

LYNX and the Commonwealth Spatial Data Integration Initiative

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Key words: LYNX Services Framework, National Address Management Framework (NAMF), Address Verification, Address Geocoding Engine, Geocoded National Address File (G-NAF).

SUMMARY

PSMA Australia is a governments' owned, unlisted public company, that was established in 2001 to coordinate the assembly of, and facilitate access to, fundamental national spatial datasets. PSMA Australia's Head Office is in Canberra, Australia, and is dedicated to developing national datasets and data management solutions that contribute to the economic, social and environmental outcomes for Australia.

The LYNX Services Framework is a function of the LYNX system developed by PSMA Australia. The LYNX Services Framework allows users to validate street addresses against address verification engines that were developed by Value Added Reseller (VARs). It was initially a demonstration for sharing the services of the States and Territories, in this case the address verification component of the Victorian Mapping and Addressing System (VMAS).

PSMA Australia's LYNX Services Framework utilises the company's nationally recognised authoritative datasets, its relationships with the Commonwealth, State and Territory governments of Australia, and its network of private sector VARs, to provide an effective route to market for vendors of address verification engines, and a nationally consistent approach to address verification.

This paper describes:

- How and why the LYNX Services Framework came into being;
- The relationship between LYNX Services Framework and third party services created by Private Sector companies;
- The successful integration of the LYNX Services Framework within the Commonwealth Spatial Data Integration (CSDI) pilot, as a spatial enabler of address data; and
- How the LYNX Services Framework can be used to support the Australian spatial community through alignment with initiatives such as the National Address Management Framework (NAMF).

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1. INTRODUCTION

This paper describes the development of the LYNX Services Framework, a function of the PSMA Australia's LYNX system. It further discusses how the framework was used to deliver crucial functionality required by the Commonwealth Spatial Data Integration (CSDI) pilot, as well as how it will be utilised to support the National Address Management Framework (NAMF).

2. BACKGROUND OF PSMA AUSTRALIA

PSMA Australia is an unlisted public company. It was established under Australia's corporations' law and is wholly owned by each of the State and Territory Governments and the Australian Government. Each government holds an equal share despite their disparity in population and economic capacity.

PSMA Australia provides a mechanism for sovereign states to work collaboratively and yet is able to act independently within broad boundaries established by its owners – the Governments of Australia. PSMA Australia is a self-funded entity, thereby contributing to its independence and allowing the focus to be on providing social and economic benefits through the provision of national spatial data.

PSMA Australia has developed six national datasets, consisting of:

- G-NAF® (Australia's authoritative reference for geocoded addresses);
- Transport & Topography™ (nearly 2 million kilometres of road centrelines and selected topographic information);
- CadLite® (a graphical representation of all 10.7 million registered land parcels in Australia);
- Administrative Boundaries (localities, suburbs, local government areas, state boundaries, electoral boundaries);
- Postcode Boundaries (established in collaboration with Australia Post); and
- Points of Interest (a collection of point features to add context and detail).

The role of PSMA Australia is to greatly simplify the arrangements under which standardised and aggregated data can be accessed. There is great consumer confidence and certainty as PSMA Australia is a single authoritative source for fundamental spatial reference data (see Figure 1). The removal of duplication that has historically been in place, frees up resources that can then be focused on core business and innovation. The ability to share the costs of data conflation across all users enables a higher quality of

data at a lower cost per consumer, and additionally, as the cost barriers associated with access reduce, broader access to data results.

As the Australian population continues to grow, so does the quantity of data requiring management. This is further strained by the recognition by the population and public and private business sectors, the importance of spatial data. PSMA Australia is a dynamic company, and has historically been innovative in the development of national datasets. PSMA Australia sees its role as an industry leader being extended in the future as it continues to innovate to provide new continental datasets to the wider community.

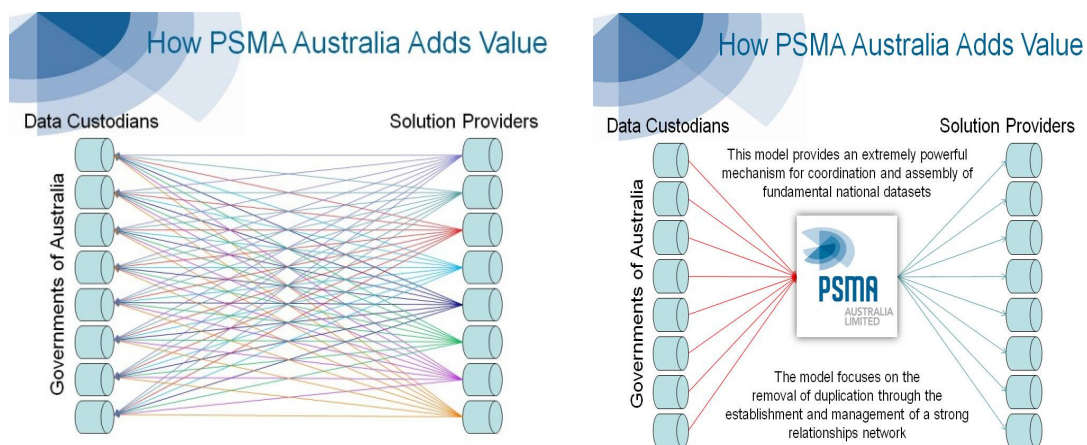


Figure 1: How PSMA Australia Adds Value

The governments of Australia established PSMA Australia Limited to ensure that the substantial value inherently held within national spatial datasets can be readily accessed so as to deliver economic, social and environmental benefits to Australia.

It is captured in the Company’s mission statement which has changed little since it was first crafted over a decade ago. It relates to the strong and consistent focus of the organisation on this task.

“The return of social, environmental and economic benefits through the provision of authoritative national location information, knowledge and services.”

Data is valuable. Spatial data has always been more difficult to handle and more difficult to put a value on. Nevertheless, it inherently contains great value. Consequently, our

shareholders measure their return not by the size of the dividend returned to them but by the value received by all Australians via access to and utilisation of these national datasets.

Like the mission, the vision has remained reasonably consistent and still accurately describes what it is that PSMA Australia is striving to achieve.

“To be recognised nationally and internationally as providing the authoritative foundations for enabling and shaping location based business solutions.”

The means by which PSMA Australia achieves the long-term outcomes sought by its shareholders is already evident in some of the previous discussion. It is by forming and managing a crucial data network between creators of fundamental spatial information and users of this information through aggregating, standardising, integrating, distributing and assisting with the utilisation of national spatial datasets.

The requirement to be financially self sustaining forces the organisation to focus on the customers, their requirements and the value of the proposition to them. Competition (and the threat of competition) drives increases in efficiency and innovation ultimately delivering to customers greater levels of value from spatial information which can be extracted with greater ease.

3. THE TECHNOLOGICAL ENVIRONMENT

Before the solution can be discussed in detail, an understanding of the technological environment must be gained. This includes the current technology being developed and utilised by PSMA Australia, and government activities driving technological initiatives and enhancements within the Australian spatial industry.

3.1 LYNX

During 2004, several initiatives were instigated including the implementation of a storage environment that would hold all the PSMA Australia data products in a single harmonised and highly normalised data schema. This was not a trivial task and took some 18 months to design and implement after considerable consultation with data contributors and VARs.

The importance of this decision cannot be understated. It has proven to be a vital step, crucial in many of the activities that were to follow. The implementation of this storage environment then enabled the automation of quality assurance tasks. This alone had a significant impact on the quality of data structure and consistency.

The new environment also enabled the establishment of a secure web portal for provision of reports and product information, data manager deliverable acceptance and VAR data

requests that could be fulfilled by automated DVD burning and mailing, e-mail or FTP delivery.

The system was coined LYNX (by virtue of the connections that it assisted in streamlining) and was launched by the then Special Minister of State, The Honourable Gary Nairn in late 2006.

During the following year, the system was recognised by URISA¹ amongst an international field as an exemplary enterprise system within government (Paull, 2009).

In 2007, PSMA Australia's Board made a number of decisions that would result in a need for enhancements to LYNX in order to continue its role in supporting the supply chain and data management activities of the company.

The following key requirements were identified:

- a. Greater levels of quality (coverage, accuracy, completeness);
- b. Flexibility of delivery (both the method of delivery and the form of the data to be delivered);
- c. Greater range of data and the harmonisation of that data to aid analysis and new product development; and
- d. Support for infrastructure and environments that enable rich blending of spatial products and services in near real-time (Paull, 2009).

The fourth requirement led PSMA Australia to explore supporting its shareholders, the Commonwealth, State, and Territory governments of Australia, by facilitating the sharing of government developed services. This, in turn, led to the creation of the LYNX Services Framework as a means of deploying and testing services through a consistent, integrated, framework.

3.2 THE COMMONWEALTH SPATIAL DATA INTEGRATION

Following their election in 2007, the Federal government took steps to initiate the sharing of data between agencies in order to assist with policy development and decision making, particularly in areas relating to social inclusion. The recognition of the importance of location in achieving these policy outcomes led to the establishment of the Commonwealth Spatial Data Integration (CSDI) Pilot Project in 2009. The intent of this initiative was to protect the privacy of data by de-identifying it, aggregating it by common and meaningful spatial areas, and making the data accessible to other government departments.

¹ The Urban and Regional Information Systems Association, <http://www.urisa.org/>

3.3 THE NATIONAL ADDRESS MANAGEMENT FRAMEWORK

The Australian Government Information Management Office (AGIMO) undertook the specification of a framework to deliver a nationally consistent approach to the management of addresses.

There were three output documents delivered as part of this specification². Firstly, the National Address Management Framework (NAMF) identified PSMA Australia's Geocoded National Address File (G-NAF) as the authoritative dataset for verification of physical addresses. Secondly, NAMF identified the Australian Standard for Client Interchange, AS4590:2006, as the standard for storage and interchange of addresses. Finally, a specification for verification of addresses that uses an AS4590 compliant address schema was developed. A process for testing compliance with these three documents has been specified, and will be built in 2010.

The Ministerial Online and Communications Council (a Ministerial Council of the Council of Australian Governments (COAG)) endorsed the National Address Management Framework at its meeting on 12 December 2008.

4. IMPLEMENTATION

In 2007, the Victorian Department of Sustainability and Environment commenced development of the Victorian Mapping and Addressing System (VMAS). One desired feature of this system was to create a single consistent source of address verification for Victorian State Government agencies, initially supporting address verification, geocoding, batch geocoding, directory searching, find the nearest, and basic map generation. Geomatic Technologies was selected to undertake the implementation of the framework, which allowed for web services to be added and orchestrated through a series of short running workflows.

VMAS laid the foundation for a national framework, which PSMA Australia developed further during 2008 and 2009 to add compliance with standards, integration between batch geocoding and directory searching, additional logging, extensions to basic map generation to include WMS via HTTPS, and third party service integration. Figure 2 shows the components that comprise the LYNX Search Framework.

² http://www.anzlic.org.au/publications.html#National_Address_Management_Framework

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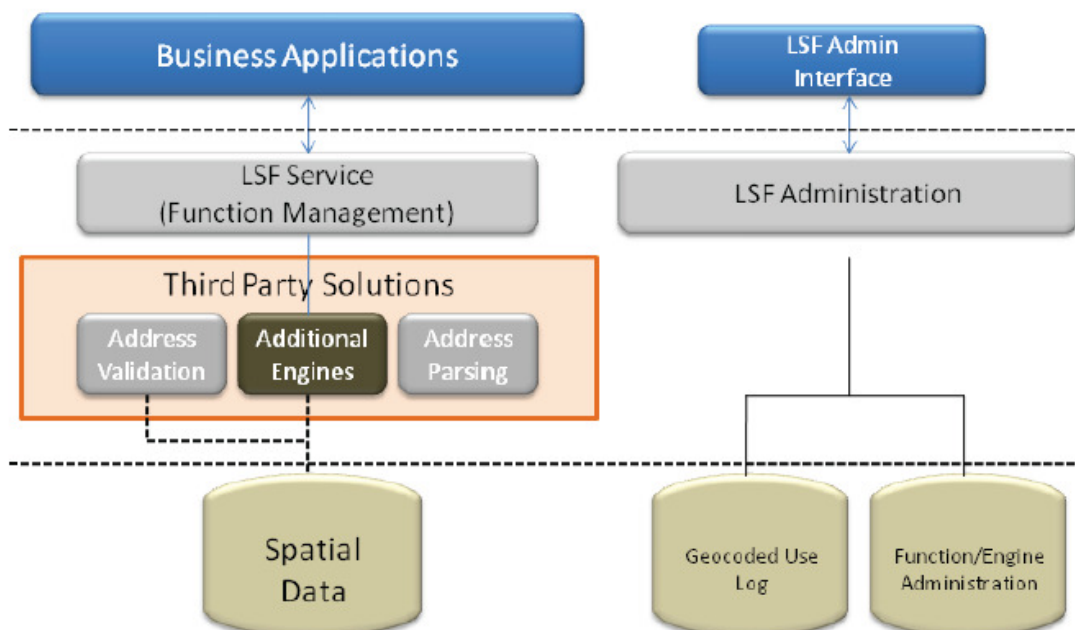


Figure 2: Components of the LYNX Search Framework

Once a release candidate became available in April 2009, expressions of interest were sought from third party vendors who wanted to make their services available through the framework. The first vendor to add their services to those that were already part of the framework was Experian QAS in mid July. Following the integration of a second address verification engine, a pilot of the LYNX Services Framework came into being.

At approximately the same time, a pilot of the CSDI commenced (August 2009). This pilot involved the deployment and use of the LYNX Services Framework within Geoscience Australia, including an address verification and geocoding framework, complete with two third party address verification engines. The aim of the deployment was to spatially enable a test dataset, and to allow the spatially enabled test dataset to be 'value added' by Geoscience Australia.

Once the solution development was complete, the project team supplied key staff and documentation to Geoscience Australia in order to successfully deploy the solution in the development and production environments for the pilot, as well as handing over the maintenance of the system. PSMA Australia and Geoscience Australia kept in constant contact during the initial stages of the operational use of the deployed solution in order to ensure that any hurdles that materialised could be overcome in a timely fashion. As Geoscience Australia learned more about the system, they were able to largely support the system themselves, as well as suggesting further enhancement to the system in order to provide features and functionality of interest to the project.

Private Sector partners who had elected to integrate their services were given the opportunity to deploy their own solutions, in conjunction with Geoscience Australia staff. Once an installed system became available for use, Geoscience Australia and PSMA Australia worked together and developed a process to geocode, and aggregate, the dataset. Figure 3 shows a simplified diagram of this process.

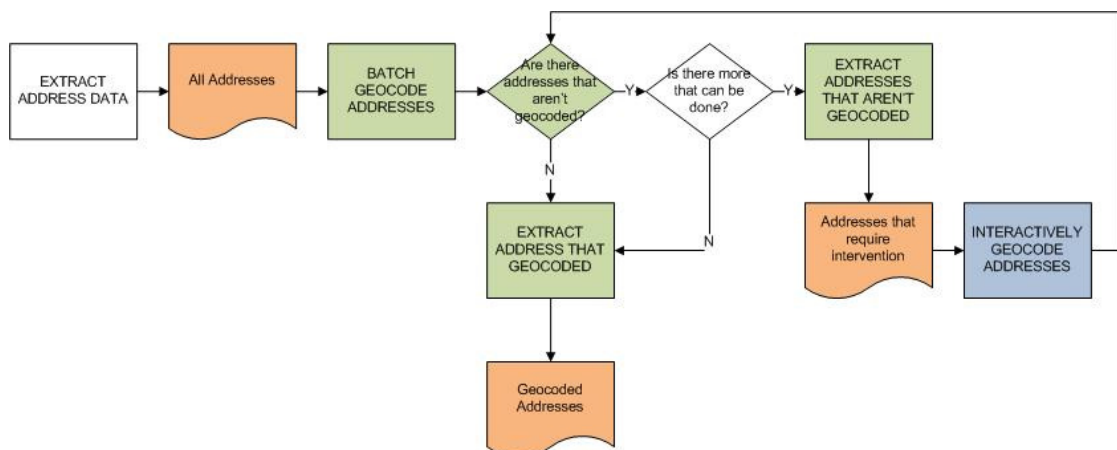


Figure 3: Spatially Enabling the Data

Figure 3 shows, in green, elements that were provided by the LYNX Search Framework that simply required a Geoscience Australia officer to perform a task in order to utilise. Figure 3 shows, in blue, elements where the LYNX Search Framework provided some tools, in this case workflows combining multiple third party geocoding engines and directory searches (used to find the relevant areas of interest within which the address was contained). In order to utilise these tools, Geoscience Australia built an interactive geocoder which was used, in conjunction with the extraction tools provided by the batch geocoding interface, to manually iterate through the list of addresses that could not be matched automatically in the batch process.

5. DISCUSSION

The implementation of the project involved strong collaboration between PSMA Australia, Geoscience Australia, and the address verification engine providers, Geomatic Technologies and Experian QAS. Furthermore, there were numerous meetings between PSMA Australia's project team, and Geoscience Australia, in order to tailor the deployment of the LYNX Services Framework to suit the proposed architecture for CSDI. The level of collaboration that occurred during this time was a credit to every organisation involved.

The next step for LYNX Services Framework is achieving compliance with the NAMF Web Services Specification, which will be supported by a reference implementation. It is

also envisaged that a NAMF Address Verification function, to be developed in 2010 to coincide with the compliance service for the NAMF Web Services Specification, will allow services that have either achieved NAMF compliance, or are in the process of achieving NAMF compliance, to be easily accessed and tested through the LYNX Services Framework.

6. FINDINGS

The LYNX Services Framework demonstrated a strong capability for public and private cooperation, and has established a solid foundation for future sharing of services developed by the Commonwealth, State, and Territory governments. It has further shown potential for integration with national initiatives, such as NAMF and the CSDI.

7. ACKNOWLEDGEMENTS

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- Geomatic Technologies for their continued support and technical partnership;
- Experian QAS for their continued support; and
- The Commonwealth, State, and Territory Governments.

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BIOGRAPHICAL NOTES

Joseph Abhayaratna is the Enterprise Architect for PSMA Australia. He is currently responsible for technical communication and alignment of solutions with PSMA's enterprise policies and standards. Jo has been involved in Public Sector projects since 2003. His key interest in Public Sector projects is national initiatives that either assist in policy decision making, or assist in implementing policy. In this pursuit, he has been involved in areas such as the Department of Employment and Workplace Relations (now DEEWR) Employment Systems and the Department of Families, Housing, Community Services, and Indigenous Affairs (FaHCSIA) Information Management. Jo moved into location based systems after realising its potential for assisting decision making and coordination through demographic profiling. He has since become heavily involved in projects such as the National Address Management Framework (NAMF) and the Commonwealth Spatial Data Integration.

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