



Open Knowledge  
Foundation



universität**bonn**

Rheinische  
Friedrich-Wilhelms-  
Universität Bonn

# Potentials and Benefits of **Linked** Open Government Data

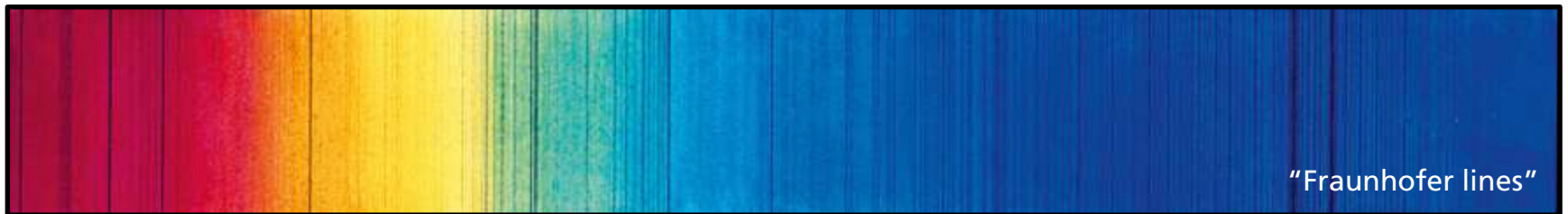
Dr. Sören Auer



eccenca  
command your data!

# Fraunhofer-Gesellschaft, the largest organization for applied research in Europe

- 67 institutes and research units
- More than 23,000 staff
- €2 billion annual research budget totaling
  - Roughly two thirds of this sum is generated through contract research on behalf of industry and publicly funded research projects
  - Roughly one third is contributed by the German federal and *Länder* governments in the form of base funding
- International cooperation



# Joseph von Fraunhofer (1787 – 1826)



© Deutsches Museum

## Researcher

- Discovery of the “Fraunhofer lines” in the solar spectrum

## Inventor

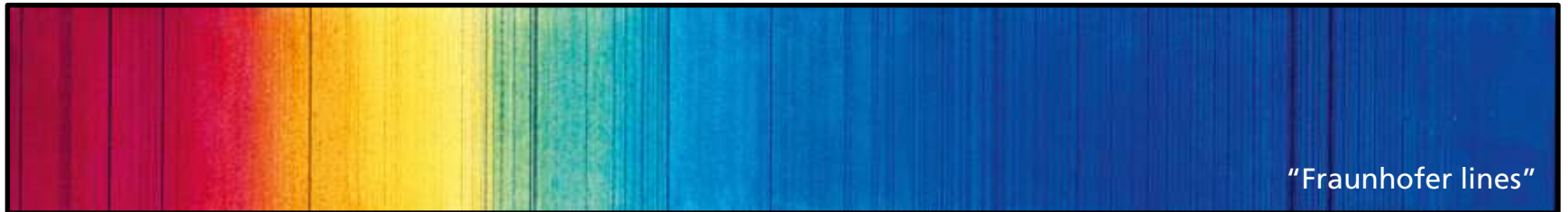
- New methods for processing lenses

## Entrepreneur

- Director and partner in a glassworks



© Fraunhofer-Gesellschaft





**Joseph von Fraunhofer**

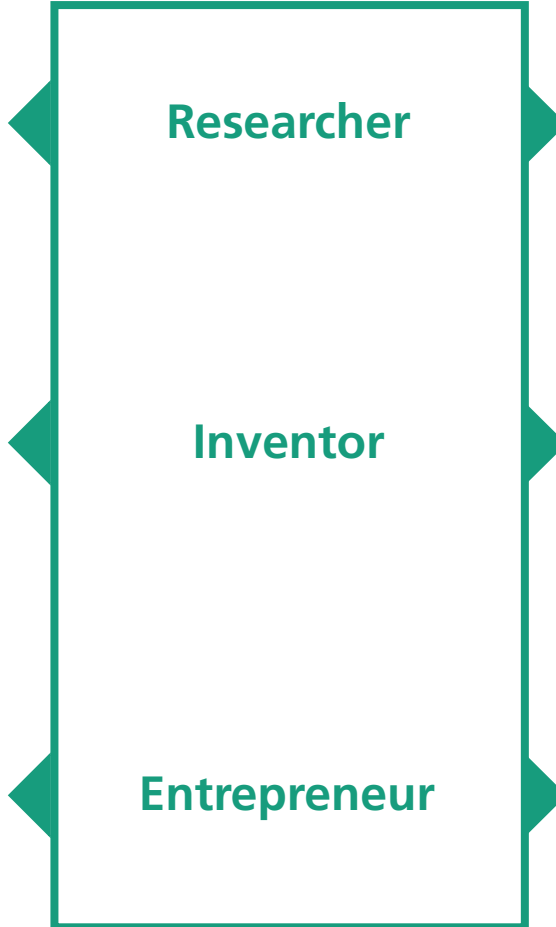


**The Fraunhofer-Gesellschaft**

Discovery of the "Fraunhofer lines" in the solar spectrum

New methods for processing lenses

Director and partner in a glassworks



Research and development on behalf of industry and state

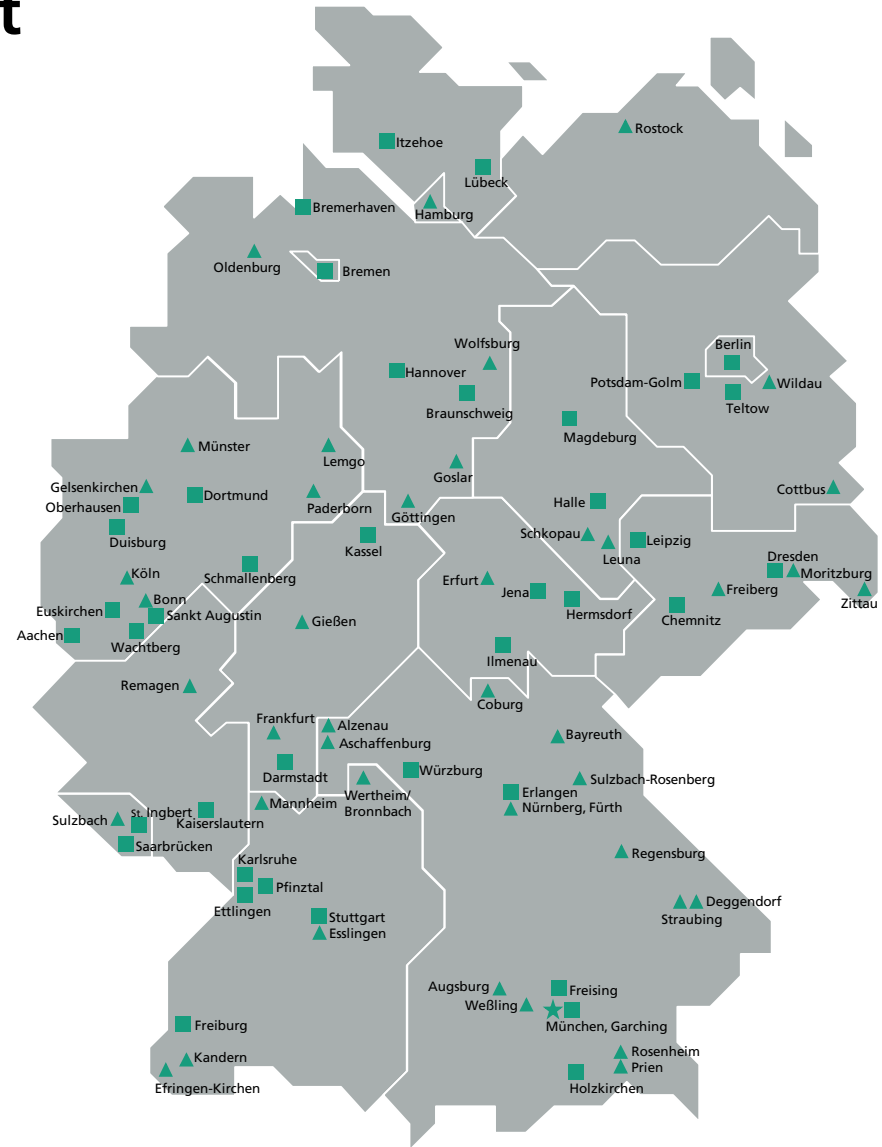
mp3 music format, white LED, high-resolution thermal camera

Research volume: approx. €2 billion annually

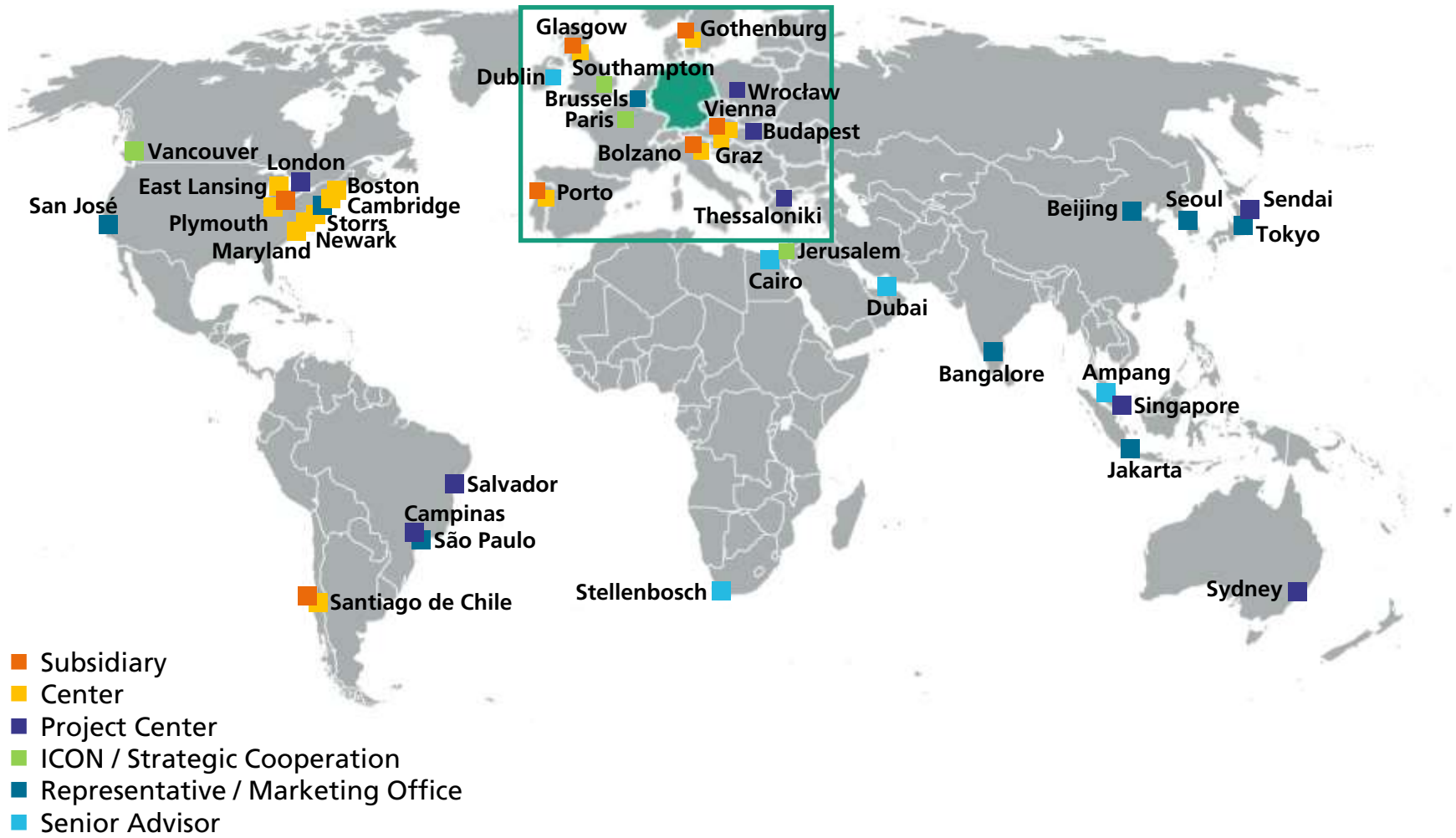
# The Fraunhofer-Gesellschaft Locations in Germany

- 67 institutes and research units
- more than 23,000 staff

- Institute/research unit
- ▲ Other research unit
- ★ Headquarter

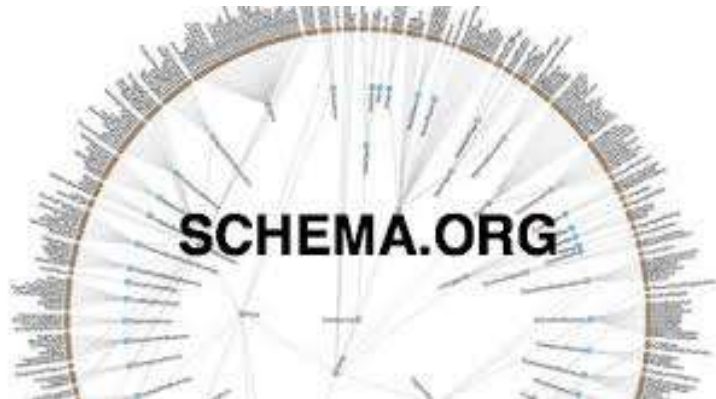
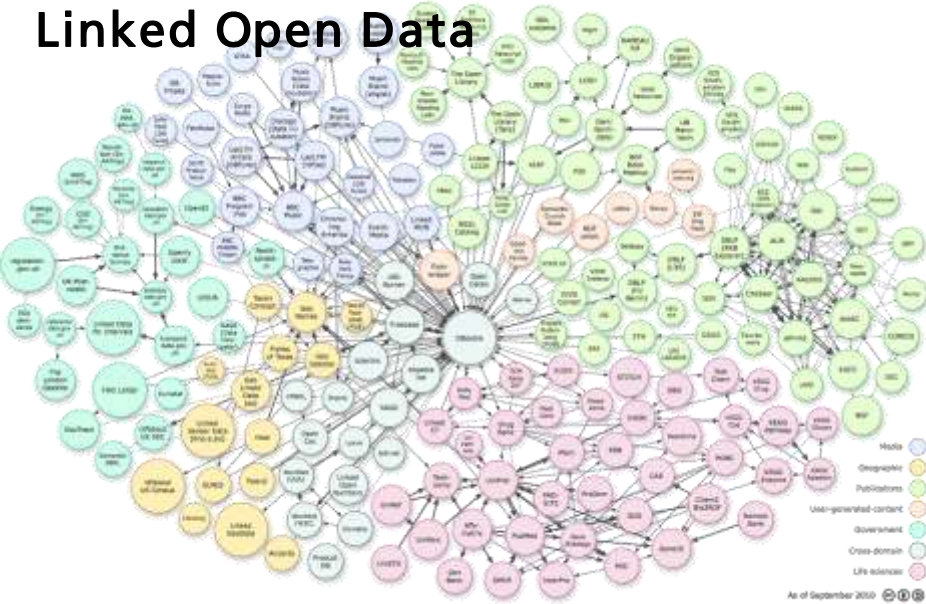


# Fraunhofer worldwide



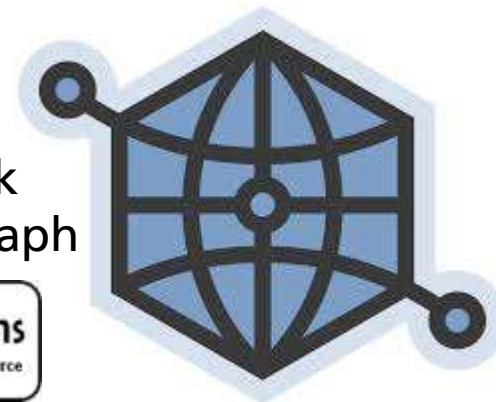
# The Web evolves into a Web of Data

## Linked Open Data

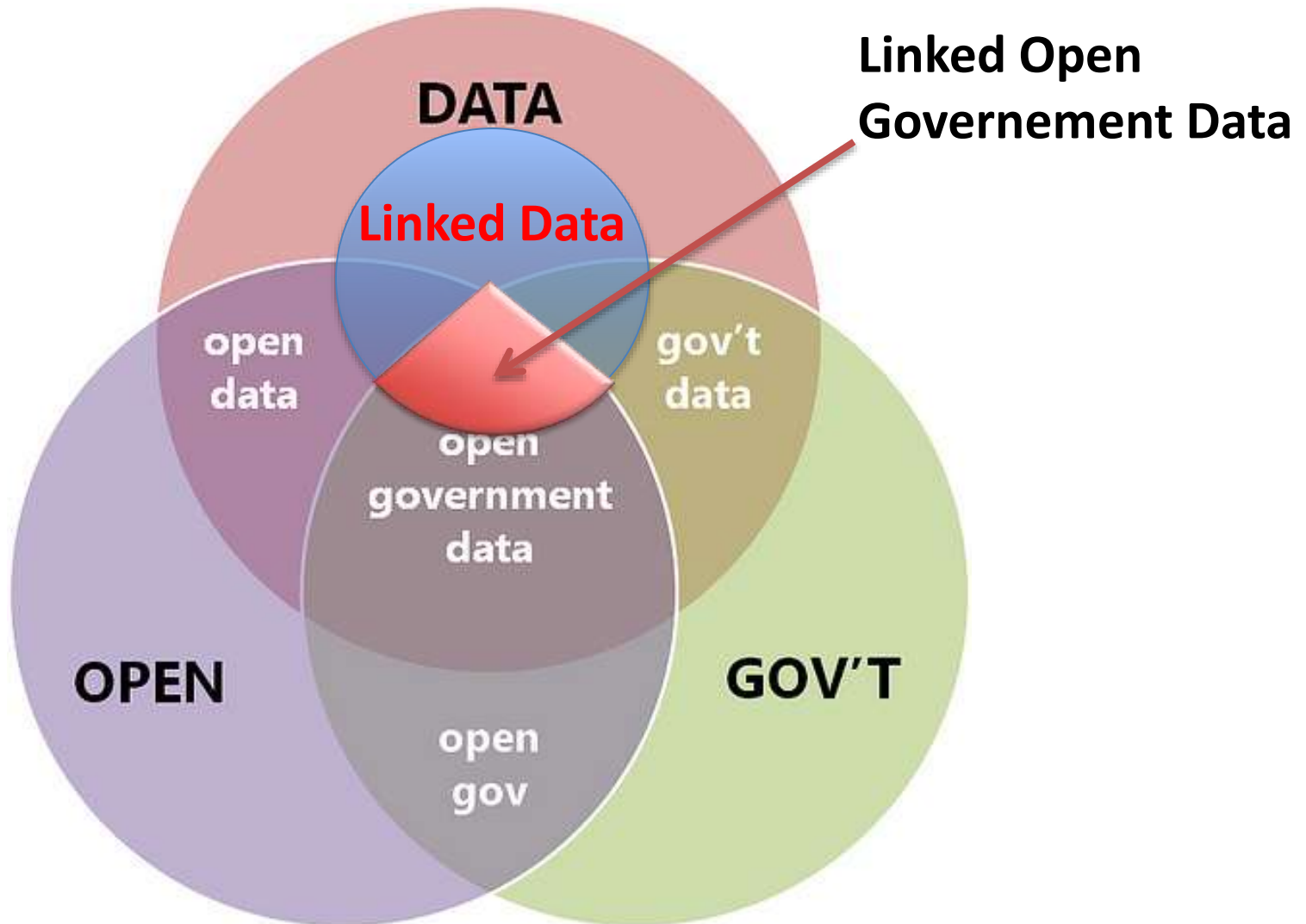


Powerset  
NATURAL LANGUAGE SEARCH

Facebook  
Open Graph



# What is Linked Open Gov Data?





# We need an Open Government Data Ecosystem

## Business

- Startups
- SMEs
- Large companies

## Research

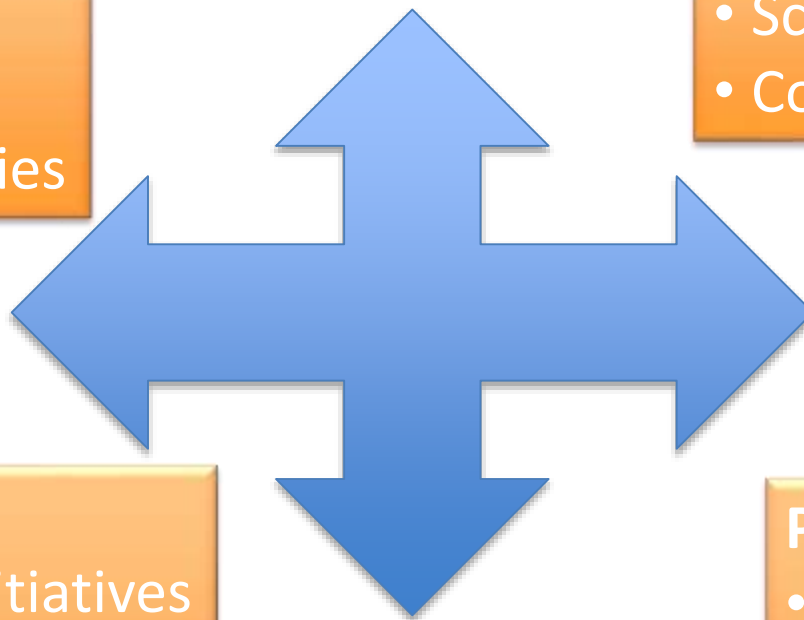
- Science
- Collaborative projects

## Civil society

- Grass-roots initiatives
- NGOs
- Pluralism

## Politics

- On different levels:  
(supra-) national,  
regional, municipal



## Potential of Open Data

Open Data Strategy for Europe (Reference: IP/11/1524):

- expected to deliver a **€40 billion boost** to the EU's economy each year
- make it easier for businesses to obtain access and permission to reuse government-held information

Data becomes a tradable commodity, open data is on the rise

- “the value of data increases the more you share it”
- “Data is the new oil”

## Example US Weather Data

[Opening US weather data](#) [1] led to

- gross receipts by commercial weather industry of USD \$400-700 million a year with
- 400 firms employing 4,000 people

Europe had a similar sized economy but closed weather data:

- Only 30 firms with 300 employees and receipts of USD \$30m-50m a year

[1] [http://www.nap.edu/openbook.php?record\\_id=10610&page=23](http://www.nap.edu/openbook.php?record_id=10610&page=23)

## Examples in Spain and UK

**Spain:** in-country business volume directly associated with open data released by national government was [1]

- €550-650 million (USD \$669-791 million)
- 5,000 and 5,500 employees were directly assigned to activities related to re-using information.

**UK:** Centre for Economics and Business Research says [2]

- 58.000 new jobs will be created between now and 2017 for UK connected with the growing data economy.
- Deloitte gives advice for growing data economy in UK: Open data - driving growth, ingenuity and innovation, White Paper, Deloitte Analytics, London, 2012 ([PDF](#))

[1] <http://www.ontsi.red.es/ontsi/en/estudios-informes/characterization-study-infomediary-sector-june-2011>

[2] <http://www.sas.com/reg/gen/uk/data-equity>

# “DATA IS THE NEW OIL.”

Coined in 2006 by Clay Humby, a British data commercialization entrepreneur, this now famous phrase was embraced by the World Economic Forum in a 2011 report, which considered data to be an economic asset, like oil.

From the beginning of recorded time until 2000, we created **5 exabytes** of data.

In 2011 the same amount was created every two days.

By 2013, it's expected that the time will shrink to 10 minutes.

Every hour, we create enough internet traffic to fill **7 billion DVDs.**

Side by side, that's that's screen times the height of Everest.

There are nearly as many bits of information in the digital universe as there are **1000** in our actual universe.

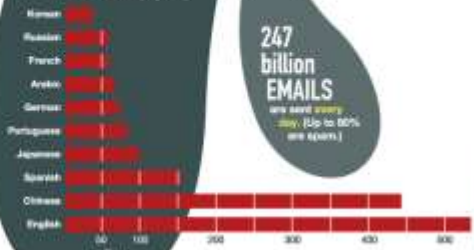
As of August 2012, there were just over **4 million** articles in the English Wikipedia.

There are **133 million** BLOGS on the web.

**80%** of all humans own a mobile phone of some sort. Out of 1 billion mobiles, 1 billion are smartphones. In Singapore, 94% of citizens are smartphone users.

**247 billion** EMAILS are sent every day. (Up to 86% are spam.)

Top languages used on the web (May 2011)



Just as a study of activity on Twitter gave residents, family members, and journalists advance warning of details about the devastating earthquake and tsunami in Japan, **high-frequency traders**, with the help of computer algorithms, use Big Data to follow trends and to act quickly on their findings.

These specialized algorithms make split-second decisions to buy or sell a commodity. New cable (being laid under the Atlantic) will shave **5 milliseconds**

from the current 95 milliseconds it takes for trading instructions to travel between New York City and London.

With new fiber-optic cable, the round-trip time between New York and London will be 50.6 milliseconds.

This 5-millisecond saving is worth many millions of dollars to the trading firms who use the cable (and who will pay millions to do so).

How they save 5 milliseconds

The depth of the Atlantic Ocean varies. The new cable will be on areas of the ocean floor that are up to 1,000 feet shallower than the current fastest cables. By taking a different route, the new cable is shorter, meaning that the time it takes for messages to travel along it is shortened.



**10%** of all photos ever taken were taken in 2011. **60%** of all humans (3.4 billion people) are active texters. In 2010, 193,500 text messages were sent every second.

**50%** of 8-year-old kids in the U.S. are given access to a smartphone.



©Nigel Holmes 2012 / from The Human Face of Big Data

- Open Data Strategy (Ref: IP/11/1524) expected to deliver **€40 billion boost** to the EU's economy each year
- Data becomes a tradable commodity, “the value of data increases the more you share it”

# Open Budget Data

OpenSpending

[Spending Blog](#)

[Datasets](#)

[Search](#)

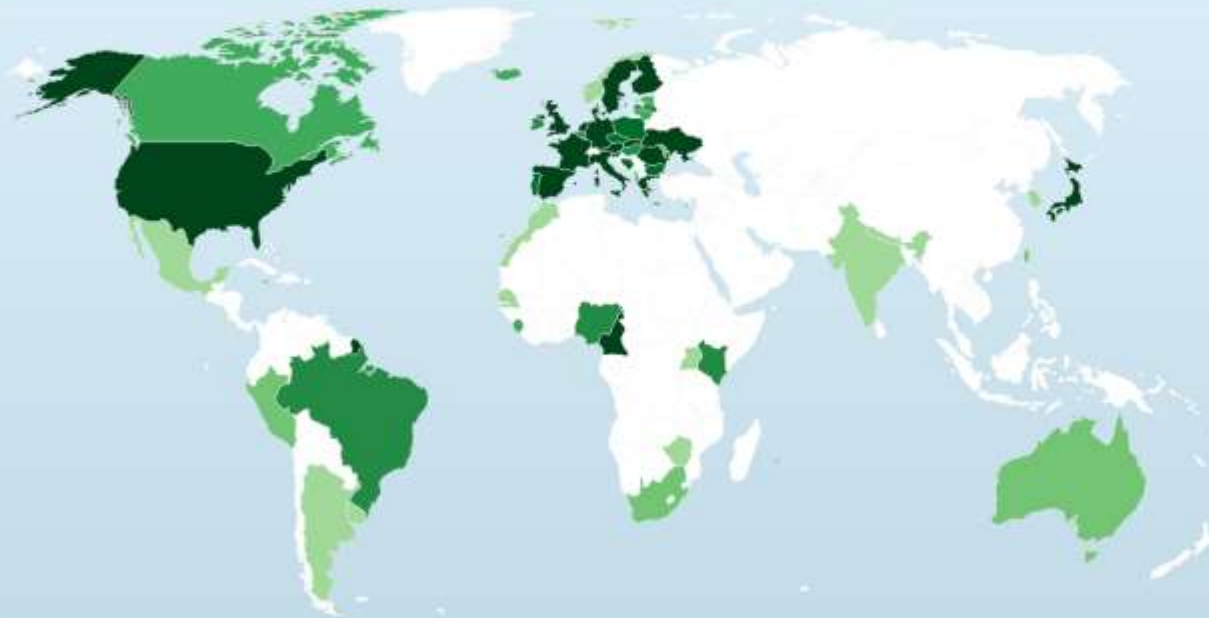
[Community](#)

[Help](#)

[About](#)

[Login/Register](#)

[Language](#)



## Mapping the money.

Our aim is to track every government financial transaction across the world and present it in useful and engaging forms for everyone from a school-child to a data geek.

- Let citizens build and experiment with apps visualizing governmental spending – leverage the creative potential
- Reach better societal agreement
- Identify overspending, potential for savings, misuse

ASK A QUESTION

ADD YOUR PUBLICATIONS

Your profile is 95% complete.

YOUR NETWORK ACTIVITY

Endorse more of your peers



Is Sebastian Schaffert skilled at Semantic Technologies?

Endorse

Learn more



Is Tassilo Pellegrini skilled at Social Networks?

Endorse

Show more >



Martin Gaedke was endorsed for Web Engineering.

19h



Martin Gaedke followed Michael Hausenblas.

2d



Martin Gaedke was endorsed for Web Development.

4d

RELATED RESEARCHERS

Load more



Zachary G. Ives  
University of Penns



Craig A. Knoblock  
University of South

We found a match!

Are you the author of these publications?



## Live Feed



Uldis Bojars added the publication Finding experts using Internet-based discussions in online communities and associated social networks

8 hours ago



Christian Bizer added the publication Proceeding of 5th Scripting for the Semantic Web Workshop at theESWC (SFSW 2009) and 15 others.

- Identify excellence/ underperformance in education
- Foster competition
- Create transparency
- Make education more efficient and effective

Similar strategy can be pursued with

- health care (physicians, hospitals),
- public administrations
- Environment
- ... ..

# Open Transportation Data – Increase Efficiency of Public Transport



- It is hard for public transportation agencies to develop the best user interfaces
- Why not letting citizens and companies solve this?

**Smart  
Cities**

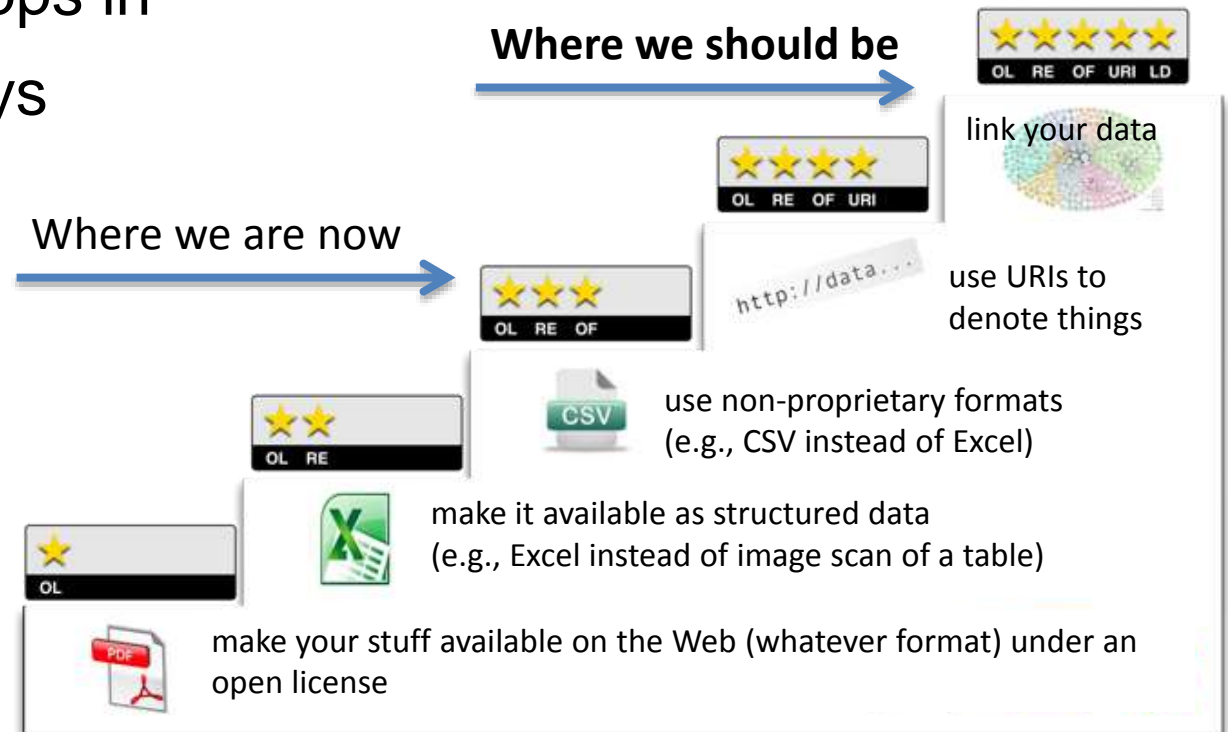
U Weinmeisterstr.	N5, N6, N42	83m
N5 → Riesaer Str.		5 min
U Weinmeisterstr.	N5	83m
N5 → Riesaer Str. (Berlin)		5 min
U Weinmeisterstr./Gipsstr.	N40, N42	193m
N40 → U Turmstr.		4 min
U Weinmeisterstr./Gipsstr.	M1	193m
M1 → Schillerstr.		7 min
S+U Alexanderplatz Bhf/Memhardstr.	S99	376m
(no departures)		
S+U Alexanderplatz Bhf/Memhardstr.	N5, S99, S99S	376m
N5 → S Hackescher Markt		14 min
S+U Alexanderplatz Bhf/Memhardstr.	N42, N40, N42	376m
N42 → U Theodor-Heuss-Platz		7 min
S Hackescher Markt	N2	396m
N2 → S+U Zoologischer Garten		3 min
S Hackescher Markt	N5, N6	396m
N5 → Riesaer Str.		3 min
S Hackescher Markt	N2, N6, N42, N40, N42	396m
N2 → S+U Zoologischer Garten		3 min
S Hackescher Markt	N42	396m



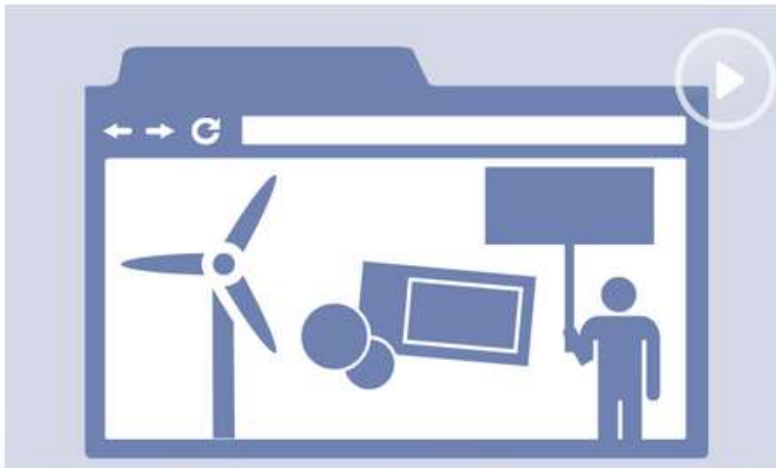


# What has to be done?

- Publish Open Data in RDF reusing vocabularies which can be understood and combined by apps in unforeseen ways



The European Union Open Data Portal contains [5899 datasets](#) that you can browse, learn about and download.



CC BY

## Welcome to the European Union Open Data Portal

### What is this Data Portal about?

Are you looking for easy access to EU data? Do you want to reuse data for research, an article, an application or something else?

You have come to the right place. The EU Open Data Portal is your single point of access to a growing range of data produced by the institutions and other bodies of the European Union.

Data are free to use, reuse, link and redistribute for commercial or non-commercial purposes.

The portal aims to promote the innovative use of these data and to engage with the user community for EU open data.

### Blogs

#### Digital Agenda for Europe

#### Tweets

[Follow @EC\\_opendata](#)

**Open data** @\_opendata 4h

RT @vickyande: Portales #opendata como aeropuertos sin aviones por @dcabo #transparencia <http://t.co/XnEe89YCs...> [bit.ly/127Ph4t](http://bit.ly/127Ph4t)

Retweeted by EC Open Data Policy

Expand

okfn\_spain 10h

Tweet to @EC\_opendata



Find datasets...

Data Portal contains [5895 datasets](#) that you can browse, learn about and download.

## Top Publishers

[view all publishers »](#)

- 
**Eurostat**  
 (5718 datasets)
- 
**European Environment Agency**  
 (106 datasets)
- 
**Joint Research Centre**  
 (33 datasets)
- 
**Directorate-General for Health and Consumers**  
 (12 datasets)
- 
**Publications Office**  
 (12 datasets)
- 
**Directorate-General for Education and Culture**  
 (3 datasets)
- 
**Directorate-General for Communications Networks, Content and Technology**  
 (2 datasets)
- 
**Secretariat-General**  
 (2 datasets)
- 
**Directorate-General for Employment, Social Affairs and Inclusion**  
 (1 datasets)

## Recent Updates

[view all datasets »](#)

- 
**Psychiatric care beds in hospitals**  
 was updated on 26/04/13.
- 
**Total length of railway lines**  
 was updated on 26/04/13.
- 
**Public electronic procurement systems**  
 was updated on 26/04/13.
- 
**Enterprises using Internet for interaction with public authorities (NACE Rev. 1.1)**  
 was updated on 26/04/13.
- 
**Public services - Individuals**  
 was updated on 26/04/13.
- 
**Enterprises using the Internet for submitting a proposal in a public electronic tender system to public authorities**  
 was updated on 26/04/13.
- 
**Population connected to independent wastewater collecting systems; with treatment**  
 was updated on 26/04/13.
- 
**Gross value added - NACE Rev. 1: L-P - current prices**  
 was updated on 26/04/13.
- 
**Water abstracted for public water supply**  
 was updated on 26/04/13.
- 
**Compensation of employees - NACE Rev. 1**

## Visualisation applications

The datasets you can access via the EU Open Data Portal contain raw data. Since data in this format can be difficult to read, applications are used to visualise and to reuse them. Discover the potential of EU open data with the applications created by data providers: see the gallery below.

You will find below examples of visualisation applications used by various data providers of the European Commission. If you would like to view these applications, please go to their websites, using the links shown.

### Share your app

Have you used our data to create an application?

*Please let us know!*

DG CONNECT

The Digital Agenda Scoreboard



[See description](#)

JRC

The European Forest Data Centre (EFDAC) Map Viewer



[See description](#)

JRC

The European Forest Fire Information System



[See description](#)

EEA

The Natura 2000 European protected areas interactive map



EEA

Land accounts data viewer 2000-2006



EUROSTAT

The Eurostat Country Profiles



## Publishing Data about Kindergartens in XML (1)

```
<kindergarten>
```

```
  <name>Seven Dwarfs</name>
```

```
  <location>...</location>
```

```
  <description>...</description>
```

```
</kindergarten>
```

## Publishing Data about Kindergartens in XML (2)

```
<child_care name=„Seven Dwarfs“>  
  <address>  
    <street>...</street>  
    <zip>...</zip>  
  </address>  
  <text>...</text>  
</child_care>
```

## Publishing Data about Kindergartens in XML (3)

```
<daycare id=„Seven Dwarfs“  
  address=„...“>  
  . . .  
</daycare>
```

## Problem of XML

```
<kindergarten>
  <name>Seven Dwarfs</name>
  <location>...</location>
  <description>...</description>
</kindergarten>

<child_care name=„Seven Dwarfs“>
  <address>
    <street>...</street>
    <zip>...</zip>
  </address>
  <text>...</text>
</child_care>

<daycare id=„Seven Dwarfs“
  address=„...“>
  . . .
</ daycare >
```

**Syntactic heterogeneity** – different trees

**Semantic heterogeneity** – different tags and attributes (e.g. kindergarten, child\_care, daycare)



## Maybe CSV helps?

Kindergarten	Location	Description	...
Seven Dwarfs	Rosentalgasse 9, 04105	...	...
...	...	...	...

Child_care	street	Zip	text
Seven Dwarfs	Rosentalgasse	04105	...
...	...	...	...

Type	Name	Location	Features
Daycare	Seven Dwarfs	42.052384   13.2736 79	...
...	...	...	...

## A nightmare ...

Imagine you have 10.000 open data files describing child care from communities all over Europe all in different XML, CSV, Excel, JSON, ... formats

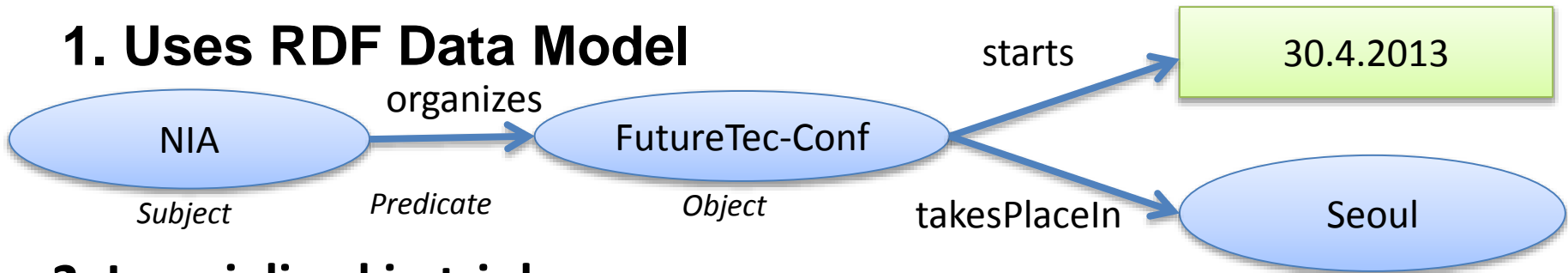
And then you want to look into pollution, road congestion, health care, ...



**Linked Data can help**

# Linked Data in a Nutshell

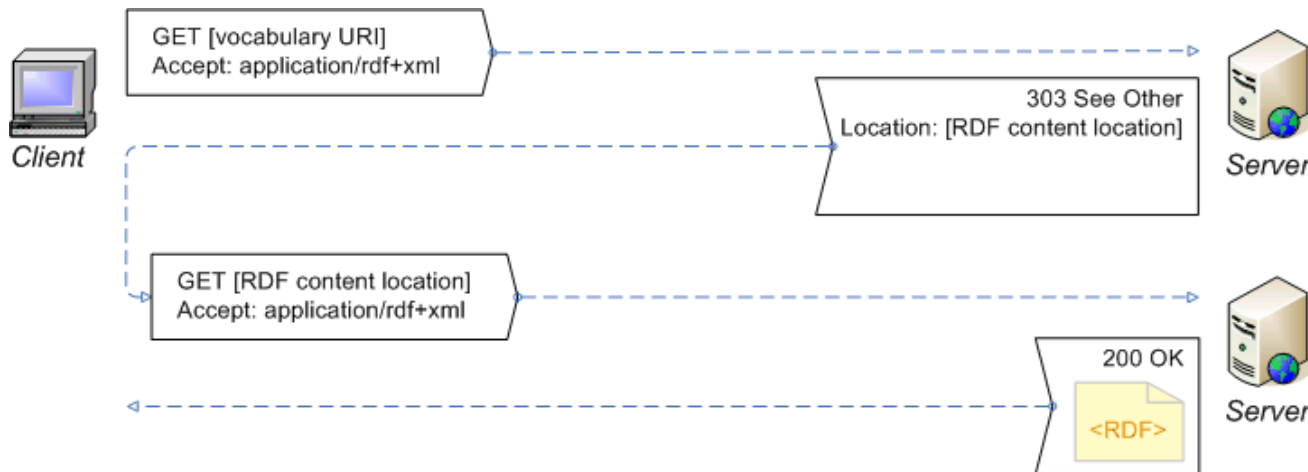
## 1. Uses RDF Data Model



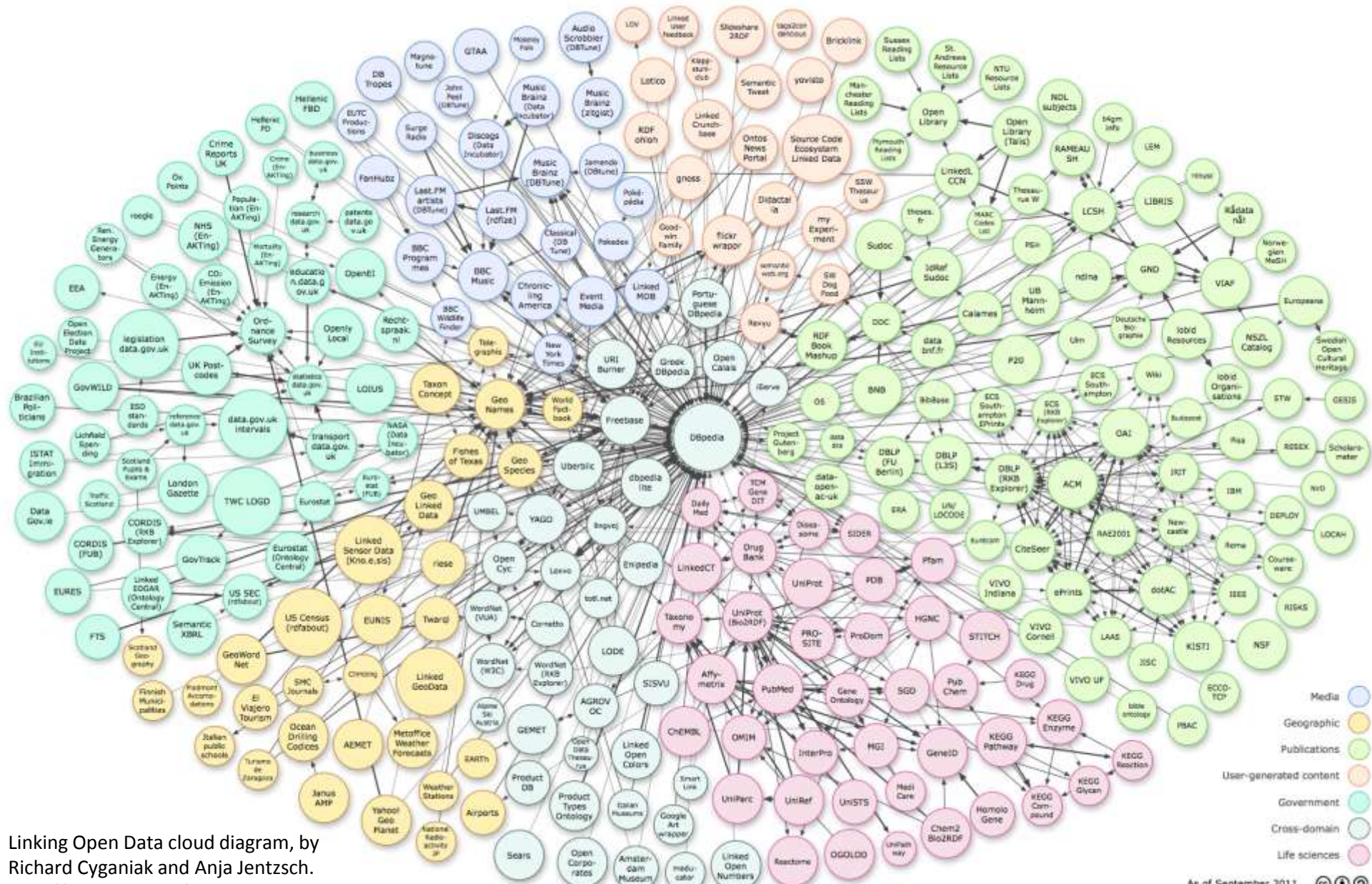
## 2. Is serialised in triples:

NIA organizes FutureTech-Conf .  
 FutureTech-Conf starts "20130324"^^xsd:date .  
 FutureTech-Conf takesPlaceAt Seoul .

## 3. Uses Content-negotiation



# The emerging Web of Data



Linking Open Data cloud diagram, by Richard Cyganiak and Anja Jentzsch. <http://lod-cloud.net/>



How can we support Linked  
Government Data Publishing and  
Integration?



## Search Europe's Public Data

Find datasets



**Finance and Budgeting** (436)

**Social Questions** (226)

**Environment** (215)

**Transportation** (196)

**Education and Communication** (188)

**Agriculture, Fisheries, Forestry** (176)

**Population** (145)

**Economy and Industry** (114)

**Health** (79)



[View larger map >](#)

## Open Data Showcase

### Featured Applications

**ZNasichDani / From Our Taxes**

ZNasichDani.sk uncovers who are influential... (show more)

**OpenCorporates**

OpenCorporates has taken one of the most im... (show more)

**Live London Underground tube map**

It plots the current positions of all Londo... (show more)

## Pan-European Data Portal PublicData.eu

**publicdata.eu** - find and reuse >20,000 datasets from 30 regional and national data catalogs across Europe from a single place (incl. [Data.kk.dk](http://Data.kk.dk), [opengov.se](http://opengov.se), <http://ckan.hri.fi>, <http://lt.ckan.net>, [digitaliser.dk](http://digitaliser.dk))

For:

- Data literate citizens
- Data journalists
- Policy experts
- Decision makers
- Mobile & web developers
- Academics / researchers
- Public bodies
- Companies
- Civic society / NGOs
- ...



The screenshot shows the publicdata.eu website. At the top, there is a navigation bar with the logo, the text "publicdata.eu beta — Europe's Public Data", and links for "Search", "Groups", "About", "Apps", "Ideas", "Login", and "Register". Below the navigation bar is a large blue banner with the text "europe's public data" and a search bar labeled "Find datasets". To the right of the search bar is a map of Europe. Below the search bar, there are two columns of category counts:

Finance and Budgeting (436)	Social Questions (229)
Environment (227)	Transportation (199)
Education and Communication (194)	Agriculture, Fisheries, Forestry (181)
Population (145)	Economy and Industry (118)
Health (83)	

At the bottom right of the banner, there is a link "View larger map [+]".

- **Exchange of metadata between different data catalogues**
- **Aggregate datasets** from existing data catalogues
- Creating a **European community** of reusers to improve metadata
- Creating mechanisms for **capturing derived / related datasets**
- Bridge **language and topical gaps** to associate related information



## PublicData.eu CSV Statistics

- 31,0% - Not Specified
- 24,0% - CSV
- 11,6% - Spreadsheets
- 10,9% - Text
- 9,7% - Geo Data
- 1,7% - RDF

Format	Number of resources
<b>Total</b>	<b>137470</b>
<b>N/A</b>	<b>42758</b>
<b>CSV</b>	<b>33235</b>
<b>Spreadsheet</b>	<b>16019</b>
<b>Text</b>	<b>15014</b>
<b>Geographical</b>	<b>13360</b>
<b>Other (machine-readable)</b>	<b>9372</b>
<b>Archives</b>	<b>2455</b>
<b>RDF</b>	<b>2373</b>
<b>Other</b>	<b>1777</b>
<b>Rich text documents (Word)</b>	<b>230</b>
<b>Databases</b>	<b>59</b>
<b>APIs</b>	<b>40</b>
<b>PDF</b>	<b>4</b>

# How can we fix Open Data?

We need:

- Standard formats, which preserve semantic: RDF
- Reuse vocabularies
- Visualization widgets, mashups, apps, which can make sense out of those vocabularies

## 7 Dwarfs in RDF

```
Seven_Dwarfs    rdf:type           Kindergarten
Seven_Dwarfs    rdfs:label        „Seven Dwarfs“
Seven_Dwarfs    foaf:location     „Rosentalgasse 9“
Seven_Dwarfs    rdfs:description „...“
...
```

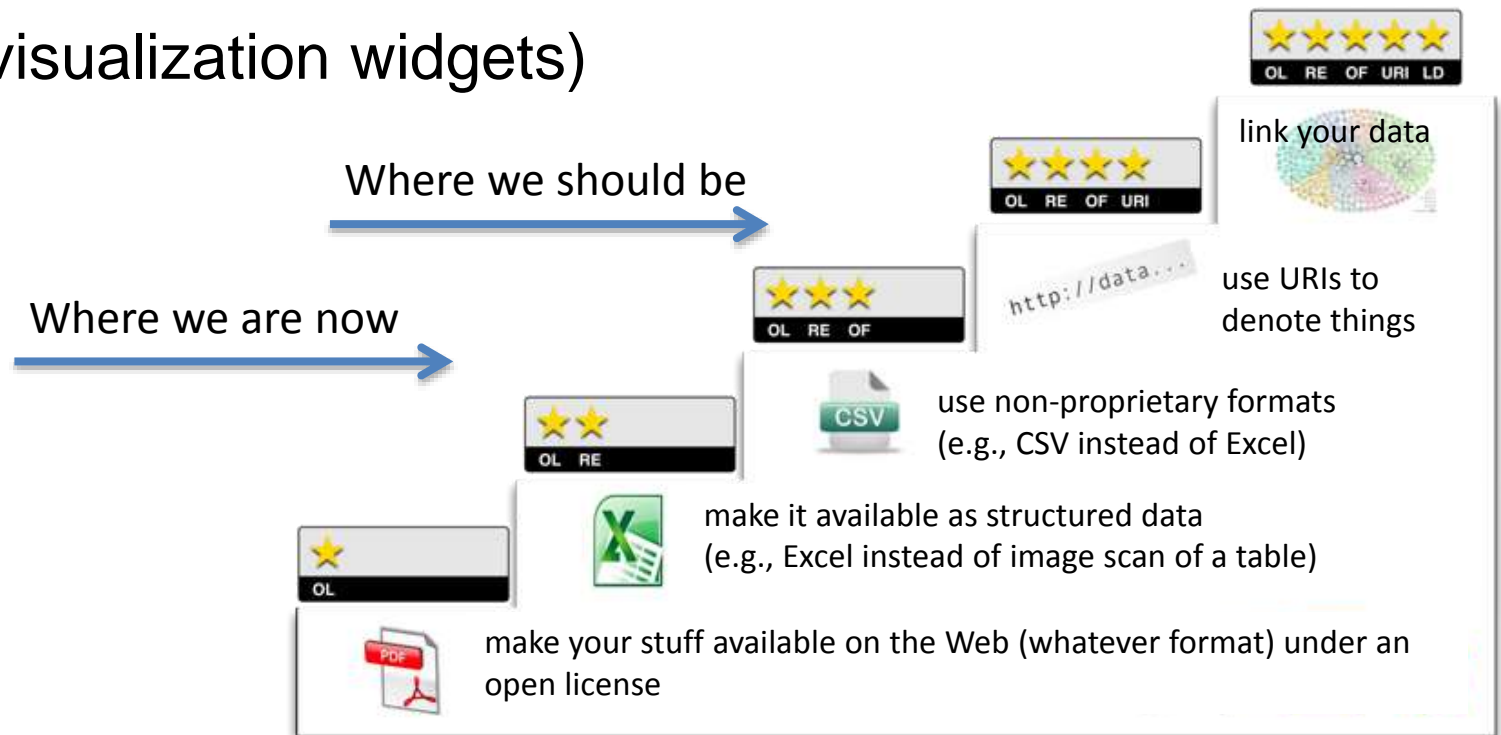
Different Kindergarten descriptions also might look different, but there will be definitely less variety than with XML or CSV

You can mix and mesh different vocabularies (RDF, RDFS, FOAF)

More information can be added without destroying the data structure

# What has to be done?

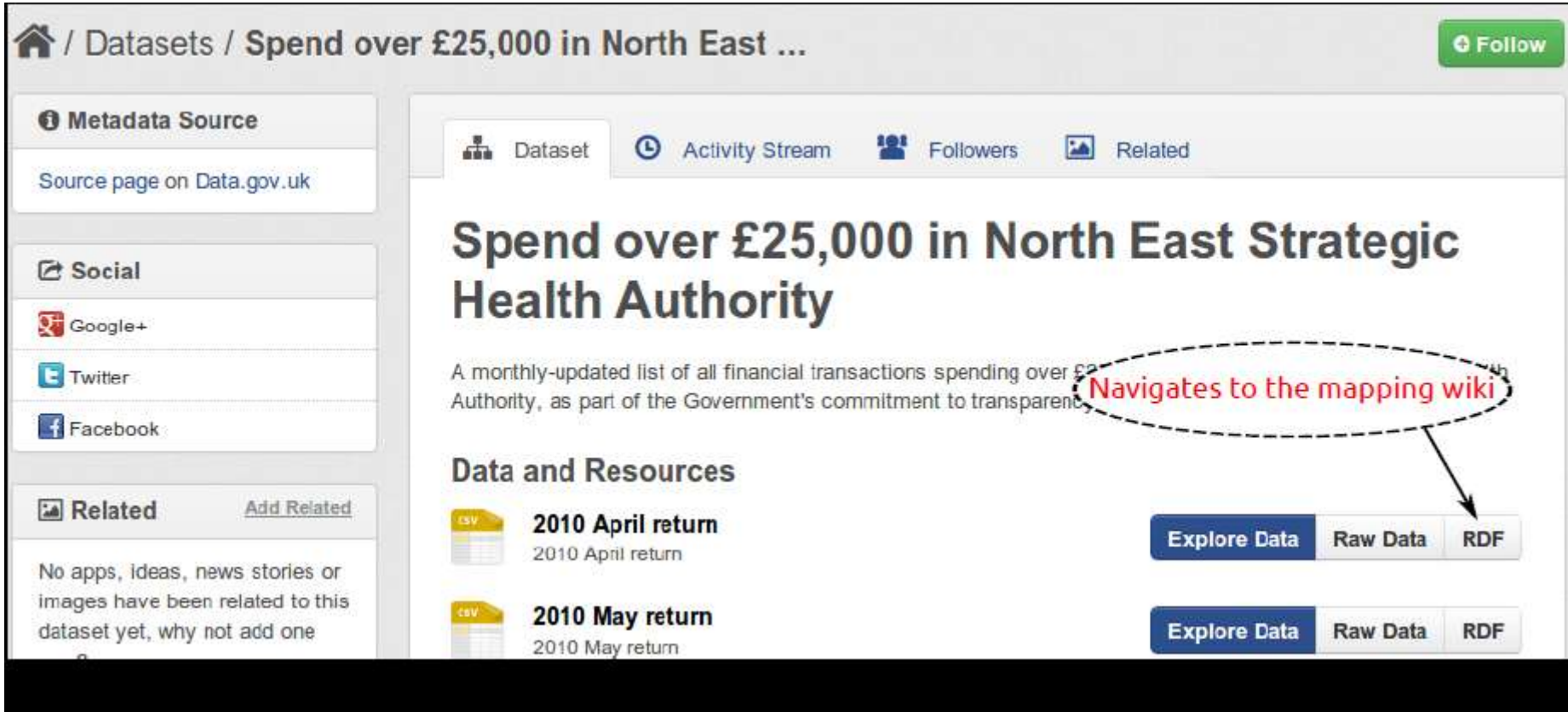
- Publish Open Data in RDF reusing vocabularies which can be understood and combined by apps in unforeseen ways (e.g. visualization widgets)





How can we lift Open Data to Linked Open Data?

# All CSV on PublicData.eu is transformed in RDF



The screenshot shows a dataset page on PublicData.eu. The breadcrumb trail is: Home / Datasets / Spend over £25,000 in North East ... A green 'Follow' button is in the top right. The main title is 'Spend over £25,000 in North East Strategic Health Authority'. Below the title is a description: 'A monthly-updated list of all financial transactions spending over £25,000 in the North East Strategic Health Authority, as part of the Government's commitment to transparency'. A red dashed oval highlights the text 'Navigates to the mapping wiki' with an arrow pointing to the 'RDF' button in the 'Data and Resources' section. The 'Data and Resources' section lists two datasets: '2010 April return' and '2010 May return', each with 'Explore Data', 'Raw Data', and 'RDF' buttons. The left sidebar contains sections for 'Metadata Source' (Data.gov.uk), 'Social' (Google+, Twitter, Facebook), and 'Related' (no related items found).

Home / Datasets / Spend over £25,000 in North East ... [Follow](#)

**Metadata Source**  
Source page on Data.gov.uk

**Social**  
[Google+](#)  
[Twitter](#)  
[Facebook](#)

**Related** [Add Related](#)  
No apps, ideas, news stories or images have been related to this dataset yet, why not add one

**Dataset** [Activity Stream](#) [Followers](#) [Related](#)

## Spend over £25,000 in North East Strategic Health Authority

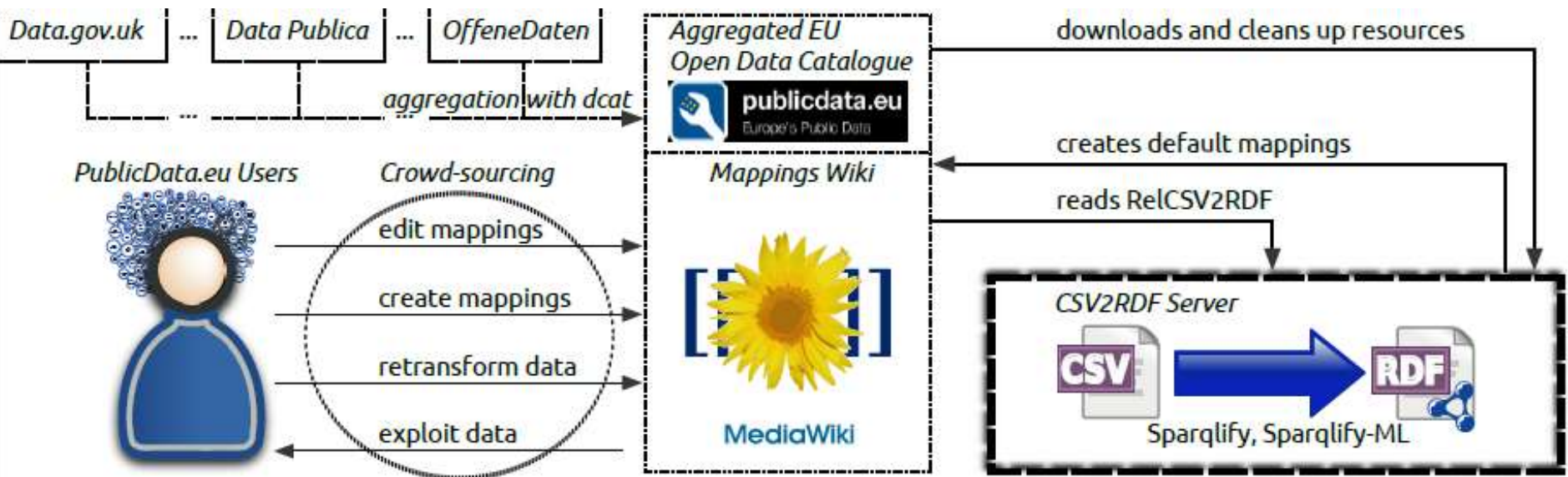
A monthly-updated list of all financial transactions spending over £25,000 in the North East Strategic Health Authority, as part of the Government's commitment to transparency.

**Data and Resources**

- 2010 April return**  
2010 April return  
[Explore Data](#) [Raw Data](#) [RDF](#)
- 2010 May return**  
2010 May return  
[Explore Data](#) [Raw Data](#) [RDF](#)

*Navigates to the mapping wiki*

# CSV2RDF Confersion at PublicData.eu



# Mapping Wiki

- Automatic CSV to RDF transformation won't render good results
- Mappings Wiki enables the crowdsourcing of mappings

## Dataset resource "2011 March return" from dataset

This page contains mappings for the CSV2RDF transformation. More information can be found in the documentation.  
The mapping(s) listed below transform the "2011 March return" resource from the "Spend over £25,000" dataset.



### Csv2rdf mapping: default-transformation-configuration

[Download RDF](#)

[Edit mapping](#)

[Retransform](#)

#### Mapping features

Header is defined by the line(-s) #1 of the csv file.

Column omitting is disabled

Row omitting is disabled

No delimiter is defined

Column mappings are defined as follows:

Column	Mapping
col1	<a href="#">Department Family</a>
col2	<a href="#">Entity</a>



# CSV2RDF Mapping Syntax

```
1 {{CSV2RDFHeader}}
2
3 ...
4
5 {{RelCSV2RDF
6 | name      = default-mapping
7 | header    = 1
8 | omitRows  = -1
9 | omitCols  = -1
10 | delimiter =
11 | col1      = Department Family
12 | col2      = Entity
13 | col3      = Payment Date
14 | col4      = Expense Type
15 | col5      = Cost Centre Name
16 | col6      = Supplier
17 | col7      = Transaction No.
18 | col8      = Line Amount
19 | col9      = Invoice Total
20 }}
```

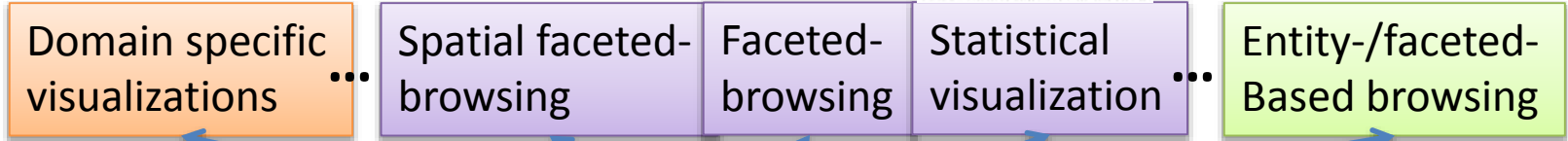
```
1 {{CSV2RDFHeader}}
2
3 ...
4
5 {{RelCSV2RDF
6 | name      = default-mapping
7 | header    = 1
8 | omitRows  = -1
9 | omitCols  = -1
10 | delimiter =
11 | col1      = Department Family
12 | col2      = Entity
13 | col3      = Payment Date^^xsd:date
14 | col4      = rdf:type
15 | col5      = Cost Centre Name
16 | col6      = Supplier
17 | col7      = Transaction No.
18 | col8      = Line Amount
19 | col9      = Invoice Total^^xsd:decimal
20 }}
```

# How can we make this happen?

*SemMap OntoWiki*



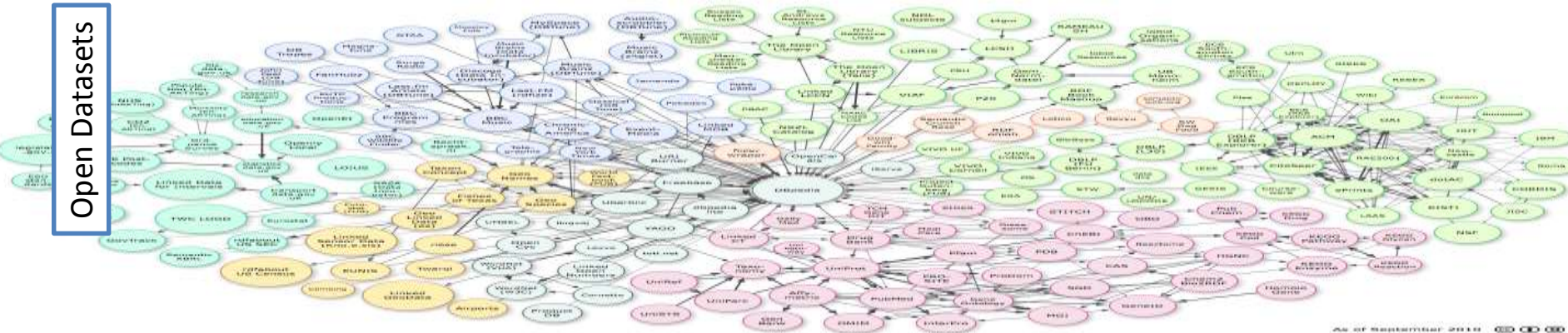
Exploration  
Widgets



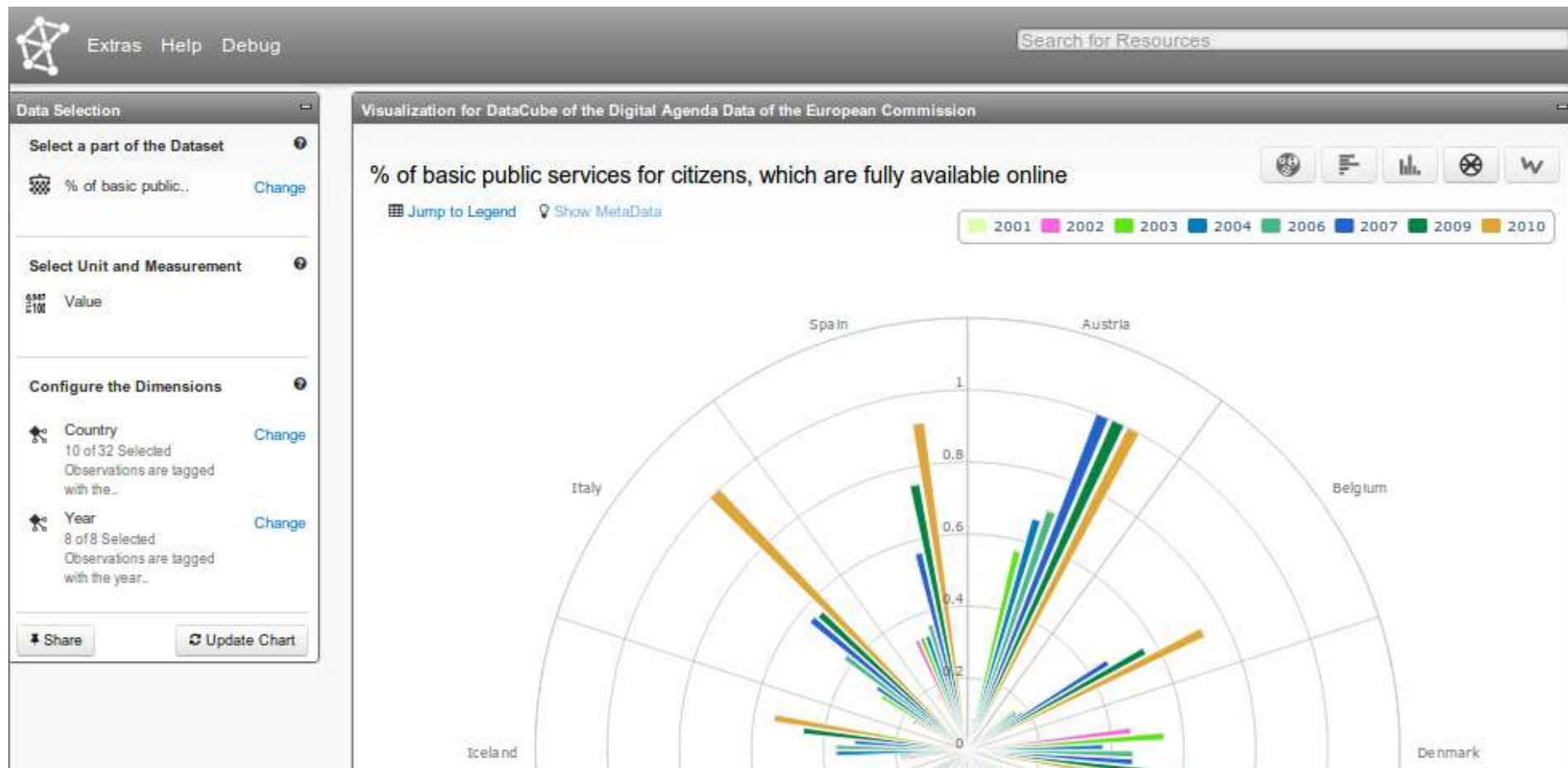
Data Portal

- Dataset analysis (size, vocabularies, properties)
- Selection of suitable visualization widgets

Open Datasets



# Browsing Statistical Data with CubeViz



# Browsing Spatial Data with Facete

European Commission > Open Data Portal > SemMap

Service: <http://fp7-pp.publicdata.eu/sparql> Datasets: <http://fp7-pp.publicdata.eu/>

### 1. Selection

**Facets**

- Items 1/
- ▶ type 1/1
- ▶ label 1
- ▶ strategic objective 1
- ▶ call 1
- ▶ instrument 1
- ▶ year 1
- ▶ funding 15
  - ▶ type 1
  - ▶ label 15
  - ▶ partner 15
  - ▶ amount 15
    - ▶ partnerRole 2
    - ▶ id 1

**Facet Values**

Filter  Max Rows: 10

**Facet value**   **Count**   **Restrict to value**

Select a facet to show its values.

< 1 2 3 4 5 6 7 8 9 10 11 12 >

**Filters**

Clear filters

type is Project

is LOD2

### 2. Data

**Table View**

Filter  Max Rows: 10


Item	funding	amount
LOD2	Funding of partner UNIVERSITAET LEIPZIG in project LOD2	1333901
LOD2	Funding of partner OPENLINK GROUP LIMITED in project LOD2	870380
LOD2	Funding of partner TENFORCE BVBA* in project LOD2	706280
LOD2	Funding of partner NATIONAL UNIVERSITY OF IRELAND, GALWAY in project LOD2	692704
LOD2	Funding of partner FREIE UNIVERSITAET BERLIN in project LOD2	669988
LOD2	Funding of partner SEMANTIC WEB COMPANY GMBH in project LOD2	518526
LOD2	Funding of partner STICHTING CENTRUM VOOR WISKUNDE EN INFORMATICA in project LOD2	505275
LOD2	Funding of partner EXALEAD in project LOD2	470220
LOD2	Funding of partner WOLTERS KLUWER DEUTSCHLAND GMBH in project LOD2	371815
LOD2	Funding of partner OPEN KNOWLEDGE FOUNDATION LIMITED LBG in project LOD2	362304

< 1 2 >

### 3. Geographical

**Map**

Geo-Link: Auto (funding / partner / address / city / sameAs)



**Detail view**

Click a marker to view its details.

Filter  Max Rows: 10

Item	funding	amount
LOD2	Funding of partner UNIVERSITAET LEIPZIG in project LOD2	1333901

< 1 >

# Towards Linked Data Value Chains

*Data Value Chains today*

Extraction, Curation, Quality, Linking, Integration, Publication, Visualization, Analysis

*Data Value Chains tomorrow*



*Increased Specialization  
Separation of concerns  
More interdisciplinarity*





**Cortex** – a semantic digital library  
search backend

# Semantic Search Technology IAIS-Cortex = Heart of the Deutsche Digitale Bibliothek



- Flexible Data Integration (Import)
  - Powerful toolbox for aggregation of heterogenous data sources
  - >2.000 Data Providers
- Reliable Data Management
  - Based on filesystem or cloud technology
  - >10.000 concurrent users
- Individual Access
  - Powerful semantic search and performant access of objects



Try it out – www.ddb.de

The screenshot shows the homepage of the Deutsche Digitale Bibliothek (DDb). At the top, there is a navigation bar with links for **SUCHE**, **ÜBER UNS**, and **HILFE**, and a language selector set to **Deutsch**. The main header features a red dragonfly logo and the text **DEUTSCHE DIGITALE BIBLIOTHEK BETA** with the tagline *Kultur und Wissen online*. Below this is a search bar with a magnifying glass icon and a help icon, and the text **Erweiterte Suche**. The main content area contains four featured tiles with navigation arrows:   
1. **Das ist die Deutsche Digitale Bibliothek!** (with a red arrow pointing right)   
2. **Wir sind die DDB: Deutsches Filminstitut** (with the logo of the Deutsches Filminstitut)   
3. **Thema des Monats: Fälschungen als Kulturgut** (with an image of a document)   
4. **Entdecken Sie die DDB über die Kulturlandkarte!** (with a map of Germany covered in red dots)   
At the bottom, there is a footer with copyright information: **Copyright © 2012 Deutsche Digitale Bibliothek**, and links for **Nutzungsbedingungen**, **Datenschutzerklärung**, **Impressum**, **Sitemap**, and **Kontakt**.



Filter results 

- Time >
- Location >
- Person/organisation >
- Keyword >
- Language >
- Media type >
- Sector >
- Data provider >

Keep all filters  
**Remove all filters**



Compare objects

Choose first object

Choose second object

Results per page  Sort by

1 - 20 of **4,647** results Page  of 233 Next > Last >

Only results with thumbnails  

**Goethe**  
Zeichnung  
...61 B 2 (GOETHE, Johann Wolfgang von) 11 (+52); Porträt einer Person (mit NAMEN) (allein)...



**Goethe-Theater**  
Gentz, Heinrich; Goethe, Johann Wolfgang, 1802  
...Gentz, Heinrich **Goethe**, Johann Wolfgang, **Goethe-Theater**... ...Gentz, Heinrich; **Goethe**, Johann Wolfgang...



**Goethe-Theater**  
Gentz, Heinrich; Goethe, Johann Wolfgang von, 1802  
...Gentz, Heinrich **Goethe**, Johann Wolfgang von, Lauchstädt, Bad, **Goethe-Theater**... ...Gentz, Heinrich; **Goethe**, Johann Wolfgang von...



**Goethe-Theater**  
Gentz, Heinrich; Goethe, Johann Wolfgang von, 1802  
...Gentz, Heinrich **Goethe**, Johann Wolfgang von, Lauchstädt, Bad, **Goethe-Theater**... ...Gentz, Heinrich; **Goethe**, Johann Wolfgang von...





Filter results

Results per page 20 Sort by Relevance

Time >

1 - 20 of 4,647 results

Page 1 of 233 Next > Last >

Location

Sorted by frequency

Page 1 Next >

Frankfurt am Main	(407)	Ludwigsburg	(104)
Stuttgart	(213)	kreisfrei	(104)
Dresden	(141)	Weimar	(100)
Karlsruhe	(131)	Freiburg im Breisgau	(97)
Berlin	(117)	München	(76)

Person/organisation >

Keyword >

Language >

Media type >

Sector >

Data provider >

Keep all filters

Remove all filters

Compare objects

Choose first object

### Goethe-Theater

Gentz, Heinrich; Goethe, Johann Wolfgang, 1802

...Gentz, Heinrich Goethe, Johann Wolfgang, Goethe-Theater... ...Gentz, Heinrich; Goethe, Johann Wolfgang...



### Goethe-Theater

Gentz, Heinrich; Goethe, Johann Wolfgang von, 1802

...Gentz, Heinrich Goethe, Johann Wolfgang von, Lauchstädt, Bad, Goethe-Theater... ...Gentz, Heinrich; Goethe, Johann Wolfgang von...

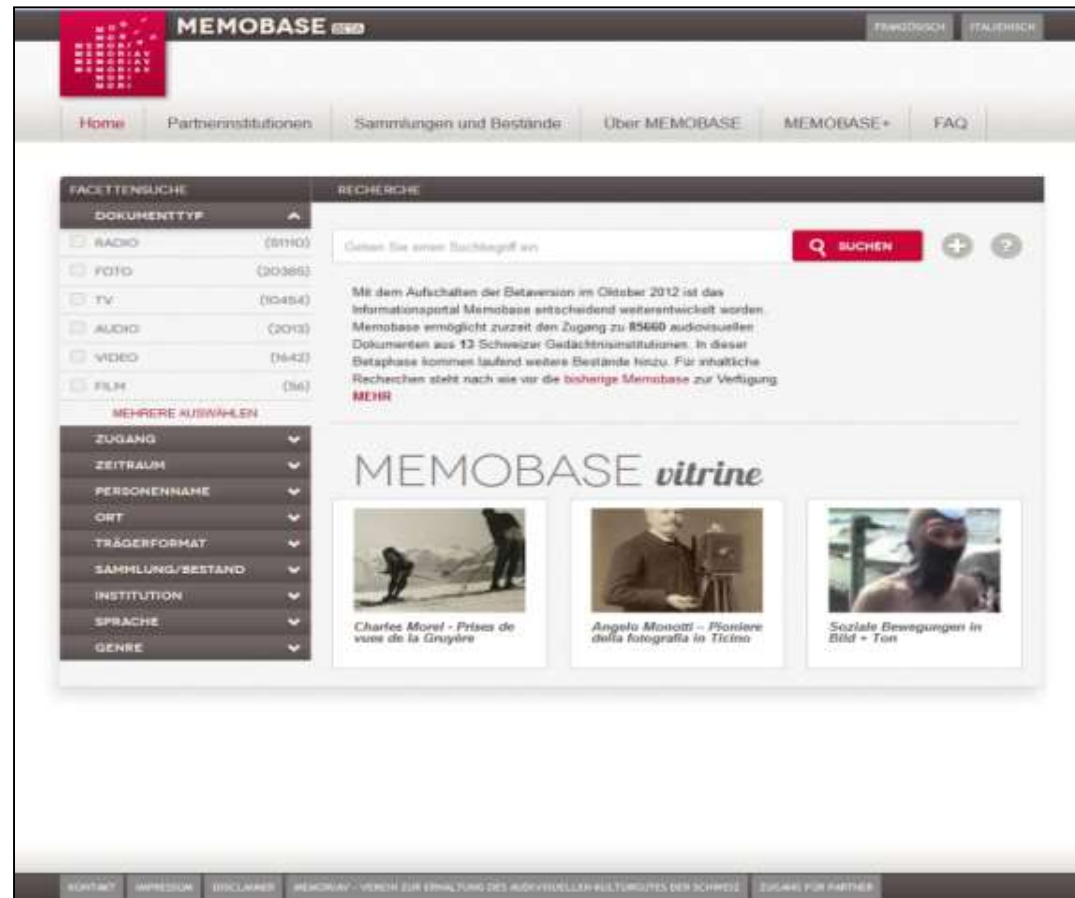


# Further Cortex Deployments

## •Memobase+

- about 30 data providers integrated (up to 100)
- about 100.000 objects online
- Launched 10.2012

- E-Varamu (Estonia)** currently under development





How can we create an ecosystem of  
(Linked) Open Gov Data publishing  
and value-added services

## UK Open Data Institute



**Disclaimer:** The following slides include material from Nigel Shadbolt, Tim Berners-Lee and <http://theodi.org>



„ Government will provide up to £10 million over five years, with match funding from industry and academia, to establish the world’s first Open Data Institute to **help business exploit the opportunities created by release of public data**“

“to realise significant economic benefits by enabling businesses and non-profit organisations to build innovative applications and websites using public data.”

**David Cameron** (UK Prime Minister), May 2010

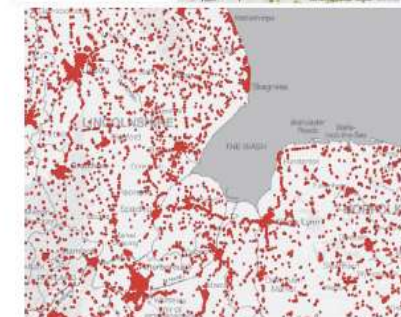
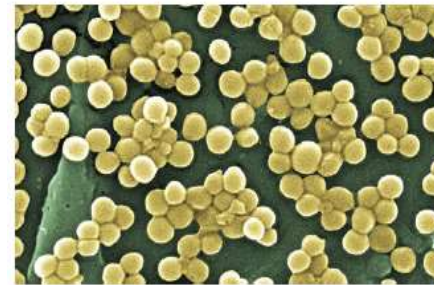
“Our ambition is to become the world leader in open data”

**George Osborne** (UK Chancellor), May 2011

## Open Government Data Delivers

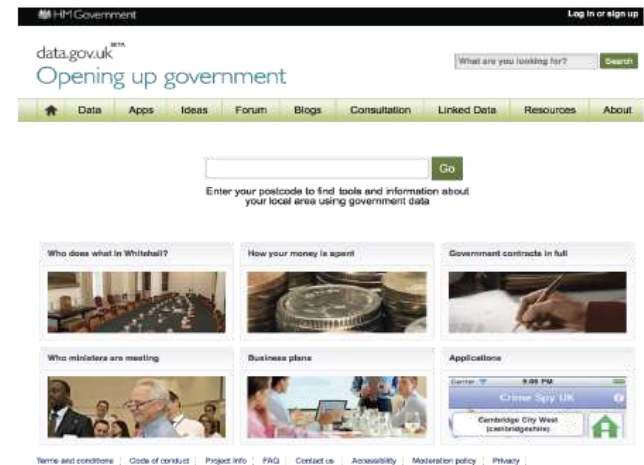
Advantages and benefits of open data include:

- Transparency
- Accountability
- Efficiency
- Public Service Delivery
- Engagement
- Data Improvement
- Societal\*value
- Economic value



## Open Government Data Successes

- National, Regional and City portals launched
- Significant data sets released
- Public Data Principles
- Open Licenses
- Open consultations
- International collaboration





## Open Data ...applications follow

By opening data companies, organizations and interested citizens are able to build applications and mashups on top of the data.



data.gov.uk BETA  
Opening up government

Home Data Apps Ideas Forum

**Apps**

- See UK
- BUSit London
- Carehome Map
- UK Post Box
- See UK



data.gov.uk BETA  
Opening up government

Home Data Apps Ideas Forum

**Apps**

- Numberhood
- UK Pharmacy
- UK Crime Stats
- London Cycle Hire

Numberhood  
Show how your local area fares



**Bus Guru** LIVE

Android Market Download Available on the App Store

Like 132 Send Follow @BusGuru @BusGuru

HOME REVIEWS PRESS SUPPORT

Bus Guru NEVER MISS A BUS AGAIN!

Bus Guru is the UK's first app to give users both the LIVE (real-time) bus times AND the best routes from TFL's Journey Planner and Countdown System – and it's FREE!

**SAVE TIME & ELIMINATE STRESS:** No more waiting around at bus stops, with Bus Guru you can plan your journey to perfection – knowing which route will be the fastest AND when your bus will arrive at the stop.

<<< CLICK ON IPHONE SCREEN TO TRY THE LIVE APP

- For iPhone/iPad: Download iPhone App
- For Android: Download Android App
- All Smartphones: To install the Bus Guru mobile app open the following link in your phone's browser: <http://m.busguru.co.uk> (the web app can usually be saved on your phone from the browser).

**FEATURES**

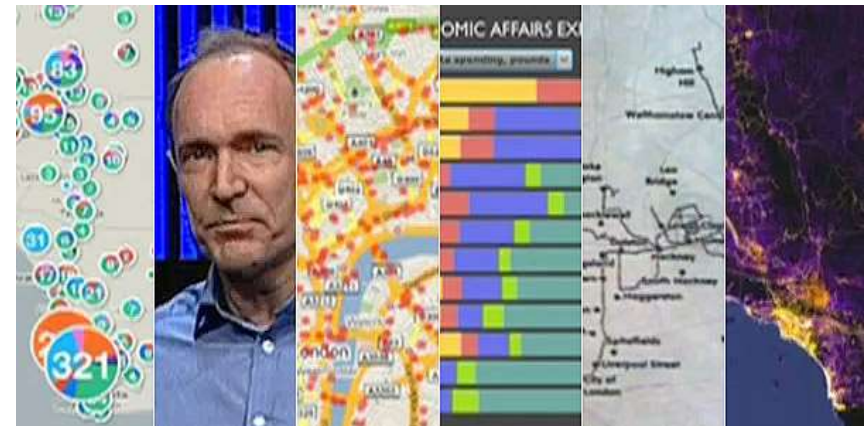
- LIVE INFO:** Up-to-the-second information on all TFL buses' real-time locations.
- ONE CLICK:** To view your nearest stop's buses OR all the bus stops around you.
- LIVE JOURNEY PLANNER:** Compare the quickest routes AND live bus times using Bus Guru's Journey Planner integrated with live bus times. So you can find the fastest bus AND which bus is leaving first. (We have combined two very complex systems so please email [support@busguru.co.uk](mailto:support@busguru.co.uk) if you find any blips and we will update the app).
- SEARCH:** For ANY bus stop and live bus info via an address/postcode/area.

Developed by AppShed

Bus Guru has been developed by

“The vision is to establish the Open Data institute as a world leading centre to innovate, exploit and research the opportunities for the UK created by the Government’s Open Data policy.”

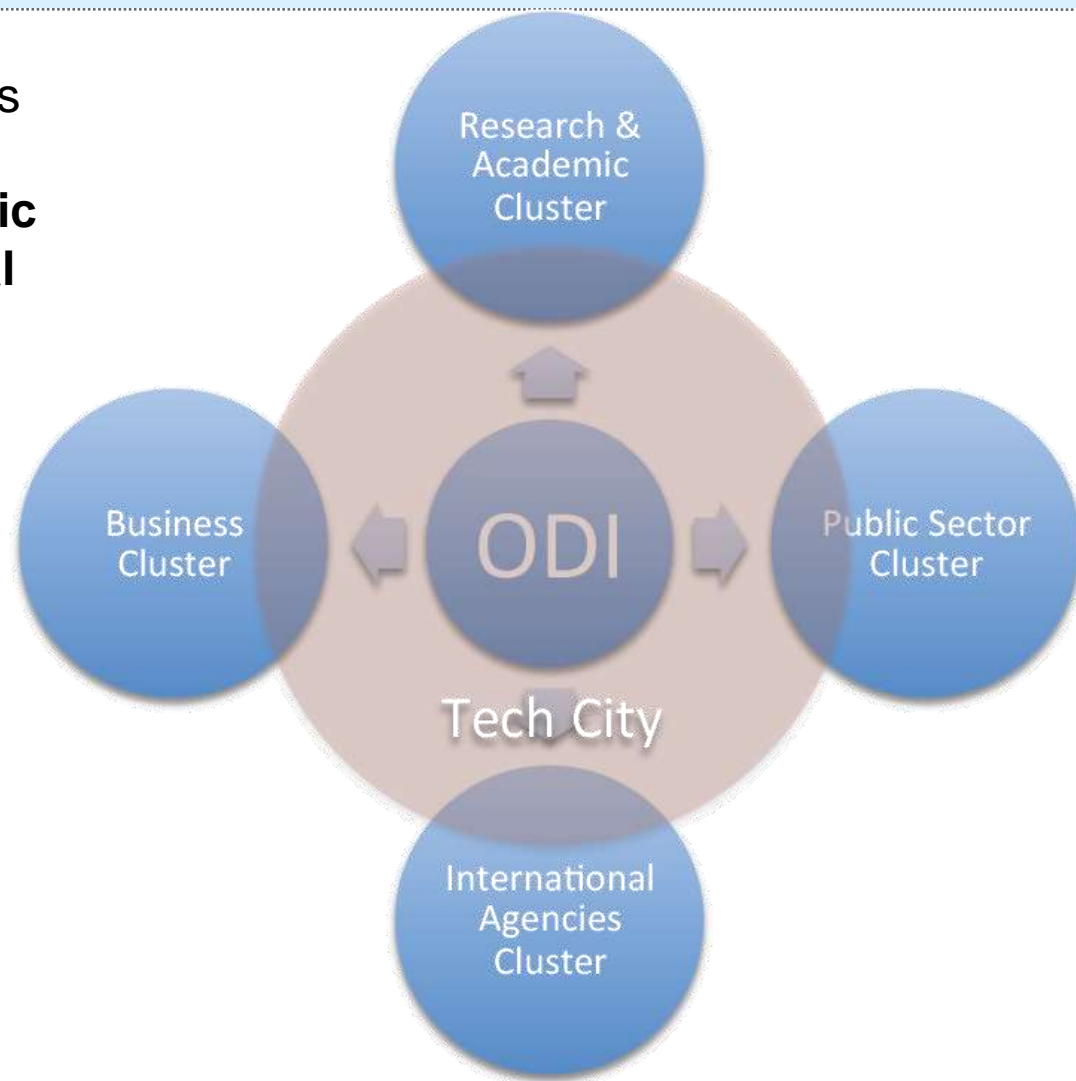
- Business Innovation
- Training the Open Data Generation
- Public Sector Innovation
- Researching Open Data
- Open Data Standards and Policies
- Advisor to Government
- International Collaboration

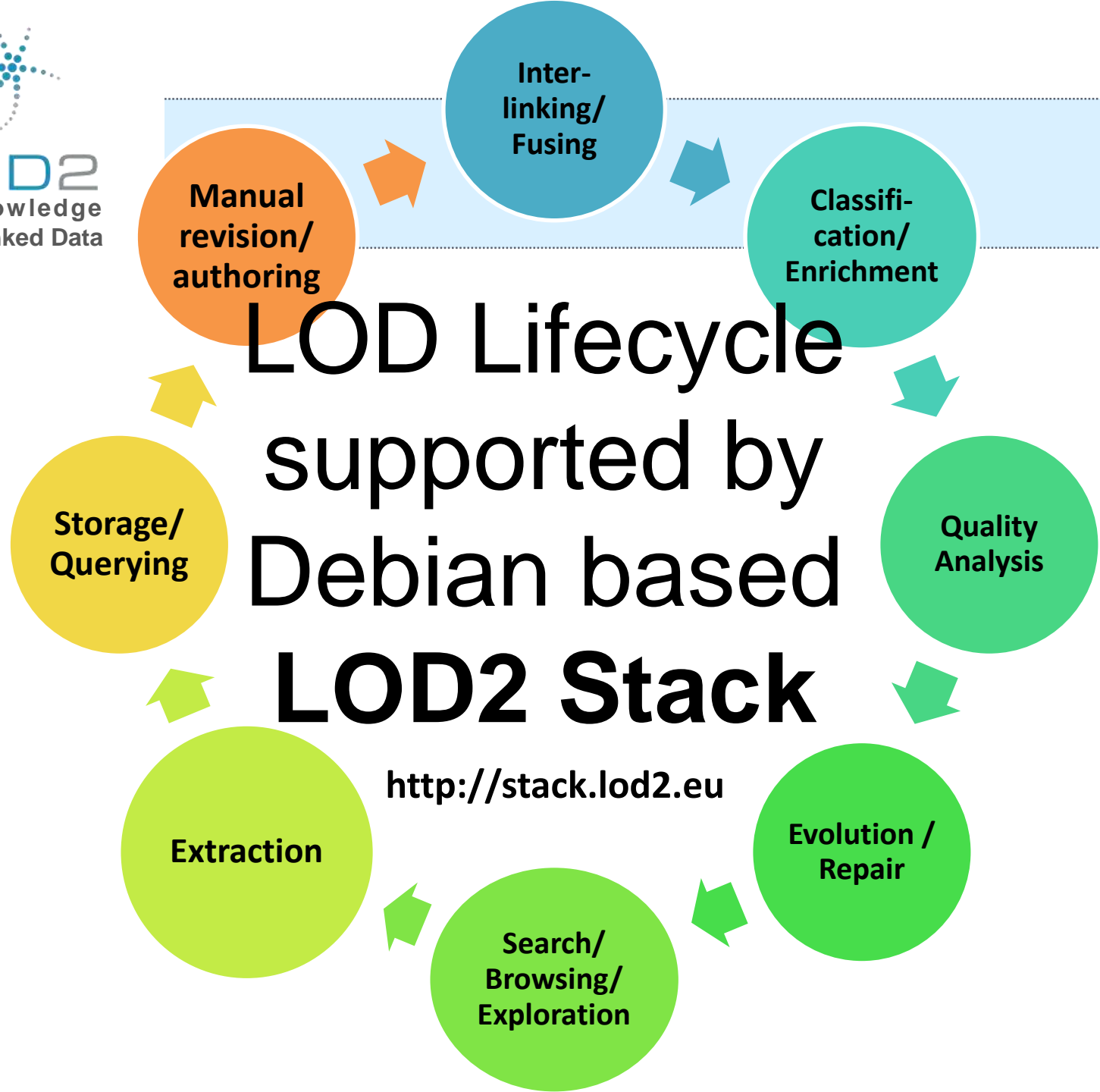


## How will the ODI work

The Open Data Institute consists of **four clusters**, the **Research and academic** cluster, the **public sector** cluster, the **international agencies** cluster and the **business** cluster.

The aim of the clusters is to provide an environment to concrete projects with the respective stakeholders.





**Facts: 14 partners, Budget 10,2 M €**

**Consortium - 14 partners from 11 EU countries + 1 Korea**

Universität Leipzig (Coordinator), <b>Germany</b>	Centrum Wiskunde & Informatica, <b>The Netherlands</b>	National University of Ireland in Galway, <b>Ireland</b>
Freie Universität Berlin , <b>Germany</b>	OpenLink Software, <b>UK</b>	Semantic Web Company, <b>Austria</b>
TenForce, <b>Belgium</b>	Exalead, <b>France</b>	Wolters Kluwer Deutschland, <b>Germany</b>
Open Knowledge Foundation, <b>UK</b>	Vysoká Škola Ekonomická v Praze, <b>Czech Republic</b>	Zemanta d.o.o., <b>Slovenia</b>
Instytut Informatyki Gospodarczej, <b>Poland</b>	Institut Mihajlo Pupin, <b>Serbia</b>	Korea Advanced Institute of Science and Technology, <b>South Korea</b>



# We need SMART Big Data

## Summary: Benefits of Linked Data

*Service-orientation to increase “customer” satisfaction (businesses, citizens)*

- Linked Data and apps, visualizations, mashups build on top help businesses and citizens to build value-added services

Intra-government collaboration for efficient/effective government

- Linked Data helps establishing a pay-as-you-go data integration ecosystem

Increased transparency

- Standardized vocabularies allow to quickly compare data from different sources and do fact checking

Not using the chances arising from the interlinking of government data puts the development of our data economy and the realization of associated positive societal and economical effects at risk.

## Contact

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Institute of Computer Science  
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Germany

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<http://www.informatik.uni-leipzig.de/~auer>



**eccenca**  
command your data!



Open Knowledge  
Foundation



Rheinische  
Friedrich-Wilhelms-  
Universität Bonn

UNIVERSITÄT LEIPZIG

# Thanks for your attention!