Semantic Web Applications and Tools for Preserving Computational Experiments

Understanding complex diseases requires complex computational studies. Workflows help perform these studies. To uphold scientific principles of reproducibility we develop tooling for digitally preserving computational experiments.

Example Research Object
An instance of a Workflow was used to perform a text mining run on two ‘concept sets’, resulting in best-matching biological processes per gene. The workflow was created by Kristina Hettne.

Preserving digital Research Objects including workflows will help reuse of methods, data, and interpretations across experiments. Wf4Ever architecture uses Semantic Web models to represent and expose its content. Semantic annotations enables us to understand preserved computational experiments.

Acknowledgements
We thank Harish Dharuri, Eleni Mina, Peter ‘t Hoen, Peter Henneman, and Ko Willems van Dijk from the LUMC Human Genetics Department for their contributions and advice. Harish in particular for his Metabolic Syndrome workflows. We thank our colleagues from the BioSemantics group (LUMC/EMC), in particular Reinout van Schouwen and Martin Schuemie for their (Web) Services. Wf4Ever is funded by the Seventh Framework Programme of the European Commission (Digital Libraries and Digital Preservation area ICT-2009.4.1 project reference 270192).

Check our web page and wiki:
http://www.wf4ever-project.org/
Release Version 0.1 of the RO model:
http://www.wf4ever-project.org/wiki/display/docs/Research+Object+Vocabulary+Specification+v0.1

A possible extension for experimental science is the Experiment Ontology (EXPO)* to link to for instance experimental design or a hypothesis.


Earth observation
The World Wide Web
Data

Requirements are drawn from the study of Metabolic Syndrome. The other test domain is Astronomy.

MetaBolic Syndrome Data Interpretation

MetS experiment run

Best-matched Concept Set

Hypothesis Representation

EXP: Representation|Experimental Execution|Procedure

Kristina Hettne

GLS2 Concept set

Biological Process Concept Set

Preserving computational experiments

Obese Person

We know what is wrong here

Our Genes

What is wrong here?