NLS
NATIONAL
LAND SURVEY
OF FINLAND

# Open-Source solution

EuroGeographics Webinar

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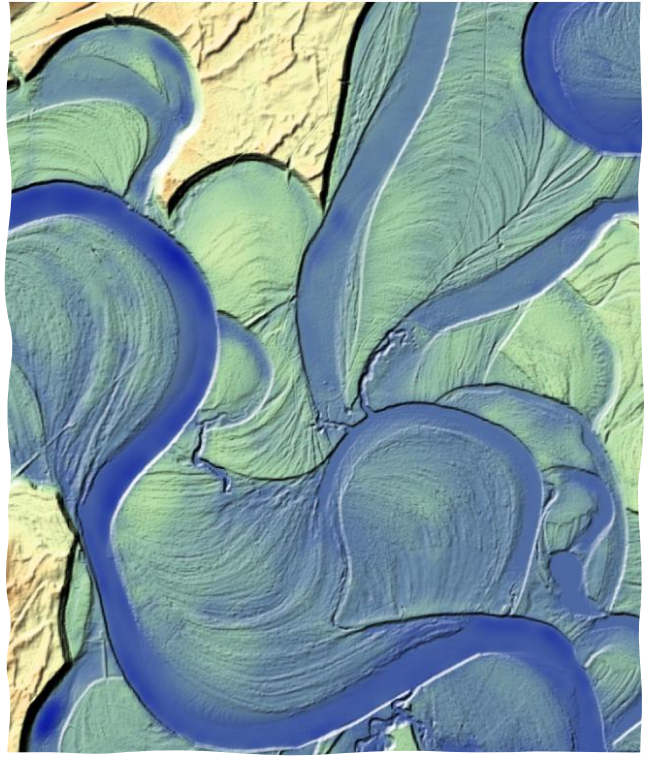
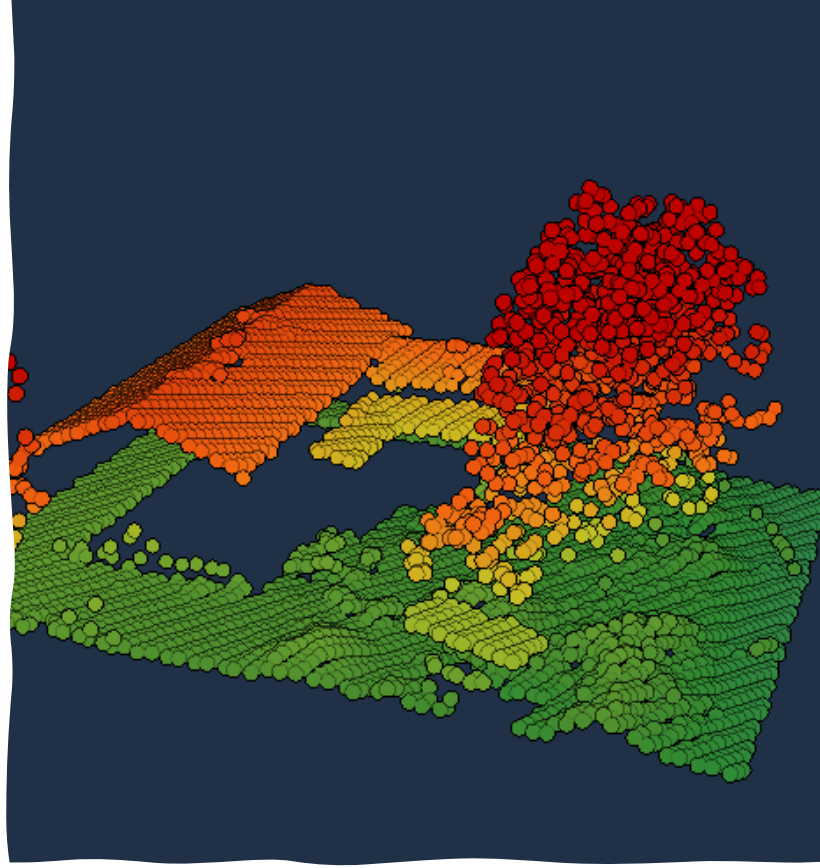
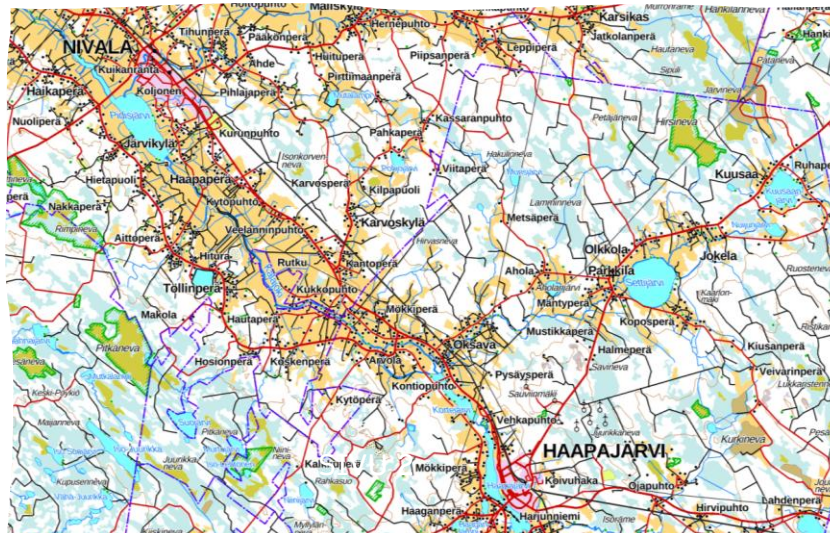
# Basic spatial data (NLSFI)

- Positioning data
- Aerial photos and lidar data
- Elevation model
- Topographical data: Land cover, Buildings and structures, Transport networks, Hydrography, Geographical names
- Map products derived from topographical data
- Geospatial Web Services









# Open-Source based systems in NLS

- Aerial image, Lidar point cloud and Ground control point registers
- Production planning and status map
- Topographic data production
  - Several PostGIS, QGIS and QField related tools in the GitHub
  - Plan is to publish all components
  - QGIS conference presentation about quality assurance
- Elevation production - Pinta
- Map production – cartographic generalization, QGIS conference presentation
- Oskari.org – web mapping
- Hakunapi OGC API Features Server
- …

# Topographic data production system

# Components

National data models

Concurrent data management by 100+ operators

Stereo mapping

Derivation of feature heights

Efficient editing of topographic data

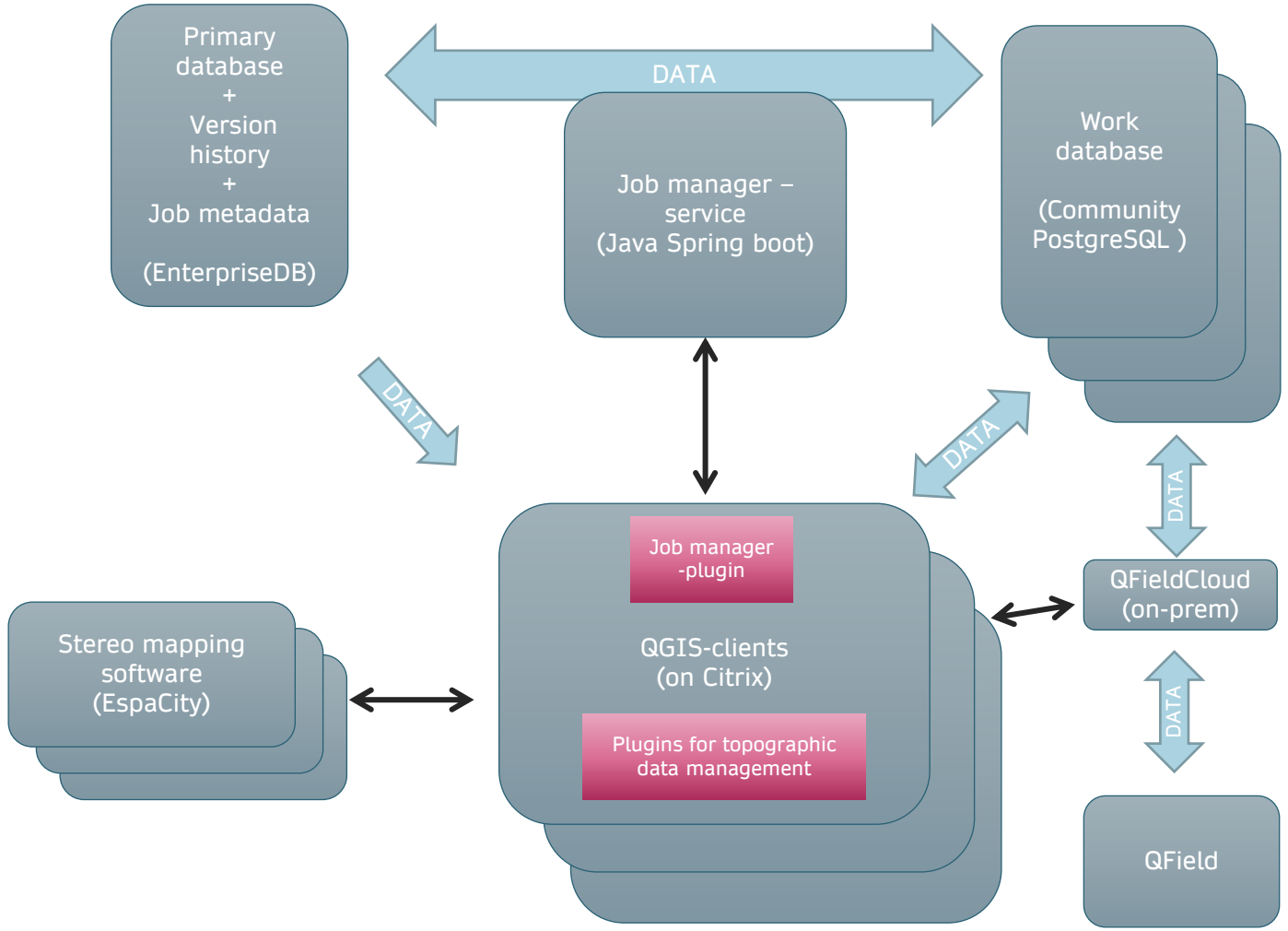
Quality assurance

Field mapping

Enable the processes of the various products

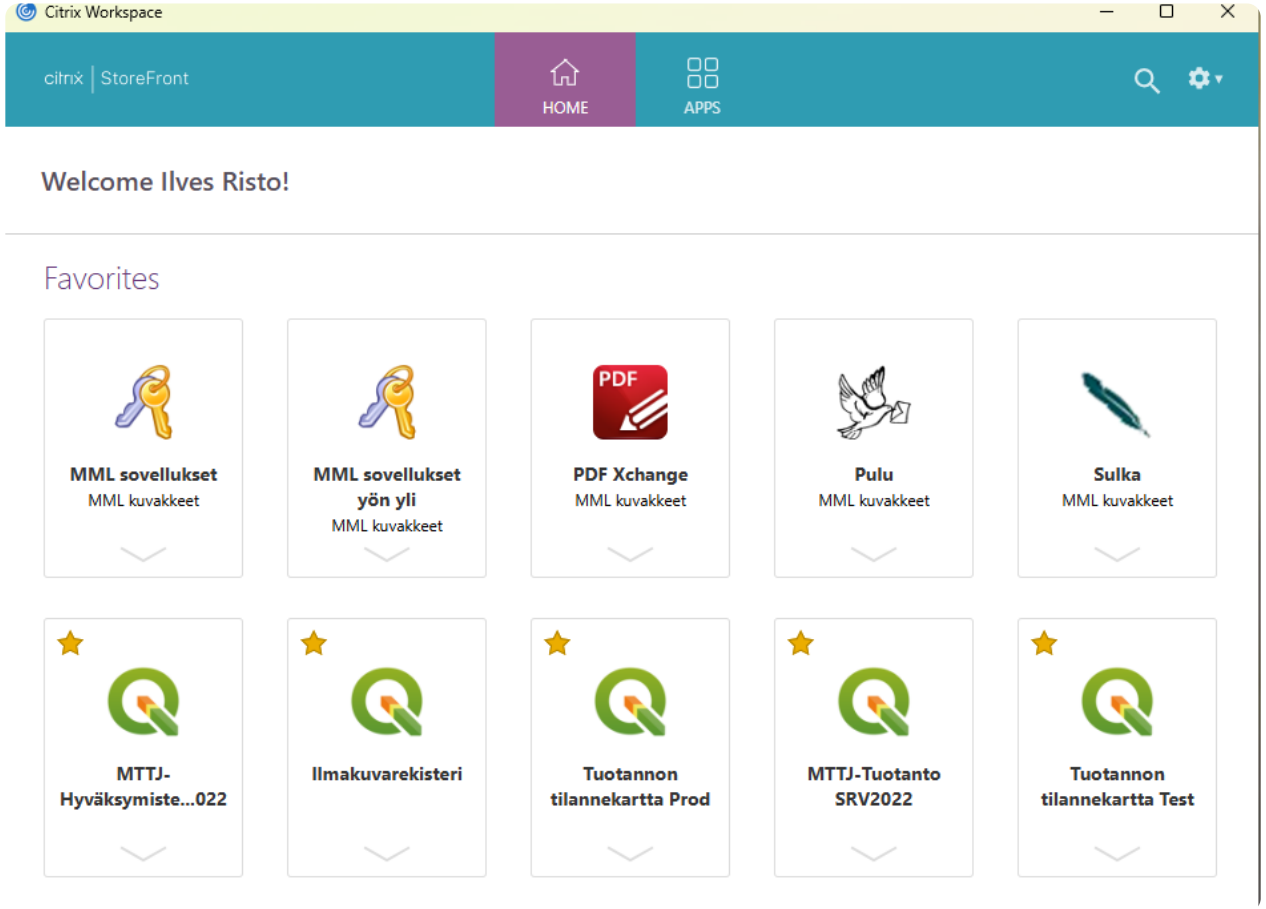
# Architecture

- Architecture enables concurrent data management by +100 operators
- Primary topographic database
  - Version history
- Work database
  - Operators own copy of primary from a selected area
- Job manager -service
  - Manages the dataflow from and to primary DB.
  - Manages work DBs
- QGIS
  - Controls the dataflow with plugin
  - Operator edits topographic data in work DB

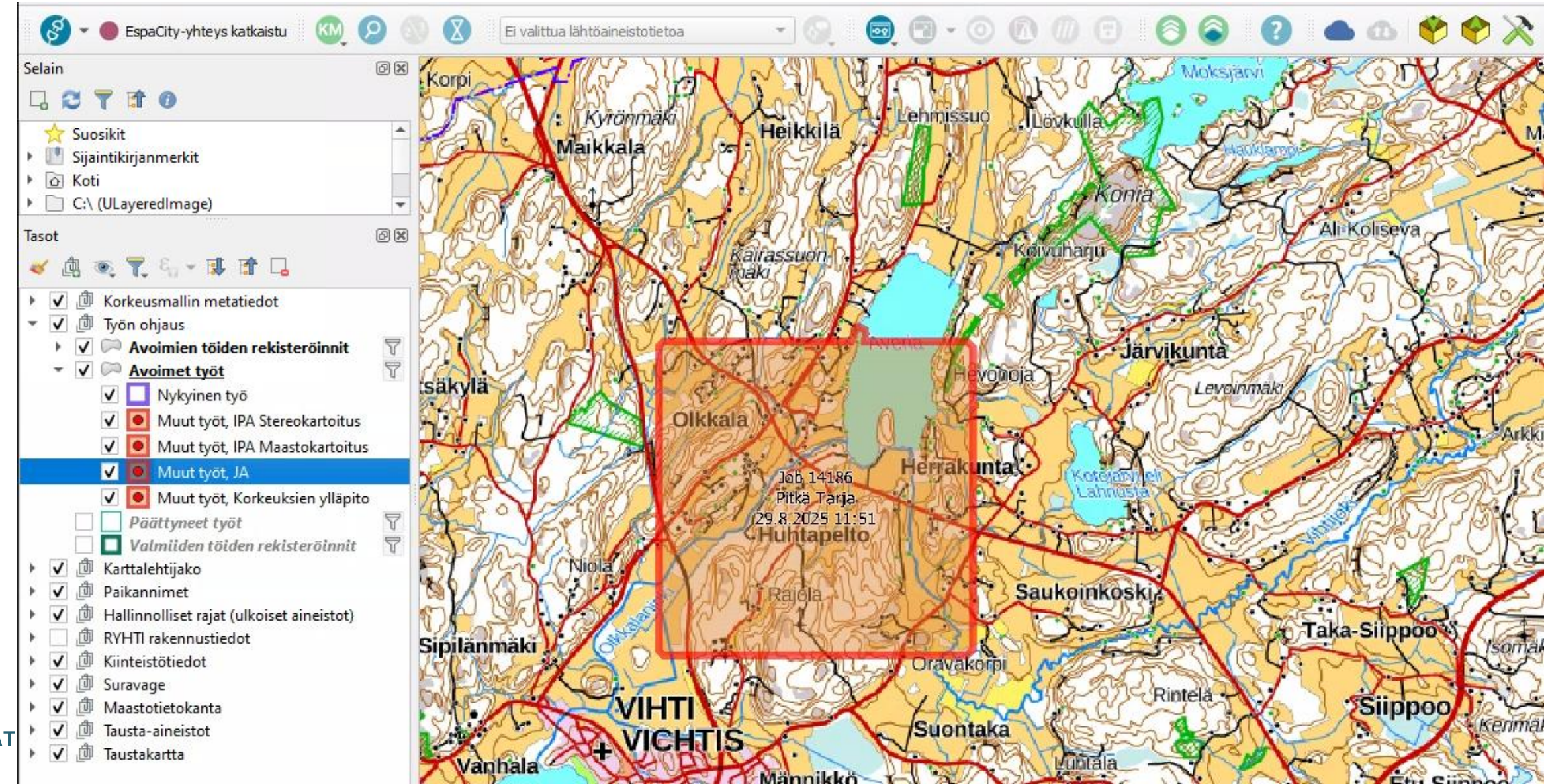


# Virtualized environment

- Centralized database
- Good for maintenance and security
- Operators are in multiple district survey offices in Finland
- Different environments for development, testing and production
  - New version is fully tested before we start to use it in production



# Basic view



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Avoimet työt
Nykyinen työ
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Muut työt, IPA Maastokartoitus
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Paikannimet
Hallinnolliset rajat (ulkoiset aineistot)
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Suravage
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Tausta-aineistot
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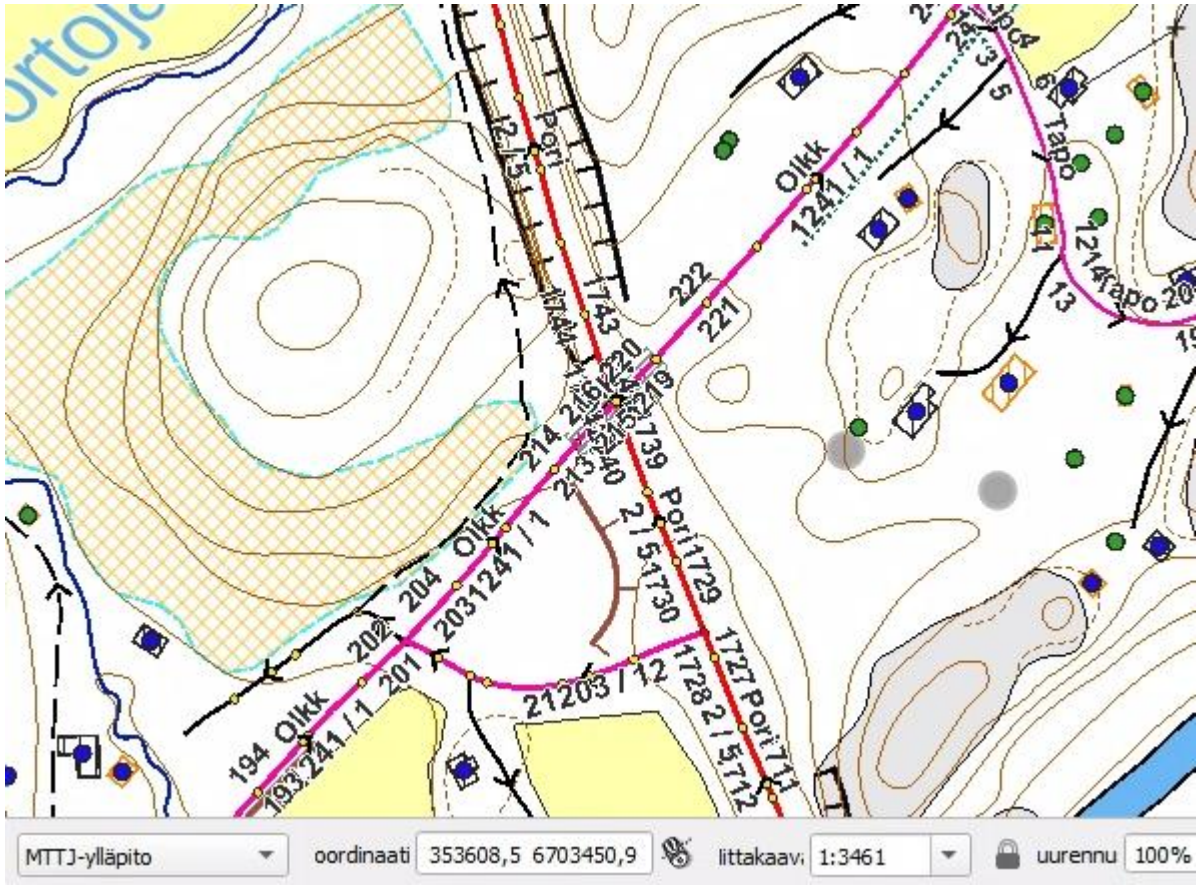
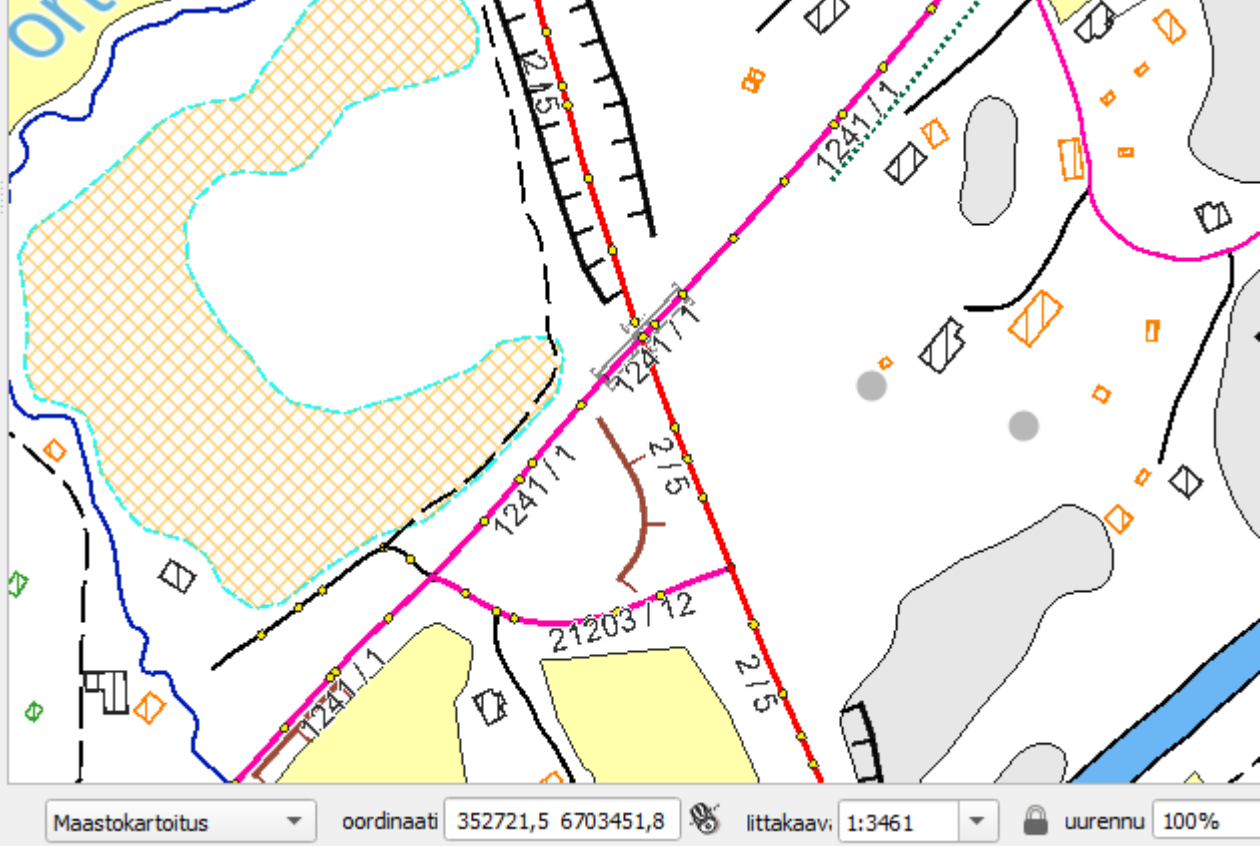
# Job Management

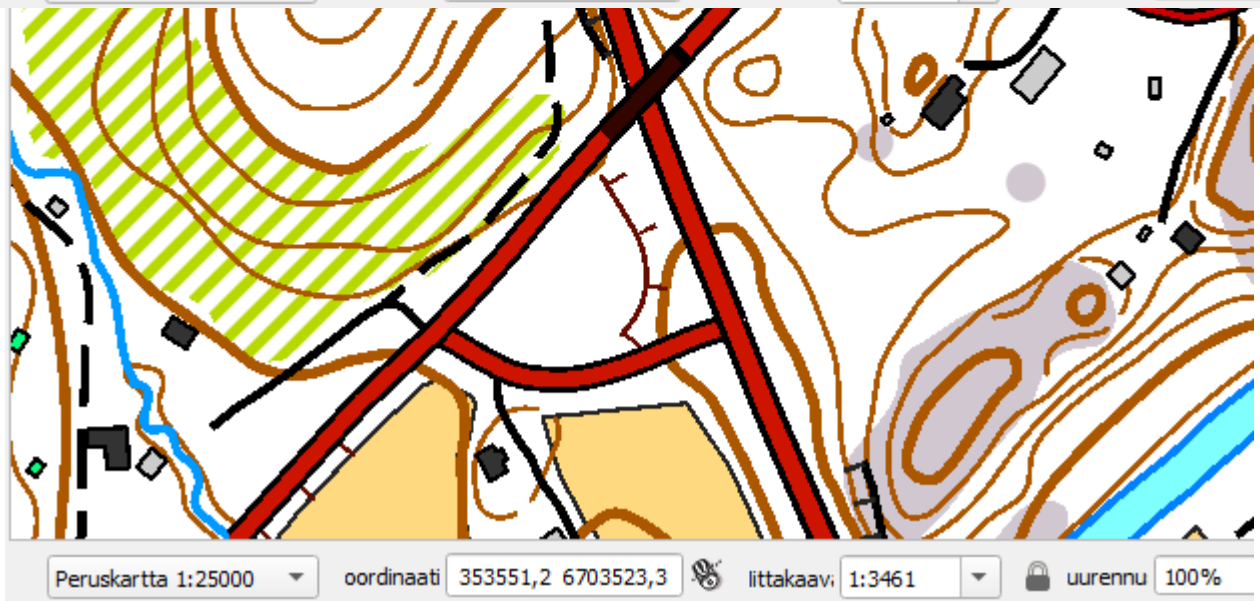
- Create work database
- Read data from the main database
- Edit the data
  - All editing is done in the work database
- Save your Job database
- Refresh data from main database
  - Must do, if something has changed
- Register Job
  - As many times as needed
- Close Job
- End Job



# Visualization

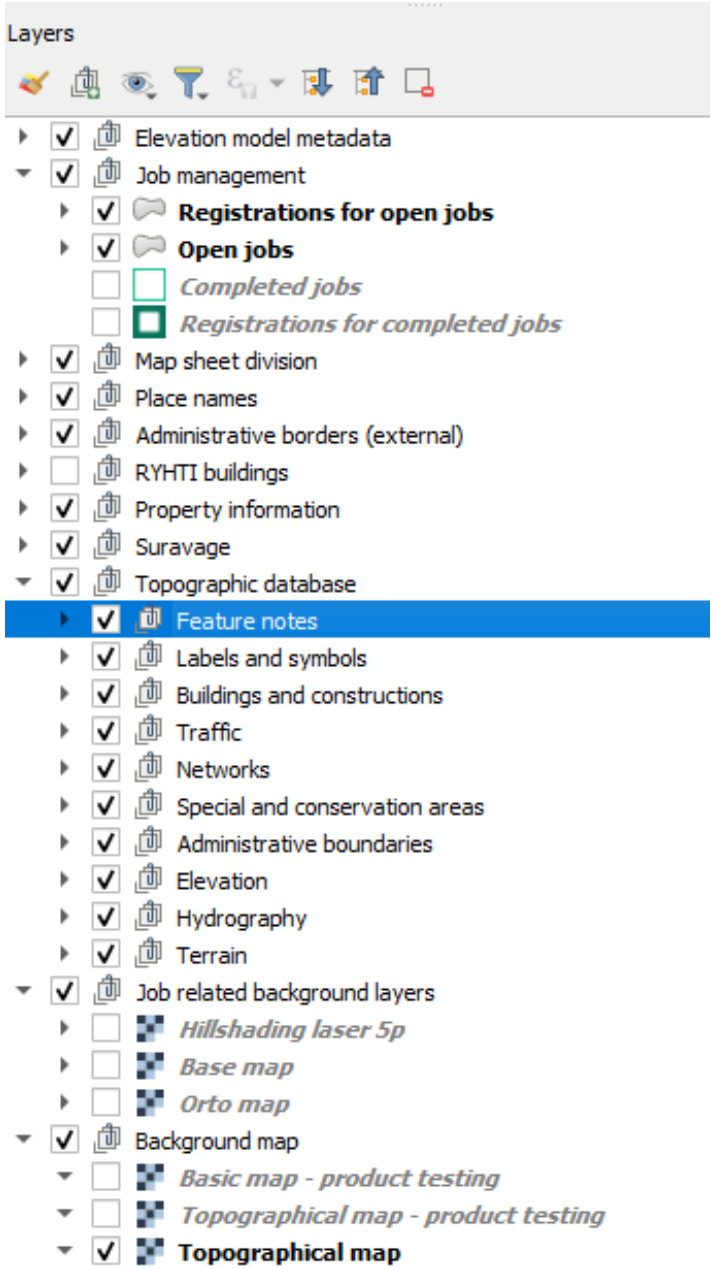


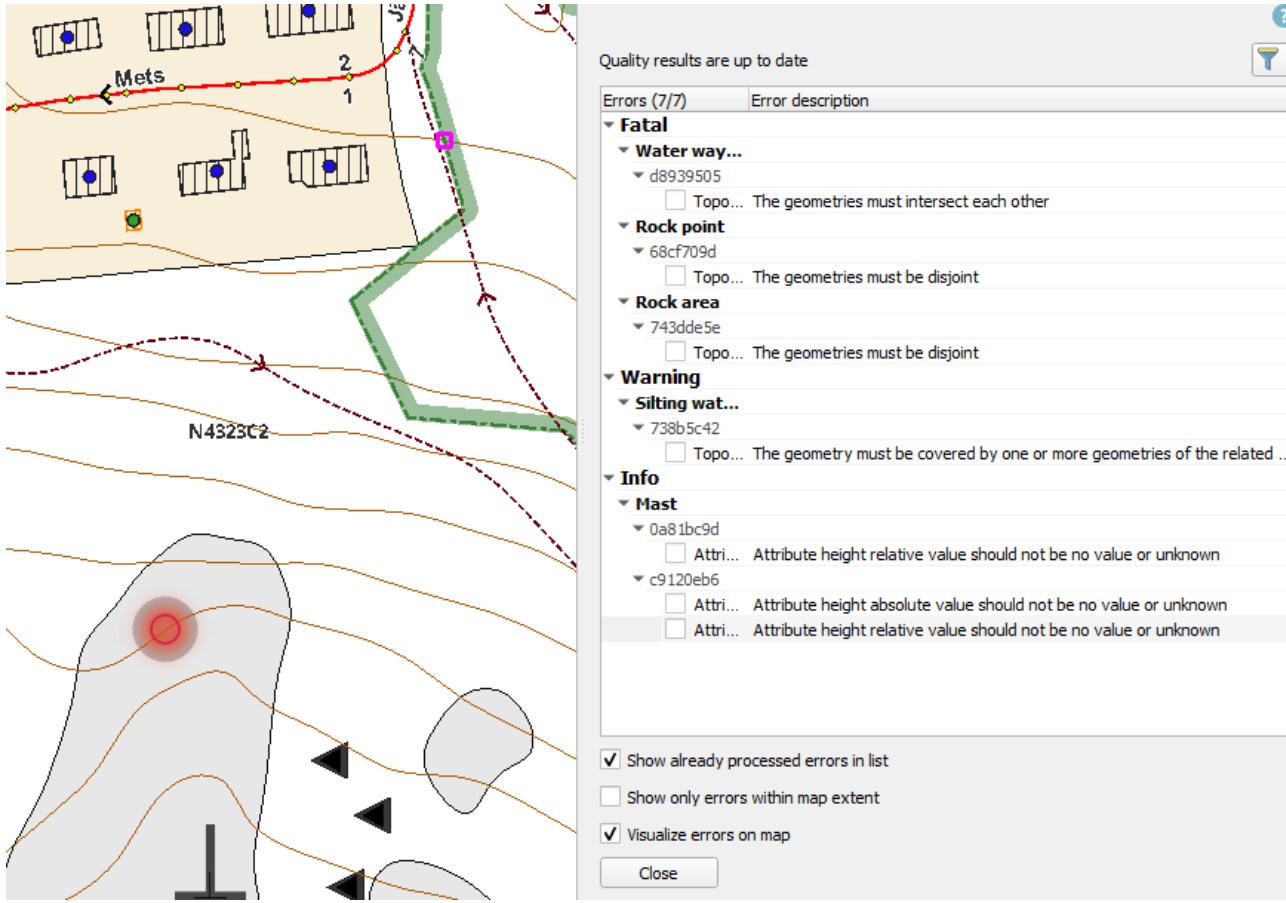
# Topographic database

- Themes
  - Over 100 feature layers
- Permanent id
  - Lifecycle information
- Using efficiently data from other data providers
  - Processing tools
  - Auxiliary database



# Quality control

- Three types of rules
  - Geometry, attribute and topological rules
  - Attribute rules also include continuity of attributes in networks e.g. road links
- Implemented in the database
  - Great performance
  - One place to manage the rules
- Rules
  - 15 topological rule types
  - 12 000 combinations ”rule + feature type + related feature type + filter by attribute
  - Classification of the error level
    - Fatal, warning, info



# Field mapping / QField

QFieldCloud

- Handling the data flow
- On-premises installation

QField

- Development for missing features
- GNSS receiver: Leica FLX plus

Main solution

- Quality control and database management



# QGIS development

- Components to improve mapping workflow
  - Plugin to select active layer from map
  - Editing mode and save for all layers
  - Topological segment reshape tool
  - Visualisation of the earlier changes and removals
  - Search by ID from all of the layers in primary and work database
  - Street address management tools
  - Easy way to provide additional datasets to all users
  - Quality control and related QGIS interface
- Bugfixes and larger feature requests to QGIS and QField core
  - Topological editing
  - OGC API Features
  - Enhancements to Split and Merge Features functionalities
  - …

# Conclusion

- There are a lot of mature open-source solutions available
  - It’s important to understand how to secure software continuity
  - No license fees, but it’s important to support development
    - COSS in Finland
  - You need own capabilities and/or good partnerships
- Growing interest in Europe
  - Sovereignty
  - EuroCommons
  - GeoCommons (OSGeo)
  - …

# After all
# – people are the most important part



# We know the Earth
# – we secure the future

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