



Photo: Partners IN Salford

On the right track in Salford

Web mapping based on a spatial data warehouse is helping Salford City Council move from a culture of individual 'silos' of information to an open, corporate GIS. Neil McLeod reports on how the move is propelling service levels to a new high

The city of Salford in Greater Manchester, in the north west of England, is interesting in a number of ways. Apart from being the UK's only 'city within a city', Salford has Britain's largest inland waterway network. During the industrial revolution, this helped it to become one of the world's first industrialised cities.

Today, that part of the waterway network that was once filled with dockside warehouses and environment-polluting factories is home to The Quays - a modern, world-class arts, theatre, shopping and housing complex that attracts over one million visitors a year and which will soon be the northern home of the BBC. And yet, despite this industrial heritage, half the city of Salford is made up of open green spaces.

Salford also boasts a web mapping system based on a central spatial data warehouse. Today, council members and the staff of Salford City Council, as well as the general public, are able to access and to use a store of mapping and associated information relating to the council's wide range of activities, using a web browser over the corporate intranet and externally via the Internet.

Silo syndrome

But only three short years ago things were very different. The council's digital mapping/GIS facilities - and its IT systems in general - had evolved over a number of years mainly through individual departments acquiring their own perceived 'best-of-breed' solutions. Even today this approach is not unusual in organisations of all types around the world. But it can lead

to the generation of 'silos' of information, with little, if any sharing of information between departments and activities.

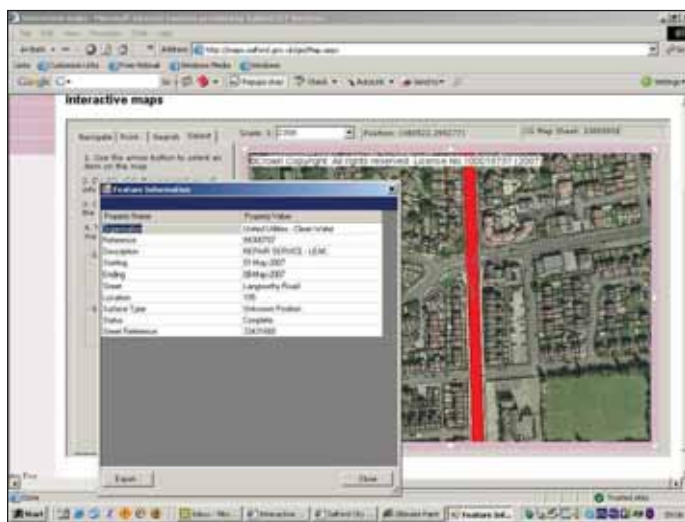
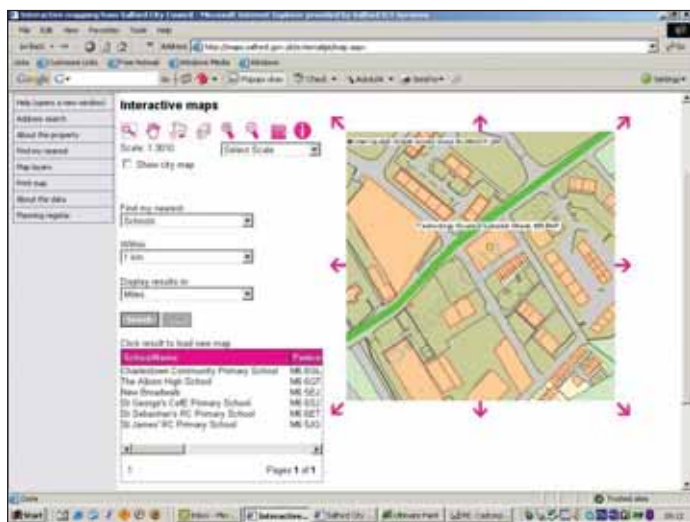
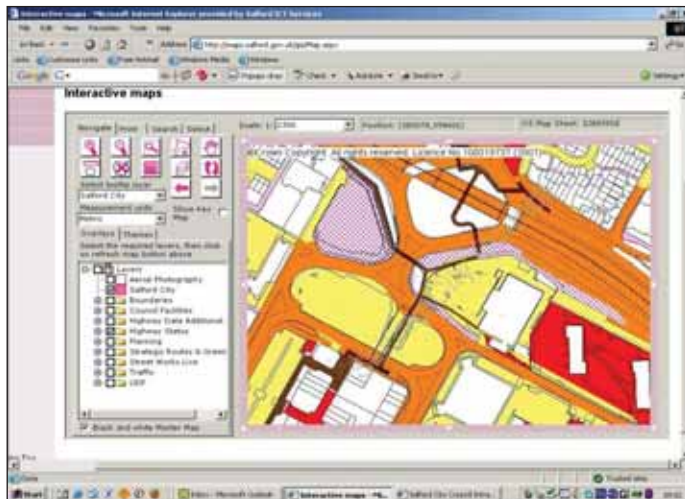
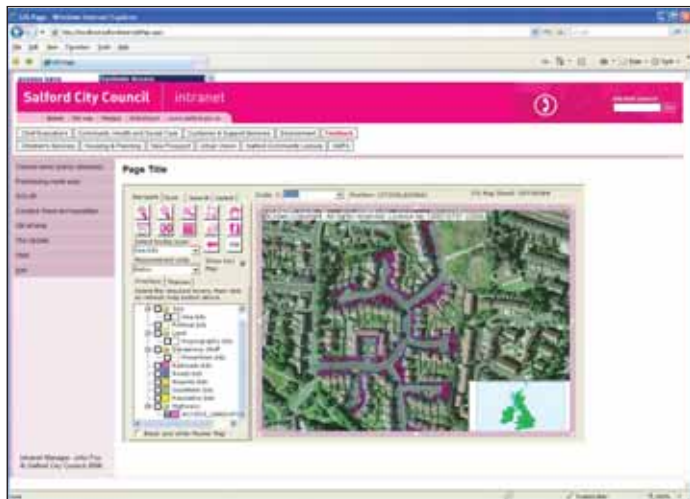
At Salford City Council, this departmental approach had led to there being digital mapping/GIS systems from four different software vendors, depending on the type of application. As a result there were separate information silos, which didn't communicate with each other.

For planning, building control and highways there was a number of ESRI ArcInfo desktop licences with interfaces to ESRI CAPS Uniform for development control and building control. Uniform was also the chosen software for creating and maintaining the Local Land and Property Gazetteer (LLPG).

For environmental health and education applications there were some MapInfo desktop licences, some of which had links to the Flare back-office system for environmental health, while for Terrier and highways management use, there was a third GIS, from GGP.

A fourth system, a simple mapping application for crime, disorder and community safety use called Sirius 7, had been installed in all local authorities within the Greater Manchester area, including Salford, in partnership with the Greater Manchester Police Authority.

Each of these systems existed in almost total isolation from the others with very little, if any data sharing or interaction taking place between departments. Each department loaded its own base mapping and managed its own data within its own local database or flat files.



Web-enabled interactive mapping serves Salford across a variety of activities. Examples pictured here from top left clockwise: boundary planning, highways management, planning utility works, and 'Find my Nearest' services

A couple of exceptions to this did exist. There was some data sharing between the Sirius 7 and MapInfo systems, but only on an ad hoc basis, and some transfer of LLPG data between the ESRI CAPS Gazetteer Management System (GMS) and Flare using DTF, the UK's national transfer format for LLPG data.

The only public interaction with any of the data held in these separate databases was through some limited access through the ESRI CAPS Public Access module to give access to planning applications data - though even this facility was buried deep inside the council's web site, making it difficult to find. As a result, it wasn't much used.

Strategy for success

With this background - and to its credit - Salford City Council's management team decided that in order for it to be able to meet the e-government targets and priority outcomes laid down by central government, it needed to improve its use of digital mapping/GIS technology. So in 2004, the council appointed Salford GIS, a digital mapping/GIS consulting firm, to produce a new GIS strategy that would enable the council to move forward and meet its aims and objectives.

In short, the strategy that Salford GIS presented to the council made three principal recommendations:

- That a central spatial data warehouse be developed in which all spatial and associated data would be stored and managed and from which all users would access information;
- That increased access to mapping data should be made available via the council's corporate intranet so as to make it readily available to all staff who need to use mapping data;
- That map-based interaction with the general public, via the Internet, should be implemented.

Seeking independence

The strategy recognised that conventional systems for integrating spatial information with database applications tend to be rather complex and unwieldy. Spatial data is normally held in a separate, proprietary data format and is linked to a relational database via middleware, resulting in complex data management issues and higher software licensing costs.

The central data store therefore needed to be as 'GIS vendor-independent' as possible to allow both spatial and non-spatial data to be stored and managed together and it needed to provide access to the LLPG, with two ways of indexing the data: by address and by location on a map. Tying these two together would mean that users could access almost any information relating to the organisation.

Human factors

The strategy also took into account a number of important 'human' factors that existed within the council. These included the fact that there was a high level of user loyalty to the existing GIS within each of the departments. And while there was a fair degree of GIS expertise among these users, the lack of an overall GIS strategy meant there were almost no GIS standards in place.

There was also little perceived need to share information between departments, as well as a resistance to sharing data that one department had paid to collect and maintain with other departments who had not.

GIS was also considered to be expensive and only for 'techies'. It was not seen as a technology for general use throughout the council's operations.

Any new strategy therefore had to enable existing systems to stay



With regeneration schemes changing the face of Salford, the City Council's LLPG-based 'Where's my Nearest' and 'About a Property' services are popular features of its public access web site

in place in order not to lose the cooperation of those systems' users. So under the strategy produced by Salford GIS and agreed to by Salford City Council, all users of existing systems would continue to record and maintain their data - but within a single, corporate spatial data warehouse, from where it could be shared with other parts of the organisation, as appropriate.

Implementing the strategy

Before any of the recommendations could be implemented, it was important that backing and support could be won from everyone affected. Among the first tasks, therefore, after the project was given the go-ahead in September, 2005, was to determine precisely what data existed, in which formats; who could make good use of it other than the originating department; and what it was people actually wanted from the intranet and Internet web interfaces.

This was an attitude-changing moment. Once the project team had circulated details of what information existed in the individual silos, people throughout the organisation suddenly realised that it would be very helpful to them to be able to access it and to use it in their own activities.

As the aim was to have a GIS vendor-independent spatial data warehouse, the project team needed to ensure that all existing GIS could read and write data in a standardised format. And as the City Council was already an Oracle house, the logical conclusion was to adopt Oracle 10g for this purpose, with the Oracle SDO (spatial data object) holding all spatial data. Two of the four incumbent GIS vendors already provided support for SDO, the third committed to supporting it in time, while the fourth had no such plans.

With the decision made to adopt Oracle 10g for the central spatial data warehouse, the next steps were to acquire two servers - one for the intranet and Internet web-mapping applications and one for the central data store - and to select software to deliver the web mapping capabilities.

Software evaluation

Proposals were received from four vendors, including three of the incumbents, and following a comprehensive evaluation by the council's GIS steering group, the unanimous decision was to select Cadcorp SIS® - Spatial Information System® desktop and GeognoSIS web-based digital mapping/GIS software to deliver the web mapping service. Cadcorp was also selected to be Salford's partner in developing the council's web mapping sites and spatial data warehouse.

"Although we already had GIS facilities from other vendors in the bidding process," says Paul Coward from Salford GIS, who is project managing the development and implementation programme, "we selected Cadcorp SIS and GeognoSIS because of the software's obvious

openness, its flexibility and development tools and most importantly, its ability to work with data from the other systems in use and to interface with Oracle 10g without the need for additional-cost translation software or middleware."

Expanding horizons

Today, Salford City Council still has its four different GIS and their users are happy to continue using them, as is the council's management team. It also still has the existing back-office systems that interface to these different GIS.

But it also now has a central spatial data warehouse, which enables data sharing, both internally and externally.

Cadcorp GeognoSIS web-based GIS software and development tools have been used to develop both the corporate intranet web mapping capability for internal users and the public access site (<http://maps.salford.gov.uk/externalgis/>), both of which recently went live.

Where existing systems aren't capable of writing/reading data to/from the spatial data warehouse using Oracle SDO, Cadcorp SIS desktop software is being used to interrogate the data and to load it into Oracle 10g directly. The LLPG is still maintained within the ESRI CAPS GMS but it is accessed by the web applications through a web service.

So today, anybody within Salford City Council with access to the corporate intranet via a web browser can access information via the web mapping server. Existing GIS and back-office systems users can use their own data from within the spatial data warehouse but now they can also access other departments' data, although this is often on a view-only basis.

Councillors and the general public are also able to use the Internet to access filtered, map-based information and to interact with the council's various departments on matters such as planning applications and to make fault reports and service requests.

In addition, Cadcorp products have been used to develop other web services, including an LLPG web service and 'Where Is My Nearest' and 'About a Property' services, all of which can be used to validate and retrieve information about addresses either in conjunction with or independently of the mapping system.

And as Paul Coward explains, "When the external Internet and internal intranet facilities went live earlier this year there was a mushrooming of interest and requests from other departments within the council for their data to be included."

Further enhancement

So the development programme continues. As more information becomes available it is migrated to the spatial data warehouse. The web mapping capability is to be enhanced using Cadcorp GeognoSIS to enable on-the-fly thematic mapping and the production of business graphics. A link to the council's CRM system is being established to enable fault reporting and service requests based on map rather than address locations. The ability to view planning applications and constraints from ESRI CAPS on the web mapping system is to be developed and links are being considered to other internal systems.

All of this will help to make digital mapping/GIS a mainstream facility within the organisation and improve data analysis capabilities. This will help to further improve the decision-making process, enabling Salford City Council to continue to deliver an improving service to its citizens.

Neil McLeod is a freelance writer who can be contacted by email at neilmcleod@btopenworld.com. For more information on Cadcorp solutions please contact Richard Rollins at richard.rollins@cadcorp.come.co.uk