The Ontological Imperative

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Semantic Interoperability

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Semantic Integration: Success?

Information Integration

- Multiple information resources are combined using ontologies to match concepts with similar meaning.
- Examples: information aggregation, data fusion.

Software Interoperability

- Software systems exchange sentences that are written using ontologies. Each software software uses an ontology (either its own or a set of shared ontology) to translate the exchanged sentences.
- Dream: seamless exchange of information among the software systems.
Proactive Computing

• Information systems act in anticipation of future problems, needs, or changes of the user.
• Truly proactive systems need to be able to predict possible future behaviours.
• By analysing data and events in real-time, objects become self-directing, processes become self-managing, and the supply chain becomes self-correcting.
Proactive Computing

Manufacturing Process Scenario

1. Production order released
2. Translated to PSL & stored on RFID tag
3. Which activities must occur?
4. What's next?
5. What happened?
6. Feeding back the activities that occurred

Grüniger (Ontology Summit 2016)
What’s Stopping Us?
Implicit Semantics

- Semantics is still hidden away in data structures and algorithms, or “baked” into implementations.
- It makes sense to make explicit the ontology of an application, but we must always recognize that this is distinct from the ontologies of the domain.
Standards Alone Won’t Work

- There is an over-reliance on standard terminologies without an understanding of the different variations in semantics.
- This also applies to standard (upper) ontologies.
A Symphony of Ontologies

- We need high-quality sharable and reusable expressive ontologies that work together.
  - Relationships between ontologies – similarities, differences, interpretations, synonymy
- We need efficient reasoners for expressive ontologies.