Appendix C

ROMULUS documentation

ROMULUS is a web-based repository aimed at promoting foundational ontology usage for achieving semantic interoperability. To access ROMULUS, go to `http://www.thezfiles.co.za/ROMULUS/home.html`

The header of ROMULUS has a menu bar containing ROMULUS's functions. See Fig. C.1.

Figure C.1.: ROMULUS's menu bar with different functions.

The **Home** page (Fig. C.2) introduces a user to ROMULUS, its goals and functions.

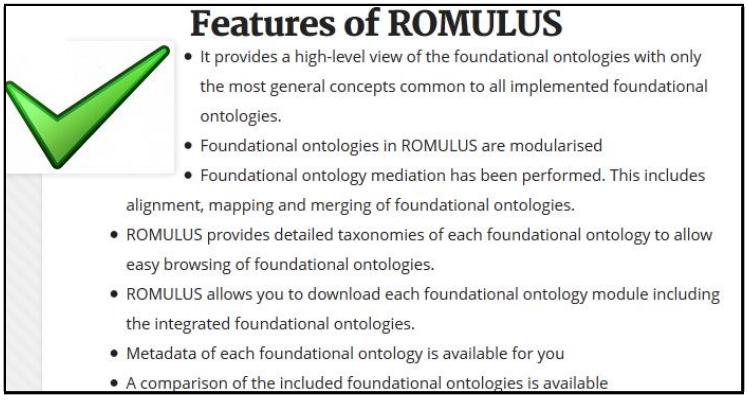


Figure C.2.: ROMULUS's home page.

A user may browse the ontologies in the repository, online by opening up the **Browse ontologies** page. See Figures C.3 and C.4 for this.

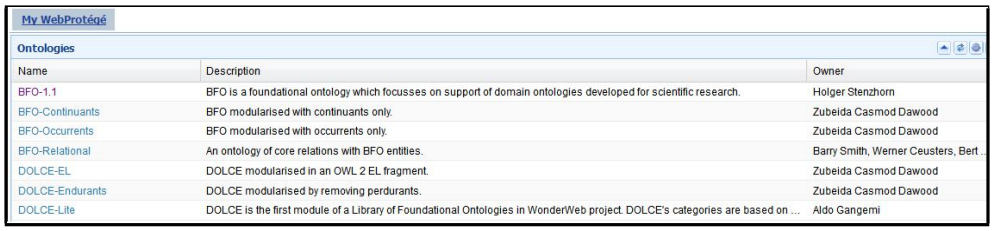


Figure C.3.: ROMULUS's browse ontology page.

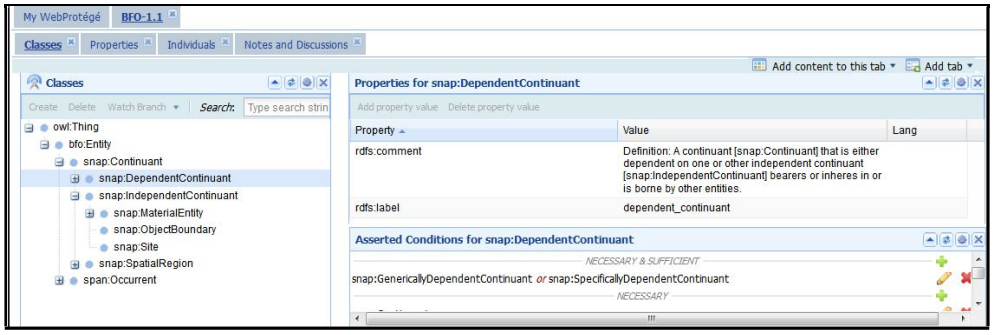


Figure C.4.: Browsing through the BFO ontology in ROMULUS.

The **Ontology Comparison** page provides a multi-dimensional comparison of foundational ontologies. It is spread out to different pages: **Ontological Commitments, Representation Language, Software Engineering Properties, Subject Domains, and Applications**. One of the pages, **Software Engineering Properties** is displayed in Fig. C.5

Foundational Ontology Comparison: Software Engineering Properties

These are general properties associated with foundational ontologies e.g. licensing, modularity etc.

Term	DOLCE	BFO	GFO	SUMO
		Software Engineering Properties		
Dimensions	100 categories and 100 axioms and relations. Quality and qualia to represent attributes	in OWL - 39 universals; in OBO- 39; with RO-33 universals and 34 object properties	Full- 79 classes, 97 subclass axioms and 67 object properties; Basic- 44 classes, 28 subclass axioms, 41 object properties	1000 terms, 4000 axioms, 750 rules
Modularity	Lighter/expressive versions built-in domain- specific ontologies, endurants and perdurants are found in separate branches	Endurants and perdurants are found in separate branches	Lighter/expressive versions, modules for functions and roles	Endurants and perdurants are found in separate branches, built-in domain-specific ontologies
Licensing	Freely available	Freely available	Freely available	Freely available
Actively maintained	Yes	Yes	Yes	Yes

Figure C.5.: The Software Engineering Properties comparison page.

The **Ontology View** page provides different human-readable views on the axioms of the ontology for the users. Currently it provides a natural language, and description logic view. The user decides on a view before proceeding with viewing the ontology. Description logic view provides the axioms of the ontology in description logic while natural language view provides the axioms in natural language sentences, in alphabetical order of classes, relational properties and individuals. Fig. C.6 displays these views.

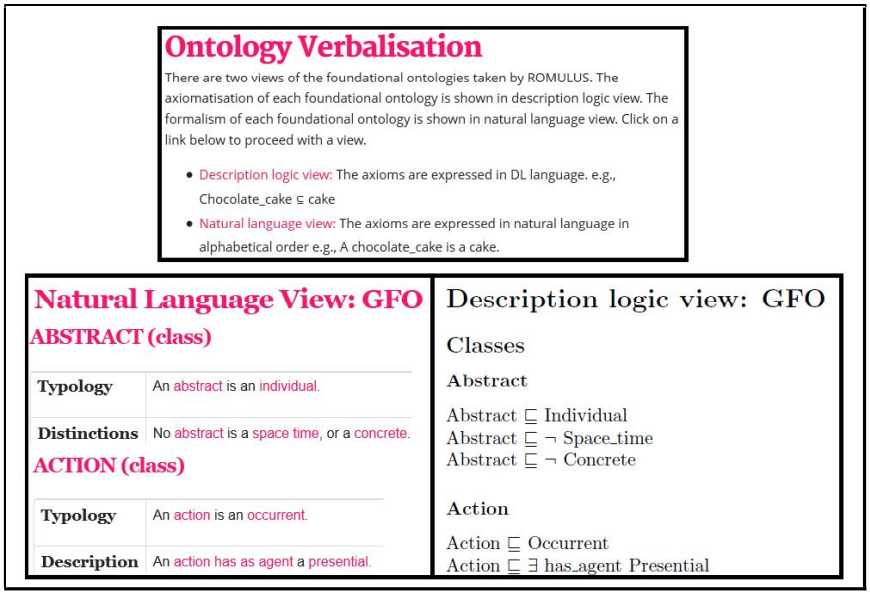
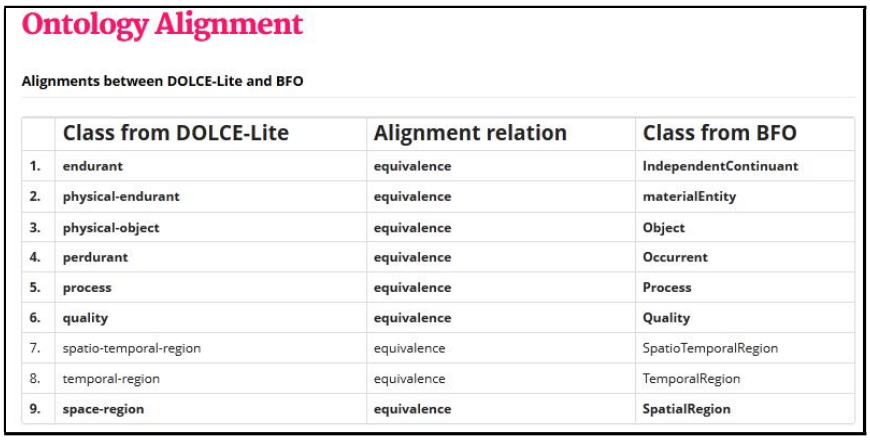


Figure C.6.: A screenshot of the ontology view page with snippets from natural language and description logic views for GFO ontology.

The **Ontology mediation** page is spread out onto five pages: **Alignment, Mapping, Merging, Search, Foundational Ontology Interchangeability, and Mapping Inconsistencies**.The **Alignment** pages (Fig. C.7) have tables of ontological alignments.



	Class from DOLCE-Lite	Alignment relation	Class from BFO
1.	endurant	equivalence	IndependentContinuant
2.	physical-endurant	equivalence	materialEntity
3.	physical-object	equivalence	Object
4.	perdurant	equivalence	Occurrent
5.	process	equivalence	Process
6.	quality	equivalence	Quality
7.	spatio-temporal-region	equivalence	SpatioTemporalRegion
8.	temporal-region	equivalence	TemporalRegion
9.	space-region	equivalence	SpatialRegion

Figure C.7.: A table of ontological alignments.

The **Search** page allows you to search for a particular alignment. See Fig. C.8.

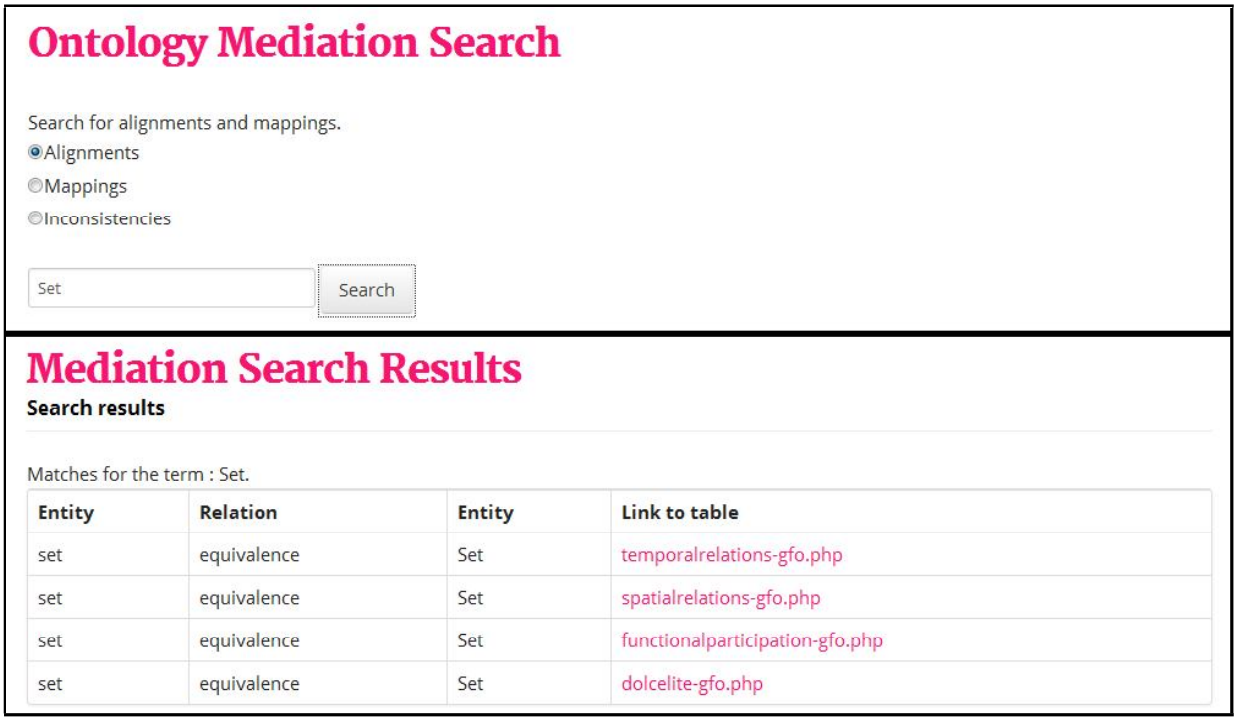


Figure C.8.: Ontology alignment search.

The **Mapping** and **Merging** pages have similar functionality as the **Browse ontologies** page in that they allow a user to browse through the mapping and merged ontologies. The **Foundational Ontology Interchangeability** page contains a method that may be used to perform foundational ontology interchangeability. The **Mapping Inconsistencies** page provides explanations for mapping inconsistencies that arise in cases where alignments cannot be mapped due to various logical reasons.

The **Ontology Metadata** page has compiled lists of metadata for each foundational ontology module in ROMULUS. See Fig. C.9 for the page that shows the metadata list of the BFO-Continuants module. There is also an **Ontology Metadata Search** page, and the output of this is shown in Fig. C.10.

The **Downloads** page has download links for each foundational ontology module, as well as for additional resources for ROMULUS and ONSET.

The **Ontology Selection** page provides the user with some insight on ONSET, a foundational ontology selection tool, and has a link for the user to download ONSET.

The **Contact** page has the details of ROMULUS developers.

For further details about ROMULUS, feel free to contact:
Zubeida Casmod Dawood email:zkhan@csir.co.za
C.Maria keet email: keet@ukzn.ac.za

Entity	Value
Ontology details	
Ontology Name	Basic Formal Ontology (Continuants)
Ontology Acronym	BFO-Continuants
Ontology ID	13
Ontology description	BFO modularised with continuants only
Ontology creation date	27 July 2012
Ontology latest modified date	27 July 2012
Ontology version	1
Ontology URI	http://www.cs.ukzn.ac.za/zubeida/ontologies/bfo-continuants.owl
Ontology languages	All OWL species
Ontology licence	Free
Organisation details	
Ontology documentation page	
Ontology creators contact details	Zubeida Casmod Dawood zkhan@csir.co.za
Organisation name	University of KwaZulu-Natal (UKZN) and Centre for Artificial Intelligence Research (CAIR), South Africa
Organisation homepage	http://cair.za.net/
Metrics	
Number of classes in the ontology	22
Number of individuals in the ontology	0
Number of properties in the ontology	0
Number of axioms in the ontology	53
Modularity	
Module type	Separate branches of 3D and 4D entities
Original ontology	BFO 1.1

Figure C.9.: Metadata list for BFO-Continuants.

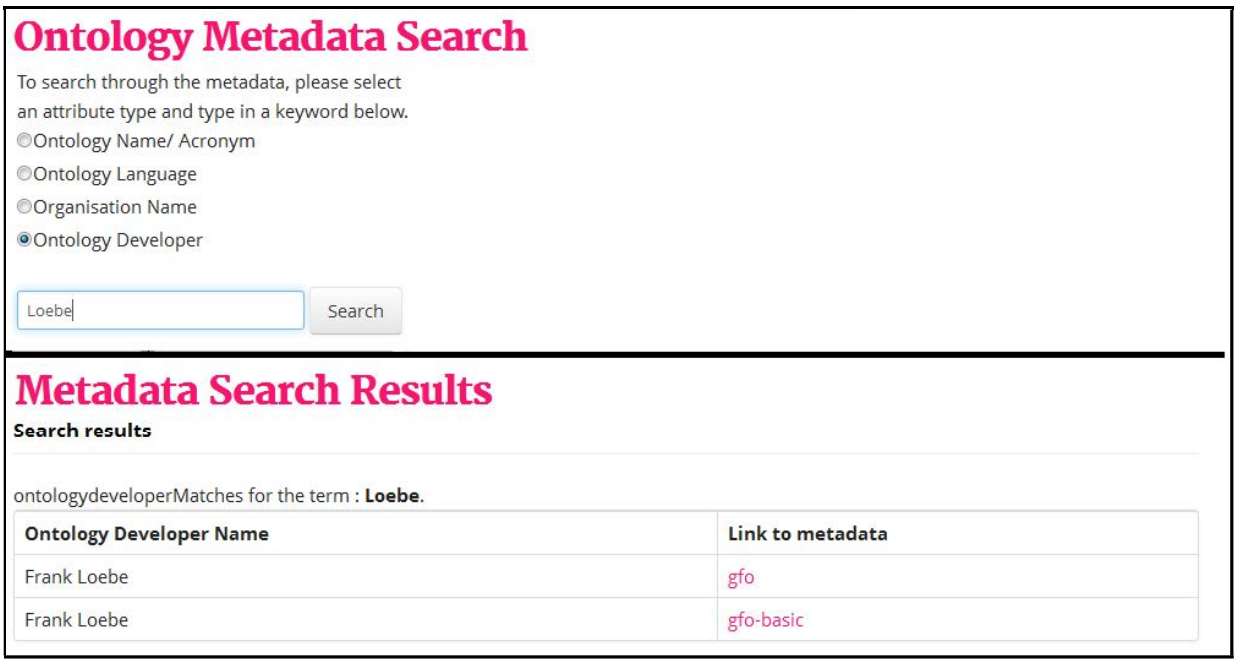


Figure C.10.: Ontology metadata search.