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 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.

Over 80% worldwide companies take their business decisions based on data characterized by a spatial component.
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 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
- Geo-enhanced processing
  - Spatial triggering
- Spatial clustering
Lily - Features (3)

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

- Multi-layer representation
- Geo-enhanced data visualization (2/2)
  - Real-time refresh
  - Temporal slider

- Spatial KPI visualization
Lily can be interposed between Oracle Business Intelligence and Oracle MapViewer.
Typical flows for a SOLAP query

- Oracle Business Intelligence
- Oracle BI Server
- Oracle Database
- Metadata
- MapViewer
- Lily
- SOLAP query & rendering state
- SQL query
- (extens.) mappings
- spatial SQL query & rendering code
- integrated data
- spatial data
- end-user
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)
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?