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Toponymic data files: Compatibility and structure of systems

Integrating Geographic Names Data into A GIS

Submitted by Australia **

INTEGRATING GEOGRAPHIC NAMES DATA INTO A GIS

Australia is a major user of spatial information, and a multitude of custodians of applications. Individually, the data sets satisfy an identified need and provide benefits to their custodial agencies. Collectively, however, they exhibit a distinct lack of homogeneity, inhibiting their integration into a national or even state dataset and preventing the realisation of their full value.

The lack of homogeneity becomes a problem when gathering data for national, regional or state projects. A project's implementer is faced with the expensive and time-consuming task of obtaining consistency from fragmented and heterogeneous data sets. The absence of uniformity is also an inhibitor to the development of on-line applications. This ultimately results in economic loss to data users and suppliers alike.

In Australia the Intergovernmental Committee on Surveying and Mapping (ICSM) had the foresight to create a harmonised data model which provides a cohesive, standards-based framework which will promote consistency in the management and transfer of spatial data. It also reveals the strategic importance of geographical names data in spatial data infrastructure, and this paper provides an outline of how one Australian state has utilised the principles outlined by ICSM and integrated its names data base into a departmental GIS system.

Introduction

In this spatial information age, the real value of names databases gazetteers is often not recognised. Gazetteers should no longer be stand alone databases of value to topographical mapping and general referencing only. Names databases can be integrated into land information/GIS systems where their value and utility is greatly enhanced, and where they can become one of the key linking datasets. There is a great opportunity to enhance names data by making it far more inclusive by including any names data of value to users and government. This paper reports on how the names database in Western Australia has been developed in such a way that it is regarded as one of the most valuable fundamental datasets to Landgate, the agency that has custodianship of it, and how it adds valuable referential integrity to a number of the agencies datasets. The authority of the names data is now recognised across government and has assured that names information is stored and maintained in only one place for many purposes, and that resources are available to sustain the database.

Background

There is nothing remarkable about the geographical names gazetteer (acronym GEONOMA) for the Australian state of Western Australia, except that it includes all of the road names within the state. It is also not a large gazetteer, and has approximately 53,500 topographical names, 66,000 road names and 3,900 administrative names. Western Australia is a large state of 2,500,000 ha but has a population of a little over 2,000,000.

The gazetteer was built in the early 1960's as a card gazetteer in support of a new topographical map series – essentially a gazetteer to ensure the correct spelling and position of the names of geographical features shown on 1:250,000 scale mapping. The cards included spatial information and often a brief account of the history and meaning of the name. A separate road names card index included similar information on road names, but no spatial information other than locality and local government areas. The gazetteer has been redeveloped twice, and as the last time was around 10 years ago, it is again in need of redevelopment.

The agency with responsibility for maintenance of the gazetteer is now named Landgate, and was previously the Department for Land Information. Foresight and good management by key people has ensured that in these times of rapid changes of agency names and responsibilities that this agency has maintained custodianship for both the state's cadastre and topographical databases, as well as land titling. The value of these responsibilities in connecting with the geographical names database will be obvious later in this paper.

Like most similar government agencies Landgate now primarily maintains data, and on-sells this to other agencies and companies who produce mapping or other products from it. Landgate's mapping functions are now mainly customised and tourist maps, but for more than 60 years it has produced, and continues to produce, a street directory of the State's major metropolitan area of Perth. In recent years this has also been expanded to include other urban areas across the State. This is a product that has been produced for more than 60 years, and is another key reason that has required the agency to maintain an authoritative road names dataset.

Current Status

A key decision was made around 10 years ago when the agency developed a new digital cadastral spatial database, and included the geographic names database in that development. This enabled a link to be made with names data and all cadastral entities that have a name. This includes roads, reserves and parks, and more recently, administrative boundaries. As other digital datasets have been developed the names database has continued to be linked to any where there are named entities.

The integration of the names database into the agencies cadastral, topographic, and other datasets is briefly described below.

Cadastre – Landgate's spatial cadastral data base includes all of the cadastral boundaries within the state, and most of the administrative boundaries that link to those boundaries. It is added to on a daily basis by the inclusion of all new cadastral surveys within the state, as Landgate is the approving and registration agency for all surveys. New road names are approved at the same time as the survey, and included in the names database. The names shown in the cadastral database are obtained from the names database, with the unique feature identifier (UFI) attached to the name being the link. The same principle applies to administrative names, with the names of suburbs and localities, land administrative districts, named forests and reserves and even electoral districts included in the names database and linked to the cadastre.

Street Address – Property street addresses provide a common reference framework between many fundamental data sets. Various organisations have created detailed property address databases and are now seeking benefits in linking these to digital cadastral or road network spatial databases to assist in their administrative and maintenance functions. In a similar way accurate property address details are a valuable asset in a geographic information system. The names database includes all road names, including private roads, and all suburb and locality names, and all address systems used within the agency link to the correct names in the names database. This includes the addresses included on land titles.

Topography – Landgate has only recently redeveloped its topographic database into a digital topographic database, and a special project was initiated to link the topographic features to the names database. With the aim of centralising data management, this project links the spatial representations of topographic features to their corresponding name in the geographic names database rather than store names in the Topographic Database. This supports referential integrity by eliminating the need to maintain feature names in two fundamental data sets. A later stage of development of the topographic database will be the inclusion of a street centreline dataset which will be linked in a similar way to the names database.

Summary

The need for timely and accurate geo-spatial information is steadily increasing due to the changing requirements of our society. Therefore, it is necessary to improve the accuracy of spatial information and advance technology related to the acquisition, processing, storing, retrieving, analysis, dissemination and presentation of geospatial data for effective use for sustainable economic development and protection of the environment. The principle of maintaining a single comprehensive names database and integrating it into various other datasets enhances the value of all of the data, reduces maintenance costs and ensures that the strategic value of names data receives the recognition it deserves.

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