

SPARQL micro-services: Bridging Web APIs and the Web of Data

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Web APIs: APIs all over the web

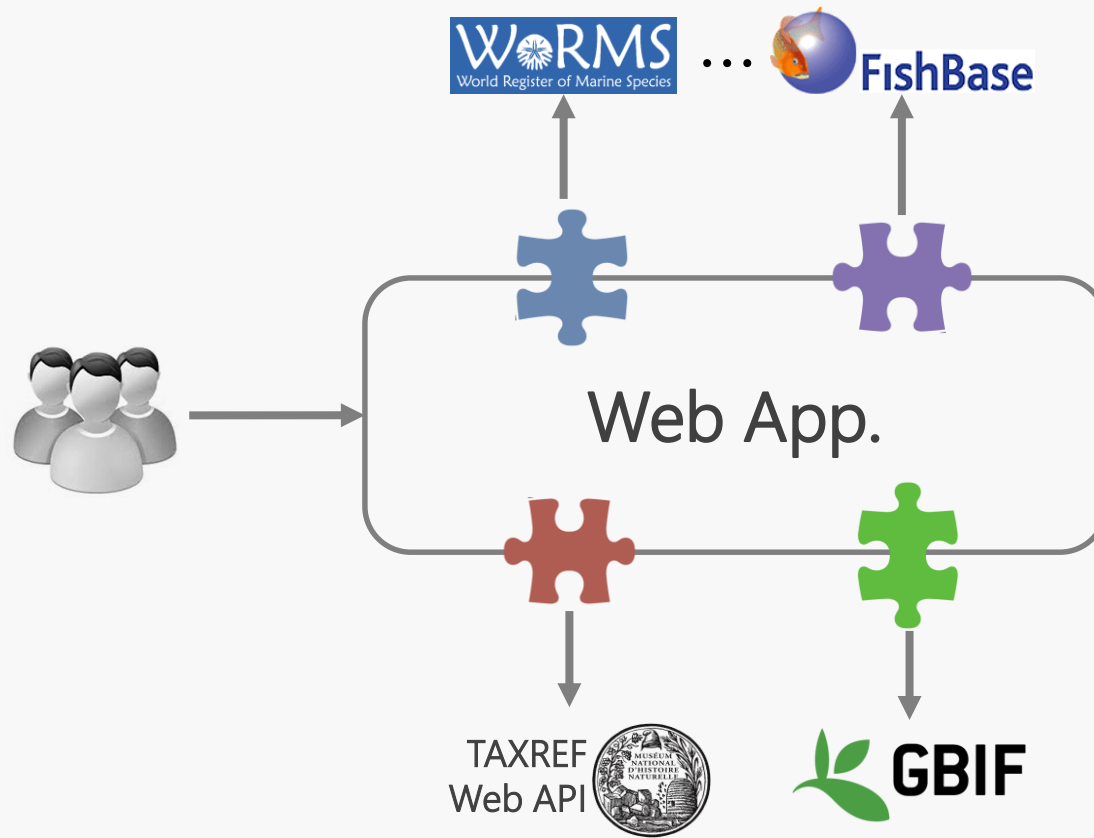
~24,000 Web APIs are registered on ProgrammableWeb.com (Jan. 2021)



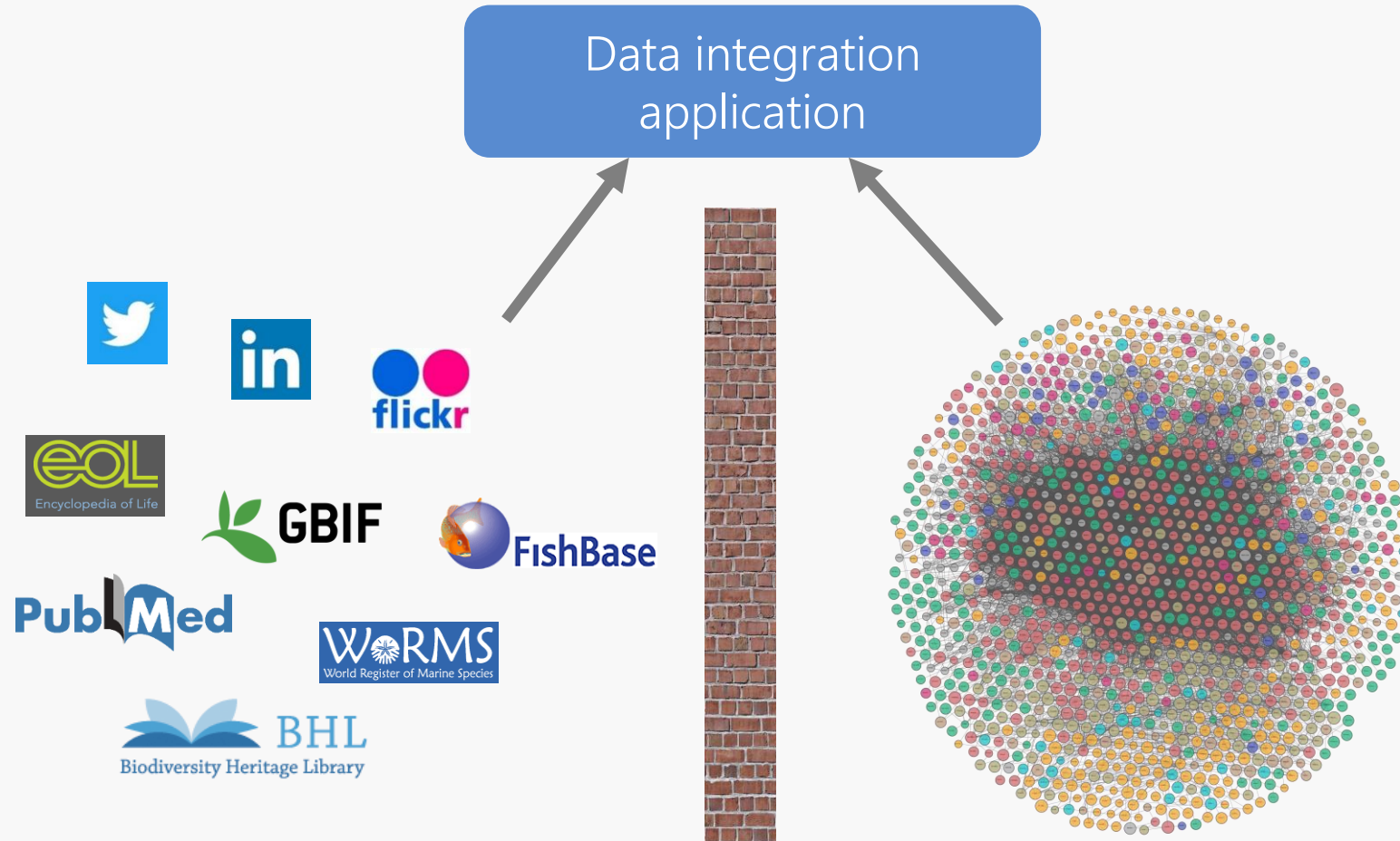
Limitations:

- **Documented** in web pages meant for developers, not machine-processable
- Standard formats (e.g. JSON, XML) but **proprietary vocabularies**
- **No explicit semantics**: manual alignment of pieces of data
- Internal resource identifiers, (often) no hyperlinks to resources
- Partial view over the database by means of predefined services

1. Cumbersome: write a specific connector for each Web API



2. How to leverage Web APIs and Linked Data at the same time?

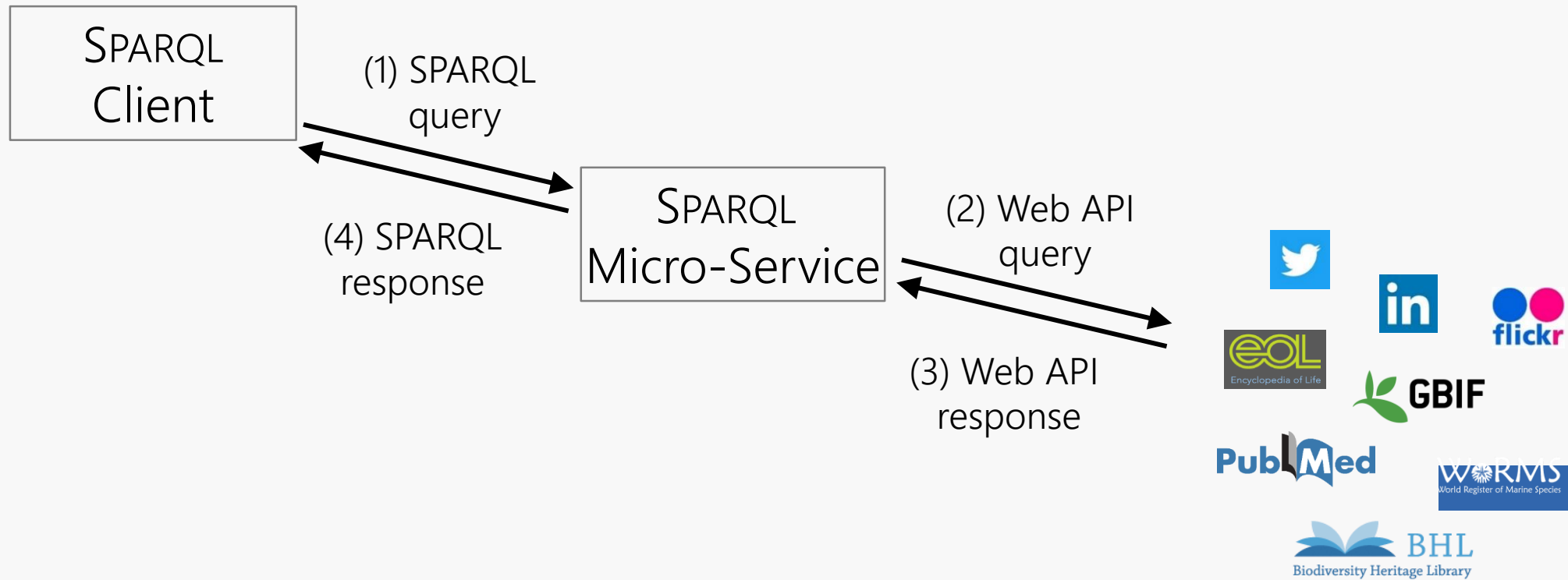


Can **Linked Data** and **Semantic Web**
techniques and practices solve these issues?

URIs, RDF, vocabularies, SPARQL

The SPARQL Micro-Service Architecture

Lightweight method to query a Web API with SPARQL



SPARQL Micro-Services

Lightweight method to query a Web API with SPARQL

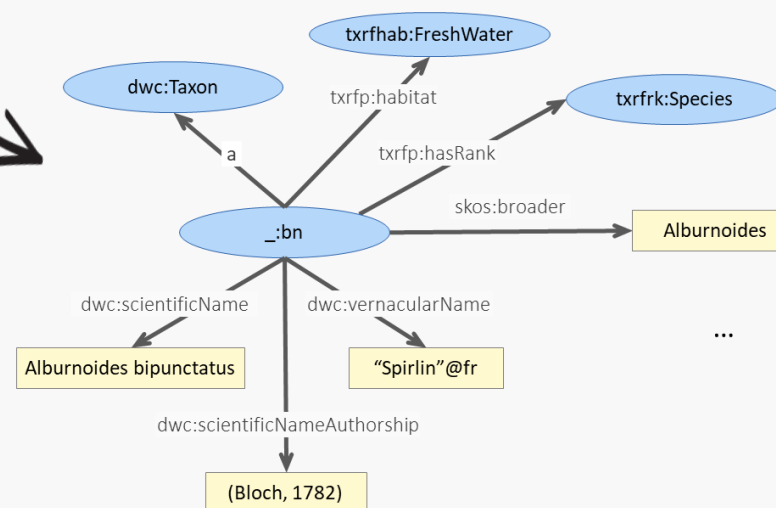
```
SELECT * WHERE {  
  ?taxon          a dwc:Taxon;  
  dwc:taxonId     "2360305";  
  dwc:scientificName ?name;  
  taxrefp:hasRank  ?rankUri;  
  skos:broader     ?parentTaxon;  
  ...  
}
```

SPARQL
μ-service

id=2360305



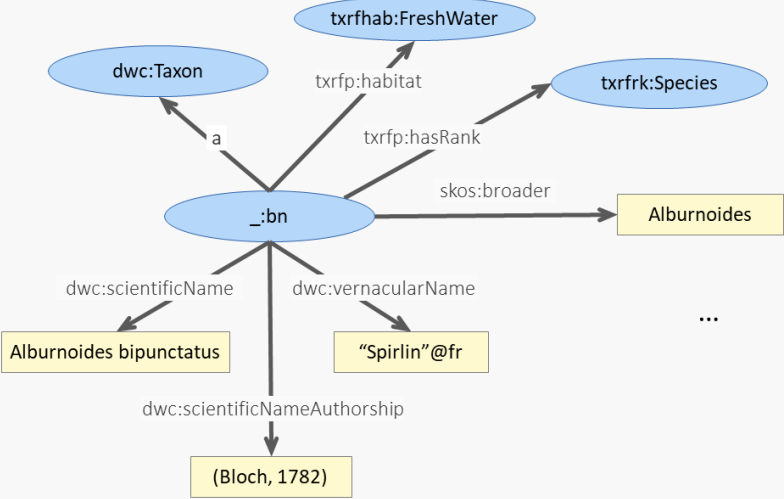
<http://example.org/ld/gbif/getTaxonById/>



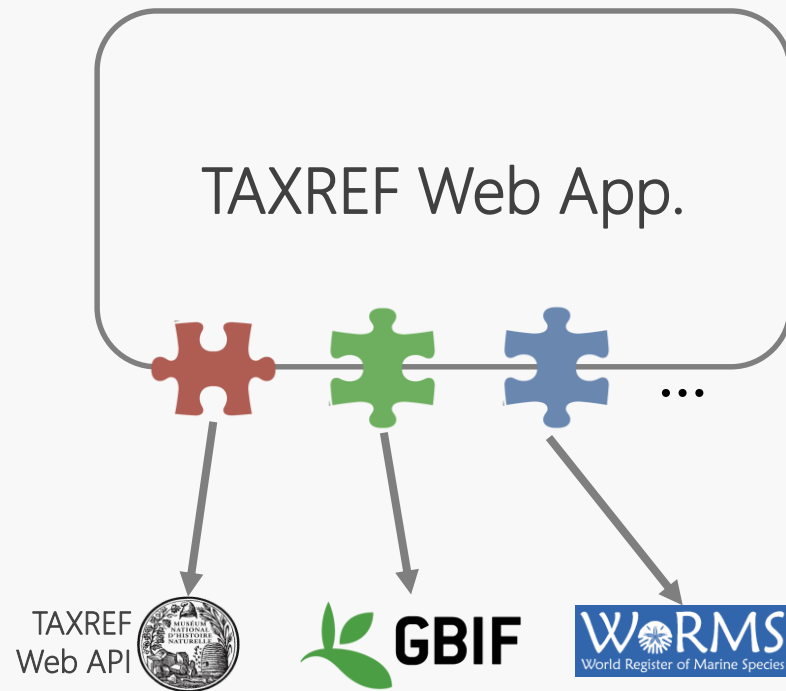
Use HTTP URIs
Reuse existing vocabularies
Link to other resources

A uniform model to accommodate multiple data sources

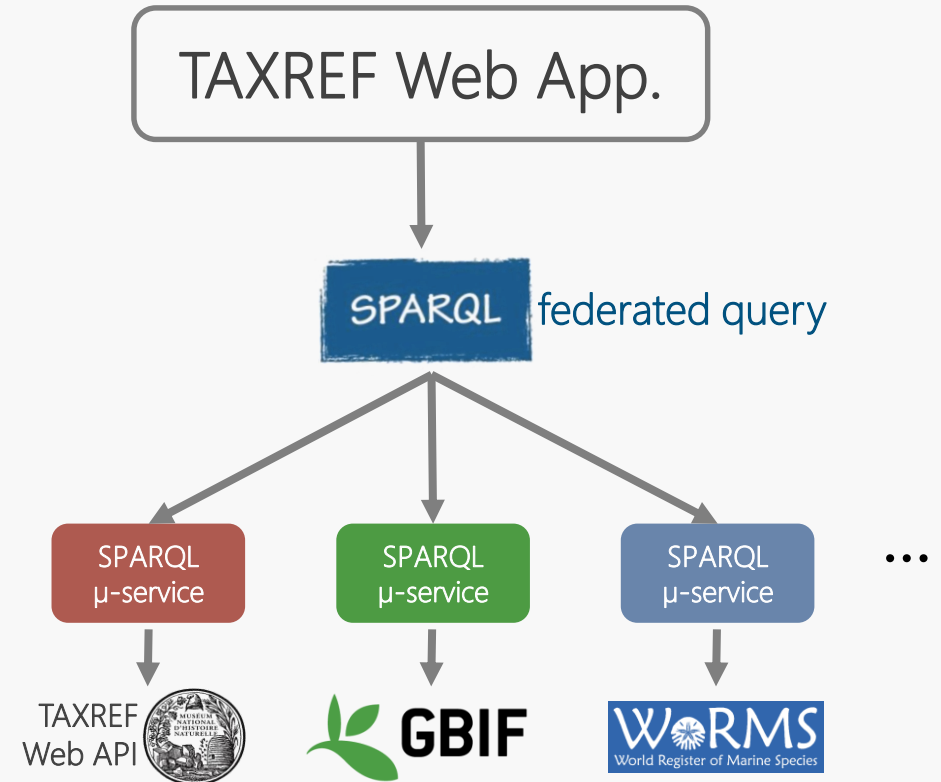
Data source	Scientific name and authorship	Taxonomic rank	Habitat	Parent taxon	Synonyms
TAXREF	✓	✓	✓	✓	✓
WoRMS	✓	✓	✓	✓	✓
GBIF	✓	✓		✓	✓
FishBase	✓	✓	✓		✓
Tropicos	✓	✓			✓
SANDRE	✓	✓		✓	
PESI	✓	✓			✓
IndexFungorum	✓	✓			



Data integration made easier



Alignment and comparison
hardcoded in the web app



Alignment done by SPARQL μ-services,
comparison carried out by the web app,
or SPARQL queries

Integration of Web APIs and Linked Data

