

Web GIS

STEMS (Schools Transport Enquiry Management System)

Introduction

Local authorities are required to provide free school transport to children living beyond a certain distance from their school. In order to do this, council staff require access to accurate reliable road and path network information to be able to determine the eligibility of pupils for transport assistance.

In 1998 Forth Valley GIS developed a desktop GIS application which allowed users to carry out this function. The application was used successfully for many years, but with the increasing use of web systems and new intelligent road network datasets e.g. OS Integrated Transport Network®, another solution was needed.

Clackmannanshire, Falkirk and Stirling Council service users decided to commission Forth Valley GIS to develop a replacement system. The result was a new Web GIS-based routing application integrated within the wider GIS infrastructure available to all staff in the councils.

Requirements

An application was required which would allow multiple-user access to the following functionality:

- Design safe routes to schools
- Calculate distances travelled to schools by pupils either within or outwith the school catchment
- Designate sections of road as unsafe for children to use

- Produce maps and reports on the routes



The application would have to be underpinned by a reliable property and address database to facilitate searching for pupil's home addresses successfully. Integration with the councils Corporate Address Gazetteer (CAG) was an ideal solution. The application also requires access to school location, school gates and school crossing data.

In addition, the application was to be easily integrated with the existing corporate GIS solutions already in place.

A web GIS solution was the preferred option to remove the costs associated with desktop GIS and to provide wider access to the schools data and related routing information.

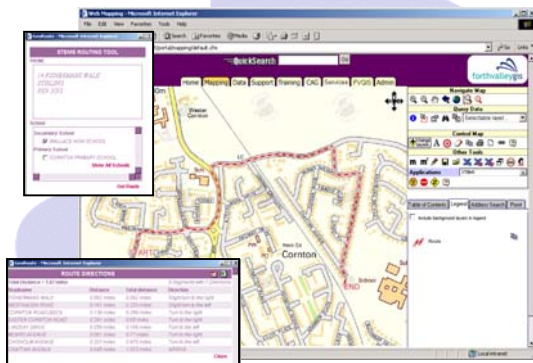
Solution

The following bullet points summarise key aspects of the new STEMS application:

- A bespoke toolbar and associated forms enable users to access the routing functionality and unsafe route designation.

This can be readily slotted into the existing Corporate GIS solution.

- Existing Web-services are used to provide the address-based selection of households using the Corporate Address Gazetteer (CAG). Using the CAG provides reliable, up to date information on new properties and address changes.
- The Ordnance Survey ITN® dataset which is available to all Scottish Local Authorities under the Mapping Service Agreement is employed to provide a robust and reliable network upon which the base the routing.
- Procedures were developed to generate the necessary Routeware Netserver datasets from the ITN dataset.
- There is the option to include digitised paths where these are available.



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Forth Valley GIS developed the new system using Routeware NetServer to provide the routing functionality. This routing software uses application server technology and is designed to operate with a high uptime, a high performance and with a high level of scalability. Routeware NetServer runs completely independently of GIS systems, but can import road networks from various common GIS data formats, and can be used in conjunction with all the main Web-mapping software systems e.g. MapXtreme, ArcIMS, MapServer, MapGuide etc. to show routes on a map.

Benefits

The new STEMS system provides an extremely cost effective and reliable means for planning school routes interactively and calculating free school transport entitlement.

- The Routeware NetServer functionality is easily slotted into the existing application Architecture with no requirement to re-develop exiting GIS functionality. To date, implementations have been made in conjunction with ESRI ArcIMS® and Autodesk Mapguide®.
- There is flexibility in the way the application can be hosted. FVGIS provide a hosted service for the Tri-Council Consortium. Other Councils have implemented STEMS locally using there own infrastructure.
- The customer is easily able to decide which streets should be designated un-safe and apply this designation using the STEMS interface.
- The system provides individual route maps for each route calculated in associated with a full description of the route, and the calculated distance.
- The ITN® data preparation procedures written by Forth Valley GIS customer support arrangements provide a convenient and reliable mechanism for applying change-only MasterMap ITN updates. Furthermore, research undertaken during the pre-preparation of routing data has been shared with the key data loading systems supplier to the wider general benefit of the GIS community.
- Routeware Netserver provides a broad range of analytical functions for planning routes and modelling accessibility. This provides scope to incorporate additional functionality. For example, one customer has travel time from schools mapping (isochrone) capabilities incorporated in

STEMS. The bulk processing of all free-school transport entitlement calculations as a single annual batch operation is under consideration as a possible development.

STEMS ensures that consistent information is available to aid the decision making of officers, and to record known routing difficulties that a large number of officers can see. By using intranet GIS a large number of officers can now respond to public enquiries.

- Colin McMenemy, Planning & Performance Officer, Stirling Council

Wider Use

Following successful implementation in Falkirk, Stirling and Clackmannanshire Councils, Forth Valley GIS have now developed STEMS for Angus Council. This has also been integrated with their corporate web GIS which is based on Autodesk Mapguide®.

Project type:	Technical, System Development, School Transport Planning.
Software:	Corporate Intranet GIS; ESRI ArcIMS®, Autodesk Mapguide® Routeware Netserver
Customers:	Clackmannanshire, Falkirk, Stirling & Angus Councils.

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