

## Achieving Interoperability at Staffordshire County Council using the Digital National Framework

This document has been prepared by Staffordshire County Council and 1Spatial for the benefit of users of the Digital National Framework

Local Authorities are increasingly required to share data efficiently within departments, between departments and with external organisations and the general public. Staffordshire County Council (SCC) has a number of departments using Geographic Information Systems (GIS) and each maintains its own data and uses different GIS tools to manipulate that data. This has resulted in duplication of effort and led to inconsistencies between datasets. SCC is tackling these problems by enabling interoperability throughout the organisation.

Using DNF (Digital National Framework) principles, SCC worked with spatial data experts 1Spatial to prove and achieve an open and interoperable solution to data management. By sharing regional mapping data across the organisation, a single repository was created for business and spatial data to be stored together and to meet SCC's initial business requirement, i.e. improved spatial data access and sharing.

Such a shared environment lays the foundation for a DNF approach to be taken for the creation and management of spatially based business data across the organisation.

### The Challenge

*"We have invested nearly £1m in GIS over the years yet all it seems to do is produce lots of pretty maps." \**

SCC was faced with the challenge of achieving interoperability without a corporate GIS system or strategy. Their IT staff had no or little knowledge of spatial data. Their data was held in various systems, producing the classic multi-vendor applications situation (ESRI, MapInfo, 1Spatial etc. all used in different departments); a situation that makes DNF principles difficult to implement.

*"I never seem to be able to get hold of the right data at the right time, even though I know we have it somewhere." \**

SCC experienced several problems relating to their data access handling:

- Inconsistencies between datasets – datasets were maintained independently with no regard to how they related. Users were unknowingly introducing inconsistencies such as gaps and overlaps.
- Inefficiency – data was often duplicated across several departments. Valuable time was spent making the same updates to several versions of the same dataset, with no guarantee that these versions would remain synchronised.
- No interoperability between data formats – SCC's data was maintained in a number of proprietary formats. To share data, departments would have to export/import to a standard known format, meaning that real-time data sharing was impossible.

*"Wouldn't it be great if all the County Council's spatial data could be viewed or edited in a variety of applications?" \**

SCC needed to enhance the underlying spatial data quality and remove errors. They needed a single database across the organisation to centralise data storage and a link between business data and spatial. SCC required real-time access to maps and plans, for the data to be available for sharing internally and externally and a secure and scalable platform. With up-to-date, high quality data SCC could then use their spatial data for business analysis and decision making instead of simply as a backdrop. In addition this would then allow consistently referenced business data to be created and maintained to DNF principles.

\* (user comments from an SCC internal GIS survey undertaken in 2004)

### The solution

SCC was faced with the option of moving to a single GIS platform, or choosing an enterprise solution based on interoperable principles.

The single GIS platform option is not favoured by GIS users as SCC had 10 years of investment in various systems with bespoke applications and solutions. In any event a single GIS would not necessarily provide the link for data sharing with partners such as District Councils and other public bodies, thereby falling short of several DNF principles related to the sharing and structuring of data.

The second option was interoperability. By moving to storing data centrally, SCC could ensure access to the information by all systems/applications. Data could be opened up for sharing and duplication of effort could be avoided. Spatial data could be viewed in standard browsers, and access to spatial data outside the traditional GIS environment could be achieved. Overall, an interoperable solution appeared to provide the most promising platform for the future, something very important to SCC.



By sharing regional base reference mapping data across the organisation a single repository was created for business and spatial data to be stored together and to meet SCC's initial requirements and provide the foundation for a DNF based architecture. An Oracle9i database was installed and data uploaded from an area around central Stafford. Initially Ordnance Survey (OS) MasterMap® data of the area were loaded. Foreground data belonging to SCC were loaded and topologically structured against the OS MasterMap data using 1Spatial's Radius Topology™ product. Once configured, Autodesk MapGuide 6.3 was installed so that data could be viewed via a Web browser. The data can now be viewed using a variety of other Web viewers, e.g. ESRI ArcIMS 4.1.

All SCC's GIS applications will work alongside each other reading from an Oracle9i database. These applications include:

- Autodesk – MapGuide
- ESRI – ArcIMS
- Map Info Professional

1Spatial's Radius Topology provides a persistent, server-side solution for ensuring ongoing data quality management; it is client agnostic and so works with all desktop and web editors that can read/write the Oracle spatial data type [SDO\_Geometry].

In order to improve usability, SCC wanted to link foreground data to DWG floor plans that had been created in AutoCAD. Linking foreground data to floor plans allows SCC to easily store and access information such as asbestos and asset location. All the information relating to the asbestos can be stored, including type, composition, amount and removal cost. To have attempted to locate all the asbestos areas in the Stafford region manually and manage its condition, treatment and removal would have been an impossible task. This interoperable initiative saved a considerable amount of time, effort and cost by automating most of this effort.

## Results and Benefits

- Base layer OSMM linked to data layers of all groups (e.g. education, property, development) via TOIDs
- Re-usable spatial data certified to be of a consistent quality standard
- Reduced duplication of effort by separate departments
- Spatial data available for sharing both internally and externally, in real-time and not solely in GIS applications
- Successful link between spatial and business data for quicker analysis and decision-making
- Secure and scalable platform to support information transfer both now and in the future
- Quick and simple report production, e.g. for asbestos locations, as all that is required is a standard Internet browser

By implementing open and interoperable centralised data management, SCC has achieved its original objectives and has developed a system providing a foundation for DNF principles: -

- **Definitive** – Radius Topology was used to move the council's data on top of OSMM to provide a definitive reference layer
- **Inclusive** – By migrating to a centralised Oracle database, SCC are creating an open and inclusive environment
- **Structured** – By linking to OSMM using TOIDs, SCC reference their features through unique identifiers and maintain their data effectively
- **Reliable** – SCC have one consistent dataset; everyone has access to the same high quality data which underpins important business decisions
- **Cost-effective** – The central database needs only to be updated once, but the data are used many times in different departments
- **Flexible** – The Oracle database uses open standards; SCC can use many different applications to exploit their data.

**Staffordshire**  
County Council

the digital national  
framework

[www.dnf.org](http://www.dnf.org)

**ORACLE** CERTIFIED  
PARTNER



**1Spatial**  
Head Office  
Cavendish House  
Cambridge Business Park  
Cambridge  
CB4 0WZ, UK

**1Spatial**  
Olavsgt. 39b,  
NO-3612 Kongsberg  
Norway

**1Spatial**  
c/o Ordnance Survey of  
Northern Ireland, Colby  
House, Stranmillis Court,  
Malone Lower, Belfast,  
BT9 5BJ, Northern Ireland

**1Spatial**  
c/o Ordnance Survey  
Ireland  
Phoenix Park  
Dublin 8, Ireland