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/](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.

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

3 Ontological Commitments

The table of ontological commitments for each foundational ontology appears in the following page.
<table>
<thead>
<tr>
<th>Term (and very brief descriptions of its meaning)</th>
<th>DOLCE</th>
<th>BFO</th>
<th>SUMO</th>
<th>GFO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universals vs. Particulars (universals can have instances, particulars do not)</td>
<td>Descriptive</td>
<td>Realist</td>
<td>Unclear</td>
<td>Endurantism and perdurantism</td>
</tr>
<tr>
<td>Multiplicative vs. Reductionist (multiplicative: different objects can be co-located at the same time; Reductionist: only one object may be located at the same region at one time)</td>
<td>Endurantism and perdurantism</td>
<td>Endurantism and perdurantism</td>
<td>Endurantism and perdurantism</td>
<td>Endurantism and perdurantism</td>
</tr>
<tr>
<td>Actualism vs. Possibilism (everything that exists in the ontology is real vs. objects are allowed independent of their actual existence)</td>
<td>Possibilism</td>
<td>Possibilism</td>
<td>Unclear</td>
<td>Unclear</td>
</tr>
<tr>
<td>Undertantism vs. Perdurantism (an object is wholly present at all times, a perdurant has temporal parts)</td>
<td>Endurantism and perdurantism</td>
<td>Endurantism and perdurantism</td>
<td>Endurantism and perdurantism</td>
<td>Endurantism and perdurantism</td>
</tr>
<tr>
<td>Concrete vs. Abstract entities (entities that exist in space and time; abstract entities that exist neither in space nor time)</td>
<td>Concrete, abstract</td>
<td>Concrete, abstract</td>
<td>Concrete, abstract</td>
<td>Concrete, abstract</td>
</tr>
<tr>
<td>Mereology (theory of parts)</td>
<td>Provided</td>
<td>Provided</td>
<td>Provided</td>
<td>Provided</td>
</tr>
<tr>
<td>Temporal aspects</td>
<td>GEM</td>
<td>Provided</td>
<td>Provided</td>
<td>Provided</td>
</tr>
<tr>
<td>Granularity (different levels of detail contained in an ontology)</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Properties and values (attribute: e.g., the colour of an apple)</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Model for space and time (consists of time and space regions and boundaries)</td>
<td>Not provided</td>
<td>Not provided</td>
<td>Not provided</td>
<td>Not provided</td>
</tr>
<tr>
<td>One-layered vs. Three-layered architecture (a basic level only; an abstract top level, abstract core level and abstract basic level)</td>
<td>One-layered architecture</td>
<td>One-layered architecture</td>
<td>One-layered architecture</td>
<td>One-layered architecture</td>
</tr>
<tr>
<td>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)</td>
<td>Not included</td>
<td>Not included</td>
<td>Not included</td>
<td>Not included</td>
</tr>
</tbody>
</table>
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