



**NLS**  
FINNISH GEOSPATIAL  
RESEARCH INSTITUTE  
FGI

# Cross-border Delivery and Web-based Visualization of 3D Buildings

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# Agenda

- GeoE3 project
  - Goals, Use cases, Integration Platform
- Provision of 3D Buildings
  - OGC API Features, CityJSON
- Cross-collection Queries for Data Integration
- Conclusions

# Geospatially Enabled Ecosystem for Europe GeoE3

- Cross-border and cross-domain integration of geospatial data
- Use case –driven
  - Renewable energy, smart city
- Finland, Estonia, Norway,  
The Netherlands, Spain



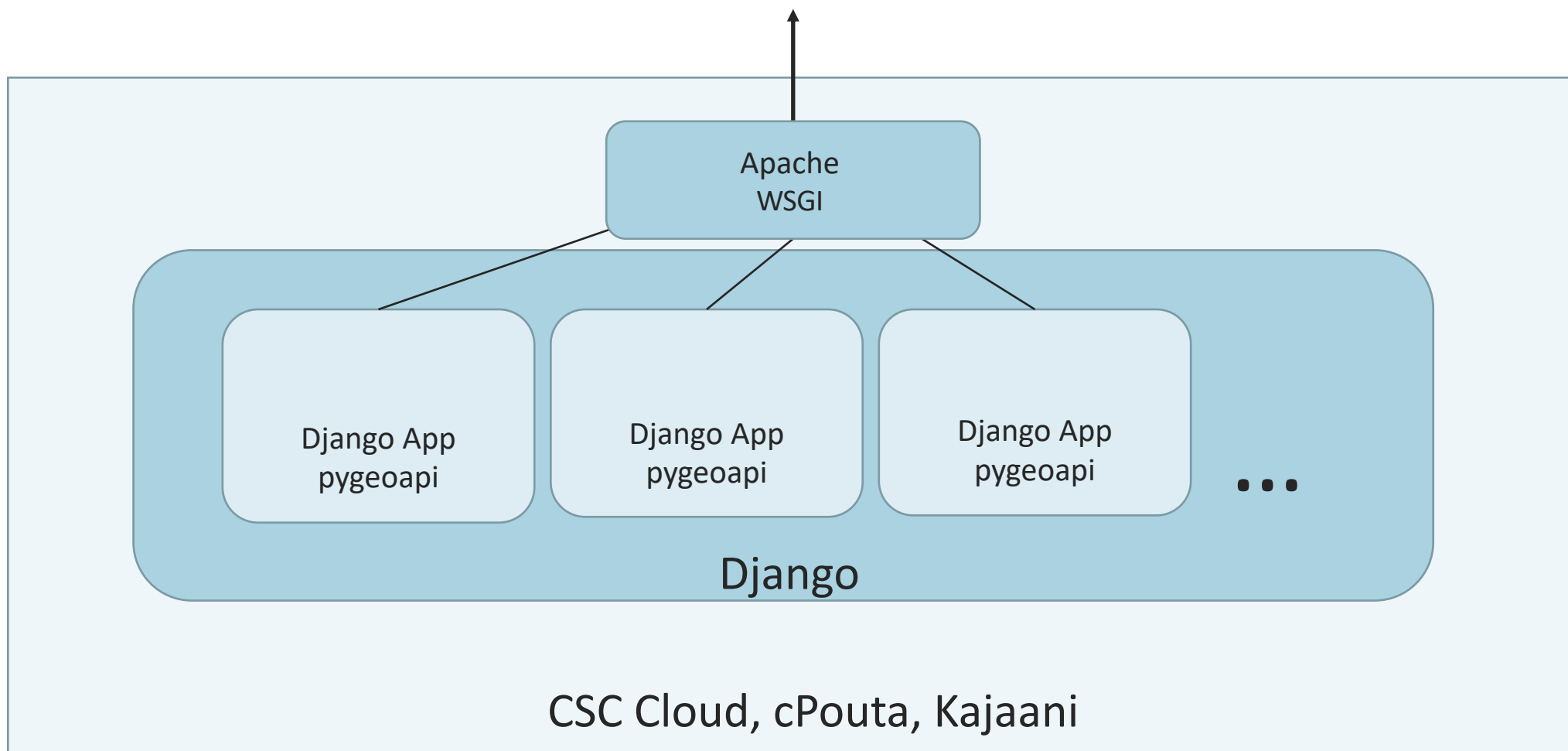
# Data contents on the Integration Platform

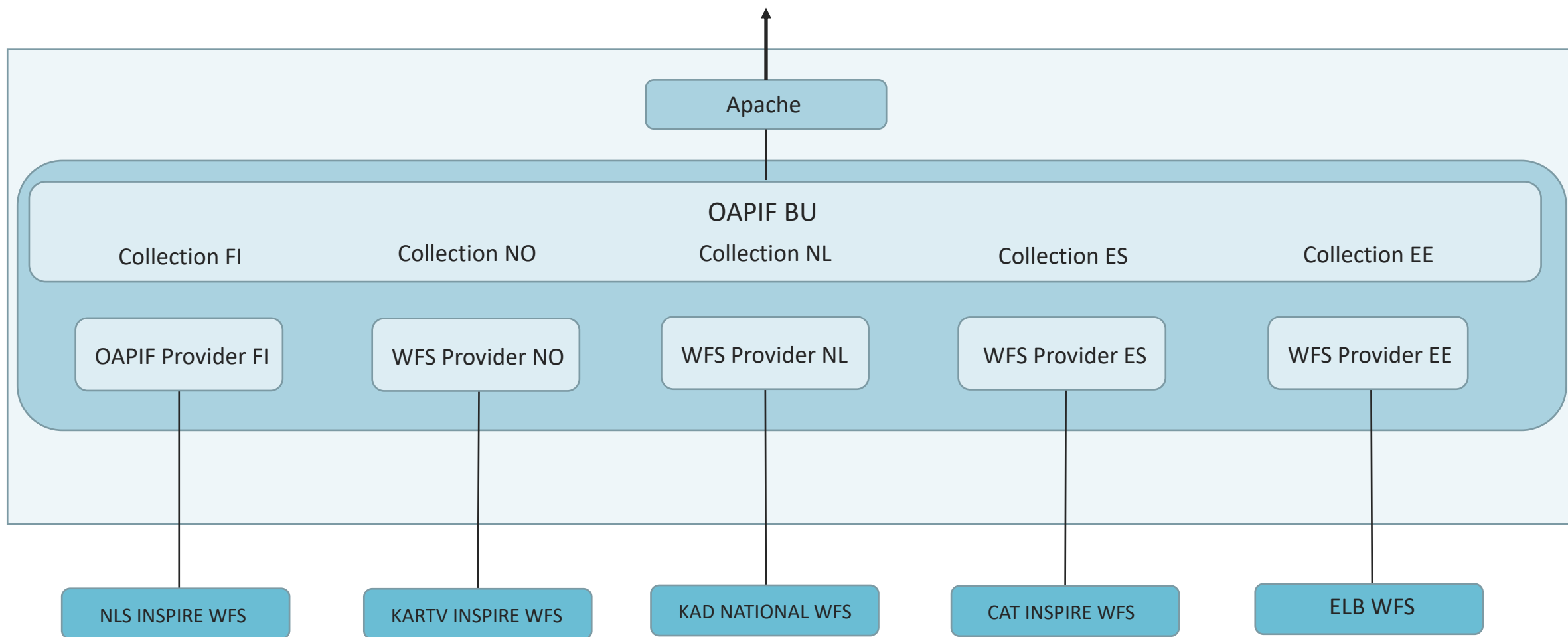
- Focus so far mostly on
  - Buildings
  - DTM, DSM
  - Climate
- All datasets available via OGC API Features, OGC API Coverages
  - Metadata via OGC API Records
  - 3D buildings (Norway) via OGC API Processes
- Running on cloud service platform
  - Django, pygeoapi (provider plugins, web user interface), 3D City DB etc.



# Cloud Platform

- Linux, Apache, WSGI
- Django
- pygeoapi
  - rasterio
  - GDAL
  - owslib
- OpenLayers, ThreeJsViewer
- CSC Cloud Computing Platform
  - In Kajaani, Finland



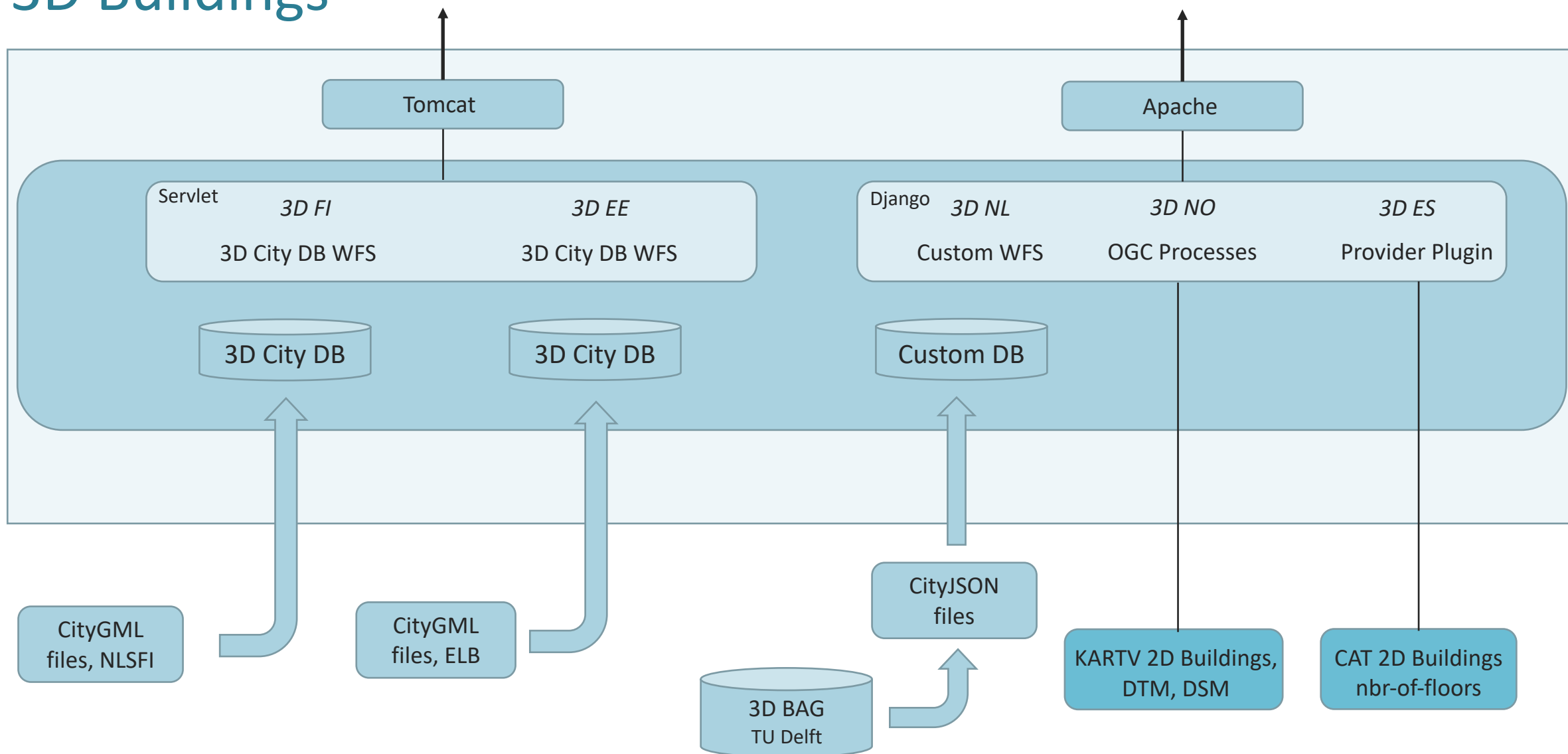


# 3D Buildings

- Downloaded to Integration Platform
  - Finland, Estonia, The Netherlands
- Accessed from national-level service, processed on-the-fly
  - Spain, Norway



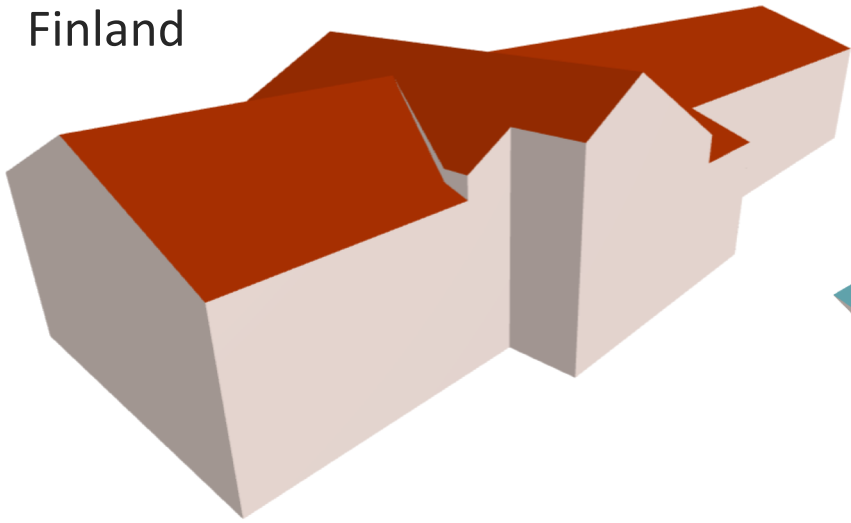
# 3D Buildings



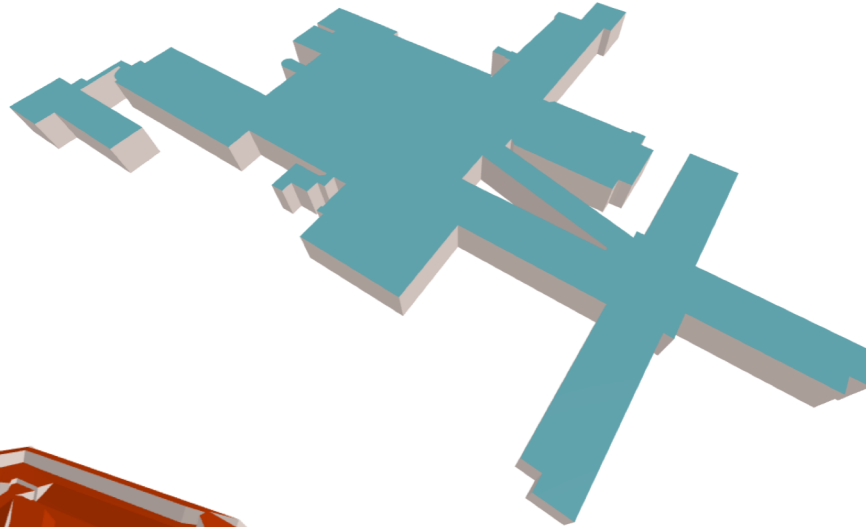
# Data content status, Buildings

|              | Finland               | Estonia | Norway                                                            | The Netherlands | Spain          |
|--------------|-----------------------|---------|-------------------------------------------------------------------|-----------------|----------------|
| Buildings    | OK                    | OK      | OK (limited coverage)                                             | OK              | OK             |
| 3D Buildings | OK (limited coverage) | OK      | OK (limited coverage, experimental on-the-fly process, only LOD1) | OK              | OK (only LOD1) |

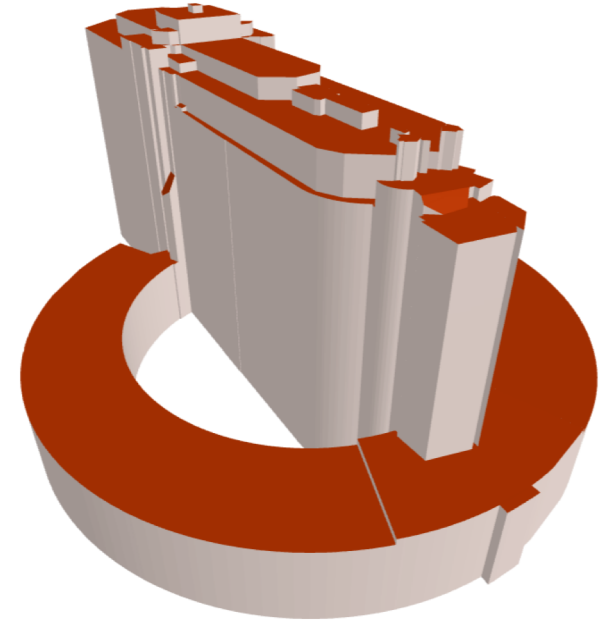
Finland



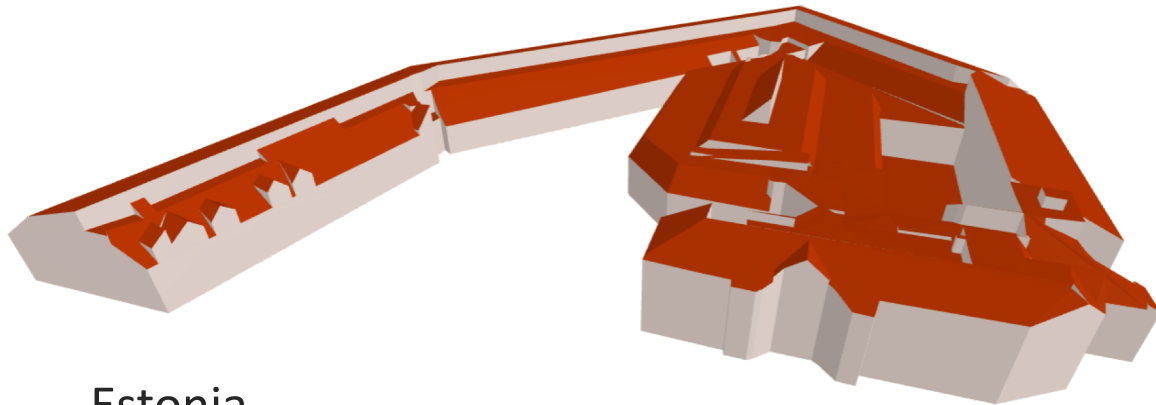
Norway



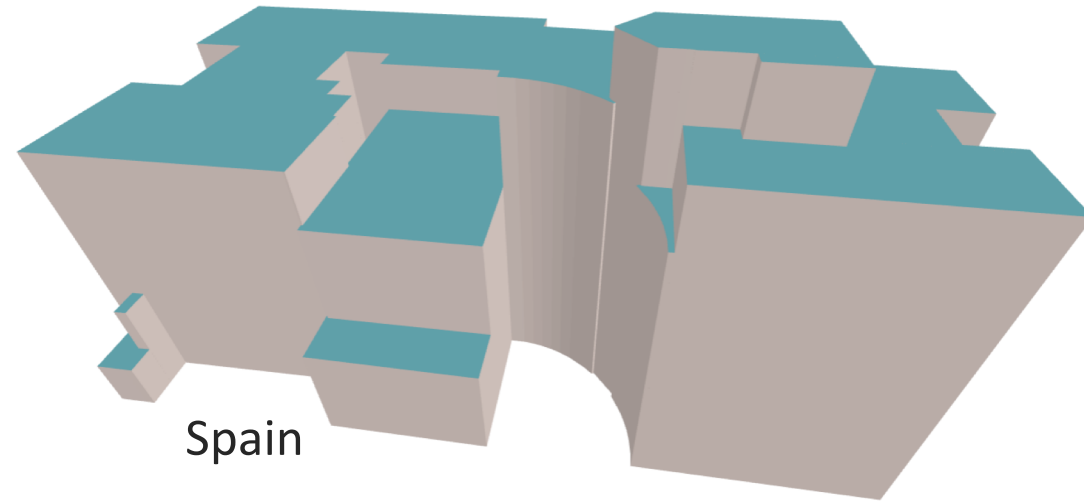
The Netherlands



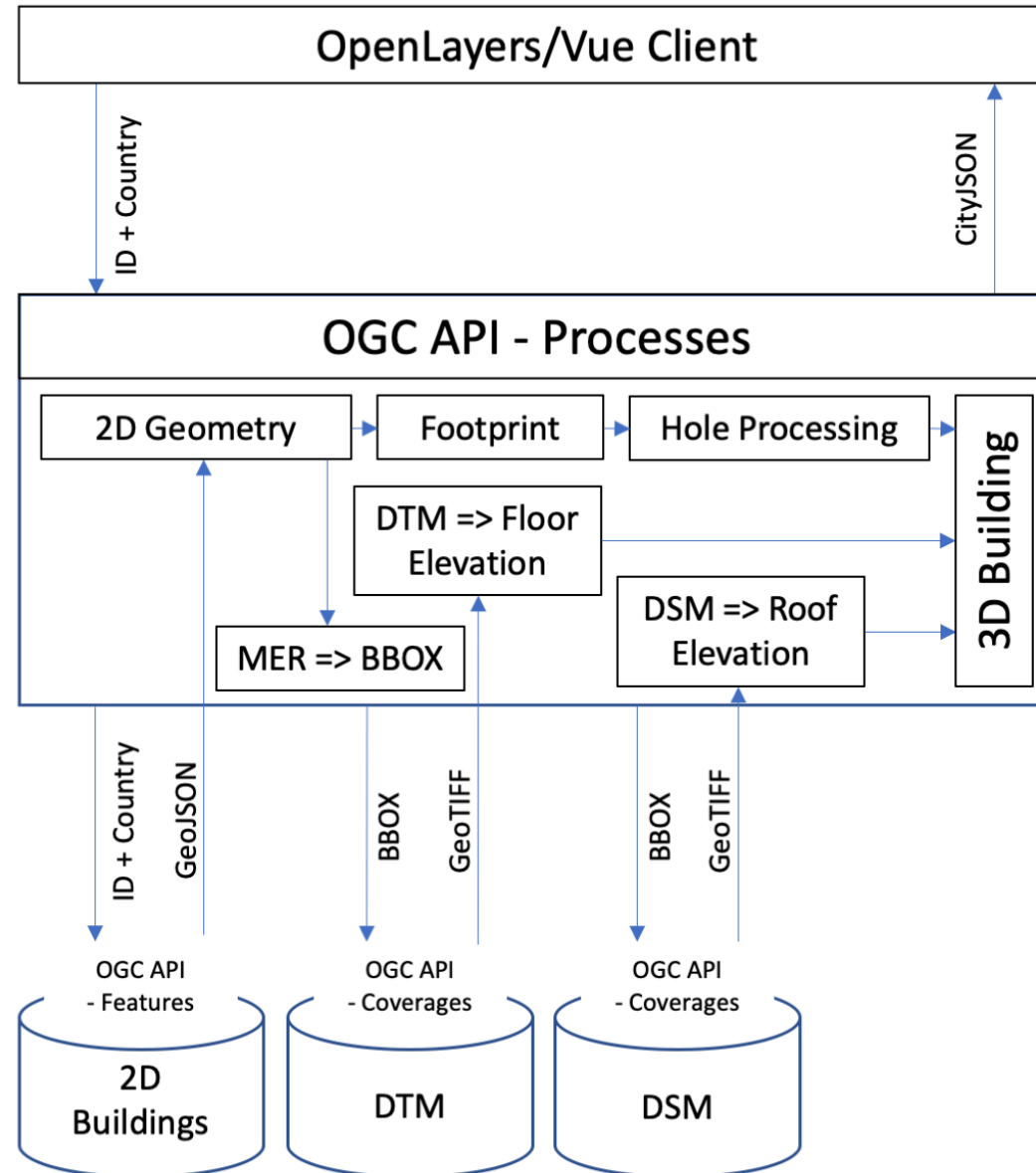
Estonia



Spain

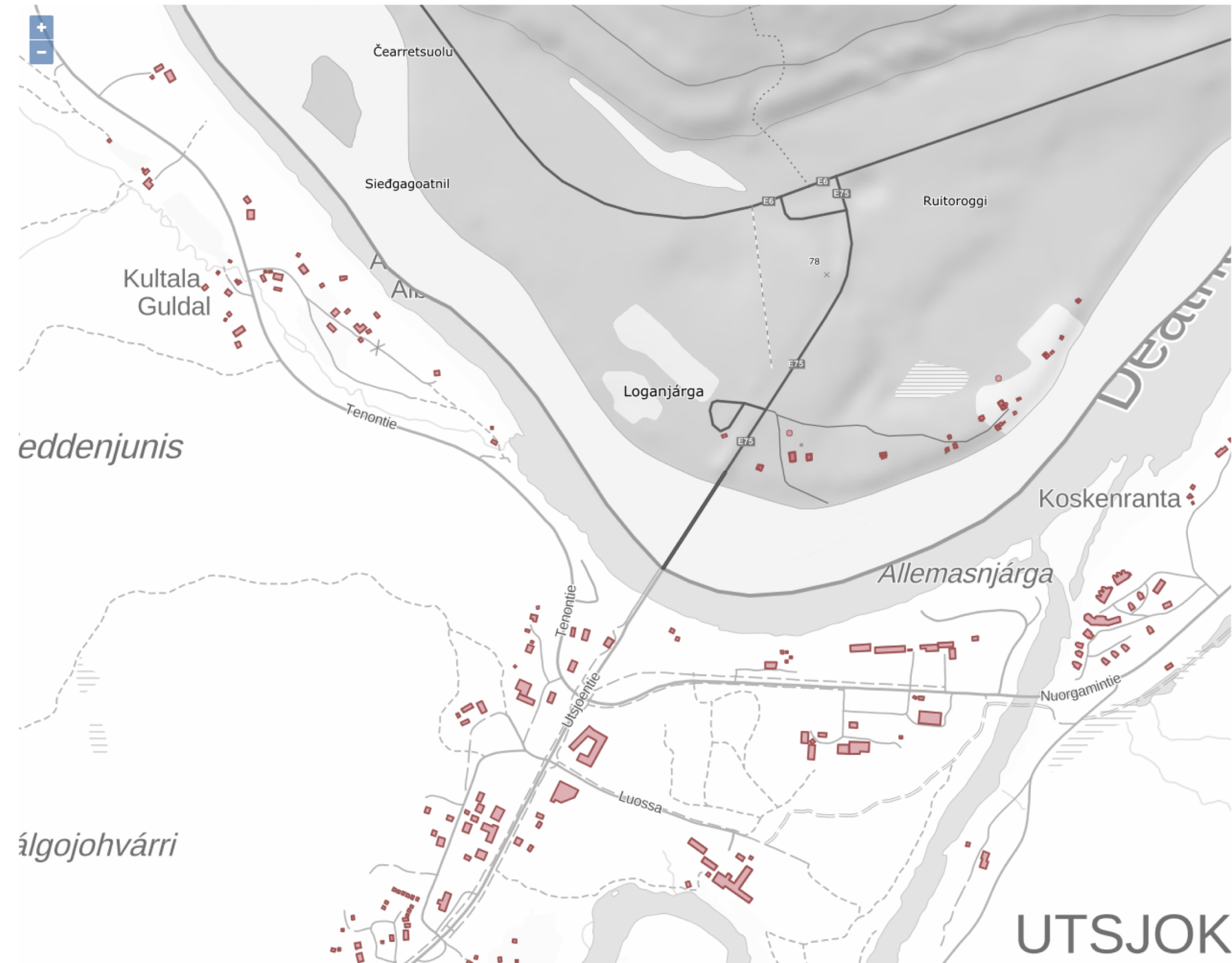


# On-the-fly Generation of 3D Buildings



# Cross-collection queries

- Important for the cross-border provision of datasets
- Officially supported in the OGC API Features spec (Part 3)
- [https://.../geoe3/buildings/search?](https://.../geoe3/buildings/search?collections=buildings_FI,buildings_NO&bbox=26.998585,69.903087,27.061414,69.920908&f=json&limit=1000)  
    [collections=buildings\\_FI,buildings\\_NO](#)  
    **&bbox=26.998585,69.903087,27.061414,69.920908**  
    **&f=json**  
    **&limit=1000**



Elements Console Network >> 30 30

search Hide data URLs

All XHR JS CSS Img Media Font Doc WS Manifest Other

Has blocked cookies Blocked Requests

1000 ms 2000 ms 3000 ms 4000 ms

| Name               | St... | Ty... | Initiator | Size | T..  | Waterfall |
|--------------------|-------|-------|-----------|------|------|-----------|
| search?collecti... | 200   | xhr   | featur... | 2... | 4... |           |

1 / 66 requests 215 kB / 1.0 MB transferred 215 kB / 1.8 MB resources Finish:

Console What's New Issues

Highlights from the Chrome 90 update

**New CSS Flexbox debugging tools**  
Debug and inspect CSS Flexbox with the new CSS Flexbox debugging tools.

**New Core Web Vitals overlay**  
Visualize page performance with the new Core Web Vitals overlay.

# Cross-collection queries

- Important for the cross-border provision of datasets
- Experimental for OGC API Coverages (not yet in the spec)
- [https://.../geoe3/dsm/search?](https://.../geoe3/dsm/search?collections=DSM_NO,DSM_FI&subset=x(1756108.1:3748915.4),y(10110879.3:11705125.2)&scaleSize=x(1000),y(800)&f=png)  
    [collections=DSM\\_NO,DSM\\_FI](#)  
    [&subset=x\(1756108.1:3748915.4\),y\(10110879.3:11705125.2\)](#)  
    [&scaleSize=x\(1000\),y\(800\)](#)  
    [&f=png](#)







Hide Border

☐ DTM

☒ DSM

FI ☒ NO ☒



# GeoE3 Integration Platform URL

- Stable version
  - <https://geoe3platform.eu>
- All feedback welcome!
  - [lassi.lehto@nls.fi](mailto:lassi.lehto@nls.fi)

# Conclusions

- 3D Buildings available from all five participating countries
- Upload to DB on the Integration Platform
- On-the-fly generation
  - Elevations from DTM, DSM
  - Elevations based on nbr-of-floors –attribute
- All provided in CityJSON, via OGC API Features
- Web-based visualization by ThreeJsViewer.vue (Delft)

Thank you!

