Conceptualising RDFBones as an RDF ontology and application

UNI FREIBURG

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Biologische Anthropologie Freiburg

Workshop “Digital Standards for Research Data from Human Skeletal Collections”,
06.10.2016

Human Skeletal Collections

Collections surveyed for this project as examples

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- **Historical research collections**
  - Alexander Ecker Collection, Freiburg
  - Rudolf Virchow Collection, Berlin
  - Blumenbach Collection, Göttingen
- **Active research collections (various contexts)**
  - Osteological Collection, Tübingen
- **Bioarchaeological archives**
  - State Collection of Anthropology and Palaeoanatomy Munich
  - Archaeological Unit Baden-Württemberg, Constance
- **Museums (various contexts)**
  - Natural History Museum Basel
  - (Natural History Museum Vienna)
- **Forensic facilities**

Materials to be Modelled

Human anatomy

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Human remains

- Skeletal material
  - Skeletons
  - Commingled remains
  - Material from stratigraphical units
  - Forensic cases
- Mummified remains
- Wet specimen

Models

- Anatomical
- Pathological

Replica

- Humans
- Human remains

Materials to be Modelled

Material objects

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Objects

- Archaeological finds
  - Artefacts
  - Biological/geological samples
- Ethnological objects

Replica

- Archaeological artefacts
- Ethnological Objects

Materials to be Modelled

Documents

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Unpublished

- Earlier collection inventories
- Reports
  - Research projects
  - Expeditions
  - Archaeological excavations
  - Forensic cases
- Personal records
  - Diaries
  - Laboratory notebooks
  - Notes, sketches
- Correspondence
  - Personal letters
  - Business correspondence
- Art
  - Drawings
  - Paintings

Published

- Literature
  - Monographs
  - Text books
  - Academic journals
  - Manuals
  - Catalogues
- Maps

Materials to be Modelled

Referenced vs. unreferenced materials

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It is assumed that each collection has an active inventory that indexes all objects comprised in the collection.

Referenced materials

Materials listed in the collection inventory.

Unreferenced materials

Materials that are kept with the collection because they are relevant to the collection objects but which do not appear in the collection's inventory.

Processes to be Modelled

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Collection history

- Acquisitions, disposals of objects
- Curation periods
- Institutional changes
- Changes of locality
- Decisions
  (e. g. restitution processes)

Research

- Projects
- Investigations
  - Sampling

Actors to be Modelled

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Persons

- Users
- Researchers
- Curators
- Contributors
- Identities (e. g. of skeletal individuals)

Institutions

- Keepers of the collection
- Research facilities
- Interest groups
- Service providers

Additional Information to be Modelled

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Content-oriented

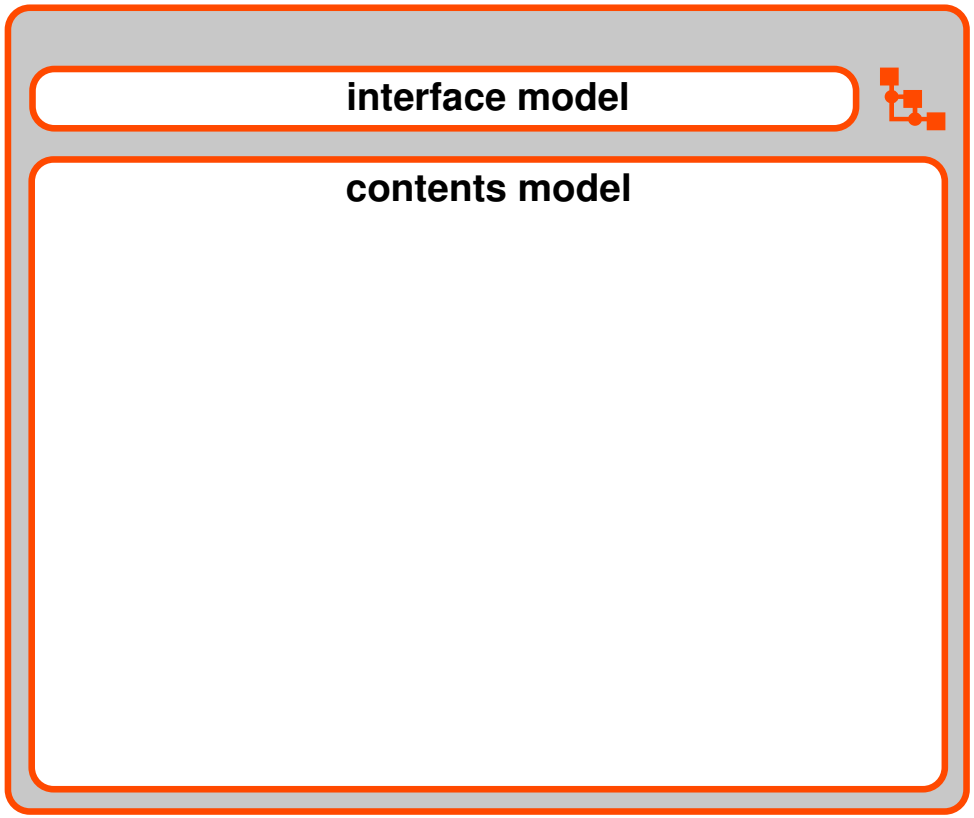
- Workflow-related information
- Notes
- Restrictions on access to material
- Directives for material preservation

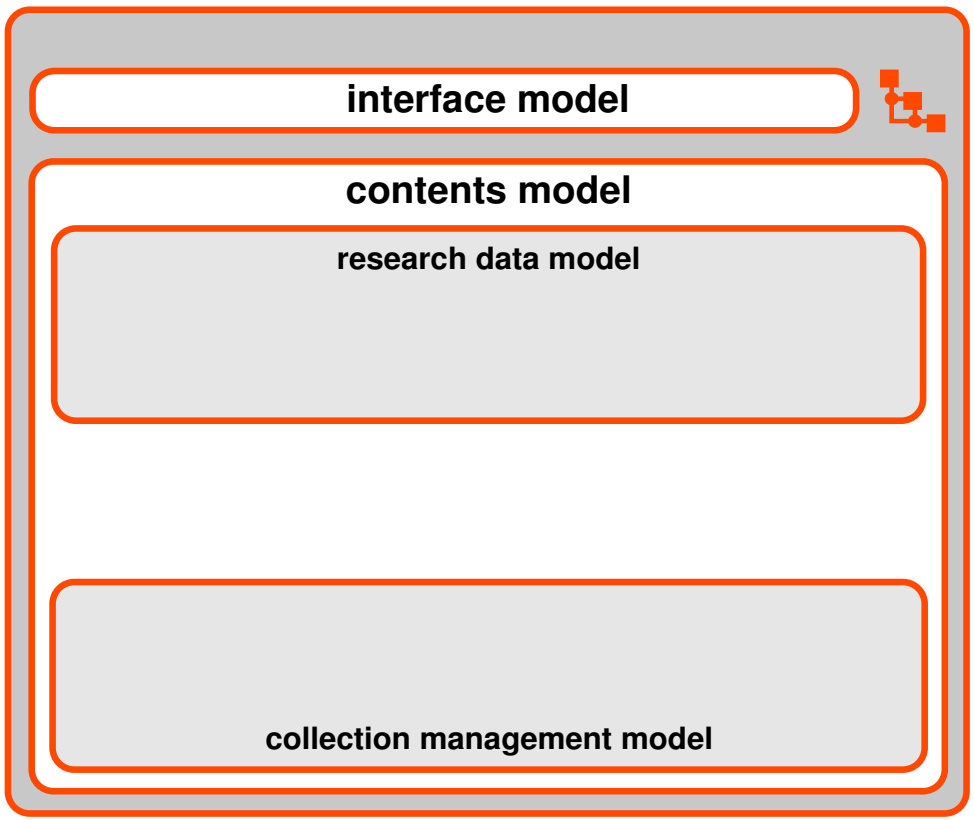
Display-oriented

- Workflow-related information
- Information on form structure

Data Model

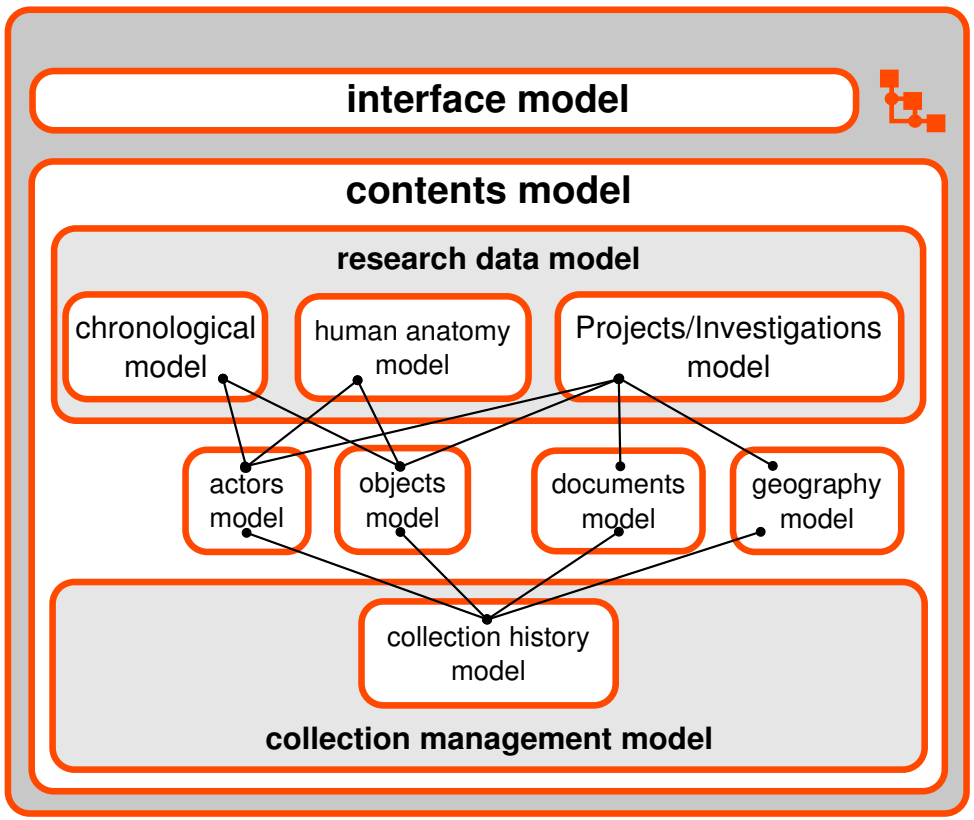
Contents and Interface




interface model
contents model
research data model
collection management model

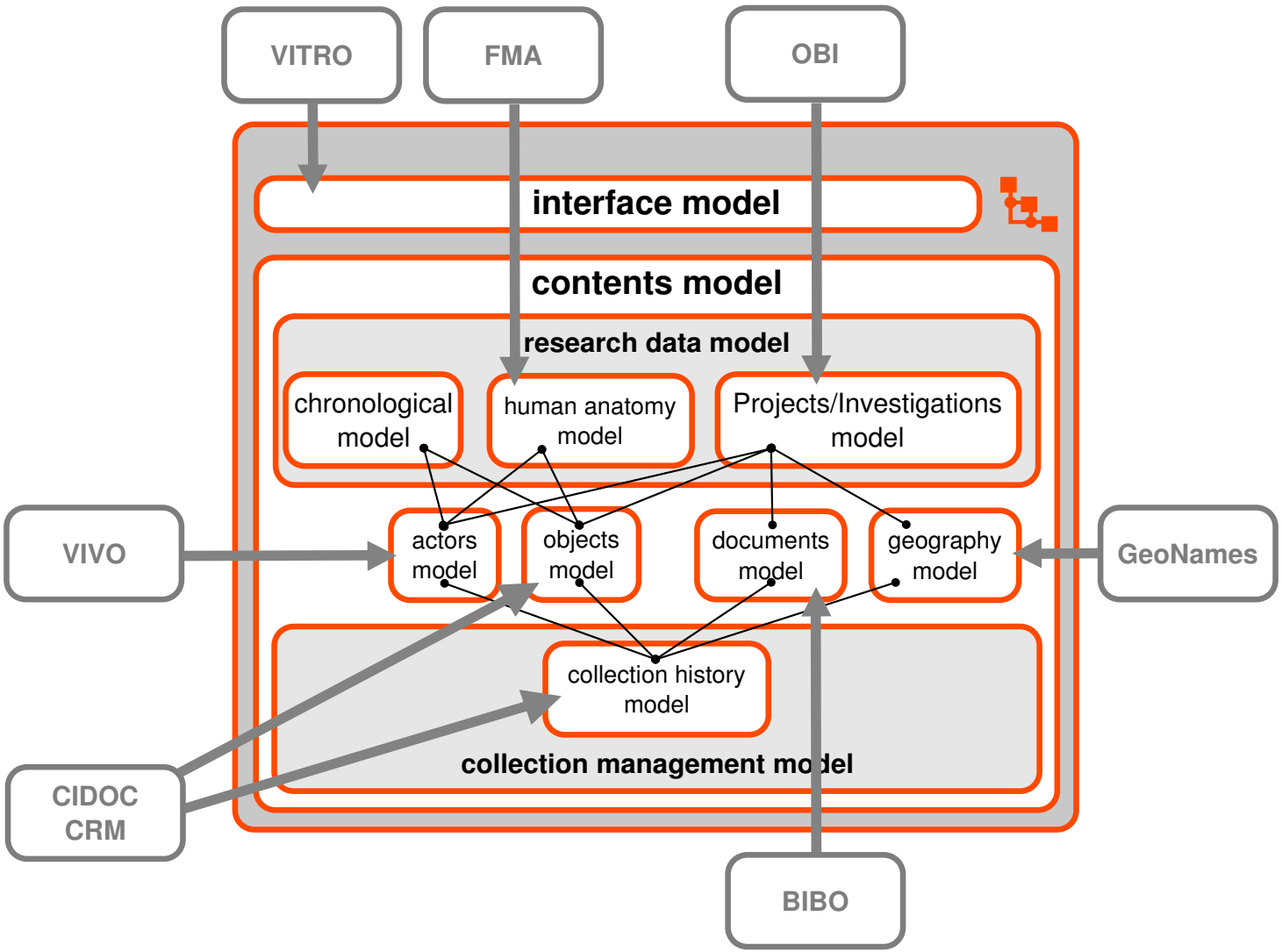
Data Model

Modules



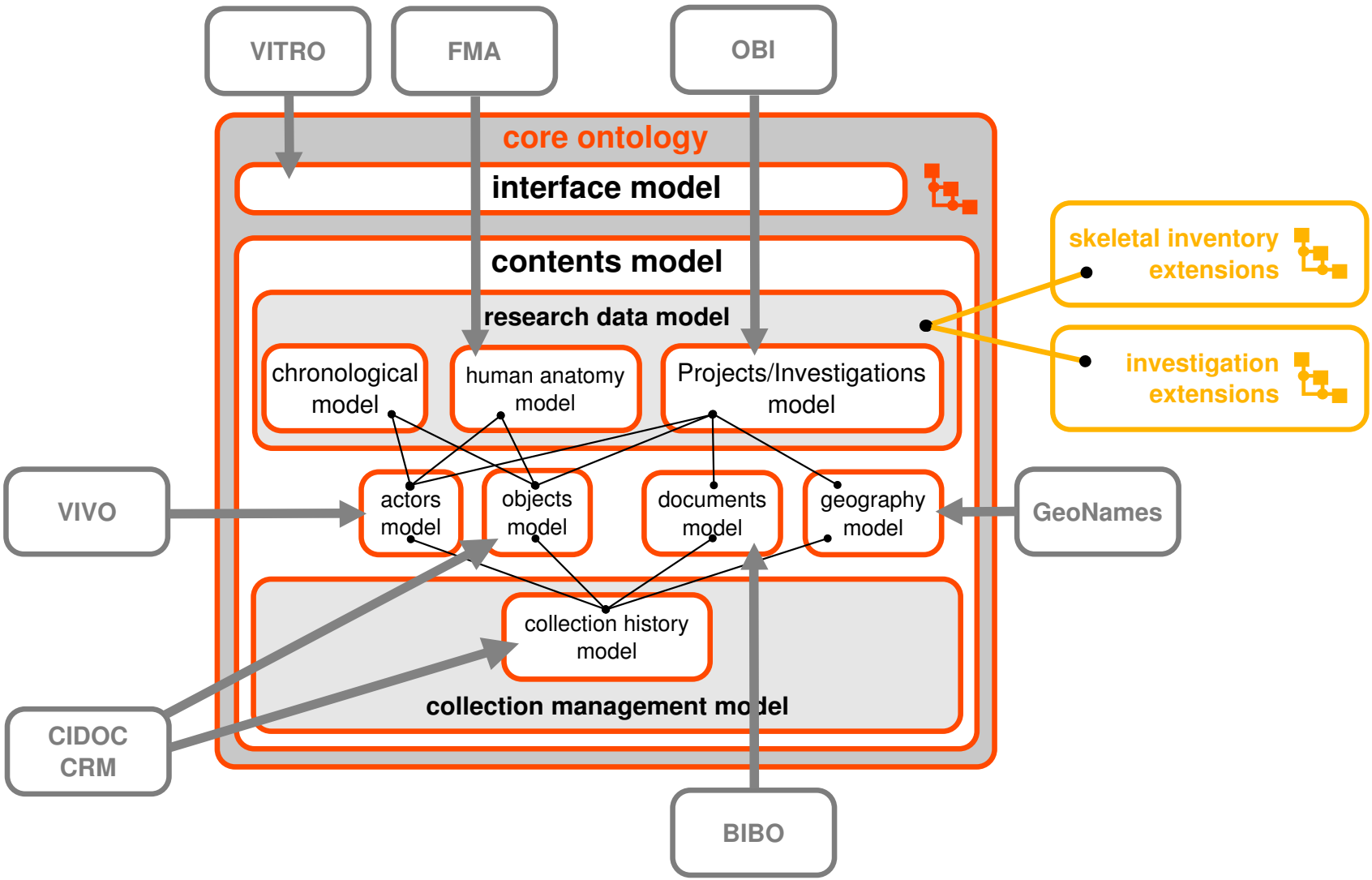
Data Model

External Ontologies



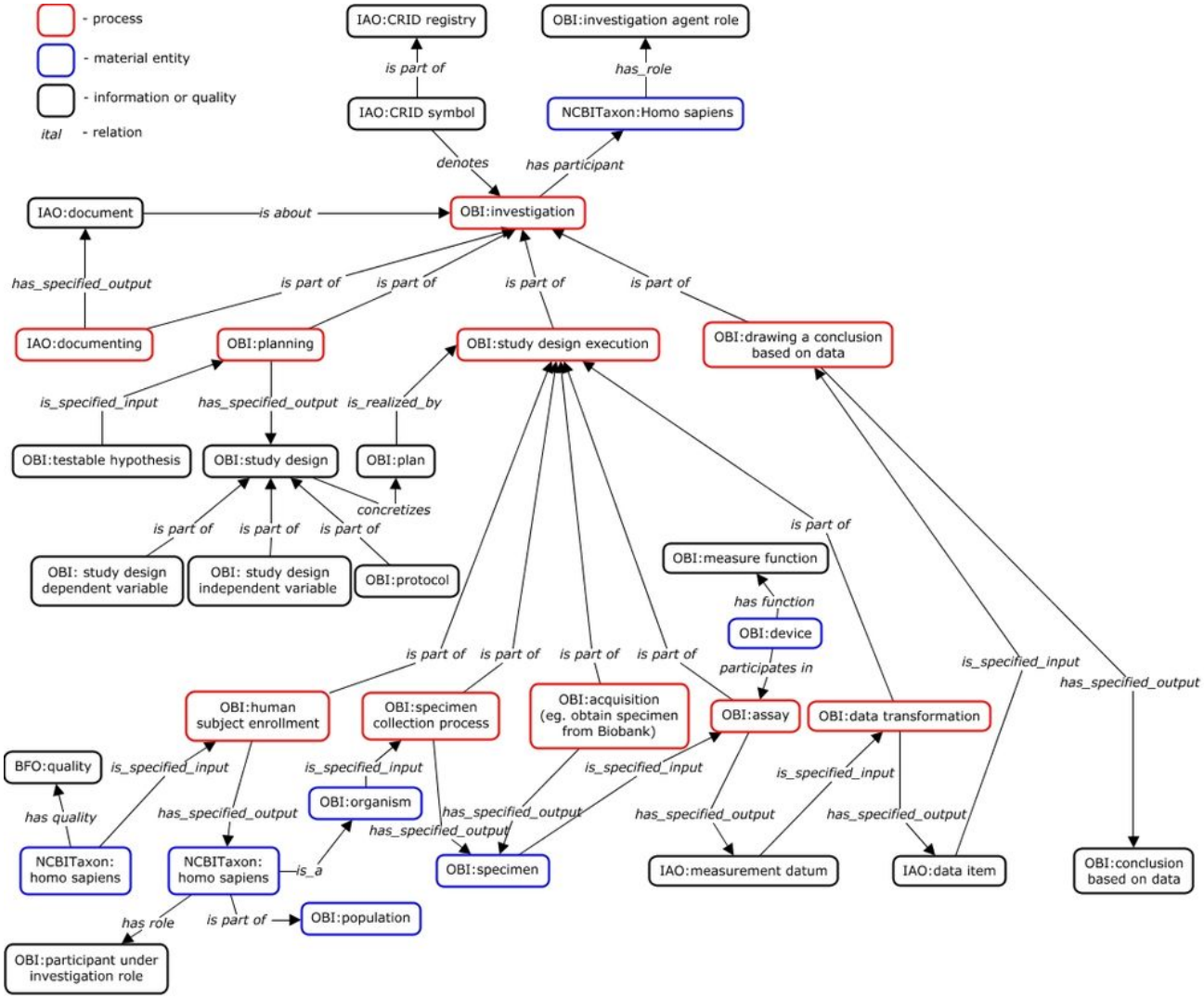
Data Model

Core Ontology and Extensions



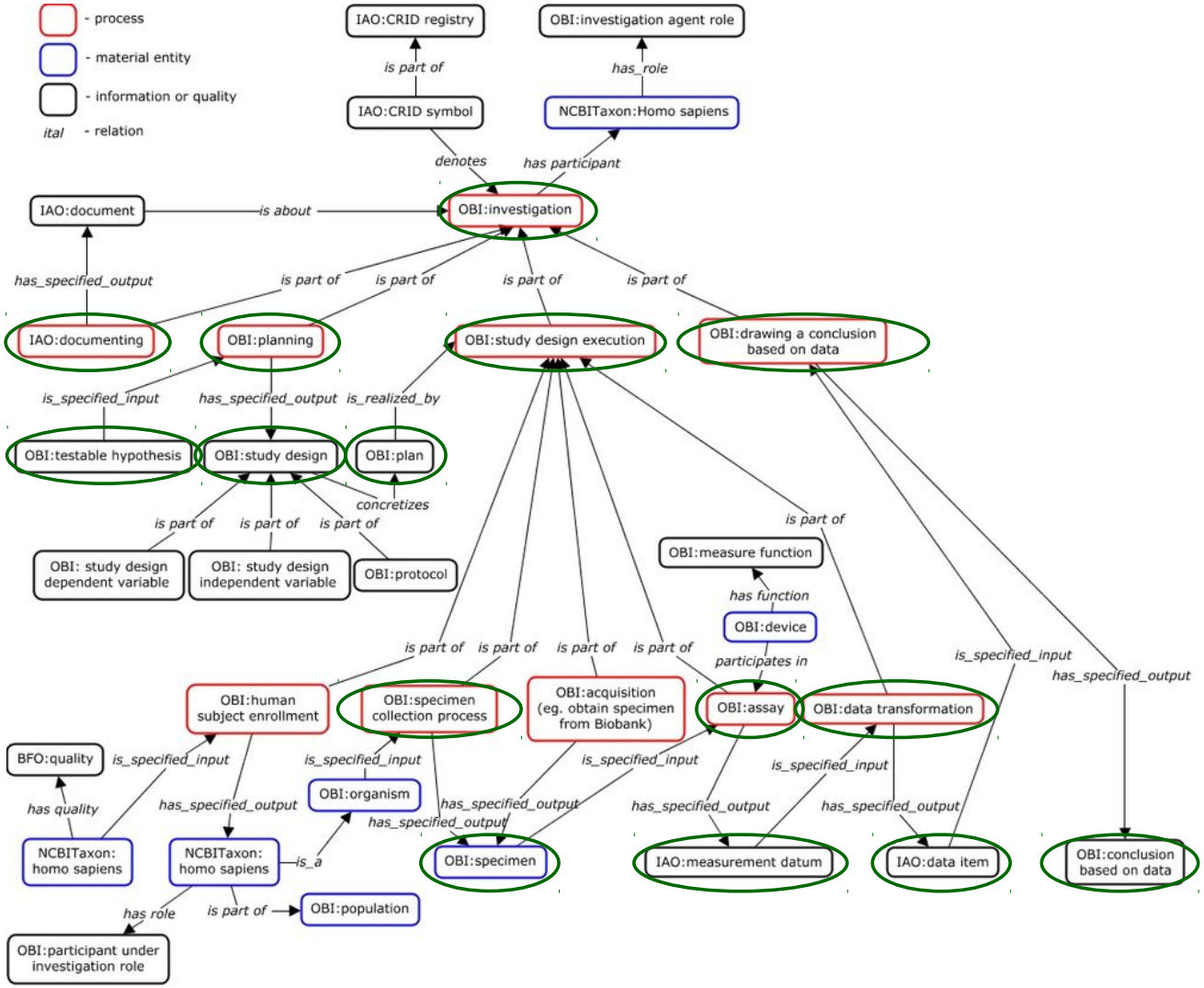
Ontology for Biomedical Investigations

An Example for an External Ontology



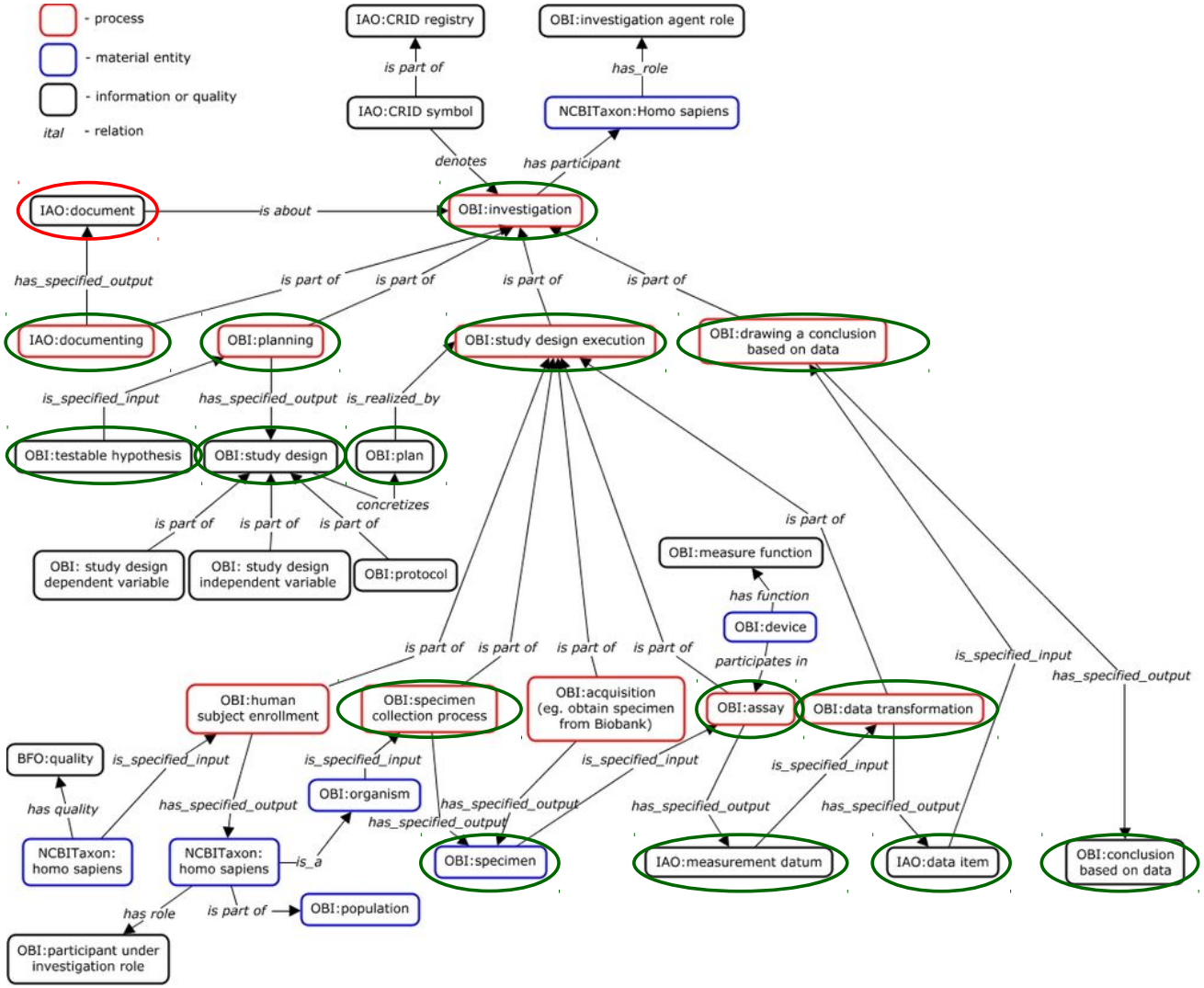
Ontology for Biomedical Investigations

Classes Selected for Use in RDFBones



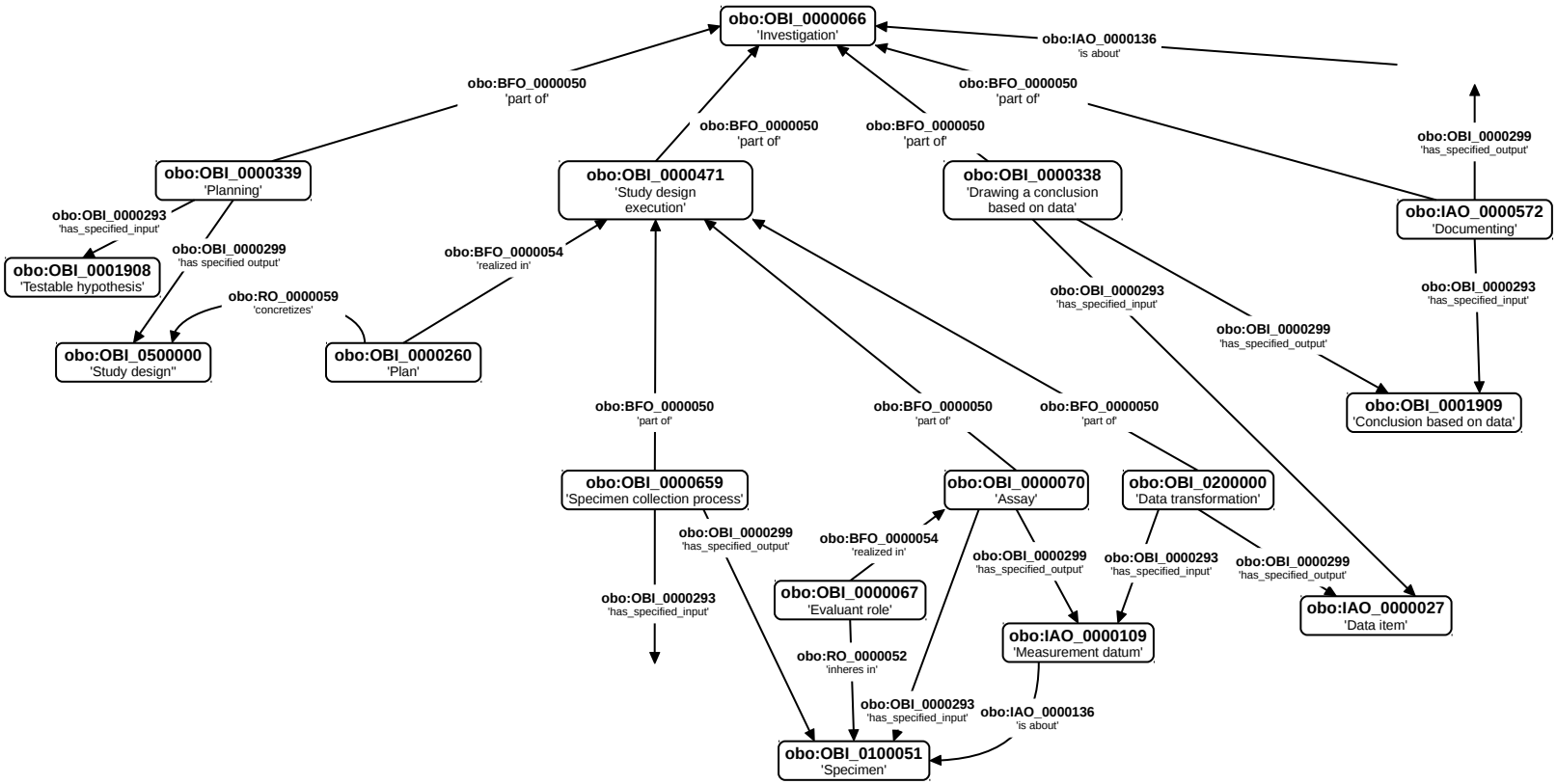
Ontology for Biomedical Investigations

Class Not Used in RDFBones



Modelling Investigation Data

Classes Selected from OBI Documentation



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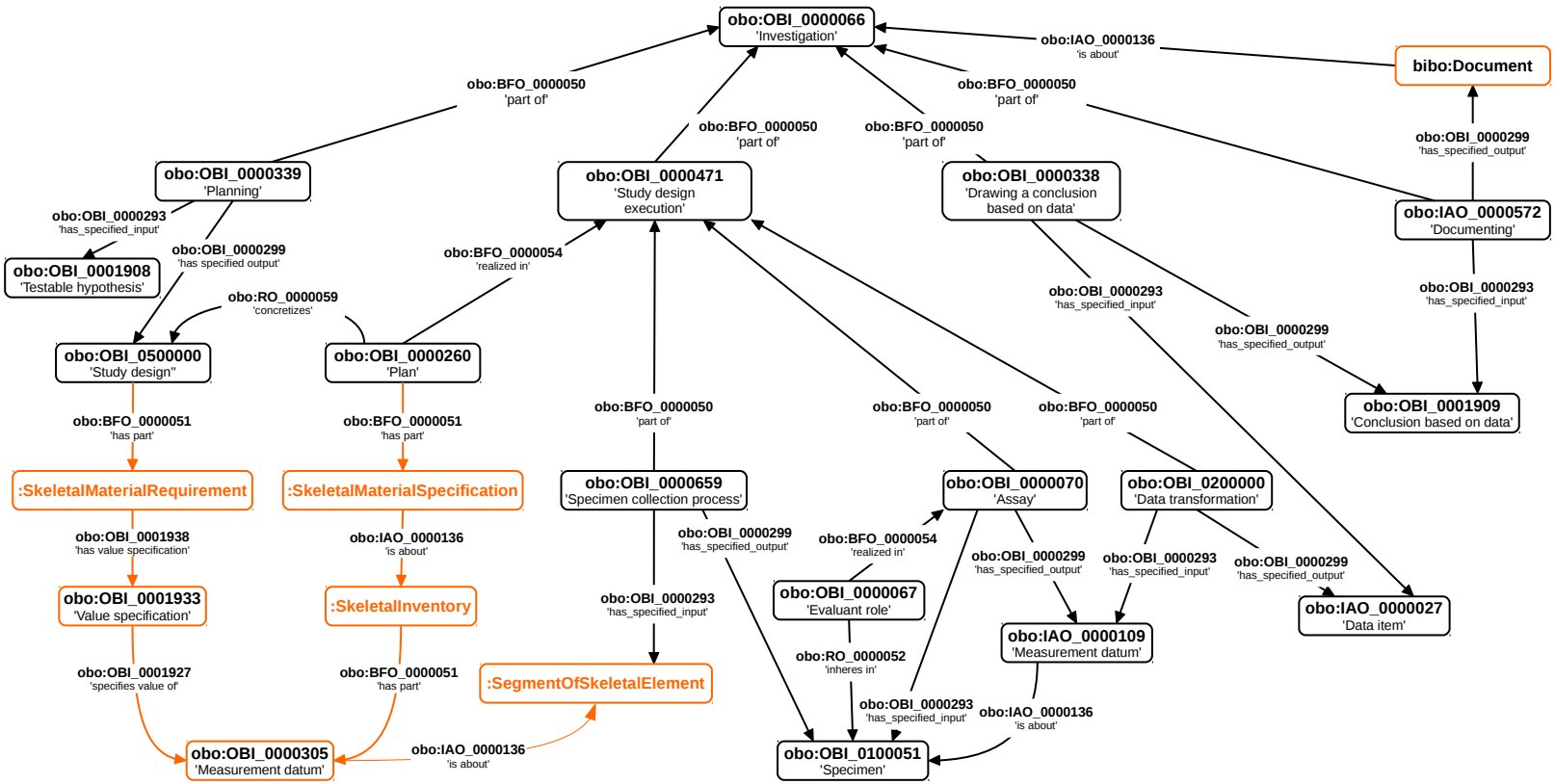

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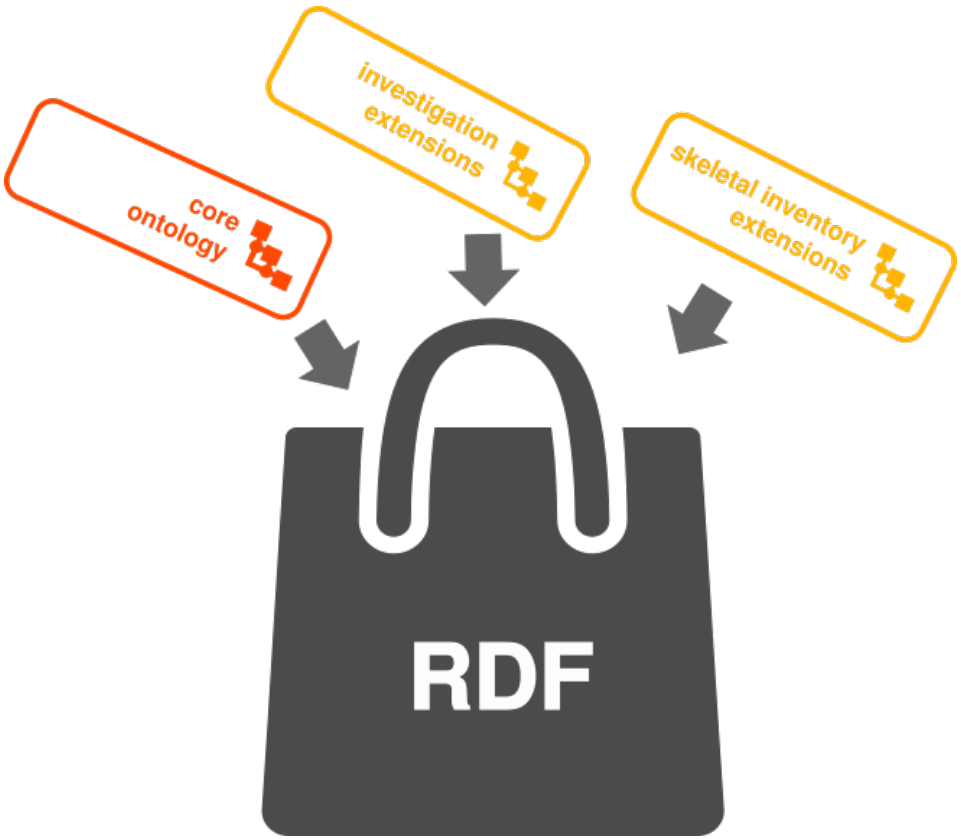

Problem of Duplicate Creation

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Referenced materials

Separation of data input and reference
-> primary directories
-> primary inventories

Non-referenced materials

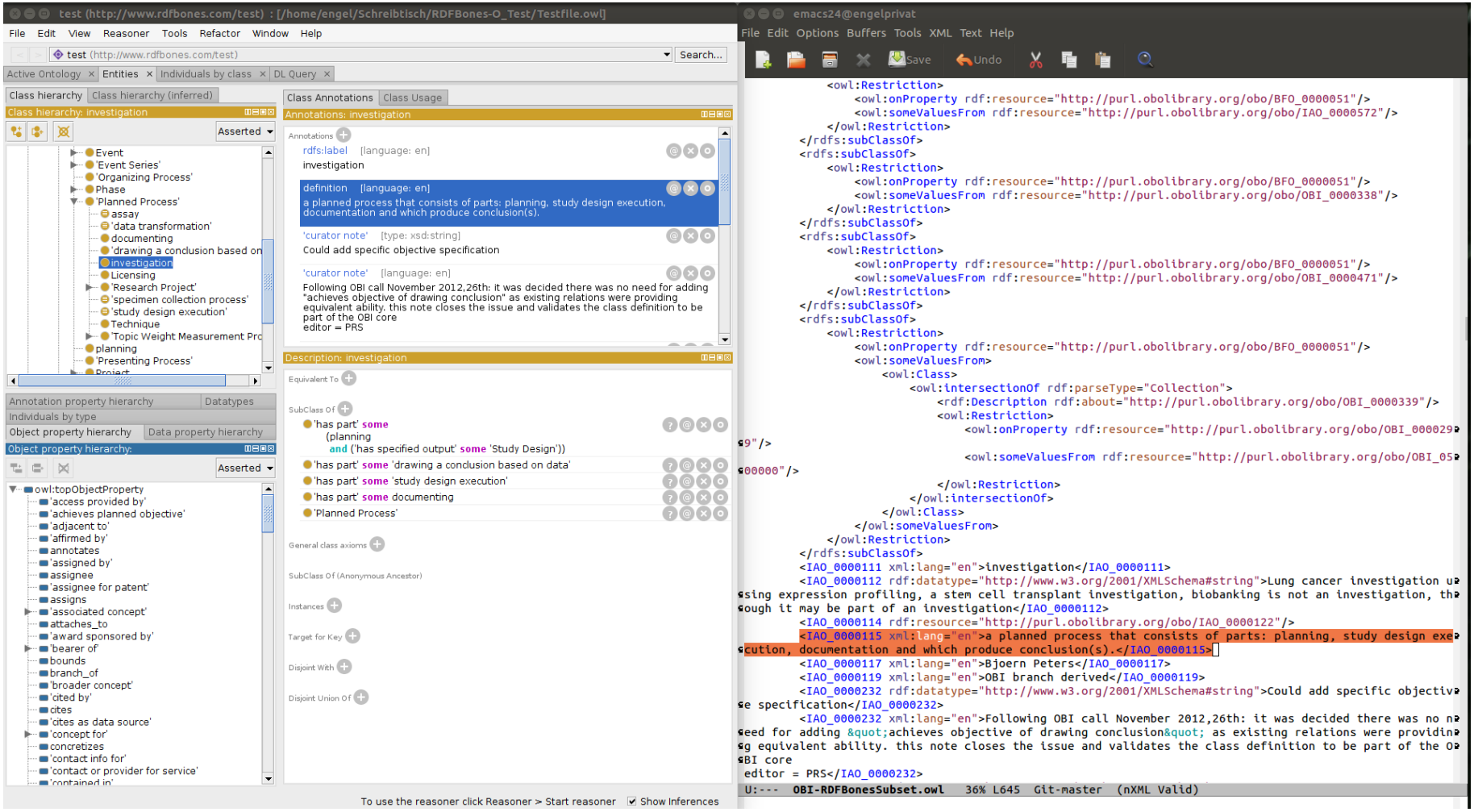
Creation of inventory upon data entry

External materials

Duplicates likely, use owl:sameAs to eradicate.

The Ontologist's Workshop

RDF-Editor Protégé and Text Editor



Requirements

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- Flexible User Interface For All Kinds Of Models (FUIFAKOM)
- Im- and Export of Data (and/or configuration files)
- Connectibility: I.e. the possibility to link different installations and make content comparable
- Fine grained user rights administration

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Suitable frameworks for implementation

Options

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Options were:

1. Build an application from scratch (e.g. using java spring framework) or
2. Find a working and actively maintained implementation.

Suitable frameworks for implementation

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Suitable frameworks for implementation

Problems

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1. Building from scratch was too ambitious
2. There are (almost) no available free implementations. One oftentimes finds projects that served as proof-of-concept in a thesis but are abandoned afterwards, without reaching full functionality.

Suitable frameworks for implementation

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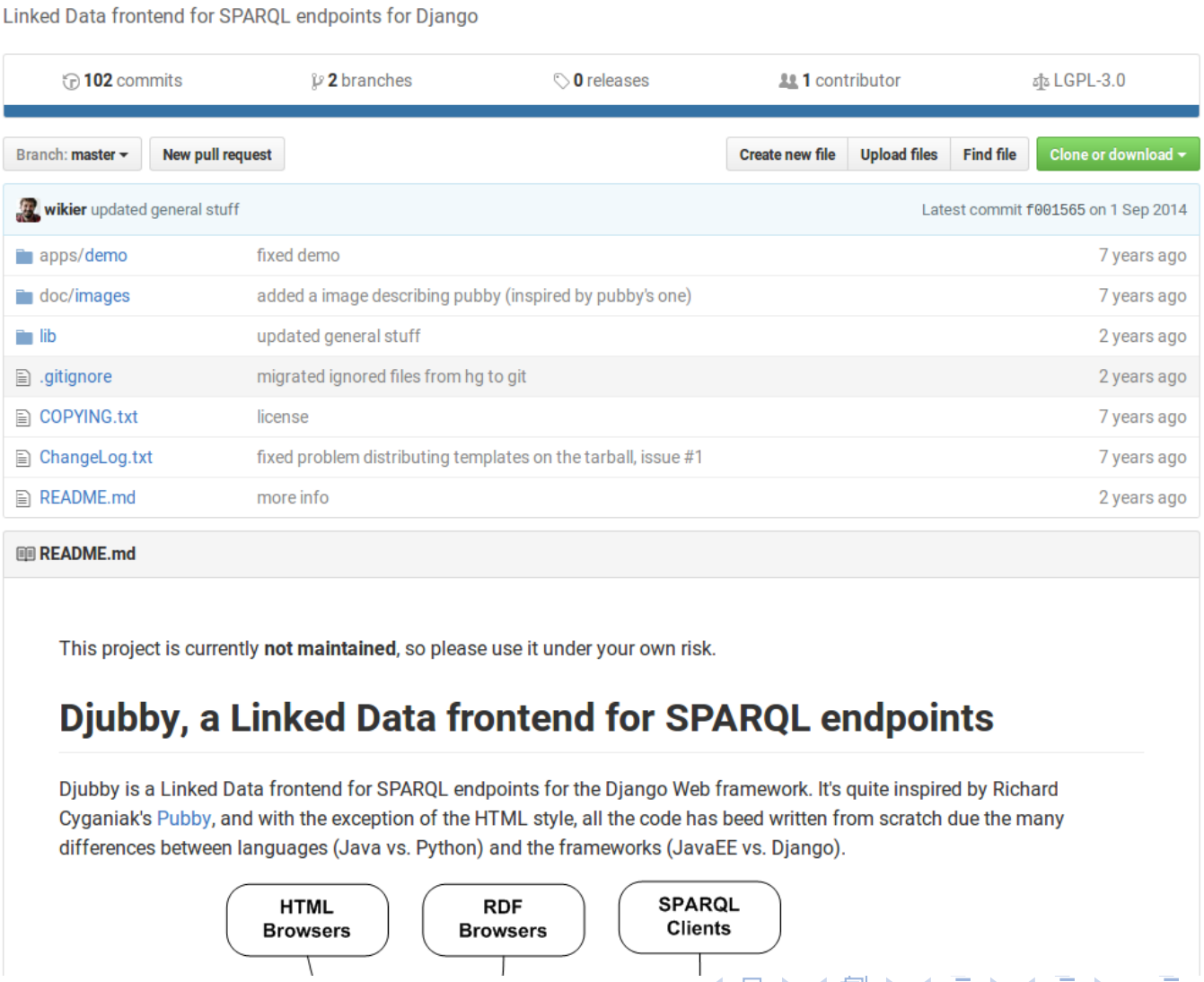
Abandoned Implementation projects



Linked Data frontend for SPARQL endpoints for Django

102 commits | 2 branches | 0 releases | 1 contributor | LGPL-3.0

Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

wikier updated general stuff — Latest commit f001565 on 1 Sep 2014

apps/demo	fixed demo	7 years ago
doc/images	added a image describing pubby (inspired by pubby's one)	7 years ago
lib	updated general stuff	2 years ago
.gitignore	migrated ignored files from hg to git	2 years ago
COPYING.txt	license	7 years ago
ChangeLog.txt	fixed problem distributing templates on the tarball, issue #1	7 years ago
README.md	more info	2 years ago

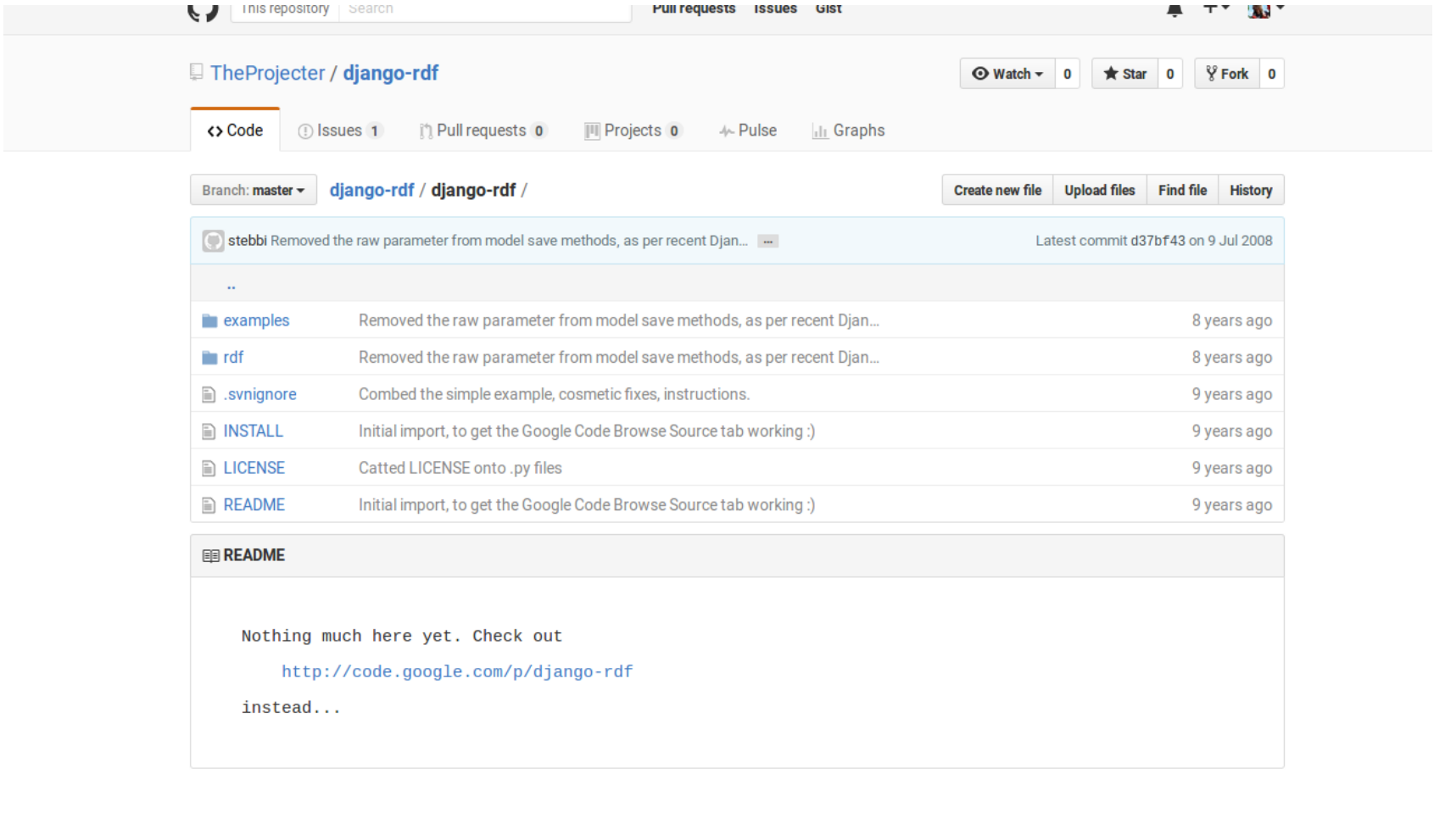
README.md

This project is currently **not maintained**, so please use it under your own risk.

Djubby, a Linked Data frontend for SPARQL endpoints

Djubby is a Linked Data frontend for SPARQL endpoints for the Django Web framework. It's quite inspired by Richard Cyganiak's Pubby, and with the exception of the HTML style, all the code has beed written from scratch due the many differences between languages (Java vs. Python) and the frameworks (JavaEE vs. Django).

Abandoned Implementation projects



This repository Search Pull requests Issues Gist

TheProjecter / **django-rdf**

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Branch: master ▾ **django-rdf** / **django-rdf** / Create new file Upload files Find file History

stebbi Removed the raw parameter from model save methods, as per recent Djan... Latest commit d37bf43 on 9 Jul 2008

..		
examples	Removed the raw parameter from model save methods, as per recent Djan...	8 years ago
rdf	Removed the raw parameter from model save methods, as per recent Djan...	8 years ago
.svnignore	Combed the simple example, cosmetic fixes, instructions.	9 years ago
INSTALL	Initial import, to get the Google Code Browse Source tab working :)	9 years ago
LICENSE	Catted LICENSE onto .py files	9 years ago
README	Initial import, to get the Google Code Browse Source tab working :)	9 years ago

README

```
Nothing much here yet. Check out

    http://code.google.com/p/django-rdf

instead...
```

Finally...


VIVO
Connect Share Discover
VIVO creates an integrated record of the scholarly work of your organization
Download VIVO
Connect
VIVO creates a connected, integrated record of the scholarly work of your institution, ready for reporting, visualization, and analysis
See VIVO
Share

VIVO/Vitro

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- Server-based web application
- Handles RDF-graphs
- Allows configuration using RDF, too

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- The underlying network-graphs, provided by the ontologies, are represented by webpages (see problems later)
- Each object has a profile page, where the corresponding properties are listed

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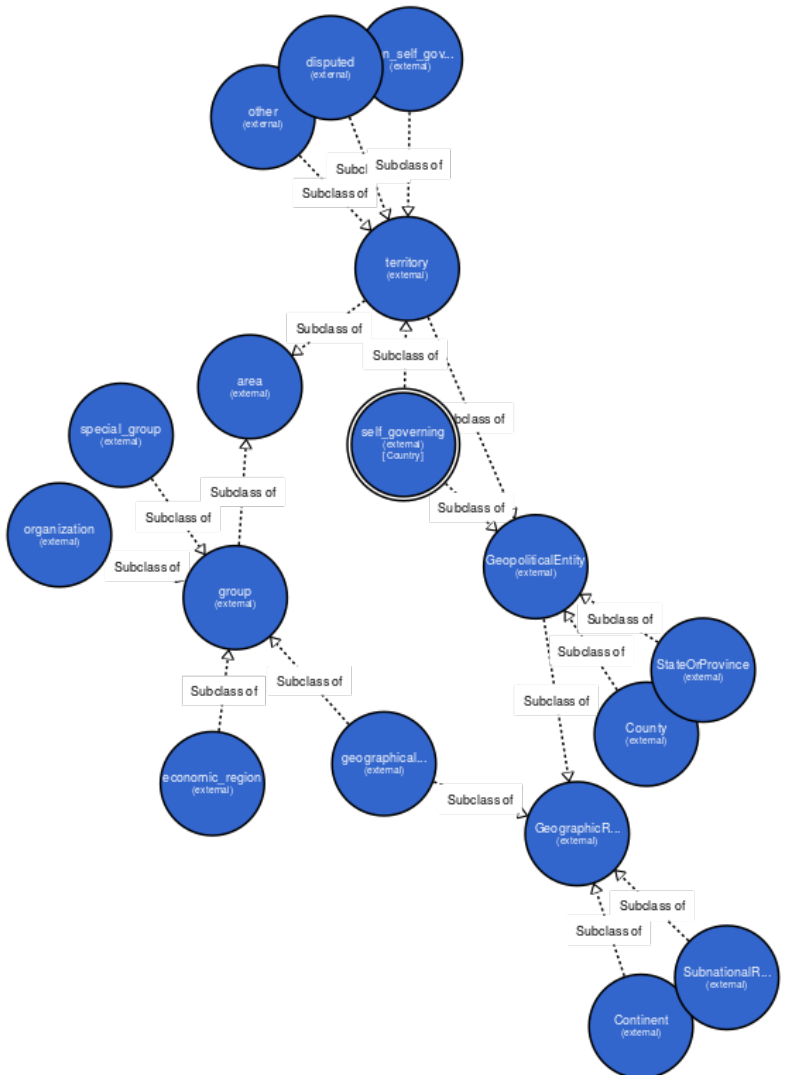
Examples



VIVO/Vitro

Examples

Resource URI: http://aims.fao.org/aos/geopolitical.owl#Afghanistan

Afghanistan | Country

Overview | Identity | File | Other | View All

in geographic grouping

Asia Continent

Economic Cooperation Organization

FAO_2006

Food and Agriculture Organization of the United Nations

Food and Agriculture Organization of the United Nations

... more

has border with

China Country

Iran (Islamic Republic of) Country

Pakistan Country

VIVO/Vitro

Examples

Photo

Admin Panel | Edit this individual

Verbose property display is **off** | Turn on

Resource URI: http://aims.fao.org/aos/geopolitical.owl#Asia

Asia | Continent | Transnational Region

Overview | Identity | File | Other | View All

Overview

has member country or territory

- Afghanistan Country
- Armenia Country
- Azerbaijan Country
- Bahrain Country
- Bangladesh Country
- Bhutan Country
- Brunei Darussalam Country
- Cambodia Country
- China Country
- Cyprus Country
- Georgia Country

Vivo provides basic functionality to handle spreadsheet data. This functionality can be built upon for a more user friendly way to im- and export large amounts of existing data.

VIVO/Vitro - Data Input/Output

Data im- and export

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Ingest Menu > Convert CSV to RDF

comma separated tab separated

CSV file URL (e.g. "file:///")

Or upload a file from your computer:

Browse... No file selected.

This tool will automatically generate a mini ontology to represent the data in the CSV file. A property will be produced for each column in the spreadsheet, based on the text in the header for that column.

In what namespace should these properties be created?

Namespace in which to generate properties

Each row in the spreadsheet will produce a resource. Each of these resources will be a member of a class in the namespace selected above.

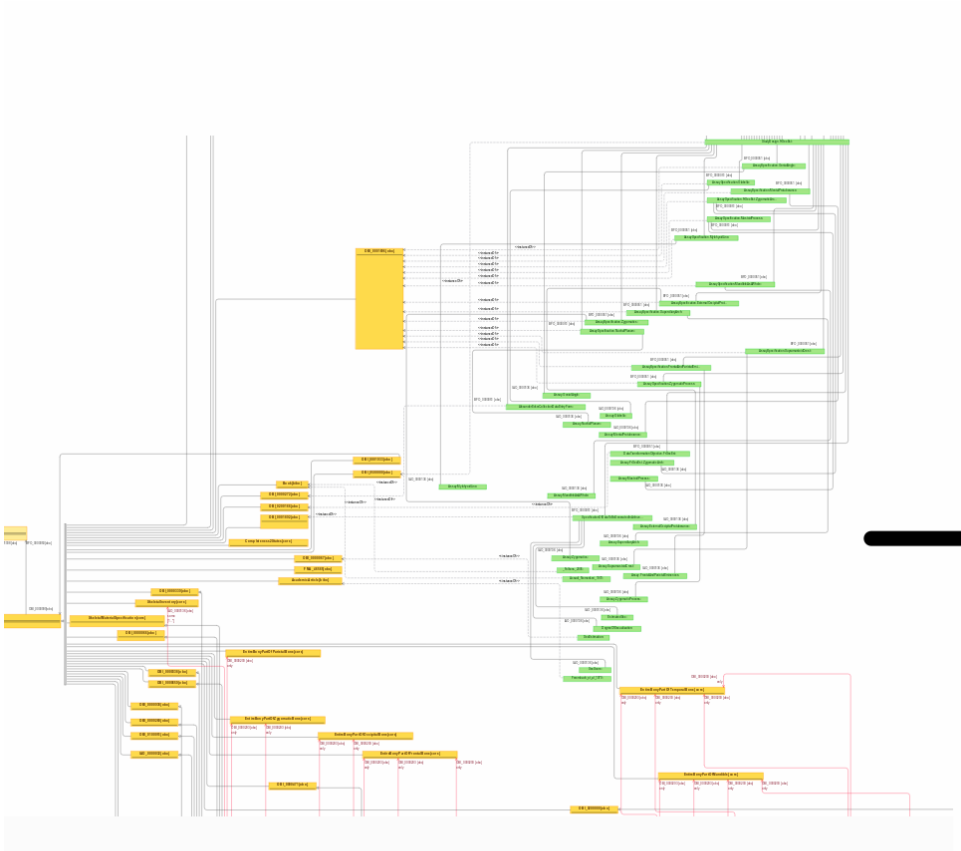
What should the local name of this class be? This is normally a word or two in "camel case" starting with an uppercase letter. (For example, if the spreadsheet represents a list of faculty members, you might enter "FacultyMember" on the next line.)

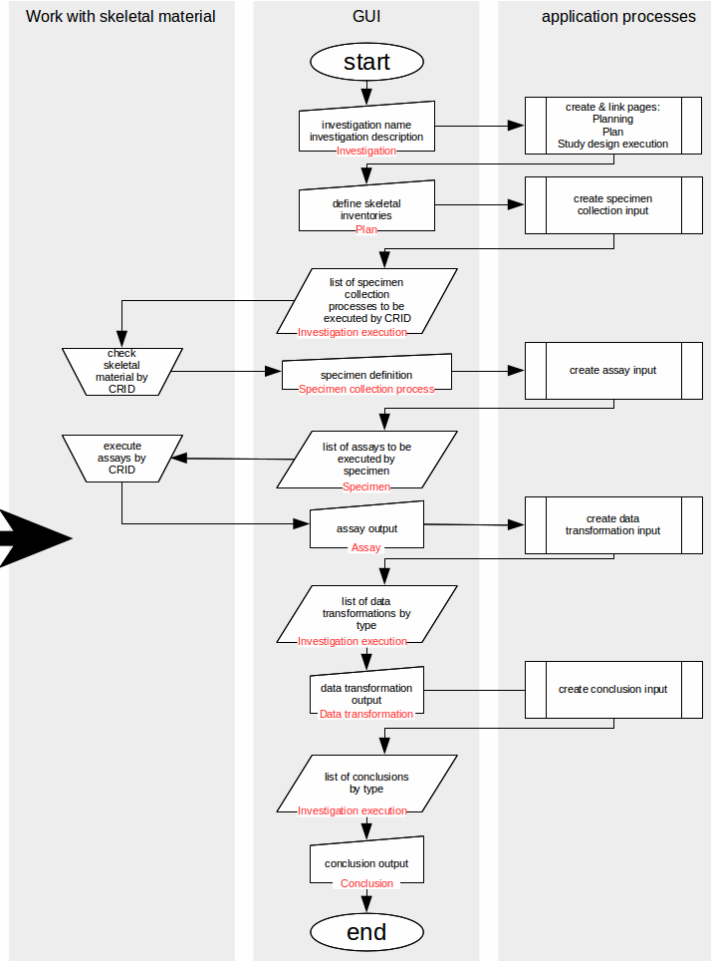
Class Local Name for Resources

webapp assertions

From Ontology to workflow

Non-linearity vs. linearity





From Ontology to workflow

Non-linearity vs. linearity

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While the ontology and the resulting web application exhibit a network structure with no distinct entry and exit points, a workflow for entering new data is usually a linear process (select data, do something in a consecutive manner)

Automatic triple generation

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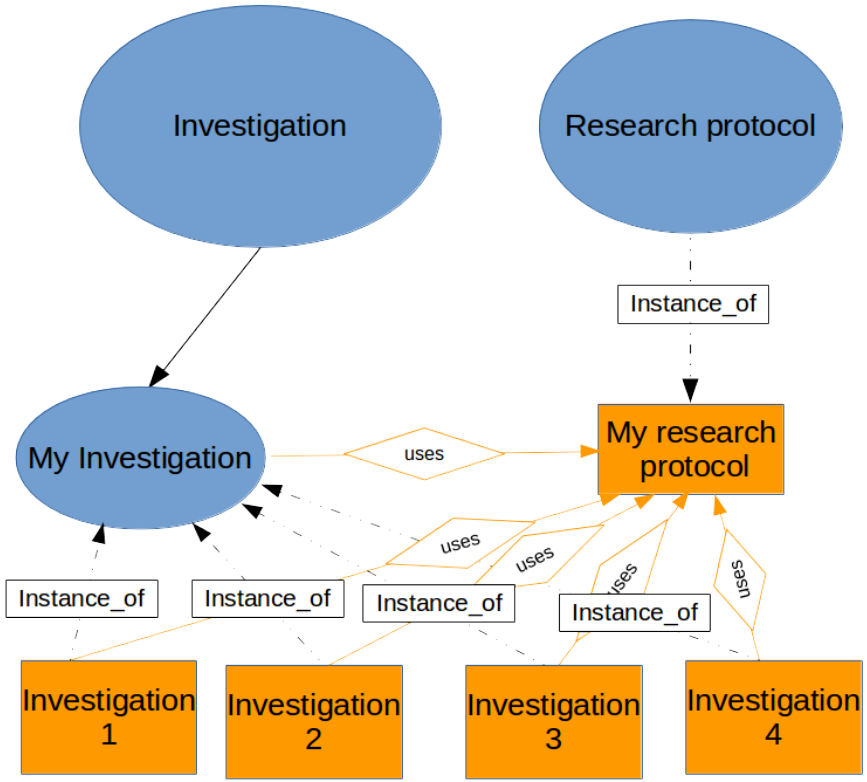
When entering new data (creating instances) in VIVO, restrictions regarding <Class - Instance> relations are by default not respected:

Automatic triple generation

Example:



Automatic triple generation

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Unfortunately, VIVO does not (yet) do this.

Solution

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Fortunately, VIVO allows for easy (theoretically) modification and adaptability, without touching the actual VIVO code.