



D7.2 Case Study 2: Domain ontology building and semantic augmentation of legacy content

Synthesis Report

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Abstract

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Deliverable D7.2 (WP 7)

This deliverable provides an outline of the tasks performed to transition a complex legacy application in the domain of aircraft maintenance into a semantic SOA framework. The TAO transitioning support is exploited for conducting these tasks. A semi-automated acquisition process is set up to build the fined-tuned formal ontologies needed to ensure interoperability in service communication. The developed ontologies are exploited in two applications of content augmentation techniques: SAWSDL annotation of maintenance services and semantic annotation of the technical documentation.

Keyword list: Semantic Modelling, Ontology Acquisition, Legacy data analysis, Semantic Annotation, Semantic Web Services, SOA, Aircraft Maintenance

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Executive Summary

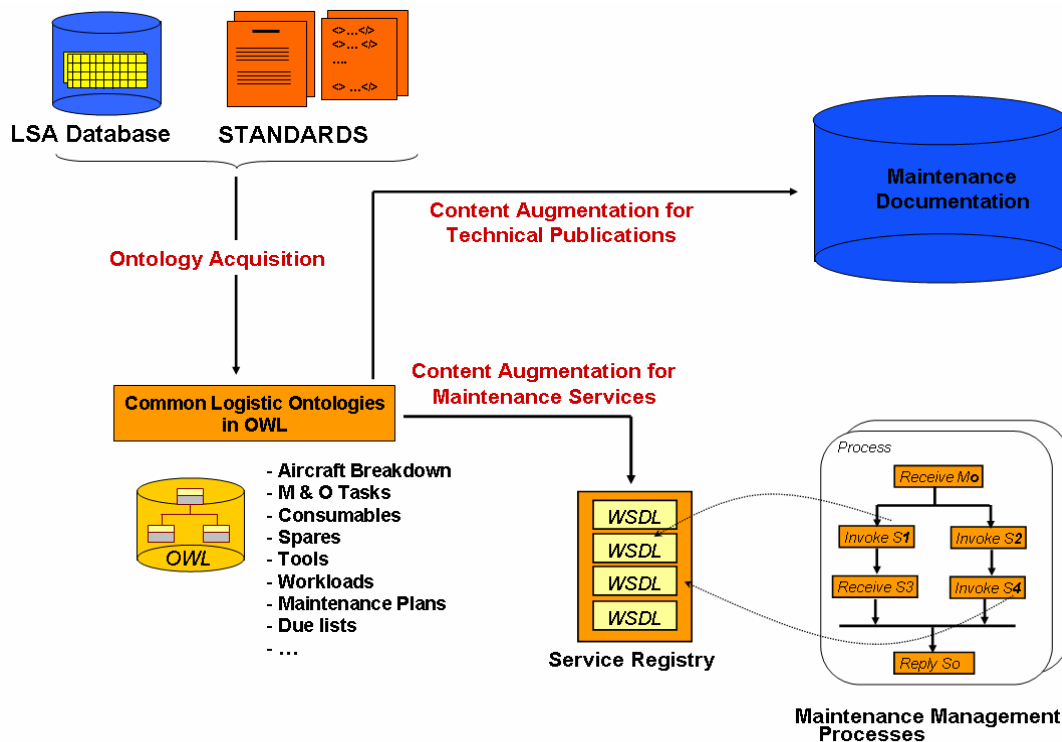
We give in this document an overview of the tasks conducted to transition a complex legacy application in the domain of aircraft maintenance into a semantic SOA framework. The case study is divided into three scenarios which are developed using the TAO transitioning support. A semi-automated acquisition process is set up to build the fined-tuned formal ontologies needed to ensure interoperability in service communication. The developed ontologies are exploited in two applications of content augmentation techniques: SAWSDL annotation of maintenance services and semantic annotation of technical publications.

Development of the TAO case study in aircraft maintenance

This deliverable provides the description of the development tasks performed to transition a complex legacy application in the domain of aircraft maintenance to a semantic SOA framework. This transitioning work is conducted using TAO software support and follows the requirement analysis and the global specification of the transitioning scenarios defined during the first year of the project.

The deliverable describes the systematic transitioning process applied to redesign the legacy application. It also gives an illustrated description of the resulting prototype. The case study is composed of three inter-related scenarios (see figure next page):

- **Semi-automated acquisition of the domain ontologies:** Constructing the fine-tuned ontologies needed to ensure interoperability is the key step in a transitioning project. Significant efforts in the case study development were dedicated to the acquisition of ontologies from legacy data, and more particularly from corporate relational databases. The implemented multi-step process relies on a combination of learning tools that ensures the construction of highly accurate ontologies from such structured input. The process is applied to build domain ontologies from the maintenance database which is the core of this case study. An ontology normalisation step allows reusing standard-based ontologies.
- **Content augmentation of maintenance services:** An SAWSDL-based mediation approach is applied to ensure semantic interoperability in a revisited scenario of aircraft maintenance management. The business processes are enhanced and redefined in terms of services within an SOA framework and the involved maintenance services are semantically augmented with SAWSDL annotations. These annotations refer to elements of a shared interoperability model based on ontologies.
- **Content augmentation of technical publications:** Annotating technical publications with references to product parts and logistic resources is a time-consuming task which is not well supported in the legacy process. An active authoring assistance based on ontology-based annotation tools is developed in this scenario. Large ontologies are exploited to identify relevant references to the technical items.



The three transitioning scenarios of case study 2

Developments on the case study scenarios conducted during the second year of the project give more insight on how transitioning work is eased by the TAO technology and what are the potential benefits of the revisited business processes. Contributions of the tools in the case study are precisely positioned with respect to key requirements addressed in TAO, including transitioning help and effort reduction, improvement of interoperability in complex systems, and knowledge reuse.

A number of tasks for improving the prototype have been identified. After performing these additional tasks, a systematic evaluation of the prototype will be conducted.