

# Ontolion: A Web-based Integrative Ontology Development Platform

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## Abstract

While many ontology development tools exist, an integrative and interactive web tool that incorporates state-of-the-art technologies is still needed for domain experts with a limited computer science background. Here we report the initiation of Ontolion, a web interface which integrates features from Ontofox, Ontorat, ROBOT, and ODK kit for user-friendly and efficient ontology development without the requirement of programming. The usage of the Ontolion pipeline for the OHPI ontology development is demonstrated.

## Keywords:

Ontology development; OHPI; Ontolion

## Introduction

There are many ontology development tools exist. For example, Ontofox (<http://ontofox.hegroup.org>) and Ontorat (<http://ontorat.hegroup.org>) are two web applications that support efficient ontology term reuse and new term/annotation generation, respectively. The Ontology Development Kit (ODK) (<https://github.com/INCATools/ontology-development-kit>) and ROBOT (<http://robot.obolibrary.org/>) automate the initiation, import, build, validate, and release processes during ontology development. However, these tools have their pros and cons. For example, the update of the importing ontologies' versions using Ontofox relies on the Ontofox internal Virtuoso database. The hierarchy extraction with computed intermediates and automatic modification of existing terms, are available in Ontofox/Ontorat but not in ODK. To enhance the ontology development environment for researchers with a limited programming background, it would be ideal to have the Ontolion which integrates all Ontofox, Ontorat, and ODK features.

## Methods

The Ontolion command line pipeline was first developed and tested for the development of the Ontology of Host-Pathogen Interactions (OHPI; <https://github.com/OHPI/ohpi>). Figure 1 illustrates the Ontolion pipeline that uses and integrates features of Ontofox, Ontorat, and ODK. Ontolion provides the option to choose either ODK or Ontofox for terms and relations extraction from existing ontologies. Ontorat also supports the generation and editing of new and existing terms, relations, and annotations based on design patterns. All ODK/Ontofox/Ontorat outputs will be merged to form a new ontology. The ODK package will then

support backend quality check, merge, reason, and final release to a public repository such as GitHub.

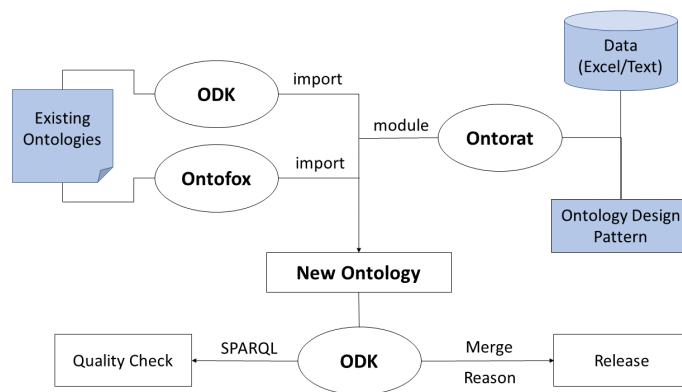


Figure 1. The Ontolion pipeline

## Results

The Ontolion pipeline supported the OHPI ontology development, which reuses terms from over 30 existing ontologies (<http://www.ontobee.org/ontostat/OHPI>). The pipeline also generates and modify OHPI-specific terms with data extracted from the Vectors (<http://www.phidias.us/vectors/>) and Protegen (<http://www.violinet.org/protegen/>) databases. The details and files of the OHPI using the Ontolion pipeline are available at the OHPI GitHub site: <https://github.com/OHPI/ohpi>.

## Conclusions and Discussion

The integration of ODK and Ontofox/Ontorat Ontoanimal tools provide a comprehensive framework to seamlessly initiate, import, edit, validate, build, and release ontology, such as the OHPI ontology, as a pipeline. A web-based Ontolion interface, which will directly interact with tools such as Ontofox, Ontorat, and ODK, is still under development. The web application will be available for the demonstration at the ICBO-2019 conference. The further development of the web-based Ontolion system will allow ontology to develop create, maintain, and release ontologies without advance programming requirement.

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