

# Applied Information and Data Science

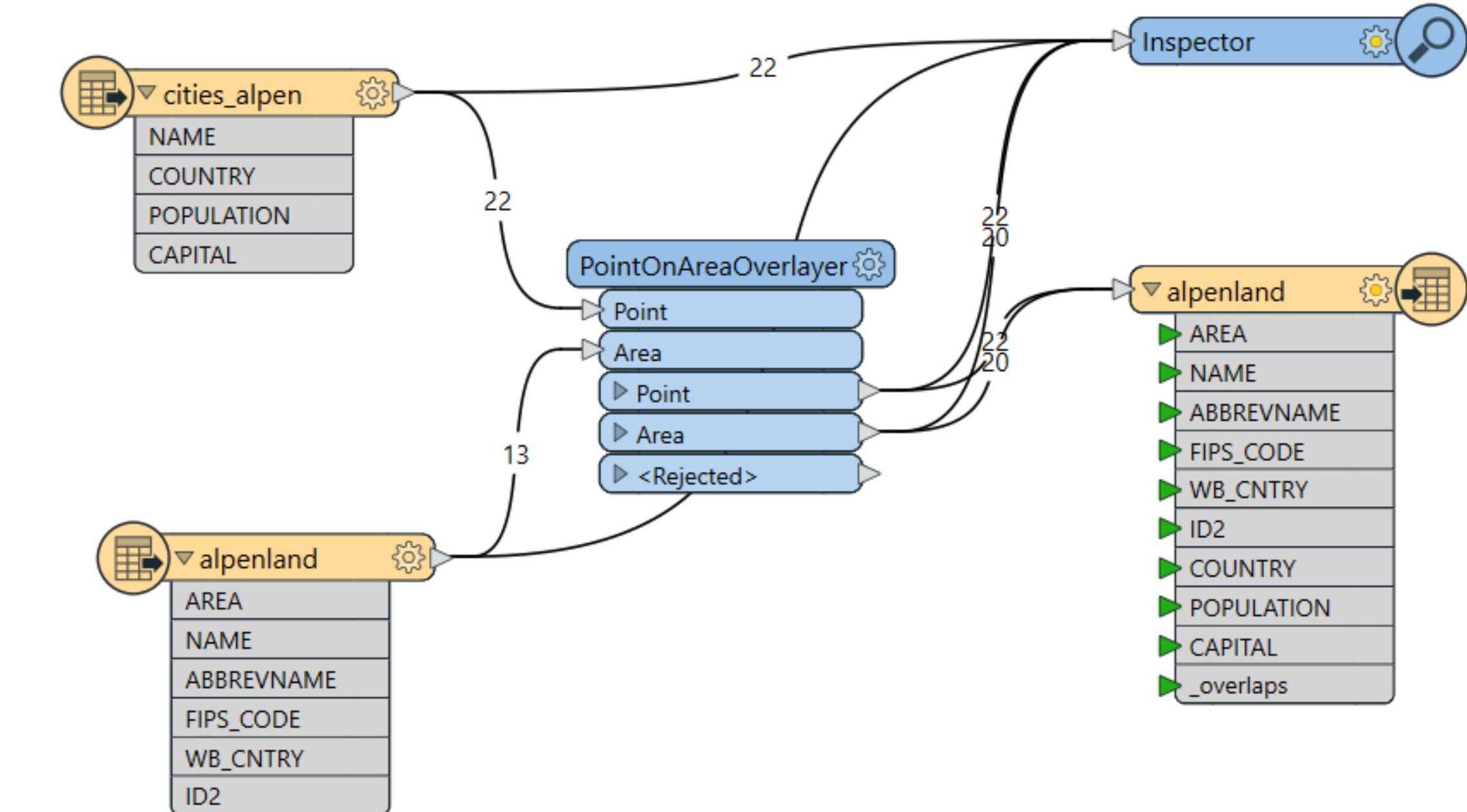
Geospatial Data Analysis for Smart Communities

## FME Introduction

Timo Ohnmacht

**Wirtschaft**

21. November 2025



# Current state of progress in the module

## Week 45 (4 lessons), 07.11.2025 (Face-to-Face)

Zeit	Lesson	Subject	Lecturer
12.25 - 13.15	1	Introduction to our semester work	Timo Ohnmacht
13.15 - 14.05	2		
14.05 - 14.55	3	Senozon Mobility Model: Analytics and Examples of microscopic and dynamic mobility data.	Michael Balmer
14.55 - 15.45	4		

## Week 46 (4 lessons), 14.11.2025 (Online)

Zeit	Lesson	Subject	Lecturer
12.25 - 13.15	1	Introduction QGis II: Thematic maps (points, lines and polygons)	Yves Maurer
13.15 - 14.05	2		
14.05 - 14.55	3	Introduction QGis III: Thematic maps (points, lines and polygons)	Yves Maurer
14.55 - 15.45	4		

## Week 47 (4 lessons), 21.11.2025 (Online)

Zeit	Lesson	Subject	Lecturer
12.25 - 13.15	1	Matrices of (cross-border) commuters, statistics on building zone & Population, employees and	Balz Bodenmann
13.15 - 14.05	2	statistics of areas	
14.05 - 14.55	3	FME Introduction	Timo Ohnmacht
14.55 - 15.45	4		

# Information

- You are now familiar with **Tableau** and **QGIS**
- You know the data **Swiss Data Sources**
- You are ready to **produce your map**. But first you have to:

## Etherpads

 Form your group ! (max. 5 persons per group)

# Your concept paper

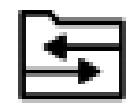
~1-2 pages

What kind of map do you want to produce?

Which data do you use?

Which theories can be applied?

What is the policy that can be linked to the data?



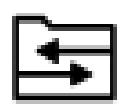
Upload your Concept Paper here (no later than 04.12.2025)



# Term paper

## Includes

- theoretical objective
- factsheet for the data used
- data preparation
- map
- form: scientific report: (10-15 pages containing all figures, maps and bibliography)



[Upload your Term Paper here \(no later than 31.01.2026\)](#)



# Week 49

## Week 49 (4 lessons), 05.12.2025 (Online)

Zeit	Lesson	Subject	Lecturer
12.25 - 13.15	1	Individual group work & coaching I	Timo Ohnmacht
13.15 - 14.05	2		
14.05 - 14.55	3	Individual group work II	Timo Ohnmacht
14.55 - 15.45	4		

We start with a presentation of each group:

Please be prepared to give insights into the

- topic of your concept,
- data availability and
- map

at the beginning of our meeting (approx. 5-10 minutes).

Please be brief and precise during your introduction! Please nominate a presenter in advance so we do not waste valuable time during the consultation.

Right away, I will give you a feedback on your topic in general and the feasibility of your study with regard to data availability and time efforts for realization of the project until the end of the semester.

## Week 49

You will receive at the end of the consultation one of the following information:

**Do it!:** Concept is feasible - both in terms of concept (1), data availability (2), time efforts (3) for realization and meaningfulness of the map (4)!

**Minor revision needed** - do it! Change the concept slightly on your own, hand it in and do the map!

**Major revision needed** – do it again! Go and search new data, develop a new concept of a map and hand in a new version of your concept that will be “feedbacked” again by us!

## Install FME

- Do you have student licenses?: [safe.com/downloads](https://safe.com/downloads)

# Agenda

## Part 1

- Introduction to (geo)-data processing with FME (*theory*)
- Tutorial and *introductory exercises*

## Part 2

- Coaching of own, project-specific applications
- Q&A

Today we **learn** ...

- to familiarising ourselves with the **components** of FME
- to understand the structure of a **workbench**
- to carry out the first simple **data manipulations**

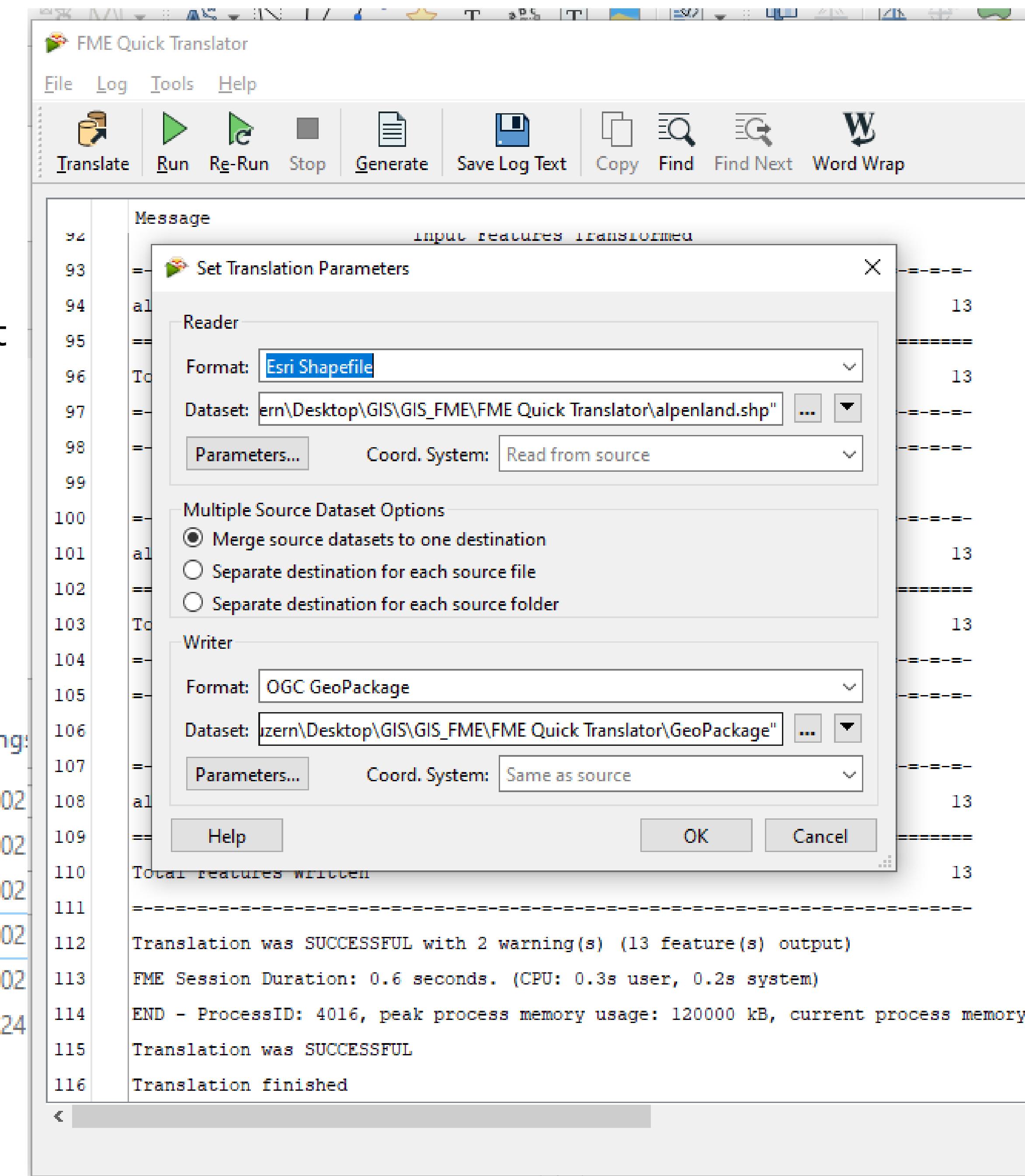
## Primary FME components

- FME Quick Translator
- FME Data Inspector
- FMW Workbench

# 01\_FME Quick Translator

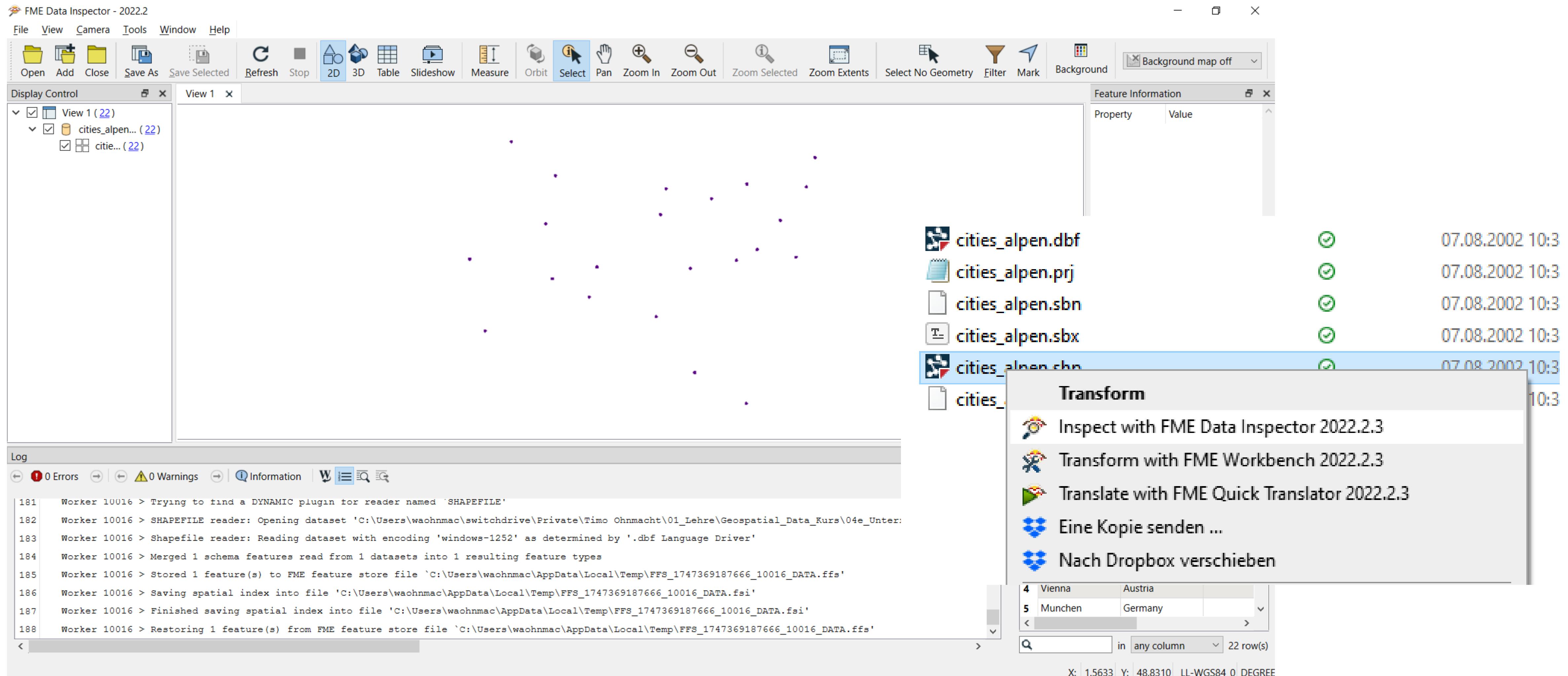
- The **FME Universal Translator** is used for fast translation from one format to another without parameterization  
(= adding/changing attributes/variables/information).
- Application example: Translation of ESRI shape files to a geodatabase or to GeoPackage

Name	Status	Änderung:
alpenland.prj	🕒	05.08.2002
alpenland.sbn	🕒	05.08.2002
alpenland.sbx	🕒	05.08.2002
<b>alpenland.shp</b>	🕒	05.08.2002
alpenland.shx	🕒	05.08.2002
<b>GeoPackage.gpkg</b>	🕒	04.12.2024

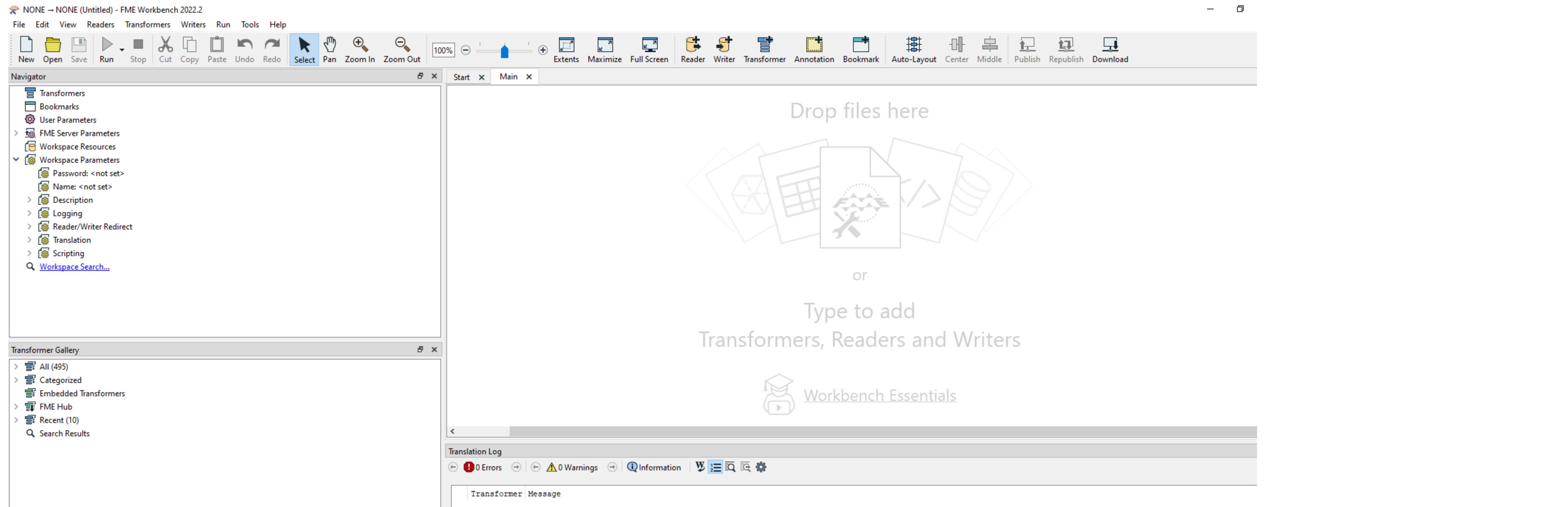


## 02\_FME Data Inspector

- The **FME Data Inspector** is used for preview of data.

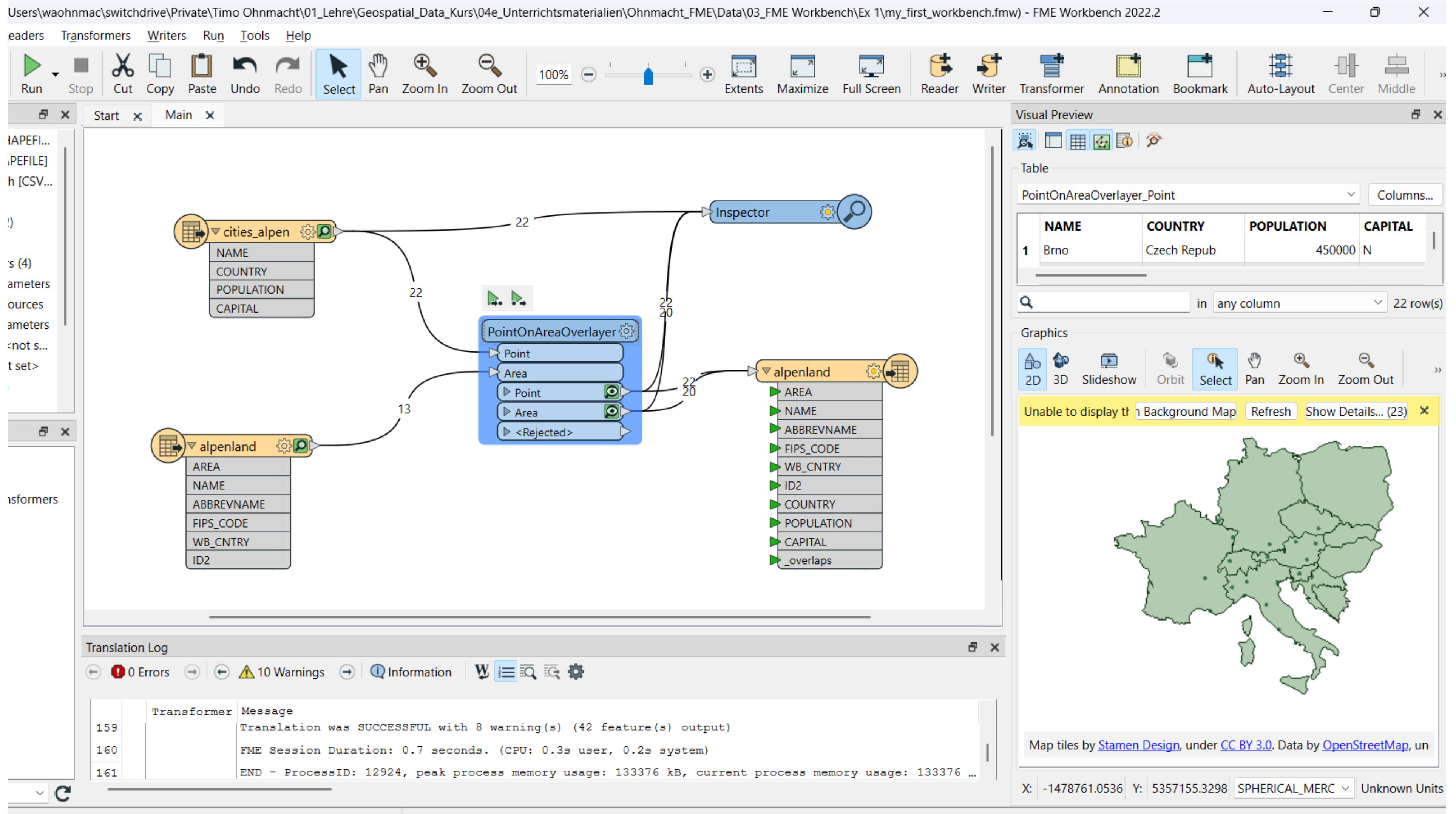


## 03\_FME Workbench

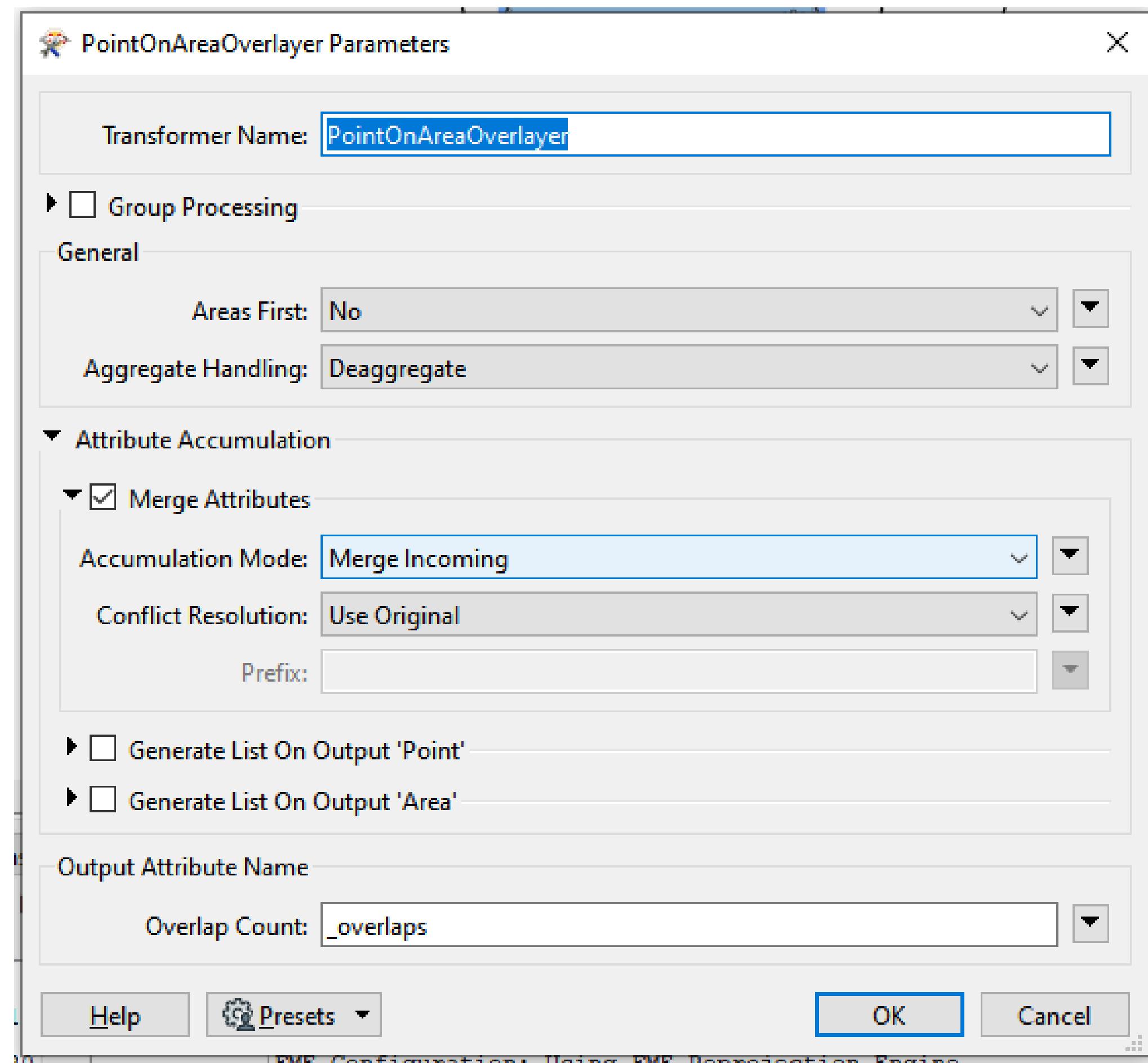


- The **FME Workbench** can define complex translation and processing procedures.
- Data flows can be defined between different source and target formats.
- By adding so-called '**transformers**', individual or entire groups of objects can be manipulated.
- Attributes can be added, and external data sources can be connected (e.g., Federal Register of Buildings and Dwellings (GWR)).
- With over **300 functions**, the workbench is a powerful tool.

# Ex 1: PointOnAreaOverlayer



# Ex 1: PointOnAreaOverlayer = Spatial Join



A	B	C	D	E	F	G	H	I	J
AREA	NAME	ABBREVNAME	FIPS_CODE	WB_CNTRY	ID2	COUNTRY	POPULATION	CAPITAL	_overlaps
30951.749	Brno	Czech Repub	EZ			Czech Repub	450000	N	1
212659.463	Strasbourg	France	FR	FRA		France	400000	N	1
32782.119	Linz	Austria	AU	AUT		Austria	335000	N	1
32782.119	Vienna	Austria	AU	AUT		Austria	1875000	Y	1
135095.816	Munchen	Germany	GM			Germany	1955000	N	1
32782.119	Innsbruck	Austria	AU	AUT		Austria	185000	N	1
32782.119	Graz	Austria	AU	AUT		Austria	325000	N	1
16004.784	Bern	Switzerland	SZ	CHE		Switzerland	298800	Y	1
212659.463	Lyon	France	FR	FRA		France	1275000	N	1
114334.976	Milano	Italy	IT	ITA		Italy	3750000	N	1
114334.976	Venezia	Italy	IT	ITA		Italy	420000	N	1
114334.976	Torino	Italy	IT	ITA		Italy	1550000	N	1
114334.976	Firenze	Italy	IT	ITA		Italy	640000	N	1
114334.976	Trieste	Italy	IT	ITA		Italy	239031	N	1
32782.119	Salzburg	Austria	AU	AUT		Austria	220000	N	1
20746.208	Zagreb	Croatia	HR			Croatia	697925	Y	1
7892.208	Ljubljana	Slovenia	SI			Slovenia	233200	Y	1
1041.095	Luxembourg	Luxembourg	LU	LUX		Luxembourg	133000	Y	1
114334.976	Genova	Italy	IT	ITA		Italy	805000	N	1
212659.463	Marseille	France	FR	FRA		France	1225000	N	1
114334.976	Napoli	Italy	IT	ITA		Italy	2875000	N	1
114334.976	Roma	Italy	IT	ITA		Italy	3175000	Y	1

## Ex 2: Include OSM: <http://extract.bbbike.org/>

The screenshot shows the extract.bbbike.org web application interface. On the left, there is a sidebar with the following fields:

- Format: Shapefile (Esri) (selected)
- Name der extrahierten Region: (empty input field)
- Deine E-Mail Adresse: timo.ohnmacht@gmail.com
- Andere Region auswählen: (button)
- extrakt: (button)
- Options:
  - Punkte zum Polygon hinzufügen (radio button)
  - Polygon vergrössern o. verschieben (radio button, selected)

Below the sidebar, there is a text instruction:

Um das Polygon zu ändern, musst du zuerst darauf klicken und dann kannst du es verschieben, skalieren oder erweitern. Bitte drücke den Extraktionsknopf, nachdem Du mit der Polygonerstellung fertig bist.

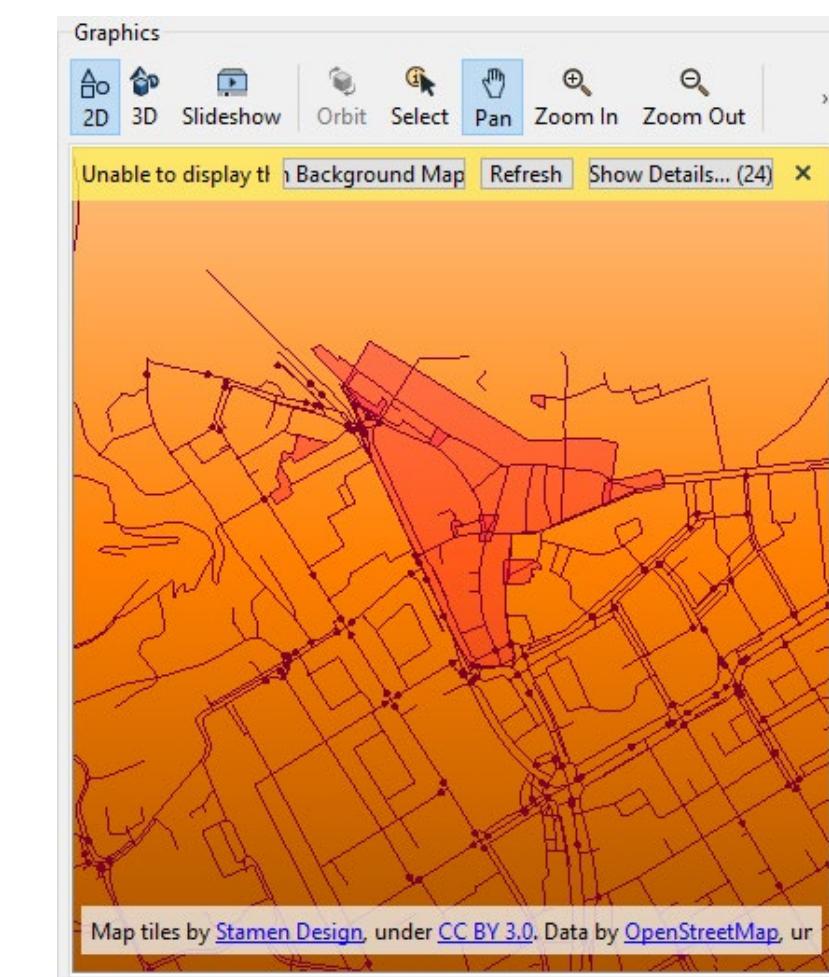
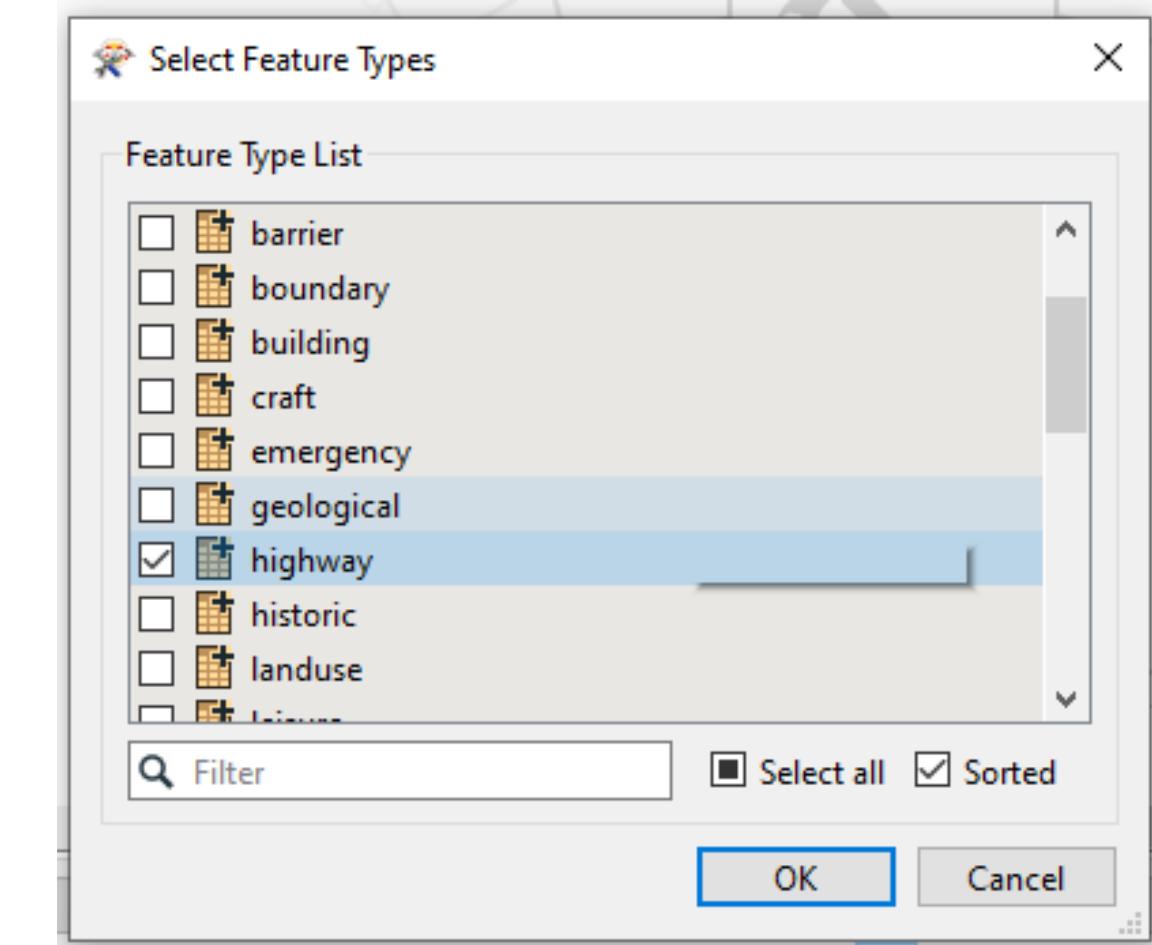
At the bottom of the sidebar, there is a "Donate" button with payment method icons (Mastercard, Visa, giroPay, Facebook).

The main area of the interface is a map of Lucerne, Switzerland, centered on the city. A yellow polygon highlights a specific area of the city, likely the one defined in the extraction settings. The map shows various landmarks and street names. At the bottom of the map, there is a scale bar indicating 200 m and 1000 ft, and a timestamp indicating the last database update was on 2025-04-17T00:00:00Z.

## Ex 2: Include OSM

Get data: <http://extract.bbbike.org/>

The screenshot shows the extract.bbbike.org web application. At the top, there's a navigation bar with links for Chronik, Export, GPS-Tracks, Benutzer-Blogs, and Gemeinschaft. Below the navigation is a search bar and a toolbar with icons for zooming and panning. A modal window titled "Exportieren" is open, displaying coordinates (47.051689, 8.309301), (8.292543, 8.3045293), and (47.045293, 8.292543). It also includes a link to "Einen anderen Bereich manuell auswählen". The main area shows a detailed map of Lucerne with street names like Gutschweg, Gibraltarstrasse, and Reussstrasse. A legend on the left identifies different OSM data types: barrier, boundary, building, craft, emergency, geological, highway (which is checked), historic, landuse, and waterway.

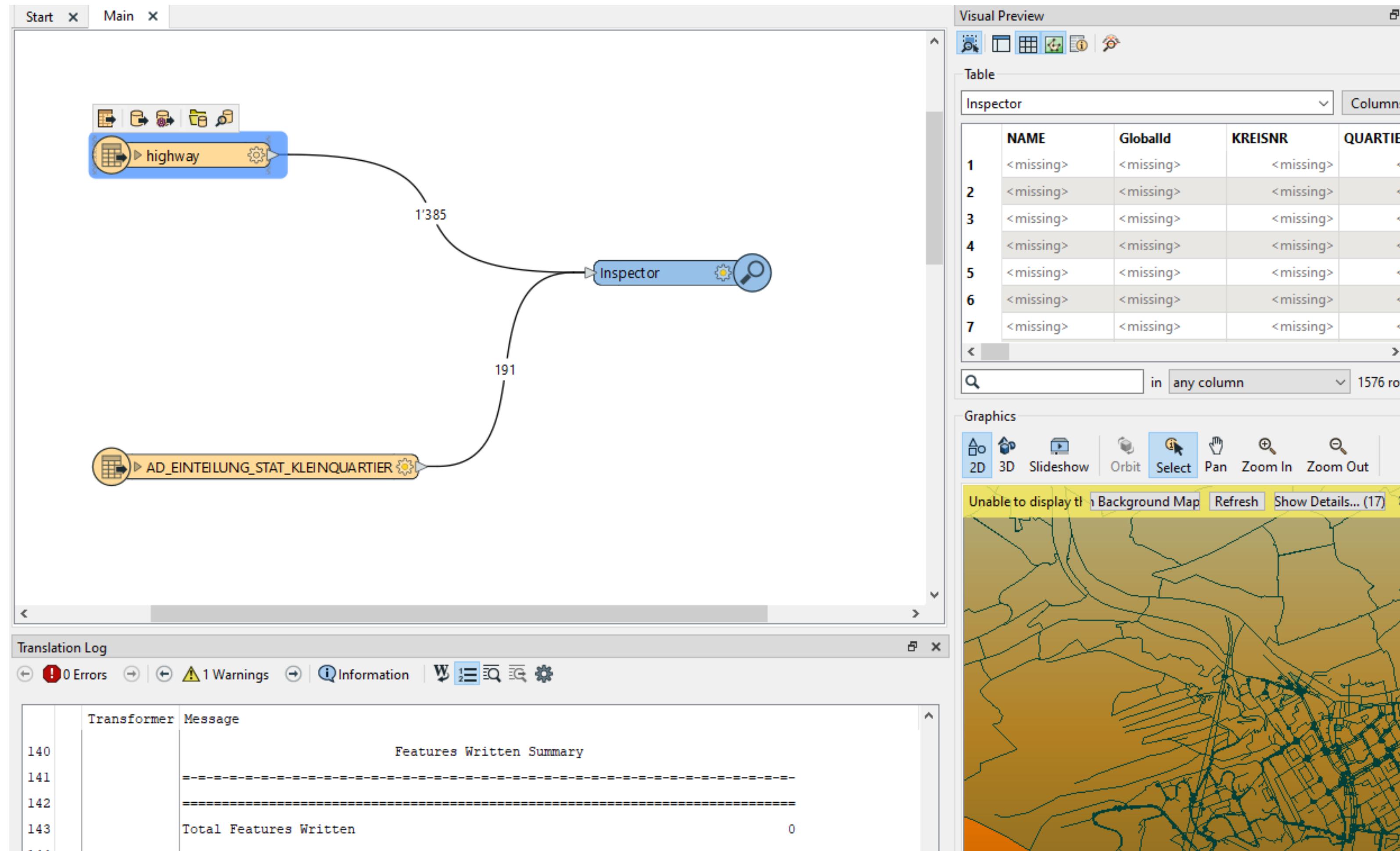


Get data: [Stadt Luzern: Einteilung Stadtkreise und -quartiere | opendata.swiss](#)

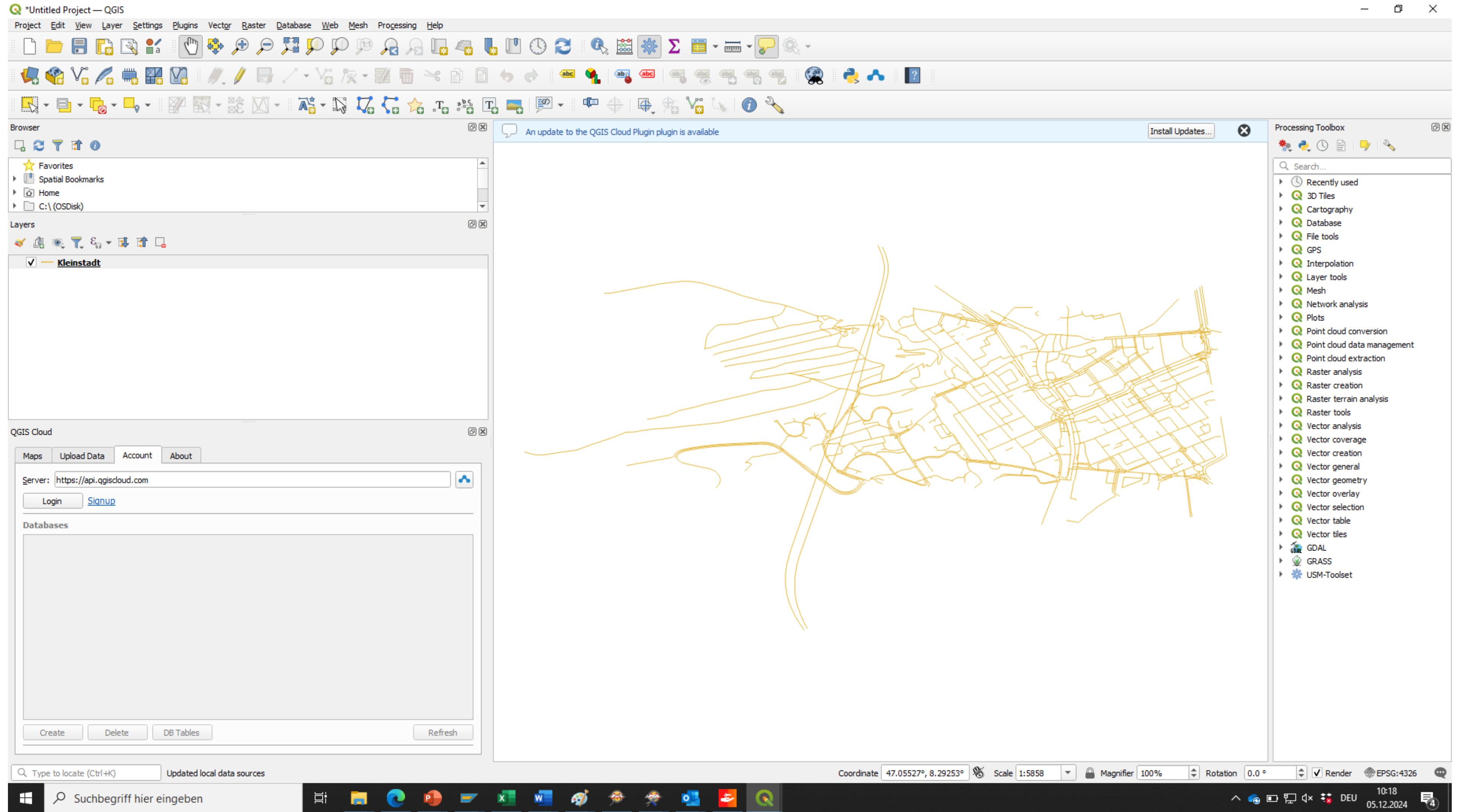
Oder direkt: [Stadt Luzern: Einteilung Stadtkreise und -quartiere - Geoportal Kanton Luzern](#)

(1201 = Kleinstadt)

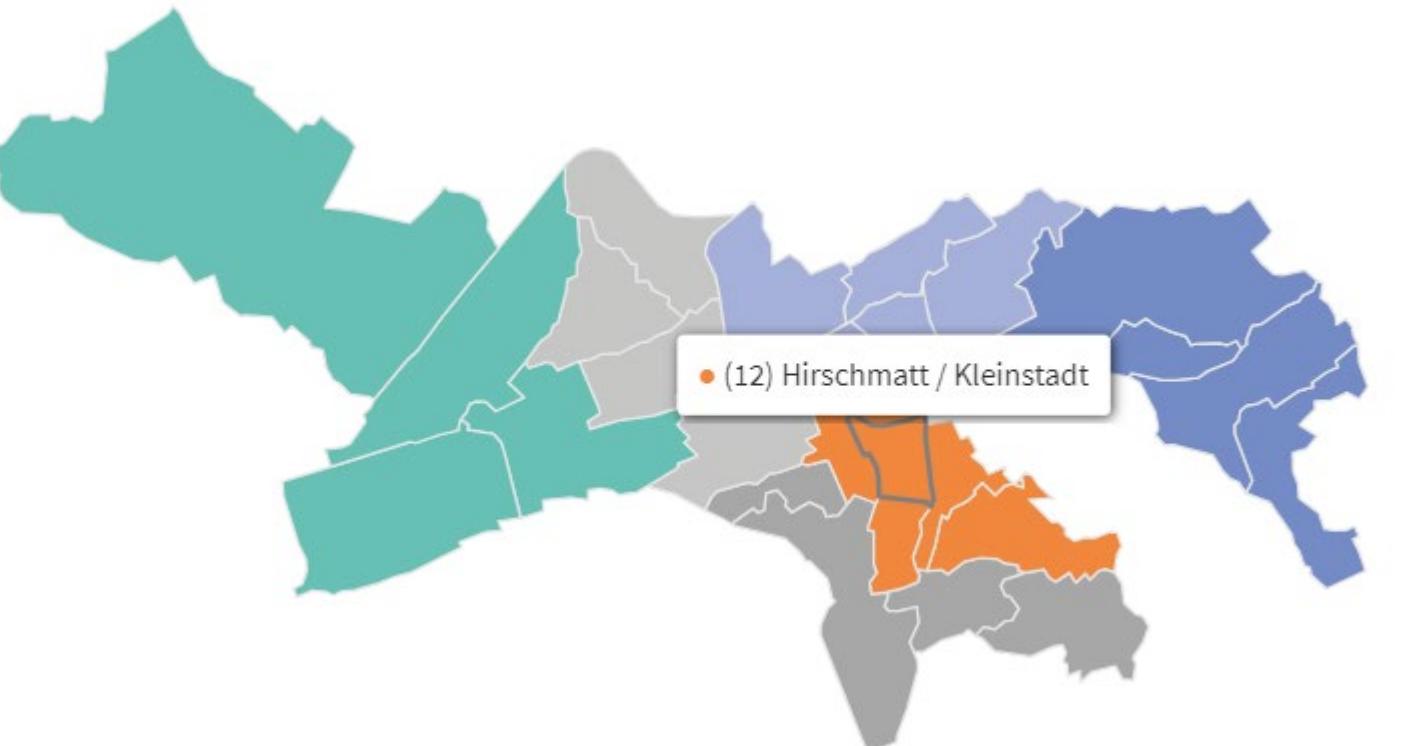
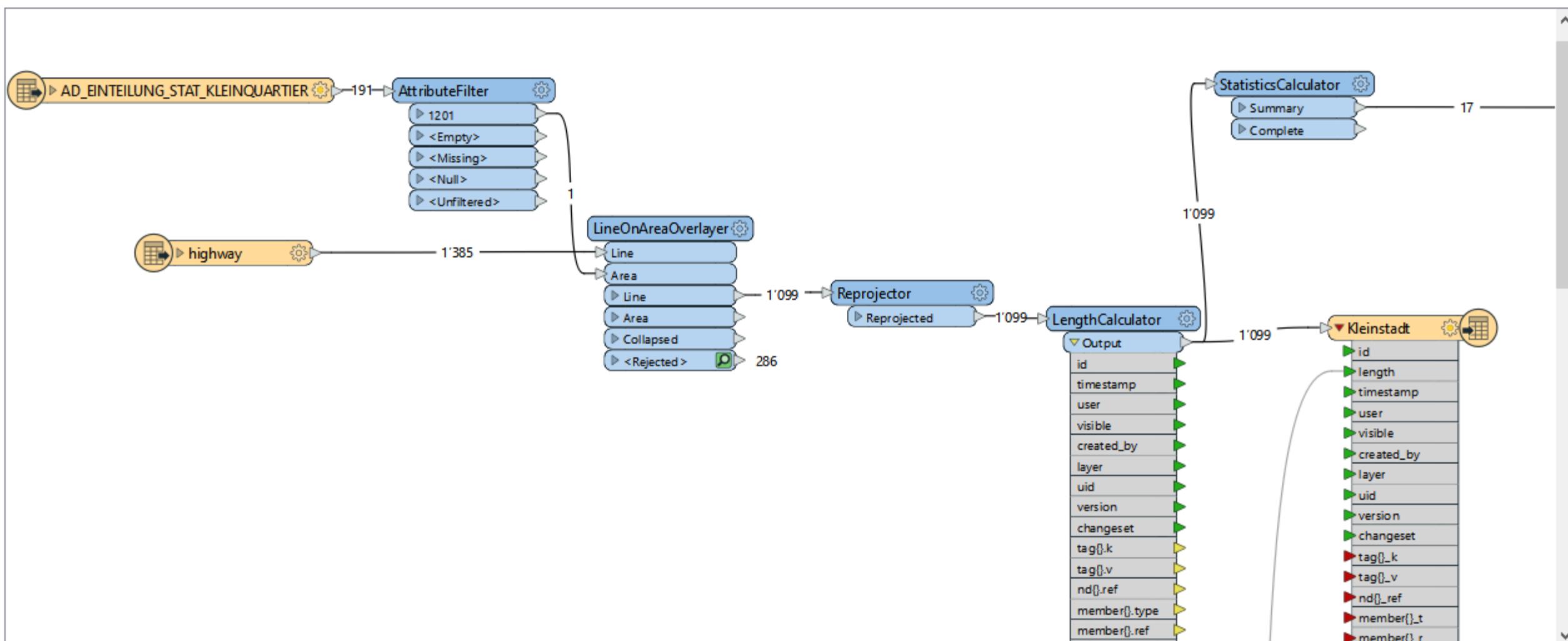
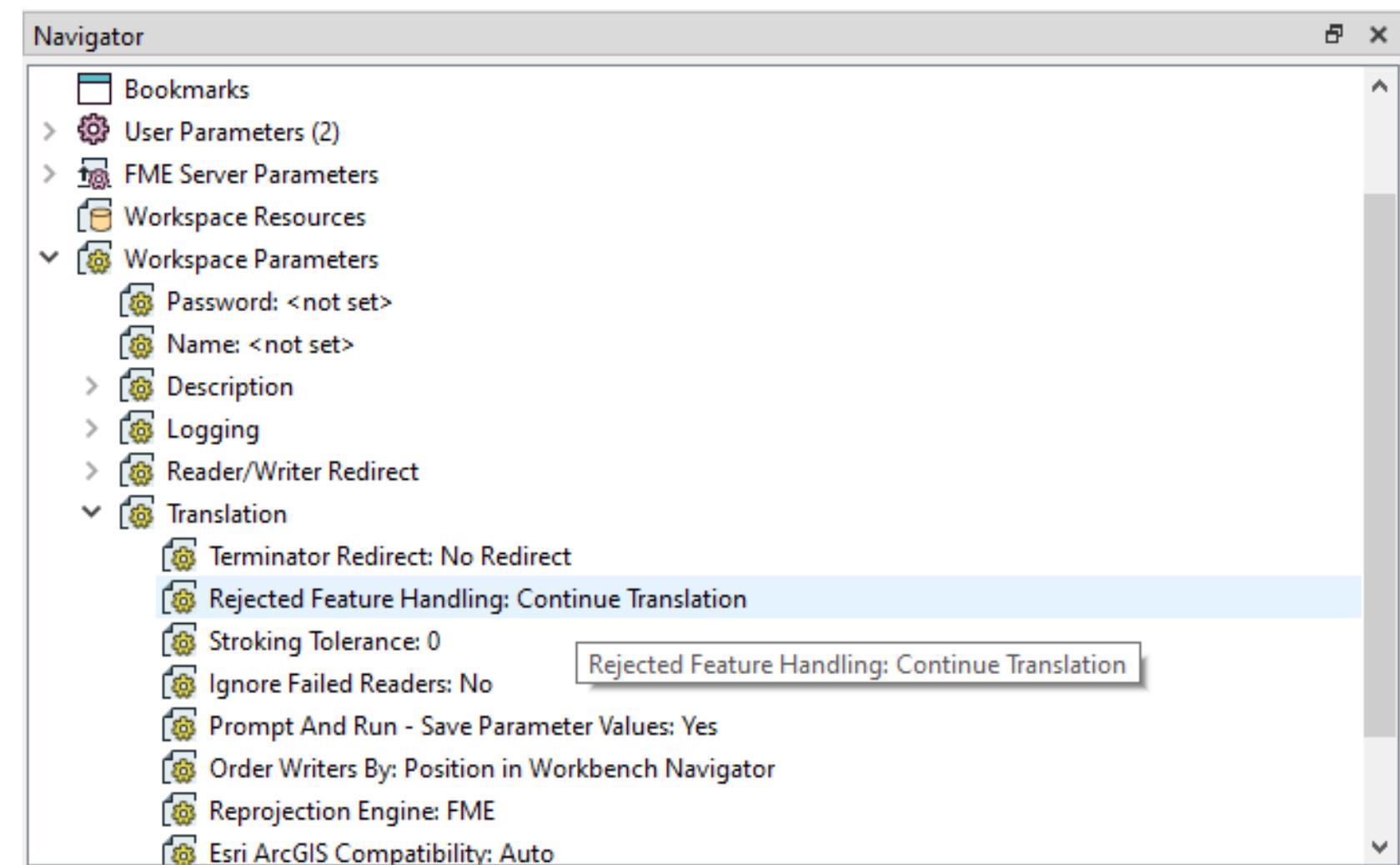
## Ex 2: Include OSM & combine it with borders



## Ex 2: Transport Infrastructure that intersects «Kleinstadt Luzern» (inluding\_length)



## Ex 2: Include OSM combine it with borders



**Visual Preview**

**Table**

**Inspector**

highway	_length.sum
1 residential	12.53630262519...
2 cycleway	0.515434226540...
3 steps	0.767196928803...
4 footway	18.24384311495...
5 secondary	0.633147064019...
6 tertiary	0.58223905967426
7 primary_link	0.025374446896...
8 track	2.340990990529...
9 pedestrian	1.17867691914086
10 service	6.085900292312...
11 living_street	0.920150379457...
12 primary	2.326803997153...
13 motorway_link	0.364094469647...
14 motorway	3.384699162667...
15 unclassified	0.184156823867...
16 path	3.315345631126...
17 platform	0.722312038404...

# Parkplätze auf öffentlichem Grund | opendata.swiss



Daten Organisationen Showcases Dashboard Handbuch Mehr ▾

Startseite > Organisationen > Stadt Luzern > Parkplätze auf öffentlichem... > Parkplätze auf...

## Parkplätze auf öffentlichem Grund

Zuletzt aktualisiert

17. Juli 2025

Nutzungsbedingungen



Organisation

Stadt Luzern

Format

GPKG

Herunterladen

### Beschreibung

Parkplätze als Geopackage (.gpkg)

### Zusätzliche Informationen

Identifier

Publikationsdatum 24. Februar 2021

## Links & Ressources

- fme- community: [FME by Safe Software Community | Community](#)
- Readers & Writers: [FME Readers and Writers Documentation](#)
- FME Blogs: [Improving transportation data: 8 real-world success stories using FME - FME by Safe Software](#)

## Ex 3:

- **Aim** : Combine municipal boundaries in Switzerland with statistical figures and aggregate to cantons.
- **Inputdata** : Swissboundaries, [Housing inventory and secondary homes rate](#)
- **Manipulations** : Dissolver

## Ex 4:

- **Aim** : The Ex1 workbench is to be extended so that the proportion of second homes is shown for each municipality, and those with a proportion > 20% are written as an additional table (e.g. Excel).
- **Inputdata** : see Ex 3
- **Manipulations** : ExpressionEvaluator

## Ex 5:

- **Aim** : Sort road categories according to certain criteria (road class or speed category) and write them as separate geodata sets.
- **Inputdata** : OSM
- **Manipulations** : Reprojector, TestFilter

## Ex 6:

- **Aim** : Hectare data Inhabitants. Hectare data employees, commune typology ARE
- **Inputdata** : OSM
- **Manipulations** : PointOnAreaOverlayer, Aggregator, ...

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