Open Source Geospatial Foundation
Australia - New Zealand Chapter

Submission for Parliament of Victoria's Inquiry Into Improving Access To Victorian Public Sector Information and Data

Bruce Bannerman, Cameron Shorter

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Revision History

Revision	Date	Contributor	Comment
0.1	17Aug08	Bruce Bannerman	Initial Revision
0.2	18Aug08	Cameron Shorter	Review
0.3	20 Aug08	Bruce Bannerman	Added comments on Spatial Liability, Chapters 3 and 4, OSGeo-AustNZ Proposal for Spatial Data Maintenance, merged CS comments and revised abstract.
1.0	21 Aug 08	Bruce Bannerman	Incorporated Cameron Shorter's contribution and numerous edits.

1 http://creativecommons.org/licenses/by/3.0/

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Abstract

The Australia – New Zealand Chapter of the Open Source Geospatial Foundation (OSGeo-AustNZ) would like to congratulate the Parliament of Victoria for this exciting initiative, investigating public access to public sector information.

We believe that one of the main impediments to the development of a vibrant spatial industry in Victoria is the difficulty experienced in obtaining free, quality Public Sector spatial Information.

This type of information is needed by the community at large for a wide number of reasons, including to help understand and ideally, to help find a solution to, some of the Big Picture issues that are facing our society, for example Climate Change and Water Shortage.

This submission has been prepared by volunteer members of the OSGeo-AustNZ community.

OSGeo-AustNZ will be focussing on issues relating mainly to spatial information in its comments on PSI.

Given the short time frame available to respond to this Inquiry, OSGeo-AustNZ has focussed more on trying to communicate practical experiences rather than academic references. Having said that there are a number of important studies that we will come back and address, time permitting. One of the more important of these is the “Models of Public Sector Information Provision via Trading Funds” by Newbery, Bentley and Pollock from Cambridge University dated February 26, 2008.

This submission may seem critical of Government processes in places. It is hoped that this will be read as constructive criticism. We appreciate that the organisations concerned are operating under constraints as to what can be done.

The key messages from OSGeo-AustNZ are:

- All data should be free of charge and access restrictions (excluding privacy issues etc.)
- All data should be licensed under a Creative Commons license.
- All data should be provided via Open Standards.
- The Government needs to pay particular attention to its Information Management practices to ensure that data can be reliably delivered to the public.

We finish our submission with an OSGeo-AustNZ suggestion for a community approach to maintenance of spatial data. This proposal has the potential to reduce the Government's spatial data maintenance burden. It is only a rough idea at this stage and needs more work if it is felt by the community that it has merit.

What is the Open Source Geospatial Foundation

The Open Source Geospatial Foundation, or OSGeo, is an international not-for-profit organisation whose mission is to support and promote the collaborative development of open geospatial technologies and data.

The foundation provides financial, organisational and legal support to the broader open source geospatial community. It also serves as an independent legal entity to which community members can contribute code, funding and other resources, secure in the knowledge that their contributions will be maintained for public benefit.

OSGeo also serves as an outreach and advocacy organisation for the open source geospatial community, and provides a common forum and shared infrastructure for improving cross-project collaboration.

OSGeo has attracted a large on-line international community who work collaboratively to further the cause of open source and open data as it relates to spatial information.

More information on OSGeo can be found at:

http://www.osgeo.org/content/foundation/about.html

What is the Open Source Geospatial Foundation – Australia New Zealand Local Chapter

The Australia – New Zealand local chapter of the Open Source Geospatial Foundation (OSGeo-AustNZ) aims to act as OSGeo's local representative within the Australian and New Zealand region, furthering the aims of the Foundation.

OSGeo-AustNZ is in the process of incorporating as a Not For Profit organisation in Australia.

In its short time in existence, OSGeo-AustNZ has attracted a significant community, including a number of key people in the regional spatial industry.

The community is proving to be an effective way to break down the traditional barriers that exist between different levels of government, research organisations and private enterprise. It is also encouraging to see an increasing degree of cooperation and cross fertilisation between Australian and New Zealand organisations.

In 2009, OSGeo-AustNZ will be hosting the premier International conference for Free and Open Source Software for Geospatial (FOSS4G-2009) in Sydney.

OSGeo-AustNZ is contributing to this inquiry in line with several of our organisation's key goals:

- To promote freely available spatial data - free software is useless without data.
- To promote open standards to access that data – free data is not free to the end user if the end user can't afford the tools to access it. Data is at risk of becoming inaccessible in the future if it is locked into a proprietary standard.
- To promote free, open source tools as an effective way to reduce the cost of supplying and

using data across a much broader user base.

More information on OSGeo-AustNZ can be found at:

http://wiki.osgeo.org/wiki/Aust-NZ

The main contributors to this document on behalf of OSGeo-AustNZ have been:

- Bruce Bannerman, IT Architect
- Cameron Shorter, Geospatial Architect

A summary of contributor's backgrounds may be found at Annex A.

General Comments on the Enquiry

OSGeo-AustNZ congratulates the Parliament of Victoria for taking the courageous step calling this enquiry.

We believe that this is a timely enquiry and call for radical and sweeping changes to open up access to PSI.

Reference Documentation

Given the short time frame available to respond to this Inquiry, OSGeo-AustNZ has focussed more on trying to communicate practical experiences rather than academic references.

There are however a number of relevant studies that the committee may wish to explore.

Mr Roger Longhorn, a well known European spatial consultant has suggested that the following references may be of interest to the Inquiry:

- "Models of Public Sector Information Provision via Trading Funds[2]" by Newbery, Bentley and Pollock from Cambridge University dated February 26, 2008.
- "The United Kingdom Report on the Re-use of Public Sector Information 2008[3]" from the Office of Public Sector Information, dated July 2008.

Mr Robert Freeth, a well known Western Australian spatial consultant has suggested the following references in addition to the Cambridge University study above:

- "The Power of Information[4]", Ed Mayo and Tom Steinberg, A Report to the Cabinet Office of the UK Government, June 2007.
- "The Commercial Use of Public Information[5]", Office of Fair Trading, UK Government, December 2006.
- "The Government Response to the Office of Fair Trading Market Study on Commercial Use of Public Information[6]", Department of Trade and Industry, UK Government, June 2007.
- 1st April 2007: Government of Canada makes Digital Topographic Data products available free of charge and without the requirements for commercial licences[7].

2 http://www.opsi.gov.uk/advice/poi/models-psi-via-trading-funds.pdf
3 http://www.opsi.gov.uk/advice/psi-regulations/uk-report-reuse-psi-2008.pdf
4 http://www.cabinetoffice.gov.uk/publications/reports/power_information/power_information.pdf
5 http://www.oft.gov.uk/advice_and_resources/publications/reports/consumer-protection/oft861
6 http://www.dti.gov.uk/files/file39966.pdf
7 http://www.geogratis.ca/

What are some of the current problems being faced trying to access public sector spatial data in Victoria?

There are a range of issues that affect access to public sector spatial data in Victoria. These include:

Intellectual Property Issues

In addition to the Intellectual Property issues that have been covered in the Inquiry Discussion Paper, there is also the issue of what IP applies to spatial data that is purchased on behalf of the government. Some examples are:

- Aerial photography;
- Satellite imagery; and
- formatted vector data.

There have been a number of problems experienced over the years that could be quite difficult to resolve, and these problems should be resolved because a lot of the data in question may have relevance in the future to help resolve Climate Change issues.

Some examples of problems are:

- Aerial Photography was tendered for and purchased by a government department under an agreement that ceded IP to the vendor, as the cost was 'cheaper'. Unfortunately, no other government organisation was, or is, able to use this valuable dataset due to the restrictive IP. The vendor is happy to sell the government additional copies of this data though.
- Similarly, some of the high resolution satellite vendors have very restrictive arrangements where they retain the IP in the data and constrain what can be done by purchasers.
- There is also a trend among some commercial vendors to offer to sell attractive datasets to government. However, if the license agreement is looked at there are restrictive usage arrangements in place such as 'the data may not be used in an externally facing web site'. This renders the data unusable in most instances.
- In a recent High Court of Australia judgement against NSW, the judgement found to the effect that the NSW Government was not entitled to copy survey plans and provide them to the public without providing remuneration to the copyright holders. This has broader implications for the provision of PSI to the public.
- There is an increasing trend towards 'seamless' spatial datasets that cover the geographic extents of the State of Victoria. These datasets may comprise spatial data that has originated from a variety of sources with differing IP arrangements in place. The people who construct and use these datasets may not be aware of IP related issues, or of what part of each dataset came from which source data.

Cost Issues

There are anecdotal reports that it can be quite costly to access spatial data in Victoria.

Internally to government, there have been reports of departments who have been asked for a substantial annual fee per user in order to access spatial data. This is for an access fee to spatial data that the government has already purchased or captured internally.

External to government there are also reports of substantial fees being asked to access spatial data. However, during the course of putting together this submission it has not been possible to quantify just what these fees are for a large set of data covering the extents of the State of Victoria. Numerous unsuccessful attempts were made. In the end due to time constraints imposed by the submission deadline, these attempts were abandoned.

In part cost issues are driven by government budgetary concerns. For example, a substantial portion of Spatial Information Infrastructure's (SII) budget comes from the sale of 'licenses' to spatial information. SII is a Division within the Department of Sustainability and Environment.

In part, this issue is also driven by the need to try and secure some (inadequate) funding to contribute towards spatial data maintenance. Maintenance will be covered separately, below.

Information Management Issues

Victoria is facing an increasing number of challenging issues that demand ready access to quality spatial information. Several of these issues are Big Picture issues that are going to require innovative and possibly even radical approaches to try and resolve. Some examples are issues such as Climate Change and Water Shortage.

Government does not have a monopoly on expertise relevant to these areas. However, Government is certainly a key partner in trying to help find solutions. As a good partner, one of the items that Government can offer the community to help resolve these problems is free and unrestricted access to the Government's spatial data holdings.

To do this, Government needs to have good Information Management processes in place to make it easy to search for, find and deliver data that is applicable for a particular purpose. Outlined below are a number of perceived problem areas that may make it difficult for the Government to achieve its aim of Improving Access to Victorian Public Sector Information and Data.

Data Custodians

Spatial Information Infrastructure (SII) have prepared some excellent strategic guidelines for spatial data custodians. The aim is to get accountability for spatial data sets to defined people.

There are a number of conscientious spatial professionals in a number of departments who are attempting to implement these guidelines, however, they do not appear to be adequately supported by their senior management and as such, the guidelines do not appear to be widely adopted.

If the public sector is to retain Custodianship of defined spatial data sets, Custodianship must be allocated at a senior management level and monitored via the performance management process. The Senior Managers should then be help accountable for the availability and quality of that data.

It is understood that an attempt has been made in this regard, however judging by the funds that are available for spatial data maintenance and other Spatial Data Infrastructure issues, this does not appear to have been successful.

Spatial Metadata

Spatial Metadata is structured information that describes a given spatial dataset, including properties such as: search key words, data quality, intended use, access constraints, contact people, physical location of the dataset and the spatial area that it represents.

Spatial Metadata is intended for use within a Spatial Metadata Catalogue to help other spatial professionals find spatial datasets that could potentially help them with a particular piece of analysis or other task that they need to undertake.

Ideally, a professional could save a considerable amount of work and money by browsing a catalogue looking for existing data that may be suitable for their purpose.

Unfortunately, metadata and metadata catalogues are not given appropriate priority by managers, data custodians and spatial data maintainers. Some examples of problems are:

- Metadata may be entered once, but is often rarely maintained.
- Metadata may be entered for key datasets, but there is a lot of other spatial data created as part of a project, or maintained in traditional business systems that do not necessarily have metadata records.
- Australia is in the process of migrating from an old metadata standard to an international standard. Unfortunately, the Victorian corporate project to implement a system and catalogue to support this standard has not been adequately resourced and is consequently taking a considerable amount of time to implement.

If the Government does not improve its focus and resourcing on issues relating to Metadata, it will be very difficult for the public to be able to find public sector spatial information.

On a positive note, SII have several people who are well respected within the Australian Spatial Community and have contributed significantly to the implementation of the new metadata standard.

Project Focus and Cost of Disk Space

While Victoria is developing a number of reasonable contiguous statewide spatial datasets e.g. the VicMap series of products and the Seamless Geology dataset, there is a class of spatial data sets that are often overlooked.

Often spatial professionals will be asked to undertake some analysis or research work within the context of a project within their business unit. Often the output of this work will be a written report with a set of printed maps and a presentation.

What happens to the valuable spatial data that was created during this analysis or project work? Some of this data may well be of relevance to a large number of people.

Often this data is archived at the end of a project or possibly even forgotten about as people move on to other projects. Metadata may or may not be created to describe the data created.

There are no clear processes in place to help a project team to decide whether the data that they have created is of corporate interest or not.

Some preliminary analysis work that was undertaken during the Gold Undercover Project for the Department of Primary Industries highlights a couple of areas of concern and may well be indicative of what is happening in other departments as well. It was found that Spatial data tended to be archived to individual users desktop PCs, Portable Disk Drives, or to tape without adequate backup.

There were a number of reasons for this, including:

- The department did not have a corporate spatial data maintenance environment. It is understood that this is the normal situation in most departments.
- The cost of enterprise storage solutions available is very expensive within government. The rate quoted internally to host 1TB of data per year is nearly 20 times more than that quoted by a well known commercial service. Therefore project personnel opted to archive their project data on Portable Disk Drives or on tape.
- The department has approximately 60 TB of spatial data. Given the costing issue, of this, over 55 TB is stored off site on tape. Given that tape has a limited life span, this data is at risk.

These issues will also need to be addressed to improve access to Victorian PSI.

As it currently stands, significant holdings of data are not available for use, search, or delivery.

Data Format Issues

Proprietary solutions and proprietary data formats

Within the Victorian Government, there is an unhealthy focus on the use of proprietary solutions and proprietary data formats for managing and delivering spatial PSI.

This has lead to a range of issues that affect the Government's ability to improve access to PSI. Some examples are:

- Focussing on proprietary vendor solutions has led to vendor 'lock-in' in some situations. One example of the problems that this can cause government is:
    - Ten to fifteen years ago, one particular spatial vendor had a range of products that were well regarded with the state government. Individual branches and departments customised some of these products considerably, integrating them with their business systems to deliver advanced functionality to their staff and the public. An example is the Minerals and Petroleum Division's Eureka! application.
    - This vendor introduced a new product line, but did not provide an upgrade path for the the superseded products. This has left the Government with no upgrade path for such applications and the prospect of finding sufficient funds from budget bids to redevelop the same functionality, using newer technology.
    - Consequently as of 2008, many of these business customisations have still not been replaced. The applications that they were based on, are well past their end of life status with no support from vendors. Due to the perceived archaic nature of the technology, it is also very difficult to find suitably trained personnel to keep them maintained.
    - If these types of systems were to be developed today, a valid case could be made to design as much of the functionality as possible around the use of Open Standards. This should allow quite a degree of flexibility should a similar upgrade path problem be faced, as the Government would have the potential of utilising other products that utilised the same set of standards.

- Providing data in specific proprietary formats places constraints, undue expense and additional work on people and organisations that wish to consume the data. Some examples are:
    - To fully utilise a spatial dataset as it was intended, requires the use of the data in it's native data format (excluding open standards, see below). If the data is not used in this format and translated into another format, then there is often contextual information that is lost during the translation (e.g. topology, relationship rules etc).
    - Post processing is often required by people translating proprietary spatial data to get it into a format that is suitable for their use. Each time that the source data is updated by the Government, which in same cases occurs on a regular basis, the people importing the data must go through this same process again.
    - Consumers of Government spatial data may be forced into buying very expensive software in order to utilise Government spatial PSI so that they can minimise the amount of rework that they have to do in converting proprietary data formats.
- The use of proprietary spatial data formats for the **Archival** of spatial PSI is also a high risk strategy. Given the Government's experiences with vendor lock-in and lack of upgrade options, it is highly likely that in ten years time that spatial PSI that has already been archived in proprietary formats will be unreadable. See also comments on Open Data formats below.

Spatial Imagery data formats

This issue is also related to the cost of disk space issue as discussed above.

Victoria has a very rich holding of spatial imagery that spans a number of decades. This imagery will prove to be an invaluable data source to help address current Big Picture issues such as Climate Change and Water Shortage.

Traditionally, spatial imagery has been treated as a 'pretty picture' and utilised effectively in mediums such as Google Earth.

What is often missed is the value that this data offers as an input into digital image analytical processes. Such techniques can be an invaluable input into spatial analysis projects.

In an example relating to Water Shortage, a multi-temporal analysis could potentially be conducted over a particular area to determine the difference in surface water between e.g. 1975 and 2005 (assuming that source data is available).

The long term ability for Government, academia, industry and the public to undertake such analysis in the long term is at risk.

There is currently a view within a number of organisations in Government that the majority of users of spatial imagery only want to view imagery as a pretty picture. Therefore, current plans are that this imagery will be compressed into a particular format and source imagery backed up to tape.

The problem with this approach is that:

- People who want to undertake analysis, will wish to utilise the source data, not the compressed data. This will not be readily available. Once the data is on tape, there is a very real risk that it may not be able to be recovered at all due to corrupted media.
- Given the invaluable nature of this data for 'Big Picture' analysis, this is a high risk strategy.

- There is a very real doubt that the radiometric integrity of the imagery compressed in the format proposed for storage could be restored in the future in the event that the original data could not be recovered from tape.

Open Standards – Open Geospatial Consortium and ISO 19100 series

There is a rapidly increasing demand in the world for the use of Open Standards for both the design of IT solutions and for the provision of data.

Using the vendor lock-in example above, if these systems were to be designed today, it would make sense to design them around the use of open standards to insulate the systems from any changes to vendor technology. If designed appropriately, the use of open standards should allow one vendor's product to be replaced by another, avoiding the type of problem that is currently experienced necessitating the same functionality to be redeveloped and essentially re-paid for.

Similarly, the use of open standards for the provision of data is having a revolutionary affect on the provision and consumption of spatial data. As long as producer and consumer both have products that understand how to utilise a particular set of standards they can utilise data with no translation and consequent rework and loss contextual information. See also comments on GeoSciML below.

The two most relevant sets of open standards relating to spatial data are:

- Open Geospatial Consortium (OGC):
    - OGC Standards have been in ongoing development and refinement for over sixteen years. They are built on a solid theoretical base.
    - They are rapidly gaining market acceptance, and seen as mechanism that organisations can use to seize back strategic control of their IT investments.
    - Open Source spatial applications, including OSGeo applications, have very strong support for OGC standards. Most of the OGC standards specify an Open Source product as the reference implementation for that standard. These products are available free of charge to end users.
    - One of the OGC standards, GML has strong potential as an archival medium for vector spatial data.
    - It is also fair to say that OGC standards are evolving as the spatial industry's understanding of its requirements for open standards are also evolving. Therefore, it would be prudent for the Victorian Government to become actively involved in the development and implementation of these standards. Australia has already contributed a significant amount to the development of OGC standards. For example, Dr Simon Cox from CSIRO was awarded OGC's prestigious Gardel's Award for his outstanding contributions[8].
- ISO 19100 series of standards
    - The International Standards Organisation has a set of standards that relate to spatial information.
    - These standards are directly relevant to Australia.
    - ISO and OGC work closely together on the development of spatial open standards.

8 http://www.opengeospatial.org/pressroom/pressreleases/577

Open Standards – GeoSciML a Victorian Government example

Over the last five years, a group of Victorian Government employees from the Minerals and Petroleum Division have been helping to pioneer the development of spatial open standards pertinent to geoscience data.

They have been working with a group of like minded professionals from a number of key geoscience organisations around the world to develop ways to exchange and utilise geoscience information via the use of spatial open standards (OGC standards). This team has pioneered the development of GeoSciML[9].

The world-wide GeoSciML team have had a significant achievement. They have been able to get professionals from a number of countries, speaking a range of languages to agree to a common way of describing and exchanging data representing one of the most abstract types of spatial information available.

Using this open standards format, it is now possible to take geoscience data served by disparate organisations from around the world and combine this data into a single homogeneous dataset that can be analysed as a single entity.

This team is showing what could be possible to help society develop profiles of a range of data types to help specialists understand factors relating to Big Picture issues e.g. Climate Change and Water Shortage.

Business Context Issues

Traditionally, spatial data has been seen as an input whose sole purpose has been to produce a map. Much of the spatial data delivery processes used within the main State Government delivery mechanisms, the Corporate Spatial Data Library (CSDL) and Spatial Data Mart (SDM) tend to reflect this concept.

Increasingly spatial information is seen as a critical decision support tool. Often analysis is conducted that requires a set of spatial data and a number of aspatial data sets from business systems.

There may be a direct relationship between the spatial and aspatial data in the context of a primary / foreign key relationship. However, equally as relevant there may only be a spatial relationship between the two, e.g. all properties that are within 100 meters of bus route 790 to Frankston.

Both the CSDL and SDM do not cater for live links to aspatial data in business systems. They rely on a spatial data maintenance person manually creating a spatial dataset with a subset of the appropriate attributes (if possible) and copying this into the CSDL for consumption by the SDM.

This is not suitable for:

- Time sensitive data such as mining tenements.
- Dynamic exploration of data relationships.
- Complex data such as GeoSciML.

9 http://www.geosciml.org/

Spatial Data Maintenance Issues

Spatial data requires ongoing maintenance, if it is to utilised effectively as an aid to decision making.

There is an argument to the effect that:

- The US provides its spatial data for free, yet considerable portions of its data are not well maintained.
- In the UK, the Ordnance Survey charges for access to its data and it has a well maintained library of spatial data.
- Therefore, if you charge you your data you can have well maintained data.

This argument misses a few key points:

- It does not take into account the geographic size differences between the USA and the UK, assuming that it costs the same to maintain data for both countries.
- The Community Mapping phenomena that has attracted widespread industry support. This phenomena started out of frustration experienced obtaining access to PSI such as that from the UK's Ordnance Survey. Communities such as Open Street Map (see also the response to Question 4 in this submission) now have extensive holdings of spatial data that are utilised in place of traditional Government sources of data.
- Victoria has approximately the same geographic size as the UK and similar policies in charging for access to spatial data as the UK. Yet as highlighted by the Nationals Member for Benalla[10] Mr Bill Sykes, there are maintenance problems with Victorian spatial PSI.

It could be argued that the types of problems identified by Mr Sykes are symptomatic of decades of neglect in spatial data maintenance.

Much of the VicMap data is still believed to be based on 1970s data.

Blame for this state of affairs cannot be placed on SII or its predecessors. They have been doing an admirable job in an environment of successive budget cuts.

Blame for the current state of affairs must lay with successive Parliaments for not ensuring that sufficient resources are provided to ensure that such a critical resource is adequately maintained.

OSGeo-AustNZ has a proposal for spatial data maintenance at the end of this proposal that may result in win-win situation for Government and industry.

Spatial Data Liability Issues

There is a great deal of uncertainty over liability relating to the use or misuse of spatial information.

Epstein, Hunter and Agumya[11] explored the issue of legal liability and the requirement for liability insurance in relation to the use of spatial information. Some of the key points that they make are:

- Due to the growing awareness of uncertainty inherent in spatial information there is now '***considerable potential'*** for litigation and for the loss of both personal and organisational

10 http://www.abc.net.au/news/stories/2007/12/06/2111673.htm

11 **Epstein E.F, Hunter G.J and Agumya A, 1998**, Liability Insurance and the Use of Geographical Information: International Journal of Geographical Information Science Volume 12, Number 3, pp203-214.

reputation and integrity arising from error in spatial information.

- It is argued that traditional disclaimers added to products may not be a strong defense in the event of litigation.
- Spatial information may be misused and abused by organisations who acquire a data set without understanding the purpose of the dataset and the methods used to capture it.
- An approach that is starting to appear in the spatial information industry is for organisations to seek some form of insurance protection to manage their risk and liability in the event of litigation.
- This insurance protection may place strict guidelines on the procedures and industry standards that an organisation is required to follow.
- In order to limit their liability, organisations may be required to maintain amongst other things, a high level of quality documentation that adequately and truthfully labels their products to the '***best of their ability and knowledge'***.

Opportunity Management

Opportunity management is the same as Risk Management, but in reverse. Instead of identifying what can go wrong, then invest in a strategy to mitigate the risk, with Opportunity Management you identify what could go right and then invest in a strategy to ensure you can benefit from the opportunity if it occurs.

Opportunity Management is an effective way to identify, quantify and manage the potential benefits and techniques involved in freeing Victoria's data, and should be used when assessing these proposals.

Use data from external agencies.	Agencies are given access to open source tools to reduce their barrier to sharing data. Use Open Standards for tools to facilitate communication. Use Open Standards for data schemas so data can be integrated.
External Agencies extend our toolset.	Use and share our tools as Open Source Software so that others can use and extend them. Support the Open Source development processes to reduce the barrier of entry to potential development sponsors.

Community Engagement

The Internet has facilitated dramatic improvements in the way we can collect and refine data by tapping into community intelligence. Some examples are:

- Open Source software development has harnessed thousands of developers to build free Linux distributions which have dislodged numerous Unix operating systems, and now

competes head to head with Microsoft's windows.

- Wikipedia has harnessed thousands of volunteers to build an encyclopaedia that rivals[12] more traditional than Encyclopaedias such as Britannica.
- And the Open Street Maps project are harnessing volunteer map makers to build an international street map of the world.

In 2007, the Open Geospatial Consortium sponsored a Canadian Geographic Data Infrastructure Interoperability Pilot which developed a process for stakeholders to efficiently contribute data updates to data custodians, and for these updates to be distributed in real time, using Open Standards.

Victoria should develop similar processes which will facilitate order of magnitude improvements in data collection efficiencies. Please see the OSGeo-AustNZ proposal on spatial data maintenance at the end of this submission.

12 http://www.abc.net.au/science/articles/2005/12/15/1531455.htm

Comments on Chapter 2

Question 2: How can improved access to and re-use of PSI drive economic growth, employment opportunities and new commercial ventures?

Free and unrestricted access to spatial PSI can have a significant impact on economic growth, employment, opportunities and new commercial ventures. Some examples are:

- Quality spatial information is a pre-requisite planning aid for many engineering and infrastructure related projects.
- This information can have a significant impact on the quality of early analysis and on investigation of alternate what-if scenarios.
- By providing this information for free and with unrestricted access, the Government can reduce preliminary planning costs considerably. This in turn could lead to more money being available for other engineering work and potentially more projects.
- This in turn would lead to more activity and employment within dependent businesses and communities. There would also be money returned to Government by way of taxes, royalties etc.

There is also another challenge and potential benefit that could arise from this approach. Engineering and Infrastructure related organisations spend considerable sums of money on more detailed spatial information at later stages in project life cycles. The challenge will be to foster a community attitude where it is normal to exchange spatial data for free and with no constraints. This approach would then allow for Government libraries to in turn be updated with more accurate private sector data.

Question 3: What can the Victorian Government do to improve access to PSI in a manner that creates new opportunities for information and knowledge flow, and thereby encourage further innovation?

The Victorian Government can provide PSI for free, without restrictions[13] via open standards under a Creative Commons license. In the context of spatial PSI, it is assumed that this information would be provided via OGC Web Services.

Having such data available via OGC Services would encourage innovation via the use of Web 2.0 techniques such as Mashups.

Datasets become significantly more valuable when they are aggregated with other datasets, e.g.: add a roads dataset with a traffic accidents dataset and achieve accurate routing and trip planning.

13 OSGeo-AustNZ acknowledges that there would need to be some constraints on data access, e.g. to comply with Privacy Legislation.

Question 4: If the Victorian public sector is to provide increased access to information, what kind of information would provide the greatest opportunities to improve or develop ?

All spatial information should be provided for free, without restrictions via open standards.

This includes, vector, grid, related aspatial and spatial imagery.

The term 'spatial imagery' is used in its broadest context throughout this document and includes all kinds of remotely sensed data including for example: aerial photography, satellite imagery, radar, lidar, gravity, aeromagnetics, muti and hyper spectral, sonar etc.

It is important to understand that historic imagery is just as important as current data.

Question 5: How can social engagement, in particular through the development of spontaneous social networks, be enhanced through the provision of enhanced access to PSI?

The provision of PSI for free, without restrictions via open standards can help to to drive the spontaneous development of social networks.

This can happen in a manner similar to the way that OSGeo-AustNZ itself has evolved, for example:

- After cursory exploration of Victorian Government PSI, several people see the potential for a much deeper analysis. They may be looking at a particular aspect of one of the Big Picture issues.
- They establish a mailing list and announce their intent to other mailing lists where they know they will find people with similar interests.
- In time, other people will join their list and they will begin to develop a 'community'.
- Eventually, they will attract sufficient people to be self sustaining. Like many such communities, there are no borders, so they may well attract the interests of world leading experts from Australia and overseas.
- One of the attractions binding this community together would be the ready access to quality Victorian Government PSI to conduct research and development with. This PSI is of course available for free, without restrictions via open standards and Creative Commons license.
- The community would use this data to explore the issue in question at depth.

Question 6: In what circumstances can open access to PSI empower individual citizens and communities to participate in social and political activities?

In a manner similar to that described in the answer to question 5.

Comments on Chapter 3

Question 7: What institutions and agencies should be considered part of the public sector for the purposes of this Inquiry? What advantages will be obtained by encompassing some or all of the following agencies and institutions under this definition:

a) executive government: principally government departments, but also incorporating statutory authorities?

b) the legislature: including parliament?

c) the judiciary?

d) local councils?

e) other public institutions, such as universities, TAFEs, public hospitals, etc?

From a spatial perspective, all institutions and agencies would have data that would be of interest and should ideally be considered part of the Public Sector for the purposes of improving data access.

Question 8: What kinds of documents, data and/or other materials should be considered for public access? What criteria should be applied when judging whether specific documents, data and materials should be made available to the public?

There is too much ambiguity as a consequence too much time wasted in trying to find and access PSI.

To simplify this OSGeo would like to see access policy overturned to the effect that:

- All data is free of charge and access restrictions (excluding privacy issues etc).
- All data licensed under a Creative Commons license.
- All data is provided via Open Standards.
- If an organisation wants a different outcome for a particular dataset, it would need to go through an arduous and clearly defined, administrative process to achieve that outcome.

This approach should free up considerable time for both government and public alike as it provides clear concise policy that can be easily understood and followed.

Comments on Chapter 4

Question 9: What types of access and pricing policies have been adopted by Victorian Government agencies for the provision of PSI? Is there consistency across individual departments?

Question 10: How should governments ensure transparency and fairness in their pricing policies?

Question 11: What criteria should government apply when determining whether to provide access to PSI?

External Access to Data

Policies vary between departments.

Departments such as Minerals and Petroleum and Aboriginal Affairs Victoria provide licenses to their spatial data free of charge when the data is accessed via the Internet.

It is difficult to get a clear picture of what costs are involved for access to a large amount of spatial data sufficient to suit spatial analysis use by professionals or entrepreneurs.

Internal Access to Data

There are also instances where Victorian departments have difficulty doing their work, because they:

- do not have technical access to critical spatial data;
- do not have the legal ability to access critical spatial data due to IP constraints;
- cannot afford to pay for expensive annual per user license fees to critical spatial data that the Government already 'owns'.

National Experiences

Geoscience Australia provide free licenses to a significant number of Australian spatial datasets, where the data is downloaded via the Internet.

This is an excellent source of good quality spatial data.

International Experiences

It is interesting to note the Canadian experience from opening up access to their spatial data. NRCan reportedly[14] noted an increase in downloads of data by a magnitude of 54 over the previous year. An attempt is being made to verify these figures, however given the tight time frame for public comment, this may not be possible. This is a significant increase in demand for PSI.

14 http://www.thinkwell.ca/cgdi-icdg/libraryDocs/FeevsFree.pdf

The Community Mapping Phenomena

The difficulty experienced by many people in obtaining usable spatial data has led to a new community based phenomena. These groups use open source techniques to capture their own spatial data for their community's purposes.

An example is the Open Street Map project[15]. This project is using the Open Source ethos and harnessing the enthusiasm of a large number of people from around the world with an aim to providing a reliable source of spatial data. They aim to combine having fun with data capture in the form of mapping parties[16].

The project is capturing significant datasets around the world.

While some of the collection methods may be questionable for the spatial information purist, it is more than adequate for a large number of uses. There also appear to be other organisations willing to support the project, e.g.:

- A Dutch company specialising in navigation data donated their data[17] for Holland, India and China to Open Streetmap.

Open Streetmap has a number of volunteers based in Australia.

Open Streetmap has considerable support and momentum behind it. It is likely that their activities will increase rapidly, including in Australia.

One perceived negative factor relating to Open Streetmap is the project's current aversion to acknowledging sources of data. While this is suitable for data that is used for simple cartography, it is not acceptable for data that is required for spatial analysis, as the quality of the analysis is largely affected by the quality of the data used as input and analysts need to be able to determine the quality of the data that they use. However, given the speed that open source projects can move at, once this is acknowledged as an issue by the community, it will no doubt be dealt with quite quickly.

To many people, the spatial data provided by projects such as Open Street map is the ***Authoritative*** source of their data.

One of the factors that has lead to the rise of such organisations is the difficulty experienced obtaining access to government authoritative data. This includes costs, license agreements, restrictive data formats, difficulty in finding the data wanted, and education as to how to find and use the data.

If Government wants to retain the role of provider of Authoritative Data, it will need to move quickly to address data access issues. Currently some budgets seem to be tied to income generated for access to spatial data. This will need to be reassessed with a view to providing data at no cost, via a Creative Commons license and via open data standards such as OGC standards.

15 http://www.openstreetmap.org/

16 http://wiki.openstreetmap.org/index.php/South_East_London_Mapping_Party

17 http://www.and.com/company/newsletter/newsletter10/art01en.php

Comments on Chapter 5

Question 12: What other open content licensing models may be of interest to the Committee?

The Creative Commons licence (with attribution) is an excellent choice for data with relatively few authors (say less than ten), but for geographic datasets which often have thousands of authors, providing attribution can become unwieldy and impractical.

The Open Street Map project who face this licence problem are now moving toward a newly developed "Science Commons"[18] licence which is less prescriptive in the requirements on attribution.[19]

OSGeo-AustNZ suggests that the Victorian Government also consider:

- The Science Commons license; and
- The "Zero Commons".[20]

Attribution

The issue of attribution should not be dismissed lightly. It can be a very effective factor in determining whether a particular dataset is suitable for an intended use. If this type of information is not available, it reduces the value of the dataset as an input into analysis.

There are more effective mechanisms for recording information relation to data quality. This is related to Metadata as discussed earlier in this submission. The new International Metadata Standard that Australia is moving towards allows for metadata to be stored at an individual record level. This may provide a solution to the attribution problem when there are many authors for the one data set.

Question 14: What are the merits of the Victorian Government developing its own whole-of-government licensing framework as an alternative to adopting the Creative Commons licensing system?

Question 15: Is it appropriate for the Victorian Government's licensing framework to comprise both the Creative Commons licences and other more tailored licences?

The Victorian Government should endeavour to use pre-existing licences wherever possible. National and International standardisation of licences provides numerous benefits:

- The expensive legal cost to users regarding the use of a dataset is minimised as users only need to review one license, not many.
- Legal hurdles associated with mismatched licences are removed when integrating datasets.
- Increasingly, spatial data will be served via Open Standard Services such as OGC Services. There is potential for these services to be chained together under program control, or used by innovators from Victoria, Australia or even Overseas in ways that cannot currently be anticipated. Should Victoria implement non-standard licenses, this type of

18 http://sciencecommons.org/projects/publishing/open-access-data-protocol/
19 http://www.opengeodata.org/?p=262
20 http://wiki.creativecommons.org/CC0

innovative adoption of Victorian PSI could be curtailed or otherwise affected by developers due to a lack of understanding of the licenses in force.

Comments on Chapter 6

Question 18: To what extent have other Australian governments adopted the use of OSS in their ICT business solutions?

Like other types of Open Source software, Open Source Spatial software is gaining rapid acceptance across Australia and New Zealand as offering a viable and cost effective alternative to commercial offerings. Some examples of where spatial OSS is being used in Government are:

- CSIRO, the Office of Spatial Data Management and a number of other departments are building the Spatial Information Services Stack using Open Source spatial software to serve Open Standards Spatial Data. CSIRO is leading this work and will be investing approximately $10 million over the next few years. This project will result in a set of products that can be installed by interested Government departments to serve their own data.
- Landgate/WALIS, which has invested $20million in a cross government Spatial Data Infrastructure uses Geospatial Open Source software for a significant proportion of its infrastructure. This includes:
    - Postgres/PostGIS geospatial database
    - Geoserver and Mapserver (Web Map Service and Web Feature Service)
    - Tilecache (currently being investigated)
- Australian Bureau of Meteorology is using a number of OSS products to serve OGC Services.
- Geological Surveys and CSIRO serving Geochemistry data.
- The Victorian Minerals and Petroleum Division and CSIRO
    - Geoserver - a Web Feature server which is having the Community Schemas used by GeoScML built into it.
    - FullMoon
    - GeoNetwork
- Australian Water Data Infrastructure Project, including many departments:
    - Geoserver is used to serve WMS and WFS data into the infrastructure by numerous agencies, including NSW Department of Environment.
    - Duckhawk, a robustness and conformance testing tool was developed as Open Source software for the project by the Bureau of Rural Sciences.
- Australian and New Zealand Land Information Council (ANZLIC)
    - ANZLIC has backed the extension of GeoNetwork Open Source as the tool of choice for its members for storing and editing metadata.

Useful references to national and international geospatial case studies and policies can be found here: http://wiki.osgeo.org/wiki/Case_Studies

Question 19: What risks and benefits do OSS products offer over proprietary software for use in government operations? Are there opportunities for broader adoption of OSS by the Victorian Government?

Geospatial Open Source offers a full stack of proven, robust, feature rich applications which should be considered by all Geospatial Systems Integrators.[21]

The packages are backed by Australian Commercial Support[22].

One of the key benefits of Open Source Spatial software is that it is backed by a vibrant world-wide community.

As ANZLIC and the OSDM are finding with their exploration of the GeoNetwork Metadata Catalogue application, they do not have to do all of the work themselves.

Government merely needs to be seen to be a good and active community participant and commence its development activities. With a world-wide community there are many other organisations with similar interests who can and do willingly share the burden of maintenance of these tools.

Within Australia, there is potential for the development and maintenance burden to be spread across a large number of organisations around the country.

ANZLIC and OSDM are also finding significant functionality that they in turn will be able to use is also being developed by International community members.

Question 20: What is the capacity for both software models to coexist in the same organisation?

Geospatial Open Source and Proprietary products integrate very effectively through well defined Open Standards, as defined by the Open Geospatial Consortium[23].
Landgate in Western Australia is one of many organisations in Australia where Open Source and Proprietary geospatial applications co-exist.

Question 21: What is the role of the Victorian government in procuring and distributing OSS in ICT business solutions?

Government should ensure purchasing decisions and contracts do not preclude or hinder Open Source. (Many government contracts need to acknowledge that Open Source developers often don't own the code they are proposing to deploy).

Purchasing decisions should be based upon the total cost to the community in buying a product, not just the cost to the organisation. For instance, if the Government delivers all their documents in Microsoft Word, then every user of the documents are required to purchase a copy of Microsoft Word (and Windows) as well.

Purchasing decisions should consider Opportunity Management in order to consider the long term cost of projects. These considerations will often favour using Open Standards and Open Source.

21 http://www.lisasoft.com/LISAsoft/Company/Presentations/contentParagraph/011/document/ReadyForPrimeTime.ppt
22 http://lisasoft.com/
23 http://www.opengeospatial.org/

OSGeo-AustNZ Proposal for Spatial Data Maintenance

A significant issue when considering a funding model for spatial data, is to find a cost effective way of ensuring that efficient maintenance occurs within an acceptable information management framework.

Government expenditure

Government expends considerable funds each year in capturing and maintaining spatial data. Yet as highlighted by Mr Sykes in Parliament last year, it is not sufficient and more funds need to be found.

The time has come for some creative thinking on spatial data maintenance. Why should the responsibility for maintenance for an entire State's dataset fall on a small department within government when it it used by many departments? For that matter, why should the responsibility for spatial data maintenance rest solely with Government, when it could potentially be maintained by any number of organisations and people in industry as well? There are a number of valid data integrity concerns that will need to be addressed to answer these questions, however we will ignore them for now to suggest a way forward. A way can be found to address these concerns.

Industry capability

As suggested by this submission's answer to Question 2, Industry has considerable capabilities in spatial data capture, maintenance and management. Government does not have a monopoly role in this regard.

Industry routinely captures and maintains its own data, often at as good, or at a superior quality to that held by the Government.

As an example, one of the authors of this submission worked with WMC Ltd in the mid-1990s. WMC undertook a substantial topographic mapping exercise over in excess of 10,000 km^2 around Kambalda in Western Australia. The data was captured to strict quality control standards by experienced photogrammetrists[24]. Where the best available state data in this area was between 1:100,000 and 1:250,000 scale, this project captured data at 1:25,000 scale, and was far superior to what was available from the State Government. This data was not made available to the State Government, in part due to the Government's restrictive data access policies then in place, but also due to the belief by several Government representatives at the time, that because the data wasn't captured under their control, it must be sub-standard.

This is but one example of the type of data which is available within industry.

Community capability

As indicated in this submissions' response to Question 4, there is considerable expertise and willingness within open data communities to capture, maintain, manage and innovate with spatial information.

24 The photogrammetrists were also approved government contractors on a number of government panels.

Open Source methods

As discussed in the response to Chapter 6, Open Source succeeds for a number of reasons, including:

- Development occurs within a community of like minded people who have a strong desire to see their product succeed.
- Often, the ability to influence others within a community is directly proportional to the effort that the person has put into developing the community's aims. This is loosely called meritocracy[25].
- If a significant portion of the community does not like the direction that the community is going, they have the right to 'fork' the project, take the source code and start their own project.
- All activity happens in the open in a public forum.

The open source methodology is clearly seen as a superior development model and is rapidly being adopted by most of the main IT companies.

It is becoming normal for organisations to pay their employees to work on Open Source projects, as they get so much more in return from all of the other organisations who are also doing the same.

Companies are starting to make their money from services relating to software, rather than from the sale of software.

Many of these ideas could be applied to spatial data and spatial data maintenance.

Window of Opportunity

There is a narrow window of opportunity for Government to help build a community where the focus is on sharing data and expertise using open source principals.

This will not be easy and it will take some time to achieve.

The government can initiate this process by:

- Opening up access to its data holdings for free, with no restrictions on data access and data provided using Open Standards under a Creative Commons license.
- Being willing to discuss and investigate joint data custodianship of datasets with communities of interest. However, the communities will need to self-organise and through the principles of meritocracy, demonstrate that they too understand what is required to be a good spatial data custodian. Government may need to foster the communities initially.

In return, the Government may well find that they have many willing partners to help with the spatial data maintenance burden.

It is after all in the interests of all spatial professionals to have access to good quality spatial data. The price to pay for this access may well be participation as a maintenance partner.

25 See the section on Meritocracy at: http://www.apache.org/foundation/how-it-works.html

Annex A - Summary of Contributors

Bruce Bannerman

Bruce is a Spatial Information specialist with approximately thirty years experience in the industry. He has worked around Australia in Local, State and Federal Government. He also has substantial experience in private enterprise, large and small, including a period of five years as an entrepreneur, operating a small spatial consultancy.

Bruce is an advocate for Open Source software and free and open access to spatial data.

He has experiences that are relevant to this enquiry, including:

- For the past two years, working as an IT Solutions Architect within the Department of Primary Industries looking at issues relating to opening up Departmental data for search and access by the external public.
- As a Director of OSGeo-AustNZ.
- As a Director of a small spatial entrepreneurial consultancy, GeoInnovations Pty Ltd (currently not trading).
- As a member of the Victorian Spatial Council's Coordinated Image Acquisition Work group.
- Personal interests over the last two decades in spatial data management and access issues.

Cameron Shorter

Cameron is a Geospatial Systems Architect at LISAsoft. He has over 15 years experience in the Software Development industry with the last 5 years focused on Open Geospatial Systems. He has led a number of teams working on OGC testbeds which build and test Open Geospatial Standards.

Cameron is a respected member of the Open Source Geospatial industry, having contributed to numerous projects both as a developer and on the Project Steering Committees.

He is a Director of OSGeo-AustNZ and the chair of the FOSS4G-2009 Conference Organising Committee.