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A Web distributed Incident and Hazard Mapping Solution for Life Saving Victoria: an Open Source Software Case Study

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Volunteer Life Saving organisations play a significant role in promoting community awareness of water safety issues, and in the provision of patrolled areas featuring rescue facilities and services at many beach locations.

As noted with Armed Forces and Emergency Services Organisations, the use of GIS and Command & Control software provides a most useful service for Real-Time and Post-Event analysis and decision support. Commercial vendors offer a wide range of software products to fulfil these service requirements, however, due to the mission criticality addressed by their use, these software products typically attract significant purchase and maintenance costs.

The challenge of this project was to design and implement a software solution to address Life Saving Victoria's (LSV) core requirements in this application space using Open Source Software (OSS).

The base objective was to provide a ?proof of concept? software platform to record and collate State-wide incident and hazard information from Life Saving Clubs (LSCs), regardless of location, into a centralised repository. The subsequent objective is to make the data available in a GIS style visual environment featuring supporting context spatial information such as satellite imagery, vector GIS data, and Real-Time weather information streamed by Bureau of Meteorology (BOM).

The objective of distributing this supplementary feature rich information to each LSC is to enhance corporate and local decision making, regardless of location or computational resource. In addition to near real-time decision support, the systematic collection of spatialised data is highly desirable at a corporate level for Post-Event analysis with the ultimate business objective of optimising service quality based on iterative learning.

Due to the lack of standardised IT infrastructure at LSCs outside of LSV's corporate

office, a server based solution interfaced using a Web client was considered to be the most effective method of providing a functional service accessible by participant clubs. It is therefore significant to note that the service is required to be functional using heterogeneous, potentially obsolete, residential quality compute infrastructure and a dial-up Internet services.

The software platform constructed uses a three-tiered architecture consisting of a spatialised database, a web service and a web application.

The communication between the components is through Web Map Service (WMS) and Transactional Web Feature Service (WFS-T) protocols, open standards set by the Open Geospatial Consortium (OGC). The data passed back and forth between the server and the client is encoded as Geographic Markup Language (GML) which supports the representation of complex geometries as well as point data.

The middle tier web service is highly scalable as it is partly implemented as a J2EE web-service. This allows for the application to be deployed in multiple instances for increased performance. The application can make use of a wide variety of data including satellite imagery, aerial photography, live weather information streamed as a WFS, and vector GIS data.

It is notable that the access to spatial databases is via WFS-T, since this facilitates the insertion, deletion and updating of spatial data across the web in a highly interoperable manner. Operationally this means that multiple users can concurrently access the application from anywhere using a web client. By making use of transactional operations in conjunction with a spatial database, new features can be added via the web interface allowing the recording of incident and hazard information from remote locations.

All of the components deployed in this solution are Open Source Software. The use of open systems and open standards facilitates simple integration of external data sources and additional software components.

The application is currently being trialled by several Victorian and one interstate Life Saving Clubs.

Primary authors : Ms. WALDREN, Nicola (Life Saving Victoria)

Co-authors : Mr. FLANNERY, Simon (VPAC) ; Mr. MCAULAY, Angus (VPAC) ; Mr. BURQ, Shoaib (VPAC) ; Mr. RESTON, Marcus (VPAC) ; Mr. GARNETT, Nichola (Office of the Emergency Services Commissioner, Department of Justice, Victoria)

Presenter : Mr. BURQ, Shoaib (VPAC)

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