

# Exposing Missing Links

From CONTENTdm digital collections to the  
Linked Open Data cloud

**Best Practices Exchange**

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**Silvia B. Southwick**

Digital Collections Metadata Librarian

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# Agenda

- Linked Data basic concepts
- UNLV Linked Data project
- Technologies
- Transforming metadata into linked data
- Next steps

# Linked Data Overview

- My collections are already visible through Google; so who cares
- This is a topic for catalogers
- It's too technical / complicated / boring

Actually ...

- Linked data is the future of the Web
- Data will no longer be trapped in silos imposed by systems, collections, or records
- Exposed open data presents new opportunities for users

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# What is Linked Data?

- Linked Data *refers to a set of best practices for **publishing** and **interlinking** data on the Web*
  - Data needs to be machine-readable
  - Linked data (Web of Data) is an expansion of the Web we know (Web of documents)

# Current Practice

- Data (or metadata) encapsulated in records
- Records contained in collections
- Very few links are created within and/or across collections
- Links have to be manually created
- Existing links do not specify the nature of the relationships among records

This structure hides potential links within and across collections

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# What we can do with linked data

- Free data from silos
- Expose relationships
- Powerful, seamless, interlinking of our data
- Users interact or query data in new ways
- Search results would be more precise
- Data can be easily repurposed

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# How can we create linked data?

- Our metadata records are deconstructed in triples (statements) that are machine-readable
- Triples are expressed as: **Subject – Predicate - Object**
  - For example: This book – has creator – Tom Heath
  - This book – has title – Linked Data: Evolving the...”
- **Subjects, predicates** and most **objects** should have unique identifiers (URIs) creating data that can be used in Web architecture (HTTP)
- These statements are expressed using the Resource Description Framework (RDF)
- Linked data can be queried using SPARQL

# So, what?

- We already have the metadata!
- We need to transform them into triples
- Each metadata field may produce one or several statements
- One metadata record can produce many, many, triples

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# Example of a metadata record



☺☆☆☆☆☆☆☆☆

## Metadata

<b>Digital ID</b>	sh0000077
<b>Title</b>	Photograph of Frank Sinatra and Jack Entratter at rehearsal, Las Vegas, 1954
<b>Group Creator</b>	Las Vegas News Bureau
<b>Description</b>	Jack Entratter and Frank Sinatra watch rehearsals at the Sands Hotel.

## Description

Jack Entratter and Frank Sinatra watch rehearsals at the Sands Hotel.

## Name of Show

- [Ziegfeld Follies](#) 📄

## Identified Individuals

- [Sinatra, Frank](#) 📄
- [Entratter, Jack](#) 📄

## Source

Image Number: 0287 0037

## Original Collection

- [Sands Hotel Collection](#) 📄

## Date

1954

## Site Name

- [Sands Hotel and Casino](#) 📄

## Graphic Elements (TGM)

- [Theatrical producers & directors](#) 📄
- [Entertainers](#) 📄

## DC Type

- [Still Image](#) 📄

## Genre (TGM)

- [Pictures](#) 📄
- [Photographs](#) 📄
- [Photographic prints](#) 📄

## Language

eng

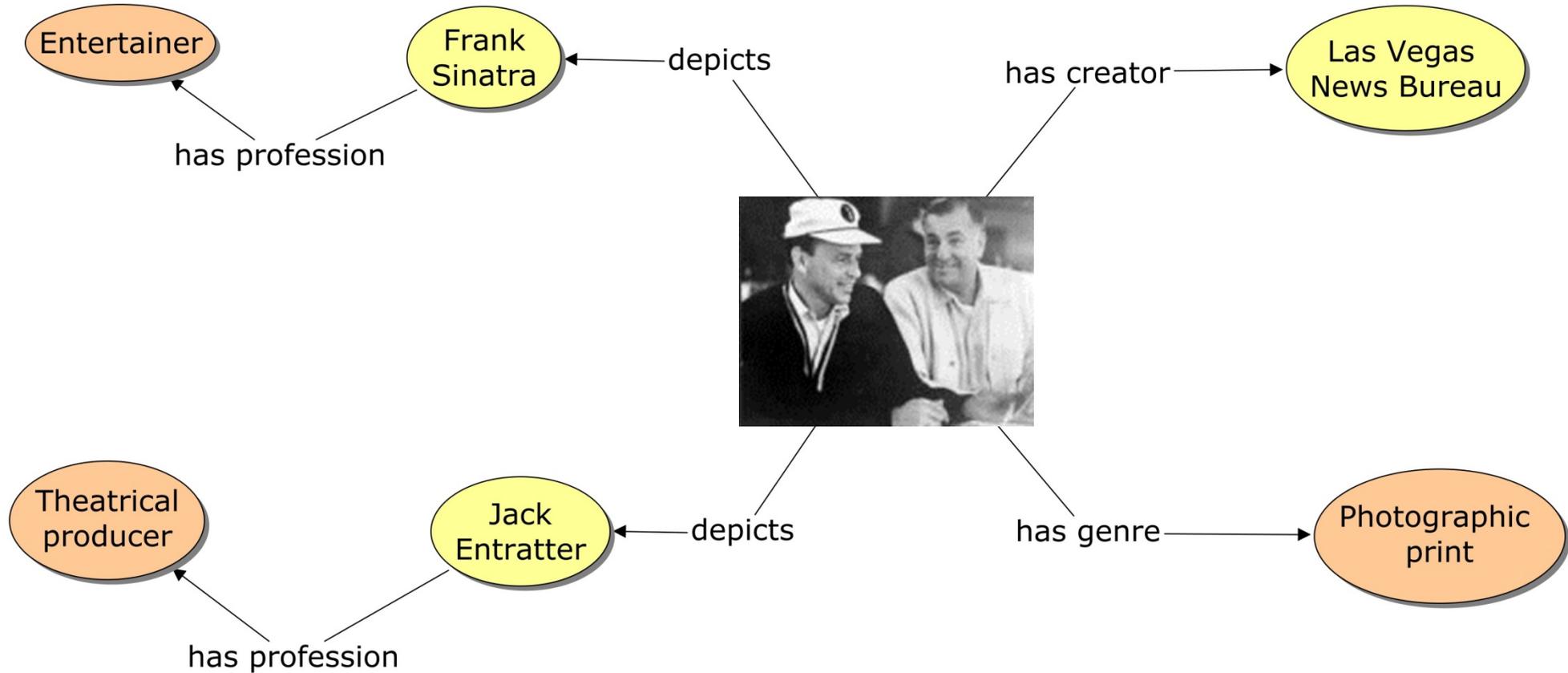
# Expressing metadata as triples

- <this thing> <has creator> <Las Vegas News Bureau>
- < this thing > <has genre> <Photographic print>
- < this thing> <depicts> <Frank Sinatra>
- < this thing> <depicts> <Jack Entratter>



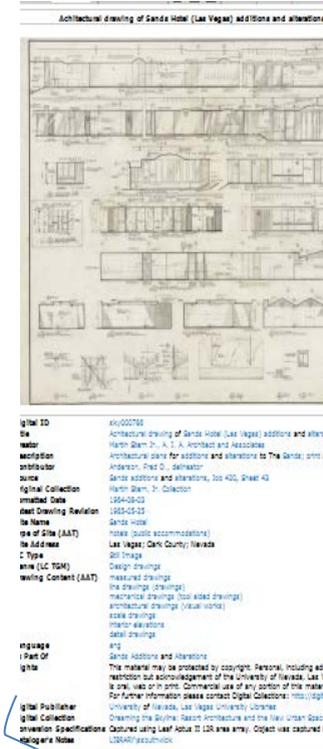
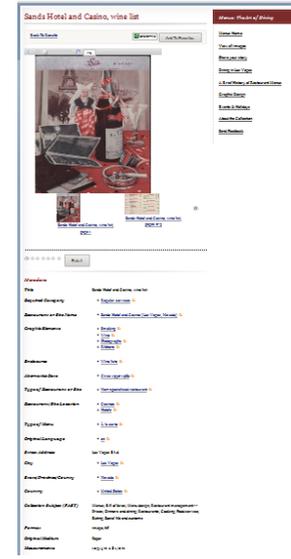
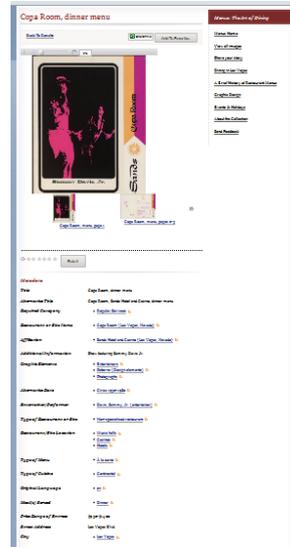
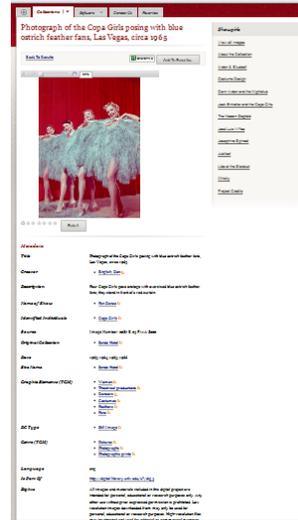
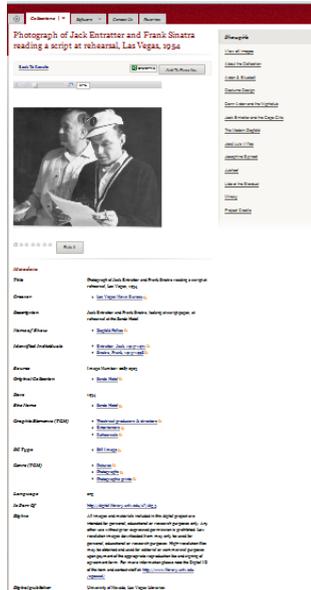
- 
- <Frank Sinatra> <has profession> <entertainer>
  - <Jack Entratter> <has profession> <theatrical producer>

# Graphical Representation



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# Examples of records

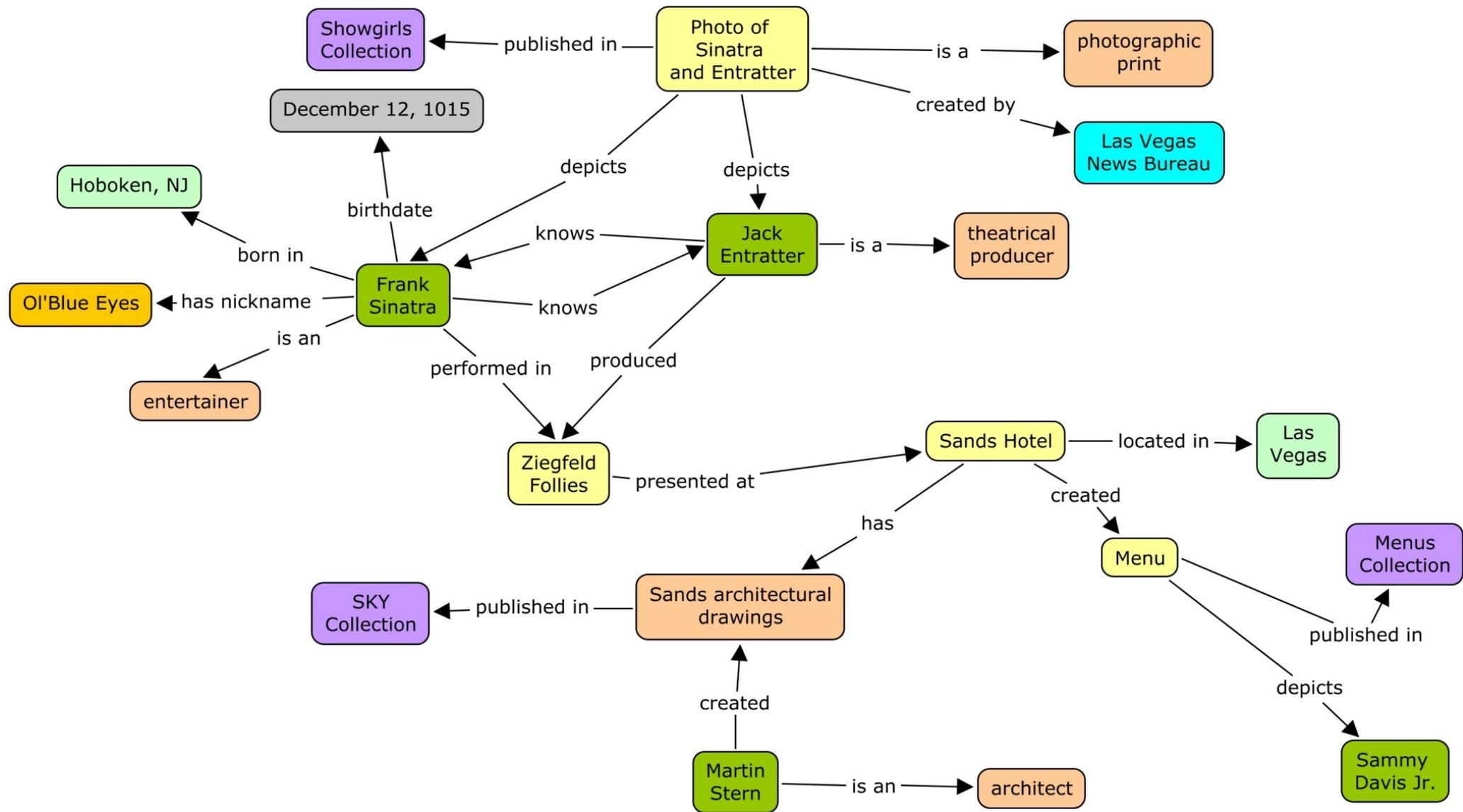


Showgirls

Menus

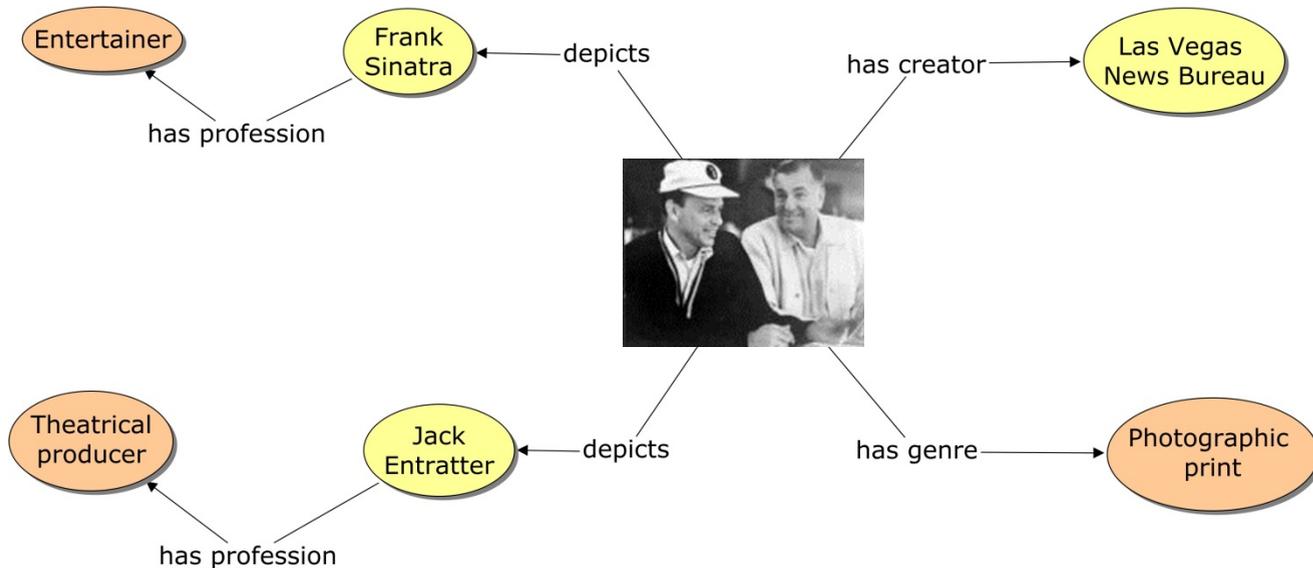
Dreaming the Skyline

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# Graphical Representation



# Vocabularies

- Controlled Vocabularies for values (objects) containing term URI
- Vocabularies for predicates (e.g., Dublin Core, foaf, skos, etc.)

# SubjectURIs

- Re-use existent URIs
- Create URIs for unique “things” or for “things” that do not have yet URIs

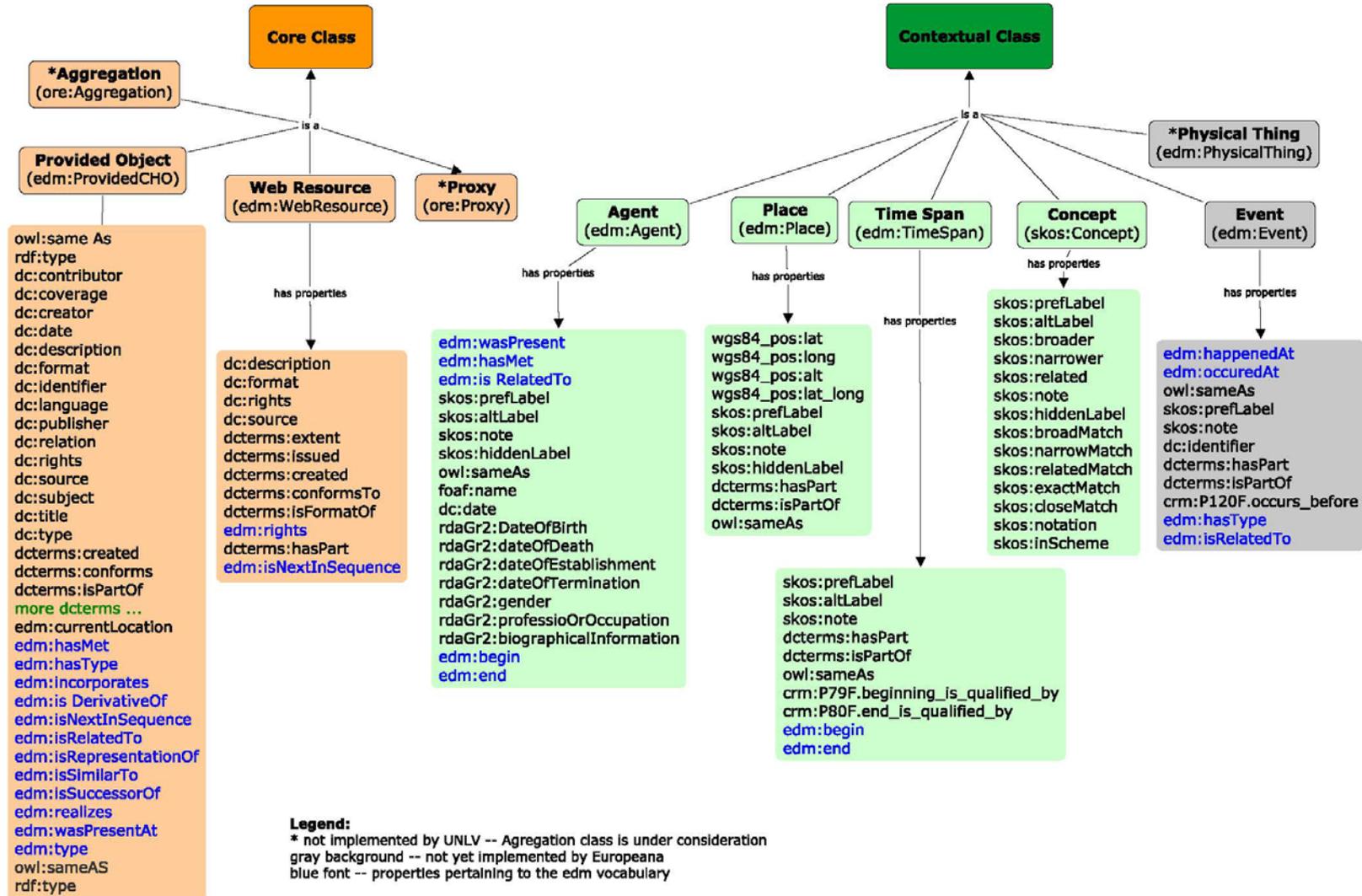
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# How can I transform textual triples into machine-readable?

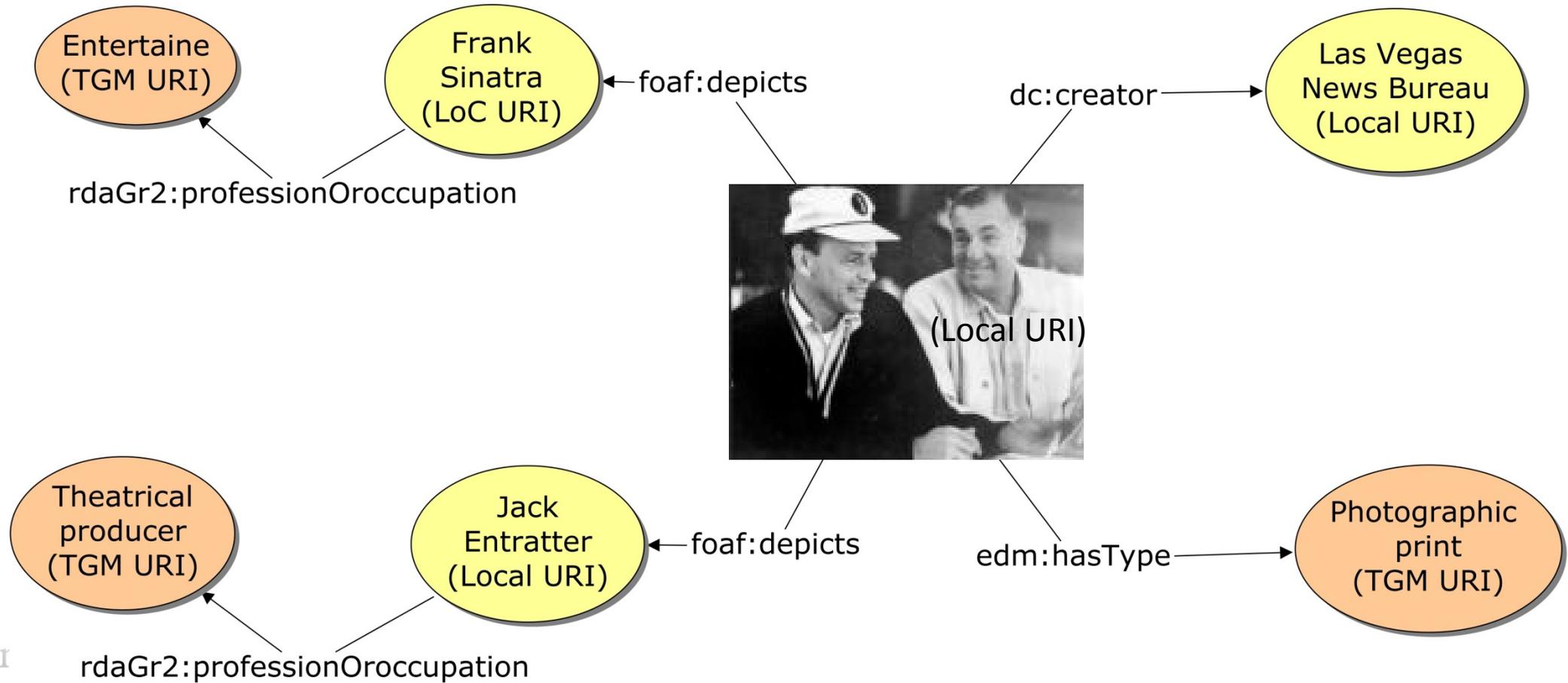
- We need a data model
- **Europeana Data Model** gives us a framework to help organize, structure, and define which predicates we are going to use
- Adopting an existing model is preferable to creating your own (interoperability)

# Europeana Data Model

Based on the EDM documentation at  
<http://pro.europeana.eu/edm-documentation>



# Triples with URIs & EDM model predicates



# Machine-readable triple

@prefix dc: <<http://purl.org/dc/elements/1.1/>> .

@prefix edm: <<http://www.europeana.eu/schemas/edm/>> .

@prefix foaf: <<http://xmlns.com/foaf/0.1/>> .

<<http://digloc7.library.unlv.edu:8890/ProvidedCHO/sho000071>> dc:creator  
<http://digcol7.library.unlv.edu:8890/Agent/Las-Vegas-News-Bureau> .

<<http://digloc7.library.unlv.edu:8890/ProvidedCHO/sho000071>> foaf:depicts  
<<http://id.loc.gov/authorities/names/n50026395>> .

<<http://digloc7.library.unlv.edu:8890/ProvidedCHO/sho000071>> edm:hasType  
<http://id.loc.gov/vocabulary/graphicMaterials/tgm007779> .

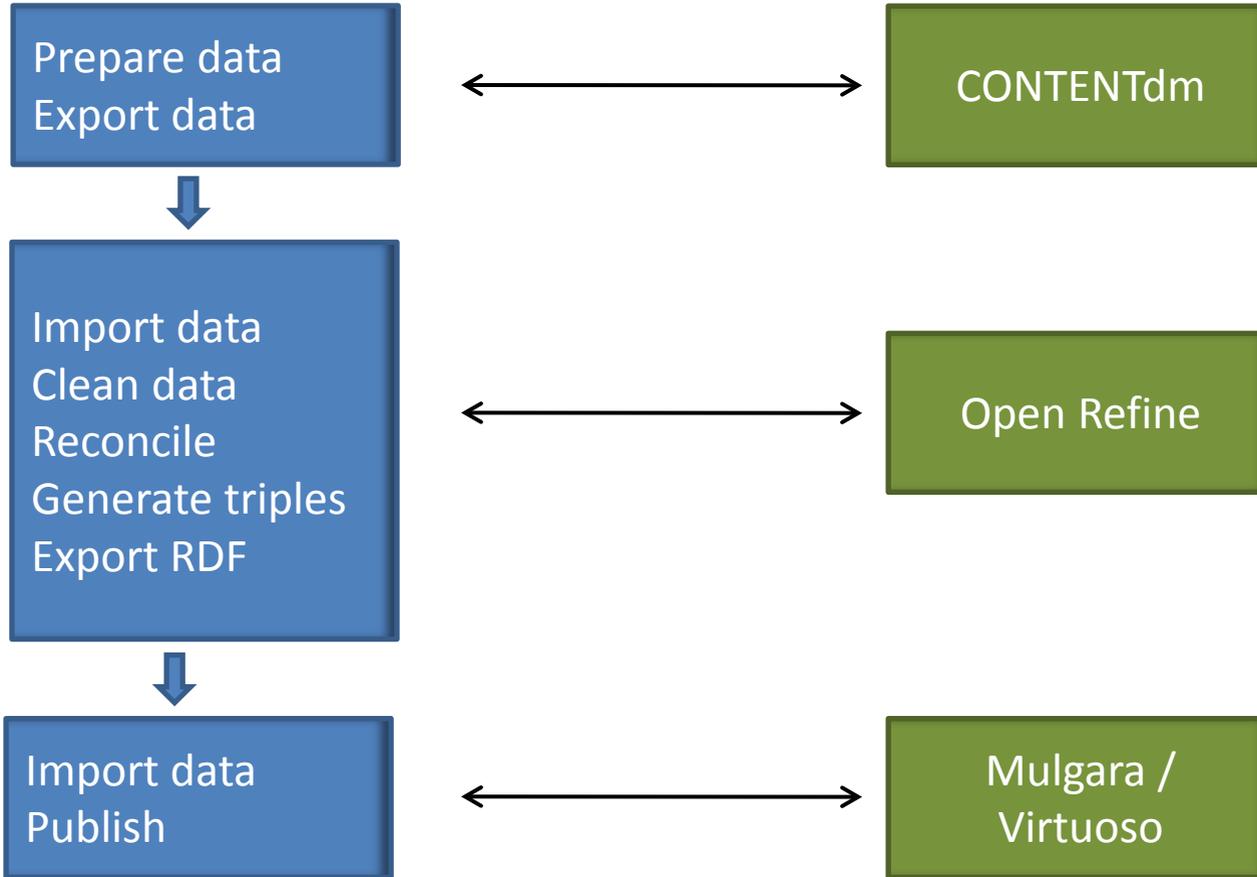
# UNLV Linked Data Project

## Goals:

- Study the feasibility of developing a common process that would allow the conversion of our collection records into linked data preserving their original expressivity and richness
- Publish data from our collections in the Linked Data Cloud to improve discoverability and connections with other related data sets on the Web

# Actions

# Technologies



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# Prepare / Export Data

Technology: CONTENTdm

- Increase consistency across collections:
  - metadata element labels
  - use of CV, share local CVs
  - etc.
- Export data as spreadsheet

Create mapping between metadata elements and EDM model predicates

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# OpenRefine

- Open source
- It is a server – can communicate with other datasets via http
- Install Open Refine and its RDF extension

Screenshots to show some of the functions we have used

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# OpenRefine first screen

The screenshot shows the OpenRefine web interface in a Mozilla Firefox browser window. The browser's address bar displays the URL `127.0.0.1:3333`. The page title is "Google Refine" and the main heading is "Google refine A power tool for working with messy data." The interface is divided into a left sidebar and a main content area. The sidebar contains three menu items: "Create Project", "Open Project", and "Import Project", all of which are circled in red. The main content area features a section titled "Create a project by importing data. What kinds of data files can I import?" with a sub-heading "Get data from". Under "Get data from", there are four options: "This Computer", "Web Addresses (URLs)", "Clipboard", and "Google Data". The "This Computer" option is selected and highlighted. To the right of the "This Computer" option, there is a text prompt "Locate one or more files on your computer to upload:" followed by a "Browse..." button and the text "No files selected.", both of which are circled in red. Below the "Browse..." button is a "Next »" button.

Google Refine - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Google Refine

127.0.0.1:3333

AVG Secure Search

Most Visited Getting Started

**Google refine** *A power tool for working with messy data.*

**Create Project**  
**Open Project**  
**Import Project**

**Create a project by importing data. What kinds of data files can I import?**  
TSV, CSV, \*SV, Excel (.xls and .xlsx), JSON, XML, RDF as XML, and Google Data documents are all supported. Support for other formats can be added with Google Refine extensions.

Get data from

**This Computer** Locate one or more files on your computer to upload:  
Browse... No files selected.

Web Addresses (URLs)  
Clipboard  
Google Data

Next »

Facet / Filter

Undo / Redo 0

539 records

Show as: rows records Show: 5 10 25 50 records

**Using facets and filters** 

Use facets and filters to select subsets of your data to act on. Choose facet and filter methods from the menus at the top of each data column.

Not sure how to get started?  
[Watch these screencasts](#)

All	Digital ID	Title	Individual Crea	Group Creator	Description	Costume Detail	Name of Show
  1.	sho000119	Costume design drawing, yellow calypso costume, circa 1945-55		<a href="#">edit</a>		Sketch of female dancer in yellow calypso costume with skirt with long train, ruffled short sleeves, and floral headdress.	Vi
  2.	sho000114	Costume design drawing, samba costume pencil sketch, circa 1945-55				Pencil sketch on tracing paper of female dancer in samba costume, with notations of colors and fabrics.	Se

# Facet

alink

Open... Export Help

539 records

Extensions: Freebase RDF

Show as: rows records

Show: 5 10 25 50 records

« first < previous 1 - 10 next > last »

All	Digital ID	Title	Individual Crea	Group Creator	Description	Costume Detail	Name of Show	Name of Perfor	Identified Indiv	Ide
	1.	1.	sho000119	Costume design drawing, yellow calypso costume, circa 1945-55	<ul style="list-style-type: none"><li>Facet<ul style="list-style-type: none"><li>Text facet</li></ul></li><li>Text filter</li><li>Numeric facet</li><li>Edit cells<ul style="list-style-type: none"><li>Timeline facet</li></ul></li><li>Edit column<ul style="list-style-type: none"><li>Scatterplot facet</li></ul></li><li>Transpose<ul style="list-style-type: none"><li>Custom text facet...</li></ul></li><li>Sort...<ul style="list-style-type: none"><li>Custom numeric facet...</li></ul></li><li>View<ul style="list-style-type: none"><li>Customized facets</li></ul></li><li>Reconcile</li></ul>	Sketch of female dancer in yellow calypso costume with skirt with long train, ruffled short sleeves, and floral headdress.		Virgin Islands		
	2.	2.	sho000114	Costume design drawing, samba costume pencil sketch, circa 1945-55		Pencil sketch on tracing paper of female dancer in samba costume, with notations of colors and fabrics.		Samba		

[Facet / Filter](#) [Undo / Redo](#) 0

**16 matching records** (539 total) Extensions: [Freebase](#) [RDF](#)

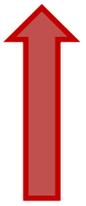
[Refresh](#) [Reset All](#) [Remove All](#)

Show as: [rows](#) [records](#) Show: [5](#) [10](#) [25](#) [50](#) records  
 « first < previous **1 - 10** next > last »

**Individual Creator** [change invert reset](#)  
 15 choices Sort by: **name** [count](#) [Cluster](#)

- Beardsley, Aubrey, 1872-1898; 5
- Bernard, Bruno, 1912-1987; 1
- de Otley, Murray; 1
- English, Don 4
- ErtÅ© 7
- Frasnay, Daniel 1
- Mackie, Robert Gordon, 1940-; 35
- Mackie, Robert Gordon, 1940-;** [exclude](#) 16
- Aghayan, Ray;** 16
- Menefree, Pete; 140
- Romaine 3

All	Digital ID	Title	Individual Crea	Group Creator	Description	Costume Detail	Name of Show	Name of Perfor	Identified Individ	Ide
☆	39. sho000124	Costume design drawing, feathered turquoise showgirl costume decorated with stars, Las Vegas, 1974	Mackie, Robert Gordon, 1940-; Aghayan, Ray;		Costume design for Hallelujah Hollywood!, an MGM Grand Hotel production.	Two-piece bikini-type jeweled showgirl costume with stars, with matching cuffs and headpiece; embellished with oversized turquoise feather tail and plumes.	Hallelujah Hollywood!			
☆	40. sho000128	Costume design drawing, long black showgirl costume with split skirt, Las Vegas, 1974	Mackie, Robert Gordon, 1940-; Aghayan, Ray;		Costume design for Hallelujah Hollywood!, an MGM Grand Hotel production.	Long black sheath-style showgirl costume with split skirt, one arm extending into a glove, one arm bare; decorated with purple and fuchsia jewels with matching fan, head piece, and bracelets.	Hallelujah Hollywood!			



Facet / Filter Undo / Redo 0

Refresh Reset All Remove All

Graphic Elements (TGM) change

384 choices Sort by: name count Cluster

- Airplanes; Chorus girls; 1
- Animals; Dogs; Pets; Women; 2
- Aprons; Trousers; Men; Vests; Stripes; 1
- Audiences; Beads; Capes (Clothing); Costumes; Dancers; Theatrical productions; 1
- Audiences; Beads; Capes (Clothing); Dancers; Theatrical productions; 1
- Audiences; Beads; Costumes; Headdresses; Theatrical productions; Top hats; Tuxedos; 1
- Audiences; Belts (Clothing); Chaps; Coats; Costumes; Cowboy boots;

539 records

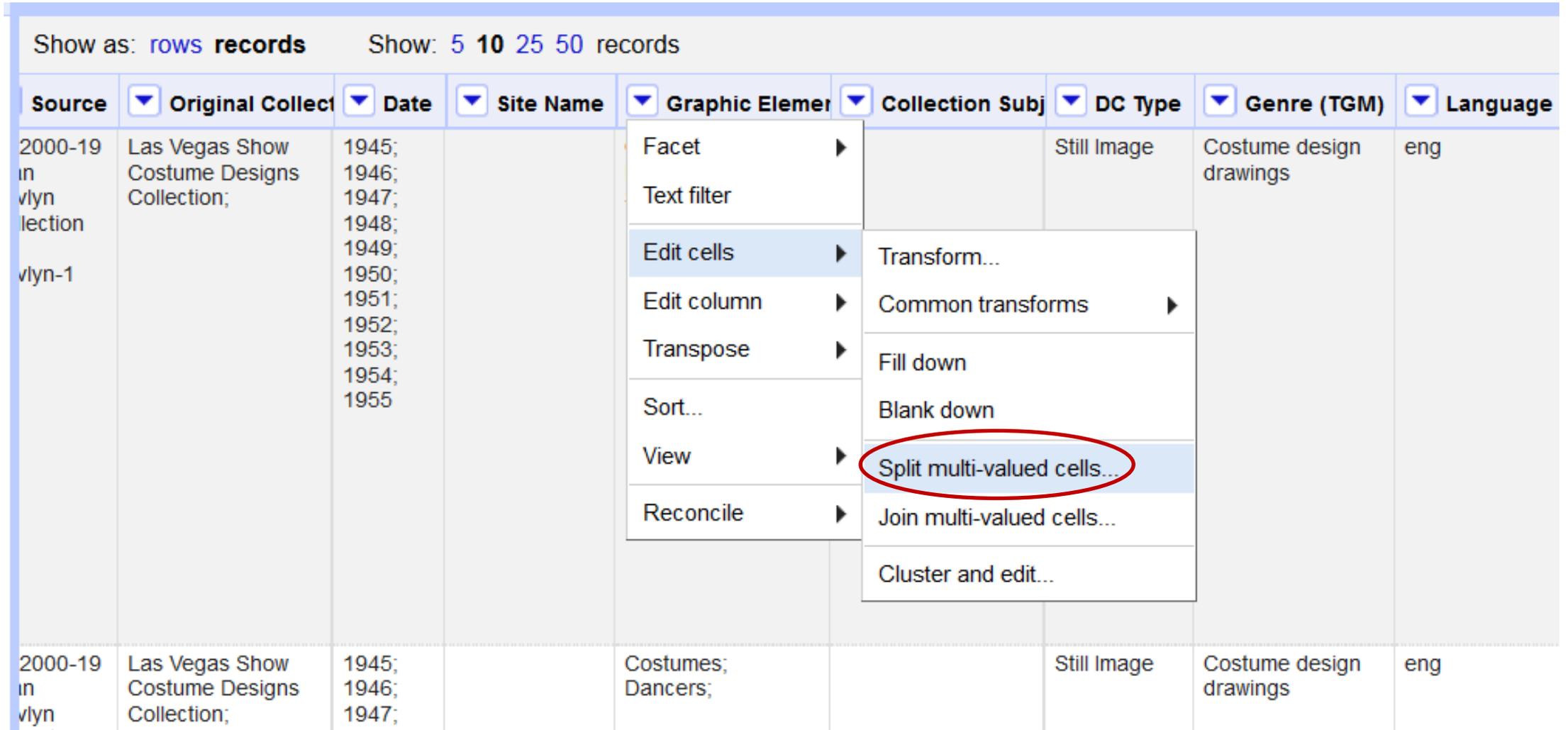
Show as: rows records Show: 5 10 25 50 records

al Collect	Date	Site Name	Graphic Elemer	Collection Subj	DC Type	Genre (TGM)	Language	Is Part Of
Show esigns	1945; 1946; 1947; 1948; 1949; 1950; 1951; 1952; 1953; 1954; 1955		Costumes; Dancers; Turbans; Skirts;		Still Image	Costume design drawings	eng	<a href="http://digital.library.unlv.edu/u?dig,5">http://digital.library.unlv.edu/u?dig,5</a>
Show esigns	1945; 1946;		Costumes; Dancers;		Still Image	Costume design drawings	eng	<a href="http://digital.library.unlv.edu/u?dig,5">http://digital.library.unlv.edu/u?dig,5</a>

# Split multi-value cells

Show as: **rows records** Show: 5 10 25 50 records

Source	Original Collect	Date	Site Name	Graphic Elemer	Collection Subj	DC Type	Genre (TGM)	Language
2000-19 in vlyn lection  vlyn-1	Las Vegas Show Costume Designs Collection;	1945; 1946; 1947; 1948; 1949; 1950; 1951; 1952; 1953; 1954; 1955		Facet Text filter Edit cells Edit column Transpose Sort... View Reconcile		Still Image	Costume design drawings	eng
2000-19 in vlyn ..	Las Vegas Show Costume Designs Collection;	1945; 1946; 1947;		Costumes; Dancers;		Still Image	Costume design drawings	eng



The image shows a data table interface with a context menu open over the 'Graphic Elemer' column. The menu options are: Facet, Text filter, Edit cells, Edit column, Transpose, Sort..., View, and Reconcile. A sub-menu is open for 'Edit cells', showing options: Transform..., Common transforms, Fill down, Blank down, Split multi-valued cells... (circled in red), and Join multi-valued cells... There is also a 'Cluster and edit...' option at the bottom of the sub-menu. The table data shows a multi-valued cell in the 'Graphic Elemer' column that is being split into individual values.

**Individual Creator** change

15 choices. Sort by: name count Cluster

- Beardsley, Aubrey, 1872-1898; 5
- Bernard, Bruno, 1912-1987; 1
- de Otley, Murray; 1
- English, Don 4
- ErtÅ© 7
- Frasnay, Daniel 1
- Mackie, Robert Gordon, 1940-; 35
- Mackie, Robert Gordon, 1940-; 1
- Aghayan, Ray; 16
- Menefree, Pete; 140
- Romaine 3

Source	Original Collect	Date	Site Name	Graphic Elemer	Collection Subj	DC Type	Genre (TGM)	Language	Is Part Of	Rights
2000-19 in vlyn lection	Las Vegas Show Costume Designs Collection,	1945; 1946; 1947; 1948; 1949; 1950; 1951; 1952; 1953; 1954; 1955		Facet Text filter		Still Image	Costume design drawings	eng	<a href="http://digital.library.unlv.edu/u?dig_5">http://digital.library.unlv.edu/u?dig_5</a>	This material is protected by copyright. Personal, including educational use of this material without restriction is permitted. For further information, please contact Collections. <a href="http://digital.library.unlv.edu/contact">http://digital.library.unlv.edu/contact</a>
2000-19 in vlyn lection	Las Vegas Show Costume Designs Collection,	1945; 1946; 1947; 1948; 1949; 1950; 1951; 1952; 1953; 1954; 1955		Costumes: Dancers,		Still Image	Costume design drawings	eng	<a href="http://digital.library.unlv.edu/u?dig_5">http://digital.library.unlv.edu/u?dig_5</a>	This material is protected by copyright. Personal, including educational use of this material without restriction is permitted. For further information, please contact Collections. <a href="http://digital.library.unlv.edu/contact">http://digital.library.unlv.edu/contact</a>

What separator currently separates the values?

OK Cancel

Split multi-valued cells in column Graphic Elements (TGM)  
Undo

Facet / Filter Undo / Redo 1 **1070 records**

Refresh Reset All Remove All

Show as: rows records Show: 5 10 25 50 records

**Individual Creator** change

15 choices Sort by: name count Cluster

- Beardsley, Aubrey, 1872-1898; 5
- Bernard, Bruno, 1912-1987; 1
- de Otley, Murray; 1
- English, Don 4
- ErtÅ© 7
- Frasnay, Daniel 1
- Mackie, Robert Gordon, 1940-; 35
- Mackie, Robert Gordon, 1940-;
- Aghayan, Ray; 16
- Menefree, Pete; 140
- Romaine 3

Source	Original Collect	Date	Site Name	Graphic Elemer	Collection Subj	DC Type	Ge
2000-19 n rlyn ection  rlyn-1	Las Vegas Show Costume Designs Collection;	1945; 1946; 1947; 1948; 1949; 1950; 1951; 1952; 1953; 1954; 1955		Costumes          Dancers Turbans Skirts		Still Image	Costum drawing

# Facet view for Graphic Elements

Facet / Filter Undo / Redo 166

Refresh Reset All Remove All

Graphic Elements (TGM) change

112 choices Sort by: name count Cluster

Advertising	1
Aerialists	1
Airplanes	1
Animals	2
Aprons	2
Audiences	34
Automobiles	1
Ball dresses	10
Ballet	2
Banjoes	1
Bathing suits	7
Beads	39
Beards	1
Belts (Clothing)	13
Berets	1
Bikinis (Bathing suits)	7
Billboards	1
Blazers	3
Bloomers	1
Blouses	2
Bonnets	1
Boots	18
Boudoirs	1

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# Reconciliation

alink

Open... Export Help

Extensions: Freebase RDF

539 records

Show as: rows records Show: 5 10 25 50 records

All	Digital ID	Title	Individual Crea	Group Creator	Description	Costume Detail	Name of Sho
☆	1.	sho000119	Costume design drawing, yellow calypso costume, circa 1945-55				
☆	2.	sho000114	Costume design drawing, samba costume pencil sketch, circa 1945-55		Pencil sketch on tracing paper of female dancer in samba costume, with notations of colors and fabrics.		Samba

Based on SPARQL endpoint...  
Based on RDF file...  
Based on a Sindice site search...  
Based on a Apache Stanbol EntityHub...

Edit RDF Skeleton...  
Reset RDF Skeleton...  
Add reconciliation service

# Specifying Reconciliation service

nk

2540 rows

Show as:

Site name

URI

Language

.gov eng

/materials

7

### Add SPARQL-based reconciliation service

**Name:**   
A human readable name

**Endpoint details**

Endpoint URL:

Graph URI:   
Leave empty to use the default graph

Type:   
This determines the syntax that will be used for search

**Label properties**

Select properties that are used to label resources in the endpoint. These properties will be used to match resources:

rdfs:label     skos:prefLabel     dcterms:title     dc:title

foaf:name

Other...

OK    Cancel

Choose new match

/vocabulary

/graphicMaterials

# Activating Reconciliation

2540 rows

Show as: **rows** records    Show: 5 10 25 50 rows

Site name URI	Graphic Elemer	Graphic URI	Collection Subj	DC Type	Genre (TGM)	Genre URI	Lan
	Facet						
	Text filter						
	Edit cells						
	Edit column						
	Transpose						
	Sort...						
	View						
	Reconcile						
		<a href="http://id.loc.gov/vocabulary/graphicMaterials/m002610">http://id.loc.gov/vocabulary/graphicMaterials/m002610</a>		Still Image	Costume design drawings <a href="#">Choose new match</a>	<a href="http://id.loc.gov/vocabulary/graphicMaterials/tgm002607">http://id.loc.gov/vocabulary/graphicMaterials/tgm002607</a>	eng
	<a href="#">Dancers</a> <a href="#">Choose new match</a>	<a href="http://id.loc.gov/vocabulary/graphicMaterials/tgm002607">http://id.loc.gov/vocabulary/graphicMaterials/tgm002607</a>					
	<a href="#">Turbans</a> <a href="#">Choose new match</a>	<a href="http://id.loc.gov/vocabulary/graphicMaterials/tgm002607">http://id.loc.gov/vocabulary/graphicMaterials/tgm002607</a>					

- Start reconciling...
- Facets
- QA facets
- Actions
- Copy reconciliation data...
- Discover related RDF datasets...



# Creating a Skeleton

AVG Secure Search

Open... Export Help

Extensions: Freebase RDF

Genre (TGM)	Genre URI	Language
Costume design drawings <a href="#">Choose new match</a>	<a href="http://id.loc.gov/vocabulary/graphicMaterials/tgm002607">http://id.loc.gov/vocabulary/graphicMaterials/tgm002607</a>	eng

- Edit RDF Skeleton...
- Reset RDF Skeleton...
- Add reconciliation service ▶

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**Using facets and filters**  
Use facets and filters to narrow down the data to act on. Click on a facet to see filter methods from the data. You can also filter methods from the data of each data column.  
Not sure how to get started? [Watch these screencasts](#)

### RDF Schema Alignment

The RDF schema alignment skeleton below specifies how the RDF data that will get generated from your grid-shaped data. The cells in each record of your data will get placed into nodes within the skeleton. Configure the skeleton by specifying which column to substitute into which node.

Base URI: <http://digloc7.library.unlv.edu:8890/> [edit](#)

**RDF Skeleton**    [RDF Preview](#)

Available Prefixes: dc rdfs edm foaf xsd owl rdf skos dcterms [+ add prefix](#) [manage prefixes](#)

<b>(row index) URI</b>	<input type="checkbox"/>	<input type="checkbox"/> >dc:title→	<input type="checkbox"/>	<b>Title cell</b>
<input type="checkbox"/> edm:ProvidedCHO	<input type="checkbox"/>	<input type="checkbox"/> >dc:creator→	<input type="checkbox"/>	<b>Individual creator URI URI</b> <input type="checkbox"/> ...
<a href="#">add rdf.type</a>		<input type="checkbox"/> >dc:creator→	<input type="checkbox"/>	<input type="checkbox"/> edm:Agent
		<input type="checkbox"/> >dc:creator→	<input type="checkbox"/>	<a href="#">add rdf.type</a>
		<input type="checkbox"/> >dc:description→	<input type="checkbox"/>	<b>Group creator URI URI</b> <input type="checkbox"/> ...
		<input type="checkbox"/> >dc:description→	<input type="checkbox"/>	<input type="checkbox"/> edm:Agent
		<input type="checkbox"/> >edm:isRelatedTo→	<input type="checkbox"/>	<a href="#">add rdf.type</a>
			<input type="checkbox"/>	<b>Description cell</b>
			<input type="checkbox"/>	<b>Costume Details cell</b>
			<input type="checkbox"/>	<b>Name show URI URI</b> <input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/> >edm:happenedAt→ <input type="checkbox"/>
			<input type="checkbox"/>	<b>Site name URI URI</b> <input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/> edm:Place
			<input type="checkbox"/>	<a href="#">add rdf.type</a>

[Add another root node](#) [Save](#)

OK Cancel

### RDF Schema Alignment

The RDF schema alignment skeleton below specifies how the RDF data that will get generated from your grid-shaped data. The cells in each record of your data will get placed into nodes within the skeleton. Configure the skeleton by specifying which column to substitute into which node.

Base URI: <http://digloc7.library.unlv.edu:8890/> [edit](#)

RDF Skeleton **RDF Preview**

This is a sample Turtle representation of (up-to) the first 10 rows

```
@prefix dc: <http://purl.org/dc/elements/1.1/> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix edm: <http://www.europeana.eu/schemas/edm/> .
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
@prefix dcterms: <http://purl.org/dc/terms/> .

<http://digloc7.library.unlv.edu:8890/ProvidedCHO/sho000119> a edm:ProvidedCHO ;
  dc:title "Costume design drawing, yellow calypso costume, circa 1945-55" ;
  dc:description "Sketch of female dancer in yellow calypso costume with skirt with long train, ruffled short sleeves, and
  dc:source "MS2000-19 Jean Devlyn Collection B1 Devlyn-1" , <http://digcol7.library.unlv.edu:8890/Concept/OC0127> .

<http://id.loc.gov/vocabulary/graphicMaterials/tgm002610> a skos:Concept .

<http://digloc7.library.unlv.edu:8890/ProvidedCHO/sho000119> dc:subject <http://id.loc.gov/vocabulary/graphicMaterials/tgm002610>
  dc:type "Still Image" .

<http://id.loc.gov/vocabulary/graphicMaterials/tgm002607> a skos:concept .

<http://digloc7.library.unlv.edu:8890/ProvidedCHO/sho000119> edm:hasType <http://id.loc.gov/vocabulary/graphicMaterials/tgm002607>
  dc:language "eng" ;
  dc:rights "This material may be protected by copyright. Personal, including educational and academic, use of this materia
```

Open... Export Help

ons: Freebase RDF

previous 1 - 10 next last

Rights

rary.unlv.edu This material m  
protected by cc  
Personal, inclu  
educational an  
use of this mat  
without restricti  
acknowledgem  
University of Ne  
Vegas, Univers  
is requested wi  
use is oral, web  
Commercial us  
portion of this r  
requires permis  
the University L  
For further info  
please contact  
Collections:  
[http://digital.libr  
/contact](http://digital.libr<br/>/contact)

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protected by cc  
Personal, inclu  
educational an  
use of this mat

# Exporting RDF files

8

AVG Secure Search

link

Open... Export Help

2540 rows

Show as: rows records Show: 5 10 25 50 rows

Site name URI	Graphic Element	Graphic URI	Collection Subject	DC Type	Genre (TGM)	Genre URI	
	Costumes <small>Choose new match</small>	<a href="http://id.loc.gov/vocabulary/graphicMaterials/tgm002610">http://id.loc.gov/vocabulary/graphicMaterials/tgm002610</a>		Still Image	Costume design drawings <small>Choose new match</small>	<a href="http://id.loc.gov/vocabulary/graphicMaterials/tgm002607">http://id.loc.gov/vocabulary/graphicMaterials/tgm002607</a>	eng
	Dancers <small>Choose new match</small>	<a href="http://id.loc.gov/vocabulary/graphicMaterials/tgm002610">http://id.loc.gov/vocabulary/graphicMaterials/tgm002610</a>					

Export project

Tab-separated value

Comma-separated value

HTML table

Excel

ODF spreadsheet

Triple loader

MQLWrite

Custom tabular exporter...

Templating...

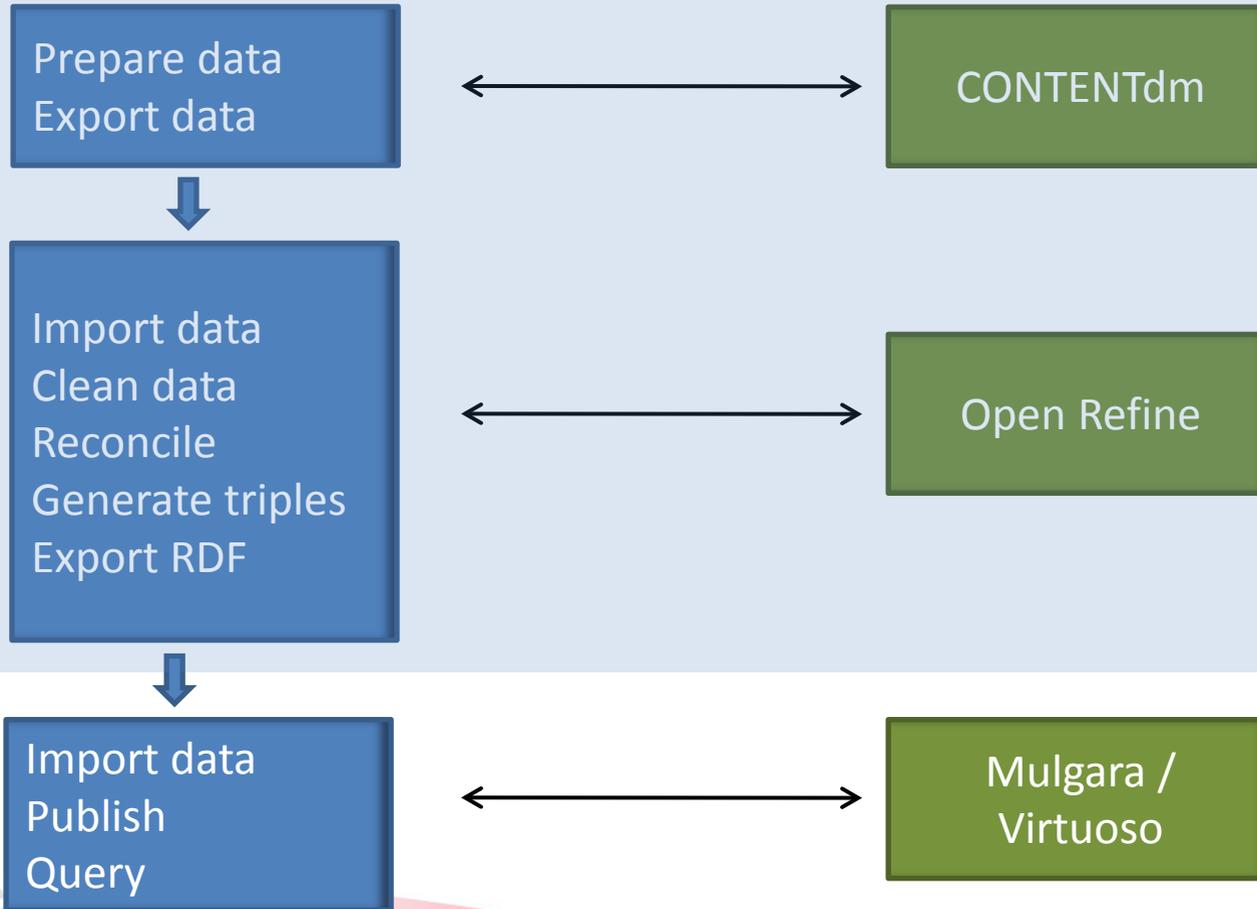
RDF as RDF/XML

RDF as Turtle

please contact  
Collections:  
<http://digital.lib.berkeley.edu/contact>

# Actions

# Technologies



inspire celebrate  
connect create *explore* innovate achieve reach  
grow innovate discover *focus*

# Mulgara Triple Store: Import

The screenshot shows a web browser window with the address bar displaying `http://localhost:8080/webui/ExecuteQuery`. The browser tab is titled "Mulgara Viewer". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The toolbar contains icons for "CONTENTdm Admin", "TGM", "LOC Authorities", and "UNLV Libraries", along with standard browser navigation icons.

The main content area features the Mulgara logo (a stylized orange and red bird) and the text "mulgara™ SEMANTIC STORE". Below the logo, there is a form for configuring a query:

- Graph URI:** A text input field containing `http://showgirls`.
- Query Text:** A large, empty text area for entering a query.
- Buttons:** "Submit Query" and "Clear Query" buttons are located below the query text area.
- File:** A text input field containing `M:\workshop\LD1-Showgirls.ttl`, with "Browse..." and "Upload" buttons to its right.

# mulgara™ SEMANTIC STORE

Graph URI:

Query Text:

File:

**Results:** (1 query, 7.643 seconds)

**Query Executed:** load <http://mulgara.org/virtual/M:workshopLD1-Showgirls.ttl> into <http://showgirls>

**Result Message:** Successfully loaded 11881 statements from http://mulgara.org/virtual/M:workshopLD1-Showgirls.ttl into http://showgirls

# A simple SPARQL query



Graph URI:

Query Text:

```
Select *
```

```
Where {?s ?p ?o} limit 100
```

File:

<a href="http://dbpedia.org/resource/Sun_City,_South_Africa">http://dbpedia.org/resource/Sun_City,_South_Africa</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Place">http://www.europeana.eu/schemas/edm/Place</a>
<a href="http://dbpedia.org/page/El_Rancho_Hotel_and_Casino">http://dbpedia.org/page/El_Rancho_Hotel_and_Casino</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Place">http://www.europeana.eu/schemas/edm/Place</a>
<a href="http://library.unlv.edu:8890/Concept/C'est_Magnifique_(Lido_Paris_France)">http://library.unlv.edu:8890/Concept/C'est_Magnifique_(Lido_Paris_France)</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/C'est_Magnifique_(Lido_Paris_France)">http://library.unlv.edu:8890/Concept/C'est_Magnifique_(Lido_Paris_France)</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://id.loc.gov/authorities/names/no2011149556">http://id.loc.gov/authorities/names/no2011149556</a>
<a href="http://library.unlv.edu:8890/Concept/Casino_de_Paris">http://library.unlv.edu:8890/Concept/Casino_de_Paris</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Casino_de_Paris">http://library.unlv.edu:8890/Concept/Casino_de_Paris</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://dbpedia.org/resource/Dunes_(hotel_and_casino)">http://dbpedia.org/resource/Dunes_(hotel_and_casino)</a>
<a href="http://library.unlv.edu:8890/Concept/Cocorico_(Lido_Paris_France)">http://library.unlv.edu:8890/Concept/Cocorico_(Lido_Paris_France)</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Cocorico_(Lido_Paris_France)">http://library.unlv.edu:8890/Concept/Cocorico_(Lido_Paris_France)</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://id.loc.gov/authorities/names/no2011149556">http://id.loc.gov/authorities/names/no2011149556</a>
<a href="http://library.unlv.edu:8890/Concept/Fan_Dance">http://library.unlv.edu:8890/Concept/Fan_Dance</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Fan_Dance">http://library.unlv.edu:8890/Concept/Fan_Dance</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://dbpedia.org/resource/Sands_Hotel_and_Casino">http://dbpedia.org/resource/Sands_Hotel_and_Casino</a>
<a href="http://library.unlv.edu:8890/Concept/Hallelujah_Hollywood!">http://library.unlv.edu:8890/Concept/Hallelujah_Hollywood!</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Hallelujah_Hollywood!">http://library.unlv.edu:8890/Concept/Hallelujah_Hollywood!</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://sws.geonames.org/6490161/">http://sws.geonames.org/6490161/</a>
<a href="http://library.unlv.edu:8890/Concept/Hello_America!">http://library.unlv.edu:8890/Concept/Hello_America!</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Hello_America!">http://library.unlv.edu:8890/Concept/Hello_America!</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://dbpedia.org/resource/Desert_Inn">http://dbpedia.org/resource/Desert_Inn</a>
<a href="http://library.unlv.edu:8890/Concept/Jubilee!">http://library.unlv.edu:8890/Concept/Jubilee!</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Jubilee!">http://library.unlv.edu:8890/Concept/Jubilee!</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://sws.geonames.org/6489654/">http://sws.geonames.org/6489654/</a>
<a href="http://library.unlv.edu:8890/Concept/Jubilee!">http://library.unlv.edu:8890/Concept/Jubilee!</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://sws.geonames.org/6490161/">http://sws.geonames.org/6490161/</a>
<a href="http://library.unlv.edu:8890/Concept/Lido_(Paris_France)">http://library.unlv.edu:8890/Concept/Lido_(Paris_France)</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Lido_(Paris_France)">http://library.unlv.edu:8890/Concept/Lido_(Paris_France)</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://id.loc.gov/authorities/names/no2011149556">http://id.loc.gov/authorities/names/no2011149556</a>
<a href="http://library.unlv.edu:8890/Concept/Lido_de_Paris_(Las_Vegas_Nev.)">http://library.unlv.edu:8890/Concept/Lido_de_Paris_(Las_Vegas_Nev.)</a>	<a href="http://www.w3.org/1999/02/22-rdf-syntax-ns#type">http://www.w3.org/1999/02/22-rdf-syntax-ns#type</a>	<a href="http://www.europeana.eu/schemas/edm/Event">http://www.europeana.eu/schemas/edm/Event</a>
<a href="http://library.unlv.edu:8890/Concept/Lido_de_Paris_(Las_Vegas_Nev.)">http://library.unlv.edu:8890/Concept/Lido_de_Paris_(Las_Vegas_Nev.)</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://id.loc.gov/authorities/names/no2011149556">http://id.loc.gov/authorities/names/no2011149556</a>
<a href="http://library.unlv.edu:8890/Concept/Lido_de_Paris_(Las_Vegas_Nev.)">http://library.unlv.edu:8890/Concept/Lido_de_Paris_(Las_Vegas_Nev.)</a>	<a href="http://www.europeana.eu/schemas/edm/happenedAt">http://www.europeana.eu/schemas/edm/happenedAt</a>	<a href="http://dbpedia.org/resource/Stardust_Resort_and_Casino">http://dbpedia.org/resource/Stardust_Resort_and_Casino</a>

# SPARQL: Querying Data

- Using Virtuoso triple store PivotViewer

inspire celebrate achieve  
connect create *explore* innovate achieve reach  
grow innovate discover *focus*

# Query

### Dynamic Collection

#### SPARQL

##### Query Service Endpoint

http://digcol7.library.unlv.edu:8890/sparql

##### Default Data Set Name (Graph IRI)

##### Query Text

```
describe ?thing
where{
  ?thing a edm:ProvidedCHO.
  ?thing edm:hasType ?tgmuri .
  ?tgmuri skos:prefLabel "Costume design drawings" .
  ?thing dcterms:isPartOf ?collection .
  ?collection dc:title "Showgirls" .
  optional {?thing foaf:depiction ?image }
}
```

##### Resultset Options

##### Timeout

SPARQL Query Results

Tiles Table Map Timeline Bubble Chart Sort: dc.contributer [Grid Icon] [Bar Chart Icon] [Zoom In] [Zoom Out] [Reset]

Search...

dc.contributer

Sort: Quantity

Devlyn, Jean 3

(no info) 102

Creator

Language

Publisher

Subject

Type

Is Part Of

edm:hasType

edm:isDerivativeOf

edm:isRelatedTo

Subject Type



Search...

dc:contributor	Sort: Quantity
Devlyn, Jean	1
(no info)	102

Creator  
Language  
Publisher  
Subject  
Type  
Is Part Of  
edm:hasType  
edm:isDerivativeOf  
edm:isRelatedTo  
Subject Type



← | → ↗

**Costume design drawing, red ruffled Spanish flamenco costume with rimmed hat and flared cuffs, circa 1965-75**

Red ruffled Spanish flamenco pants costume with flared white cuffs, white ruffles on shirt front, and hat with brim and flowers on female dancer.

[More](#)

**Creator**  
Spinedi, Josephine

**Language**  
eng

**Publisher**  
University of Nevada, Las Vegas L...

**Rights**  
This material may be protected by copyright. Personal, including educational and academic, use of this material is without restriction but acknowledgement of the University of Nevada, Las Vegas, University Libraries is requested whether the use is oral, web or in print. Commercial use of any portion of this material requires permission from the University Libraries. For further information please contact Digital Collections: <http://digital.library.unlv.edu/contact>

**Source**  
Dynamic collection generation by OpenLink Virtuoso

Search...

dc:contributer

Creator

Sort: Quantity

- Spinedi, Josephine 34
- Mackie, Robert Gordon, 1911- 28
- Aghayan, Ray 16
- Erté 7
- Viñas, José Luis 7
- Beardsley, Aubrey, 1872-1893 5
- Menefree, Pete 2
- (no info) 22

Language

Publisher

Subject

Type

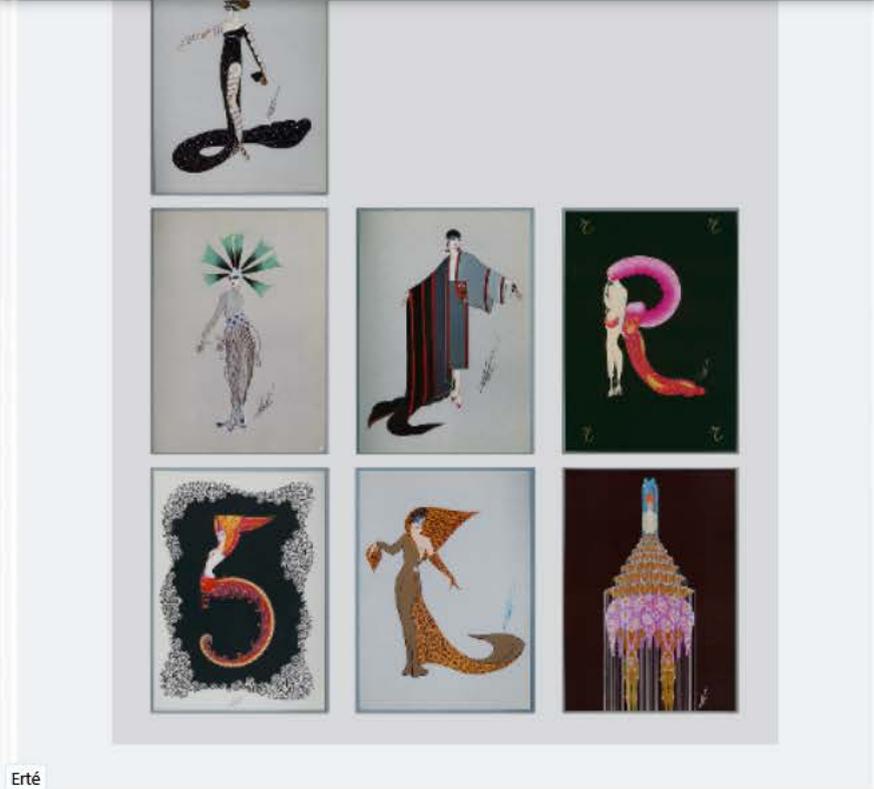
Is Part Of

edm:hasType

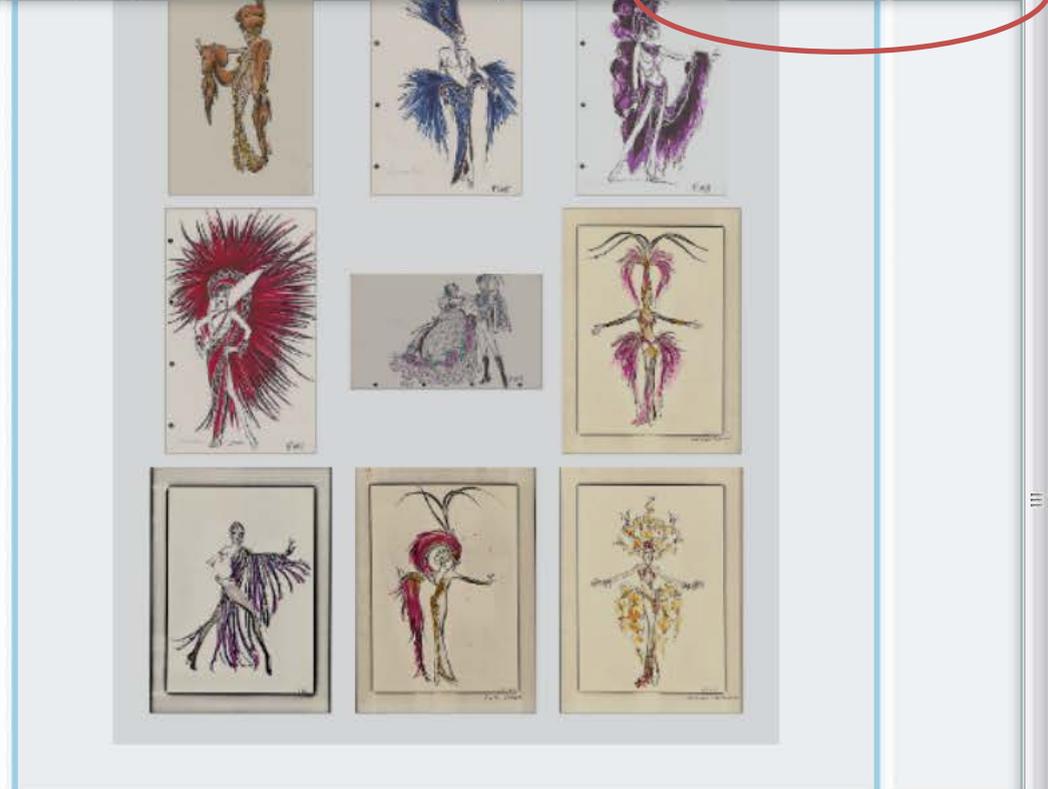
edm:isDerivativeOf

edm:isRelatedTo

Subject Type



Erté



Mackie, Robert Gordon,

# Next steps for the UNLV project

- Transform digital collections into linked data (parallel structure)
- Increase linkage with other datasets
- Design interfaces to access and display our data and related data from other datasets
- Evaluate alternative designs from user's perspective
- Produce a cost benefit analysis to inform future plans for the development of digital collections

Thank You!

Questions?

inspire celebrate achieve  
connect create *explore* innovate achieve reach  
grow innovate discover *focus*