

Development of an Open Source-based Regional SDI for Heraklion Prefecture

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Stefanakis, E.; Prastacos, P. Development of an open source-based spatial data infrastructure. Applied GIS. 2008 Oct; 4(4): 1-26.
<http://arrow.monash.edu.au/vital/access/manager/Repository/monash:7759>

The Heraklion SDI

- A regional SDI ...
 - has recently been developed for the Heraklion Prefecture in Crete, Greece
 - using merely ...
 - Geographic Free and Open Source Software (**GeoFOSS**)
 - funded by the GSRT (ΓΓΕΤ – ΠΕΠ Κρήτης)

<http://heraklion-sdi.dynalias.net/coastatlas/index-en.html>

Heraklion SDI

■ The Web page...

http://heraklion-sdi.dynalias.net/coastatlas/index-en.html

Heraklion SDI (PEP Crete 2006-08) - Windows Internet Explorer

http://localhost/coastatlas/index-en.html

Heraklion SDI (PEP Crete 2006-08)

FORTH > Institutes > IACM > Research Groups > RAD

Regional Analysis Division

FORTH IACM

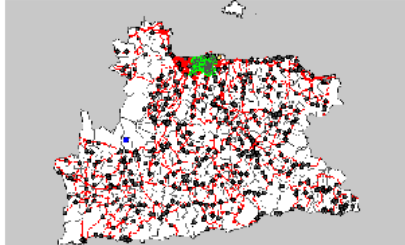
[Greek Version](#)

Heraklion - Spatial Data Infrastructure

This page provides access to the Heraklion Prefecture Spatial Data Infrastructure (SDI) geospatial content and the servers: [WMS](#), [WFS](#) and [WCS](#). Additionally, data layers are also available in [KML](#) (for visualization in Google Earth).

Browse in the data layers of the Heraklion SDI and combine them with mashups, such as the Google Maps and the CEOS European Data Server, via the [Web Client \(Viewer\)](#).

Web Map Server (WMS)



[Topography \[GetCapabilities\]](#)

[Topography Layers \[ALL\] \[GetMap\]](#)

- [Prefecture \[GetMap\]](#)
- [Municipalities \[GetMap\]](#)
- [Municipalities Subdivisions \[GetMap\]](#)
- [Road Network \[GetMap\]](#)
- [Urban Areas \[GetMap\]](#)
- [Towns and Villages \[GetMap\]](#)
- [Lakes \[GetMap\]](#)
- [Heraklion City Buildings \[GetMap\]](#)
- [Airport - Sea Port \(POI\) \[GetMap\]](#)

Heraklion SDI

- This SDI is ...
 - **compatible** with the geospatial **standards and specifications** introduced by the Open Geospatial Consortium (**OGC**), and
 - serves the geospatial content through widely accepted **web services** (e.g., WMS, WFS, WCS and CSW)

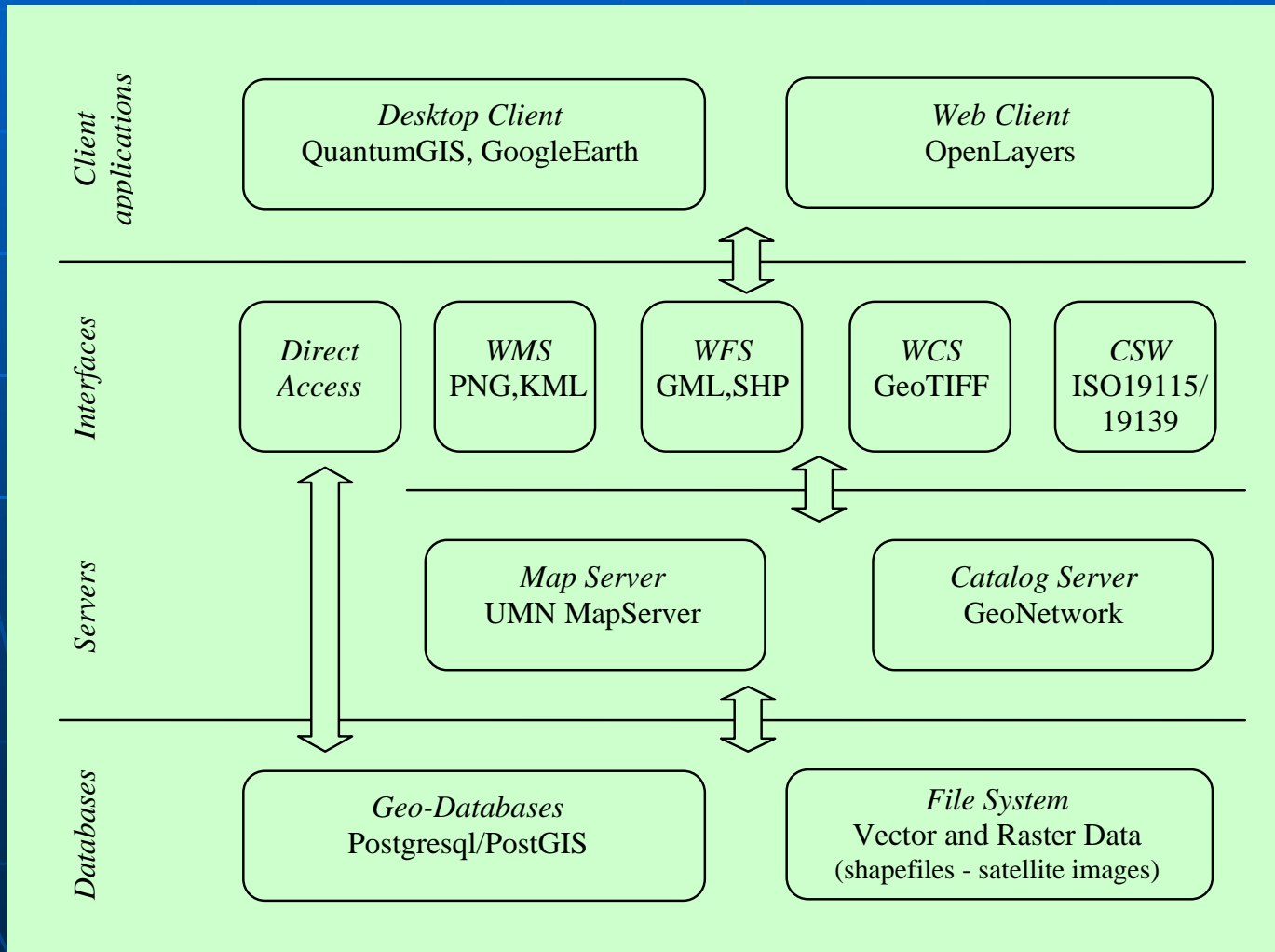
Heraklion SDI

■ Public Datasets ...

<i>Layer Content/Description</i>	<i>Format</i>	<i>Name</i>
Prefecture (outline)	Shapefile	<i>nomos_irakliou</i>
Municipalities (outlines)	Shapefile	<i>dhmoi_irakliou</i>
Municipalities Subdivisions (outlines)	Shapefile	<i>dhm_diamer_irakliou</i>
Urban Areas (outlines)	Shapefile	<i>bua_irakliou</i>
Towns and Villages (points)	Shapefile	<i>oikismoi_irakliou</i>
Road Network (lines)	Shapefile	<i>odiko_irakliou</i>
Heraklion City buildings (polygons)	Shapefile	<i>build_egsa</i>
Heraklion city Airport and Seaport (points)	Shapefile	<i>poi_irakliou</i>
Lakes (polygons)	Shapefile	<i>limnes_irakliou</i>
Geology cover (polygons)	Shapefile	<i>geo_N_Herakleio</i>
Archaeological spots (points)	Shapefile	<i>archaiologia_N_Herakleio</i>
Digital Elevation Model (raster)	GeoTiff	<i>dem</i>
Land Cover (raster)	GeoTiff	<i>lc</i>
Orthophoto Map (raster)	GeoTiff	<i>hr_ortho</i>

Architecture & Software Systems

- The architecture...



Architecture & Software Systems

- The geospatial layers of the SDI are served using ...
 - Services: WMS, WFS, WCS
 - Languages: GML, KML
 - Standards: ISO19115/139
- They are visualized via ...
 - a web application (web client)
 - a desktop GIS / GE (desktop client)

Architecture & Software Systems

■ Open Source Software Systems...

http://www.osgeo.org/

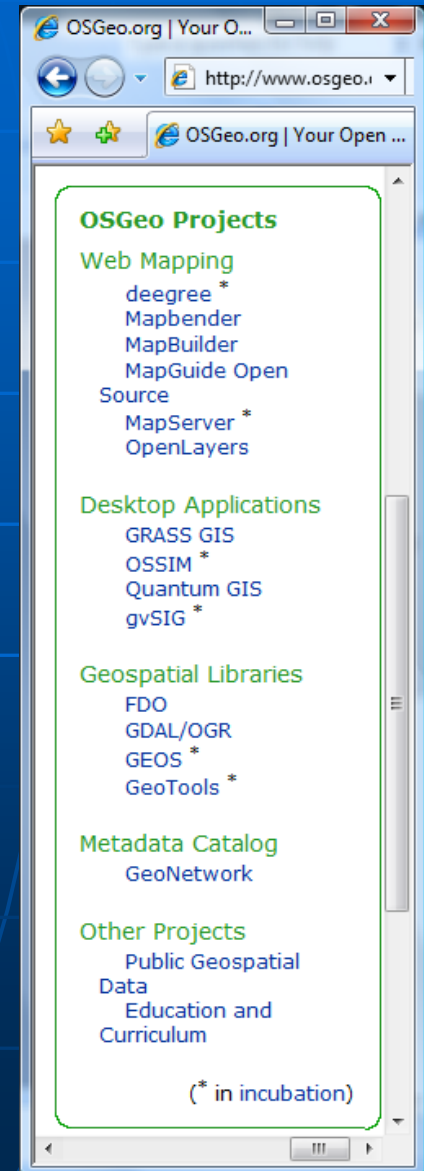
The screenshot shows the OSGeo.org website in a Windows Internet Explorer browser window. The browser's address bar displays "http://www.osgeo.org/". The website features the OSGeo logo (a green compass rose) and the tagline "Your Open Source Compass". A search bar is located in the top right corner. The main content area is divided into several sections:

- OSGeo Foundation:** A list of links including Home, About the Foundation, FAQ, Sponsors, Sponsor OSGeo, Incubator, Swag Store, and Contact.
- OSGeo Community:** A list of links including Welcome, News, Events, Wiki, Mailing Lists, Blogs, IRC, Service Providers, Journal, Sol Katz Award, Local Chapters, and Spotlights.
- Language:** A list of language options including English, Български, 简体中文, Deutsch, and Nederlands.
- Welcome to the Open Source Geospatial Foundation Website:** A paragraph explaining the foundation's goal to support and build high-quality open source geospatial software.
- Community Spotlights:** Two featured individuals: Steve Lime (lead developer of MapServer) and Tom Kralidis (participant at OSGeo.org and employee of Environment Canada).
- News:** A list of recent news items, including "FOSS4G 2008 New Bronze sponsorship category and Workshop sneak preview" and "OSGeo Supports CASCADOSS".
- Support OSGeo:** A section with the text "Any Amount".
- OSGeo Projects:** A list of projects including Web Mapping (deegree, Mapbender, MapBuilder, MapGuide Open Source, MapServer, OpenLayers) and Desktop Applications (GRASS GIS, QGIS).

Architecture & Software Systems

- OSGeo...
 - The Open Source Geospatial Foundation...
 - has been created to support and build the highest-quality open source geospatial software
 - The foundation's goal is....
 - to encourage the use and collaborative development of community-led projects

<http://www.osgeo.org/>



Architecture & Software Systems

■ Software Systems...

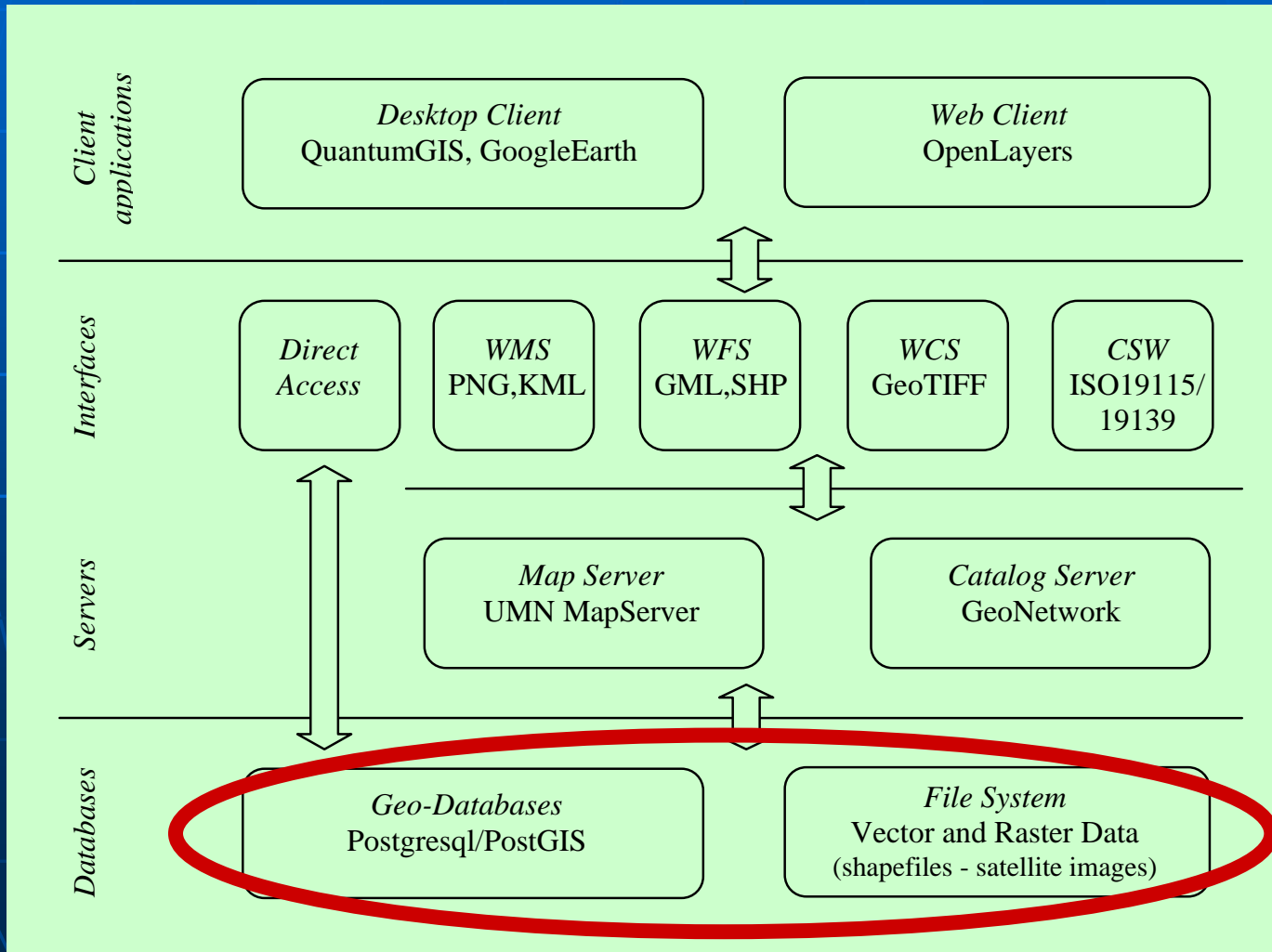
- *Apache Web Server* (<http://www.apache.org>) in the role of the **Web Server**.
- *OpenLayers JavaScript Library* (<http://openlayers.org>) in the role of the **Web Client** (Interface).
- *QuantumGIS* (<http://www.qgis.org>) in the role of the **Desktop Client**.
- *Google Earth* (<http://earth.google.com>) in the role of the **Desktop Client** (for the KML files).

Architecture & Software Systems

- Software Systems... (cont')
 - UMN MapServer (<http://mapserver.gis.umn.edu>) in the role of the **Map Server**.
 - GeoNetwork Opensource (<http://geonetwork-opensource.org>) in the role of the **Catalog Server**.
 - GDAL/OGR (<http://www.gdal.org>) in the role of the **Geospatial Library**.
 - Postgresql/PostGIS (<http://www.postgis.org>) in the role of the **Spatial Database Server**.

Architecture & Software Systems

- The architecture...



Heraklion SDI

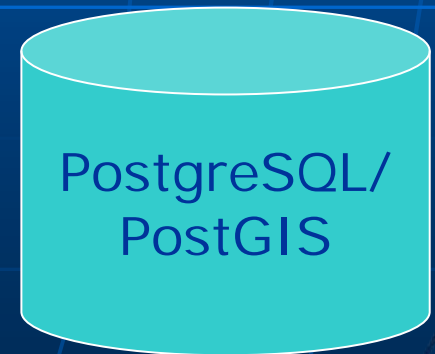
■ The Geo-Databases...

SDI Public Layers

<i>Layer Content/Description</i>	<i>Format</i>	<i>Name</i>
Prefecture (outline)	Shapefile	<i>nomos_irakliou</i>
Municipalities (outlines)	Shapefile	<i>dhmoi_irakliou</i>
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Towns and Villages (points)	Shapefile	<i>oikismoi_irakliou</i>
Road Network (lines)	Shapefile	<i>odiko_irakliou</i>
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Orthophoto Map (raster)	GeoTiff	<i>hr_ortho</i>

Shapefiles
(Vector)

GDAL/OGR

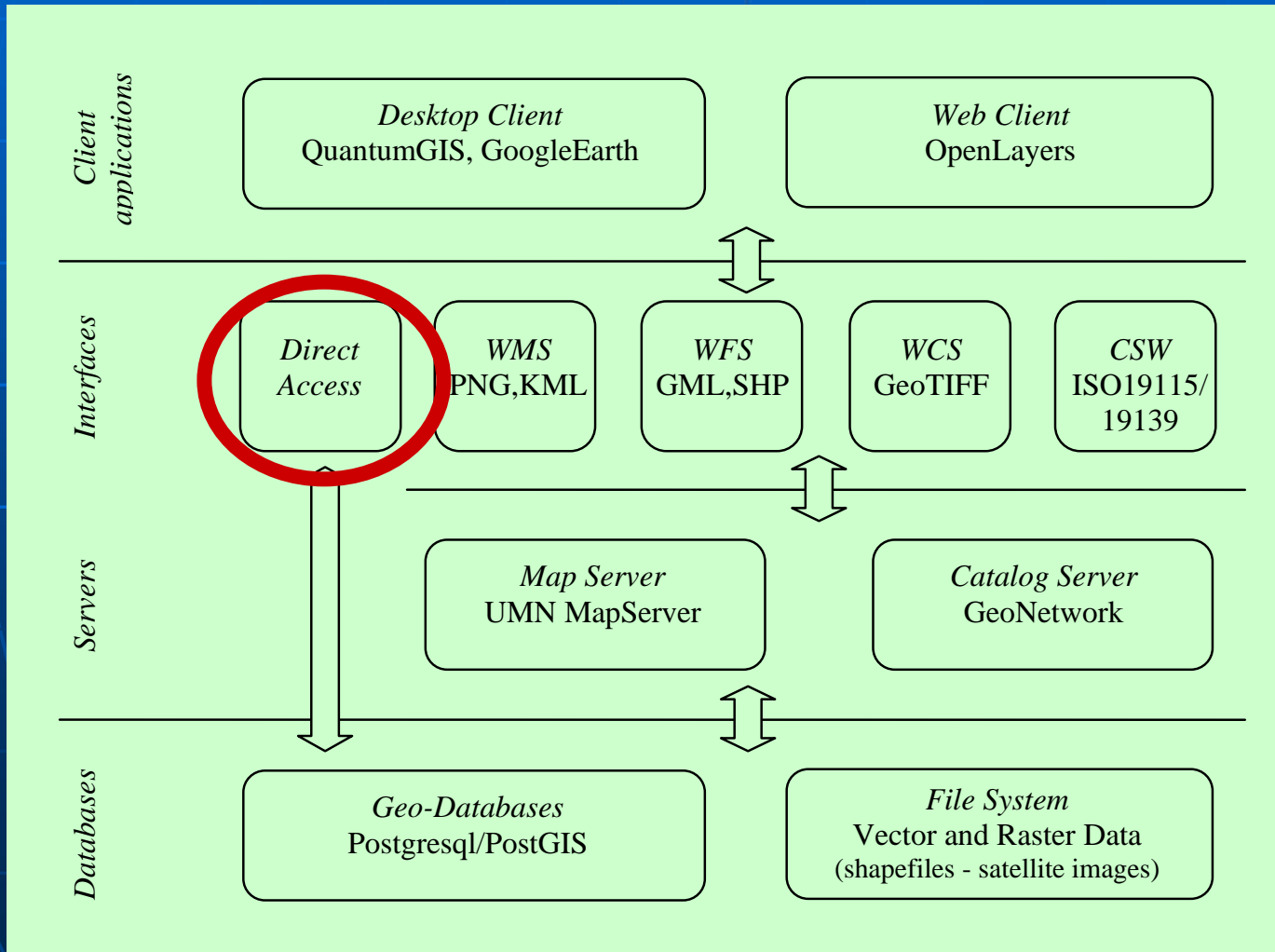


GeoTiff
(Raster)

File System

Architecture & Software Systems

- The architecture...

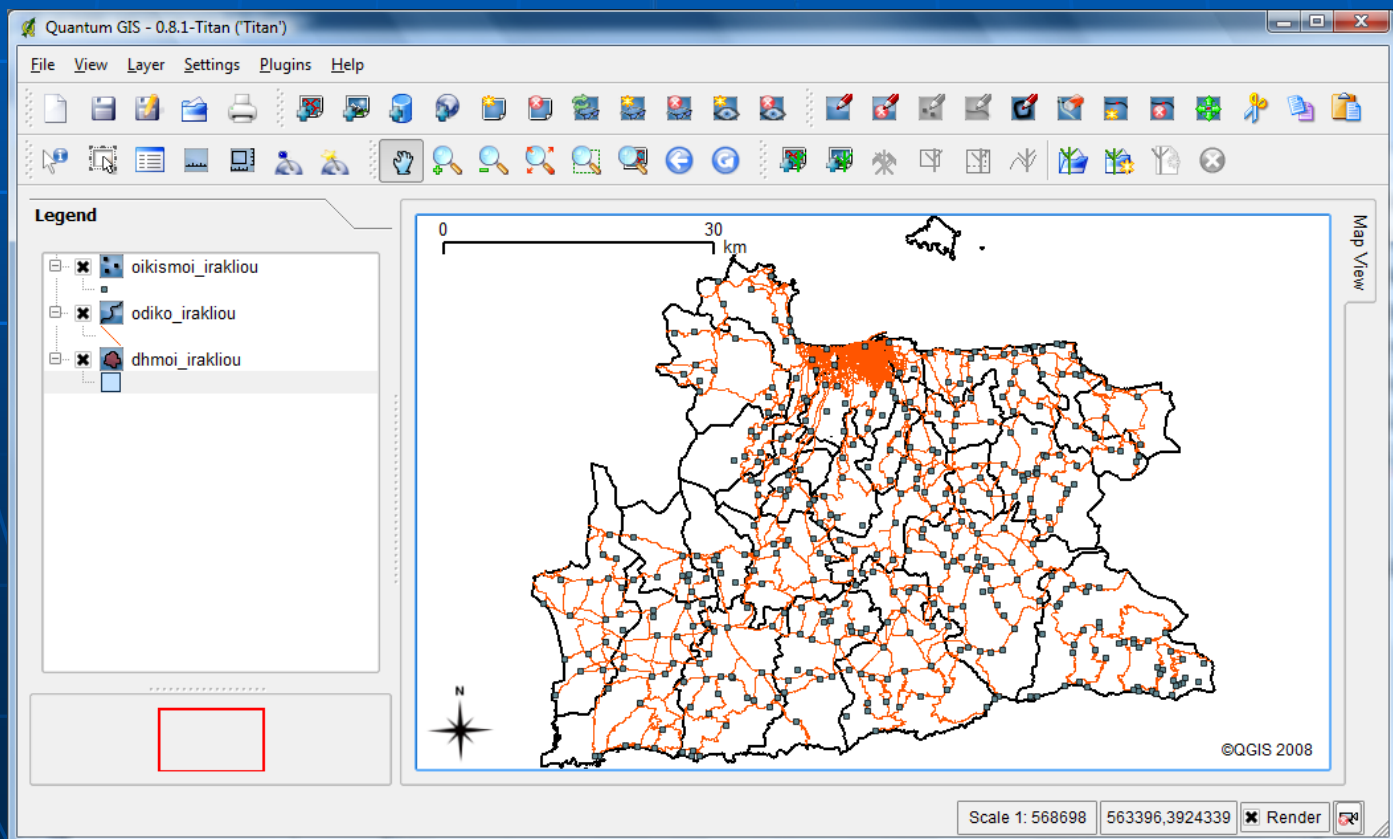


Heraklion SDI

- The middle layer...
 - provides the **Direct Access Interface**
 - to the geospatial content that resides in the spatial database server
 - The Direct Access Interface ...
 - may support effectively...
 - the querying and
 - the analysis
 - ... of the geospatial content using SQL statements

Heraklion SDI

- The Direct Access Interface...
 - Example queries...



- **Table of Municipalities: “dhmoi_irakliou” (type: multi_polygon)**

```
SELECT gid, NAMF_EN, POP_01, AsText(the_geom)
FROM dhmoi_irakliou;
```

gid (identifier)	NAMF_EN (municipality name)	POP_01 (population in 2001)	the_geom (geometry column)
1	Municipality Of Irakleio	137711	MULTIPOLYGON(...)
2	Municipality Of Agia Varvara	5310	MULTIPOLYGON(...)
3	Municipality Of Arkalochori	10897	MULTIPOLYGON(...)
4	Municipality Of Archanes	4548	MULTIPOLYGON(...)
...

26 rows

- **Table of Cities/Villages: “oikismoi_irakliou” (type: point)**

```
SELECT gid, NAMEENG, POP01, AsText(the_geom)
FROM oikismoi_irakliou;
```

gid (identifier)	NAMEENG (city/village name)	POP01 (population in 2001)	the_geom (geometry column)
1	Agia Pelagia	553	POINT(592221 3918593)
2	Paralia Fodele	99	POINT(586237 3917962)
3	Achlada	119	POINT(589949 3917093)
4	Fodele	540	POINT(586850 3915575)
...

400 rows

- **Table of Road Network: “odiko_irakliou” (type: multi_linestring)**

```
SELECT gid, SPEED, EU_CODE, AsText(the_geom)
FROM odiko_irakliou;
```

gid (identifier)	SPEED (speed limit)	EU_CODE (E75 for national roads)	the_geom (geometry column)
1	50		MULTILINESTRING(...)
2	50		MULTILINESTRING(...)
3	80	E75	MULTILINESTRING(...)
4	70	E75	MULTILINESTRING(...)
...

12228 rows

Query 1: Find how many cities there are per municipality.															
<p><i>SQL Statement</i></p> <pre>SELECT r.NAMF_EN as Municipality, count(m.the_geom) as Number FROM dhmoi_irakliou AS r, oikismo_i Irakliou AS m WHERE intersects(r.the_geom, m.the_geom) GROUP BY r.NAMF_EN ORDER BY number_of_cities DESC;</pre>	<p><i>Output</i></p> <table border="1"> <thead> <tr> <th>Municipality</th> <th>Number</th> </tr> </thead> <tbody> <tr><td>Municipality Of Viannos</td><td>46</td></tr> <tr><td>Municipality Of Arkalochori</td><td>40</td></tr> <tr><td>Municipality Of Asterousia</td><td>28</td></tr> <tr><td>Municipality Of Gortyna</td><td>26</td></tr> <tr><td>Municipality Of Kasteelli</td><td>24</td></tr> <tr><td>...</td><td></td></tr> </tbody> </table>	Municipality	Number	Municipality Of Viannos	46	Municipality Of Arkalochori	40	Municipality Of Asterousia	28	Municipality Of Gortyna	26	Municipality Of Kasteelli	24	...	
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...															

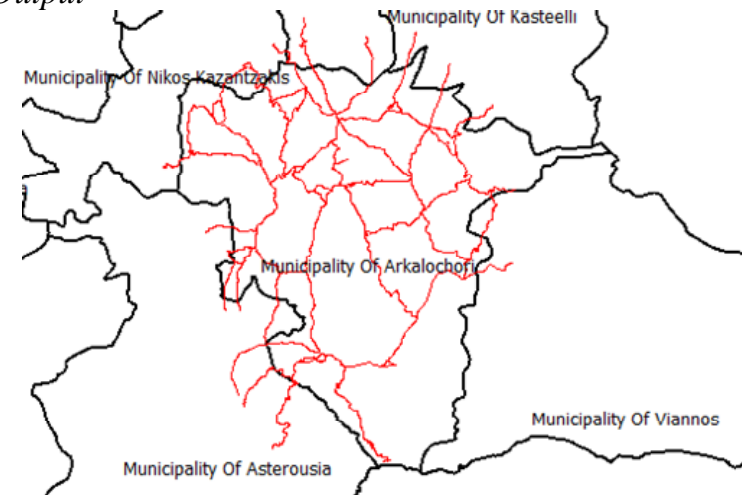
Query 2: What is the length of roads fully contained within each municipality? Report only the 5 largest.													
<p><i>SQL Statement</i></p> <pre>SELECT m.NAMF_EN as Municipality, sum(length(r.the_geom))/1000 as Roads_km FROM odiko_irakliou AS r, dhmoi_irakliou AS m WHERE r.the_geom && m.the_geom AND contains(m.the_geom,r.the_geom) GROUP BY m.NAMF_EN ORDER BY roads_km DESC LIMIT 5;</pre>	<p><i>Output</i></p> <table border="1"> <thead> <tr> <th>Municipality</th> <th>Roads_km</th> </tr> </thead> <tbody> <tr><td>Municipality Of Irakleio</td><td>595.440</td></tr> <tr><td>Municipality Of Gazi</td><td>200.706</td></tr> <tr><td>Municipality Of Arkalochori</td><td>147.853</td></tr> <tr><td>Municipality Of Asterousia</td><td>146.120</td></tr> <tr><td>Municipality Of Viannos</td><td>137.159</td></tr> </tbody> </table>	Municipality	Roads_km	Municipality Of Irakleio	595.440	Municipality Of Gazi	200.706	Municipality Of Arkalochori	147.853	Municipality Of Asterousia	146.120	Municipality Of Viannos	137.159
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Municipality Of Viannos	137.159												

Query 3: Find the road segments intersected by the municipality of Arkalochori

SQL Statement

```
CREATE TABLE "ark_roads"  
  (gid serial PRIMARY KEY,"id" int4);  
SELECT AddGeometryColumn('', 'ark_roads',  
  'the_geom', '2100', 'MULTILINESTRING', 2);  
INSERT INTO ark_roads(id, the_geom)  
SELECT r.gid, r.the_geom  
FROM odiko_irakliou AS r,  
     dhmoi_irakliou AS m  
WHERE r.the_geom && m.the_geom  
AND intersects(m.the_geom,r.the_geom)  
AND m.NAMF_EN =  
     'Municipality Of Arkalochori';
```

Output

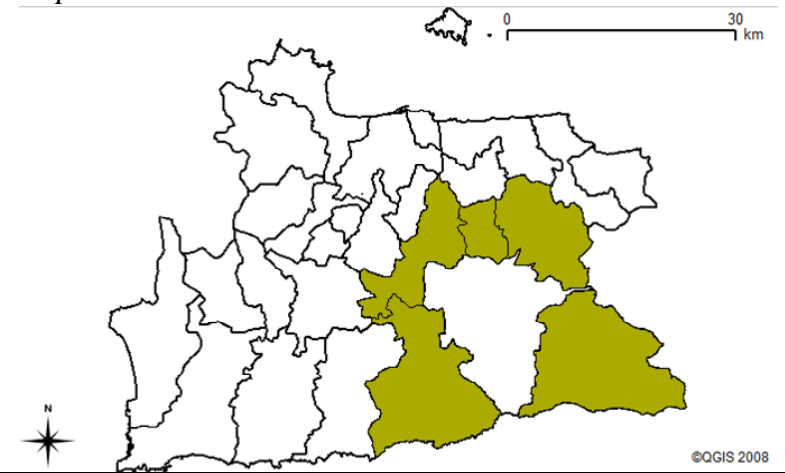


Query 4: Find the neighbors (with a common border) of the municipality of Arkalochori.

SQL Statement

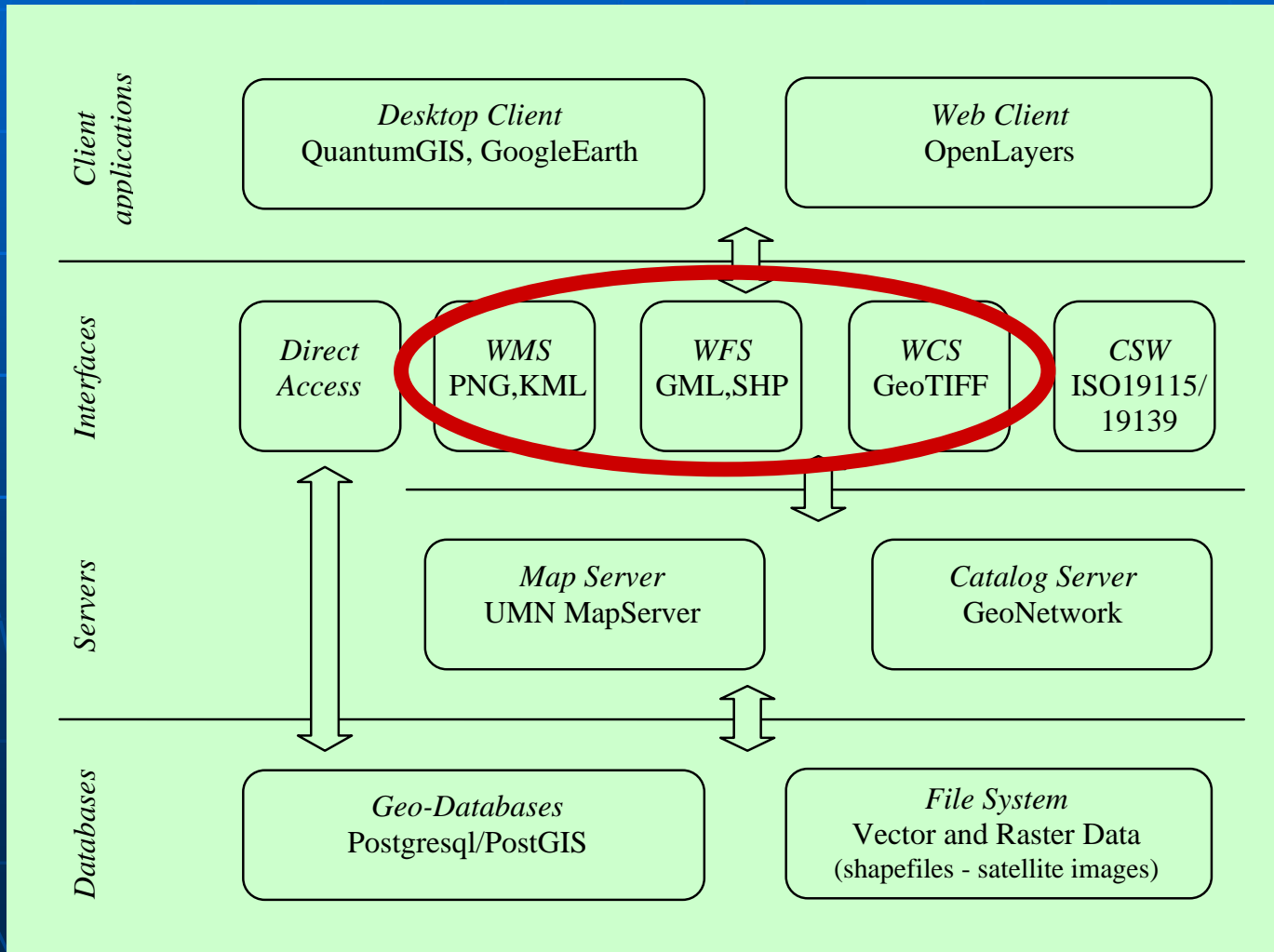
```
CREATE TABLE "ark_neigh"  
  (gid serial PRIMARY KEY,"id" int4);  
SELECT AddGeometryColumn('', 'ark_neigh',  
  'the_geom', '2100', 'MULTIPOLYGON', 2);  
INSERT INTO ark_neigh (id, the_geom)  
SELECT n.gid, n.the_geom  
FROM dhmoi_irakliou as m,  
     dhmoi_irakliou as n  
WHERE m.NAMF_EN =  
     'Municipality Of Arkalochori'  
AND Touches(m.the_geom, n.the_geom);
```

Output



Architecture & Software Systems

- The architecture...



Heraklion SDI

■ The Web page...

http://heraklion-sdi.dynalias.net/coastatlas/index-en.html

Heraklion SDI (PEP Crete 2006-08) - Windows Internet Explorer

http://localhost/coastatlas/index-en.html

Heraklion SDI (PEP Crete 2006-08)

FORTH > Institutes > IACM > Research Groups > RAD

Regional Analysis Division

FORTH IACM

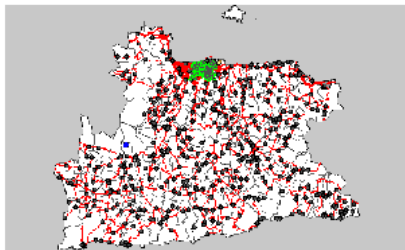
[Greek Version](#)

Heraklion - Spatial Data Infrastructure

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Web Map Server (WMS)



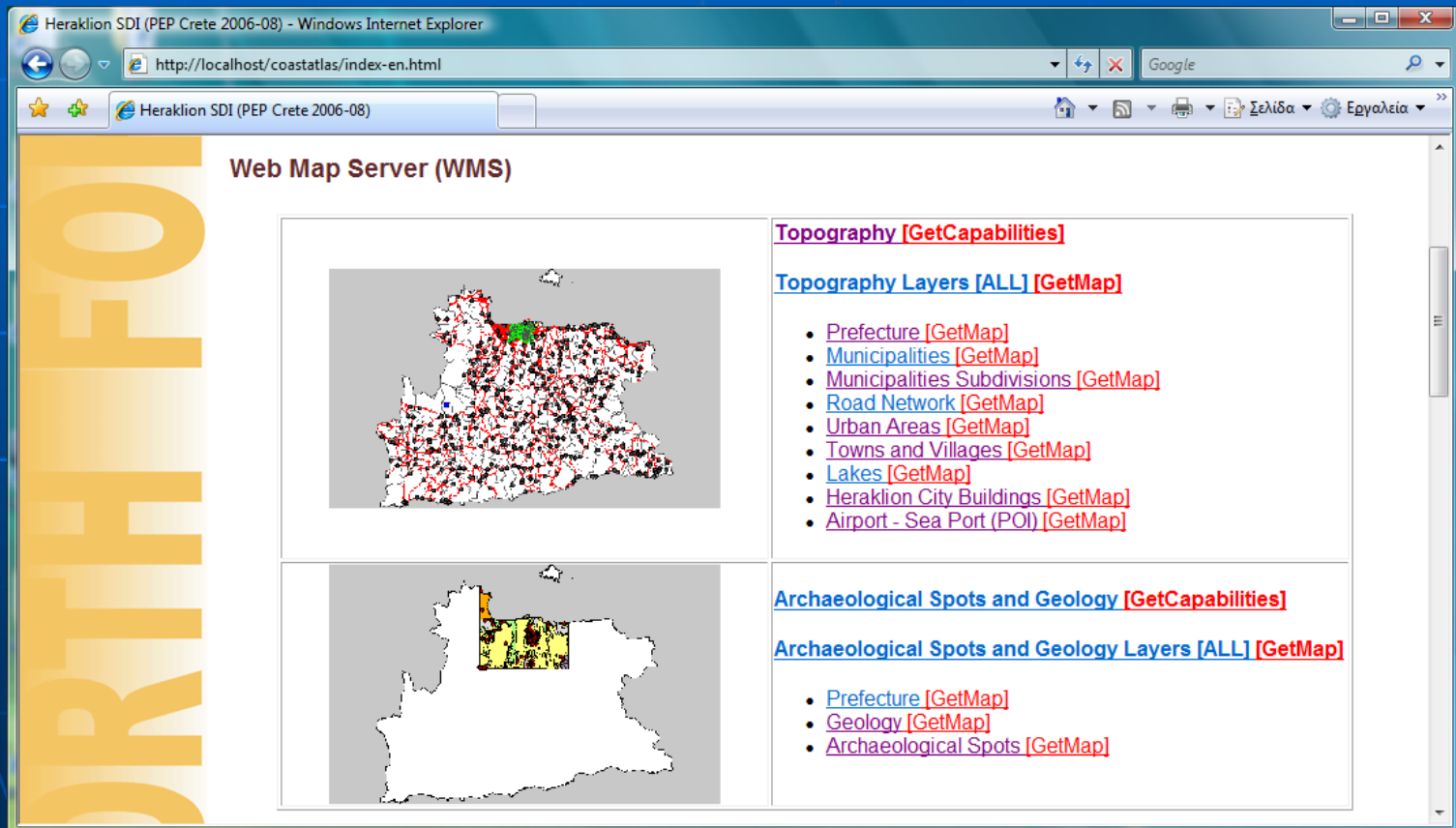
[Topography \[GetCapabilities\]](#)

[Topography Layers \[ALL\] \[GetMap\]](#)

- [Prefecture \[GetMap\]](#)
- [Municipalities \[GetMap\]](#)
- [Municipalities Subdivisions \[GetMap\]](#)
- [Road Network \[GetMap\]](#)
- [Urban Areas \[GetMap\]](#)
- [Towns and Villages \[GetMap\]](#)
- [Lakes \[GetMap\]](#)
- [Heraklion City Buildings \[GetMap\]](#)
- [Airport - Sea Port \(POI\) \[GetMap\]](#)

Heraklion SDI

- The Web Map Service (WMS)...

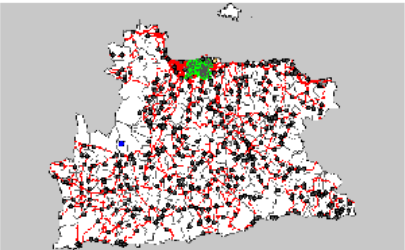


Heraklion SDI (PEP Crete 2006-08) - Windows Internet Explorer

http://localhost/coastatlas/index-en.html

Heraklion SDI (PEP Crete 2006-08)


Web Map Server (WMS)



Topography [GetCapabilities]

Topography Layers [ALL] [GetMap]

- [Prefecture \[GetMap\]](#)
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- [Heraklion City Buildings \[GetMap\]](#)
- [Airport - Sea Port \(PO\) \[GetMap\]](#)



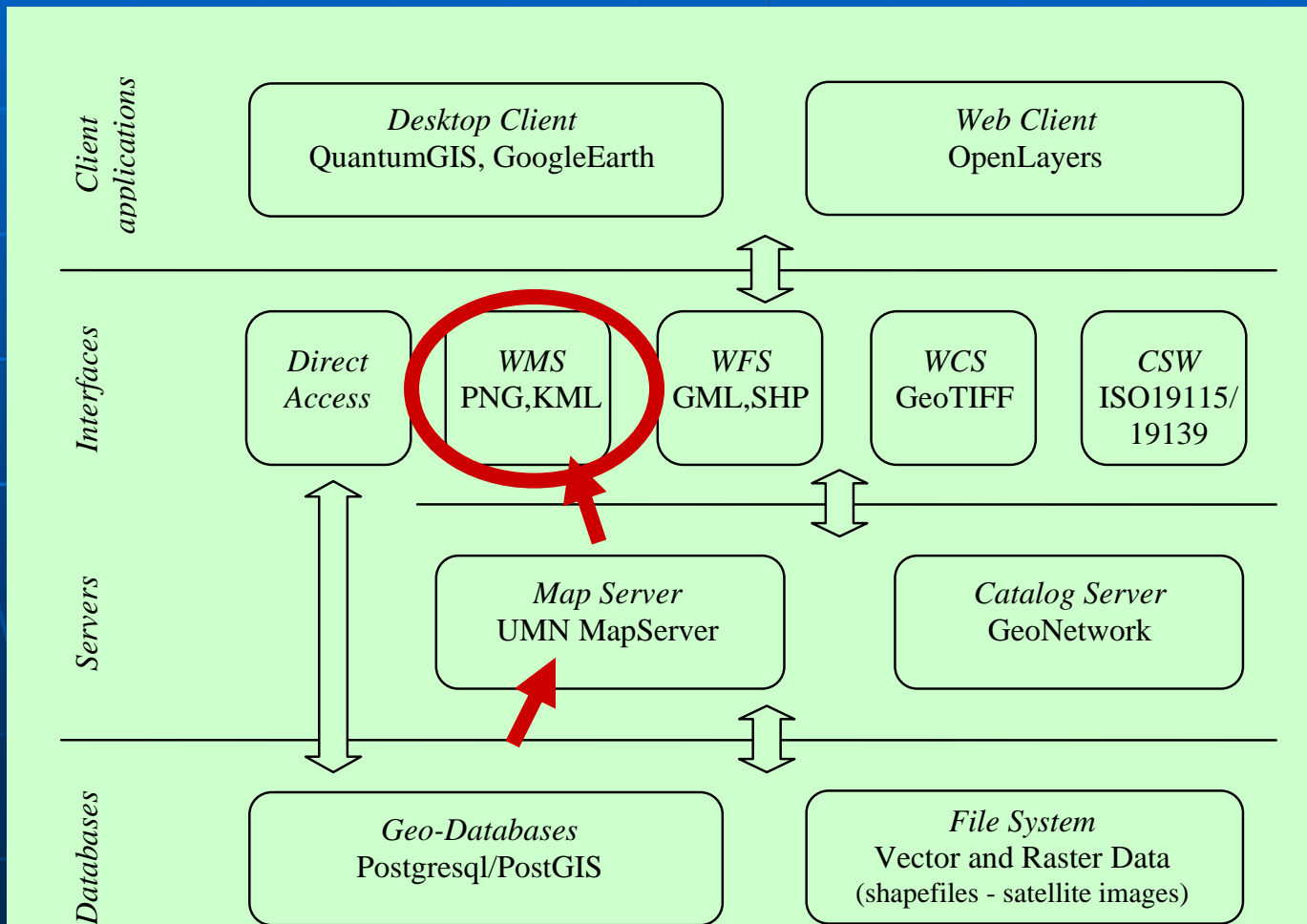
Archaeological Spots and Geology [GetCapabilities]

Archaeological Spots and Geology Layers [ALL] [GetMap]

- [Prefecture \[GetMap\]](#)
- [Geology \[GetMap\]](#)
- [Archaeological Spots \[GetMap\]](#)

Architecture & Software Systems

- The architecture...

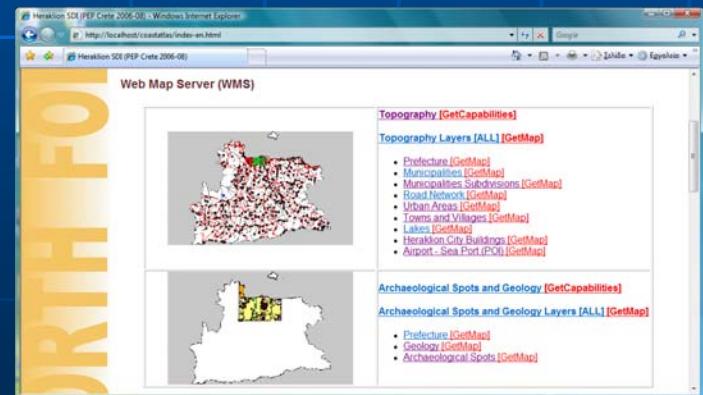


Heraklion SDI

- The Web Map Service (WMS)..
 - maps served as images
 - GetCapabilities request

```
http://localhost/cgi-bin/mapserv.exe?  
map=/ms4w/apps/ITE/htdocs/WMS/infocharta.map&  
SERVICE=WMS&
```

REQUEST=GetCapabilities

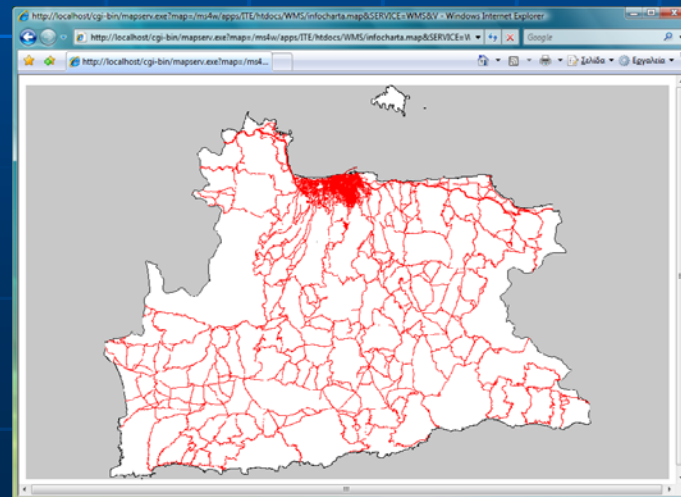


Heraklion SDI

■ The Web Map Service (WMS)...

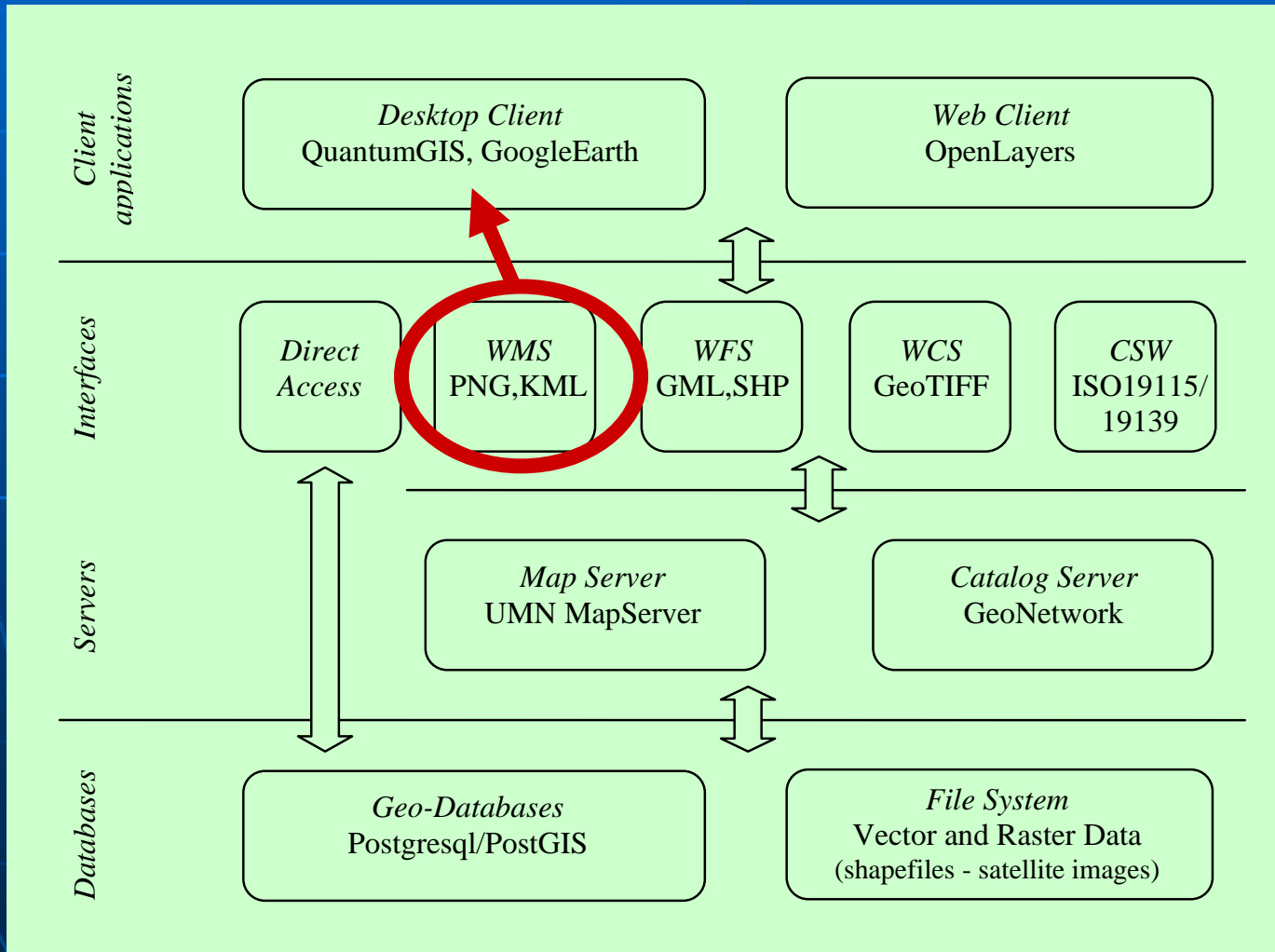
- GetMap request

```
http://localhost/cgi-bin/mapserv.exe?  
map=/ms4w/apps/ITE/htdocs/WMS/infocharta.map&  
SERVICE=WMS&VERSION=1.1.1&  
REQUEST=GetMap&  
LAYERS=odiko_irakliou&  
BBOX=553530,3864020,653540,3925230&  
STYLES=&  
SRS=EPSG:2100&  
WIDTH=500&HEIGHT=306&  
FORMAT=image/png
```



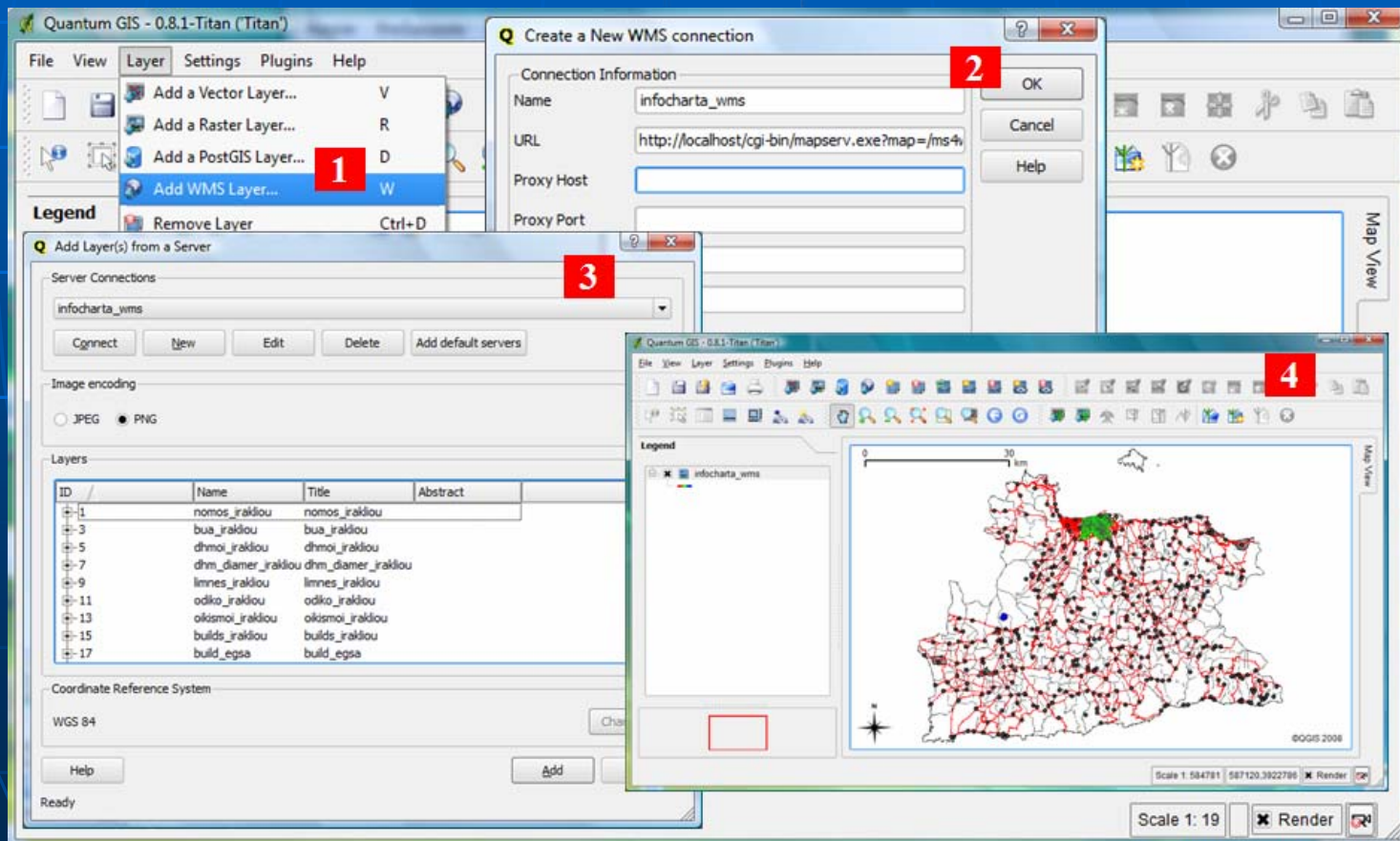
Architecture & Software Systems

- The architecture...



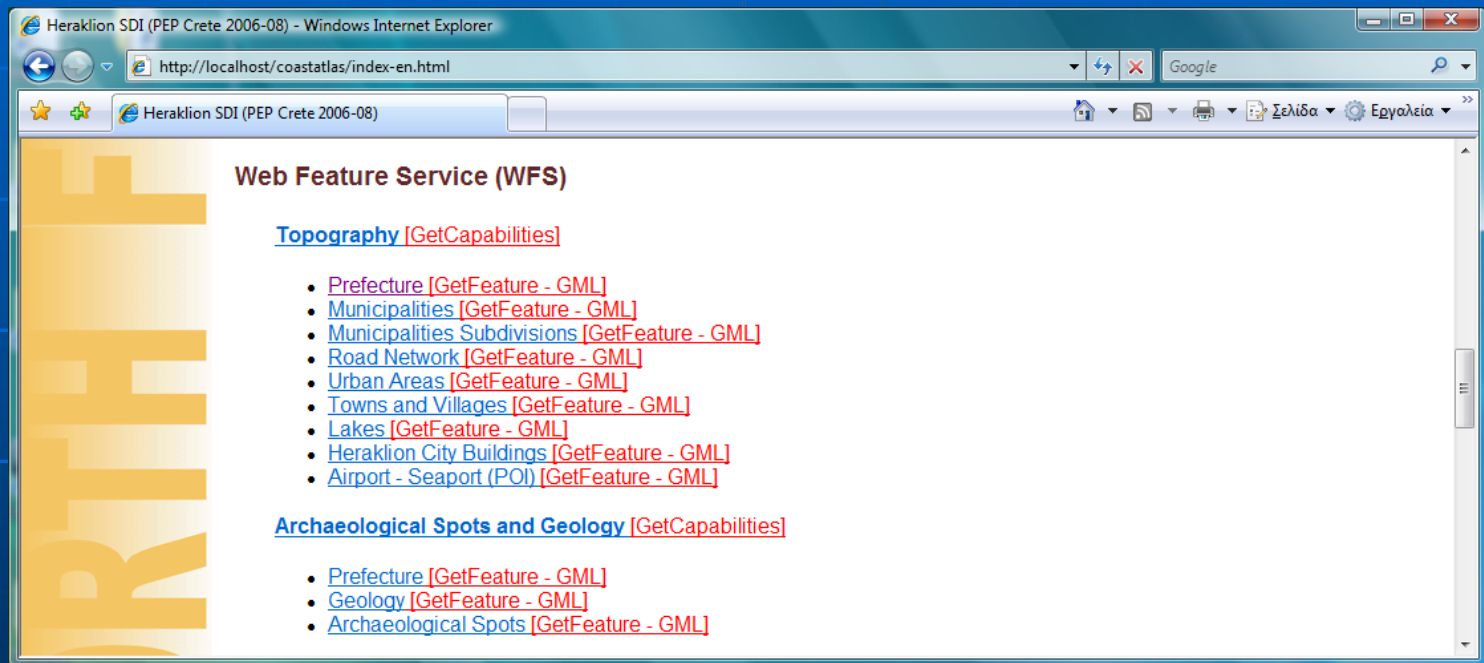
Heraklion SDI

- The Web Map Service (WMS)...
- QGIS: Connect to the WMS



Heraklion SDI

- The Web Feature Service (WFS)...

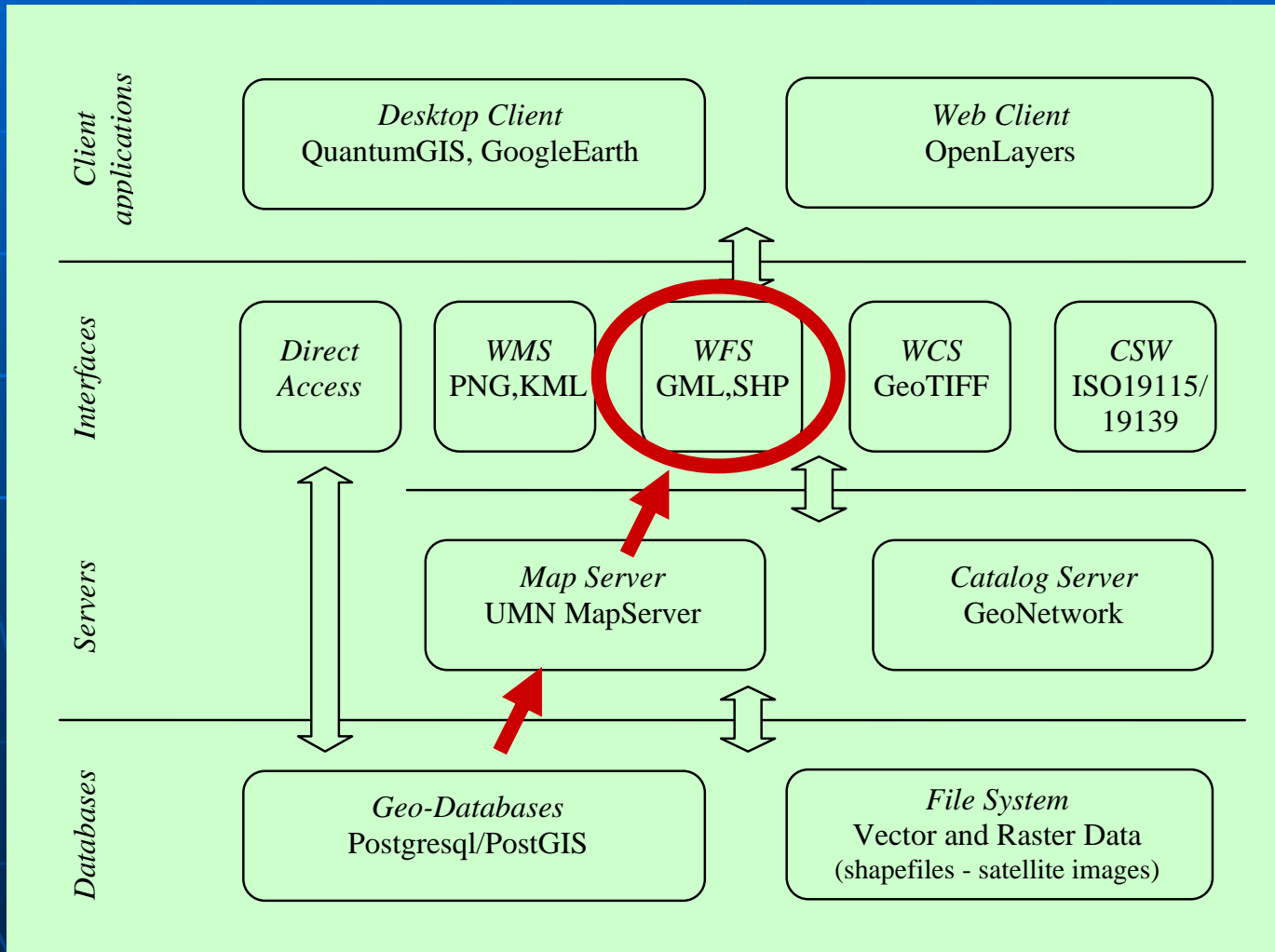


The screenshot shows a Windows Internet Explorer browser window titled "Heraklion SDI (PEP Crete 2006-08) - Windows Internet Explorer". The address bar displays "http://localhost/coastatlas/index-en.html". The page content is titled "Web Feature Service (WFS)" and features a large vertical "RTA" logo on the left. The main content is organized into two sections:

- Topography [GetCapabilities]**
 - [Prefecture \[GetFeature - GML\]](#)
 - [Municipalities \[GetFeature - GML\]](#)
 - [Municipalities Subdivisions \[GetFeature - GML\]](#)
 - [Road Network \[GetFeature - GML\]](#)
 - [Urban Areas \[GetFeature - GML\]](#)
 - [Towns and Villages \[GetFeature - GML\]](#)
 - [Lakes \[GetFeature - GML\]](#)
 - [Heraklion City Buildings \[GetFeature - GML\]](#)
 - [Airport - Seaport \(POI\) \[GetFeature - GML\]](#)
- Archaeological Spots and Geology [GetCapabilities]**
 - [Prefecture \[GetFeature - GML\]](#)
 - [Geology \[GetFeature - GML\]](#)
 - [Archaeological Spots \[GetFeature - GML\]](#)

Architecture & Software Systems

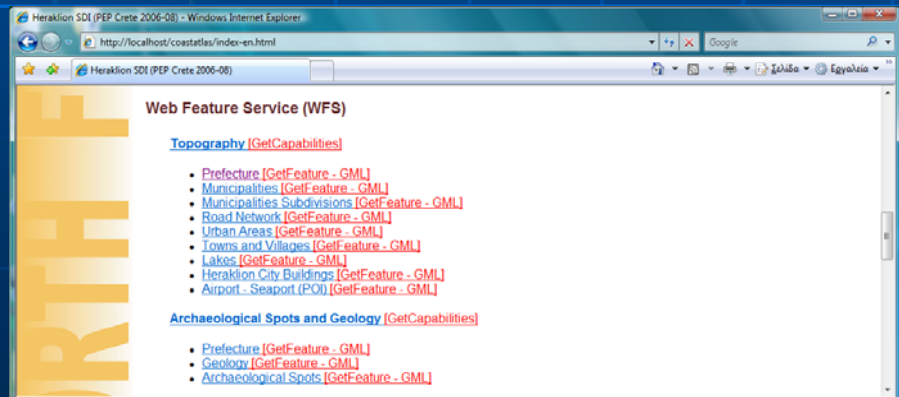
- The architecture...



Heraklion SDI

- The Web Feature Service (WFS)...
- data served in GML
 - GetCapabilities request

```
http://localhost/cgi-bin/mapserv.exe?  
map=/ms4w/apps/ITE/htdocs/WFS/infocharta.map&  
SERVICE=WFS&  
VERSION=1.0.0&  
REQUEST=GetCapabilities
```



Heraklion SDI

- The Web Feature Service (WFS)...
- GetFeature request

```
http://localhost/cgi-bin/mapserv.exe?  
map=/ms4w/apps/ITE/htdocs/WFS/infocharta.map&  
SERVICE=WFS&VERSION=1.0.0&  
REQUEST=GetFeature&  
typename=odiko_irakliou
```

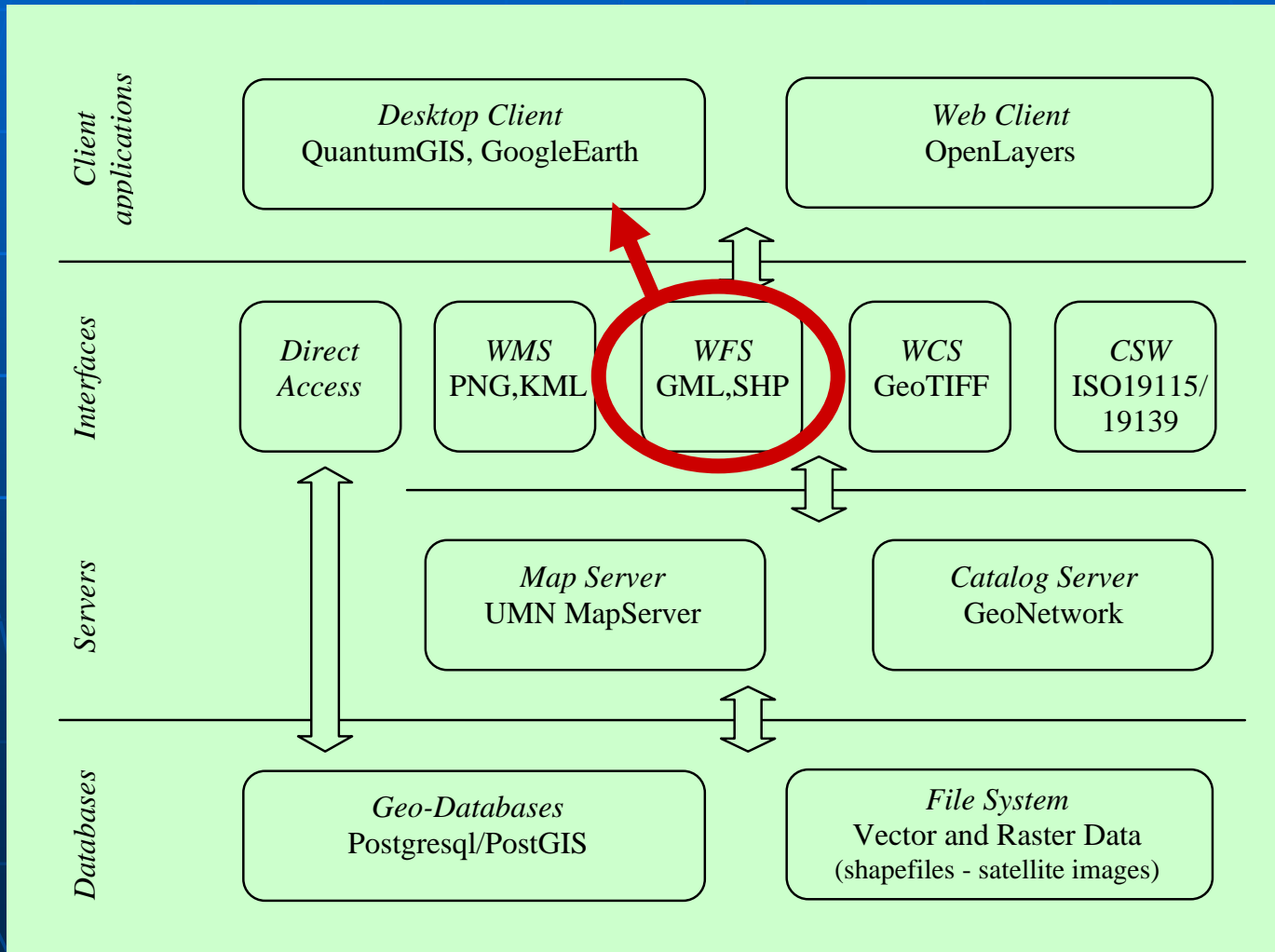
Heraklion SDI

- The Web Feature Service (WFS)...
- GetFeature request

```
<?xml version="1.0" encoding="ISO-8859-7" ?>
- <wfs:FeatureCollection xmlns:ms="http://mapserver.gis.umn.edu/mapserver" xmlns:wfs="http://www.opengis.net/wfs"
  xmlns:gml="http://www.opengis.net/gml" xmlns:ogc="http://www.opengis.net/ogc" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
  instance" xsi:schemaLocation="http://www.opengis.net/wfs http://schemas.opengis.net/wfs/1.0.0/WFS-basic.xsd
  http://mapserver.gis.umn.edu/mapserver http://localhost/cgi-bin/mapserv.exe?
  SERVICE=WFS&VERSION=1.0.0&REQUEST=DescribeFeatureType&TYPENAME=odiko_irakliou&OUTPUTFORMAT=XMLSCHEMA">
- <gml:boundedBy>
- <gml:Box srsName="EPSG:2100">
  <gml:coordinates>565874.864634,3865386.250000 641016.749039,3919382.000000</gml:coordinates>
  </gml:Box>
</gml:boundedBy>
- <gml:featureMember>
- <ms:odiko_irakliou fid="odiko_irakliou.5752">
  - <gml:boundedBy>
  - <gml:Box srsName="EPSG:2100">
    <gml:coordinates>592705.440000,3917686.000000 592993.310000,3917771.250000</gml:coordinates>
    </gml:Box>
  </gml:boundedBy>
  - <ms:msGeometry>
  - <gml:LineString srsName="EPSG:2100">
    <gml:coordinates>592705.440000,3917686.000000 592718.190000,3917699.500000 592736.190000,3917716.750000
    592743.810000,3917726.000000 592751.000000,3917730.000000 592777.810000,3917729.000000
    592791.810000,3917732.750000 592811.380000,3917740.750000 592839.000000,3917750.250000
    592860.630000,3917758.250000 592878.190000,3917763.500000 592893.810000,3917766.000000
    592907.810000,3917764.750000 592921.000000,3917762.000000 592930.190000,3917757.500000
    592935.380000,3917747.500000 592940.630000,3917739.000000 592950.190000,3917736.250000
    592958.190000,3917740.000000 592963.810000,3917746.000000 592983.000000,3917762.250000
    592993.310000,3917771.250000</gml:coordinates>
  </gml:LineString>
  </ms:msGeometry>
  <ms:CITY_ID>50000</ms:CITY_ID>
  <ms:LINK_ID>5646</ms:LINK_ID>
  <ms:FULL_ID>5752</ms:FULL_ID>
  <ms:FRC_IC>7</ms:FRC_IC>
  <ms:FOW_IC />
  <ms:DIR>0</ms:DIR>
```


Architecture & Software Systems

- The architecture...



Heraklion SDI

- The Web Feature Service (WFS)...
 - QGIS: Connect to the WFS

1. Plugins > Add WFS layer

2. Create a New WMS connection dialog

3. Server Connections panel

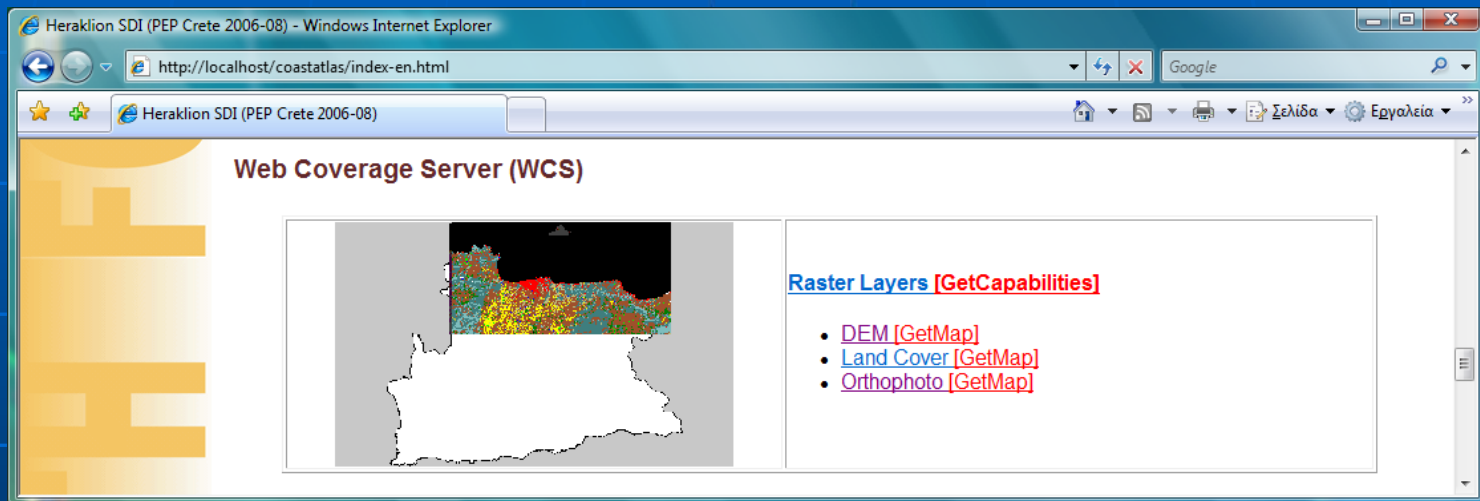
4. Main QGIS map view

Title	Name	Abstract
nomos_irakliou	nomos_irakliou	
buia_irakliou	buia_irakliou	
dhmoi_irakliou	dhmoi_irakliou	
dhm_diamer...	dhm_diamer...	
limnes_irakliou	limnes_irakliou	
odiko_irakliou	odiko_irakliou	
oikismoi_iraki...	oikismoi_iraki...	
builds_irakliou	builds_irakliou	
build_egsa	build_egsa	
poi_irakliou	poi_irakliou	

id	ID	CODE	NAMF_GR	NAMF_EN	POP_01
1	0	841	91010000 Δήμος Ηρακλείου	Municipality Of Irakleio	137711
2	1	842	91020000 Δήμος Αγίας Βαρβάρας	Municipality Of Agia Varvara	5310
3	2	843	91030000 Δήμος Αρκαλοχωρίου	Municipality Of Arkalochori	10897
4	3	844	91040000 Δήμος Αρχανών	Municipality Of Archanes	4548

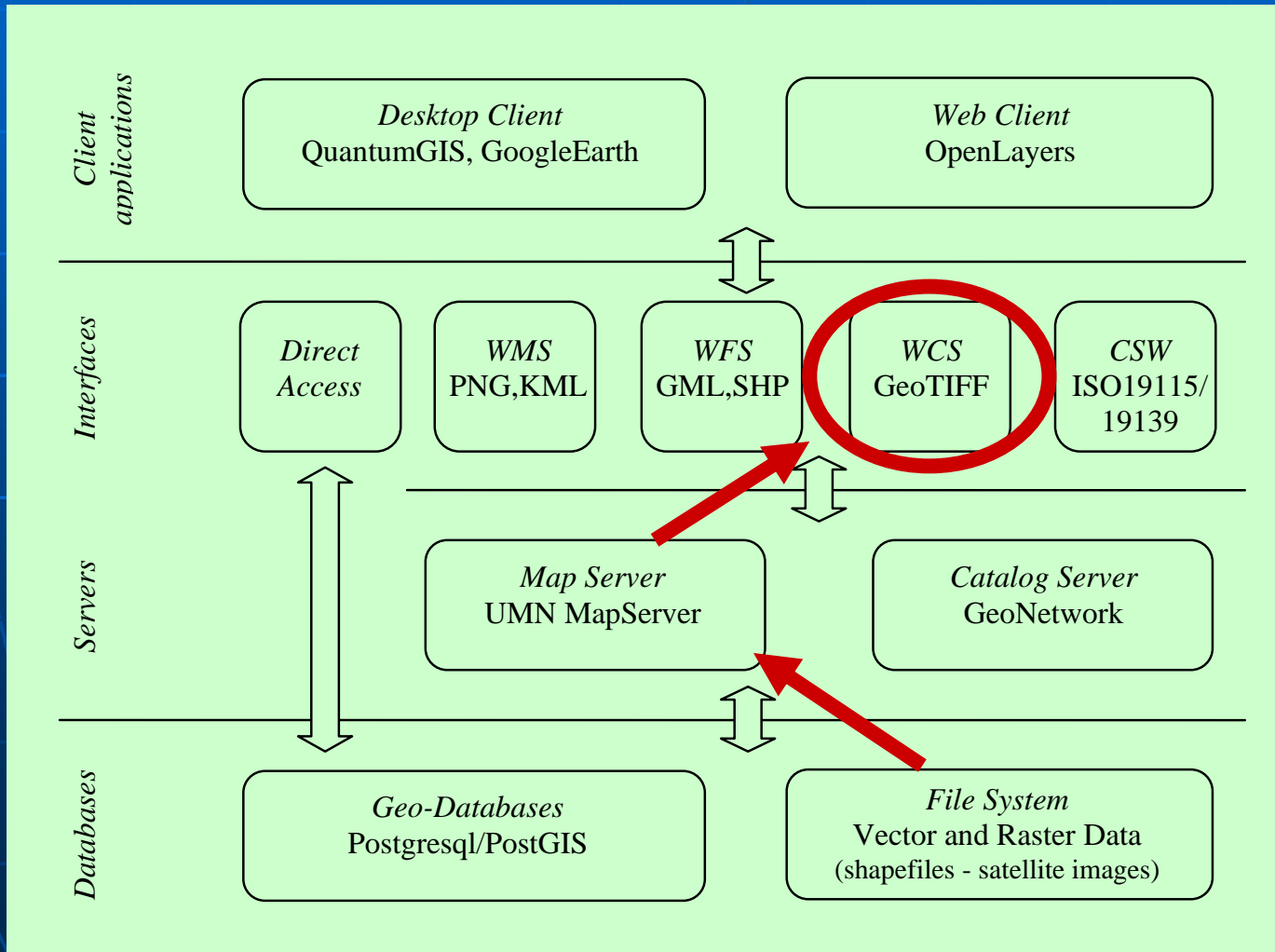
Heraklion SDI

- The Web Coverage Service (WCS)...



Architecture & Software Systems

- The architecture...



Heraklion SDI

■ The Web Client Application ...

Heraklion SDI - Web Client in OpenLayers - Windows Internet Explorer

http://localhost/ol_coastatlas/index-en.html

Heraklion SDI - Web Client in OpenLayers

Heraklion SDI...

Base Map

- Heraklion Prefecture
- ICEDS
- Google Satellite
- Google Map
- Land Cover
- Orthophoto
- DEM

Data Layers

- Heraklion Prefecture
- Geology
- Urban Areas
- Municipalities
- Municipal.Subdiv.
- Lakes
- Road Network
- Towns & Villages
- Airport Building
- Her.City Buildings
- Airport/Seaport POI
- Archaeological Spots

Scale = 1 : 500K

λ: 25.20437, φ: 35.47303

Welcome to the Heraklion SDI (PEP Crete 2006-08) - Browse in the Geospatial Layers...
Select the base map and the thematic layers on the right frame...
Double click on the map to zoom in...
With a single click on the entities retrieve their non-spatial attributes...

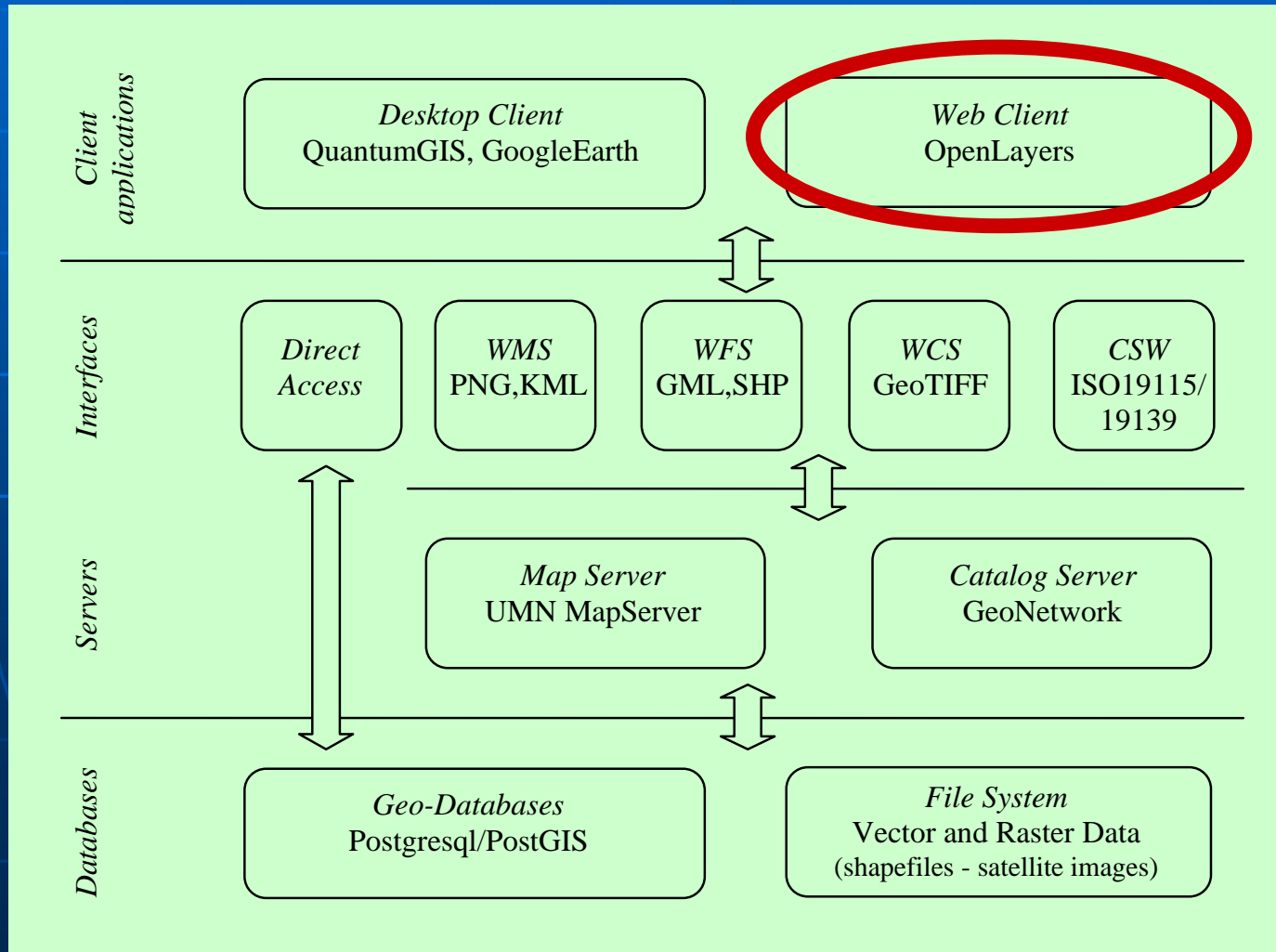
Base Maps
(radio buttons)

SDI Layers
(multiple selection
buttons)

*Report of attribute
values for clicked
features*

Architecture & Software Systems

- The architecture...



Heraklion SDI

■ The Web Client Application ...

Heraklion SDI - Web Client in OpenLayers - Windows Internet Explorer

http://localhost/ol_coastatlas/index-en.html

Heraklion SDI - Web Client in OpenLayers

Heraklion SDI...

Base Map

- Heraklion Prefecture
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- Google Satellite
- Google Map
- Land Cover
- Orthophoto
- DEM

Data Layers

- Heraklion Prefecture
- Geology
- Urban Areas
- Municipalities
- Municipal.Subdiv.
- Lakes
- Road Network
- Towns & Villages
- Airport Building
- Her.City Buildings
- Airport/Seaport POI
- Archaeological Spots

Scale = 1 : 500K

X: 25,20437, Y: 35,47303

Welcome to the Heraklion SDI (PEP Crete 2006-08) - Browse in the Geospatial Layers...
Select the base map and the thematic layers on the right frame...
Double click on the map to zoom in...
With a single click on the entities retrieve their non-spatial attributes...

Base Maps
(radio buttons)

SDI Layers
(multiple selection
buttons)

*Report of attribute
values for clicked
features*

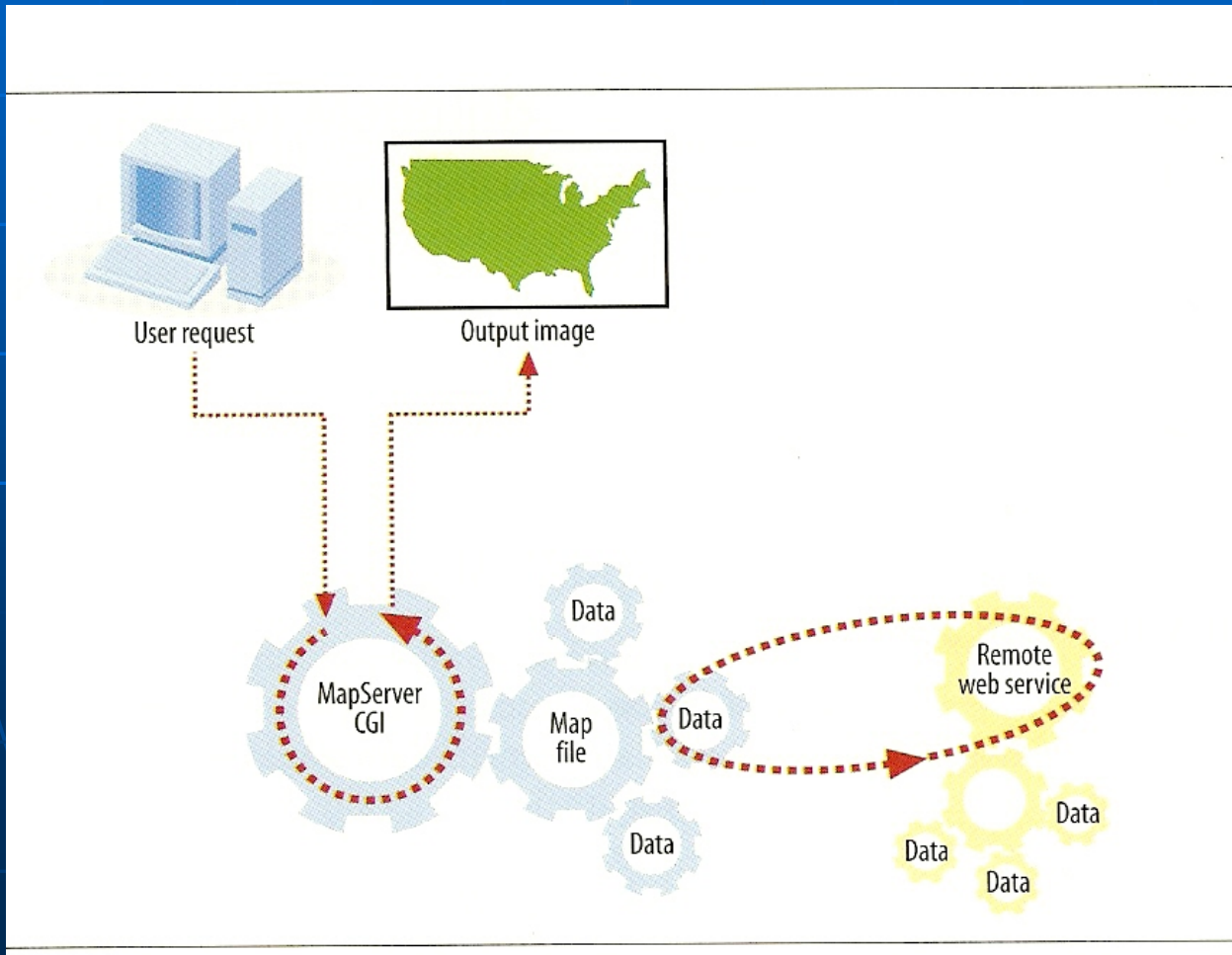
Heraklion SDI

- The Web Map Service (WMS)...
 - GetFeatureInfo request

```
dhmoi_irakliou.getFullRequestString({  
REQUEST: "GetFeatureInfo",  
EXCEPTIONS: "application/vnd.ogc.se_xml",  
BBOX: dhmoi_irakliou.map.getExtent().toBBOX(),  
X: e.xy.x, Y: e.xy.y,  
INFO_FORMAT: "text/html",  
FONT: "c:/ms4w/fontlist/times.ttf",  
ENCODING: "ISO-8859-7",  
QUERY_LAYERS: dhmoi_irakliou.params.LAYERS,  
WIDTH: dhmoi_irakliou.map.size.w,  
HEIGHT: dhmoi_irakliou.map.size.h});
```

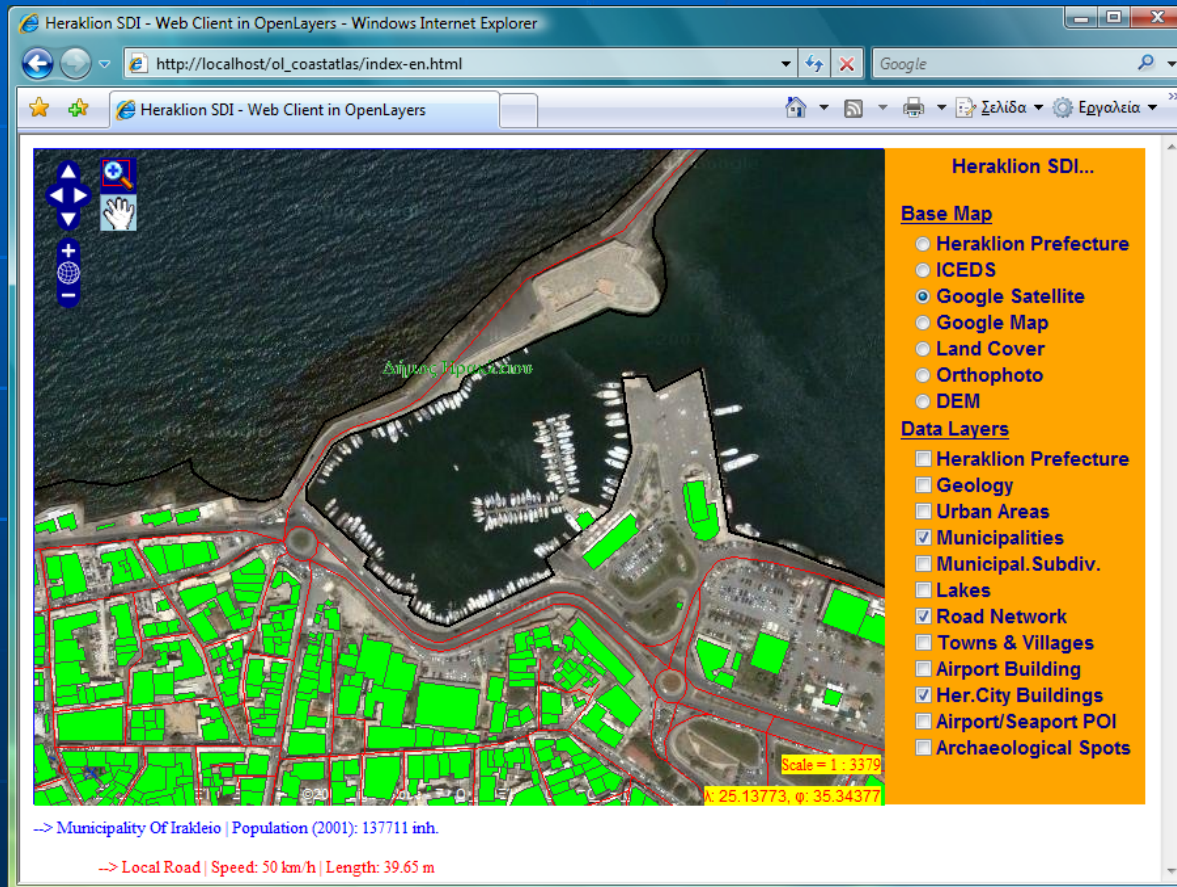
Heraklion SDI

- Mashups ...



Heraklion SDI

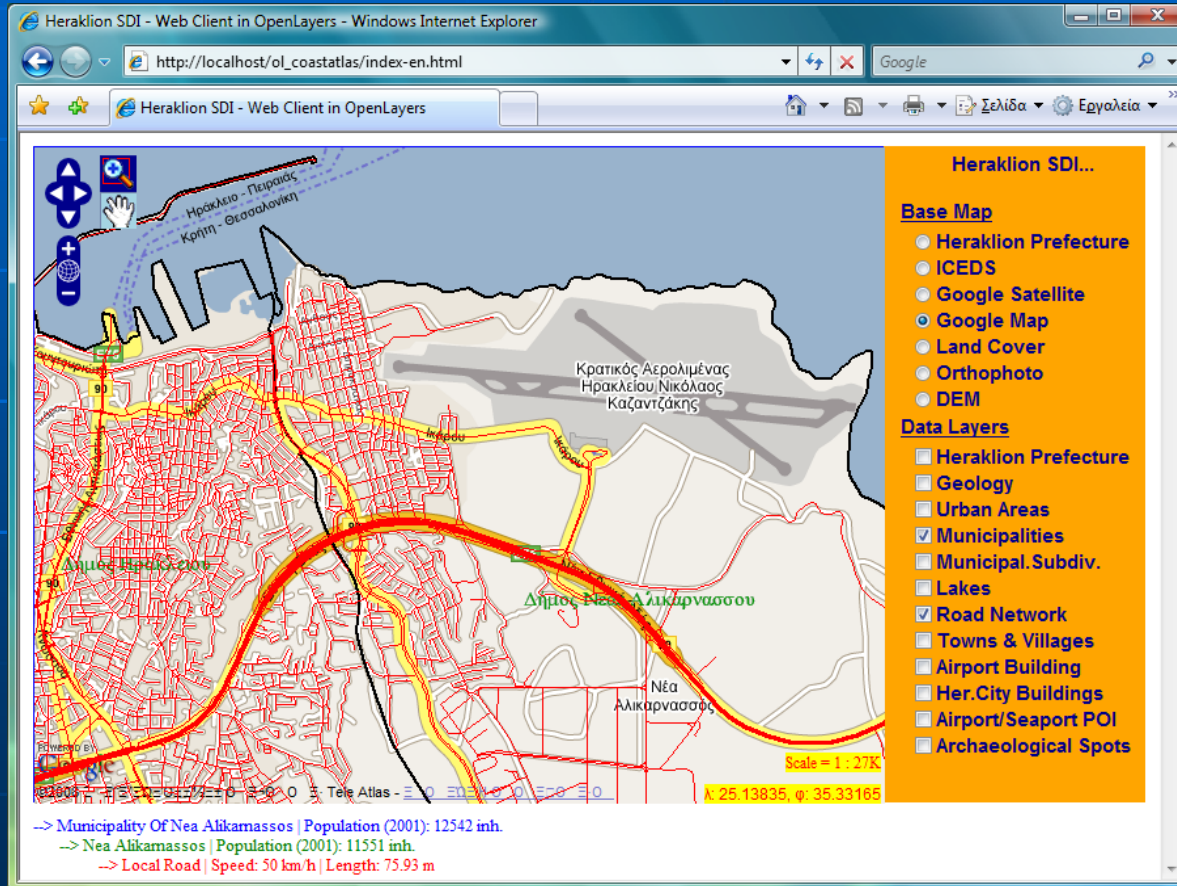
■ Mashups ...



Base Map: Google Satellite
Layers: Municipalities, Road Network, Buildings

Heraklion SDI

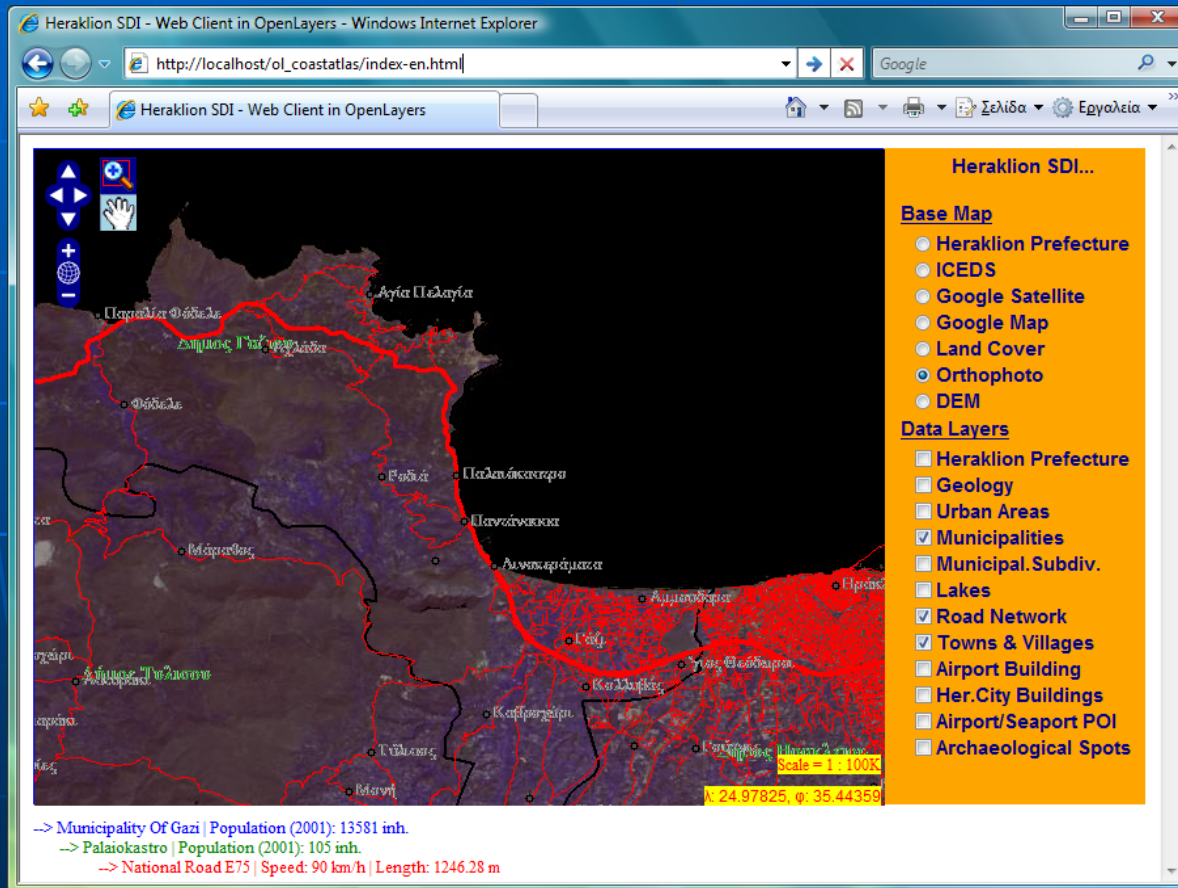
■ Mashups ...



Base Map: Google Map
Layers: Municipalities, Road Network

Heraklion SDI

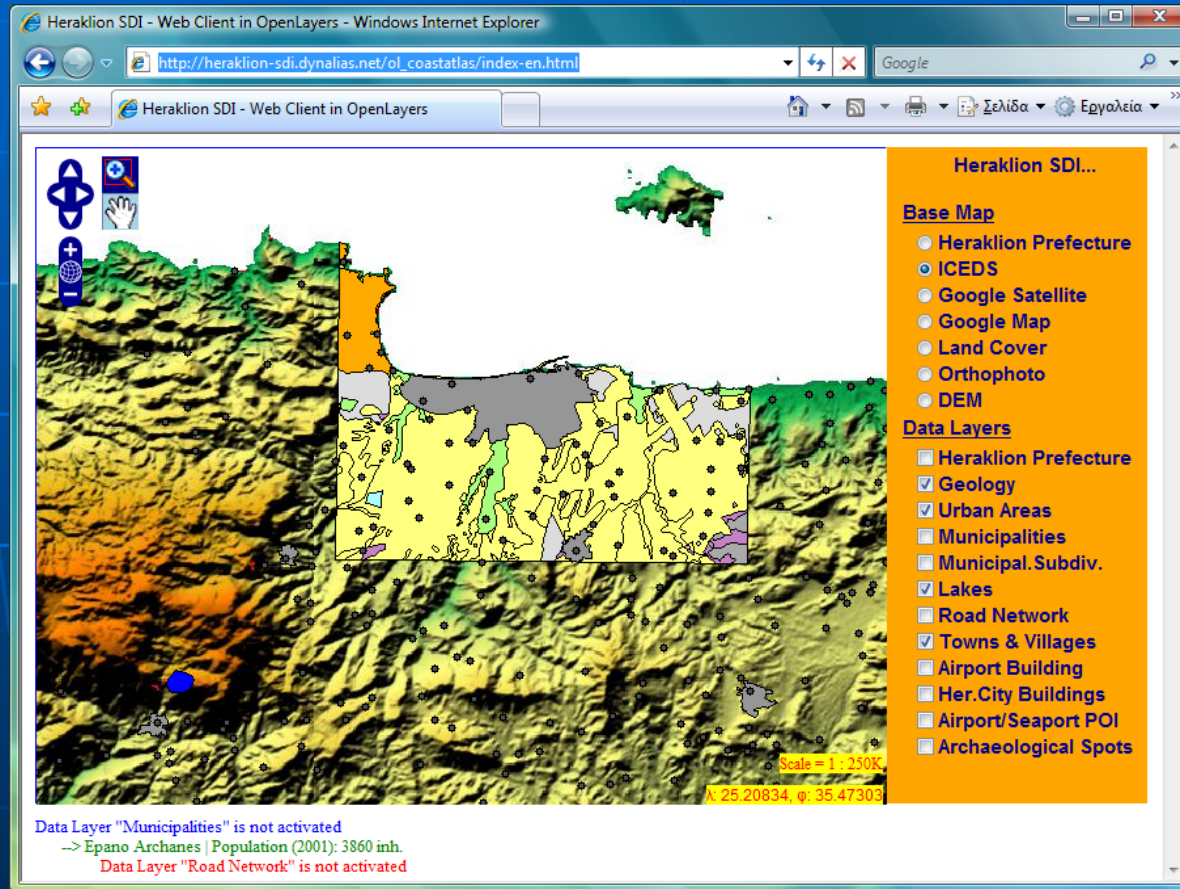
■ Mashups ...



Base Map: Orthophoto Map
Layers: Municipalities, Towns, Road Network

Heraklion SDI

■ Mashups ...



Integrated CEOS European Data Server

Base Map: ICEDS (WMS)
Layers: Geology, Urban areas, Towns, Lakes

Heraklion SDI

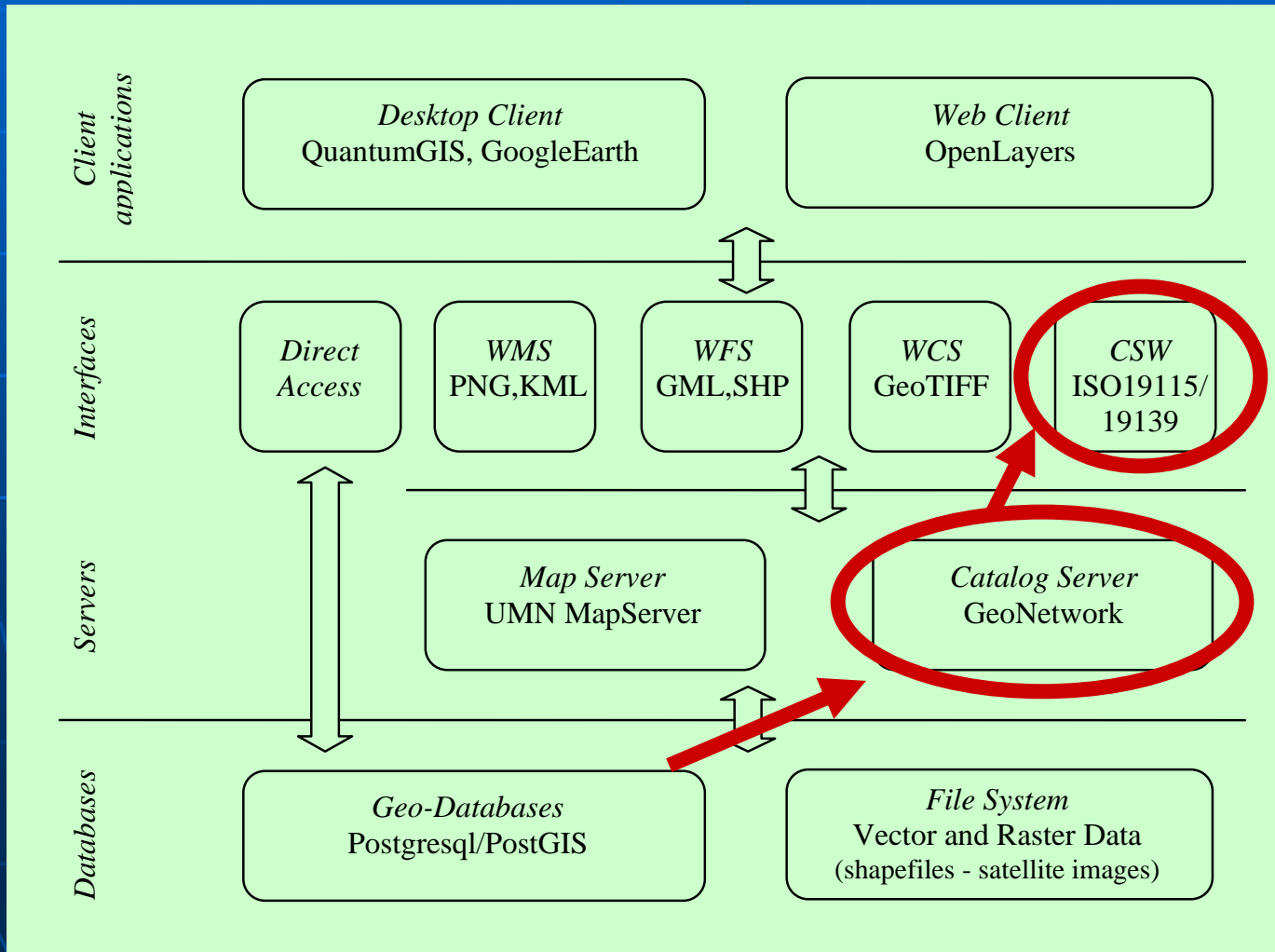
- The Catalog Server ...
 - Heraklion SDI accommodates...
 - a wide digital content of **various types and formats**
 - geospatial data layers
 - satellite images
 - web mapping applications and services

Heraklion SDI

- The Catalog Server ...
 - to make this content accessible on the web and assure its usability,
 - appropriate **metadata items** must be generated
 - a **data catalog server** is needed
 - to make the metadata items available on the web
 - support the efficient discovery and evaluation of the SDI content

Architecture & Software Systems

- The architecture...



Heraklion SDI

- The Catalog Server ...
 - The content items of the SDI ...
 - have been assigned appropriate metadata items in **XML format**
 - according to the specification of a customized **ISO19139 template**

Heraklion SDI

- The Catalog Server ...
 - ... then a catalog server has been implemented using **GeoNetwork OpenSource Server** software ver. 2.1
 - The configuration adopted utilizes
 - the **PostgreSQL** in the role of the DBMS server and
 - the **Apache Tomcat v5.5** in the role of the Web Server.

Heraklion SDI

■ The Catalog Server ...

GeoNetwork- The portal to spatial data and information - Windows Internet Explorer

http://localhost:8080/geonetwork/srv/en/main.home

GeoNetwork- The portal to spatial data and inf...

FORTH
Foundation for Research & Technology - Hellas

GeoNetwork™
OpenSource v2.1
Geographic data sharing for everyone

Home | Last results | Contact us | Links | About | Help

English | Français | Español | 中文

Username Password Login

FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS

What?

Where?

Open Map Viewer ▶

Greece

Search

Reset Advanced

CATEGORIES

- ▶ Applications
- ▶ Datasets
- ▶ Images (Raster)

THIS PAGE PROVIDES ACCESS TO THE CATALOG SERVER OF:

- ▶ The Heraklion Coastal Atlas SDI (PEP Crete 2006-08)

Authorized users may have full access to the metadata and content. Please login at the top right corner of this page. If you aren't such a user, you may browse at the public content.

The server above has been created and maintained by...

Asst. Prof. Emmanuel Stefanakis
Dept. of Geography, Harokopio University of Athens
email: estef@hua.gr
URL: http://www.dbnet.ece.ntua.gr/~stefanak

For more information please contact : estef@hua.gr

Internet | Προστατευμένη κατάσταση λειτουργίας: Ενεργή

100%

Heraklion SDI

■ The Catalog Server ...

The screenshot displays the GeoNetwork v2.1 web interface within a Windows Internet Explorer browser window. The browser's address bar shows the URL `http://localhost:8080/geonetwork/srv/en/main.home`. The page header includes the FORTH logo (Foundation for Research & Technology - Hellas) and the GeoNetwork v2.1 logo (Geographic data sharing for everyone). Navigation links for Home, Last results, Administration, Contact us, Links, About, and Help are visible, along with language options (English, Français, Español, 中文) and a User/Logout link.

The main content area is titled "FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS". It features a search interface on the left with fields for "What?" and "Where?" (set to Heraklion) and a "Search" button. Below the search interface are sections for "CATEGORIES" (Applications, Datasets, Images (Raster)) and "RECENT CHANGES" (Caption, Template for Dublin Core, Heraklion Orthophoto Map (Raster)).

The search results are displayed in a table format, showing three entries:

- HERAKLION CITIES (TOWNS AND VILLAGES)**: Abstract: These are the Heraklion Prefecture towns and villages. Keywords: cities, Heraklion, Crete Island, Greece. Includes a thumbnail map and buttons for Metadata and WMS/Interactive Map.
- HERAKLION ROAD NETWORK (TRANSPORTATION)**: Abstract: This is the Heraklion Prefecture road network. Keywords: roads, Heraklion, Crete Island, Greece. Includes a thumbnail map and buttons for Metadata and WMS/Interactive Map.
- HERAKLION MUNICIPALITIES (BOUNDARIES)**: Abstract: These are the Heraklion Prefecture Municipalities boundaries. Keywords: boundary, Heraklion, Crete Island, Greece. Includes a thumbnail map and buttons for Metadata and WMS/Interactive Map.

The browser's status bar at the bottom indicates "Internet | Προστατευμένη κατάσταση λειτουργίας; Ενεργή" and a zoom level of 100%.

Heraklion SDI

- The Catalog Server ...

The screenshot displays the GeoNetwork v2.1 web interface in a Windows Internet Explorer browser window. The browser's address bar shows the URL `http://localhost:8080/geonetwork/srv/en/main.home`. The page header includes the FORTH logo (Foundation for Research & Technology - Hellas) and the GeoNetwork v2.1 logo (Geographic data sharing for everyone). Navigation links for Home, Last results, Administration, Contact us, Links, About, and Help are visible, along with language options (English, Français, Español, 中文) and a User/Logout link.

The main content area is titled "FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS". It features a search interface with a "What?" text input field and a "Where?" map input field. A "Search" button is present, along with "Reset" and "Advanced" options. Below the search area, there are sections for "CATEGORIES" (Applications, Datasets, Images (Raster)) and "RECENT CHANGES" (Caption, Template for Dublin Core, Heraklion Orthophoto Map (Raster)).

The search results are displayed under the heading "AGGREGATE RESULTS MATCHING SEARCH CRITERIA : 1-3/3 (PAGE 1/1)". Three results are shown, each with an "ITE IYM" icon, a title, an abstract, keywords, and buttons for "Metadata" and "WMS/Interactive Map":

- HERAKLION DEM (RASTER)**: Abstract: This is the data elevation model (DEM) of the Heraklion city and the surroundings. Keywords: DEM, Heraklion city, Crete Island, Greece.
- HERAKLION ORTHOPHOTO MAP (RASTER)**: Abstract: This is the orthophoto map of the Heraklion city and the surroundings. Keywords: Orthophoto, Heraklion city, Crete Island, Greece.
- HERAKLION LAND COVER (RASTER)**: Abstract: This is the land cover image of the Heraklion city and the surroundings. Keywords: Land cover, Heraklion city, Crete Island, Greece.

The browser's status bar at the bottom shows "Ολοκληρώ" (Completed), "Internet | Προστατευμένη κατάσταση λειτουργίας; Ενεργή" (Internet | Protected mode; Active), and a zoom level of "100%".

Heraklion SDI

- The Catalog Server ...

The screenshot displays a web browser window titled "GeoNetwork- The portal to spatial data and information - Windows Internet Explorer". The address bar shows the URL "http://localhost:8080/geonetwork/srv/en/main.home". The page header includes the "FORTH" logo (Foundation for Research & Technology - Hellas) and the "GeoNetwork opensource v2.1" logo with the tagline "Geographic data sharing for everyone". Navigation links include "Home", "Last results", "Administration", "Contact us", "Links", "About", and "Help". Language options are "English", "Français", "Español", and "中文". A "User: Logout" link is present.

The main content area is titled "FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS". It features a search interface with "What?" and "Where?" fields, a map preview, and a "Search" button. Below the search bar are "Reset" and "Advanced" options. A dropdown menu shows "Heraklion".



The search results section is titled "AGGREGATE RESULTS MATCHING SEARCH CRITERIA : 1-1/1 (PAGE 1/1)". The first result is "HERAKLION SDI VIEWER (APPLICATION)" with an "ITE IYM" icon. The abstract reads: "This is the application to visualize the geospatial content accommodated in the Heraklion Coastal SDI." Keywords include "SDI Viewer, Heraklion, Crete Island, Greece, mashups". There are buttons for "Metadata" and "WMS/Interactive Map". A page number "1" is displayed below the result.

On the left side, there are "CATEGORIES" (Applications, Datasets, Images (Raster)) and "RECENT CHANGES" (Caption, Template for Dublin Core, Heraklion Orthophoto Map (Raster)).

The browser status bar at the bottom shows "Ολοκληρώ", "Internet | Προστατευμένη κατάσταση λειτουργίας; Ενεργή", and "100%".


Heraklion SDI

■ The Catalog Server ...

**HERAKLION ROAD NETWORK (TRANSPORTATION)**

Abstract This is the Heraklion Prefecture road network.
Keywords roads, Heraklion, Crete Island, Greece

Metadata WMS/Interactive Map



Identification info

Title	Heraklion Road Network (transportation)
Date	2008-02-29T12:21:00
Date type	Publication
Edition	
Presentation form	mapDigital
Abstract	This is the Heraklion Prefecture road network.
Purpose	This layer is part of the Heraklion Coast Atlas SDI (PEP Crete 2006-08)
Status	completed

Heraklion SDI

■ The Catalog Server ...

Point of contact	
Individual name	Emmanuel Stefanakis
Organisation name	Harokopio University of Athens
Position name	Asst Professor
Delivery point	
City	
Administrative area	
Postal code	
Country	
Electronic mail address	estef@hua.gr
Role	publisher
Maintenance and update frequency	notPlanned
Descriptive keywords	roads (theme).
Descriptive keywords	Heraklion, Crete Island, Greece (place).
Access constraints	copyright
Use constraints	copyright
Other constraints	copyright
Spatial representation type	vector
Equivalent scale	
Denominator	5000
Language	English
Character set	utf8
Topic category code	transportation

Heraklion SDI

■ The Catalog Server ...

::Extent	
::Extent	
::Geographic bounding box	
West bound longitude	North bound latitude
24.7	35.5
	East bound longitude
	25.6
	South bound latitude
	34.9
Supplemental Information	
::Distribution info	
OnLine resource	KML layer of the Heraklion Coastal SDI
OnLine resource	WFS layer of the Heraklion Coastal SDI
WMS/Interactive Map	WMS layer of the Heraklion Coastal SDI
::Reference system info	
Code	HGRS'87 (EGSA'87)
::Data quality info	
Hierarchy level	dataset
Statement	TBA

Heraklion SDI

■ The Catalog Server ...

:: Metadata	
File identifier	3c20bd77-8eec-481e-8ba8-165143822785
Language	English
Character set	utf8
Date stamp	2008-03-08T21:27:33
Metadata standard name	ISO 19115:2003/19139
Metadata standard version	1.0
:: Metadata author	
Individual name	Emmanuel Stefanakis
Organisation name	Harokopio University of Athens
Position name	Asst. Professor
Delivery point	
City	
Administrative area	
Postal code	
Country	
Electronic mail address	estef@hua.gr
Role	pointOfContact

Heraklion SDI

■ The Catalog Server ...

The screenshot displays the GeoNetwork v2.1 web interface in a Windows Internet Explorer browser. The page title is "GeoNetwork- The portal to spatial data and information - Windows Internet Explorer". The address bar shows "http://localhost:8080/geoportal/srv/en/user.login#". The page features the FORTH logo (Foundation for Research & Technology - Hellas) and the GeoNetwork v2.1 logo (Geographic data sharing for everyone). The navigation menu includes "Home", "Last results", "Administration", "Contact us", "Links", "About", and "Help". The language menu shows "English", "Français", "Español", and "中文". The user is logged out.

The main content area is titled "FIND INTERACTIVE MAPS, GIS DATASETS, SATELLITE IMAGERY AND RELATED APPLICATIONS". It contains search filters for "WHAT?", "WHERE?", and "WHEN?".

WHAT?

- What? []
- Title []
- Abstract []
- Keywords "roads" []
- Search accuracy: Precise Imprecise

WHERE?

- lat (min) 35.5
- long (min) 24.7
- lat (max) 34.8
- long (max) 25.6
- Type: overlaps
- Region: Heraklion (selected), - Any -, Greece, Heraklion World

WHEN?

- Anytime
- From 2005-01-01T00 To 2007-12-31T00
- Restrict to: Catalog: Heraklion SDI, Group: Coast Atlas, Category: Datasets
- Map type: Digital, Hard copy
- Hits per page: 10

CATEGORIES

- Applications
- Datasets
- Images (Raster)

RECENT CHANGES

- Caption
- Template for Dublin Core
- Heraklion Orthophoto Map (Raster)
- Heraklion DEM (Raster)

AGGREGATE RESULTS MATCHING SEARCH CRITERIA : 1-1/1 (PAGE 1/1)

HERAKLION ROAD NETWORK (TRANSPORTATION)

Abstract This is the Heraklion Prefecture road network.
Keywords roads, Heraklion, Crete Island, Greece

Buttons: Metadata, WMS/Interactive Map

Footer: Ολοκληρώθηκε, αλλά υπάρχουν σφάλματα στη σελίδα. Internet | Προστατευμένη κατάσταση λειτουργίας: Ενεργή 100%

Η Διαλειτουργικότητα στη Γεωγραφική Πληροφορία



Παρασκευή
03/04/2009



www.opengeospatial.org

Ledra Marriott Hotel

www.hellasgi.gr

Development of an Open Source-based Regional SDI for Heraklion Prefecture

Ευχαριστώ! Thank you!

Emmanuel Stefanakis & Poulicos Prastacos

Harokopio University of Athens
Department of Geography
estef@hua.gr

FORTH & InfoCharta Ltd
STEP-C, Heraklion
poulicos@iacm.forth.gr