EO data applications for agriculture

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Current commercial priorities

- **Web-based tool for creating variable rate application maps based on remote sensing data**

- **Complex solution for sensor data management**

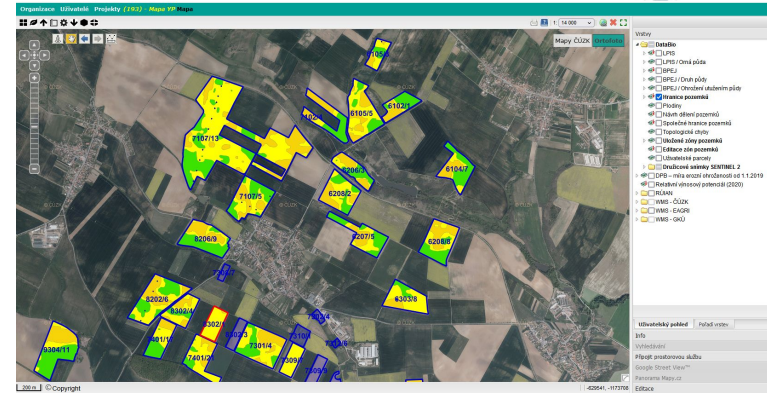# Introduction

Lesprojekt - služby, Ltd.

- Small innovative company, more than 20 years on the market
- A long-term focus is on commercialization of research results as products and services.
- The results from previous research activities are offered mainly as services, e.g. SaaS (Software as a Services), PaaS (Platform as a Service) a IaaS (Infrastructure as a Service).
- Focuses on the management, analysis and use of geospatial data, especially earth observation data including sensor networks, remote sensing products, and spatial data infrastructure building, web map applications development

Web-based tool for creating variable rate application maps

We use an approach based on the estimated long-term relative variability of crop yields within a field.

Source data:

- Satellite multispectral imagery
  - Multi-year time series
  - Landsat 8
  - Sentinel-2
  - Vegetation index EVI, May to June
- Field blocks boundaries (LPIS)

Web-based tool for creating variable rate application maps

The variable application rate map is based on production zones

Production zones show the expected yield in a given area as a percentage of the average yield of that field.


Zones classified by 5%

5-zone map

3-zone map

# Web-based tool for creating variable rate application maps

- A low-resolution map of production zones without manual corrections is available free of charge for the entire Czech Republic.
- For real use for the purpose of variable rate application, it is possible to order the calculation of production zone maps in higher resolution, where the result is verified by our expert consultant.
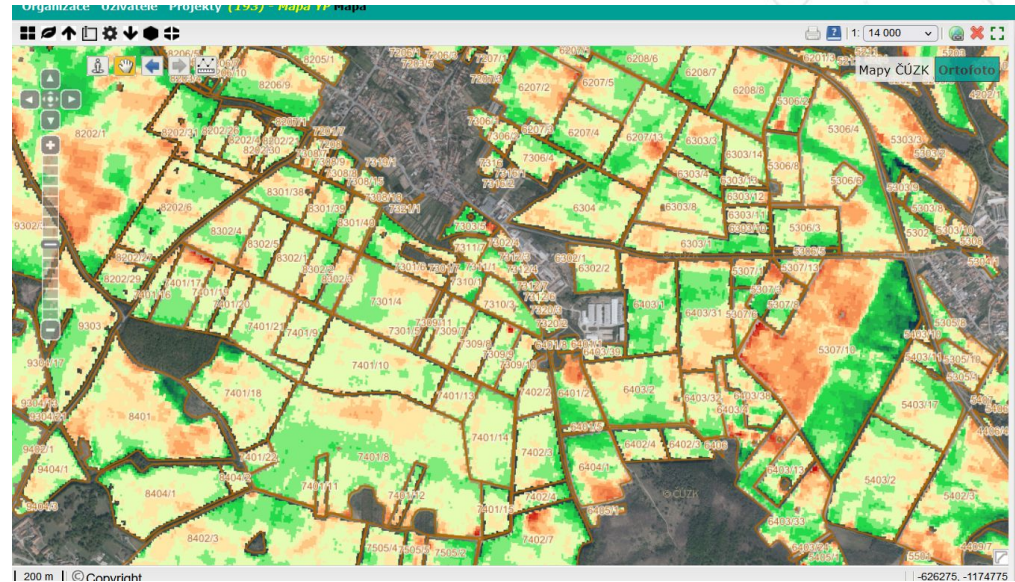
Web-based tool for creating variable rate application maps

Main features:

- Management of organizations, users and projects
- Several ways to import or create field boundaries in a project
  - Import fields from LPIS by cadastral area and user name.
  - Manual selection of fields from LPIS
  - Import from shapefile.
  - Manual creation or editing of field boundaries.
- Management of map layers including the ability to connect layers from various sources.
- Ordering computation of production zones for selected fields.
- Defining the amount of fertilizer for each zone.
- Creating variable rate application maps.
  - Using production zones
  - Manually
- Downloading shapefile with application map
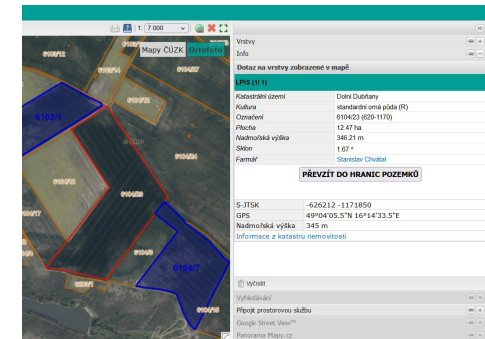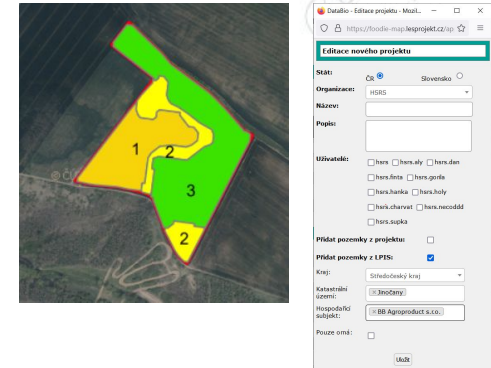
Complex solution for sensor data management

- Consists of telemetry unit and data management application

- Implementing modern IoT approaches - low power networks

- New standards for data transfer

- Tested in many use cases with SensLog as data management
  - Meteostations
  - Soil nodes - agrometeo phenomenons
  - Groundwater measurement
  - Fleet monitoring

smart
agriculture

AgroNode

- Autonomous telemetry station
- Developed by Lesprojekt-služby, Ltd.
- Radio-based transmitting – IoT networks, GSM
- Interfaces for the most of digital sensors
- Gathering, temporary storing and online transfer of data

LoRa™

NB-IoT

sigfox

EGPRS

AgroNode

◎ Telemetry unit controlled by user script

◎ Internal memory for observation storage

◎ USB and BLE user interface

◎ Solar charging or primary battery powered

◎ ARM Cortex M0 ultra low power processor

◎ External connectors

   ○ SDI12
   ○ RS485
   ○ 1WIRE
   ○ I2C
   …

SensLog

- Web-based & cloud-based **sensor data management** application for:
  - storing, managing, processing and publishing
- Static in-situ sensors, deployed on mobile carrier, collected by smart devices
- Provides REST API for both sides of chain – data producers and data consumers
- Uses relation DB with spatial extension – can provide variety of analytical services

SensLog
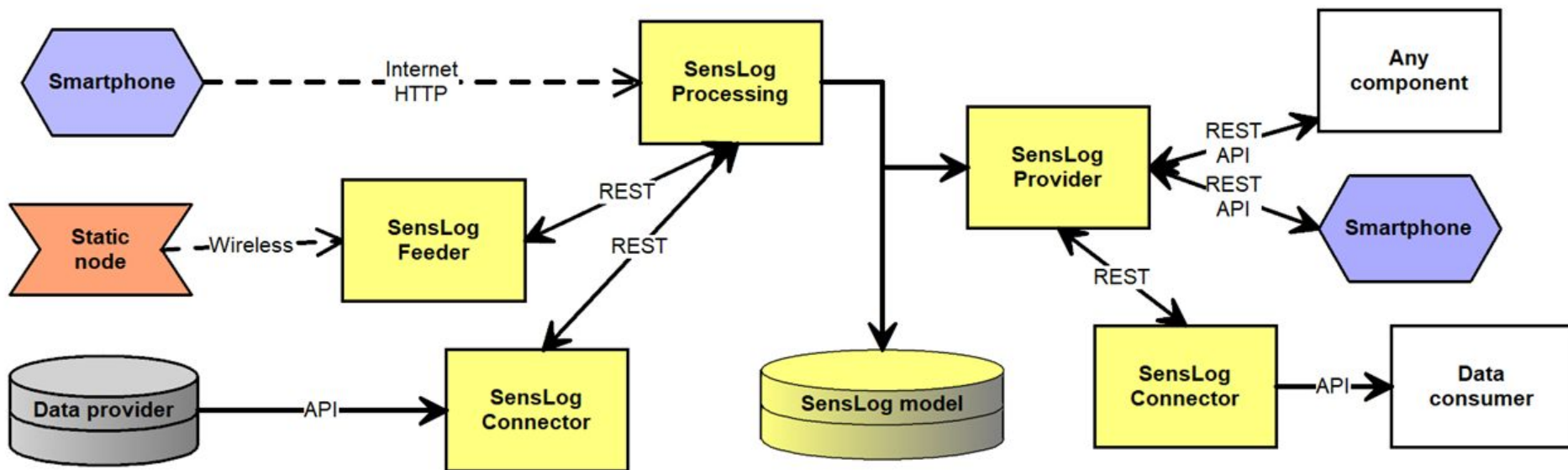
SensLog - interoperability

- **Connector** - component to transform different APIs to SensLog API and vice-versa
- Suitable for tasks where there is no impact on API of data providers/consumers
- Push / pull / proxy option
- List of Allowed/Blocked sensors
- Development of **OGC SensorThingsAPI** implementation

Thank you for your attention!

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