



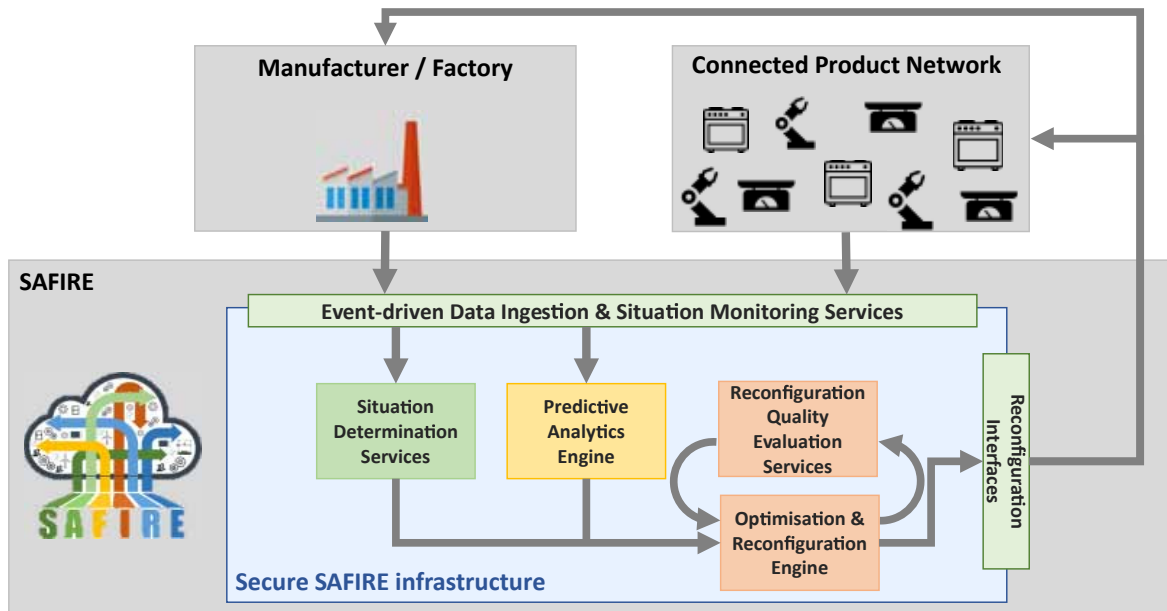
**REAL-TIME DATA ANALYTICS,
OPTIMISATION AND
RECONFIGURATION PLATFORM
FOR FACTORIES AND SMART
PRODUCTS**



www.safire-factories.org

A PLATFORM FOR INCREASING OVERALL EQUIPMENT EFFICIENCY OF FACTORIES

The SAFIRE project is developing innovative technologies and infrastructure that enable Reconfiguration-as-a-Service for dynamic smart factory systems and manufactured smart products. The innovations being developed exploit cloud-based services and computing power to continually optimise the performance of production systems and products focusing on throughput, power consumption, usage, maintenance, utilisation levels, and other key factors.



The SAFIRE solution is targeted as an add-on for existing production systems, or next generation smart factory operating systems, allowing production systems to be transformed to include capabilities for dynamic real-time reconfiguration and optimisation.

OPTIMISING PERFORMANCE AND SERVICES OF SMART PRODUCTS

The advanced analytics and reconfiguration capabilities being developed in SAFIRE are based on mastering the big data challenges associated with manufacturing (sensor and process data), enterprise and smart product data. They allow manufacturers to address production system behaviour forecasting, and to establish optimisation methods that are integrated in the design and product chain. The SAFIRE solution will provide the following:

- *Both reactive and predictive reconfiguration for both production systems and smart products.*
- *Flexible run-time reconfiguration decisions during production rather than pre-planned at production planning time.*
- *Real-time reconfiguration decisions for optimisation of performance and real-time production and product functions.*

The project will deliver big data analytic capabilities that meet real-time requirements so that dynamic runtime reconfiguration decisions are made during production time rather than pre-planned at production planning time.

COMPONENTS THAT MAKE YOUR PRODUCTION SYSTEMS AND PRODUCTS PERFORM

The SAFIRE solution operates in a secured infrastructure and utilises a Big Data Platform that contains different SAFIRE components separately managed by a cloud resource management system. The Big Data Platform includes a Monitoring Interface for collecting data coming from production systems and smart products through use of different types of algorithms and multiple information sources.

SITUATION MODEL AND DETERMINATION SERVICES

A

Analyses correlations between production and products including situational information to dynamically monitor and identify situations based on process information from various sensors, products and databases. Analysis results make it possible to adapt configurations to specific factory and product situations.

PREDICTIVE ANALYTICS ENGINE

B

Provides support for real-time big data analytics based on the Lambda+ architecture offering data aggregation, filtering, mapping, storage and processing. The engine is capable of using machine learning algorithms to extract valuable knowledge and provide tolerance to failures enabling continuous operation despite hardware or software failures.

OPTIMISATION & RECONFIGURATION ENGINE

C

Delivers reactive and predictive optimisations of production assets and product configurations within real-time constraints. The engine calculates new configurations that meet required system metrics including real-time constraints, communications bandwidths and latencies, power dissipation, maintenance cycles, and optimised reconfigurations are sent to connected production assets and products.

RECONFIGURATION QUALITY EVALUATION SERVICES

D

Evaluates optimisation metrics related to each production or product scenario and provides respective data collection strategies and configuration quality evaluation methods. The quality evaluation services supports the construction of a range complex relationships between production and product metrics to be optimised and to drive improved configurations.

SECURITY SERVICES

E

A Security, Privacy, and Trust Framework that enables the identification of security requirements, prioritisation of security objectives and selection of technologies for implementation. Security services builds an overall solution delivering security, privacy and trust for production and product data and authentication and verification services to ensure the integrity of optimised configurations.

Results of the Predictive Analytics Engine are used by the Reconfiguration and Optimisation Engine, which generates optimised configurations for production systems and smart products. The Reconfiguration Quality Evaluation Services determines the quality of old and more optimised configurations, based on the feedback loop. The Reconfiguration and Optimisation Engine uses the Reconfiguration Interfaces to upload optimised configurations to connected production systems and smart products.

RESEARCH PARTNERS



SOLVING THE CHALLENGES MANUFACTURES ARE FACING TODAY

The SAFIRE solution encompasses complex software and hardware systems and is driven by different manufacturing scenarios reflecting the real challenges encountered by European manufacturers today. These different scenarios have been aggregated to address the many interests and desired improvements manufacturers seek both for improving production, as well as the performance of the smart products that are produced.

ONA



Adaptive
Machining

OAS

AKTIENGESELLSCHAFT



Optimised Production
Processes

Electrolux



Smart Product
Customisation



SAFIRE aims to demonstrate that by performing reconfiguration in the cloud, continuous optimisation of systems and products can be achieved, which enables far better reconfiguration control and accuracy than if performed in either a pre-planned or online manner.

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