



LOD BRASIL
LINKED OPEN DATA

19a21 novembro 2014

Enterprise Linked Data

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Ronald Denaux, José M. Gómez, and **Boris Villazón-Terrazas**

iSOOCO, Intelligent Software Components

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[@boricles](#)

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- iSOCO brief introduction
- Quick recap on Linked Data
- What about Enterprise Data
- How to apply Linked Data within Enterprises
- iSOCO's use cases

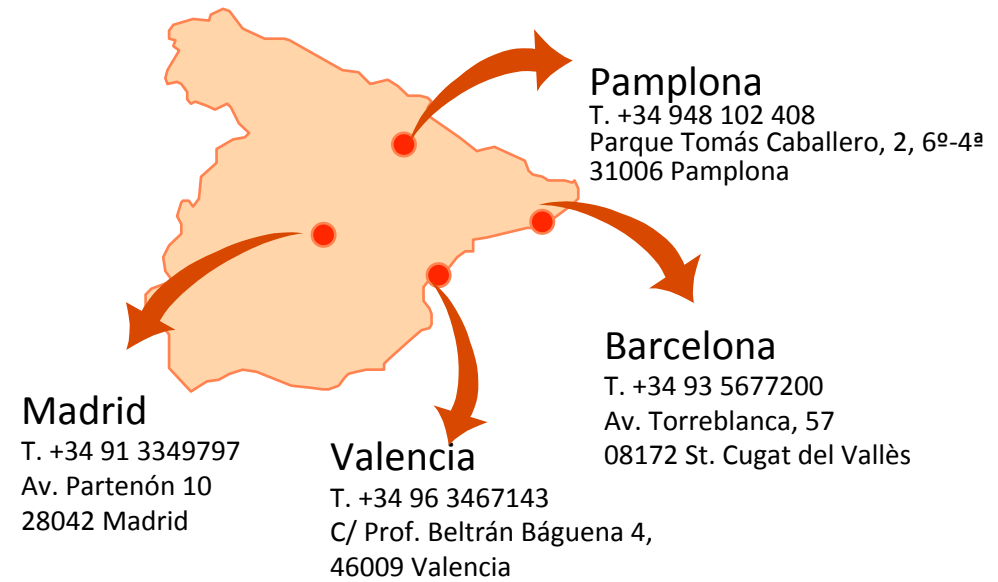
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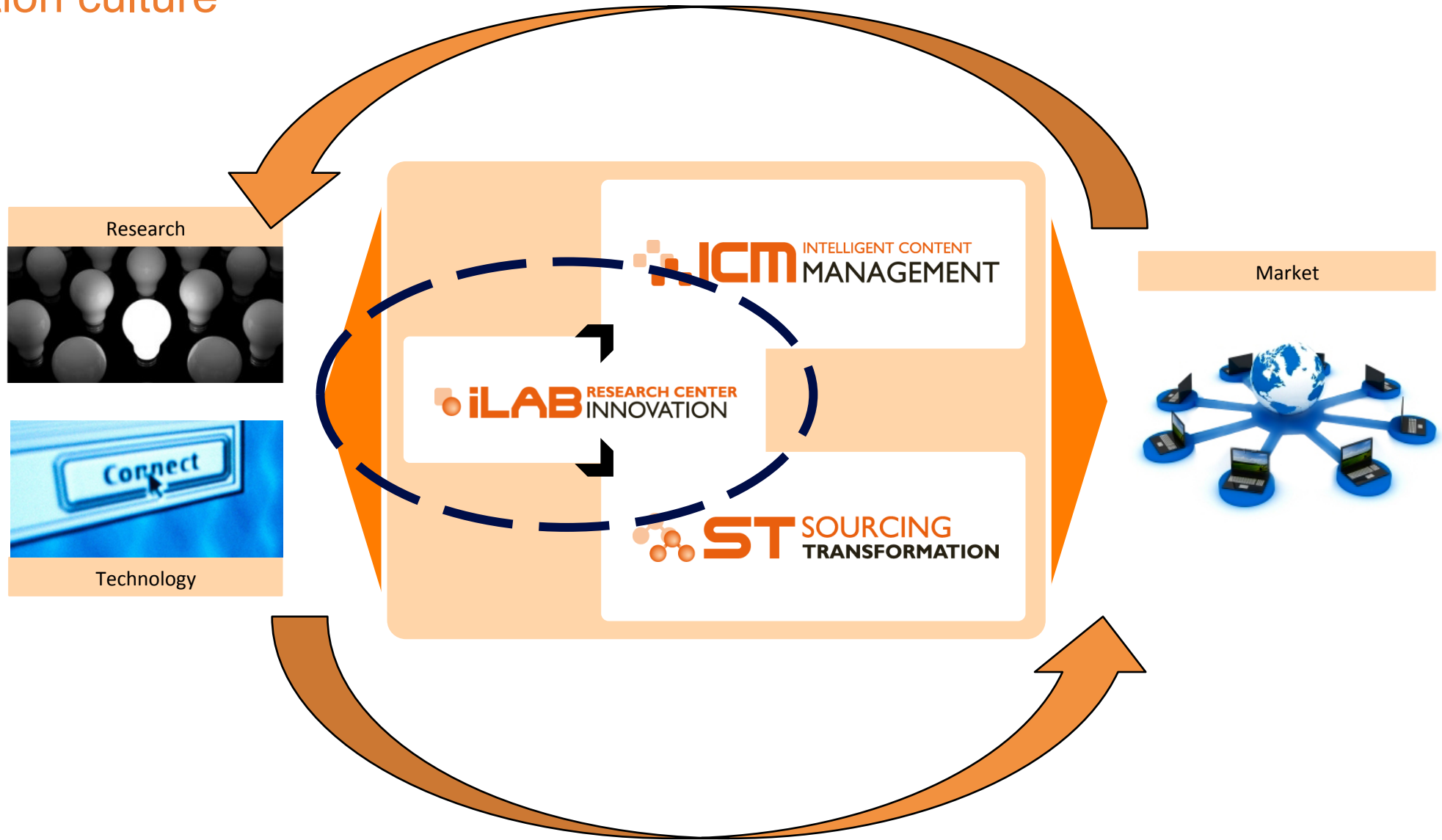
What is iSOCO?

“Our mission is to transform research into innovation and value for our clients in the networked economy”

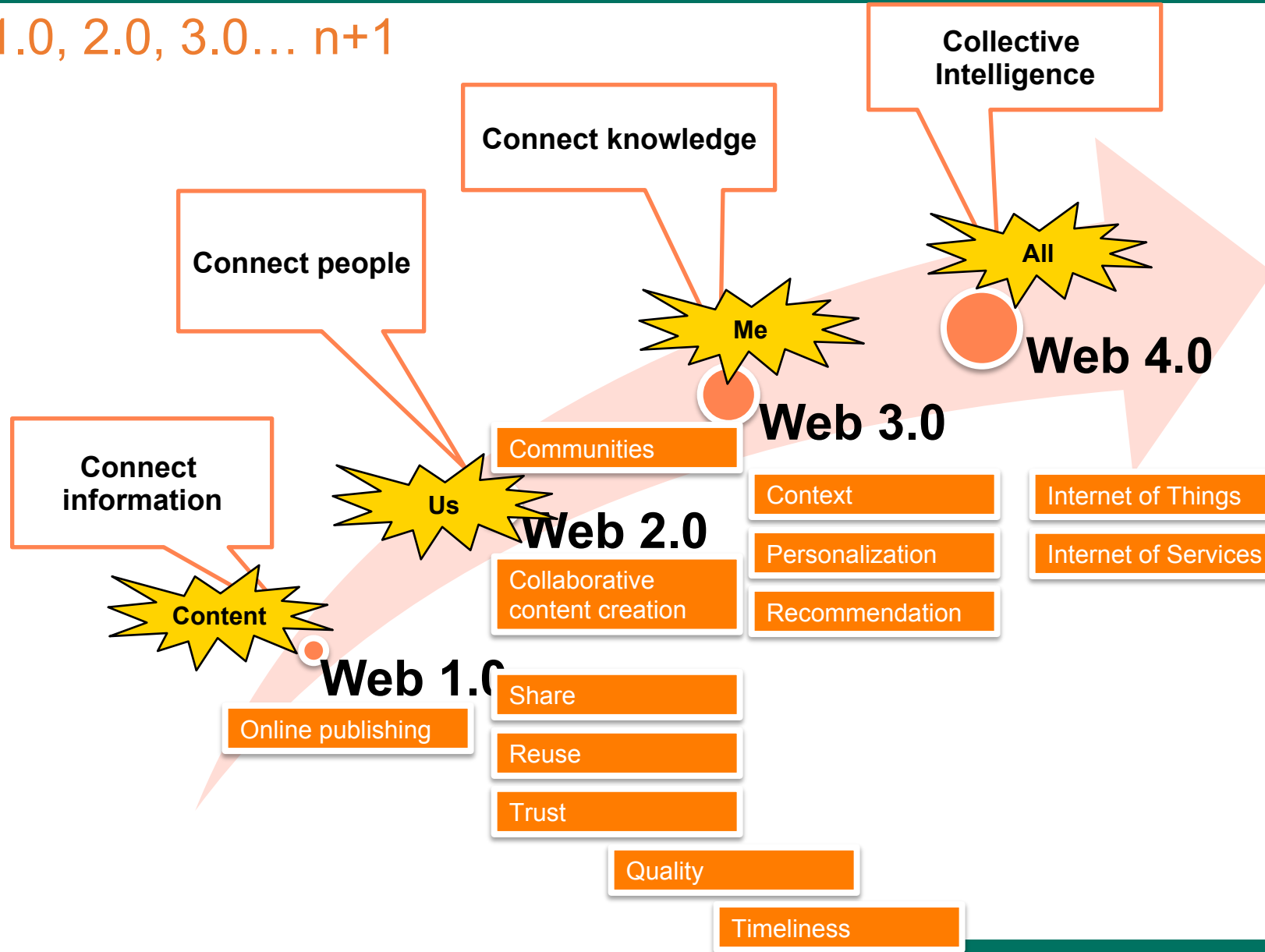
<http://www.isoco.com>



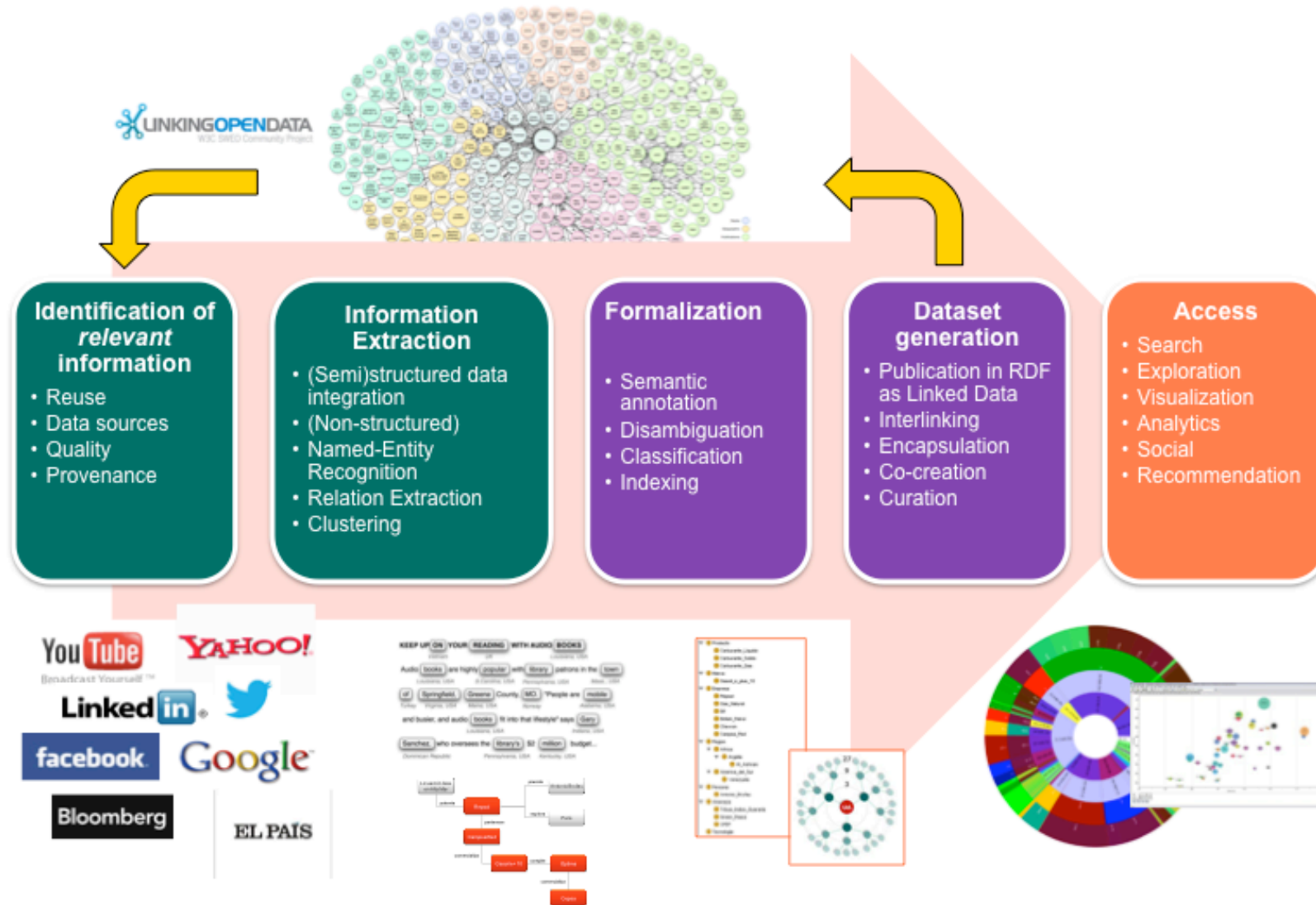
Innovation culture



Web 1.0, 2.0, 3.0... n+1



Our pipeline



Research projects and partners

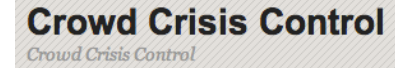
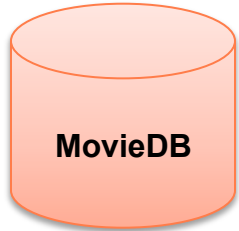


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Classic Web

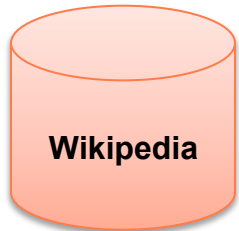


1. **Elite Squad: The Enemy Within** (2010)
 ★★★★★★☆☆ 8.1/10

After a prison riot, former-Captain Nascimento, now a high ranking security officer in Rio de Janeiro, is swept into a bloody political dispute that involves government officials and paramilitary groups. (115 mins.)

Director: José Padilha
 Stars: Wagner Moura, Irandhir Santos, André Ramiro, Milhem Cortaz
[Add to Watchlist](#)

"Not as violent as the first one, but very tense! Captain Nascimento narration this time makes you question our world. Also great production and direction." - Chaval



List of

From Wikiped

This is a list
in this count

Contents

Basic m

- Acesita,
- Aracruz Cel
- Companhia Siderúrgica Nacional (BM&F Bovespa: CSNA3), steel
- Duratex (BM&F Bovespa: DURA3, DURA4), wood and paper
- Fibria, pulp and Paper and lumber
- Gerdau (BM&F Bovespa: GGBR3, GGBR4), steel
- Klabin (BM&F Bovespa: KLBN3, KLBN4), paper
- Suzano Papel e Celulose, pulp and paper and lumber
- Telequartz, mining
- Usiminas (BM&F Bovespa: USIM3, USIM5, USIM6), steel
- Vale (BM&F Bovespa: VALE3, VALE5), mining

Conglomerates [edit]

- Camargo Corrêa (BM&F Bovespa: CCIM3), conglomerate
- EBX Group, conglomerate
- Hypermarcas, conglomerate

Data exposed to the Web via HTML, pdf, etc.

further information on the types of business entities

Google

Web Imágenes Maps Noticias Vídeos Más Herramientas de búsqueda

- Aproximadamente 642.000.000 resultados (0,64 segundos)
- Doing Business in Brazil - World Bank Group**
www.doingbusiness.org/data/.../brazil/ Traducir esta página
This page summarizes Doing Business 2015 data for Brazil. The first section presents the Ease of Doing Business rank (out of 189 economies) and the distance ...
 - Doing Business and Investing in Brazil. PwC?**
www.pwc.de/internationale.../doing-business-and-investing-in-brazil.pdf
Doing Business and Investing in Brazil www.pwc.com.br. Our introduction to Brazil's business and legal environment helps you to understand the Brazilian ...
 - 5 Key Things To Know Before Doing Business In Brazil**
www.forbes.com/.../5-key-things-to-know-before-d... Traducir esta página
15/7/2014 - By Natalie Burg For Major League Gaming (MLG), the reasons for expanding into Brazil were obvious. After 11 years in the U.S. and several ...

Imágenes de business in brazil Informar sobre las imágenes

List of companies of Brazil

From Wikipedia, the free encyclopedia

This is a **list of notable companies based in Brazil**, grouped by their **Industry Classification Benchmark** in this country and their abbreviations, see "Business entities in Brazil".

Contents [\[show\]](#)

Basic materials [\[edit\]](#)

- **Acesita**, steel
- **Aracruz Celulose**, defunct paper, now part of Fibria
- **Companhia Siderúrgica Nacional (BM&F Bovespa: CSNA3)**, steel
- **Duratex (BM&F Bovespa: DURA3, DURA4)**, wood and paper
- **Fibria**, pulp and Paper and lumber
- **Gerdau (BM&F Bovespa: GGBR3, GGBR4)**, steel
- **Klabin (BM&F Bovespa: KLBN3, KLBN4)**, paper
- **Suzano Papel e Celulose**, pulp and paper and lumber
- **Telequartz**, mining
- **Usiminas (BM&F Bovespa: USIM3, USIM5, USIM6)**, steel
- **Vale (BM&F Bovespa: VALE3, VALE5)**, mining

Conglomerates [\[edit\]](#)

- **Camargo Corrêa (BM&F Bovespa: CCIM3)**, conglomerate
- **EBX Group**, conglomerate
- **Hypermarcas**, conglomerate



Sábado, 15 de Novembro de 2014
Florianópolis 21,4°C previsão do tempo

DIÁRIO CATARINENSE Exclusivo para assinantes
Lela o DC impresso Assine o DC

Atualizada às 21h54min Blogs Últimas notícias Multimídia Serviços Classificados

Operação Lava-Jato

Executivo denuncia "clube" de empreiteiras para ganhar as licitações da Petrobras

- Justiça nega seis habeas corpus para suspeitos da Operação
- Executivos da Camargo Corrêa se entregam em São Paulo
- Polícia Federal começa a ouvir presos na Operação Lava-Jato
- Presos da Operação Lava-Jato são transferidos para Curitiba

Música eletrônica

Veja programação deste sábado do Dream Valley

- Nicky Romero encerra primeira noite no palco principal em Penha
- FOTOS: festival reúne amantes da música eletrônica em Santa Catarina
- Anexo em Cartaz: veja os melhores momentos da festa em Penha

rolou no primeiro dia do Dream Valley atos de intermistas com #dreamvalley meio dia do festival no Litoral Norte nemem agitar a segunda noite do Festival

Heist (2011)
5.9/10
to commit the perfect heist involving 3 tons of gold. For this he... (101 mins.)
Alberto Leão, Hermila Guedes, Lima Duarte
ing this in comments :) - Chaval

DNES
6.6/10
an epidemic of instant "white blindness".
are quarantined... (121 mins.)
Melles
re, Mark Ruffalo, Gael García Bernal, Yūsuke Iseya
watchlist

"This is not a brazilian movie, but the it's directed by Fernando Meirelles, so I wanted to mention this" - Chaval

31. The Constant Gardener (2005)
7.5/10
A widower is determined to get to the bottom of a potentially explosive secret involving his wife's murder, big business, and corporate corruption. (129 mins.)
Nestor Cerón, Emma Thompson

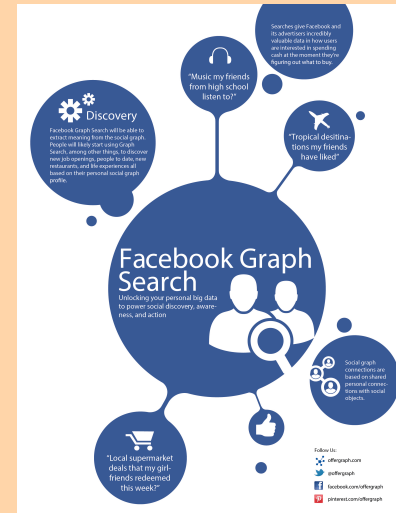
Complex queries over multiple pages / data sources?

What do we actually want?

Use the Web like a single **global database**

Move from a Web of documents to a Web of Data

- **And obviously Google (and others) have already started working on it**
 - Google Knowledge Graph
 - **schema.org**



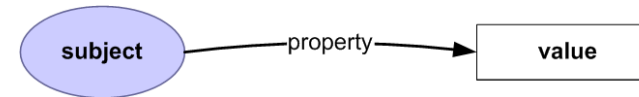
Linked Data enables such Web of Data

Global Identifier: URI (Uniform Resource Identifier), which is a string of characters used to identify a name or a resource on the Internet.

Data Model: RDF (Resource Description Framework), which is a standard model for data interchange on the Web

Access Mechanism: HTTP

Connection: Typed Links



Linked Open Data Cloud - 2014

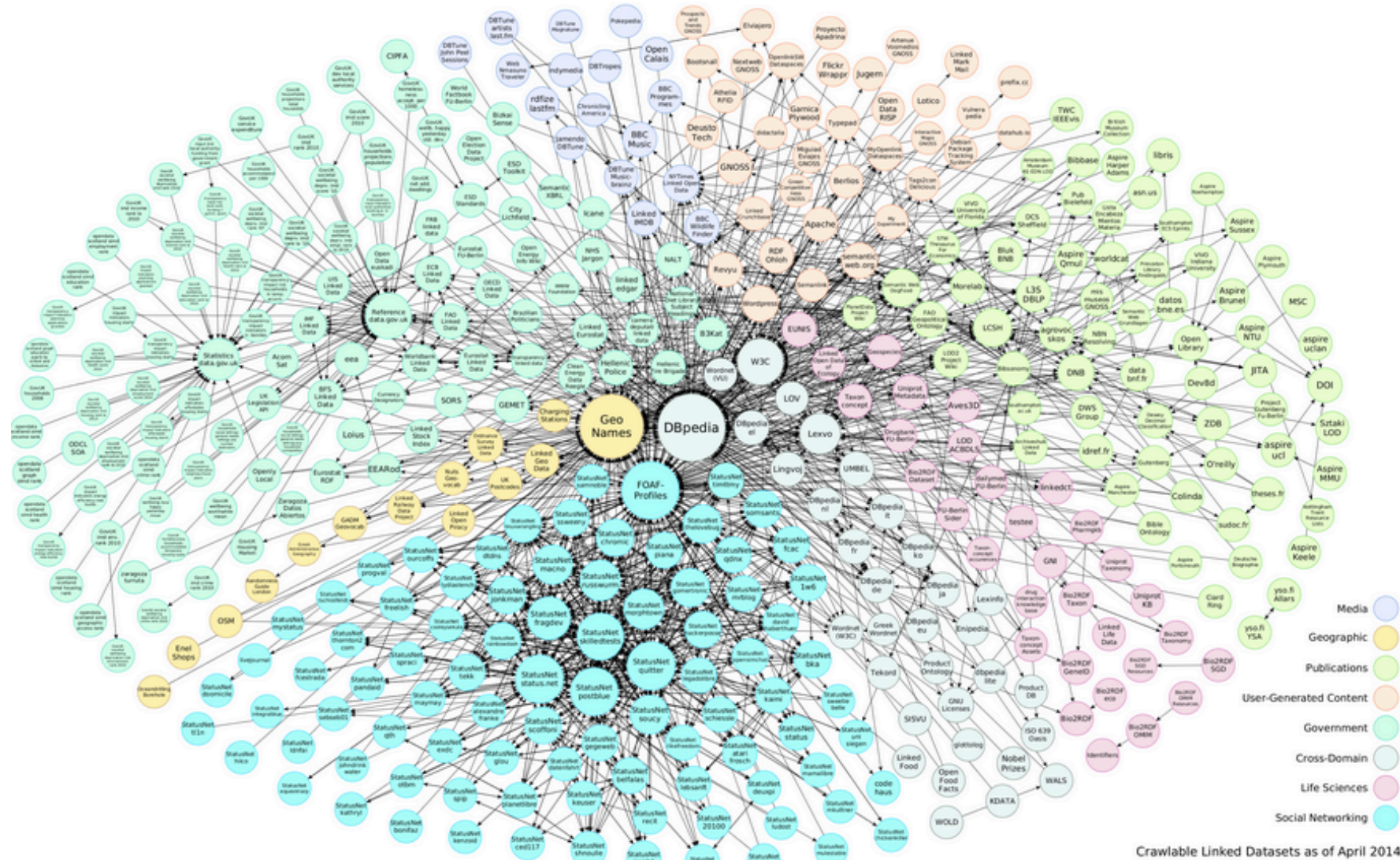
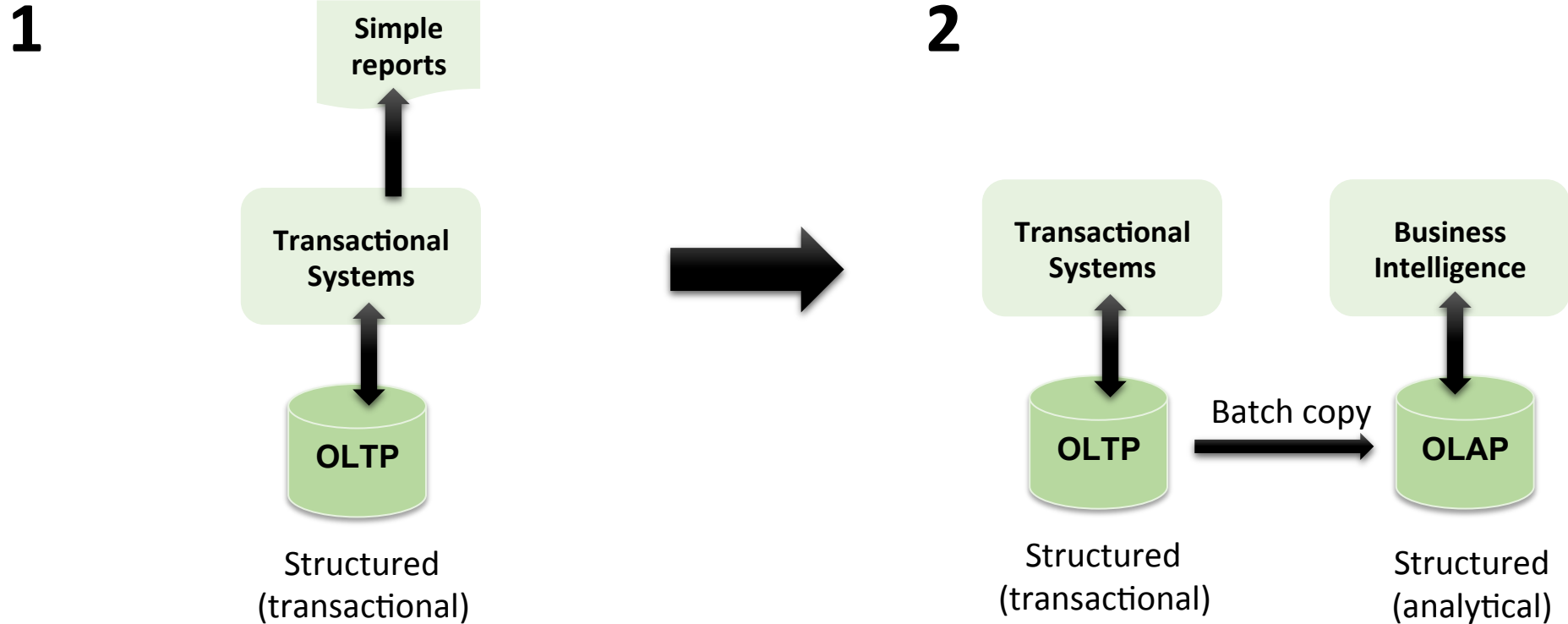


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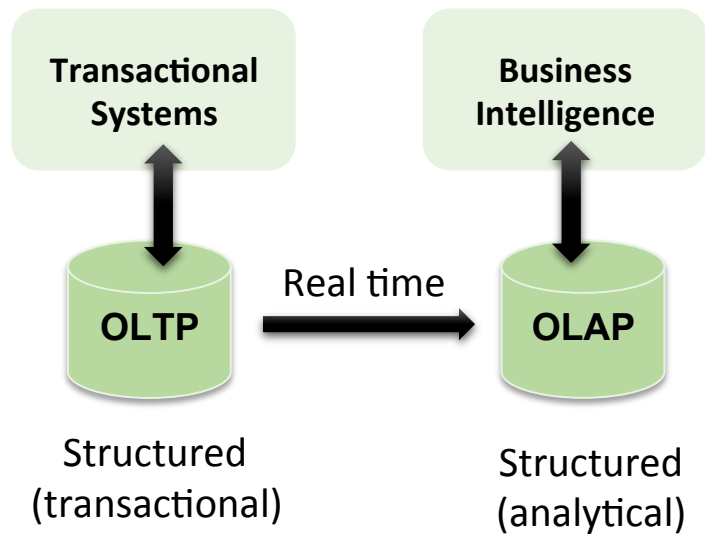
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Approaches to data management – Evolution of the database

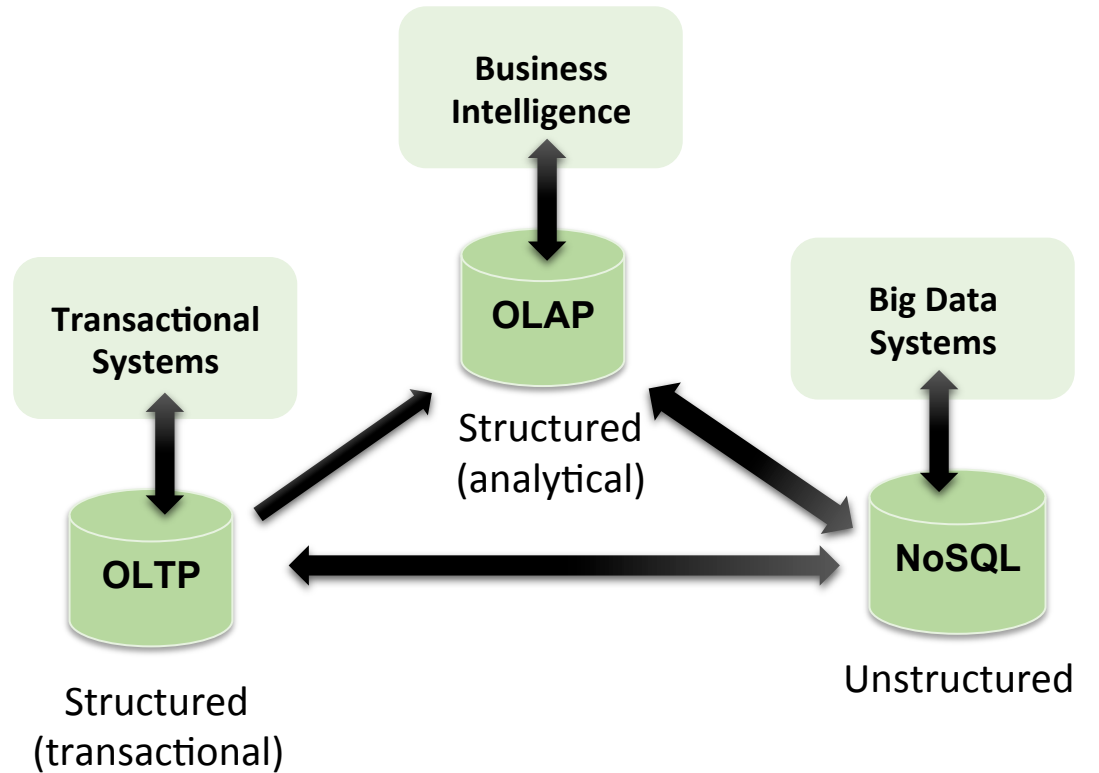


Approaches to data management – Evolution of the database

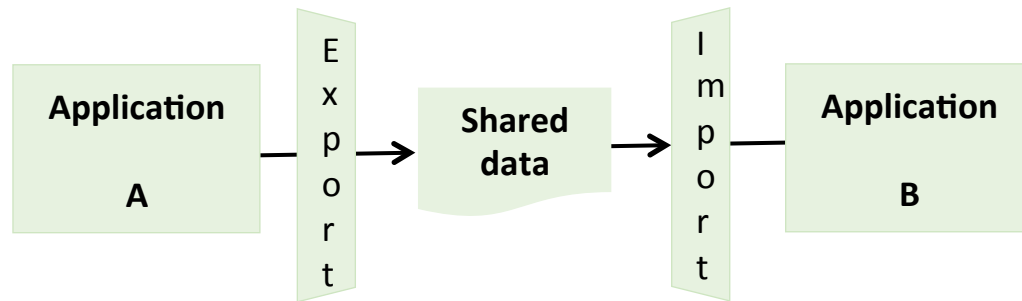
3



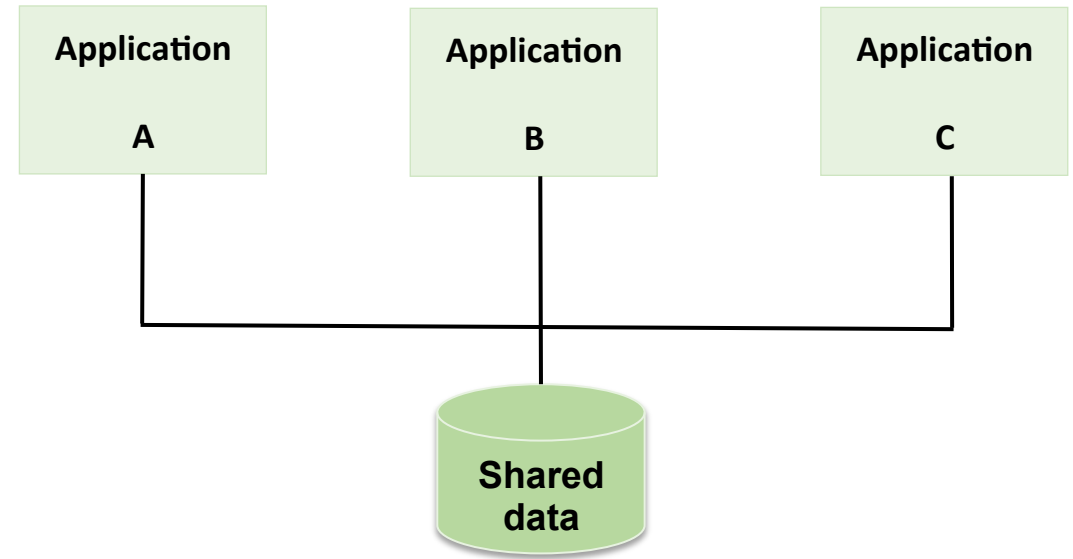
4



Approaches for Data Integration



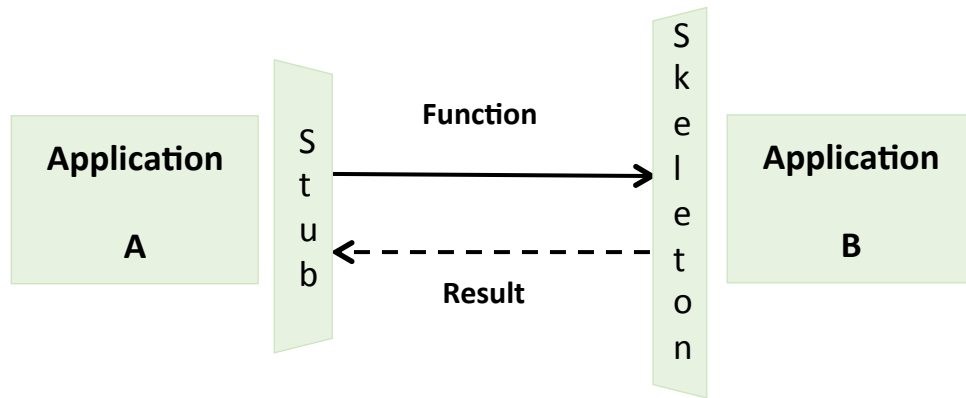
File transfer



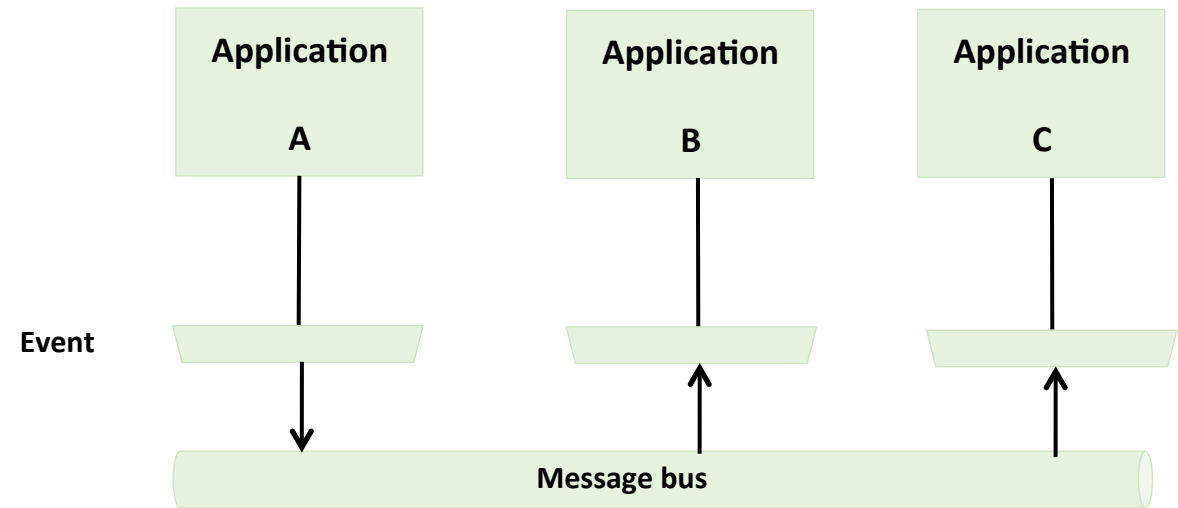
Shared database



Approaches for Data Integration



Remote Procedure Invocation



Messaging

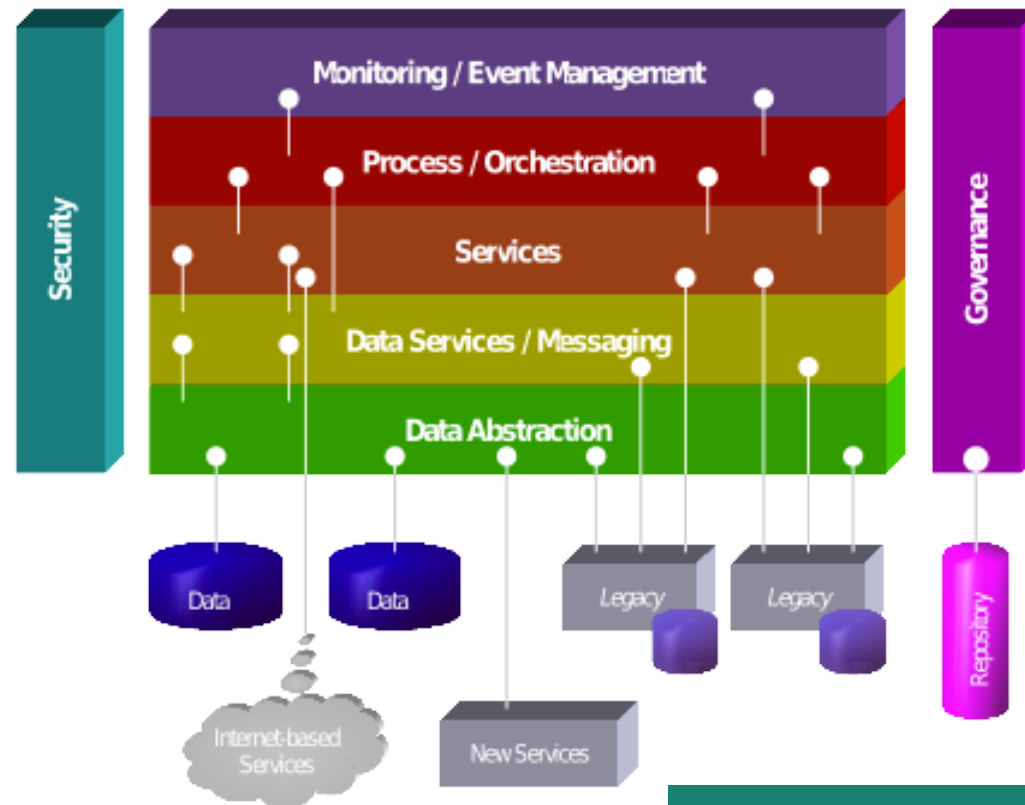


Enterprise application integration

- Three main levels
 - Physical integration, interconnection of devices via computer networks
 - Application integration, integration of software applications and databases
 - Business integration, coordination of the functions that manage control and monitor business processes.

Enterprise application integration

- Service Oriented Architecture (SOA), architectural style for building enterprise applications using independent business-aligned services that can be combined into agile and flexible business processes.



Enterprise application integration

- REST, architectural style that defines a set of constraints for describing hypermedia system
 - Resource identification
 - Uniform interfaces
 - Self-descriptive messages

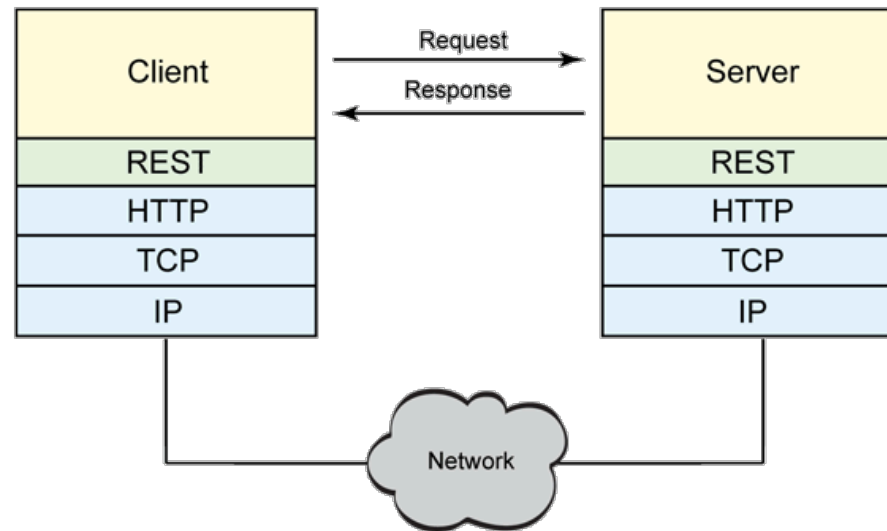
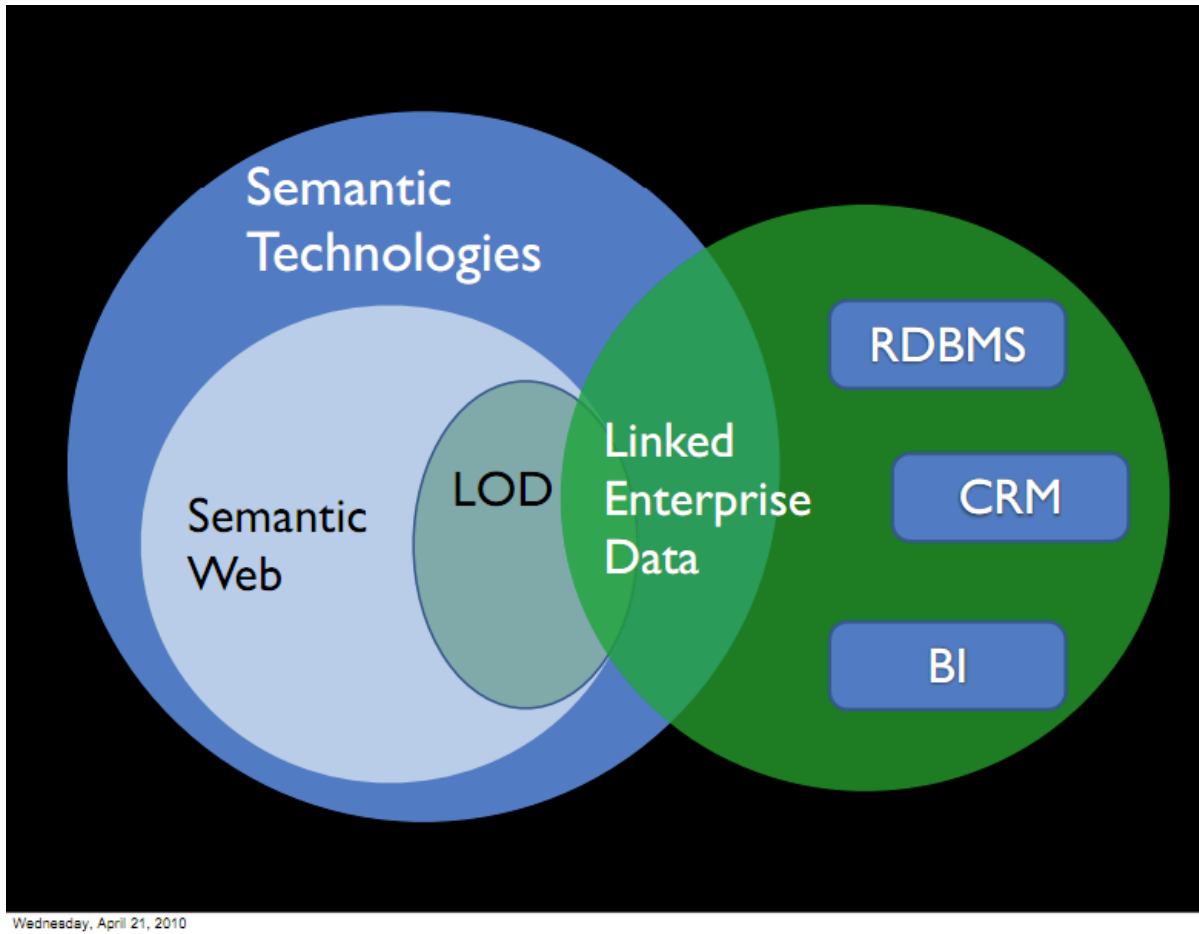


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But first, what is Enterprise Linked Data?



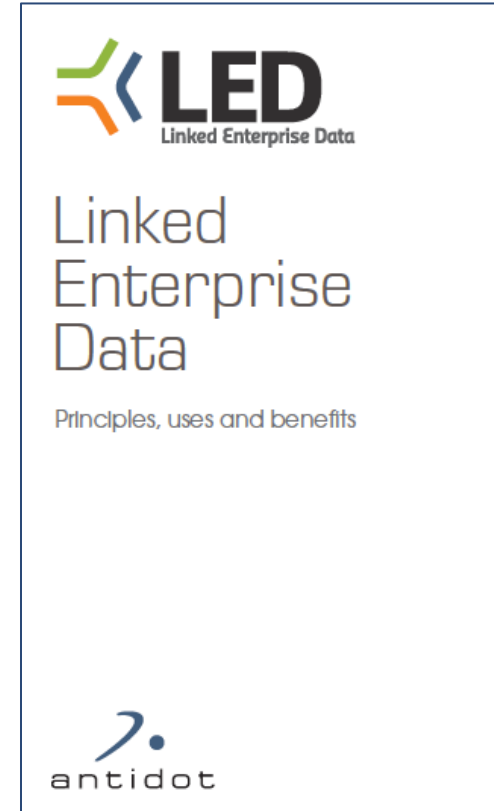
Enterprise Linked Data is the application of Semantic Web architecture principles to real-world information management issues faced by commercial, not-for-profit and government enterprises.



More references



<http://linkeddatadeveloper.com/Projects/Linking-Enterprise-Data/Manuscript/led-contents.html>



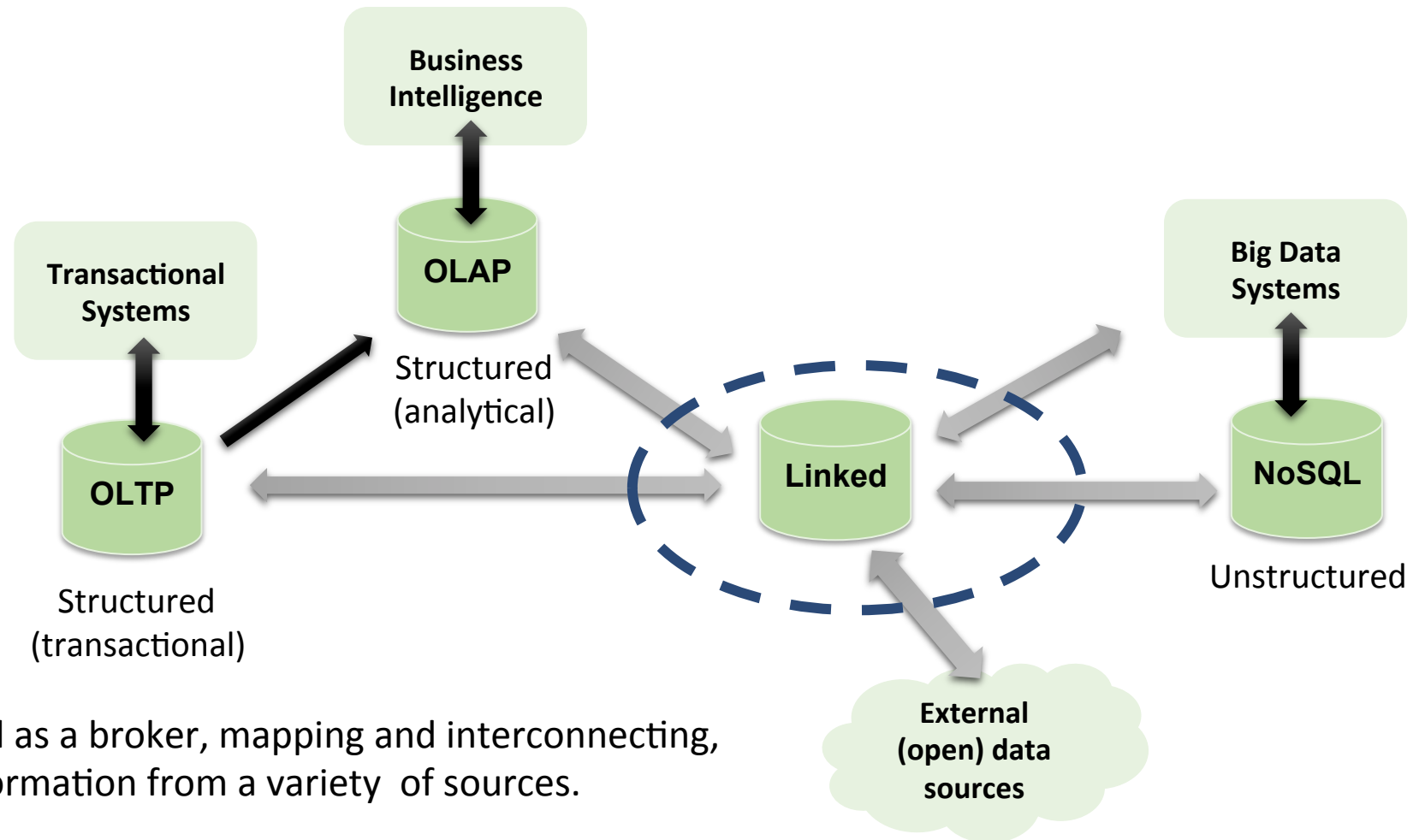
https://www.inria.fr/content/download/18171/514403/version/1/file/Antidot_Fabrice-LACROIX.pdf

Enterprise

- Linked Data is not necessarily free data
- Enterprises have many disparate data sources and data silos
- Data sources with similar/inconsistent information
- Complex data integration processes

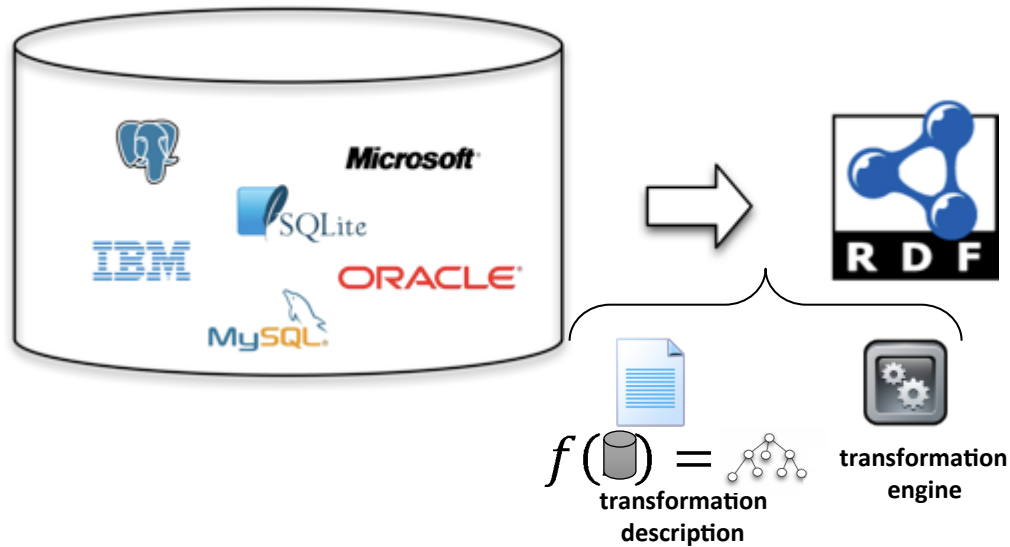
Could linked data represent the next evolutionary stage for data management?

5



Effectively, linked data can be used as a broker, mapping and interconnecting, indexing and feeding real-time information from a variety of sources.

RDB2RDF



Student		
ID	FirstName	LastName
INTEGER	VARCHAR(50)	VARCHAR(50)
10	Venus	Williams

```

<TriplesMap1>
  a rr:TriplesMap;

  rr:logicalTable [
    rr:sqlQuery ""
    SELECT "ID",
           ("FirstName" || ' ' || "LastName") AS Name
    FROM "Student"
    ""
  ];

  rr:subjectMap [ rr:template "http://example.com/Student/{\"ID\"}"; ];

  rr:predicateObjectMap
  [
    rr:predicate      foaf:name ;
    rr:objectMap      [ rr:column "Name" ]
  ]
  .
    
```

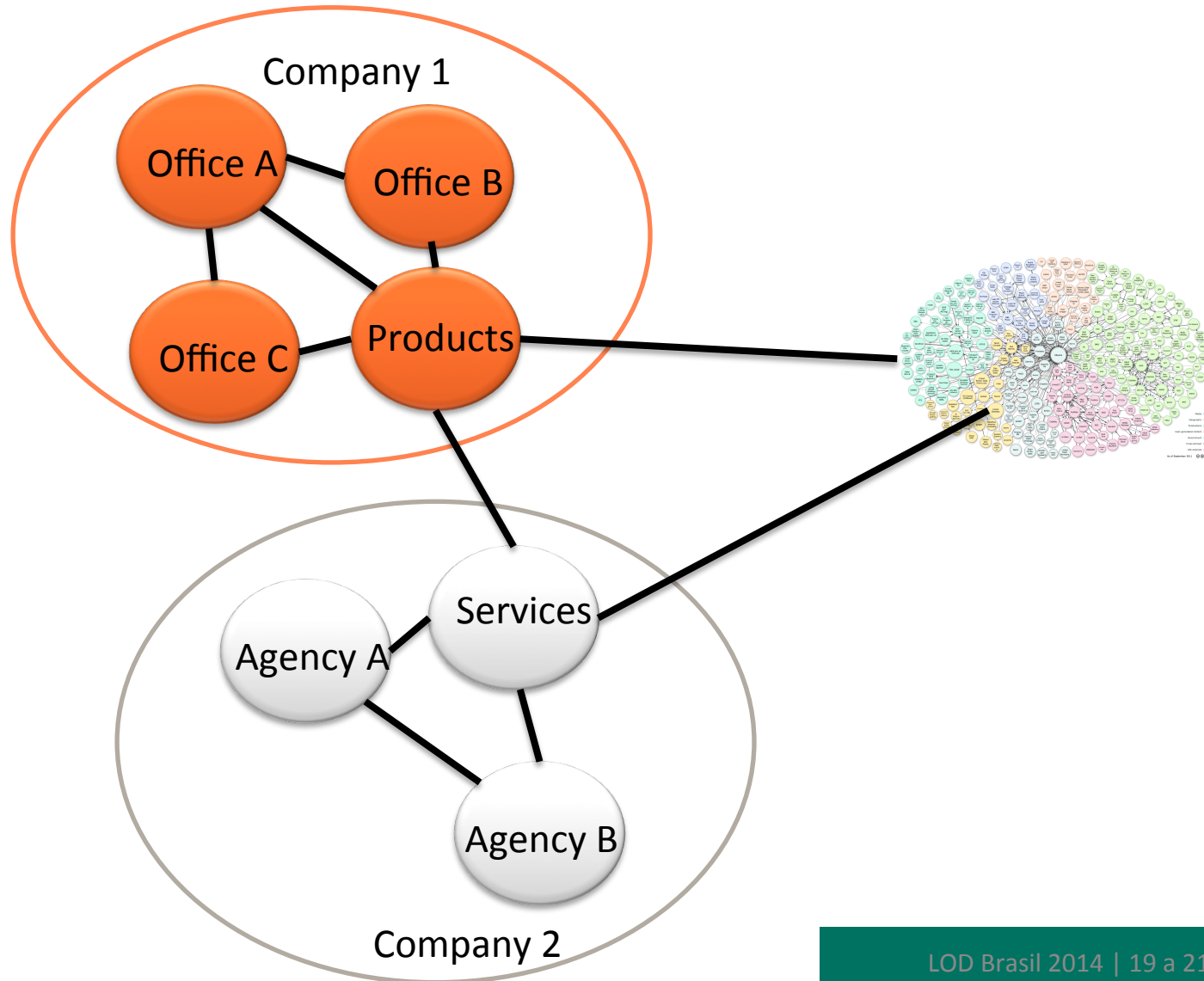
Subject	Predicate	Object	Graph
<http://example.com/Student/10>	<http://xmlns.com/foaf/0.1/name>	"Venus Williams"	

- R2RML: RDB to RDF Mapping Language - <http://www.w3.org/TR/r2rml/>
- Direct Mapping - <http://www.w3.org/TR/rdf2rdf/>
- R2RML and Direct Mapping Test Cases - <http://www.w3.org/TR/r2rml-test-cases/>
- RDB2RDF Implementation Report - <http://www.w3.org/TR/rdb2rdf-implementation/>

More RDF converters

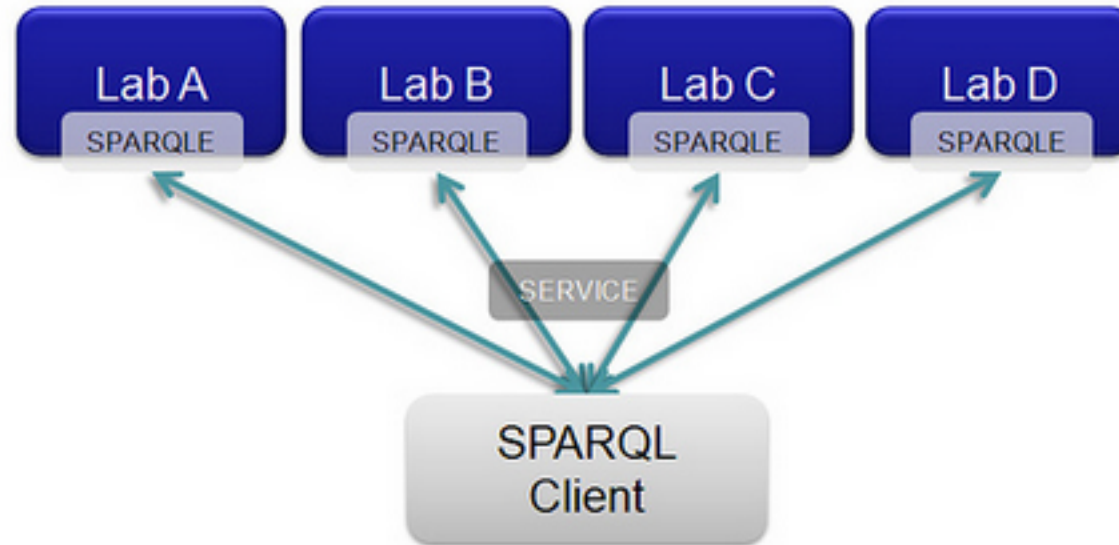
- XML - <http://www.w3.org/TR/grddl/>
- CSV – RDF Refine – a Open Refine extension for exporting RDF
 - CSV on the Web Working Group <http://www.w3.org/2013/05/lcsv-charter.html> ... There will be a tutorial this afternoon
- <http://www.w3.org/wiki/ConverterToRdf>

A scenario



Federated Queries

Federated SPARQL Query



SPARQL Client sends subqueries into each endpoint and merges the results

Federated SQL queries within DBMS?

- Not so difficult if we are using the same DBMS vendor
 - MySQL to MySQL
 - Oracle to Oracle
 - PostgreSQL to PostgreSQL
- If we are dealing with different DBMS vendor
 - Build wrappers



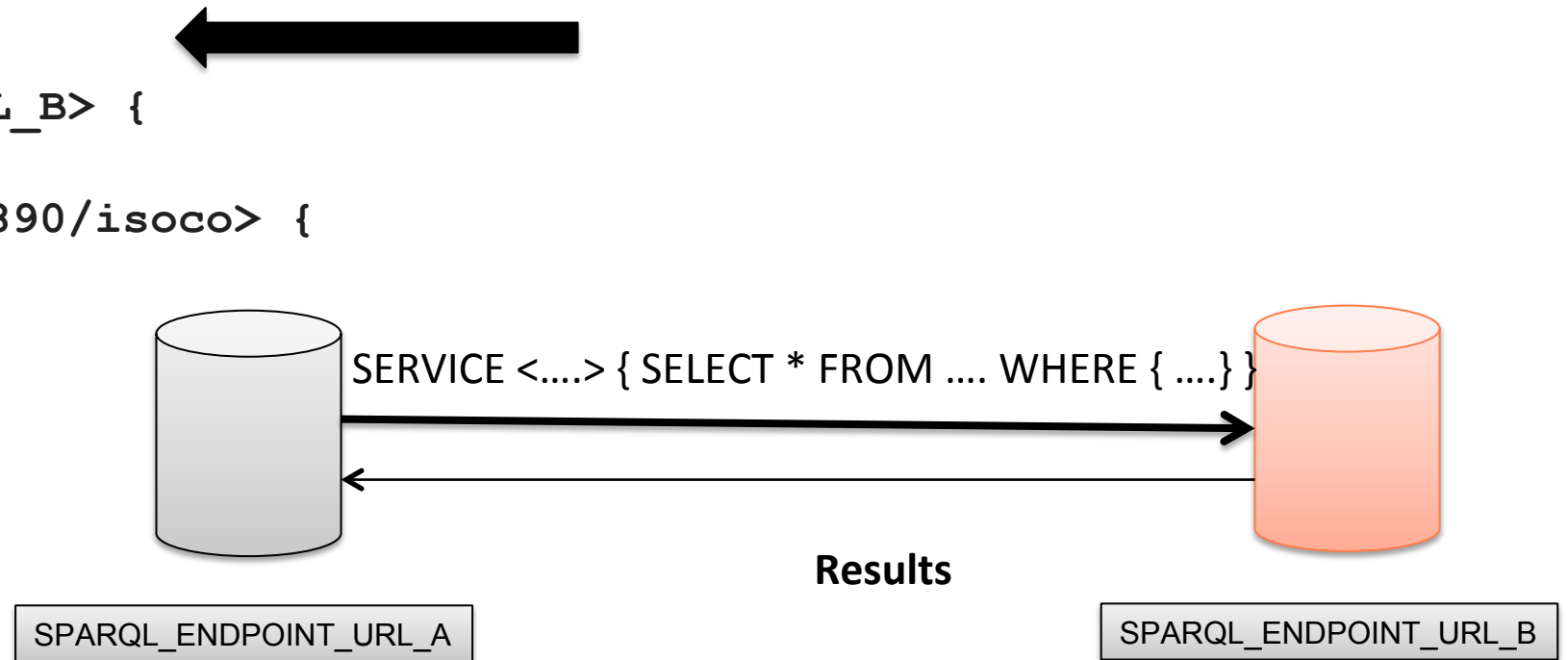
Federated SPARQL Query Syntax

SPARQL_ENDPOINT_URL_A

```

SELECT *
FROM <http://example.com/graph/mygraph>
WHERE {
  ?s ?q ?w .
  SERVICE <SPARQL_ENDPOINT_URL_B> {
    SELECT *
    FROM <http://localhost:8890/isoco> {
      ?t ?q ?o .
    }
  }
}

```



Moreover, we have the LDP platform

- LDP is a set of best practices and simple approach to read-write Linked Data architecture, based on HTTP access to web resources that describe their stage using RDF data model



Linked Data Platform 1.0

W3C Last Call Working Draft 16 September 2014

This version:

<http://www.w3.org/TR/2014/WD-ldp-20140916/>

Latest published version:

<http://www.w3.org/TR/ldp/>

Latest editor's draft:

<http://www.w3.org/2012/ldp/hg/ldp.html>

Test suite:

<https://dvcs.w3.org/hg/ldp/wg/raw-file/tip/tests/ldp-testsuite.html>

Implementation report:

<https://dvcs.w3.org/hg/ldp/wg/raw-file/tip/tests/reports/ldp.html>

Previous version:

<http://www.w3.org/TR/2014/CR-ldp-20140619/>

Editors:

[Steve Speicher, IBM Corporation](#)

[John Arwe, IBM Corporation](#)

[Ashok Malhotra, Oracle Corporation](#)

Current implementations

Eclipse Lyo-BC	Fedora4	Apache Marmotta	ldphp	LDP4j	Virtuoso	gold	LDP.js BC
PASS	PASS	PASS	PASS	FAIL	PASS	PASS	PASS
PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
PASS	PASS	PASS	FAIL	PASS	FAIL	FAIL	PASS
100.0%	100.0%	100.0%	75.0%	75.0%	75.0%	75.0%	100.0%

<https://dvcs.w3.org/hg/ldp/wg/raw-file/default/tests/reports/ldp.html>

Platform Architecture Overview

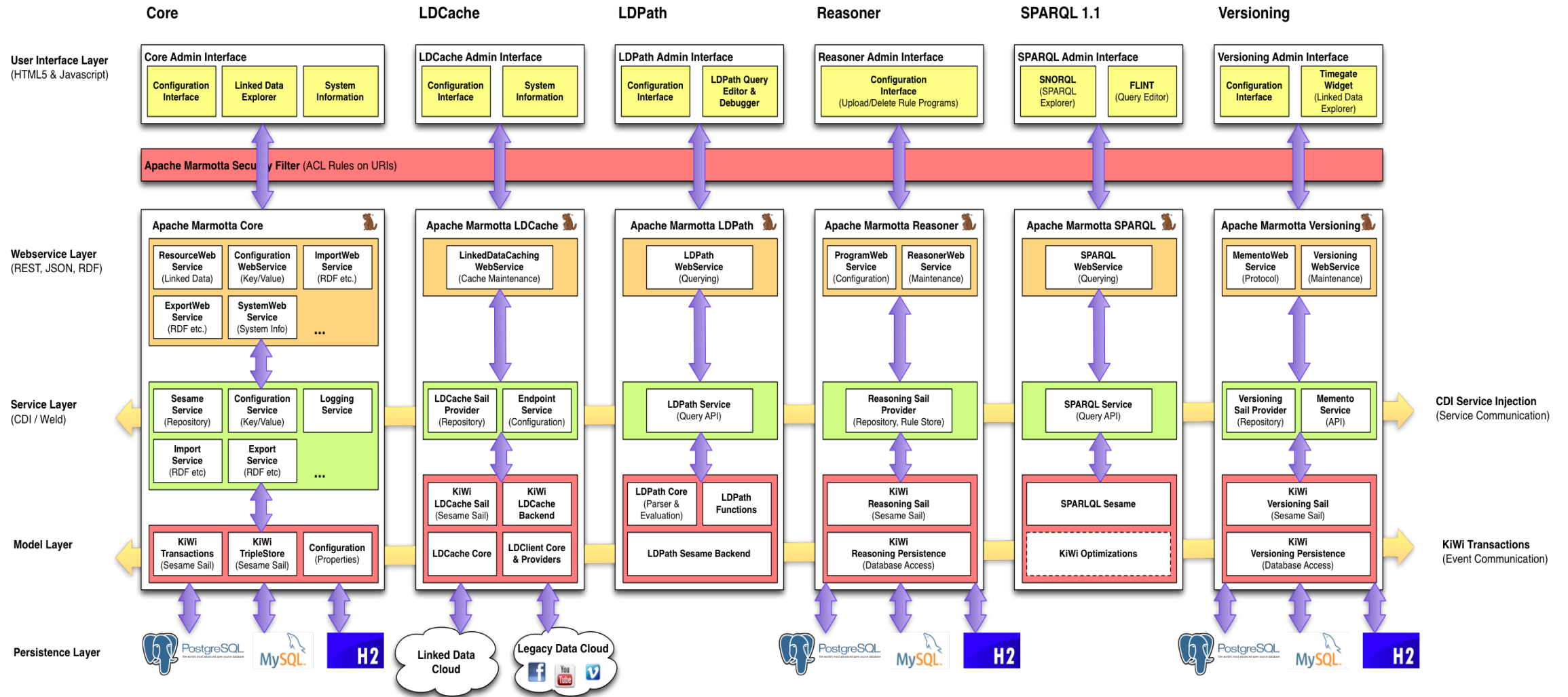


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Search through personalised, adaptive interaction

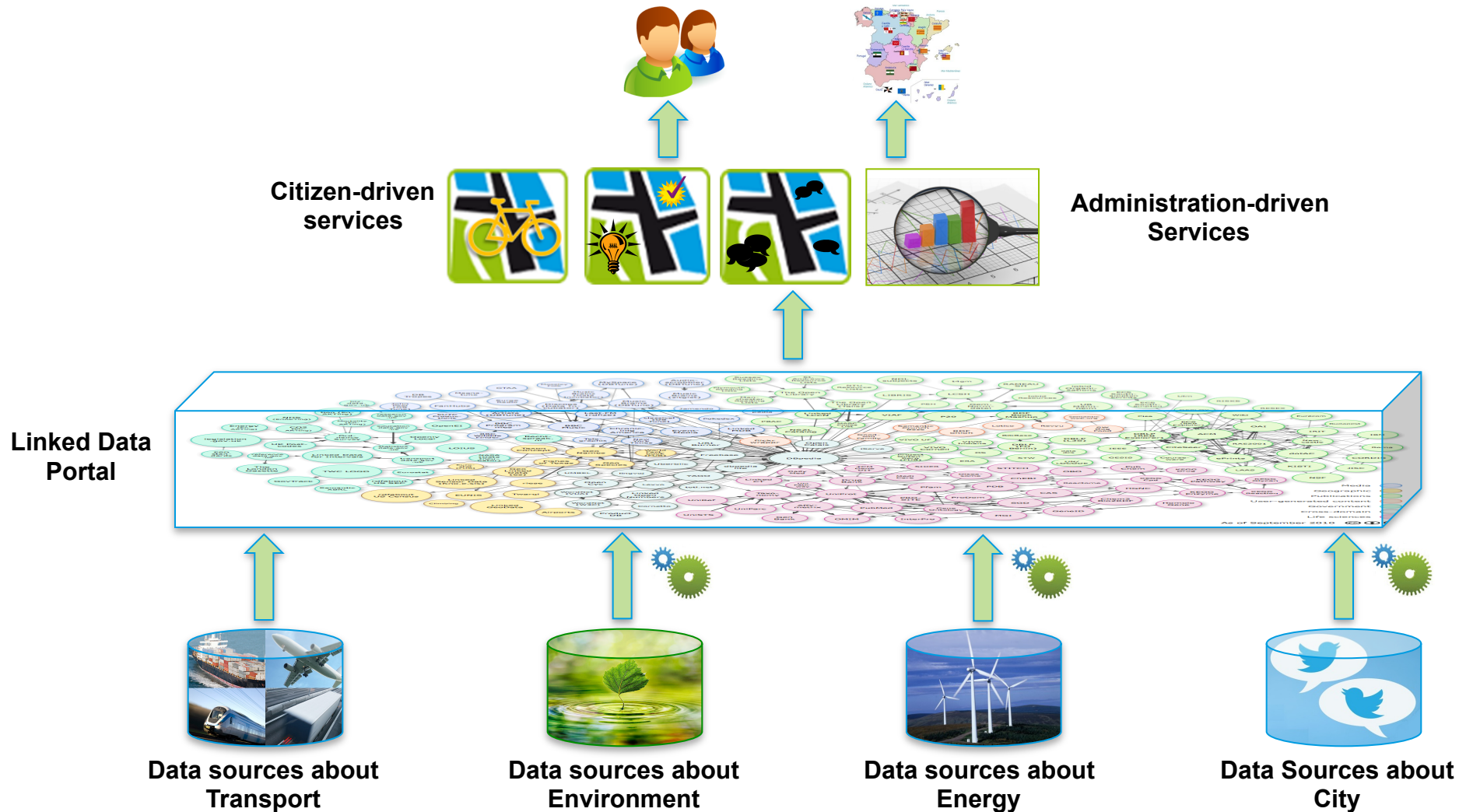


Workers

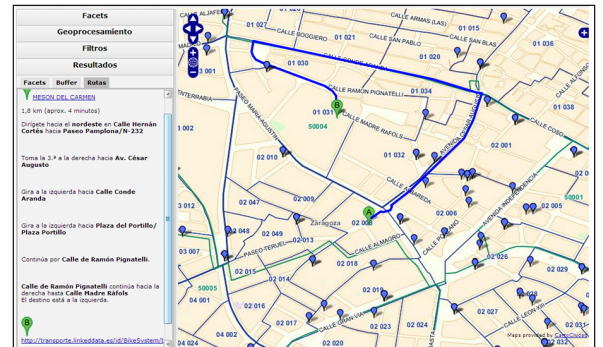
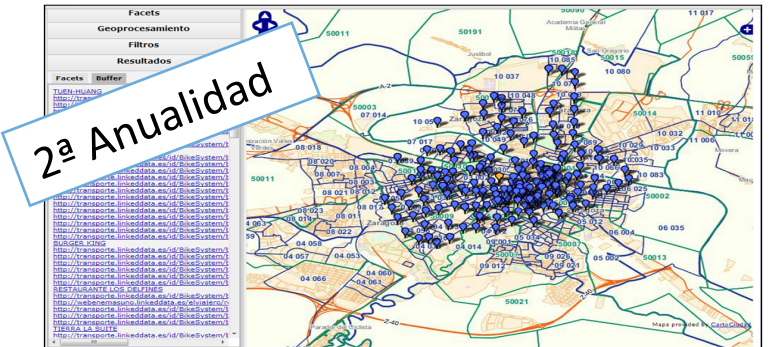


<https://www.youtube.com/watch?v=sqmFRpgiLlg>

Linked Data within Smart Cities

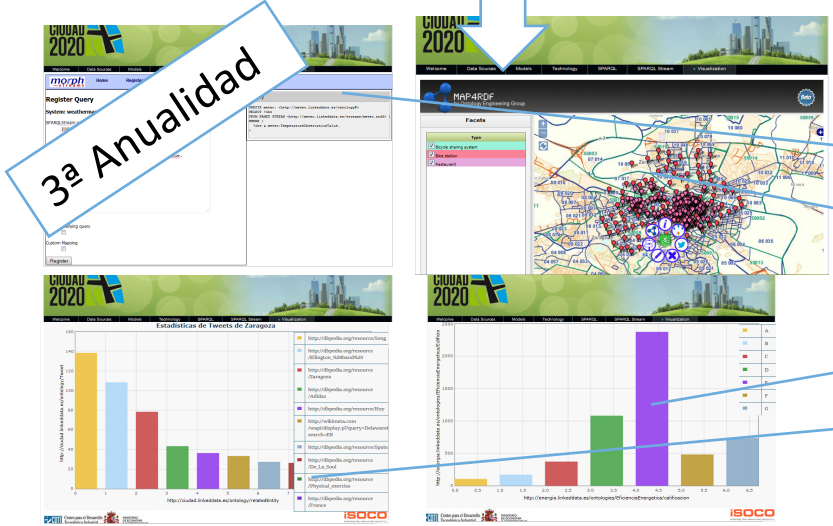


Linked Data within Smart Cities



Portal Transporte

Nuevas funcionalidades: Buffer, Rutas, Tweets,...



- Portal Transporte (transporte.linkeddata.es)
- Portal Medioambiente (streams.linkeddata.es)
- Portal Ciudad (ciudad.linkeddata.es)
- Portal Energía (energia.linkeddata.es)

Portal Open Data (ciudad2020.linkeddata.es)

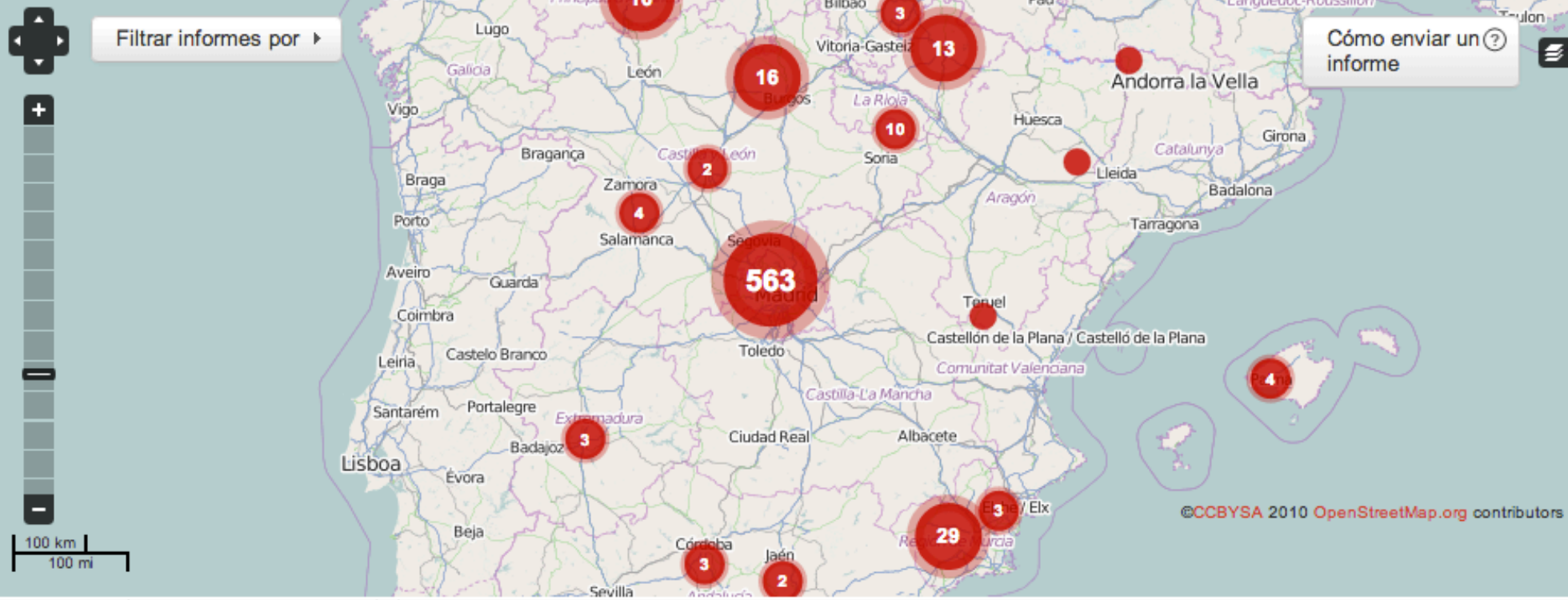
Controlling and monitoring humanitarian crisis

Crowd Crisis Control

Crowd Crisis Control

+ ENVIAR UN INFORME

INICIO AVISOS ENVIAR UN INFORME RECIBIR ALERTAS CONTACTE CON NOSOTROS



Cómo enviar un informe

100 km / 100 mi

Scale = 1 : 7M -12.63716, 40.32980

Knowledge Tagger

Goal: Perform **detection and disambiguation of targeted named entities** in texts, in **domain and application specific scenarios** where texts have particular content nature:

E.g. Disambiguate football players and teams in texts describing football matches.

E.g. Disambiguate locations in texts describing military conflicts.

E.g. Disambiguate films and actors in film reviews.

...

Input text



[Athletic Bilbao](#) 1.00

This lost penalty kick by [Llorente](#) cost [Athletic](#) the cup. I think Bielsa and the whole team feel very disappointed right now

Perform NER

Back to text

Knowledge Tagger

- The first case is from the media sector, involving extracting event descriptions from multimedia content related to football.
- The second case is from the scientific publishing domain, involving the development of a semantic recommendation system for papers and experts.
- Finally, the third case is from the insurance sector, involving using NER to categorize customer requests, as part of a larger customer support system.

Knowledge Tagger – Lessons learned

Lesson 1: Open domain approaches may not be effective in specific domains and scenarios.

Lesson 2: Performing NER is not always enough to understand what a text talks about.

Lesson 3: Reusing Linked Open Data as domain knowledge for NER systems is not always straightforward.



Alexopoulos, P., Villazón-Terrazas, B., Gómez-Pérez, J.M.:
Knowledge Tagger: Customizable Semantic Entity Resolution
using Ontological Evidence. ;In I-SEMANTICS (2013)

Low uptake of LOD in non-academic

- LOD cloud covers mainly “general knowledge” in contrast to “domain knowledge”
 - We need micro LOD clouds, e.g., Bio2RDF
 - Datasets without licenses are most problematic for commercial use
- Most LOD datasets are maintained by a single person or nobody at all
 - It’s not the data only which is linked, also people and organizations



ELD

- Elimination of internal data 'silos'
- Integration of internal and external data
- Easy interlinkage of enterprise, industry-standard, open public and public subscription data
- Report creation and data display based on templates and queries, not requiring manual crafting
- Data access, analysis and manipulation pushed out to the user level
Deliver new applications





LOD BRASIL

LINKED OPEN DATA

19a21 novembro 2014

isoco
enabling the networked economy

Realização



**UNIVERSIDADE FEDERAL
DE SANTA CATARINA**



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SANTA CATARINA**

Apoio

