FUTURE INTERNET SMART UTILITY SERVICES

FINESCE

MANAGING SHOPFLOOR ENERGY CONSUMPTION IN A SMART FACTORY

Using FIWARE for Demand Side Management

In the Smart Factory we are producing parts of an electric car

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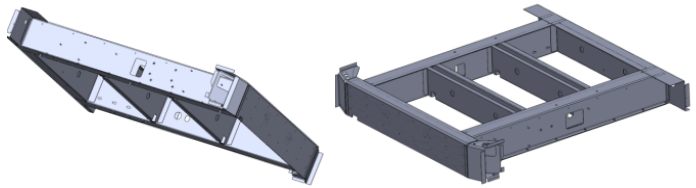
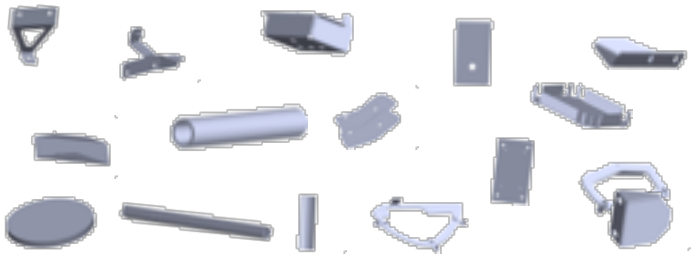
StreetScooter

Production of the underbody





The Smart Factory in Aachen

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Laser cutting machine

Bending machine

Objectives

- Enable manufacturing sites to become an intelligent load in the smart grid
- Create simple-to-use and fast-to-scale energy management infrastructure

Factory setup

- Demonstration factory with direct shopfloor access
- Production of prototypes and pilot series to be sold
- Monitoring of energy consumption of machines

FIWARE GEs are used on different layers to support integration

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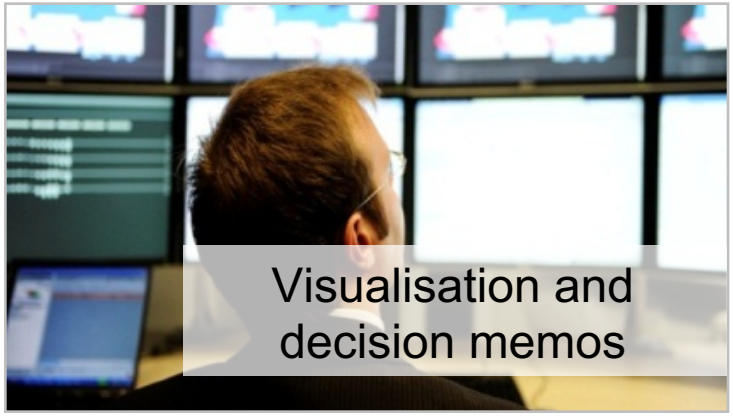
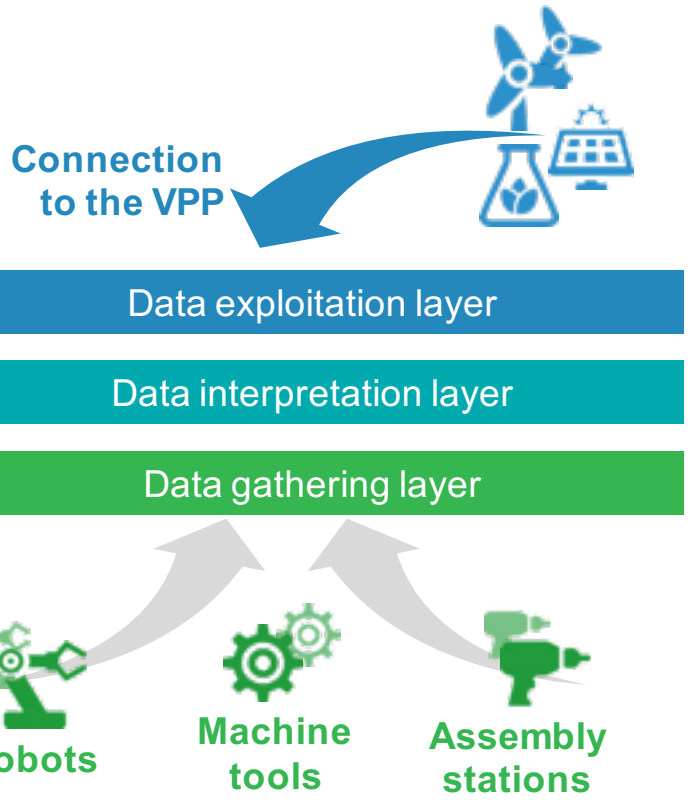
Goal of the integration



Overall architecture



Integration of the GEs with good progress and results

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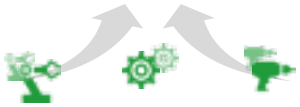
GEs and DSEs

Data exploitation layer	▪ GE Application Mashup (U, FI-Lab) ▪ DSE Production Planning and Control System Integrator (on-premise, under discussion)
Data interpretation layer	▪ GE Complex Event Processing (D, FI-Lab) ▪ GE Publish/Subscribe Broker (D, FI-Lab) ▪ GE Big Data Analysis (E, FI-Lab) ▪ GE Object Storage (E, FI-Lab)
Data gathering layer	▪ GE Gateway Data Handling (D, on-premise) ▪ DSE OBDC Event Sink (on-premise, OS) ▪ DSE Modbus Adapter (on-premise, PS)



* Enterprise-Resource-Planning, the key business management software for manufacturing companies

Reminder: The GE Gateway Data Handling gathers shopfloor data

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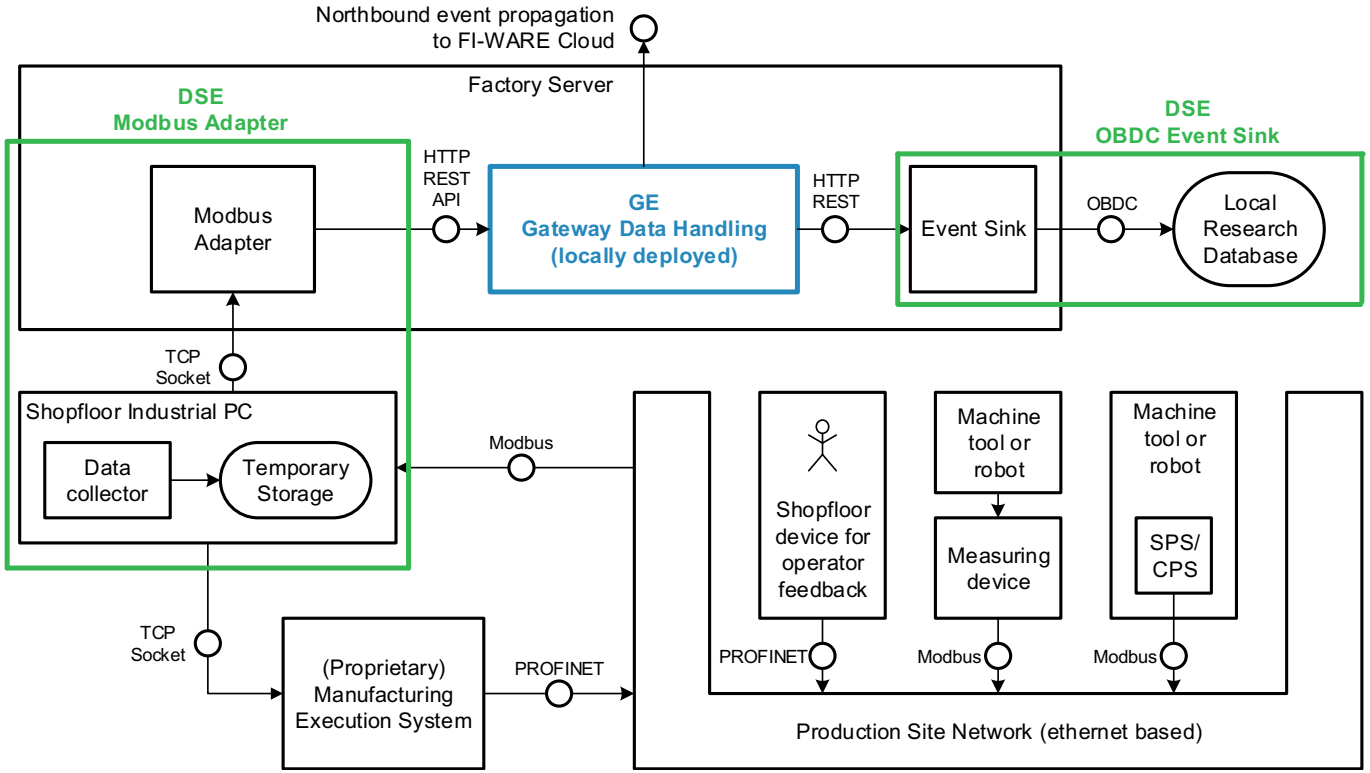
Data exploitation layer

Data interpretation layer

Data gathering layer



Assessment of the GE Gateway Data Handling

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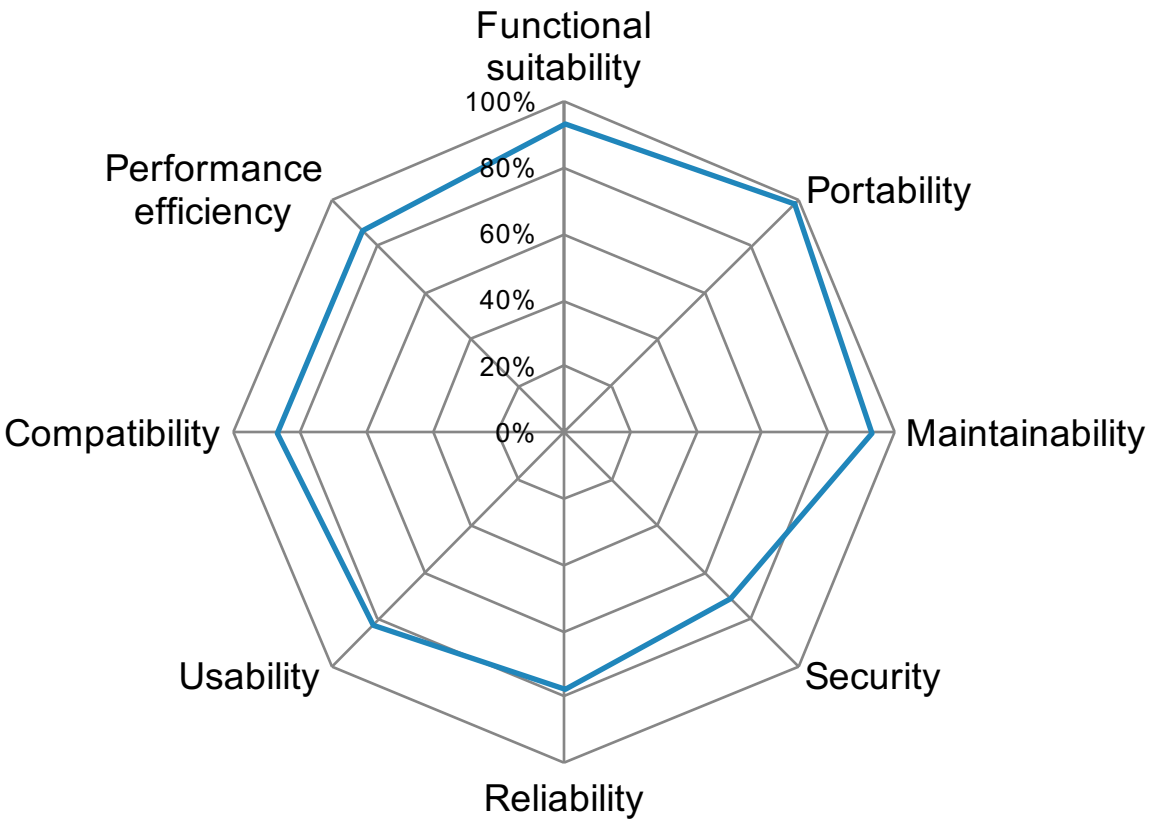

The GE Gateway Data Handling showed a very good overall result (83,85%) and greatly supports a fast and scalable integration of energy management in an industrial environment!

The interpretation layer is implemented and mainly consists of GEs

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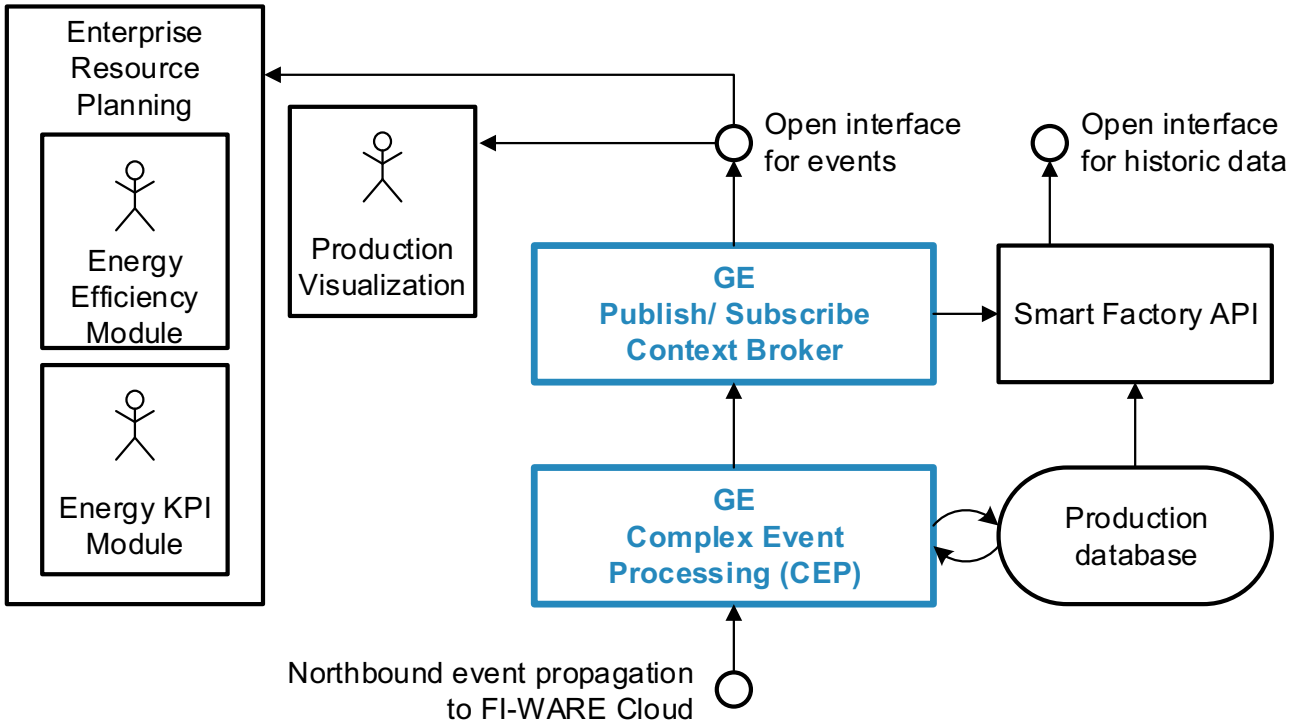
Data exploitation layer

Data interpretation layer

Data gathering layer



Deep-dive: The CEP performs good compared to commercial alternatives

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Several commercial alternatives

Microsoft SQL Server StreamInsight

Drools Business Logic integration Platform

Software AG Suite Powering the Digital Enterprise

Apama Analytics & Decisions Platform

Amit Active Middleware Technology

EsperTech

IBM

SAP EVENT STREAM PROCESSOR

Alternatives in the research community

stanfordstreamdatamanager

Cornell University Database Systems

TelegraphCQ Berkeley Database Research

SPOVNET spontaneous virtual networks

Evaluation in FINESCE WP3-Smart Factory

- Functional suitability: Query Language fulfils all requirements in the trial
- Performance efficiency: Easily manages load
- Compatibility: Out-of-the-box with Pub/ Sub Context Broker, REST API
- Usability: Text-intensive interface with good structure
- Reliability: No problems in trial experienced
- Maintainability: No problems in maintenance so far
- Portability: Standardized interfaces based on established technologies

iPad App to visualise factory

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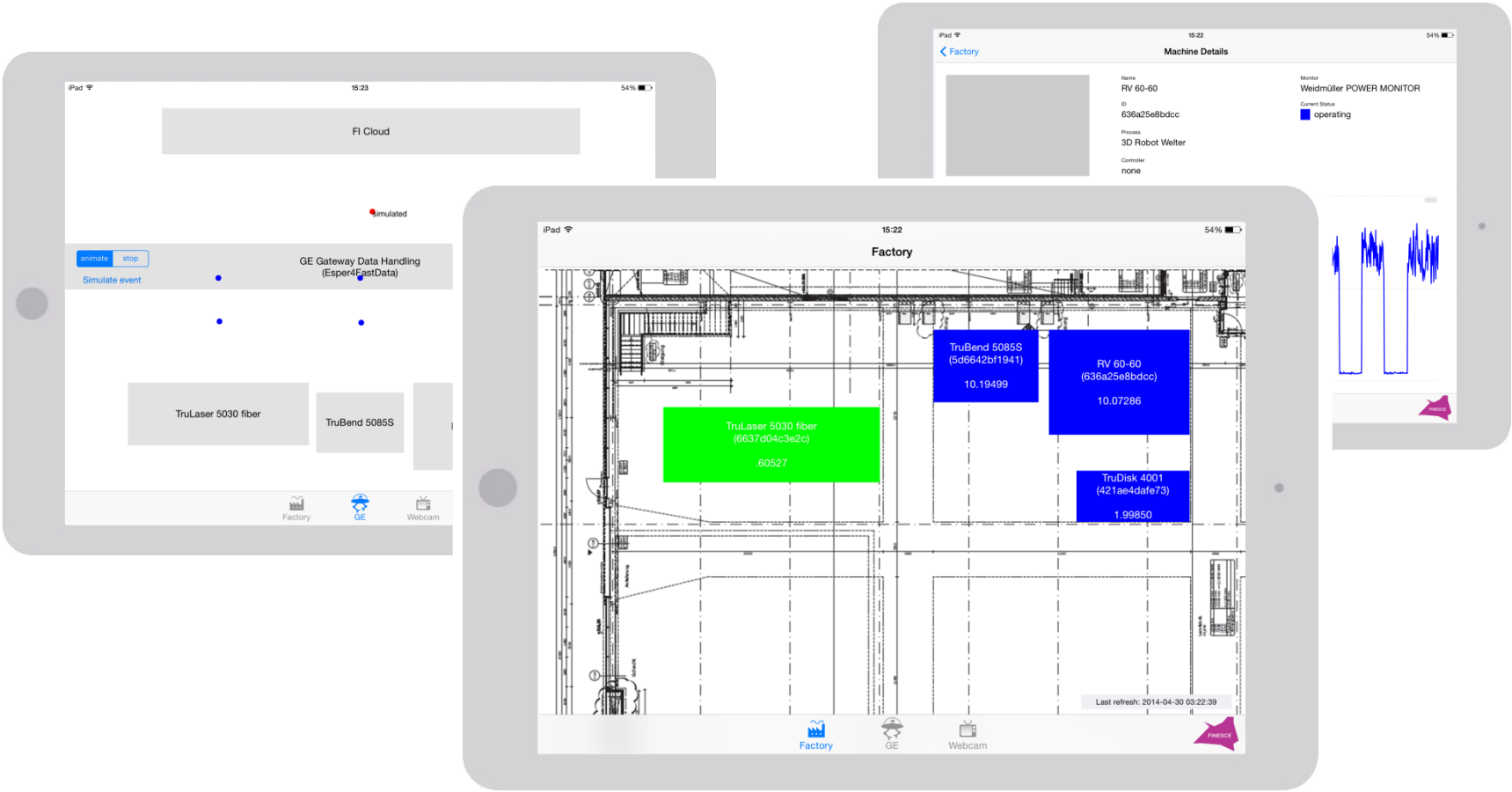

kthxbai

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