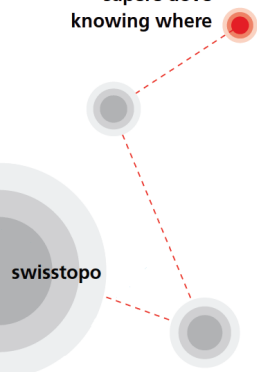




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wissen wohin
savoir où
sapere dove
knowing where



EuroGeographics QKEN Dublin Linked Data

05.12.2018, Stefan Flury

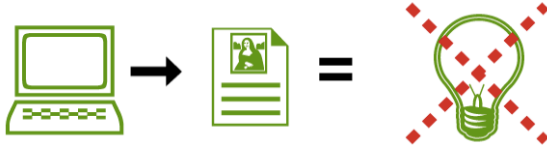


Agenda

1. web of documents <-> web of data
2. Linked Data a short introduction
3. A kind of cookbook



web of documents <-> web of data



Web of documents

Today machines find documents but they can not understand the content. The web browser is able to open a HTML-document and interpret the content, but not understand.



Web of data

Machines could find data and they can understand the content. You are looking for a hotel and you get a map



Linked Data; a short introduction

The four rules [Tim Berners-Lee 2006-07-27]

1. Use URIs as names for things
«A resource can be anything that has identity» → [RFC 2396](#)
URI = scheme ":" hier-part ["?" query] ["#" fragment] → [RFC 3986](#)
2. Use HTTP URIs so that people can look up those names.
<https://ld.geo.admin.ch/transportation/stop/8571395>
3. When someone looks up a URI, provide useful information, using the standards (RDF*, SPARQL)
RDF → [Resource Description Framework](#)
SPARQL → [Query language W3C-Standard](#)
4. Include links to other URIs. so that they can discover additional data.
Connect the data we have, into a web



RDF (machine readable) | HTML (customized implementation)

[illegible]



Linked Data; a short introduction

What is Resource Description Framework (RDF)?

- Standard model for data interchange
- This linking structure forms a directed, labeled graph
- To name the relationship between things → Semantic triple

What is a semantic triple?

subject–predicate–object

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. geo:long
3. 7.45264305299276

Rule 2

Rule 1

Subject: our URI

Predicate: the ontology between subject and object based on a vocabulary

Object: Longitude in WGS84



Linked Data; a short introduction

Ontology / Vocabularies?

W3C says in their best practices Step#6 Use standard vocabularies:

- Standardised vocabularies should be reused as much as possible to facilitate inclusion and expansion of the web of data
- Vocabularies **MUST** be documented
- Vocabularies **SHOULD** be described in more than one language
- Vocabularies **SHOULD** be published by a trusted group or organisation
-

geo:long is described in the class

https://www.w3.org/2003/01/geo/wgs84_pos (Fierfox)

in the property longitude



Linked Data; a short introduction

Now we are ready



Let's start making data linkable



Example: Transportation stop





How to make them consumable?

It's like cooking really good food in a self service restaurant

You need

1. High quality certified raw material
→ standardised data in a well described data modell
2. A professional who knows the recipe
→ knowledge of the right vocabulary
3. A kitchen
→ soft and hardware (not content of this presentation)
4. Guests
→ Clients who uses the data

No guests - no usage - do more publicity!

If there is no demand your self service restaurant will





Transportation stops go linkable

Find the data, metadata, data model ...

Find the data: <https://data.geo.admin.ch/>

Metadata: ch.bav.haltestellen-oev

Data model: <http://models.geo.admin.ch/...> Interlis official norm

geocat.ch
geographic catalogue

ch.bav.haltestellen-oev

Public transport stops

Slope over 30 degrees

ÜBER GEO.ADMIN.CH

A PROPOS DE GEO.ADMIN.CH

geo.admin.ch ist die Geoinformationsplattform der Schweizerischen Eidgenossenschaft innerhalb der Bundesverwaltung. Als Anwender können Sie hier direkt auf Geoinformationen, -daten, -diensten und Metadaten des Bundes zugreifen.

geo.admin.ch est la plateforme de géoinformation de la Confédération suisse au sein de l'administration fédérale. En tant qu'utilisateur, vous pouvez directement accéder à des géoinformations, des géodonnées, des géoservices et des métadonnées de la Confédération ici.

DATENSATZ

JEU DE DONNÉES

http://map.geo.admin.ch/?layers=ch.bav.haltestellen-oev

Date	Time	Attr	Size	Compressed	Name
2017-12-21	10:14:44	...	2088651	1907483	Description_modèle_arrêts_tp_OFI_(ID_98.2)_V1_3.pdf
2017-12-21	10:50:16	...	448349	446361	EntrepriseTF_20171210.zip
2018-01-29	06:57:24	...	1131	497	license.txt
2017-12-04	14:45:34	...	5701093	5668597	Lieferung_HST_20171201_1_ArcGIS.zip
2017-12-04	14:45:40	...	4191564	4191564	Lieferung_HST_20171201_1_CSV.ZIP
2017-12-04	14:45:44	...	6575535	6575535	Lieferung_HST_20171201_1_Interlis.zip
2017-12-04	14:45:48	...	5829499	5812813	Lieferung_HST_20171201_1_MapInfo.zip
2018-01-29	07:16:12	...	6491164	615034	Metadata_gm03.xml
2018-01-29	07:16:02	...	417134	414227	Metadata_PDF.pdf
2018-01-29	07:16:16	...	1674185	430873	Metadata_xml_iso19139.xml
2017-12-21	10:11:22	...	1744559	1606327	Modellbeschreibung_Haltestellen_BAV_(ID_98.2)_V1_3.pdf
2018-01-29	07:14:26	...	161550	147011	Nutzungsbedingungen_98_2_BAV_O-BY.pdf
2017-12-04	14:31:58	...	144816	135366	ReleaseNotes_GBD_ID_98_2_20171210_de.pdf
2017-12-04	14:32:38	...	143086	133731	ReleaseNotes_GBD_ID_98_2_20171210_fr.pdf
2017-12-21	10:50:06	...	446335	444582	TransportunternehmenOEV_20171210.zip

36058651 28530001 15 files, 0 folders

[EN] O-BY: Open use. Must provide the source.

- You may use this dataset for non-commercial purposes.
- You may use this dataset for commercial purposes.
- You must cite the source (title of the dataset, Federal Office of Transport FOT).

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Transportation stops go linkable

Define your publishing model

It's a CSV, where we select the columns we like to publish

colum	«Ontology»
xtf_id	internal ID not published
Nummer	--> identifier
Name	--> name
Abkuerzung	ignore
DatenherrAbkuerzung	ignore
TUNummer	--> provider
TUAbkuerzung	is name from TUNummer ignore
Betriebspunkttyp	--> operatingPointType
Verkehrsmittel	ignore
y_Koord_Ost	--> long
x_Koord_Nord	--> lat
Hoehe	--> elevation
GdeNummer	--> containedInPlace
GdeName	is name from GdeNummer, ignore
BeginnGueltigkeit	--> validFrom
EndeGueltigkeit	never used, ignore
BearbeitungsDatum	--> dateModified
Stand	--> releaseDate
rUebergeordneteHaltestelle	ignore



Transportation stops go linkable

Create RDF triples subject–predicate–object (rule 3)

Sometimes you can take the data as they are

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://purl.org/dc/terms/identifier>
3. 8571395

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://schema.org/name>
3. Wabern, Tram-Endstation

.....



Transportation stops go linkable

Create RDF triples subject–predicate–object (rule 3)

Sometimes you have to calculate the value. In this example from our local reference system (LV95 EPSG 2056) to WGS84

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. https://www.w3.org/2003/01/geo/wgs84_pos#long
3. 7.45264305299276

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. https://www.w3.org/2003/01/geo/wgs84_pos#lat
3. 46.9280273599974

.....

Calculate value

2601067[LV95] to 7.452[WGS84]

119743[LV95] to 46.928[WGS84]



Transportation stops go linkable

Create RDF triples subject–predicate–object (rule 3)

Sometimes you have to change the format of the value. In this example from YYYYMMDD to
DateTime CCYY-MM-DDThh:mm:ss

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://schema.org/validFrom>
3. 2014-12-01

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://schema.org/releaseDate>
3. 2017-12-10

.....

Change format

20141201 to 2014-12-01

20171210 to 2017-12-10



Transportation stops go linkable

Create RDF triples subject–predicate–object (rule 3)

Sometimes you create «new» access to the same information

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://schema.org/hasMap>
3. <https://map.geo.admin.ch/?showTooltip=true&ch.bav.haltestellen-oev=8571395>

Call REST-API, show a map with all stops, **select the specified stop** and show a tooltip (more detailed information about the stop)





Transportation stops go linkable

Create RDF triples subject–predicate–object (rule 3)

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://schema.org/sameAs>
3. <http://api3.geo.admin.ch/rest/services/api/MapServer/ch.bav.haltestellen-oev/8571395?geometryFormat=geojson>

Call REST-API and returns all properties to an specified stop as geojson

```
{"feature": {"layerBodId": "ch.bav.haltestellen-oev", "featureId": 8571395, "id": 8571395, "geometry": {"type": "MultiPoint", "coordinates": [[601066.9624702379, 197436.96865385302]]}, "bbox": [601066.9624702379, 197436.96865385302, 601066.9624702379, 197436.96865385302], "layerName": "\u00f6V-Haltestellen", "type": "Feature", "properties": {"verkehrsmittel": "Bus_Tram", "name": "Wabern, Tram-Endstation", "tuabkuerzung": "PAG", "label": "Wabern, Tram-Endstation", "betriebspunkttyp": "Haltestelle", "abkuerzung": null}}}
```




Transportation stops go linkable

Create RDF triples subject–predicate–object (rule 3)

Sometimes you link your data to other linkable data.

Refer **rule 4**, include links to other URIs. so that they can discover additional data. Connect the data we have, into a web

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://schema.org/provider>
3. <https://ld.geo.admin.ch/transportation/provider/7>

Same dataset but other subject

1. <https://ld.geo.admin.ch/transportation/stop/8571395>
2. <http://schema.org/containedInPlace>
3. <https://ld.geo.admin.ch/boundaries/municipality/355>

Other dataset and other subject

.....

→ The most important! Connect the data



Transportation stops go linkable

And now?

- Store the triples in a triple store
- Twitter, post an announce your service sell it

If you implement a solution for HTML clients like web browsers, humans understand your data better and more easily.

If you use standardised and common vocabulary, RDF clients / machines can use your data.

If you describe your data well, search engines can browse your data and use them automatically.



HTML client



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geo.admin.ch - Linked Data

Searchterm

Wabern, Tram-Endstation

<https://ld.geo.admin.ch/transportation/stop/8571395>

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

Objekt-Information

Haltestellen des öffentlichen Verkehrs (Bundesamt für Verkehr)

Wabern, Tram-Endstation, nächste Abfahrt:

9	Bern Wankdorf, Bahnhof	09:12	3'
340	Niedermuhlen, Baumgärtli	09:15	6'
9	Bern Wankdorf, Bahnhof	09:18	9'
9	Bern Wankdorf, Bahnhof	09:24	15'
9	Bern Wankdorf, Bahnhof	09:30	21'

[Zusatzinformation](#)

Download Boundaries as GeoJSON

type	Stop
type	OperatingPoint
elevation	554 (M)
identifier	8571395
containedInPlace	355
dateModified	2017-12-01 (date)
hasMap	?showTooltip=true&ch.bav.haltestellen-oev=8571395
name	Wabern, Tram-Endstation
provider	7
releaseDate	2017-12-10 (date)
sameAs	8571395?geometryFormat=geojson
validFrom	2014-12-01 (date)
seeAlso	8571395
lat	46.9280273599974
long	7.45264305299276
meansOfTransportation	13
operatingPointType	Haltestelle



HTML client



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geo.admin.ch - Linked Data

Searchterm

Köniz

<https://ld.geo.admin.ch/boundaries/municipality/355>

a <http://schema.org/AdministrativeArea>, <http://www.opengis.net/ont/geosparql#Feature>, <http://www.geonames.org/ontology#ADM3>



Download Boundaries as GeoJSON

type	AdministrativeArea
type	Feature
type	A.ADM3
hasVersion	355:2018
hasVersion	355:2016
hasVersion	355:2017
hasMap	?ch.swisstopo.swissboundaries3d-gemeinde-flaeche.fill=355
name	Köniz
sameAs	355?geometryFormat=geojson
seeAlso	355
seeAlso	Q64058
bfsNumber	355