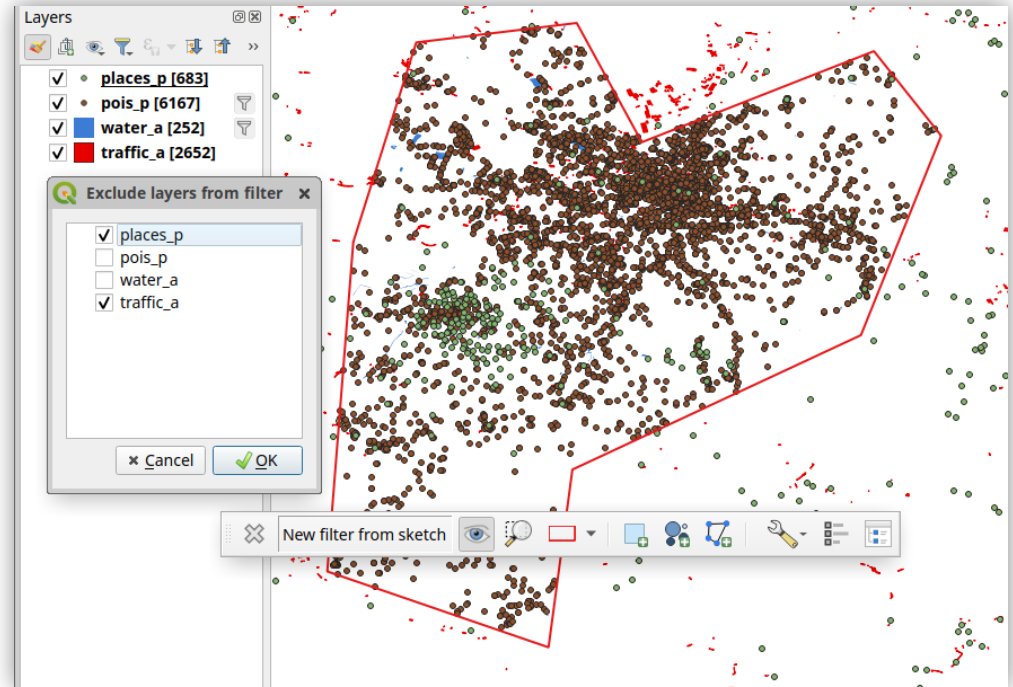




Spatially filtering your project's layers for more efficient workflows

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~~Depression~~ Motivation

Huge layers

... in a remote database and your connection is slow?

Complex layers

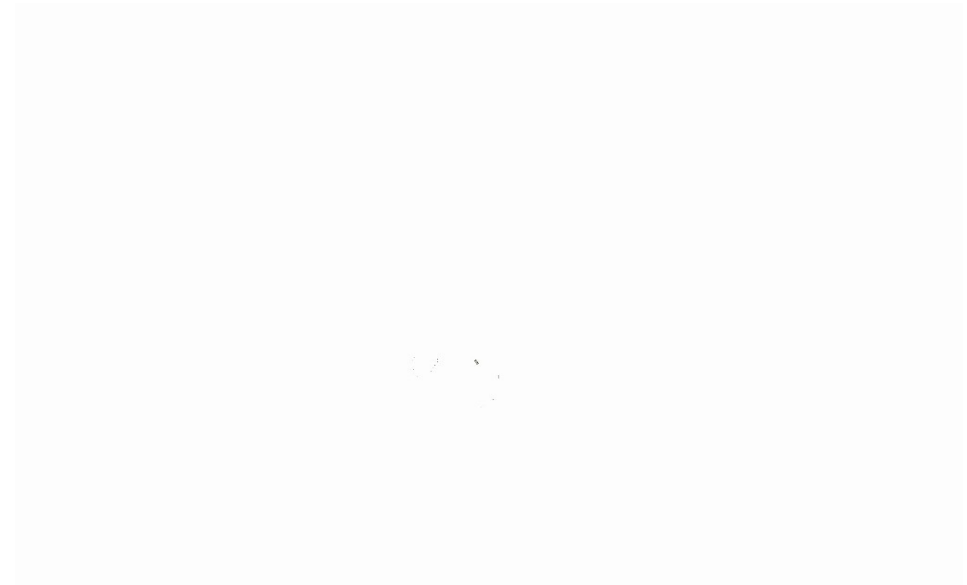
... that take ages to display?

Detailed layers

... and you don't care about most of their data?

Countless layers

... and you need exports for different spatial regions?



→ What if ... there was a way to make it *fun*?



WhereGroup

- 📐 Experts for anything GIS
- 📐 Decades of experience with all kinds of projects
- 📐 One of the biggest FOSS GIS software companies in Germany
- 📐 50+ nerds with diverse backgrounds
- 📐 Offices in Berlin, Bonn, Freiburg, Hamburg*

* come visit me!





Johannes Kröger

GIS developer/consultant

Cartography lover, tinkerer, FOSSGIS jeopardy quiz master, @cartocalypse, organiser of the News-Infographics-Analytics-Maps conference, active in FOSSGIS e. V., German Society for Cartography (DGfK e. V.) etc.

QGIS



100%

ArcGIS



-5%



Layers

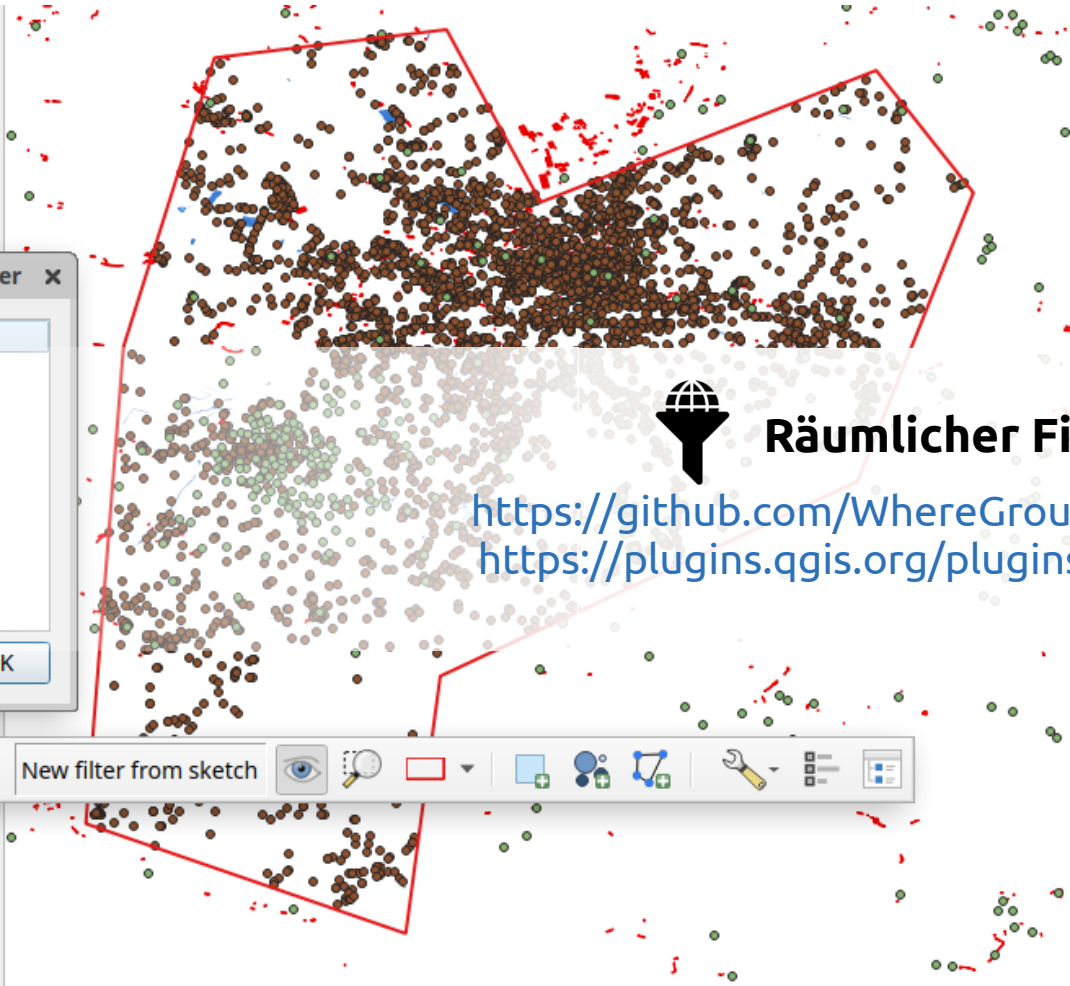
- places_p [683]
- pois_p [6167]
- water_a [252]
- traffic_a [2652]

Exclude layers from filter

- places_p
- pois_p
- water_a
- traffic_a

Cancel OK

New filter from sketch



Räumlicher Filter

https://github.com/WhereGroup/spatial_filter
https://plugins.qgis.org/plugins/spatial_filter/



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„[‘W̄ımlıç] Filter“ waaaaht?!?;

→ „Spatial Filter“



TODO 3 Videos

- Open project with filter applied, some layers excluded
 - Show filter name
 - toggle filter geometry visibility (maybe change style? :D ?)
 - Show layer exemptions
 - Load other, saved filter from mana
- Create new filter
 - With a three code
 - Switch predicate
- „Package layers“ with active filter → Export is filtered accordingly!

Live demo time!



The QGIS-Plugin



- 1) Disable and remove current filter
- 2) Name of the current filter
- 3) Show/hide filter geometry
- 4) Zoom to filter geometry
- 5) Change filter geometry styling
- 6) Create filter: Rectangle
- 7) Create filter: From selected features
- 8) Create filter: Freehand polygon drawing
- 9) Choose spatial predicate
- 10) Set layer exemptions
- 11) Manage filters (name, save, ...)



Why a new plugin?

Cause for development

- Customer (~public administration) migrating from GeoMedia to QGIS
- Implementation of missing features via QGIS-Plugin(s)
- Initiated and funded by



Hessische Verwaltung für
Bodenmanagement und
Geoinformation

Goals

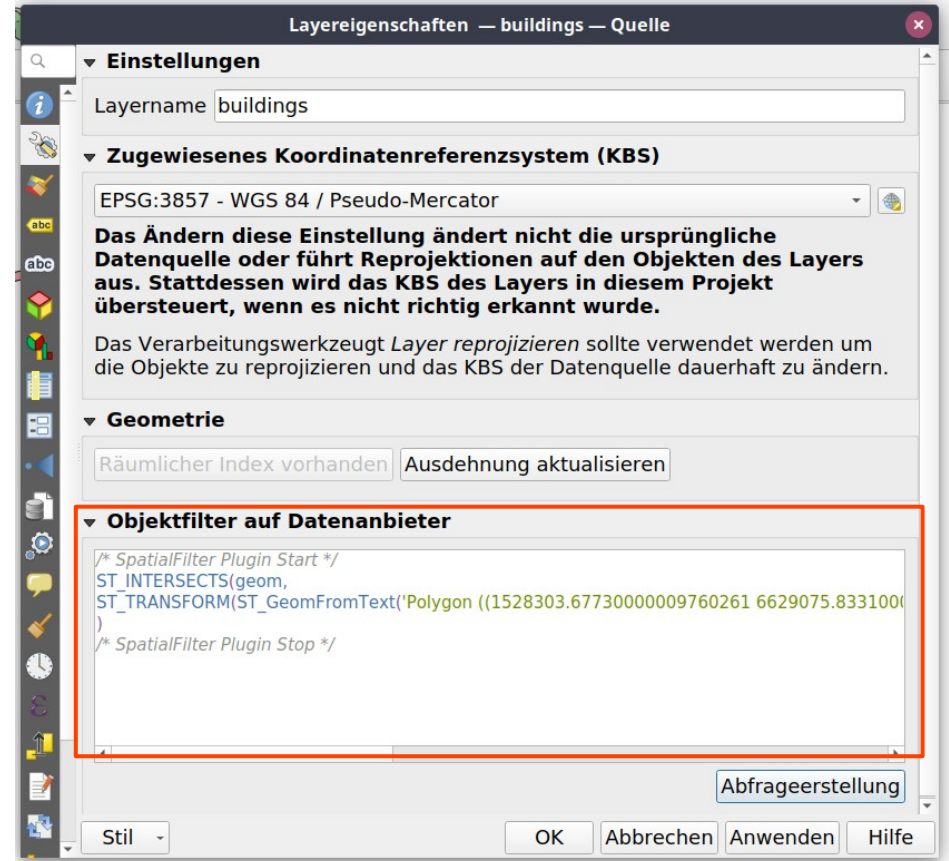
- Filtering of specific layers directly at the data source (PostgreSQL/PostGIS)
- To prevent the GIS software from having to load lots of data all the time
- To dynamically restrict a project's working area to certain spatial regions (municipalities, grid cells, ...)
- Easy and intuitive to use
- Development of a solution that is **freely available to anyone and everyone**

Implementation



Via QGIS' Provider Feature Filter Feature

- The filter is applied directly at the data source (database)
- Can consist of multiple filter clauses
- Spatial SQL queries can be used for some providers (PostGIS, Spatialite, GeoPackage, ...)



Implementation

Technical details

- `QgsVectorLayer.setSubsetString(string)` to set and unset filters as wanted
 - aka: Right-click on vector layer → „Filter...“
- Connection to `QgsProject.layersAdded` signal
 - Plugin jumps in and immediately alters the filter string, before the data is even requested once
- Persistence:
 - QGIS stores current filter strings in project file



```
return ...er() <= other.name.upper

@property
def geometry(self) -> QgsGeometry:
    return QgsGeometry.fromWkt(self.wkt)

@property
def boxGeometry(self) -> QgsGeometry:
    return QgsGeometry.fromRect(self.geometry.boundingBox())

def filterString(self, layer: QgsVectorLayer) -> str:
    """Returns a layer filter string corresponding to the filter definition

    Args:
        layer (QgsVectorLayer): The layer for which the filter should be

    Returns:
        str: A layer filter string
    """
    # ST_DISJOINT does not use spatial indexes, but we can use its opposite
    spatial_predicate = f"ST_{Predicate(self.predicate).name}"
    if self.predicate == Predicate.DISJOINT:
        spatial_predicate = "NOT ST_INTERSECTS"

    wkt = self.wkt
    if self.bbox:
        wkt = self.boxGeometry.asWkt()

    geom_name = getLayerGeomName(layer)

    return FILTERSTRING_TEMPLATE.format(
        spatial_predicate=spatial_predicate,
        geom_name=geom_name,
        wkt=wkt,
        srid=self.crs.postgisSrid(),
        layer_srid=layer.crs().postgisSrid()
    )
```

Where we're at



Result

- It works!
- Support of PostGIS, SpatiaLite and GeoPackage vector layers
- Customer is happy
- Community is happy

(Current) Limitations

- Curved geometries cannot be filtered for SQLite-based data sources (SpatiaLite, GeoPackage)
 - Upstream issue in Spatialite
- „Only“ vector layers are supported
 - Upstream issue in QGIS
- No support for other, less great, geospatial databases (MS SQL? SAP HANA? Oracle?)
 - Our issue if you fund development ;-)

Be the change you want to see in the world



The screenshot shows a GitHub Issues page with the following elements:

- Navigation bar: Code, Issues (6), Pull requests, Discussions, Actions, Projects, Wiki.
- Search bar: Filters, is:issue is:open
- Labels: 10, Milestones: 0, New issue button.
- Issue status: 6 Open, 1 Closed.
- Issue list with columns: Author, Label, Projects, Milestones, Assignee, Sort.
- Issue 1: Freeze if filter geometry is very complex (bug, good first issue), #13 opened 2 weeks ago by kannes.
- Issue 2: Catch local CRS' instead of failing in PostGIS queries (bug, good first issue), #12 opened 2 weeks ago by kannes.
- Issue 3: Support for Postgis raster? (enhancement, upstream), #10 opened on Mar 1 by image80.
- Issue 4: Add more predicates (enhancement, good first issue), #8 opened on Feb 7 by kannes.
- Issue 5: Toggle button to enable/disable filter (enhancement, good first issue), #6 opened on Jan 3 by pascatl.
- Issue 6: Curve geometries in GPKG/Spatialite are ignored by filtering (upstream), #1 opened on Dec 8, 2022 by kannes.



Layers

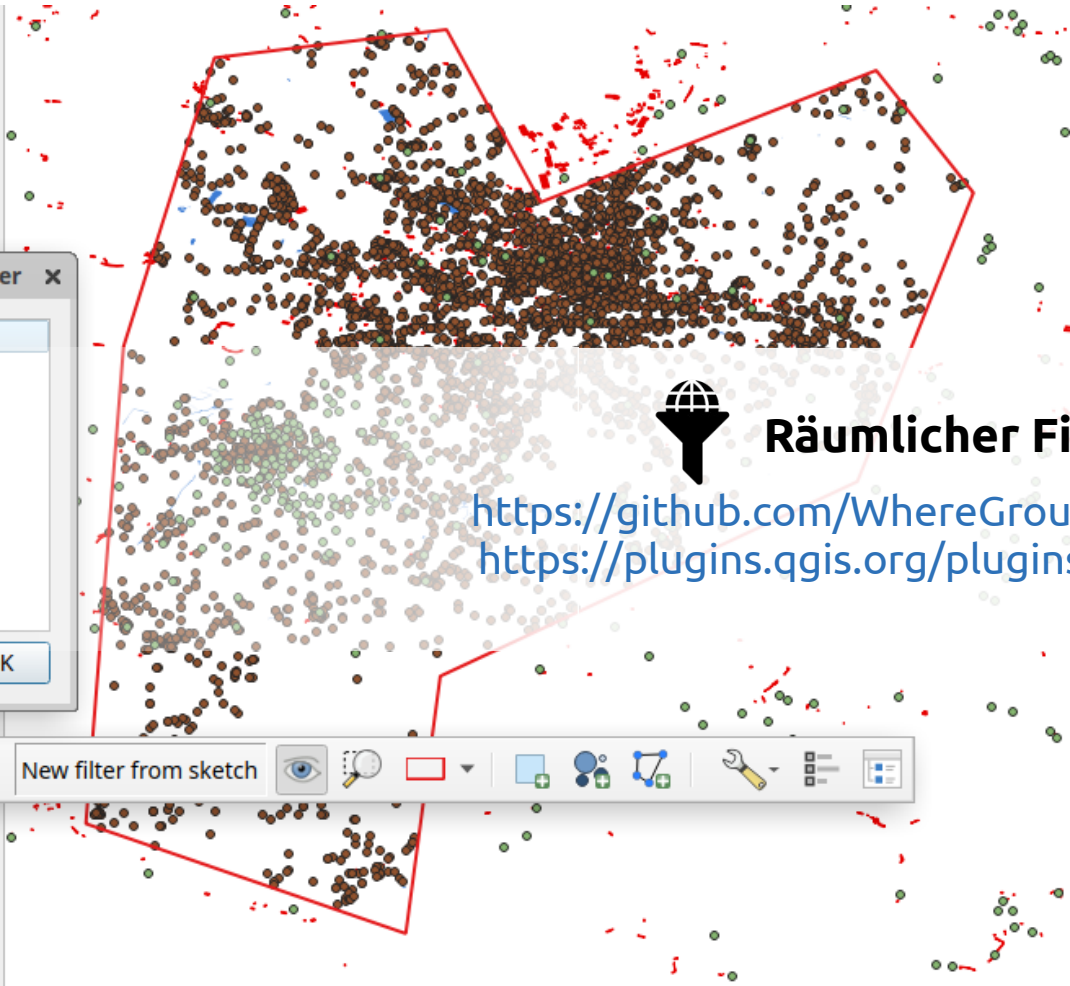
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