



sprasad@esri.com
yhu@esri.com

Semantic Web and ArcGIS Online

Sathya Prasad and Yingjie Hu

July 15th Tuesday | 2:30 – 3:00 pm

Demo Theater

Session: 590

UNDERSTANDING THE SEMANTIC WEB

- Web 3.0, Web of Data
- W3C Standard
- Sir Tim Berners-Lee
- Currently, we are in Web 2.0

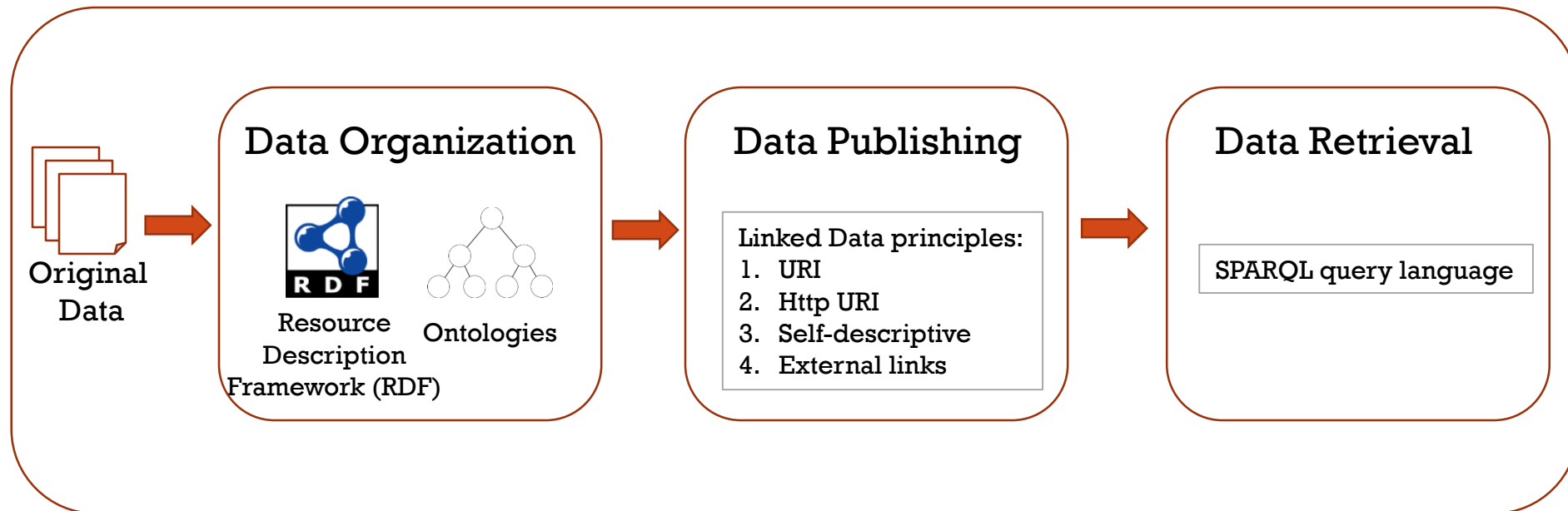


WEB 2.0 V.S. WEB 3.0

	Web 2.0	Web 3.0
Key elements	Documents	Data
Connections	Hyperlinks among documents	Links among data
Data Consumers	Humans	Humans and machines
Data Organization	Customized ways	RDF
Data Publication	Customized ways	Linked Data
Data Retrieval	Customized APIs	SPARQL queries



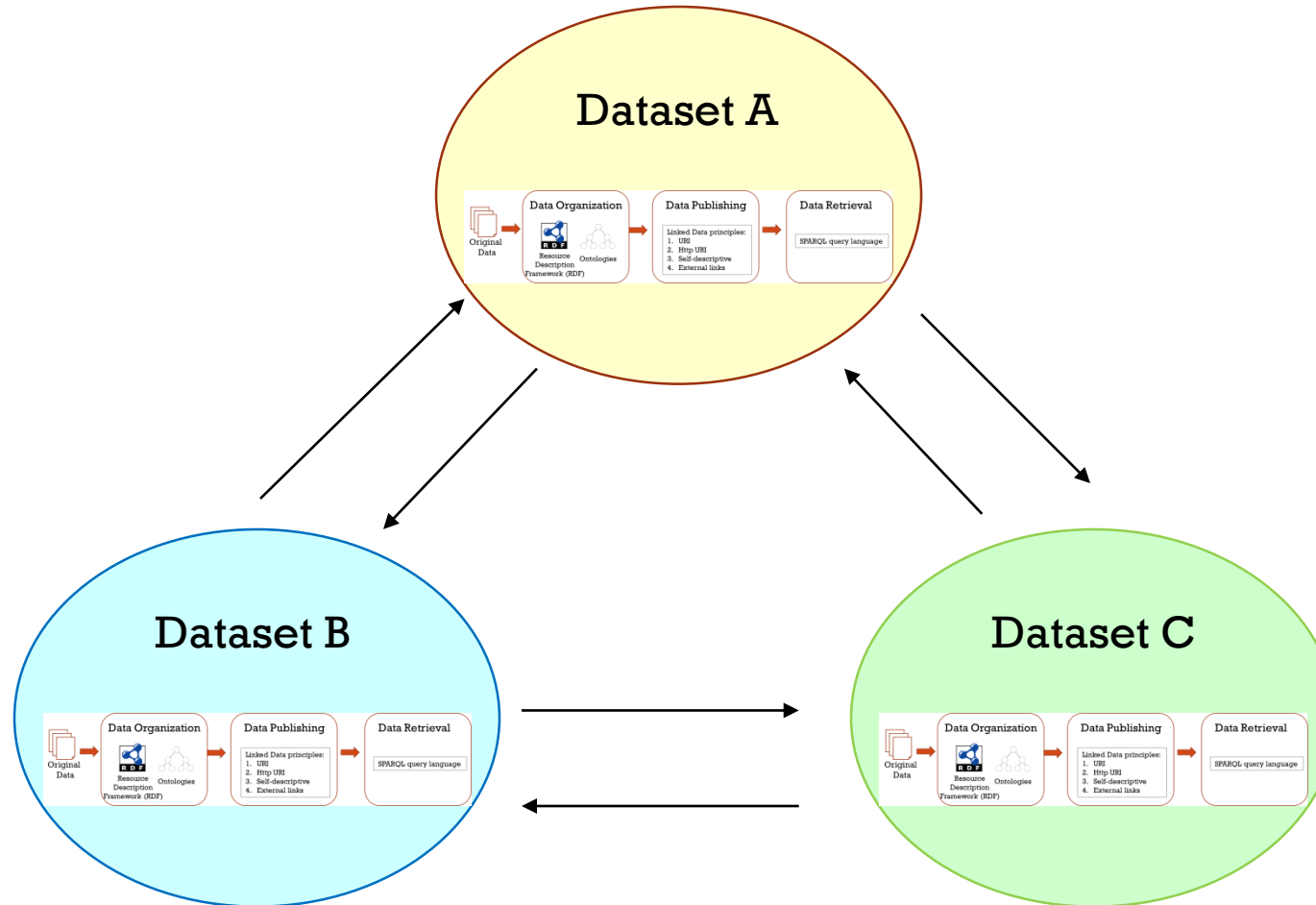
UNDERSTANDING THE SEMANTIC WEB



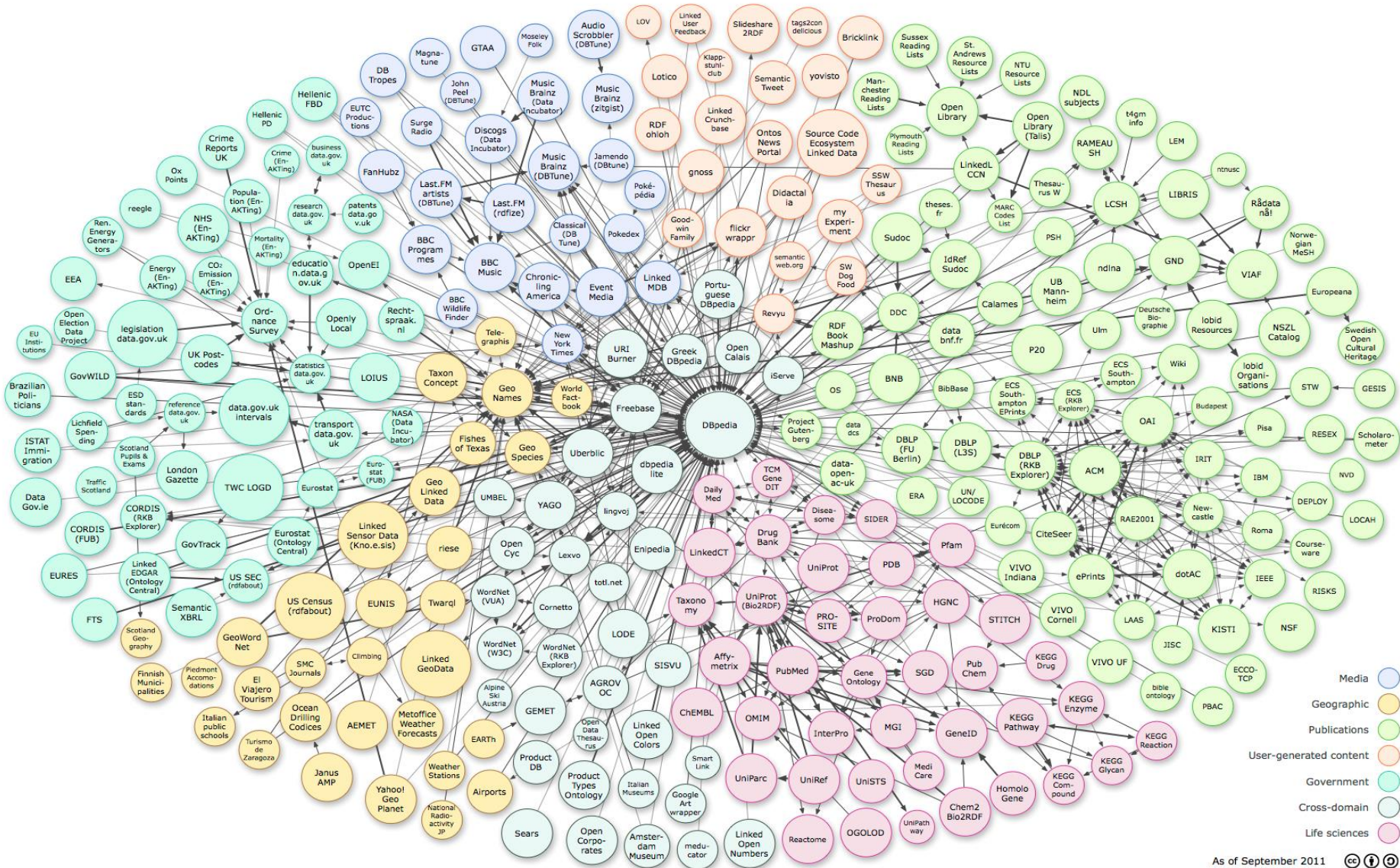
A dataset on the Semantic Web



UNDERSTANDING THE SEMANTIC WEB



EXISTING LINKED DATASETS



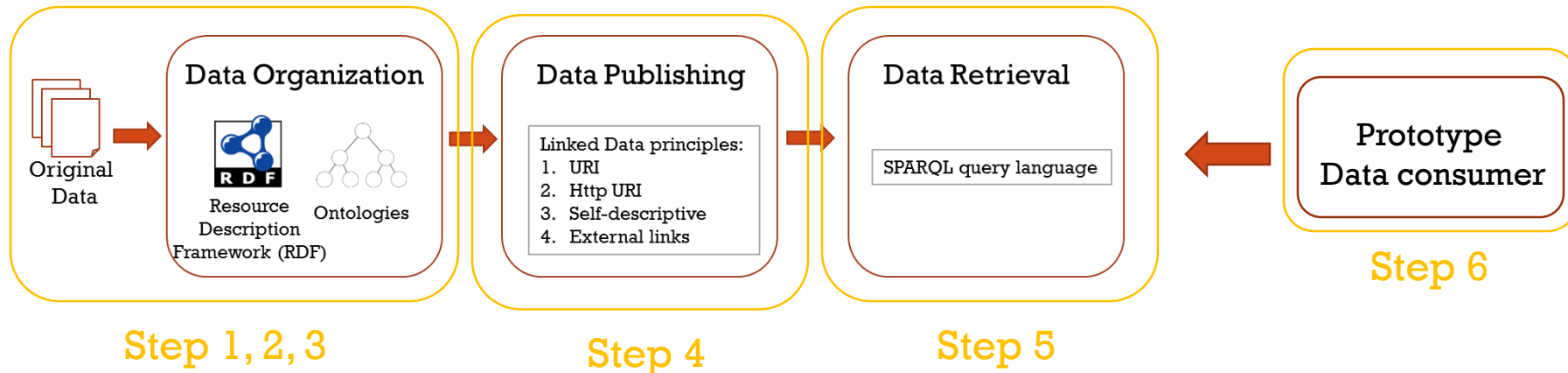
PROJECT

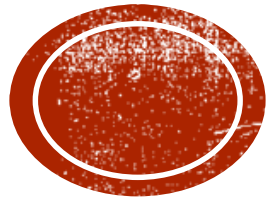
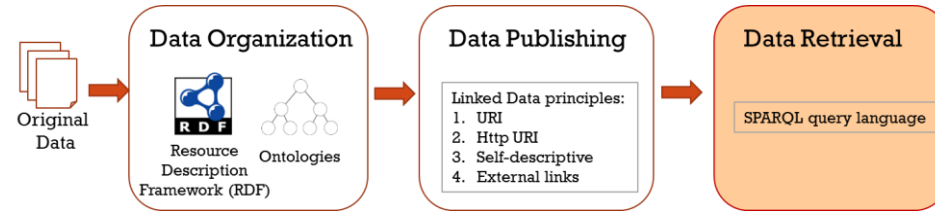
- Publish a sample of ArcGIS Online metadata following the principles of the Semantic Web.
- Explore the new capabilities enabled by the semantically structured data.
- Explore the functionalities enabled by GeoSPARQL, OGC's standard for geospatial data on the Semantic Web.



METHODOLOGY

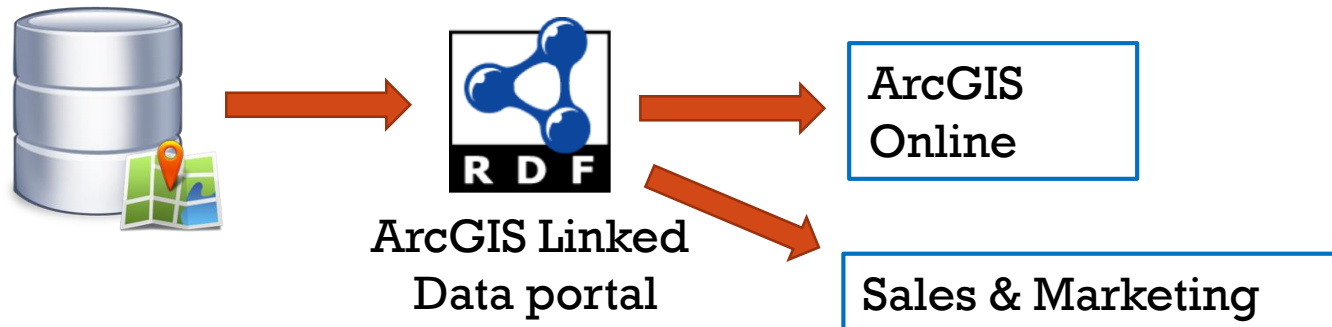
1. Define ontologies (schema)
2. Mine items from ArcGIS Online (around 45,000 items)
3. Convert metadata of the items into RDF
4. Publish RDF data on a SPARQL endpoint
5. Use both SPARQL and GeoSPARQL to query
6. Build a prototype to consume the published data



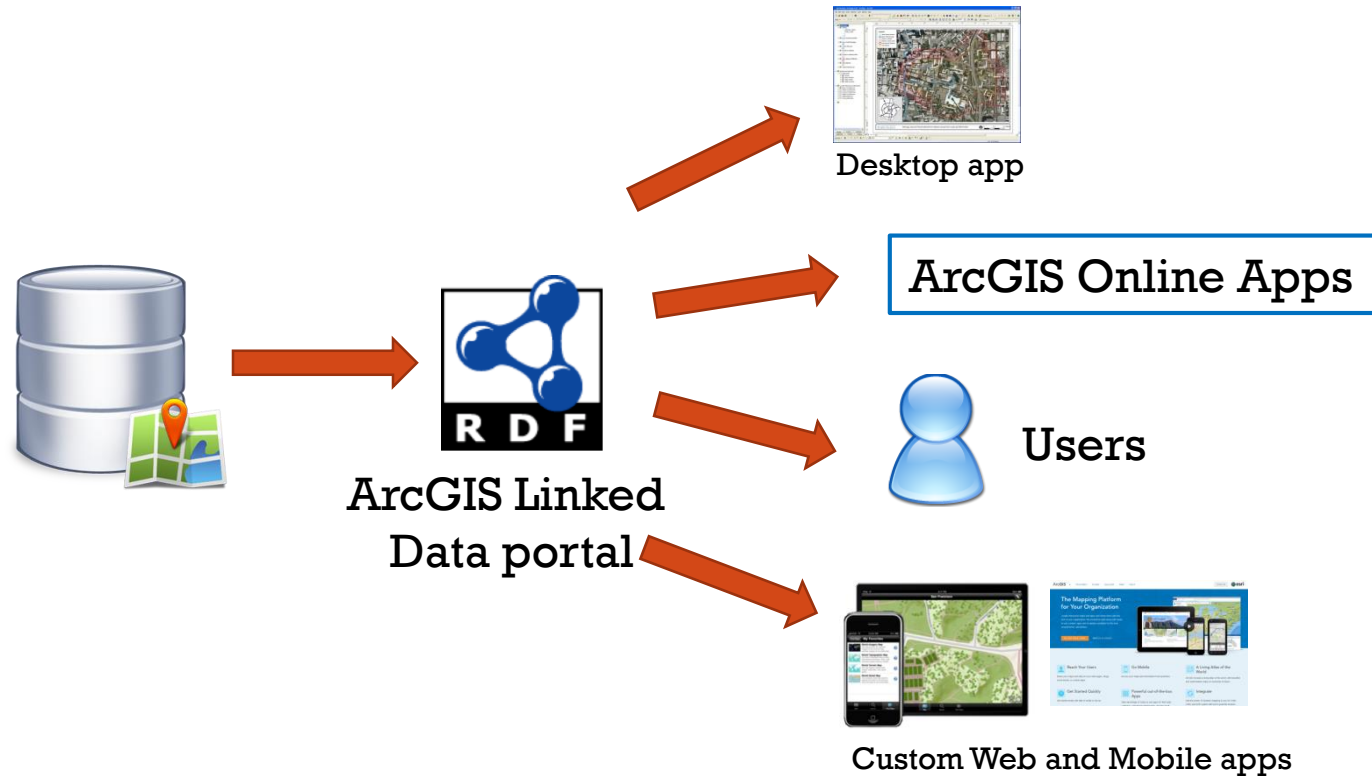


DEMO

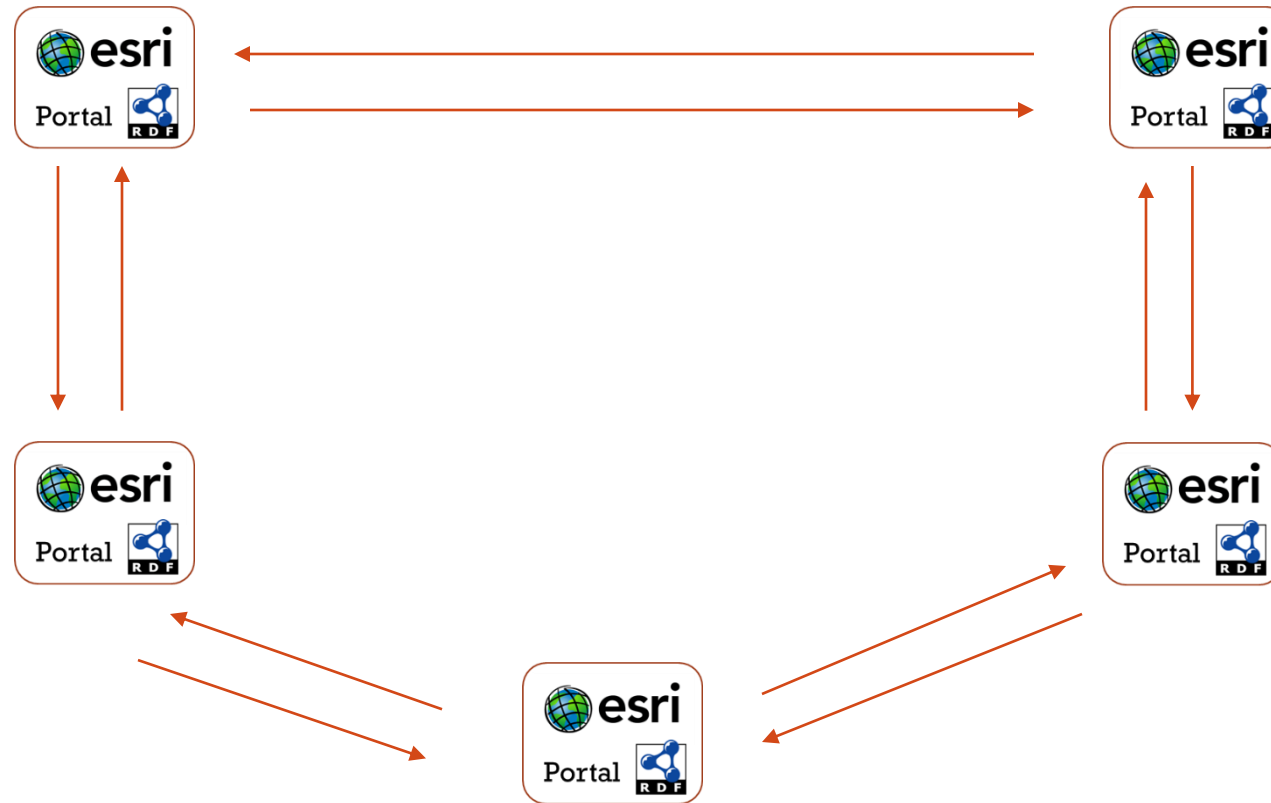
USAGE SCENARIO: INTERNAL PORTAL



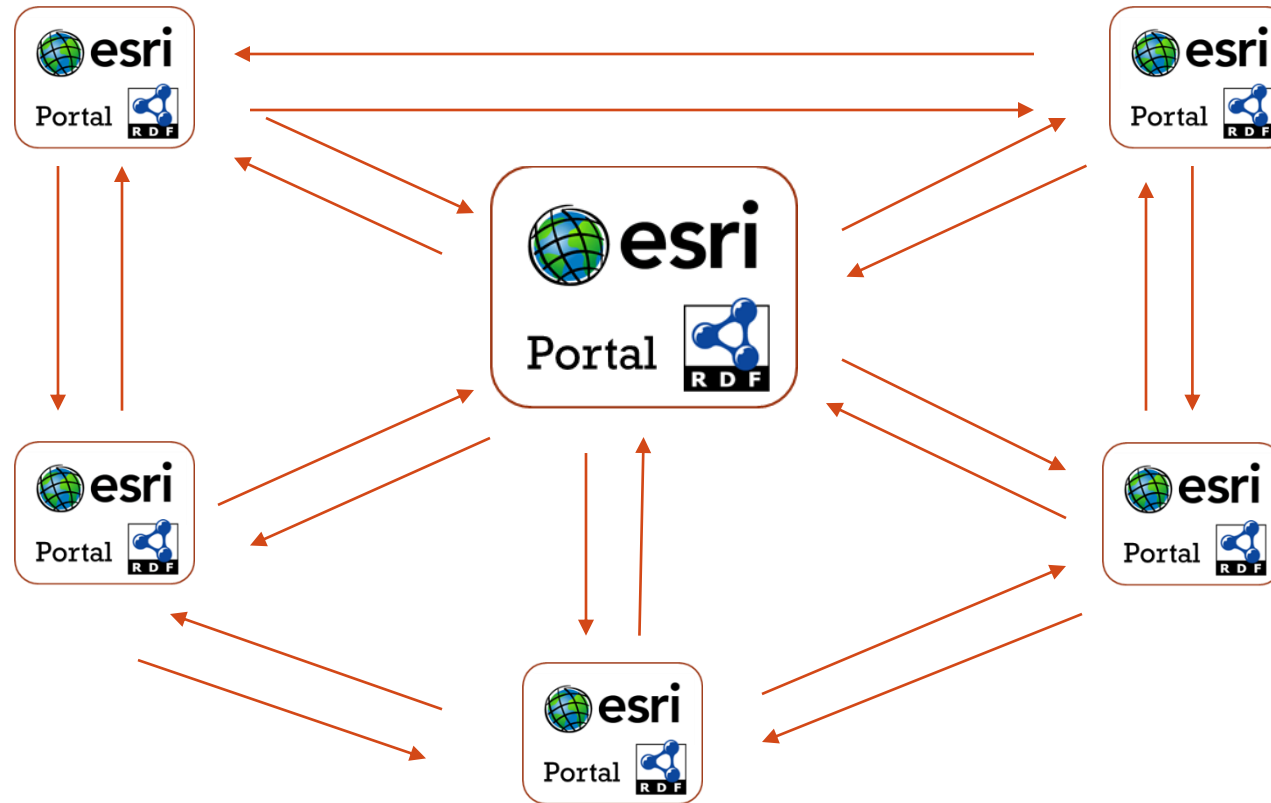
USAGE SCENARIO: EXTERNAL PORTAL & API



USAGE SCENARIO: FEDERATION

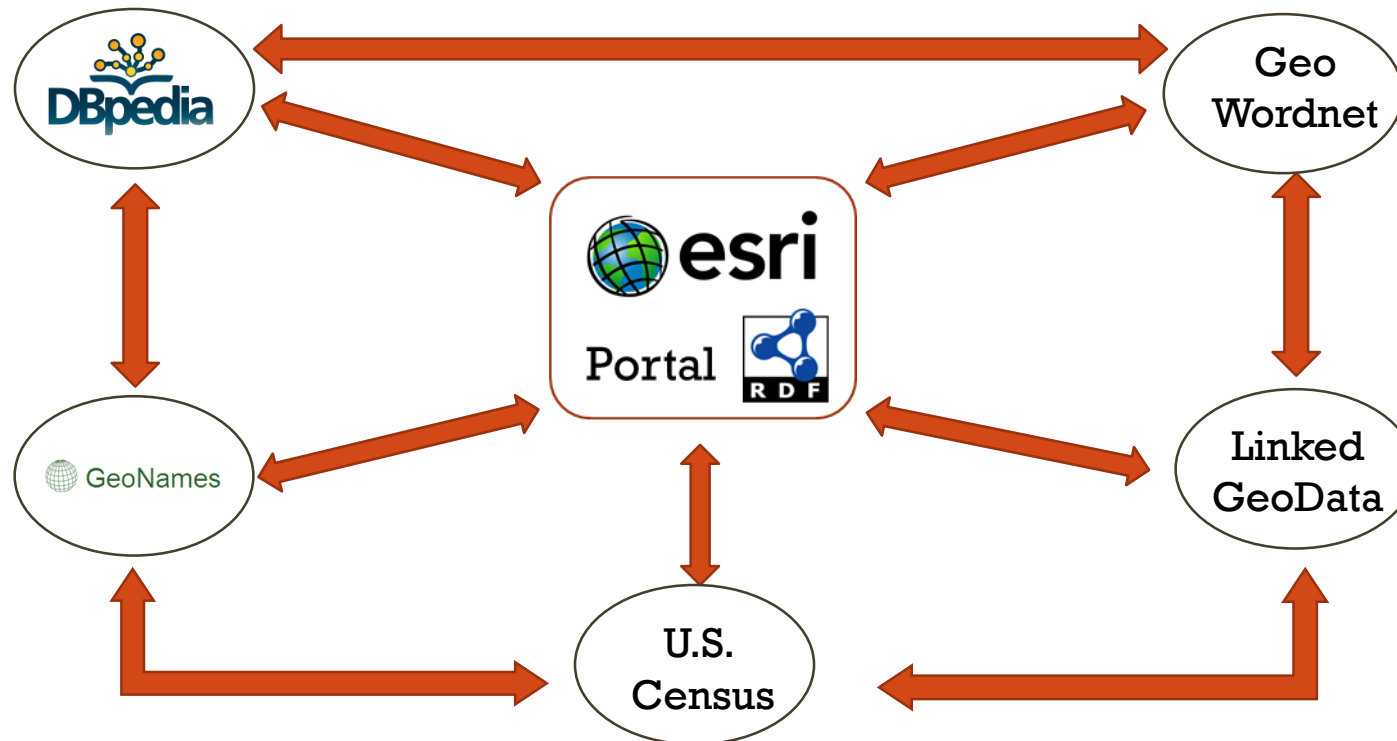


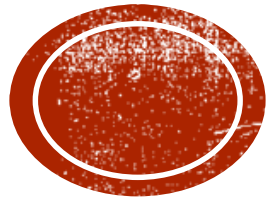
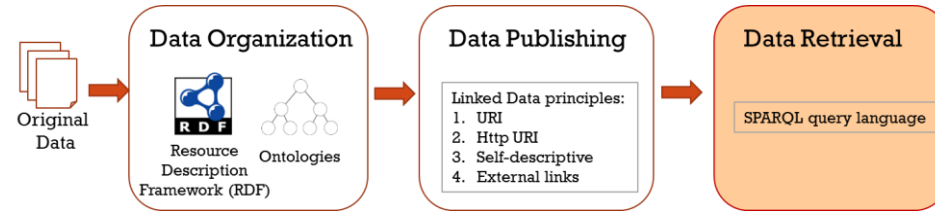
USAGE SCENARIO: FEDERATION



USAGE SCENARIO: SEMANTIC WEB

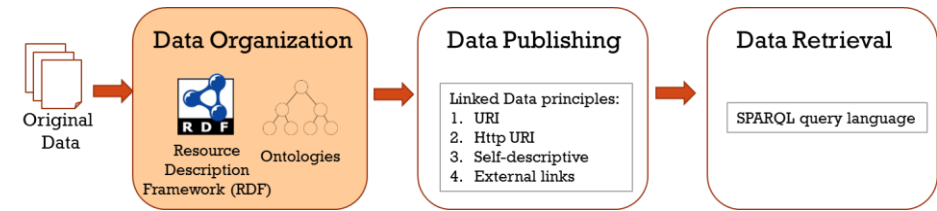
Linking Existing Datasets on the Semantic Web



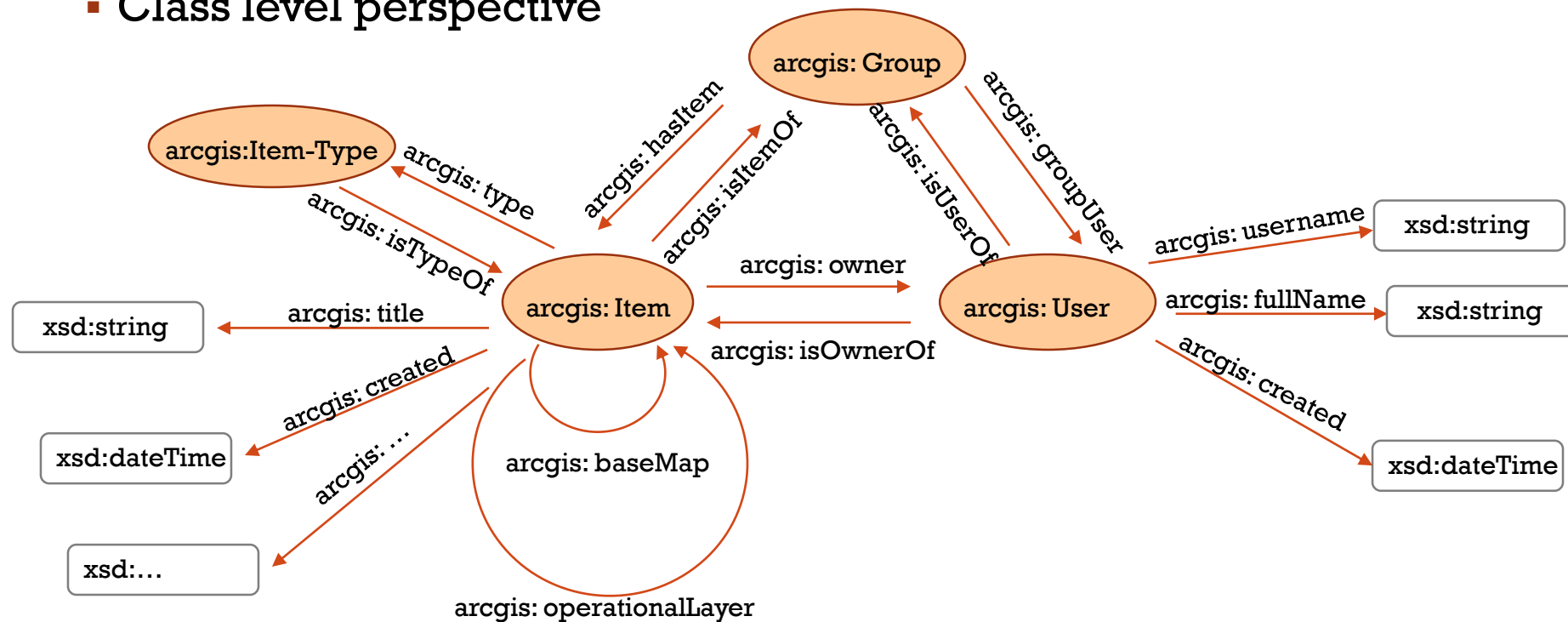


DEMO

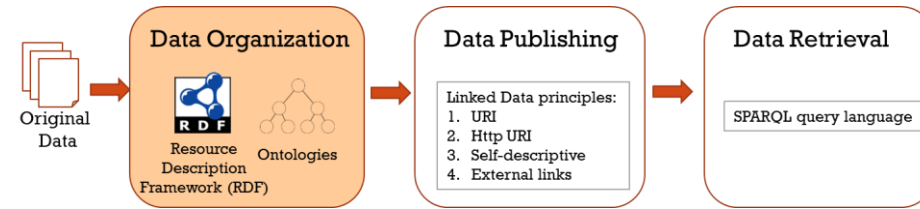
ONTOLOGIES



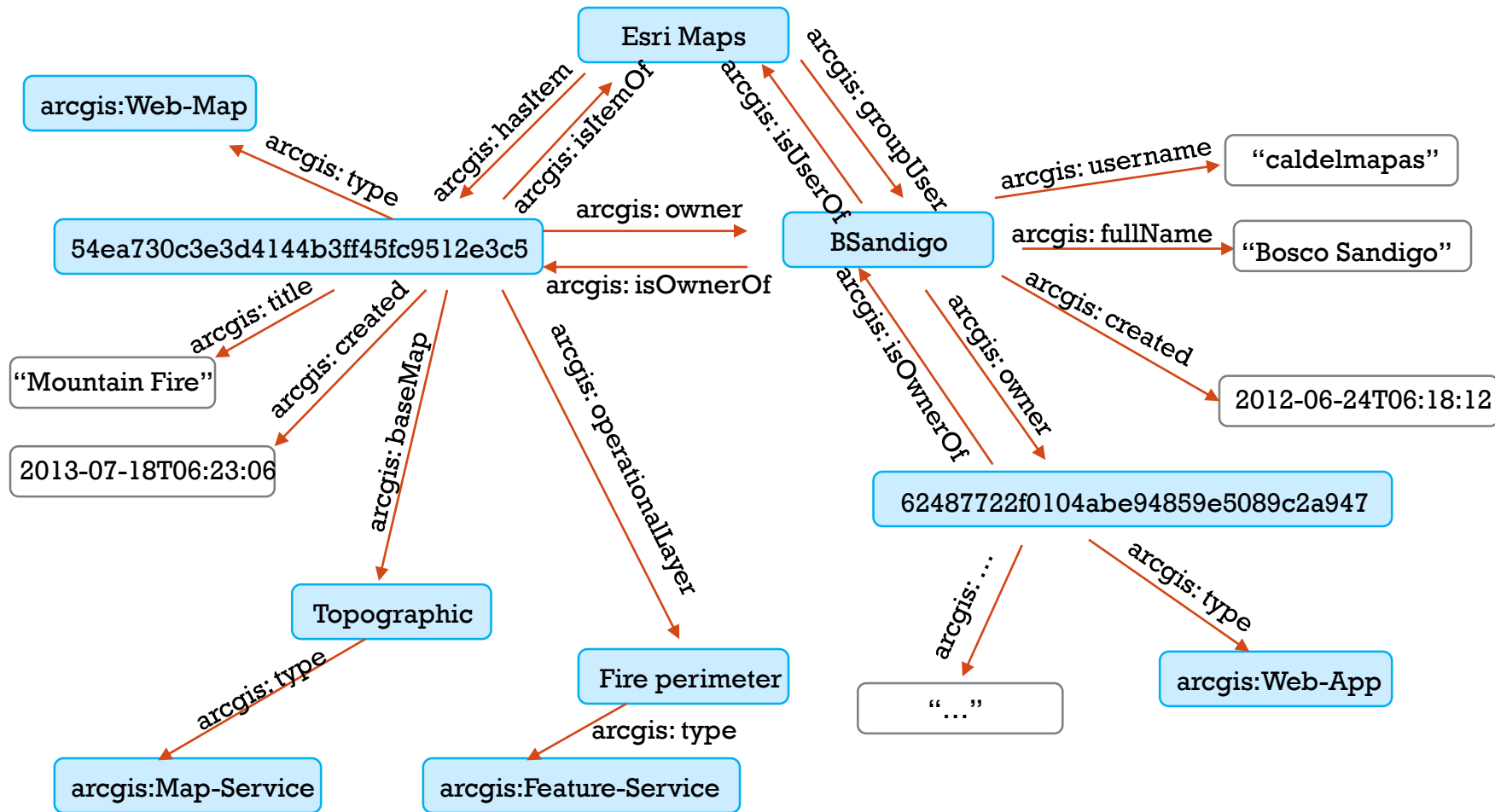
■ Class level perspective



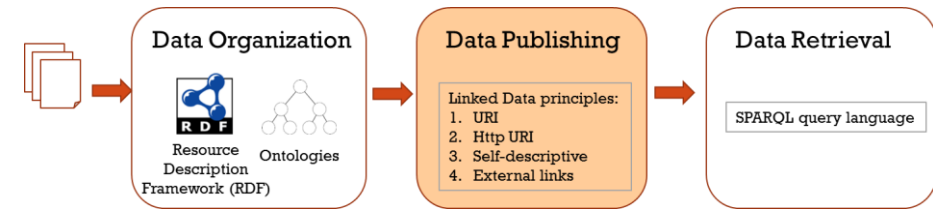
ONTOLOGIES



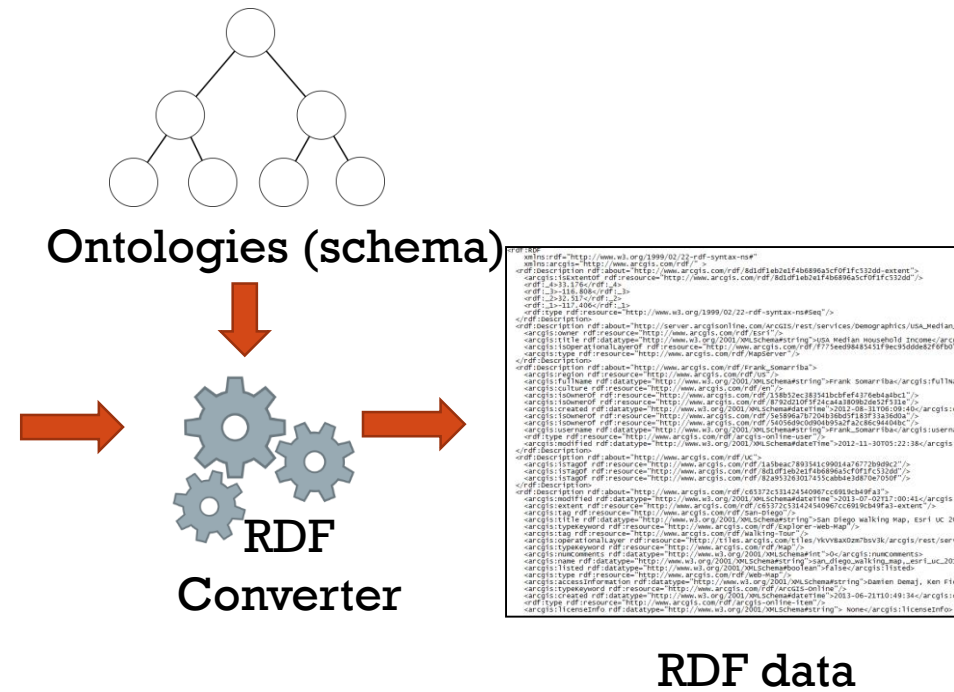
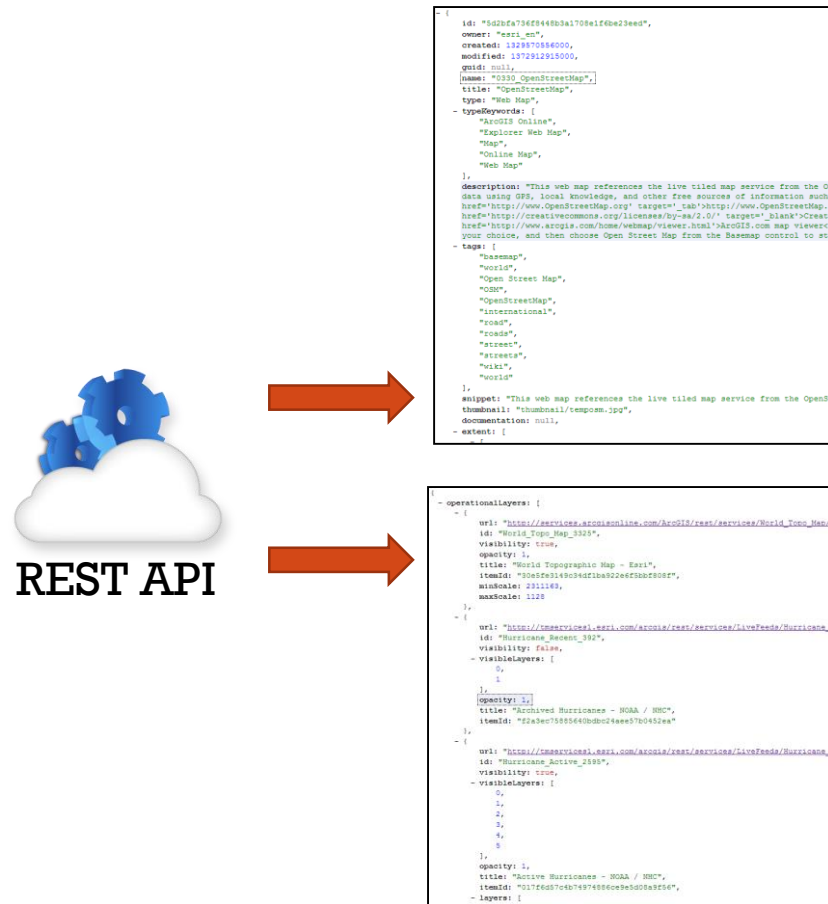
■ Entity level perspective



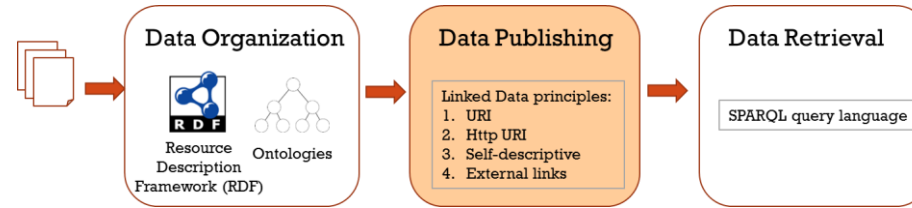
DATA CONVERSION



JSON



SPARQL ENDPOINT



Parliament Query Server

Operations

- [Query](#)
- [Explore](#)
- [SPARQL/Update](#)
- [Insert Data](#)
- [Export](#)
- [Indexes](#)
- [Admin](#)

Java Memory Usage (KB)

Type	Heap	Non-Heap
Used	247289	53552
Max	466048	133120

Graphs

[Default Graph](#)

<http://parliament.semwebcentral.org/parliament#MasterGraph>

SPARQL is defined by 3 documents:

- [SPARQL query language](#)
- [SPARQL protocol](#)
- [SPARQL XML results format](#)



FUTURE WORK

- A friendly UI for customized SPARQL queries
- Hierarchy and automatic reasoning
- Language and translation
- More process automation



SEMANTIC SEARCH VS. SYNTAX SEARCH

- **Syntax search:** exact syntax match between the query and the target documents (keyword search).
 - E.g., if you search “natural disaster”, then the results must contain the exactly same phrase “natural disaster”.
- **Semantic search:** match of the meaning between the query and the target documents.
 - E.g., “natural disaster” will be matched with “earthquake”, “hurricane”, and “wildfire” ...
 - “Waterbody” will be matched with “lake”, “river”, “stream”, ...





Semantic Search

This module provides semantic search based on the exported linked map data (currently 35,624 maps in total).

Search

Geo & thematic matching: 5 results

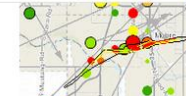


WV-2 MSI Analysis (Salt Lake, Utah) - Flooding Index Map
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Utah ShakeOut 2013 - Salt Lake City Segment 7.0 (Exercise)
FEMA Hazus Earthquake Analysis of Potential Earthquake Risk Resulted from a Salt Lake City Segment M 7.0

Thematic matching: 216 results



Moore, Oklahoma-Tornadoes 2013
US Historical Tornadoes



Occurrence of flood events in Europe 1998 - 2008
Occurrence of flood events in Europe 1998 - 2008

Geospatial matching: 29 results



Salt Lake City, Utah
Salt Lake City



WV-2 MSI Analysis (Salt Lake, Utah) - Enhanced False Color

Thank You!



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Please fill out the survey if you liked the session (#590)

Demo Theater

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