Spatial Data Integrability and Interoperability in the Context of SDI

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Abstract. The number of multi-sourced heterogeneous spatial datasets continues to grow and the fragmentation of organizational arrangements has caused much technical and non-technical heterogeneity. Spatial Data Infrastructures aim to facilitate spatial data use and sharing, and can be an effective platform to aid in data integration. This paper discusses the technical and non-technical heterogeneities of multi-sourced spatial data within the holistic framework of Spatial Data Infrastructure. The paper capitalizes on research and case studies undertaken within Australia. The paper also introduces Geo-WebServices as a means of facilitating spatial data integration and interoperability. Geo-WebService can provide a platform to assess the level of Integrability and readiness of multi-sourced datasets. The results of this research aim to assist practitioners in developing the necessary technical tools including geo web-services and guidelines for effective data integration.

Keywords: spatial data, Spatial Data Infrastructure, integratability, interoperability, Geo Web-Service

1   Multi-Source Data Integration and Interoperability

Multi-source data integration and interoperability has become a significant issue as it ensures effective access and reuse of spatial data by many spatial users and applications. This has created many opportunities and possibilities for using and applying spatial datasets in a range of services.

Many spatial applications and services try to model and analyze some aspects of the environment utilizing different criteria. These applications rely highly on multi-sourced spatial data to meet the requirements of di-

verse criteria. For example, the Emergency Information Coordination Unit (EICU) of New South Wales (NSW)-Australia utilizes different spatial data ranging from fundamental datasets including cadastre, topography, roads and imagery to locational data including police, fire and points of interests to socio-economic and infrastructure data including demography, valuation, public transport and utilities (Colless 2005). Many of these datasets are managed by different custodians in NSW. For example cadastre and topography is managed by local councils and Department of Lands, roads by local councils, Roads and Traffic Authority (RTA) and National Parks (Baker and Young 2005), and fire data by Department of Land, National Parks and Wildlife Service and Royal Botanic Gardens.

Table 1 summarizes some spatial datasets which are necessary for emergency management purposes and also their potential sources within the state of NSW-Australia.

Table 1. Example of spatial data with potential sources used in NSW-Australia

Spatial data	Source
cadastre and topography	Local councils and Department of Lands
roads	Local councils, Roads and Traffic Authority (RTA) and National Parks etc.
imagery	Department of Lands, RTA, and Department of Agriculture
vegetation	Department of Land and Water Conservation, National Parks and Wildlife Services, Forests NSW, Department of Defense
fire	Department of Land, National Parks and Wildlife Service and Royal Botanic Gardens
threatened species	Department of Land, National Parks and Wildlife Service and Royal Botanic Gardens
waste	Environmental Protection Agency, Waste Service and Local Councils

As shown in the above table, different organizations are responsible for different datasets. Organizations develop their own strategies and policies in regards to capturing, managing and sharing data. The diversity of approaches utilized by these organizations leads to many technical and non-technical inconsistencies and heterogeneity among datasets.