Introduction to

uDig

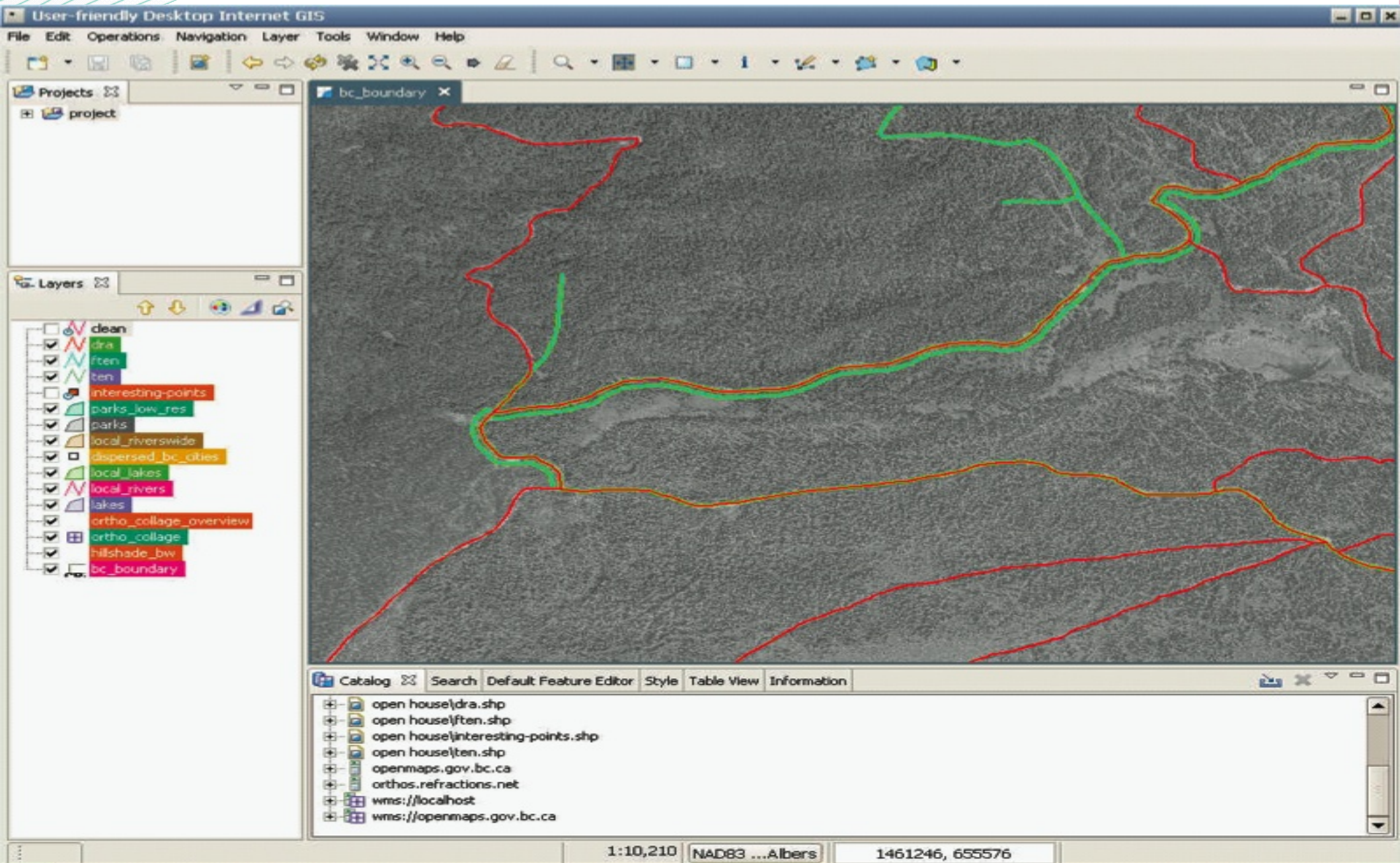
User-friendly Desktop Internet GIS

An Open Source Platform for GIS

Refractions RESEARCH

THE GEOSPATIAL EXPERTS

uDig


User-friendly Desktop Internet GIS
File Edit Operations Navigation Layer Tools Window Help
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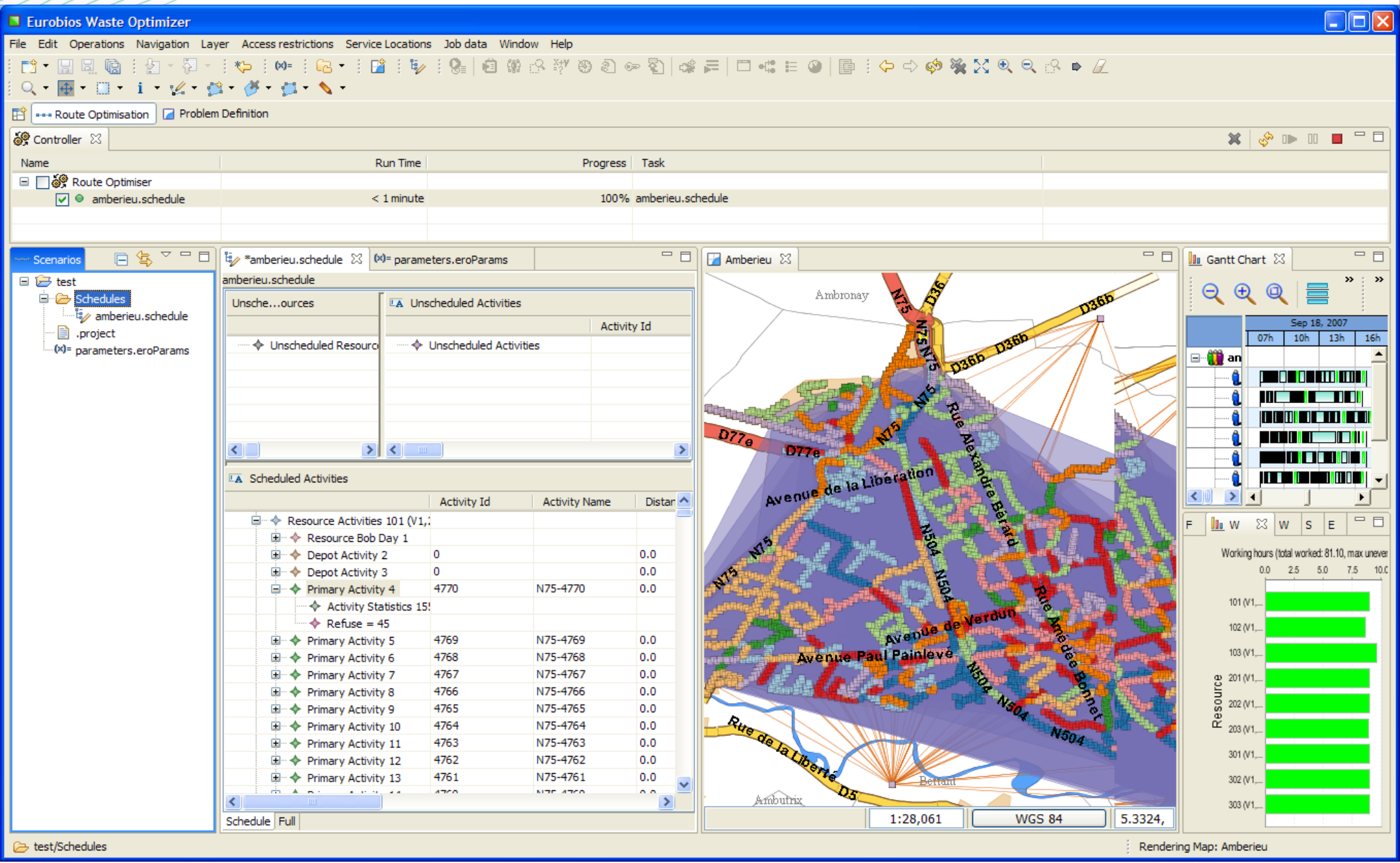
Facelift


Eurobios Waste Optimizer
File Edit Operations Navigation Layer Access restrictions Service Locations Job data Window Help
Route Optimisation
Problem Definition
Controller
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Primary Activity 12
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Ambronay
D36
N75
D36b
D77e
Rue Alexandre Bérard
Avenue de la Libération
N504
Avenue de Verdun
Avenue Paul Painlevé
Rue Amédée Bonnet
Rue de la Liberté
D5
Bettant
Ambutrix
1:28,061
WGS 84
5.3324,
Gantt Chart
Sep 18, 2007
07h
10h
13h
16h
Working hours (total worked: 81.10, max unever
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test/Schedules
Rendering Map: Amberieu

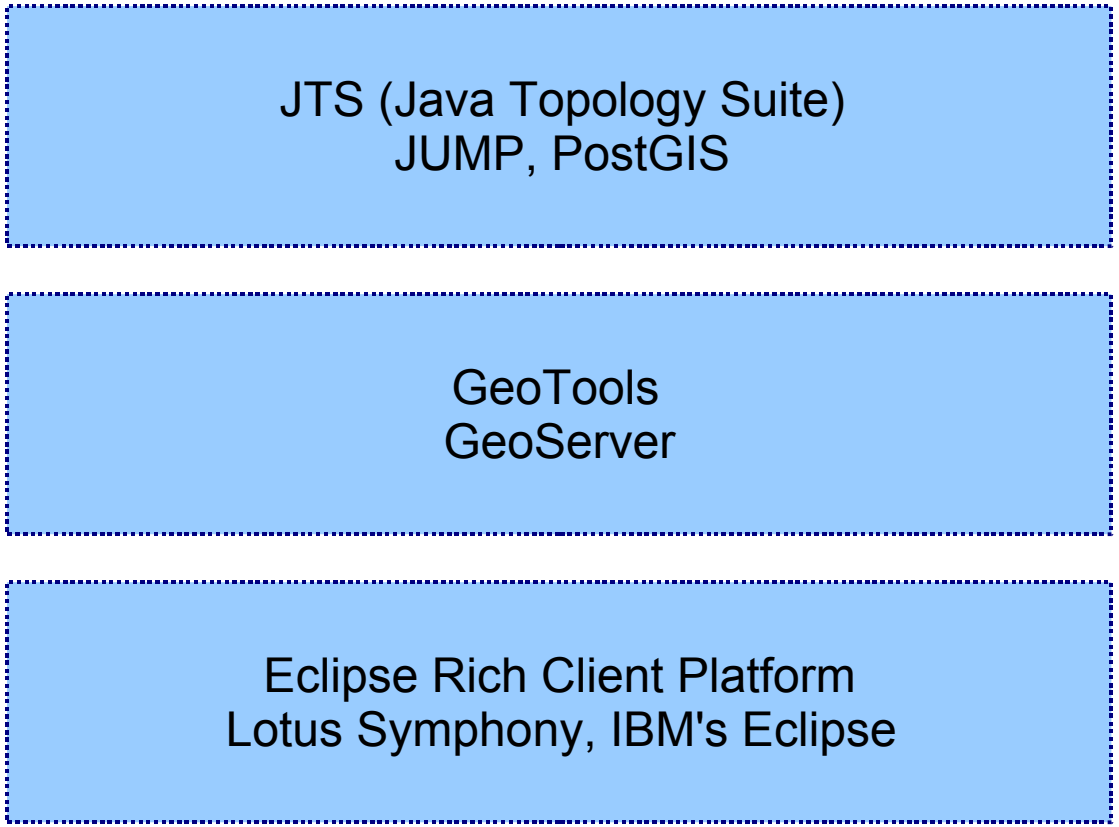
What does "uDig" mean?

- "***U***ser-friendly"
  - Automatic Integration
- "***D***esktop"
  - Native client
  - Operating system integration
  - Cut and paste
  - Drag and drop
- "***I***nternet"
  - OGC Web Map Server
  - OGC Web Feature Server
  - Catalogue
- "***G***IS"
  - Analysis framework
  - Printing
  - Customizable

uDig is a Framework

- uDig is a framework
- Success measured by number of adopters

Based on Mature Technologies



2D Spatial predicates and functions

Java GeoSpatial Development Library

Platform for building and deploying rich client applications

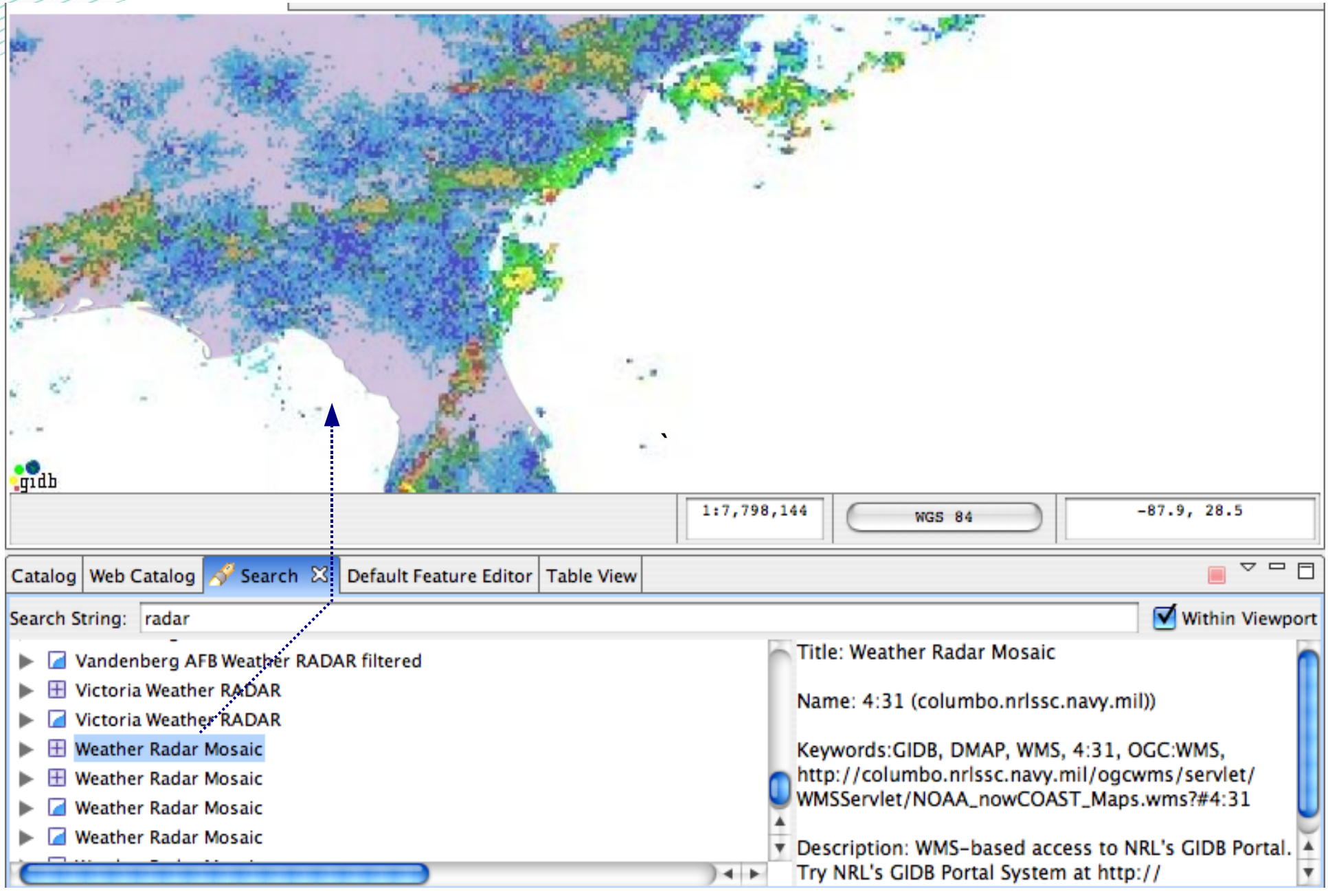
Eclipse RCP

- 944 projects at Plugin Central Alone
- Strategic Members:
  - IBM, Borland, BEA, NOKIA, ORACLE, ...
  - Going to be around for a while

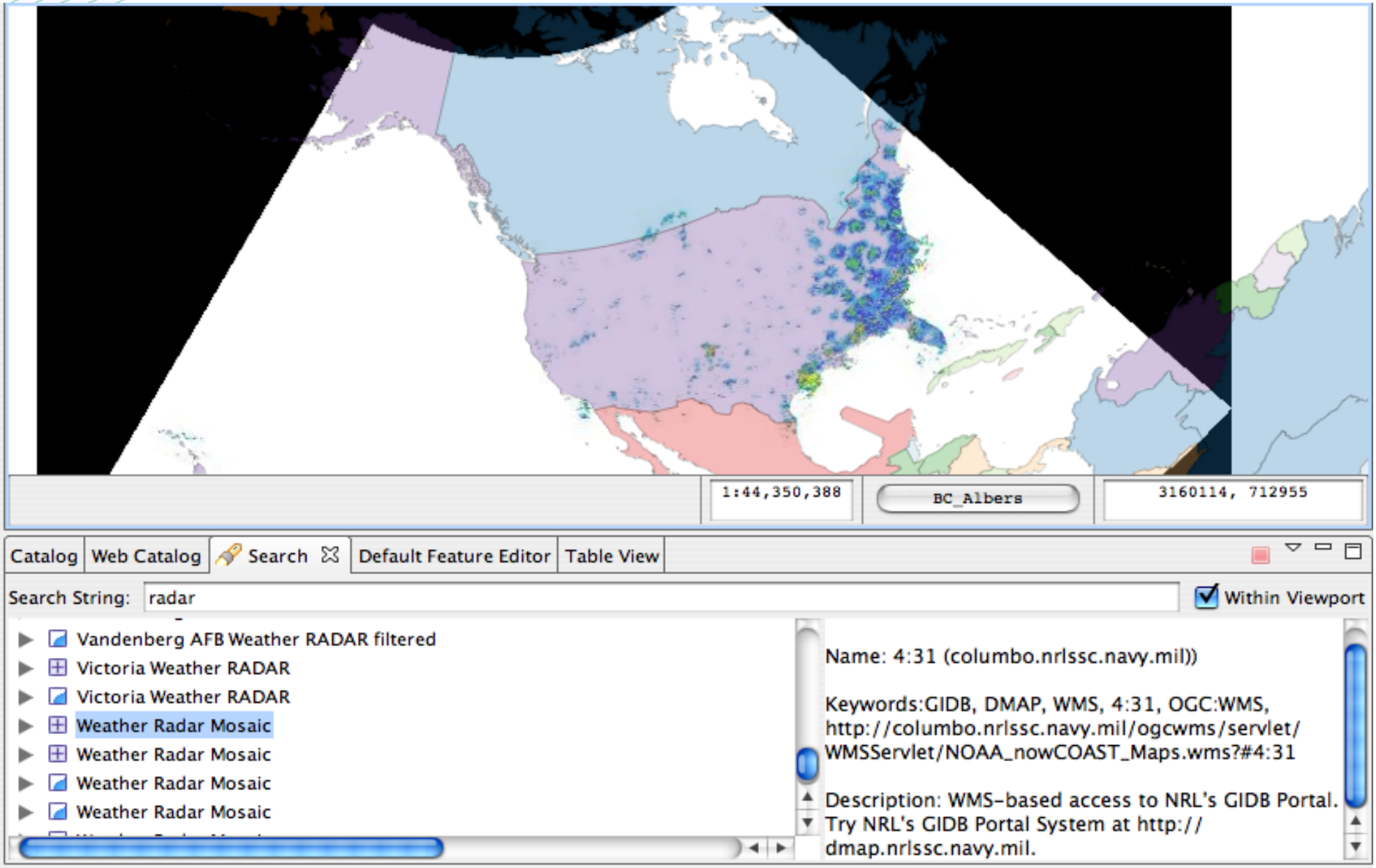
What does uDig add to the mix?

- Integration Platform
- Very useful product before customization
- Many many degrees of customization

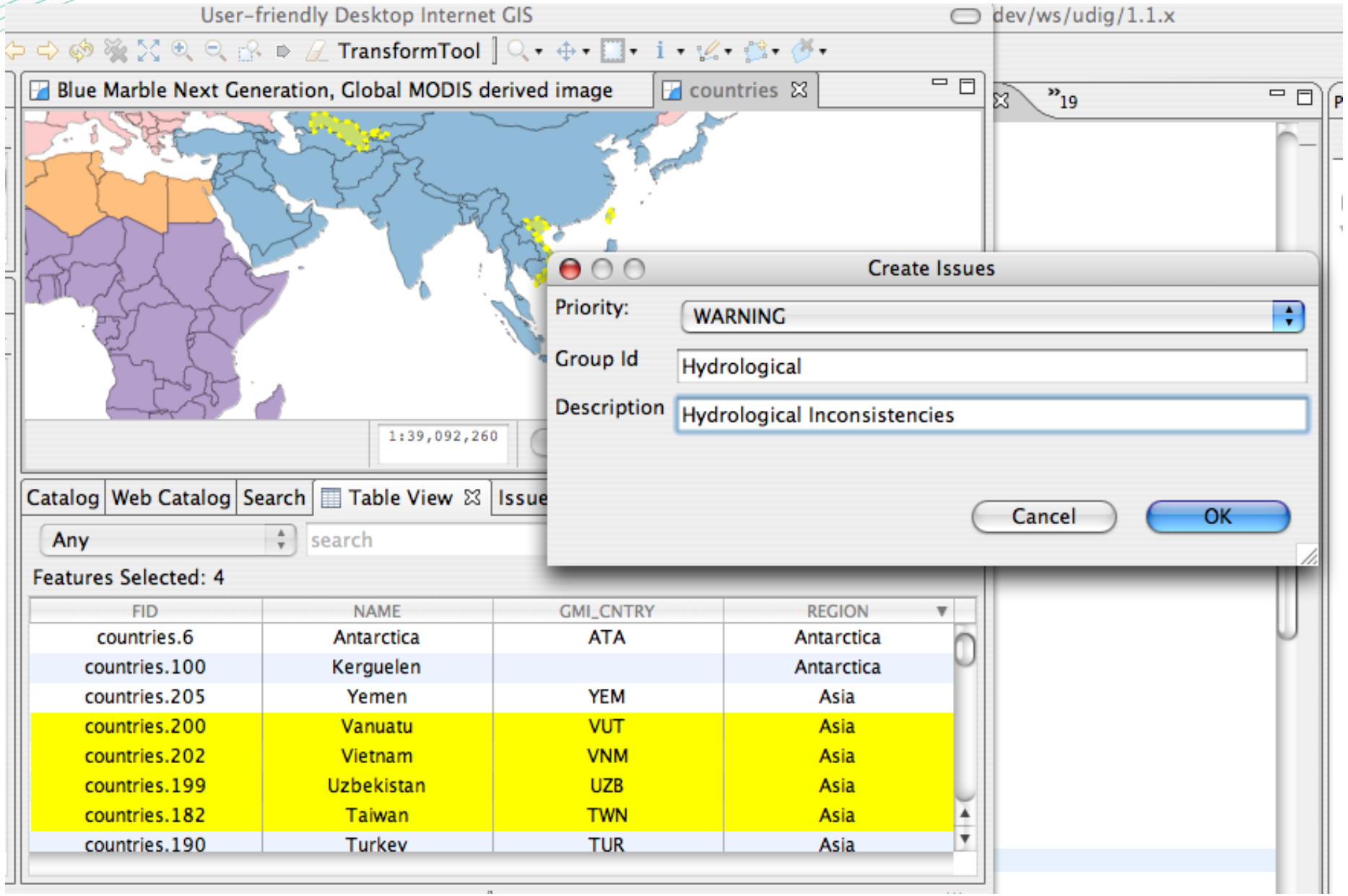
Mysteries of uDig - Searching



Mysteries of uDig - On the fly reprojection



Issues


User-friendly Desktop Internet GIS
dev/ws/udig/1.1.x
TransformTool
Blue Marble Next Generation, Global MODIS derived image
countries
1:39,092,260
Create Issues
Priority:
WARNING
Group Id
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Description
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Cancel
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Catalog
Web Catalog
Search
Table View
Issue
Any
search
Features Selected: 4
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Kerguelen
Antarctica
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Yemen
YEM
Asia
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Vanuatu
VUT
Asia
countries.202
Vietnam
VNM
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countries.199
Uzbekistan
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Taiwan
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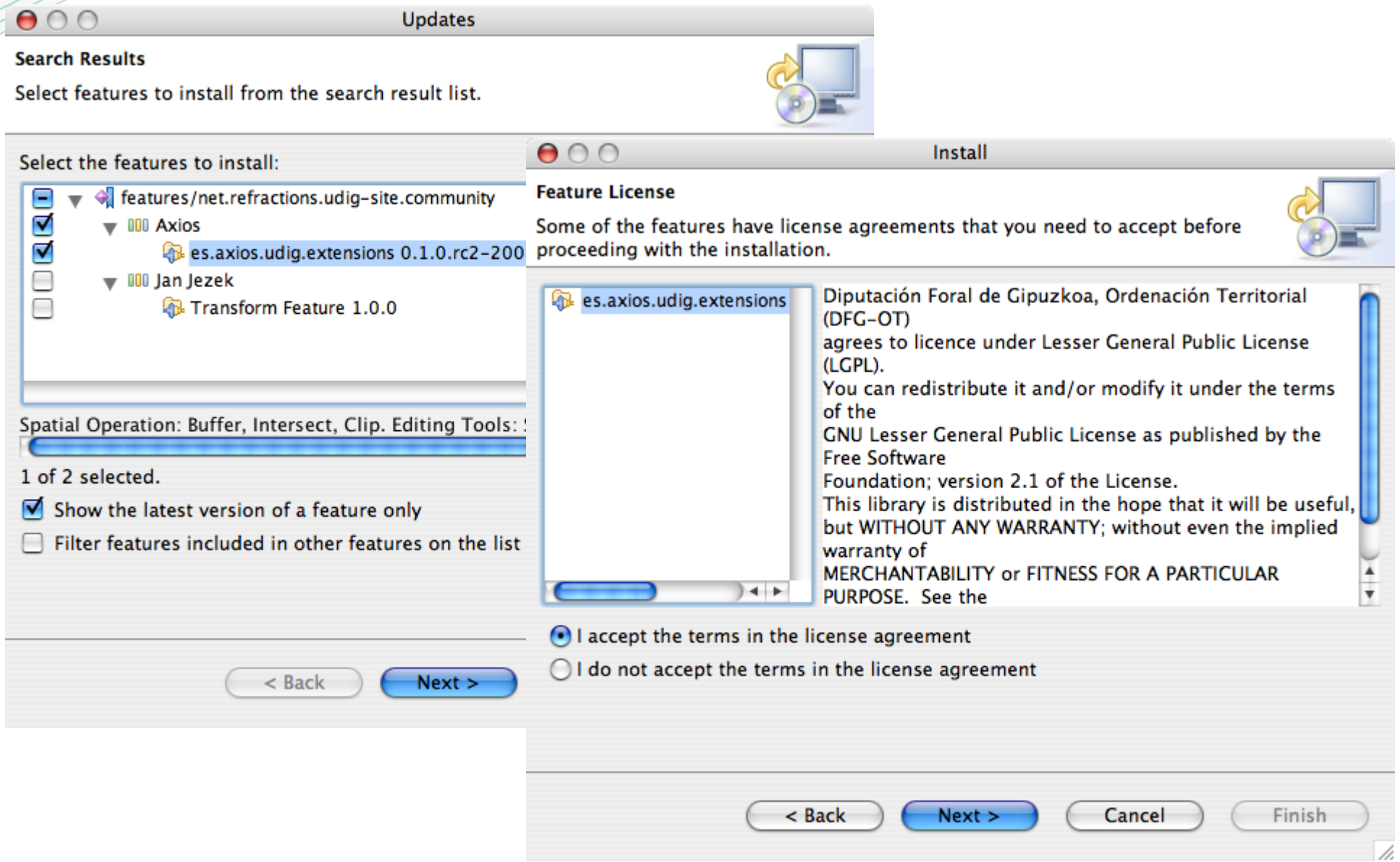
Mysteries of uDig - Update Manager



Native Widgets

User-friendly Desktop Internet GIS

Catalog | Web Catalog | Search | Table View

Home - User-friendly Desktop Internet GIS

MANAGING INFORMATION FOR LOCAL ENVIRONMENT IN SRI LANKA

MILES VIRTUAL SEMINAR - Nov 2005
FREE SOFTWARE, GEOINFORMATICS AND ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEMS AT THE LOCAL LEVEL

User-friendly Desktop Internet GIS

Jody Garnett, Refractions Research Inc.

Greetings

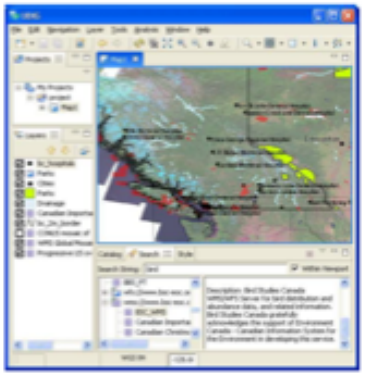
Open-source Geospatial is an international, cross organizational, undertaking. Everyday I work with people from around the World. People come to open-source from all shorts of backgrounds, with all manner of interests, and from many different projects.

Together we form a community, and although they may not have a name (our conference has changed its name each and every year it has been held), I consider these people I enjoy working with. I would love to add the members of MILES to the list.

In this document I have been asked to write about my experience in developing uDig, and address some of the issues slated for discussion in the MILES forum in November.

User-friendly Desktop Internet GIS

UDIG is open source desktop GIS development platform that includes support for local data, databases, and internet data. The development of uDig started in spring of 2004, with initial support from the Canadian GeoInnovations program, and has continued throughout 2005 as an independent project.



uDig has been designed from the start as a general purpose development platform:

- Industry standard extension framework using Eclipse technology;
- Completely scalable and customizable rendering pipeline to handle even the largest data sets;
- Complete integration with standard internet data sources such as OGC Web Map Service and Web Feature Service;
- Coordinate reference system support for all data sources, and on-the-fly coordinate system integration;
- Support for ESRI Shape files, PostGIS, DB2, Oracle Spatial, and OGC web services; and,
- Extensive standards support (OGC Filter, OGC Spatial Reference System , OGC Styled Layers, etc).

MANAGING INFORMATION FOR LOCAL ENVIRONMENT IN SRI LANKA

Background

The vision for uDig is to fill functional gaps in two technology communities: the open source geospatial community; and the open standards geospatial community (as represented by the OpenGIS Consortium).

- For the open source community, uDig is meant to fill in the functional role provided by ArcView in proprietary software architectures. It provides data viewing across a range of formats and projections, and provides access to downstream data sources (such as PostGIS) that contain data, but do not expose it visually. The software architecture has been chosen and developed to encourage modular improvement to the platform. Successful open source projects provide a modular architecture to allow maximum collaboration from a wide community of interest, and the technical design of uDig has been focussed on providing that foundation.

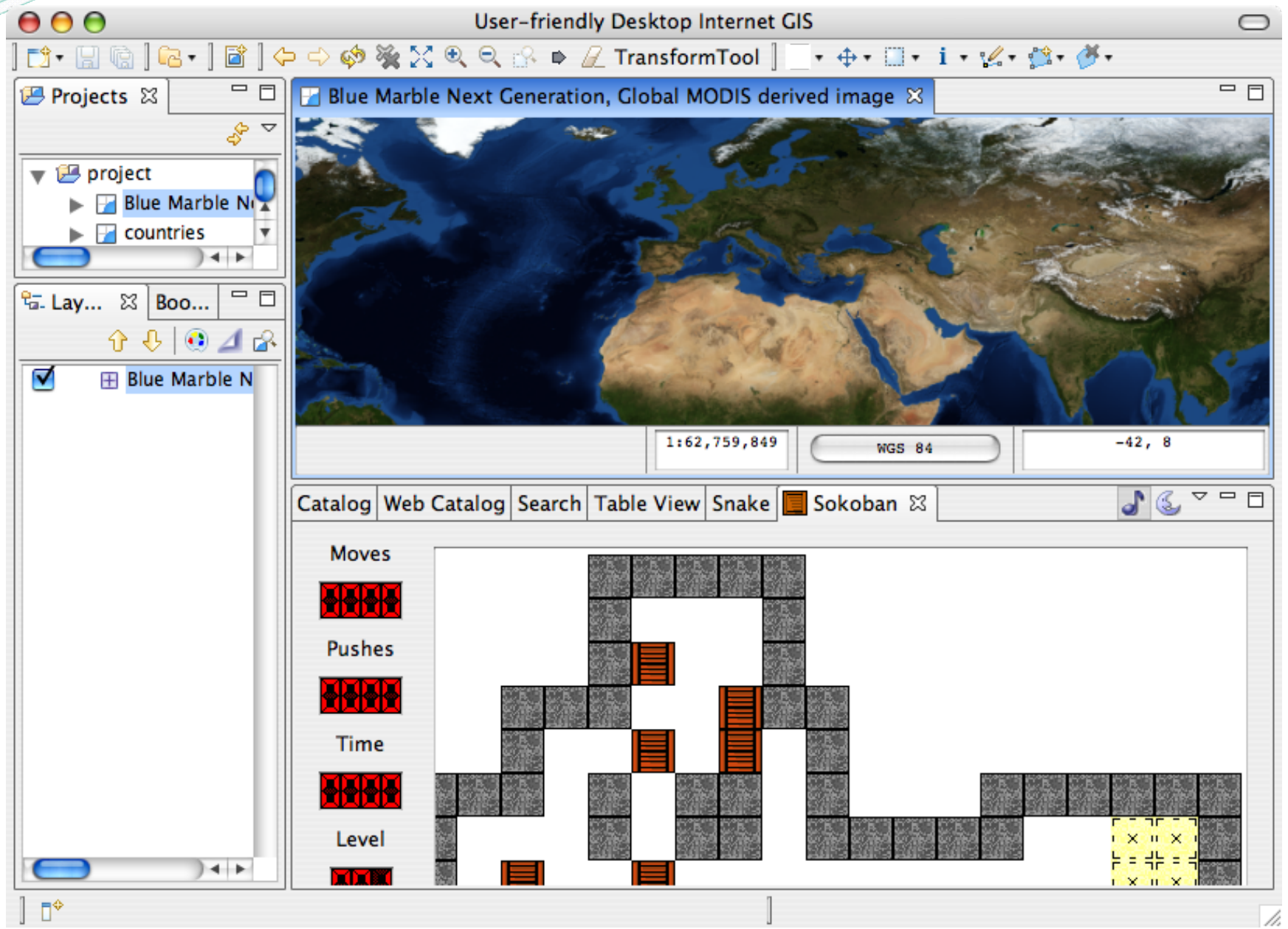
- For the open standards community, uDig is meant to fill the role of an "integrated client" capable of consuming internet services and data transparently and easily. While the OpenGIS process has created a number of server specifications, and numbers of servers obeying those standards have been set up, access to the data is still largely through clunky web interfaces. UDig brings network spatial data access to the desktop, and makes adding network data to the map as easy as a drag-and-drop.

Initial funding for the uDig project came from the Canadian GeoConnections program and ran from spring of 2004 to spring of 2005. Refractions Research proposed the uDig vision and GeoConnections provided sufficient funding to take the project through design to an initial implementation.

Since then, Refractions Research has continued with uDig development, and is working on a number of consulting projects that use uDig as a development base. In particular, we are currently completing a project for the OpenGIS consortium to deploy uDig as a demonstration integrated client for their upcoming "Open Web Services" demonstration to the US government. Since the spring, Refractions has also used uDig as a platform for a data entry tool for the UN Food & Agriculture Organization (FAO), and an emergency response data aggregator for the US State Department.

Our experience is that more and more organizations are recognizing the utility of uDig as the basis for advanced application development. In Finland, uDig is being used as the basis for a forestry management application. In Peru, the UN FAO is using uDig as the basis for a spatial data analysis application with their potato genetics library. In the United States, the Army Corps of Engineers is

Many Many Eclipse plugins to add



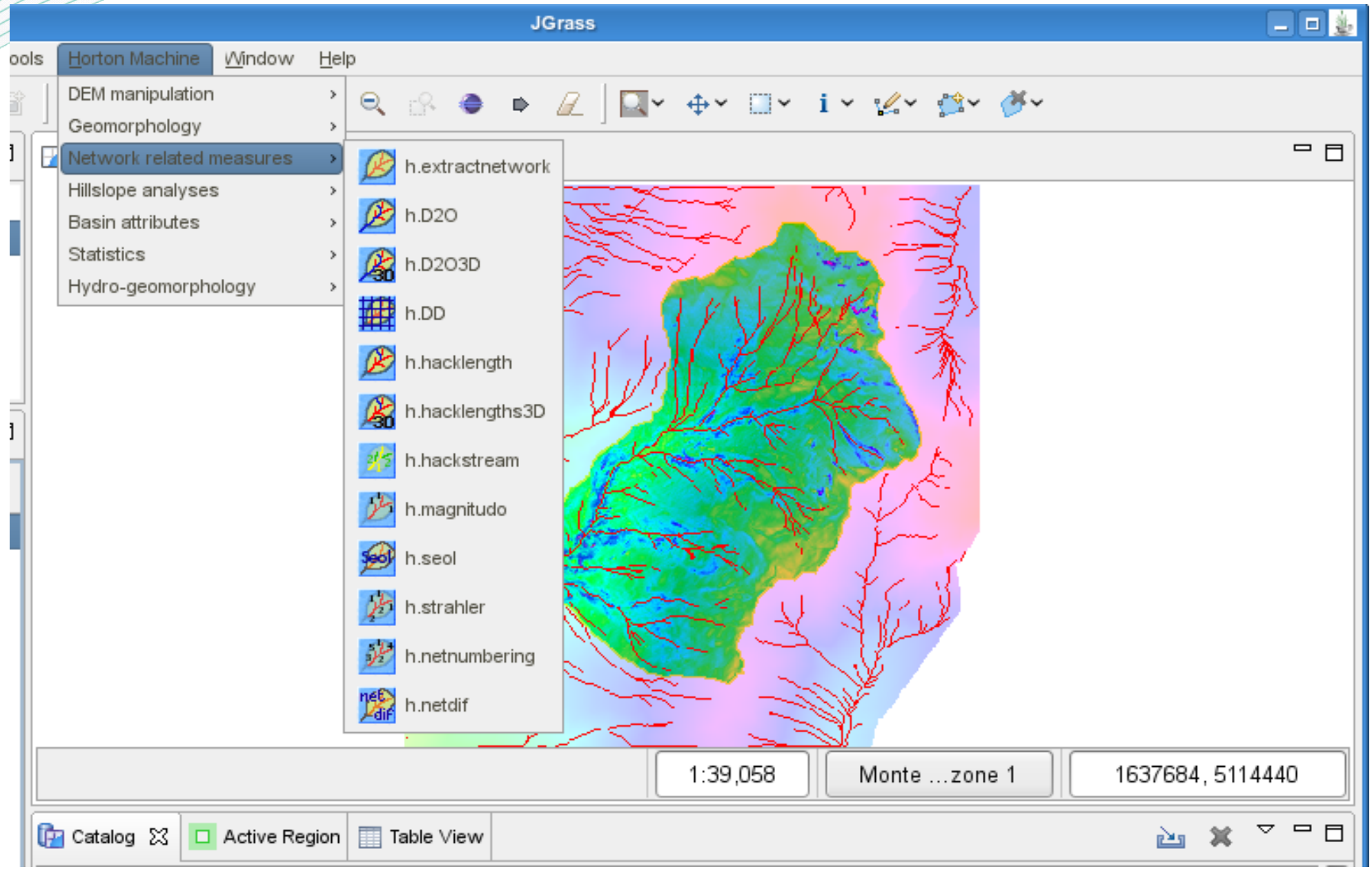
Common Extensions

- Custom Feature Editor
- Issue
- Catalog
- Operation
- View
- Tool
- Service
- Map Interceptor
- Layer Interceptor

JGrass

- uDig application based on the famous Grass project
- Primarily dedicated to hydrological and geomorphological analyses
- CUDAM, HydroloGIS, ICENS

JGrass


JGrass
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Horton Machine
Window
Help
DEM manipulation
Geomorphology
Network related measures
Hillslope analyses
Basin attributes
Statistics
Hydro-geomorphology
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h.strahler
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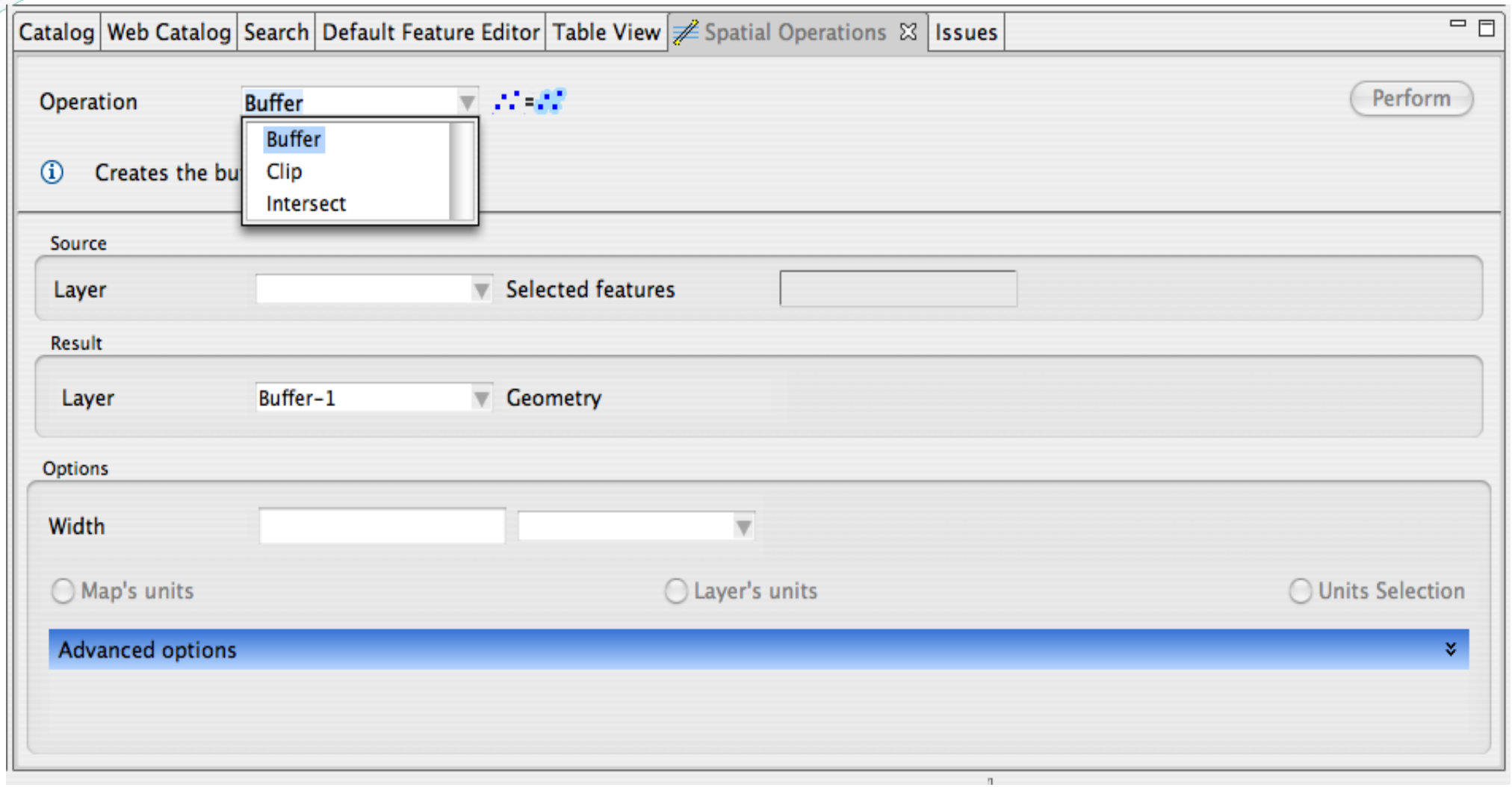
Catalog
Active Region
Table View

Axios Spatial Operations

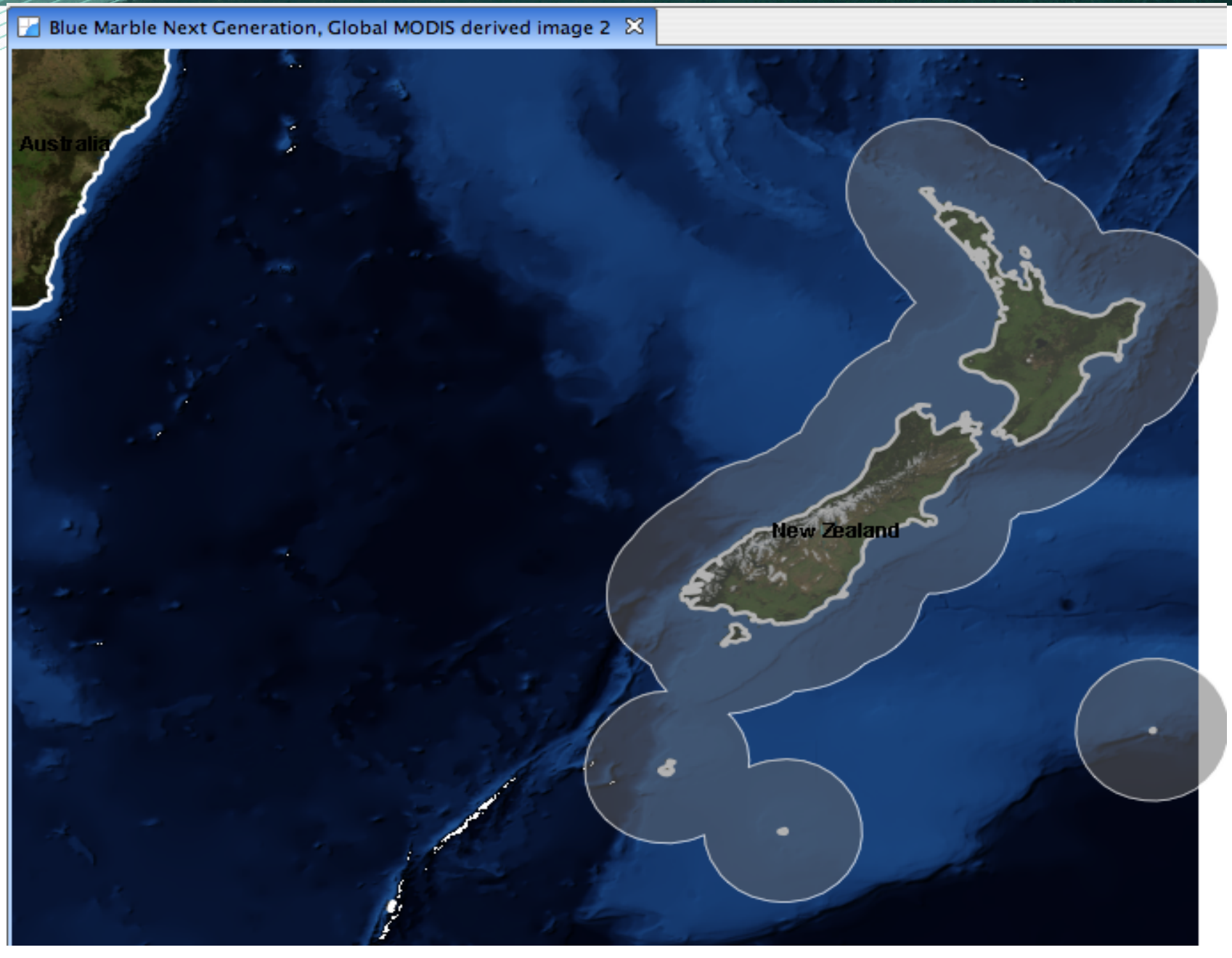
Collection of Operation and Tools

- Now Available
  - Buffer
  - Intersection
  - Clip
  - Split
- Coming Soon
  - Merge
  - Trim Line
  - Arc
  - Parallel
  - Dissolve
  - Spatial Join Geometries

Axios Spatial Operations



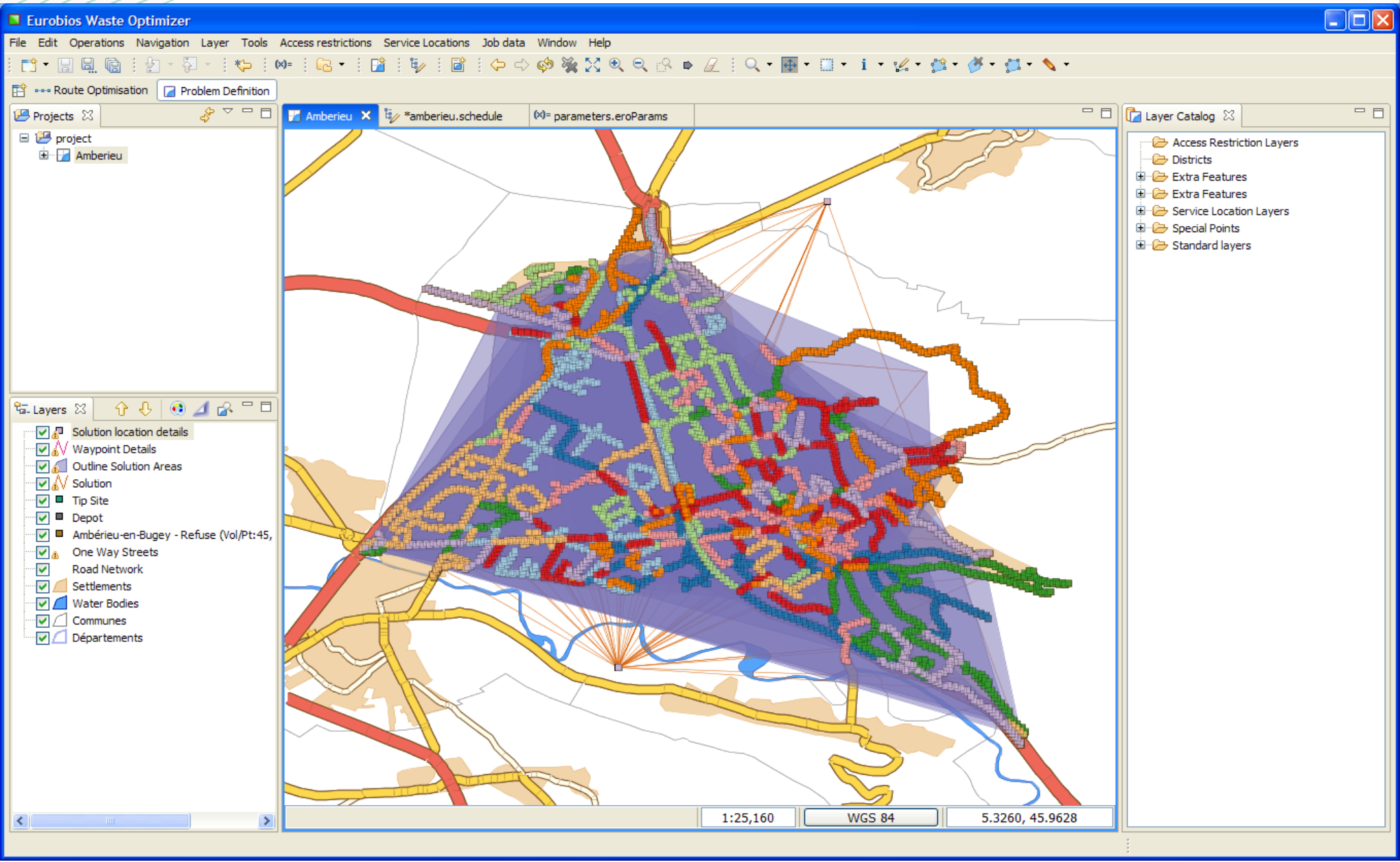
Axios Spatial Operations



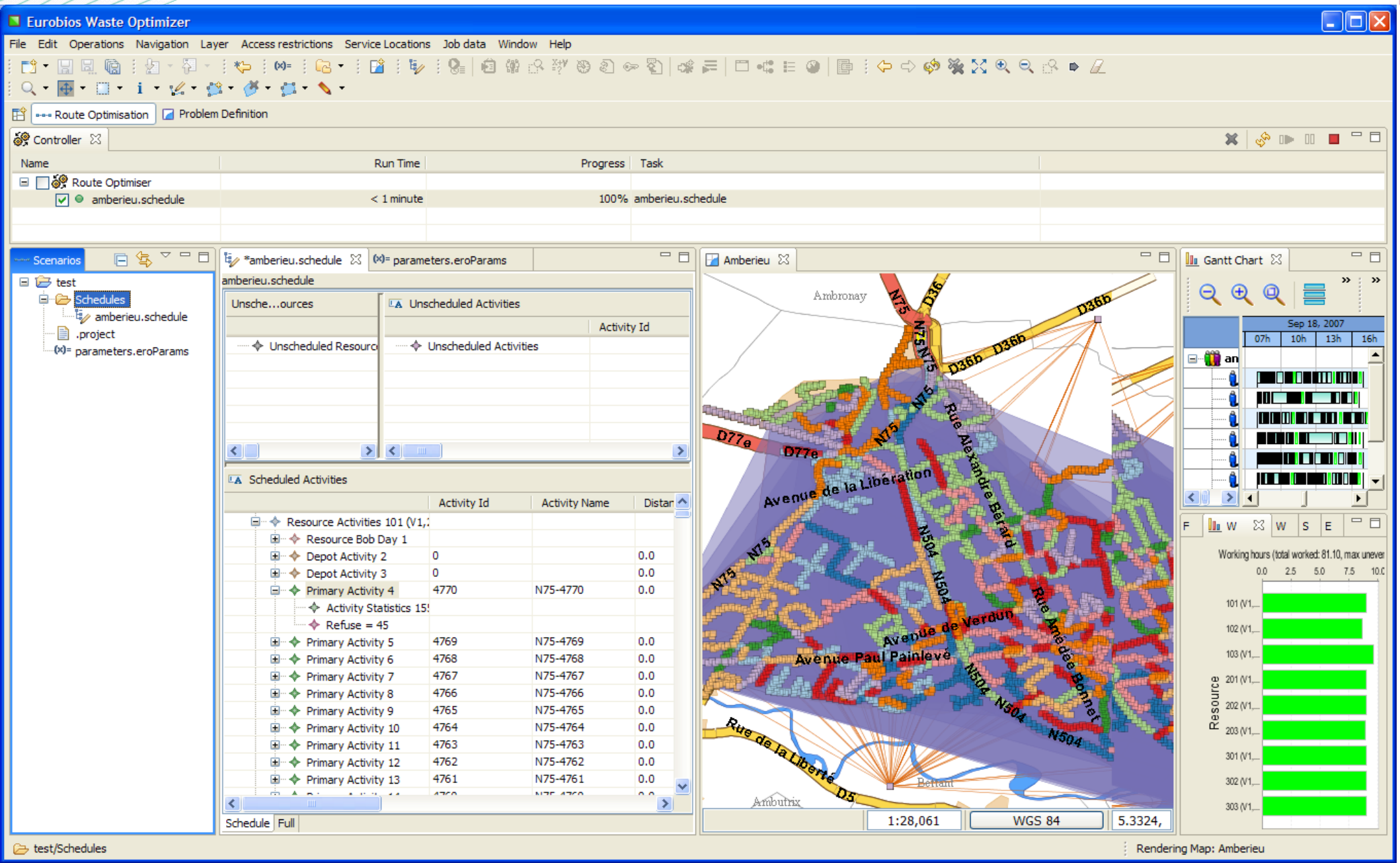
Eurobios Route Optimization Engine

- Waste Collection Route Optimization Engine
- First version deployed in 7 Areas in UK and France
- Each area services 50,000 – 100,000 households

Eurobios Route Optimization Engine



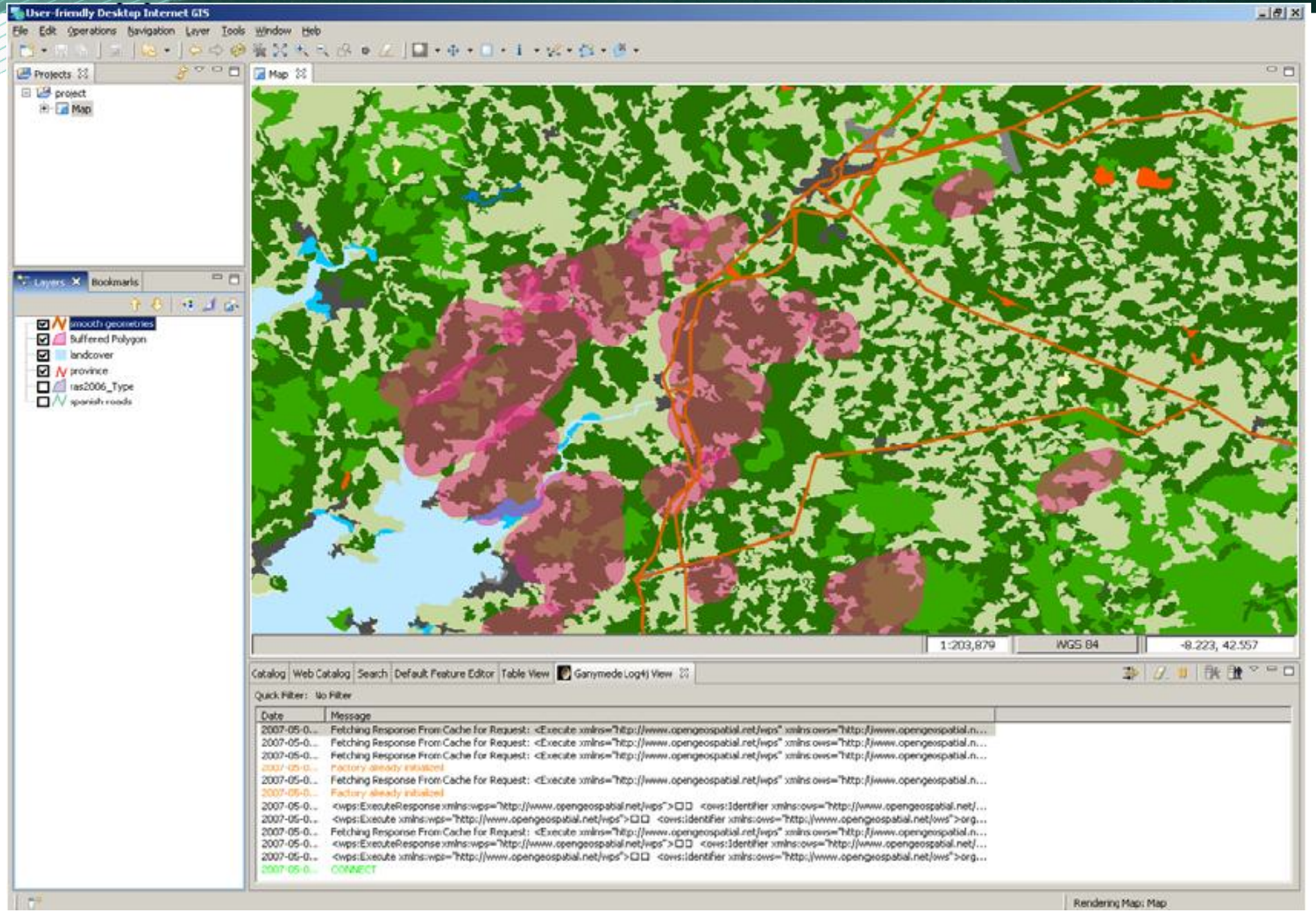
Eurobios Route Optimization Engine



52° North

- From the city of Münster Germany
- OGC Web Processing Client
- Chaining of data services within the process request
- Manage multiple WPS instances
- Log interaction with Ganymede plugin

52° North


User-friendly Desktop Internet GIS
File Edit Operations Navigation Layer Tools Window Help
Projects
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Map
Layers
Bookmarks
smooth geometries
Buffered Polygon
landcover
province
ras2006_Type
spanish roads
Map
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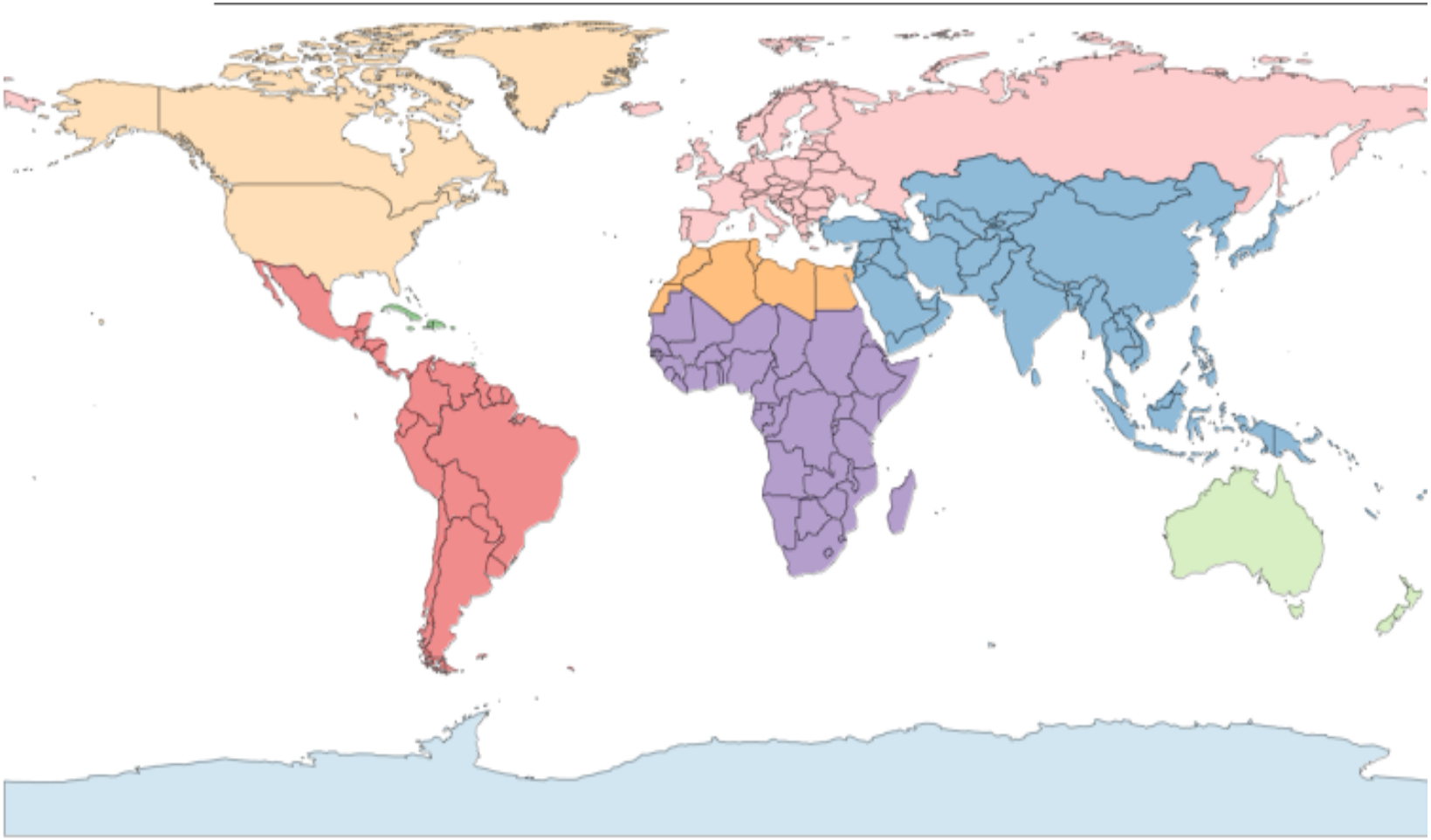
-8.223, 42.557
Catalog
Web Catalog
Search
Default Feature Editor
Table View
Ganymede Log4j View
Quick Filter: No Filter
Date
Message
Rendering Map: Map

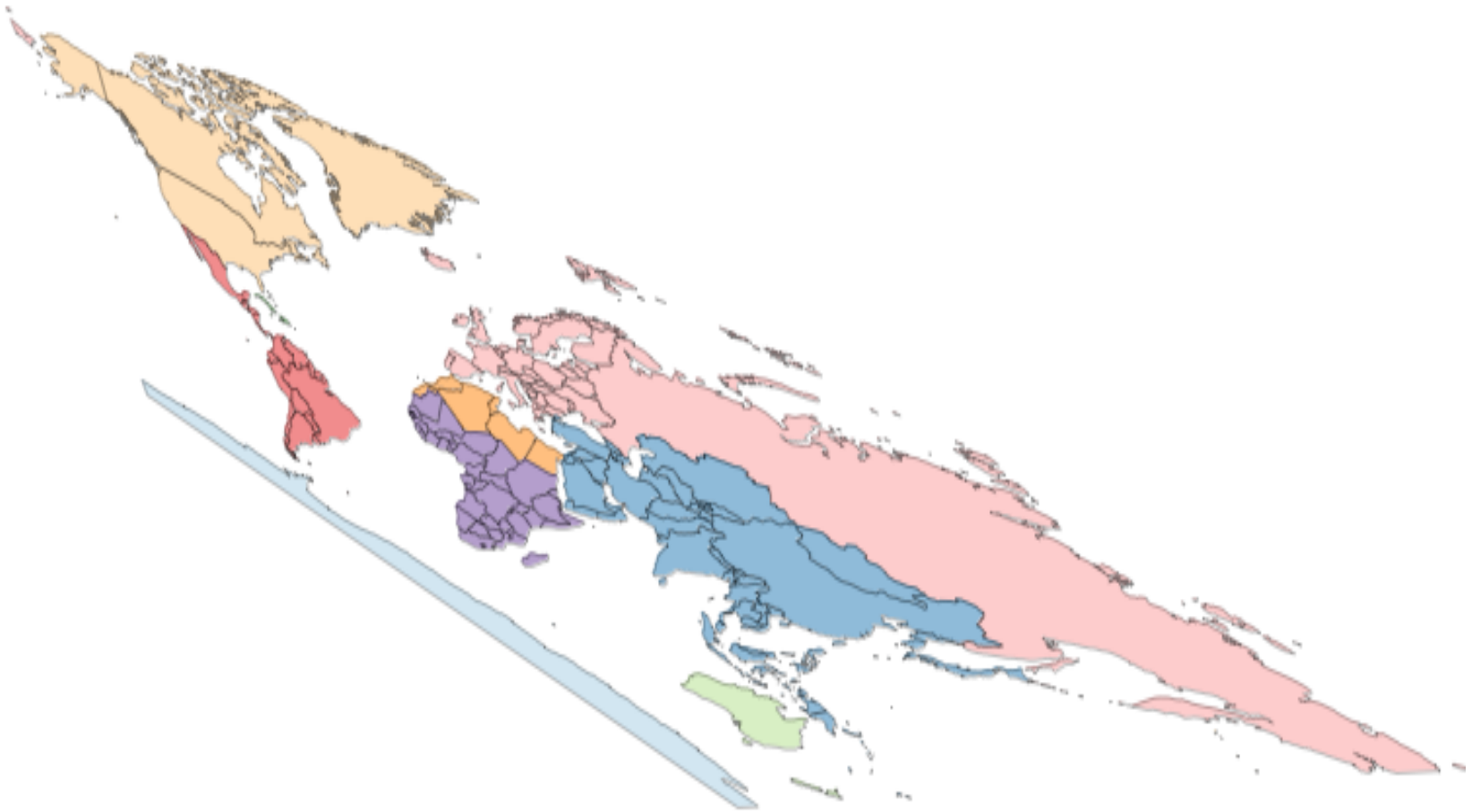
Google Summer of Code - Jan Jezek

- uDig extension that adds:
  - Feature transformation
  - Feature -> Coverage Generation
- Transformation Types:
  - Rubber Sheeting (Triangulation + Affine Transformation)
  - Thin plate spline interpolation
  - Inverse distance weighted interpotion

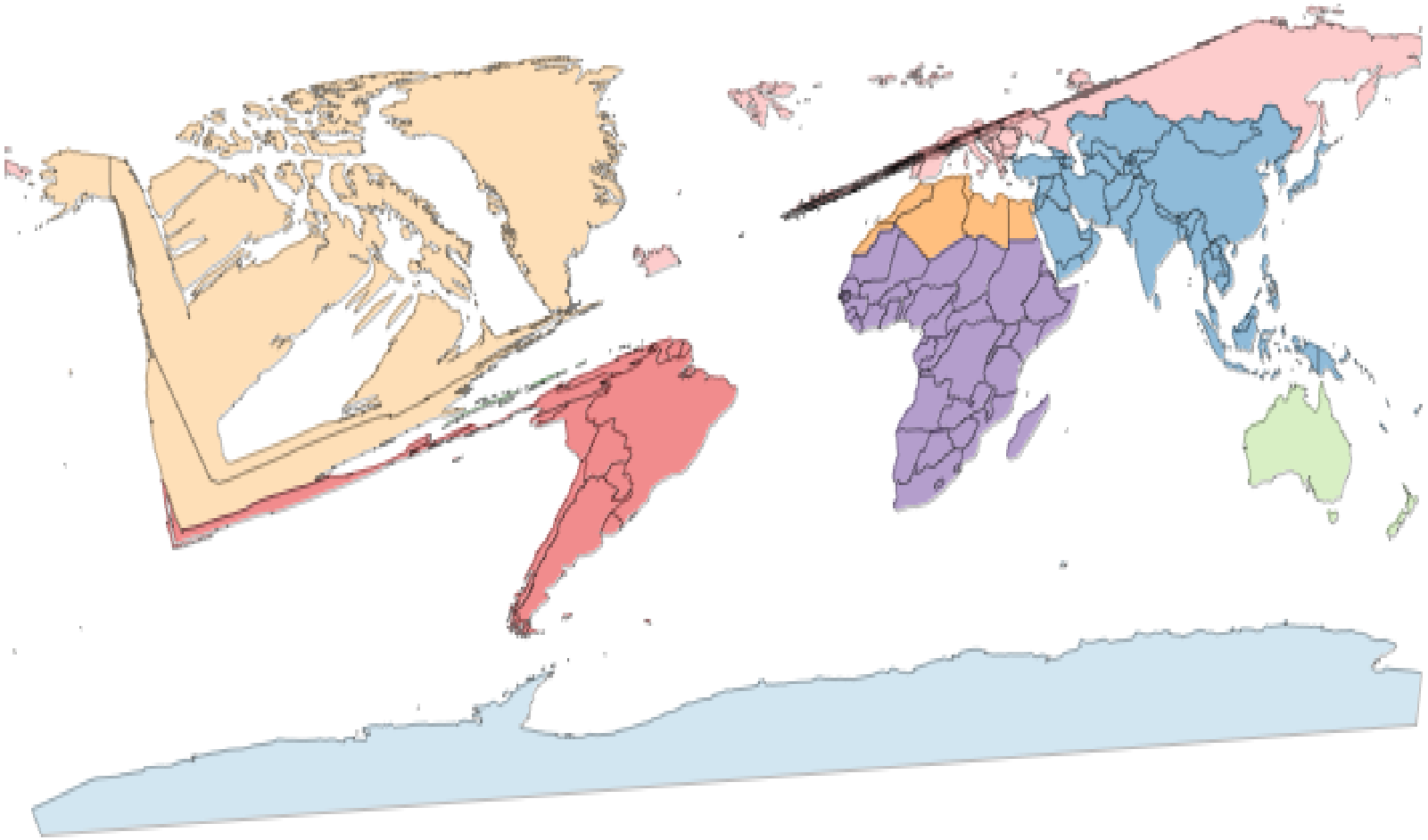
Google Summer of Code - Jan Jezek



Google Summer of Code - Jan Jezek

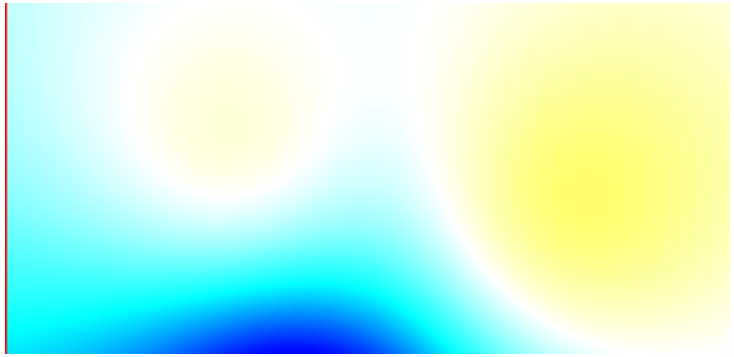


Google Summer of Code - Jan Jezek



Google Summer of Code - Jan Jezek

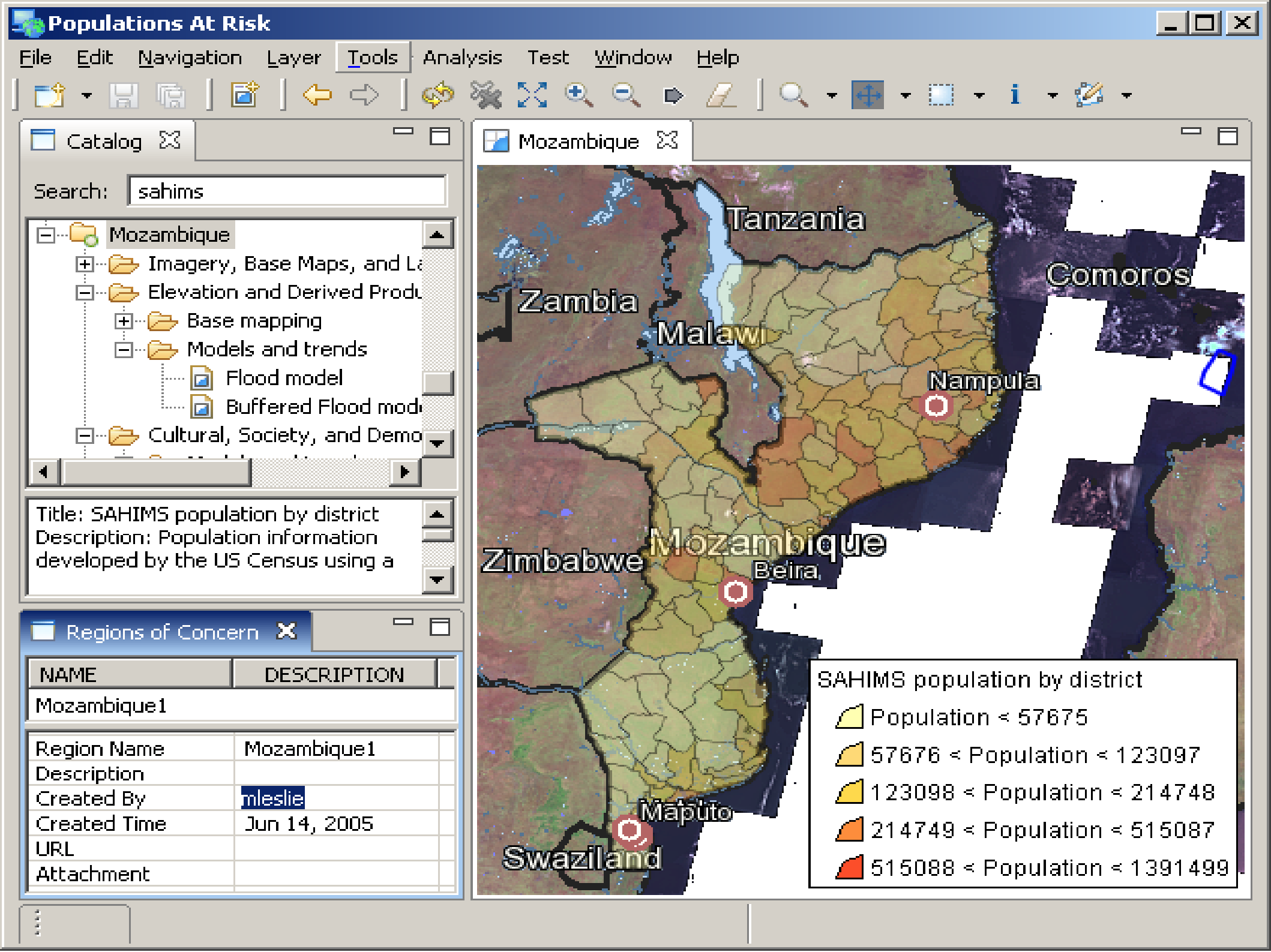
Inverse Distance Weighted Interpolation



Thin-plate Spline Method

Populations @ Risk

- Proof of Concept for US State Department
  - Integrate distributed information into common framework for decision making
  - OGC services based
  - Third-world populations and aid response


Populations At Risk
File
Edit
Navigation
Layer
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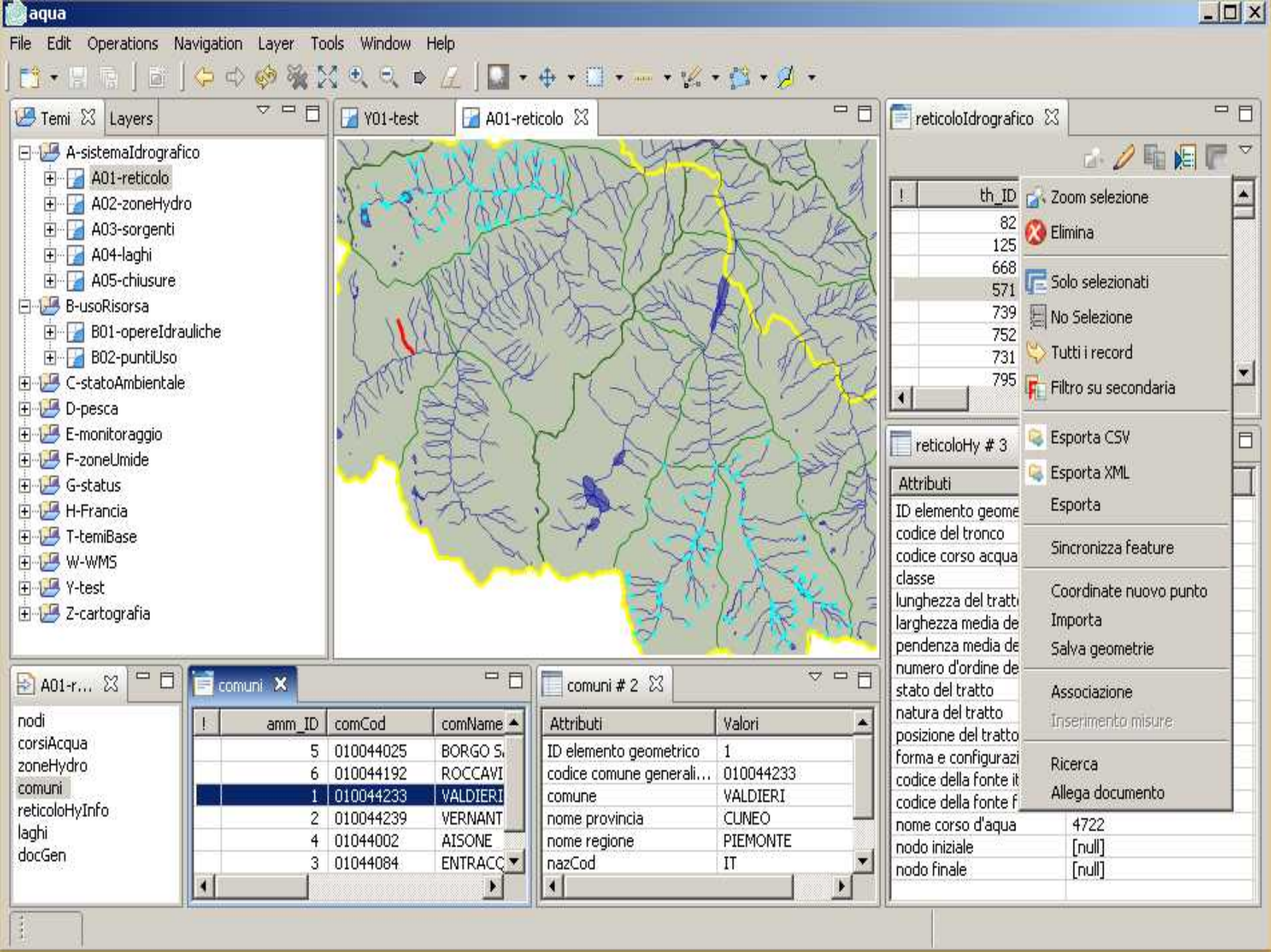
Analysis
Test
Window
Help
Catalog
Search:
sahims
Mozambique
Imagery, Base Maps, and La
Elevation and Derived Produ
Base mapping
Models and trends
Flood model
Buffered Flood mod
Cultural, Society, and Demo
Title: SAHIMS population by district
Description: Population information developed by the US Census using a
Regions of Concern
NAME
DESCRIPTION
Mozambique1
Region Name
Mozambique1
Description
Created By
mleslie
Created Time
Jun 14, 2005
URL
Attachment
Mozambique
Tanzania
Comoros
Zambia
Malawi
Nampula
Zimbabwe
Mozambique
Beira
Maputo
Swaziland
SAHIMS population by district
Population ≤ 57675
57676 ≤ Population ≤ 123097
123098 ≤ Population ≤ 214748
214749 ≤ Population ≤ 515087
515088 ≤ Population ≤ 1391499

EU GeoViste

- Developed in Italy
- IT system for management of parks and reserves
- Framework on a framework
  - uDig as core mapping component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Layers
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A01-reticolo
A02-zoneHydro
A03-sorgenti
A04-laghi
A05-chiusure
B-usoRisorsa
B01-opereIdrauliche
B02-puntiUso
C-statoAmbientale
D-pesca
E-monitoraggio
F-zoneUmide
G-status
H-Francia
T-temiBase
W-WMS
Y-test
Z-cartografia
Y01-test
A01-reticolo
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571
739
752
731
795
Zoom selezione
Elimina
Solo selezionati
No Selezione
Tutti i record
Filtro su secondaria
Esporta CSV
Esporta XML
Esporta
Sincronizza feature
Coordinate nuovo punto
Importa
Salva geometrie
Associazione
Inserimento misure
Ricerca
Allega documento
reticoloHy # 3
Attributi
ID elemento geome
codice del tronco
codice corso acqua
classe
lunghezza del tratt
larghezza media de
pendenza media de
numero d'ordine de
stato del tratto
natura del tratto
posizione del tratto
forma e configurazi
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zoneHydro
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5 010044025 BORGO S.
6 010044192 ROCCAVI
1 010044233 VALDIERI
2 010044239 VERNANT
4 01044002 AISONE
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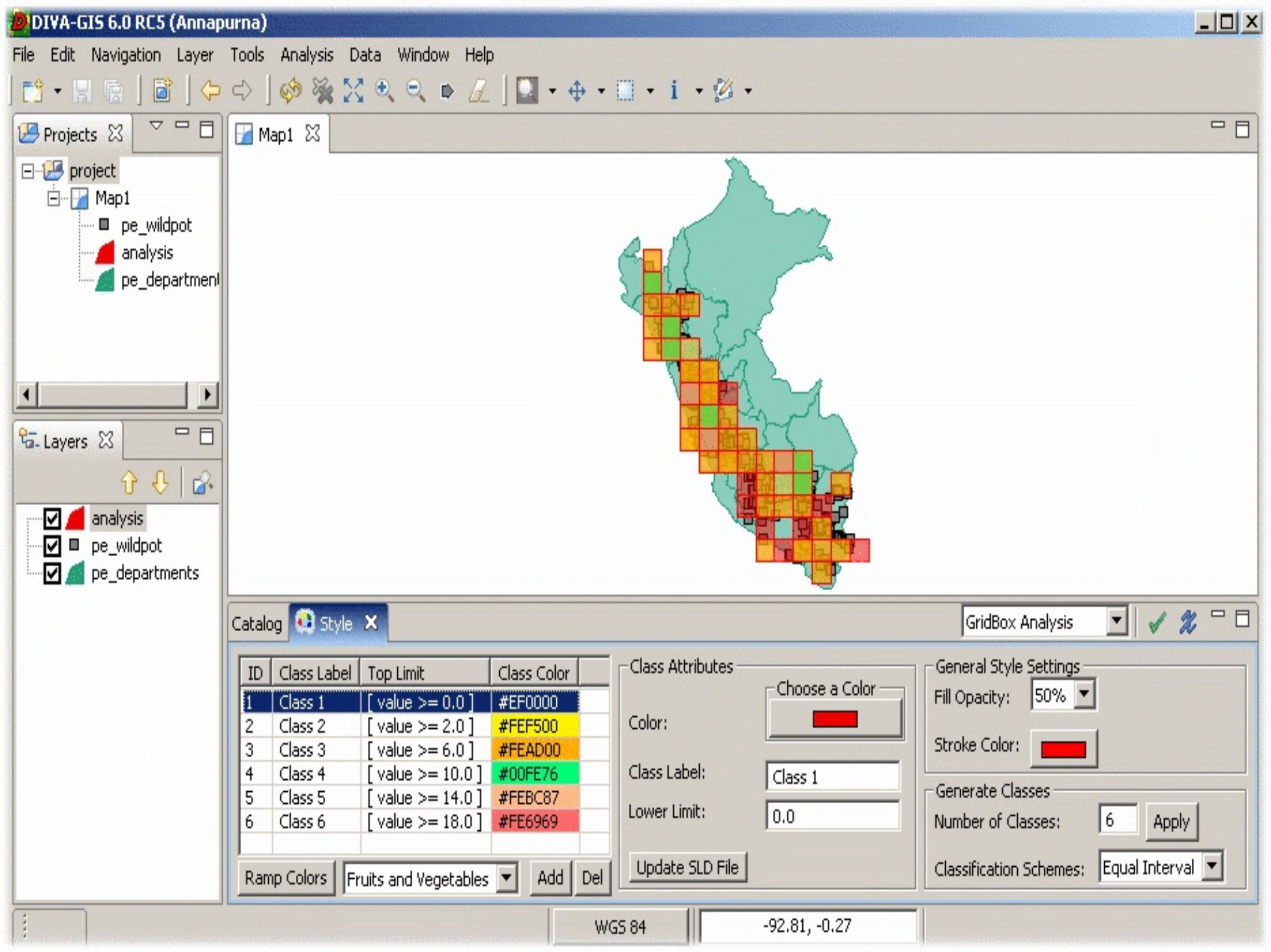
comune VALDIERI
nome provincia CUNEO
nome regione PIEMONTE
nazCod IT

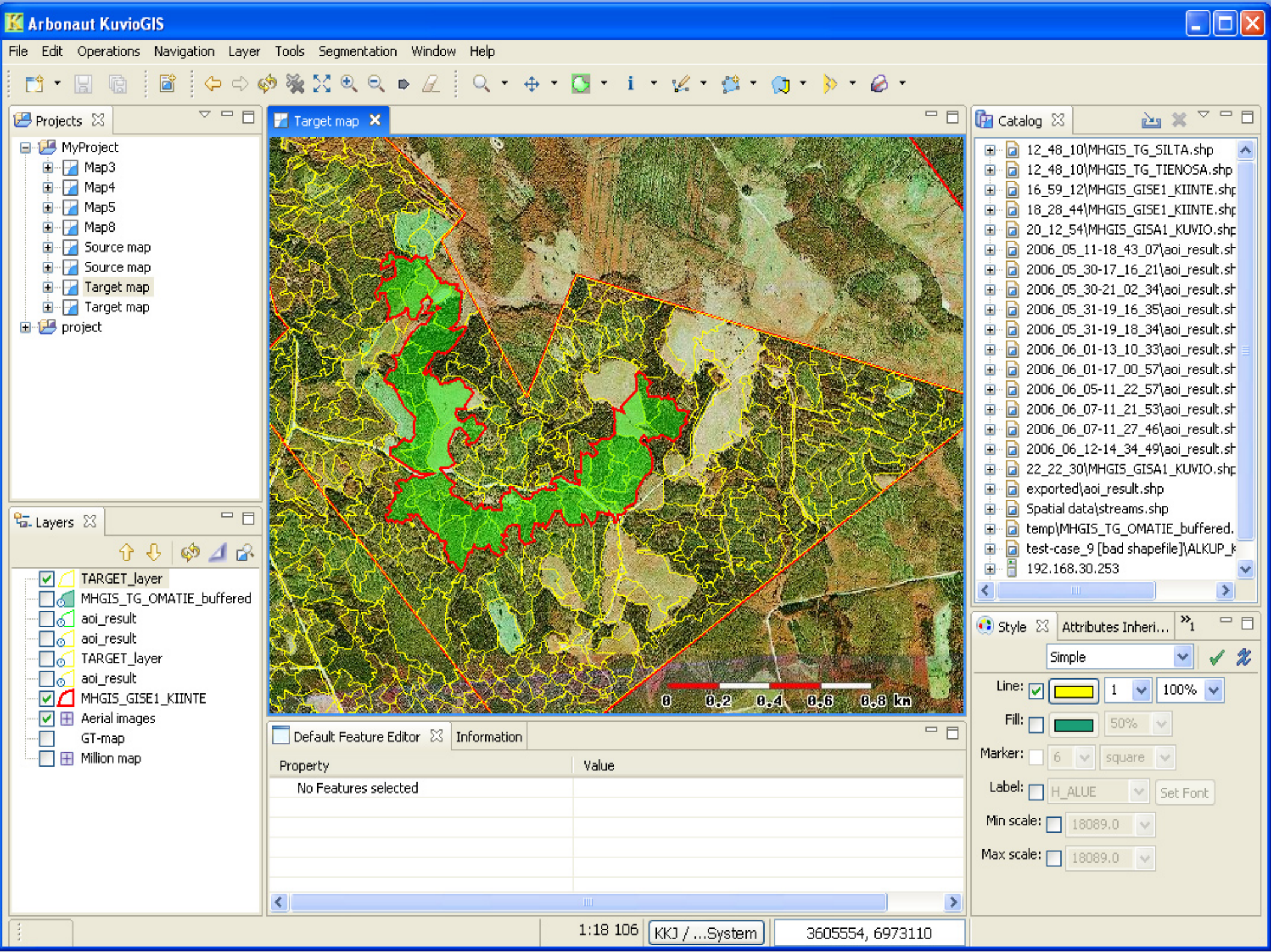
DIVA GIS

- UN Food & Agriculture Organization
  - International Potato Center (CIP)
  - Lima, Peru
- Map and analyze species distributions
- Works with genebank data from CIP and other laboratories


DIVA-GIS 6.0 RC5 (Annapurna)
File Edit Navigation Layer Tools Analysis Data Window Help
Projects
project
Map1
pe_wildpot
analysis
pe_departmenl
Layers
analysis
pe_wildpot
pe_departments
Map1
Catalog
Style
GridBox Analysis
ID Class Label Top Limit Class Color
1 Class 1 [value >= 0.0] #EF0000
2 Class 2 [value >= 2.0] #FEF500
3 Class 3 [value >= 6.0] #FEAD00
4 Class 4 [value >= 10.0] #00FE76
5 Class 5 [value >= 14.0] #FEBC87
6 Class 6 [value >= 18.0] #FE6969
Ramp Colors
Fruits and Vegetables
Add
Del
Class Attributes
Choose a Color
Color:
Class Label:
Class 1
Lower Limit:
0.0
Update SLD File
General Style Settings
Fill Opacity:
50%
Stroke Color:
Generate Classes
Number of Classes:
6
Apply
Classification Schemes:
Equal Interval
WGS 84
-92.81, -0.27

ArboGIS

- Arbonaut of Helsinki, Finland
- Private company, bid development contractwith uDig as core mapping component
- KuvioGIS
- Process automation for forest inventory update
  - Extract forest stand information from aerial maps
  - Attach information from old inventory to new stands


Arbonaut KuvioGIS
File Edit Operations Navigation Layer Tools Segmentation Window Help
Projects
MyProject
Map3
Map4
Map5
Map8
Source map
Source map
Target map
Target map
project
Target map
Catalog
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18_28_44\MHGIS_GISE1_KIINTE.shp
20_12_54\MHGIS_GISA1_KUVIO.shp
2006_05_11-18_43_07\aoi_result.sh
2006_05_30-17_16_21\aoi_result.sh
2006_05_30-21_02_34\aoi_result.sh
2006_05_31-19_16_35\aoi_result.sh
2006_05_31-19_18_34\aoi_result.sh
2006_06_01-13_10_33\aoi_result.sh
2006_06_01-17_00_57\aoi_result.sh
2006_06_05-11_22_57\aoi_result.sh
2006_06_07-11_21_53\aoi_result.sh
2006_06_07-11_27_46\aoi_result.sh
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22_22_30\MHGIS_GISA1_KUVIO.shp
exported\aoi_result.shp
Spatial data\streams.shp
temp\MHGIS_TG_OMATIE_buffered.
test-case_9 [bad shapefile]\ALKUP_k
192.168.30.253
0 0.2 0.4 0.6 0.8 km
Layers
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MHGIS_TG_OMATIE_buffered
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aoi_result
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aoi_result
MHGIS_GISE1_KIINTE
Aerial images
GT-map
Million map
Default Feature Editor
Information
Property
Value
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square
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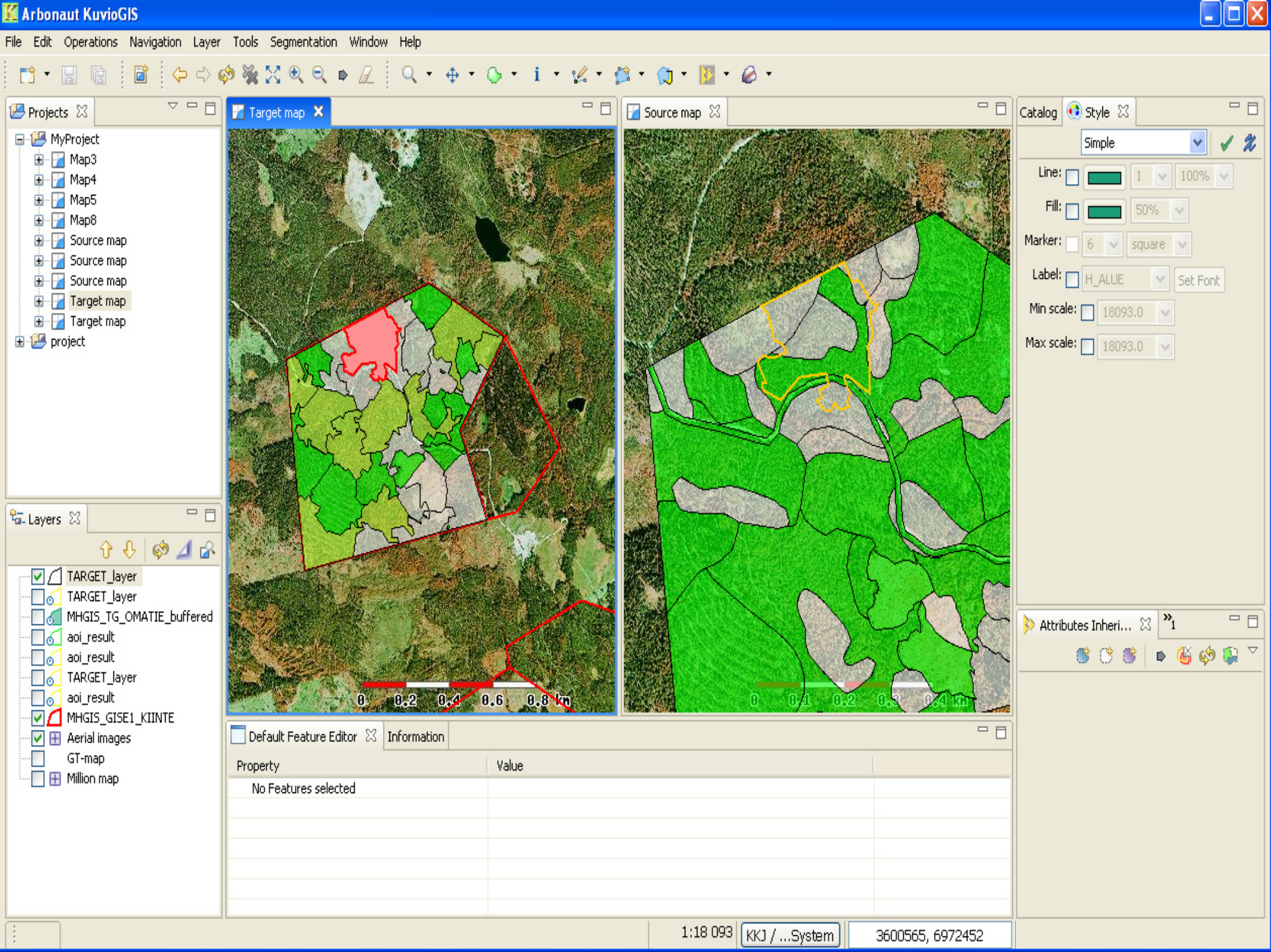
KKJ / ...System
3605554, 6973110


Arbonaut KuvioGIS
File Edit Operations Navigation Layer Tools Segmentation Window Help
Projects
MyProject
Map3
Map4
Map5
Map8
Source map
Source map
Source map
Target map
Target map
project
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aoi_result
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Aerial images
GT-map
Million map
Attributes Inheri...
Default Feature Editor
Information
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Value
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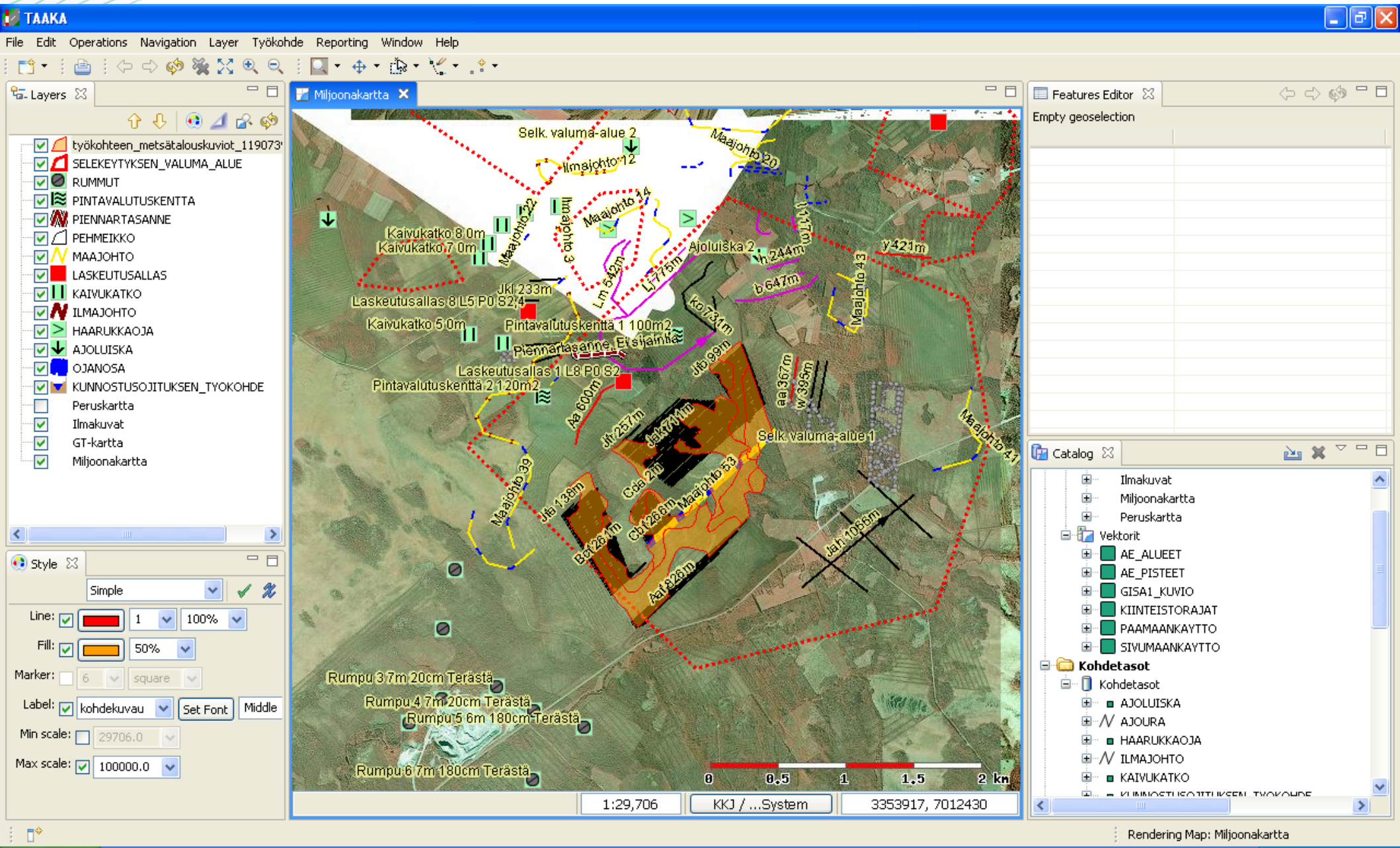
1:18 093
KKJ / ...System
3600565, 6972452

ArboGIS

- TAAKA
- Automation of customer's business process
  - Automatic creation of forest land parcels
  - Inheritance of attributes from old data
  - Road building planning and ditch repairing planning
  - Reporting

ArboGIS


TAAKA
File Edit Operations Navigation Layer Työkohde Reporting Window Help
Layers
työkohteen_metsätalouskuviot_119073'
SELEKEYTYKSEN_VALUMA_ALUE
RUMMUT
PINTAVALUTUSKENTTA
PIENNARTASANNE
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LASKEUTUSALLAS
KAIVUKATKO
ILMAJOHTO
HAARUKKAOJA
AJOLUISKA
OJANOSA
KUNNOSTUSOJITUKSEN_TYOKOHDE
Peruskartta
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Miljoonakartta
Selk. valuma-alue 2
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Maajohto 22
Kaivukatko 8 0m
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Ajoluiska 2
Laskeutusallas 8 L5 P0 S2,4
Kaivukatko 5 0m
Pintavalutuskenttä 1 100m2
Laskeutusallas 1 L8 P0 S2
Pintavalutuskenttä 2 120m2
Maajohto 43
Selk. valuma-alue 1
Maajohto 41
Maajohto 3g
Maajohto 53
Rumpu 3 7m 20cm Terästä
Rumpu 4 7m 20cm Terästä
Rumpu 5 6m 180cm Terästä
Rumpu 6 7m 180cm Terästä
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1:29,706
KKJ / ...System
3353917, 7012430
Features Editor
Empty geoselection
Catalog
Ilmakuvat
Miljoonakartta
Peruskartta
Vektorit
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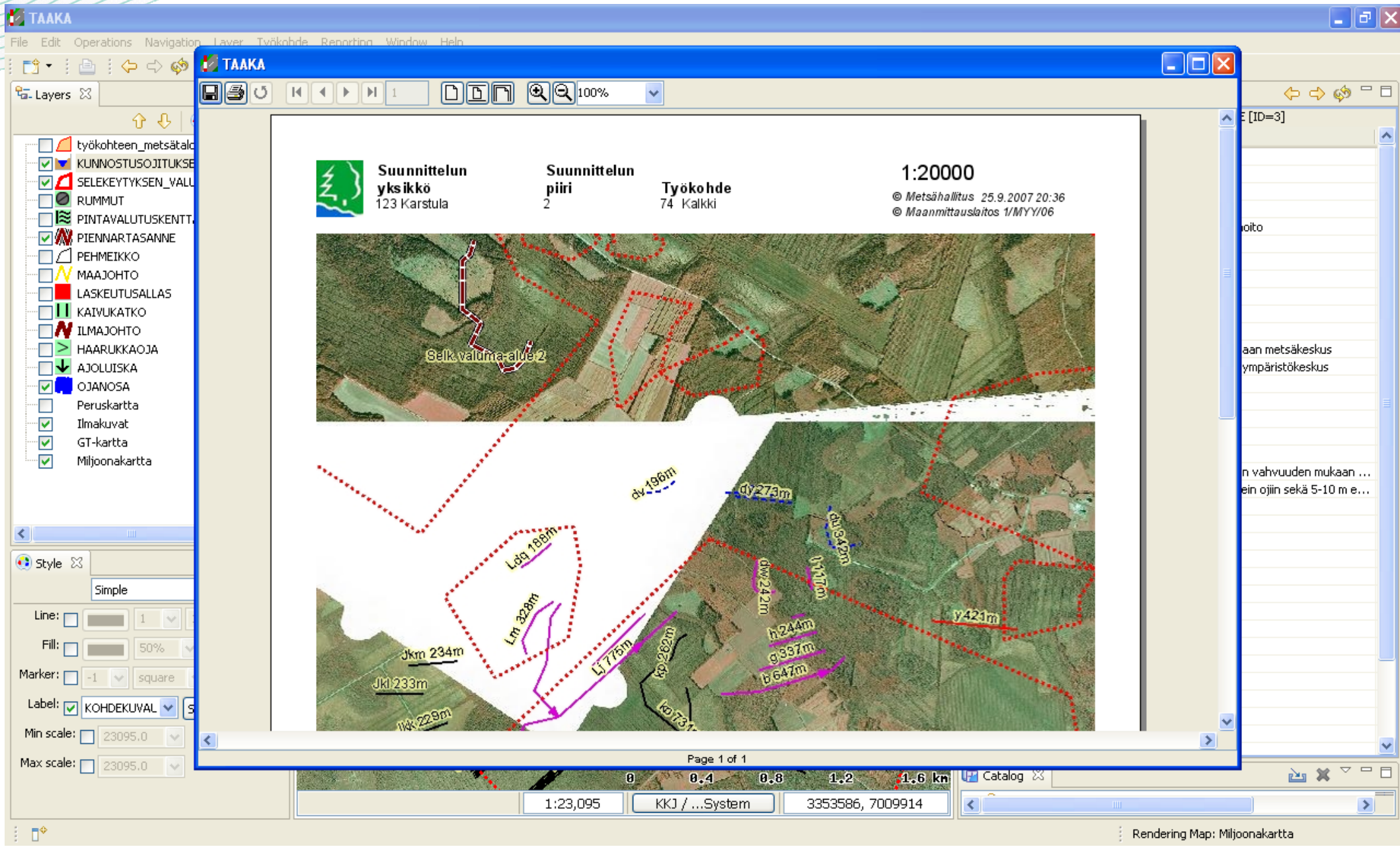
AE_PISTEET
GISA1_KUVIO
KIINTEISTORAJAT
PAAMAANKAYTTO
SIVUMAANKAYTTO
Kohdetasot
Kohdetasot
AJOLUISKA
AJOURA
HAARUKKAOJA
ILMAJOHTO
KAIVUKATKO
Rendering Map: Miljoonakartta

ArboGIS


TAAKA
File Edit Operations Navigation Layer Työkohde Reporting Window Help
Layers
työkohteen_metsätalo
KUNNOSTUSOJITUKSE
SELEKEYTYKSEN_VALU
RUMMUT
PINTAVALUTUSKENTT
PIENNARTASANNE
PEHMEIKKO
MAAJOHTO
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KAIVUKATKO
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OJANOSA
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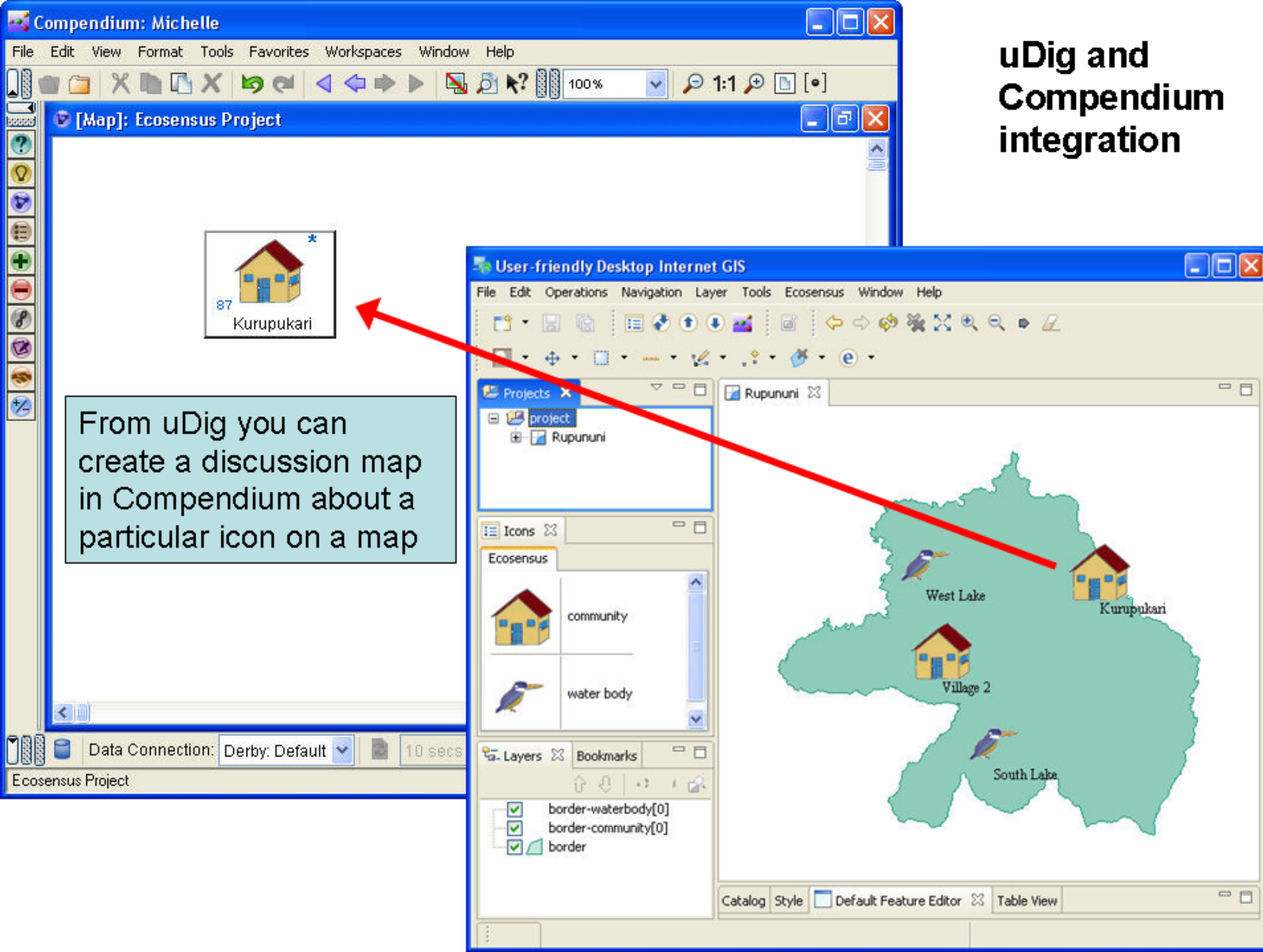
Ldg 188m
Lm 328m
dw 242m
y 421m
h 244m
g 337m
b 647m
Jkm 234m
Jkl 233m
Lj 775m
Page 1 of 1
0 0.4 0.8 1.2 1.6 km
1:23,095
KKJ / ...System
3353586, 7009914
Catalog
Rendering Map: Miljoonakartta

EcoSensus

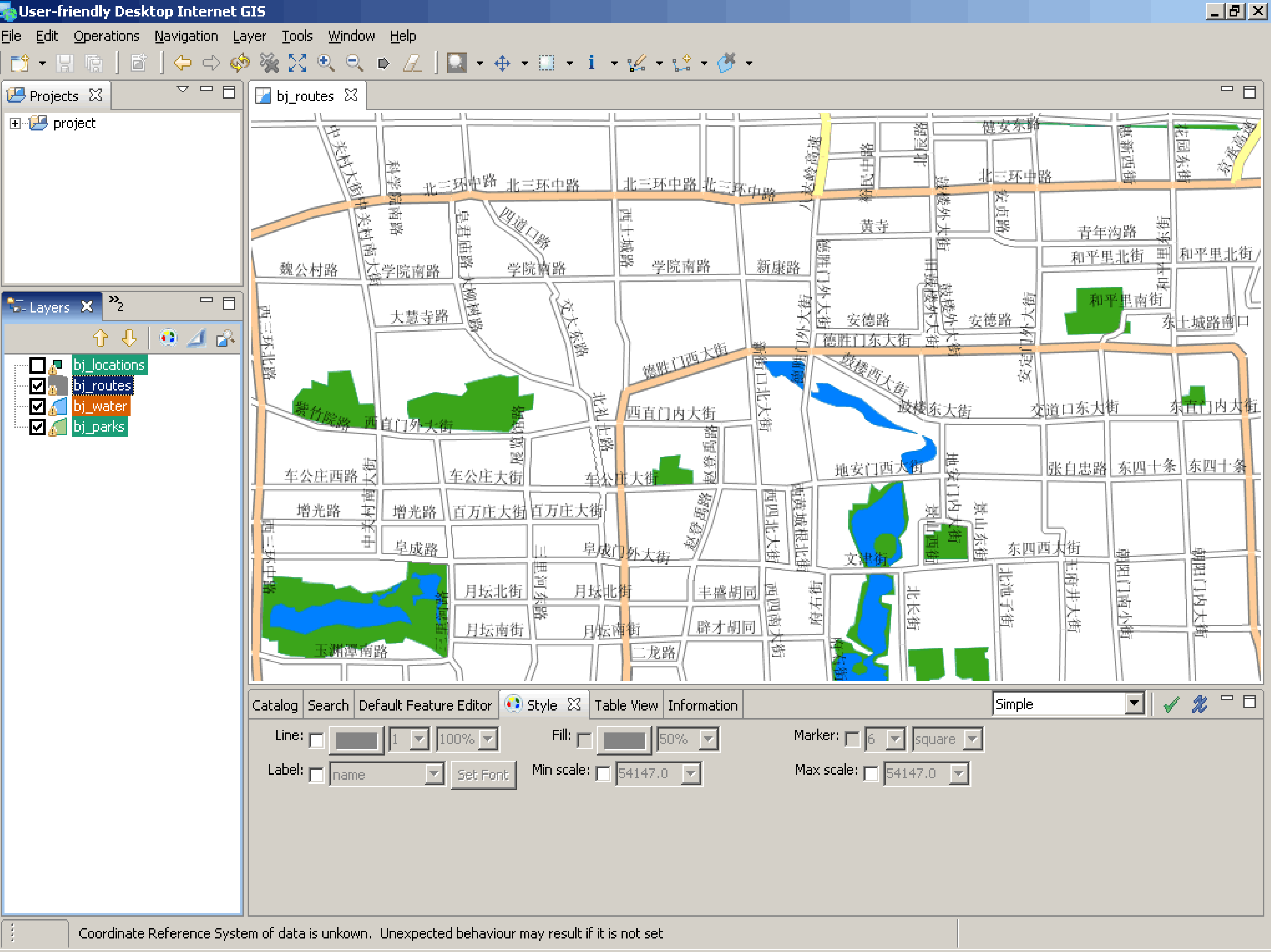
- The Open University of the UK
- Integrates uDig with “Compendium” a concept mapping application
- “Drag and drop digitization”

uDig and Compendium integration



Souwhat.com

- Chinese language location search site
- Building base data from scratch
- Many ambiguities need to be worked out of (and into) the data
  - "Tsinghua East Gate", "Wu Dao Kou", and "Chengfu Street" are pretty much the same place
- Used uDig to create a map of Beijing basically from scratch


User-friendly Desktop Internet GIS
File Edit Operations Navigation Layer Tools Window Help
Projects
project
bj_routes
Layers
bj_locations
bj_routes
bj_water
bj_parks
北三环中路
学院南路
魏公村路
大慧寺路
西直门外大街
西直门内大街
车公庄西路
车公庄大街
增光路
百万庄大街
阜成路
阜成门外大街
月坛北街
月坛南街
玉渊潭南路
二龙路
丰盛胡同
辟才胡同
新康路
安德路
德胜门东大街
德胜门西大街
鼓楼西大街
鼓楼东大街
交道口东大街
东直门内大街
地安门西大街
张自忠路
东四十条
东四西大街
文津街
北长街
王府井大街
黄寺
青年沟路
和平里北街
和平里南街
东土城路南口
Catalog
Search
Default Feature Editor
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name
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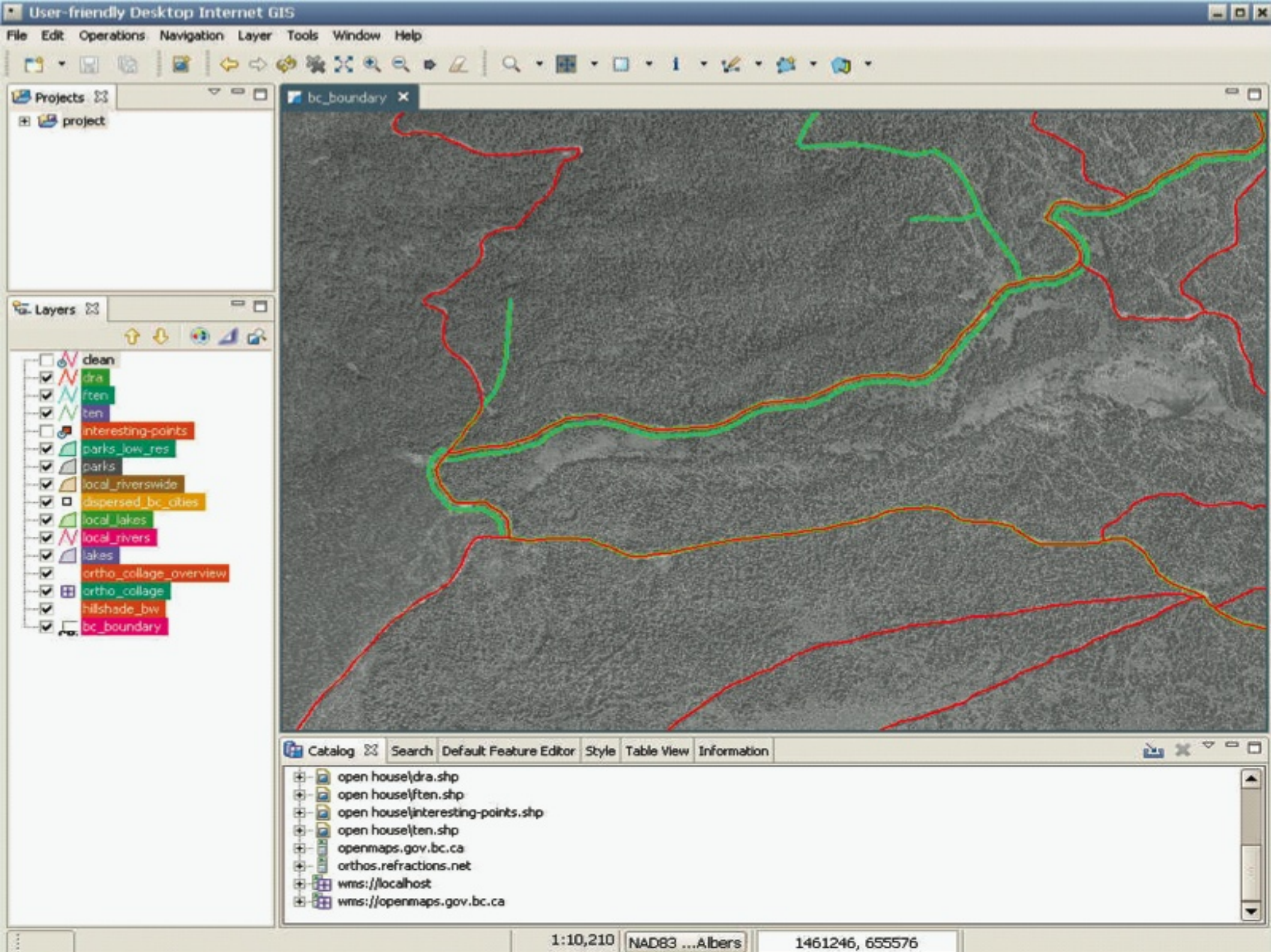
Min scale:
54147.0
Max scale:
54147.0
Coordinate Reference System of data is unkown. Unexpected behaviour may result if it is not set

Line Cleaner

- British Columbia Ministry of Forests
- Needed algorithm to remove "redundant" line work from multiple road network files
  - Building TINs and networks from the data
- Built algorithm as uDig plug-in using Geotools / JTS as core libraries


User-friendly Desktop Internet GIS
File Edit Operations Navigation Layer Tools Window Help
Projects
project
Layers
clean
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ften
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interesting-points
parks_low_res
parks
local_riverswide
dispersed_bc_cities
local_lakes
local_rivers
lakes
ortho_collage_overview
ortho_collage
hillshade_bw
bc_boundary
bc_boundary
Catalog
Search
Default Feature Editor
Style
Table View
Information
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open house\ten.shp
openmaps.gov.bc.ca
orthos.refractions.net
wms://localhost
wms://openmaps.gov.bc.ca
1:10,210
NAD83 ...Albers
1461246, 655576

So MANY Projects!

- Eurobios Routing
- Line Cleaner
- KuvioGIS
- TAAKA
- Diva GIS
- Populations @ Risk
- EU GeoVista
- Souwhat.com
- JGrass
- 52° North
- Axios's Spatial Ops
- Transformations
- All the ones I wasn't allowed to talk about...

uDig

User-friendly Desktop Internet GIS

Free uDig T-Shirts at the Booth!

Questions?

uDig

User-friendly Desktop Internet GIS