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Singapore NSDI: Towards a Spatially Enabled Nation*

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Summary

Many countries have realised the vast potential of geospatial information and recognised it as a critical element underpinning analysis and decision making for environmental, social and economic development. Hence, Spatial Data Infrastructure (SDI) is developed in many countries to provide for efficient and effective usage of geospatial data. The SDI policies also ensure that geospatial data are made available in high quality, interoperable and timely manner.

The Singapore's NSDI initiative which is known as the SG-SPACE (Singapore Geospatial Collaboration Environment) was launched in April 2008. The SG-SPACE is a cross-agencies program spearheaded by the Singapore Land Authority (SLA) under the Ministry of Law, together with the Infocomm Development Authority (IDA) under the Ministry of Information, Communications and Arts. The SG-SPACE aims to provide a platform and mechanism for government agencies to share and use geospatial data. Ultimately it facilitates better policy, decision-making and governance. Beyond data-sharing, SG-SPACE aims to create a sustainable environment where geospatial data is interoperable, accessible and usable by agencies in day-to-day operation. This geospatial data will eventually be extended to enterprises and citizens for value and knowledge creation.

This paper describes the SG-SPACE's goals, components, enablers, challenges and strategies.

SG-SPACE: A Place for Geospatial Collaboration

SG-SPACE is the Singapore Geospatial Collaborative Environment, a national initiative which aims to provide a platform and mechanism for government agencies to create a sustainable environment to share and use geospatial data which is interoperable, accessible and usable. This collaborative effort is jointly driven by the Singapore Land Authority (SLA) and the Infocomm Development Authority (IDA) of Singapore. Together, the two Statutory Boards are jointly leading the whole-of-government efforts to develop and implement a three-year masterplan to foster a thriving geospatial industry in Singapore. The benefits of this initiative will be extended to its enterprises and citizens for value and knowledge creation. It will reduce duplication of efforts in geospatial information collection, management and updating within the Singapore public sector and offer potential for new business opportunities. The vision and goals of SG-SPACE is shown in figure 1 below.



Figure 1: SG-SPACE vision and goals

How it all started?

SLA, the national mapping authority of Singapore, being the heaviest GIS user amongst all Government agencies, manages approximately 14,000 hectares of State land and about 5,000 buildings. SLA is certainly not alone in its reliance on geospatial technology and information for decision making. Many public agencies and businesses in Singapore; and for that matter, all over the world also rely heavily on geospatial information in their planning and operations. Be it in the area of infrastructure planning, utility installation, land-use planning, housing location, or simply setting up a business.

We recognise how the geospatial perspective can enhance policies by allowing us to understand the impact that policy decisions have on the real environment. Using geospatial information, we obtain a better understanding which allows us to better deal with a host of important challenges: such as disease surveillance, emergency readiness, public safety, business growth, infrastructure development and climate change. Many other data can be represented in spatial dimension and

Geospatial technologies are emerging and growing in influence and there is increasing recognition of geospatial technologies and data helping Governments design scenarios and present outcomes before anything is even built and before any decisions and action had been taken. Geospatial information is more often collected by Governments, private industries and universities, and therefore, is often scattered and fragmented. This information is valuable only when it is accurate, current, accessible, and easily integrated.

In Singapore, we currently have the Land Data Hub, People Hub and Business Hub which mainly serve relevant public agencies in the planning and management of land infrastructure, people needs and business needs respectively (A "Security Hub" is also being established). But these hubs are not linked and therefore do not allow the use of spatial and non-spatial data in an integrated manner. This limits the integration across the various government agencies and the effectiveness in planning for national needs and

dealing with threats and emergencies. Hence, the SG-SPACE also aims to enable the integration of the existing Data Hubs to support integrated government's decision-making.

Putting the Pieces in Place

Singapore's SG-SPACE provides a standardized infrastructure that allows a diverse community to access and share geospatial data: governments reduce administrative costs of enhancing their policy decisions through reuse of geospatial data, whilst both new and existing industries can evolve through the innovative use of such geospatial content. As a result, citizens benefit as their quality of life improves as a result of these developments.

The SG-SPACE framework is an integration of several components which will serve as the building blocks in realising the vision of SG-SPACE. The components of the SG-SPACE framework are shown in Figure 2.

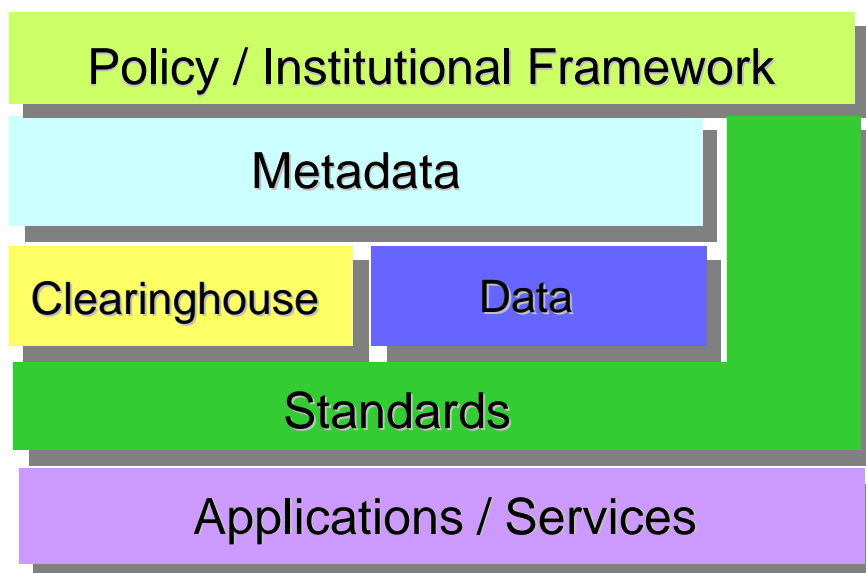


Figure 2: SG-SPACE Components

The Institutional Framework comprises committees and work teams to carry out operational work. Each committee and work team have defined roles and responsibilities, which they report the progress of to an overseeing committee.

Currently, three technical committees are focused on developing their respective areas of the SG-SPACE framework components such as the SG-SPACE Clearinghouse Applications and Services, Data Standards documentation, as well as Capacity building. A policy and governance team works in parallel to develop the policies which direct the operation of SG-SPACE activities.

Policy refers to a suite of policies and best practices which guide the operation of SG-SPACE through governance of data collection, data management, data access, data ownership, data utilisation and data dissemination.

These policies are carefully crafted to harmonize with existing data governance policies whilst addressing data governance issues that are unique to the geospatial data.

In addition to policy documents, we aim to develop initial protocols & guidelines for geospatial data, which is intended to guide the development of geospatial data and services in Singapore, and to ensure the smooth operation of SG-SPACE.

Standards documents specify a common set of open specifications for geospatial datasets. They describe how spatial data and Metadata should be collected, compiled, stored and disseminated, in order that they can be efficiently interchanged.

Data refers to the spatial datasets which can be accessed through the SG-SPACE clearinghouse. Fundamental Datasets are the datasets which serve as the common reference for overlaying and integrating other datasets.

We recognize the importance of having a core set of accurate and current geospatial data which can be immediately accessed and used for critical emergency readiness, public safety, and security functions; therefore it is vital that data owners and the data custodians who run the various data hubs (i.e. people, business, land) in Singapore are involved in the work to specify standards for these fundamental datasets, and ensure the availability of these as well.

The Clearinghouse is an online portal through which users can discover or search for geospatial datasets coming from multiple sources. It serves as one-stop access point for all government geospatial data. It also provides the

common tools and service components as the building blocks for other customised applications.

Whilst the clearinghouse is being developed, a list of existing datasets has been made accessible via the SG-SPACE website, to give agencies an insight into the wealth of data already being collected and shared within the government. The intention is to allow those agencies who may have an immediate use for such data to leverage on this information which will enhance their decision making through the use of this data.

Applications and Services are the final outcome of SG-SPACE which is visible and apparent to the stakeholders. These applications and services leverage on geospatial information for effective and efficient decision making, by enabling users to visualize data, perform analyses or even create mashups of different datasets.

Expanding the Territory

As this nationwide initiative requires the active support of government agencies for all stakeholders to reap economies of scale from SG-SPACE capabilities, the successful implementation and sustainability of SG-SPACE hinges critically upon capacity building and active engagement with stakeholders.

SG-SPACE achieves these twin goals through outreach activities, which range from forum presentations to online engagement. SG-SPACE presents projects and initiatives which aim to build capacity amongst our stakeholders to leverage the capabilities offered by SG-SPACE.

One priority of SG-SPACE is to equip stakeholders with a working knowledge of the uses of geospatial information. SG-SPACE activists reach out to audiences at forums or meet agency representatives with presentations that give a holistic overview of what SG-SPACE is working to achieve.

We reach out to our identified stakeholders through such initiatives as the recently completed user needs assessment. The survey allowed SG-SPACE members and respondents alike to gain an insight into what geospatial capabilities are now available and the areas that require development for SG-SPACE.

Stakeholders are also engaged through the intranet SG-SPACE website, which provides visitors with information about the SG-SPACE organization and scope of work, geospatially-related events and news, as well as presentations and information. Through the SG-SPACE website visitors are engaged through understanding SG-SPACE activities, and even by trying out a demonstration web-GIS application to get a feel of how GIS can enhance their decision making.

Room to Keep Growing

A key tool for raising awareness of geospatial applications already in use amongst government agencies is the Success Stories page on the website, where visitors can find out how agencies are using location-based applications in their work.

SG-SPACE is a continuous process that begins with the establishment of the framework components and continues with the collective efforts of the participating members of SG-SPACE. This consideration is borne out in the policies that are being drafted, which call for the regular review of policies, as well as active involvement in SG-SPACE activities and projects.

The challenge for SG-SPACE truly is getting people interested and involved within the government, and eventually involving private sector and the community.