

# About the project

## The Internet of Things Becomes Marketable

The electronic integration of intelligent objects and the Internet has reached a high degree of maturity and is opening a broad range of commercialization opportunities in many areas. This has been fostered by RFID (Radio Frequency Identification) technology and the OPC-standard for non-proprietary communication in the automation technology. The term "Internet of Things" (IoT) is an internationally-accepted notation for the communication of intelligent, physical objects among themselves and other computer systems using the Internet.

## ADiWa Closes Crucial Gaps

With respect to the Internet of Things, it is important to closely integrate each object/product into the logistic chains and to derive complex activities for inventory control and other business processes by the delivery and selling of RFID-tagged products. The full potential of the Internet of Things can only be made accessible if the processing of dynamic information and the realtime, automated detection and processing of business-related events become more into focus. Throughout its lifecycle, a product passes through many different stations, ranging from its creation to sales and maintenance to exploitation. In order to enable the connection to the different business processes involved by flexible control mechanisms, a complex software logistic needs to be developed. Within the ADiWa project, a powerful consortium from economy and science is aiming to investigate, realize and prove these mechanisms. As such, the goal is to select, compose, control and even create complex, dynamic business processes with refined information from the real world. This can only happen if the gaps between the systems that collect, aggregate and use information on different levels are bridged.

## Realization

ADiWa makes the huge potential of information from the Internet of Things accessible for business-relevant workflows that can be strategically planned and manipulated. For the data-level connection of objects from the real world, results from available solutions and from the SemProM project (Semantic Product Memory) shall be used. ADiWa focuses on business processes, which can be controlled and manipulated based on evaluated information from the real world. For this, a broad set of appropriate tools and mechanisms for the design as well as for the runtime of business processes will be adapted or newly created. This comprises methods and tools for an appropriate modelling of dynamic business processes and their control as well as the connection of complex events. For this, among other things, graphical modelling tools with primitives (simple graphical shapes) need to be extended to describe the interconnection of infrastructures with the real world. Additionally, concepts for a runtime environment optimized for the execution of such business processes that can access information from the real world shall be realized.

Another aspect is the identification, processing and use of "complex events". These are defined by rules applied to singular events from the Internet of Things and reflect the event interaction. As "complex events" are of greater importance for the business processes than are singular ones, their modelling is of specific value. The additional development of generic services shall assure the reusability and dynamic adoption of business processes for arbitrary industries.

## Added Value for SMEs in IT

The open architecture, including event-based information processing, together with the bridging towards service-oriented architecture, shall also explicitly create opportunities for delivering specialized and value-adding complementary components and solutions for small and medium-sized enterprises (SMEs). A first step in this direction is done by the SME partners in the project alliance. The experience expected to come from this relation shall provide a procedural method for the utilization of the Internet of Services by innovative corporate networks.

## ADiWa in Context

The ADiWa research project is based on the current SemProM (Semantic Product Memory) and Aletheia (Semantic Federation of Comprehensive Product Information) projects, which are showing a huge potential for synergies. Just like the SemProM technology network, ADiWa addresses the use of refined information from the real world, applying internet technologies. The processing of business-relevant events is automatically triggered in ADiWa, which would not be possible without the processing and semantic refinement of product-related data flows as done within Aletheia. At the same time, information derived from ADiWa based on the observed business processes flows back into both of the other projects.

## Application Scenarios

In the future, logistic service providers operating on a global scale have to be able to integrate the status of their networks into their service infrastructure in order to be able to effectively react to failures. For this, typical logistic scenarios will be analyzed to determine the benefit and influence of information from the Internet of Things on the business operations and especially on exceptional circumstances. The commodity flows in industrial parks will be analysed. These are closed industry areas on which several independent companies from one or different sectors are based. Because the operating parties never know the current status of the whole plant, incidents are a daily occurrence. The challenge lies in the coordination of the internal and external networks of transport with the aid of realtime information from the Internet of Things. Based on the results, requirements and methods for the planning, implementation and control of intelligent, adaptive business processes will be defined, which can react to events triggered by the Internet of Things. The analysis shall envision how to model, configure and operate intelligent business processes. The processes shall be visualized in an applicable and always comprehensible form for the logistics field.

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