



LINDA PROJECT

LINKED DATA



Making Linked Data usable

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Project Details & Partners

Start 1/12/2013

Duration 24 months

Objective ICT-2013.4.3 - SME Initiative on Analytics

Coordinator **National Technical University of Athens**



+ Linked Data in a nutshell

- A self-descriptive, interoperable, machine readable format (Format of choice: RDF)
- Helps to...
 - ➔ Link data on the web
 - ➔ Gain more insight into ones own data
 - ➔ Enable decision support through broadening ones own knowledge base

+ The SME issue with Linked Data

- Current Linked Data Tools are academic, rather than business oriented (*IT-savvy researchers only*)
- Enterprise's strategic decisions are based on data
 - Linking/combining datasets is a major issue for Information Managers of SMEs (Open PSI data and initiatives have proliferated)
- PSI Datasets, often, not in a standard, machine-processable format which would support true semantic enrichment and interlinking of data (such as RDF).
- No native support for Linked Data-Driven Applications (e.g. Visualizations, Data mining)



Motivation behind LinDA

Linked Data is an active research field with currently relatively little activity towards **ease of use and accessibility for non-experts**. LinDA's motivation is to

- ➔ bring lay people, especially from SMEs, closer to Linked Data and help them unlock the potential of their data in an affordable manner.
- ➔ help expand the Linked Open Data Cloud by easily publishing Linked Open Data.

+ LinDA's Offerings

- Holistic workflow for SMEs
 - From data provision (various source formats) ...
 - to data consumption (queries, visualization, analytics)
- Ease of use, simplicity + automation over sophistication
 - Graphical user interface
 - Tendency towards minimalistic concepts



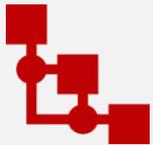
The LinDA Tool Set + APIs



Transformation Tool
Turn (semi-)structured data into RDF graphs



Query Tools
Drag-n-Drop simple or complex Linked Data queries, join multiple data sources and apply advanced filters



Vocabulary & Metadata Repository
Access and share Linked Data vocabularies



Visualisation Tool
Visualise and gain insight from semantically enriched Linked (enterprise) Data



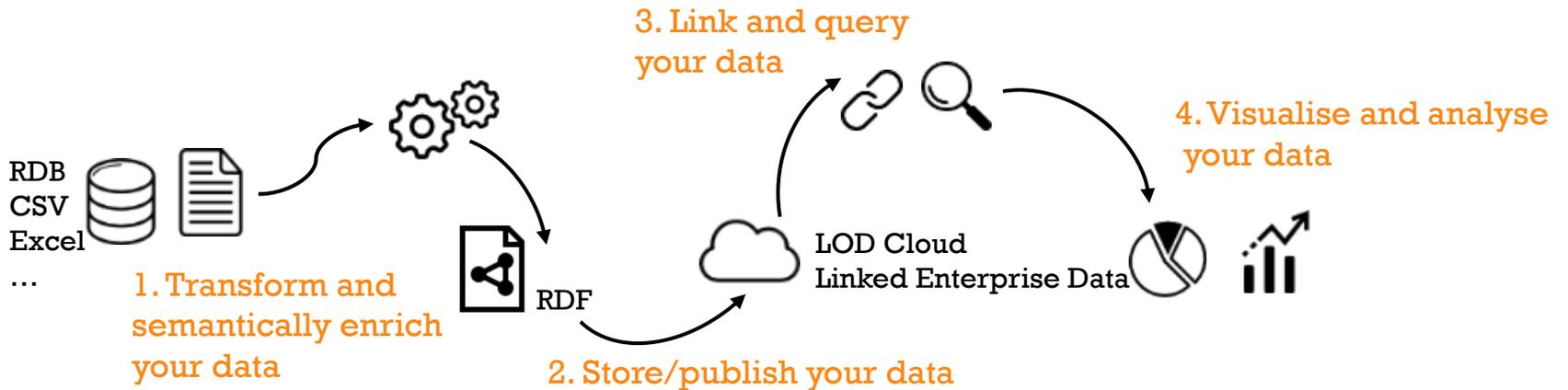
Analytics & Data-mining
Execute analytics processes against SPARQL queries



Consumption Apps
Explore and re-use open RDF sources in different ways

+ LinDA Workflow

- From the publication to the consumption of Linked Data



+ Transform your data into RDF

DATA VIEW

File: Customer_Contract_data.csv (10 of 32 rows per page)

show rows: **1-10** | 11-20 | 21-30 | 31-32

add URIs	add data type
Country	Federal state
Germany <input checked="" type="checkbox"/> http://dbpedia.org/resource/Germany	Bayern
Germany <input checked="" type="checkbox"/> http://dbpedia.org/resource/Germany	Berlin
Germany <input checked="" type="checkbox"/> http://dbpedia.org/resource/Germany	Brandenburg
Germany <input checked="" type="checkbox"/> http://dbpedia.org/resource/Germany	Bremen

- Simple, intuitive web-based UI
- The construction of relevant semantic parts of an RDF graph are partitioned in 7 dedicated steps
- Integrates 'DBpedia Lookup' to reconcile against Linked Data resources
- Automatic type guessing (xsd:schema)

+ Use Oracle service to access properties and classes

Country	Federal state
Country ✓ (★100) <i>country</i>  DBPedia Ontology <input checked="" type="checkbox"/> lookup in LinDA dictionary <input checked="" type="checkbox"/> dbpedia.org/ontology/country	Federal state ✓ (★100) <i>federal state</i> DBPedia Ontology <input checked="" type="checkbox"/> lookup in LinDA dictionary <input checked="" type="checkbox"/> dbpedia.org/ontology/federalState
(★94) <i>Country</i> OpenVocab <input checked="" type="checkbox"/> lookup in LinDA dictionary <input checked="" type="checkbox"/> open.vocab.org/terms/country	Baden-Wuerttemberg
(★94) <i>country</i> NEPOMUK Contact Ontology <input checked="" type="checkbox"/> lookup in LinDA dictionary <input checked="" type="checkbox"/> .../nco#country	Bayern
Germany	Berlin
	Brandenburg
	Bremen

- Access to repository with public ontologies
- Oracle Service for best matches
- Ranking based on popularity and re-use
- Cross-lingual suggestions

+ Interlink and Query data

- Interlink remote resources (e.g. Eurostat, Open Data portals)
- Drag-n-drop, filter, etc.

Start Save Download Analyze Visualize

Eurostat Search terms Regions Countries

Observation (209) total-drug-consumptions-per-country-
<http://purl.org/linked-data/cube#Observation>

Show	Property	Optional	Order by	Filters	Foreign
<input checked="" type="checkbox"/>	URI	<input type="checkbox"/>			
<input type="checkbox"/>	Ref Area	<input type="checkbox"/>			
<input checked="" type="checkbox"/>	Drugs	<input type="checkbox"/>	DES		
<input type="checkbox"/>	Ref Period	<input type="checkbox"/>			

find property 5 properties found

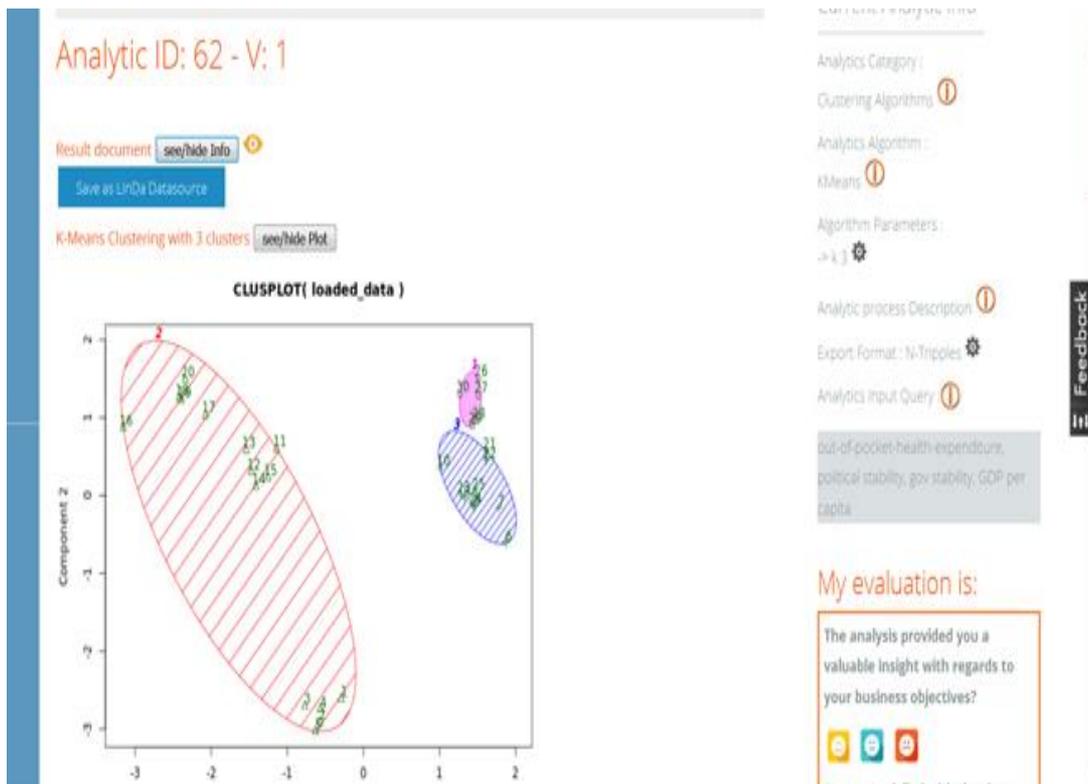
Countries (45) eurostat
<http://wifo5-04.informatik.uni-mannheim.de/eurostat/resource/eurostat/countries>

Show	Property	Optional	Order by	Filters	Foreign
<input type="checkbox"/>	URI	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Name	<input type="checkbox"/>			
<input checked="" type="checkbox"/>	Marriages	<input type="checkbox"/>			
<input checked="" type="checkbox"/>	Population total	<input type="checkbox"/>			

find property 36 properties found



Visualise and Analyse your data



- Auto recommendation and configuration of charts based on RDF's semantic
- Support for different analytics processes (e.g. LinearRegression, ClustersNumber, *Kmeans, Model Based Clustering)



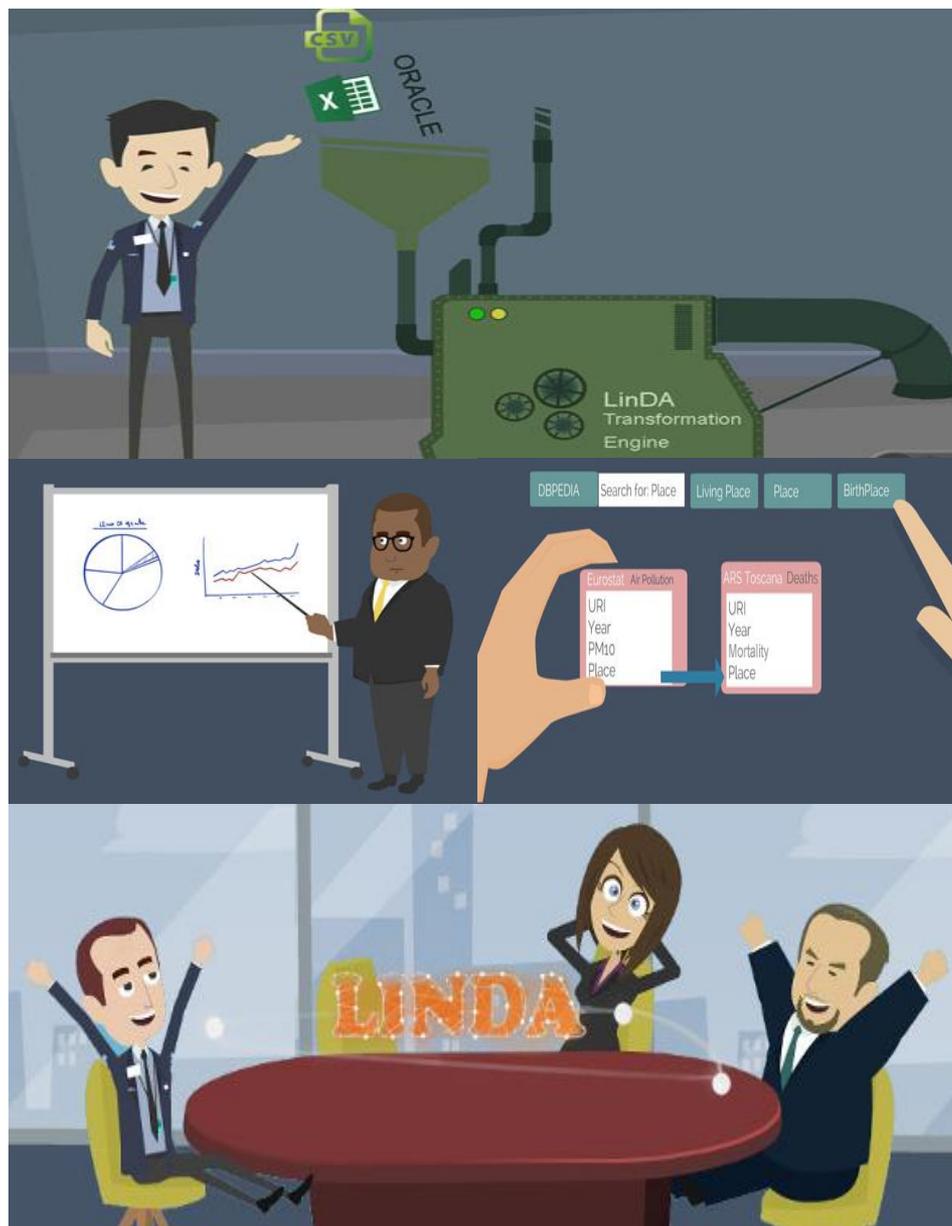
Conclusion

- LinDA project makes simple Linked Data workflows accessible to SMEs, Public Sector, ...
- Knowledge required from user reduced to a minimum



Come see for yourself!

LinDA demo outside in the breaks





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Thank you! Questions?

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