

Ontology Standard vs. Data Exchange Standard, Friend or Foe and a Road to Coexistence or Transition

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Ontology vs Technical standards

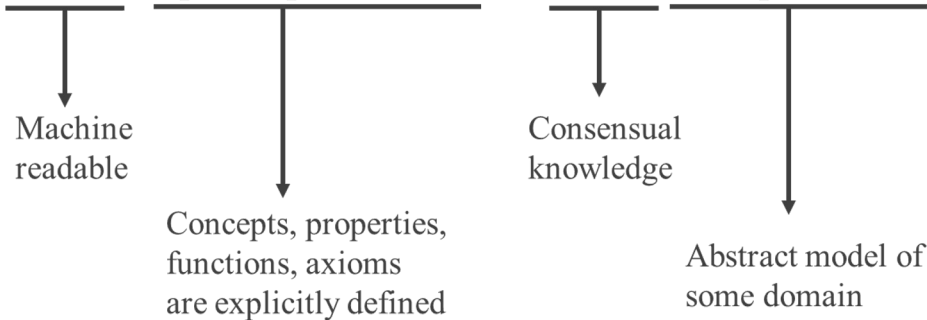
Standards are the distilled wisdom of people with expertise in their subject matter and who know the needs of the organizations they represent. (ISO)

E.g., requirement, protocol, policy, operation, quality, design

- Standard Definitions

Ontology

Studer(98): Formal, explicit specification of a shared conceptualization



Primary application:
vocabulary, taxonomy, glossary

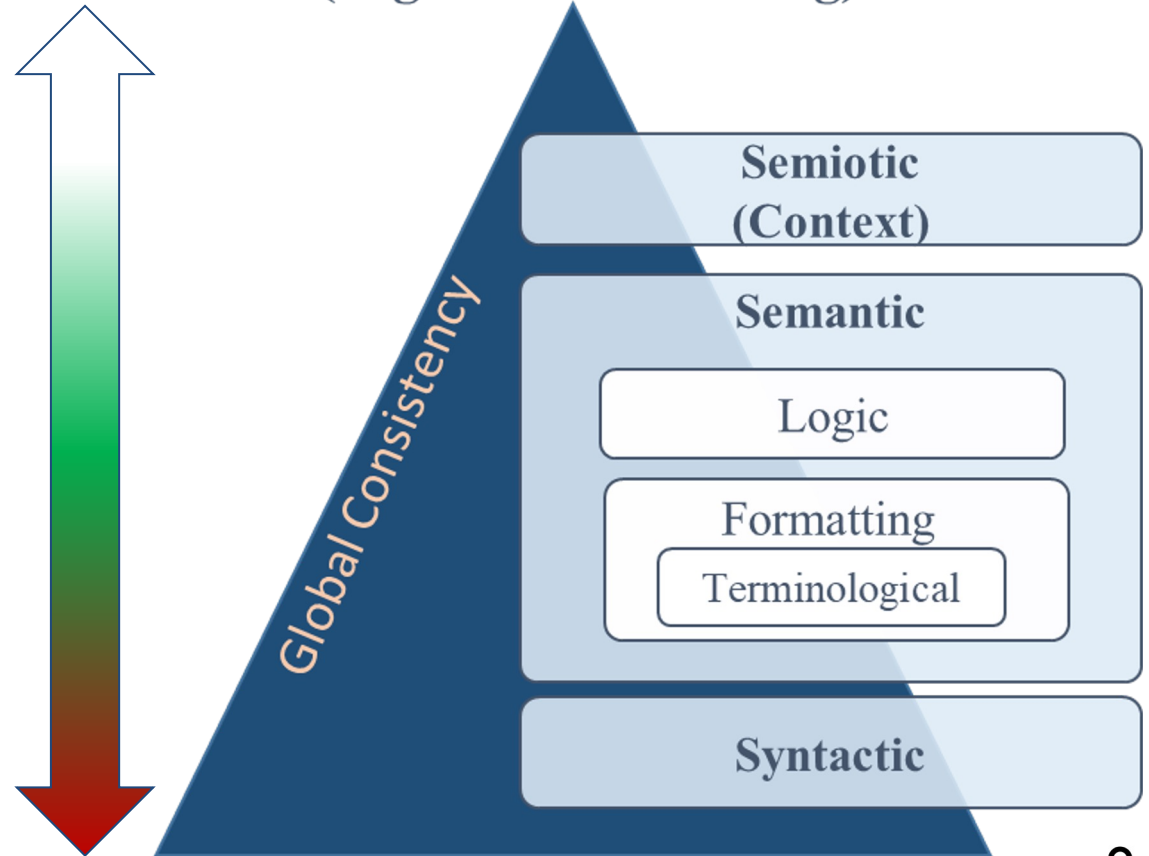
Secondary applications:
Knowledge graph, Semantic services, Semantic process model

Interoperability

“Ontology” standards uses formal languages with logical foundation and other metadata modeling techniques to convey the interpretation of its entities.

“Traditional” standards uses mostly natural language, sometimes UML or other types of diagram to convey the interpretations of its entities.

Interpretation (Right Understanding)



Problems with “Traditional Standards”

- Ambiguity and open to interpretation
 - ISO interpretation service, also see House Rules.
- Contradictory definitions
 - See Schaubroeck et al., 2022 for “two contradictory product system definitions in the ISO standard”
 - “ISO Doesn’t Have Consensus on Whether it Has Consensus” – Paris, 2014
- Preservation of competitive edge over interoperability
- Bureaucracy, pressure for continuous compliance, huge manual effort (so expensive!)
- Diversity, pluralism, cultural sensitivity, and sovereignty

How ontology can help?

- Good ontology should be self-explainable, and machine readable - less human interpretation.
- Interoperability solution
 - Hub and spoke – interoperable sharing same top-level semantic architecture
 - Pluralistic – multiple TLO with rigorous mapping between them
 - All possible because of the logical rigor
- Avoid conflict, contradiction, and duplication
- Standard Definition should be replaced by ontology-based definitions for vocabularies.
- Semantic service schema (SWSL, WSMO, OWL-S) for tagging request and response
- Semantic process and design models (BPMN and derivatives, SysML activity diagram)

Ontology standards vs Ontology for standards

Ontology(s) are used as a standardized data model for sharing and integration of information.

Helps in ensuring data interoperability among stakeholders of each domain.

Integrate software and services.

Domains and disciplines make their own ontology(s).

Vision of semantic web (data annotation).

Ontology is used for standardizing scientific, engineering, and socio-political knowledge.

Standards (definitions, taxonomy, policy) are encoded in ontology.

Models and Services are published with ontology.

A new house rule for ISO and others?

Conclusion

- Command vs Consensus
- Ontology standards needs periodic survey, integration and promotion over typical standard.
 - Coverage is still extremely low
- Raise awareness, promote, and advocate use of ontology definitions in the standard as a start
- Next step is to semanticisation of every standard
 - New business opportunity around infrastructure, tooling, and compliance

