Library of Congress BIBFRAME Update

Using BIBFRAME in multi-institutional projects

Jeremy Nelson
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Co-Founder/CTO, Knowledgelinks.io

Technology
- Open-source modules bibcat and rdfframework developed by KnowledgeLinks.
- Metadata sources included Islandora, ContentDM, Luna, using MODS XML, Dublin Core, spreadsheets, OAI-PMH, and JSON feeds.

Linked Data
- Uses RDF Mapping Language to map input data to BIBFRAME RDF
- Standardized on BIBFRAME 2.0
- Output format to DP.LA’s Metadata Application Profile 4.0 in JSON-LD

Plains2Peaks DP.LA Service Hub Technology
RML Mapping: CSV to BIBFRAME 2.0 Baseline

History Colorado Argus System
Provided two spreadsheets one matching the published digital object and the second with the metadata.

RDF Mapping Language (RML) was used to build a custom mapping file link columns in each of the row to a BIBFRAME Entity's property.

Input CSV
Metadata CSV File Column Headings and Sample Data Row

```
Object ID, Object Name, Term, Description, Title, Non-Original Title, Count, Inscription, Maker, Term, Dates, Date Range, Dimension, Subject, Term, Used, Term, Locale, Term, Period, Line, Collection Name, Collection Type, Code Description, Collection Code Description, Copyright, Copy Right Category, Type, Code Description, DPLA Rights, Copyright Rights Granted
```

```
Object ID, Object Name, Term, Description, Title, Non-Original Title, Count, Inscription, Maker, Term, Dates, Date Range, Dimension, Subject, Term, Used, Term, Locale, Term, Period, Line, Collection Name, Collection Type, Code Description, Collection Code Description, Copyright, Copy Right Category, Type, Code Description, DPLA Rights, Copyright Rights Granted
```

```
0.274.1, Miniature bowl, "Tag reads, "253" or "258,"", 1, Prehistoric, DIA: 1.25 in, H: .5 in", Ancestral Puebloan, "Ancestral Puebloan, Ancestral Puebloan", A. F. Wilmarth Collection, Artifacts, No Copyright - United States
```

Object ID to BF Item IRI and BF Instance
CoverArt Rows

```
Object ID, Portal Link, Image Link
```

```
```

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Input

CSV
RML
MODS
XML
JSON
Sparql

BIBCAT transform to RDF
RML

RDFFramework
• RDF to ES
• RML Mappings

Output

BIBCAT Publisher
Web API
Elasticsearch
ResourceSync

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MODS XML Input Example

```xml
  <mods:titleInfo>
    <mods:title>Statewide coordinated state of need (SCSN)</mods:title>
  </mods:titleInfo>
</mods:mods>
```

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Input
- CSV
- MODS
- XML
- MARMOT LIBRARY NETWORK
- JSON
- SPARQL

Conversion
- BIBCAT transform to BIBFRAME
- RDF to ES
- RML Mappings
- RDF Triplestore

Datastore
- Blazegraph
- Elasticsearch
- RDF Triplestore
- Web API
- ResourceSync

Output
- BIBCAT Publisher
- Metadata Application Profile 4.0

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MODS XML to Baseline BIBFRAME 2.0 RDF Example

**mods-to-bf.ttl**  BF Instance Title Rule

```turtle
.mods2BFFRAME_InstanceTitle a rr:TriplesMap ;

rml:logicalSource [  
  rml:source "{mods_record}" ;  
  rml:iterator "mods:titleInfo"  ] ;

rr:subjectMap [  
  rr:termType rr:BlankNode ;  
  rr:class bf:Title ;  ] ;

rr:predicateObjectMap [  
  rr:predicate bf:mainTitle ;  
  rr:objectMap [  
    rr:reference "mods:title" ;  
    rr:datatype xsd:string  ] ] ;

rr:predicateObjectMap [  
  rr:predicate bf:subTitle ;  
  rr:objectMap [  
    rr:reference "mods:subtitle" ;  
```

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Input

CSV
MODS
XML
RML
JSON
SPARQL

BIBFRAME 2.0 RDF to MAPv4 JSON-RDF

bf-to-map4.ttl BF to MAPv4

JSON RDF

```
rr:predicateObjectMap {
  rr:predicate dcterm:title ;
  rr:datatype rdf:List ;
  rr:objectMap {
    rml:query """"SELECT DISTINCT ?title
    WHERE {{ ?instance_iri rdf:type
      bf:Instance .
      FILTER (sameTerm(?instance_iri, <{instance_iri}>))
      OPTIONAL {{ ?instance_iri
      rdfs:label ?title }}
      OPTIONAL {{ ?instance_iri
      ?bnode rdf:type
      bf:Title .
      ?bnode
      bf:mainTitle ?title
      )
    }}"
    rml:reference """"$.bf_itemOf.rdfs_label,
    $.bf_itemOf.rdf_value,
    $.bf_itemOf.bf_title.bf_mainTitle
    |stripend=,.
    /|distinct|limit=1"""
  }
}
```

Elasticsearch

Web API

ResourceSync

Publisher

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**Linked Data**
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[Diagram showing input, conversion, datastore, and output processes related to BIBFRAME, RDF, and Linked Data]

RDF to ElasticSearch
- RDF Vocabulary Rules
  - i.e. domain & range
- RML processor execution
- Standardized process

RDF to ES
RML Mappings

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RML Mapping

Handles both input and output using RDF Mapping Language

Inputs
- CSV
- JSON
- XML
- SPARQL
- Relational Databases

Outputs
- DPLA Metadata Application Profile
- Schema.org JSON-LD

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Linked Data Uses
RDF Mapping Language to map input data to BIBFRAME RDF
Standardized on BIBFRAME 2.0
Output format to DPLA's Metadata Application Profile 4.0

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Why Elasticsearch?

- Performance Increase
- Converted Mappings
- Standard search mapping
- Full text search

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