An efficient and sustainable approach for the creation and maintenance of a national and seamless thoroughfares map: CartoCiudad

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General Description

CartoCiudad is a large-scale project launched in 2006 to create and maintain a seamless cartographic database of the Spanish thoroughfares network topologically structured all over the country. In addition, it also contains building numbers, kilometric points, toponyms, boundaries and postal and census information from each municipality.

CartoCiudad was born as a new project to fulfil, mainly, the requirements from thoroughfares maps users and under the condition of being developed according to the policy of the efficient use of resources: avoiding the duplication of cartography and capturing the primitive data just only one time, as INSPIRE declares. In consequence, CartoCiudad can be defined as the outcome of the harmonization and integration of cartographic datasets produced by the main suppliers of official geographic information in Spain: Cadastre, Statistics Office, Post Office and the National Geographic Institute.

In order to achieve the goal of integrating and keeping up-to-date all the Spanish municipalities in a seamless way, a common agreement to ensure the permanent collaboration among the national stakeholders indicated above was required. Moreover, as the project has been growing and in order to achieve a data sustainable maintenance, the cooperation with the Autonomous Regions organisations has been established as well. These agreements enable the data harmonization and integration at a national level, facilitating the harmonisation within the European Framework what implies an optimisation of the resources among the Administrations involved, since only one product is created for everyone.

Fulfilling SDI and INSPIRE principles, CartoCiudad data are published at its Geoportal (www.cartociudad.es) where they are handled through standard web services conform to OGC specifications: WMS for visualising, WFS to locate entities (addresses, postcodes, census information, administrative units) and WPS to implement functionalities like routing or reverse geocode throughout Spain. Additionally, since October 2010 the CartoCiudad data are also available through the Download Data Center of CNIG (National Center of Geographical Information), allowing users to download a ZIP file of each Spanish province in Shapefile format.

Project Evolution

The project production strategy carried out since 2006 has consisted in, firstly, focusing the efforts on the creation of the main cities (places where the most of population is concentrated) and secondly, producing the rest of municipality according to their population. In fact, taking into account the production made in 2010, the current project coverage is more than 6000 municipalities (Spain has got 8111 municipalities), meaning a coverage of more than 96% of the Spanish population.

Therefore CartoCiudad is now focused on the maintenance and updating processes. CartoCiudad data model was modified to consider the updating and improvement of the data by means of the storage of the entities temporal life-cycle. Consequently every feature must have a unique identifier in the database, so temporal variations of a feature are entered in the database using several records that share its identifier. Therefore, it is possible to know the date of addition and its further modifications. If the feature does not exist anymore this model also stores its previous existence.

To take a step towards a cooperative maintenance, inter-administrative agreements have been signed between the National Geographic Institute and the regional governments of La Rioja, Valencia, Illes Balears and Murcia, resulting in the incorporation of updated data of those regions in CartoCiudad during 2011. The main benefit of such agreements lies in that Autonomous Regions in Spain may produce their own geographic data regarding thoroughfares network, usually at a larger scale and according to their own competences. Those data sources are also used to enrich CartoCiudad, becoming a useful and official thoroughfares map for national and also for regional administrations so that the resources invested in geographic information are optimised. Inter-administrative agreements with other Autonomous Regions are envisaged to decentralize the data maintenance and to ensure the future sustainability of CartoCiudad.

Since CartoCiudad participated actively in the drafting of the INSPIRE Data Specification on Addresses (DS-AD), and after assuring its data model complied with the specification, this project has become the referent in the implementation of the European application schema on the Spanish addresses data. In consequence, during 2010 new efforts were also invested in the development of a harmonized addresses model, according to DS-AD, for the public organisations related to address data at national level. The benefits of using a unique data model for addresses at state level are incalculable, not only for the address data providers but also for the growing social demand which requires more accurate data. A first draft was delivered at the end of the last year and it is expected to be extended to create a thoroughfares map model based on CartoCiudad.

Finally, during 2010 new technical developments regarding CartoCiudad web services and applications have been carried out as well. The CartoCiudad Geoportal has changed to fully comply with SDI and INSPIRE principles, incorporating Cadastre WMS as a transparent overlay. Hence the most updated cadastral information is provided directly by the competent organisation. The PNOA (National Aerial Orthophotography Plan) WMS has also been integrated to make the navigation more intuitive.