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Georeferenced Managed Objects and InfraWorld

Jan Kolář, Ph. D.

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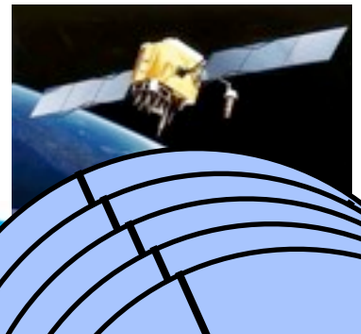

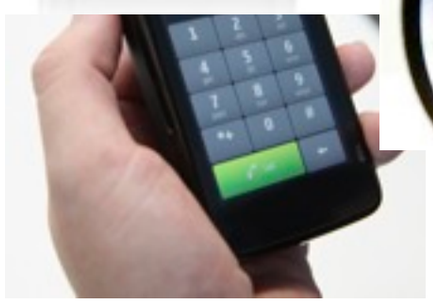

Why?
The Idea ...
How?

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InfraWorld Project Information

Partners:

VIANOVA

norkart geoservice

IVER TECNOLOGIAS

AALBORG UNIVERSITY

DRAMMEN KOMMUNE

Duration of the project:
2008-2012

Total budget: 36,7 MNOK (4.6 MEUR)

Funding contribution from NFR: 12 MNOK (1.5 MEUR)

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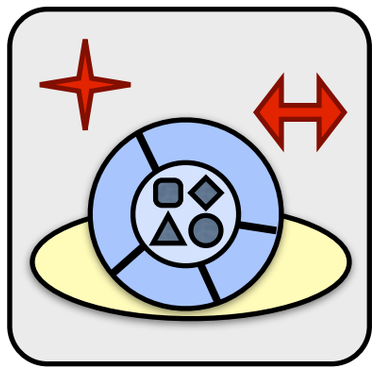
Overview

Motivations
Background, Flexible Data Model, Goals, InfraWorld Scope.

Georeferenced Managed Objects
Objects and Managed Objects, Runtime, Storage and Communication, Accessing MOs.



GMOs in gvSIG & Results
Implementation in gvSIG, Video, GRIFIN Shell, Future work.

Conclusions

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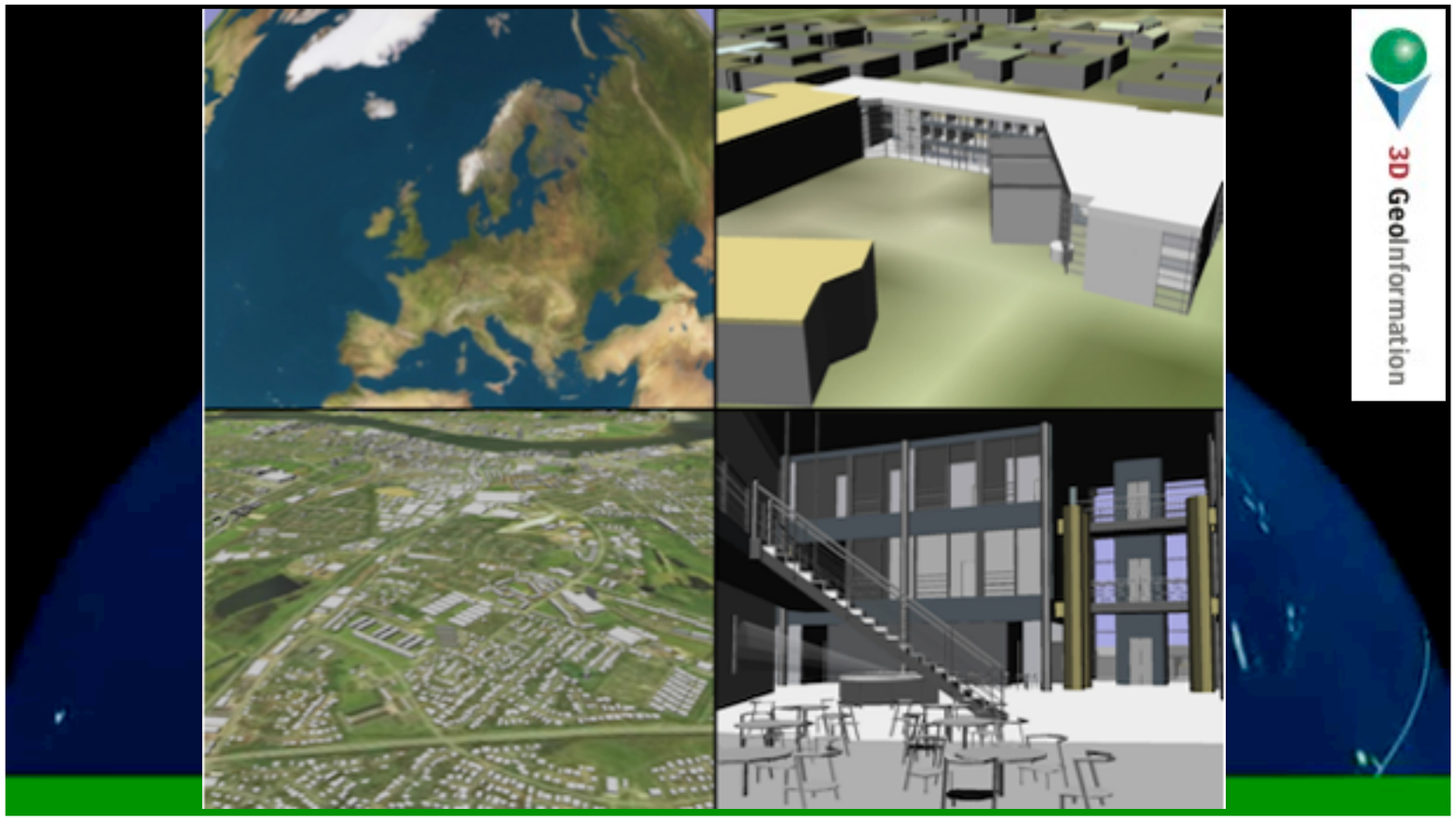
Motivation (R&D Background)



Centre for 3d GeoInformation
ended 2005

Mechanism for handling 3DGI
Distributed network arch.
3D + Time Data Model
Geospatial indexing for SDI
Visualization and navigation in 3D

Many, different types of geospatial information

Data model shapes Software implementation

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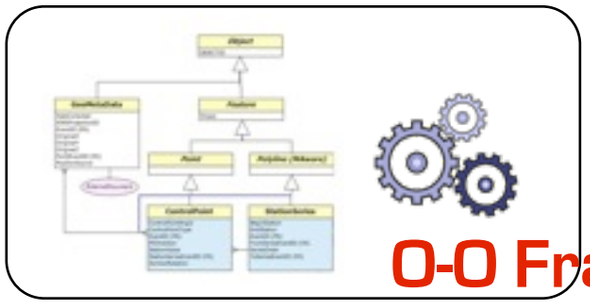
R&D on Flexible Data Model for GI

Field workers,
Decision makers,
Broader public

Tool Specialists

Mediate Data/Information



O-O Framework for:
Data Modeling
Data Exchange
Publishing of GI

Abstract from GI complexity

NOT New Standard Specification

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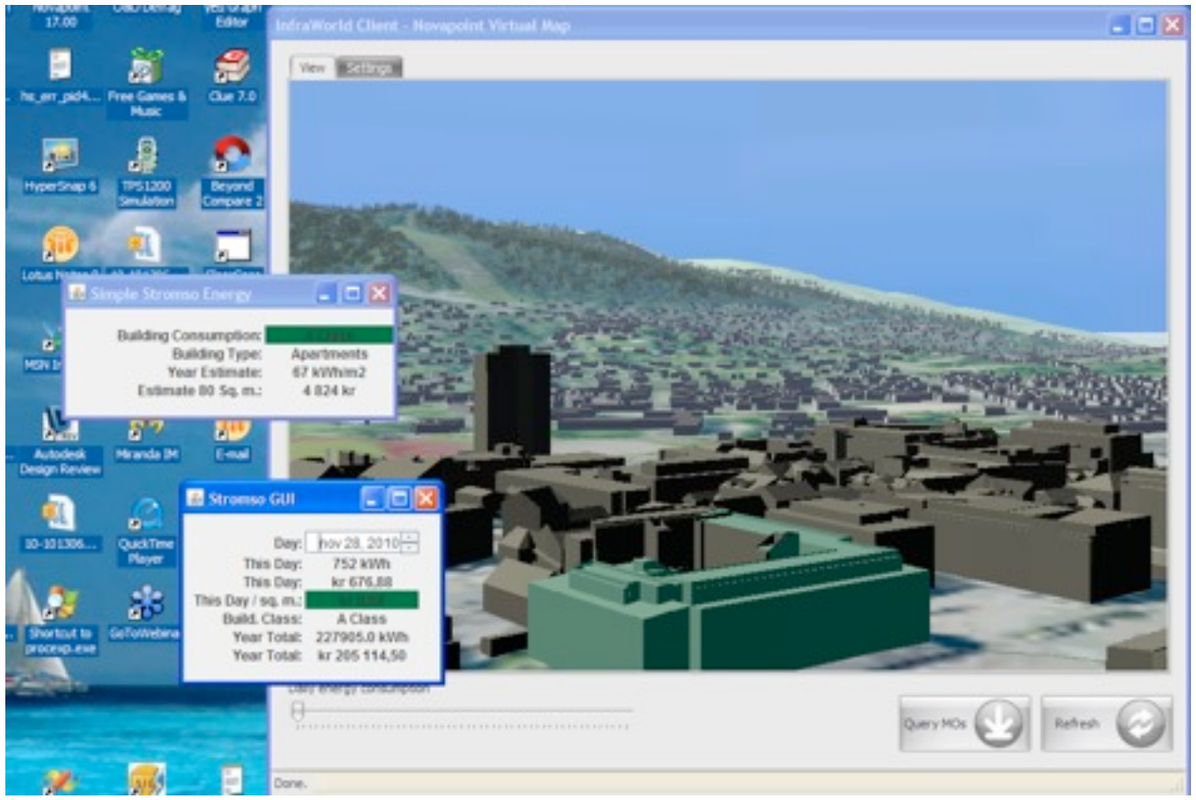
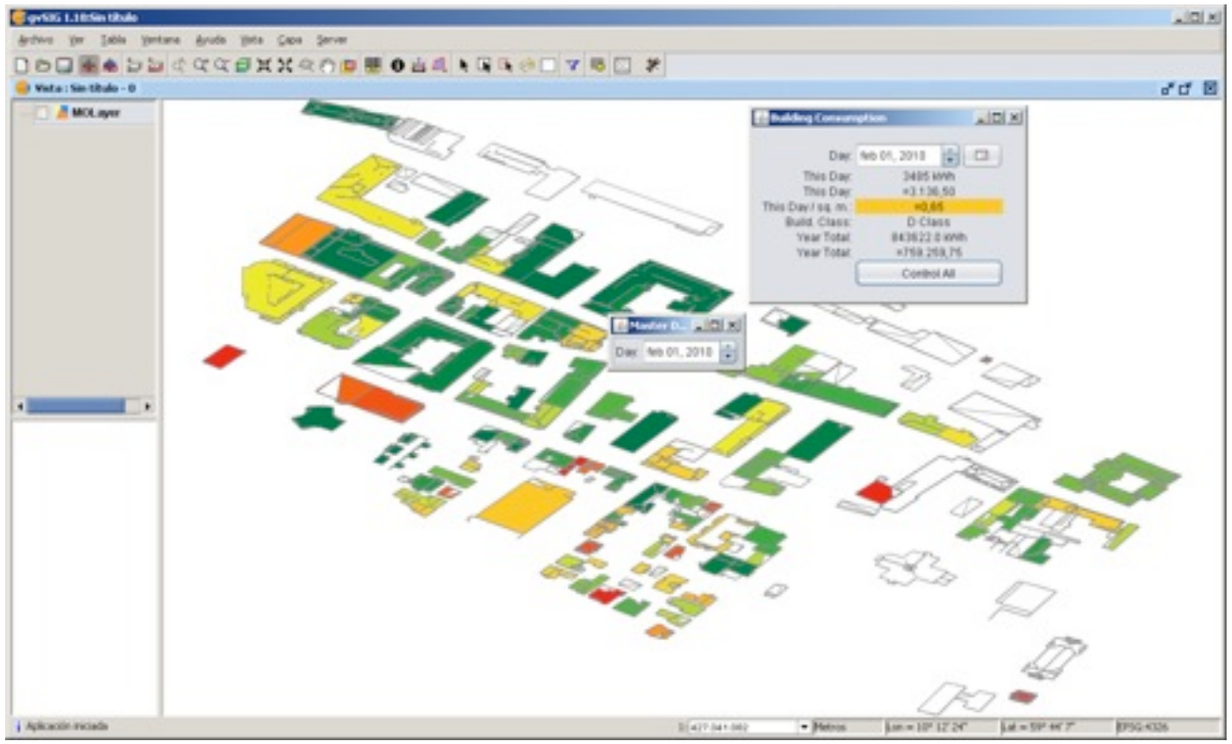
Virtual Map



.NET & JVM

gvSIG



Java

Virtual Globe

Java

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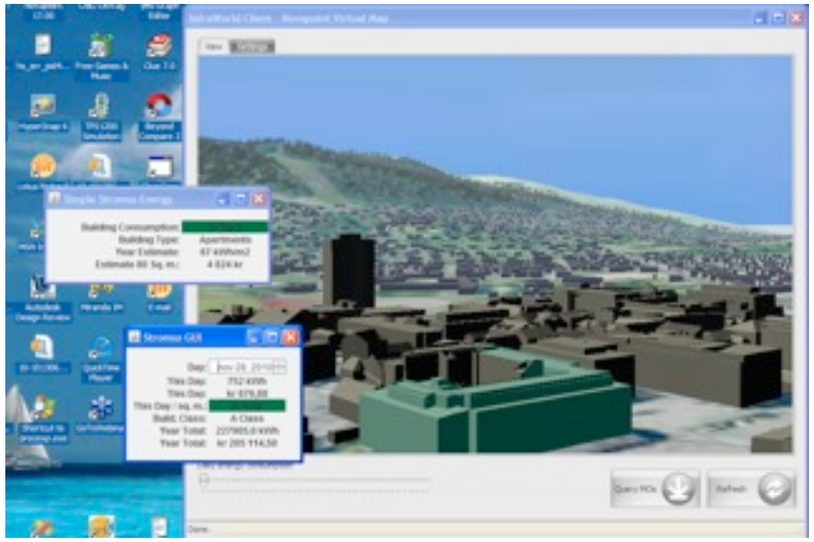
Virtual Map



.NET & JVM

GRIFIN

Managed Objects

gvSIG

Java

Virtual Globe

Java

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InfraWorld Goals

InfraWorld
ends 2012

VIANOVA
norkart geoservice
IVER TECNOLOGIAS
AALBORG UNIVERSITY
DRAMMEN KOMMUNE

Viz independent of rendering tech.
Supporting clients on diff platforms
Tables and layers as GIS case
ODB with single geospatial index
...

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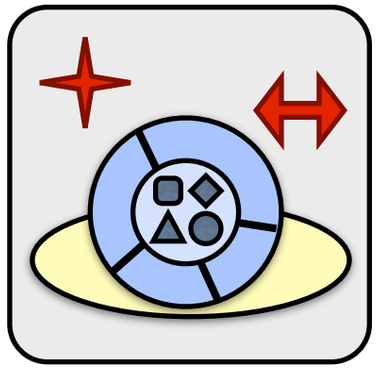

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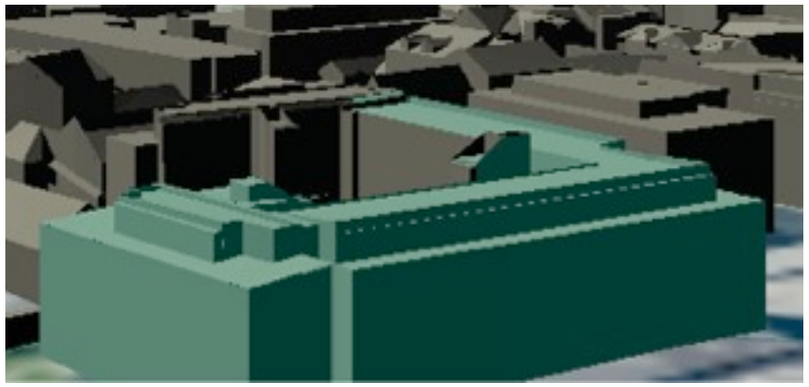
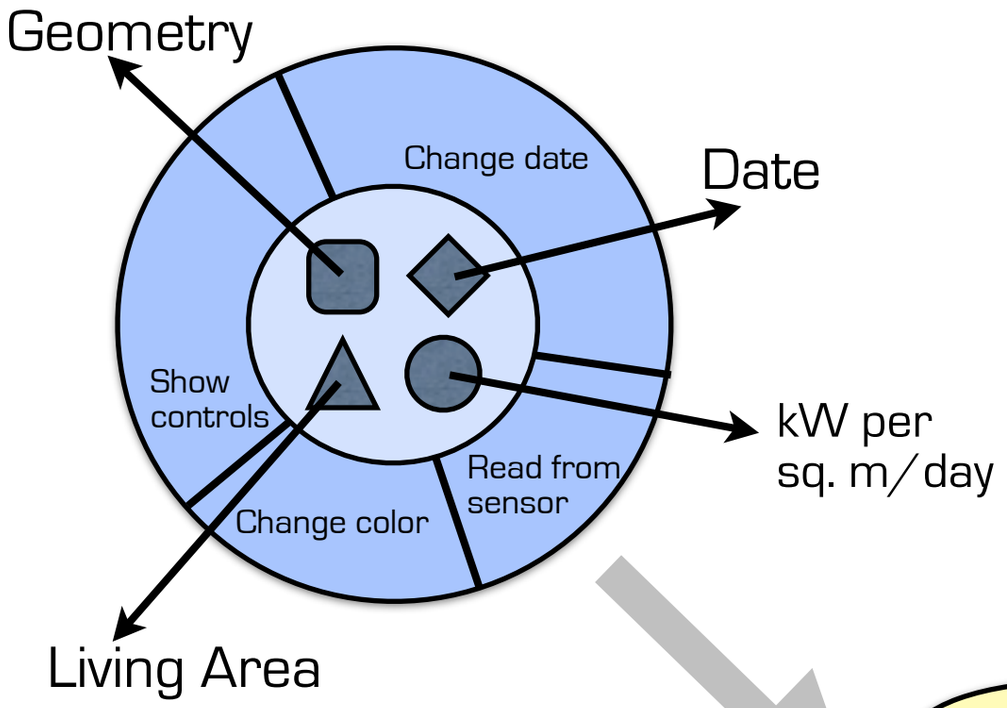
Object & Data Exchange

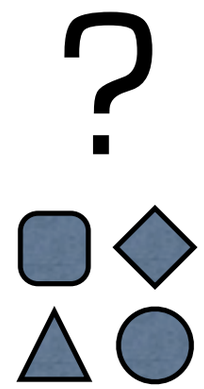


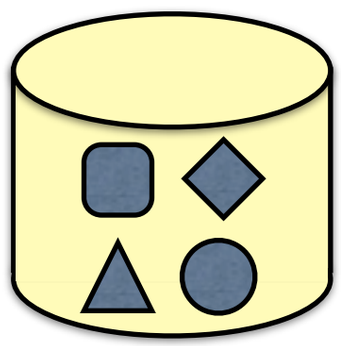
Only Data are stored, functionality in apps

Cannot be used by other system

Need for standard exchange format







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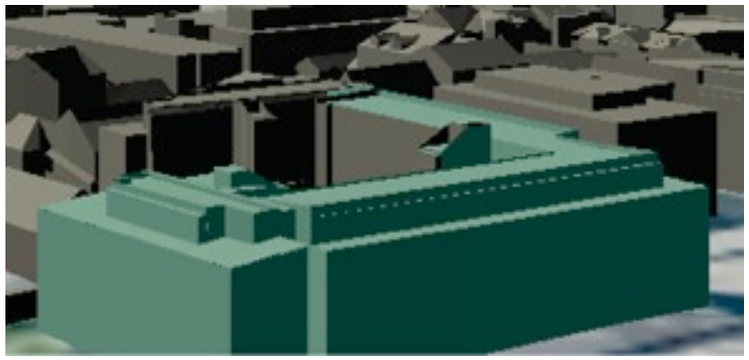
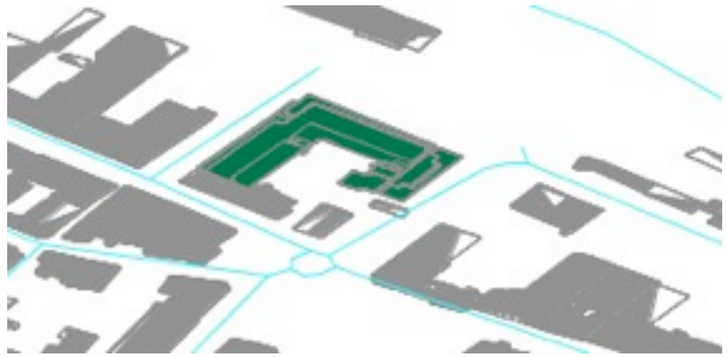
Managed Object



MO solution needs Runtime

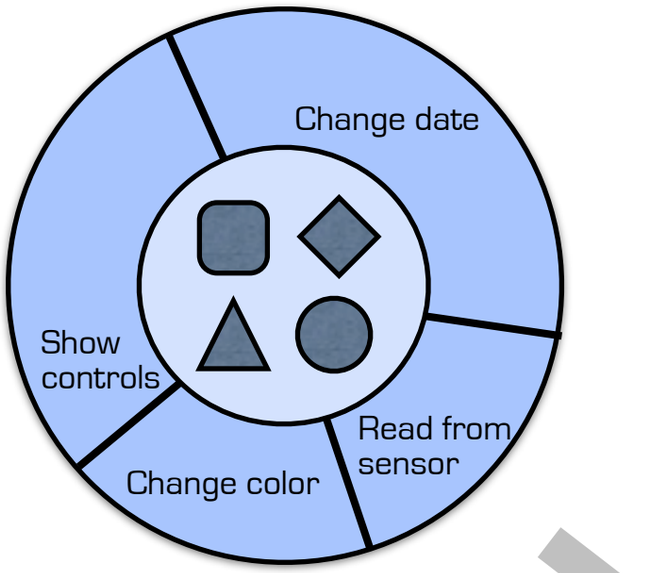


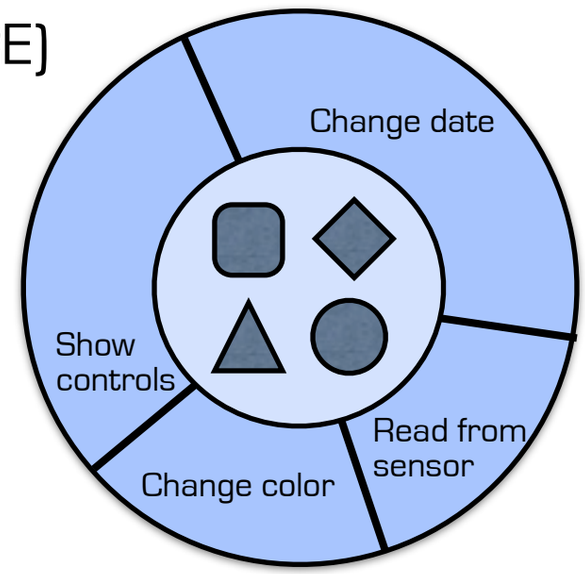
Standard Runtime:
rules how to build & run apps

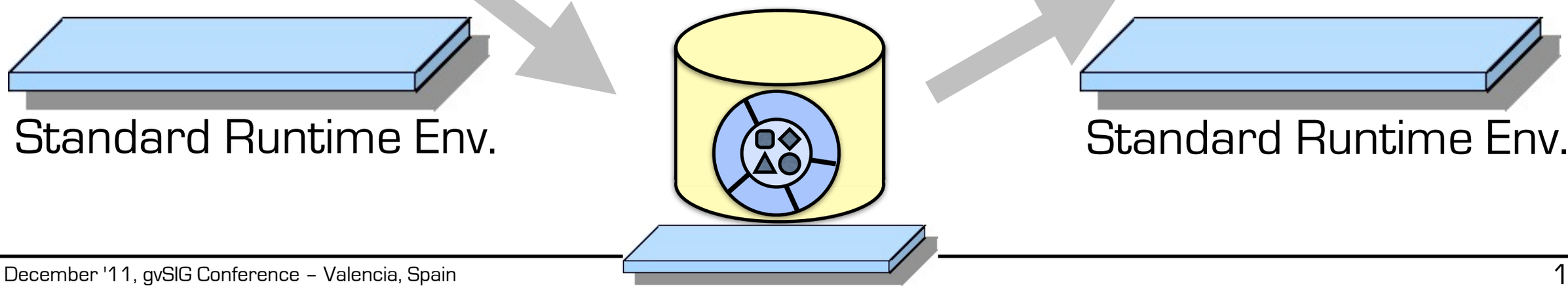
Standard Format/Protocol:
rules what to code (fixed data model)

System Runtimes: .NET, Java RE (JRE)

One Runtime must be used by all!







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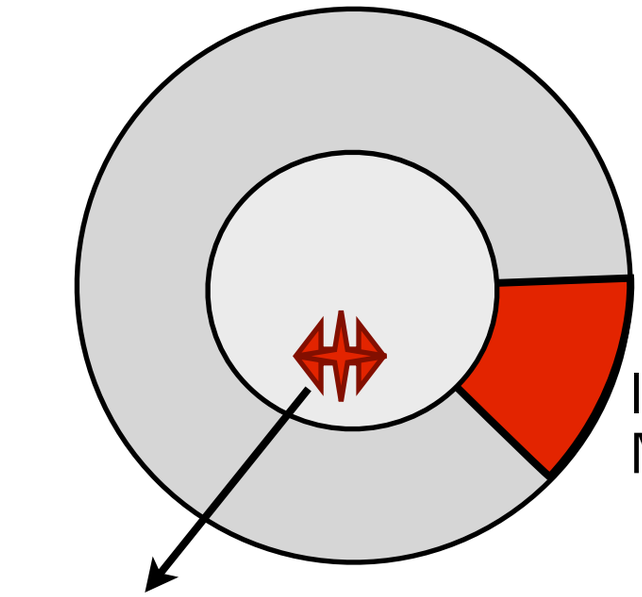
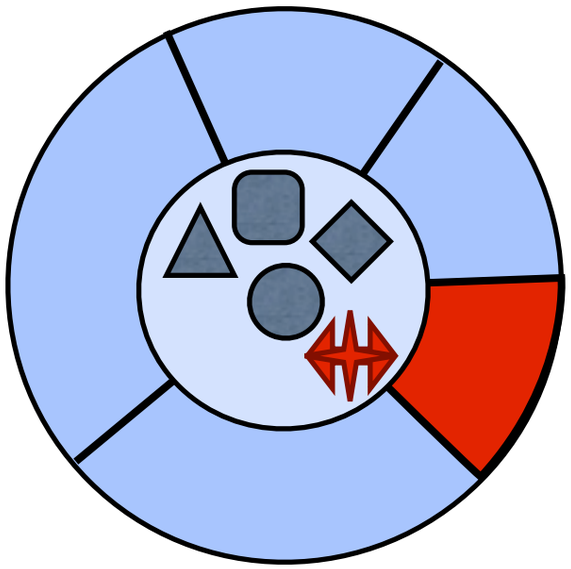
Georeferenced MO

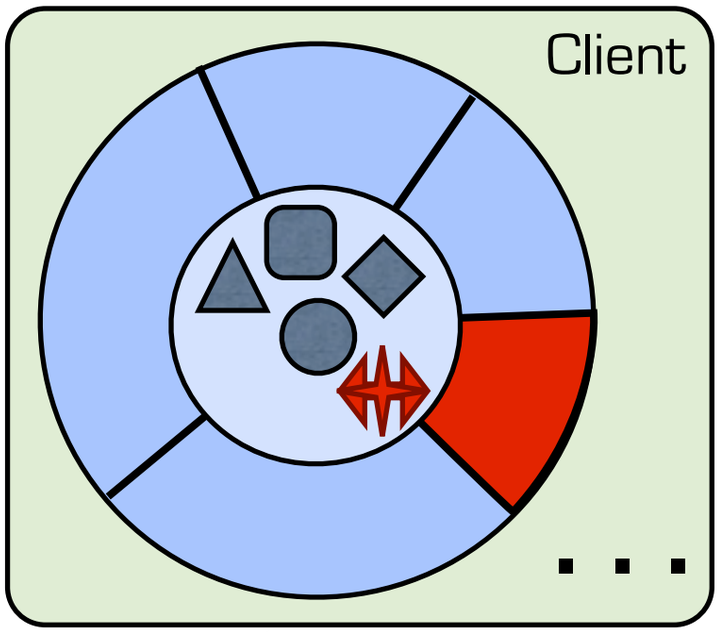


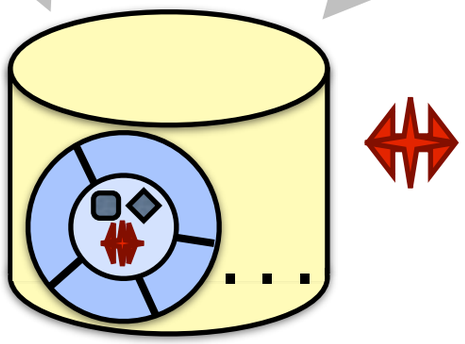
Initialization Method

Geospatial Index (GHIX)

3d position
1d spatial scale
2d time interval (scale)







Framework's Object DB Component

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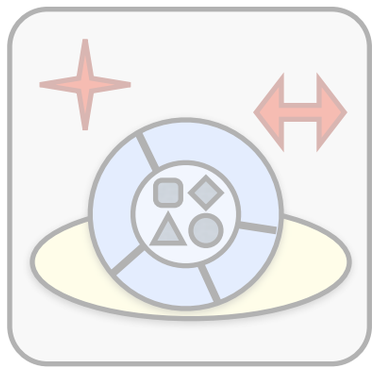


GMOs in gvSIG & Results
Implementation in gvSIG, Video, GRIFIN Shell, Future work.

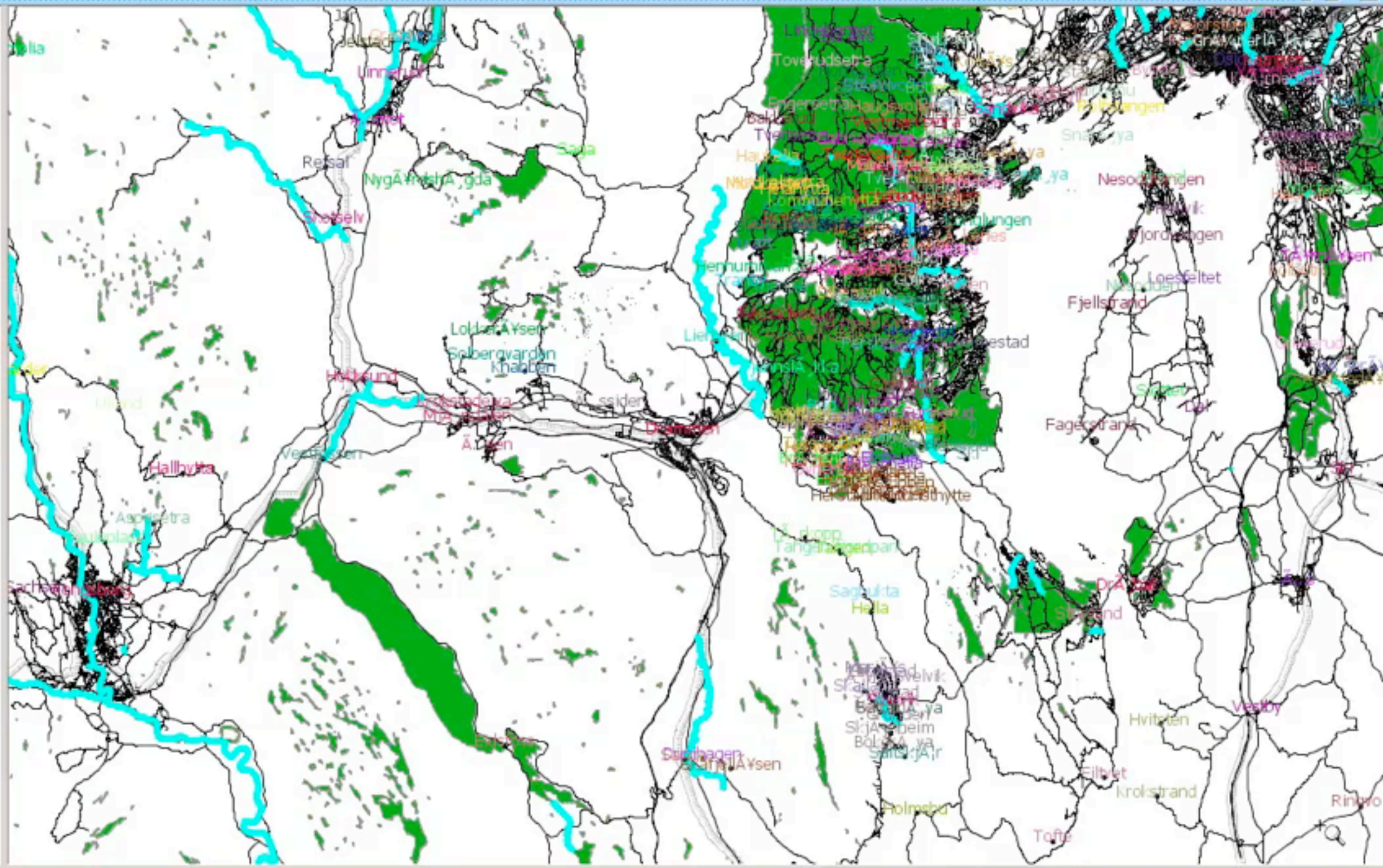
Conclusions

gvSIG 1.10:base.gvp

Archivo Ver Tabla Ventana Ayuda Vista Capa Server

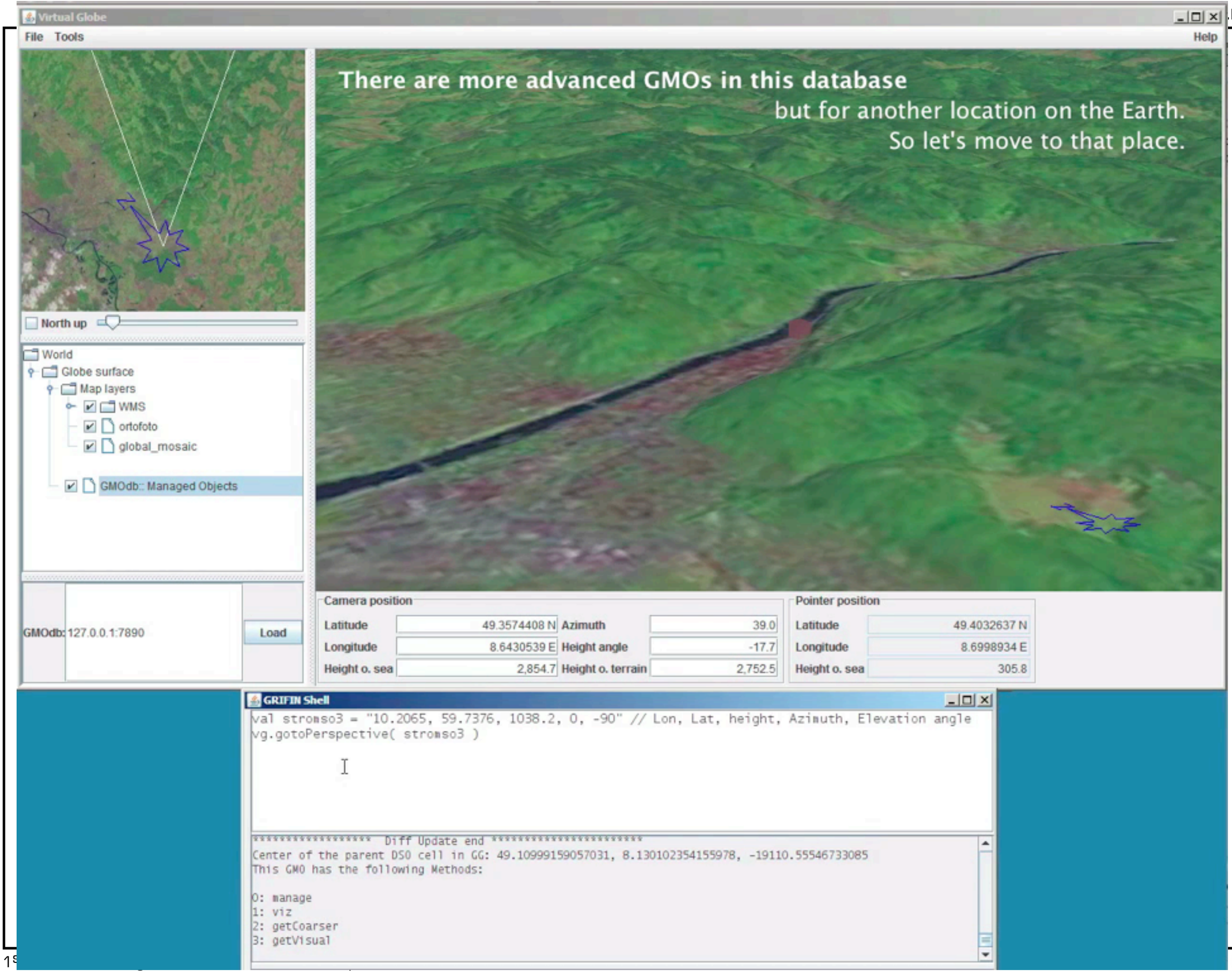
Vista : Sin título - 0

- places.shp
- waterways.shp
- roads.shp
- railways.shp
- 118 points.shp
- buildings.shp
- natural.shp



Abriendo un proyecto: base.gvp

1: 263.478 | Metros | X = 602.610,81 | Y = 6.602.150,33 | EPSG:25832


Virtual Globe
File Tools
Help
There are more advanced GMOs in this database
but for another location on the Earth.
So let's move to that place.
North up
World
Globe surface
Map layers
WMS
ortofoto
global_mosaic
GMOdb:: Managed Objects
GMOdb: 127.0.0.1:7890
Load
Camera position
Latitude 49.3574408 N
Longitude 8.6430539 E
Height o. sea 2,854.7
Azimuth 39.0
Height angle -17.7
Height o. terrain 2,752.5
Pointer position
Latitude 49.4032637 N
Longitude 8.6998934 E
Height o. sea 305.8
GRIFIN Shell
val stromso3 = "10.2065, 59.7376, 1038.2, 0, -90" // Lon, Lat, height, Azimuth, Elevation angle
vg.gotoPerspective(stromso3)
********** Diff Update end **********
Center of the parent DS0 cell in GG: 49.10999159057031, 8.130102354155978, -19110.55546733085
This GMO has the following Methods:
0: manage
1: viz
2: getCoarser
3: getVisual

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Conclusions

R&D on flexible data representation

Mechanism for developing and exchanging of smart data models (GRIFIN).
Building energy consumption in Stromso.
Three types of clients on different platforms.
Support for visual presentation in 3d and for time.

What you gain with GMO

Uniform approach from data handling to system programing and publishing.
Two way communication.
Fast access to geographically relevant (nearest) data.
Scalability to very large heterogenous system of systems.

Disadvantages

Depends on Virtual Machine (HotSpot)

Hard to test its main strength (on very large heterogenous system of systems)
GRIFIN is still experimental code

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Future Work

Handle multiple GMO Definitions in gvSIG.
Improve 3D to 2D geometry conversion.
Export gvSIG to predefined GMO Definition.

Clients for the Web and mobile devices
Advanced data models based on GMOs
Peer-to-peer discovery

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Thanks for your attention