TransportDCAT-AP: A common metadata model

Federated SPARQL queries over Public Transport domain

Civic Lab - 18/07/2017

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- Introduction
- The importance of metadata in open data (portals)
- EU regulation on the provision of EU-wide multimodal travel information services
- TransportDCAT-AP: Metadata profile for public transport domain
- PhD thesis: Federated queries over heterogeneous resources

Who am I?

PhD Student at Ontology Engineering Group

PhD Student and researcher at OEG

- PhD thesis - Early stage (1/4 years)

  "Federated query processing over heterogeneous native and virtual RDF datasets"

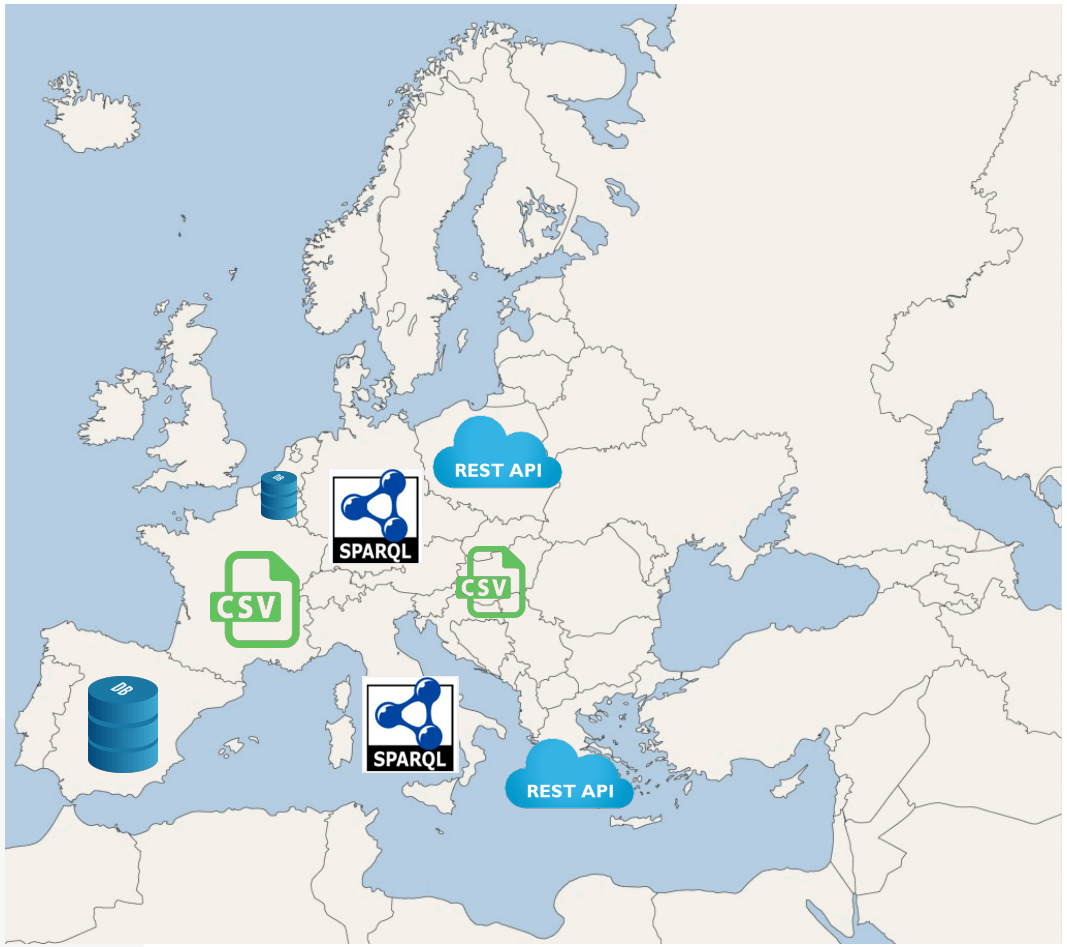
- EU Projects focused on **Semantic Interoperability in Public Transport**

The importance of metadata in Open Data

- There is a clear lack of metadata in most of the open data portals
- Open data is considered a key asset for the development of many types of open applications
- Availability of such metadata will make it possible for agents to discover Open Data throughout Europe
- Metadata provides an easy way to get relevant information from datasets

EU regulation on the provision of EU-wide multimodal travel information services

*"In order to facilitate the **easy exchange and re-use of these data** for the provision of comprehensive travel information services, corresponding metadata and information on the quality of the data will be accessible to users through **a national or common access point**."*

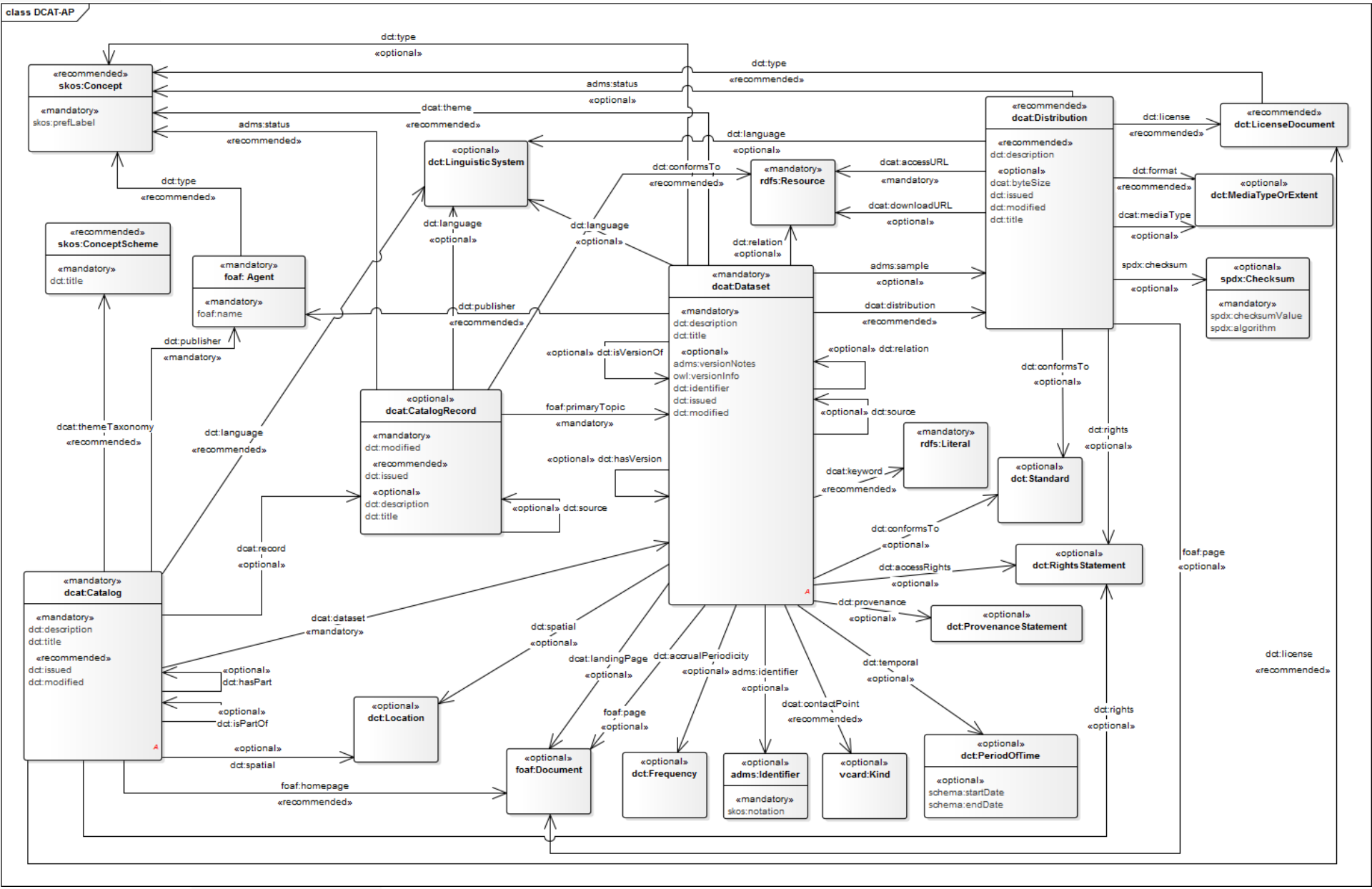


TransportDCAT-AP

Metadata profile for public transport domain

- OASIS: Open Applications for Semantically Interoperability Services
- Partners: UPM, CRTM, OKF Belgium, Stad Gent, iMinds and VICTOR
  - Toolkit for non-experts focused on Public Transport/Services

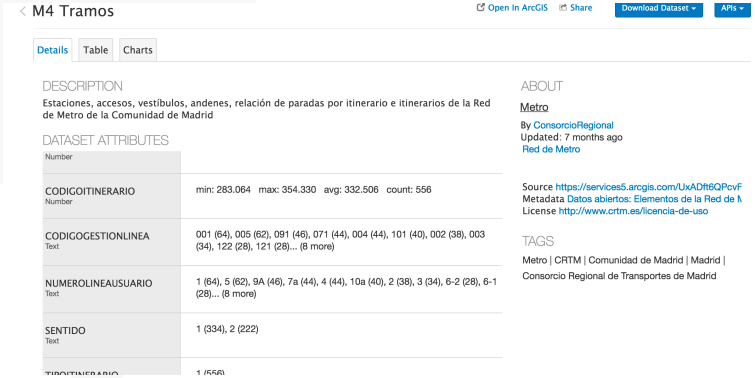
- Development of new metadata profile: TransportDCAT-AP
  - Based on EU metadata standard (DCAT-AP)
  - Included controller vocabularies
  - CRTM metadata is following TransportDCAT-AP
  - 10 organizations were involved in its validation
  - Undergrad student will develop a WebApp


class DCAT-AP
«recommended» skos:Concept
«mandatory» skos:prefLabel
«recommended» skos:ConceptScheme
«mandatory» dct:title
«mandatory» foaf: Agent
«mandatory» foaf:name
«optional» dct:LinguisticSystem
«mandatory» rdfs:Resource
«recommended» dcat:Distribution
«recommended» dct:description
«optional» dcat:byteSize dct:issued dct:modified dct:title
«recommended» dct:LicenseDocument
«optional» dct:MediaTypeOrExtent
«optional» spdx:Checksum
«mandatory» spdx:checksumValue spdx:algorithm
«mandatory» dcat:Dataset
«mandatory» dct:description dct:title
«optional» adms:versionNotes owl:versionInfo dct:identifier dct:issued dct:modified
«optional» dcat:CatalogRecord
«mandatory» dct:modified
«recommended» dct:issued
«optional» dct:description dct:title
«mandatory» rdfs:Literal
«optional» dct:Standard
«optional» dct:RightsStatement
«optional» dct:ProvenanceStatement
«mandatory» dcat:Catalog
«mandatory» dct:description dct:title
«recommended» dct:issued dct:modified
«optional» dct:Location
«optional» foaf:Document
«optional» dct:Frequency
«optional» adms:Identifier
«mandatory» skos:notation
«optional» vcard:Kind
«optional» dct:PeriodOfTime
«optional» schema:startDate schema:endDate
dct:type «optional»
dct:type «recommended»
adms:status «optional»
dcat:theme «recommended»
adms:status «recommended»
dct:language «optional»
dct:type «recommended»
dct:conformsTo «recommended»
dcat:accessURL «mandatory»
dcat:downloadURL «optional»
dct:license «recommended»
dct:format «recommended»
dcat:mediaType «optional»
spdx:checksum «optional»
dct:language «optional»
dct:language «optional»
dct:relation «optional»
adms:sample «optional»
dct:distribution «recommended»
dct:publisher «recommended»
dct:publisher «mandatory»
«optional» dct:isVersionOf
«optional» dct:relation
«optional» dct:source
dct:conformsTo «optional»
dcat:themeTaxonomy «recommended»
dct:language «recommended»
foaf:primaryTopic «mandatory»
«optional» dct:hasVersion
«optional» dct:source
dcat:keyword «recommended»
dct:rights «optional»
dct:conformsTo «optional»
dcat:record «optional»
dct:accessRights «optional»
foaf:page «optional»
dct:provenance «optional»
dcat:dataset «mandatory»
dct:spatial «optional»
dcat:landingPage «optional»
dct:accrualPeriodicity «optional»
adms:identifier «optional»
dct:temporal «optional»
dct:license «recommended»
«optional» dct:hasPart
«optional» dct:isPartOf
«optional» dct:spatial
foaf:page «optional»
dcat:contactPoint «recommended»
dct:rights «optional»
foaf:homepage «recommended»

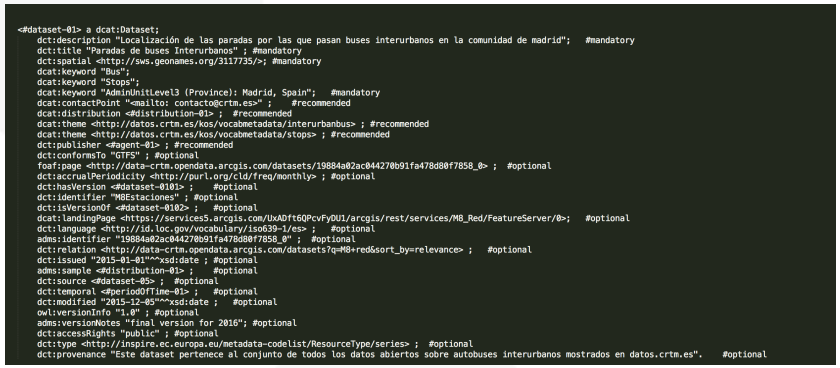
- The properties **dct:spatial** and **dcat:keywords** from dcat:Catalog and dcat:Dataset changes from **Optional** to **Mandatory**.
- The property dcat:keywords modify its range following:
  - dcat:keyword A, where A is the type of transport (Tram, Metro, Rail, Bus, Ferry, Cable car, Suspended cable car, Funicular or Other)
  - dcat:keyword B, where B is the type of dataset (Calendar, Fare, Frequencies, Routes, Shapes, Stops, Transfers, Trips or Other)
  - dcat:keyword C, where C is an INSPIRE feature for address (AdminUnitLevel3 (Province): Madrid)

dcat:Dataset dcat:keyword "Bus";
dcat:Dataset dcat:keyword "Stops";
dcat:Dataset dcat:keyword "AdminUnitLevel3 (Province): Madrid, Spain";

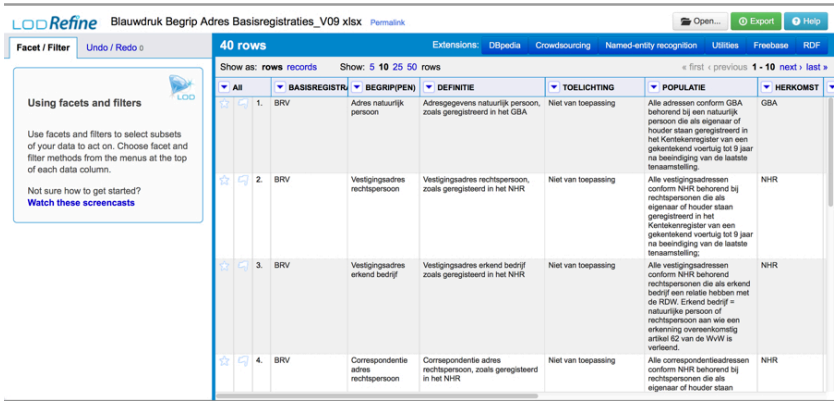
CRTM Transformation



	dcat:accessURL	dct:description	dct:format	dct:license	dcat:downloadURL	dct:language
<urbanbus-stops/csv>	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_0	CSV file with the localizations of the urban buses stops	CSV	http://www.crtm.es/licencia-de-uso	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_0.csv	http://id.loc.gov/vocabulary/iso639-1/es
<urbanbus-stops/kml>	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_0	KML file with the localizations of the urban buses stops	KML	http://www.crtm.es/licencia-de-uso	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_0.kml	http://id.loc.gov/vocabulary/iso639-1/es
<urbanbus-stops/shp>	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_0	SHP files with the localizations of the urban buses stops	SHP	http://www.crtm.es/licencia-de-uso	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_0.zip	http://id.loc.gov/vocabulary/iso639-1/es
<urbanbus-lines/csv>	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_2	CSV file about the different lines of the urban buses in the City of Madrid	CSV	http://www.crtm.es/licencia-de-uso	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_2.csv	http://id.loc.gov/vocabulary/iso639-1/es
<urbanbus-lines/kml>	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_2	KML file about the different lines of the urban buses in the City of Madrid	KML	http://www.crtm.es/licencia-de-uso	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_2.kml	http://id.loc.gov/vocabulary/iso639-1/es
<urbanbus-lines/shp>	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_2	SHP files about the different lines of the urban buses in the City of Madrid	SHP	http://www.crtm.es/licencia-de-uso	http://data-crtm.opendata.arcgis.com/datasets/46044e95c2f340e6a9e07908842bbbef2_2.zip	http://id.loc.gov/vocabulary/iso639-1/es
<interurbanbus-stops/csv>	http://data-crtm.opendata.arcgis.com/datasets/19884a02ac044270b91fa478d80f7858_0	CSV file with the localizations of the interurban buses stops	CSV	http://www.crtm.es/licencia-de-uso	http://data-crtm.opendata.arcgis.com/datasets/19884a02ac044270b91fa478d80f7858_0.csv	http://id.loc.gov/vocabulary/iso639-1/es



```
<#dataset-01> a dcat:Dataset;
    dct:description "Localización de las paradas por las que pasan buses interurbanos en la comunidad de madrid";   #mandatory
    dct:title "Paradas de buses Interurbanos" ; #mandatory
    dct:spatial <http://sws.geonames.org/3117735/>; #mandatory
    dcat:keyword "Bus";
    dcat:keyword "Stops";
    dcat:keyword "AdminUnitLevel3 (Province); Madrid, Spain";   #mandatory
    dcat:contactPoint "<mailto: contacto@crtm.es>" ;    #recommended
    dcat:distribution <#distribution-01> ;  #recommended
    dcat:theme <http://datos.crtm.es/kos/vocabmetadata/interurbanbus> ; #recommended
    dcat:theme <http://datos.crtm.es/kos/vocabmetadata/stops> ; #recommended
    dct:publisher <#agent-01> ; #recommended
    dct:conformsTo "GTFS" ; #optional
    foaf:page <http://data-crtm.opendata.arcgis.com/datasets/19884a02ac044270b91fa478d80f7858_0> ;  #optional
    dct:accrualPeriodicity <http://purl.org/cld/freq/monthly> ; #optional
    dct:hasVersion <#dataset-0101> ;    #optional
    dct:identifier "M8Estaciones" ; #optional
    dct:isVersionOf <#dataset-0102> ;   #optional
    dcat:landingPage <https://services5.arcgis.com/UxADft6QPcvFyDU1/arcgis/rest/services/M8_Red/FeatureServer/0>;   #optional
    dct:language <http://id.loc.gov/vocabulary/iso639-1/es> ;   #optional
    adms:identifier "19884a02ac044270b91fa478d80f7858_0" ;  #optional
    dct:relation <http://data-crtm.opendata.arcgis.com/datasets?q=M8+red&sort_by=relevance> ;   #optional
    dct:issued "2015-01-01"^^xsd:date ; #optional
    adms:sample <#distribution-01> ;    #optional
    dct:source <#dataset-05> ;  #optional
    dct:temporal <#periodOfTime-01> ;   #optional
    dct:modified "2015-12-05"^^xsd:date ;   #optional
    owl:versionInfo "1.0" ; #optional
    adms:versionNotes "final version for 2016"; #optional
    dct:accessRights "public" ; #optional
    dct:type <http://inspire.ec.europa.eu/metadata-codelist/ResourceType/series> ;  #optional
    dct:provenance "Este dataset pertenece al conjunto de todos los datos abiertos sobre autobuses interurbanos mostrados en datos.crtm.es".    #optional
```



LocaliData

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TRANSPORTES
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¡MADRID!
EMT

ALCOBENDAS
Un modelo de ciudad

SNCB

TEC

DE
LIJN

STIB
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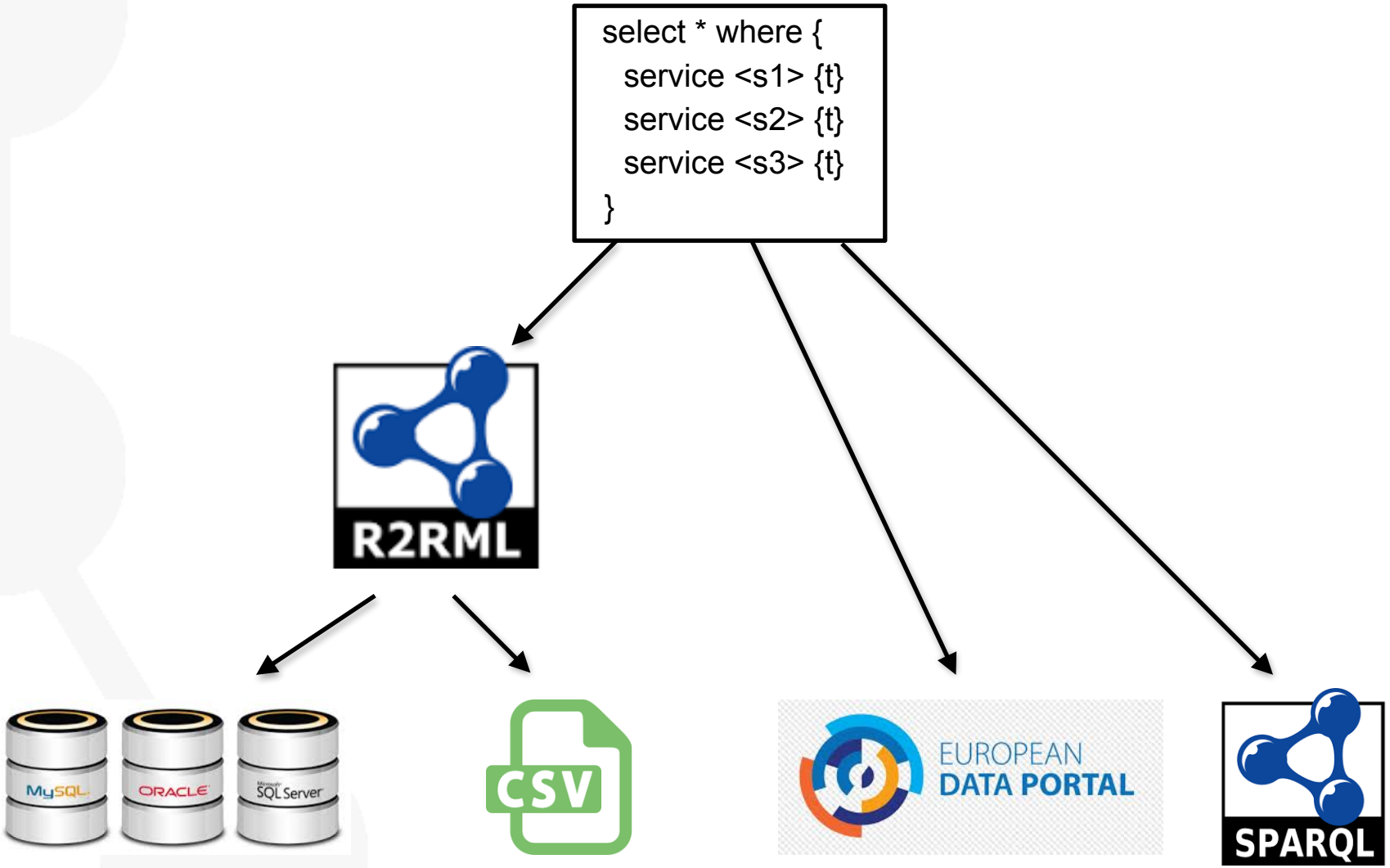
Federated query processing over heterogeneous native and virtual RDF datasets

"Federated query processing over heterogeneous native and virtual RDF datasets"



- Two different types:

A

```
select * where {
    gp
}
```

B

```
select * where {
    service <s1> {t}
    service <s2> {t}
    service <s3> {t}
}
```

- Disadvantages of A:
  - Closed world
  - Focused on the source selection problem
  - Without real application
  - Doesn't deal with the problem of availability

- Metadata profile for federated queries over heterogeneous resources
- Extend a federated benchmarking adding SERVICE and GRAPH
- Optimizations of the queries (Future Work)
- Real world environment for evaluation

Ontology Engineering Group

THANK YOU!

QUESTIONS?

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