

Applied Information and Data Science

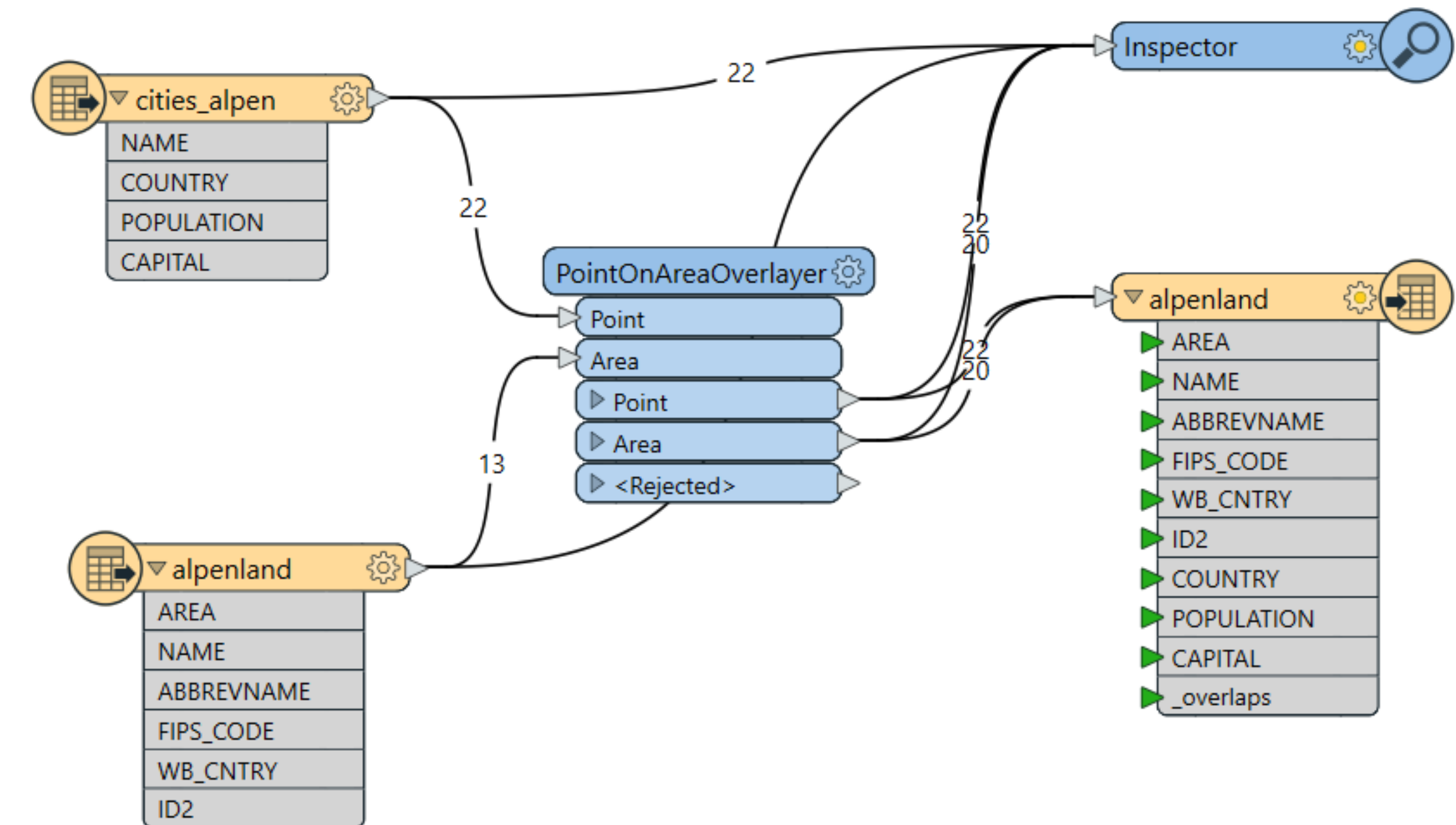
Geospatial Data Analysis for Smart Communities

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 polygones) | Yves Maurer |
| 13.15 - 14.05 | 2 | | |
| 14.05 - 14.55 | 3 | Introduction QGis III: Thematic maps (points, lines and polygones) | 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 statistics of areas | Balz Bodenmann |
| 13.15 - 14.05 | 2 | | |
| 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

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**

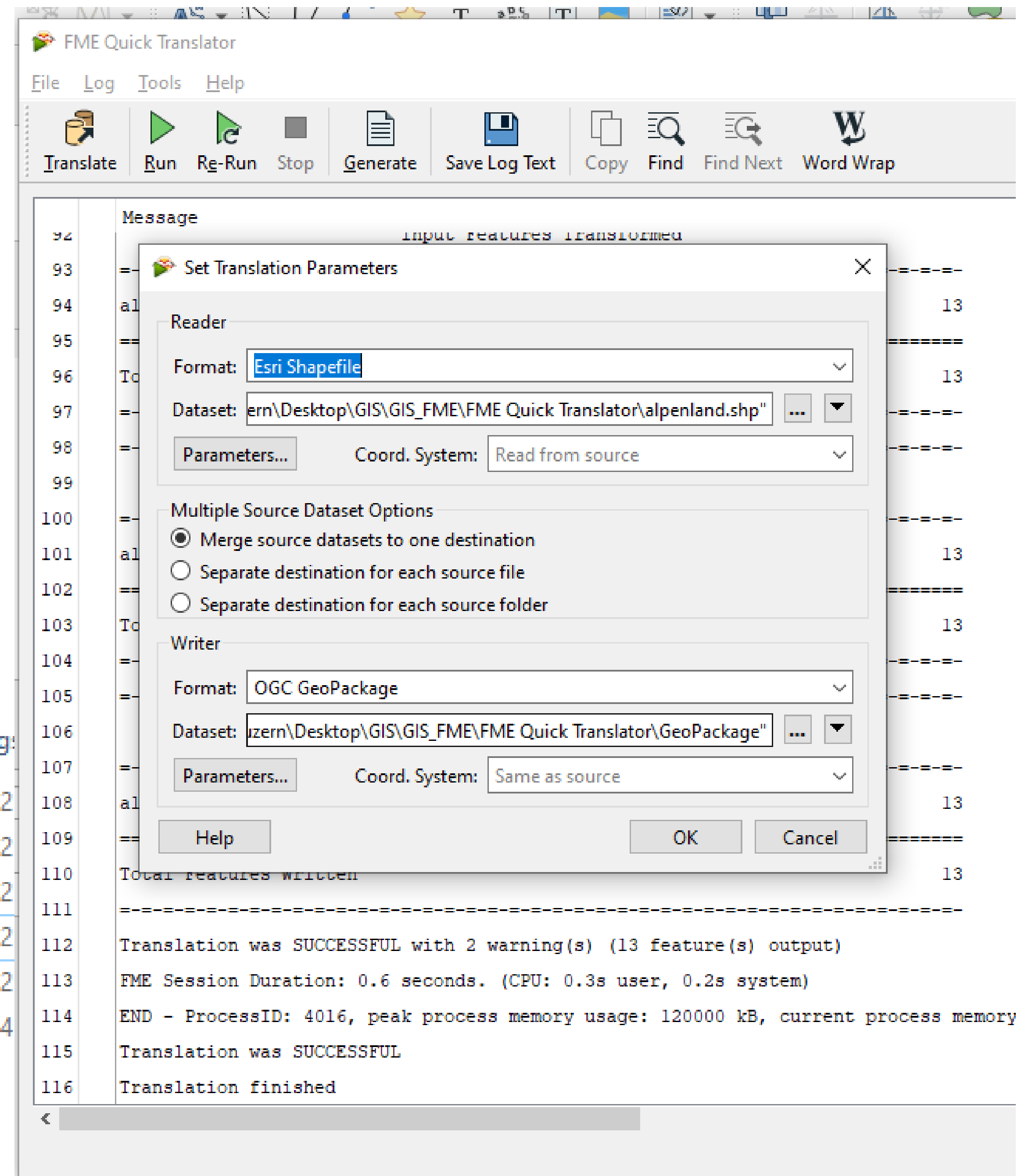
Primary FME **components**

- FME Quick Translator
- FME Data Inspector
- FMW Workbench

01_FME Quick Translator

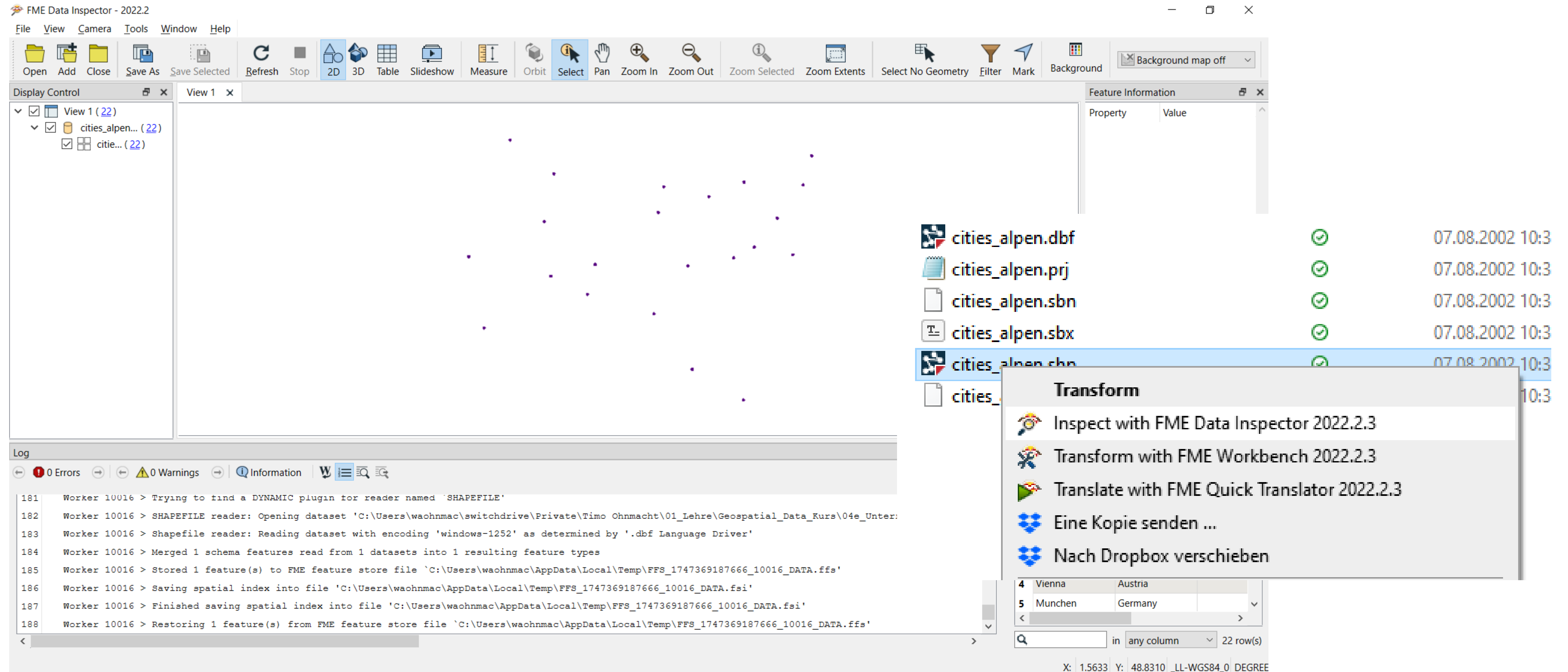
- The **FME Universal Translator** is used for fast translation from one format to another without parameterization (= adding/changing attributes/variables/information).
- Application example: Translation of ESRI shape files to a geodatabase or to GeoPackage

| Name | Status | Änderung: |
|---|--------|------------|
|  alpenland.prj | ✓ | 05.08.2002 |
|  alpenland.sbn | ✓ | 05.08.2002 |
|  alpenland.sbx | ✓ | 05.08.2002 |
|  alpenland.shp | ✓ | 05.08.2002 |
|  alpenland.shx | ✓ | 05.08.2002 |
|  GeoPackage.gpkg | ✓ | 04.12.2024 |

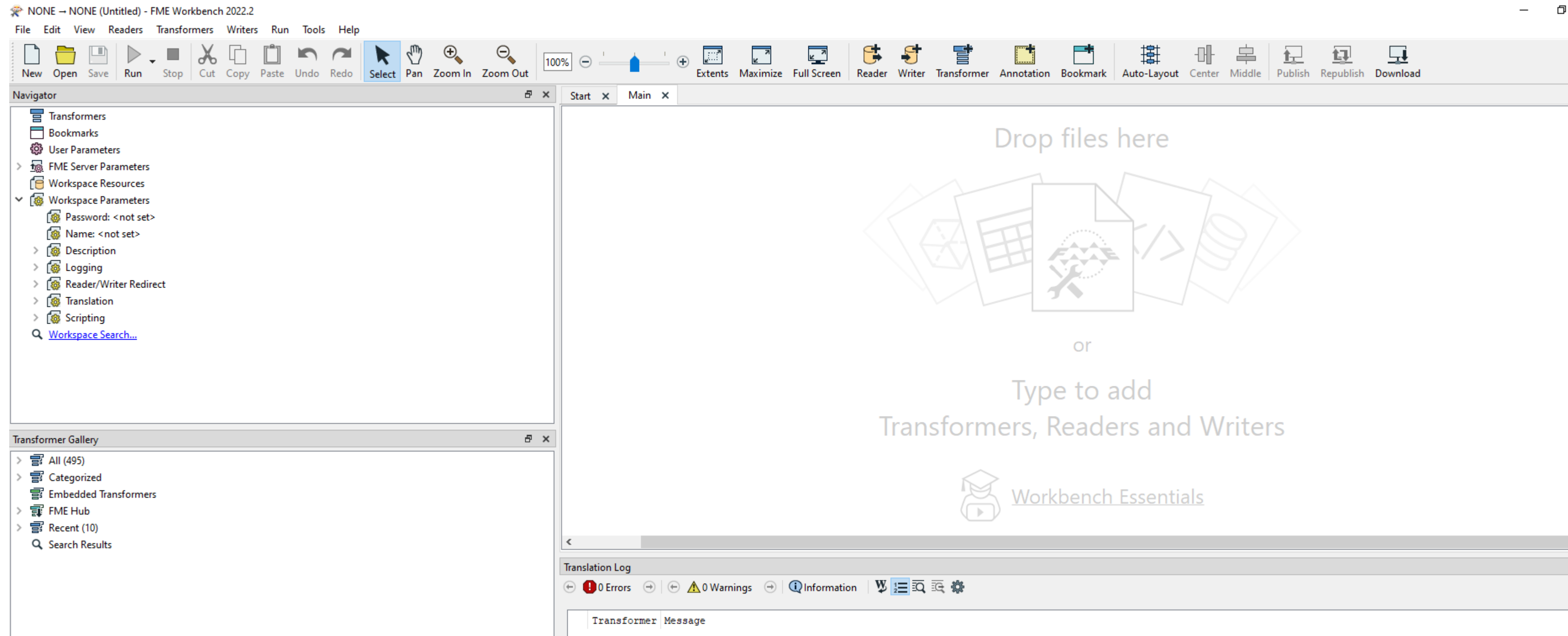


02_FME Data Inspector

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

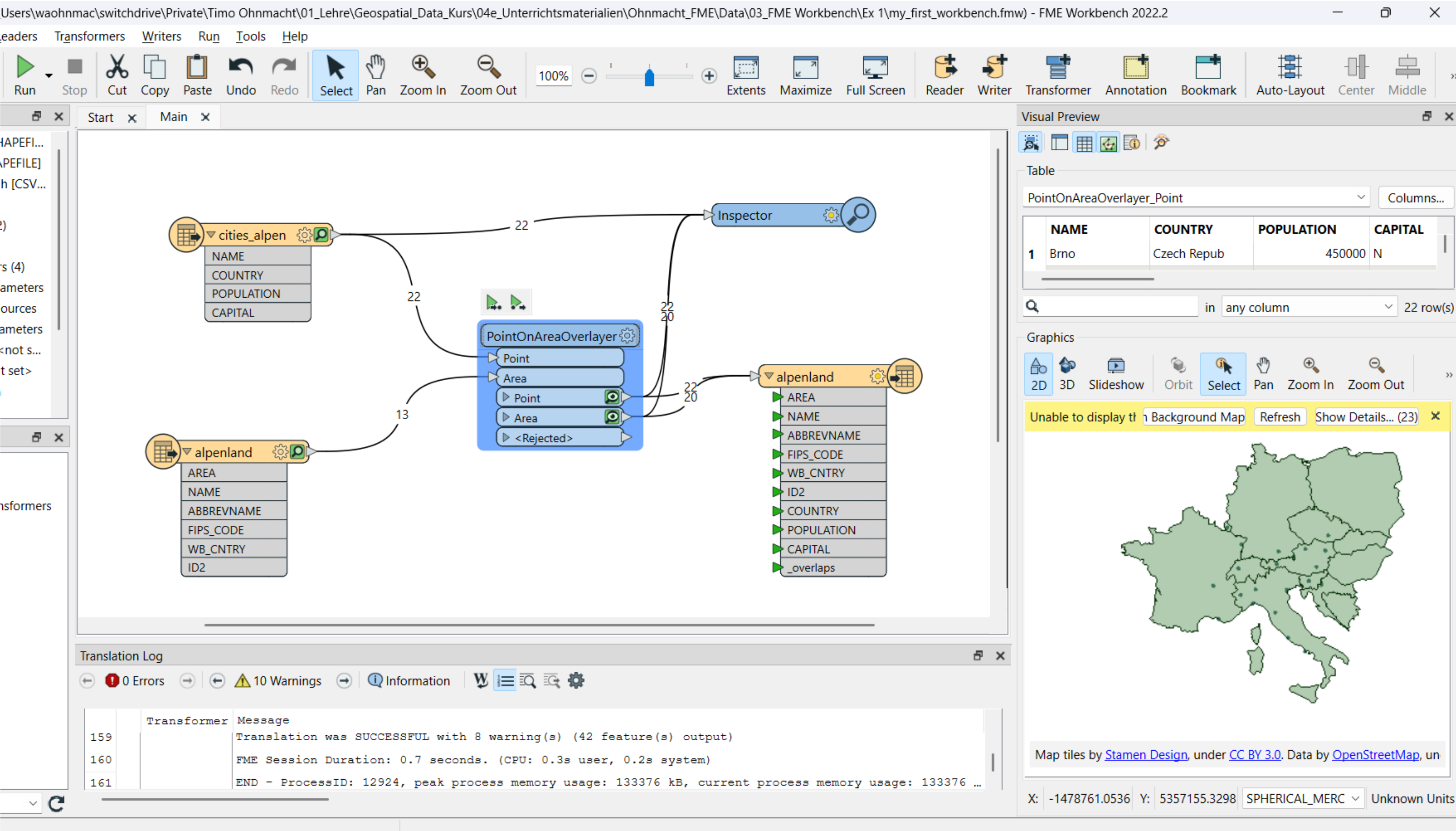


03_FME Workbench




- 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

 **PointOnAreaOverlayer Parameters** ✕

Transformer Name:

☐ Group Processing

General

Areas First: ▼

Aggregate Handling: ▼

▼ Attribute Accumulation

▼ ☒ Merge Attributes

Accumulation Mode: ▼

Conflict Resolution: ▼

Prefix:

☐ Generate List On Output 'Point'

☐ Generate List On Output 'Area'

Output Attribute Name

Overlap Count: ▼

▼

| A | B | C | D | E | F | G | H | I | J |
|------------|------------|-------------|-----------|----------|-----|-------------|------------|---------|-----------|
| AREA | NAME | ABBREVNNAME | 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/>

en de fr ru - intro - über

Format ?
Shapefile (Esri) ▼

Name der extrahierten Region ? oder Suche

Deine E-Mail Adresse ?

Andere Region auswählen ?

○ zeige lng/lat
4 km²

~0.3 MB

2 min

extrakt

Punkte zum Polygon hinzufügen ?

Polygon vergrössern o. verschieben ?

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.

Donate

home | hilfe | garmin | status | download | kommerzieller support

(©) 2025 BBBike.org by Wolfram Schneider
Map data (©) OpenStreetMap.org contributors

Zoom HSLU PPDB M G R S SWEET SZ DP SNF HSLU - Zoom we WT Basic Channel Dub... Weitere Favoriten

200 m

1000 ft

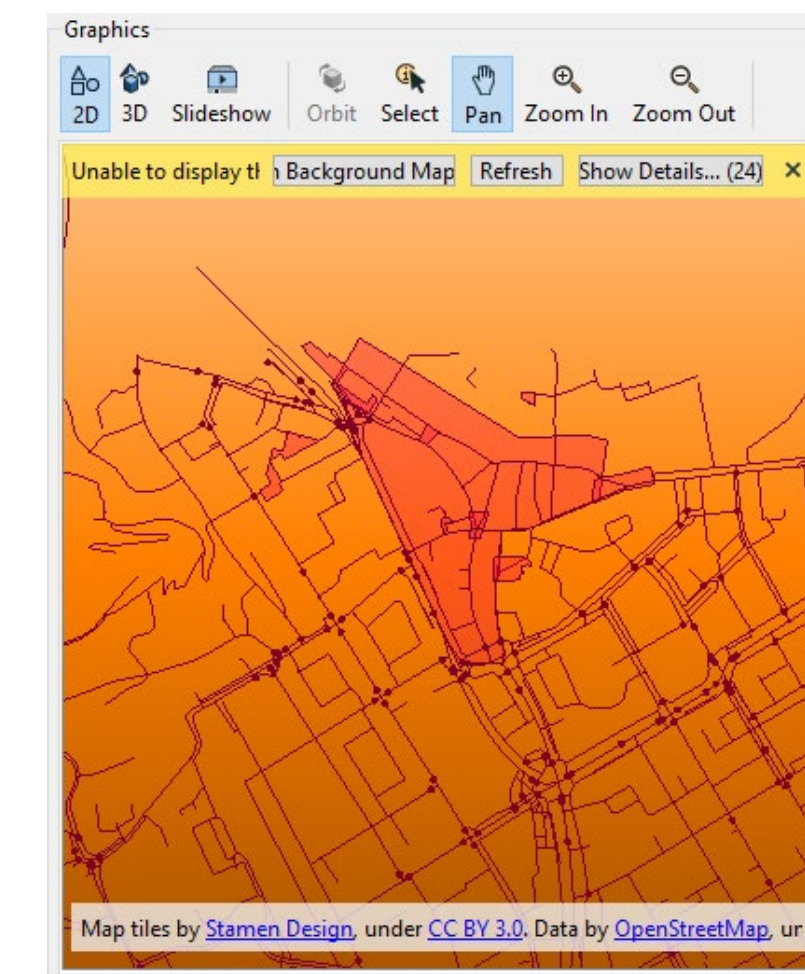
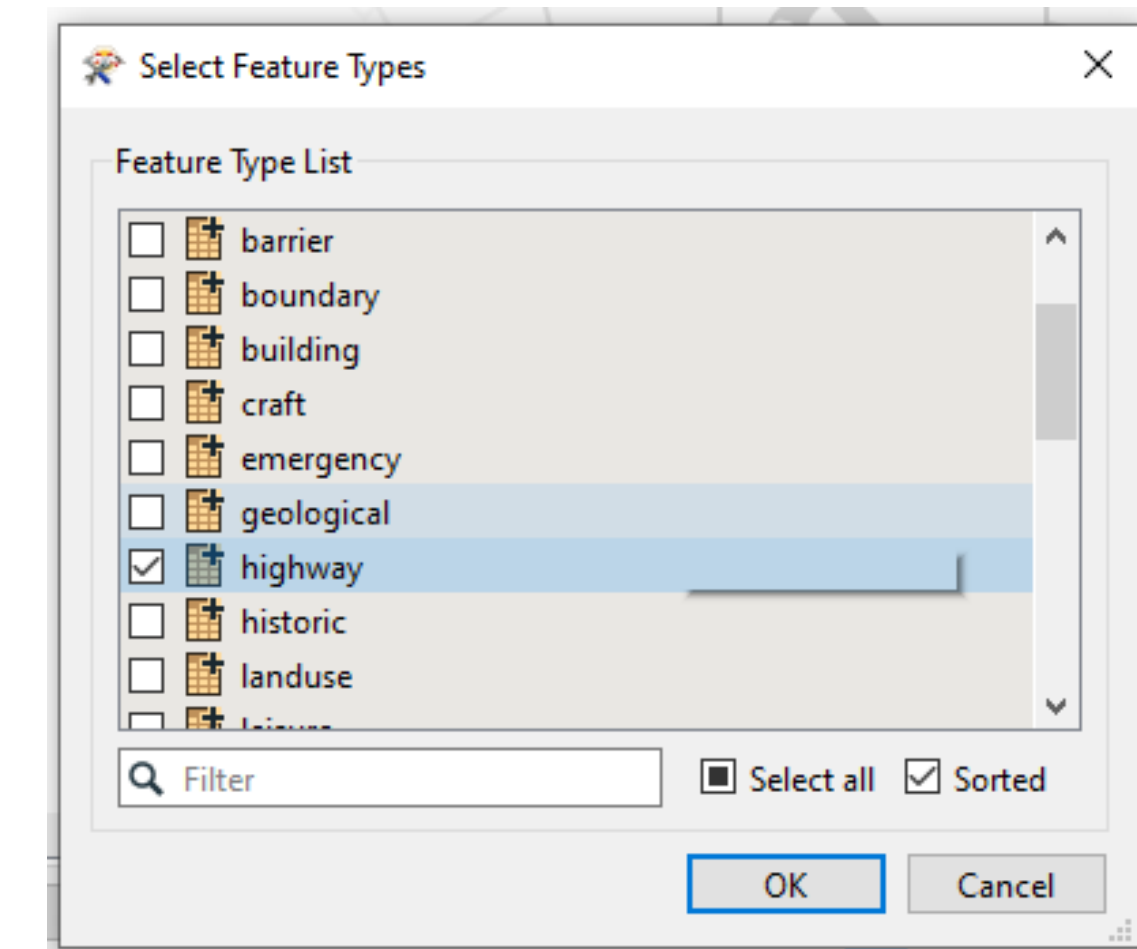
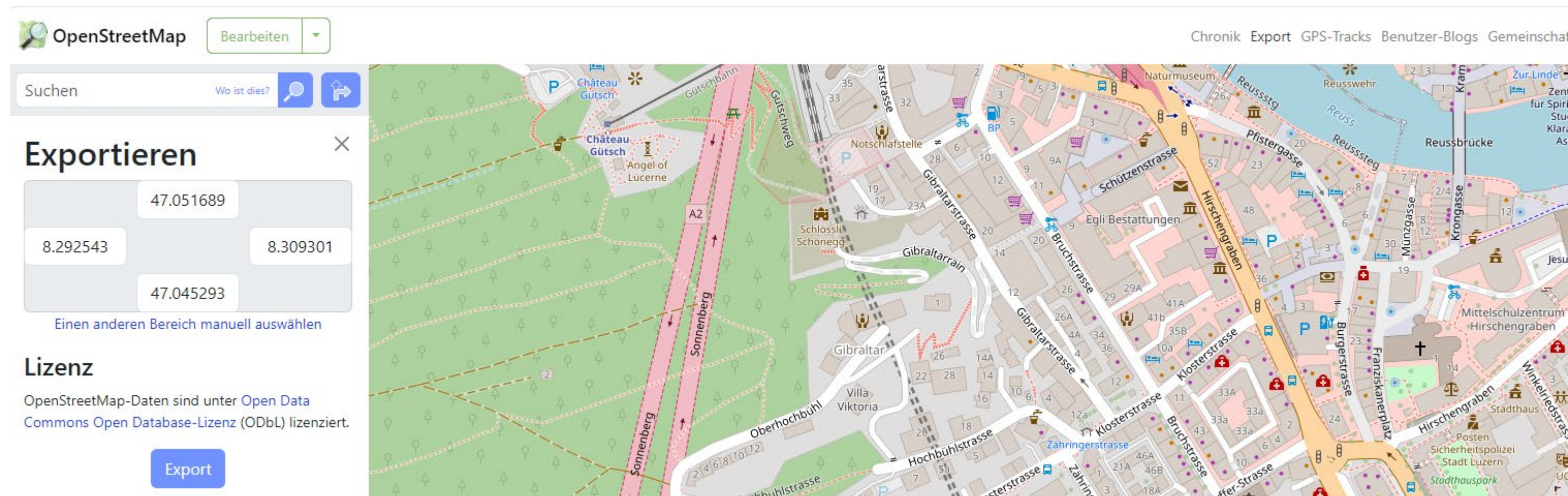
(©) OpenStreetMap contributors, (©) OpenCycleMap

last database update: 2025-04-17T00:00:00Z

Permalink 8.29500, 47.04814

Ex 2: Include OSM

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



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

Oder direkt: [Stadt Luzern: Einteilung Stadtkreise und -quartiere - Geoportal Kanton Luzern](http://geoportal.kanton-luzern.ch)

(1201 = Kleinstadt)

Ex 2: Include OSM & combine it with borders

StartMain

highway

1'385

AD_EINTEILUNG_STAT_KLEINQUARTIER

191

Inspector

Visual Preview

Table

Inspector

| | NAME | GlobalId | KREISNR | QUARTIER |
|---|-----------|-----------|-----------|-----------|
| 1 | <missing> | <missing> | <missing> | <missing> |
| 2 | <missing> | <missing> | <missing> | <missing> |
| 3 | <missing> | <missing> | <missing> | <missing> |
| 4 | <missing> | <missing> | <missing> | <missing> |
| 5 | <missing> | <missing> | <missing> | <missing> |
| 6 | <missing> | <missing> | <missing> | <missing> |
| 7 | <missing> | <missing> | <missing> | <missing> |

Columns...

Q

in any column

1576 row

Graphics

2D3D

SlideshowOrbit

SelectPanZoom InZoom Out

Unable to display the Background Map

Refresh

Show Details... (17)

Translation Log

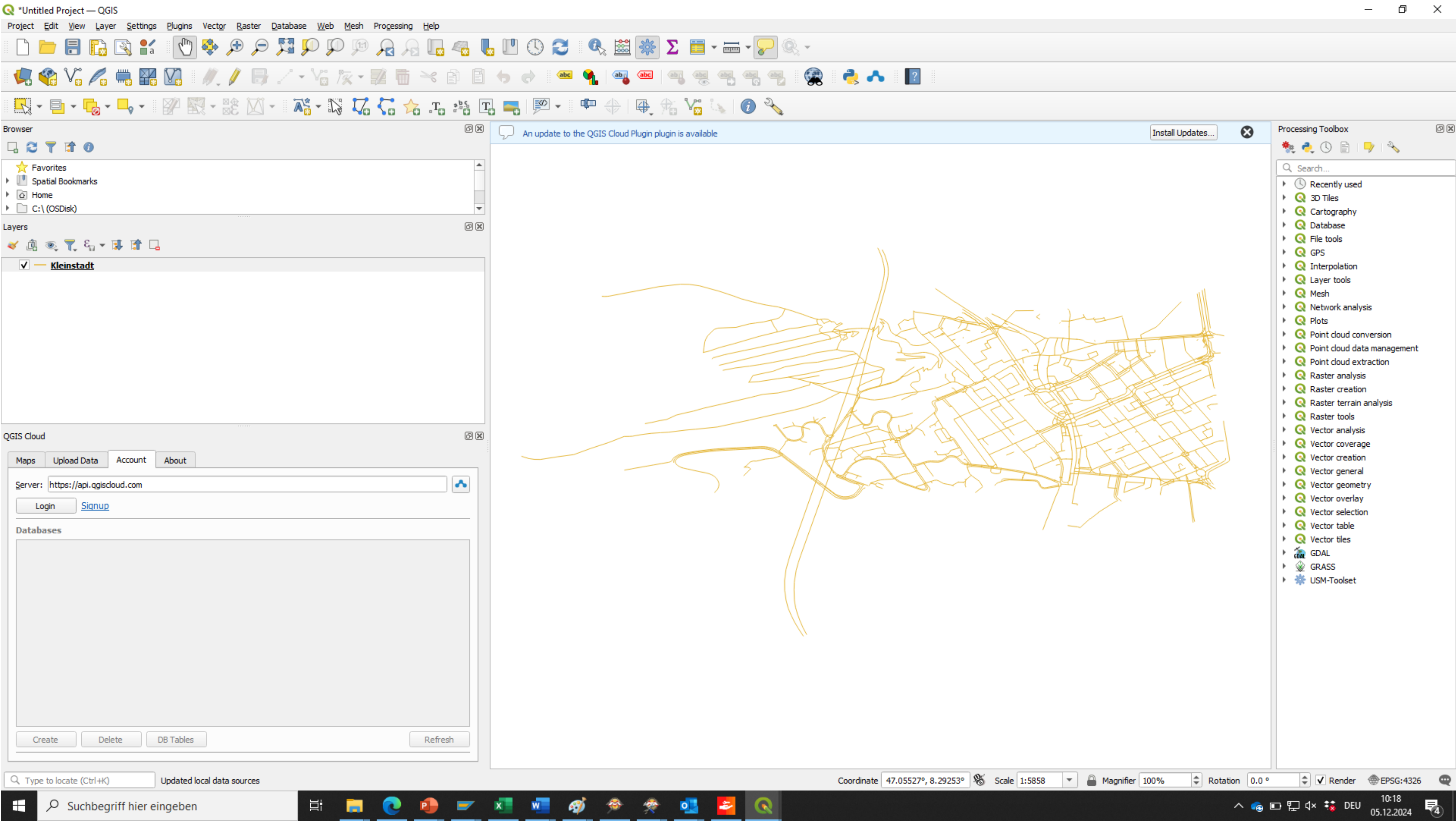
0 Errors

1 Warnings

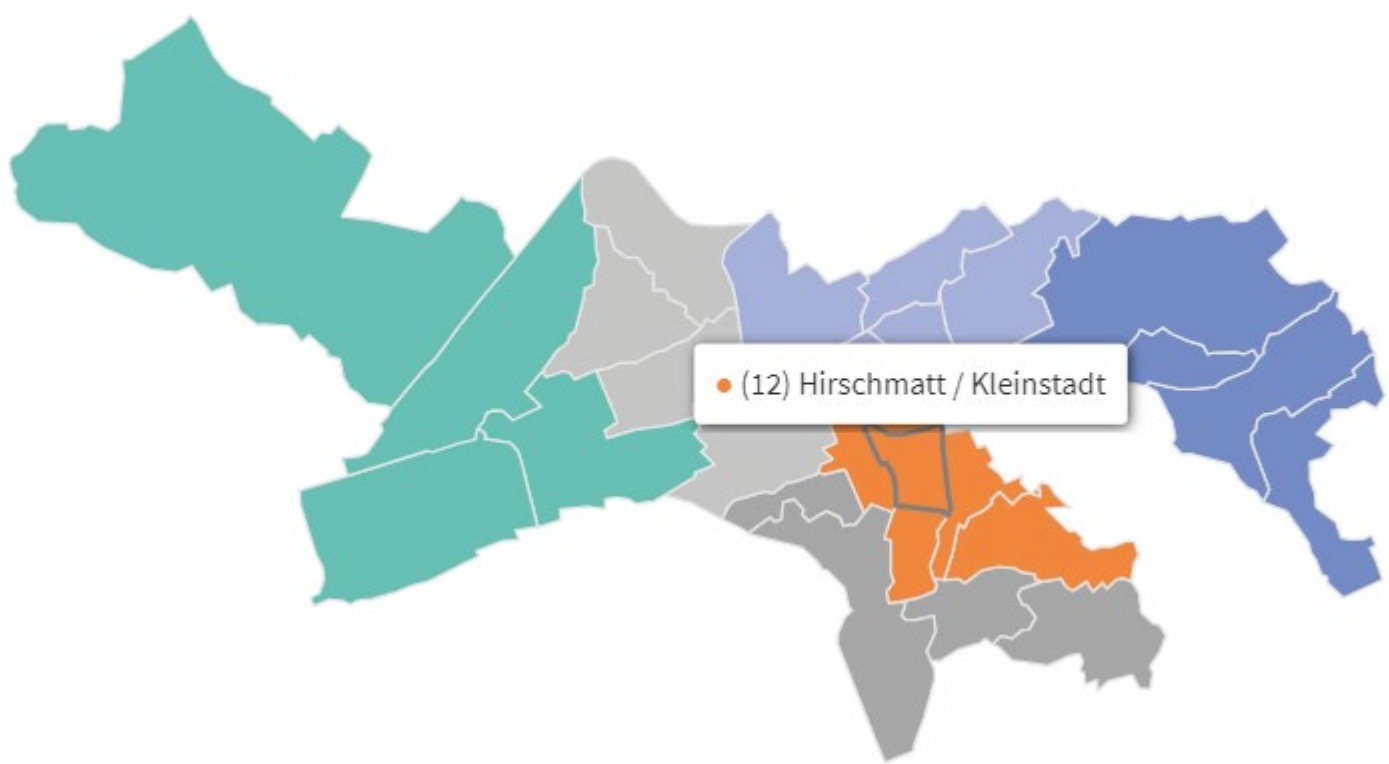
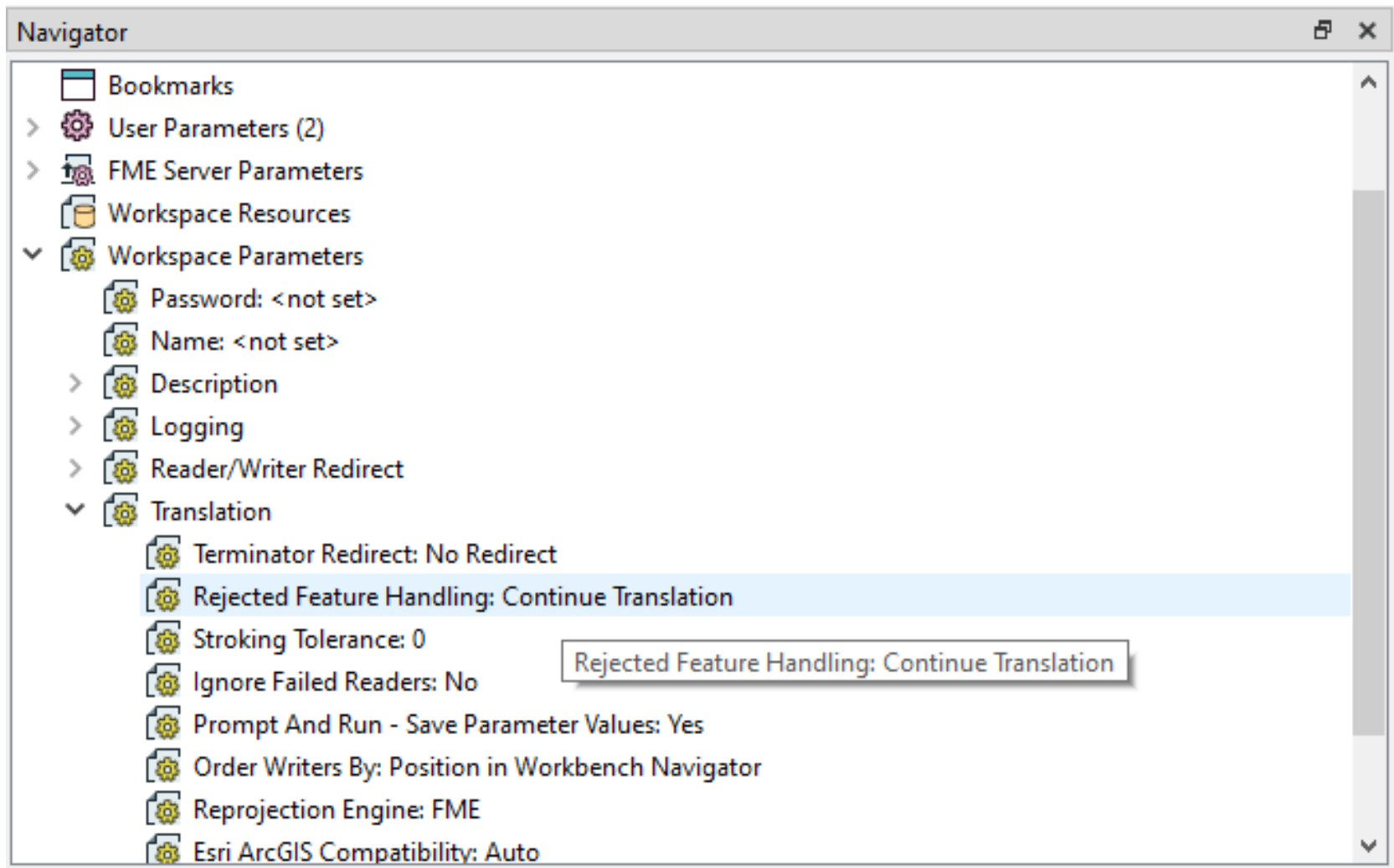
Information

| Transformer | Message |
|-------------|--------------------------|
| 140 | Features Written Summary |
| 141 | ===== |
| 142 | ===== |
| 143 | Total Features Written 0 |

Ex 2: Transport Infrastructure that intersects «Kleinstadt Luzern» (inluding_length)



Ex 2: Include OSM combine it with borders

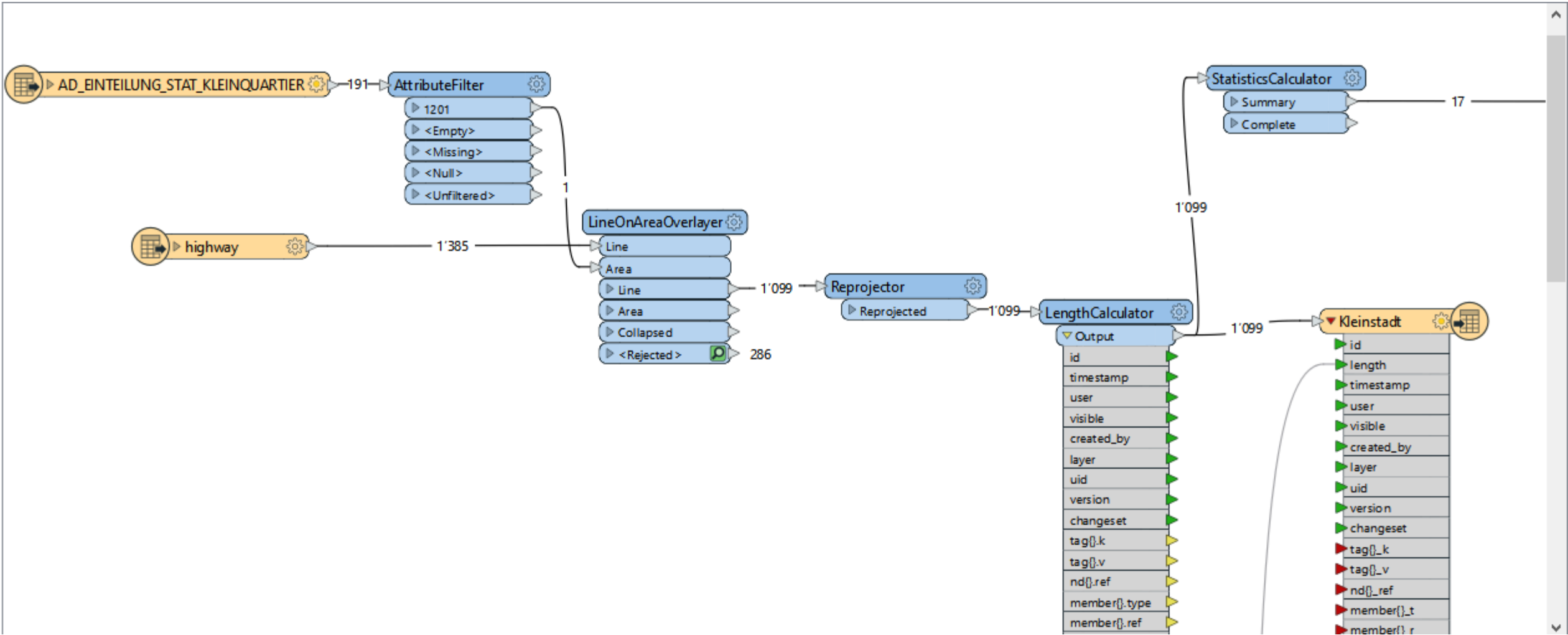


Visual Preview

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

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

Identifizier

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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