OLS4: New Features for Exploring Ontologies - Abstract

Haider Iqbal[1,†], James McLaughlin[1,†], Helen Parkinson[1,†] and Henriette Harmse[1,*, †]

European Bioinformatics Institute (EMBL-EBI), Wellcome Genome Campus, Hinxton, Cambridgeshire, CB10 1SD, United Kingdom.

Abstract

The Ontology Lookup Service (OLS) is an open-source search engine for ontologies, utilised within the bioinformatics community for annotating biological and biomedical data with Findable, Accessible, Interoperable, and Reusable (FAIR) ontology terms. Since OLS3, the ontology landscape has expanded, with the number of indexed ontologies growing from 158 in 2016 to 251 in 2023. We have developed OLS4 from the ground up to address the latest advancements in ontology authoring and support the community's future needs. OLS4 includes several new features to enable ontology exploration and annotation capabilities. Annotations on annotations, a feature that enriches terms with detailed provenance information, are now supported. Cross-ontology linking enables users to see which ontologies define each term. This gives users a clearer context and relationships of terms across different ontologies. OLS4 provides additional data enrichment, such as associating names with ORCID identifiers to allow curators and editors to tag terms with their authorship. OLS4 now supports the full rendering of all OWL 2 axioms on the frontend, empowering users with a deeper understanding of their ontologies, and displaying relationships such as disjointness between terms. Before OLS4, one of the major pain points faced by our users was the prolonged duration required for their ontologies to be reflected in OLS. We have re-engineered the data-load pipeline to address this, substantially improving the data update process. Users can now access the latest versions of all OBO Foundry and EBI-defined ontologies within 48 hours. In addition to these technical enhancements, OLS4 embraces a global user community with multi-language support, ensuring that ontology exploration is more accessible to a diverse audience. OLS4 maintains a backwards-compatible API to ensure a seamless transition for existing users and is now operational at EMBL-EBI (https://www.ebi.ac.uk/ols) replacing OLS3 in production.

Keywords
ontology, visualisation, owl, classes