Modeling and application profiles in the Art and Rare Materials BIBFRAME Ontology Extension

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Abstract

Between April 2016 and July 2018, the Art Libraries Society of North America's Cataloging Advisory Committee (CAC) and the RBMS Bibliographic Standards Committee (BSC) collaborated with the Andrew W. Mellon Foundation funded Linked Data for Production (LD4P) project on the Art and Rare Materials BIBFRAME Ontology Extension (ARM). The motivation for this effort stems from BIBFRAME purposefully under-defining modeling for realms considered outside of core bibliographic description, expecting specialized communities to build extension ontologies.

In this context, ARM facilitates the descriptive needs of the art and rare materials communities; modeling includes areas such as exhibitions, materials, measurements, physical condition and other realms, as well. For each area, narrative recommendations documents were written that included use cases, diagrams and terms from relevant ontologies. Further, OWL ontologies files were developed for both the newly-defined ARM terms as well as target ontologies expected to be used alongside ARM, as defined in the aligned recommendation documents and SHACL application profiles. ARM ontology files were divided into four modularized ontologies: Core, which includes all ARM terms not identified for other ontology files; Award, which includes all terms relevant to the description of awards received by an agent or other resource; Custodial History, which includes terms relevant to the provenance or custodial history of an object; and Measurement, which includes terms relevant to the description of measurements of an object. The modularized approach was selected to encourage reuse of models by communities other than art and rare collections as well as communities not using BIBFRAME as their core modeling. These ontologies were published to https://w3id.org/, a lightweight solution affording publishing these ontology files without developing infrastructure while communities of practice consider long-term maintenance, hosting and governance.

In February 2018, development effort shifted focus to a Shapes Constraint Language (SHACL) application profiles for art resources as well as a SHACL application profile for rare monographs. SHACL is an RDF-based W3C recommendation; as such, it can be represented as linked data and easily made available for reuse and extension by other communities. SHACL affords both validation and non-validation property shapes. The non-validating property shape characteristics available in SHACL benefited the ARM project in that the primary goal in developing application profiles was to create forms within an editing environment.

These application profiles were used to define forms and display for the cataloging environment in VitroLib, an RDF-based, ontology agnostic cataloging tool developed as part of the Linked Data for Libraries - Labs project. VitroLib customization requires idiosyncratic development of property groups and custom forms. As such, the ARM SHACL files were translated into code understood by VitroLib; Ideally,

future editor environments will use specifications like SHACL natively. Implementing these applications profiles in VitroLib afforded catalogers the ability to test the ARM modeling in a real-world environment, providing feedback to the project for potential future development through two workshops held June 2018.

LD4P support for ARM concluded July 2018. As of September 2018, the standards bodies of multiple archival, art, rare and special collections library professional organizations are actively discussing how best to continue development of ARM; the authors of this paper believe that this will be determined shortly following DCMI 2018.

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References

Khan, H., Rayle, E.L. and Younes, R (2017). VitroLib: From an ontology and instance editor to a linked data cataloging editor. Proceedings of the International Conference on Dublin Core and Metadata Applications, 2017. Retrieved August 25, 2018, from http://dcevents.dublincore.org/IntConf/dc-2017/paper/view/507

Linked Data for Libraries - Labs (2018). The VitroLib Metadata Editor. Retrieved August 25, 2018 from https://wiki.duraspace.org/x/0rmdB

Linked Data for Production (2018). Art and Rare Materials (ARM) BIBFRAME Ontology Extension GitHub repository. Retrieved August 25, 2018, from https://github.com/LD4P/arm

Linked Data for Production (2018). ARM Awards Ontology. Retrieved August 25, 2018, from https://w3id.org/arm/award/ontology/0.1/award.html

Linked Data for Production (2018). ARM Core Ontology. Retrieved August 25, 2018, from https://ld4p.github.io/arm/core/ontology/0.1/core.html

Linked Data for Production (2018). ARM Custodial History Ontology. Retrieved August 25, 2018, from https://w3id.org/arm/custodial_history/ontology/0.1/custodial_history.html

Linked Data for Production (2018). ARM Measurements Ontology. Retrieved August 25, 2018, from https://w3id.org/arm/measurement/ontology/0.1/measurement.html

Linked Data for Production (2018). ARM Recommendation Documents. Retrieved August 25, 2018, from https://github.com/LD4P/arm/tree/master/modeling_recommendations

Linked Data for Production (2018). ARM SHACL application profile : art objects. Retrieved August 25, 2018, from https://github.com/LD4P/arm/tree/master/application_profiles/art/shacl

Linked Data for Production (2018). ARM SHACL application profile : rare monographs. Retrieved August 25, 2018, from https://github.com/LD4P/arm/tree/master/application_profiles/raremat_monograph/shacl

W3C (2017). Shapes Constraint Language. Retrieved August 25, 2018, from https://www.w3.org/TR/2017/REC-shacl-20170720/