From Business Intelligence to Location Intelligence with the Lily Library

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Agenda

- Location Intelligence
- State of the art
- Lily
  - Features
  - Architecture
  - Technological stack
- Demo
- Summary

Location Intelligence

Over 80% worldwide companies take their business decisions based on data characterized by a spatial component.

- *Location Intelligence* is a set of tools and techniques to integrate a **geographical dimension** into **BI platforms**, aimed at enhancing their capability of better monitoring and interpreting **business events**. It supports advanced **maps visualizations and interactions** together with all typical **BI systems functions for exploring information**.

State of the art

- SOLAP (Spatial OLAP): integration of GIS and OLAP technologies
  - **Architectures, data models**, **operators and algorithms** (extend expressiveness of traditional OLAP in querying)
- Architecture classification
  - **Loosely-coupled:** import-export-reformatting or mapping data between GIS and OLAP.
  - **Semi-tightly coupled:** GIS-dominant or OLAP-dominant solutions.
  - **Tightly-coupled:** fully-integrated Spatial OLAP technology.
- Tools
  - Static maps:
    - Coarse-grained, non interactive, simple indicators represented on maps.
    - ➢ Hyperion Web Analysis, Microsoft Reporting Services, Business Object Xcelsius, …
  - Bridge between legacy BI platforms and GIS:
    - High interaction, full GIS capabilities but still two separate systems
    - ➢ Apos LIS, Business Geografic, Galigeo, …
  - Fully-integrated SOLAP technology:
    - Spatial data is stored together with business data in a spatial data warehouse
    - ➢ Oracle DB + Spatial option, PostgreSQL + PostGIS, Microsoft SQL Server, …

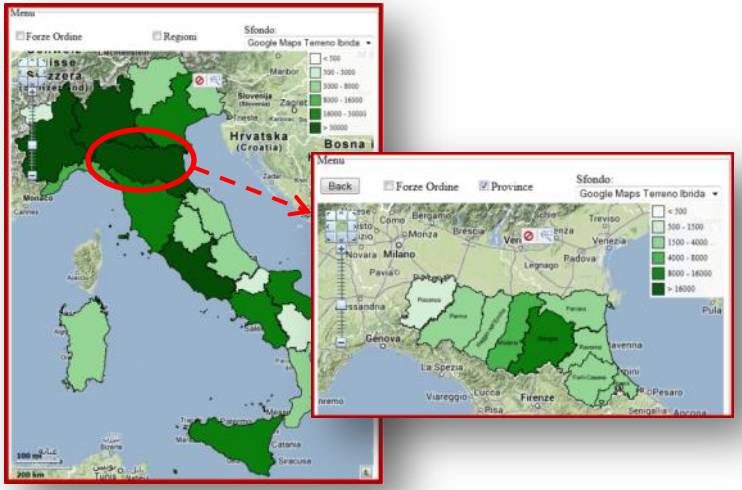
Lily

Lily is a geo-enhanced library that adds true Location Intelligence capabilities to existing BI platforms.

- Lily is a Javascript + AJAX library.
- Layer of abstraction **between the map renderer and the BI platform**.
- It helps the development of a Location Intelligence solution by:
  - maximizing performances;
  - dramatically reducing development time.
- It fits a tightly-coupled architecture.
- Mash-up approach.
  - Fast deployment.
  - Possibility of reusing existing services.

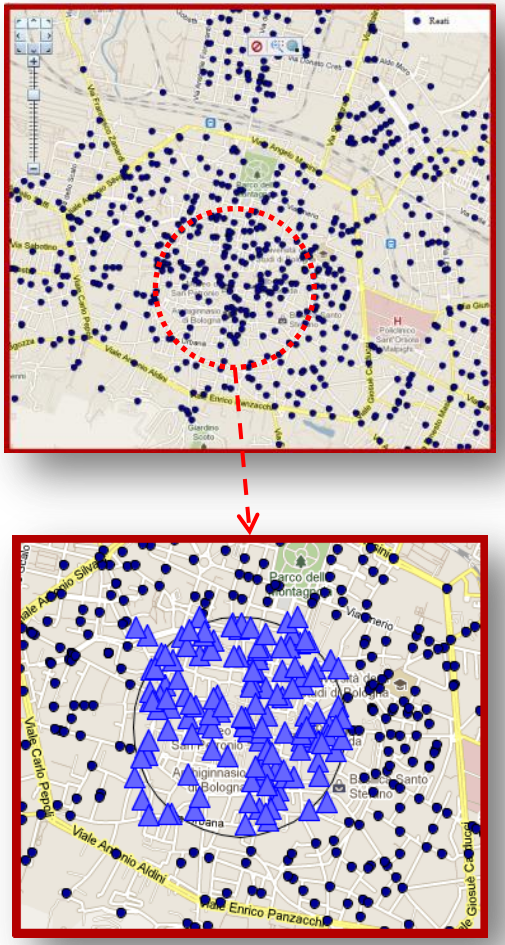
Lily - Features

- Geo-enhanced query formulation
  - Spatial drill



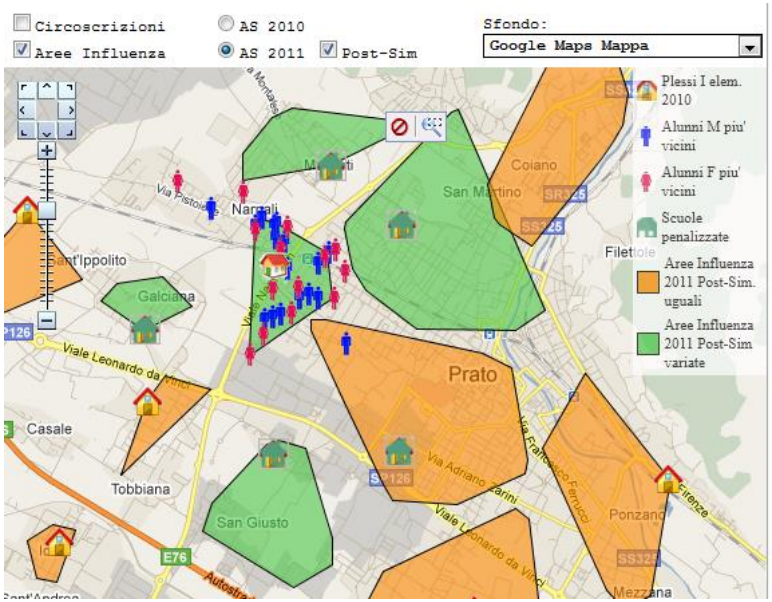
  - Geo-coding

  - SOLAP queries

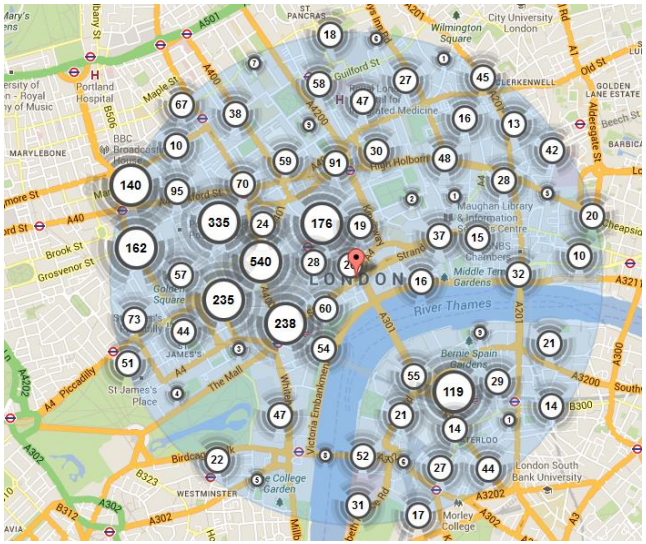


Lily - Features (2)

- Geo-enhanced processing
  - Spatial triggering

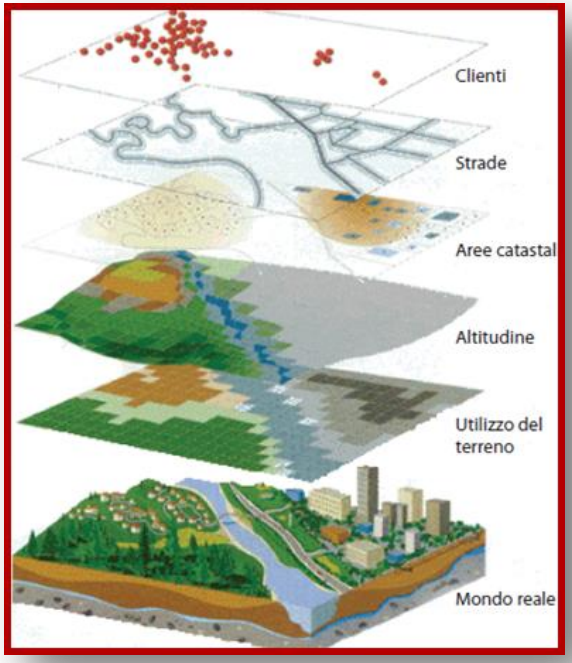


  - Spatial clustering



Lily - Features (3)

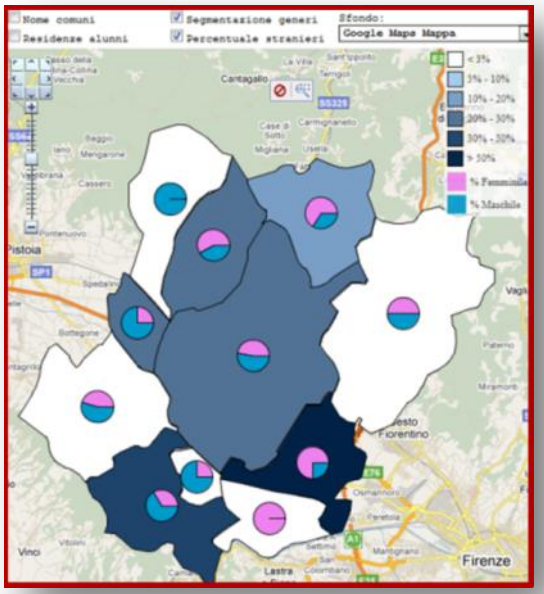
- Geo-enhanced data visualization (1/2)
  - Integration of external maps
  - Multi-layer representation



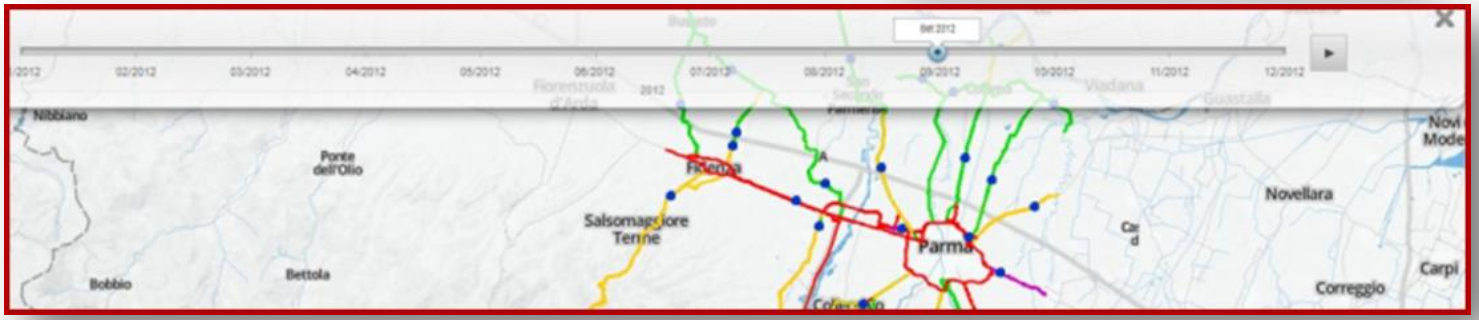
Lily - Features (4)

- Geo-enhanced data visualization (2/2)
  - Real-time refresh

  - Spatial KPI visualization

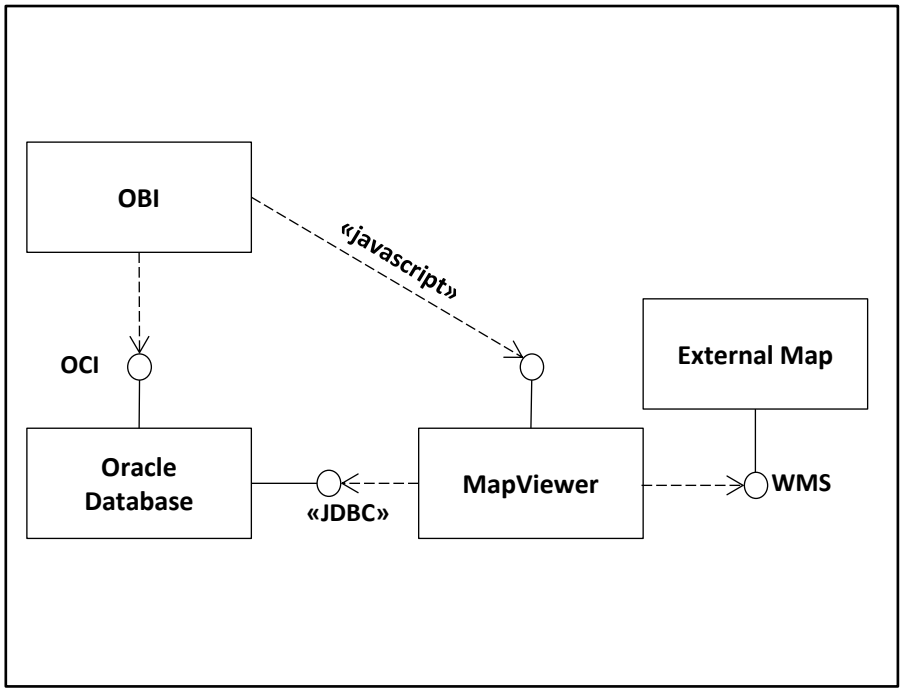


  - Temporal slider

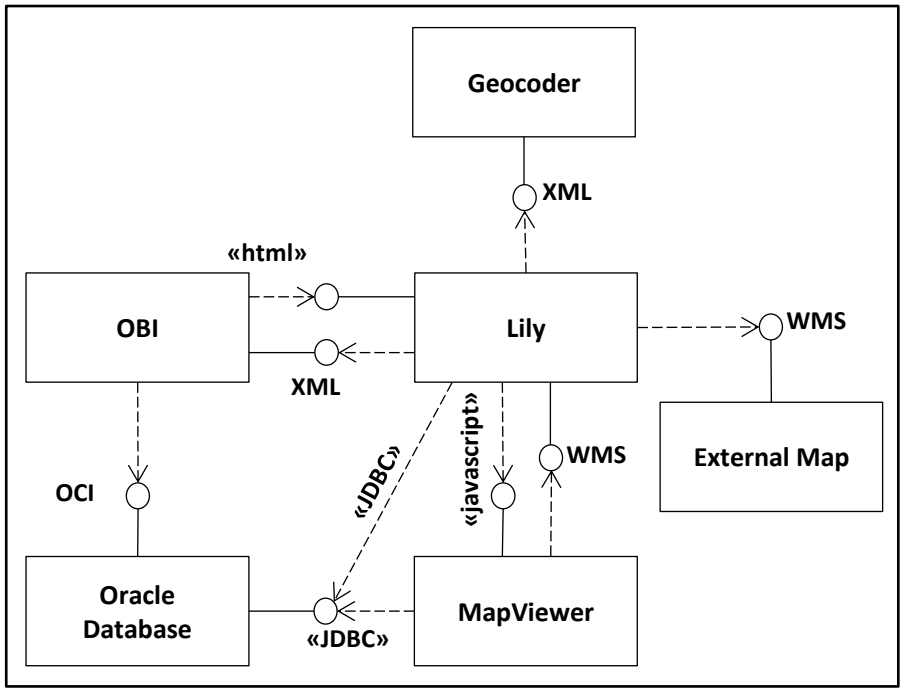


Lily - Architecture

- Lily can be interposed between Oracle Business Intelligence and Oracle MapViewer.



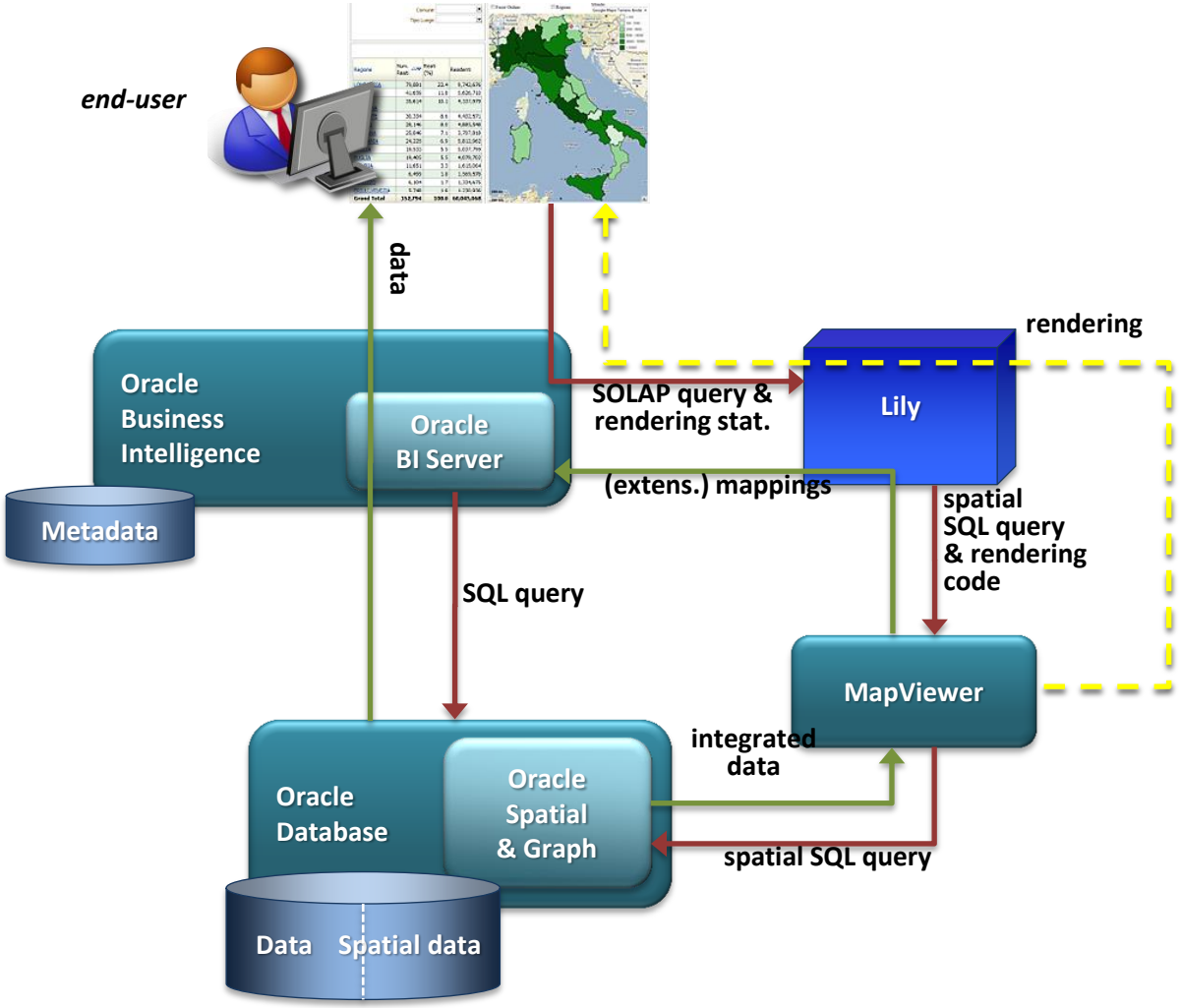
Without Lily



With Lily

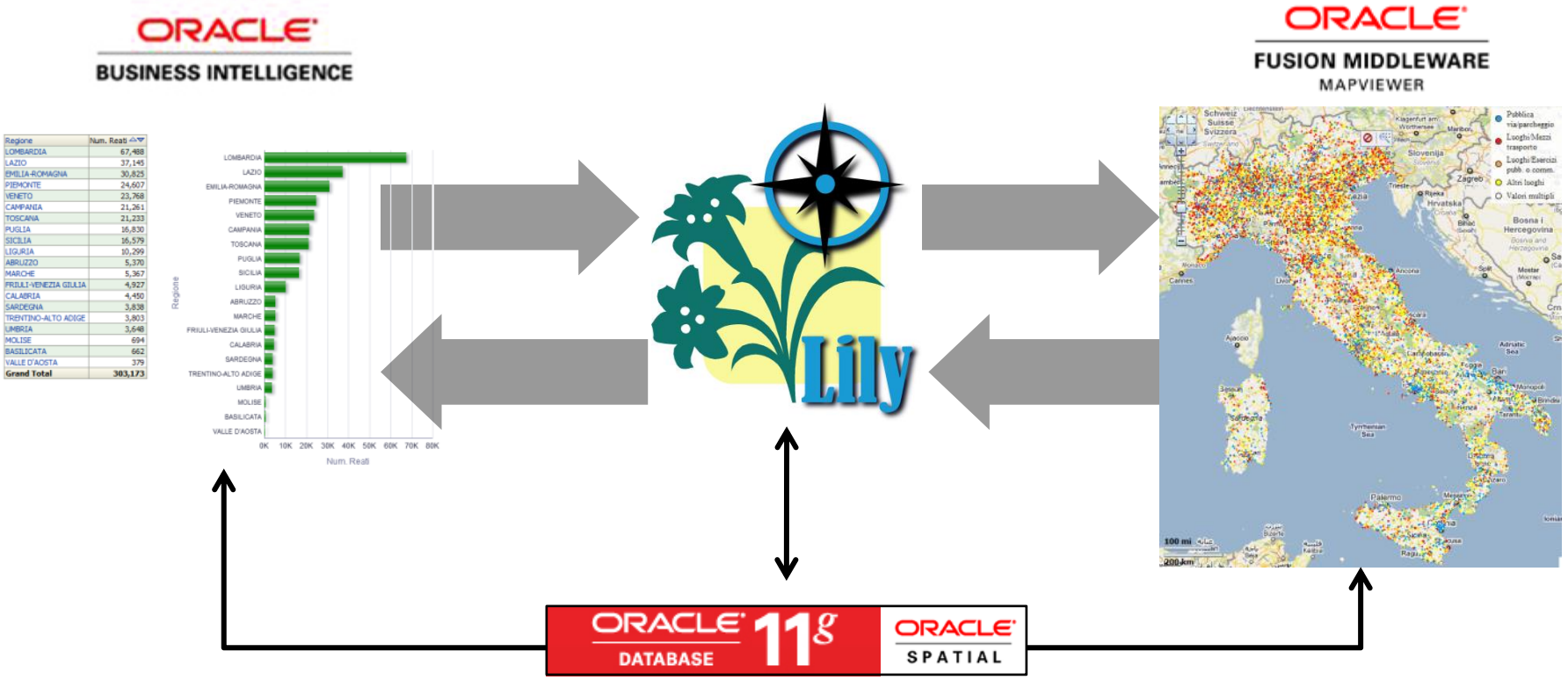
Lily – Architecture (2)

- Typical flows for a SOLAP query



Lily - Technological stack

- Currently, Lily is Oracle-based.
- The chosen architecture is open to other technologies.
  - The main requirement is a DBMS with spatial support (e.g., MS SQL Server, PostgreSQL+PostGIS)



Geo Data Warehouse

Summary and Future work

- Business Intelligence tools lack from the spatial analysis perspective.
- Lily enables a quick development of a tightly-coupled Location Intelligence solution with unmatched geo-enhanced features.

- Future work:
  - Although Lily has been designed to be open, the current implementation is Oracle-based. Further developments will make it independent of:
    - BI platform.
    - DBMS (and spatially-enabled DBMS would be compatible).
    - Map renderer.

Thank you

Questions?