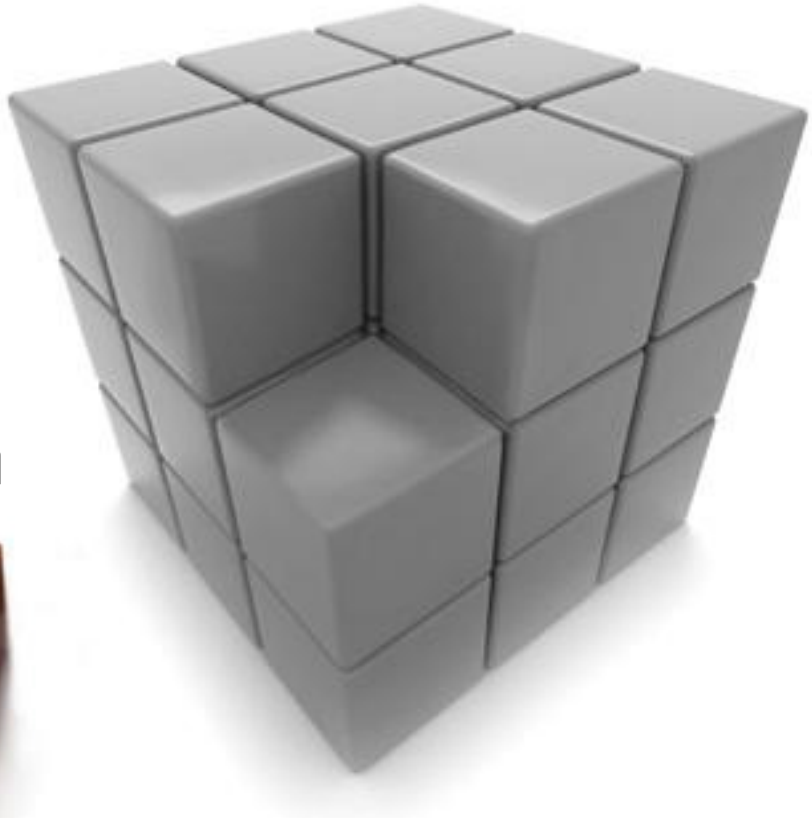
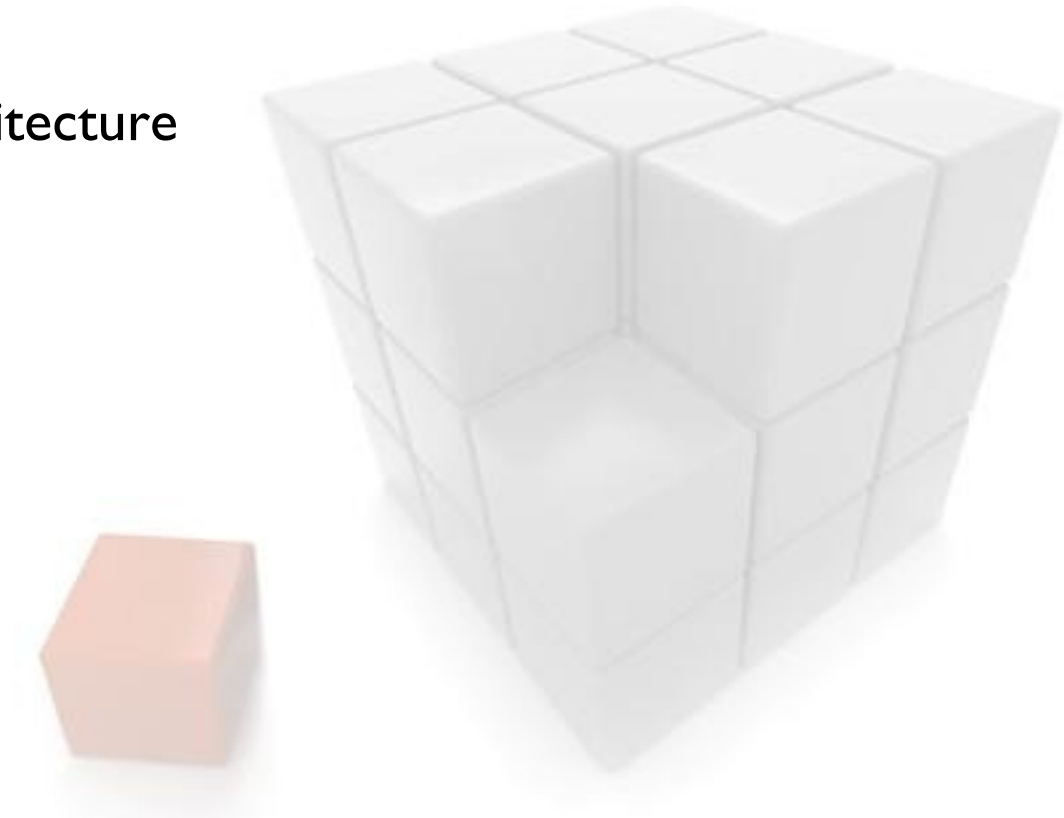
Croatian Motorways Road Database Management System



Marko Turković

Presentation overview

- About us…
- System introduction
- System component architecture
- Kosmo Desktop
- WebGIS portal
- Future development
- We've learned that…



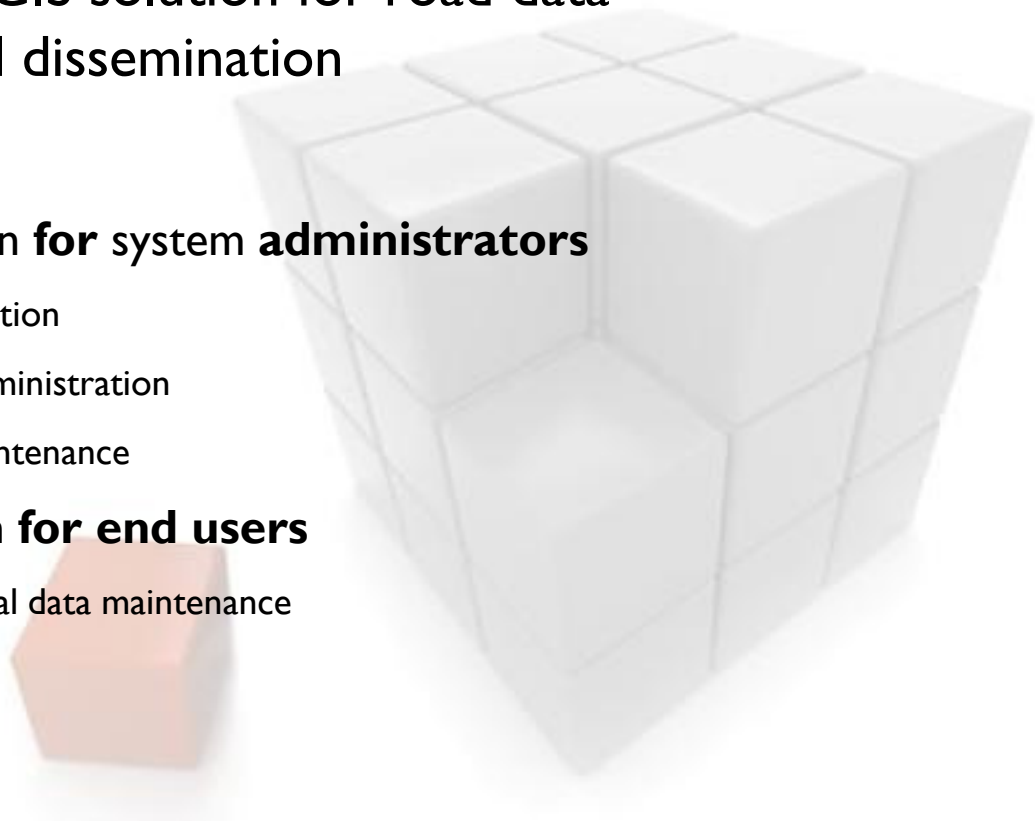
About us…

- **IN2 Ltd.** established in 1992 in Zagreb, Croatia
- Continuous business growth
  - 11 companies in **IN2 Group**, present in 6 countries
  - **IGEA Ltd.** – member of the IN2 Group, competence center for GIS
- Employees are our most valuable asset
  - more than 450 employees in the group, 300+ in Croatia
- Long term relationship with clients

- **Croatian Motorways Ltd.** a company for operation, construction and maintenance of motorways
- 100% owned by the Republic of Croatia

System introduction

- Road database management system developed for Croatian Motorways Ltd.
- Integrated desktop + web GIS solution for road data definition, maintenance and dissemination
- Two client applications
  - **Kosmo Desktop** application **for** system **administrators**
    - database data model administration
    - assets access rules and user administration
    - spatial and non-spatial data maintenance
  - **WebGIS portal** application **for end users**
    - data visualization and non-spatial data maintenance
    - document management
    - analysis and reporting

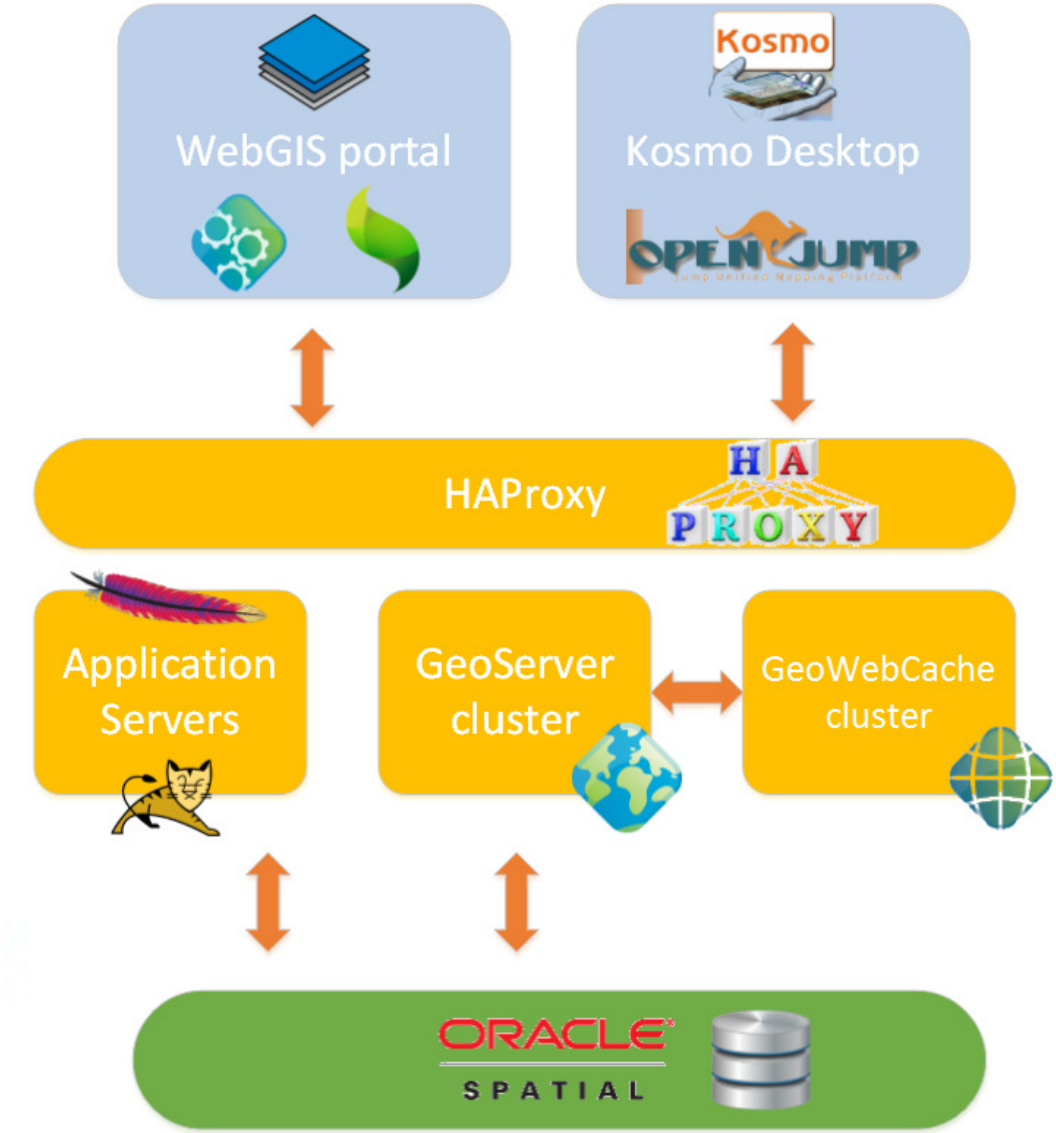


System component architecture

client tier

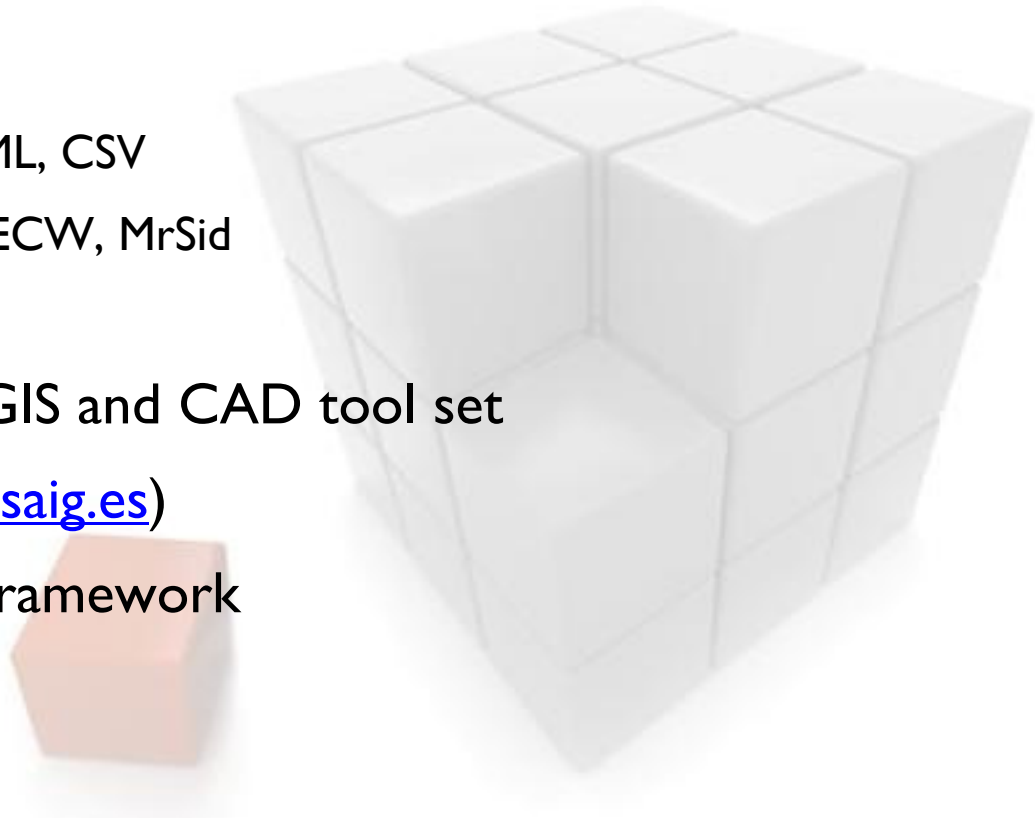
middle tier

database tier



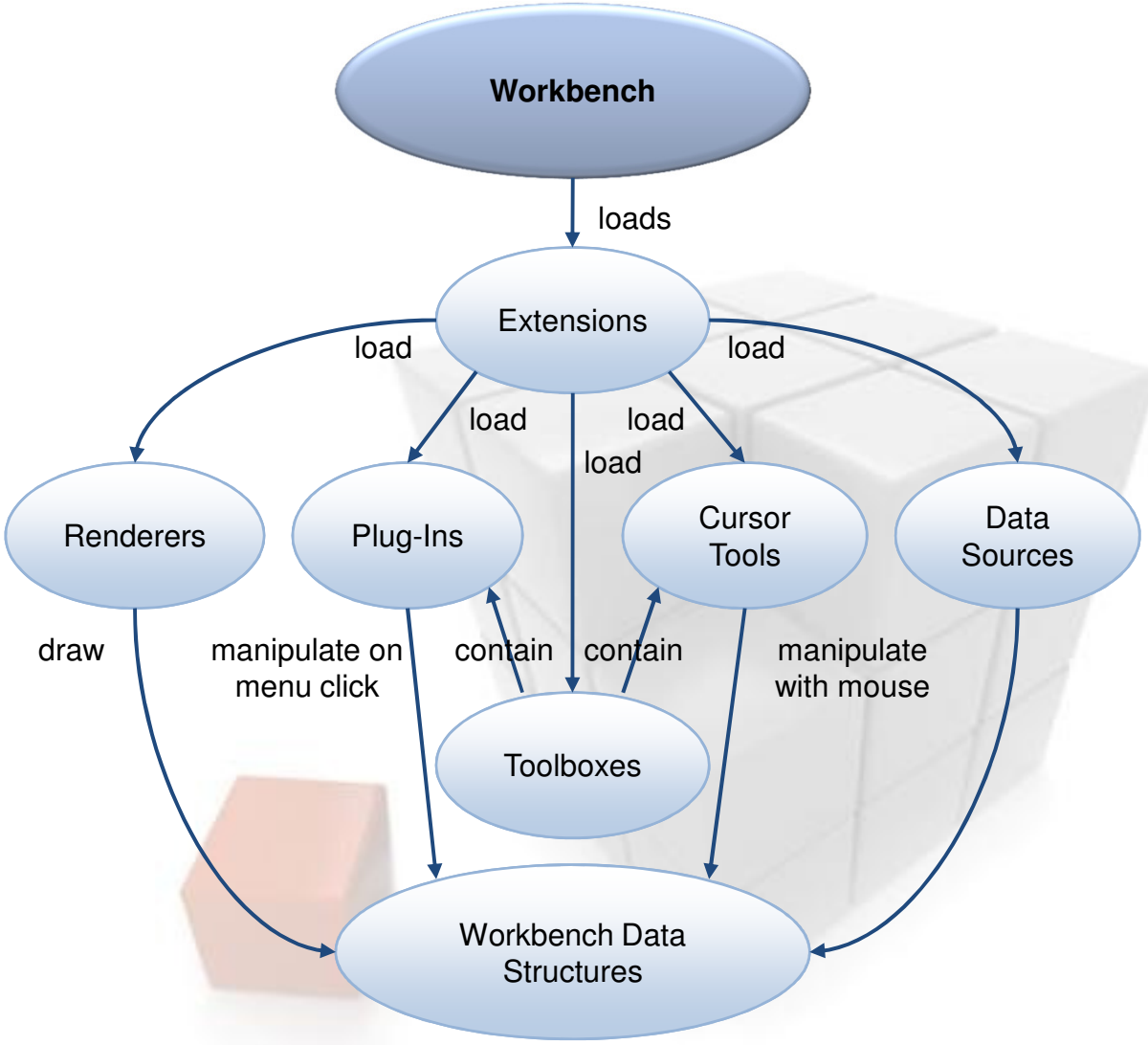
Kosmo Desktop

- Desktop GIS with powerful query, edition and analysis tools
- Support for major spatial databases, file formats and OGC standards
  - PostgreSQL, Oracle, MySql
  - SHP, DXF, DWG, DGN, GML, CSV
  - TIFF, GeoTIFF, PNG, JPEG, ECW, MrSid
  - WMS, WFS
- Rich and easily extensible GIS and CAD tool set
- Developed by SAIG (www.saig.es)
- Based on Java OpenJUMP framework



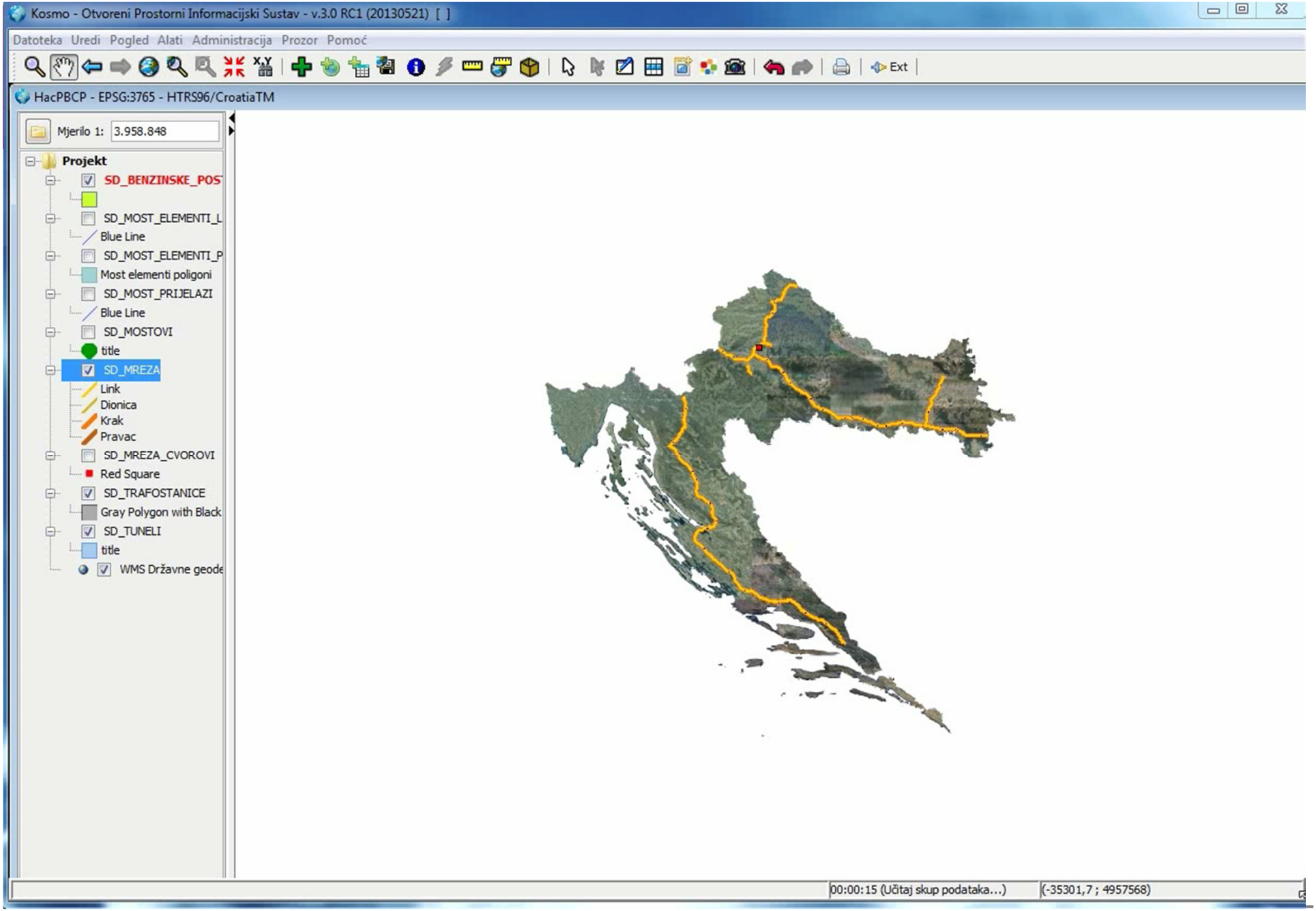
OpenJUMP software architecture

- Workbench
- Extensions
  - Plug-Ins
  - CursorTools
  - Renderers
  - DataSources
  - Toolboxes



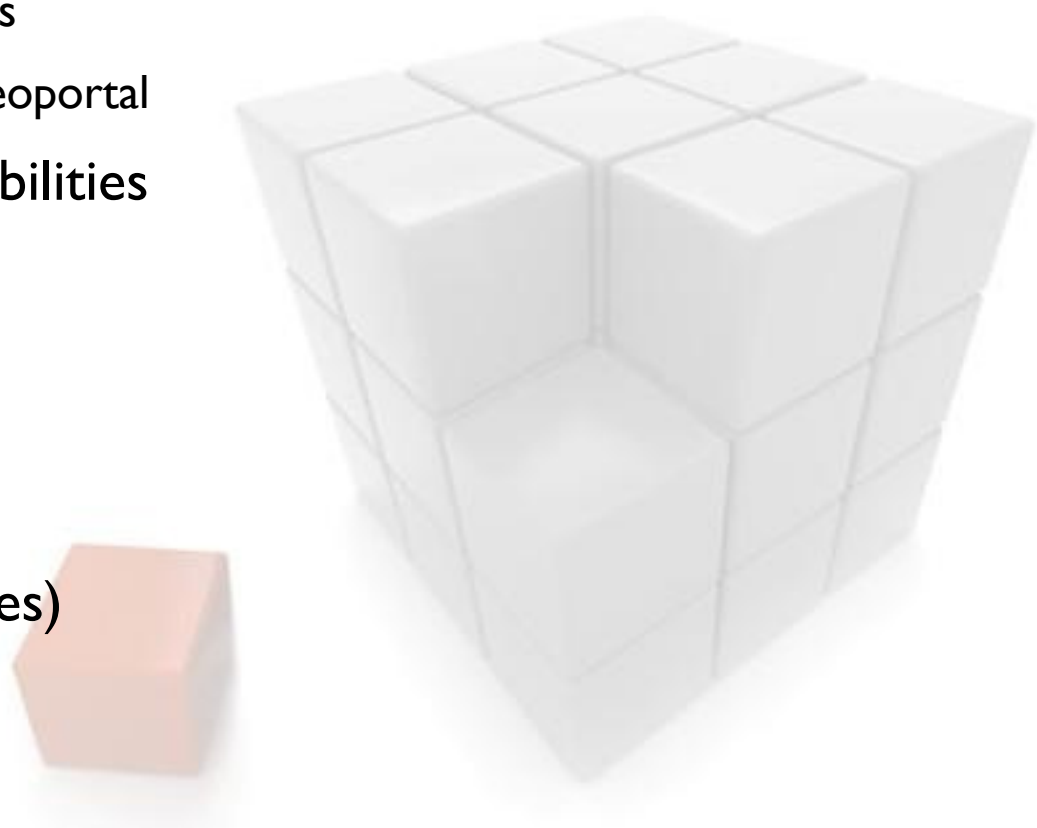
Kosmo project specific functional modules

- Project specific modules:
  - database data model administration
    - data model metadata
    - spatial metadata and spatial indexes
    - style and layer creation via GeoServer REST API
  - user administration, security and access rules
  - tools for aid in linear referencing
    - splitting and merging of linear elements
    - measure recalculation, show measure for selected point on linear element
  - feature class administration for the WebGIS portal
    - WebGIS portal layer tree created from layer tree metadata

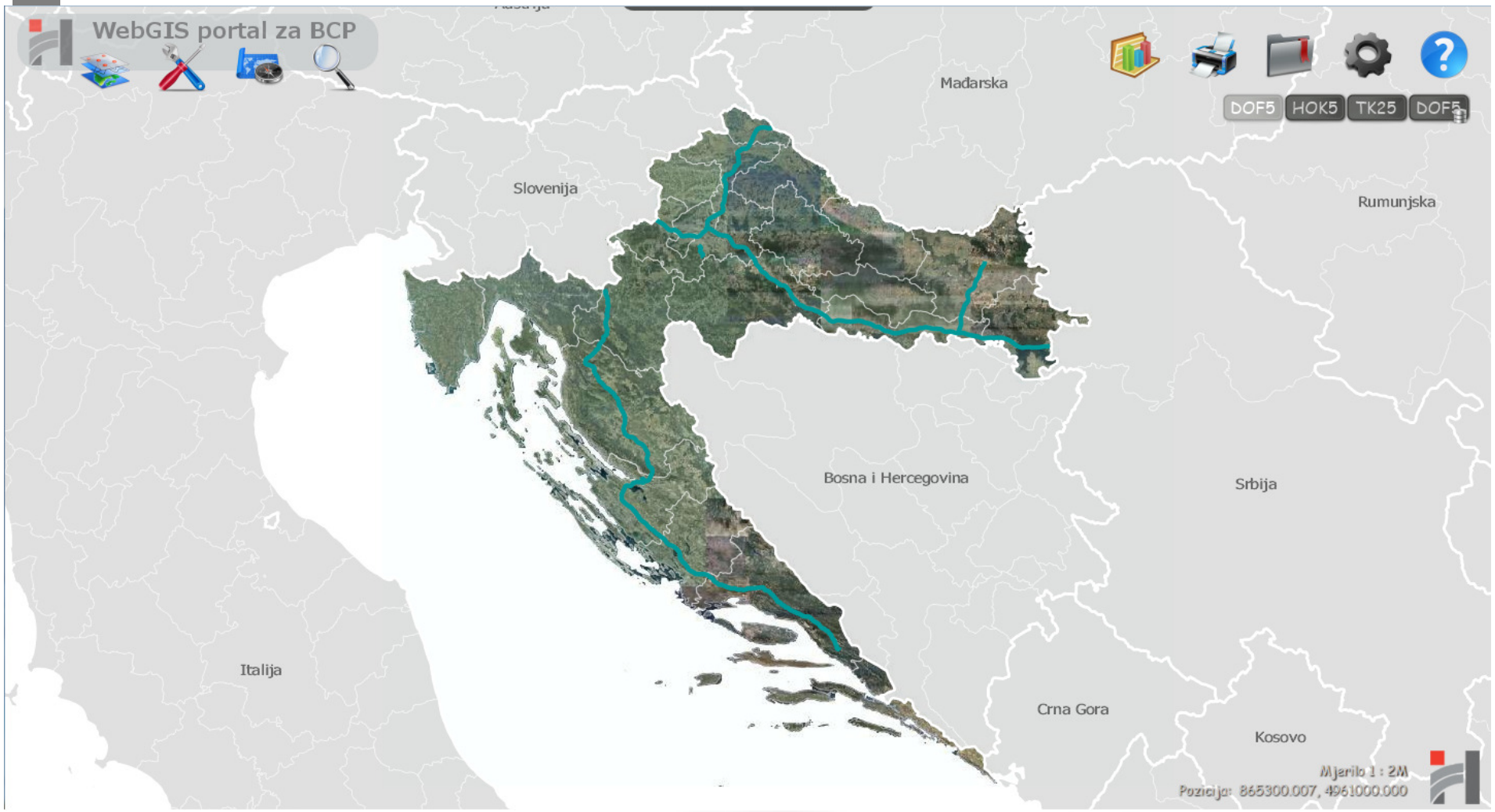

Kosmo - Otvoreni Prostorni Informacijski Sustav - v.3.0 RC1 (20130521) [ ]
Datoteka Uredi Pogled Alati Administracija Prozor Pomoć
Ext
HacPBCP - EPSG:3765 - HTRS96/CroatiaTM
Mjerilo 1: 3.958.848
Projekt
SD_BENZINSKE_POS
SD_MOST_ELEMENTI_L
Blue Line
SD_MOST_ELEMENTI_P
Most elementi poligoni
SD_MOST_PRIJELAZI
Blue Line
SD_MOSTOVI
title
SD_MREZA
Link
Dionica
Krak
Pravac
SD_MREZA_CVOROVI
Red Square
SD_TRAFOSTANICE
Gray Polygon with Black
SD_TUNELI
title
WMS Državne geode
00:00:15 (Učitaj skup podataka...)
(-35301,7 ; 4957568)

WebGIS portal

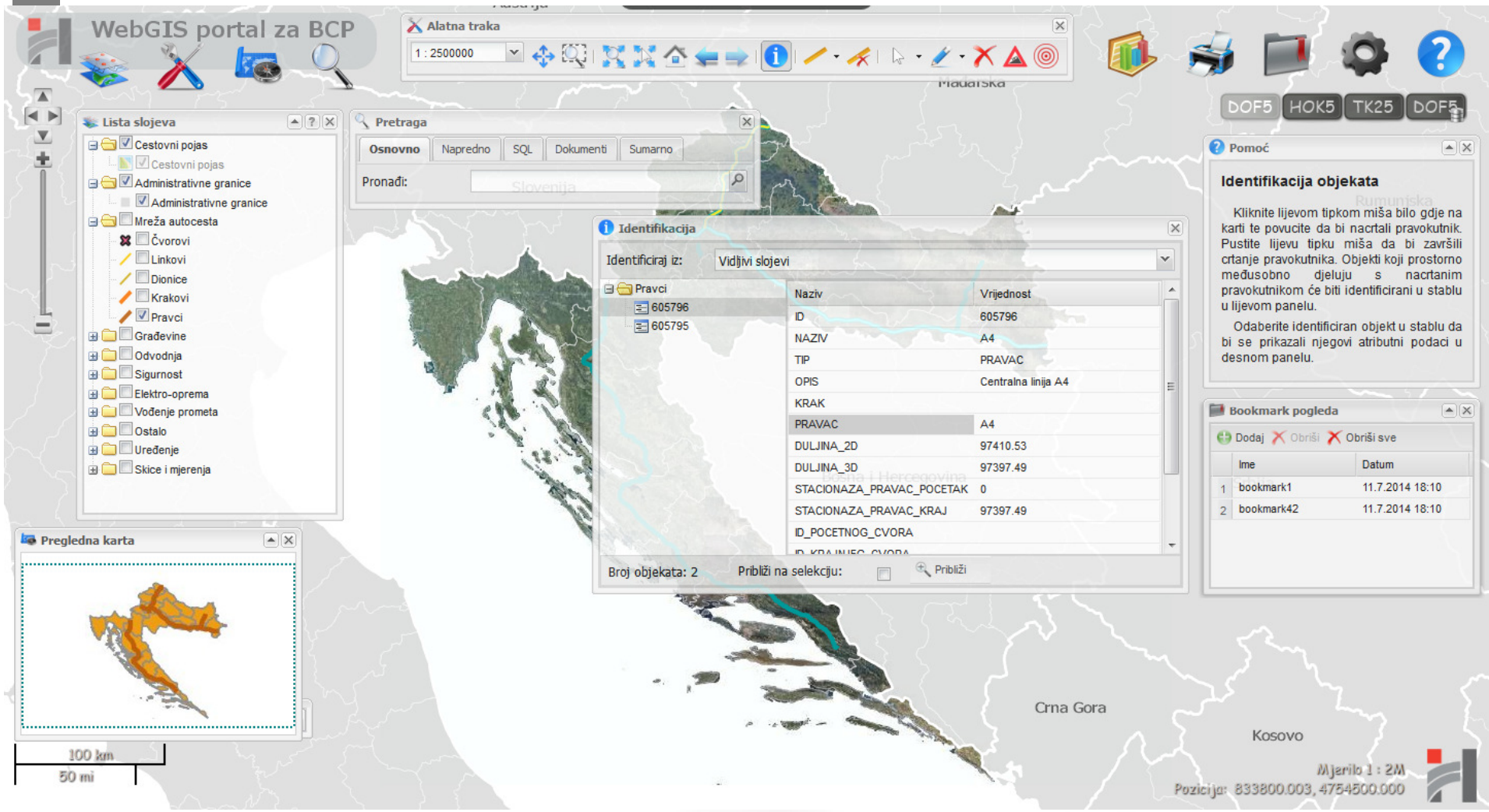
- Web application built on OpenLayers, GeoExt and ExtJS
- Spatial data visualization
  - Road database feature classes
  - Base maps from Croatian Geoportal
- Advanced data search capabilities
  - Quick search
  - Basic search
  - Advanced search
  - SQL Query builder
- Changeable UI skins (themes)
- Localization



WebGIS portal – interface 1

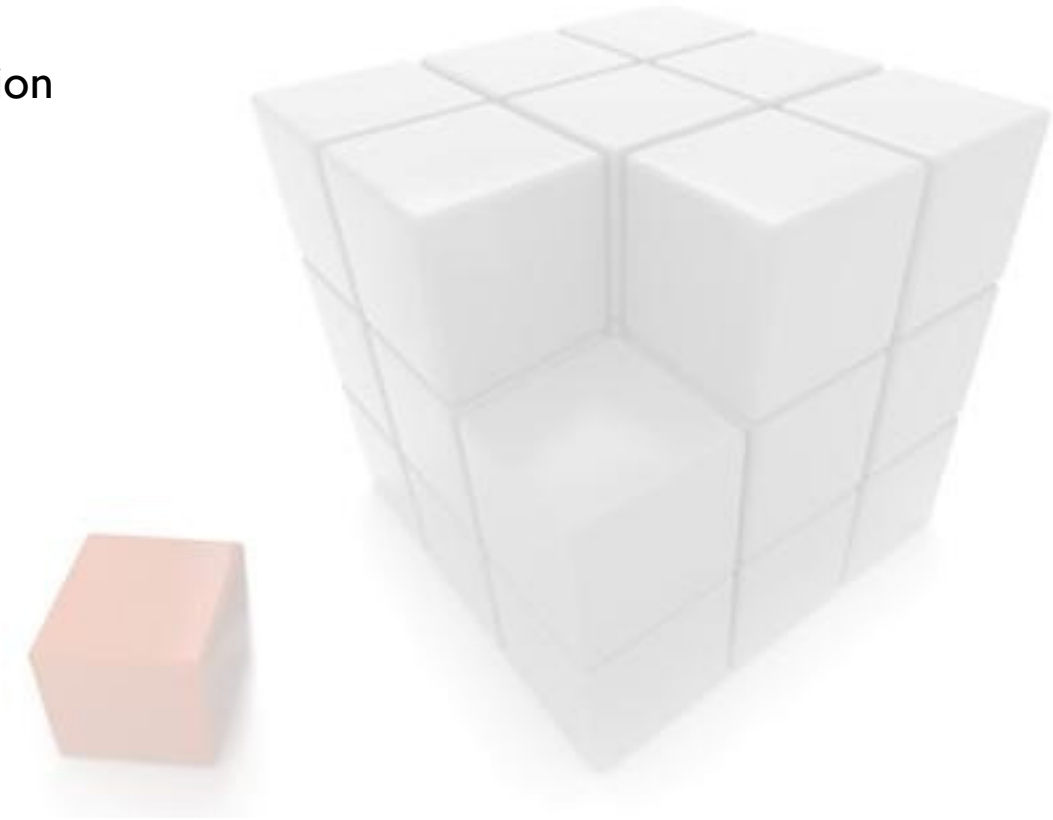


WebGIS portal – interface II



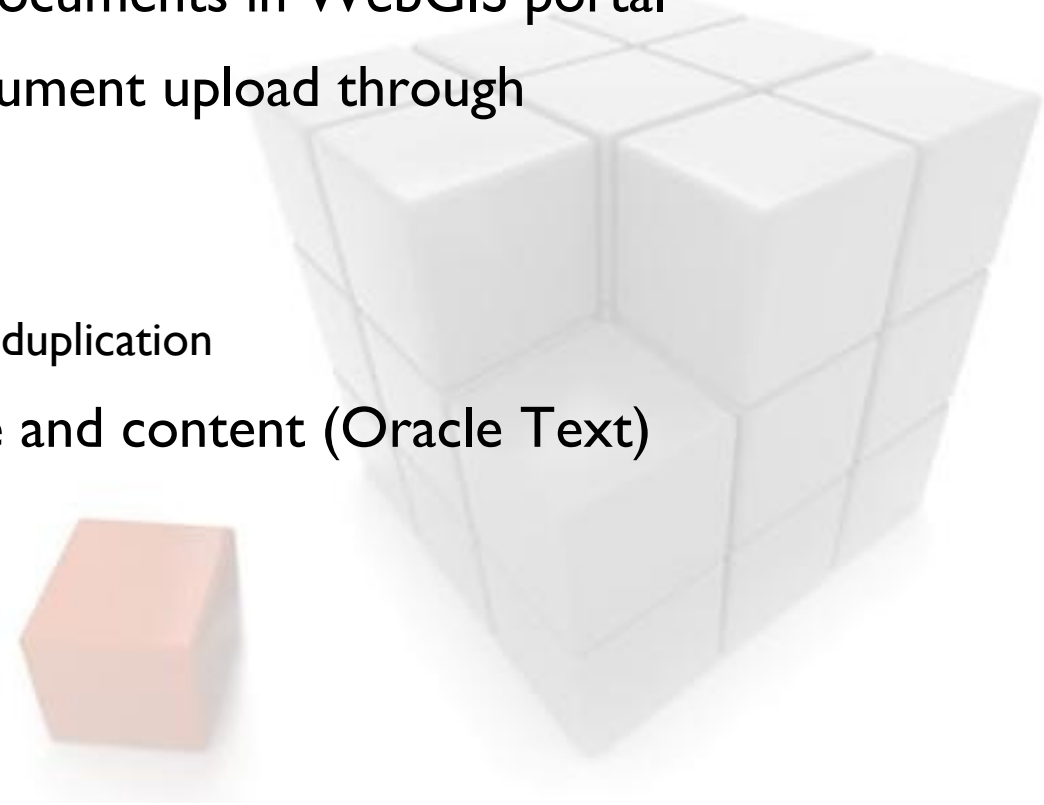
WebGIS portal functional modules

- WebGIS portal features
  - secure access to the data
  - non-spatial data administration
  - server side printing
  - document management
  - reporting
  - buffer and slope analysis



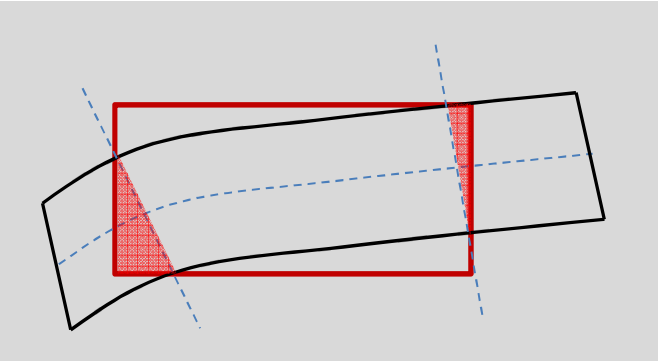
Document management module

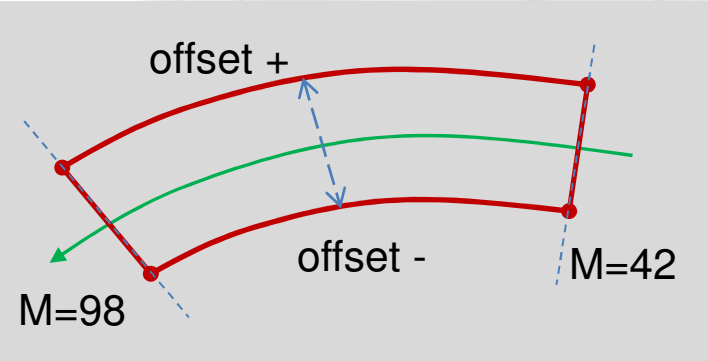
- Linking documents to road assets
- Upload and download of documents in WebGIS portal
- HTML5 asynchronous document upload through XMLHttpRequest
- Oracle SecureFiles
  - compression, encryption, deduplication
- Document search by name and content (Oracle Text)



Reporting module

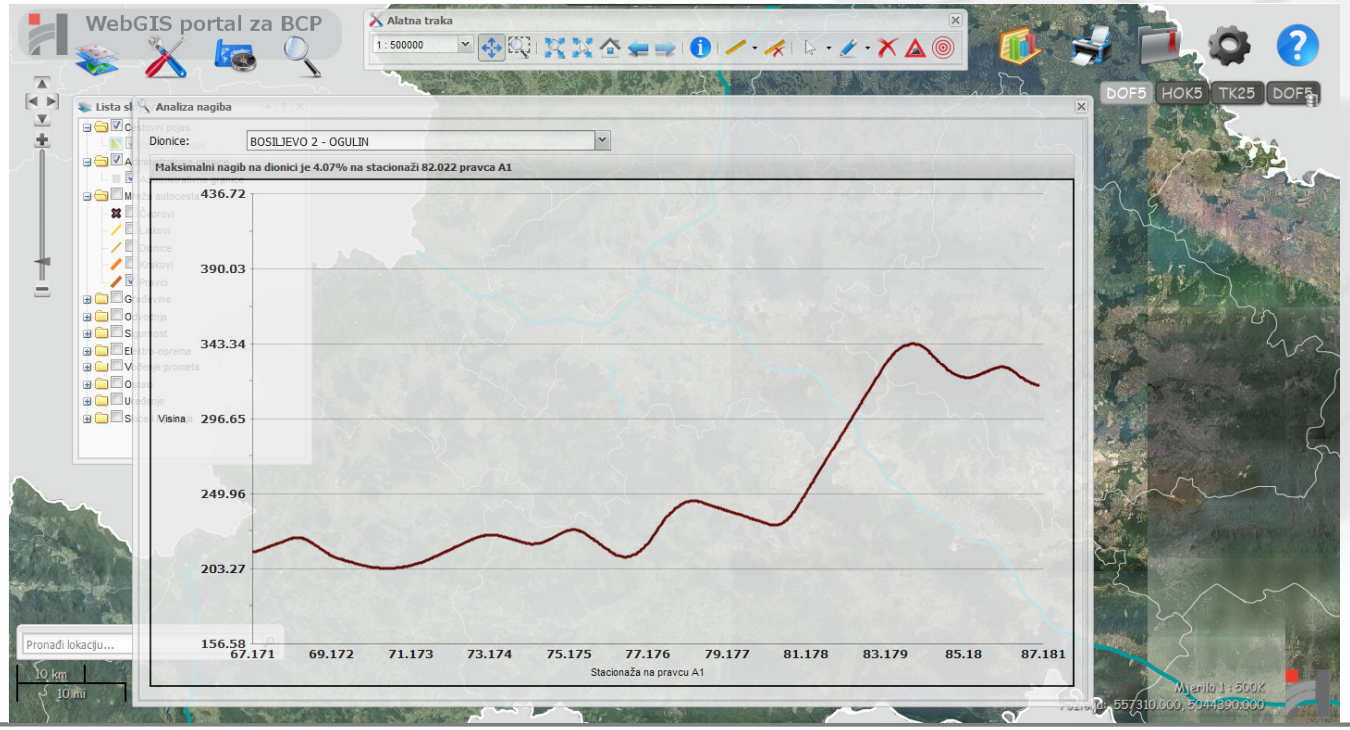
- Jasper Reports
- Dynamic Reports
  - implemented with Oracle APEX Interactive report in iframe
  - integrated with OL/GeoExt application via JS interface
- Summary Reports
  - query the combined area or length between arbitrary measurements
  - clipping procedures implemented in Oracle Spatial



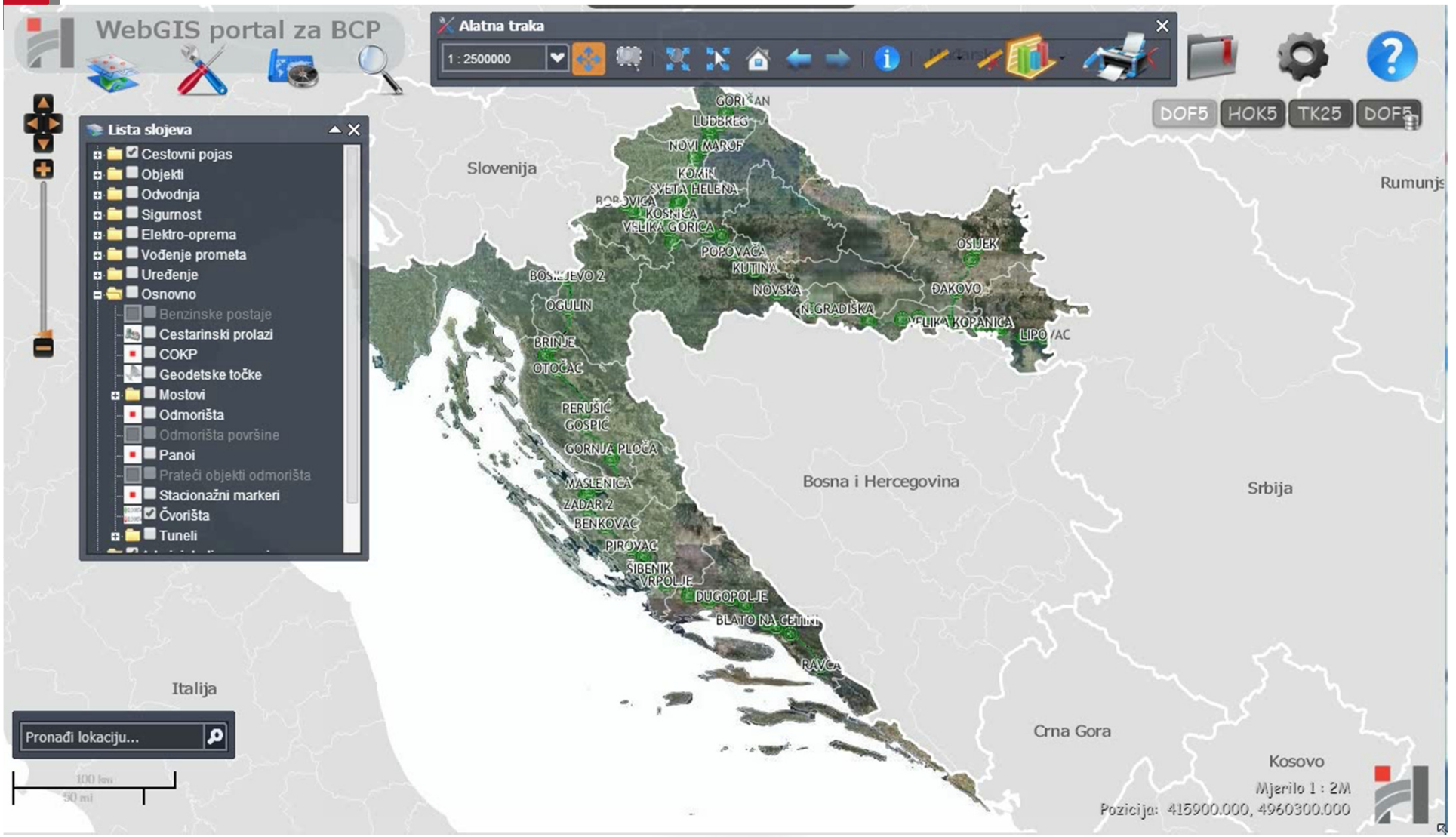


Buffer and slope analysis

- Buffer analysis
  - Query spatial features in arbitrary distance from arbitrary point
- Slope analysis
  - Calculate the maximum slope for the linear element

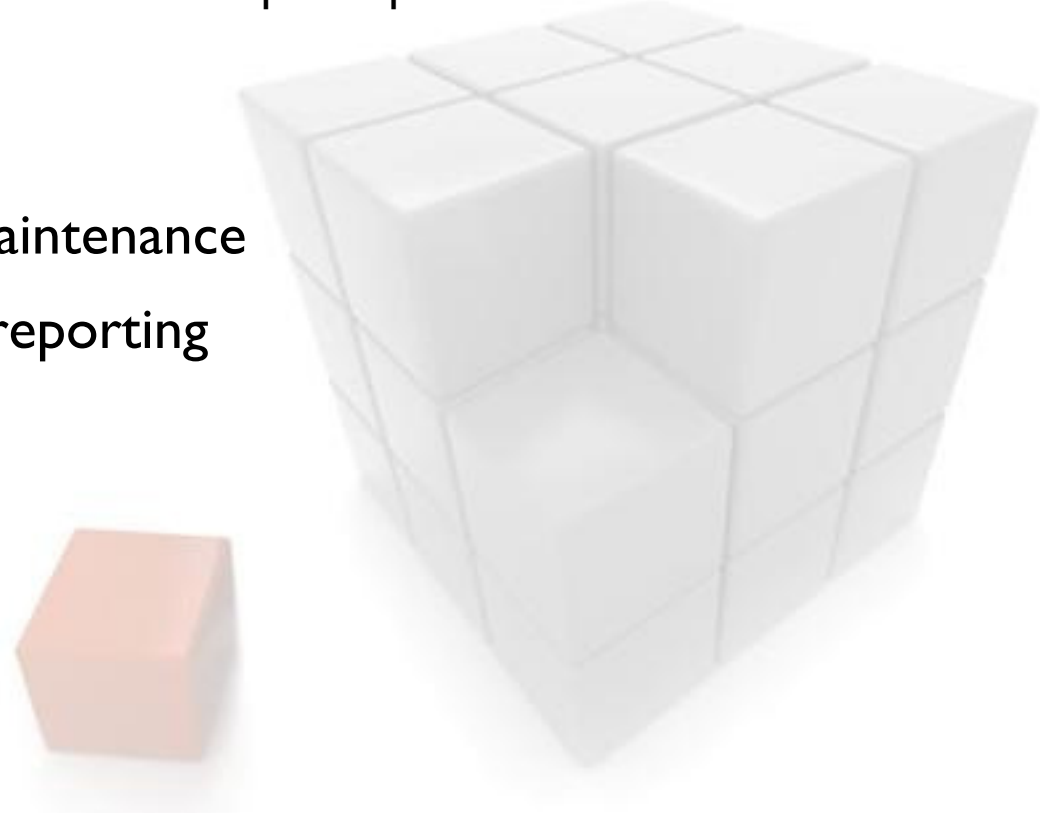


WebGIS portal video



Future development

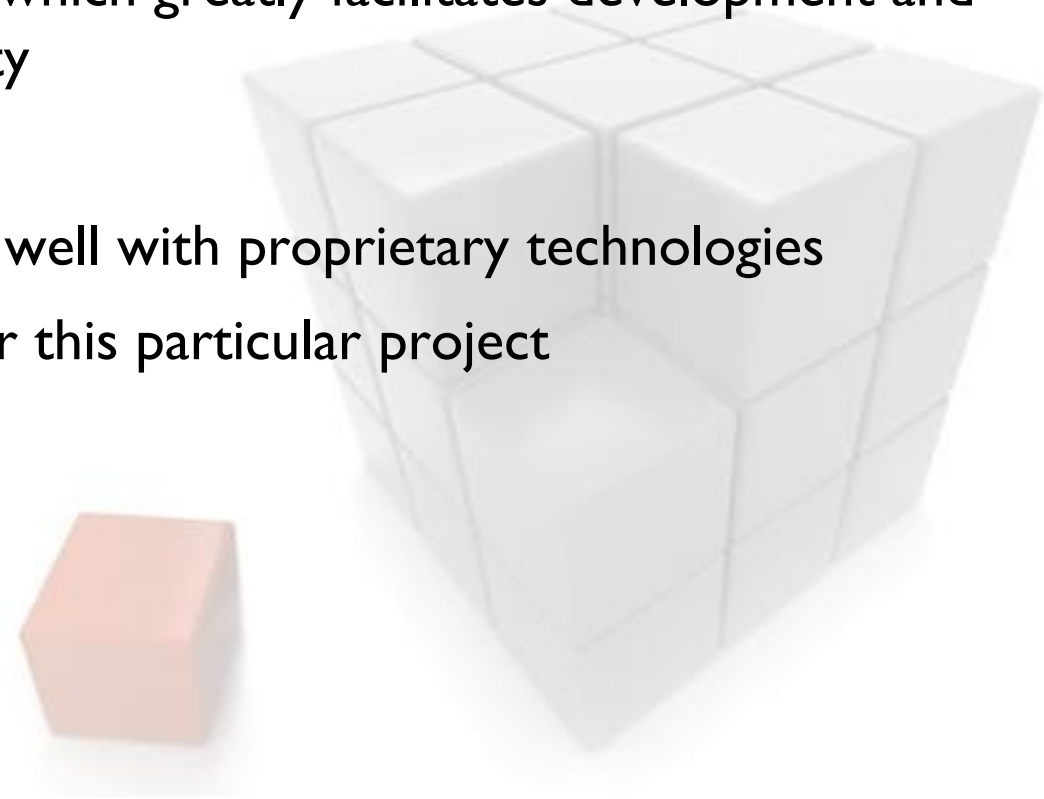
- mobile application
  - non-spatial attribute editing
  - display of current GPS position on the map in top and side view
  - link photos to road assets
  - add georeferenced videos
- module for road asphalt maintenance
- module for road problem reporting



Once again, we've learned that...

…FOSS4G

- is mature and flexible enough for complex systems
- has a large community which greatly facilitates development and ensures software quality
- is very versatile
- if necessary, integrates well with proprietary technologies
- was the right choice for this particular project



Questions anyone?

Thanks for your attention! ☺

marko.turkovic@in2.hr

IGEA d.o.o.
Frana Supila 7/b
42 000 Varaždin, HR
tel: +385 42 556 700
www.igea.hr
www.in2.hr