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The SHARE-VDE Project:
Fulfilling the Potential of BIBFRAME

Michele Casalini
Casalini Libri

Tiziana Possemato
Casalini Libri - @Cult
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Introduction and overall project goals
Current activity and infrastructure

Casalini Libri produces, for publications from Romance language countries, more than 40,000 original bibliographic records in RDA as a member of the Program for Cooperative Cataloguing (PCC) with authority entries;

Bibliographic records are created using the @Cult OLISuite WeCat cataloguing modules;

@Cult, in addition to the LMS and Discovery tools field, is specialized in the development of software components and platforms to convert, enrich, reconcile and publish the data of cultural institutions under the linked data paradigm.
The three major areas of activity towards the BIBFRAME/Linked Data environment

The enrichment of MARC records with URIs to simplify conversion into BIBFRAME;

The use of a framework to automate the conversion from MARC to RDF, using BIBFRAME vocabulary;

The creation of a BIBFRAME layered platform prototype starting from bibliographic and authority records, to test and demonstrate the advantages of the BIBFRAME data model.
SHARE-VDE overall goals

The main goals of Phase 1 and 2 Research & Development activities are:

- Reconciliation and clusterization of variant forms of the same entity;

- Enrichment of MARC records with URIs, with the development of detection procedures for entity identification, including relator terms;

- Conversion, supply and management of authority and bibliographical data in BIBFRAME, taking into account the complexity of the long and heterogeneous transition time both for libraries and data producers;

- Publication of a BIBFRAME three-layered platform prototype.
SHARE Virtual Discovery Environment project

Each participant decides whether or not to take part in the subsequent phases.

Phase 1: analysis, enrichment, reconciliation, conversion in RDF, publication of two sets of bibliographic data for each participating library were foreseen (1985 and 2015 imprint titles). This phase also included the release of MARC records enriched with URIs and BIBFRAME 1.0 datasets for each participating library.

A total of 2,249,387 bibliographical records and 3,601,327 authority records were converted into BIBFRAME 1.0 and published on the SHARE-VDE portal.

Phase 1: from October 2016 to January 2017.
Phase 2: data enrichment and conversion refinements and customization, enhanced data supply workflow experimentation, second release of the portal.

The library catalogue of each participating institution is be converted into BIBFRAME 2.0 and returned to each library (over 100 million records and consequent datasets are expected to be processed).

A relationship database that registers the relationships between entities (person, work, instances, subjects, publisher, …) is established in order to assure a more precise identification rate of each entity and reach a higher quality of results without human intervention.

Refinement of data, e.g. for co-authors and editors, where they are identified in a variety of ways within library records (Relator terms topic).
SHARE Virtual Discovery Environment project

... cont. Phase 2:

Export of data in MARC or RFD format filtering the library preferred URIs.

Inclusion of additional URI sources, e.g. specific source for corporate bodies, subjects (LCSH, FAST ...), RDA vocabularies.

Analysis for the creation of relationships among subject terms and strings in different languages.

Provenance declaration, update management and built-in instances will be addressed.

Phase 2: from March to December 2017.

Phase 3: modular implementation in production of the various components, according to the specific workflow of the each library.
## Participating libraries (1)

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>(in Country/State order):</th>
</tr>
</thead>
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<tr>
<td>x</td>
<td>x</td>
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</tr>
<tr>
<td>x</td>
<td>x</td>
<td>University California Berkeley</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
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<td>x</td>
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<td>x</td>
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<td>Columbia University</td>
</tr>
<tr>
<td>x</td>
<td>x</td>
<td>University of Pennsylvania</td>
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## Participating libraries (2)

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</thead>
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<tr>
<td>x</td>
<td></td>
<td>Texas A&amp;M University</td>
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<td></td>
<td>x</td>
<td>University of Alberta</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td>University of Toronto</td>
</tr>
</tbody>
</table>
Theoretical context
The theoretical context of the project

Where we are going...

Functional Requirements for Authority Data

Functional Requirements for Bibliographic Records

International Cataloguing Principles

Resource Description and Access

Semantic web/Linked data

BIBFRAME

MARC 21
The theoretical context of the project

New standards, models and technologies as ways to approach entity identification and the relationships between entities, recognized as the key element in the construction of new entity detection and entity identification processes:

- **RDA** — *Resource Description and Access*, the new international guidelines to manage resources

- **Linked Open Data** philosophy and technology

- **BIBFRAME**: one of more interesting models to convert and publish data. This model is considered ‘the core’ ontology, completed with the ontologies for specific domains, that libraries will suggest
SHARE-VDE process overview
The SHARE-VDE processes

OliSuite: manual process

MARC enriched/URIs

Database of relationships

Knowledge base of clusters

RDF/BIBFRAME dataset

SHARE-VDE Portal

Similarity’s score

Entity detection

Enrichment

Reconciliation/Cluster

Authify

Dump db

APIS

External sources

SHARE

VDE Portal

MARC enriched/URIs

Entity detection

Enrichment

Reconciliation/Cluster

Database of relationships

Knowledge base of clusters

RDF/BIBFRAME dataset

SHARE-VDE Portal
Focus on processes 1/2

**Authority records**

- BIB1
- BIB2
- BIB...

**Bibliographic records**

- BIB1
- BIB2
- BIB...

**Similarity’s score**

**Authify**

**CLUSTERS KNOWLEDGE BASE**

**Marc enriched (.pxml)**
Focus on processes 2/2

Marc enriched (.pxml)

BIB1
BIB2
BIB...

Marc enriched (Binary) (one for LIB)

Clusters Knowledge base

Lodify

Triplestore

RDF

RDF

RDF

RDF

RDF

SHARE-VDE URIs

External (VIAF) URIs
Entity identification, Reconciliation and Data enrichment
Who’s Who?

The question at hand: how to identify an entity?
I don't care, and you find that attractive. But I also don't care about that.

Happy Valentine's Day
Love, __________ and
Albert Camus
benkling.tumblr
Albert Camus
The importance of identification in the cataloguing tradition (and not only!)

Entity identification: it has traditionally been considered a highly important aspect of cataloguing.

But, the use of attributes to identify a person has not been widely used

* Both pictures are taken at the City Lights Bookstore, in San Francisco
Data reconciliation and enrichment

With the online presence of different catalogues and authority files available in various formats and, where possible, in open mode, the concepts of authority control and of union catalogue have also evolved into the grouping of an entity’s identifying attributes from different sources.

The process is best known as **reconciliation** and consists in creating a cluster of data that all refer to the same entity.
The new revolution: from record to entity

<table>
<thead>
<tr>
<th>Title</th>
<th>Language</th>
<th>Publisher</th>
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<tbody>
<tr>
<td>As you like it</td>
<td>English</td>
<td>Cambridge University Press</td>
</tr>
<tr>
<td>Come ti piace</td>
<td>Italian</td>
<td></td>
</tr>
<tr>
<td>Comme il vous plaira</td>
<td>French</td>
<td></td>
</tr>
<tr>
<td>Fathers and daughters</td>
<td>English</td>
<td></td>
</tr>
<tr>
<td>Padri e figlie</td>
<td>Italian</td>
<td></td>
</tr>
</tbody>
</table>

Shakespeare, William, 1564-1616

Шекспир, У. 1564-1616 Уильям

Saixpēr, Gouilliam, 1564-1616

Agent

Work

Subject
Data entification, reconciliation, enrichment and publication

Bring together and make available data from different sources in a way that could be defined as *democratic* to better identify the entity in question.

Even wider reconciliation and enrichment processes form the basis of a number of projects that convert and publish bibliographic catalogues as Linked Open Data, such as:

- **Share VDE — *Share Virtual Discovery Environment***: [www.share-vde.org](http://www.share-vde.org) (in partnership with Casalini Libri and @Cult)
Albert Camus on the SHARE-VDE platform

A WORK AS AN ENTITY WITH ITS RELATIONSHIPS!

http://share-vde.org/sharevde/searchTitles?t_cluster_id=240309&l=en
Different entities from the same Marc record!

Here Thomas Mann is the subject of a work!
Different entities from the same Marc record!

The PUBLISHER with its RELATIONSHIPS!
The result of a reconciliation of the entity *Antonio Vivaldi* in the Share VDE project, with data from different sources and projects:

- the authorized form from a local authority file
- the variant forms originating from the references on the local authority records
- the variant forms originating from the VIAF
- the forms of the name used in the bibliographic records.

The cluster is completed and enriched with identifiers for the same entity, Antonio Vivaldi, from sources such as:

- Wikidata
- Library of Congress Name Authority File
- Data.bnf.fr
- VIAF
An example of Work/Instances reconciliation

Grouping under a single work title of the many publication titles in the catalogue for *Cimento dell’armonia e dell’inventione*

Single work title

Brings together different publications/resources present in different catalogues.

http://share-vde.org/sharevde/searchTitles?t_cluster_id=11287
Example of same Instances present in different libraries

The storm and other things / Eugenio Montale ; translated, with preface and commentary, by William Arrowsmith (9 documenti)

Montale, Eugenio, 1896-1981
Publisher: New York : Norton, c1985
Extent: 219 p. ; 25 cm.
Format: Language material

5 results found
Reconciliation & Enrichment
Automatic procedures
How reconciliation is obtained

Data reconciliation and enrichment is obtained by:

- **automated processes**
- **manual processes**

It is important to underline how the relationship between the reconciliation and validation of the results can differ greatly between the automated and manual processes:

- **automated processes**: a high level of reconciliation and clustering; a low level of result validation;
- **manual processes**: a low level of reconciliation and clustering; a high level of result validation.
Automated reconciliation and enrichment

The process of reconciling variant forms of the entity *Antonio Vivaldi* found in different projects and catalogues.
Authify – General description

Authify is a RESTFul module that offers several search and detection services. The original aim of the project was to overcome some of the limitations of the public VIAF Web API.

VIAF, being a public project, does not allow a massive invocation of its API: for those use cases where such requirement is needed, the project provides a download of the whole dataset.

That was the main reason we started implementing Authify: to index and store the VIAF clusters dataset and also provide powerful full-text and bibliographic search services.

It is possible to add to Authify other dump databases, coming by external projects that make them available.
The Authify cluster search service provides, as the name suggests, a full-text search service for names and works clusters. The search Web API uses an “invisible queries” approach in order to (try to) find as precise as possible a match within the managed clusters.

The invisible queries approach makes everything transparent to the caller: in addition to a single search request, the system carries out a chain of different search strategies with different priorities, and the first match to produce a result will populate the response that will be returned.

For debugging purposes, the response will also include the matching strategy that produced the results.
Authify – Cluster search services

The system has been built with extensibility in mind, so the chain is fully configurable; for instance, here is a brief description of the current configuration when searching names clusters:

• **Subfields matching**: the query language allows the caller to specify the source tag / subfields that compose the heading (which is the actual input query string).

• **Input heading exact match**: the system tries to find an exact match with the provided query string.

• **FullText search**: if an exact match is not possible, then a regular full text search is carried out, with options like proximity search for names (e.g. Bertrand Meyer = Meyer Bertrand) and special detection for some entities (e.g. birth and death dates).

• Finally, the system executes a **search by “initials”**, in order to find a valid match in those cases when the input string (or the indexed heading) contains the name in its short form. As with the previous point, this could lead to a less precise response.
The query interface:  

```
http://labs.atcult.it/authify/names?q=bertrand Meyer
```

: the system will provide a response like this:

```
{
  "responseHeader" : {
    "QTime" : 3,
    "matching-strategy" : "name::headings-exact-match",
    "status" : 0
  },
  "response" : {
    "docs" : [ {
      "id" : "51714577",
      "type" : "Personal",
      "uri" : "http://viaf.org/viaf/51714577/",
      "headings" : [ "Meyer, Bertrand, 1950-....", "Bertrand Meyer", "Meyer, Bertrand" ],

      "sources" : [ "BNF|12079479", "DNB|112127843", "ISNI|0000000109003927", "LC|n 86061235", "LNB|LNC10-000142119", "NDL|00471567", "NKC|skuk0004073", "NLA|000035194108", ...
    }
  }
}
```
Authify – Relator term detection

Another service which has been added to Authify is the so called “Relator term detection”.

Starting from a MARC record (whatever the specific dialect) the system analyses all (configured) tags that contain a name and, for each of them, tries to determine (using the statements of responsibility of the input record) what is the corresponding role within the work represented by the given record.

So, for instance, for the following input (the example shows only the relevant tags):

245 10$aFondamenti di teoria dei circuiti /$cCharles A. Desoer, Ernest S. Kuh ; prefazione all'edizione italiana di G. Biorci
100 1 $aDesoer, Charles A.
700 1 $aBiorci, Giuseppe
700 1 $aKuh, Ernest S.
Authify – Relator term detection

The system will give a response like this:

```json
{
  "id": "LE02614324",
  "statements": [
    "245 10$aFondamenti di teoria dei circuiti /cCharles A. Desoer, Ernest S. Kuh ; prefazione all'edizione italiana di G. Biorci"
  ],
  "names": [
    "100 1 $aDesoer, Charles A.",
    "700 1 $aBiorci, Giuseppe",
    "700 1 $aKuh, Ernest S."
  ],
  "responsibilities": {
    "content": {
      "http://id.loc.gov/vocabulary/relators/oth": {
        "headings": [
          {
            "name": "Biorci, Giuseppe"
          }
        ],
        "relatorTermCode": "oth",
        "relatorTermText": "Other"
      },
      "http://id.loc.gov/vocabulary/relators/aut": {
        "headings": [
          {
            "name": "Kuh, Ernest S."
          },
          {
            "name": "Desoer, Charles A."
          }
        ],
        "relatorTermCode": "aut",
        "relatorTermText": "Author"
      }
    }
  }
}
```
Authify – Relator term detection

In these examples you can see that two main roles have been detected:

- **authors**
- **other** (unclassified role).

The “other” role is a catch-all role used when no valuable information can be gathered from the analysis.

Behind a simple token matching analysis, there is a more complicated logic that tries (using, among other things, the search services described in the previous point) to find the role of each name using its variant forms or using a set of tokens that could identify it (e.g. edited by, by, illustrated by).
Entity detection (example 1)

=100 1\$aStephens, John
=245 10\$aLiterature, language and change :$bf from Chaucer to the present /$cJohn Stephens and Ruth Waterhouse
=260 1$bRoutledge,$cc1990
=300 1$aix, 293 p. ;$c20 cm.
=650 4$aLetteratura inglese$xStoria e critica
=650 4$aLingua inglese
=700 1\$aWaterhouse, Ruth
Entity detection - Authify/Detect response (1)

Response Body service authify/detect:
{
  "id": "LE02519084",
  "statements": [
    "245 10$aLiterature, language and change :$bfrom Chaucer to the present /$cJohn Stephens and Ruth Waterhouse"
  ],
  "names": [
    "100 1 $aStephens, John",
    "700 1 $aWaterhouse, Ruth"
  ],
  "responsibilities": {
    "content": {
      "http://id.loc.gov/vocabulary/relators/aut": {
        "headings": [
          {
            "name": "Stephens, John"
          },
          {
            "name": "Waterhouse, Ruth"
          }
        ],
        "relatorTermCode": "aut",
        "relatorTermText": "Author"
      }
    }
  }
}
Entity detection (example 2)

Jerusalem interrupted: modernity and colonial transformation 1917-present / edited and introduced by Lena Jayyusi.

Includes bibliographical references and index.

Jerusalem, History, 20th century.

Jerusalem, History, 21st century.

Jerusalem, International status.

Arab-Israeli conflict.

Jayyusi, Lena.
Entity detection - Authify/Detect response (2)

{
"id": "7486885",
"statements": [
"245 00$aJerusalem interrupted :$bmodernity and colonial transformation 1917-present /$cedited and introduced by Lena Jayyusi."
],
"names": [
"700 1 $aJayyusi, Lena."
],
"responsibilities": {
"content": {
"http://id.loc.gov/vocabulary/relators/edt": {
"headings": [
{
"name": "Jayyusi, Lena."
}
],
"relatorTermCode": "edt",
"relatorTermText": "Editor"
}
}
}
}
Entity detection (example 3) - Critical case

=Breviarium Romanum : edizione princeps, 1568 / cedizione anastatica, introduzione e appendice a cura di Manlio Sodi, Achille Maria Triacca ; con la collaborazione di Maria Gabriella Foti ; presentazione di Virgilio Noè

Città del Vaticano : Libreria editrice Vaticana, 1999

XXII, 1056 p. ; 25 cm

Monumenta liturgica concilii tridentini v3

Sodi, Manlio
Triacca, Achille Maria
Foti, Maria Gabriella
Noè, Virgilio

001 LE01988135
005 20020503105244.0
008 010702s1999
010702s1999
020 $a882092868X
040 $aDip.to Beni Arti e Storia
082 0$a264.024
245 00$aBreviarium Romanum :$beditio princeps, 1568 /$cedizione anastatica, introduzione e appendice a cura di Manlio Sodi, Achille Maria Triacca ; con la collaborazione di Maria Gabriella Foti ; presentazione di Virgilio Noè
260 $aCittà del Vaticano :$bLibreria editrice Vaticana,$c1999
300 $aXXII, 1056 p. ;$c25 cm
440 0$aMonumenta liturgica concilii tridentini$v3
700 1$aSodi, Manlio
700 1$aTriacca, Achille Maria
700 1$aFoti, Maria Gabriella
700 1$aNoè, Virgilio
907 $a.b10000914$b02-04-14$c29-05-02
245 00$aBreviarium Romanum :$beditio princeps, 1568 /$cedizione anastatica, introduzione e appendice a cura di Manlio Sodi, Achille Maria Triacca ; con la collaborazione di Maria Gabriella Foti ; presentazione di Virgilio Noè
Name cluster process

Authority form:
Lucio, José de
De Lucio, José
Lucio, J. de (José de)
Lucio, José de

ID cluster: 2085026
Author: Lucio, José de m. 1949

Other forms:
Lucio, José de
Lucio, José de m. 1949
De Lucio, José
Lucio, J. de (José de)
Massive clusters processes

- Authority headings analysis and process in PostgresSql;
- Data enrichment with external sources
- MARC bibliographic process
- Entity detection (authors and co-authors identification process)
- Name heading-to-Authority names association (through a weighted comparison algorithm)
- Name heading-to-Variant names association
- Cluster check (it exists = add; it doesn’t exist = create new)
Reconciliation & Enrichment
Manual procedures
PCC directives

PCC identifies and addresses policy issues on the use of identifiers in MARC:

- Developing guidelines to include identifiers in MARC bibliographic and authority records
- The use of multiple identifiers for the same entity
- Determining the entities for which identifiers should be provided in an initial implementation
- Identifying automated methods for populating and maintaining new and existing records with identifiers
The importance of identification and detection in the Semantic Web

Key elements of the cataloguing workflow:
- entity identification
- reconciliation

To enrich a MARC record with URIs Casalini Libri uses the “URI MANAGEMENT SYSTEM” (included in the OLISuite cataloguing module within WeCat).

This also simplifies the reconciliation of varying forms of the same entity with the development of detection procedures for entity identification and the conversion to BIBFRAME.
The manual process to enrich MARC records

The “URI MANAGEMENT SYSTEM” allows the management of multiple identifiers for each access point or heading.

Use of external sources (such as NAF, ISNI and VIAF) with API and web services.

Associate heading with the URIs that identify it in each of the projects.
URI Management System in OLISuite

Browse search

Search/Cataloguing
- Simple
- Advanced
- External
- Last index
- Active queries
- Indexes list
- Diacritic

Reports
- General
- Label

Templates/Download
- From template
- Load from file
- Check loaded data
- Templates
- Load from VIAF

Access
- New heading (F9)
- Transfer relationships

Browse search

URI: kafka

Configuration

NT ✓ References ✓ Aut ✓ Doc ✓ Level ✓ Indic ✓ Acc ✓ Rapid insertion ✓

Table:

<table>
<thead>
<tr>
<th>Heading</th>
<th>DB</th>
<th>NT</th>
<th>URI</th>
<th>Refs</th>
<th>A</th>
<th>Docs</th>
<th>Level</th>
<th>Index</th>
<th>Acc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaestli, Jean-Daniel</td>
<td>B1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>Unverified</td>
<td>und</td>
<td>und</td>
</tr>
<tr>
<td>Kafka, Franz, 1883-1924</td>
<td>B1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>Saved</td>
<td>und</td>
<td>und</td>
</tr>
<tr>
<td>Kafka, Franz 1883-1924 The Metamorphosis</td>
<td>B1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>Saved</td>
<td>und</td>
<td>eng</td>
</tr>
<tr>
<td>Kafka, George</td>
<td>B1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>Unverified</td>
<td>und</td>
<td>und</td>
</tr>
</tbody>
</table>
URI Management System in OLISuite

The cataloguer can check, modify, delete or add other identifiers to the same heading
Adding new URIs to a heading in OLISuite

From this drop down menu the cataloguer can choose the desired source and start the URI search.
Adding new URI to a heading OLISuite

From the search result window choose the desired URI and SAVE.
Access points and URIs

The multiple identifiers associated with Kafka are saved in a specific oracle table and not directly in subfield $0$ of the MARC tag for that heading.

While it is an acceptable practice in MARC to have multiple identifiers for the same entity in one field via repeating subfields, that does not translate well to RDF.

It is impossible for the program to determine which subfield each $0$ URIs references because the sequence and order of subfields has no meaning for the program.

For example:

```
382 0\$aviolin$n1$n1$s2$s2$lcmpt
$http://id.loc.gov/authorities/performanceMediums/mp2013015782 $apiano
$http://id.loc.gov/authorities/performanceMediums/mp2013015550
```
Access points and URIs

Saving the different URIs in an Oracle table allows them to be used in various ways, selected during the data export/conversion:

- how many URIs to make available for each heading
- how to associate them with the heading
- how to show them in relation to data use and formats

Different customer profiles that were previously defined in Adempiere are considered.
Adempiere – Customer profile

Customer profile for Harvard College Library
### URIs/tag mapping

#### URIs/tag mapping for Library A

<table>
<thead>
<tr>
<th>Mappatura URI ID</th>
<th>Tag da arricchire</th>
<th>LC NAF</th>
<th>LC SH</th>
<th>LC CLASSIFICATION</th>
<th>LC GENRE FORMS</th>
<th>ISNI</th>
<th>VIAF</th>
<th>FAST</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>MU000001</td>
<td>100</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>1</td>
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<td>0</td>
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<td>MU000001</td>
<td>600</td>
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#### URIs/tag mapping for Library B

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<th>LC NAF</th>
<th>LC SH</th>
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<th>LC GENRE FORMS</th>
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<th>VIAF</th>
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Access points and URIs

MARC authority record (customer A)
=005 00000127573
=003 CaOOAMICUS
=005 20160108094931.0
=008 160107s19740000000a
=040 \$aAtCult\ita
=100 \$aKafka, Franz,$d1883-1924
=400 \$aWikipedia, Oct. 25, 2012

MARC bibliographic record (customer B)
=005 20160108125155.0
=008 751003s1974000$enki
=024 7\$a566118573$2viaf
=024 7\$a000000012280370X$2isni
=040 \$aPS$bita
=100 \$aKafka, Franz,$d1883-1924

DCM BATCH framework

Adempiere – Customer profile (URI/tag mapping)

URI Management System (OLISuite/WeCat)
Access point and URIs (customer A)

As $0 or $1 is associated to the access point in the MARC bibliographic record:

=LDR 00560nam a2200181 4500
=001 000000127573
=003 CaOOAMICUS
=005 20160108094931.0
=008 160107s\\\\\\\\\rid\\\\\\\\\\\\\\\n000u\ita\n
=040 "aAtCult\ita

=100 1\aKafka, Franz, d1883-1924$0/isni.org/isni/000000012280370X
=245 03$aLa metamorfosi /$cFranz Kafka.
=260 "aMilano :$bLa spiga,$c2002.

=300 "a61 p.; $c18 cm
=336 "atext$2rdaccontent

=337 "aunmediated$2rdamedia
=338 "avolume$2rdacarrier
=997 "aPS
Access point and URIs (customer B)

As a specific tag in the MARC authority record:

=LDR 00698nz 2200145 4500
=001 000000000617
=005 20160108125155.0
=008 751003s1974|||enkl|||0001\1\eng\
=02 7\$a//viaf.org/viaf/56611857$2uri
4 7\$a//isni.org/isni/000000012280370X$2uri
=02 \$$aPS$$bita
4 1\$aKafka, Franz$d1883-1924
=040 1\$aKafka, F.$q(Franz)$d1883-1924
=100 \$$aWikipedia, Oct. 25, 2012$bFranz Kafka; born 3 July
=400 1883 in
=670

Prague; died 3 June 1924 Kierling near Vienna; an influential German-language writer of novels and short stories, regarded by critics as one of the most influential authors of the 20th century. Kafka was a Modernist and heavily influenced other genres, including existentialism)
The reorganisation of a cluster can modify its original content, so we need to save the relevant cluster updates in a URI Registry.

The URI Registry could keep information such as (but not limited to):

- the resources added to the cluster, but also modified or removed from it
- the date of the update
- the particular operation performed
- the status of an URI (for instance valid or invalid)
- the URI aliases
Conversion in RDF/BIBFRAME
Lodify: the evolution of Aliada for BIBFRAME conversion

The conversion process from any format to RDF

RESOURCES

METADATA CREATORS
(Librarians, curators)

- Library Management System (ILS)
- Museum Collection Management System (MMS)
- Content Management System (CMS)

IT COMPANIES

BROWSERS
(GOOGLE)

OTHER PUBLIC AND CULTURAL INSTITUTIONS

LINKED DATA CLOUD

http://lod-cloud.net/
Lodify - The asynchronous pipeline

A Lodify building block, realized through Apache Camel. The process is split into atomic pieces (processors), each of these responsible for a small part of the overall task. Each processor can act as a splitter or aggregator and can achieve content manipulation on the incoming message.
Lodify - Conversion templates

Lodify converts each incoming record by means of Conversion templates. Each template associates:

- a MARC record belonging to the incoming data-stream
- with a set of (conversion) rules associated with one or more ontologies.

Example:

001 27283
020 1 $a880921191X

001 27283
100 1 $aCollodi, Carlo.
Trust and Provenance
 Guarantee of authority and quality in the new LOD environment

Need to guarantee the accuracy of this information

Knowing the *provenance* of a piece of information – *its origin*, authorship or matrix – is a key factor in determining *the extent to which it can be trusted*.

The information source has become the guarantor of quality: *creating a link between information and its source has become essential for the purpose of guaranteeing the authority of the information itself.*
Guarantee of authority and quality in the new LOD environment

The source or *provenance*, which, in turn, must be constructed with reference to specific ontologies, providing the classes, properties and restrictions needed for identifying it, becomes the *fourth element* added to every triple (assertion) to certify its validity, transforming the triple into a quadruple.

Stating the *provenance* of a piece of information is an essential element for increasing the trust that can be placed in data, and facilitating its use and sharing by end users or by the institutions choosing to co-operate in this way.
SHARE-VDE phase 2 deliverables
**Phase 2 deliverables overview**

**Deliverable 1:** The datasets in BIBFRAME 2.0 of the entire catalogue of each institution with the "tuples" derived directly from MARC records, delivered both as triples and as quadruples with the addition of provenance and with Share-VDE URIs.

**Clusters Knowledge base**

**Deliverable 2:** The knowledge base of clusters accessible in RDF.

**SHARE-VDE URIs**

**Deliverable 3:** The datasets in BIBFRAME 2.0 for each institution with the triples that include the URIs from the external sources.

**Marc enriched (Binary) (one for LIB)**

**Deliverable 4:** The MARC21 records for each institution enriched with URIs.

**External (VIAF) URIs**
Phase 2 deliverables overview

D1: the catalogue of each library converted into BIBFRAME 2.0 format

Entities are reconciled in the dataset and linked to SHARE-VDE project URIs of D2 for identification.

D2: the SHARE-VDE project Knowledge base of clusters in RDF format

Common for all institutions as it includes data from all of the participants. Entities in D2 are enriched with URIs from external sources. All variant forms are included.

D3: the dataset converted in BIBFRAME 2.0 with external URIs included

This dataset includes a certain number of relationships already present in the knowledge base. Works autonomously from D2.

D4: the MARC21 version of D3

Includes all of the institution's records enriched with URIs.
BF LC vocabulary extensions: The current situation

Class List

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<thead>
<tr>
<th>AppliesTo</th>
<th>DemographicGroup</th>
<th>Relation</th>
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<td>CreatorCharacteristic</td>
<td>EncodingLevel</td>
<td>Relationship</td>
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Property List

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<td>title00MatchKey</td>
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@prefix ns1: <http://id.loc.gov/ontologies/bibframe/> .
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@prefix ns3: <http://www.loc.gov/mads/rdf/v1#> .


<http://id.loc.gov/authorities/names/n50044402> a <http://id.loc.gov/ontologies/bibframe/Agent>, <http://id.loc.gov/ontologies/bibframe/Person> ;
    rdfs:label "Bridget, approximately 1303-1373." ;
    ns0:name00MatchKey "Bridget, approximately 1303-1373." ;
    ns0:name00MarcKey "1000 $aBridget, $cof Sweden, Saint, $dapproximately 1303-1373.
$0http://id.loc.gov/authorities/names/n50044402" ;
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    ns1:content <http://rdaregistry.info/termList/RDAContentType/1020>, <http://id.loc.gov/vocabulary/contentTypes/txt> ;
    ns1:adminMetadata <http://share-vde.org/sharevde/rdfBibframe2/AdminMetadata/4a8a08f0-9d37-3737-9564-9038408b5f33>
    ns1:genreForm <http://id.loc.gov/vocabulary/marcgt/bib> ;
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<http://share-vde.org/sharevde/rdfBibframe2/Subject/2f1b63c0-98ed-35e9-b57b-f7d7ce7c525d> .
Deliverable 1: the RDF conversion

<http://share-vde.org/sharevde/rdfBibframe2/Title/a0f4e860-c259-3611-b7ca-03b9369568cb> rdfs:label "Revelationes." 
<http://share-vde.org/sharevde/rdfBibframe2/uniform-title/a0f4e860-c259-3611-b7ca-03b9369568cb> 
  a ns1:Title ;
  rdfs:label "Revelationes.";
  ns0:titleSortKey "Revelationes.";
  ns1:mainTitle "Revelationes.";
  ns0:title40MatchKey "Revelationes.";
  ns0:title40MarcKey "24010$aRevelationes. $lEnglish $s(Searby) $0http://id.loc.gov/authorities/names/n84007202" .

<http://share-vde.org/sharevde/rdfBibframe2/Instance/LOC13910411> 
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  ns1:issuance <http://id.loc.gov/vocabulary/issuance/mono> ;
  ns1:adminMetadata <http://share-vde.org/sharevde/rdfBibframe2/AdminMetadata/ad1517aa-fe91-3d10-902c-a0de7cbd787e>, <http://share-vde.org/sharevde/rdfBibframe2/AdminMetadata/4abfffd8-f0be-a554-8965-9c9e74d1> ;
  ns1:contribution <http://share-vde.org/sharevde/rdfBibframe2/Contribution/e3d5c3a8-560a-3737-a105-dc7a4e8edba> ;
  a ns1:Instance ;
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Clusterization of "forename" heading type

Example:

"$aBridget,$c of Sweden, Saint,$d approximately 1303-1373"

1) selections of interesting subfield

2) normalization of string text without diacritics, accents: Bridget of Sweden Saint approximately 1303-1373.

3) translate all in uppercase and search string into db variant forms and cross references: BRIDGET OF SWEDEN SAINT APPROXIMATELY 1303-1373

4) if no cluster found, subfields will be analyzed
4.1 comparing $a with other existing forms

4.2 comparing only the numeric part of $d (having same $a): $d approximately 1303-1373
=> $d1303-1373

4.3 comparing $c for "saint" or "santa" or other forms (having same $a)
## Deliverable 2: the Knowledge base of clusters - Postgres as a bridge

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<th>hdg_id</th>
<th>name text</th>
<th>pref_firm boolean</th>
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Deliverable 2: the Knowledge base of clusters - the final result

- Other name forms
  - Bridget, of Sweden, Saint, approximately 1303-1373
  - Birgida, de Suecia, santa, 1303-1373
  - Bridgit, s., vidua, c. 1303-1373
  - Birgitta, Zwedigias, Svetka, ap 1303-1373
  - Bridget, of Sweden, Saint, approximately 1303-1373
  - Birgitta Sivare 1303-cm.1373
  - Birjiga, de Suecia, sant
  - Bridget of Sweden, Saint, ca. 1303-1373
  - Birgitta, of Sweden, d. 1373
  - Birgitta, of Sweden, ca. 1303-1373
  - Revelations
  - Birgitta, Saint, of Sweden, approximately 1303-1373. Selections
  - Bridget, of Sweden, Saint, approximately 1303-1373
  - Birgitta, von Schweden, Saint, approximately 1303-1373
  - Birgitta, of Sweden, Saint, ca. 1303-1373
  - Bridget, of Sweden, Saint, ca. 1303-1373
  - Revelations of Saint Birgitta
  - Bridget, of Sweden, Saint, approximately 1303-1373. Book V of St Birgitta's Uppenbarelser


## URI table for external sources

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<th>URI</th>
<th>URI EXAMPLE</th>
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Deliverable 4: enriched MARC21

Record example: http://id.loc.gov/tools/bibframe/compare-id/full-ttl?find=13910411

Original record (by LOC)

01996cam a2200421 i 4500
001 13910411
005 20161026123523.0
008 050324s2015 nyua b 001 0 eng
010 $a 2005047277
020 $a9780195166446 (v.1)
020 $a9780195166262 (v.2)
020 $a9780195166279 (v.3)
020 $a9780195166286 (v.4)
040 $aDLC$beng$cDLC$erda
041 1 $aeng$hlat
042 $aapcc
050 00 $aBX4700.B62$bE5 2006
100 0 $aBridget,$cof Sweden, Saint,$dapproximately 1303-1373.
240 10 $aRevelationes.$lEnglish$s(Searby)
245 14 $aThe revelations of St. Birgitta of Sweden Volume 4 : the heavenly emperor's book to kings, the rule, and minor works /$ctranslated by Dennis Searby with Introduction and Notes By Bridget Morris.
264 1 $aOxford :$bOxford University Press,$c2006-[2015]
300 $a4 volumes :$billustrations ;$c25 cm
Deliverable 4: enriched MARC21

Record example: http://id.loc.gov/tools/bibframe/compare-id/full-ttl?find=13910411

Original record (by LOC)

336  $atext$btxt$2rdacontent
337  $aunmediated$bn$2rdamedia
338  $avolume$bn$nc$2rdacarrier
504  $aIncludes bibliographical references and index.
505  0  $av. 1. Liber Caelestis, books I-III -- v. 2. Liber Caelestis, books IV-V -- v. 3. Liber Caelestis, books VI-- v. 4. The heavenly emperor's book to kings, the rule, and minor works.
650  0  $aPrivate revelations.
650  0  $aVisions.
700  1  $aSearby, Denis Michael,$etranslator.
700  1  $aMorris, Bridget,$d1954--$ewriter of supplementary textual content.
906  $a0$bibc$corignew$d1954$encip$f20$gy-gencatlg
925  0  $aacquire$b1 shelf copy$xpolicy default
952  $aComplete in 4 vols.
955  $brm08 2016-06-06 (Telework)
955  $aADDED VOLS: v. 3 xn05 2012-4-5 to USGEN
955  $aADDED VOLS: v. 4 xn12 2015-12-01 to USASH
Record example: http://id.loc.gov/tools/bibframe/compare-id/full-ttl?find=13910411

Deliverable 4: enriched MARC21

Record enriched with URIs (LOC)

=001 13910411
=008 050324s2015\\nyua\\\
b\\\b\\\b001\0\eng\n=010 \$$a 2005047277
=020 \$$a9780195166446 (v.1)
=020 \$$a9780195166262 (v.2)
=020 \$$a9780195166279 (v.3)
=020 \$$a9780195166286 (v.4)
=040 \$$aDLC$beng$cDLC$erda
=041 1\saeng$hlat
=042 \$$apcc
=050 00$aBX4700.B62$bE5 2006
=100 0\saBridget,$cof Sweden, Saint,$dapproximately 1303-1373.
=240 10$aRevelationes.$lEnglish$s(Searby)$0http://id.loc.gov/authorities/names/n50044402
=245 14$aThe revelations of St. Birgitta of Sweden Volume 4 : the heavenly emperor's book to kings, the
rule, and minor works /$ctranslated by Dennis Searby with Introduction and Notes By Bridget Morris.
=264 \l$aOxford :$bOxford University Press,$c2006-[2015]
=300 \$$a4 volumes :$billustrations ;$c25 cm
Record example: http://id.loc.gov/tools/bibframe/compare-id/full-ttl?find=13910411

Record enriched with URIs (LOC)

\$atext\btxt\$2rdacontent\0http://rdaregistry.info/termList/RDAContentType/1020
\$unmediated\bn\$2rdamedia\0http://rdaregistry.info/termList/RDAMediaType/1007
\$avolume\bn\$2rdacarrier\0http://rdaregistry.info/termList/RDACarrierType/1049
\$aIncludes bibliographical references and index.
\$av. 1. Liber Caelestis, books I-III -- v. 2. Liber Caelestis, books IV-V -- v. 3. Liber Caelestis, books VI-VII -- v. 4. The heavenly emperor's book to kings, the rule, and minor works.
\$aPrivate revelations. \0http://id.loc.gov/authorities/subjects/sh85107042
\$aVisions. \0http://id.loc.gov/authorities/subjects/sh85143882
\$aSearby, Denis Michael, $etranslator. \0http://id.loc.gov/authorities/names/nr98021028
\$aMorris, Bridget, $d1954- $ewriter of supplementary textual content. \0http://id.loc.gov/authorities/names/n92016617
\$aComplete in 4 vols.
\$brm08 2016-06-06 (Telework)
\$aADDED VOLS: v. 3 xn05 2012-4-5 to USGEN
\$aADDED VOLS: v. 4 xn12 2015-12-01 to USASH
SHARE-VDE
possible steps for the future
**Candidate Use Cases for a production phase**

**Phase 3a**
- Publication of the entire catalogues on the SHARE-VDE platform, updated SHARE-VDE common knowledge base [UC1]
- Batch or automated updating of data from libraries [UC2]
- Dissemination of data to contributing libraries on automated or batch process [UC3]

**Phase 3b**
- Interaction with the common knowledge base [UC4]
- Reporting to serve library needs [UC5]
- Engage in cataloguing activities (holding assignment, entity editing, entity creation) using third party cataloguing tools [UC6]
Copy cataloguing

- Authify for enrichment and reconciliation
- Lodify for conversion

External Sources

Knowledge base of clusters

Libraries

Local discovery (Blacklight)

Local Triple store

BF editor (LC or CEDAR) for entity editing and holding assignment
Original cataloguing

PCC Guidelines

Local discovery (Blacklight)

Triple store

Local or common?

Create entity, Create relation tool

Create entity, Create relation tool

Authority tool

Authify for enrichment and reconciliation

Lodify for conversion

common triple store

Knowledge base of clusters

External Sources

SHARE

Linkage to external authorities and web context data
Conclusions: the sharing and reuse of information resources

All of these efforts are being made with the aim of facilitating the sharing and reuse of assets, and tools produced by libraries, museums and other institutions, guaranteeing their availability to a wider public, enriching the World Wide Web with valuable information that would otherwise remain mostly hidden in archives, collections and catalogues, and promoting a culture of open access to knowledge, with numerous advantages for each link in the information chain.

Libraries, archives and museums all benefit from the possibility of more comprehensive and well-structured tools which provide end users with a vast wealth of information, and create new co-operative tools for information professionals.

In line with this new, open philosophy of data sharing and reuse, even traditional authority controls, union catalogues and discovery systems are evolving.
The Library of Congress

**LC’s Digital Future and You!**

*a series of briefings sponsored by Library Services on digital initiatives*

Tuesday, February 6, 2018

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**Thank you!**

Any questions or feedback are greatly appreciated.

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Michele Casalini  
Casalini Libri

Tiziana Possemato  
Casalini Libri - @Cult