RDF2Map Library

Luis Daniel Fernandes Rotger
Ana Cristina Trillos Ujueta
Jaime Manuel Trillos Ujueta

Bonn University - 27.09.2017

Problem

There is a lack in libraries for processing and displaying RDF geospatial concepts in a map.

Relevance and Importance

- There is a growing amount of spatial RDF data available (LinkedGeoData, DBPedia, GNIS).
- Lack of JS libraries which support it out of the box.

- Goal: Lowering the bar for Web Developers and GIS experts to engage with that RDF data.

Challenges

- Changes of requirements:
  - understanding the new requirements,
  - lack of communication.

- Requesting information remotely in an efficient and effective way.

Proposed Solution

We developed a JavaScript library for processing geospatial concepts, from a Turtle file, and displaying them in a map, named RDF2Map.

RDF2Map works with two open-source JavaScript libraries,

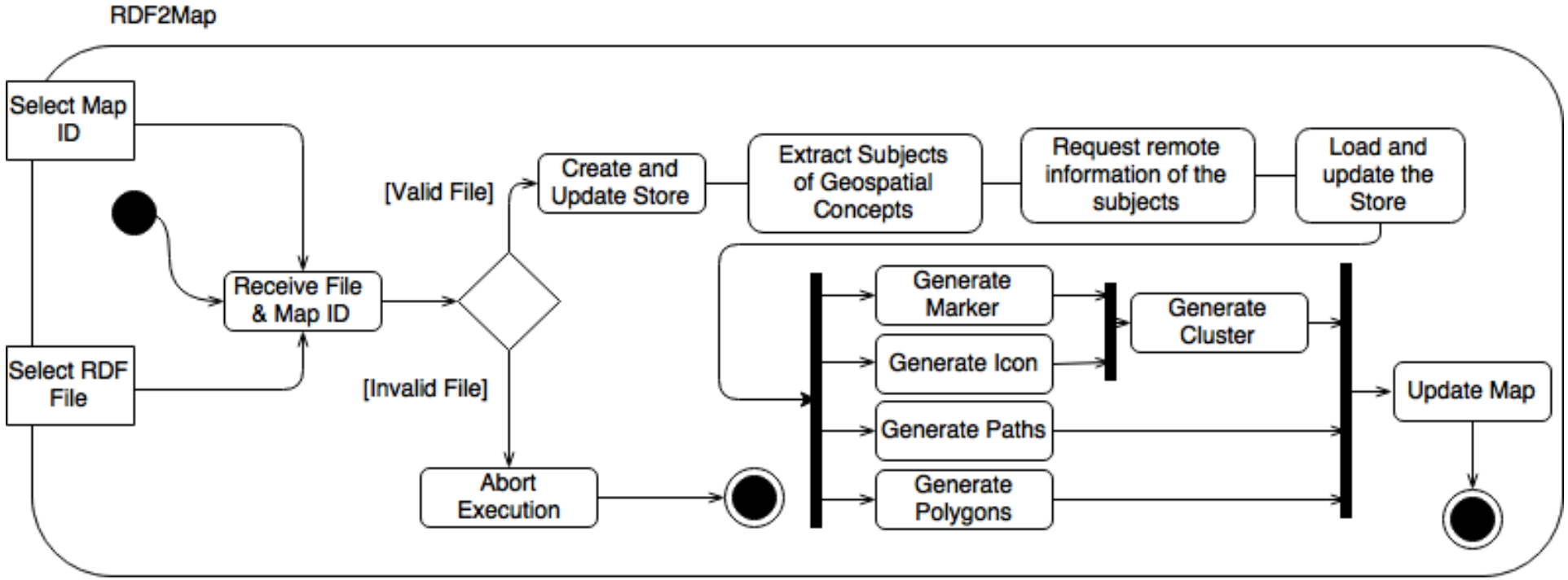
- Leaflet for interactive maps and
- RDFStore for processing information.

Proposed Solution

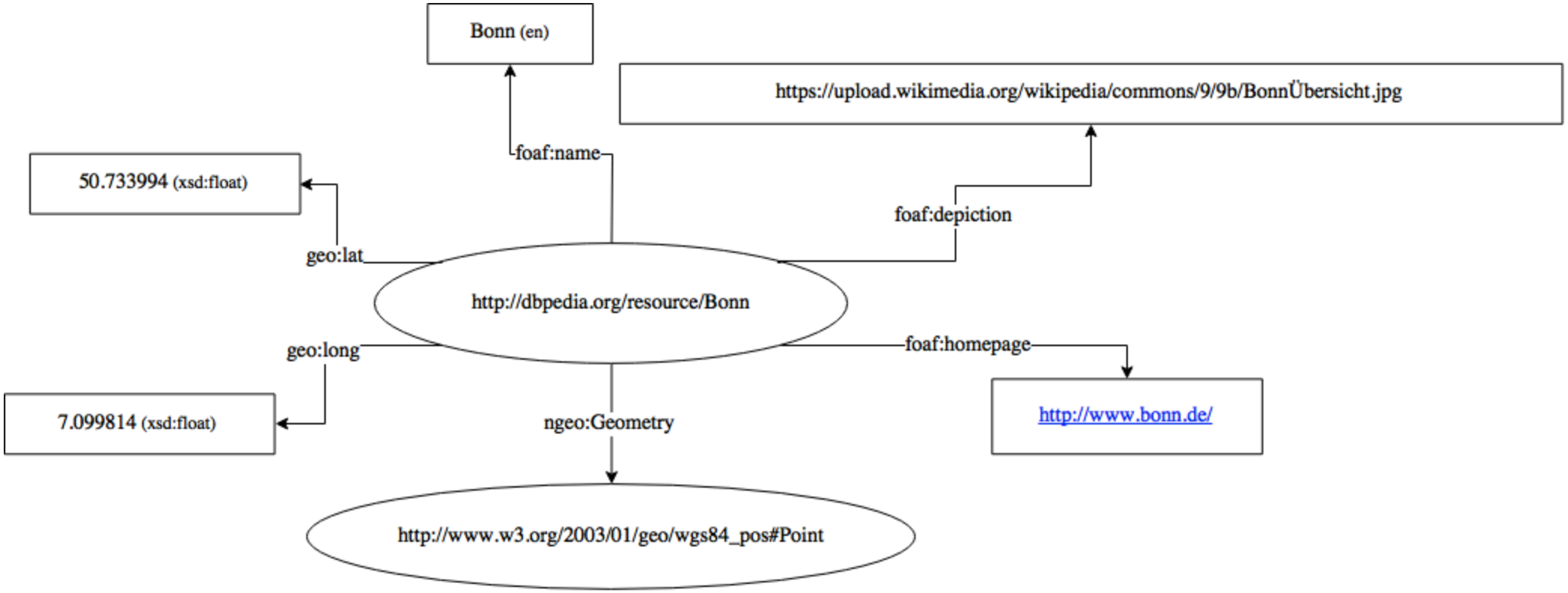
One of the main features of RDF2Map is the capability to extract remote information from the DBPedia SPARQL Endpoint and then display them in the map.
These information can be represented as:

- markers,
- icons,
- polylines and
- Polygons.

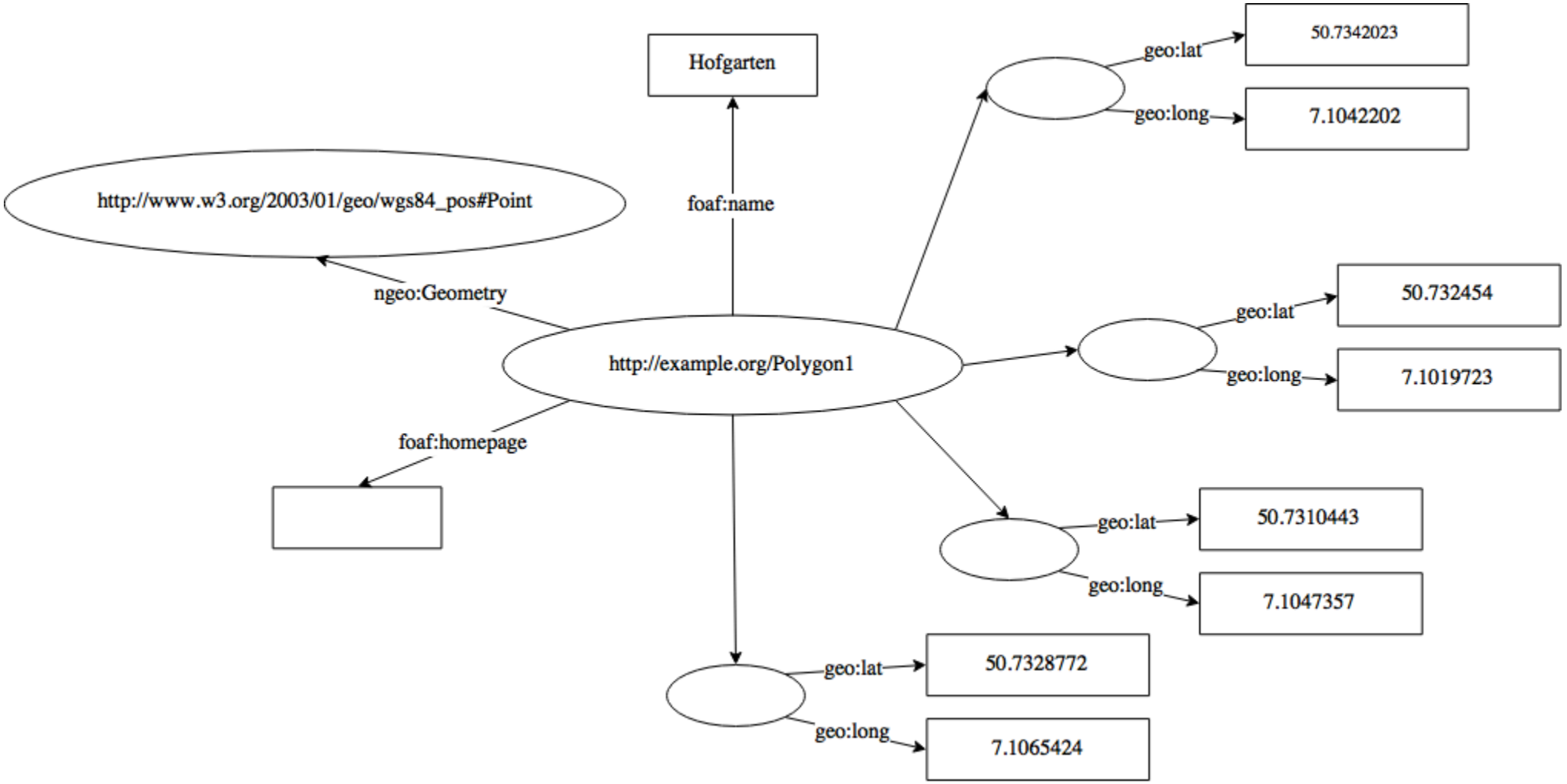
Implementation - Activity Diagram



Implementation - Data Model



Implementation - Data Model (2)



Use Case 1:

- A company (e.g. Rewe) desires to inform its users the location of their stores on their Web page, but this information is not published on the Web.
- The developer creates a RDF file, with the geospatial information for each store, as shown below.

Use Case 1:

```
@prefix ns0:    <http://geovocab.org/geometry#> .
@prefix ns1:    <http://linkedgeodata.org/triplify/> .
@prefix ns2:    <http://linkedgeodata.org/ontology/> .
@prefix foaf:   <http://xmlns.com/foaf/0.1/> .
@prefix xsd:    <http://www.w3.org/2001/XMLSchema#> .
@prefix geo:    <http://www.w3.org/2003/01/geo/wgs84_pos#> .
ns1:node1329330946      ns0:Geometry    ns2:Icon ;
foaf:homepage   "https://www.rewe.de/" ;
foaf:depiction  "https://i.imgur.com/yH6LWPn.png" ;
geo:lat 53.1333271000000002474 ;
geo:long        8.19049600000000013309 ;
foaf:name       "REWE" .
ns1:node2545718183      ns0:Geometry    ns2:Icon ;
foaf:homepage   "https://www.rewe.de/" ;
foaf:depiction  "https://i.imgur.com/yH6LWPn.png" ;
geo:lat 48.11693530000000001519 ;
geo:long        11.52566850000000000094 ;
foaf:name       "REWE" .
ns1:node1574280669      ns0:Geometry    ns2:Icon ;
foaf:homepage   "https://www.rewe.de/" ;
```

Use Case 1:


Hannover
Braunschweig
Magdeburg
Göttingen
Deutschland
Köln
Bonn
Frankfurt am Main
A 31
A 3
A 4
A 9
REWE
3
5
9
Leaflet | Map data © OpenStreetMap contri

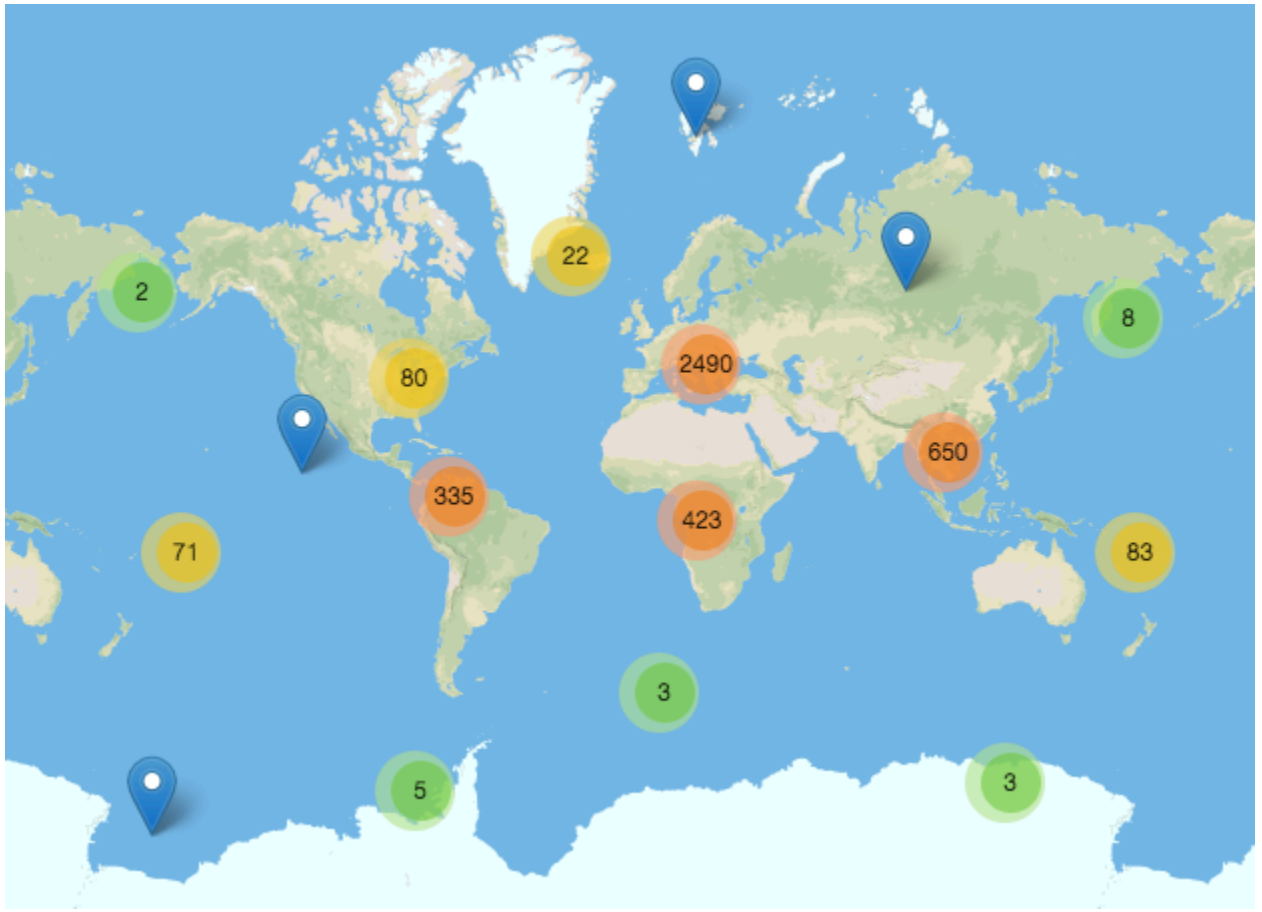
Use Case 2:

- An institute wants to teach their students with an interactive map, all the countries that exist and have existed.
- So, a developer creates an RDF file, with the URIs of all the countries from the DBPedia Endpoint, as shown below.

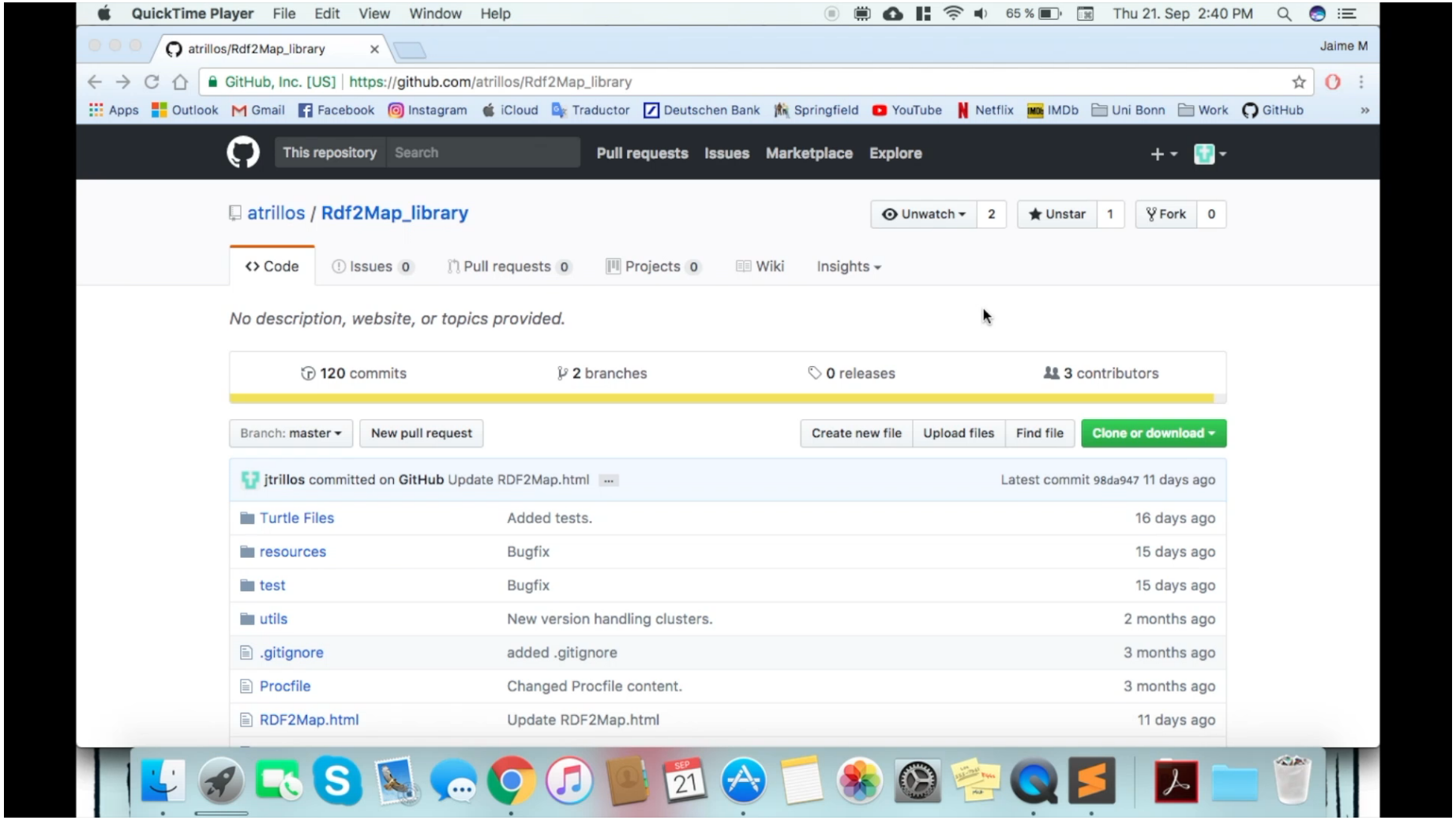
Use Case 2:

```
@prefix ns0:    <http://geovocab.org/geometry#> .
@prefix dbr:    <http://dbpedia.org/resource/> .
@prefix geo:    <http://www.w3.org/2003/01/geo/wgs84_pos#> .
@prefix foaf: <http://xmlns.com/foaf/0.1/>.
dbr:Abbasid_Caliphate   ns0:Geometry    geo:Point .
dbr:Almohad_Caliphate   ns0:Geometry    geo:Point .
dbr:Arab_League ns0:Geometry    geo:Point .
dbr:Cape_Colony ns0:Geometry    geo:Point .
dbr:Central_Tibetan_Administration      ns0:Geometry    geo:
    Point .
dbr:Dacia       ns0:Geometry    geo:Point .
dbr:Democratic_Republic_of_Afghanistan  ns0:Geometry    geo:
    Point .
```

Use Case 2:



Demonstration



Lessons Learned

The implementation using RDF2Map in the developer project is simple.

The performance of the library takes some time (milliseconds) to process files containing more than 1000 geospatial concepts.

However, RDF2Map ensures that all the concepts which are in the Turtle file has been inserted in the map.

Conclusions and Future Work

- RDF2Map library is probably one of the first attempt to offer a library for displaying geospatial concepts on a map.

- It offers features like,
  - the ability to extract data remotely from the Web,
  - or extract data locally from a Turtle file and showing the results in a map.

- RDF2Map permits adding geo-points represented as markers, icons, polygons and or lines (paths).

Conclusions and Future Work

In the future, we plan:

- to extend the library to include multiple SPARQL endpoints,
- to accept other RDF serializations formats (e.g. N3, RDFa, NQuads, etc.),
- to make it more flexible: through the API, the developer can choose which information about the geospatial concepts wants to obtain and display.

Thank you.
Any question?