

## Roads Generalisation at IGN France



In 1999, the Carto2001 project was launched by Institut Géographique National (IGN), with IGN selecting 1Spatial's automated generalisation technology to achieve its target of creating 1:100,000 mapping (Top100) from the BD Carto® database at 1:50,000. Since the BD Carto® database does not hold buildings as elementary objects, the generalisation flowline needed to focus on road networks. The project was initiated on the back of IGN's leading involvement in the European AGENT project (Automated GEneralisation New Technology).

### The Challenge

A generalisation process needed to be defined to draw the first version of the Top100 maps from BDCarto, and IGN needed to introduce BDCarto updates into the Top100 database with a high degree of automation.

Manual generalisation has traditionally been a difficult task to carry out, depending chiefly on the skills of the human cartographer. The process is subject to cartographic interpretation, and is also time consuming. The automation of generalisation has previously been largely unsuccessful, but 1Spatial's unique advances in generalisation technology were put to use to tackle this problem. The project successfully brought together IGN's cartographic knowledge and abilities to test AGENT measures and algorithms, and 1Spatial's knowledge of generalisation and software development.

### The Solution

The AGENT prototype was adopted by the project team, along with the use of the Gothic products it was based on.

1Spatial's solution has allowed IGN to automate generalisation in their production lines. Generalisation problems were mainly concerned with road and railway networks, and retaining consistency between the various themes of the map. The automated generalisation allows IGN to derive products from those that already exist and reduces the cost of maintaining multiple datasets, which can be costly, time consuming and produce inconsistencies in the data.

Two types of generalisation form the heart of 1Spatial's solution: independent and contextual. Independent generalisation aims to solve the coalescence conflicts (e.g. overlapping symbols) and noise at the object level. Contextual generalisation considers groups of objects within their environment, maintains the connectivity between objects within a network and the relative position of features in relation to the rest of the network (e.g. road junctions).

The complex generalisation tools used to perform the automated generalisation are only available from 1Spatial's production platform Gothic. The results of the generalisation are saved in a topologically coherent geographic database, and can be easily exported in various vector formats.

### Results

1Spatial's automated generalisation solution has ensured that the original estimates of 1000 hours of operator work per map have been cut dramatically. The automatic generalisation itself took 50 hours of calculation for a whole sheet of a Top100 prototype, and the interactive re-working required to finish the generalisation of the whole sheet took just 100 hours. This is a significant improvement: the automated methods have greatly reduced the time and costs of both updating and the subsequent full-scale production for IGN France.

### The Future

The IGN Top100 maps are now in full production. IGN is currently using 1Spatial's technology, including the latest generalisation product Clarity™, for research and development. The foundations set by 1Spatial are also being used by IGN to develop building generalisation flowlines.

