

Semantic web, RDF, Linked Data





Menu

- The web and the semantic web
- The RDF data model
- RDF standards and vocabularies
- RDF use cases and examples
- Linked Data

The semantic web

- The web
- Tim Berners-Lee 1989
- Components
 - URL (addressing)
 - HTTP (transport)
 - HTML (content)
- Identify what exists on the web
- For humans
- The semantic web
- Tim Berners-Lee 2001
- Components
 - URI (identification)
 - HTTP (transport)
 - **RDF** (content)
- Identify on the web what exists
- For machines



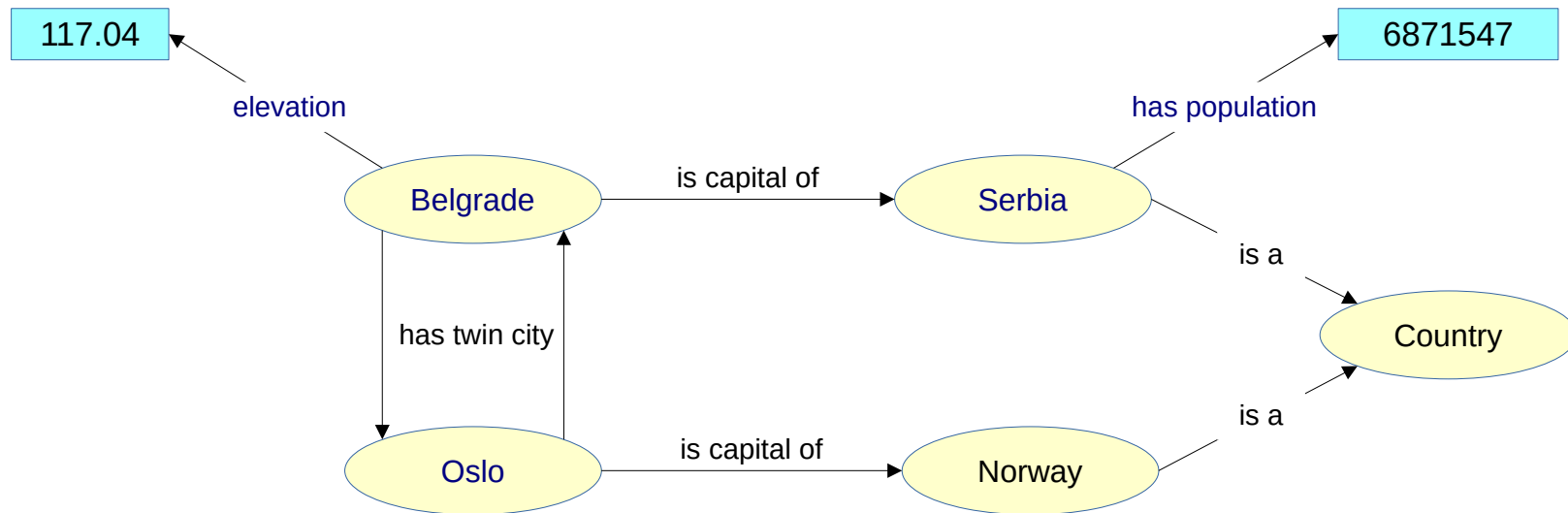
RDF

Resource Description Framework

- A very simple information model
- Statements (« triples ») about resources:
(subject) – (predicate) – (object)
 - Belgrade is capital of Serbia
 - Belgrade has twin city Oslo
 - Serbia has population 6871547
- The subject is a URI (identifying a resource)
- The predicate is a URI
- The object is a URI or a literal (a value with a type)

RDF Model

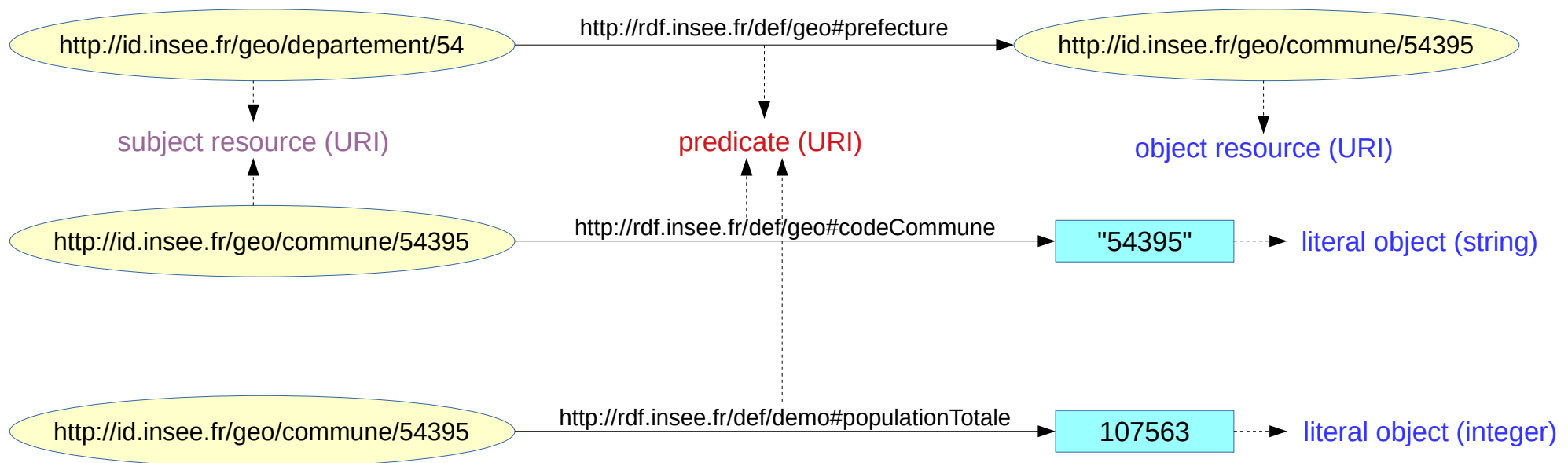
- A very simple **graph** information model



- Think « Knowledge Graphs »

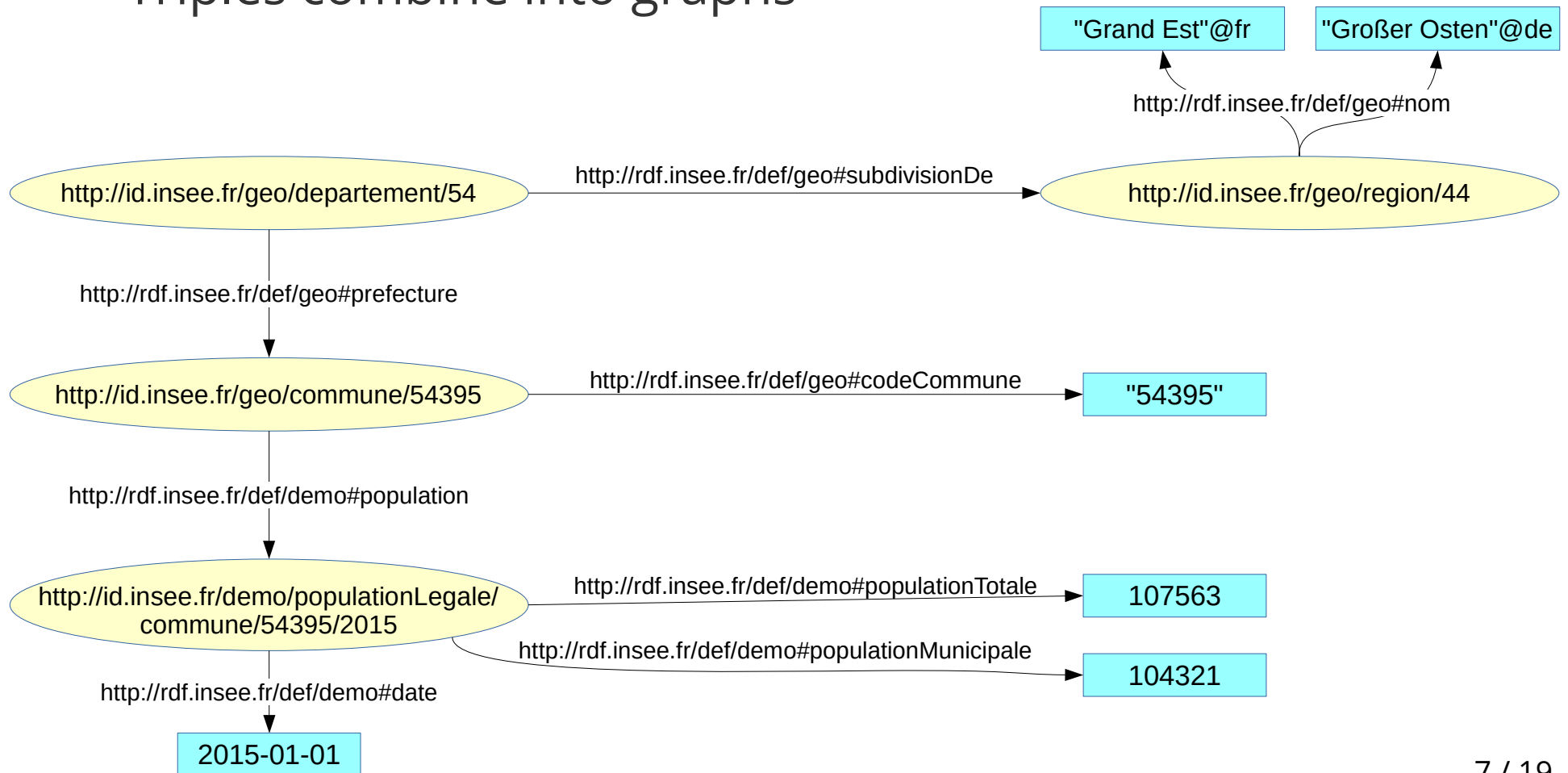
RDF Triples

- Example triples from Insee's RDF triple store



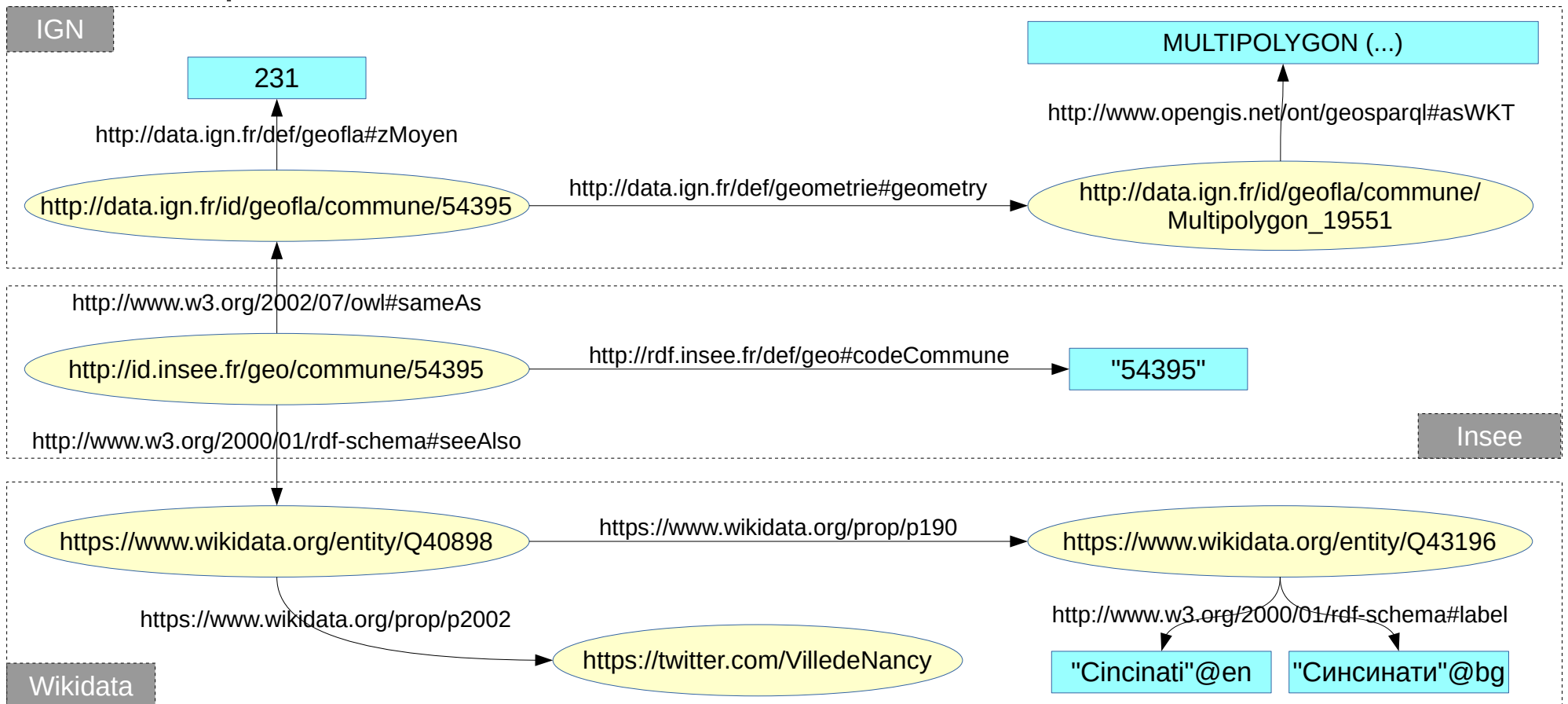
RDF Graphs

- Triples combine into graphs

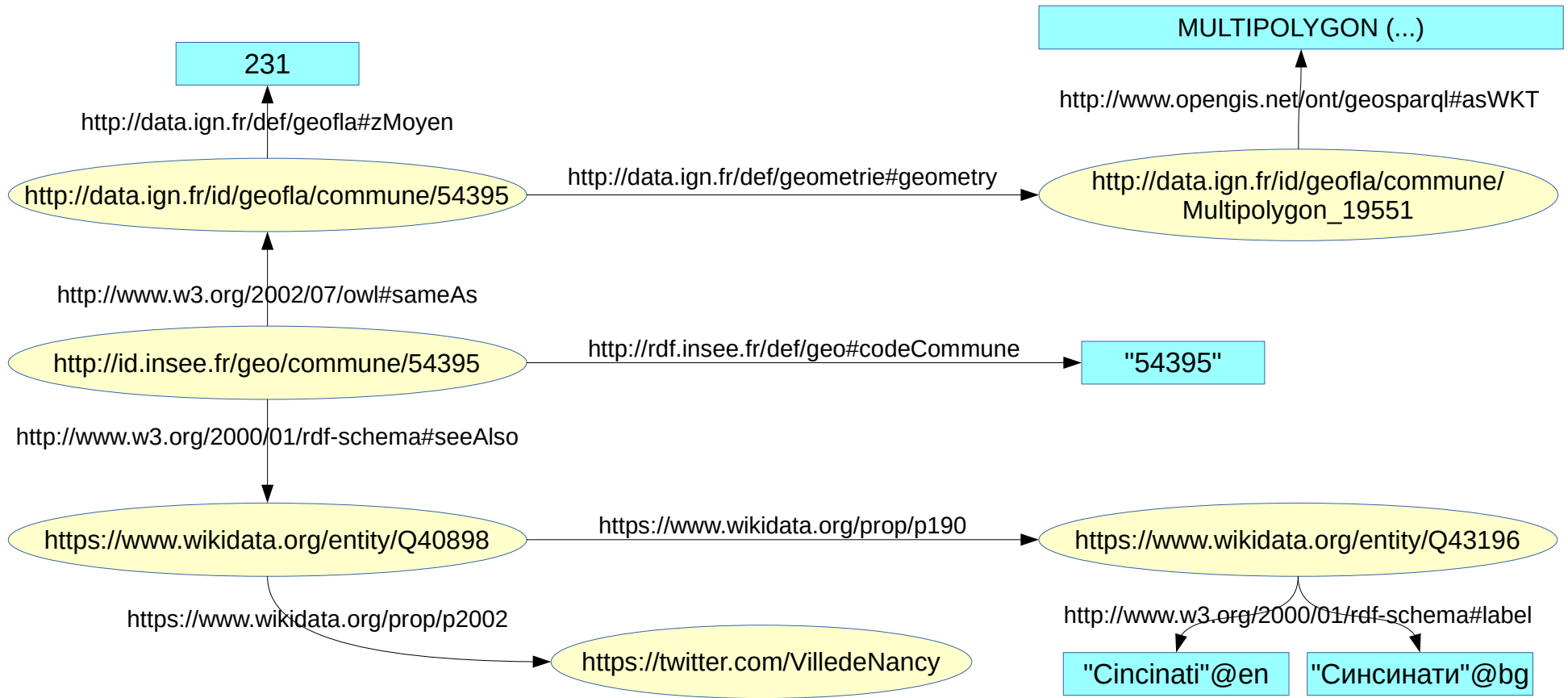


RDF Graphs

- Graphs connect to each other

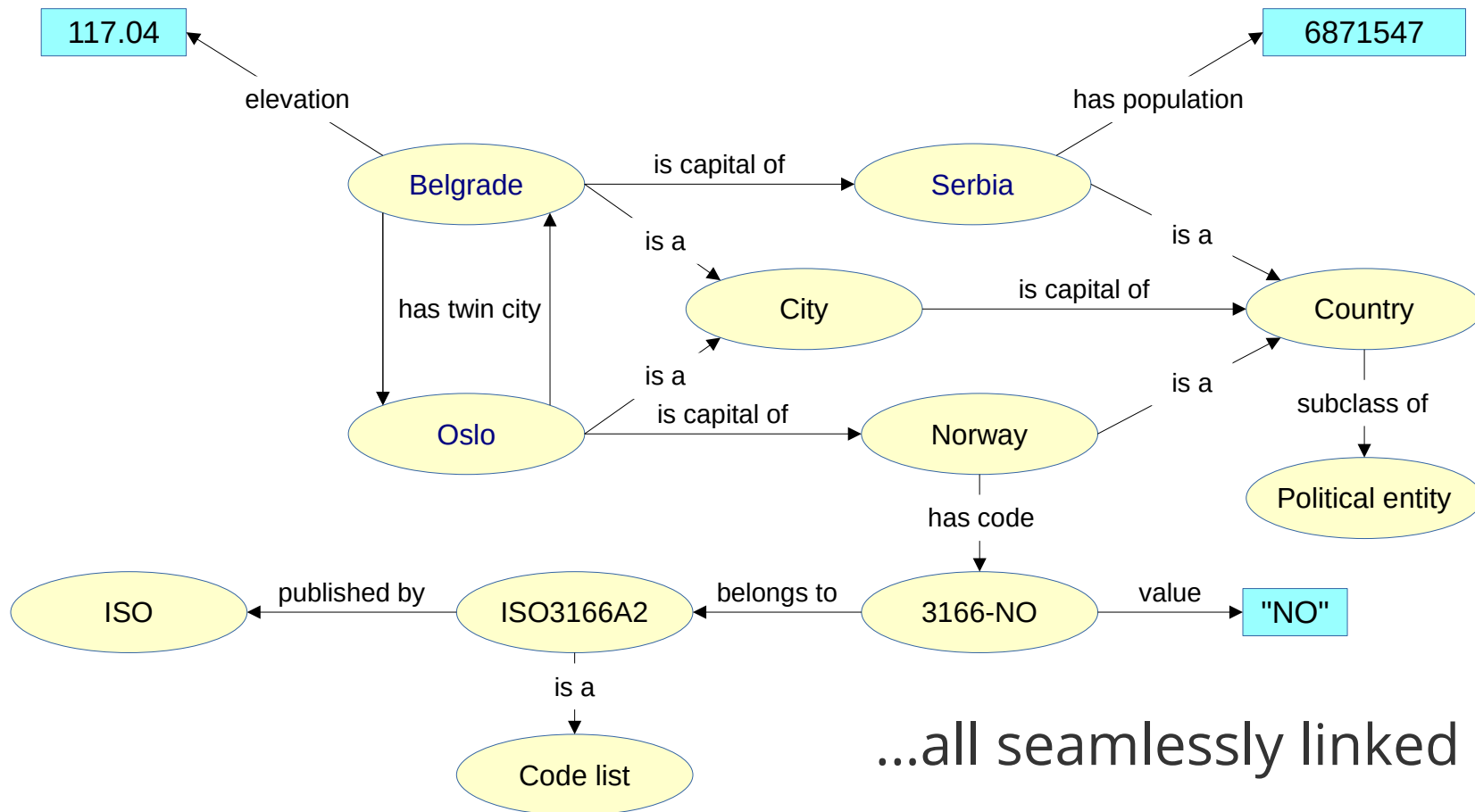


RDF Graphs

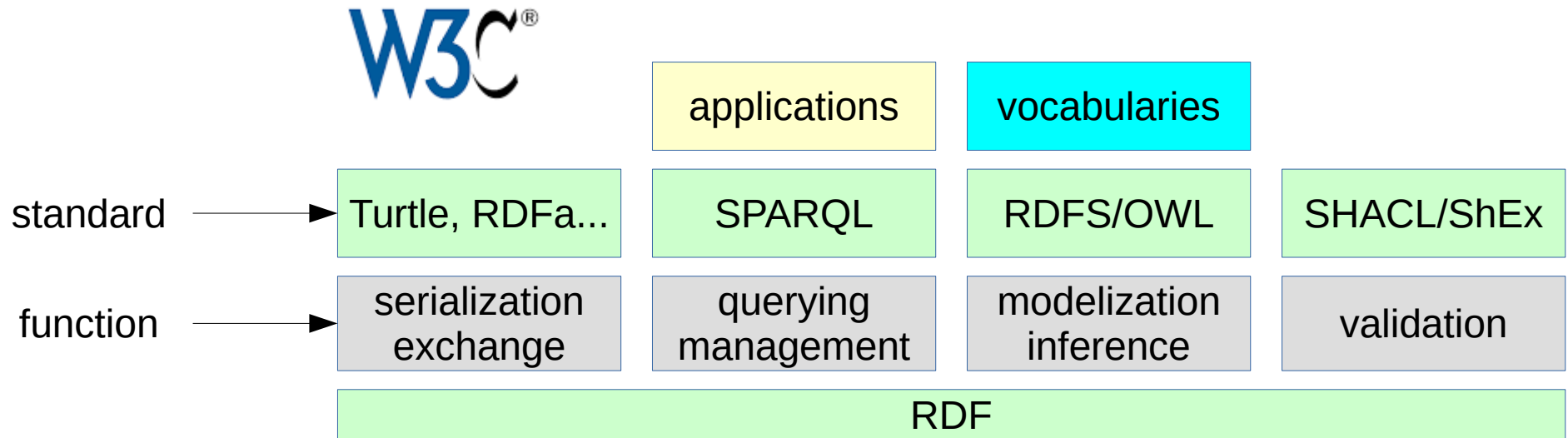


RDF Model

- Can represent data, metadata, models...



RDF Standards



- Inference: RDF/RDFS/OWL are grounded on formal logic
- Distinction modelization/validation: the open-world assumption

RDF and the Semantic Web

- Features
 - Universal data model (simple, adaptable)
 - Absolute identification (univocal, reusable)
 - Natively multilingual
 - Compositional
 - Solid logical foundation (coherence, inference)
 - Machine-actionable
 - Open-world friendly
- ⇒ Built for the web



RDF Use cases

- Knowledge representation
 - Terminologies, thesaurii
 - Metadata representation (and link to data)
- Data integration
 - Harmonization of terminologies
 - Model integration
- Semantic annotations
 - More than 40% of web pages (RDFa, microdata, schema.org)

RDF Examples

→ See also <https://lod-cloud.net/>

- Libraries, cultural data
 - Librairie du Congrès, BnF, Europeana
- Thesaurii, knowledge graphs
 - Eurovoc, Agrovoc, GEMET
 - DBPedia / Wikidata
 - Wordnet, Yago, Google Knowledge Graph
- Biology
 - BioPortal, Bio2RDF
- Geography
 - Geonames, Ordnance Survey, Ordnance Survey Ireland



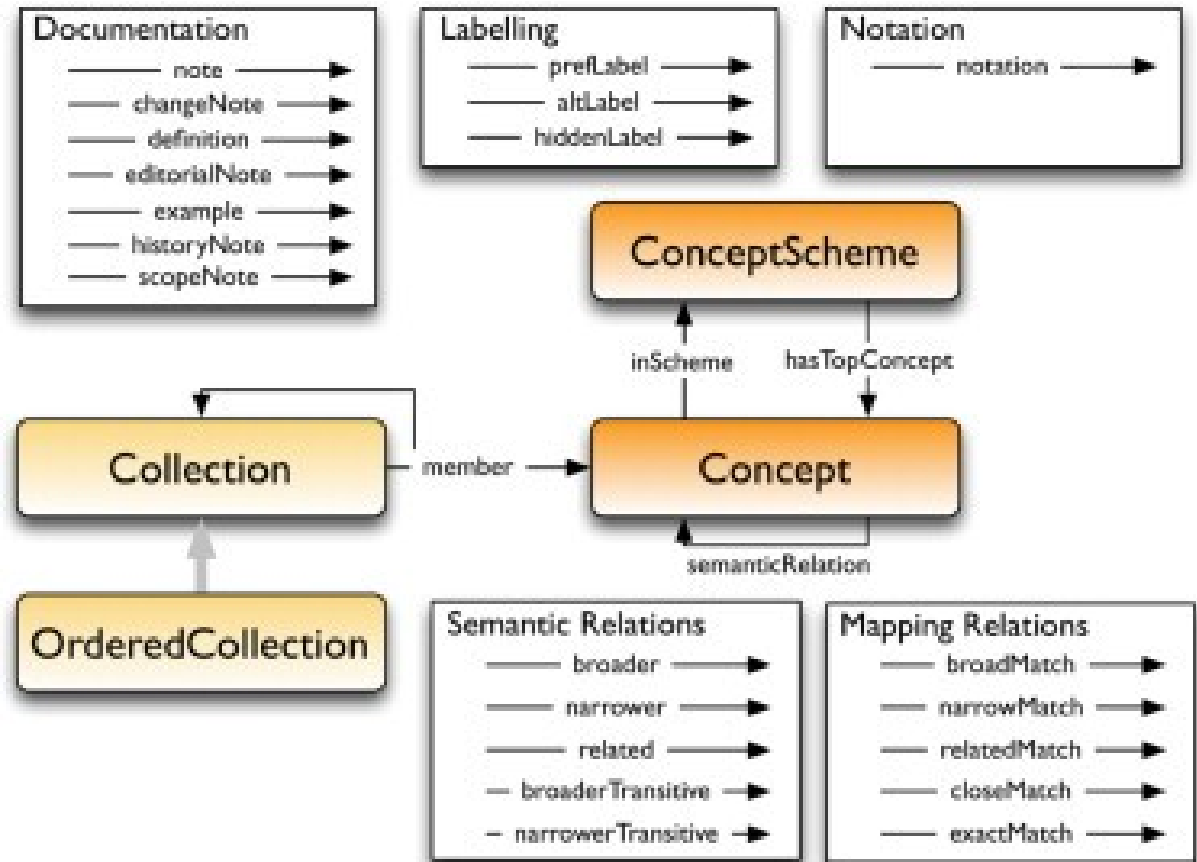
RDF Vocabularies

→ Voir aussi <https://lov.linkeddata.es/dataset/lov>

- Dublin Core: basic metadata
- Schema.org: extended terminology for microdata
- Annotation ontology
- FOAF (social relations), ORG (organizations), SSN (sensors)
- SKOS / XKOS
- PROV-O
- Data Cube

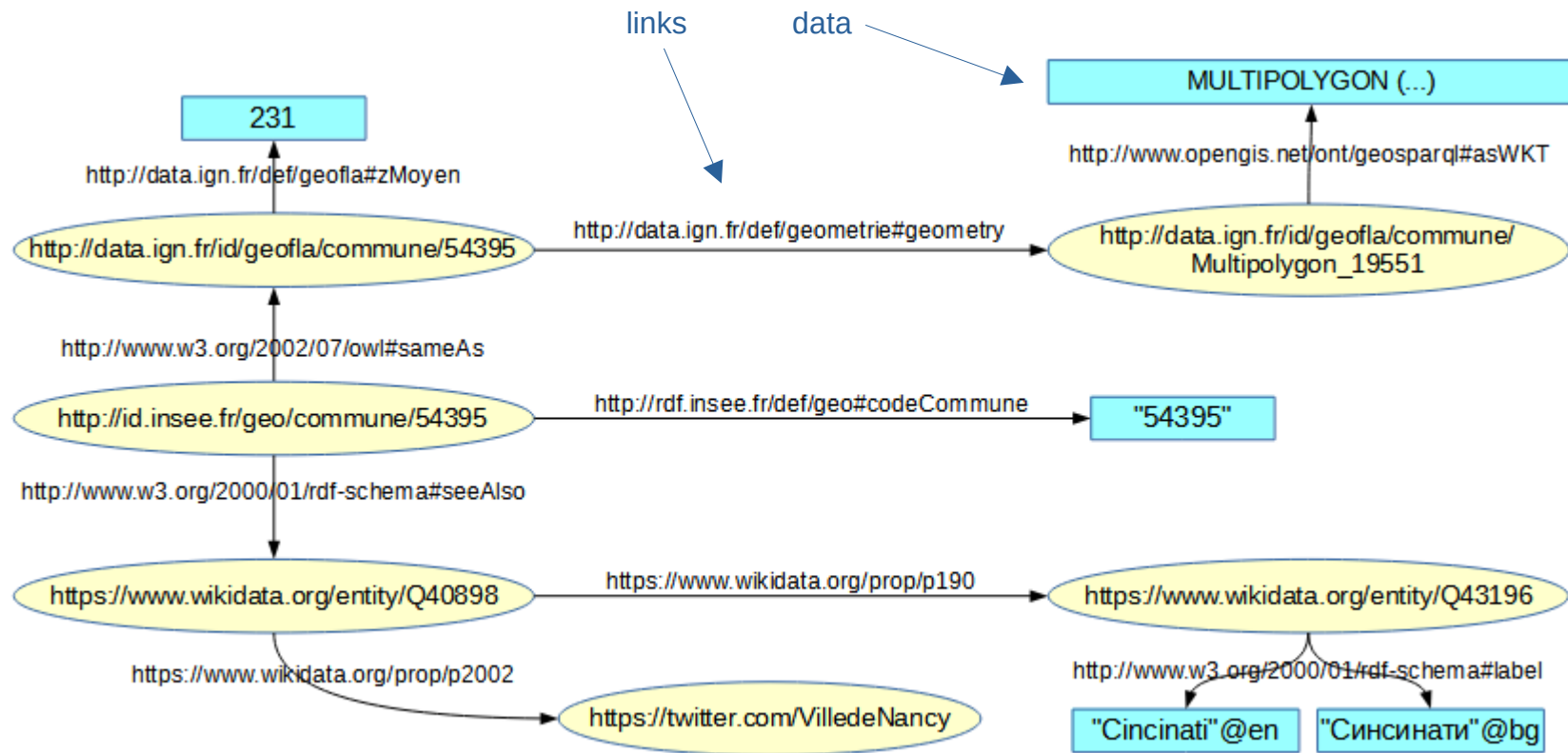
SKOS Model

- SKOS
 - Thesaurii
 - Taxonomies
 - Codes
- XKOS
 - Classifications



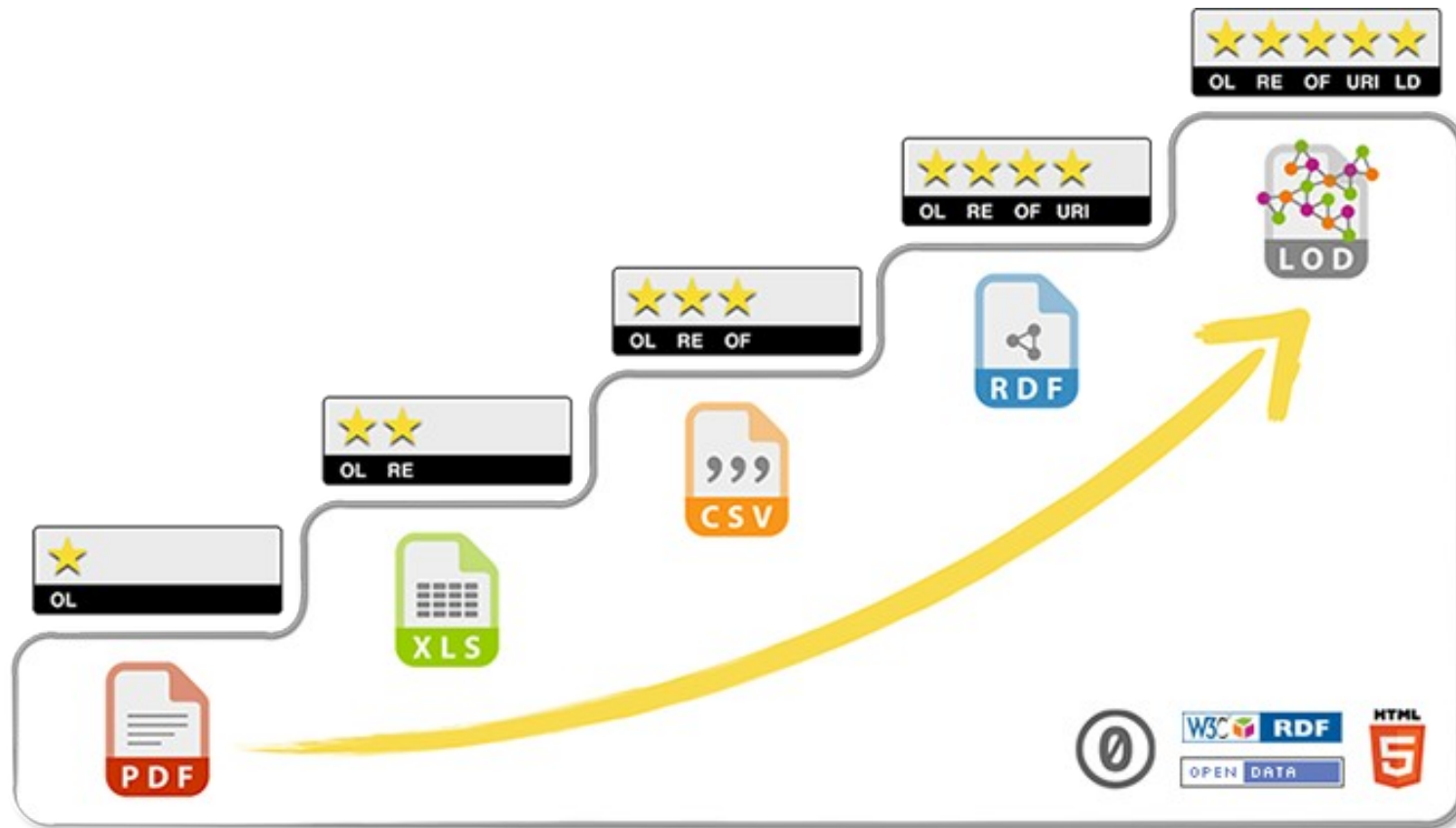
RDF for Linked Data

- Basically RDF data published on the web



RDF for Linked Data

- The 5-star scheme





Thank you for your attention