

Building a single-geometry land and property database at Dudley Metropolitan Borough Council using the Digital National Framework





With local authorities required to make their data available internally, for public services and for wider public access, Dudley Metropolitan Borough Council (DMBC) needed to share and integrate data held in disparate application databases while maintaining a corporate data system. This required the integrity of the information within each database to be unquestionable and interoperable.

This necessitated a common standard in the accuracy of data production and source to facilitate cross-database comparisons, correlations and integration. Using principles defined by the Digital National Framework (DNF), DMBC worked with GIS developer Assist Applications Ltd to create a system that would avoid replicating or recreating the geography and text within an application system's database each time an item was stored.

Data in applications was associated to a single geometry database source, converting existing polygon datasets to associate with OS MasterMap®. Incomplete conversions were addressed separately to complete the data association. As a by-product, the process eliminated positional accuracy issues. Because an application data boundary refers to the OS MasterMap Topographic Identifiers (TOID®) for its geography, if the TOIDs move, the boundary moves as well.





This necessitates that a database process does not replace or archive superseded TOIDs – all versions must be available all of the time. While some of the date fields may be useful for certain application processes, the actual date when mapping change is made by a local authority to its own online databases (the inclusion date) is legally important.

DMBC then made a first-pass attempt to correlate LLPG polygons with OS MasterMap polygon data. Each postcode was processed as manageable sets of data. Data correlation was acceptable if matching TOIDs provided an accumulated area within 90% of the original LLPG polygon area. For the whole of Dudley, consisting of about 165 000 residential LLPG polygons, this first pass achieved a 76% correlation. The remaining polygons were roughly edited to achieve a second-pass correlation closer to the desired 90%.

Where property representation between LLPG polygons and OS MasterMap didn't correspond, userTOIDs were created. userTOIDs are user-tagged TOIDs, formed from part of an OS MasterMap TOID, which have the same structure and are maintained in the same way. userTOIDs carry the originating TOID for back reference, enabling the tracing of previous versions and facilitating polygon maintenance should the underlying data change.

DMBC ran trials with this data association capacity switched on (the display of the LLPG geography is reconstituted on the fly from the OS MasterMap TOIDs and userTOIDs) and then switched off (using geography from the LLPG database directly). Neither procedure showed performance issues that were likely to annoy users.

Trials following Ordnance Survey updates demonstrated the corporate data system's capability of displaying:

- Polygons using original TOID+VersionNumber geometry overlaid on current mapping (default).
- Polygons using original TOID+VersionNumber or current TOIDs overlaid on mapping of a particular date (historical).
- Polygons using original TOID+VersionNumber overlaid on mapping at the polygon creation date (reproduction).
- Polygons using the current TOIDs overlaid on current mapping (dynamic)

There are business cases for each of these scenarios. Although positional accuracy improvement (PAI) issues can be eliminated using the dynamic process, the practicality of PAI avoidance requires a mixture of this and reprocessing polygon cleaning after each OS MasterMap change-only update.





DNF technical architecture

The information held in the application's database contains no geometry in the final LLPG, only a list of TOIDs and userTOIDs. When the geometry of the LLPG item is required, the system attaches to the OS MasterMap database, extracts the appropriate TOIDs and reconstitutes the curtilage of the area from the one or many identifiers contributing to the area.

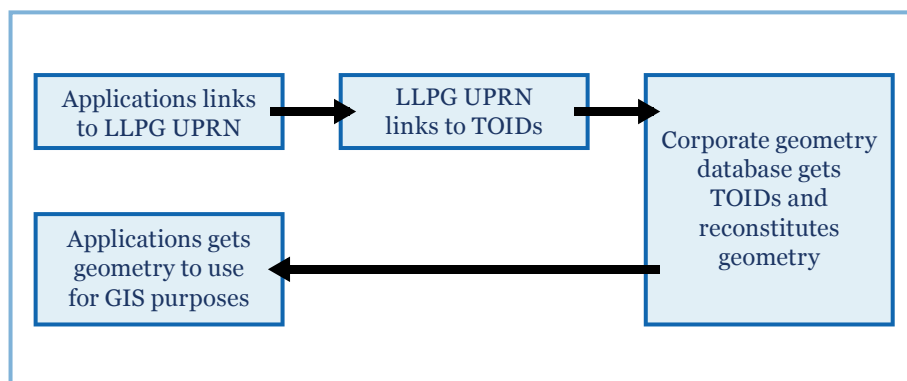
The e-volutionGIS provides interoperability at several levels, from a simple list of participating geometries in another database to URL linkages to web services delivering similar results from far-off data providers. This enables, for example, an application database containing only a unique property reference number (UPRN) to first refer to the LLPG database for that UPRN, which in turn refers to the OS MasterMap database for the geometry.

From this trial, DMBC realised that until data is exposed to the requirement of interoperability, the reliance on accurate representation of geometries is not appreciated. The adoption of DNF principles tested the accuracy of local authority-held data and revealed inconsistencies which must be addressed to achieve the successful adoption of DNF practise and the development of future DNF-compliant systems.

DMBC and AAL have researched into the feasibility and operation of a central corporate geometry database (CGD), proving the concept and practical implementation of data association to be wholly desirable. The next phase will convert this research into a fully practical system incorporating all types of DNF interoperability principles.

Benefits

- Creates a single source for geometry used by all applications;
- Enables the perfect correlation of land charges, planning, building control, housing, environmental health data;
- Facilitates the future-proofing of data interoperability between datasets at the local level through the DNF architecture; and
- Realises the possibility of extracting geometries for National Land and Property Gazetteer (NLPG) items from other authorities in whose addresses DMBC has an interest.



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For more information on DNF or the DNF Expert group please email the DNF Expert Group at info@dnf.org

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