

Launching a Geoportal to support eNorway Dissemination of Geographical Data through the Web

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SUMMARY

The Norwegian government wants to support a knowledge society where everyone can participate and where the potential of the use of information and communication technology is optimised. The needs of the citizens and the private industry shall be the driving force for the development of the eNorway services. *eNorway 2009* is about how the government wants to use and realise the opportunities

Norway Digital is a national program for co-operation on establishment, maintenance and distribution of digital geographic information. The major concept is the building of a national geospatial infrastructure in support of eGovernment (the *eNorway 2009* plan). The co-operation is based on a Parliamentary White Paper on the National Spatial Data Infrastructure presented by the Norwegian government and accepted by the Parliament on June 18. 2003.

An important activity is establishing a national portal for geographic data and services – (www.geonorge.no.) This geoportal will give the public free access to a number of map services through user applications on the Internet. The geoportal will provide effective mechanisms for dissemination of all kinds of geospatial information to the public.

The geoportal will demonstrate the benefits of an open, distributed infrastructure unifying reference data and thematic data. A key element is standardisation of data and services. The use of Web Feature Services (WFS) and Geography Markup Language (GML) opens for integration between different governmental document filing systems and Geographic Information Systems (GIS). This will contribute to simplify the interaction between the citizens and the public sector.

The geoportal is based on partnership and joint venture funding through the *Norway Digital program* and covers local, regional and national authorities. The Norwegian Mapping and Cadastre Authority (NMCA) under the Ministry of Environment, is co-ordinating the realisation of the program.

1. GOVERNMENT POLICY FOR IT AND CITIZENS – eNORWAY 2009

New products and services and new communication forms are developed and are used in more fields. The confidence and trust to the technology is increased. IT has a strong society changing power. It touches upon more and more areas, from business development, education and culture on to health and welfare. This development has political impact. It makes a basement and creates needs for a cross sector IT policy. The Norwegian Government has set up an objective of making everyday life simpler for the citizens and securing the future welfare. IT, used in the appropriate way, is a contribution to achieve these goals. IT is a natural part of everyday life for most people. The Norwegian government wants to support a knowledge society where everyone can participate and where the potential of the use of information and communication technology is optimised. The needs of the citizens and the private industry shall be the driving force for the development of the eNorway services. *eNorway 2009* is about how the government want to use and realise the opportunities

The Norwegian Government wants to support a knowledge society where everyone can participate and where the potential of the use of information and communication technology is optimised. Advanced used of IT shall give the citizens, NGOs and the private industry a better daily life and contribute to value adding services and give a sound basis for future generations. IT shall support the development of public authorities to be a safe and efficient distributor of services and resources. The needs of the citizens and the private industry shall be the driving force for the development of the eNorway services. Through a stronger co-ordination, trough pointing out more visible action areas and through concrete, ambitious and at the same time realistic goals, the ambitions is to create results that makes the difference.

The government has initiated a co-operation between representatives from governmental and municipal institutions, private enterprises, professional organisations and NGOs. With a strong and constructive commitment from the various actors, there is achieved a lot of results in relatively short time. eNorway 2009 will support the governments policy on economic growth and value for society. Good environment for research, high digital competence amongst the citizens, a high level of investments in IT and a good IT infrastructure are factors which contribute to get Norway in a good position in this field. For 2005 Norway was ranked 10th at UN Global eGovernment Radiness Report.

The first eNorway plan was presented in June 2000. The three first eNorway plans (eNorway 1.0, 2.0, 3.0) was to a great extent visualisation of concrete development within the various ministries. In 2002 a core framework across the ministries was initiated through eNorway 2005. eNorway 2009 is about use and realise the IT possibilities. Actions and projects will contribute to release value for society of IT. It is not only about technology but also about the way we communicate, work, learn and organise our public sector and about how value adding services are to be created in the Norwegian society.

eNorway 2009 has three main focused areas:

- **The citizens in the Norwegian digital environment.**
- **Innovation and growth in the private industry**
- **A co-ordinated and user approached public sector.**

eNorway 2009 is focusing on cross sector initiatives and projects both across the sectors and between public and private sector.

Some of the goals from eNorway 2009 relevant for the GI society.

- eServices for everyone including those who does not have internet access by 2007
- 80% of public web sites shall fulfil the quality criteria of Norway.no for availability by 2007
- ICT shall be integrated in all subjects through the education plans
- Development of methods and tools to measure the students digital competence
- All relevant interactive public services for the citizens shall be available through the citizens portal My Page by 2009
- All Citizens can choose to receive public information and communication from the public electronic by 2007
- Reuse of public data for value added services shall follow the free of charge principle by 2008
- All agreements for reuse of public data shall be assessed for adaptation to the PSI directive by 2007
- Governmental authorities within the geodata field and most of the municipalities shall be part of Norway Digital from 2005 and have an update system for their own data.
- There will be modern electronic charts available for all Norwegian coastal water by 2008
- All non-sensitive communication between public authorities shall be done electronic
- All public institutions shall use electronic supported administrative systems and electronic archives
- All public institutions shall use eID and eSignature for all relevant services
- All new ICT systems in public sector shall be based upon open source standards by 2009
- By 2006 there will be management standards for data and document exchange

The Ministry of Environment in co-operation with other ministries, the municipalities and Norwegian Mapping and Cadastre Authority are given the responsibility for the priority tasks in eNorway 2009 relevant for the Geographic Information Society

2. ACTIVITIES TO SUPPORT eNORWAY 2009 PLAN AND NORWAY DIGITAL

2.1 eNorway 2009 plan, task 16 Access to public geographic information through Norway Digital

Norway Digital is a national program for co-operation on establishment, maintenance and distribution of digital geographic information. The major concept is the building of a national geospatial infrastructure in support of eGovernment. The co-operation is based on a Parliamentary White Paper on the National Spatial Data Infrastructure presented by the Norwegian government and accepted by the Parliament on June 18. 2003. Norway has a long tradition for co-operation between public and private sector in general and between organisations in both public and private sectors. The national standard known as SOSI is a very good example of this co-operation. Within the framework of SOSI, there is nationwide acceptance of the data structure of nearly all relevant application fields, and also a standardised method of exchanging the data. The current policy for the SDI development is based on three main components:

- a geodata portal
- a geographic information metadata service
- a range of access services

Through Norway Digital all public producers, authorities and main national users of geographic information (maps, geodata and property data) are establishing a co-ordinated and user friendly distribution service. This service will make all standardised geodata available through a core portal. The data will be free of charge for internal use for all the participants in the program and the service will be available on commercial basis and as a free of charge view service for the citizens.

The activities in Norway Digital will be regulated through standardised agreements and a core technological platform based on internet technology. The Norwegian mapping and cadastre authority will be the co-ordinator of Norway Digital. The task will increase the availability of geographic information, and improve the quality and availability for all.

2.2 Høykom – program

The government has put up a special development program with objectives to increase the competence and the use of broad band services. This means more innovation in public sector and a more efficient and modernised public management and services. The programme has contributed strongly to the development of broad band based services within education, health and social services and in the municipalities. There have been developed new and improved services both by private enterprises and the public. The demonstration projects within the program shall serve as knowledge base for solutions that will improve public services and information distribution. There are both local and national demonstration projects in this program within a wide sector of user environment. Some have a focus on distribution and applications for interactive use of spatial information as tools in internet communication between public authorities and the citizens. One example is by use of interactive map related to “My Homepage” for the citizens to access information related to his own neighbourhood. Actual information is environmental information like pollution and sewage, cultural heritage sites, landslide risk zones, protected areas, meteorological information.

Through the Høykom program there are several demonstration projects at local level. Many small municipalities are now co-operating in setting up services to access web based geodata related applications. The co-operation will both concern technical solutions as well as competence, capacity and service co-operation. This also includes services within spatial planning, property information, water support, sewage and other utilities. Project including 3D visualisation is also tested for planners and citizens to view consequences of various construction proposals like landscape analysis, risk assessment, tourist information etc.

Another interesting example is set up by the Electricity and Power supply Authority to combine many sources related to water and hydrology information. The project creates new services and gives a new picture of Norway based on Internet, GI technology and data from distributed models, and various observation sites. This gives a living archive with millions of maps showing the situation from day to day, year to year. This project will secure an increased reuse of data from various sources.

2.3 AREALIS and Norway Digital

In Norway we have had several development and pilot programmes for co-ordinated access, electronic distribution and use of Geographic information during the period from 1990 to 2005. Based on the experiences especially from the Arealis program and GeoVEKST co-operation, the Government presented a white paper to the Parliament in 2002 called Norway Digital. Here the main principles for the GI policy are to have a standardised infrastructure of Geographic

information in Norway based on co-operation between the various governmental and municipal producers. Another principle also stated in the eNorway policy is to have one main Portal for access to Spatial Information.

Arealis was a national project initiated by the Norwegian Ministry of Environment in 1997. The main objective of the project was to make environmental data and land use information available at national, regional and local level. The project focused on co-operation, standardisation and extensive information activities to achieve the objective. From the very beginning the Arealis project has chosen the Internet as a strategic information channel. The Internet related work followed two main tracks. The first was the Arealis web-site, a traditional 'home-page' like site. However, the site now holds a huge amount of information ranging from the latest news to all specifications and data-set definitions. The second track was development of web-mapping applications. Following both tracks has been very successful.

Several successful web-mapping applications focusing on GI for environment and area planning has been launched both on national, regional and local level. The latest development of specifications by OGC and standards by ISO has been implemented by the Arealis sponsored project 'GI on the Internet' project. The project focused on testing interoperability between GI-servers through WMS clients. The further development gives an opportunity for better access and participating from the citizens in planning processes.

The experience from all work and projects is now brought further through Norway Digital that is integrating the AREALIS program as well as the GeoVekst concept for co-ordinating, access and distribution of Spatial information. The new GI-gateway is called GeoNorge, which is an Internet portal that aims to become a central part in the Norwegian national spatial data infrastructure.

One of the important elements in Norway Digital is co-operation. Today more than 10 Norwegian ministries and 20 of their agencies are involved in Norway Digital either as data suppliers or as potential users of the information accessible through GeoNorge. In addition most of the county agencies and municipalities take part. The Norwegian Mapping and Cadastre Authority is co-ordinating the programme on behalf of the Ministry of Environment. Another important element in Norway Digital is standardisation. Large effort has been made in working out specifications of several different environmental data sets. The specifications have been developed based on the principles of the national de facto standard for geographic information (SOSI). About 150 data sets have been defined, grouped into 9 main topics. The future challenge here is to adapt to the ISO and CEN standards and to the INSPIRE directive.

2.4 Developing of web mapping techniques

One of the very first web-mapping applications running in Norway was launched by the TITAN (Tactical Integration of telematics Applications Access Intelligent Network) project in 1999. The main objective of the project was to make it easier to gather and present information about the Sogn og Fjordane region, and to develop interactive services involving public sector, private sector companies and the citizens by integrating existing and new web services. The project soon realised that the map was a natural entry point and integrator and thus decided to develop the application with a geographic interface.

In 1999 the lack of international GI standards was a problem. In Norway we had a de facto national standard (SOSI). The base map was based on the NMCA's topographical databases, and the only technical solution regarding storage of data was to store as a local copy on the project server. Developing the base map from the NMCA's topographical map databases required a significant amount of work, both regarding converting the GI from standard SOSI format to Mapguide internal format and developing the digital cartography given relatively limited functionality and possibilities (in 1999). However, a remarkable satisfactory result turned out, a scalable base map designed for the scale range 1:5 mill to 1:5000. Many of the stakeholders had a lot of information already collected and stored in databases (Oracle), a minor part of it was geo-referenced. During the project all the information was geo-referenced using both direct and indirect geo-referencing, but still separating the GI-part of the information from the existing information stored in the DBMS. The Arealis members made a valuable contribution with their data sets. The overall result was a collection of 64 GI data sets generally grouped into three main categories environment, transport and tourism (hotels, point of interest). The information was made available to the user in two ways. Firstly as a set of predefined thematic maps selectable from a list, and secondly as an option of composing the users own map from a selection of 64 thematic data sets.

The TITAN project may be regarded as an early attempt to establish a Regional Spatial data infrastructure (RSDI). The service has gained much attention both through media, the GI community and at last but not at least by a large amount of visitors.

2.5 Interoperability and web services

The lack of interoperability within Geographic Information Technology (GIT) has been, and still is a serious challenge. However, the technical specifications (GML, WMS and WFS) from OGC and the standards from ISO/TC211 provide a basis for developing interoperable geospatial database services and clients as elements in a National Geospatial Data Infrastructure (NSDI). To gain experience with, and take advantage of the OGC and ISO work, the project 'GI on the Web' was launched in June 2001. The project terminated in June 2002. The following national agencies participated in the project : Norwegian Mapping and Cadastre Authority(NMCA), Norwegian Land Use Mapping Agency (NIJOS), Norwegian Geologic Survey(NGU), Road Authority(SVV) and Directorate of Nature conservation(DN) . In addition the Hedmark county and two local municipalities participated. Among several activities the most relevant in this context were:

- Establishing geodata servers,
- Add contents – GI - to the geodata servers and
- Develop Web Map Server (WMS) clients.

The content included all NMCA's topographical map databases, several environmental data-sets from NIJOS, NGU and DN. Mainly data-sets with national coverage were establish as geodatabases at this stage.

The participating national agencies already used Arc_IMS as Internet map-server. The three servers were easily upgraded to WMS functionality by installing the ESRI WMS extension (servlet). On this platform three WMS-clients were developed.

A thematic client was developed by NGU and DN. The client accesses topographic layers from the NMCA server and thematic information from the NGU and DN servers. Thematic information is from the main thematic group nature and includes geological data sets, and

conservation of nature data sets and more. NIJOS developed another thematic client. Thematic information includes suitability for crops and soil erosion susceptibility. A generic client developed by NMCA. This is a relatively thin client. The user must compose the map from a list of layers (data-sets) available from the NGU/DN, NIJOS and NMCA servers. The number of servers is expandable through the WMS register functionality provided by the client.

3. THE NEW GI GATEWAY; GEONORGE

Supporting Government Initiatives in Norway for the new GI Gateway; GeoNorge is the white paper Norway Digital, eNorway 2005 plan, eNorway 2009 plan and the demonstration programmes in HØYKOM – which are supporting initiatives for broadband internet access. More details about these initiatives are described in chapter 2 of this paper, here I only repeat some key points. There has been important work to develop and implement standards for eGovernment with a focus on architecture for electronic interoperability in public sector. There has been a working group on the policy for open standards in support for eGovernment.

3.1 Norway Digital – a common fundament for value adding.

This white paper was accepted by the Parliament in June 2003. The major concept in the White paper is the establishment of national geospatial infrastructure in support of eGovernment

3.2 GEONORGE

The Geoportal architecture is based on national components and on WMS, WFS, WCS ... web services. It includes both regional and local components and is used to build both a national portal (www.geonorge.no) and regional and local portals. Also some organisation/thematic specific portals are based on the same architecture

The development addresses all and any potential application field for geospatial information. It has a big variety of content, a rich set of functionality reference and thematic data and services. Much is now in daily, fully operational use such as the national portal, wms services from a large amount of agencies with national coverage, Web services and portals from local authorities. A new extension including more support of eCitizens is designed from 2006.

The standardisation work includes

- National framework with mandatory architecture and overview of standards involved
- Content standards – long range of ISO 191xx's
- Metadata – dataset and services, ISO, OGC, UDDI
- Services – OGC, ISO, OASIS (web services)

The geoportals and gateway focus on four main topics :

- GI catalogue/metadataservice
- Web mapping, web map server clients
- Downloading functionality
- Information, specification, standardisation

The main objective is to make spatial data and environmental data available and ready for use to local and regional planners, officials and politicians. The needs for environmental decision making and planning will have priority. The Portals shall also in general serve the government, private sector and citizens with environmental GI on the Internet.

3.3 Download functionality, access points

Still many users will need the thematic data sets for use on their own GIS applications. The portals will be an access point making spatial data-sets available through a set of download functions. It will be a distributed solutions where the data will be provided directly from the various agencies own servers. The geoportals will offer the download functionality as service to other data suppliers. In this context it is a challenge to handle the differences regarding copyright and pricing policies. Today this is ranging form full cost recovery and strict licensing regimes to general free access and use.

3.4 Collaboration, a success factor in establishing a local spatial data infrastructure

In Norway, many of the local communities are relatively small and have limited financial and human resources. After the Arealis and GeoVEKST with a broad collaboration now most of the local municipalities today participate in Norway Digital. The local communities struggle to meet the GI challenge (and other challenges). Especially as the number of GI data sets grows due to demands from central government in the field of environmental and area management and spatial planning. To meet the challenge a formalised co-operation between neighbouring municipalities about core GI portals are established. An increasing number of regional GI portals are opened the last two years. The collaboration often has defined two main activities. One activity is to join forces in first time data capture/storage, maintenance and distribution of various spatial data sets. The second activity is to develop and run is a common web-mapping application.

Two major benefits achieved from such collaboration is

- GI catalogue/metadata service
- Shared cost through establishing a common IT/GIS infrastructure and
- Access to GI expertise by employing a project manager with long GIS experience.

Further work will be focused on further data capture and technical development towards implementing the OGC Web Map Server specification. In this work the project will be supported with technical expertise from the central Arealis organization.

4. Municipal experiences and opportunities

In the municipalities we see new possibilities with WMS and an important condition for better access to data and better participation in municipal processes is to make the municipalities use WMS. A good example is Bærum municipality who has participated active in the geoPortal project and share with us some of their experiences. Bærum municipality has long experience with internet distribution of geographic information both to the public and for internal use. They are an active municipality within development and use of new solution within GIT, they have interested and demanding users within the municipality, a liberal attitude to the spread of information but they recognize sometimes conflict between the objective on free float of information and the demand for income of the same information.

The chief surveyor in Bærum summarise the basic new with WMS as increased information access, information directly from the source, always updated information (or at least dated) and independent of system and organisation.

In a municipal context this means better preparation for decisions, core information basis and a more efficient distribution system compared to the print and copy process today. WMS gives better information exchange within the organisation and with the citizens in hearings and makes

it easier to make regional (intermunicipal) map solutions – flexible for different demands and he summarises in the end that it is really fun.

What are the conditions for realising geoportals and WMS within the municipalities;

- User functionality must be as good as our solutions today
- It must be good interface to various external registries
- Demand for stable access to external WMS data all day and night
- Neighbouring municipalities accessible on the net
- Simple catalogue access to external WMS servers
- Quick communication
- External WMS data delivered within the municipality's UTM zone
- Good specifications and for the national data sets
- Integration with map management tools and GIS tools
- Good and relevant web-services

For even more success there is a need to get good ordering and payment solutions and electronic self service of data. When preparing for start there is important to know what contribution can come from others and to get good demonstrations of the possibilities by best practices. Information in local and regional media is important to get a broad involvement both from the staff and from the citizens. It is crucial to invest in competence and good guidance. It is also important to test the possibilities and the limits within the organisation and to choose a solution that is most suitable for your municipality if you should have in house services or buy services at a web-hotel.

In my presentation at the workshop I will demonstrate some applications, especially applications for interactive participation from the users side inclusive some examples from local municipalities where an increasing number now integrate a geo-portal as an integrated service in its web page and municipal services. The Minister of Modernisations has brought up the idea of “ My Page” as an entrance page for the citizens for all connection and interaction to the public sector where you can search for relevant kindergartens in your neighbourhood, the actual school for your children, take part in discussions on municipal planning processes, get forms for building application and letter to neighbours, qualify your application and get the permission. I will give some examples from both the core GeoNorge portal but also from various thematic and municipal WMS services.

One scenario is for the near future is when a family are about to move from one city to another and need to find an appropriate place to live. They can set up a list of criteria for the area where they wish to buy a house. That could be walking distance to school and kinder garden, short distance to jogging area, avoiding pollution area and traffic noise. The family can use the web to access a service that present exactly the information they want, on one map on the screen. Traffic densities along the main routes are given, area regulations are shown, schools and pollution sources are plotted, real estate is depicted and specific information about each property is a mouse-click away. All this information is collected directly from its primary sources, so it is just as fresh to the family as to the city planners. Some municipalities have already set up similar services as described in the scenario. However up to now the information is not extracted directly from the primary sources, but has to be collected, restructured and loaded into a separate, intermediate, application-specific database. The future goal is to access living data.

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BIOGRAPHICAL NOTES

Kari Strande is International Director at the Norwegian Mapping and Cadastre Authority. She is chair of FIG WG 3.1 task e-Government for e-Citizens. She is a local politician and promoting better tools for decisions for land management and environment. She is also working with development cooperation and geospatial infrastructure projects as tool for development. She is coordinating an exchange program for young surveyors in Vietnam, Laos and Norway

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