ONSET Criteria Lists

April 23, 2012

ONSET, the foundational ontology selection tool, assists the domain ontology developer in selecting the most appropriate foundational ontology. The domain ontology developer provides the requirements/answers one or more questions, and ONSET computes the selection of the appropriate foundational ontology and explains why. The current version (v1.2) includes DOLCE, BFO, GFO and SUMO. To download ONSET and access supplementary information go to `http://www.meteck.org/files/onset/`. The ONSET application was developed by Zubeida Khan as part of her BSc(honours) thesis in Computer Science at the University of KwaZulu-Natal, supervised by Maria Keet. It was further refined afterward to include other foundational ontologies and more data.

This file contains the criteria for each category that were implemented in ONSET for DOLCE, BFO, GFO and SUMO ontologies.

1 Representation Languages

1.1 Languages of DOLCE

DOLCE has been expressed in:

- FOL
- KIF
- OWL DL
- OWL 2 DL

1.2 Languages of BFO

BFO has been expressed in:

- OBO
- FOL
- KIF
- All OWL species

1.3 Languages of GFO

GFO has been expressed in:

- OWL DL
- OWL 2 DL

1.4 Languages of SUMO

SUMO has been expressed in:

- SUO-KIF
- OWL DL

2 Software Engineering Properties

Software engineering properties as per the final criteria lists are compared in Table below for their dimensions and modularity; regarding licencing: they are all freely available, and are all actively being maintained.

Table 1: Comparison of 2 of the 4 software engineering properties.

	Dimensions	**Modularity**
DOLCE	100 categories and 100 axioms + relations, quality properties and qualia to represent attributes	Lighter/expressive versions, endurants and perdurants are separate, built-in domain-specific ontologies
BFO	in OWL - 39 universals; in OBO-23 terms and 33 typedefs; with RO-33 universals and 34 object properties	Endurants and perdurants are separate
GFO	Full- 79 classes, 97 subclass axioms and 67 object properties; Basic- 44 classes, 28 subclass axioms, 41 object properties	Lighter/expressive versions, modules for functions and roles
SUMO	1000 terms, 4000 axioms, 750 rules	Endurants and perdurants separate, built-in domain-specific ontologies

3 Ontological Commitments

The table of ontological commitments for each foundational ontology appears in the following page.

Table 2: Comparison of ontological commitments

Term (and very brief descriptions of its meaning)	**DOLCE**	**BFO**	**GFO**	**SUMO**
Universals vs. Particulars (Universals can have instances, particulars do not)	Particulars	Universals	Universals, concepts, and symbols	Universals and particulars
Descriptive vs. Realist (Descriptive: represent the entities underlying natural language and human common-sense; Realist: represent the world exactly as is)	Descriptive	Realist	Descriptive and Realist	Descriptive
Multiplicative vs. Reductionist (Mutiplicative: different objects can be co-located at the same time; Reductionist: only one object may be located at the same region at one time)	Multiplicative	Reductionist	Unclear	Multiplicative
Endurantism vs. Perdurantism (Endurantism: an object is wholly present at all times; Perdurantism: an object has temporal parts)	Endurantism and perdurantism	Endurantism and perdurantism	Endurantism and perdurantism	Endurantism and perdurantism
Actualism vs. Possibilism (everything that exists in the ontology is real vs. objects are allowed independent of their actual existence)	Possibilism	Actualism	Unclear	Unclear
Eternalist stance (the past, present and future all exist)	Eternalist stance	Eternalist stance	Eternalist stance	Eternalist stance
Concrete & Abstract entities (Concrete: entities that exist in space and time; Abstract: entities that exist neither in space nor time)	Concrete, abstract	Concrete	Concrete, abstract	Concrete, abstract
Mereology (theory of parts)	GEM	Own mereology	Own mereology	Own mereology
Temporal aspects	Provided	Not provided	Provided	Provided
Granularity (different levels of detail contained in an ontology)	High level	Sensitive to granularity	Unclear	Unclear
Properties and values ('attribute'; e.g., the colour of an apple)	Included	Not included	Included	Included
Model for space and time (Consists of time and space regions and boundaries)	Not included	Not included	Included	Not included
One-layered vs. Three-layered architecture (a basic level only; an abstract top level, abstract core level and basic level)	One-layered	One-layered	Three-layered architecture	One-layered
Situations and situoids (Situation: an aggregate of facts that can be comprehended as a whole and satisfies certain conditions of unity; Situoid: is a part of the world that is a comprehensible whole and can exist independently)	Not included	Not included	Included	Not included

4 Subject Domains

4.1 Subject Domains of DOLCE

There is evidence that DOLCE has been used in the following subject domains:

- Biomedical
- Environment
- Life sciences
- Agriculture
- Engineering
- Manufacturing
- Church administration
- Computer programs
- Simulations
- Government
- Military
- Legal
- Landscape
- Geographical

4.2 Subject Domains of BFO

There is evidence that BFO has been used in the following subject domains:

- Biomedical
- Environment
- Life Sciences
- Geographical

4.3 Subject Domains of GFO

There is evidence that GFO has been used in the following subject domains:

- Biomedical
- Medical informatics
- Life Sciences
- Computer programs

4.4 Subject Domains of SUMO

There is evidence that SUMO has been used in the following subject domains:

- Biomedical
- Agriculture
- Home energy
- Business process management
- Simulations
- Sensor network
- Military
- Legal
- Geographical

5 Applications

5.1 Applications of DOLCE

There is evidence that DOLCE has been applied in:

- Ontology driven information systems
- Database integration
- The Semantic Web
- Information retrieval
- Scientific research
- Formally representing scientific theory
- Natural language processing

5.2 Applications of BFO

There is evidence that BFO has been applied in:

- Ontology driven information systems
- Database integration
- Scientific research
- Formally representing scientific theory
- Natural language processing

5.3 Applications of GFO

There is evidence that GFO has been applied in:

- Ontology driven information systems
- The Semantic Web
- Scientific research
- Formally representing scientific theory
- Modelling methodologies and languages to be used in software applications making them more explicit and ontological foundation of conceptual modelling
- Domain specific semantic wikis

5.4 Applications of SUMO

There is evidence that SUMO has been applied in:

- Ontology driven information systems
- The Semantic Web
- Scientific research
- Formally representing scientific theory
- Natural language processing
- Search applications