Massive Collection of Cadastral Data in Greece Using Web-enabled GIS Technologies

KTHMATOLOGIO S.A.
Mesogeion ave. 288
p.o. 155 62 Xolargos – Athens - Greece
Lykouropoulos Eleftherios
IT Director
Phone. (+30210) 6505-752
E-mail: elykouro@ktimatologio.gr
Mourafetis Georgios
Head of Gis Department
Phone. (+30210) 6505-624
E-mail: gmourafe@ktimatologio.gr

XXIV FIG International Congress 2010

ABSTRACT

◊ Cadastre operates in Greece for the last seven years.
◊ The IT system was developed by the middle of 2002 where the first database system was actually established.
◊ The GIS system began to develop at the end of 2002 based on ArcGIS and ArcSDE 8.2.
◊ Many in-source applications were developed to provide all the necessary functionality.
◊ At the end of 2008 the Greek Cadastre collected about 6.5 million rights using custom made web based applications thus providing advanced services to users and contractors.
Data categories of Greek Cadastre

Descriptive data
- Registrable rights
- Beneficiaries
- Legal deeds
- Applications

Spatial data
- Municipality Boundaries
- Land parcels
- Buildings
- Mines
- Exclusive use areas
- Easements
- Orthophotographs
- Digital terrain models
- Survey maps

SYSTEM OVERVIEW
(working cadastre)

XXIV FIG International Congress 2010
GIS and descriptive database systems were developed separately.
Both kinds of data are stored and handled by the same database, which is ORACLE 9.2.
GIS uses ESRI’S ArcGIS 8.2, ArcSDE 8.2 and ArcIMS 4.01.
All Data are stored and handled according to which municipality they belong to.
Restrictions and rules apply to each different dataset, all of which are handled by applications developed in house.

SOFTWARE APPLICATIONS
(working cadastre)
All the software developed in-house can be categorized into the following general categories:
- Quality control software
- Data Loading software
- Data management and editing software
- Product Creation software
- Internet Software
WEB APPLICATION (working cadastre)

COLLECTION OF NEW DECLARATIONS (2008)

- Scope of project was the collection of citizen’s rights along with a point that would indicate their property’s position on map.
- There were several procurements in order to assign contracts that would cover 107 municipalities of Greece.
- The contractor used software developed by Ktimatologio S.A. to both enter the deed information and pinpoint the property on map.
- The software run at the declaration offices located all over Greece.
- Concurrent users of declaration offices reached 2,500 at peak times.
There were mechanisms to allow offline entering of information in case of network failure.

Internet site was also developed to allow citizens to declare their properties without being obliged to visit a cadastral office.

All the data were entered into a central live system.

Supply of powerful IT infrastructure:

- Primary Site (availability 99.99%)
  - Lampertz Data Center
  - 50 Application servers (4-core Xeon@3 GHz, 8-16 GByte Memory)
  - 12 database servers (8-core itaniumII 1.6GHz, 32 GByte Memory, one 8-node RAC and two 2-node RAC)
  - 120TB STORAGE SYSTEM
  - Sophisticated Network Equipment
  - Application Firewall
- Disaster Recovery Center (availability 99.999%)
  - Similar architecture running at half computing power
  - Complex network connecting 100 points in Greece
Two different subsystems were created. One for the GIS and one for the descriptive information. The users only used one software regardless of the breakdown that was applied in the architecture. The two subsystems were communicating in both database and application levels.
NEW DECLARATIONS (Architecture 2-Cadastre Declaration Offices (CDO))

- There were more than 2,500 users at the CDO
- There were CDO with more than 100 users
- In some cases the bandwidth could not exceed 64KBit per client for both GIS and descriptive data
- The client should be able to display an orthophotograph along with the road axes so that the citizen could locate his property

XXIV FIG International Congress 2010

NEW DECLARATIONS

- The orthophotographs could not be handed out to the CDO because of various copyright and legal issues
- Bandwidth was not enough for over the Internet transfer of base map pictures to the clients
- Speed was essential for the every day running of the CDO because there were thousands of people waiting to declare their property
- The CDO needed to use their own spatial data as layers onto the base map.

XXIV FIG International Congress 2010
NEW DECLARATIONS

- For all of the above reasons KTIMATOLOGIO developed its own GIS client (KTGIS) from scratch based on C++ and .NET technology.
- The base maps were delivered to the CDO in an encrypted and compressed form that could only be read by KTGIS.
- KTGIS needed to logon to the central system, take a dynamically created decryption key and use that to decrypt the base map.
- KTGIS consumed custom made web services based on ArcGIS server in order to search, geocode, input and edit data etc.

NEW DECLARATIONS

- KTGIS had support for custom made geo-databases (ACCESS, SQL SERVER, ORACLE) on which the contractors could load their own spatial data, display and query them in KTGIS. DXF was also supported.
- KTGIS created and maintained all necessary information on the database.
NEW DECLARATIONS (KSGIS)

XXIV FIG International Congress 2010
NEW DECLARATIONS (INTERNET)

- Declaration of property was also supported over the Internet for every citizen.
- The user should first register with a username and password.
- The deeds that accompanied the declarations, could be sent via either Post mail or be uploaded via the web site.
- The users could locate their property on to a map that provided geocoding, street name and point of interest searching capabilities.
Security was a big concern.
The system was online with the central database but there were several steps in order to access it.
For example the GIS website did not have access to the database but to another web service only available to local LAN that exposed all the necessary functions.

More than 140,000 rights were declared over the Internet.
20,000 were from citizens that lived abroad.
The site will continue to support the second phase of the project which includes the actual parcel creation.
Current and Future Plans

- KTIMATOLOGIO already develops stand alone software with full editing and viewing functionality that would allow access to it's encrypted base map and ArcGIS server based services.
- Addon for commercial GIS software (ESRI, AUTODESK and COM interfaces) has being developed in order to provide access to base map and services.
THANK YOU FOR YOUR ATTENTION