Interoperability Workbench

Collaborative tool for publishing Core vocabularies and Application profiles

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Introduction

CSC - IT Center for Science Ltd. is a non-profit government organisation developing information systems and interoperability solutions for its partners in Higher Education, Science and Research and Public Administration. One of the major obstacles in operating in multidisciplinary field is the lack of common agreements, best practices and shared terminology. Work aimed at better semantic interoperability started in 2015 as the Ministry of Education and Culture in Finland supported information architecture development in education technology to help the reuse of existing terminologies and metadata standards.

Objectives

Defining a methodology for metadata modelling that enables:
• Reuse of concepts defined in controlled vocabularies
• Creation of technology independent domain data models
• Support for reusable data structures as Core Vocabularies
• Documentation of the used data structures as Application Profiles
• Support for constraining values using external Reference Data
• Formal linking to existing metadata standards and Linked Data models
• Automatic generation of base schemas in different syntaxes
• Enforcing best practices and improving quality of metadata models
• Promoting cross-domain collaboration and cooperation

Building an open source tool to support it all

Semantic Interoperability Framework

• The Semantic Interoperability Framework for Higher Education specifies how different parts of the information architecture should be interconnected
• Semantics of information entities should be based on Controlled Vocabularies that are built using systematic and formalized methods
• Domain specific data structures should be published as reusable Core Vocabularies
• Physical Data Models should be based on the Application profiles to ensure use of shared semantics

Workflow for Metadata Modelling

• Domain data structures are modelled as Core Vocabularies containing reusable Classes and Predicates that are linked to the Controlled Vocabularies
• New Classes and Predicates are created based on definitions and terms defined in the imported SKOS vocabularies
• New concept suggestions can be made to the Controlled Vocabularies based on the needs of the domain data structures
• Application profiles are used to document the reuse of Classes and Predicates
• Application profiles may also reuse any Linked Data Model imported from a resolved namespace
• Application profile may also define application specific Classes and Predicates
• Allowed values can be restricted using imported Reference Data

Results

• Semantic Interoperability Framework describes linked information architecture for defining interoperability descriptions, such as Terminologies, Core vocabularies and Application profiles
• Workflow for metadata modelling defines steps for creating Core Vocabularies and Application Profiles reusing existing Linked Data models and Terminologies
• Semantic Interoperability Workbench is an open source implementation for creating interoperability descriptions based on the presented framework and the workflow
• Currently we are in the phase of extending and adopting the framework and tool as part of the National Architecture for Digital Services in collaboration with the Ministry of Finance

Interoperability Workbench

• Collaborative tool for creating and publishing Linked Data based Core Vocabularies and Application profiles. User management is implemented with SAML based identity management solution that enables use of existing accounts from different organizations
• Workbench data model is defined as an Application profile using RDF, RDFS, OWL, SHACL, DCAP, DCTERMS, SKOS, PROV, VOID, SD
• Data models are created as JSON-LD objects in JavaScript frontend and stored to triplestore using Graph Protocol based API
• Visualisations created from the Shape Constraints using JavaScript and SVG
• Open source implementation based on Jena, Fuseki, Jersey and AngularJS available at: https://github.com/CSC-IT-Center-for-Science/iow-ui

Free to browse - Check it out: http://iow.csc.fi/