OrbisGIS

a GIS for scientific simulation

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PLAN

• General context
• GIS project
• OrbisGIS, GDMS and co...
• Use cases
• Future
General context

- Spatial Data Infrastructure Project
  - Started in december 2006 at IRSTV
  - Scientific federative project around urban environment
1. Definition

- 1994: Clinton, National Spatial Data Infrastructure of the U.S.A (NSDI)

- to facilitate the reuse and sharing of existing data resources
Definition (suite)

- SDI is often used to denote the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of (and access to) spatial data,

- It provides a basis for spatial data discovery, evaluation, and application for users and providers within all levels of government, the commercial and the non-profit sectors, academia and by citizens in general.
2. Aims

- IRSTV SDI project intends to apply the INSPIRE directive:
  - capitalize the geographical and semantic data produced or bought during the researches,
  - allow the users to identify and access geographical information using OGC standards (GML, WFS, WFS, WCS),
  - offer a unified technological platform which will be a reference to develop scientific models (GIS, library to data access and manipulation).
4. User and laboratories positions in the SDI

1. Urban remote sensing
2. Urban microclimatology
3. Sustaining cities
4. SAP
5. Urban noise
6. Urban data
5. Logical architecture
6. Technical architecture
GIS project

• Why a new GIS?
  – Current solutions:
    – Feature model and difficult extendibility,
    – Instability of gvSIG, uDig,
    – Technical problems and poor data types model in OpenJUMP,
GIS project (suite)

- Robust and cross platform GIS,
- High level of extensibility (OSGi plugins),
- High language abstraction for vectorial and raster data,
- Developer friendly,
- Full documentation for users and developers.

OrbisGIS
OrbisGIS, GDMS and co...
1. OrbisGIS architecture

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**GUI**

- Plugins System
  - GeoView2D
    - LayerManager
    - MapControl
    - Rendering
    - MapTools
  - Tool Editing
  - Tool
- I/O API
- Spatial utilities
- Feature
- Style
- Renderer

**API's**

- GDMS
- GRAP
- GDMS
- GRAP
- GeoTools

**JTS**
2. *OrbisGIS user interface*

- Focused in user friendliness
- Different independent windows...
  - Geocatalog
    - Centralized place to access data
  - GeoView2D
    - SQLConsole
- ... but no so independent
  - Communication (extensions, events)
GDMS

• Why
  – Common reusable syntax
  – Fills the gap between files and dbms
  – Decouple code from storage format
• History
  – From alphanumeric to spatial
• Evolution
  – New SQL engine
  – Spatial indexes
  – Easy to develop
1. **GDMS architecture**

- **Layered architecture**
  - Driver layer
  - Adapter layer
  - Application layer

- **Current applications**
  - SQL Engine
  - Index system
  - Swing Framework Interface
2. GDMS extensibility

- File formats
- Database drivers
- Functions
- Custom queries
GDMS extensibility (suite)

- Functions:
  - `select Buffer(the_geom) from mydata;`
- Custom queries:
  - `call CREATEGRID from landcover2000 values(100, 100);`
- UrbSAT: functions + Custom queries
  - We can get some urban, morphological and aerodynamic indicators
  - Open source, very easy to reuse.
3. **Collaborative development cycle**
3. Collaborative development cycle

[Diagram showing GDMS Functions, Topological Predicates, UrbSAT, and New GDMS application]
3. Collaborative development cycle
3. Collaborative development cycle
Use cases

1. OrbisGIS user interface

2. OrbisGIS-GDMS in action

3. OrbisGIS-UrbSAT : extended GDMS
OrbisGIS user interface
Question n°1:

- In the *roads* shapefile, just select the items that match the “municipality” type and color them in orange.

- Video 2-1 -
Question n°2:

- In the *landcover2000* shapefile, select the parcels that match type “grassland” and that are greater than 2 ha (the working coordinate system is WGS84).

- Video 2-2 -
Question n°3:

- Using landcover2000 and wsmunicipalities shapefiles, select the parcels that are contained in “Quemperven” watershed. Color them in yellow.

- Video 2-3 -
Question n°4:

- Using landcover2000 and waternetwork shapefiles, select the parcels that are located near a river (near means less than 20m),
- Using previous result and subwatershed shapefile, calculate the percentage of easily flooded parcels per sub-watershed.
OrbisGIS-UrbSAT : extended GDMS

- A set of functionalities for morphological and aerodynamic analysis in urban environment,
- Analysis based on a regular grid,
- Use vectorial data from BDTopo.
Question:

- Using landcover2000 to calculate by cells the density of grassland and building.

- Using a complete processing schema in OrbisGIS.
• Processing schema

- Video 3 -
OrbisGIS 1.0 (end of 2007)

- Plugin System,
- SQL Engine,
- Editing capabilities,
- Some more formats: GML 2.1, KML,
- New functions and custom queries.
Future

- Dynamic, on-line spatial re-projection,
- Mobility (embed GDMS + light OrbisGIS + R-DBMS in a J2ME virtual machine),
- 3D+t globe and map (model, engine, queries…)
- Storing and analyzing complex infrastructures modeled as networks (graph theory),
- GRAP (raster capabilities),
- Include other simulation tools (physical phenomenon…).
Existing applications
Existing applications (suite)
More informations

Welcome to the IRSTV IDS platform

IRSTV-Trac is a web platform to help scientific researchers for accessing, managing or starting their scientific projects around geographic data. Its development is integrated in the project of urban spatial data infrastructure (SDI).

The aims are:

- to contribute to the regional and national data products, or data to federate and enrich during the research;
- to provide access to information, and accessable data collection for the platform of SIG, GIS, VGI, WMS, WPS, WCS;
- to offer a unified technological platform which will be a reference to develop scientific models (GIS software, library to data access...).

Moreover, the SDI will be a window on the world to present research at the IRSTV.

This project can be considered as a “federative SDI”.

What is Trac?

Trac is not a trac for french users but a useful system to manage projects. With IRSTV-Trac you can found:

- a wiki,
- a road map system,
- a svn browser to display sources code,
- a bug system named ticket.

As you can see, the trac system is still incomplete. If you have suggestions, additions, or improvements for this, please contribute!

How to contribute

Terminé