POWERFUL FUNCTIONALITY BASED ON ESRI AND MICROSOFT PRODUCTS

Active Places: The Sport England GIS Portal

Sport England manages distribution amongst sporting organisations of UK government and lottery funds. It is committed to creating opportunities for people to take up, continue participating in and succeed in sporting activities. A GIS portal has been developed based on ESRI and Microsoft products delivering a cost-effective, robust and scalable solution to disseminate information to the general public.

A proposal was put to Sport England involving the establishment and maintenance of a single authoritative database holding information on all sports facilities in England. This would replace the current situation in which many sport organisations separately maintain information with varying levels of accuracy, quality and completeness, using inconsistent definitions and in a wide variety of formats. The proposal aimed to ensure that information on sports facilities would be available to the widest possible audience.

Promoting Sport

Achieving the objectives involved development of three key elements:

- sports data exchange model
- web-based framework for disseminating spatial and non-spatial sporting data
- framework for interacting with the public to receive feedback and share development plans.

Developing the sports data exchange model was the first step. It involved studying various sporting datasets and defining, publishing and promoting a unified classification scheme, metadata structure and common data schema to hold sports information. This step required wide consultation with major public and private-sector sports organisations.

Creating the Web-based framework involved developing a Web-based geospatial system to allow the general public and other end-users to query the sports database and visualise search results on a map. The system would also allow viewing of results in textual tabular format and provide an interface to exchange, download and periodically update this master sports data. The Web interface is designed to facilitate the general public in participating in regular exercise and sport by making it easy to find facility locations. This will help Sport England achieve their goal of getting 70% of the UK population active for 30 minutes, five times a week by 2020. Local authorities, national sport governing bodies, government departments and lottery-fund distributors will also be able to use the information to help guide investment in sports facilities. The final goal of gathering feedback from the general public has been incorporated into this Web-based framework.

Public and Planners

The solution, called Active Places, is a public portal that holds information on sports facilities throughout the UK, including local-authority leisure facilities and commercial and club site information. Active Places contains information on specific attributes such as activities, location, facility size, opening times and contact numbers. The solution serves two types of users. It delivers limited functionality to allow the general public to search for sports facilities anywhere in England by browsing an interactive map of the country to search for facilities in their local area or use the name address of a facility for more information. This site is active and can be accessed free of charge. It also delivers enhanced functionality to high-frequency users for analysing data and helping in the planning of new sports facilities, assisting in investment decisions and helping local authorities perform audits of their sports facilities and develop local strategies. The enhanced functionality includes generation of standard reports, census data-based thematic charts and a series of push-button analyses based on the Facilities Planning Model developed by the University of Edinburgh and designed to examine the catchment areas of existing and potential facilities. Frequent users of Active Places will also be able to download data, add supplementary data and use it with their own analysis tools; or alternatively reload it into the system for further analysis. The site is password-protected and users will be assigned different rights according...
Microsoft Windows Server 2003 NLB:

- scalability by load balancing multiple server requests
- ensured performance and low overheads as a result of fully pipe-lined implementation
- support for up to 32 computers in a single cluster, maximum eight clusters
- no specialised hardware required
- ensures good availability, automatically balancing the network load when hosts are added or removed
- ensures manageability, enabling management and configuration of multiple NLB clusters from a single computer via NLB Manager, specification of load-balancing behaviour for single IP ports or group of ports using port management rules and allowing control or blocking of undesired network access to certain IP ports
- automatic detection and recovery from failed or offline computer
- ease of use as installed on Windows
- no required hardware changes for running
- user access to cluster via single logical internet name and virtual IP address
- no modifications required to server applications to run in NLB cluster
- computers can be taken offline for preventive maintenance without disturbing cluster operations.

Technological Details

ActivePlaces.com is provided to Sport England as a hosted Web service, managed and monitored remotely from RMSI India offices. The configuration enables Network Load Balancing (NLB) to route traffic to each of the Web servers during normal operations and only to the active Web server if one of the servers fails. ArcIMS load-balancing enables distribution of spatial server processing between the two ArcIMS server platforms to evenly distribute processing of requests. The configuration involves clustering two data servers connected to a common storage array data-source. The primary data server supports query services during normal operations and the secondary data server takes over services should the primary server fail. The solution has been built using the following technologies:

- OS: Microsoft Windows Server 2003 Enterprise
- Web Server: Microsoft Internet Information Server 6.0
- Mapping Server: ESRI ArcIMS 4.0.1
- RDBMS: Microsoft SQL Server 2000 Enterprise with ESRI ArcSDE 8.3
- ASP, XML, Visual Basic.

The core components are Microsoft Windows Server 2003 NLB, Microsoft SQL Server database clustering and ESRI ArcIMS three-tier configuration. The last incorporates ArcIMS components, including Web server and connectors, ArcIMS application server, spatial server and data server. Its three-tier configuration consists of two Web servers, two map servers and two data servers, ArcIMS load balancing to balance load between the spatial servers, and two data servers are clustered and connected to a common storage array. Finally, it provides security via a firewall, with only Port 80 available for communication purposes.

Microsoft SQL Server 2000 database clustering

- ensures application availability, providing online backups, fully integrated log shipping and providing fail-over via clustering
- scalable, supporting up to 64GB RAM and 32 CPUs
- distributed partitioned views and parallel symmetric multiprocessing from two-way to 32-way systems
- highly manageable with simplified database administration and graphical enterprise manager.

Standards

As a national project the Active Places system conforms to W3C World-Wide-Web standards and, in particular, the adoption of XML (Extensible Mark-Up Language) and XSL (Extensible Style sheet Language) as the core standards for data transfer and presentation as defined by the World-Wide-Web Consortium. It uses UML (Universal Modeling Language) to model, design and document XML schema, together with GML (Geographic Mark-Up Language) to facilitate the exchange and storage of geographic information such as facility boundaries. It also uses the e-GIF (e-Government Metadata Framework) for establishing and implementing metadata standards.

Final Remarks

This project serves as the base platform for the provision of value-added services, several of which are under discussion. The ability to add servers as required without affecting the performance of the application ensures that Active Places can easily change scale to meet future requirements.

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