Testing new data model for Open Land Use

Challenge 12

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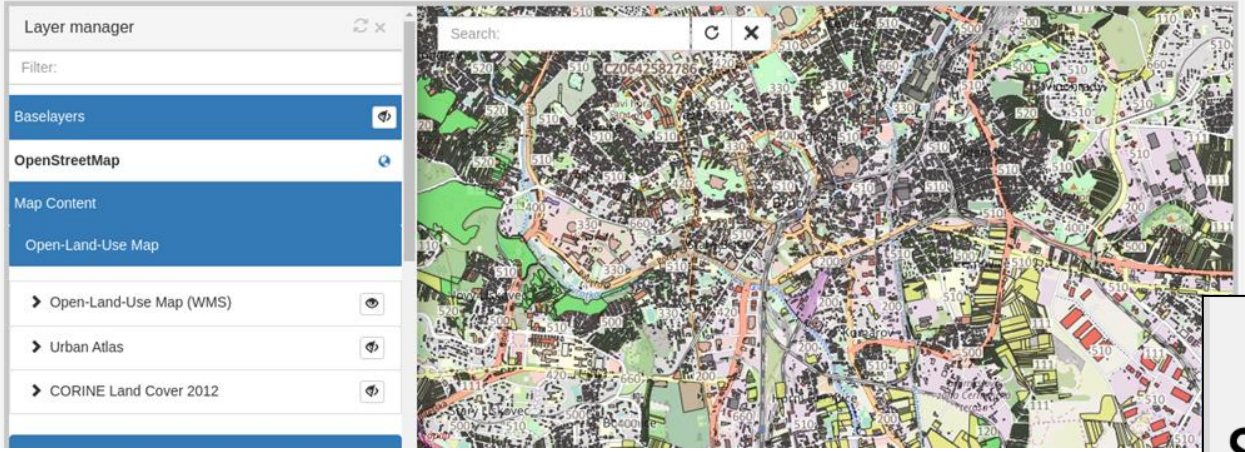
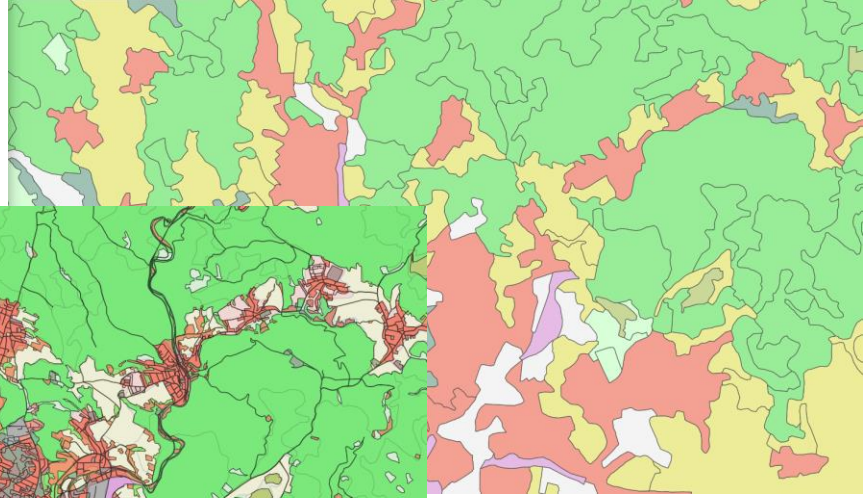
Seamless Open Land-Use Map of Europe



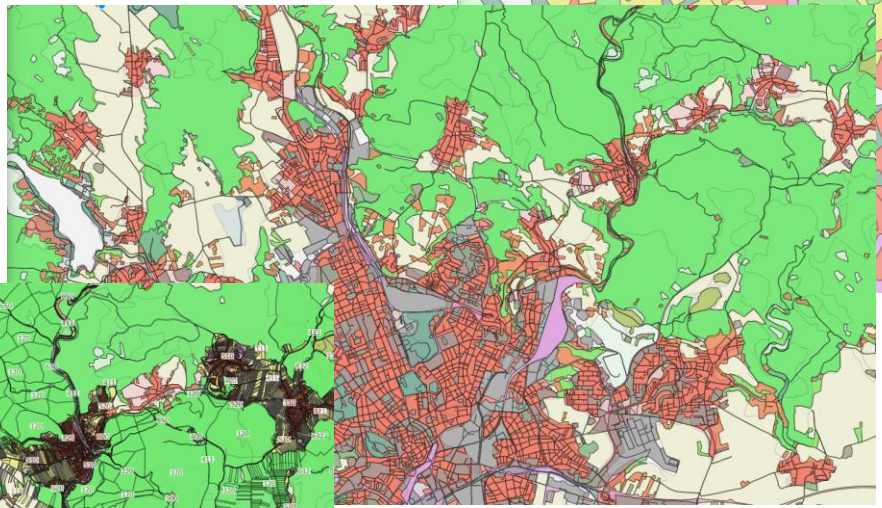
This is THE digital innovation data hub

SDI4Apps

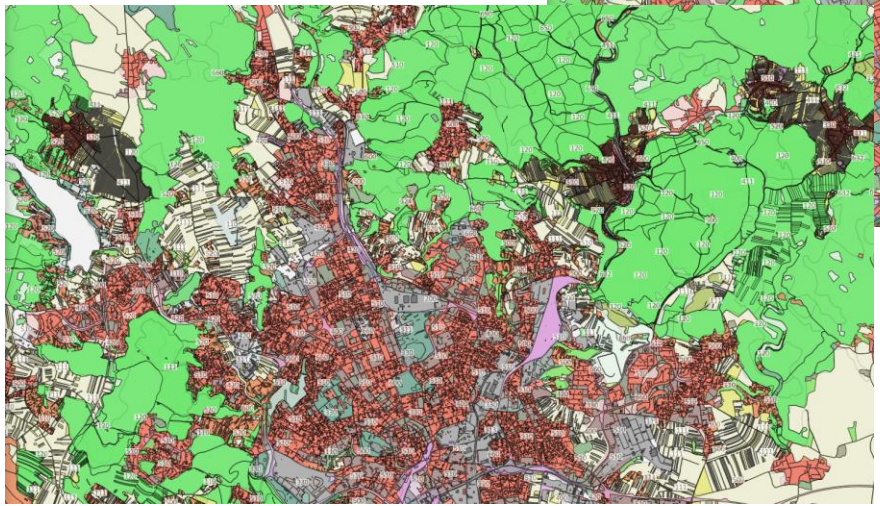
What is Open Land Use (OLU)



Corine Land Cover



Urban Atlas



Cadastre

exclusive advantages and disadvantages

The call for more

Extensibility

1. Adding more spatial attributes

Primarily using open data sources

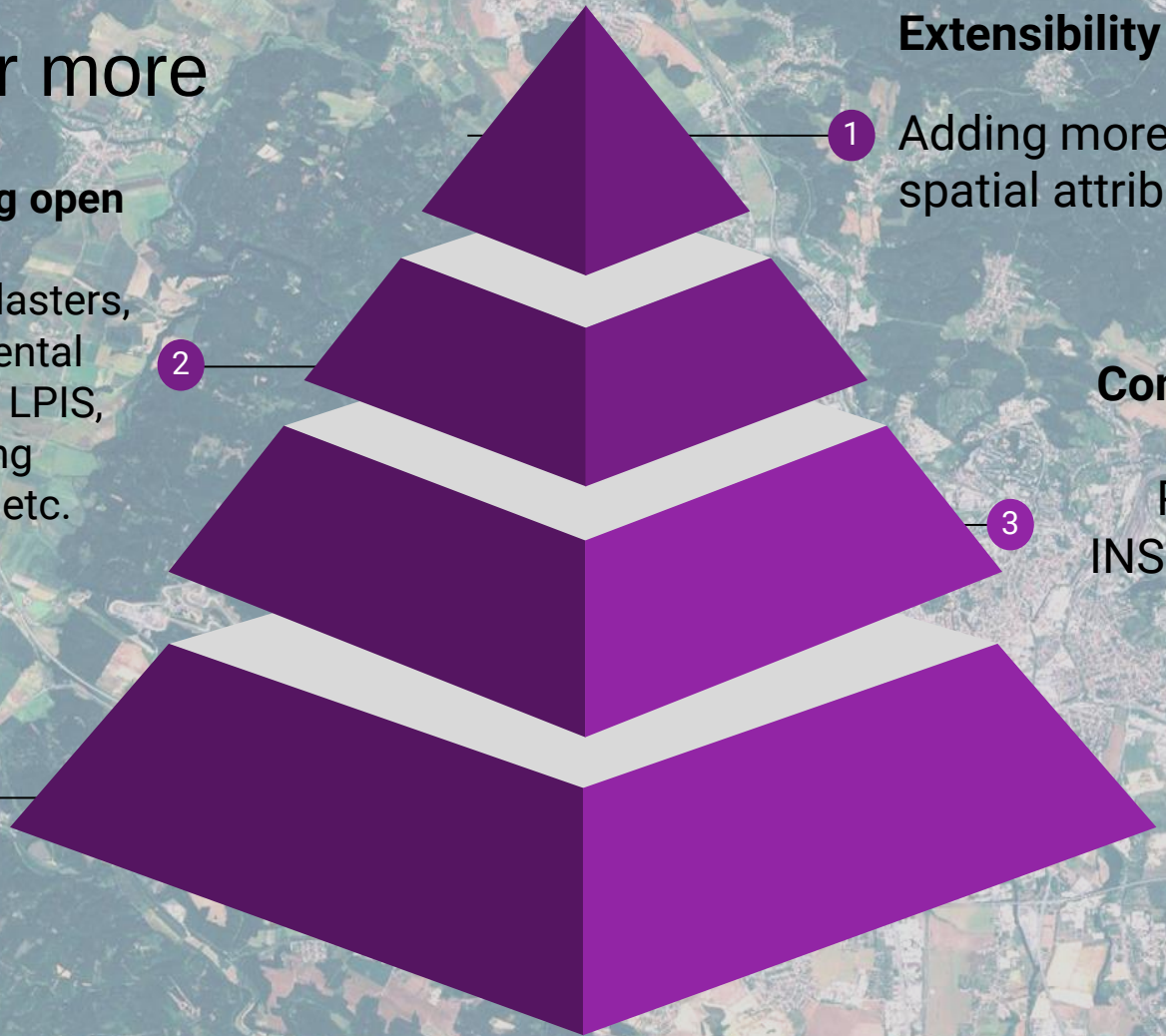
2. data: Cadasters, governmental datasets, LPIS,
   - processing software etc.

Compliment with EU standards

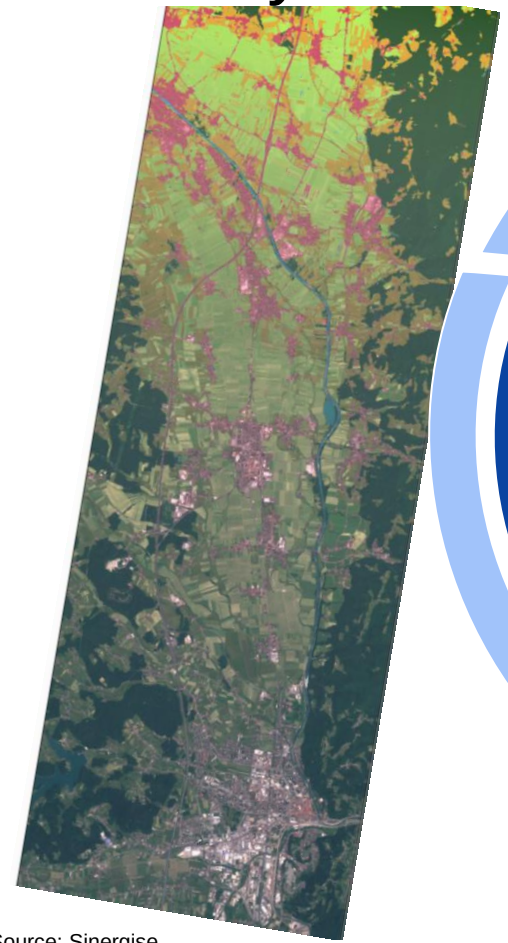
3. Pan-european, INSPIRE-oriented, EEA-oriented

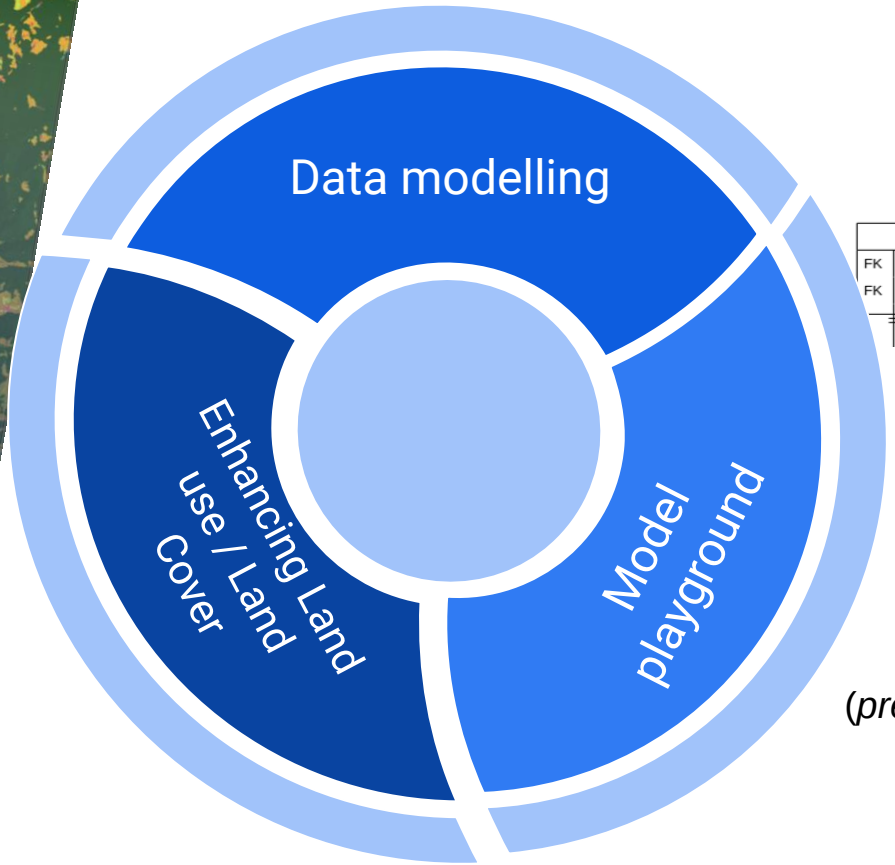
Interoperability

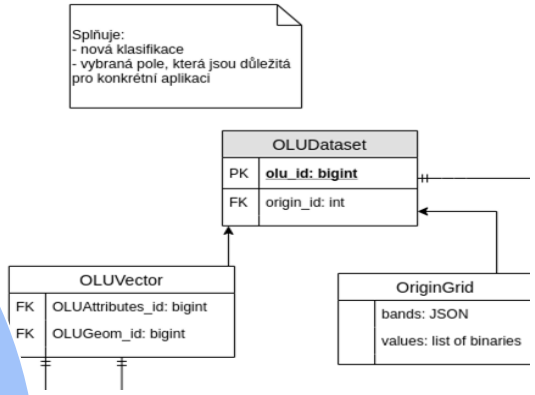
4. Facilitate various data connection



Work layout: our contribution



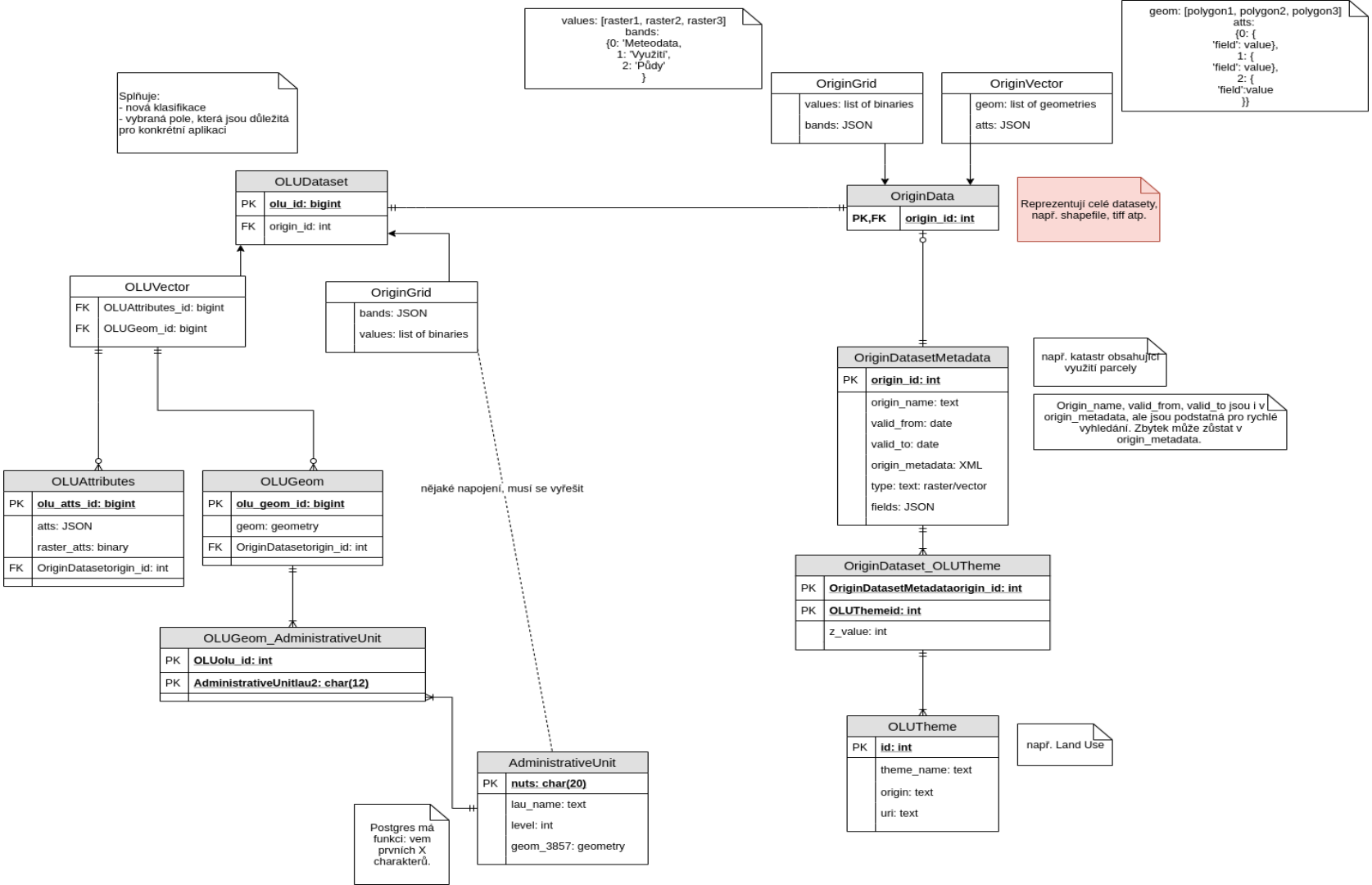




(*presented by mentors*)

Source: Sinergise

Data model


values: [raster1, raster2, raster3]
bands:
{0: 'Meteodata,
1: 'Využití',
2: 'Půdy'
}
geom: [polygon1, polygon2, polygon3]
atts:
{0: {
'field': value},
1: {
'field': value},
2: {
'field':value
}}
Splňuje:
- nová klasifikace
- vybraná pole, která jsou důležitá pro konkrétní aplikaci
OriginGrid
values: list of binaries
bands: JSON
OriginVector
geom: list of geometries
atts: JSON
OLUDataset
PK olu_id: bigint
FK origin_id: int
OriginData
PK,FK origin_id: int
Reprezentují celé datasety, např. shapefile, tiff atp.
OLUVector
FK OLUAttributes_id: bigint
FK OLUGeom_id: bigint
OriginGrid
bands: JSON
values: list of binaries
OriginDatasetMetadata
PK origin_id: int
origin_name: text
valid_from: date
valid_to: date
origin_metadata: XML
type: text: raster/vector
fields: JSON
např. katastr obsahující využití parcely
Origin_name, valid_from, valid_to jsou i v origin_metadata, ale jsou podstatná pro rychlé vyhledání. Zbytek může zůstat v origin_metadata.
OLUAttributes
PK olu_atts_id: bigint
atts: JSON
raster_atts: binary
FK OriginDatasetorigin_id: int
OLUGeom
PK olu_geom_id: bigint
geom: geometry
FK OriginDatasetorigin_id: int
nějaké napojení, musí se vyřešit
OriginDataset_OLUTheme
PK OriginDatasetMetadataorigin_id: int
PK OLUThemeid: int
z_value: int
OLUGeom_AdministrativeUnit
PK OLUolu_id: int
PK AdministrativeUnitlau2: char(12)
OLUTheme
PK id: int
theme_name: text
origin: text
uri: text
např. Land Use
AdministrativeUnit
PK nuts: char(20)
lau_name: text
level: int
geom_3857: geometry
Postgres má funkci: vem prvních X charakterů.

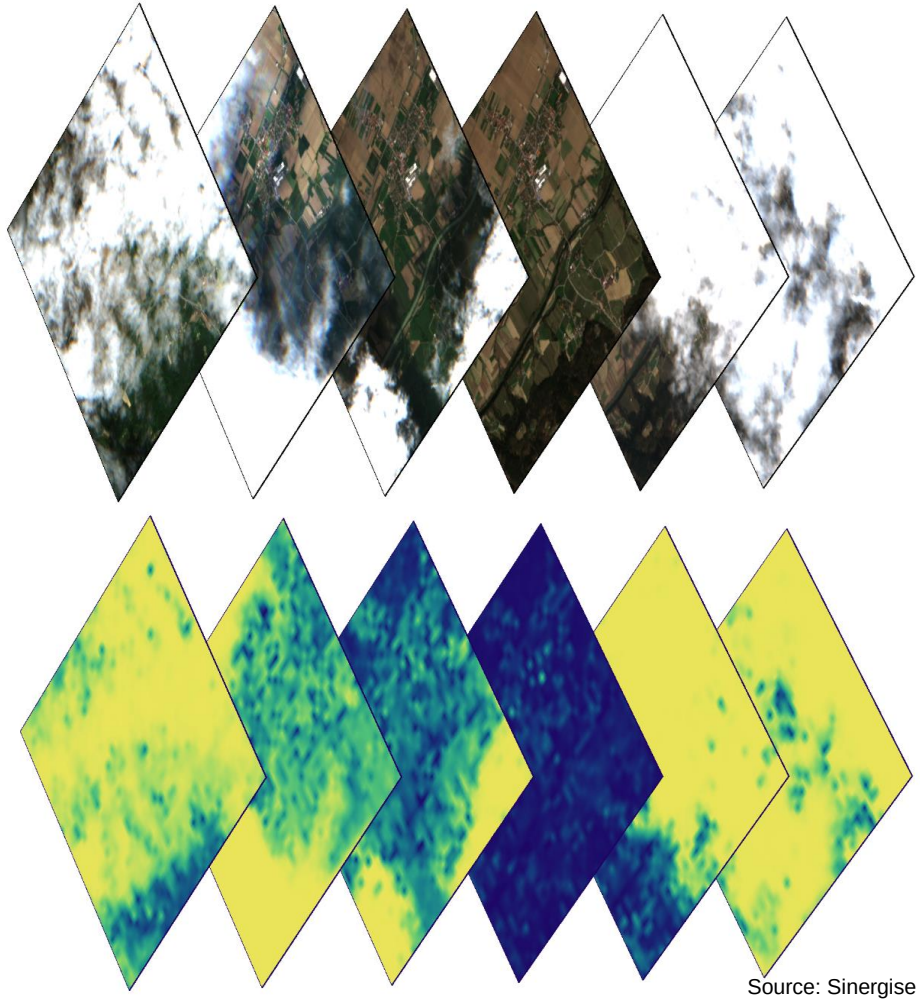
eo-learn

Another innovation hub extending our hub :-)

EOPatch
EOTask
EOWorkflow

- Yet based exclusively on Sentinel 2 data
- Using powerful tools of SciPy, Shapely, Geopandas etc.
- Flexible, scalable
- Open Source

Enhancing Land Use and Land Cover



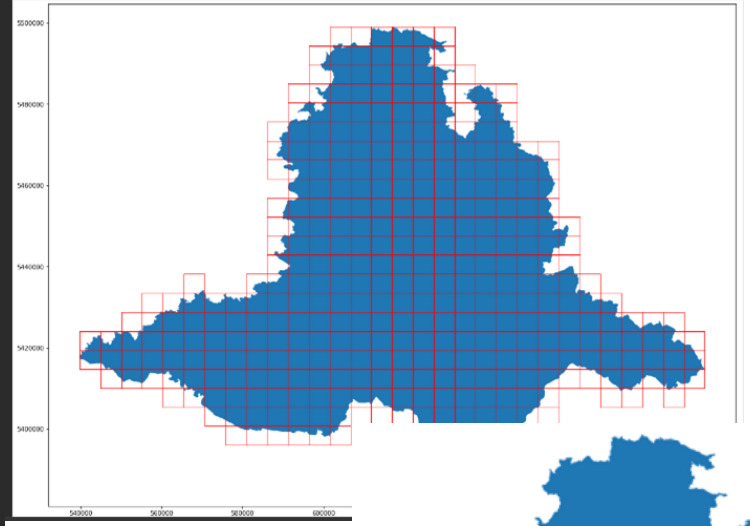
Source: Sinergise

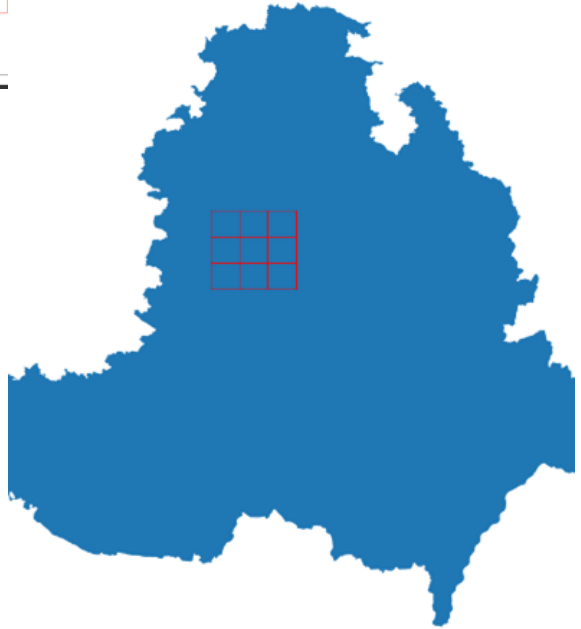
```
# TASK FOR BAND DATA
# add a request for B(B02), G(B03), R(B04), NIR (B08), SWIR1(B11), SWIR2(B12)
# from default layer 'ALL_BANDS' at 10m resolution
# Here we also do a simple filter of cloudy scenes. A detailed cloud cover
# detection is performed in the next step
custom_script = 'return [B02, B03, B04, B08, B11, B12];'
add_data = S2L1CWCSInput(
    layer='S2L1C',
    feature=(FeatureType.DATA, 'BANDS'), # save under name 'BANDS'
    custom_url_params={CustomUrlParam.EVALSCRIPT: custom_script}, # custom url for 6 specific bands
    resx='10m', # resolution x
    resy='10m', # resolution y
    maxcc=0.8, # maximum allowed cloud cover of original ESA tiles
)

# TASK FOR CLOUD INFO
# cloud detection is performed at 80m resolution
# and the resulting cloud probability map and mask
# are
cloud
add_c
```

Proof of concept

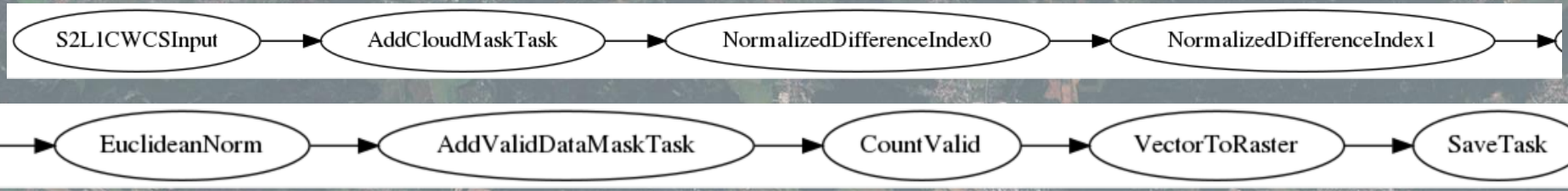
- enhancing Land Use and Land Cover
- using Czech cadastre (RUIAN) data to train machine learning classifier
- area of interest: Brno and its surroundings
- classify another area nearby
- further: try out on Flamish cadastre

```
# TAS
# NDV
# NDW
# NOR
ndvi
ndwi
norm

# TAS
# val
add_s
                                'IS_VALID' # name of output mask
                            )
```





The workflow example: obtaining data



Execution status

- Start time: 10:27:18 01/28/20
- End time: 11:20:21 01/28/20
- Duration: 0:53:02.926184
- Number of finished executions: 0
- Number of failed executions: 9
- Processing type: multithreading
- Number of workers: 5

... Execution successfully finished
... Execution failed because of an error

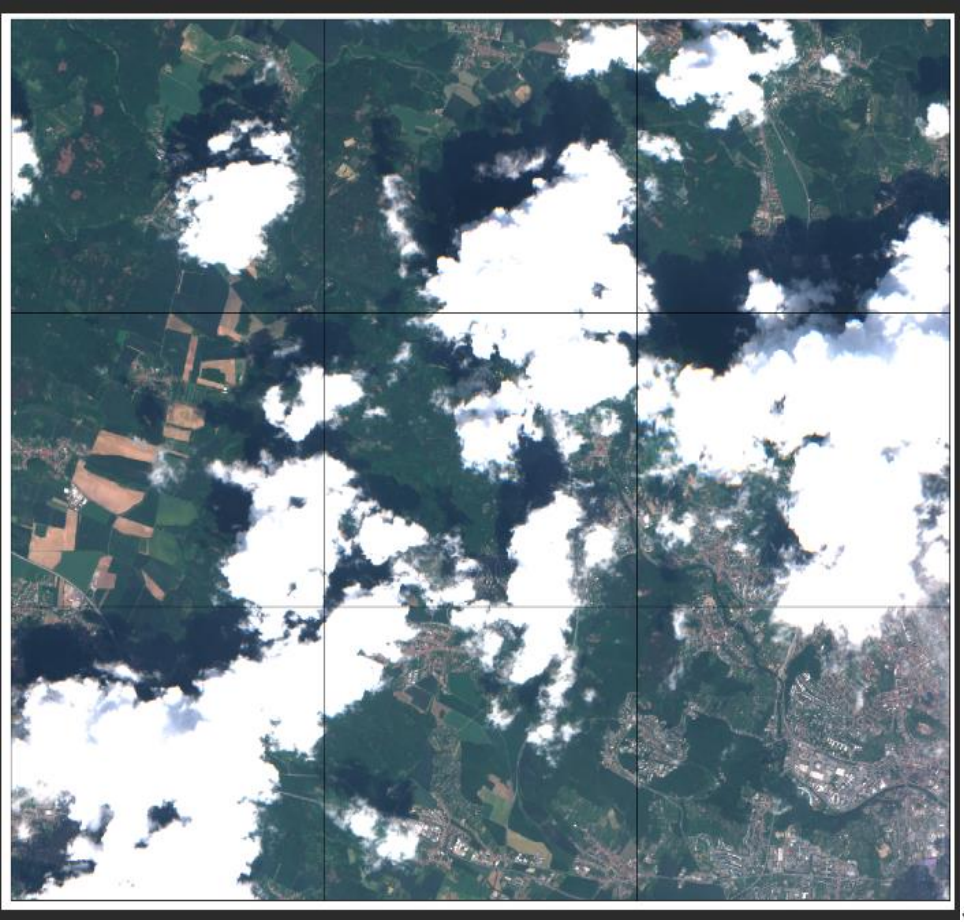
<-- Local Server -->

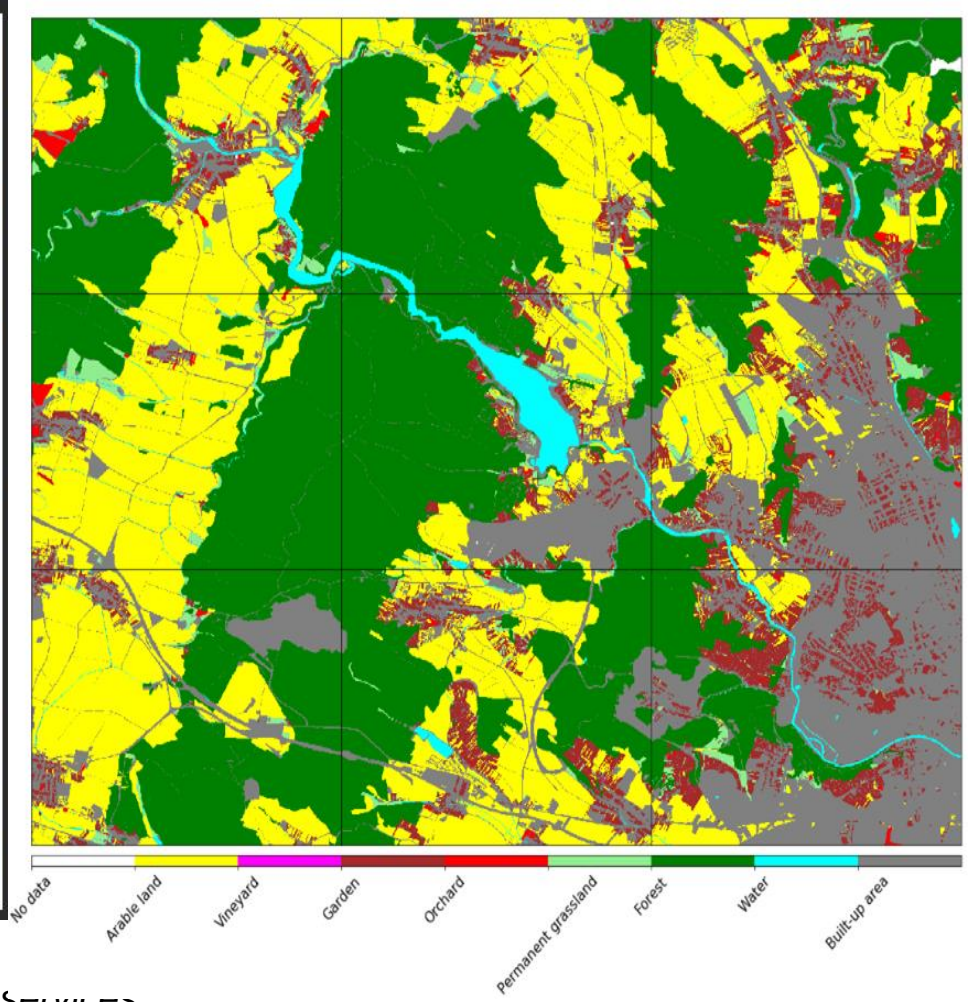
Hackathon incompatible...

Execution status

- Start time: 10:22:49 01/29/20
- End time: 10:22:49 01/29/20
- Duration: 0:00:00.091003
- Number of finished executions: 0
- Number of failed executions: 9
- Processing type: multithreading
- Number of workers: 5

... Execution successfully finished
... Execution failed because of an error





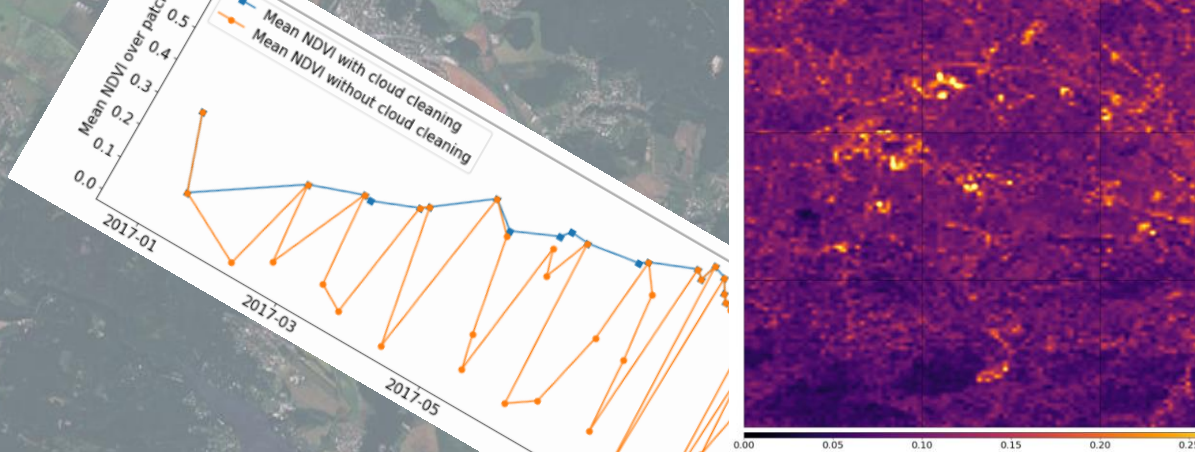
Filling of EOPatch with data through Sentinel Hub web services

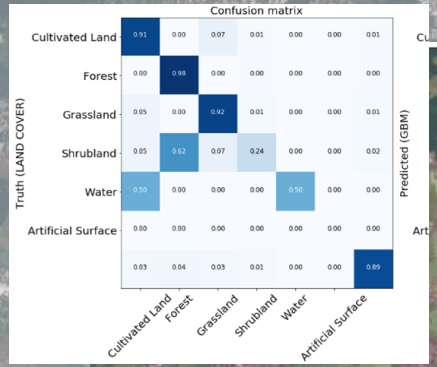
Further steps

...

- Cloud clearing
- Training classifier
- Test classification
- Accuracy assessments
- Classification of somewhere else

Loading data into the Open Land Use data model and see...





Source: Sinergise