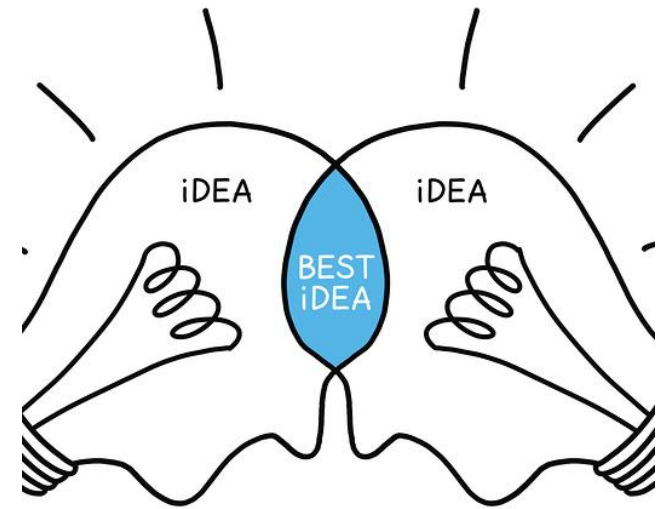




Linked Data Implementation at Ex Libris

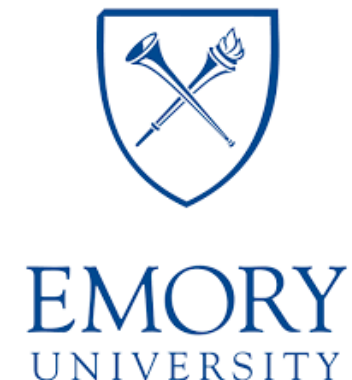
Amy Pemble, Product Manager



Collaboration

Linked Open Data Working Group

- Founded in **2011**
- Collects use cases & scenarios for LOD features
- Surveyed the community for input (2017)
- Presents ideas & progress at IGeLU and ELUNA conferences
- Advises Ex Libris on LOD features for the Alma platform



After publishing
[Putting Linked Data at the Service of Libraries](#) Ex Libris
established a Linked
Data Collaboration
Program

DIE ÖSTERREICHISCHE
BIBLIOTHEKENVERBUND
UND SERVICE GMBH



Karolinska
Institutet



—The—
UNIVERSITY
—of—
OKLAHOMA



Bodleian Libraries
UNIVERSITY OF OXFORD





2017: BIBFRAME implementation

- Ex Libris worked closely with Harvard University to deliver a first phase of BIBFRAME integration
 - MARC-to-BIBFRAME transformation
 - Publication of MARC record sets in BIBFRAME format
 - Support for BIBFRAME URIs

It's Happening

Immediately after the December 2017 release, 1000+ Alma institutions were able to publish their entire collections in BIBFRAME.

BIBFRAME Publishing

```
▼ <rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:bf="http://id.loc.gov/ontologies/bibframe/"
  xmlns:madsrdf="http://www.loc.gov/r
  ▼ <bf:Work rdf:about="https://open-
    ▼ <bf:adminMetadata>
      ▶ <bf:AdminMetadata>...</bf:Adm
    </bf:adminMetadata>
    <rdf:type rdf:resource="http://
  ▼ <bf:language>
    <bf:Language rdf:about="http:
```



ASK A LIBRARIAN

DIGITAL COLLECTIONS

LIBRARY CATALOGS

5903292171

The Library of Congress > [Linked Data Service](#)

English; Englisch

From [MARC List of Languages](#)

Details

Visualization

English Englisch

URI(s)

- > <http://id.loc.gov/vocabulary/languages/eng>
- > <info:lc/vocabulary/languages/eng>

Instance Of

- > [MADS/RDF Language](#)
- > [MADS/RDF Authority](#)
- > [SKOS Concept](#) [↗](#)
- > [RDF Resource](#) [↗](#)
- > [MARC Language](#)

BIBFRAME Publishing

```
▼ <bf:Instance rdf:about="https://open-na.hosted.exlibrisgroup.com/alma/TR_INTEGRATION_INST/bf/entity/instance/9998539000541">
  ▼ <bf:issuance>
    <bf:Issuance rdf:about="http://id.loc.gov/vocabulary/issuance/mono"/>
  </bf:issuance>
  ▼ <bf:provisionActivity>
    ▼ <bf:ProvisionActivity>
      <rdf:type rdf:resource="http://id.loc.gov/ontologies/bibframe/Publication"/>
      <bf:date rdf:datatype="http://id.loc.gov/datatypes/edtf">1967</bf:date>
      ▼ <bf:place>
        <bf:Place rdf:about="http://id.loc.gov/vocabulary/countries/nyu"/>
      </bf:place>
    </bf:ProvisionActivity>
  </bf:provisionActivity>
  ▼ <bf:illustrativeContent>
    ▼ <bf:Illustration rdf:about="http://id.loc.gov/vocabulary/millus/ill">
      <rdfs:label>illustrations</rdfs:label>
    </bf:Illustration>
  </bf:illustrativeContent>
  ▼ <bf:identifiedBy>
    ▼ <bf:Lccn>
      <rdf:value>67006784</rdf:value>
    </bf:Lccn>
  </bf:identifiedBy>
  ▼ <bf:identifiedBy>
    ▼ <bf:Local>
      <rdf:value>ocm01093047</rdf:value>
    </bf:Local>
  </bf:identifiedBy>
```


BIBFRAME Publishing

```
<bf:instanceOf rdf:resource="https://open-na.hosted.exlibrisgroup.com/alma/TR_INTEGRATION_INST/bf/entity/work/9059032921716723177"/>
<bf:hasItem>
  <bf:Item rdf:about="https://open-na.hosted.exlibrisgroup.com/alma/TR_INTEGRATION_INST/bf/entity/99985390000541#Item050-10">
    <bf:shelfMark>
      <bf:ShelfMarkLcc>
        <rdfs:label>QL676.A9 1967</rdfs:label>
      </bf:ShelfMarkLcc>
    </bf:shelfMark>
    <bf:itemOf rdf:resource="https://open-na.hosted.exlibrisgroup.com/alma/TR_INTEGRATION_INST/bf/entity/instance/99985390000541"/>
  </bf:Item>
</bf:hasItem>
</bf:Instance>
```



RDA/RDF Publishing

Content

Set name *

Filter Records


Publish on:

- Bibliographic level
- Holdings/Portfolio/Representation level
- Item/Portfolio level

Output format

Publishing Protocol

- MARC21 Bibliographic
- Dublin Core (Simple)
- BIBFRAME Bibliographic
- RDA/RDF**



ExLibris
a ProQuest Company

```
<rdac:Work rdf:about="https://open-na.hosted.exlibrisgroup.com/alma/TR_INTEGRATION_INST/rda/entity/work/908"
  <rdaw:titleOfTheWork>Rapunzel </rdaw:titleOfTheWork>
  <rdaw:creator>Zelinsky, Paul O.</rdaw:creator>
  <rdaw:SubjectRelationshipOf>Witches.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Towers.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Theft.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Rapunzel (Tale)</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Princes.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Pregnancy.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Parents.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Magic.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Jealousy.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Imprisonment.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Hair.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Folklore.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Feminine beauty (Aesthetics)</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Fairy tales.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Juvenile works.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Fiction.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf rdf:resource="http://id.loc.gov/authorities/subjects/sh85050104"/>
  <rdaw:SubjectRelationshipOf rdf:resource="http://id.loc.gov/authorities/subjects/sh85046925"/>
  <rdaw:SubjectRelationshipOf rdf:resource="http://id.loc.gov/authorities/subjects/sh2008107181"/>
  <rdaw:SubjectRelationshipOf>Dust jackets (Bindings) 1997.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Fairy tales 1997.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Folk tales 1997.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf>Caldecott Medal Winner 1998.</rdaw:SubjectRelationshipOf>
  <rdaw:SubjectRelationshipOf rdf:resource="http://id.loc.gov/authorities/subjects/sh85047737"/>
  <rdaw:SubjectRelationshipOf rdf:resource="http://id.loc.gov/authorities/subjects/sh2010108229"/>
  <rdaw:SubjectRelationshipOf rdf:resource="http://id.loc.gov/authorities/subjects/sh85058305"/>
  <rdaw:SubjectRelationshipOf rdf:resource="http://id.loc.gov/authorities/subjects/sh91004673"/>
  <rdaw:creator>Beniker, Amy.</rdaw:creator>
  <rdaw:creator>Dutton Children's Books (Firm)</rdaw:creator>
  <rdaw:creator>Stevens, John, 1954-</rdaw:creator>
  <rdaw:manifestationOfWork rdf:resource="https://open-na.hosted.exlibrisgroup.com/alma/TR_INTEGRATION_INST"
</rdac:Work>
<rdac:Expression>...</rdac:Expression>
<rdac:Manifestation rdf:about="https://open-na.hosted.exlibrisgroup.com/alma/TR_INTEGRATION_INST/rda/entity
```

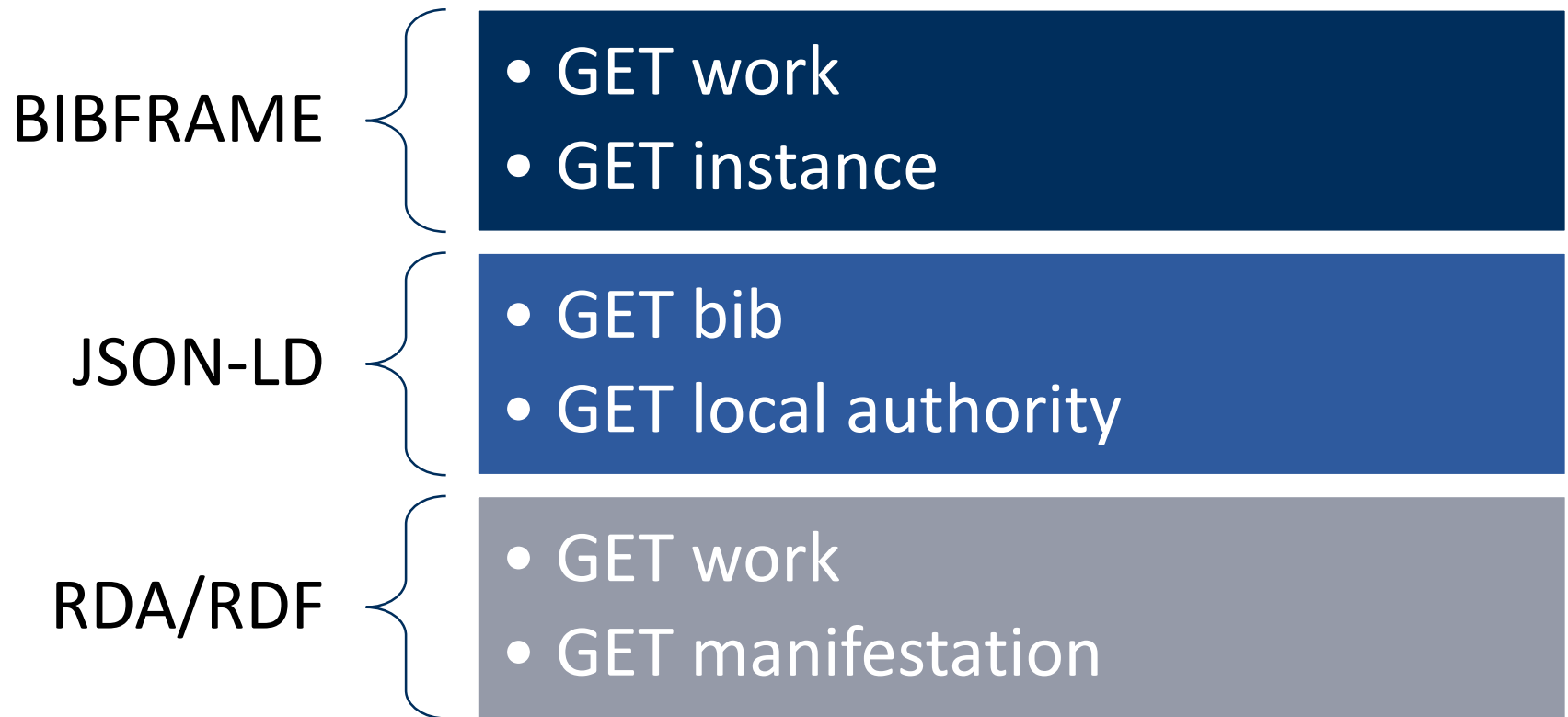
Linked Data: APIs

Alma provides API endpoints for these linked data formats

- JSON-LD
- RDA/RDF
- BIBFRAME

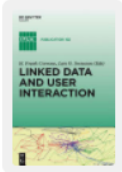
Once activated the APIs are open and available to everyone (no keys required!)

Records are automatically enriched with URIs for language, identifiers, names, and subjects



Alma Linked Data Views

1



Linked data and user interaction : the road ahead / edited on behalf of IFLA by H. Frank Cervone and Lars G. Svensson.

Book {Book - Electronic} text; computer; online resource
By Cervone, H. Frank. (Berlin, [Germany] ; Walter de Gruyter GmbH, 2015)

Subject: Linked data. Semantic Web. User interfaces (Computer systems) and others

Series: IFLA Publications

Language: English

ISBN: 3-11-039616-5 and others

Record number:
(CKB)3360000000515034

Update Date: 12/04/2017

Edit Record

Portfolio List

Physical

Electronic (1)

Digital

Other details

Linked Data



Context	https://open-na.hosted.exlibrisgroup.com/alma/contexts/bib	
bibo:oclcnum	http://www.worldcat.org/oclc/(PQKBManifestatID)11892389	(PQKBManifestationID)11892389
bibo:oclcnum	https://open-na.hosted.exlibrisgroup.com/resolver/wikidata/oclc/(PQKBManifestatID)11892389	(PQKBManifestationID)11892389
bibo:isbn10	http://www.isbnsearch.org/isbn/3110316927	3-11-031692-7
bibo:isbn10	https://open-na.hosted.exlibrisgroup.com/resolver/wikidata/isbn10/3110316927	3-11-031692-7
dct:language	http://id.loc.gov/vocabulary/iso639-2/eng	---
JSONLD version	https://open-na.hosted.exlibrisgroup.com/alma/EXLDEV1_INST/bibs/99109800800121	---

Alma BIBFRAME Preview

Linked data and user interaction : the road ahead / edited on behalf of IFLA by H. Frank Cervone and Lars G...

MMS ID	99109800800121	Suppress from publishing	No	Export to WorldCat	Don't publish
Brief level	-	Record format	marc21		
Originating system	PQNKB	Originating system ID	(CKB)33600000000515034	Originating system version	20160803134623.0

MARC

BIBFRAME

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?><rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:bf="http://id.loc.gov/ontologies/bibframe/" xmlns:bfbc="http://id.loc.gov/ontologies/bfbc/" xmlns:madsrdf="http://www.loc.gov/mads/rdf/v1#"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
<bf:Work rdf:about="https://open-na.hosted.exlibrisgroup.com/alma/EXLDEV1_INST/bf/entity/work/9037292348598534584">
  <bf:adminMetadata>
    <bf:AdminMetadata>
      <bf:generationProcess>
        <bf:GenerationProcess>
          <rdfs:label>DLC marc2bibframe2 v1.3.0-SNAPSHOT: 2018-01-29T19:42:07Z</rdfs:label>
        </bf:GenerationProcess>
      </bf:generationProcess>
    </bf:adminMetadata>
  </bf:Work>
  <bf:status>
    <bf:Status>
      <bf:code>n</bf:code>
    </bf:Status>
  </bf:status>
  <bf:encodingLevel>
    <bf:EncodingLevel>
      <bf:code>f</bf:code>
    </bf:EncodingLevel>
  </bf:encodingLevel>
  <bf:descriptionConventions>
    <bf:DescriptionConventions>
      <bf:code>isbd</bf:code>
    </bf:DescriptionConventions>
  </bf:descriptionConventions>
  <bf:identifiedBy>
    <bf:Local>9037292348598534584</bf:Local>
  </bf:identifiedBy>
</rdf:RDF>
```

Knowledge Card

[Experimental, source from Wikidata]



WIKIPEDIA

[Judy Garland](#) 朱迪·加兰

actress, singer and vaudevillian from the United States

LCCN: [n50015080](#) VIAF: [49233610](#) Wikidata: [Q11637](#)



WIKIPEDIA

[L. Frank Baum](#) 李曼·法蘭克·鮑姆

Children's writer, editor, journalist, screenwriter

LCCN: [n80110912](#) VIAF: [4926394](#) Wikidata: [Q207544](#)



WIKIPEDIA

[Cedric Gibbons](#) 塞德里克·吉本森

Art director, set decorator

LCCN: [n85342791](#) VIAF: [42042359](#) Wikidata: [Q727904](#)



WIKIPEDIA

[Mervyn LeRoy](#) 茂文·李洛埃

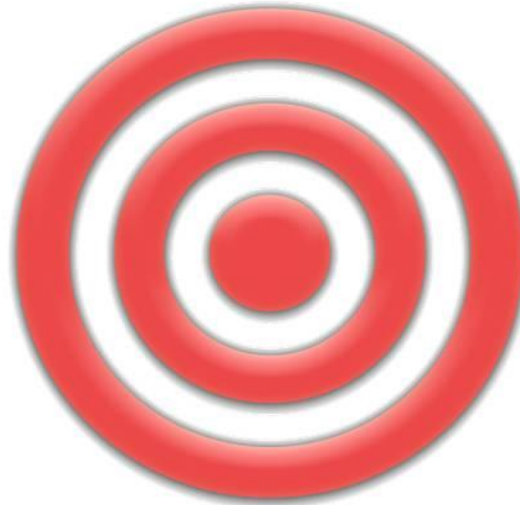
American film director, film producer and sometime actor

LCCN: [n85342783](#) VIAF: [17407979](#) Wikidata: [Q103788](#)

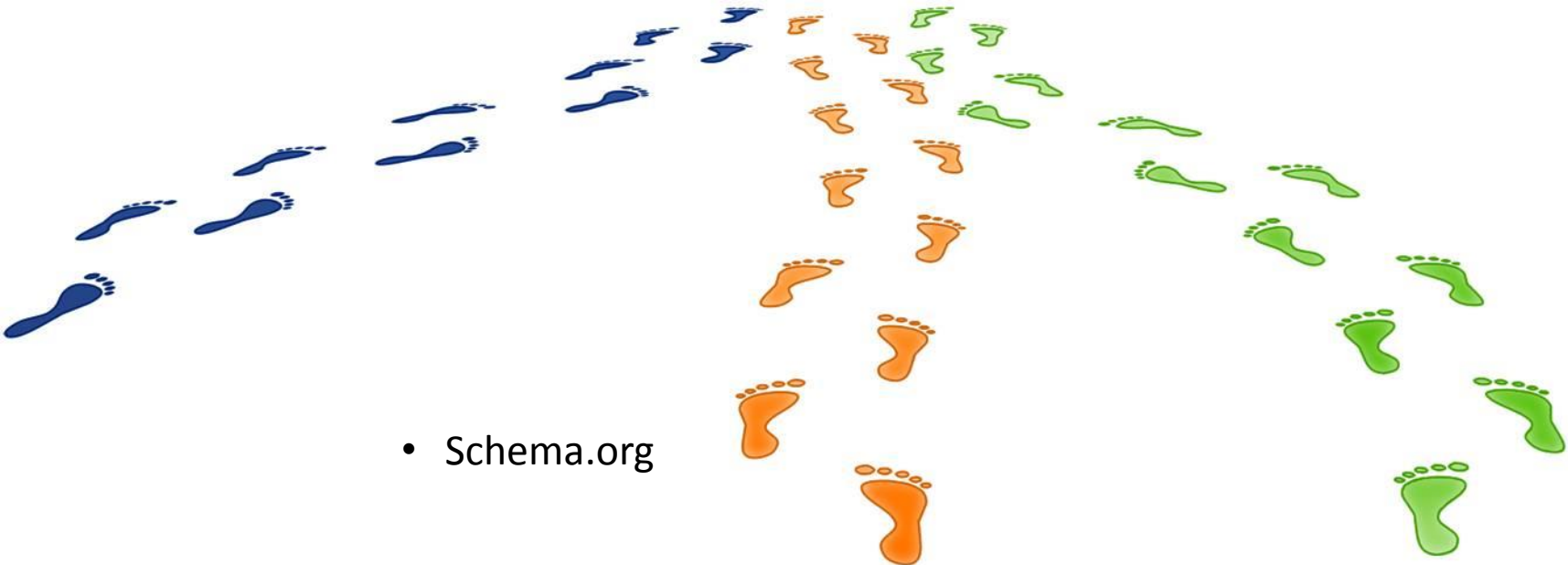
Discovery

Multiple Paths of Exploration

- Search linked data endpoints from within the Alma editor
- Select controlled vocabulary term, even from non-MARC based vocabularies



- Catalog in BIBFRAME
- Import BIBFRAME records



Challenges

- We've issued an open call for input on our Linked Data roadmap
- Linked Data at scale
- Web relevancy
- Reconciliation beyond the Alma Community Zone

100 1_ |a Mitchell, Erik T., |e author.

245 10 |a Library linked data : |b research and adoption / |c Mitchell, Erik.

250 __ |a 5th ed.

264 _1 |a Chicago, Illinois : |b ALA TechSource, |c 2013.

264 _4 |c ©2013

300 __ |a 1 online resource (54 p.)

336 __ |a text |b txt

337 __ |a computer |b c

338 __ |a online resource |b cr

490 1_ |a Library Technology Reports, |x 0024-2586 ; |y Volume 49, Number 5

500 __ |a Description based upon print version of record.

0_ |a Cover; Library Linked Data: Research and Adoption; Contents; Chapter 1: Metadata De
 History of LAM Metadata; The Motivation for a New Approach to Metadata; A General Fran
 505 Linked Open Data in Libraries; Introduction; What Is Linked Open Data?; Conclusion; Notes;

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?><rdf:RDF :
xmlns:bf="http://id.loc.gov/ontologies/bibframe/" xmlns:bf:c="http
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#">
<bf:Work rdf:about="https://open-na.hosted.exlibrisgroup.com/al
<bf:adminMetadata>
<bf:AdminMetadata>
<bf:generationProcess>
<bf:GenerationProcess>
<rdfs:label>DLC marc2bibframe2 v1.3.0-SNAPSHOT: 2018-01
</bf:generationProcess>
</bf:generationProcess>
<bf:status>
<bf:Status>
<bf:code>n</bf:code>
</bf:Status>
</bf:status>
<bf:encodingLevel>
<bf:c:encodingLevel>
<bf:code>f</bf:code>
</bf:c:encodingLevel>
</bf:encodingLevel>
</bf:encodingLevel>
<bf:descriptionConventions>
```

dc:title	Erecting cableway
dc:identifier	libimagesR0258
dc:identifier	http://hdl.handle.net/11124/8985
dc:publisher	Murray Lakes Library
dc:contributor	Murray Lakes Library
dc:contributor	Wisconsin Mining History Archive
dc:description	Construction cableway for bridge structure. 1920?-1929?
dc:description	Held in the Wisconsin Mining History Archive, Murray Lakes Library.
dc:rights	Rights management statement available at: http://out.murray.edu/dig
dc:subject (dcterms:LCSH)	Ropeway construction
dc:subject (dcterms:LCSH)	Ropeway
dc:subject (dcterms:LCSH)	Cableways
dc:type	image/jpeg