



LD4P3 | Linked Data for Production: Closing the Loop

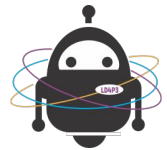
Discovering Relationships BIBFRAME in Europe Workshop 2022

Huda Khan and Steven Folsom, Cornell University

<https://bit.ly/bwe2022disc>

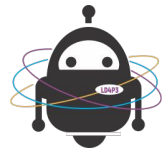
Overview

- Background and motivation
- Analysis: Work relationships in BIBFRAME data
- Prototype: Using BIBFRAME works in the catalog
- Questions



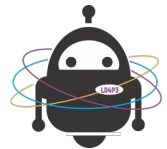
Background

- Linked Data for Production: Closing the Loop (LD4P3).
 - “LD4P3 aims to “close the loop” to create a working model of a complete cycle for library metadata creation, sharing, and reuse.”
 - Funded by Andrew W. Mellon Foundation
- Discovery
 - Using linked data to support and enhance discovery
 - Continue experiments
 - Work on integration into production



Motivation

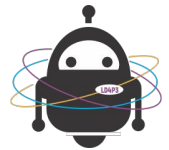
- Which work relationships can we find in existing BIBFRAME datasets? Are they...
 - Consistent?
 - Meaningful?
- How can/do work relationships enable end users
 - To get more context for a library resource?
 - Find related library resources?



Mining for Discovery



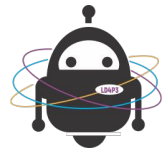
Matthew Williamson



Analyzing work relationships in BIBFRAME data

Work Relationships and Aggregations

- Sources
 - Library of Congress (LOC) Hubs
 - ShareVDE Program for Cooperative Cataloging (PCC) data
- Focused on top level aggregations as a start
- Retrieve clusters of related Cornell catalog resources





Bibframe Work

Title

Romeo and Juliet

Type

Hub

Language

English

Identified By

Identifier: 5006443 (LC-ILSDB)

Note

Description source: Created from azbib.

Authorized Access Point

Romeo and Juliet

Admin Metadata

Generation Process: DLC marc2bibframe2 v1.8.0-SNAPSHOT-MTA

Status: changed

Encoding Level: minimal

Identified By: bf:Local, 14684c52-957b-c03c-a3db-095b3394bb9f

Change Date: 2011-08-23T10:46:46

Creation Date: 1998-10-20

Alternate Formats

- RDF/XML (Verbose)
- N-Triples (Verbose)
- JSON (Verbose)
- RDF/XML (Compact)
- N-Triples (Compact)
- JSON (Compact)

Has Expression

[Fox Interactive \(Firm\) William Shakespeare's Romeo + Juliet : an interactive trip to Verona Beach](#)

[Romeo and Juliet](#)

[Romeo and Juliet](#)

[Romeo and Juliet](#)

[Romeo and Juliet](#)

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[Romeo and Juliet](#)

[Romeo and Juliet](#)

[Romeo and Juliet](#)

[Romeo and Juliet](#)

[Romeo and Juliet](#)

[Romeo and Juliet](#)

[\[Romeo and Juliet\]](#)

Part Of

[Tchaikovsky, Peter Ilich, 1840-1893 1812 overture, op. 49](#)

[Prokofiev, Sergey, 1891-1953. Symphony no. 5, op. 100 Romeo and Juliet : suite no. 2](#)

[Tchaikovsky, Peter Ilich, 1840-1893. 1812 overture ; Romeo and Juliet ; Francesca da Rimini ; Marche slave](#)

[Tchaikovsky, Peter Ilich, 1840-1893. Overture "1812" ; Romeo and Juliet ; Capriccio italien](#)

[Lambert, Constant, 1905-1951. bird actors Pomona ; Romeo and Juliet](#)

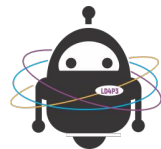
[Eberhardt, Cliff. Mona Lisa café](#)

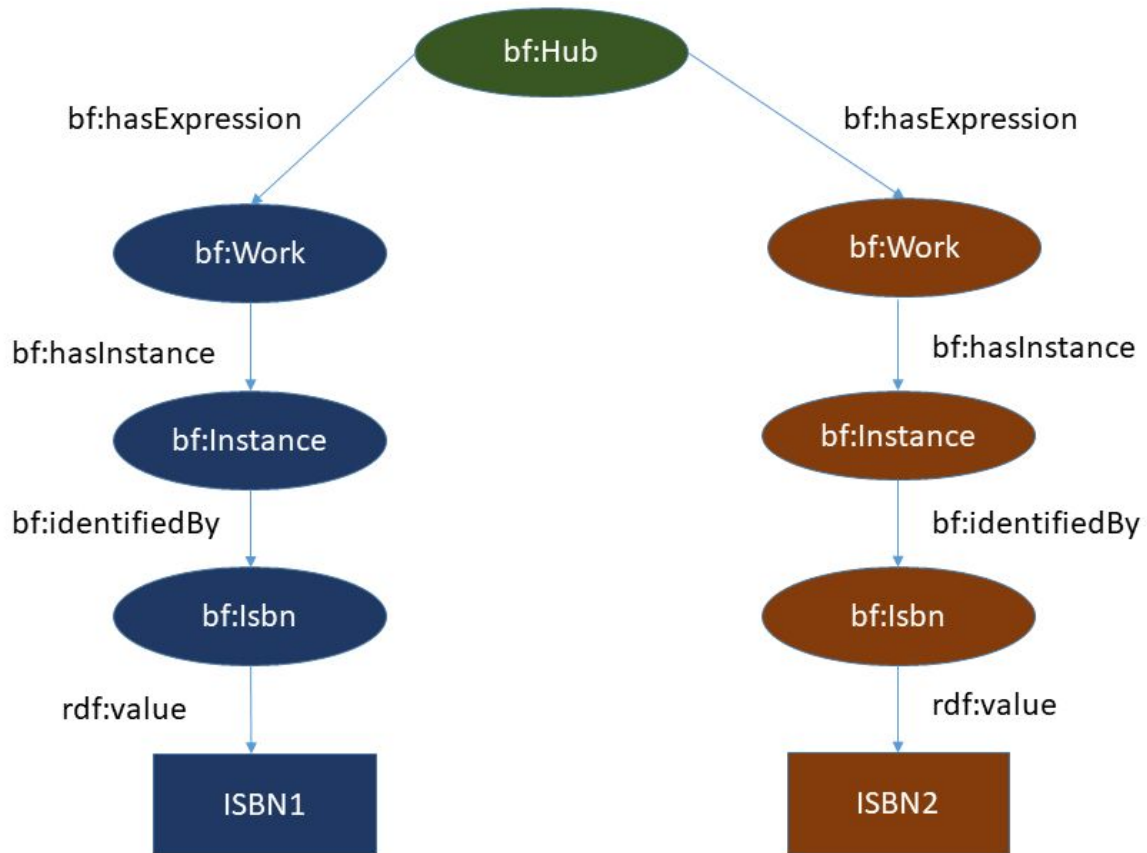
[Tchaikovsky, Peter Ilich, 1840-1893. Symphony no. 6 in B minor, op. 74 "Pathétique" ; Romeo and Juliet](#)

[Tchaikovsky, Peter Ilich, 1840-1893. Piano concerto No. 1 ; Romeo and Juliet](#)

[Indigo Girls \(Musical group\) Rites of passage](#)

[Griffith, Andy, 1926-2012. What it was, was football](#)





Original work ⓘ

Dune (Motion picture : 2021)

Motion pictures.

Also known as: *Dune (Motion picture : 2021)*

More options ▾

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<https://svde.org/opuses/45201660898848174>

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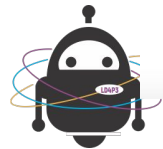
.json

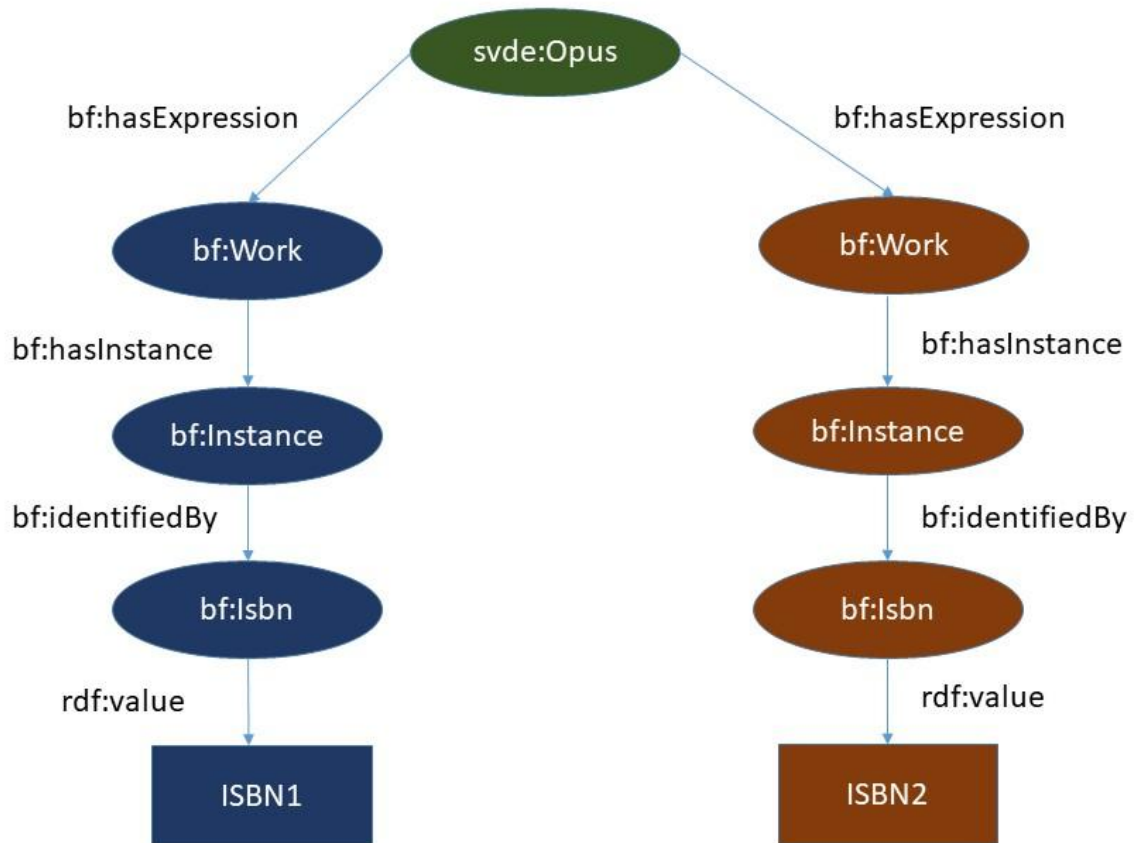
Sort by (A - Z) ▾

1 ● [Dune \(Videodisc in English, published in 2022.\)](#)

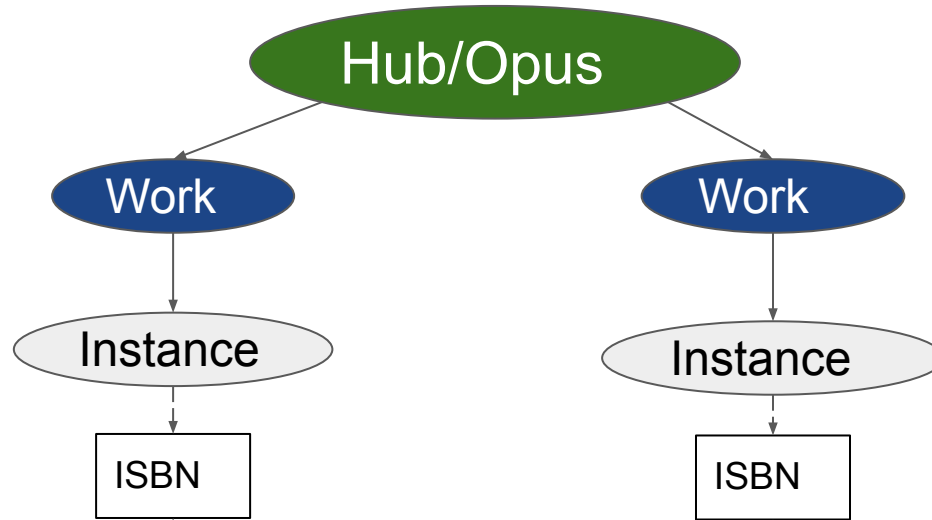
Contributors:

- [Josh Brolin](#) (actor)
- [Studio Distribution Services \(Firm\)](#) (publisher)
- [Eric Roth](#) (screenwriter)
- [Rebecca Ferguson](#) (actor)
- [Joe Walker](#) (editor of moving image work)



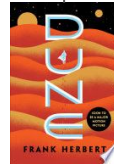


Clusters of Related Catalog Records

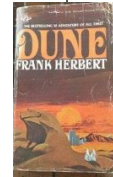


CORNELL UNIVERSITY
Library

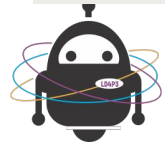
LIBRARY CATALOG



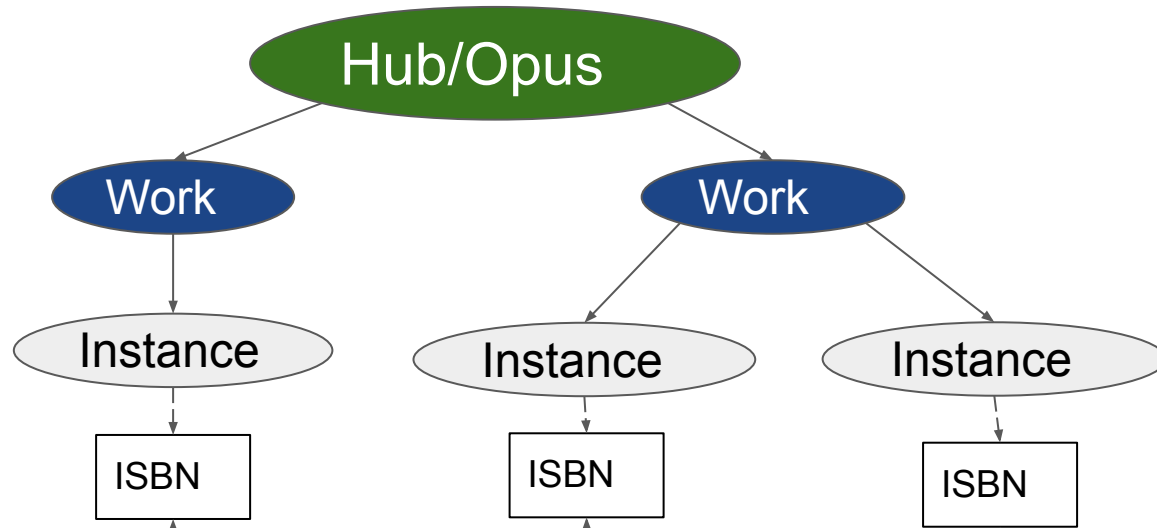
catalog/id1



catalog/id2

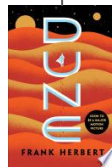


Clusters of Related Catalog Records

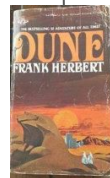


CORNELL UNIVERSITY
Library

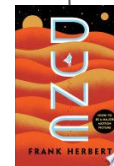
LIBRARY CATALOG



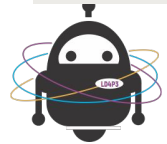
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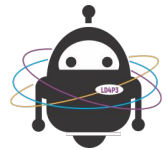
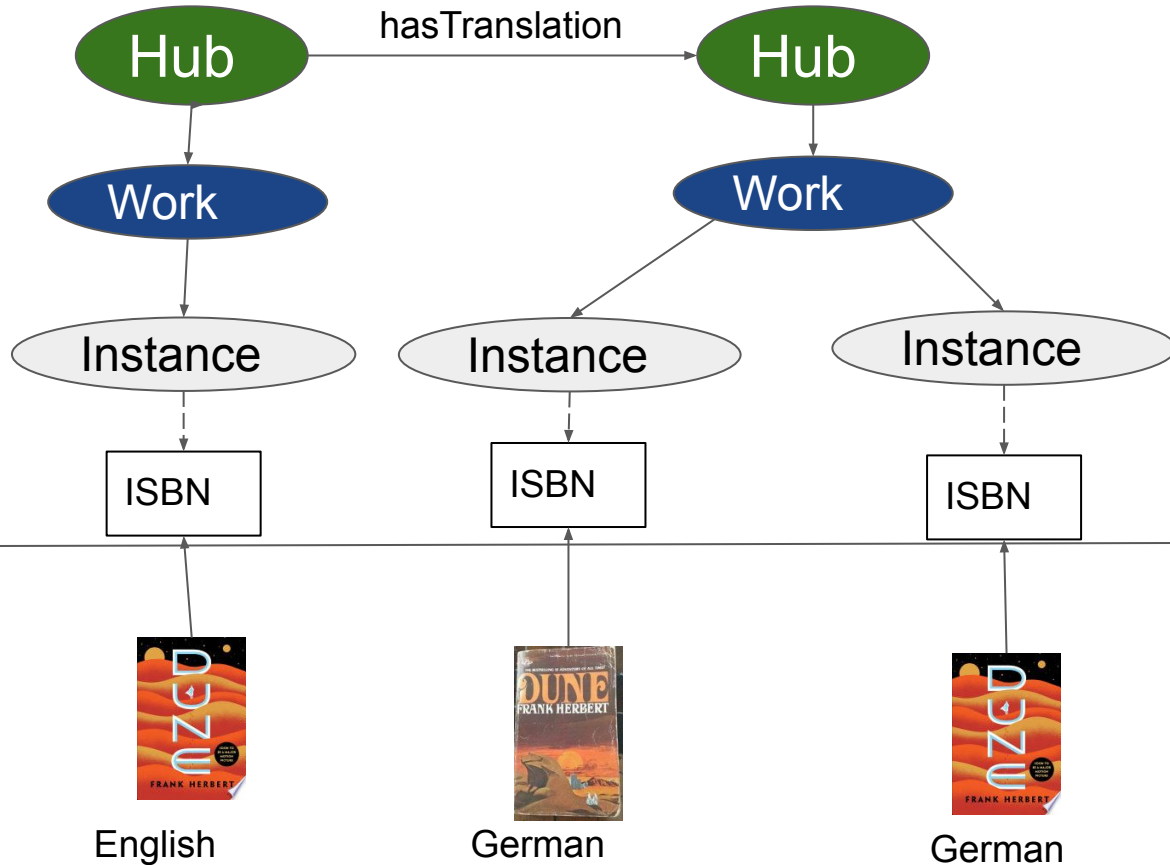
catalog/id2



catalog/id3



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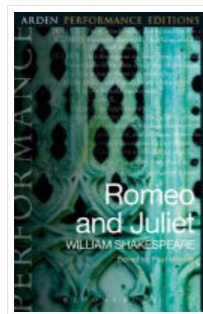
Print

Romeo and Juliet

"edited by Paul Menzer."

- Author, etc.: [Shakespeare, William, 1564-1616, author](#) [Info](#)
- Format: Book
- Language: English.
- Published: London ; New York : Bloomsbury Arden Shakespeare, 2017.
- Copyright date: ©2017
- Subject: [Romeo \(Fictitious character\)](#) [Info](#)
Drama.
[Juliet \(Fictitious character\)](#) [Info](#)
Drama.
[Vendetta](#) [Info](#)
Italy
Verona
Drama.

Summary: "In the heat of renaissance Italy two houses are at war. One son and one daughter from the opposing families break this



Availability

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PR2831 .A2 M38 2017 [Text](#)

✓ Available

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Other related works

Related through Opus using ISBN
(9781474280143)

Italy
Verona
Drama.

Summary: "In the heat of renaissance Italy two houses are at war. One son and one daughter from the opposing families break this bitter conflict by falling in love. Yet, in this whirlwind of enmity, Romeo and Juliet's passion agitates rather than unites the clashing houses, causing a trail of destruction. Locked in a burning embrace, the two young lovers are tragically doomed to live or die together."-- Publisher's description.

"For the first time, the world-renowned Arden Shakespeare is producing Performance Editions, aimed specifically for use in the rehearsal room. Published in association with the Shakespeare Institute, the text features easily accessible facing page notes--including short definitions of words, key textual variants, and guidance on metre and pronunciation; a larger font size for easier reading; space for writing notes and reduced punctuation aimed at the actor rather than the reader."-- Publisher's description.

Description: xlvii, 303 pages ; 22 cm.

ISBN: 9781474280143 (paperback ; alkaline paper)
1474280145 (paperback ; alkaline paper)

Other contributor: [Menzer, Paul, 1966-](#) editor

Series: [Arden performance editions.](#)

Other form: Online version: Shakespeare, William, 1564-1616 author. | Romeo and Juliet. London ; New York : Bloomsbury Arden Shakespeare, 2017 ISBN: 9781474280167, (DLC) 2017036865

Other related works

**Related through Opus using ISBN
(9781474280143)**

[Romeo and Juliet](#)

Book 2013 English. At the Library

[Romeo and Juliet](#)

Book c2001 English. At the Library

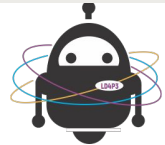
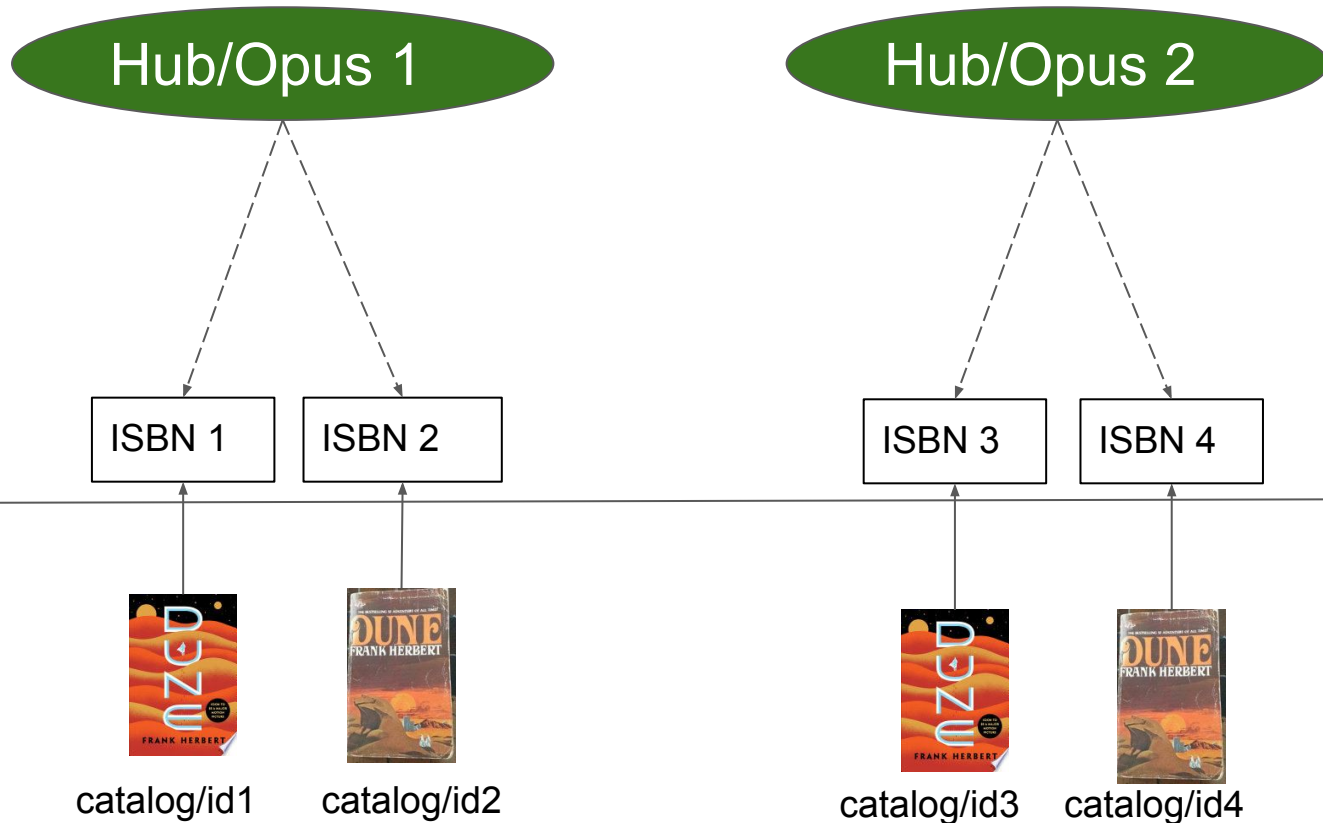
[Romeo and Juliet](#)

Book 2000 Online

Related through Translation Hub using isbn
[Ang trahedyang nina Romeo at Julieta](#)

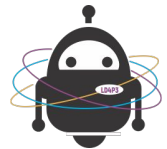
Book 2015 In Tagalog. At the Library

Clusters to Related Catalog Records



Clusters with ≥ 2 Catalog Records

| | | |
|--------------------------|-------------------------------------|---|
| ShareVDE Opus | 10,000,486 total opera | 3,258 ISBN clusters by opus |
| LOC hub | 2,481,410 total hubs | 9,430 LCCN clusters by hub (extrapolated) |
| OCLC Work ID | 513,078 total work ids (in catalog) | 195,108 clusters by work id |

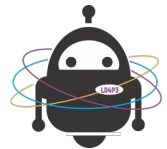


| <i>Data source</i> | <i>Description for groups</i> | <i>Number of groups matching at least two Cornell catalog records</i> |
|----------------------|---|---|
| ShareVDE PCC | ISBNs aggregated by Opus | 3,258 |
| | LCCNs aggregated by Opus | 1,226 |
| | ISBNs related by work to work relationships | 184 |
| LOC Hubs | ISBNs aggregated by hub | 6,452 (extrapolated) |
| | LCCNs aggregated by hub | 9,430 (extrapolated) |
| | ISBNs related by hub to hub relationships | 5,459 (extrapolated) |
| | LCCNs related by hub to hub relationships | 8,189 (extrapolated) |
| OCLC Work IDs (2015) | Aggregated by OCLC Work ID | 195,108 |



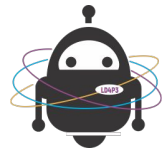
Process

- ShareVDE: Fuseki server allowing SPARQL (thanks Dave Eichmann)
- LOC Hubs: AJAX queries using 10,000 Hubs as sample
 - Just learned there is now a download!
- OCLC Work IDs 2015: Solr queries (since already in catalog)
- Technical limitations with respect to APIs



Lessons Learned

- Hubs and Opera have potential to provide useful clustering of related catalog items
- Can provide specific relationships (e.g. translations, or all forms of same higher level opus or hub)
- Need further analysis to determine overlap with existing OCLC work id set.
 - Individual examples where other sources provide more clusters than OCLC work ids
 - Individual examples where other sources provide fewer clusters than OCLC work ids



Bringing in BIBFRAME works into the catalog

Dune

Author, etc.: [Herbert, Frank.](#) Author info »

Format: Book

Language: English.

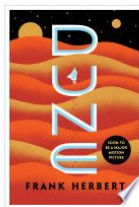
Edition: [1st ed.]

Published: Philadelphia, Chilton Books [1965]

Subject: [Dune \(Imaginary place\)](#) > [Fiction.](#)

Description: xxvi, 412 p. illus. 24 cm.

Notes: Sequel: Dune messiah.



Availability

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✓ Available

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⊖ Checked out, due 02/02/23

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| | | |
|---|--|--|
| <p>PS3515.E596 Z95x 1998</p>  <p>Josephine Herbert's short fiction : a window to her li... to her li... c1998</p> <p>✓ Available</p> | <p>PS3515.E61 D9</p>  <p>Dune 1965</p> <p>✓ Available</p> | <p>PS3515.E61 V7</p>  <p>Villa Elsa: a story of German family life c1920</p> <p>✓ Available</p> |
|---|--|--|

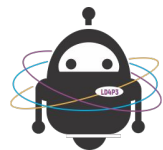
Other forms of this work

[Dune](#)
 Book English Special twenty-fifth anniversary edition. Online

[Dune](#)
 Book English Berkley trade pbk. ed. At the Library

[Dune](#)
 Book English 40th anniversary ed. At the Library

[See all forms of this work](#)




Dune

Author, etc.: [Herbert, Frank.](#) [Author info »](#)

Language: English.

Subject: [Dune \(Imaginary place\)](#) > [Fiction.](#)

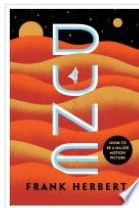
Notes: Sequel: Dune messiah.

Format:  Book

Edition: [1st ed.]



Description: xxvi, 412 p. illus. 24 cm.

Published: Philadelphia, Chilton Books [1965]





Other copies

1. [Dune](#) 1982, c1965

Herbert, Frank.
 Book New York : Berkley Books, 1982, c1965. English. Berkley trade pbk. ed.
 Olin Library PS3558.E645 D9 1982


2. [Dune](#) 2005, c1965

Herbert, Frank.
 Book New York : Ace Books, 2005, c1965. English. 40th anniversary ed.
 Olin Library PS3558.E63 D8 2005

3. [Dune](#) 2005 ©1965

Herbert, Frank.
 Book New York : Ace, 2005. English. Ace trade paperback edition.
 Veterinary Library (Schurman Hall) PS3558.E63 D8 2005

4. [Dune](#) [1990, 1965] ©1965




Herbert, Frank.
 Book New York : Ace Books, [1990, 1965] English. Special twenty-fifth anniversary edition.
 Online

Sequels




1. [Dune messiah](#) [1969]

Herbert, Frank.
 Book New York, Putnam [1969] English.
 Olin Library PS3558.E645 D91


2. [Children of Dune](#) c1976

Herbert, Frank.
 Book New York : Berkley Pub. Corp. : distributed by Putnam, c1976. English.
 Library Annex PS3558.E645 C5
 Olin Library PS3558.E645 C5



3. [God Emperor of Dune](#) c1981

Herbert, Frank.
 Book New York : Putnam, c1981. English.
 Olin Library PS3558.E645 G4
 Library Annex PS3558.E645 G5

4. [Heretics of Dune](#) c1984

Herbert, Frank.
 Book New York : Putnam, c1984. English.
 Olin Library PS3558.E645 H5

5. [Chapter house, Dune](#) c1985

Herbert, Frank.
 Book New York : Putnam, c1985. English.
 Olin Library PS3558.E645 C4


Availability

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 Available

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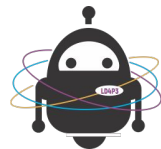
PS3558 .E645 D9  [Text](#)

 Available

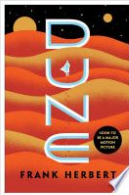
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Dune



Dune is a 1965 epic science fiction novel by American author Frank Herbert, originally published as two separate serials in Analog magazine. It tied with Roger Zelazny's This Immortal for the Hugo Award in 1966 and it won the inaugural Nebula Award for Best Novel. It is the first installment of the Dune saga. In 2003, it was described as the world's best-selling science fiction novel. Since 2009, the names of planets from the Dune novels have been adopted for the real-life nomenclature of plains and other features on Saturn's moon Titan. [\(From DBPedia ↗\)](#)

Author(s): [Herbert, Frank.](#)
Language: English.
Subject: [Dune \(Imaginary place\)](#) > [Fiction.](#)

RELATED ITEMS [↕ Copies of "Dune"](#) [↕ Prequels/Sequels](#) [↕ Translations](#) [↕ Adaptations](#) [↕ Items about "Dune"](#) [↕ Items by Herbert, Frank.](#)

Copies of "Dune"

1. [Dune](#) 1982, c1965

Herbert, Frank.

📖Book New York : Berkley Books, 1982, c1965. English. Berkley trade pbk. ed.

✔Olin Library PS3558.E645 D9 1982



2. [Dune](#) [1965]

Herbert, Frank.

📖Book Philadelphia, Chilton Books [1965] English. [1st ed.]

✔Library Annex PS3515.E61 D9

✔Olin Library PS3558.E645 D9



3. [Dune](#) 2005, c1965

Herbert, Frank.

📖Book New York : Ace Books, 2005, c1965. English. 40th anniversary ed.

🔴Olin Library PS3558.E63 D8 2005



4. [Dune](#) 2005 ©1965

Herbert, Frank.

📖Book New York : Ace, 2005. English. Ace trade paperback edition.

🔴Veterinary Library (Schurman Hall) PS3558.E63 D8 2005



5. [Dune](#) [1990, 1965] ©1965

Herbert, Frank.

📖Book New York : Ace Books, [1990, 1965] English. Special twenty-fifth anniversary edition.

✔ [Online](#)



Sequels

1. [Dune messiah](#) [1969]



Translations

1. [Dūn](#) 2546 [2003]

Dune. Thai. Thai[Dune. Thai]Herbert, Frank.

Herbert, Frank.

📖Book Krung Thep : Samnakhphim Khun Phō, 2546 [2003] Thai. Phim khrang rāk.

✔Kroch Library Asia PS3558.E645 D919 2003

Adaptations

1. [Dune](#) 2022

Dune (Motion picture : 2021)[Dune (Motion picture : 2021)]

🎬Video [Burbank, CA] : Warner Bros. Entertainment, [2022] English, French or Spanish dialogue; French or Spanish subtitles.

🔴Uris Library Dean Room Videodisc 9910

Items about "Dune"

1. [The art and soul of Dune](#) 2020

Lapointe, Tanya, author

📖Book San Rafael : Insight Editions, 2020. English.

🔴Olin Library Oversize PN1997.Z.D864 L27 2020 +



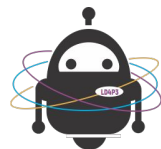
Items by Herbert, Frank.

1. [The collected stories of Frank Herbert](#) 2014

Herbert, Frank.

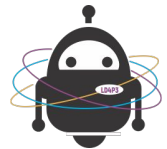
📖Book New York : Tor, 2014. English. 1st ed.

✔Olin Library PS3558.E63 A6 2014



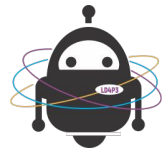
Lessons Learned

- Usability testing with both production and earlier prototype
 - Easier to find translations, sequels (first and/or last)
 - “Other copies”: a clear way to find items
 - Result: Updated explore link (button, labeling)
- Users generally found the page to be useful
- Need to identify additional use cases for work relationships of interest

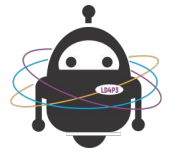


Lessons Learned

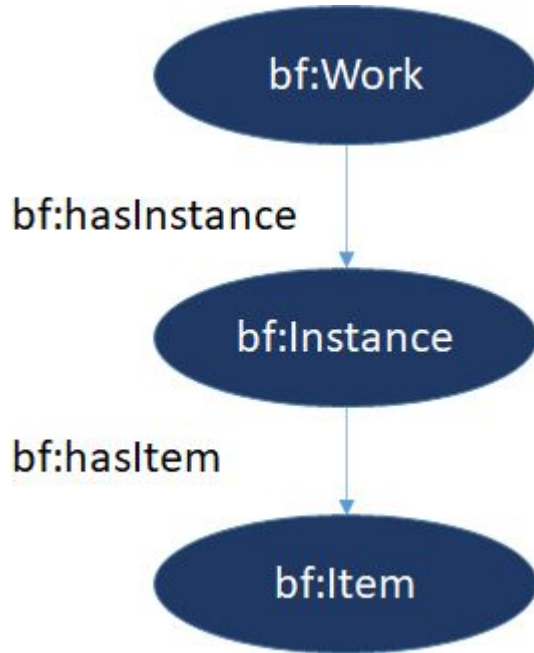
- Avoided terms “Works” and “Instances” in UI
- Avoided FRBR/RDA terms that might suggest more precision than the models/data actually provide
- Focused instead on displaying relationships



Catalog <-> BIBFRAME



Bridging Two (Or More) Paradigms



Dune

Author, etc.: [Herbert, Frank.](#) Author info »

Format: Book

Language: English.

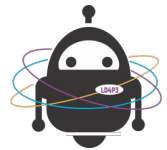
Edition: [1st ed.]

Published: Philadelphia, Chilton Books [1965]


Subject: [Dune \(Imaginary place\)](#) > [Fiction.](#)

`title_display: "Dune"`

```
035      #a (OCoLC) 503303
035      #a 575725
040      #a DLC #c DLC #d NIC
050      #a PZ4 #b .H538Du
100 1    #a Herbert, Frank.
245 1 0  #a Dune.
```



Anatomy of a Catalog Record

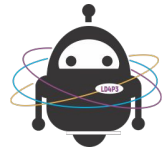
| | |
|---------------|--|
| Dune | |
| Author, etc.: | Herbert, Frank. Author info » |
| Format: |  Book |
| Language: | English. |
| Edition: | [1st ed.] |
| Published: | Philadelphia, Chilton Books [1965] |
| Subject: | Dune (Imaginary place) > Fiction. |
| Description: | xxvi, 412 p. illus. 24 cm. |
| Notes: | Sequel: Dune messiah. |

- Roughly as many catalog records as instances (or manifestations)

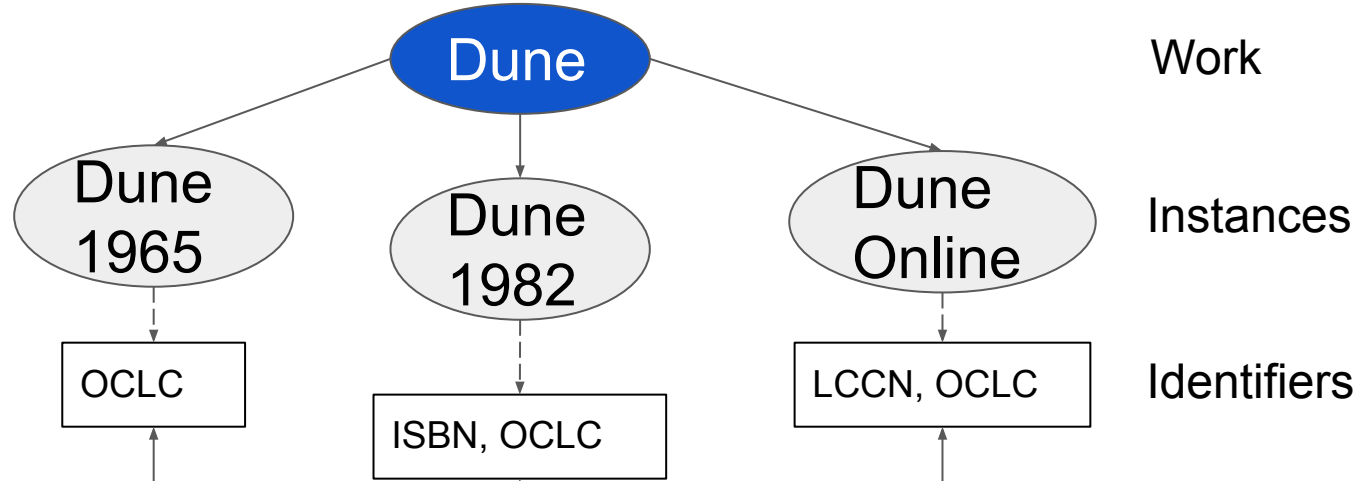
Work

Expression

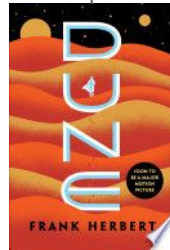
Instance



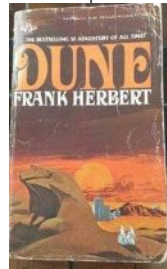
Sinopia to Catalog



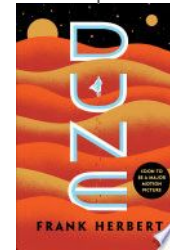
LIBRARY CATALOG



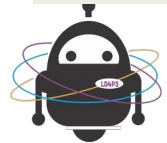
[catalog/57525](#)



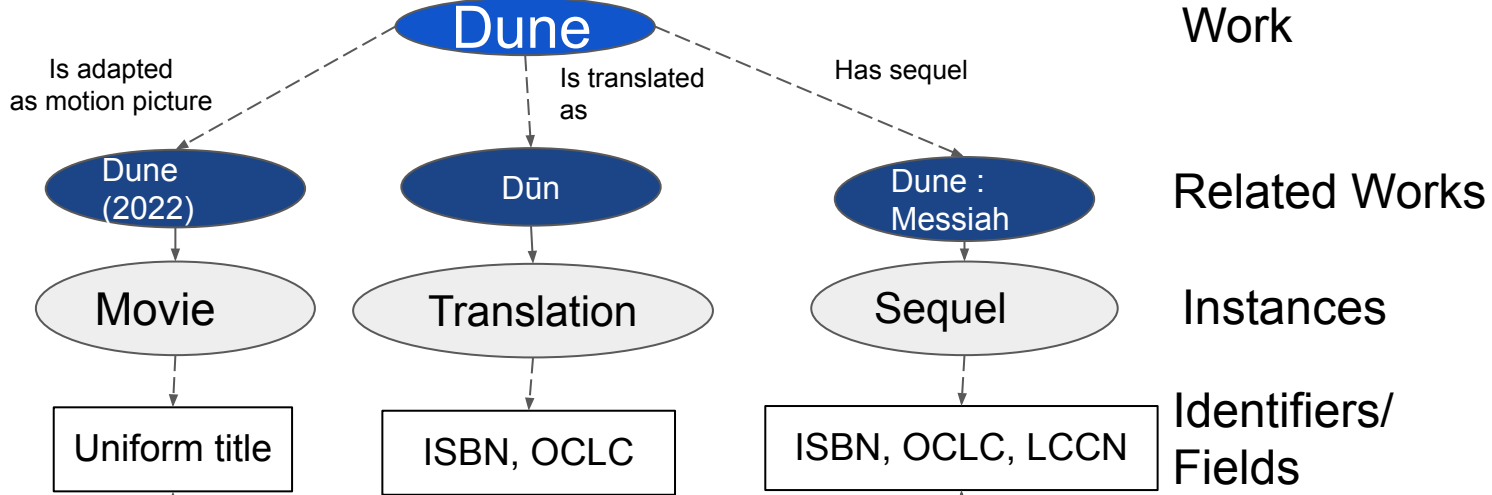
[catalog/58460](#)



[catalog/15139747](#)



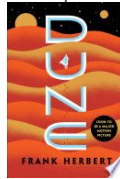
Sinopia to Catalog



LIBRARY CATALOG



catalog/15271081

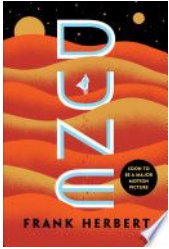


catalog/5183484



catalog/15139747

Catalog to Sinopia



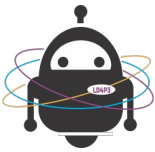
catalog/57525

```
▼ marc_display:      "<?xml version='1.0' encoding='UTF-8'?><record xm
<controlfield tag=\"001\">575725</controlfield><c
\">711124s1965      pausa      000 1 eng </cont
```

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<datafield tag="758" ind1=" " ind2=" ">
  <subfield
code="4">http://id.loc.gov/ontologies/bibframe/instanceOf
</subfield>
  <subfield code="i">instance of</subfield>
  <subfield
code="1">https://api.sinopia.io/resource/89b30ba3-2d
d4-45f1-a7c5-8e2276666d36</subfield>
</datafield>
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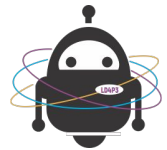
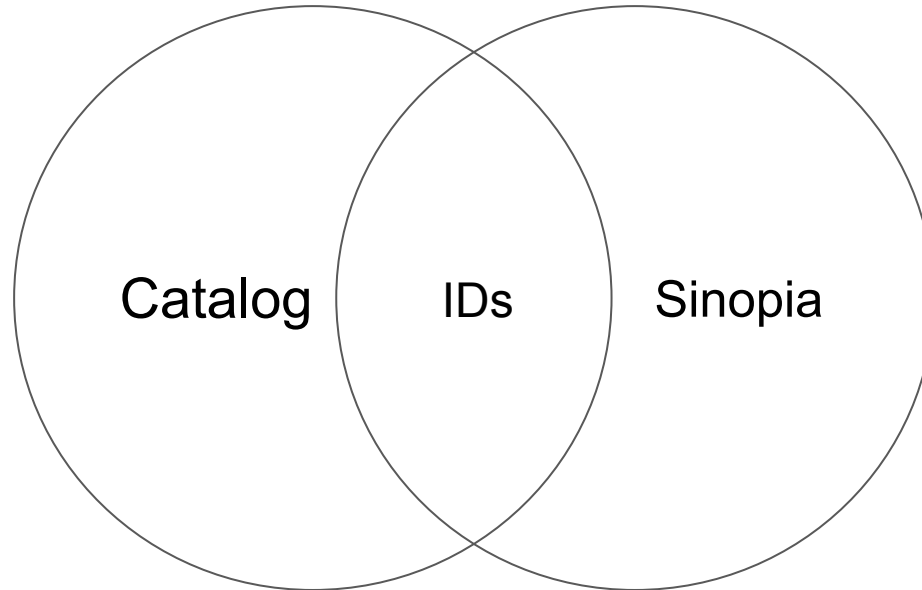


Work




Connecting Sinopia with Our Catalog

- Sinopia Work URIs in 758 of BIB
- ISBNs, LCCNs, and/or OCLC numbers in Sinopia Instances



Work to Work Relationships in Sinopia


Related Works 





Sequels

Related Work + Add another Related Work

Property: <http://id.loc.gov/ontologies/bf/c/relationship>
Class: <http://id.loc.gov/ontologies/bf/c/Relationship>


▼ Search related works 

Property: <http://id.loc.gov/ontologies/bibframe/relatedTo>

URI  



Label ä en

[+ Add another Search related works](#)

▼ Relationship Designator 


Relationship Designator + Add another Relationship Designator

Property: <http://id.loc.gov/ontologies/bf/c/relation>
Class: <http://id.loc.gov/ontologies/bf/c/Relation>

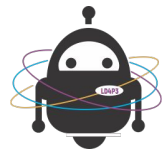
▼ Input Relationship Designator  

Property: <http://www.w3.org/2000/01/rdf-schema#label>

Enter a literal

ä en 

[+ Add another Input Relationship Designator](#)



Work to Work Relationships in Sinopia

About

Related Work

Property: <http://id.loc.gov/ontologies/bflc/relationship>
Class: <http://id.loc.gov/ontologies/bflc/Relationship>

▼ Search related works

Property: <http://id.loc.gov/ontologies/bibframe/relatedTo>

URI

Label ä en

[+ Add another Search related works](#)

Relationship Designator

Property: <http://id.loc.gov/ontologies/bflc/relation>
Class: <http://id.loc.gov/ontologies/bflc/Relation>

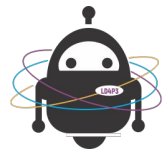
▼ Input Relationship Designator

Property: <http://www.w3.org/2000/01/rdf-schema#label>

Enter a literal

ä en

[+ Add another Input Relationship Designator](#)



Work to Work Relationships in Sinopia

Adaptation

Related Work

Property: <http://id.loc.gov/ontologies/bfrc/relationship>
Class: <http://id.loc.gov/ontologies/bfrc/Relationship>

▼ Search related works

Property: <http://id.loc.gov/ontologies/bibframe/relatedTo>

URI

Label ä en

[+ Add another Search related works](#)

▼ Relationship Designator

Relationship Designator [+ Add another Relationship Designator](#)

Property: <http://id.loc.gov/ontologies/bfrc/relation>
Class: <http://id.loc.gov/ontologies/bfrc/Relation>

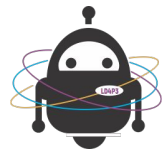
▼ Input Relationship Designator

Property: <http://www.w3.org/2000/01/rdf-schema#label>

Enter a literal

ä en

[+ Add another Input Relationship Designator](#)



Work to Instance (bf:hasInstance)

Has BIBFRAME Instance



Property: <http://id.loc.gov/ontologies/bibframe/hasInstance>

URI

Label ä en

Property: <http://id.loc.gov/ontologies/bibframe/hasInstance>

URI

Label ä en

Property: <http://id.loc.gov/ontologies/bibframe/hasInstance>

URI

Label ä en

Property: <http://id.loc.gov/ontologies/bibframe/hasInstance>

URI

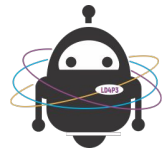
Label ä en

Property: <http://id.loc.gov/ontologies/bibframe/hasInstance>

URI

Label ä en

[+ Add another Has BIBFRAME Instance](#)



Instance Identifiers (to connect back to MARC)

Identifiers



ISBN

[+ Add another ISBN](#)

Property: <http://id.loc.gov/ontologies/bibframe/identifiedBy>

Class: <http://id.loc.gov/ontologies/bibframe/isbn>

▼ ISBN



Property: <http://www.w3.org/1999/02/22-rdf-syntax-ns#value>

Enter a literal



en



[+ Add Qualifier](#)

[+ Add Note](#)

[+ Add Incorrect, Invalid or Canceled?](#)

LCCN

[+ Add another LCCN](#)

Property: <http://id.loc.gov/ontologies/bibframe/identifiedBy>

Class: <http://id.loc.gov/ontologies/bibframe/Lccn>

▼ LCCN



Property: <http://www.w3.org/1999/02/22-rdf-syntax-ns#value>

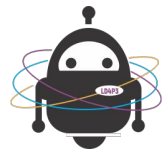
Enter a literal



en

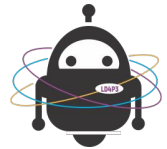


[+ Add Invalid/Canceled?](#)



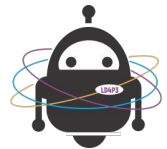
Worth Pointing Out

- We used the un-nested Monograph template from <https://sinopia.io/>
- We didn't fully catalog the Works/Instances in Sinopia
 - Only captured Work to Work information, and related Instance IDs.
- Work to Work relationships could have been captured in the MARC 7XX block of bibs, but it's not ideal
- There wasn't a Moving Image template readily available in <https://sinopia.io/>, so we linked out to a Hub/Work in id.loc.gov
- Recataloging everything by hand in RDF won't scale.



LD4P3 Discovery Collaborators

- Cornell: Greg Delisle, Steven Folsom, Huda Khan, Jason Kovari, Lynette Rayle, Simeon Warner, Tim Worrall
- Stanford: Michelle Futornick, Astrid Usong, (Hilary Thorsen as special consultant)
- Iowa: Dave Eichmann
- Directors
 - Tom Cramer, Dave Eichmann, Jason Kovari, Phil Schreur, Simeon Warner



Cornell Discovery and Access Team

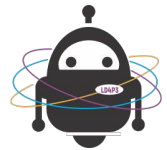
John Cline, Jenn Colt, Matt Connolly,

Caitlin Finlay, Shayla Harrington, Fred Muratori, Eisha Neely,

Emma Raub, Jim Reidy, Lenora Schneller, Nina Scholtz,

Adam Smith (*), Pam Stansbury, Melissa Wallace,

Frances Webb, Tim Worrall(*)



SPECIAL THANKS



- Greg Delisle (*Cornell*)
- Steven Folsom (*Cornell*)
- Michelle Futornick (*Stanford*)
- Jessie Keck (*formerly at Stanford*)
- Jason Kovari (*Cornell*)
- John Skiles Skinner (*formerly at Cornell*)
- Astrid Usong (*Stanford*)
- Tim Worrall (*Cornell*) (*Retired*)



Questions and discussion

- Documentation/wiki
 - [LD4P3 Discovery work](#)
- Email
 - hjk54@cornell.edu
 - sf433@cornell.edu

