

# A STRATEGIC FRAMEWORK FOR DEVELOPMENT OF LOCATION BASED INFORMATION

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Today I want to talk about the paradigm shift occurring in spatial information, what it looks like, what the implications are, and how we are responding.

In what follows, I will outline some of the characteristics of the new paradigm, and suggest some of the possibilities it brings – from technology and for spatial information.

I will then suggest that these developments are creating possibilities for ‘spatial enablement’, but that there are barriers and drivers of change that we will need to respond to.

The second part of my presentation will deal with the question of how we respond to change and the challenges we will be presented with.

I will set out the strategic directions that the Victorian Spatial Council has articulated in its forthcoming Victorian Spatial Information Strategy 2008-2010, and conclude by outlining the initial priorities for action that will be taken.

## **A new paradigm**

The paradigm shift in spatial information is characterised by:

- Spatial information no longer being confined to specialists and being used in a wider range of contexts – such as social networking
- Technologies that are changing the way we communicate with each other
- New ways of thinking about ‘location’, and
- Entry of big corporate players into the market, who are starting to drive standards

Here are just three examples of the way in which spatial information is now being used:

- Time Space Map – this is a ‘geographic wiki’ that describes itself as ‘an encyclopedic atlas of history and happenings that anyone can edit’ – anyone can mark the location of events that happened in history on Google maps or Google Earth aerial images
- The ‘GeoCommons’ web site aims to be a repository for spatial information available to anyone to create mash-ups. It provides the capacity to upload, download and search for spatial data, and create new applications by combining data from numerous sources
- Socialight.com – A site that allows users to post ‘sticky notes’ over locations to record, describe and give a rating to venues and sites of interest. These sticky notes are like the paper variety and contain text and photos. Alerts can be sent to mobile phones when people pass through a particular location to let them know what is nearby. You might be interested to know that the site also features venues and sites

here in Melbourne, using Google maps.

Some of these uses will come and go, and might only be of interest to limited groups of people. But the point is, spatial information is being used and it is capturing people's attention.

More broadly, what we are seeing is:

- Communities using technology and information in new ways to create new ways of interacting with each other – apart from the examples above, more and more people are buying houses and day to day items, investments and jobs through the use of information devices.
- The use of robotics, RFIDs, GPS, WiFi and the like to facilitate a level of tracking of people and goods at previously unthinkable levels of precision.
- Information being incorporated into objects that will, with the use of sensors, facilitate identifying who or what the object is, where it is, when it is, and what its circumstances are.
- Technology shifting power from the provider to the user or consumer at a time and place of their choice. People have greater choice in determining how goods and services are delivered to them and how to access many of the specialist services they require.

These developments are creating new possibilities for spatial enablement, or creating a 'spatially enabled Victoria'.

## **Spatial enablement**

By ‘spatial enablement’, I mean embedding location information into whatever we do.

Significant challenges exist in continuing to deliver services in an equitable way, so that everyone benefits, and within the capacity of the environment to support the demands being placed on it.

Responses to these issues require multi-disciplinary approaches – drawing on science, economics, politics, history, and technology. Spatial Information can be a unifying medium – linking solutions to location, or ‘spatial enablement’.

‘Location’, or ‘place’, is important because people identify with them – where they were born, where they live and work, and the community they share with others.

Spatial information is coming into its own because of three convergences which are creating new uses and markets for spatial data:

- Creation of new products and services based on the increasing connectivity of personal information devices (such as mobile phones, GPS units), digital knowledge management, and electronic commerce.
  
- The synergistic combination of nanoscience and nanotechnology; biotechnology and biomedicine; information technology; and cognitive science.

And

- The convergence of GIS, GPS, remote sensing technologies, mapping, and other capabilities to create 'location-based services'.

These convergences are in turn being driven by five 'forces':

- The digitising and instant availability of content.
- The demand for and emerging establishment of dominant global interfaces providing the ability to build interconnection and interoperation between information industry products and systems.
- The race between commercial corporations to dominate standards.
- Delivery of dramatically increased functionality into ever smaller devices.
- The driving down of price arising from new communications technology and rapid deregulation of the global telecommunications industry and the consequent growth of digital bandwidth.

Together these 'convergences' and 'forces' provide the opportunity to bring 'spatial' into the information mainstream.

### **The possibilities provided by spatial enablement**

Spatial enablement has a significant role in the development of on-line

mechanisms for delivering services and engaging with the community – such as e-Government and e-Democracy – including the use of unambiguous identifiers such as address.

Significant advances have been made in using spatial information in responding to emergency and security incidents, and that show that integrated approaches to using spatial information and technologies enable more efficient emergency services.

Spatial information technology is increasingly being applied to the management of health care, with ‘location’ as a key element. It enables remote monitoring and remote specialist intervention. It helps prevent errors in the prescription of drugs; the tracking of patient movements within and between medical facilities; and the location or monitoring of the movement of assets and equipment.

Spatial technologies are being adopted in the way we manage and value land, and the impact of our activities on that land. For example,

- Improving crop yields and reducing soil erosion and water losses through use of GPS and wireless technologies to manage farming inputs and yields at very precise intervals.
- Economic approaches are being used to better understand the relationship between environmental resources and land use by creating markets that give land owners incentive to invest in environmentally sound practices. These markets are in part based on spatial information that facilitates the modelling and visualization of the effects of land use change in geographic regions.
- The emergence of sensor networks such as those of the CSIRO’s

‘Farming 2020’, which aims to create wireless networks capable of monitoring land quality and the tracking of livestock.

### **What are potential barriers to achieving spatial enablement?**

One of the features of these changes is that many of the advances in spatial products and services are coming from non-traditional players.

Until recently, spatial information has traditionally been focused on mapping and the cadastre, and within a specialist community and industry that has valued standards, verification and authenticity.

However bandwidth, computer power and information creation are growing exponentially, with little regard for such traditions, and are becoming pervasive.

And industry is creating its own global standards – or uses ‘what is good enough’.

The rest of us are being left to keep up or be overtaken.

But these things will not be successful without consistent policy frameworks – within and between organizations, levels of government, and between the public and private sectors.

For example, without the tools to properly organize the information explosion, there will be greater information management costs – with systems that don’t talk to each other, the growth could become detrimental to the delivery of services.

The promise of the new technologies will not be realized until integrating frameworks and technologies are put in place.

Before I go on to outline how we aim to tackle these issues, I want to provide a few other examples of how the possibilities for spatial enablement are being further enhanced by developments in technology and information.

- The advent of Radio Frequency IDs, sensor networks, intelligent objects and WiFi is changing the way in which we think about 'location'. It will eventually be possible to uniquely identify every non-trivial asset or object in the environment and have them create, disseminate, receive and act upon information; as well as being able to map them in real-time.
- As the spatial information industry matures we can expect to see greater commoditisation and standardization, meaning that opportunities for innovation will come from differentiation and developing new services.
- Open source approaches to product development are widening the opportunities for innovation through collaboration.
- Spatial information is being used in many different, and sometimes novel, ways.

I have already illustrated three such examples; others include the rapidly developing and popular Google Earth, Google Maps, and Microsoft Virtual Earth internet sites.

Such sites are popularising spatial information and extending the uses to

which it is being put. These open and participatory approaches illustrate the potential for dramatically altering the way traditional providers acquire, manage, maintain and disseminate spatial data and information.

- The advent of the ‘participatory web’ means that the government, the community and the private sector can become co-producers of spatial information – Web 2.0, ‘collective intelligence’ and ‘neogeography’ may provide new opportunities to bridge the resourcing gap for providers of spatial information.
- The Semantic Web will facilitate the discovery and use of vast amounts of data through the development of rules and systems that enable computers to search for a wide range of data, read it, query it, classify it and extract it for use.
- Technological developments are providing the capacity to deliver greater volumes of data and facilitate greater processing capacity. This is putting it closer to users, wherever they are. As a result, we can expect the demand for immediately available and accurate spatial information to continue to increase.
- There are greater demands being placed on data content – its availability, its accuracy, its quality – as more people are able to access it. The gap between existing and required quality has the potential to widen as reliance on spatial data grows correspondingly as its use becomes more widespread, and as it becomes increasingly applied in automated systems (such as emergency response).

All of these developments and possibilities demand a response.

Therefore, how spatial enablement occurs is up to us.

We can be agents of change, or find that the changes are imposed on us by others.

The critical questions will be:

- Who will invest in creating the necessary frameworks and integrating services?
- Whose world view will be the ‘town plan’ for our future Victoria?
- Will it be the private sector or will government take a leadership role?

In the Victorian Spatial Information Strategy 2008-2010, we are trying to create the framework that enables all sectors to be highly engaged.

When this occurs,

- they will work together to implement frameworks, standards and methods of verification;
- they will create clusters to build the critical integrating technologies.
- Policies, legal and regulatory frameworks can be brought into the 21st century.
- Innovation will be based on ‘systems’ or ‘network’ based designs.

## Challenges

In the last 15 years, Victoria's spatial information strategies have focused on building spatial datasets and setting out the framework for managing them.

This foundation is now largely in place, so this new Strategy is turning to considering the strategic and policy requirements for addressing the new drivers of change that I outlined earlier, and the development and delivery of services based on that data.

The challenges we have identified that we need to address in the next three years are:

### *1. Continue to get the Foundations right*

None of the developments I have described will be possible without the fundamental ingredient – ie the spatial data.

All of our responses must be underpinned by a robust and consistent approach to the management of that data to support its use and exchange.

We must also continue to support the traditional use of spatial information in land administration, while extending it to support land use and sustainability – incorporating decisions the economy, society and environment we want to live in.

### *2. Continue to ensure accessible and maintained data*

Such a management approach/framework, must ensure data is fit for

purpose (including quality and accuracy), accessible and available. It will support awareness raising and discoverability of data.

Although it does present the further challenge of being able to keep up to date with users' requirements for quality of data – as I suggested earlier.

### *3. Being adaptable in the face of rapid change and able to respond to new developments*

Here we are dealing with questions such as:

- Are we in a position to respond to and take advantage of the pace of change that is occurring in the range of uses to which spatial information is being put and made accessible?
- Are we in a position to meet the challenges posed by competition from the larger corporations that are entering the spatial information marketplace?

### *4. Building a culture of sharing*

We are still engaged in a search for ways to encourage data managers to release their data to wider audiences. How can we overcome barriers such as copyright and liability?

Sharing also includes finding ways to encourage partnerships between all levels of government, business and academia to develop new products and services.

## *5. Addressing the Skills shortage*

The spatial information industry is not alone in facing shortages of skills now, and the challenge of ensuring we maintain our skills into the future.

But what skills will the next generation need?

How specialized will spatial information be as a discipline?

Can we harness the potential of partnerships both inside and outside traditional spatial information organizations to widen the pool of skills available?

## *6. Retaining relevant Institutional Arrangements*

Meeting all of these challenges presents a challenge in its own right.

It requires a collaborative and cooperative approach between all sectors of the spatial information community.

How will this occur – what governance model will be best capable of delivering this collaboration?

How can we maintain the incentive for participation to create a flourishing spatial community?

## **Responding to these challenges**

VSIS 2008-2010 sets out our response to these challenges.

The document as a whole paints the landscape for spatial information in Victoria, as I have described it in my preceding remarks.

It is the first strategy developed by the Victorian Spatial Council for the industry as a whole.

It sets the broad themes for facilitating the whole spatial information industry's participation in the landscape – these themes will be the focus for our engagement in the next three years, to support the Strategy's vision to create an environment that enables us to:

- **Locate** people, places, services, businesses and points of interest
  
- **Connect** systems, services, businesses, partnerships and link with other industries.
  
- **Deliver** quality services, standards, framework and what users want.

In the document, four integrated strategic directions are set out.

I will take each in turn and outline the main points.

## *1. Creating a framework in which the use of spatial information can flourish*

This direction focuses on the accessibility of spatial information, the development of applications and services based on it, and its use.

The value of Victoria's spatial information lies in users' ability to find it and access it.

Such accessibility will be guaranteed by a framework that supports participation, promulgates appropriate standards and establishes mechanisms for delivering and sharing spatial data.

Under the Strategy, the framework will incorporate:

- Standards – based on open sources, independent of technology vendors; consistent with national and international standards; and developed in consultation with users.
- Clear articulation of the roles of all sectors.
- A whole of Government approach to data management, delivery, sharing and access – government agencies working together rather than operating as sometimes competing, often duplicating, players.

One country that could provide a model is Norway, which has created a national program called Norway Digital to foster cooperation between government agencies (at local, regional and national levels) on establishment, maintenance and distribution of spatial information. One of the key features of the program is that custodians of data make their data available to other government agencies through a national portal

called geoNorge, rather than entering into separate licensing arrangements for datasets.

Opportunities to consider how arrangements between all levels of government in Victoria can be improved will be explored under the Strategy.

- Legislation that will stipulate requirements and establish best practice for delivering spatial data – here we are seeking to consolidate the multiplicity of provisions relating to the provision and management of information, to streamline and simplify them and modernize the information management environment to reflect the requirements and capabilities of digital technology.

## *2. Adopting an inclusive approach to the management of spatial information*

Approaches to data management that bring opportunities for a wider range of contributions are becoming feasible (or is it ‘necessary’) as a result of a number of factors – which I have referred to earlier:

- Partnerships and relationships that underpin a range of spatial information developments.
- The whole development of Web 2.0 that is enabling contributions to the updating and maintenance of data from any interested party.
- The demands on content providers growing, as a result of wider use, to the extent that they are not always in a position to keep up with users’ expectations or have the up to date ‘on the ground knowledge’ of changes occurring at the local level.

The Strategy recommends that standard editing environments, on-line tools for metadata creation and management, tools for notifying changes or modifications to attributes be developed.

At the same time, however, the Strategy acknowledges that such an ‘open’ approach can have its limitations.

Therefore, a number of preconditions will need to be met to make such a model viable.

It singles out

- Mechanisms for managing and verifying contributions.
- Standards against which contributions can be measured.
- Clear definition of roles, including what will be expected of data custodians

### *3. Developing the spatial information community through collaboration and partnerships*

One of the defining features of the spatial information industry in recent times has been the entry of the likes of Google and Microsoft into the market place, as well as the buying up of smaller/traditional businesses by larger companies – such as the recent acquisition of Navteq by Nokia.

These developments present challenges for Victoria’s industry to define its position in this expanding and global market.

The Strategy recommends that the next three years be a time of greater collaboration across the industry – through alliances and joint ventures (even outside the industry), capitalizing on the strengths and expertise that are already there.

Achieving this direction will be built on:

- Adopting partnerships based approaches
- Clearly defining the roles of industry sectors – which we will have done under direction 1
- Creating clusters and networks to build additional capacity
- Building on the base infrastructure/platform developed by Government to develop new services and products by the private sector.
- Entering into alliances outside the traditional spatial information industry

And, Government should support industry by providing access to its spatial data to enable it to develop new services delivering that data.

#### *4. Maintaining the foundations for Spatial Information Management.*

All of the developments I have discussed up to now rely on the spatial data.

The data needs to be available, accessible and clearly understood by users.

This will require:

- Ensuring data is fit for purpose
- Licensing models that facilitate access
- Development of technical solutions that encourage accessibility
- Awareness raising
- Enabling data to be ‘discovered’

and

- Availability of the data

The starting point will be series of principles that will govern the management of data:

- all spatial information being managed by an identifiable ‘custodian’.
- a consistent approach to managing spatial information
- networks that support custodians performing their roles.

- A Whole of Victorian Government approach for access to and sharing of data

## **Implementation**

In sum, the implementation of the Victorian Spatial Information Strategy will be based on achieving each of these directions, together and separately.

The document provides key signposts, but will need everyone's participation to make it successful.

The Victorian Spatial Council will play its part through:

- Communication and education about what is needed
- Advocacy – targeting the right ‘influencers’ in government, the private sector and academia, and
- Facilitation

The immediate priorities will be:

- Raising understanding at senior levels of government and business
- Developing a vision for a ‘spatially enabled Victoria’

- Developing standards and frameworks

And

- Fostering consistency across key public and private sector agencies

This is a big agenda for Victoria.

It brings significant challenges, but we believe that the strategic framework we have set out in the Victorian Spatial Information Strategy can help us to realise the promises that are held out by the developments in technology and information I have described.

The Victorian Spatial Council is ready to take up those challenges, and we invite our government, private sector and academic partners to join us.

Thank you