eclap
e-library for performing arts

A Linked Open Data Service for Performing Arts

Pierfrancesco Bellini, Paolo Nesi
Dipartimento Ingegneria Informazione, University of Florence, Italy
pbellini@dsi.unifi.it, paolo.nesi@unifi.it

Linked Data

- **Web of documents**
  - The current Web, where data is mixed into HTML
  - Difficult to be processed from machines

- **Web of data**
  - Data present into HTML is also accessible in a machine-friendly format
 - Data is linked to other data in other repositories
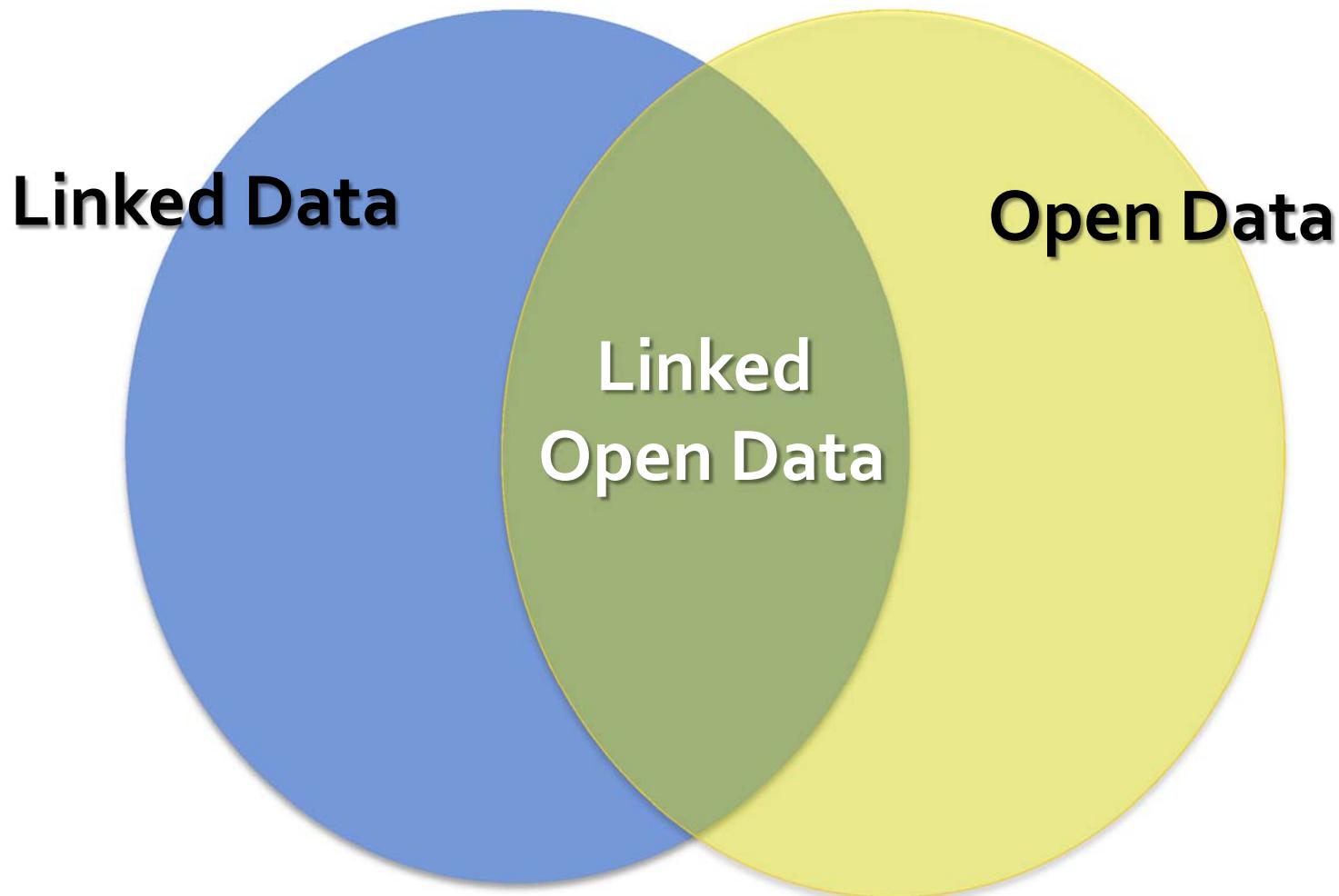
Linked Data Principles

1. Use dereferenceable HTTP Uniform Resource Identifiers to identify resources
2. Use RDF standard to describe resources
3. Link to other linked data resources over the web
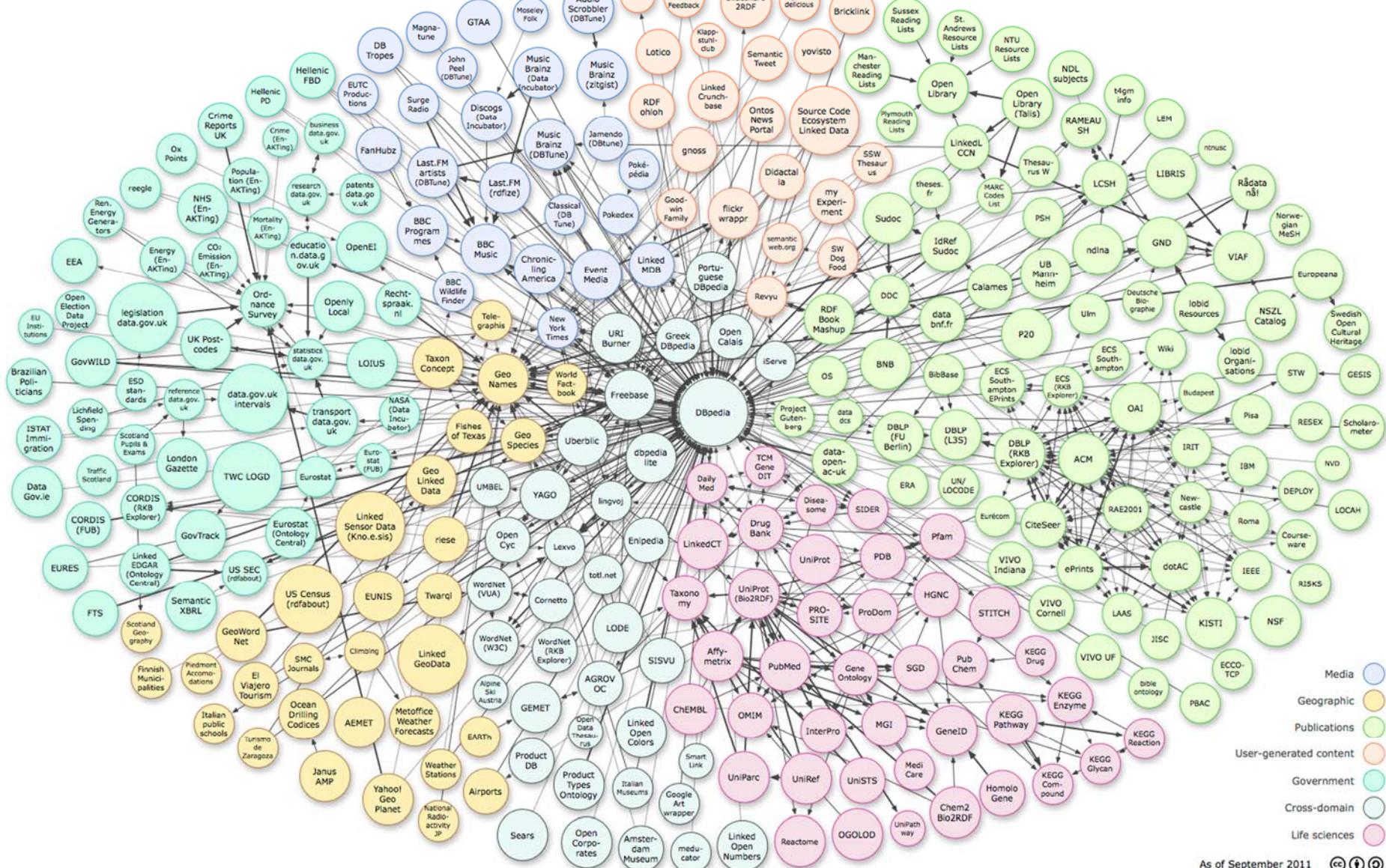
Moreover:

- Reuse vocabularies to describe resources or define them via subclass/subproperties
- Vocabularies should be available as Linked Data
- Popular vocabularies:
    - Dublin Core (human created artifacts)
    - Friend of a Friend (person, organizations and relations)
    - Creative Commons (legal information about works)
    - Basic Geo Vocabulary (geographical coords.)

Linked Data & Open Data

Linked Open Data

As of September 2011
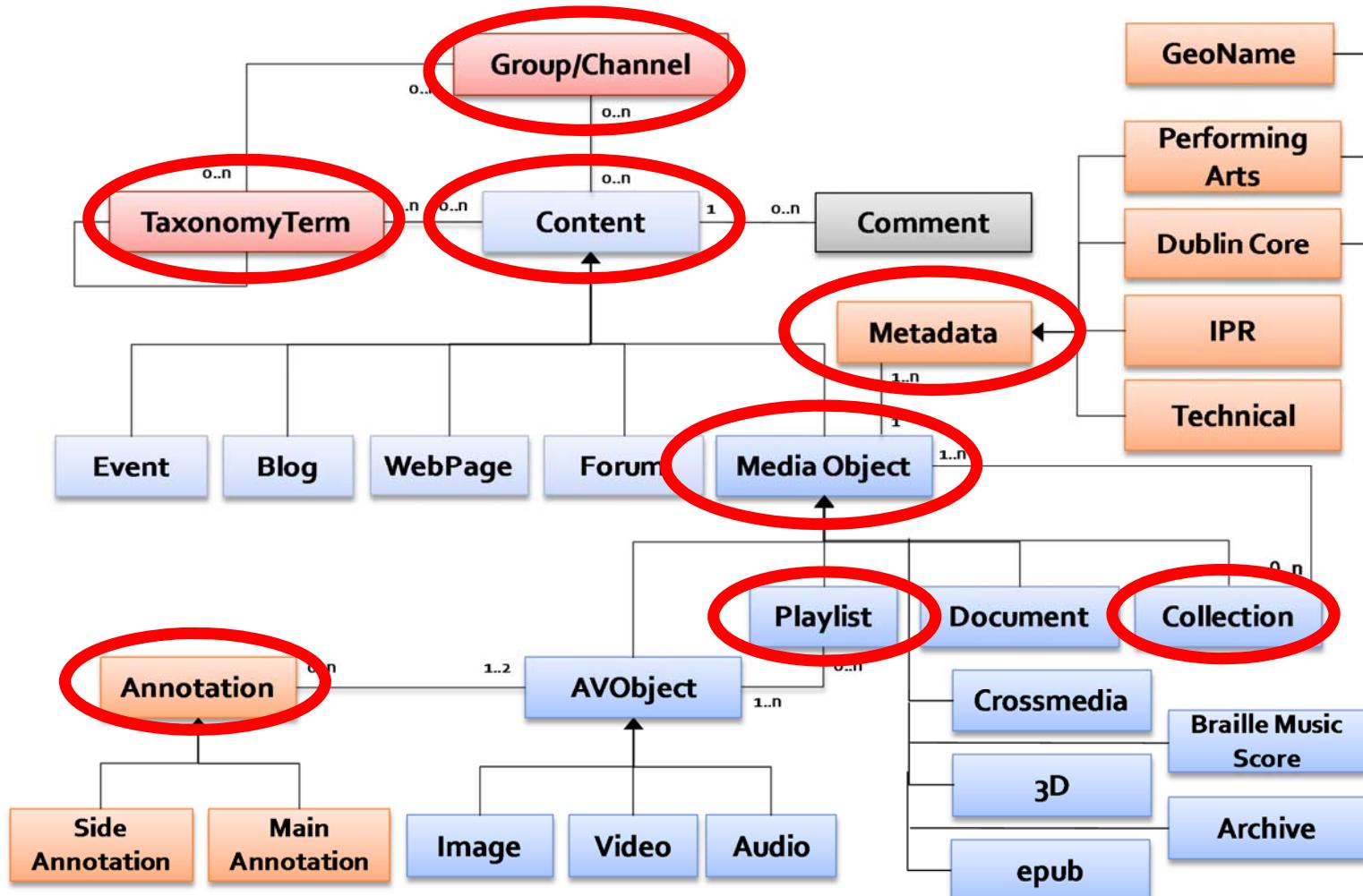
Why LOD?

- Improve user experience with more contextual information

- Semantic Data in machine-friendly formats can be used to improve search experiences

- Used in Applications & API
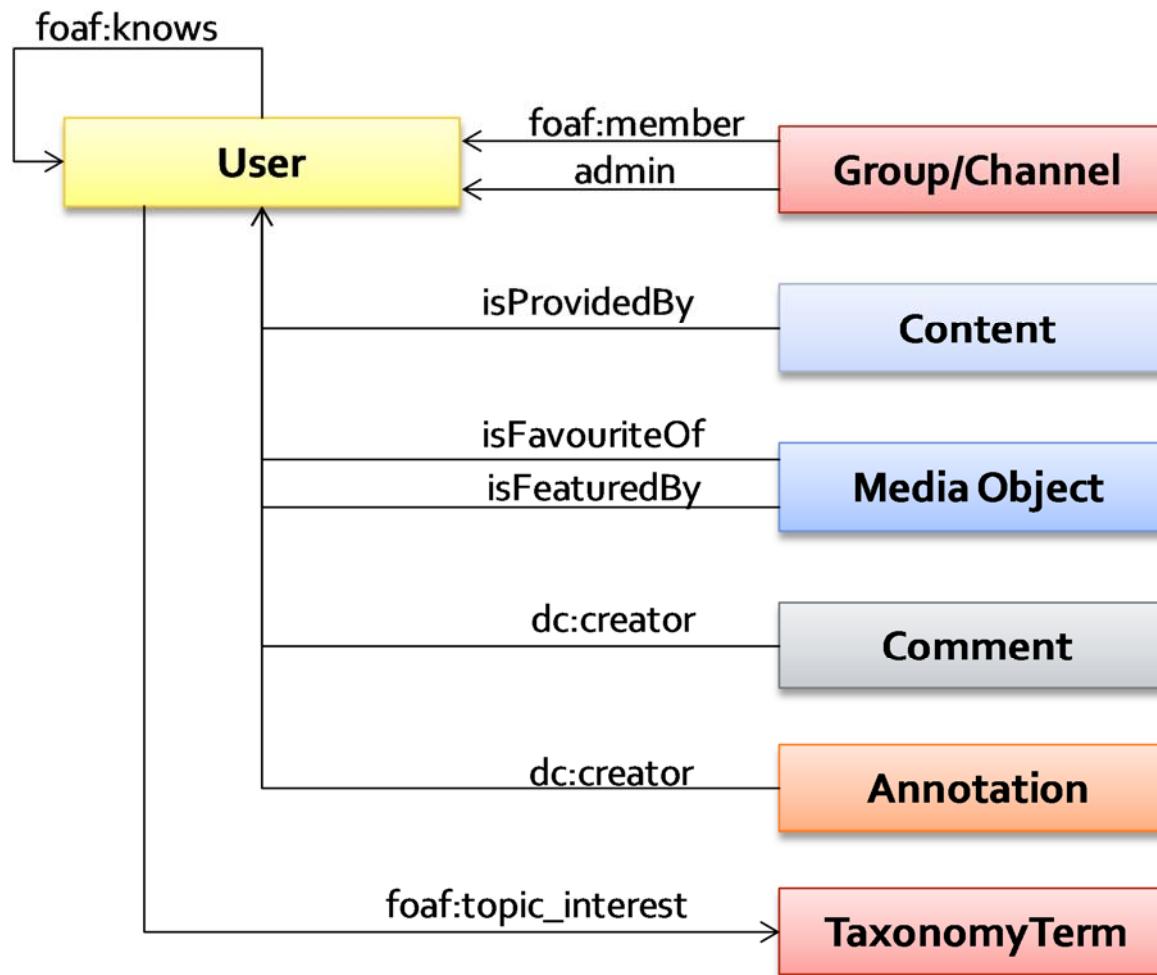
ECLAP

- Multimedia Archive of Performing Arts
  - content from 31 European content providers
  - from 13 countries
  - currently about 115,000 content items
  - video, audio, images, documents, 3D, Braille music scores, epub, crossmedia...

- Best practice network on Performing Arts
  - 3 working groups on
    - IPR issues
    - Education
   - Digital Libraries

ECLAP Semantic Model 1
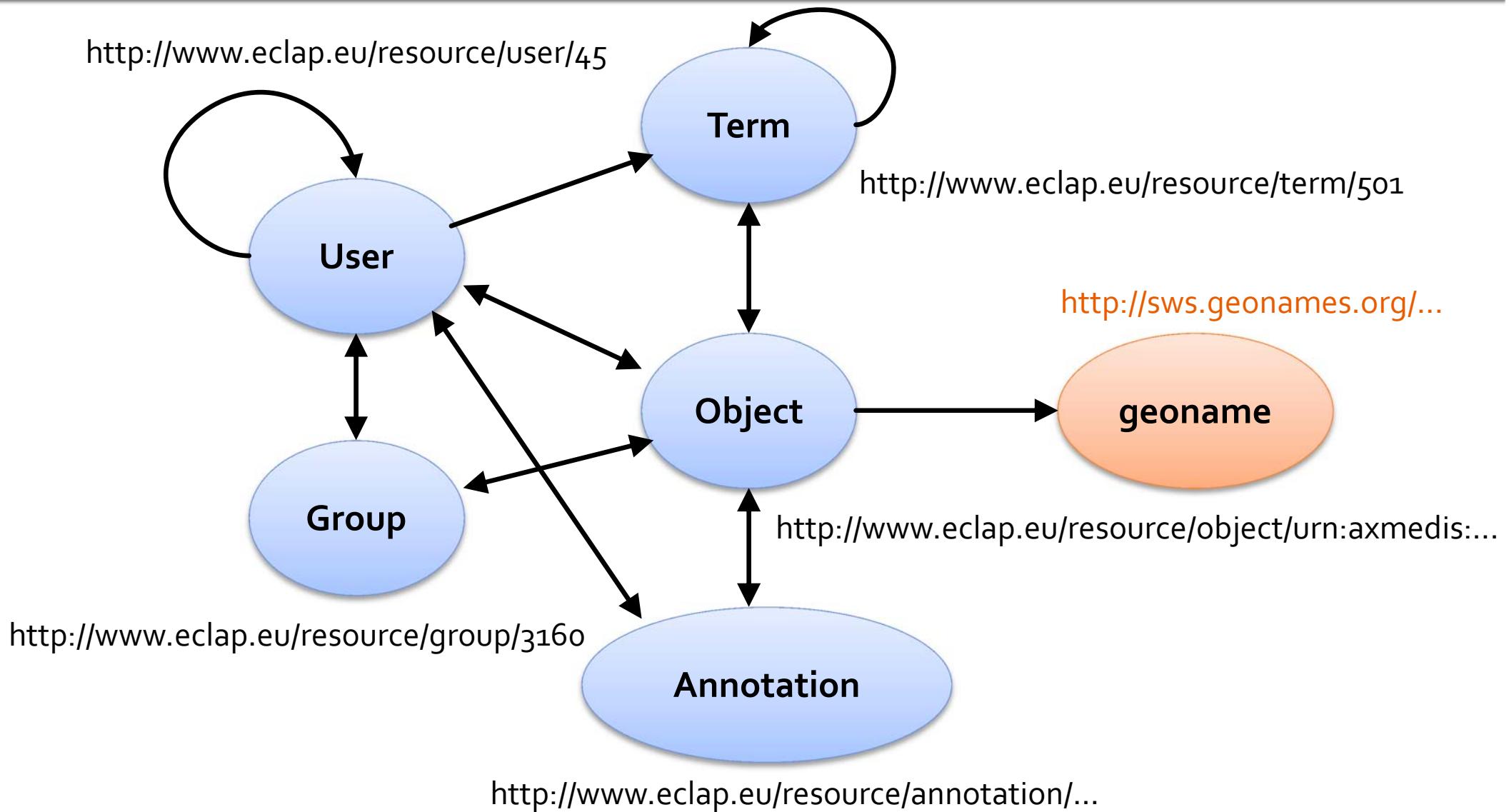
ECLAP Semantic Model 2

Linking ECLAP data

- Links to *Geonames* a LOD repository of Geographical names
- Metadata in fields like
  - dc:coverage,
  - dcterms:spatial
  - (first)Performance Place,
  - (first)Performance City,
  - (first)Performance Country

  are analyzed to match with geographical names from the GeoNames archive
- About 40000 relations found

URIs & Links

http://www.eclap.eu/resource/user/45

Term

http://www.eclap.eu/resource/term/501

User

http://sws.geonames.org/...

Object

geoname

Group

http://www.eclap.eu/resource/object/urn:axmedis:...

http://www.eclap.eu/resource/group/3160

Annotation

http://www.eclap.eu/resource/annotation/...

Object description

- Use Dublin Core vocabulary
- For Performing Arts Metadata use a custom vocabulary with properties defined as specializations of Dublin Core properties
  - performancePlace → dcterms:spatial
  - performanceCity → dcterms:spatial
  - performanceCountry → dcterms:spatial
  - performanceDate → dcterms:issued
  - performingArtsProfessional → dcterms:contributor
  - dancer → performingArtsProfessional
  - actor → performingArtsProfessional
  - director → performingArtsProfessional
  - ...

```xml
<rdf:RDF ...>
  <rdf:Description rdf:about="http://www.eclap.eu/resource/object/urn:axmedis:ooooo:obj:o4..">
    <dc:title xml:lang="en">you PARA | DISO</dc:title>
    <dc:description xml:lang="en">In July 2010 Emio Greco and Pieter C. Scholten presented their
        performance "you PARA | DISO" at Salle Garnier de l'Opéra de Monte-Carlo. You PARA | DISO is the
        last performance around Dante's Divina Commedia. ... </dc:description>
    <dc:publisher xml:lang="en">iTheatre</dc:publisher>
    <dc:subject xml:lang="en">dance</dc:subject>
    <dc:format>video</dc:format>
    <dc:creator xml:lang="en">emio greco &amp; pc</dc:creator>
    <dc:creator xml:lang="en">erik lint</dc:creator>
    ...

    <eclap:performancePlace>Salle Garnier de l'Opéra de Monte-Carlo</eclap:performancePlace>
    <eclap:performanceCity>Monte-Carlo</eclap:performanceCity>
    <eclap:performanceCountry>Monaco</eclap:performanceCountry>
    <eclap:performanceCountry rdf:resource="http://sws.geonames.org/2993457/"/>
    <eclap:performanceDate>July 2010</eclap:performanceDate>

    <eclap:choreographer>Emio Greco</eclap:choreographer>
    <eclap:choreographer>Pieter C. Scholten</eclap:choreographer>

    <eclap:historicalPeriod rdf:resource="http://www.eclap.eu/resource/term/567"/>
    <eclap:performingArtsType rdf:resource="http://www.eclap.eu/resource/term/501"/>
    <eclap:managementAndOrganization rdf:resource="http://www.eclap.eu/resource/term/514"/>

    <dcterms:isPartOf rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis:ooooo..."/>

    <eclap:hasAnnotation rdf:resource="http://www.eclap.eu/resource/annotation/SideAnnotation_130..."
      />
    ...
  </rdf:Description>
</rdf:RDF>
```

Term description

- ECLAP provides six thesauri of terms for the classification of content (for a total of 231 terms):
  - **Subject** (e.g., Teaching, Philosophy, Multiculture)
  - **Genre** (e.g., Comedy, Comic, Drama)
  - **Historical period** (e.g., Contemporary, Classical, XX Century)
  - **Movement and style** (e.g., Experimental, Theatre of the absurd)
  - **Performing arts type** (e.g., Dance, Ballet, Music, Rock, Theatre, Noh)
  - **Management and organization** (e.g., Performance, Choreography)

Term description

- Use SKOS vocabulary

```
<rdf:RDF>
 <skos:Concept rdf:about="http://www.eclap.eu/resource/term/501">
  <skos:prefLabel xml:lang="it">Danza</skos:prefLabel>
  <skos:prefLabel xml:lang="en">Dance</skos:prefLabel>
  …

  <skos:broader rdf:resource="http://www.eclap.eu/resource/term/664"/>

  <skos:narrower rdf:resource="http://www.eclap.eu/resource/term/540"/>
  <skos:narrower rdf:resource="http://www.eclap.eu/resource/term/539"/>
  <skos:narrower rdf:resource="http://www.eclap.eu/resource/term/507"/>
  <skos:narrower rdf:resource="http://www.eclap.eu/resource/term/506"/>

  <eclap:isSubjectOf
    rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis:ooo... "/>
  <eclap:isSubjectOf
    rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis:ooo... "/>
  …
 </skos:Concept>
</rdf:RDF>
```

Group description

- Use FOAF vocabulary

```
<rdf:RDF>
 <foaf:Group rdf:about="http://www.eclap.eu/resource/group/2859">
  <rdfs:label>Centro Teatro Ateneo, University of Rome La Sapienza, UNIROMA, Italia</rdfs:label>

  <eclap:admin rdf:resource="http://www.eclap.eu/resource/user/1"/>
  <eclap:admin rdf:resource="http://www.eclap.eu/resource/user/253"/>
  ...

  <foaf:member rdf:resource="http://www.eclap.eu/resource/user/1"/>
  <foaf:member rdf:resource="http://www.eclap.eu/resource/user/42"/>
  ...

  <eclap:provide rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis..."/>
  <eclap:provide rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis..."/>
  ...
 </foaf:Group>
</rdf:RDF>
```

User description

- Use FOAF vocabulary

```
<rdf:RDF ...>
  <foaf:Person rdf:about="http://www.eclap.eu/resource/user/45">
    <foaf:nick>bellini</foaf:nick>
    <foaf:knows rdf:recource="http://www.eclap.eu/resource/user/1" />
    ...
    <foaf:topic_interest rdf:resource="http://www.eclap.eu/resource/term/501" />

    <eclap:isMemberOf rdf:resource="http://www.eclap.eu/resource/group/3160" />
    <eclap:isAdminOf rdf:resource="http://www.eclap.eu/resource/group/3160" />

    <eclap:hasFavorite
      rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis:ooo..." />
    <eclap:hasFeatured
      rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis:ooo..." />
    <eclap:createdAnnotation
      rdf:resource="http://www.eclap.eu/resource/annotation/SideAnnotation..." />
  </foaf:Person>
</rdf:RDF>
```
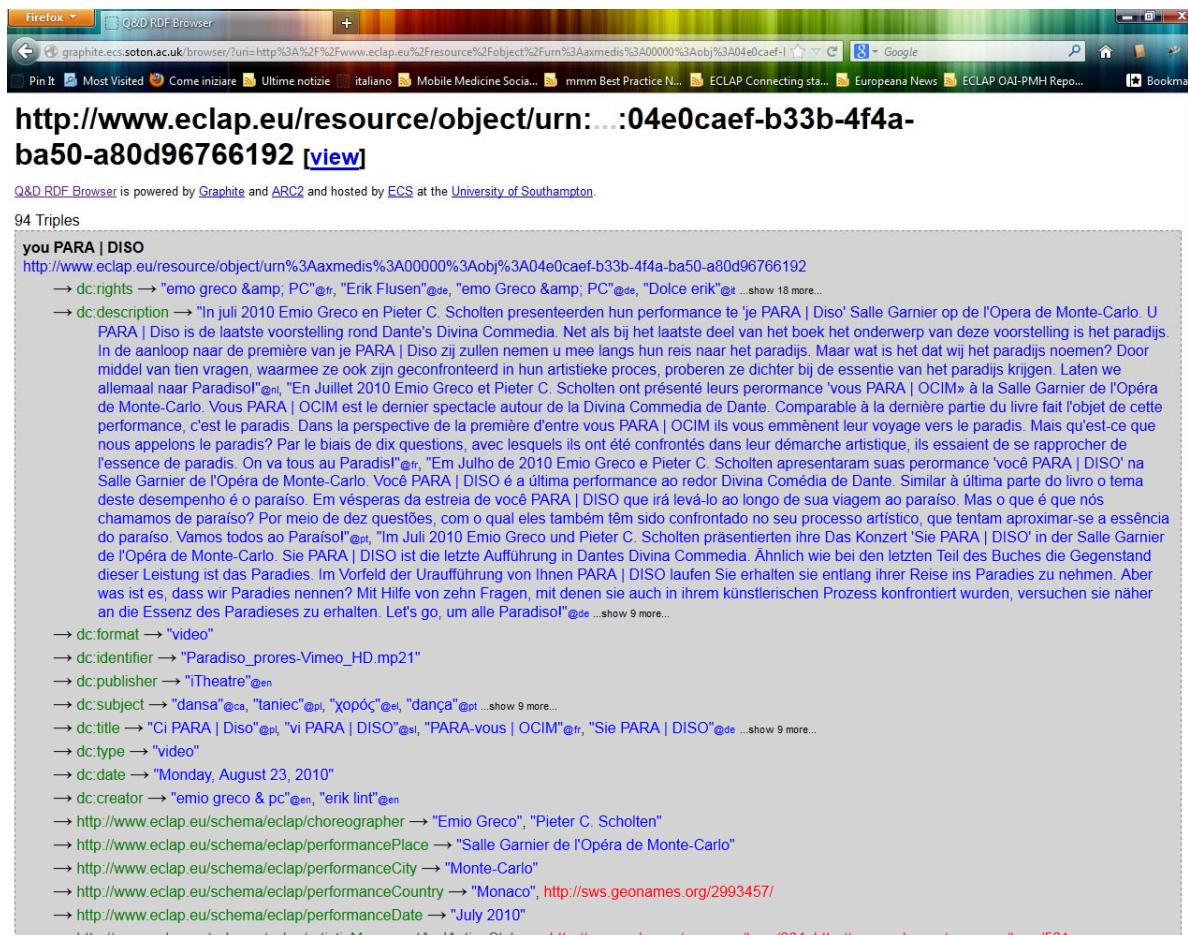
Annotation description

- Use Open Annotation Collaboration vocabulary (http://www.openannotation.org)
- Annotations can be associated with whole audiovisual or to a temporal fragment
- Body of an annotation can be a text and/or another audiovisual (as a whole or a fragment)
- **MyStoryPlayer** is the tool used navigate annotations

```xml
<rdf:RDF xmlns:oa="http://www.w3.org/ns/oa#"
    xmlns:cnt="http://www.w3.org/2011/content#">
  <oa:Annotation
    rdf:about="http://www.eclap.eu/resource/annotation/SideAnnotation_13010...">
   <oa:hasTarget>
    <oa:SpecificResource>
     <oa:hasSource
     rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis:o.."/>
     <oa:hasSelector>
       <oa:FragmentSelector>
       <rdf:value>t=npt:10,60</rdf:value>
       <dcterm:conformsTo rdf:resource="http://www.w3.org/TR/media-frags/"/>
       </oa:FragmentSelector>
     </oa:hasSelector>
    </oa:SpecificResource>
   </oa:hasTarget>
   <oa:hasBody rdf:resource="http://www.eclap.eu/resource/object/urn:axmedis:..."/>
   <oa:hasBody>
    <cnt:ContentAsText>
     <cnt:chars>this is an annotation</cnr:chars>
     <dc:format>text/plain</dc:format>
    </cnt:ContentAsText>
   </oa:hasBody>
   <oa:annotatedBy rdf:resource="http://www.eclap.eu/resource/user/1"/>
   <oa:annotatedAt>2013-02-28T20:00:00</oa:annotatedAt>
  </oa:Annotation>
```
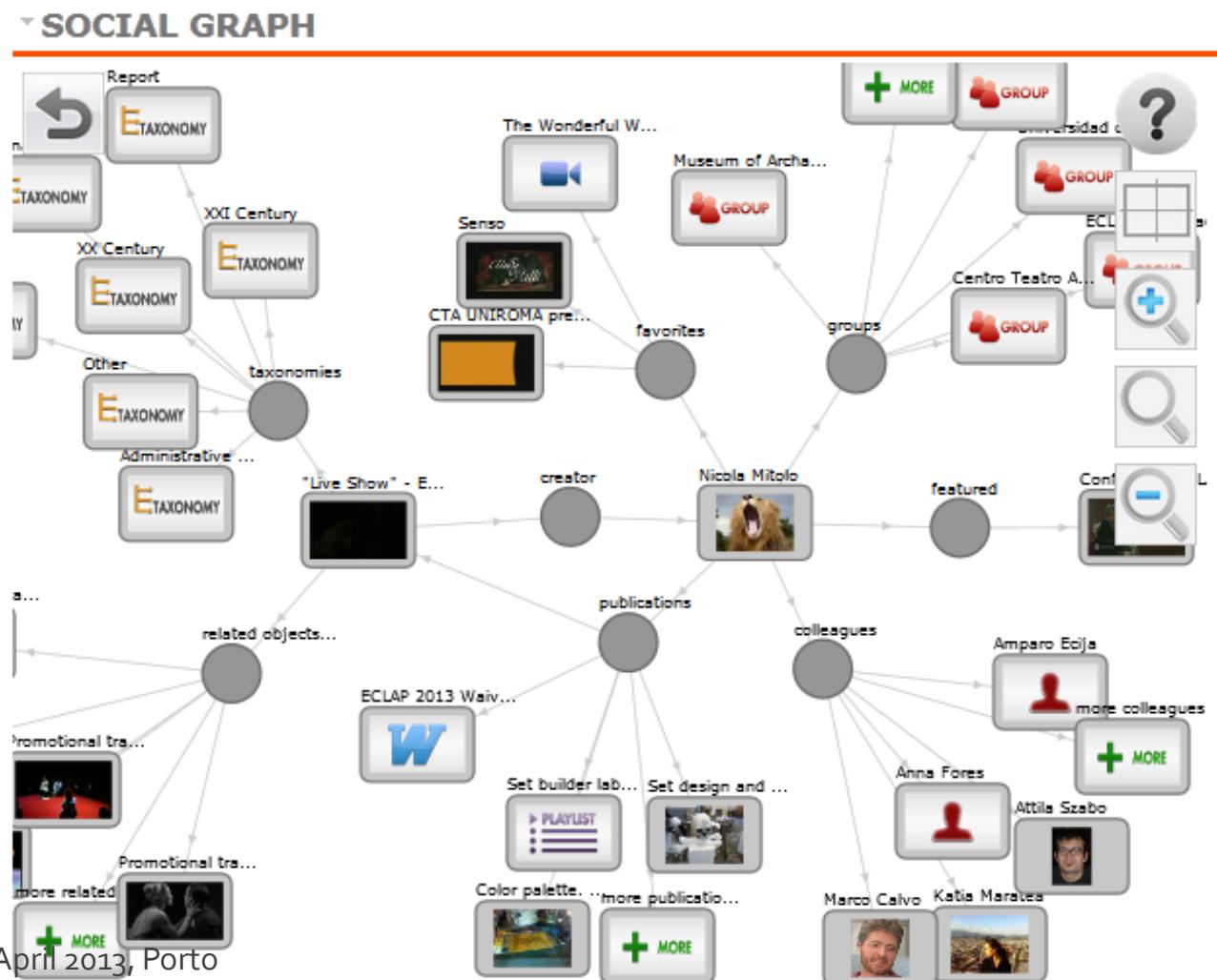
Navigating Linked Data

- ## Linked data browsers (e.g. Q&D RDF Browser)
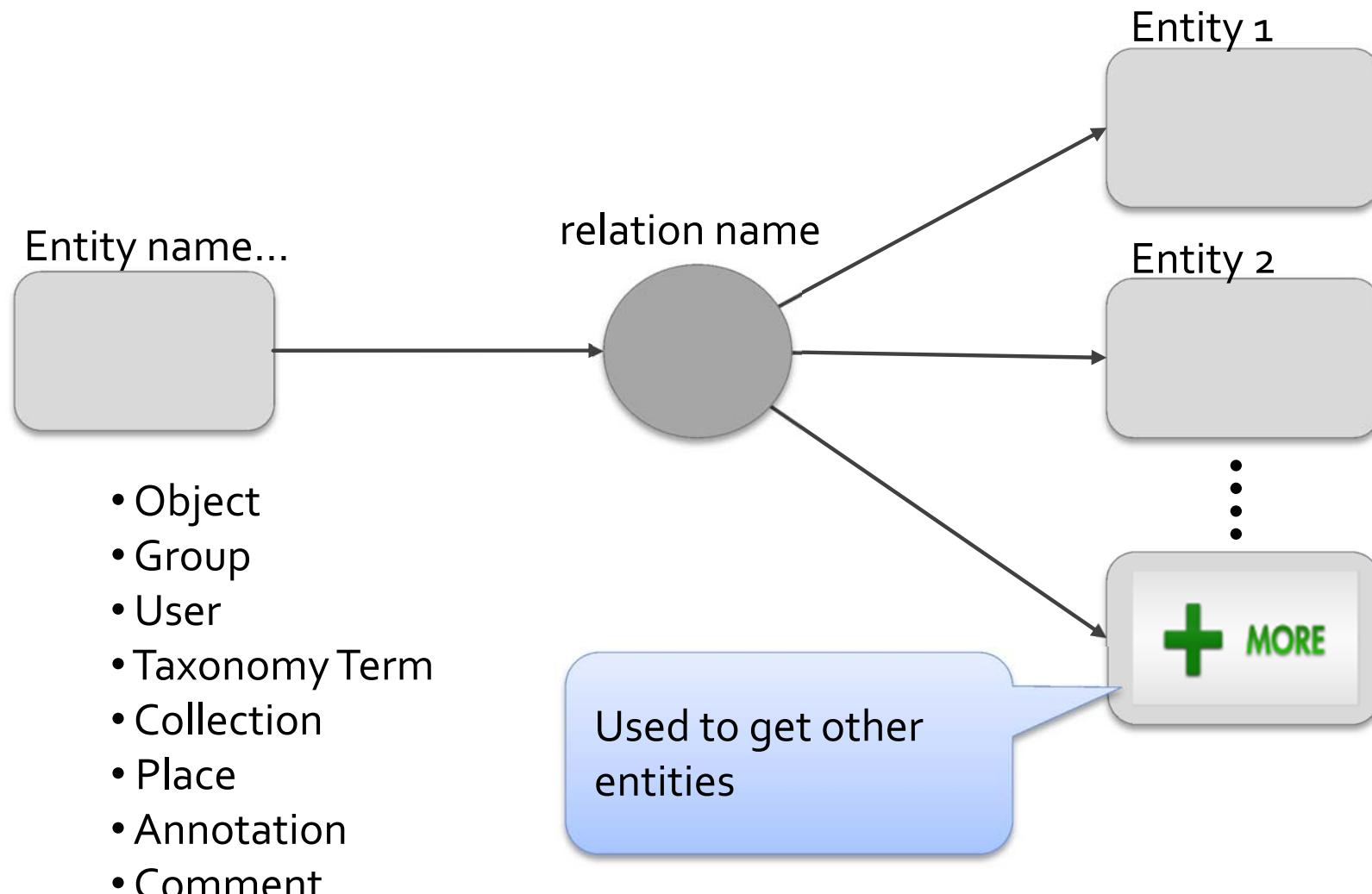
Visual Semantic Navigation

- ## ECLAP Social Graph

Graph elements

Entity 1

relation name

Entity name…

- Object
- Group
- User
- Taxonomy Term
- Collection
- Place
- Annotation
- Comment

Entity 2

+ MORE

Used to get other entities

Graph relations 1

- Object →
  - creator → User
  - groups → Group, …
  - annotations → Annotation, …
  - related objects → Object, …
  - taxonomies → TaxonomyTerm, …
  - comments → Comment, …
  - favorite → User, …
  - places → Place, …
  - collections → Collection, …

Graph relations 2
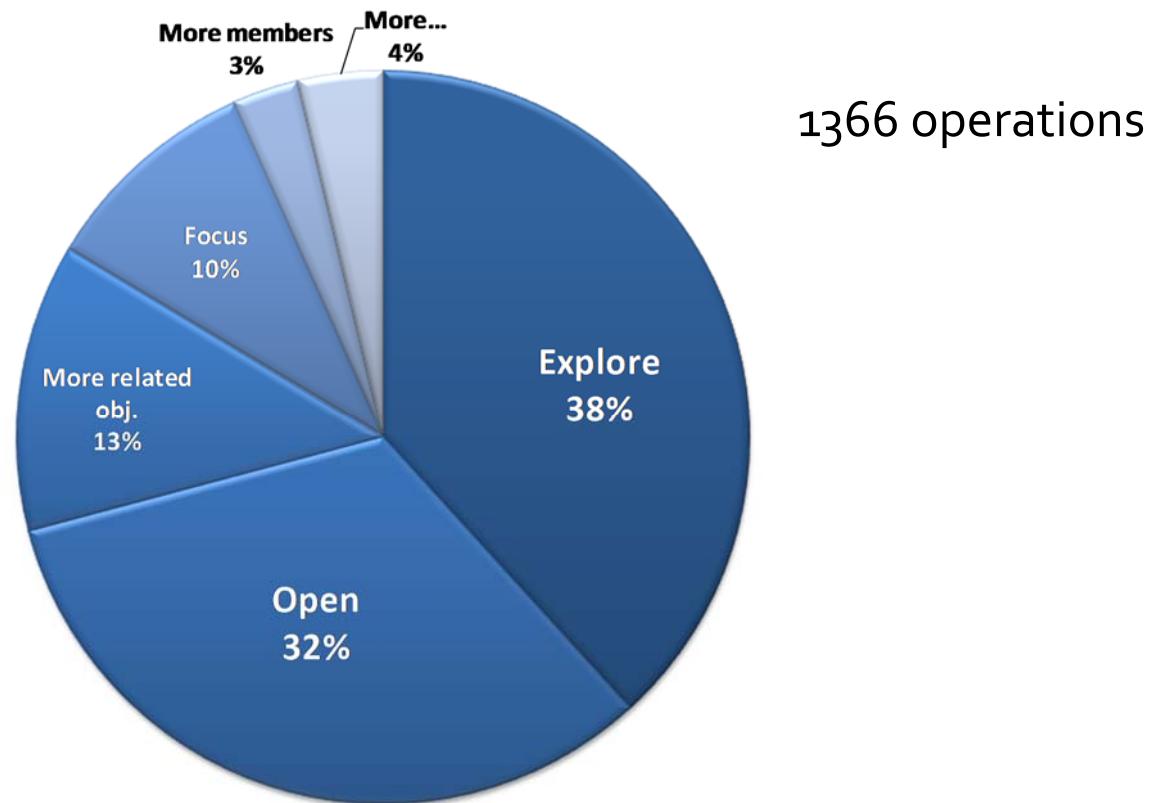
- User →
  - colleagues → User, …
  - published → Object, …
  - favorite → Object, …
  - featured → Object, …

- Collection →
  - objects → Object, …

- TaxonomyTerm →
  - objects → Object, …
  - broader → TaxonomyTerm, …
  - narrower → TaxonomyTerm, …

- Place →
  - objects → Object, …

Operations

- Operations on nodes
  - **Explore,** add node relations to the graph
  - **Reduce**, remove node relations from the graph
  - **Focus**, clear all and start from the node
  - **Open**, see the associated content

- Other operations
  - **Zoom, Pan**
  - **Back**
  - **Show/hide relations types**

Social Graph use analysis

- In 2 months 6% of users watching a content interacted with the social graph (explore, open, focus, more…)

1366 operations

Conclusions

- ECLAP data is available as Linked Open Data
- A specific vocabulary was defined and it is available for reuse http://www.eclap.eu/schema/eclap
- Semantic relations are navigable using ECLAP Social Graph

- Future work
  - Provide a SPARQL endpoint
  - Link to other repositories as DBPedia
  - Provide owl:sameAs relations with Europeana LOD