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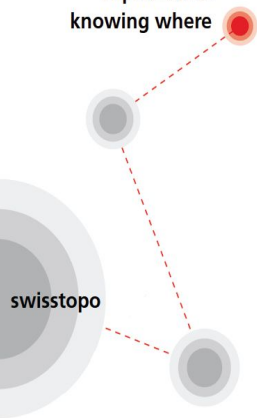
Bundesamt für Landestopografie swisstopo
Koordination, Geo-Information und Services KOGIS

Linked GeoData: the experience so far and next challenges

Linked Data Switzerland Workshop, 19.09.2018 Bern

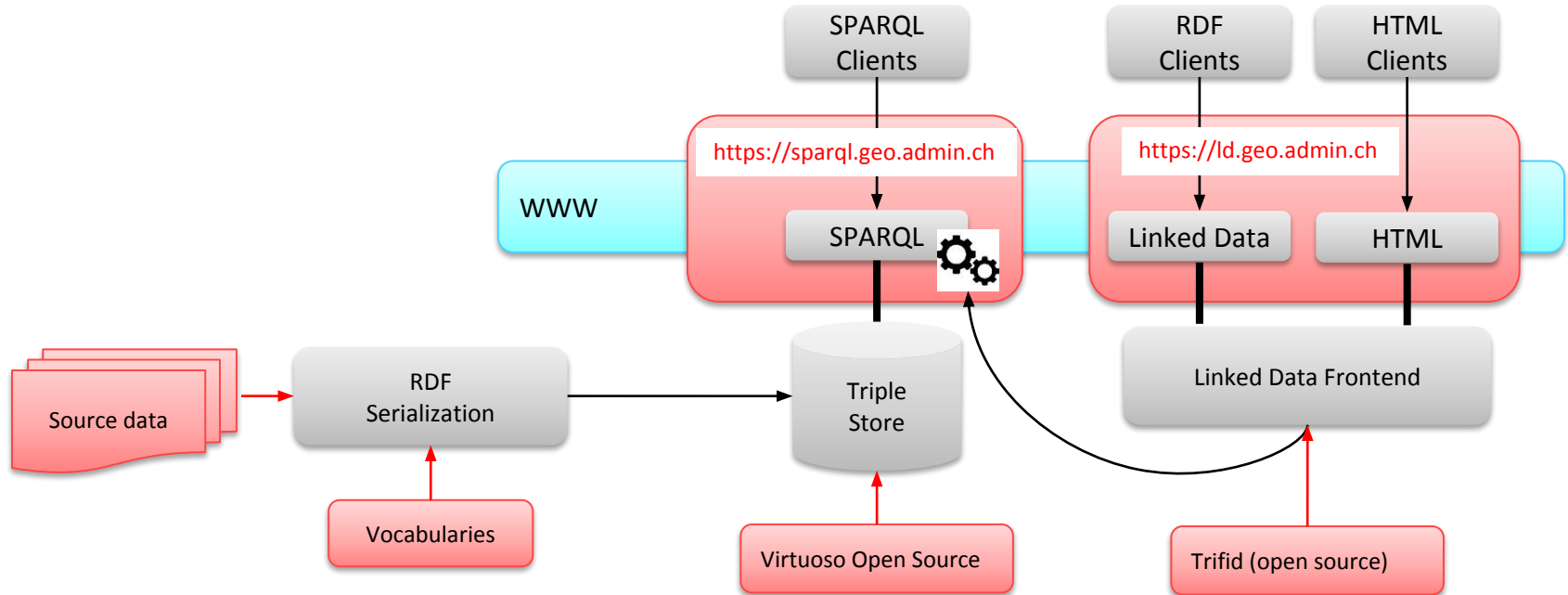
Pasquale Di Donato, swisstopo/KOGIS

wissen wohin
savoir où
sapere dove
knowing where





Linked Data Service



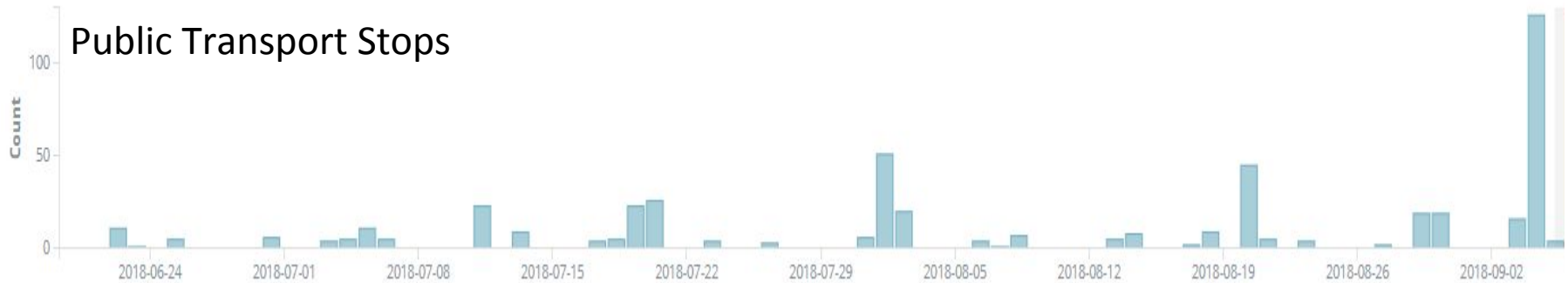
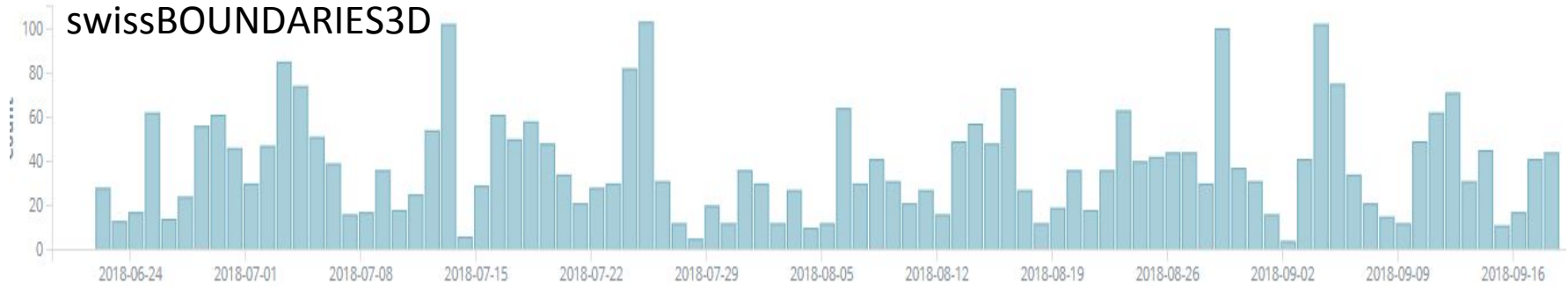


The data so far

- swissBOUNDARIES3D (2016, 2017, 2018) - swisstopo
 - National boundaries
 - Cantons
 - Districts
 - Municipalities
- Public Transport Stops – Federal Office of Transport



The stats so far





GeoSPARQL

- What the GI domain brings to Linked Data
 - GeoSPARQL is not just an encoding of geodata in RDF
 - It provides extensions to the SPARQL language enabling to query resources based on their spatial relations
 - But ...

The screenshot shows a web-based GeoSPARQL query interface. At the top, there are tabs for 'POINTInPOLYGON', '@POINT', and '+'. Below the tabs is a URL bar containing 'http://localhost:8089/parliament/sparql'. The main area displays a SPARQL query:

```
1 PREFIX geo: <http://www.opengis.net/ont/geosparql#>
2 PREFIX geof: <http://www.opengis.net/def/function/geosparql/>
3
4 SELECT ?CantonCoords ?Coords
5 WHERE {
6   ?Stop a <http://schema.org/BusStation> .
7   ?Stop geo:hasGeometry ?StopGeom .
8   ?StopGeom geof:asWKT ?Coords .
9   <https://ld.geo.admin.ch/boundaries/canton/geometry/2> geo:asWKT ?CantonCoords .
10  FILTER (geof:sfWithin(?Coords, ?CantonCoords))
11 }
```

Below the query is a toolbar with options: Table, Response, Pivot Table, Google Chart, and Geo (selected). A tip below the toolbar reads: 'Tip: Add a label variable prefixed with the geo variable name to show popups on the map. E.g. `?CantonCoords?label=1`. Or, append `?color=` to change the color.' The map below shows Switzerland with several blue location pins indicating bus stations. The map includes labels for various Swiss cantons and regions like 'Schweiz', 'Suisse', 'Svizzera', 'Svizra', 'Graubünden', 'Grigioni', 'Grischun', 'Parchi Nazionale dello Stelvio', 'Vaduz', 'Glarus', 'Schwyz', 'Sankt Gallen', 'Vorarlberg', 'Appenzel', 'Winterthur', 'Zürich', 'Neuchâtel', 'Fribourg', 'Vaud', 'Valais', and 'Genève'.



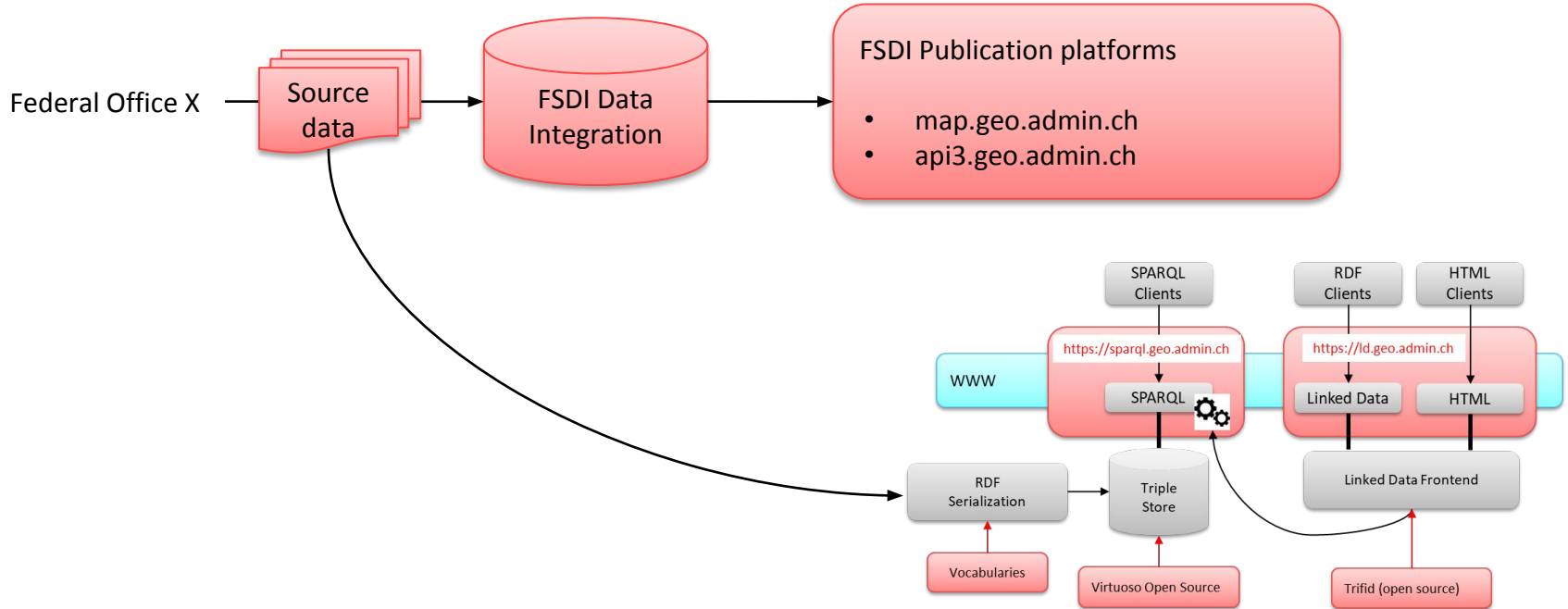
GeoSPARQL support

- GeoSPARQL support is very limited both in open source and commercial solutions
- Benchmark-Test:
 - Good support:
 - Parliament Triple Store, but old technology and not adequate for production environments
 - GraphDB, commercial
 - Virtuoso Open Source: built-in spatial functions (not the ones defined in GeoSPARQL). No valuable open source alternatives. Virtuoso will improve GeoSPARQL support (according to this tweet)



Issues with the current set up

Data redundancy / synchronization





Issues with the current set up

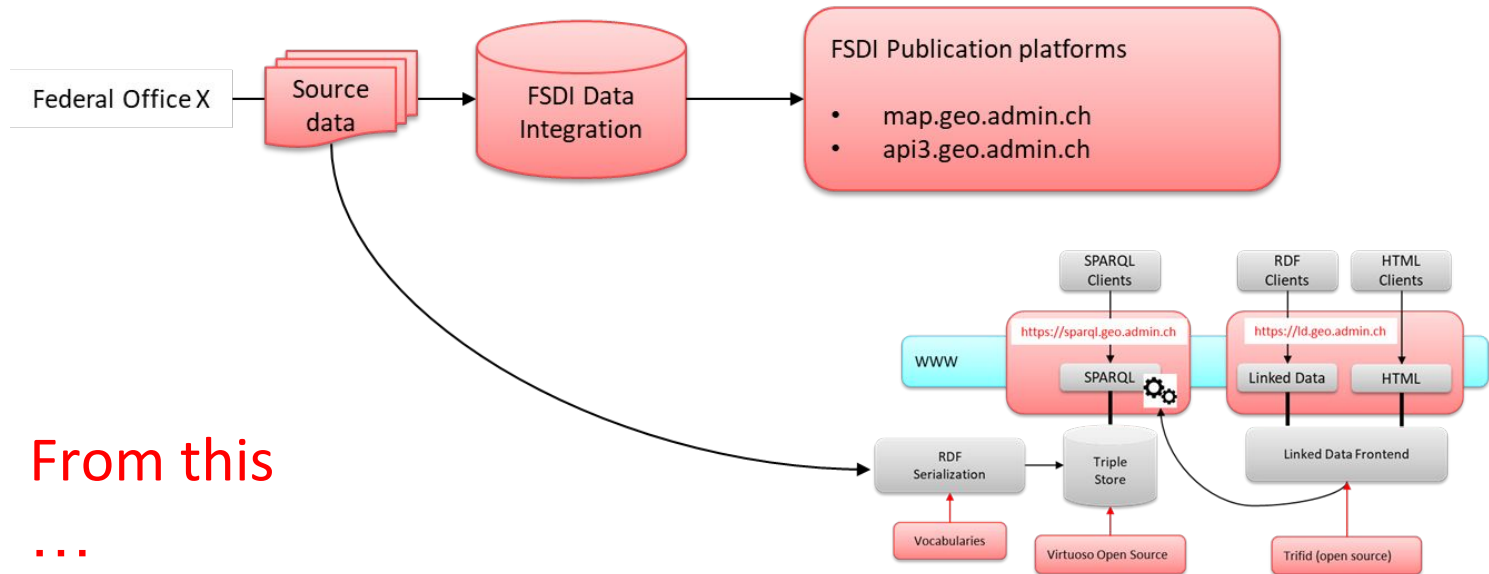
Burden with massive highly dynamic data

- Data update process in FSDI is a “full-update” (delete all / insert new)
- The current set up is not adequate to manage this process in case of massive data with a high update-frequency



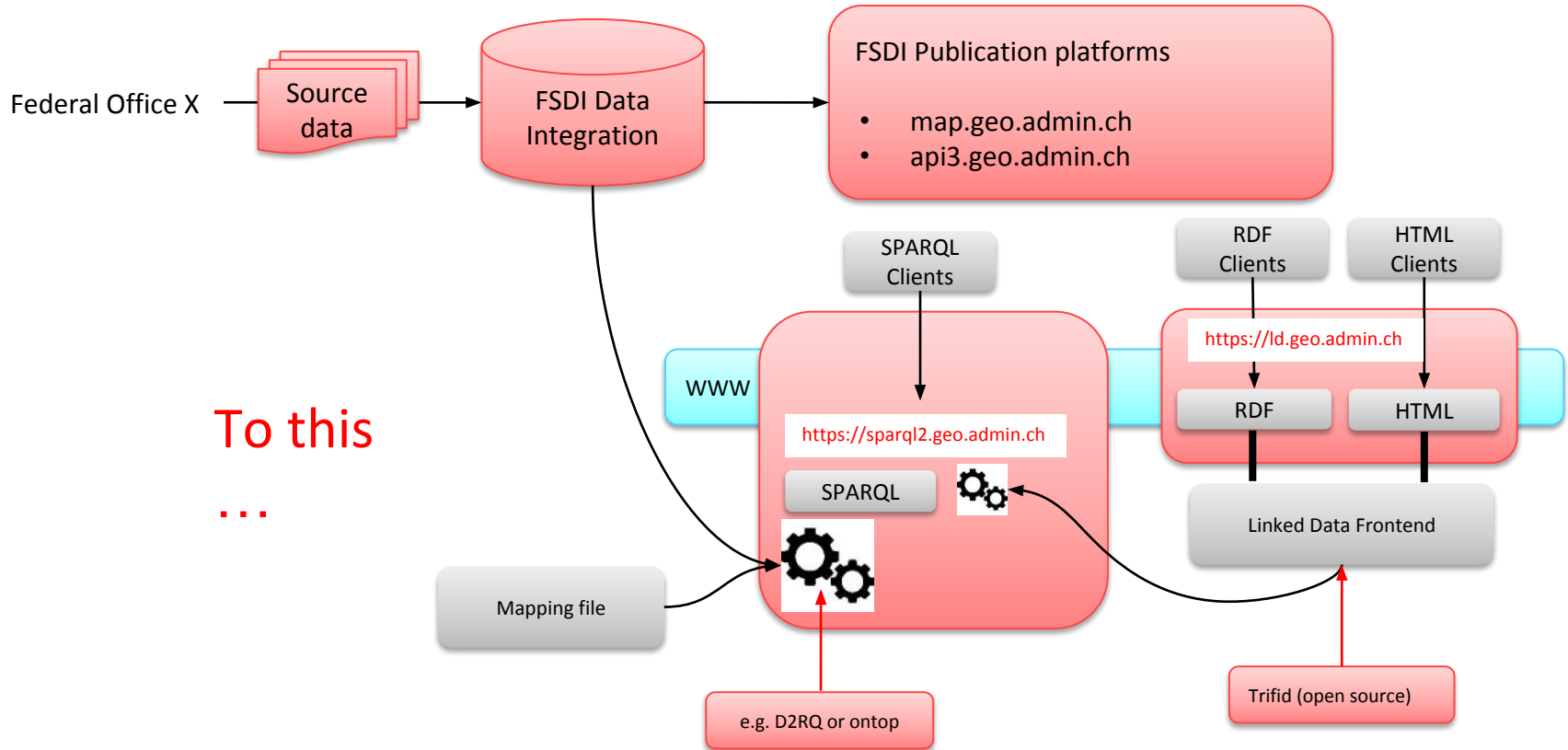
Next challenges

- Use the main FSDI data source and provide RDF serialization at runtime





Next challenges





Issues with the next challenges

- D2RQ is an old technology (last commit on github was on March 2015) and does not support GeoSPARQL
- Ontop seems not so user friendly and the current version does not support GeoSPARQL
 - Ontop-spatial is a fork of ontop, but is based on ontop V1 (current version of ontop is V3)
 - Ontop developers have planned to support GeoSPARQL (according to this [post](#))