Linked Data Experience

DINAcon 19th October 2018
https://tinyurl.com/dinacon18-ld

Jean-Luc Cochard (Schweizerisches Bundesarchiv), LINDAS
Pasquale Di Donato (swisstopo), geo.admin.ch - Linked Data Service
Michael Grüebler (Statistik Stadt Zürich), LOSD
Cristina Sarasua (Universität Zürich), Wikidata
Matthias Mazenauer (Statistisches Amt Kanton Zürich), Data Visualization

All queries are on GitHub: https://github.com/statistikstadtzuerich/documentation/tree/master/examples/2018-10-19_DINAcon

John

“Zurich, the City of Water”

Limmat Schwimmen

Frauenbadi

1,200 + Fountains

Connect Entities

Align Vocabularies

COUNT, FILTER, GROUP, SELECT pieces from any data set in a *federated* way.

Access distributed and heterogeneous data, by different providers, as if it were a unique database.

Agenda

Topics and Time

6 Visualisation 5

4 Query 3: Wikidata 10

3 Query 2: City of Zurich 10

2 Query 1: swisstopo 10

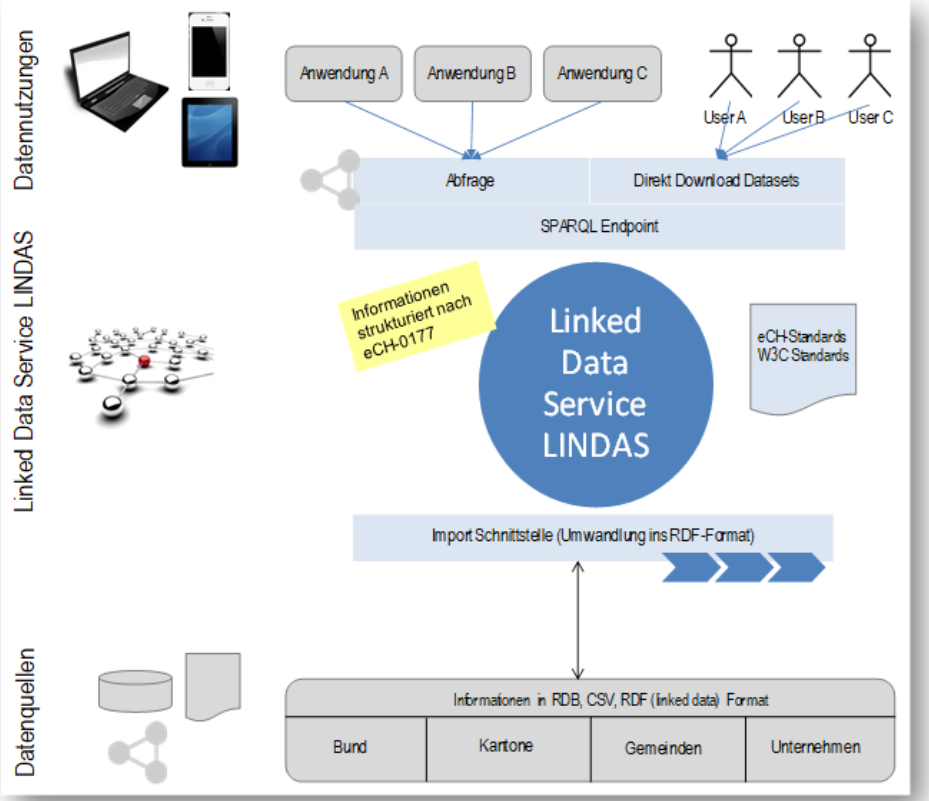
1 LINDAS - Swiss Linked Data platform 10

5 Federated Query 5

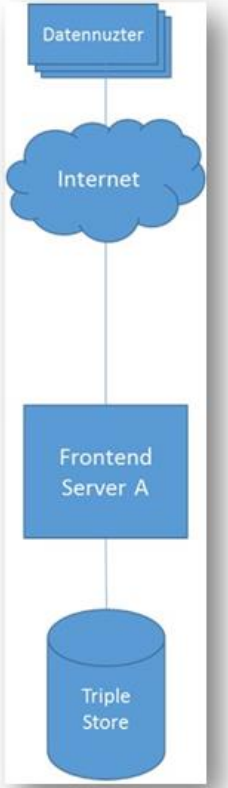
Min

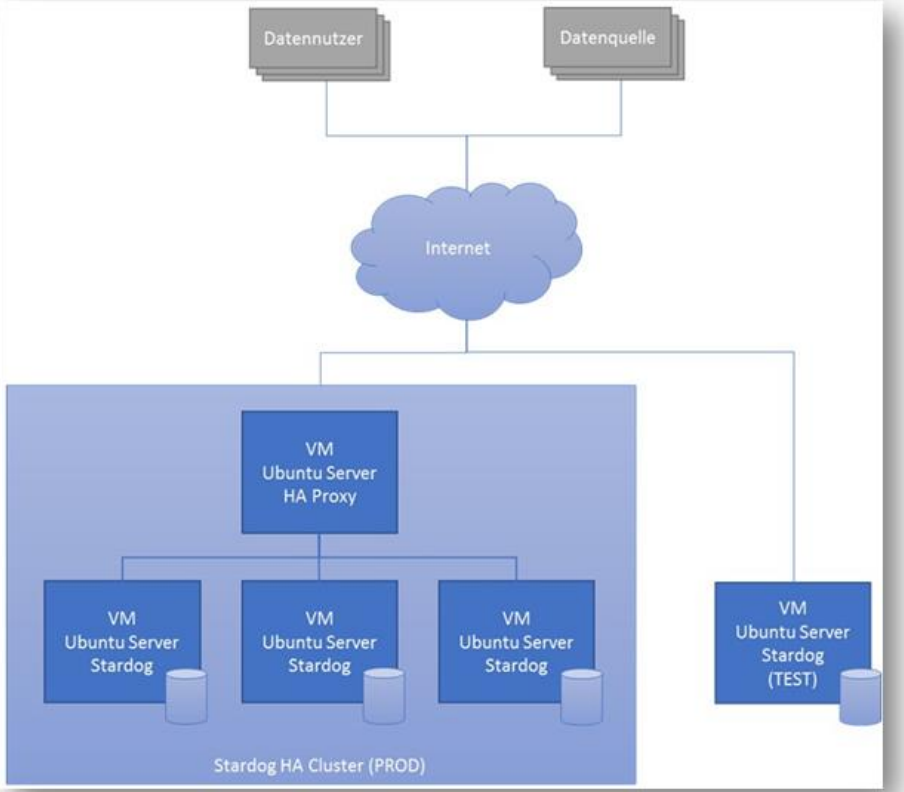
LINDAS
Jean-Luc Cochard
(Schweizerisches Bundesarchiv)

LINDAS - 2014-2019 : solution expérimentale

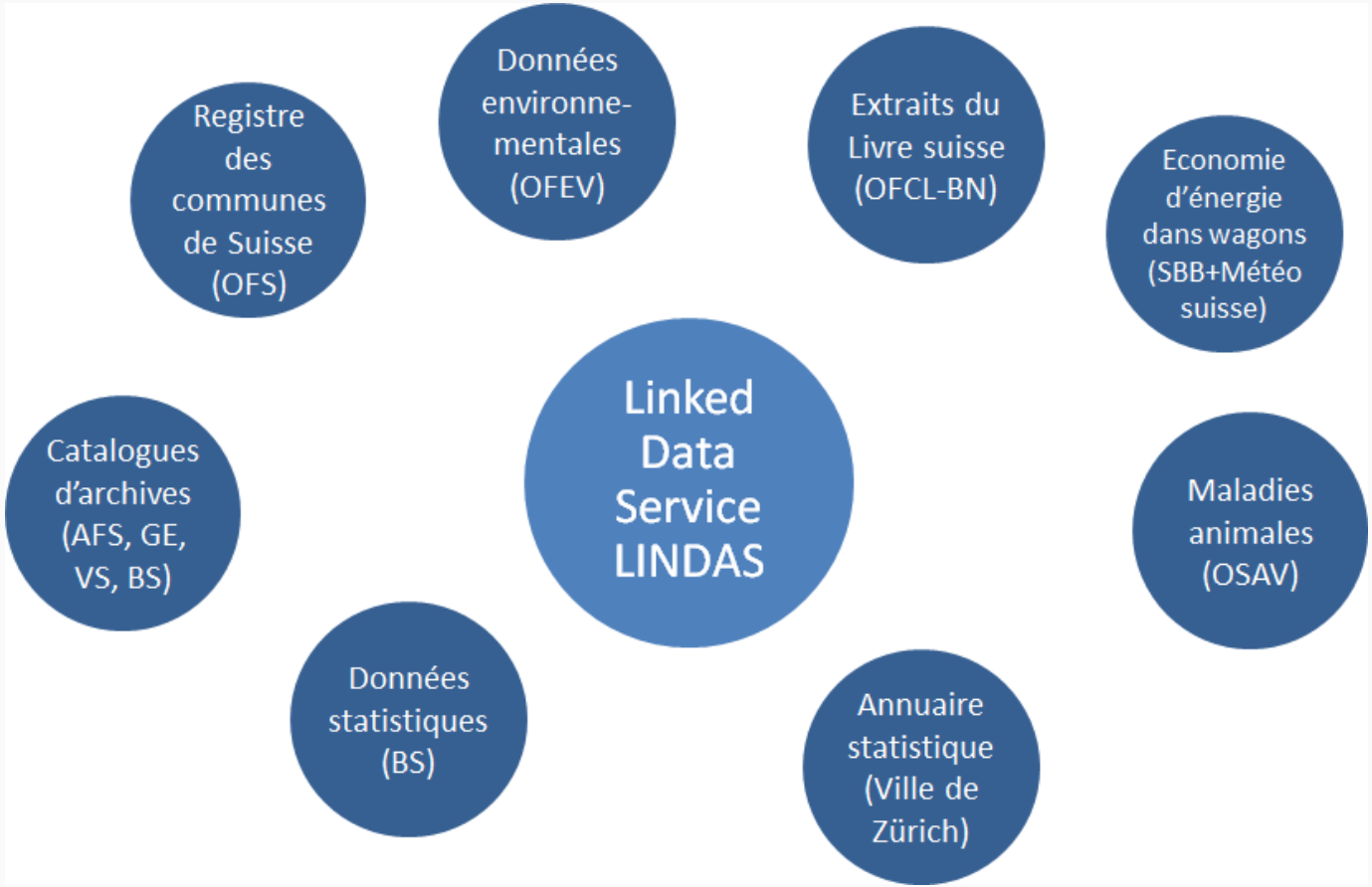


Etape vers la production - redondance des systèmes

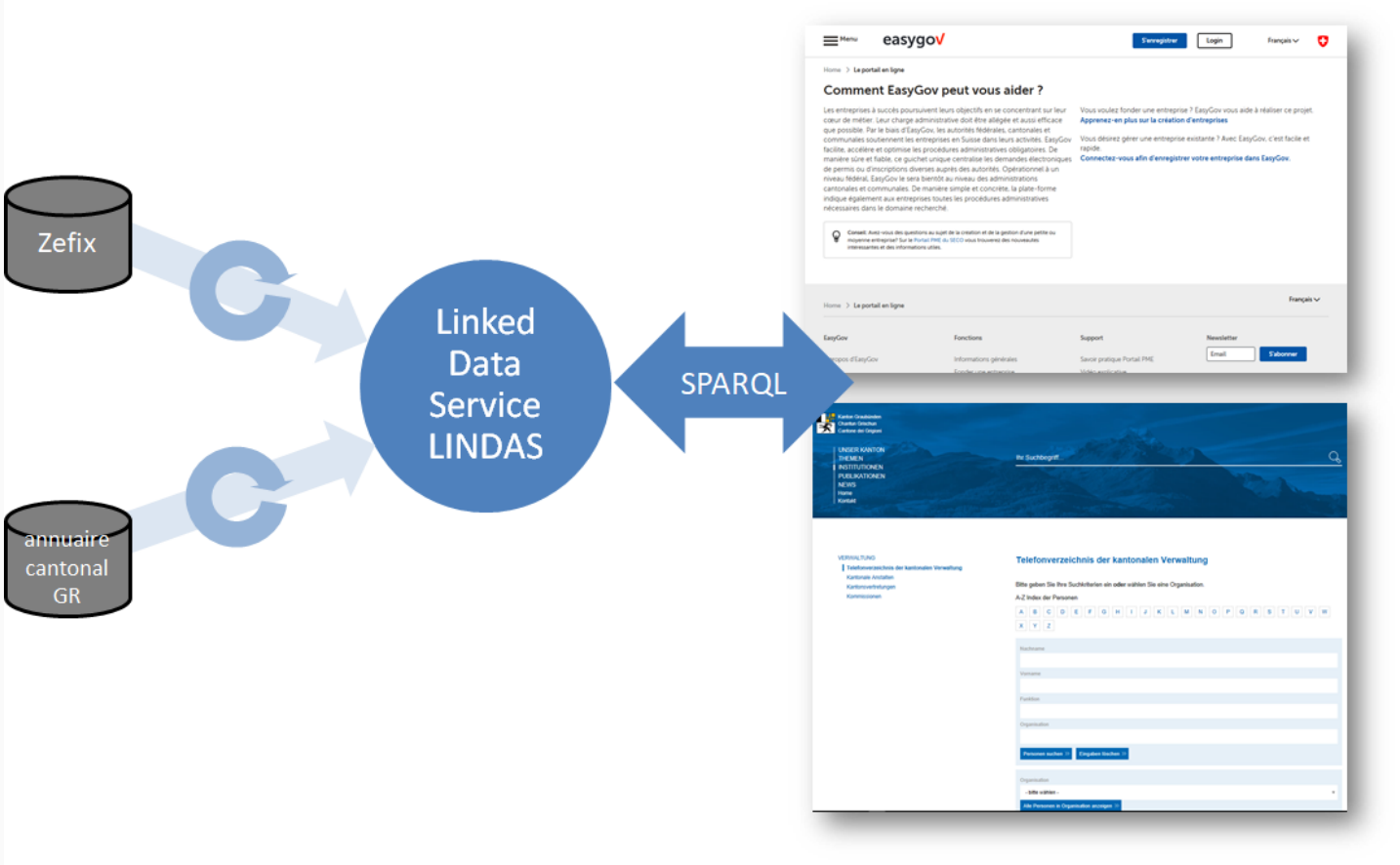




Etape vers la production - expérimentations dans différents contextes



Use cases en production sur LINDAS



Projet *Linked Data Plattform*

Collaboration

Archives fédérales suisses, Office fédéral de l’environnement et Secrétariat d’Etat à l’économie

Durée du projet : 2017-2019

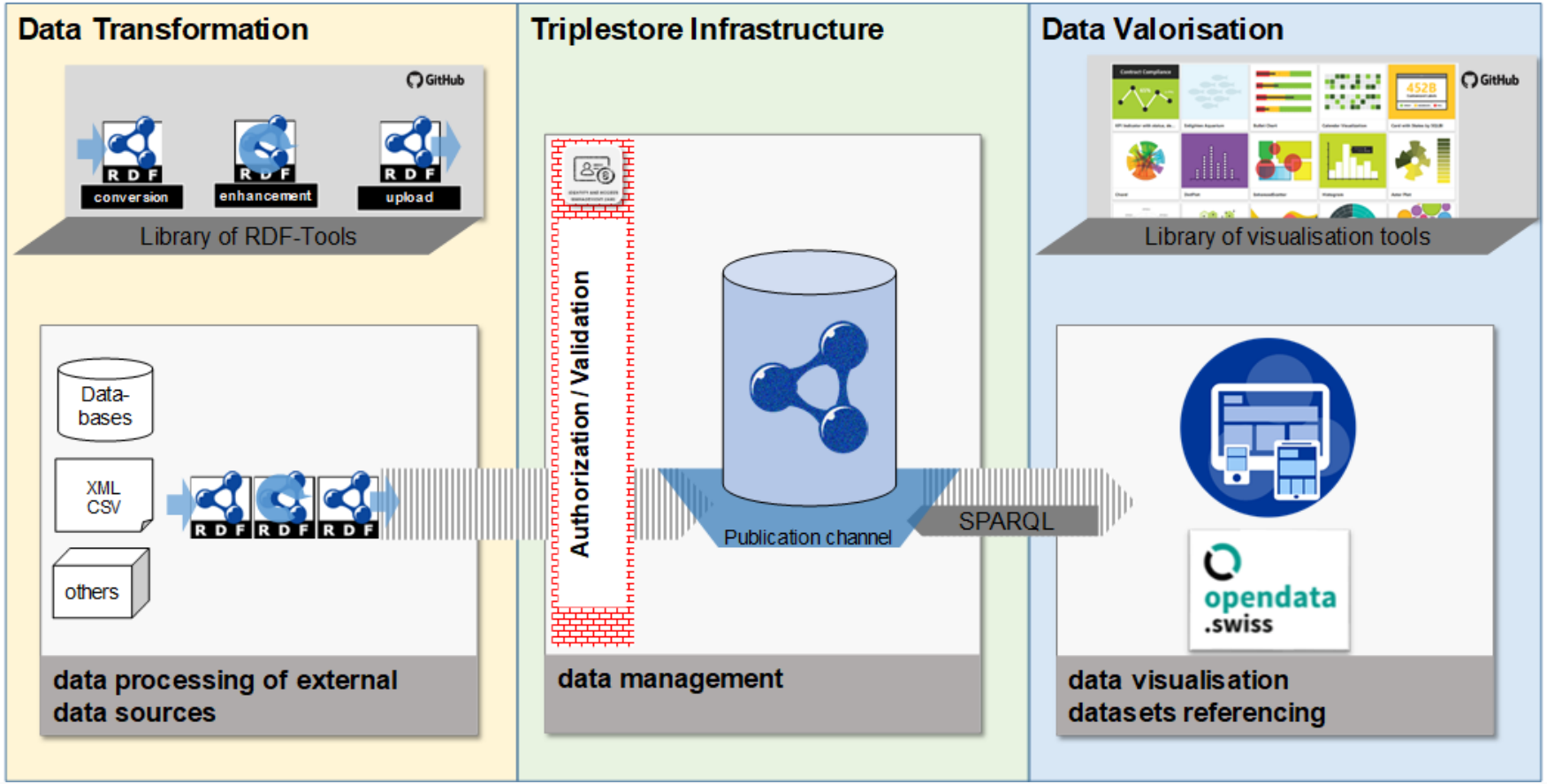
Objectif

Mettre sur pied un triple store productif pour héberge des données des administrations publiques. L’OFEV va y publier ses données environnementales et les utiliser pour fournir des présentations graphiques de ces mesures (projet Umweltdatenkiosk)

Mise en service : mi-2019.

Mise hors service de LINDAS : 3ème semestre 2019

Solution en cours de développement - plus qu'un triple store



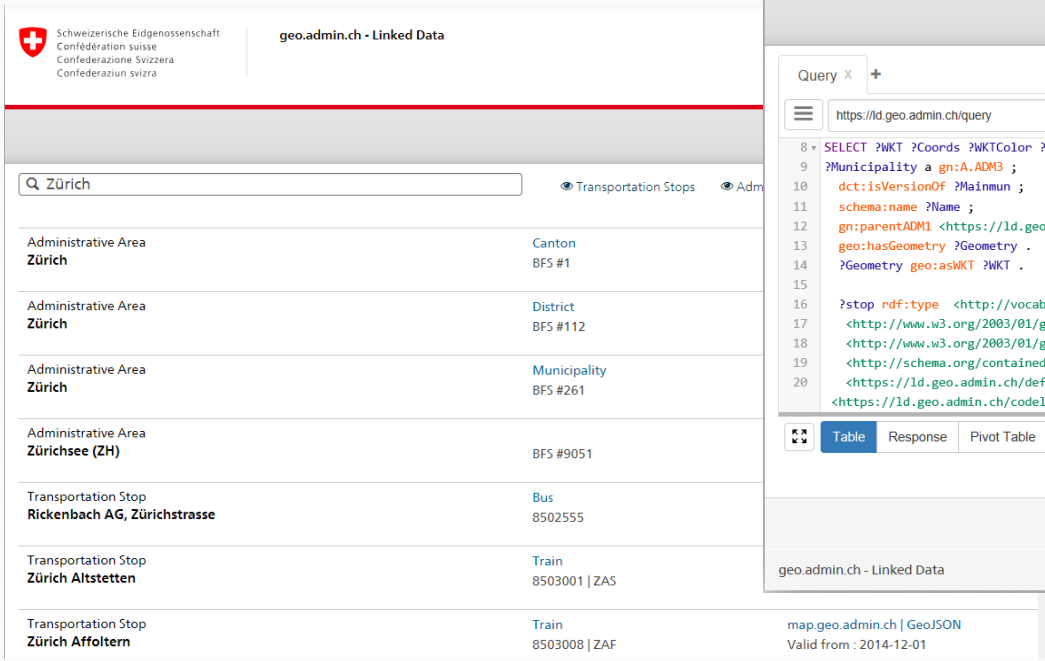
geo.admin.ch - Linked Data Service

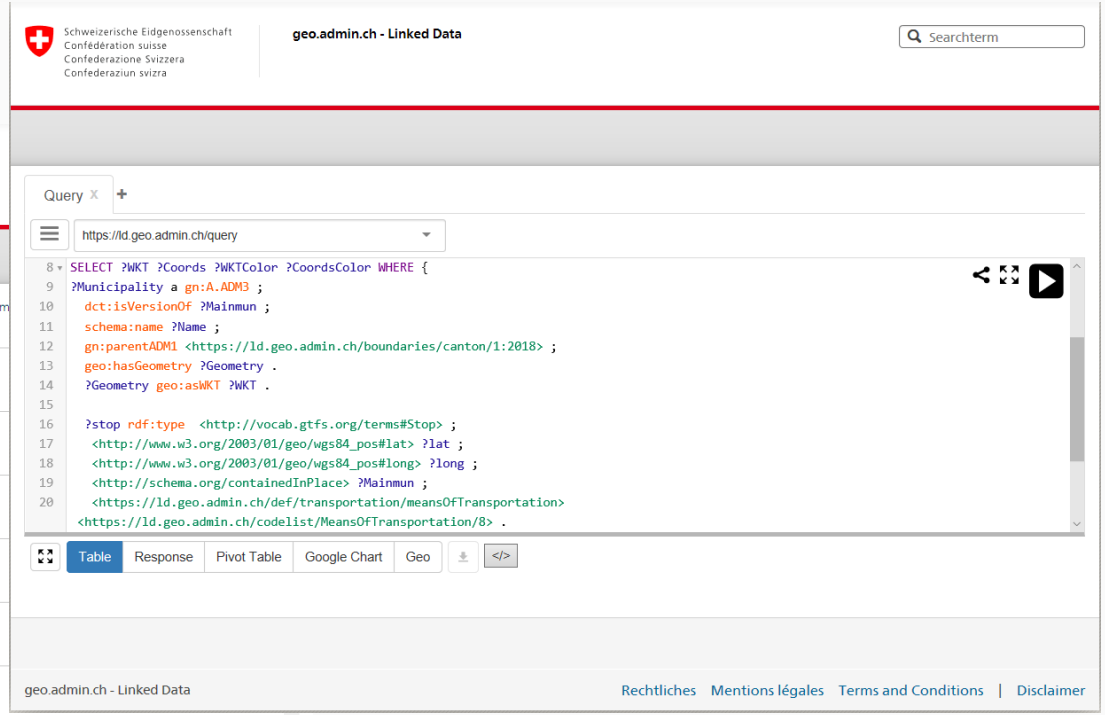
Pasquale Di Donato
swisstopo, Project Coordinator Geoinformation and Geoservices

The Linked Data Service on the FSDI ld.geo.admin.ch

- geo.admin.ch:
  - is the platform for the Federal Administration's georeferenced data and geoservices …
  - and the practical implementation of the Geoinformation Act
  - data publication is synchronized across different platforms (OGC-Service, API, …)
  - swisstopo is in charge of the coordination and the maintenance
- ld.geo.admin.ch:
  - is the platform dedicated to data publication as Linked Data
  - available since March 2017
  - is publishing selected datasets:
    - swissBOUNDARIES3D (administrative units, versioned since 2016) - swisstopo
    - Public Transportation Stops - the Federal Office of Transport

Exploring via the search interface or via the SPARQL interface





https://ld.geo.admin.ch/sparql/

https://ld.geo.admin.ch/search/

Example ressources

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

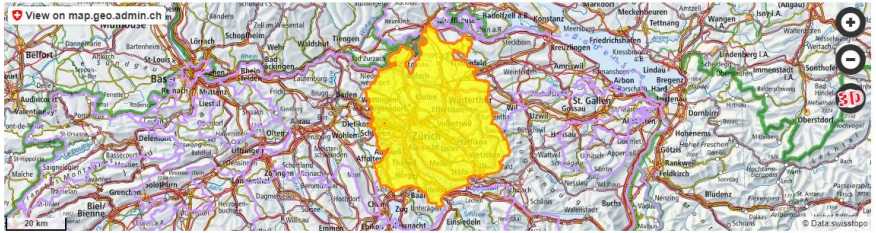
geo.admin.ch - Linked Data

Searchterm

Zürich

https://ld.geo.admin.ch/boundaries/canton/1

a http://schema.org/AdministrativeArea, http://www.opengis.net/ont/geosparql#Feature, http://www.geonames.org/ontology#A.ADM1



Download as GeoJSON

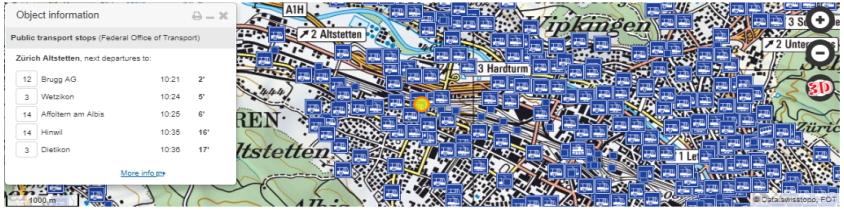
type	AdministrativeArea
type	Feature
type	A.ADM1
hasVersion	1:2016
hasVersion	1:2017
hasVersion	1:2018
hasMap	?ch.swisstopo.swissboundaries3d-kanton-flaeche.fill=1
name	Zürich
sameAs	1?geometryFormat=geojson
bfsNumber	1

https://ld.geo.admin.ch/boundaries/canton/1

Zürich Altstetten

https://ld.geo.admin.ch/transportation/stop/8503001

a https://ld.geo.admin.ch/def/transportation/OperatingPoint, http://vocab.gtfs.org/terms#Stop



Download as GeoJSON

type	OperatingPoint
type	Stop
elevation	399 (M)
identifier	8503001
alternateName	ZAS
containedInPlace	261
dateModified	2017-12-01 (date)
hasMap	?showTooltip=true&ch.bav.haltestellen-oev=8503001
name	Zürich Altstetten
provider	1
releaseDate	2017-12-10 (date)
sameAs	8503001?geometryFormat=geojson
validFrom	2014-12-01 (date)
seeAlso	8503001
lat	47.3914812090277
long	8.48895298341114
meansOfTransportation	2
operatingPointType	Haltestelle

https://ld.geo.admin.ch/transportation/stop/8503001

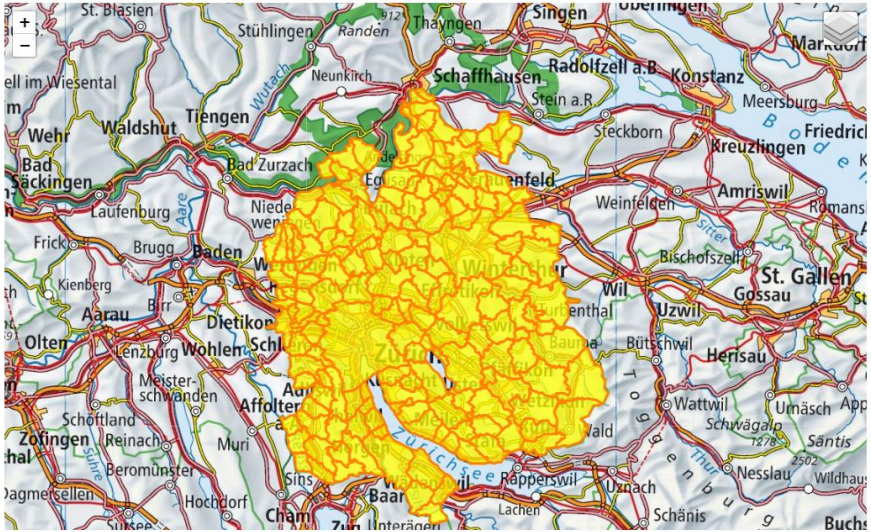
Example query: All municipalities in Canton Zürich (2018)

https://ld.geo.admin.ch/query

```
PREFIX schema: <http://schema.org/>
PREFIX gn: <http://www.geonames.org/ontology#>
PREFIX geo: <http://www.opengis.net/ont/geosparql#>
PREFIX dct: <http://purl.org/dc/terms/>
select ?Municipality ?Name ?WKT
where
{
?Municipality a gn:A.ADM3 .
?Municipality schema:name ?Name .
?Municipality dct:issued ?Date .
?Municipality gn:parentADM1 ?InCanton .
?InCanton schema:name ?CantonName .
?Municipality geo:hasGeometry ?Geometry .
?Geometry geo:asWKT ?WKT .
FILTER (?Date = "2018-01-01"^^xsd:date)
FILTER (?CantonName = "Zürich")
}
```

Table | Response | Pivot Table | Google Chart | Geo | </>

Tip: Add a label variable prefixed with the geo variable name to show popups on the map. E.g. `WKTLabel`. Or, append `Color` to change the color of the shape or marker.



http://yasgui.org/short/ryX8ZPicX

Example query: Get all versions of Canton Zürich

https://ld.geo.admin.ch/query

```
PREFIX schema: <http://schema.org/>
PREFIX gn: <http://www.geonames.org/ontology#>
PREFIX geo: <http://www.opengis.net/ont/geosparql#>
SELECT ?Canton ?Name ?DateIssued ?ValidUntil
WHERE {
  ?Canton <http://purl.org/dc/terms/isVersionOf> <https://ld.geo.admin.ch/boundaries/canton/1> .
  ?Canton <http://schema.org/name> ?Name .
  ?Canton <http://purl.org/dc/terms/issued> ?DateIssued .
  ?Canton <http://schema.org/validUntil> ?ValidUntil .
}
```

Table | Response | Pivot Table | Google Chart | Geo | </>

Showing 1 to 3 of 3 entries

Search: Show entries

	Canton	Name	DateIssued	ValidUntil
1	https://ld.geo.admin.ch/boundaries/canton/1:2017	Zürich	"2017-01-01"^^xsd:date	"2017-12-31"^^xsd:date
2	https://ld.geo.admin.ch/boundaries/canton/1:2016	Zürich	"2016-01-01"^^xsd:date	"2016-12-31"^^xsd:date
3	https://ld.geo.admin.ch/boundaries/canton/1:2018	Zürich	"2018-01-01"^^xsd:date	"2018-12-31"^^xsd:date

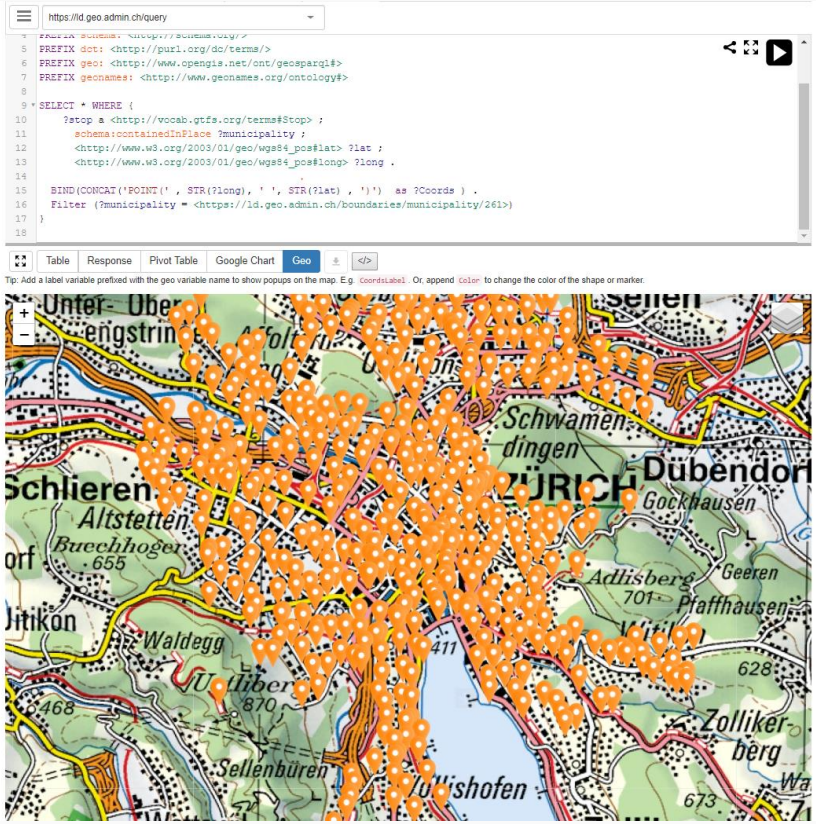
Showing 1 to 3 of 3 entries

geo.admin.ch - Linked Data

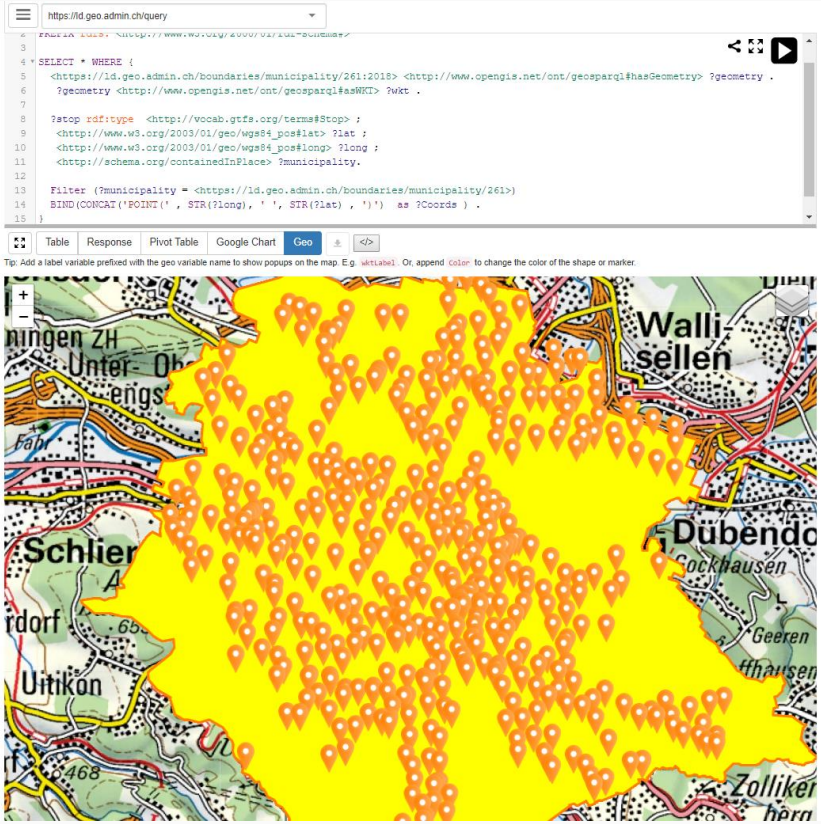
Rechtliches Mentions légales Terms and Conditions | Disclaimer

http://yasgui.org/short/8gt_gJva5

Example query: Stops in Zürich municipality



http://yasgui.org/short/i7Wmk_iaD



http://yasgui.org/short/H1ixGvscX

Example query: Top five highest stops

https://ld.geo.admin.ch/query

```
PREFIX xsd:    <http://www.w3.org/2001/XMLSchema#>
SELECT ?Stop ?Elevation {
  ?Stop a <http://vocab.gtfs.org/terms#Stop>.
  ?Stop <http://dbpedia.org/ontology/elevation> ?Elevation.
  BIND(xsd:int(?Elevation) AS ?ElevationToInt)
}
ORDER BY DESC(?ElevationToInt)
LIMIT 5
```

Table | Response | Pivot Table | Google Chart | Geo | </>

Showing 1 to 5 of 5 entries

Search: Show 50 entries

	Stop	Elevation
1	https://ld.geo.admin.ch/transportation/stop/8530210	"3818"^^<http://qudt.org/vocab/unit/M>
2	https://ld.geo.admin.ch/transportation/stop/8501732	"3462"^^<http://qudt.org/vocab/unit/M>
3	https://ld.geo.admin.ch/transportation/stop/8507364	"3454"^^<http://qudt.org/vocab/unit/M>
4	https://ld.geo.admin.ch/transportation/stop/8531168	"3360"^^<http://qudt.org/vocab/unit/M>
5	https://ld.geo.admin.ch/transportation/stop/8530102	"3319"^^<http://qudt.org/vocab/unit/M>

Showing 1 to 5 of 5 entries

geo.admin.ch - Linked Data Rechtliches Mentions légales Terms and Conditions | Disclaimer

http://yasgui.org/short/LOPF0RobU

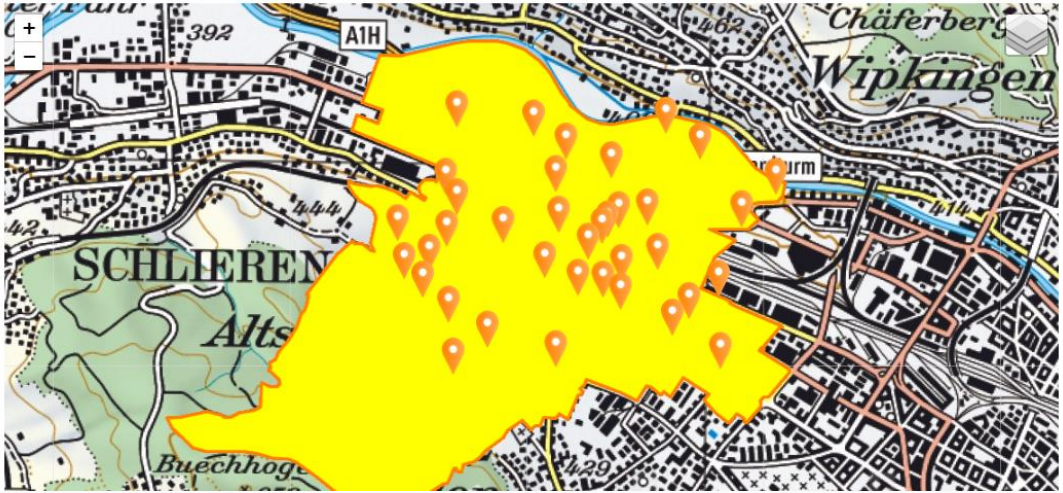
Example query: geospatial query (Stops in a Quarter)

https://ld.geo.admin.ch/query

```
SELECT * WHERE {
   ?stop rdf:type  <http://vocab.gtfs.org/terms#Stop> ;
   <http://www.w3.org/2003/01/geo/wgs84_pos#lat> ?lat ;
   <http://www.w3.org/2003/01/geo/wgs84_pos#long> ?long .
  BIND(STRDT(CONCAT('POINT(', ?long, ' ', ?lat, ')'), 'http://www.openlinksw.com/schemas/virtrdf#Geometry') AS ?Stopwkt).

  SERVICE <https://ld.stadt-zuerich.ch/query> {
    SELECT * WHERE {
      code:R00092 geo:hasGeometry ?GeoQuarter .
      ?GeoQuarter geo:asWKT ?GeoWKT
    }
  }
  FILTER (bif:st_within(?Stopwkt, ?GeoWKT))
}
```

Table | Response | Pivot Table | Google Chart | Geo | </>

Tip: Add a label variable prefixed with the geo variable name to show popups on the map. E.g. `StopwktLabel`. Or, append `Color` to change the color of the shape or marker.



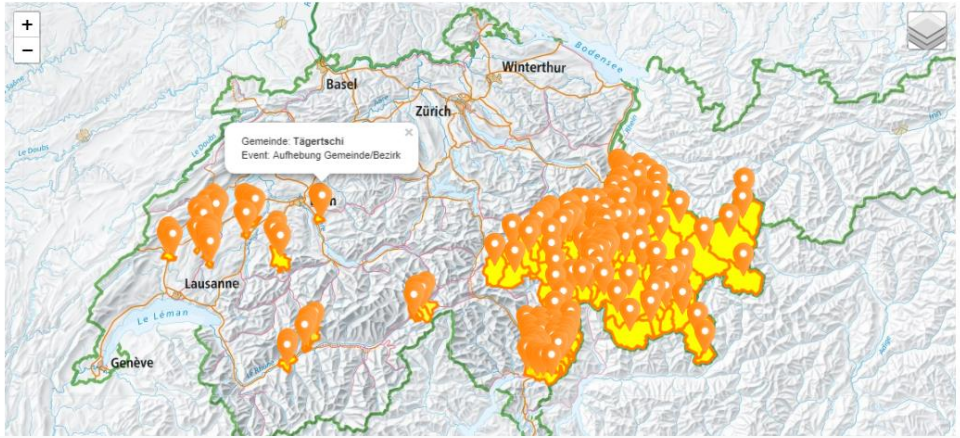
http://yasgui.org/short/tJ2flaJlz

Example query: federated query (municipality mutations in 2017 from LINDAS)

https://ld.geo.admin.ch/query

```
#
SELECT * WHERE {
  SERVICE <http://data.admin.ch/query> {
    ?event a gont:MunicipalityChangeEvent ;
      gont:date ?date ;
      gont:id ?eventid .

    ?munabo a gont:MunicipalityVersion ;
      gont:longName ?abolitionName ;
      gont:municipality ?munuri ;
      gont:abolitionMode ?abmode ;
      gont:abolitionEvent ?event .
      ?abmode skos:prefLabel ?abolitionmodeName .
  }
  FILTER ( ?date >= "2017-01-01"^^xsd:date && ?date <= "2017-12-31"^^xsd:date )
  ?shapeuri a <http://www.geonames.org/ontology#A.ADM3> ;
    dct:hasVersion ?version16 ;
    rdfs:seeAlso ?munuri .
  ?version16 geo:hasGeometry ?Geometry .
  ?Geometry geo:asWKT ?Coords  .
  BIND (CONCAT('Gemeinde: <b>', ?abolitionName, '</b><br>Event: ', ?abolitionmodeName) AS ?CoordsLabel)
}
```

Table | Response | Pivot Table | Google Chart | Geo | </>



http://yasgui.org/short/f0NgDjmyy

Example query: federated query (Municipality description from DBPedia)

https://ld.geo.admin.ch/query

```
SELECT ?Municipality ?Name ?DBPediaAbstract WHERE {
    ?Municipality a <http://schema.org/AdministrativeArea> . #specify only the non-versioned entries.
    ?Municipality <http://schema.org/name> ?Name .
    ?Municipality a <http://www.geonames.org/ontology#A.ADM3> . #municipality only
    ?Municipality <https://ld.geo.admin.ch/def/bfsNumber> ?bfsNumber . #connect to the ?bfsNumber found in wikidata.
    {
    SELECT DISTINCT (xsd:integer(?bfs) AS ?bfsNumber) ?DBPedia ?DBPediaAbstract WHERE {
        SERVICE <http://dbpedia.org/sparql>
        {
        ?DBPedia dbo:municipalityCode ?bfs .
        OPTIONAL {?DBPedia dbo:abstract ?DBPediaAbstract . FILTER (lang(?DBPediaAbstract) = "de")}
        }
    }
  }
}
LIMIT 3
```

Table | Response | Pivot Table | Google Chart | Geo | </>

Showing 1 to 3 of 3 entries (in 1.993 seconds)

Search: Show 50 entries

	Municipality	Name	DBPediaAbstract
1	https://ld.geo.admin.ch/boundaries/municipality/2293	Düdingen	"Düdingen (französisch: Guin, Freiburger Patois Dyin?/i) ist eine politische Gemeinde im Sensebezirk des Kantons Freiburg in der Schweiz. Die Gemeinde liegt östlich vom Schiffenensee ziemlich in der Mitte des deutschfreiburgischen Mittellandes. Mit mehr als 7'000 Einwohnern ist sie eine der grossen Gemeinden der Agglomeration (Ballungsgebiet) der Stadt Freiburg."@de
2	https://ld.geo.admin.ch/boundaries/municipality/2764	Biel-Benken	"Biel-Benken (Baseldeutsch: Biel-Bängge) ist eine politische Gemeinde im Bezirk Arlesheim des Kantons Basel-Landschaft in der Schweiz."@de
3	https://ld.geo.admin.ch/boundaries/municipality/2196	Fribourg	"Freiburg (schweizerdeutsch Frybùrg [ˈfriˑburg], im regionalen Senslerdeutsch [ˈfriːbʊrg] oder [ˈfriːbərg], französisch Fribourg [fʀibuːʀ], frankoprovenzalisch Friboua [a friˈbwa]?/i) ist eine Stadt und Hauptort des Saanebezirks im Kanton Freiburg in der Schweiz. Zur Unterscheidung vom deutschen Freiburg im Breisgau kann der Zusatz im Üechtland (kurz i. Üe.) oder im Üchtland (kurz i. Ü.) verwendet werden. Freiburg, beidseits der Saane im Schweizer Mittelland gelegen, ist ein wichtiges Wirtschafts-, Verwaltungs- und Bildungszentrum mit zweisprachiger Universität an der Kulturgrenze zwischen deutscher und französischer Schweiz (Romandie). Sie besitzt eine der am besten erhaltenen und grössten zusammenhängenden historischen Altstädte der Schweiz auf einem schmalen Felssporn über dem Tal der Saane."@de

http://yasgui.org/short/SixeHzcHU

Linked Open Statistical Data Population Statistics

Michael Grüebler (Statistik Stadt Zürich)

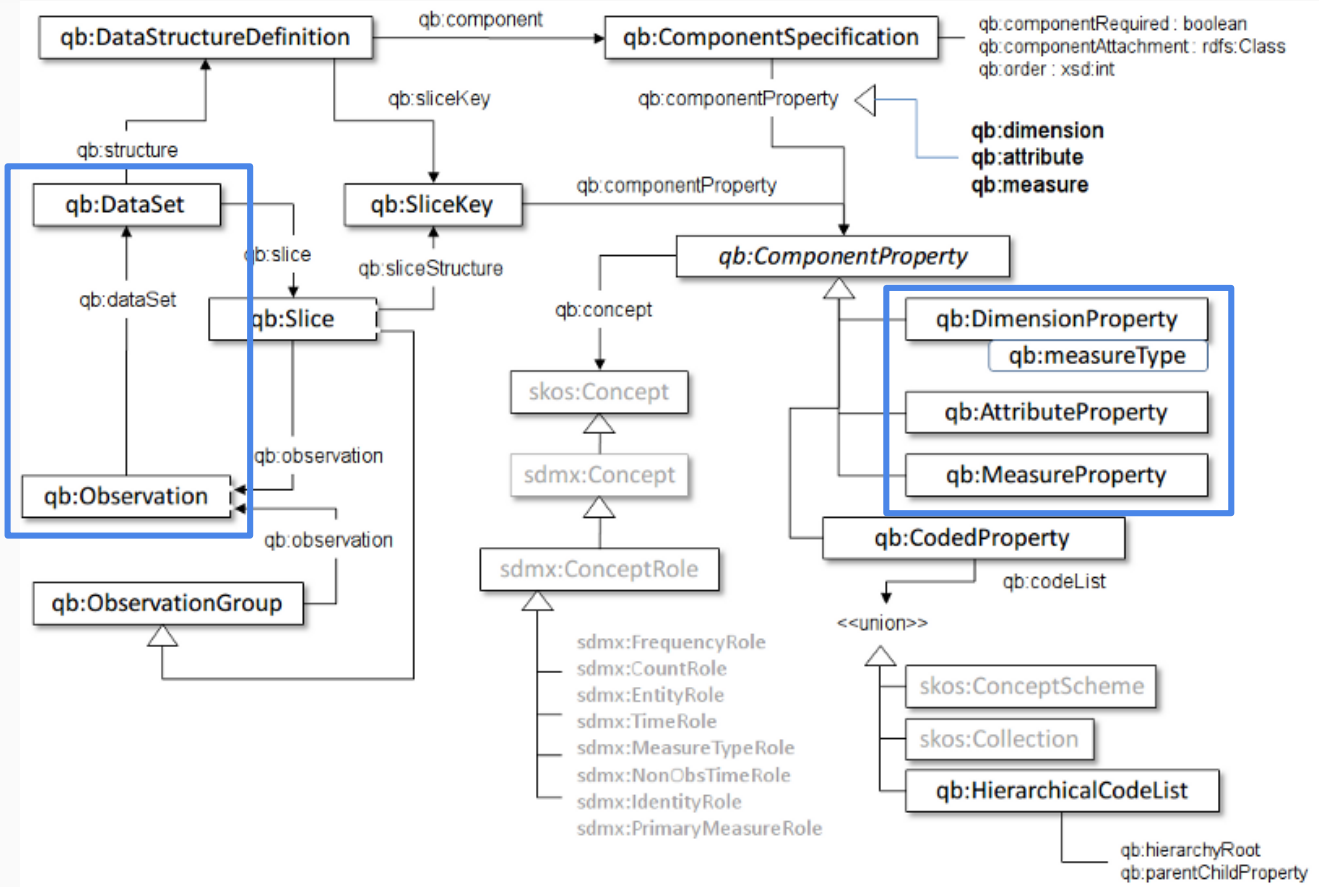
About Linked Open Statistical Data

Linked Data of Statistik Stadt Zürich is made available through LINDAS

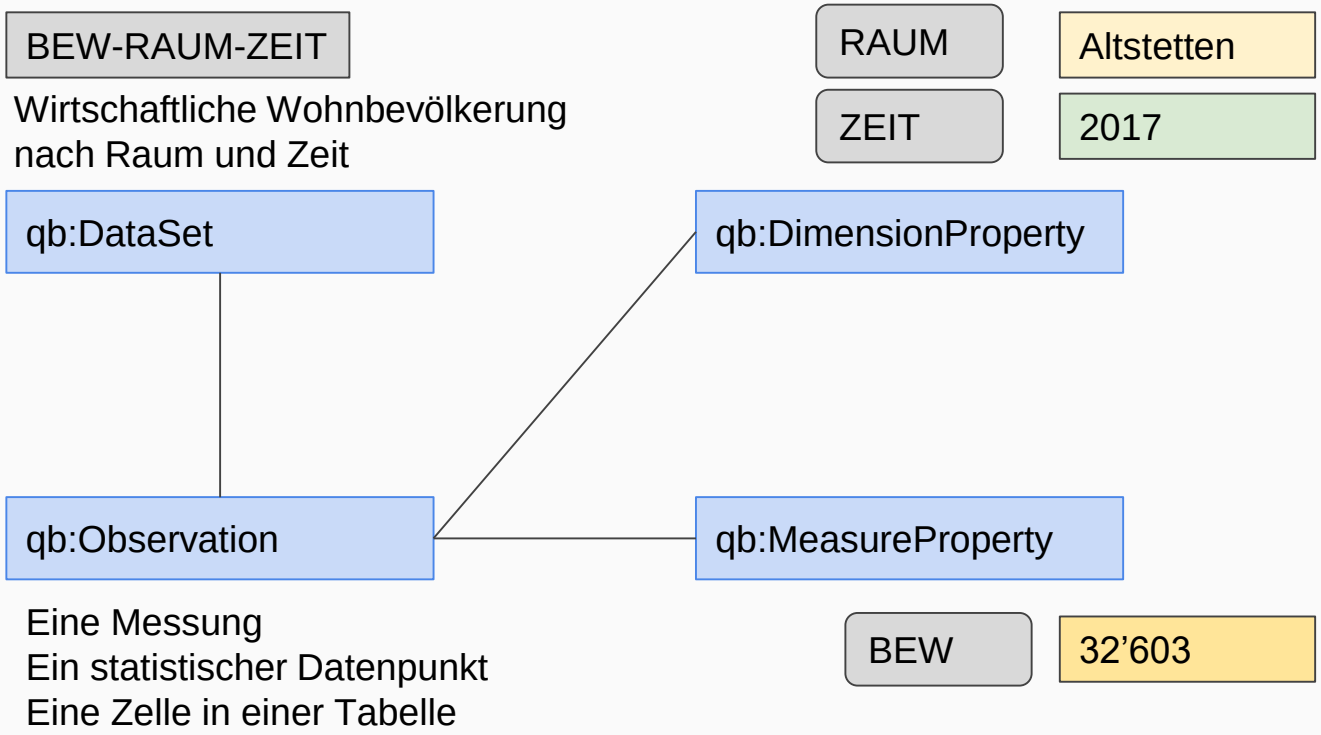
Linked Open Statistical Data (LOSD) has been launched in August 2018 with a first set of statistical datasets published as RDF Data Cubes (3'924'445 triples)

Let us have a look into the data model and how to query the population statistics of the City of Zurich

RDF Data Cube Vocabulary



RDF Data Cube Vocabulary Example



SPARQL Query on RDF Data Cube

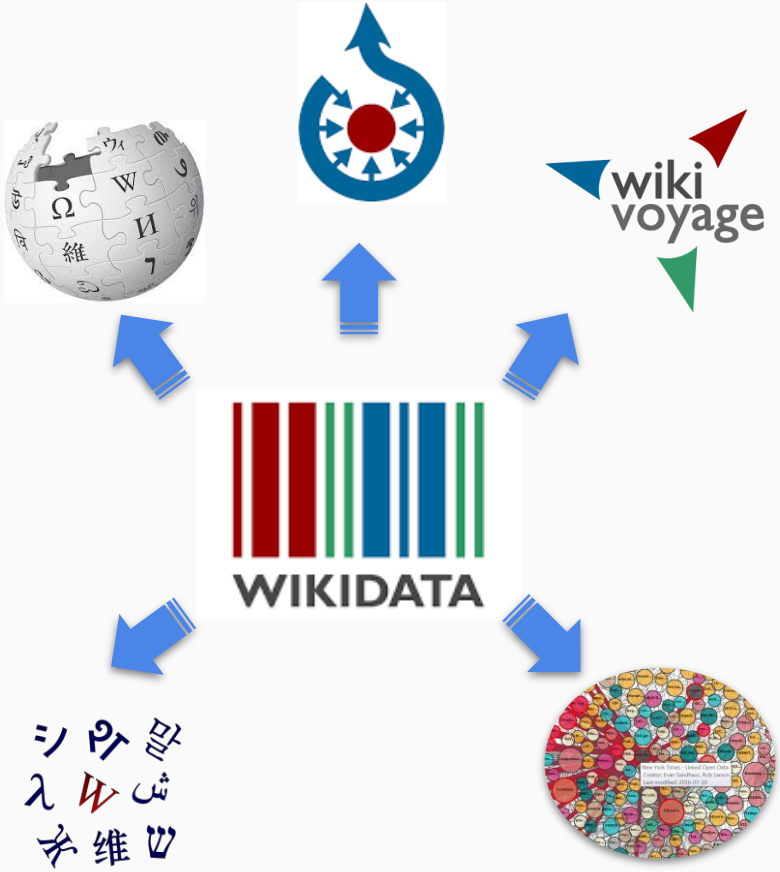
```
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX qb: <http://purl.org/linked-data/cube#>
PREFIX dataset: <https://ld.stadt-zuerich.ch/statistics/dataset/>
PREFIX measure: <https://ld.stadt-zuerich.ch/statistics/measure/>
PREFIX dimension: <https://ld.stadt-zuerich.ch/statistics/property/>
PREFIX code: <https://ld.stadt-zuerich.ch/statistics/code/>
SELECT ?RaumLabel ?Population WHERE {
  ?sub a qb:Observation ;
       qb:dataSet dataset:BEW-RAUM-ZEIT ;
       measure:BEW ?Population ;
       dimension:RAUM ?Raum ;
       dimension:ZEIT ?Date .
  ?Raum rdfs:label ?RaumLabel
  FILTER(year(?Date) = 2017)
} ORDER BY DESC(?Population)
```

Community-curated data

Cristina Sarasua

Universität Zürich & Active Volunteer Member of WMCH

Wikidata: Connecting Dataspaces



The free, multilingual knowledge base that anyone can use and edit.

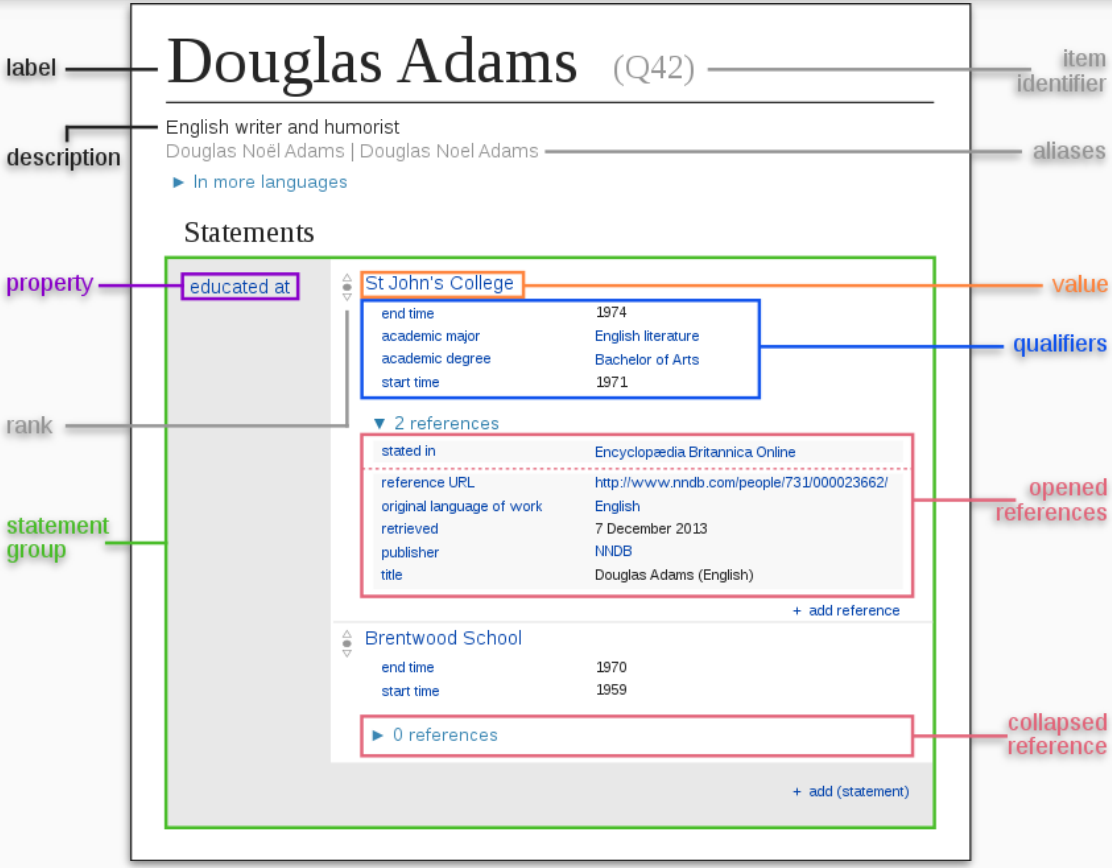
Community of thousands of volunteers curating, patrolling and maintaining the data.

51± Million Data Items

Data Quality, Data Freshness, High Availability, **Interlinking**, High Interest and Visibility, with Web technology standards.

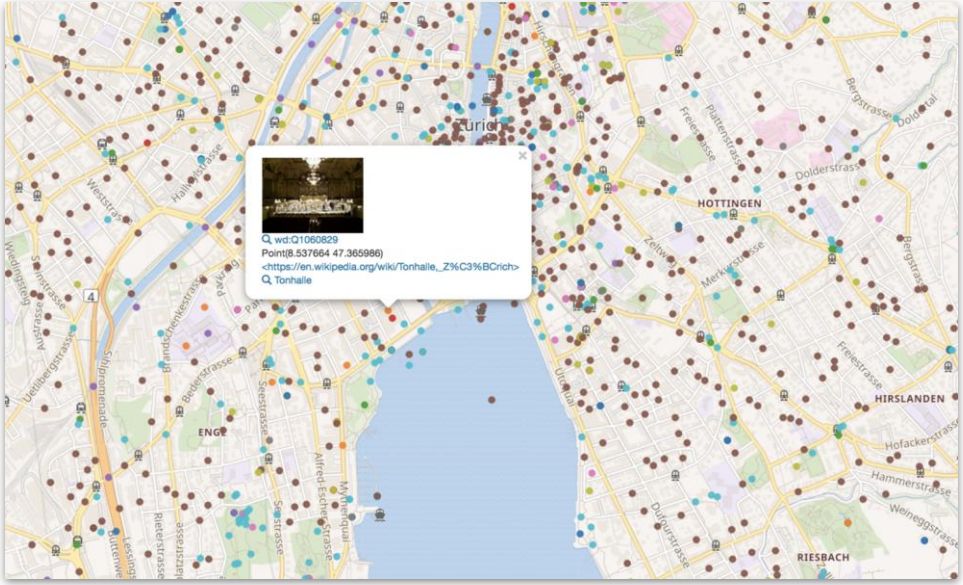
Wikidata's Data Model

Secondary source hosting Web data plurality

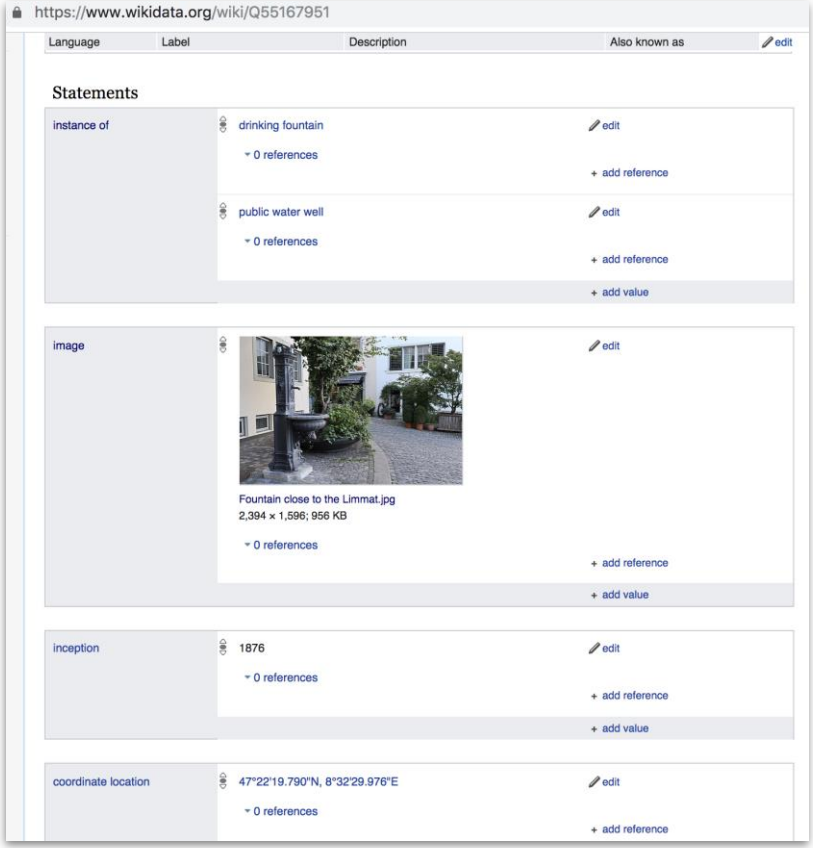


Source: https://www.wikidata.org/wiki/Wikidata:Glossary#/media/File:Datamodel_in_Wikidata.svg

Exploring via the Wiki and SPARQL Query Service

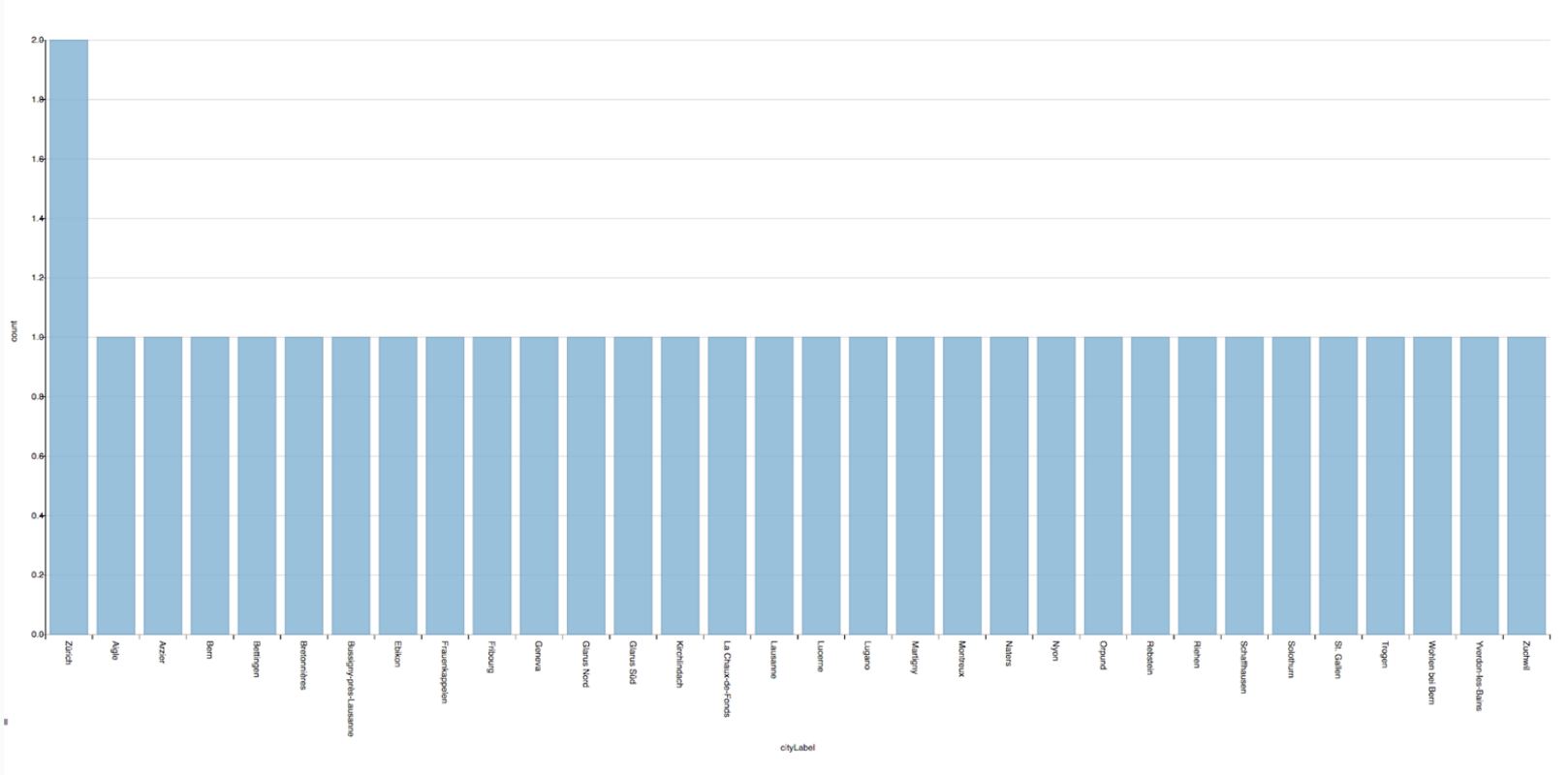


Source: http://tinyurl.com/y876qg2q



Source: https://www.wikidata.org/wiki/Q55167951

Exploring via the Wiki and SPARQL Query Service



Count of countries of citizenship from head of governments of Swiss cities

Query: https://tinyurl.com/yahl5h5g

Wikidata in our Federated Query

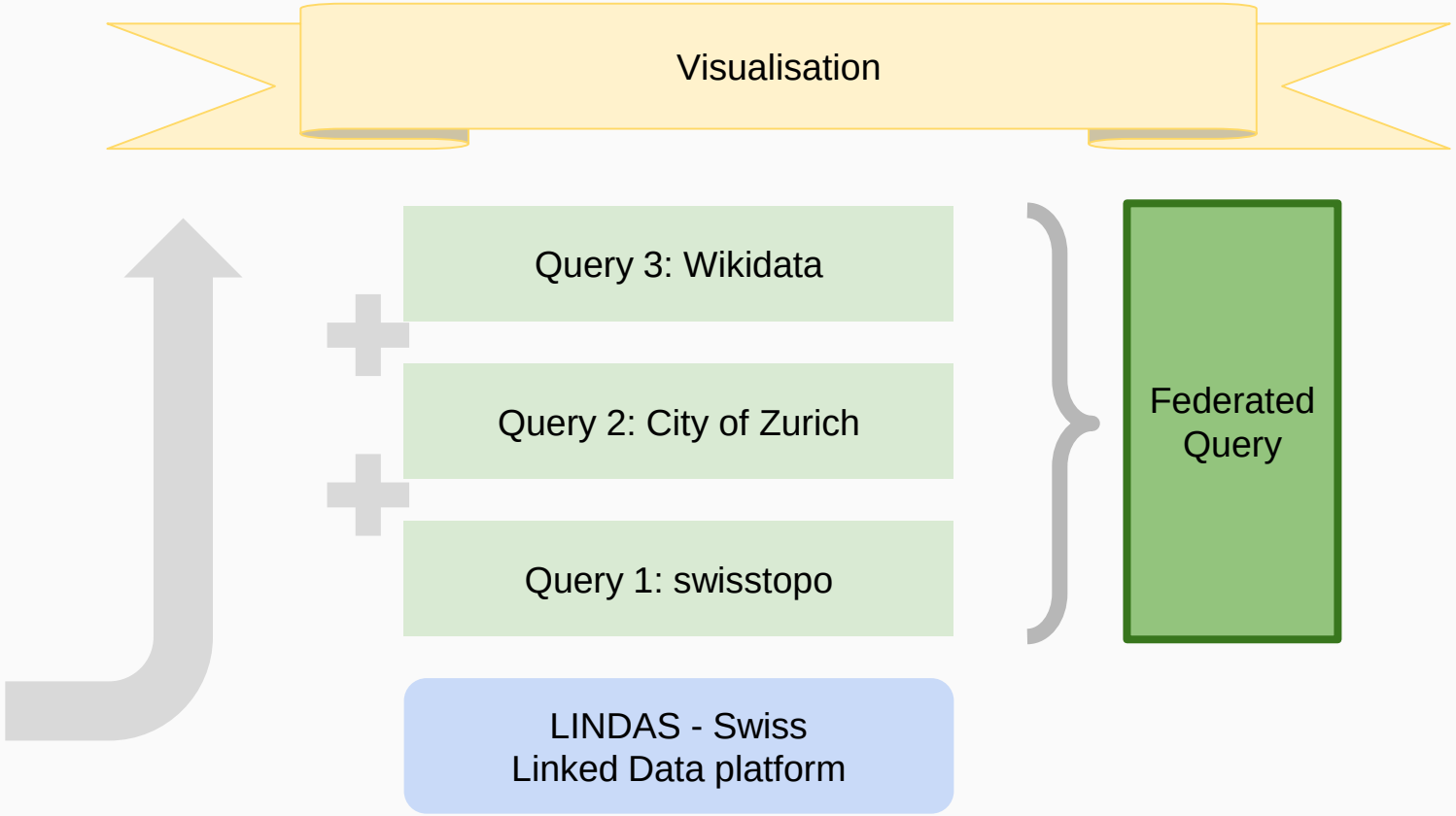
```
PREFIX wdt: <http://www.wikidata.org/prop/direct/>
PREFIX wd: <http://www.wikidata.org/entity/>
PREFIX pq: <http://www.wikidata.org/prop/qualifier/>
PREFIX ps: <http://www.wikidata.org/prop/statement/>
PREFIX p: <http://www.wikidata.org/prop/>
PREFIX wikibase: <http://wikiba.se/ontology#>
PREFIX bd: <http://www.bigdata.com/rdf#>
[...]

SERVICE wikibase:around {
  ?item wdt:P625 ?coord .
        bd:serviceParam wikibase:center "Point(8.542735
47.366761)"^^geo:wktLiteral .
        bd:serviceParam wikibase:radius "2" .
        bd:serviceParam wikibase:distance ?distance .
    }
{?item wdt:P31/wdt:P279* wd:Q4022} UNION {?item wdt:P31/wdt:P279* wd:Q12280}
UNION {?item wdt:P31/wdt:P279* wd:Q1501}
```

Wikidata in our Federated Query

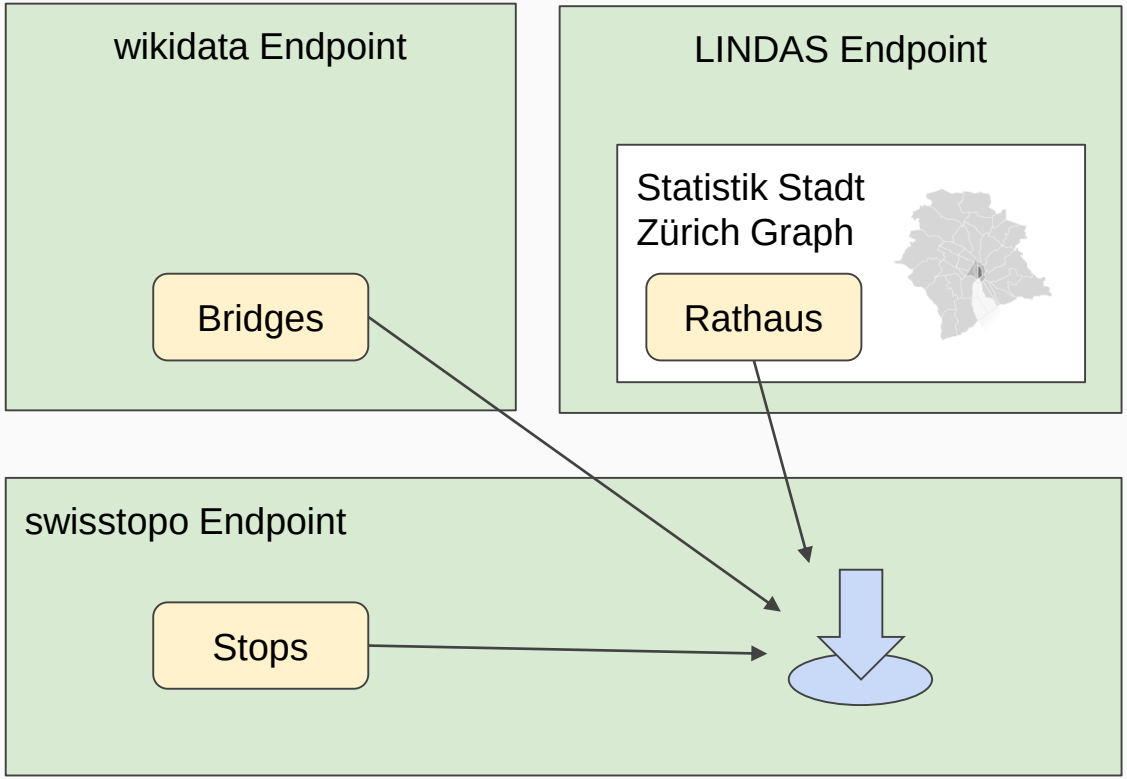
```
SELECT ?item  ?Bild ?coord ?coordColor WHERE {
        {?item p:P528 ?statement.
         ?statement pq:P972 wd:Q53629101. ?item wdt:P625 ?coord .}
    UNION
          {  things around a coordinate … (seen before)    }

    OPTIONAL {?item wdt:P18 ?Bild.}
    OPTIONAL{
        ?article schema:about ?item .
        ?article schema:isPartOf <https://en.wikipedia.org/>.
        ?articlev schema:about ?item .
       ?articlev schema:isPartOf <https://en.wikivoyage.org/>.}
    ?item wdt:P625 ?coord.
    BIND("#00FF00" AS ?coordColor) .

    }
```

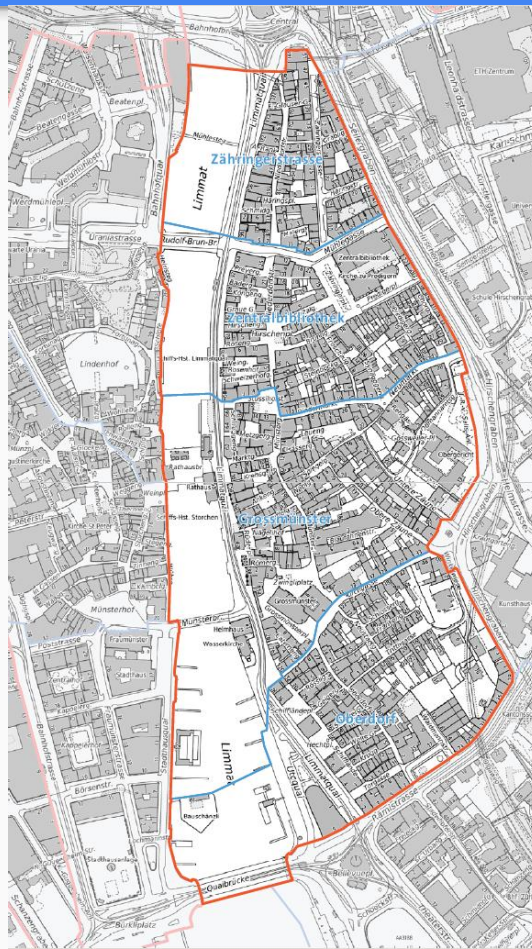
Federated Query

Federated Query



Federated Query





Linked Data Visualization

Matthias Mazenauer
(Statistisches Amt Kanton Zürich)

Why is Linked Data so much fun?

Linked Data Visualization with D3.js

https://beta.observablehq.com/@mmznrstat/dinacon2019

Questions and Answers

Vielen Dank für eure Aufmerksamkeit!

Gibt es Fragen oder Anregungen zum Workshop?