# Integration of data between the Spanish NSI and the Spanish Directorate General for Cadastre.

## 1. Introduction

In Spain Cadastre and NSI has been collaborating for more than 15 years. In 2012, the two institutions signed the last formal agreement for collaboration, where it is specified that cadastre will provide a copy of all its cartographic and literal information to the NSI. This information is from the beginning totally free of charge. Cadastre also provides periodical updates of this information and in addition allows NSI the access via INTERNET to the cadastral information system.

The collaboration has been bigger beyond this agreement. NSI uses geolocated cadastral data in all its offices and for many of its tasks.

## 2. How can the data integration method be described?

The NSI, combining cadastral and statistics data has created a corporative geodatabase that permits to work with cadastral data in all their workstations.

NSI can access, since 2007, in any moment free of charge to the data of the Spanish Cadastre.

Spanish cadastre is a data bank that includes not only cartographic information but physical, legal and economic information of 39 million urban properties, 39 million rural parcels and 25 million Cadastral Owners: parcels, buildings and other constructions with many useful attributes, addresses, uses, crops, values, etc.

In order to elaborate the census of Population and housing 2011, the NSI changed its methodology and worked on cadastral information. NSI not only used the cadastral cartography as base, but they used the associated cadastral information as for example the units within a building or the uses of each unit etc.
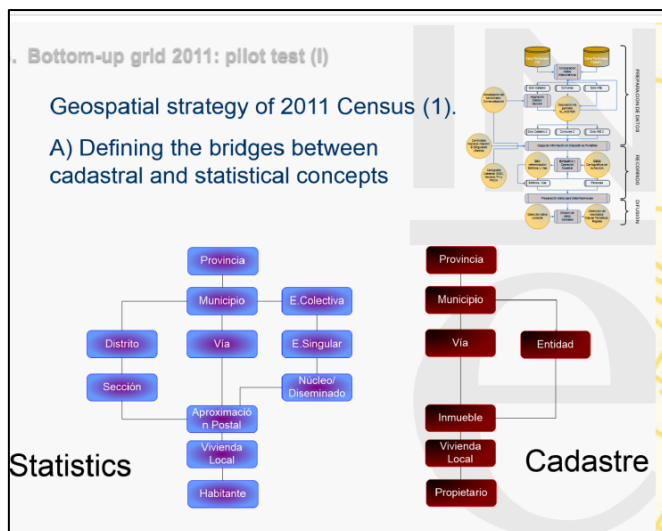
Every real estate in the cadastre (units of a building, building, etc...) are included in a cadastral parcel. Each cadastral parcel has a unique cadastral reference, unique coordinates and, in urban areas, one or several postal addresses. Therefore the link with statistical data is possible. The cadastral reference has 20 digit and includes also information about the code of the province and the code of municipality. These codification is standardized and defined by NSI.

A system was created in the corporative IT of NSI with an interoperable access to cadastral geodata and a powerful local geostatistical processes.

The main points to create the system in NSI were:

- Knowing in deep the cadastral database model
- Robust key unequivoque identifiers
- Analyze the WFS capabilities of the Cadastral service (OGC standard and INSPIRE service)
- And create a powerful tool:



Each cadastral parcel and building has an address as an attribute ant it provides a georeferenced point for each textual address permitting NSI to link Population Register addresses and dwelling characteristics. Also the NSI can obtain geometry from numerical or textual identifiers.

The system has been created in several phases and it is kept updated by the WFS that cadastre provide periodically.

This updated system is now totally unattended and very agile because only the data that has change in the cadastre since the last version is interchanged.

NSI also access via web in any moment to continuously <u>updated</u> cadastral information, and not only graphical information but alphanumeric: complete postal addresses of all units of a real estate, all constructions, uses of constructions and cadastral parcels, distribution of units within a Property, etc.

The NSI also used the graphical and alphanumeric cadastral data in the elaboration of the Agrarian census and in many other applications for several research and statistics.

NSI is using all these cadastral data in the preparation of Housing and Population Census 2021 with an innovative approach based in fully use of cadastral register.

3. What has been the motivation to execute the method? (advantages, benefits)

Since old times to near past NSI and cadastre were interchange final products as maps, files and books, but they worked as isolated departments and NSI was working using spatial units without geometry. The interoperability scenario changed the paradigm of this collaboration.

Since the early 1990s, the Spanish cadastre has met its public task by collecting information in digital format, being a government tax collection and a real estate security service. From the beginning, the cadastre opted for the use of open formats and exchanges within the Spanish Administration authorities. In 2004, all cadastral mapping was available online. In 2005, the Web Map Server (WMS) was launched. In 2006 a Web Feature Service (WFS) was implemented and since 2010, the virtual office allows electronic cadastral procedures and provides editable WFS and other formats all for free.

It was finally possible to combine information, to use web applications and to update information easily. It was not necessary storage in NSI and the updating burden was much less.

Both institutions maintained very robust databases and corporate systems that were very difficult to modify as they fulfil important missions within the administration of the Spanish state.

The idea was combining the two worlds by interoperable access to cadastral geodata and a powerful local geostatistical processes in the NSI; but without change any data model in each institution.


Addresses

As addresses are very important for both institutions it is necessary to explain here, in few words, how is the fact system actually. The municipalities define the postal addresses of their territory under the conditions established by the NSI, but it is not until a real estate is incorporated into the cadastre that the address of the real estate is given coordinates. Then the  cadastre is the institution that georeference the addresses.

The cadastre has for  each real estate one or more addresses as an attribute of the real estate. Several real estates can also have a single address with coordinates even if each of them has a subaddress to assign to each unit; all of them with the same coordinates.

This cadastral  data base that link all the characteristics of areal estate-coordinates-addresses is homogeneus for the territrory under responsability of Spanish Directorate General for

Cadastre (95% of Spanish territory) and it is countinuosly updated by municipalities and other institutiost in the cadastral database. This homogeneous database is joint with the addresses data of Basque Land and Navarra and with the postal codes areas by IGN Spain to create the road network (Cartociudad)

Cadastre offers for free these georreference addresses in several services and models and with many other associate data: owners, uses, constructions, year of construction, crops, geometry of buildings, distribution of units inside the buildings etc...

Therefore, when NSI needed to georreference inhabitants and other topics it was very logical to try to use this addresses database and not invented a new one.

But the process is not so simply, both institutions are now, in 2020, still trying to resolve some problems to have all the addresses of Spain perftly identificated and perfetly crosed with all the other information.

Also for NSI when in 2011 started to incorporate cadastral data the challenge was very big because it was a huge information: 350 millions of geometries entities had to be managed to georreference the statistic information: blocks, parcels, constructions, roads, points, text and many others…

4. What are the needs / the lacks identified which have still to be tackled?

Even the exchange system works well between NSI and cadastre, It is necessary still to define a good model of addresses in Spain. A model that links not only NSI and cadastre but all the agencies involved: municipalities, IGN, regional geographical institutes, post office etc.... And also is necessary to define a cycle for updating and exchanging address data between different agencies. A model in which addresses are a geographic object and not just an attribute of real estate.

It is also necessary going on improving the quality of addresses and axes, and define a good model for the exchange of data of the units of a building (3D information).

Also, and maybe more important, even being very good the collaboration at technical level, there is not coordination body between the institutions for cooperation and therefore no action plan or formal legal framework or partnerships for strategic planning, product design, methodological aspects, and integration of data. Collaboration in funds and financing is also lacking.

5. What might be the main message / recommendations for the management level from the example?

Sharing information is critical to avoid duplicating efforts.

Dialogue between the two institutions and in-depth knowledge of the data model and services of others is necessary before acting.

You don't need very complex systems to link data, the simpler and with fewer changes in corporate systems the better.

Not only will and "good to do" of technicians is sufficient, to move forward in the future, It is necessary, from now on, to collaborate at a higher level that will allow to maximise the results.