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1 Overview

Challenge
There is a high cost associated with the development and maintenance of product catalogues throughout the product lifecycle
Solution
Explicitly model product knowledge according to an agreed, shared terminology for the product domain
Why a Semantic solution
The use of semantics in modeling product knowledge permits the use of open (Semantic Web) standards and the easing of knowledge maintenance over the product lifecycle. With reasoning, different views can be offered upon the same products.
Key Business Benefits
There is a high entry cost associated with creating a product catalogue. Open standards and tools built for semantically-based product lifecycle management will lower this barrier, especially for middle-sized companies.

Keys components

Existing Software
Product configuration system

Research and development
Ontology visualisation
Ontology engineering
Ontology maintenance
Semantic rules
Collaborative work tools

Technology locks
Ontology development

Companies have large product portfolios which they configure and maintain electronically using expensive and complex tools. The use of such product portfolios is to enable companies to manage the entire **product lifecycle**.

Within a product portfolio there is a lot of knowledge and rules about the products and their relationship to one another, yet this is hidden in the data without it being easily possible to extract and use in supporting tools. Hence typical applications upon product catalogue data (supply chain, marketing, research & development, B2C e-commerce) are implemented in a costly hard-coded approach in which catalogue data is imported and manipulated as it suits the particular context of use.

Due to the structure of product catalogue data, in which characteristics and relationships are not explicitly expressed in some sort of standardized terminological way, there is a high cost involved in developing and maintaining this data, in re-interpreting it for a different context of use or for a new catalogue structure, and in working with it in a collaborative environment or sharing it between departments (each of which may have a different understanding of its purpose and meaning).

As a result of this, ontologies are a viable approach to improving the development of product catalogues and their maintenance over the entire product lifecycle in that they offer a consistent terminology for products throughout their lifecycle and the possibility to generate different views for different contexts on the same products.

2 Current Practices and Technologies

2.1 Current business practises

Current product lifecycle management approaches are based on the manual development of a product catalogue in which product knowledge and relationships are defined by the developers at the implementation stage, and later understanding of these definitions is based on the clear understanding of their practices, which requires good documentation. Such approaches are extremely specialised: it requires a (well-paid!) consultant to ensure a properly customised system and approximately 3 months to learn how to model the products in that system.

Product knowledge is stored internally within the system in a proprietary standard, making it difficult to extract and use in different contexts.

2.2 System requirements Analysis

In this field there is a need to reduce entry costs, which is particularly significant for middle-sized businesses which have a large product catalogue but can not afford the expense of the product configuration systems. We see a requirement for ontologies in that:
- The use of a consistent terminology for product knowledge through the entire lifecycle makes the data easier to maintain and better suited to sharing between departments which then can have a shared understanding of the data's meaning
- In combination with tools using this terminology the development process can be made simpler, reducing development time and costs
- By basing the ontology on an open standard like OWL, we move away from proprietary standards, facilitating application development and data exchange
- Ontologies support reasoning, so that product knowledge described using an ontology is also available for being reasoned upon so that e.g. different views on the same product can be offered to different users

The use of ontologies in product lifecycle management makes the following demands:
- The development and availability of good product ontologies, or the provision of best practises and guidelines for the development of such ontologies
- Tools which aid the creation of product ontologies by being able to communicate the correct understanding of the ontology to the developer, feedback on best practises and guidelines, and provide ontology visualisation
- Collaborative work tools supporting ontologies
- Ontology engineering and maintenance practices and tools
- Rules to describe product relationships not expressible in OWL

2.3 Review of the current systems

Product lifecycle management is currently supported by expensive, resource-intensive tools such as the SAP Product Configurator, Matrix10 and MAPICS.

Integrity provides Integral (www.integrity.vc, see Figure 5.1), a SemTalk add on, as a tool to support product configuration in the Microsoft Visio environment. Integral is a tool which allows for a graphical representation of product configurations as Visio diagrams, in which the diagram components are also tied to descriptions using a common terminology. The current tool is SAP-based, however it could be extended to support Semantic Web standards such as OWL in the future.
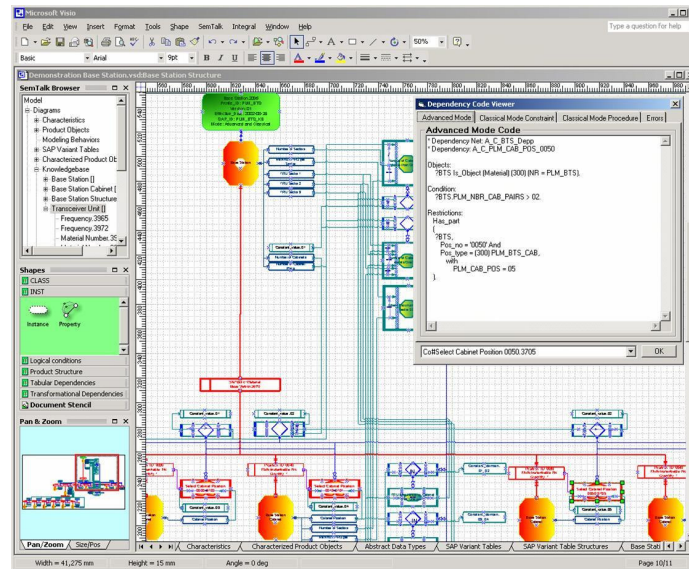

Figure 1 – Integral, a product configuration tool