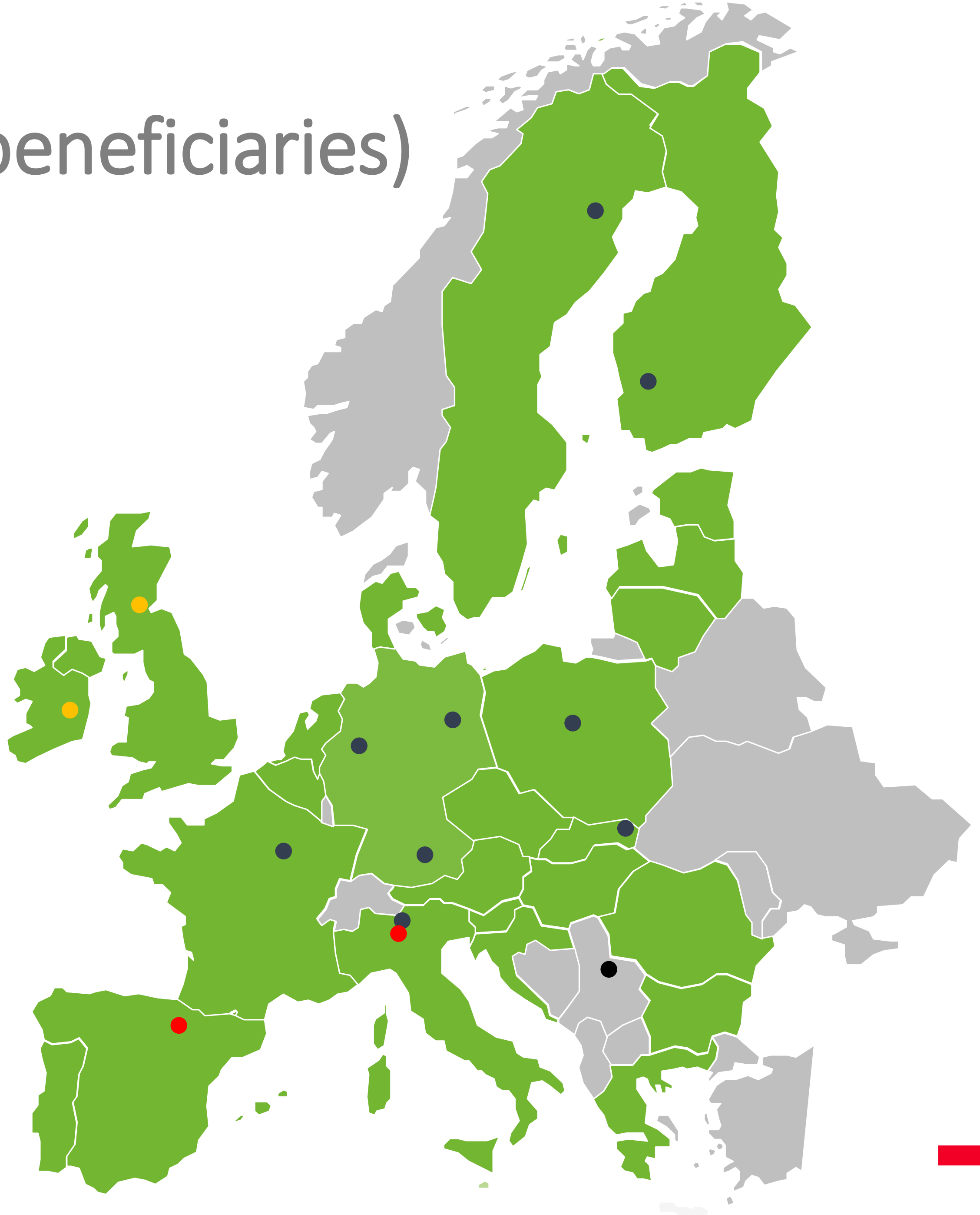


THE MIDIH ECOSYSTEM

Strong Partnership (23 beneficiaries)

- 9 CPS/IOT Competence Centers
- 2 Teaching Factories
- 2 Regional Manufacturing Digital Innovation Hubs

- 3 Pan –European Digital Innovation Hubs
  - **EIT Digital, IDS, FIWARE**
- 3 Industrial case-study providers
  - **FIAT, IDS, NECO**
- 2 Open source digital platform providers
  - **ATOS, Engineering**
- 2 IoT specialized SMEs
  - **NISSA (Serbia) and HOPU (Spain)**



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The MIDIH Network of CCs

CC1	**CPS/IoT Networks and M2M Communication c/o FhG FOKUS (Berlin CC)**
CC2	**CPS/IoT Trust Management and Cybersecurity c/o IMT (France CC)**
CC3	**CPS/IoT Modelling and Simulation and Digital Twin of CPS-enabled Production Systems c/o fortiss (Munich CC)**
CC4	**CPS/IoT Real Time Streams Analytics c/o VTT (Finland CC)**
CC5	**CPS/IoT in Smart production systems and services c/o TUKE (Slovakia CC)**
CC6	**CPS/IoT in Cloud Industrial Analytics Architectures and Tools c/o CEFRIEL (Italy CC)**
CC7	**CPS/IoT based Edge Computing and Local Clouds c/o LTU (Sweden CC)**
CC8	**CPS/IoT Data Value Chain Sovereignty in FhG IML (Dortmund CC)**
CC9	**CPS/IoT HPC-based Cloud Manufacturing in PSNC (Poland CC)**

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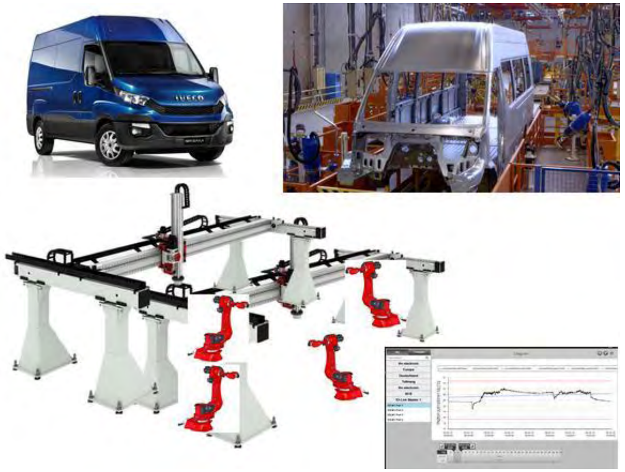
MIDIH Innovation Boosters: the Experiments

Predictive Maintenance in Automotive

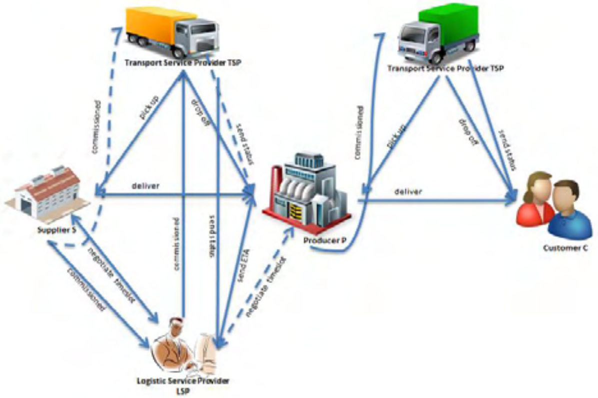


FCA
FIAT CHRYSLER AUTOMOBILES

Product-Service Systems in Cutting Tools

TIVOLY

Coss-border Logistics Interoperability in Steel



INDUSTRIAL DATA SPACE ASSOCIATION

ThyssenKrupp

MIDIH
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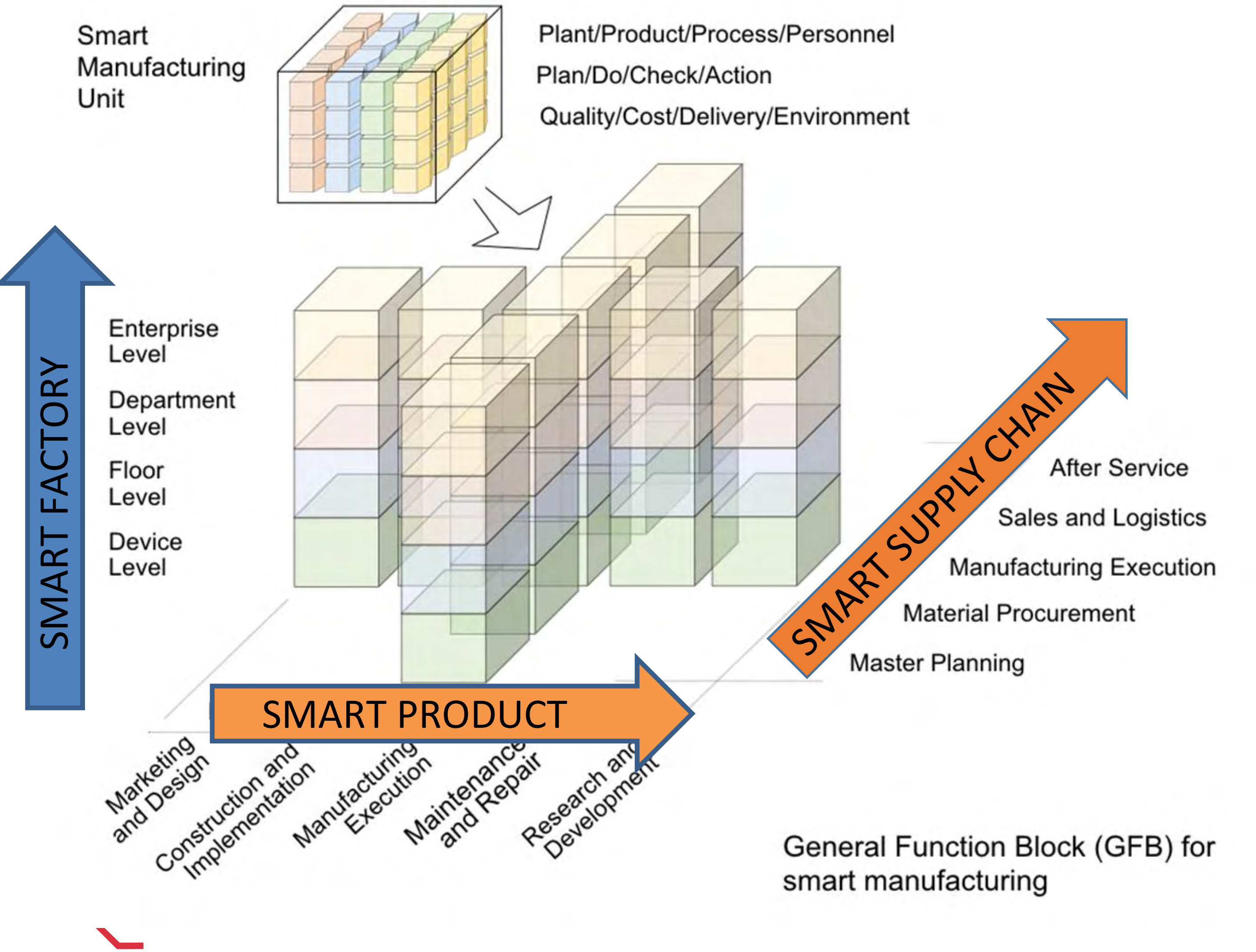
Industrial Reference Models and Architectures for IIoT

Industrial Value Chain Reference Architecture (IVRA)

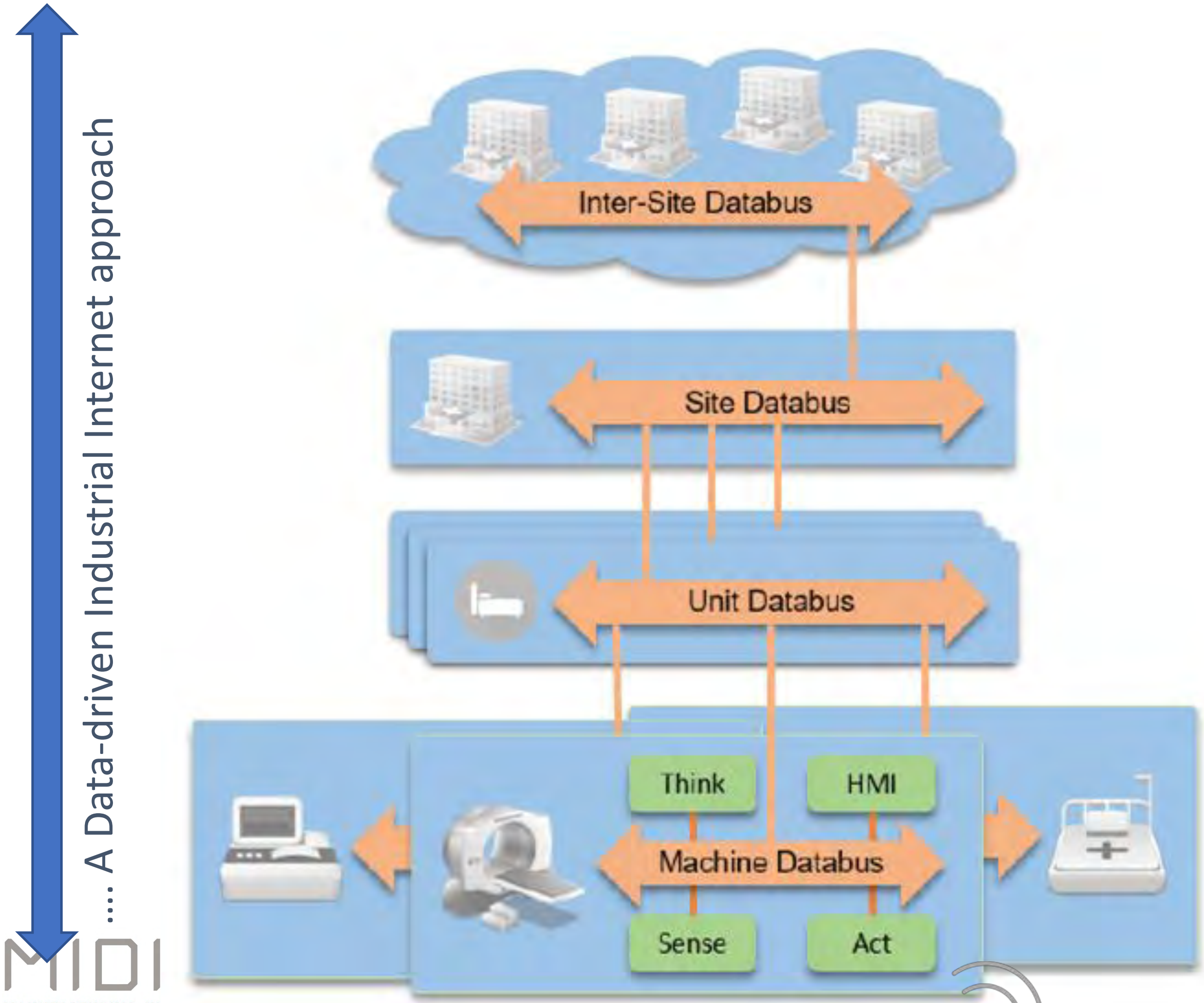


The IVRA provides three perspectives to understand manufacturing industry as a whole: The knowledge/engineering flow, the demand/supply flow and hierarchical levels from the device level to the enterprise level.

A key element is the introduction of Smart Manufacturing Units (SMUs) in a way that allows to smoothly integrate human beings as elements with their autonomous nature – paying tribute to the fact that it is the human being who discovers a problem, defines a problem, and solves a problem in many cases not only in the past, but also in the foreseeable future.

Links with RAMI and IDSA are also available

IIRA Layered Databus: A Data-Driven approach

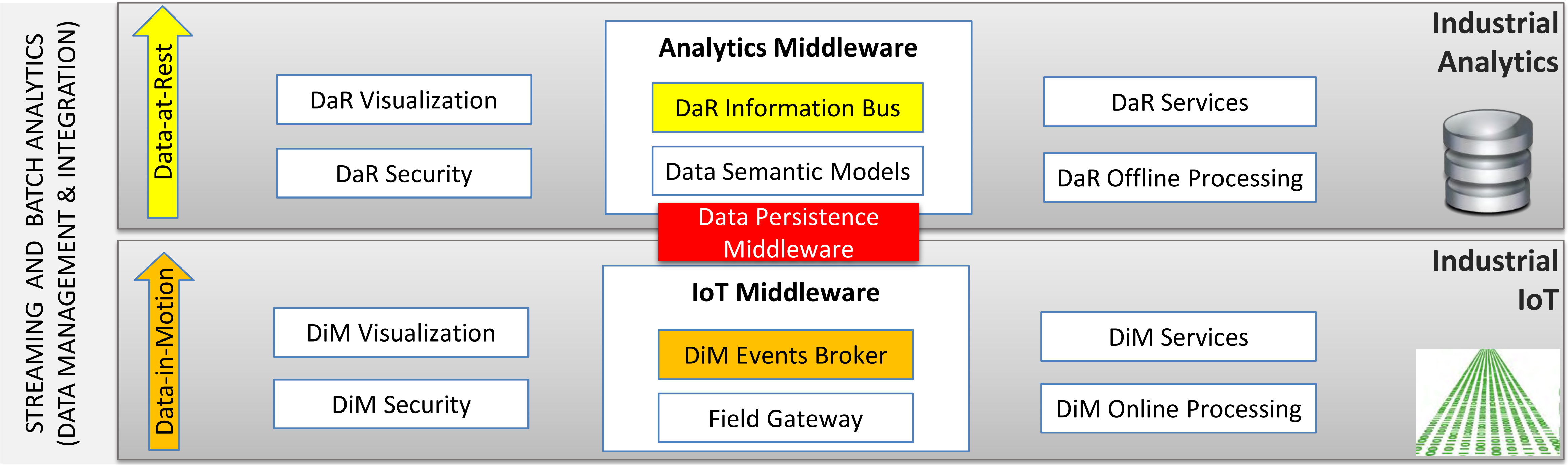


The Inter-site Databus encompasses cross-site interactions, so typically cross-Factory, cross-Enterprise value chain interactions

The Site and Unit layers could also be coincident, but we can identify the Unit layer with Edge-Cloud layers in Production Line vs. Factory, Department Assets vs. Enterprise.

This is the level of Real World Sensors, Objects, Devices, Machines, Products. Often, this Databus is embedded as Smart System (e.g. a CPPS, a Robot, a Car, a Truck, a Container.

The MIDIH Reference Architecture



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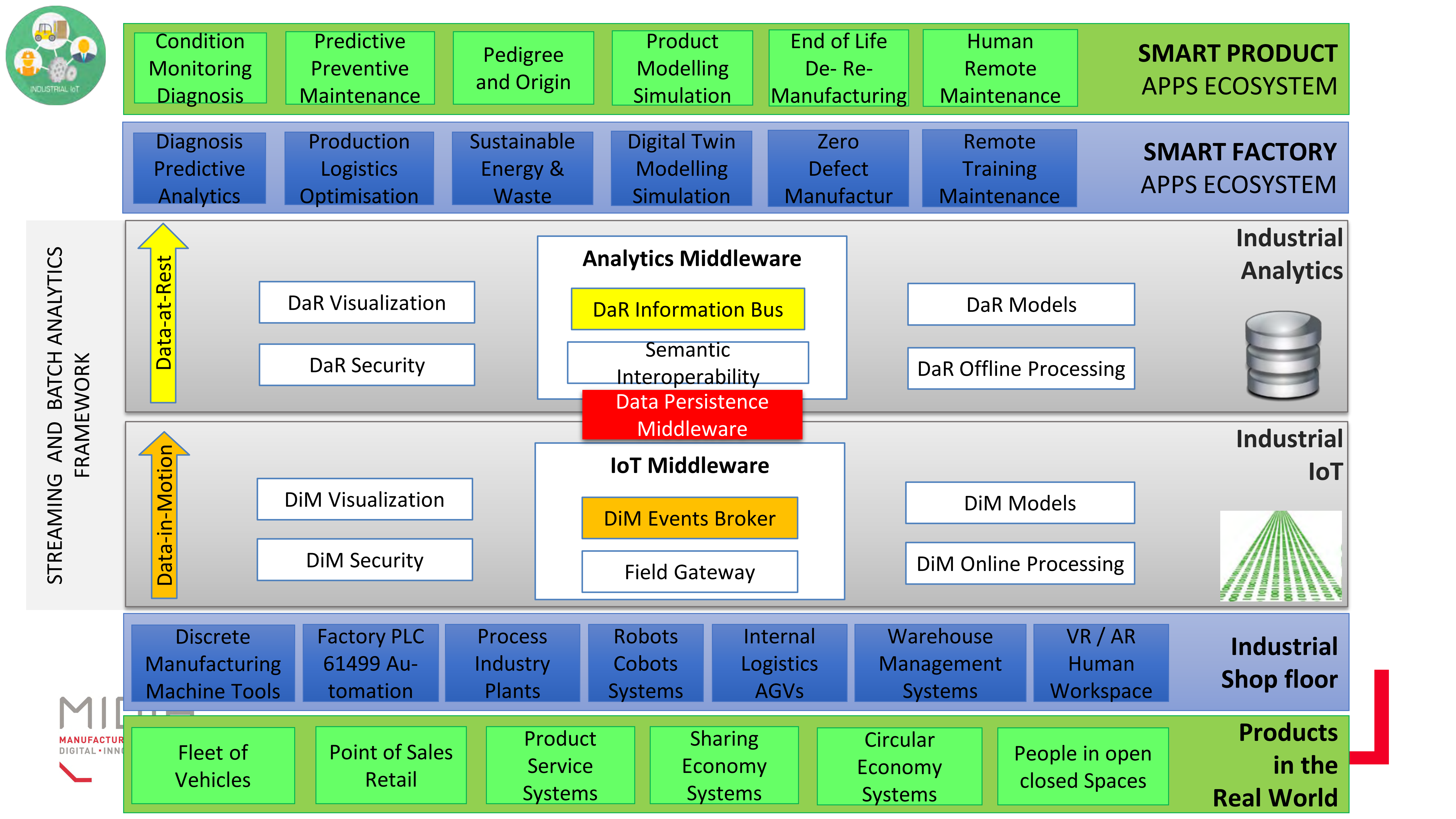
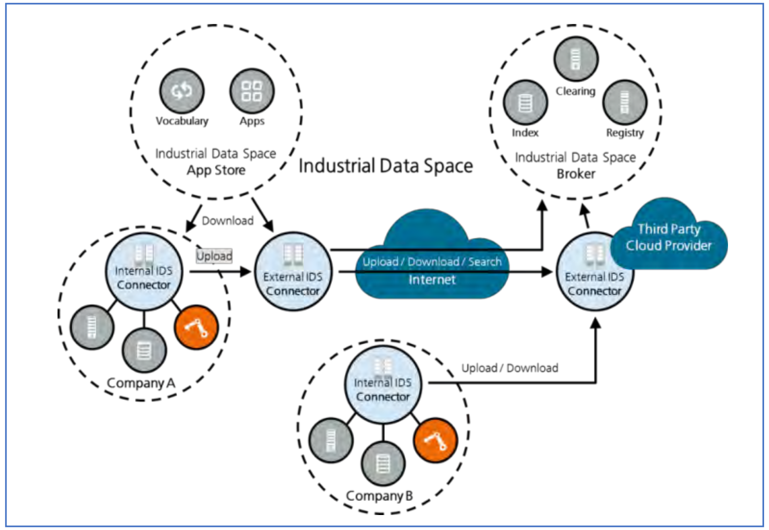

Condition Monitoring Diagnosis
Predictive Preventive Maintenance
Pedigree and Origin
Product Modelling Simulation
End of Life De- Re- Manufacturing
Human Remote Maintenance
SMART PRODUCT APPS ECOSYSTEM
Diagnosis Predictive Analytics
Production Logistics Optimisation
Sustainable Energy & Waste
Digital Twin Modelling Simulation
Zero Defect Manufactur
Remote Training Maintenance
SMART FACTORY APPS ECOSYSTEM
STREAMING AND BATCH ANALYTICS FRAMEWORK
Data-at-Rest
DaR Visualization
DaR Security
Analytics Middleware
DaR Information Bus
Semantic Interoperability
DaR Models
DaR Offline Processing
Industrial Analytics
Data Persistence Middleware
Data-in-Motion
DiM Visualization
DiM Security
IoT Middleware
DiM Events Broker
Field Gateway
DiM Models
DiM Online Processing
Industrial IoT
Discrete Manufacturing Machine Tools
Factory PLC 61499 Au-tomation
Process Industry Plants
Robots Cobots Systems
Internal Logistics AGVs
Warehouse Management Systems
VR / AR Human Workspace
Industrial Shop floor
Fleet of Vehicles
Point of Sales Retail
Product Service Systems
Sharing Economy Systems
Circular Economy Systems
People in open closed Spaces
Products in the Real World

THE MIDIH ARCHITECTURE & COMPONENTS

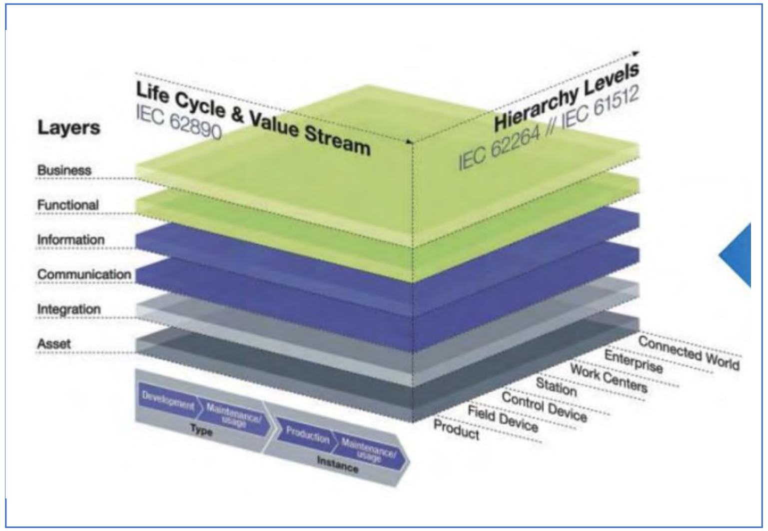
TECHNOLOGICAL SERVICES

MIDIH: Alignment of main RAs in Smart Manufacturing

Industrial Data Space
Reference Architecture



RAMI 4.0



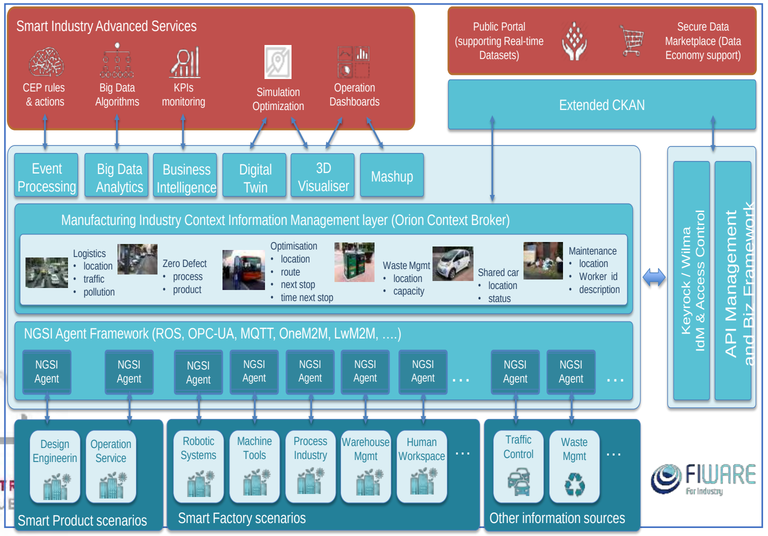
Reference Architecture
Model Industrie 4.0

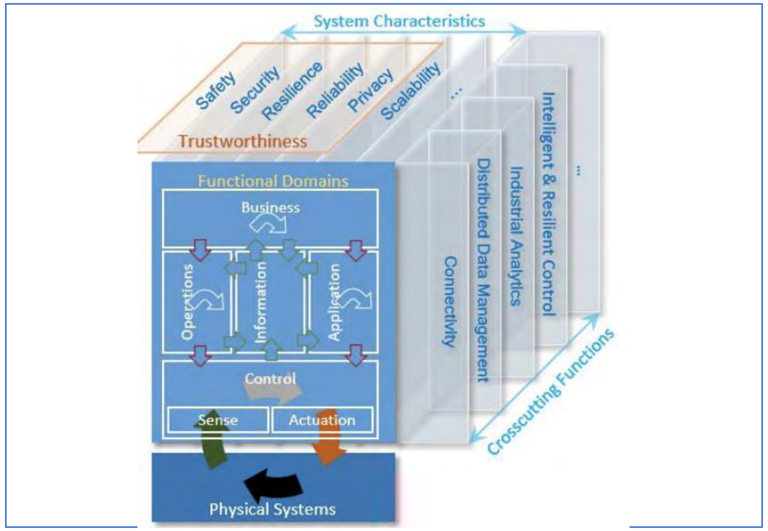
IDS

FIWARE

IIRA

FIWARE for INDUSTRY
Reference Architecture

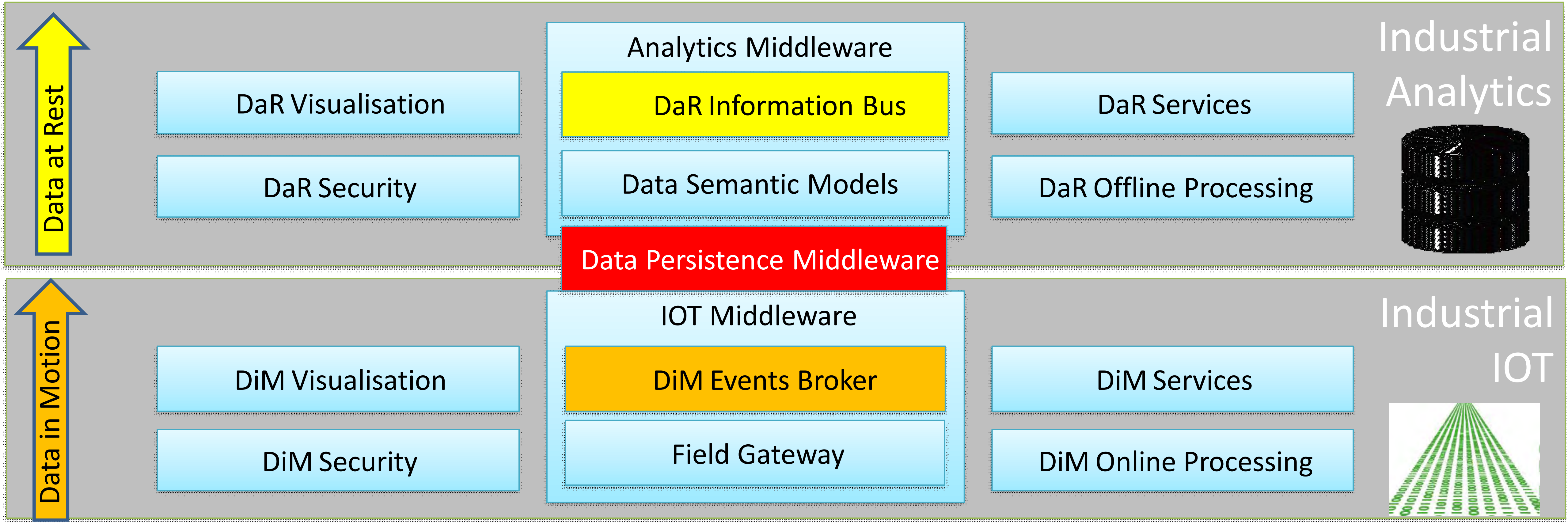




Industrial Internet
Reference Architecture

TECHNOLOGICAL SERVICES

MIDIH Data-driven Reference Architecture



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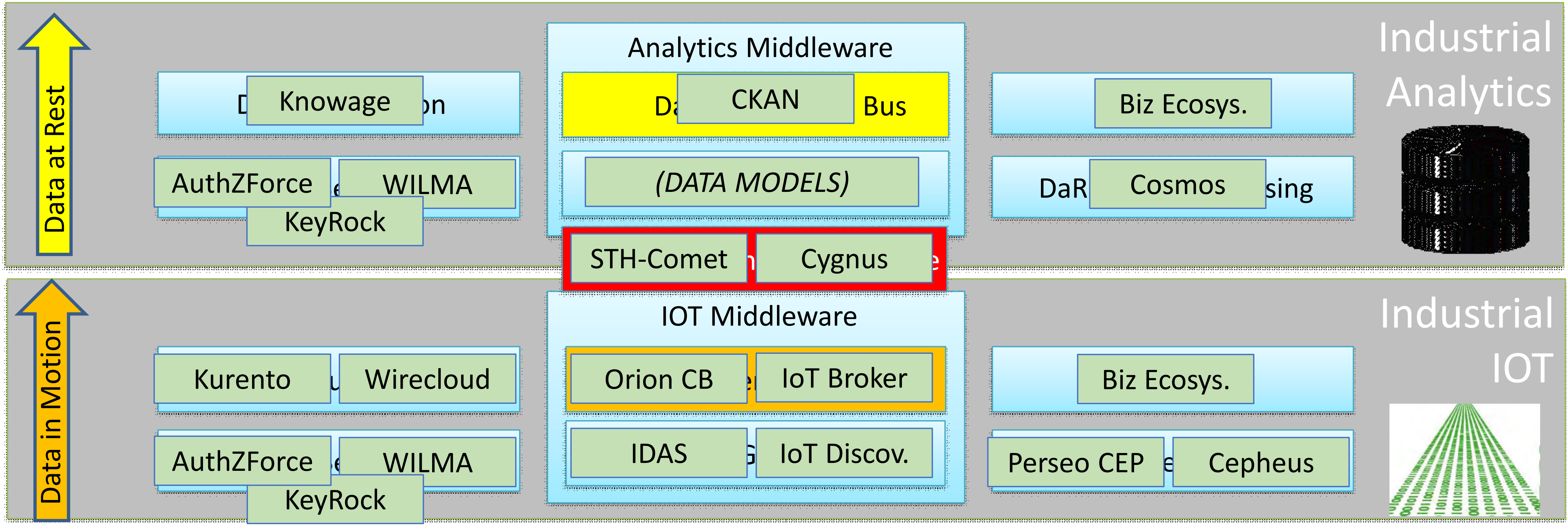
TECHNOLOGICAL SERVICES

Mapping FIWARE Components into MIDIH RA



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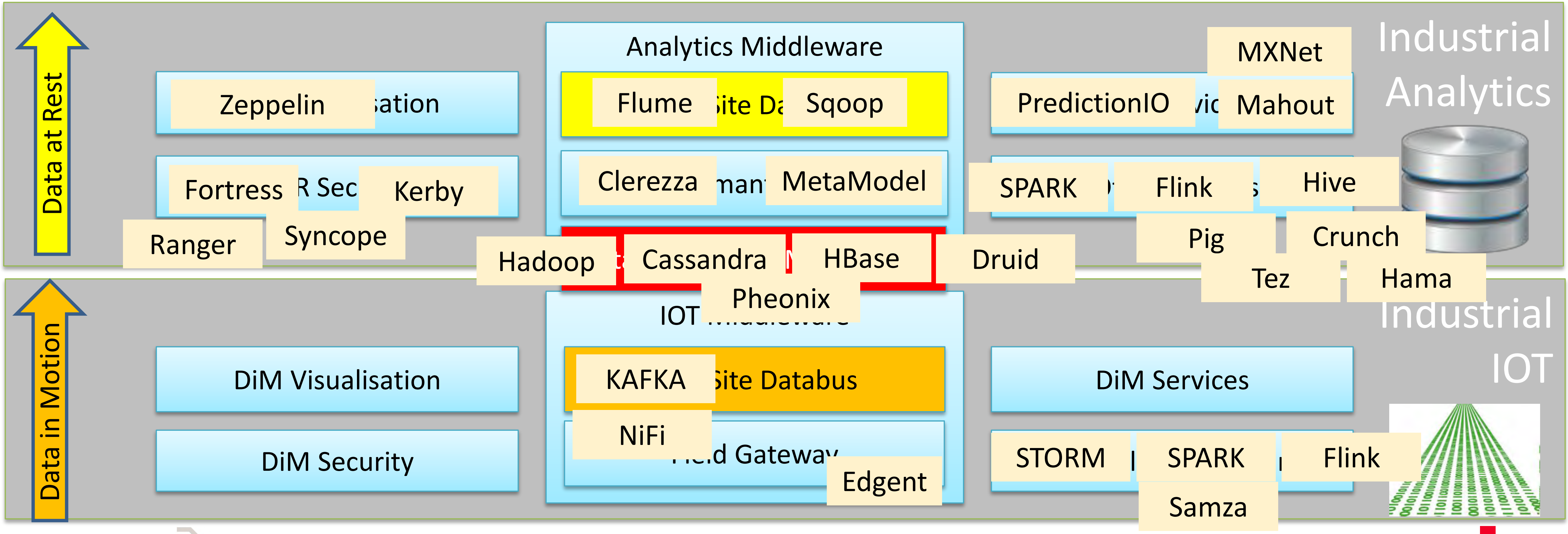
FIWARE For Industry

TECHNOLOGICAL SERVICES

Mapping APACHE Components in MIDIH RA



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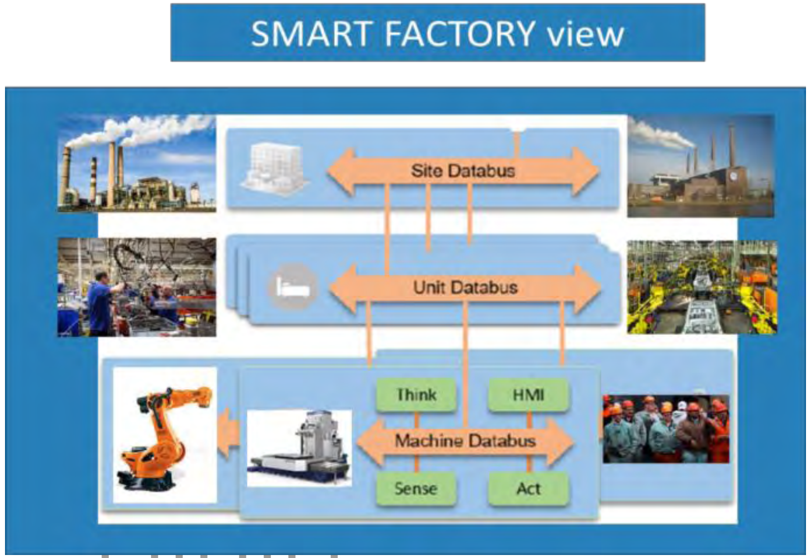
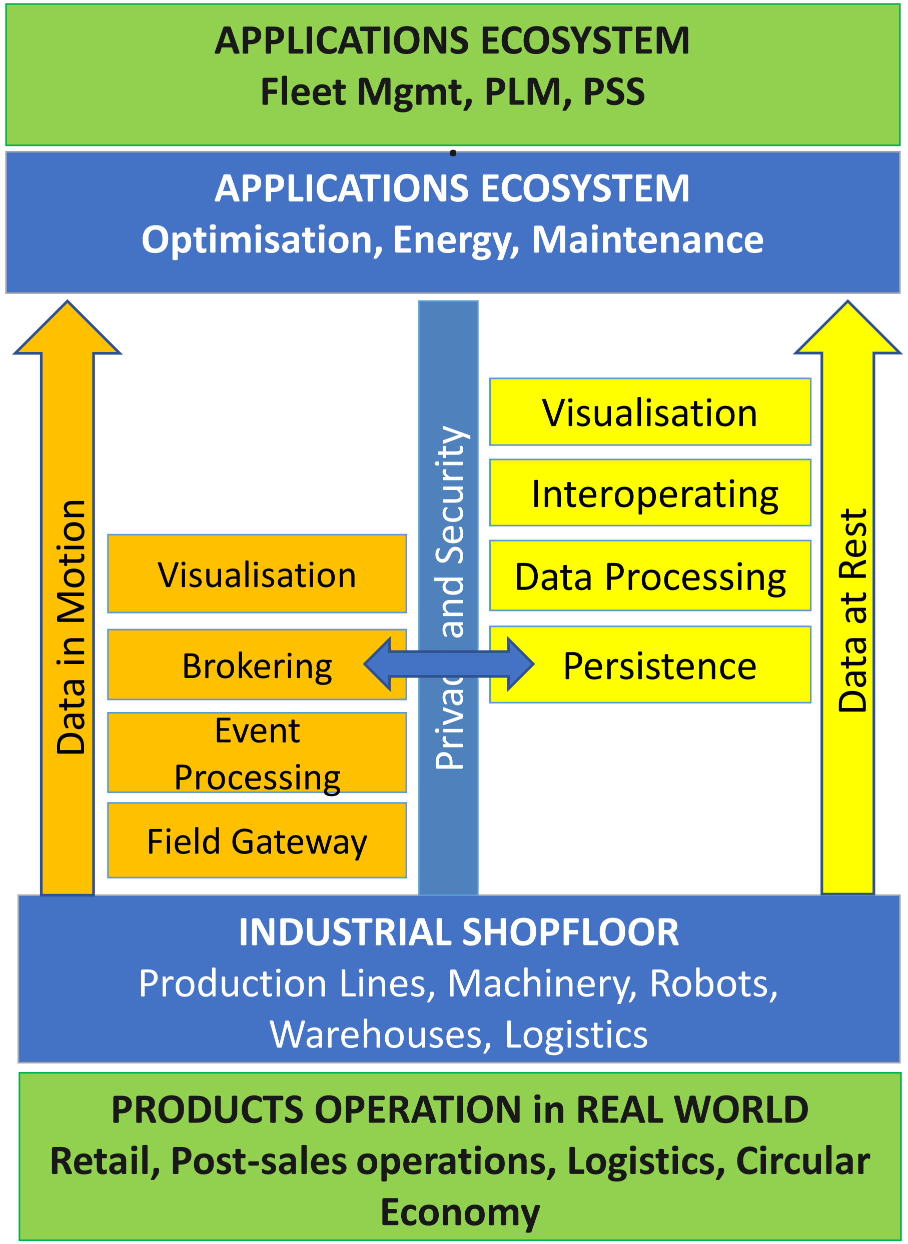
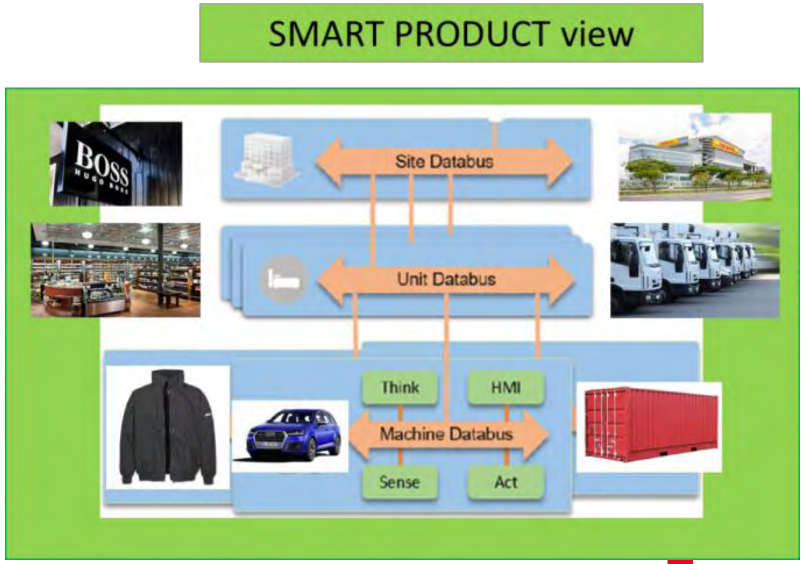
THE APACHE SOFTWARE FOUNDATION

TECHNOLOGICAL SERVICES

MIDIH: Data-Driven Smart Factory-Product







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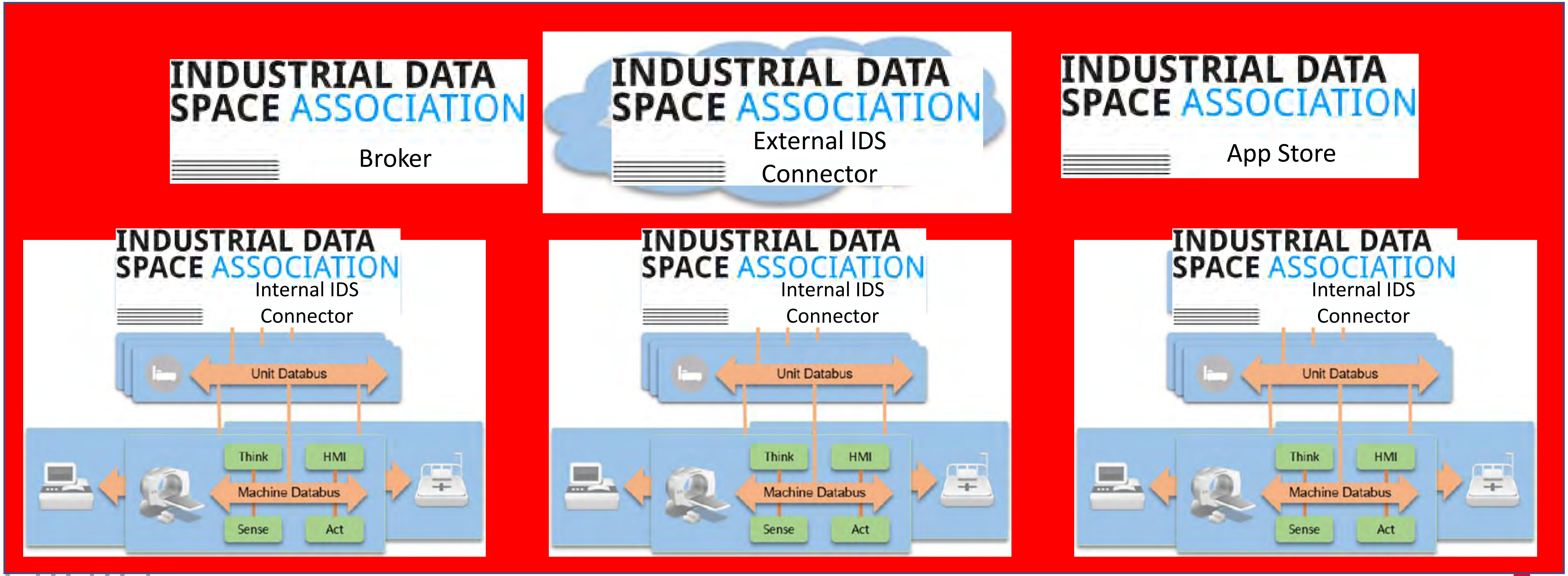
MIDIH: Data-driven Smart Supply Chain

SMART SUPPLY CHAIN view



TECHNOLOGICAL SERVICES

MIDIH Experimentation in FIAT (Sfactory)

FCA Application in IVECO. Overview

FCA
FIAT CHRYSLER AUTOMOBILES

- The use case is in IVECO, the 4th truck maker in Europe.
- The Suzzara plant manufactures the Daily:
  - a middle size commercial truck,
  - 1000+ variants
  - 300 jpd
  - A local and global network of suppliers

- The plant requires to
  - Monitor quality of final product
  - Maintain equipment to best working conditions
- On an innovative welding cell integrated with
  - Sensoring system
  - IT infrastructure integrated with the SCADA systems
- With the expected following functionalities

  Monitor and identify incoming events

  Visualise and enable decision making

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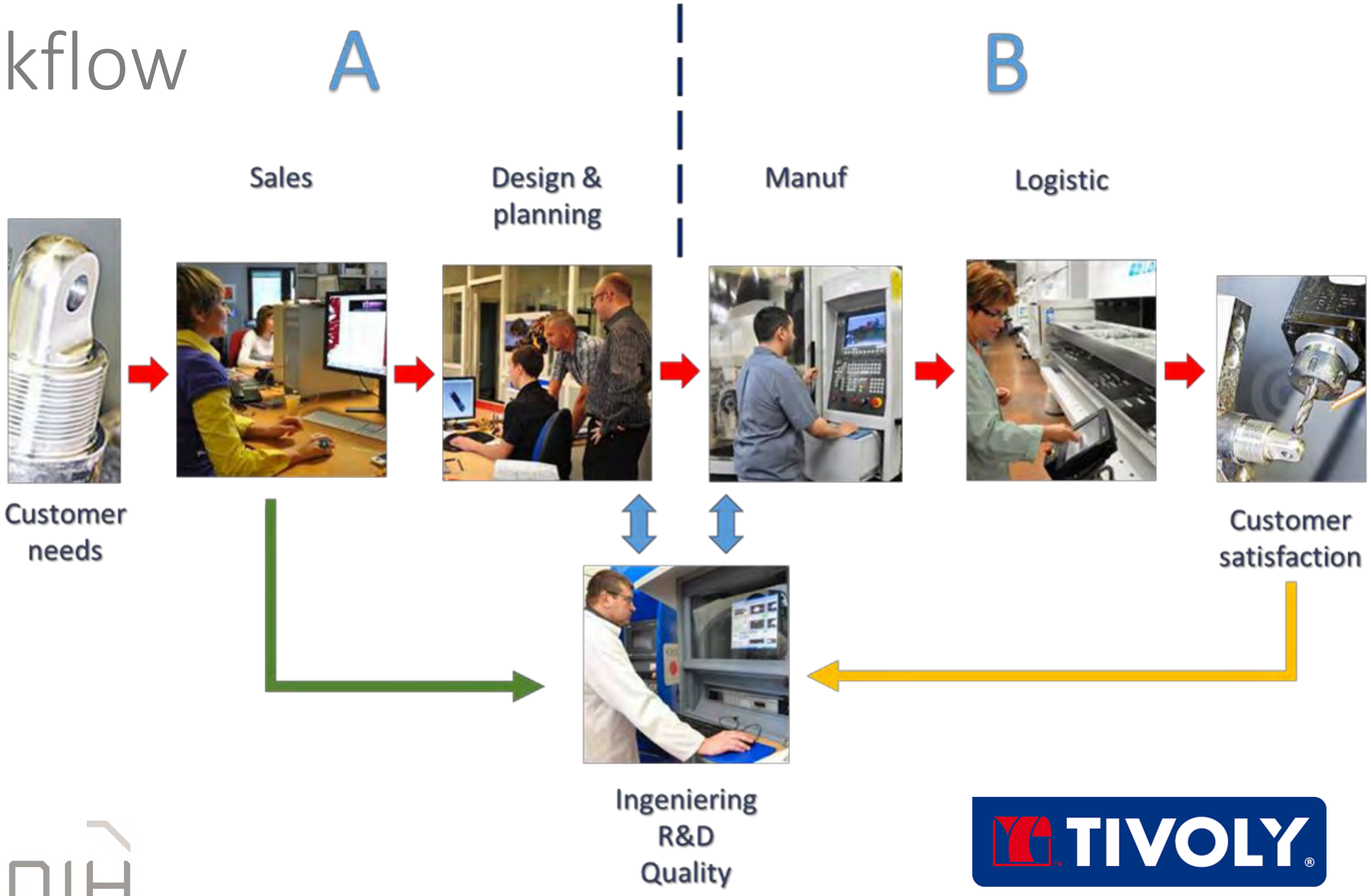
MIDIH Experimentation in NECO (Sproduct)

Workflow



Achieve the agility of production and distribution necessary to respond to the expectations of our current and future customers' leading our journey towards operational excellence

TIVOLY

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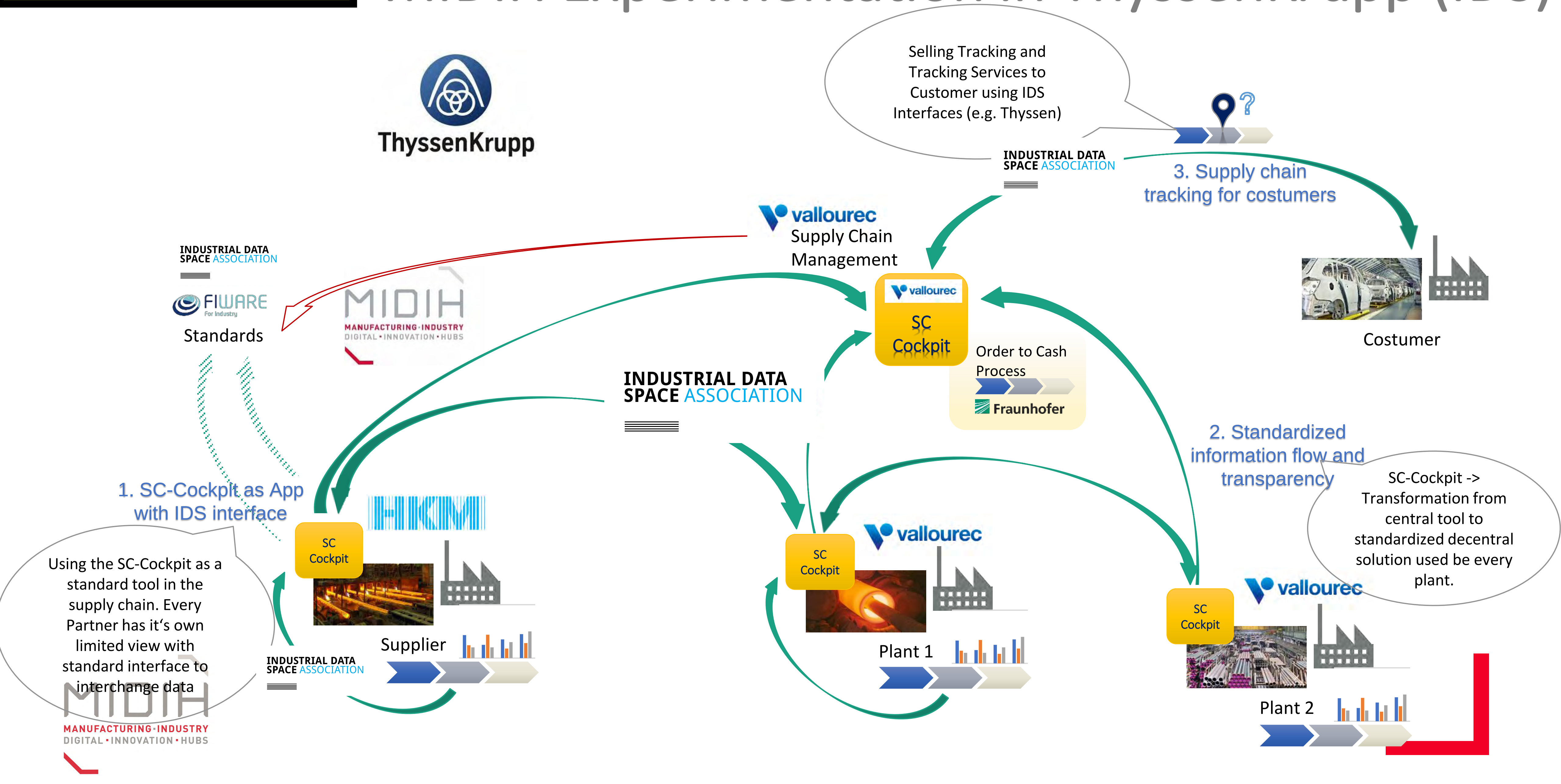
MIDIH Experimentation in ThyssenKrupp (IDS)



THE MIDIH 1st Open Call TOPICS

The MIDIH Open Call 1st

PROJECT OPEN CALL DIH NETWORK NEWS PARTNERS

Call for Proposals for Data driven applications and experiments in CPS/IOT

Project MIDIH Manufacturing Industry Digital Innovation Hubs, co-funded from the European Union's Horizon 2020 research and innovation programme under grant agreement No 767498, foresees as an eligible activity the provision of financial support to third parties, as a means to achieve its own objectives.

MIDIH Call-1 targets the development of data driven applications, by IT SMEs as technology providers, and experiments in CPS/IoT by Manufacturing SMEs.

Open Call Application

Apply before 29th of June 2018

Documentation

Template Proposal

Guide for Applicants

Reference Architecture
(Latest update: 22/05/18)

Overall Budget 960k EUR; each project funded up to 60k EUR; expected 16 winners (8+8)

WEBINAR: JUNE 14th 15:00-17:00 CEST

MIDIH MANUFACTURING·INDUSTRY DIGITAL·INNOVATION·HUBS

The Technological Topic T1: SP Simulation Models

T1. Modeling and Simulation innovative HPC/Cloud applications for highly personalized Smart Products

The Smart Products MIDIH reference architecture defines reference functions and reference implementations for innovative applications acquiring and processing data from the **Product Lifecycle**, from its design to its operations to its end of life. Modelling and Simulating complex one-of-a-kind products in the different configurations (e.g. as-designed. as-manufactured, as-maintained, as-recycled or re-manufactured) requires the availability of huge and sophisticated computational IT resources, that just modern Cloud-HPC datacenters could offer.

The **T1** topic looks for product-oriented industrial modelling & simulation IT experiments, which are using the MIDIH "**Data in Motion**" and "**Data at Rest**" architectures and reference implementations and the MIDIH Data Infrastructures. *Candidates are required to provide advanced algorithms / applications based on the MIDIH architecture and to provide the correspondent datasets to be experimented in MIDIH HPC/Clouds*

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The Technological Topic T2: SF Digital Twin

T2. Smart Factory Digital Twin models alignment and validation via edge clouds distributed architectures

Edge / Fog computing reference architectures and distributed local clouds frameworks aim at inserting a new computational layer between the Real World and the Cloud. Smart factory **Digital Twins** are digital representations of a real-world artefact in a production site (a machine, a robot, or even the whole production line). Traditionally such models run on the cloud but when real-time (or near real time) performance is required, they can be moved and deployed on a reduced scale closer to the real world.

The **T2** topic looks for factory-oriented Digital Twin IT experiments, which are using the MIDIH "edge / fog" computing architecture and reference implementations and the MIDIH Didactic Factories in Milano and Bilbao. *Candidates are required to provide advanced Factory digital models and to deploy them onto the MIDIH edge/fog framework available in our **two didactic factories**.*

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The Technological Topic T3: SP/SF AR/VR applications

T3. Advanced applications of AR / VR Technologies for Remote Training / Maintenance Operations (Smart Product and Smart Factory)

Virtual and Augmented reality applications are suitable to enhance both Smart Factory and Smart Product scenarios. In **Smart Factory** scenarios, production systems, machineries, robots, warehouses, AGVs need to be properly virtualised, while in **Smart Product** scenarios, virtual models are needed for complex products such as airplanes, vessels, trucks. Typical applications are concerned with remote training, virtual design and commissioning, maintenance operations involving both engineers, workers and even citizens. The **T3** topic looks for **product-oriented or factory-oriented virtual / augmented reality** IT experiments, which are using the MIDIH "Data in Motion" and "Data at Rest" architectures and reference implementations and the MIDIH Training Facilities. *Candidates are required to provide advanced VR/AR applications based on the MIDIH architecture and to experiment such systems in one of our two Training Factories in Milano and Bilbao*

The Technological Topic T4: AI / ML in SC Optimisation

T4. Machine Learning and Artificial Intelligence advanced applications in Smart Supply Chains management and optimisation

According to EC Digitising EU Industry communication and subsequent working groups (especially the WG 2 about Digital Platforms for Manufacturing), Industrial IoT, Industrial Analytics and Artificial Intelligence are the three major pillars for Industry 4.0 Digital Transformation. MIDIH is focussing on providing Open Source "Data in Motion" and "Data at Rest" reference implementations as development (API and SDK) platforms for innovative applications. The **MIDIH Smart Supply Chain** scenario is particularly suitable for advanced ML /AI distributed applications due to its inherent heterogeneity of models, ontologies, systems which makes it very difficult for a mere statistical Data Analytics solution to meet its requirement.

The **T4** topic looks for ML/AI applications on multi-stakeholders' owned heterogeneous datasets justifying **Data Sovereignty and Smart Contracts** requirements.

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The Experimentation Topic E1: Additive manufacturing

E1. Integrating CPS / IOT subtractive production technologies in Additive Manufacturing experimental facilities

Additive Manufacturing includes different technologies for products manufacturing through the addition of layers of materials (polymer, metals, composites or ceramics) to obtain complex shapes, functional or semi functional prototypes from data models (typically CAD).

The E1 topic looks for CPS/IOT data-driven experiments to explore the design challenges and opportunities of additive manufacturing combined with traditional subtractive technologies, aspects of products customization, rapid manufacturing, design concepts, assembly strategies, combinations of components, cybersecurity etc. Experiments must use the MIDIH reference architectures and reference implementations and the MIDIH Data Infrastructures.

In alignment with **AMABLE**, the I4MS project which facilitates digital design and solution for secure data chain in additive manufacturing, experiments results will be shared publicly in dissemination events and through the I4MS tools.

The Experimentation Topic E2: Robotics

E2. Integrating CPS / IOT factory automation technologies in Robotics experimental facilities

Robots are used in manufacturing to execute mainly these types of operations: material handling (pick up and place, movements), processing operations (tool manipulation, welding), assembly and inspection. Current challenges for robotics in manufacturing are related to efficiency, human-robot collaboration, and cognitive operations.

The **E2** topic looks for CPS/IOT data-driven experiments for sensor data collection, data analytics, and machine learning for the implementation of factory automation technologies supported by robotics which must use MIDIH reference architectures and reference implementations and the MIDIH Data Infrastructures. Candidates are required to provide experiments based on the MIDIH architecture and to provide the correspondent datasets to be experimented in MIDIH HPC/Clouds. In alignment with **Horse**, the I4MS project which proposes a flexible model of smart factory involving collaboration of humans, robots, AGV's (Autonomous Guided Vehicles) and machinery in the manufacturing environment, experiments results will be shared publicly in dissemination events and through the I4MS tools.

The Experimentation Topic E3: Process Industry

E3. Integrating CPS / IOT discrete manufacturing technologies in Process Industry experimental facilities

The manufacturing industry can essentially be classified into two main categories: process industry and discrete product manufacturing. The process industry transforms material resources into a new material with different physical and chemical properties. This material is then usually shaped by discrete manufacturing into an end user product or intermediate component.

The **E3** topic looks for CPS/IOT data-driven experiments involving all actors along the full value chain – from different types of raw material suppliers, through industrial transformation into intermediate products and applications, with the goal of reducing the environmental footprint and increase industrial efficiency. The experiments must use MIDIH reference architecture and reference implementations and the MIDIH Data Infrastructures.

Candidates are required to provide experiments based on the MIDIH architecture and to provide the correspondent datasets to be experimented in MIDIH HPC/Clouds.

In alignment with **SPIRE**, the EU **Public-Private Partnership** dedicated to innovation in resource and energy efficiency enabled by the process industries, experiments results will be shared publicly in dissemination events and through the SPIRE tools.

The Experimentation Topic E4: Whouse Logistics

E4. Integrating CPS / IOT factory logistics technologies in Warehouse management experimental facilities

CPS/IoT play a fundamental role in the factory internal logistics: innovative IT applications need to be developed specifically for planning, scheduling and **monitoring raw materials** and finite products inside the production system.
The **E4** topic looks for CPS/IOT data-driven experiments involving the integration of the different actors and stakeholders of the supply chain that will guarantee a total coordination and alignment between all the value chain phases. The experiments must use MIDIH reference architecture and reference implementations and the MIDIH Data Infrastructures.

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Submission Tool

Online Submission tool

- **Electronic submission only**

  https://midih.ems-innovalia.org

- Filetype: pdf   Max: 5M   Max. 10 pages
- Contact details: midih_opencall@innovalia.org
- There is an helpdesk inside the application
- Register before the deadline to receive information by email (e.g. updated documentation)

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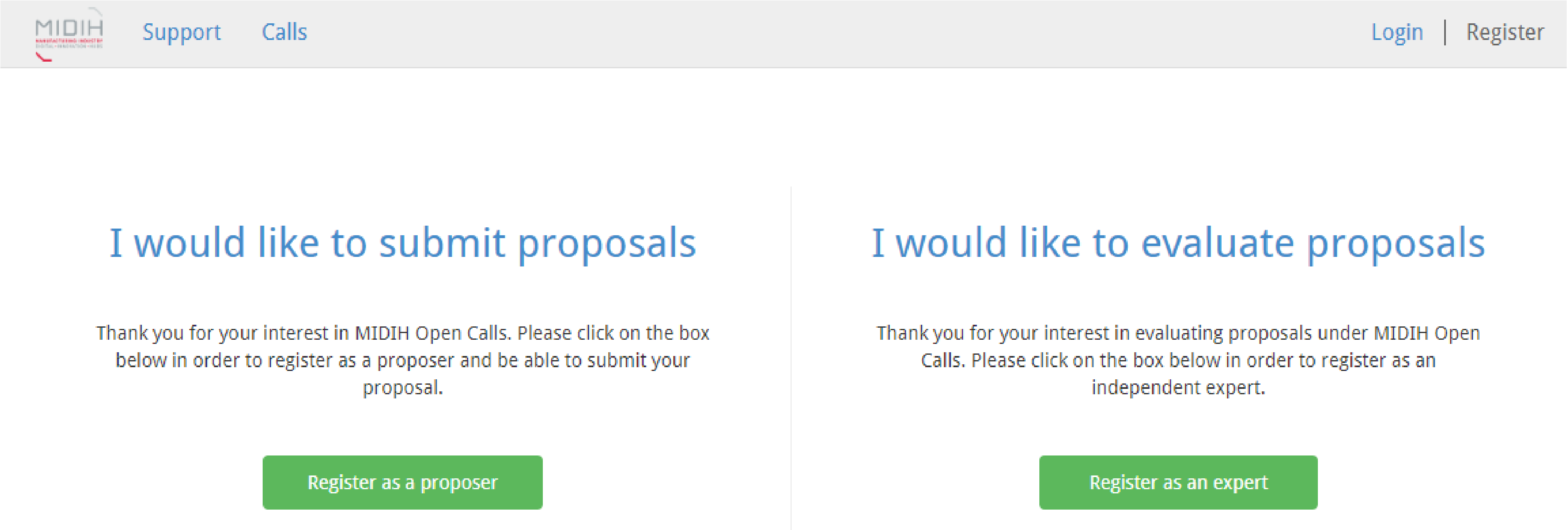
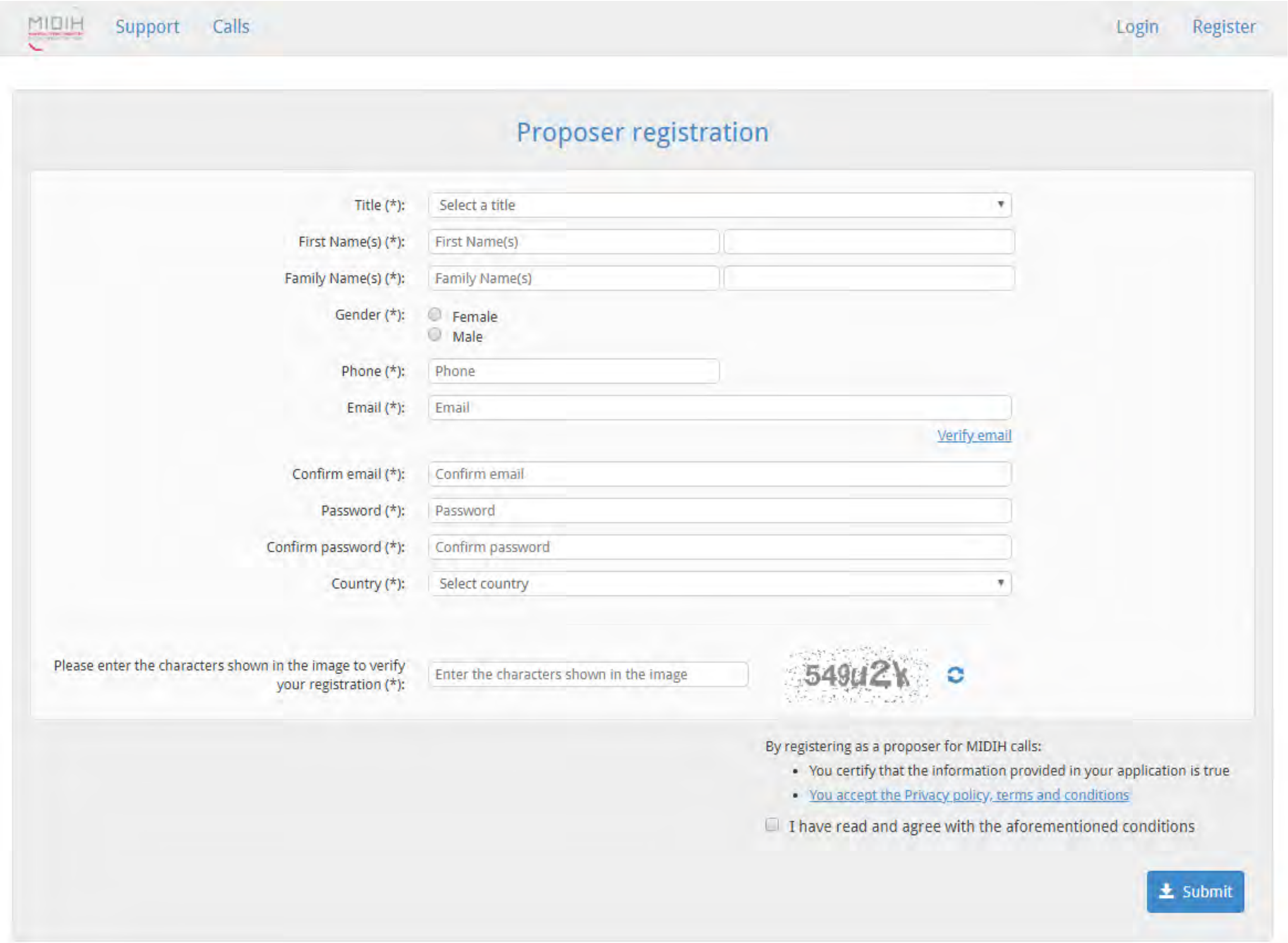
Online Submission tool



Online Submission tool



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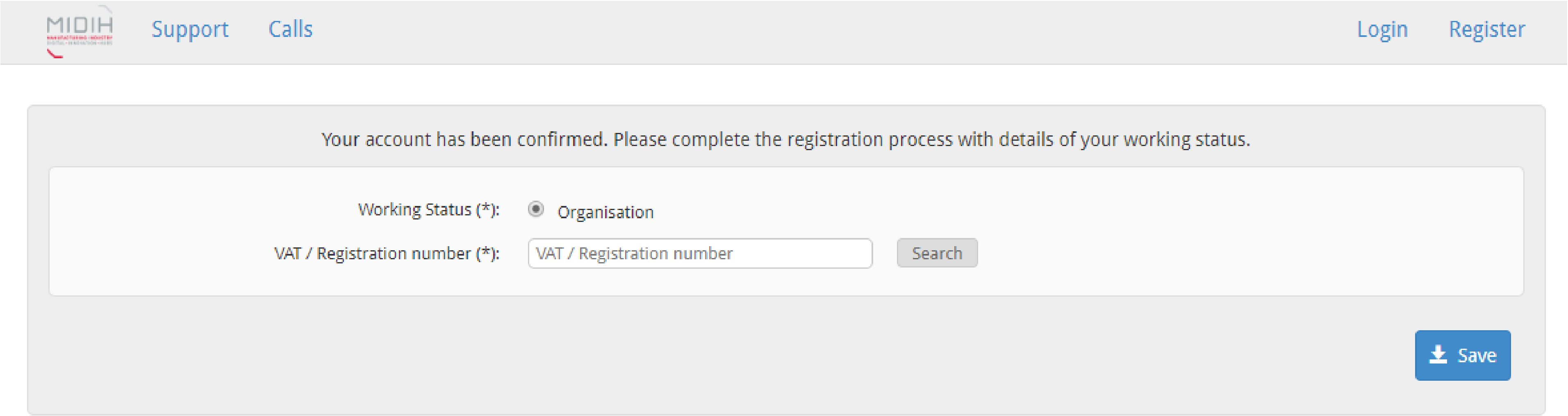

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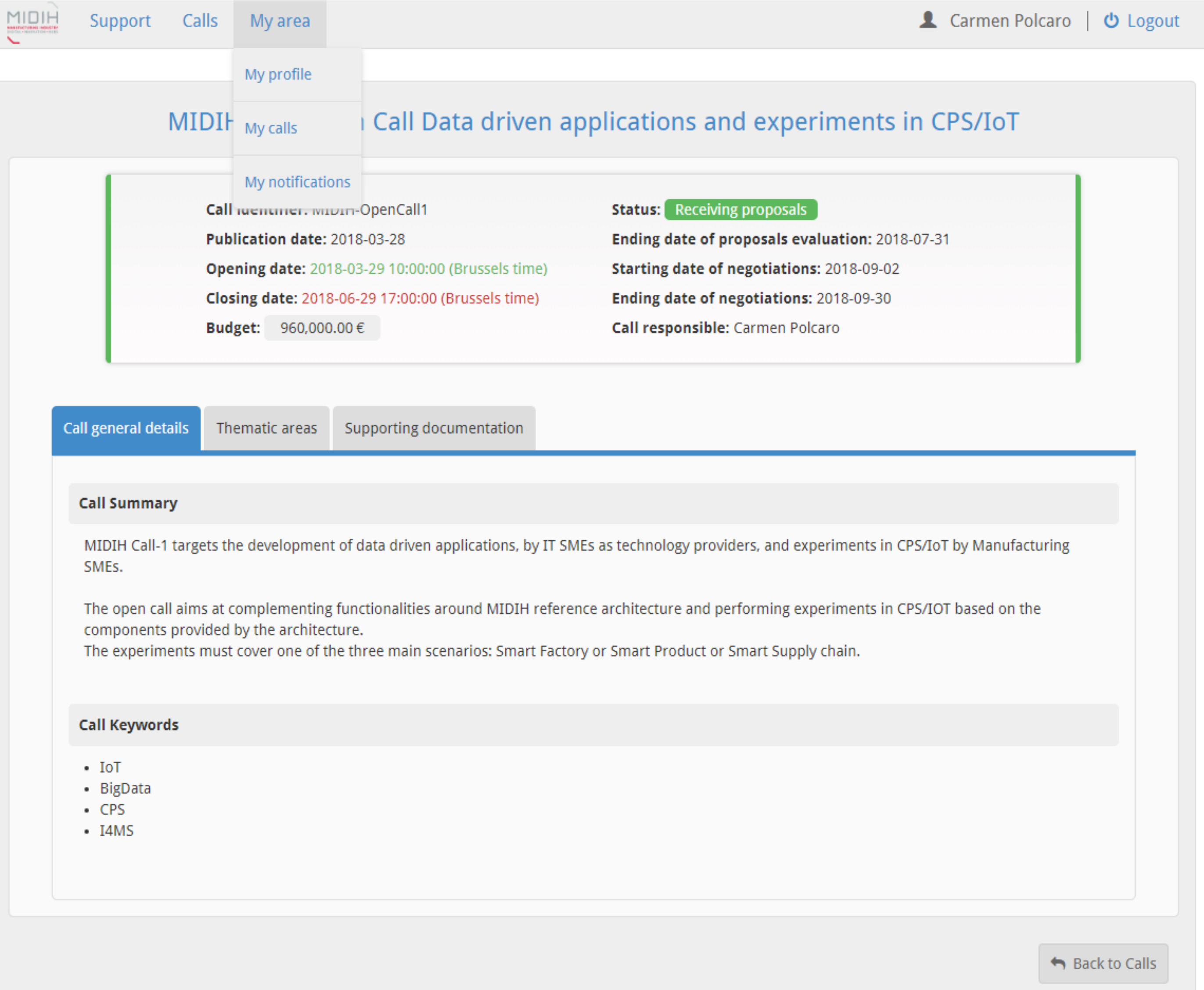

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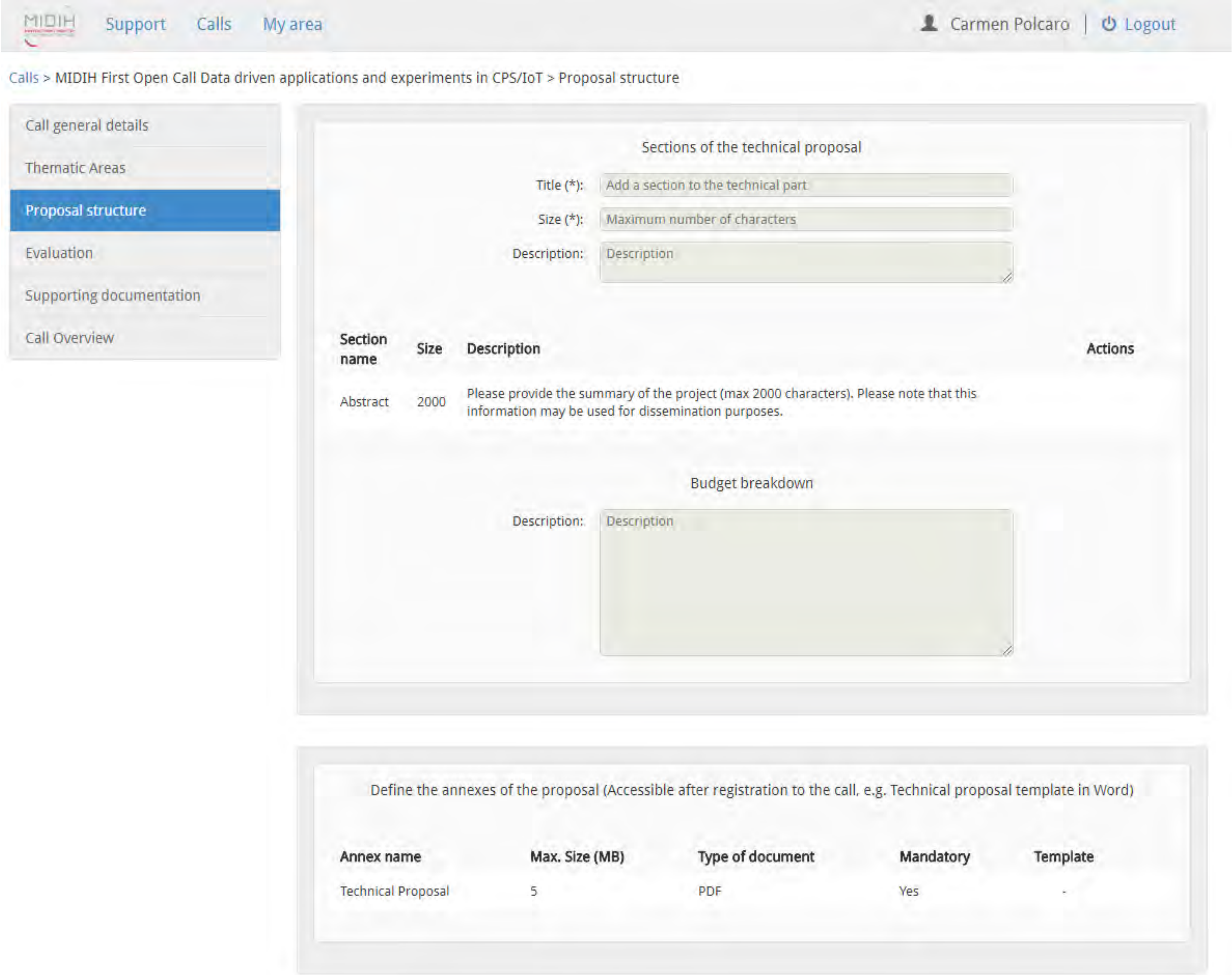

THANK YOU and GOOD LUCK!

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5 Information about Competence Center

Grant Agreement No. 767498
Innovation Action Project
H2020-FOF-12-2017

MIDIH First Open Call
Data driven applications and experiments in CPS/IoT

Information about Competence Centers

Table of Contents

1 Introduction

The **Nine ICT-driven Competence Centres** are distributed centres specialized in a key aspect of IoT/ CPS domain and enabling technologies, which will offer local SMEs access to technology, to experimentations and to competencies services. Due to this specialization, each CC will have different demands and impacts depending on their region and industrial areas.

The ecosystem of CCs represents a structured network of services in terms of technology and formation, that would be accessed by SMEs and industrial partners at regional/local level but that will also benefit from the global Pan-European networking dimension of Internet-based CPS/IOT technologies.

The CCs network will improve the value proposition and the impact of ICT innovators to Manufacturing Industry and on the other side it will preserve the local approach required by Manufacturing SMEs Associations and Regional Development Agencies. CCs will also accelerate the communication between all actors in research, innovation and industries domain, encouraging an interactive “two-way knowledge exchange” and improving the spreading and adoption of innovation.

1.1 CC1 FHG FOKUS

More than two years ago Fraunhofer FOKUS established the IIoT Center. The IIoT Center is located in Berlin, Germany, which is currently attracting a lot of ICT Start-ups and Entrepreneurs. Services of the IIoT Center range from knowledge transfer to strategy development, to implementation and testing of systems and products.

The main focus of the technology-specific services of the IIoT Center are focusing on IIoT connectivity and communication, based on our 30 years of expertise as one of the biggest ICT applied research institutes having in-depth know-how with regards to market overview; standards and technologies.

The IIoT Center is equipped with a multitude of local and wide area communication technologies that interconnect a broad range of devices and cyber-physical systems, as found in Industry 4.0, automotive, smart cities, smart energy and ehealth.

Furthermore, we maintain hands-on expertise through our own IIoT infrastructures and testbeds ranging from 5G networks, Low Power Wide Area Networks to deterministic Ethernet (TSN), where our clients are provided with live demonstrations, are supported in development and integration and supported in testing and hardening their products.

1.2 CC2 Institute Mines Telecom

CC2 IMT/ TeraLab has been in operation for 4 years and supported over 50 projects in AI/Big Data Research, Innovation and Education. Unique positioning is the intersection of Big Data (ISpace BDVA label), leading data governance frameworks like Industrial Data Space and Cybersecurity.

The institute's research activities are organized into five main disciplinary themes: digital technologies, energy, materials, natural resources and the environment and economics, enterprise and society. In addition to these areas, there are two horizontal sectors of application: health and transport.

The positioning of TeraLab and fellow I Spaces should play a major role in the building of said trusted Data marketplaces at the cross roads of Big Data Technology, Cybersecurity initiatives and the "verticals" MFD4.0 being one of the first to capitalize on such advances.

TeraLab opens new opportunities to researchers by providing an optimal environment in which big data project teams can dedicate themselves entirely to the business of processing and analyzing, stimulating the production of new research which has the potential to form the basis of innovations with major scientific implications.

The platform provides data scientists with a whole catalog of tools and services devoted to statistical processing, data analysis and display, and more.

1.3 CC3 Fortiss

As a research and transfer institute for software-intensive systems, fortiss focusses on application-driven research for engineering open, cooperative and trustworthy CPS. In close collaboration with industrial partners, fortiss conducts R&D projects in various application domains, including robotics and industrial automation, and business IT and cloud systems. In its role of a MIDIH competence centre, fortiss provides expertise in a range of fields, particularly focusing on adaptive automation architectures and model-based software engineering for industrial automation and their relationship with manufacturing operations management.

Collaboration with IT startups, SMEs and entrepreneurs typically takes the form of joint project work to develop specific software solutions for automation tasks. In this regard, the fortiss competence centre offers access to knowledge and access to technology services as follows:

- **Access to Knowledge**: fortiss organizes workshops and information events related to model-based development of open-source automation software based on the IEC 61499 standard and the application of other Industrie 4.0 technologies, such as OPC UA based on established open source SDKs specifically (free services as resources allow). Training courses and consulting on individual challenges are also offered for specific needs (premium services).
- **Access to Technology:** fortiss offers its expertise in software technologies for industrial automation in small-to-medium scale contracted development or consultancy projects. The fortiss future factory, an adaptable production plant composed of various customized Festo Didactic MPS stations, is made available for testing and demonstration purposes. Promotion of the IEC 61499 standard and its 4diac implementation in a broad range of automation-related fields: Perform complementary and cross-domain showcases to support the creation of a landscape of uses for software development in automation and control systems applications.

1.4 CC4 VTT

The VTT Competence Center locates at city of Oulu Finland in facilities of VTT Technical Research Centre of Finland. VTT collaborates with SMEs and manufacturing companies and provides a full demonstration and training platform (from devices to cloud services using 5G test network) for the collaboration.

The VTT Competence Center offer the following services:

Access to Technology:

- Supports SMEs and manufacturing companies in their digitalization plans (Industry 4.0) by providing demonstration platform
- Training platform for the companies for experimentation of real-time data streaming and analytics capabilities
- Consulting services for development of customers I4.0 systems

Access to Experiments: live demonstrations where applications from robotics and machine control laboratories are in action.

Access to Competences: VTT will organizes events/workshops, laboratory tours, seminar and workshop presentations, white papers, news.

1.5 CC5 TUKE

The Competence Centre at the Technical University of Kosice (TUKE) provide support for active ICT based R&D collaboration of "academia" with SMEs or mid-caps companies (Mid-Cap). From IT Start-ups and Web Entrepreneurs point of view TUKE support and provides several types of services:

- **The pre-incubation process** (about 6 months for participants who are selected, by an expert commission, from the registered applicants through a public interview) is provided at **the Startup Center** and includes, among others: – consultancy and training services, publicity, support for business model and its implementation plan development, promoting idea to public and potential investors
- **The active incubation process** (recommended for each successful pre-incubator graduate) is provided in **the TUKE Incubator** and lasts for 1 to 3 years and includes, among others: - consolidated business programme with active coaching and training, support for a business plan implementation, assistance in obtaining appropriate investment support and premises.

From a technological point of view TUKE Competence Center can provide support and expertise on:

- **Field CPS smart systems Technology** - with a focus on industrial applications with impacts on a field level and on an enterprise level;
- **Smart sensors and IoT protocols** with a focus on industrial applications with impacts on a field level;

- **Cloud computing** with a focus on industrial applications allocated on a cloud level;
- **HPC and modelling, simulate technologies** with a focus on industrial applications with impacts on on an enterprise level and allocations on a cloud level;
- **Data architecture, exchange sharing** with a focus on industrial applications with impacts on a field level and on enterprise level.

1.6 CC6 CEFRIEL

CEFRIEL competence center will represent a one-stop shop that provides a combination of services in terms of technology and training services. One of the goals of the CC is also to accelerate the communication between all actors in research, innovation and industries domain, encouraging an interactive "two-way knowledge exchange" and improving the spreading and adoption of innovation.

Cefriel Competence Center leveraging on the availability of the "Cefriel Experience Center", an area devoted to collaboration, education and knowledge transfer:

- Supports companies in the growing of their knowledge, exploring and experimenting new trends and technologies, that potentially can be applied in their processes or products;
- Supports companies in finding the solution to a specific wicked problem they are experimenting, for which they do not know if a solution exists or if existing solutions really fit their needs and actually solve their problem;

Cefriel Competence Center offers the following services:

- **"Access to Technology":**
    - Help companies to Assess their "industry 4.0" maturity and provide advice and insights to cover the gap
    - help and support SMEs and industrial companies to find the solution to a specific wicked problem they are experimenting, leveraging on specific digital technological competences
    - support the Identification of infrastructures and resources to support the business scenario through ranking and cost models for the use of cloud infrastructure based solutions
    - ideate and design new innovative solutions and services enabled by cloud infrastructures and analytics
- "**Access to Experiments":** Cefriel will use the Experience Center to show to stakeholders the solutions and the PoC/Pilot in action
- "**Access to Competences":** Cefriel will support the growth of companies competences offering training and courses and organizing public event or workshops on specific technologies

1.7 CC7 LTU

LTU is one of the five major technology Universities in Sweden. Lulea University of Technology is experiencing strong growth with world-leading competence in several areas of research. Our research is conducted in close cooperation with companies such as Bosch, Ericsson, Scania, LKAB, SKF and leading international universities.

The LTU field of competencies in the Industry 4.0 are:

- Automation and digitalisation system architecture
  - Arrowhead Framework
  - FAR-EDGE: edge architecture
  - Productive4.0: supply chain and product life cycle management
- IoT Interoperability e.g.
  - Protocol interoperability
  - Semantics interoperability
- System of Systems, SoS, engineering
- IoT and SoS security
- IoT automation/digitalisation engineering e.g.
  - Smart Service Contracts, PlantDescription, Configuration

LTU has led the development of the Arrowhead Framework and Its main tasks are the development and transfer of knowledge concerning Service Oriented Architecture (SOA) to manufacturing stakeholders.

In this context, we envision to collaborate with IT Startups, Web Entrepreneurs and SMEs in these contexts:

- **Access to Knowledge**: collaborate to co-organize ad-hoc events, training or workshop based on specific technologies; Understanding company status versus Industry4.0, understanding company market value proposition, understanding company plans for new market value proposition
- **Access to technology**: collaborate in innovation consultancy projects when the specific competence or technologies is needed; provide support on experiments

1.8 CC8 IML

Fraunhofer IML is said to be first address for all questions with respect to holistic logistics, the employees work on all fields of internal and external logistics. At the Institute, founded in 1981, there are at the moment 260 employees as well as 250 post-graduates and students, supported by colleagues in workshops, laboratories and service areas.

The research and innovation location on logistics in Dortmund already covers a significant part of the innovation chain – from basic research, to applied research with industry partners, technology development and different innovation trajectories to bring ideas to market.

Within the Digital Product Factory companies are specifically supported with a taylor made process in developing digital products or hybrid services for Industrie 4.0 or Logistics 4.0. Beside this process companies benefit from the digital ecosystem and the community which was created threw out the decade. Finally, participating companies can use the co-working space which is located in direct neighbourhood and work in an agile way and innovative environment.

In order to support companies to be successful with the digital transformation Digital.Hub Logistics developed a novel supporting concept for start-ins. Offering working places in the individual coworking space, access to the labs and demo centres of the Fraunhofer institutes and TU Dortmund University and to testbeds of the Port of Duisburg, it includes the necessary infrastructure on the one hand. On the other hand, the hub offers a variety of innovation components that contribute to the success of the project – be it reliable concepts of the innovation management or new formats of the start-up scene.

1.9 CC9 PSCN

PSNC (Poznan Supercomputing and Networking Centre) is affiliated to the Institute of Bioorganic Chemistry of the Polish Academy of Sciences. PSNC is the major Polish academic HPC centre and broadband network services provider (NREN for Poland) as well as application and services developer and provider.

Apart from HPC Centre and Network Security Centre, PSNC runs an R&D Centre of Future Internet, e-Infrastructure, Digital Content and Portals, working e.g. on: middleware, tools and methods for HPC and distributed computing, resource management, scheduling, large scale applications, user management and accounting, infrastructure security mechanisms and policies, grid and cloud management tools, HPC and distributed storage architectures, mobile applications, Internet of Things, operating in IaaS, SaaS and PaaS modes.

PSNC has a considerable expertise in cloud HPC simulations for manufacturing companies (Lubawa is an example) as well as in construction of IoT systems, especially IoT middleware and security.

6 Leaflet

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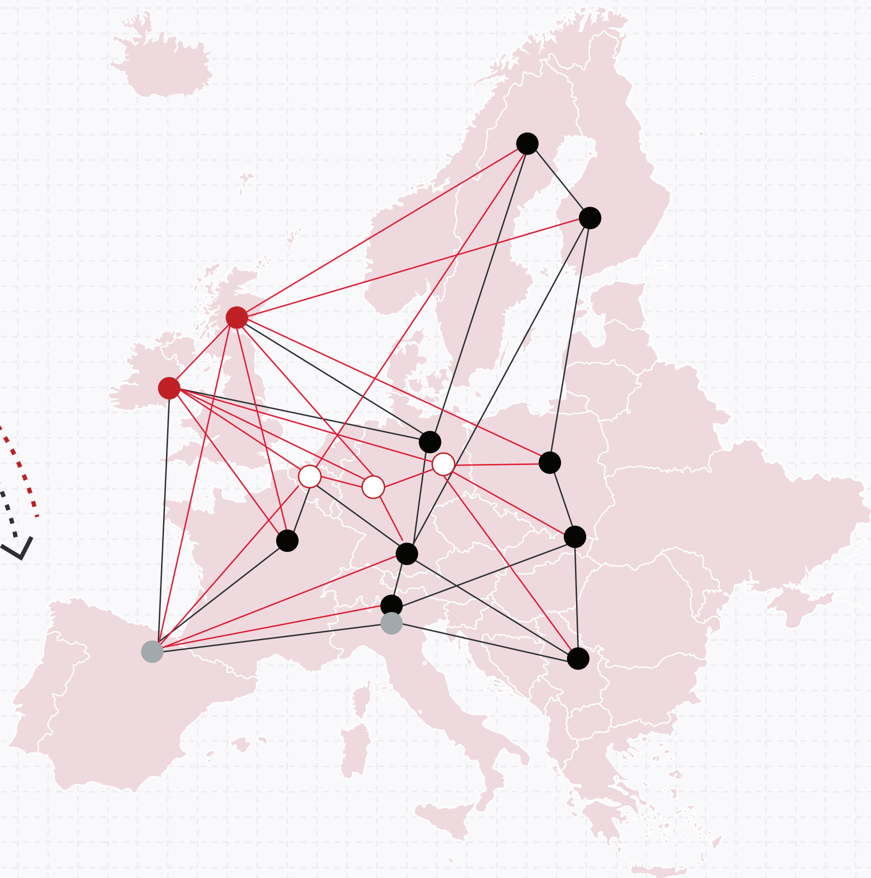
I4MS

MIDIH will create a Network of Manufacturing Digital Innovation Hubs in the area of IoT/CPS



CPS/IOT COMPETENCE CENTERS

The MIDIH nine Competence Centres cover several regions in EU, including Northern and Eastern EU, but are providing their services on a pan-EU basis, being specialized in specific branches of the CPS/IOT enabling technologies.

TEACHING FACTORIES

The 2 Teaching Factories are open environments where to perform testing and experiments of new applications focusing on ICT innovation applied to CPS production systems.

DIGITAL INNOVATION HUBS

Digital Innovation Hubs are clusters that help companies to become more competitive with regard to their business/production processes, products or services using digital technologies.

WHAT IS MIDIH

MIDIH "Manufacturing Industry Digital Innovation Hubs", is a "one stop shop" of services, providing industry with access to the most advanced digital solutions, the most advanced industrial experiments, pools of human and industrial competencies and access to "ICT for Manufacturing" market and financial opportunities.

Call for Proposals for Data driven applications and experiments in CPS/IOT

MIDIH foresees as an eligible activity the provision of financial support to third parties, as a means to achieve its own objectives.

The open call aims at complementing functionalities around MIDIH reference architecture and performing experiments in CPS/IOT based on the components provided by the architecture.

The experiments must cover one of the three main scenarios: Smart Factory or Smart Product or Smart Supply chain.

6 MONTHS

(Expected duration of participation)

€ 960,000

(Indicative budget for MIDIH Call-1)

Deadline:

29th June 2018 , at 17:00 Brussels local time

The MIDIH project aims at realizing services to support the ICT Innovation for Manufacturing SMEs

TECHNOLOGICAL SERVICES

interactive try-on demos, webinars, challenges, hackathons and awards

BUSINESS SERVICES

ideas incubation, business acceleration, demand-offer matchmaking and brokerage, access to finance

SKILLS BUILDING SERVICES

serious and role games, participative lessons and webinars, virtual experiments in physical teaching factories, professional courses for existing technicians as well as for executives

MIDIH MANUFACTURING·INDUSTRY DIGITAL·INNOVATION·HUBS

European Commission

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