

CO-OPERATING TO UP GEO-INFORMATION USE

Digital Norway

Digital Norway is a collaboration that is playing an important role in implementation of the national spatial data infrastructure in Norway. At the root of the infrastructure is a national geoPortal enabling access to geoinformation data and services owned by producers at national, regional and local level. A sophisticated internet application has been developed to facilitate regional access for a broad range of new GIS users.

Technological development is today moving rapidly from desktop GIS towards distributed GIS, leading to increased use and new users and allowing realisation of the full potential for geo-information. Recognising these areas of potential growth the Norwegian government initiated "Digital Norway"™ on the basis of a white paper approved by Parliament in June 2003. Digital Norway enables efficient distribution of geo-data and provides means of searching for and obtaining information and gaining access to data.

Co-operation

Digital Norway is a comprehensive programme for management of geo-information, the main focus being to facilitate easier access to geo-data and organise better products and services, which in turn will support increased use of geo-information and enhanced efficiency and modernisation of society. The concept includes a co-operative approach to data collection, maintenance and distribution of digital geo-information at national, regional and local-level government and authorities. Digital Norway is co-ordinated by the Norwegian Mapping and Cadastre Authority and involves important users and/or producers of geo-information at all levels of government. Access to data and services are organised via the geoPortal (Figure 1).

Information Society

The Digital Norway concept is in line with the principles of the European INSPIRE initiative (INfrastructure for SPatial InfoRmation in Europe). The initiative is in support of the "eNorway 2009 Plan" the digital leap™. This is a Norwegian government policy for an "Information Society"™ that aims at increasing the use of digital resources, including geo-information, and therefore plays an important role in increasing the use of GIS. The programme plays an essential role in the Norwegian Spatial Data Infrastructure (NSDI), where data and metadata is accessed over the internet using international and national stand-ards. NSDI is based on standards, technology and architecture that will lead towards distributed GIS wherein updated data is accessed over the internet directly from data owners in the form of WMS (Web Map Service) and WFS (Web Feature Service).

Important here is interoperability of data and reusable components in the form of services. NSDI uses ISO/TC 211 and OGC international standards and specifications. Web Map Service (WMS) and Web Feature Service (WFS) are standardised services for geo-information, dynamically accessible over the internet. These services enable seamless combination of spatial information from different sources across platforms and between users and applications. WMS allows a client to overlay displayed map images served from multiple WMS on the internet. Similarly, WFS allows a client to retrieve and update geo-data encoded in GML from multiple Web Feature Services. The GML Specification describes an encoded specification for geo-data in XML (Extensible Markup Language) that enables storage, transport, processing and transformation of geo-information.

Standardisation

Standardisation for data collection and data distribution has evolved over a long time in Norway and since 1987 the country has been using her own national standard "SOSI"™: a stand-ardised format and description for digital geo-data. This defines feature classes and transfer protocols for spatial data in 44 application domains, including property, road, utility-administration and planning. Organisations using and/or producing spatial information contribute to the development of the standard via voluntary working groups. The Norwegian Mapping Authority provides organised assistance and guidance and ensures that standards are in line with international practice. The SOSI standard is in the process of being translated into GML (Geographic Markup Language).

GeoPortal

A main task of the programme, and an important foundation for the implementation of NSDI, is the establishment of a national geoPortal for geo-data, metadata, services and thematic applications (Figure 2). This national geoPortal (www.geonorge.no) aims to organise access to data and services owned by national, regional and local data producers. It provides an efficient means of distributing geo-data, and for users to search for and obtain information and gain access to data. The geoPortal is based on the ESRI ArcIMS Portal toolkit and includes base maps, thematic information and property information. Launched in January 2004, the geoPortal has been developed further to satisfy additional requirements.

The success of the geoPortal and increased use of geo-information depends totally on the quality of content and reliability. One crucial

aspect is metadata. This makes geo-information searchable and adds an informative aspect to the data and documenting quality aspects. Norway has derived profiles from the international metadata standard (ISO19115), resulting in the Norwegian Metadata profile for thematic vector data. There is also work on developing standard interpretation, keyword, and thesaurus-reference user guides for consistent data entry and search definitions. Experience has shown that metadata is often neglected and its importance is not always fully understood. The creation of metadata is now a priority.

Increasing Use

Acting as a bridge between local and national levels, the federal government at regional level is an important client with many potential GIS users. However, difficulties arose during start-up due to factors including the high cost of GIS licences, high demand for support, and the high level of expertise needed to use the system. In addition, large numbers of people within an organisation were unaware of their need for geo-information and the benefits to be gained from GIS. To increase the use of GIS within federal government a co-operative project began in 2005 involving four departments in the counties of Hedmark and Oppland. The project, which resulted in implementation of the Digital Norway concept at regional level, has a two-step approach. As a first step, an internet application (www.innlandsgis.no) based on ArcIMS has been implemented to help new users familiarise themselves with GIS and accommodate day-to-day geo-information needs. The application gives access to dynamic and up-to-date base-map and thematic data as WMS and uses web services for national database search. The data is divided into themes giving access to predefined thematic maps for specific management needs. Some of the data is stored locally: a temporary solution until such time as more data producers supply their data as standardised map services. The second step, currently in its planning stage, is to develop ArcGIS applications in the form of thin clients for the more advanced users and tasks.

Future Developments

Complete and comprehensive NSDI requires communication and data exchange with municipalities. The 431 municipalities in Norway, ranging in size from two hundred to five hundred thousand inhabitants (in major cities), are part of Digital Norway and carry the major cost of creating detailed base-map data and cadastral information. There is a strong focus on increasing the use of GIS, and groups of municipalities are working together for best results. Municipalities use various GIS platforms, the most common being Intergraph and GISLine, a Norwegian product, whereas regional level mostly uses ESRI products. The use of different platforms enhances the need for standardised data and services for interoperability of data and exchange (Figure 3). Further work will stress the importance of metadata and data exchange with local municipalities.

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Further Reading

- Geological Survey of Norway, 2004, Web Map Server (WMS) - A Guide for New Digital Users of WMS in Norway, www.geonorge.no/geoportal under Prosjektrapporter.
- Mellum, Roy, 2004, geoNorge.no – The New Norwegian geoPortal - An Implementation of a geoPortal using Arc_IMS Portal Toolkit, Norwegian Mapping Authority, 2004 ESRI International User Conference Proceedings, Paper 2159.
- Meyer, M.A., 2005, eNorway 2009 – The Digital Leap, Ministry of Modernisation, <http://odin.dep.no/fad/english/doc/reports/050001-990252/dok-bn.html>.
- OGC WMS, 2006, Open GIS Web Map Service Implementation Specification Version 1.3.0, Wayland, Massachusetts: Open Geospatial Consortium. www.opengeospatial.org/specs/page=specs.
- Tang, W., Selwood, J., 2005, Spatial Portals – Gateways to Geographic Information, ESRI Press, pp 49-62.