FRAUNHOFER INSTITUTE FOR PHOTONIC MICROSYSTEMS IPMS

1 *RFID Reader and Sensor Tags with ROAD support.*
2 *ROAD Server enabled production environment.*

IPMS ROAD SERVER

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Motivation

As the key characteristic of the ongoing fourth industrial revolution, smart production is interlinked with modern information and communication technologies: Processes are fully automated and manufacturing as well as logistics are computerized. Man, machine and process control are digitally connected with one another to form an autonomous, intelligent system.

As production becomes more digitalized and connected, increasing amounts of sensors, machines and control units must communicate with each other resulting in a large number of different interfaces. If two devices have to exchange data, both must be precisely aware of the counterpart's communication protocol and functional capabilities. Therefore, the expansion of a production system or the replacement of sub-systems has been a complex and time consuming process so far.

Interoperability by OPC UA

OPC UA (Open Platform Communication Unified Architecture) offers a solution now. When using OPC UA, only one compliant interface has to be implemented for each device. This interface can be integrated into scalable control and monitoring systems without much effort.

As the standard for manufacturer independent communication in automation technology, OPC UA enables the universal interconnection of industrial bus systems and protocols. Machine-relevant and context-related information can be encapsulated and provided at any time.

The RFID OPC UA AutoID (ROAD) server, developed by Fraunhofer IPMS, implements
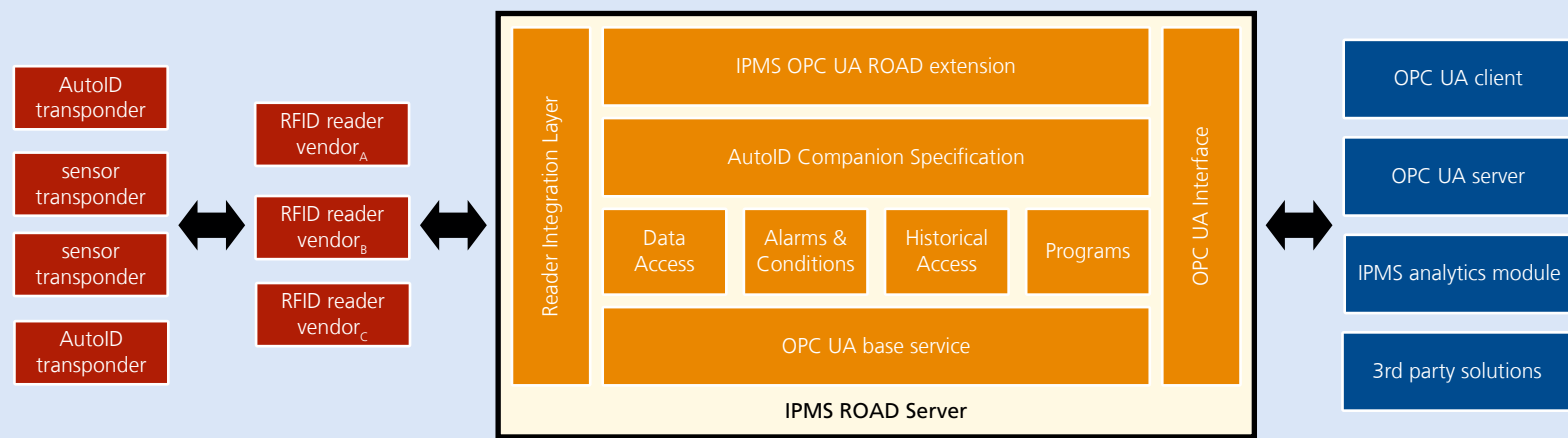
the OPC UA AutoID companion specifications for Radio Frequency Identification (RFID) components. Various RFID readers, working in different frequency bands (LF, HF, UHF) from any desired manufacturer can be directly controlled via the ROAD server. This renders manual adaptations, depending on the manufacturer, the connection type (Ethernet, RS232, USB, etc.), the frequency band or the protocol unnecessary. In the future, applications and services must establish only a connection to the server – time and effort spent on manually adapting individual control and security infrastructures to numerous manufacturer standards is thus eliminated. So you can focus on what matters most for you – your core business.

Sensor Transponders

Apart from pure AutoID functionality the new IPMS ROAD Server offers a hardware independent solution to work with modern RFID sensor transponders. Using this advanced technology, you can measure a wide range of physical parameters like temperature, pressure, light or humidity wirelessly and without the need for an active power supply using a uniform interface. The Fraunhofer IPMS extended the OPC UA AutoID companion specifications to support RFID sensor transponders and enable OPC UA applications to process these data. The ROAD server provides a generic interface for OPC UA applications to integrate sensor transponder information smoothly. The server tracks the historical sensor data and transponder information. OPC UA clients can retrieve these historical data from the archive for doing a trend analysis and data visualization.

IPMS Services

Our engineers help to find the right solution for your specific problem. Fraunhofer IPMS offers tailored RFID OPC UA AutoID server packages as well as case studies and implementation services for reader manufacturers, RFID technology suppliers and system integrators. Furthermore, Fraunhofer IPMS provides services and software components to analyze sensor transponder information.

ROAD Server Features

- Smart integration of transponder technologies in complex production environments

- One generic interface to control all reader devices

- Easy integration into existing OPC UA infrastructures

- Manufacturer independent over the complete reader, tag and sensors population

- Supports LF, HF, UHF standard frequencies

- NFC protocol support

- Supports active or passive sensor transponders with a wide range of sensors e.g. light, temperature, humidity and pressure

- Tracking of historical sensor data and tag information

- Provides operations to read and write tag user data

- Built-in write and read access control

- Support for secured communication channels

- Compliant with the OPC UA AutoID companion specification

3 *Block diagram of the IPMS ROAD Server.*