OGEMA – INDUSTRY 4.0

SECURE AND FLEXIBLE FRAMEWORK FOR INDUSTRIAL APPLICATIONS

Fraunhofer Institute for Integrated Circuits IIS

Management of the Institute
Prof. Dr.-Ing. Albert Heuberger
(executive)
Dr.-Ing. Bernhard Grill

Am Wolfsmantel 33
91058 Erlangen, Germany

Contact
Peter Heusinger
Nordostpark 84
90411 Nuremberg, Germany
Phone: +49 911 58061-9310
peter.heusinger@iis.fraunhofer.de

www.iis.fraunhofer.de/ogema

Motivation and Context

In the future, companies must expand their production with intelligent and networked solutions to remain competitive in Industry 4.0. However, the supply of customer-specific products with lot size one presents some challenges. There are more and more attacks to companies like data theft, data manipulation and unauthorized data access. A secure communication via the internet between the cloud, production facilities and the delivery management must be guaranteed.

Another prerequisite for Industry 4.0 is the networking of intelligent components and subsystems through the global availability of information technology infrastructures. Big amounts of data are collected for the Internet of Things. So you need edge computing systems which decide what kind of information should be kept local or can be sent into the cloud.

Our Solution – OGEMA

We at Fraunhofer IIS are aware of these challenges and can offer you OGEMA as a secure integration and edge computing platform for Industry 4.0. The main objectives of OGEMA are interoperability between the connected systems, implementation of a runtime environment for individual production services and easy integration of control technology for the realization of real-time processes.

OGEMA can easily be expanded with new communication interfaces. All communication objects are stored in an internal resource database. This is the base for an interoperable interaction between system components. The installed services can analyze the information in the resource database, connect it together, visualize it in a browser or forward it to the cloud.

Application Scenario: Edge Computing

OGEMA can be used to implement various functions and processes in the context of Industry 4.0. The communication between various devices with protocols like MQTT, MODBUS, and OPC-UA can be integrated in our Framework. OGEMA also serves as interface to industrial plants or to control units (e.g. PLC). With OGEMA existing sensors and actuators of a production solution are easily connected to the cloud and the cloud is brought to the machine.

An ideal application area is the retrofitting of older manufacturing plants. Individual services work as a link between sensor data and users, create interoperability between different system components. Specific interfaces simplify access to the internal system data. Customized analytical services preprocess captured data for the cloud. Compute intensive processes without real time requirements, e.g. for condition monitoring, will run on server in the cloud.

OGEMA facilitates the vertical integration in the plant. The Manufacturing Execution System or SCADA level can be dropped. If desired, OGEMA communicates directly with the ERP system. Implementations on industrial standard platforms and the integration of a PLC OGEMA enable system integrators to individually set up industrial solutions.

Application Scenario: Individual Production

Our vision of individual production is that once the order has been received, it is communicated directly to the factory in an automated and directly manner, and then controls its production to the point of delivery – exactly to the customer's request. By integrating various communication protocols and the internet, your end users can realize their product requests via a configurator and the information is passed directly to the processing machines due to OGEMA. According to your requirements and wishes, we can develop individual applications for machine control in conjunction with the integrated software PLC. An additional manual input and processing by an agent is no longer necessary. OGEMA can be extended and adapted flexibly with new standards and devices at any time.

Application Scenario: Industrial Energy Monitoring and Management

Energy often has a significant share of production costs. For documentation and as a prerequisite for shift of load power, monitoring of energy consumption is necessary. OGEMA, in former versions designed as an energy management gateway, supports this in an ideal way. The energy consumption of individual plants and machines can be easily detected, displayed and optimized. The framework allows the accounting for unit cost or individual process steps. These data can be further used to optimize the production process by shift of production steps in order to use flexible tariffs or to reduce the peak load of the plant.

Your Benefit

Enhancements and adjustments are possible during the operation of the system. Permission-based access schemes enable secure data exchange between systems, applications and users. Dedicated service applications simplify the configuration, installation and operation of energy management devices, systems and processes.

Unique Selling Proposition

- Flexible extension and adaptation based on a modular system design
- Multi-level security concept
- Integration of many communication interfaces in one system
- Hardware independence
- Efficient use of storage
- Interoperability between various processes, services and technologies
- Permission-based access to data provides high data security and multiple user management
- Protection of your networks against attacks

Our Offer

As an independent research institute, we you help to find the best solution for your problems and demands. With existing equipment, components and technologies we develop new and perfectly fitting solutions for your applications. Together with industry partners, we investigate and implement the best and application-oriented solution.