

## HOW TO GET VOLUME IN GIS-BUSINESS

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### Abstract

This paper is not to be regarded as a recipe in how to be successful in selling GIS-software. It aims to describe the pro and cons of stimulating a free flow of geographical data. Today we have a general understanding that a free flow of available data is the key point to an increased use of GIS. This concept is hard to accomplish in all senses as operators and producers of geographical data strives to cut costs at all rates.

Internationally, Sweden is well established in the sense that production rate and general coverage of geographical data is very high. We are still awaiting the real boom in using collected and stored data. In the purpose of promoting the use of geographical data a nationwide programme was formulated in the late 80:ies. The programme suggested the forming of informal bodies of users for spreading the knowledge and use of GIS.

Today we have a network of associations representing the users along with a national group representing the producers that all have the same purpose; coordination and cooperation in efforts to implement and apply the idea of GIS and spatial analysis. This paper describes the ups and downs of various projects and ideas in order to achieve volume in handling of geographical data. The regional associations called SamGIS shows a great variety of characteristics according to circumstances for the site.

Forestry in the north of Sweden, transportation in the west and physical planning in the south. Catalogues of databases and registers containing geocoded data, centres of dataexchange, INTERNET-based BBS, educational programmes and seminars are some of the means used by the SamGIS-organisation to promote GIS-use and to increase the use of geographical data.

### 1. Introduction

Geographical data is produced on national as well as on local level. Geographical data by definition consists of geometric and attribute data. Sweden is well furnished in both senses.

Cartographic data is produced on local level by communities to facilitate mapping, physical planning, documentation of electric networks and so forth. On national basis there is coverage of general mapping data ranging from 1:10 000 to 1:10 million supplied by the National Land Survey. Cartographic databases has been developed and produced since the middle of the 70:ies. Today's and tomorrow's demand of geographical data serving geographical information systems (GIS) has generated a new generation of databases called Geographical Sweden Data (GSD). The production rate of geographic data on local level is still very small, and the main focus is on implementing digital techniques in large scale mapping.

The biggest producers of cartographic data in Sweden is to be found among the local mapping authorities. The fastest growing sector using GIS on local basis are the private or public-owned companies projecting, documenting and maintaining networks on different kinds whether it is electricity, water, gas or sewage.

The Geological Survey of Sweden has started to digitize their series of bedrock maps, soil maps, hydrogeological maps, geophysical maps and so on.

The National Board of Forestry has a system for inventories of forrestal resources.

The Swedish Meteorological and Hydrological Institute has a databases containing drainage basins, lakes and rivers. Along with these there are databases with statistical series of climatic data gathered since mid 18 th century.

Within physical planning we have all the restricted areas of national importance digitized. These areas support both regional and local planning authorities.

Sweden has an unique register containing all real estate units, the system is runned by Central Board of Real Estate Data. Besides the geometrical reference for every unit, a central point, the register comprises of records that for instance describe area, administrative adresses, fiscal information and owner. The central point of each real estate unit has recently been complemented with a point for the site of the main building inside the real estate unit. A further step in the strive to geocode census data is to add a coordinate pair to the postal adress. Statistics Sweden has census data for example gathered on personal level. In order to geocode this data they are able to merge the census data with the real estate-data system . This process generates maps showing for example distribution of taxable income, there is a restriction however on showing data on a level less than 3 persons due to protection of the personal integrity.

Along with this census data Statistics Sweden produces cartographic data showing the statistical borders of the densed populated areas (areas where there lives more than 200 persons within a range of 200 meters from each other).

The use of GIS is restricted to organisations that has a well formulated need for such an information and enough money. National Land Survey uses GIS to produce geographic data out of general cartographic databases; closing polygons, attaching attribute data, building new figures of existing data and so on. When introducing GIS in the late 80'ies, GIS were tested on constructing parcels on cadastre maps. All the previously metioned data are coded in the same coordinate system apart from the locally produced cartographic data.

As you have noticed Sweden is well equipped with geographical data nevertheless the real boom of using GIS is awaited.

The swedish state who is responsible for the production and distribution of geographical data paid by public means made an effort to stimulate the use of these data by publishing a report on the situation today and the plans for tomorrow. Unlike the Lord Chorley-report, this was a teamwork between representatives of different sectors on governmental level.

As a result of this report several proposal were made on how to stimulate the use of GIS and geographical data, one of these were to form SamGIS organisations.

## **2 A Swedish model**

### *2.1 Forming organisations*

The matter of getting a growing GIS-sector and on the same time increasing the use of geographical data is of national importance.

The joint effort resulted in a proposal for the regional level to form groups on voluntary basis which would work along the line of cooperation and coordination of geographical data.

The idea was spread around the nation. At places where such an organisation was already in operation they took it as a confirmation and recognition of their existence as to others the report worked as an inspiration to start organizing. The key word was coordination and cooperation on voluntary basis.

The most common geographical unit for the SamGIS-organisation is the county (Sweden consist of 25 counties of different area and population).

The regional characteristics determines the organisational structures of SamGIS organisations. The most common form of cooperation were and still is; the cooperation between the regional Land survey department, the administration on county level and an associated group of local administrators. The membership of a SamGIS organisation is open to all intrested parts dealing with geographical data. The variety among the members is great and varies with the regional character of the county. The strength of a regional SamGIS organisation is variety of members and its ability to maintain the focus on coordination and cooperation around geographical data. The informality of its network and the ability to form new groups are also of great importance for the success of the SamGIS organisation.

## 2.2 *Imposing tasks upon the SamGIS organisation*

Along with the report that proposed the forming of the SamGIS organisation there came a row of tasks that suited the aims of the organisational body. The regional organisation should;

- work for a regional network of present and potential GIS-users
- constructing a metadata base with cartographic data and geocoded registers
- initiate projects that aims to coordination and cooperation around geographical data
- promote standardisation of geographical data
- act as an intrest group discussing the use, construction , price and distribution of geographical data with data producers

## 3 **The regional SamGIS organisation**

The regional activities within these SamGIS organisations varies in all senses. The activities, solidity, financial support is different in all senses.

In the northern of Sweden where the numbers of administrative units are few and the wealth of the areal resources are exceeding the human resources we see a great intrest in spatial planning tools. Due to a tradition of political intrests in the region there is no lack of financial support to various project involving new technology, there is also great coherence in the process of physical planning.

In mid-Sweden there is an intrest in structural planning for counties consisting of several communities. In the south of Sweden in close range of the European Community the stress is upon communication and interaction of regional networks.

### 3.1 *BD-GIT-project*

The regional SamGIS organisation, called LINFO-center is situated in Luleå, in the northern region. This organisational unit has 7 members, one of the smallest as far as members concerned. Among its members one can mention private companies and organisations who was also the sponsors of the notorious project I am about to describe.

All of these members have been involved from 1991 until 1994 in a big project of establishing and maintaining a computer switchboard containing geographical data. The sponsors of the project have been the County Board of Norrbotten, the regional Land Survey, the County Forestry Board, IBM and the Swedish Telecom (Telia). The keyconcept has been to provide the user with an on-line and integrated access and a simple query facility to a heterogenous database environment. The user has also be able to coprocess data from different databases. The system is based on a client-server approach.

Technical means has been accomplished within the project but the development of defining and structuring data has made the concept of the project a bit out of date. Progress on modelling geographical data where not developed at the time when the project started. Plans are made to go

further in order to create a heterogenous spatial database environment where several databases using different database system are working together in a shared data space. The big variety among the participant of the project provided such an environment but the tests were limited.

### 3.2 *Jönköping-county*

The modelling phase of project-administration has been in focus in the case of the next SamGIS-project which I am about to refer to.

Swedish planning authorities on the local level have accomplished the first round about of contemporary structural planning. It resulted in plans with different standard concerning content, aims and design.

In order to introduce computer-aided tools for the next generation of structural plans the Jönköping county with its 11 communities started out with a project within the regional SamGIS-organisation. The people in charge of the planning department at the county administration board in Jönköping foresaw the importance of a coherent model concerning geographical data. This project started out with an ambitious goal to make all parties aware of the fact that they must define and structure geographical data within in their structural plan in order to build a geographical database. The effort of constructing a model was a major part of the project, especially when it comes to time-consuming. Initially a course was held where engaged parties was introduced to the basic concepts of GIS.

The aim of the project was to develop method on how to provide the local planners with geographical data from central and regional level. A dialogue between the two administrative levels and between the technician and the planner was a necessity in order to speak the same language and to work towards the same goal.

At an early stage of the project GIS-software were chosen. The production of geographical data according to the model is performed with ARC/INFO, whereas local planners uses ARCVIEW II which function as windows into the centrally constructed geographical database. The project uses a complemented SPOT-image as a cartographic basemap.

### 3.3 *Kopparberg-county*

Some of SamGIS organisations has a educational profile like Kopparberg-county where courses are held to intrested members which deals with important issues, for instances environmental planning. The educational committee of the SamGIS organisation makes a enquiry among the members regarding subject of general intrest, afterwards they formulate an educational programme. The practical handling is taken care of by the administrators of the SamGIS organisation. Kopparberg-county has 23 associated members and is able to fill a course with up to 100 participants. This enables a distribution of GIS-knowledge within the regional realm.

For example the SamGIS organisation have held courses in environmental planning designed as workshops. The first part of course delt with a traditional description of an environmental plan whereas the second part demonstrated GIS-applications for the same purpose giving the participants new ways of collecting, storing, retrieving, analysing and presenting the geographical data. Kopparberg-county has also experiences in giving courses in the basic concept of GIS. As other SamGIS organisation Kopparberg-county prefers educational resources and application from the own region. Sweden has an educational resource named Swedish institute for geographical techniques situated in Kiruna, the northern parts of Sweden.

### 3.4 *Malmöhus-county*

As I mentioned previously that the SamGIS organisation in southern parts of Sweden dealt with the interaction of GIS-users in a regional network. Being a representative for this organisation I would like

to refer to our experiences. The main task for the SamGIS organisation in M-län has been to construct and maintain a metadatabase containing records on different kinds of geocoded data. All in all you can mention two types of records which can be found in our catalogue. The first type include all cartographic databases, registers, on so forth that are of general interest in terms of exchange and further usage. This kind of data is often financed by public means. The second type of data are often used internally in public or private organisation and has no interest or should have no interest outside the organisation in question. However the records in catalogue are essential as it can provide fellow users information on how different GIS-users have defined and structured their data, constructed their databases, and so on. The SamGIS organisation in M-län uses a runtime version of Microsoft's relation database tool ACCESS for manufacturing a distributed form of the metadatabase. There are also plans for a HTML-document describing the organisation, its members, its board, newsletter along with the metadatabase. Of course there will be pointers to the national metadatabase already on INTERNET and hosted at National Land Survey.

### 3.5 *Efforts on national level*

Along with the proposal to organize regional SamGIS organisations there was a need to form a national group. This constellation consists of independent experts from different departments working with policies in order to remove obstacles which can reduce the use of geographical data. There is a general interest in keeping the cost of raw data low. There have also been studies made of the internal flow of geographical data within local administration.

The national SamGIS-group has also followed the development on standards for design of metadatabases in order to construct a national database catalogue on request from the Research and Development Council for Landinformation Technology.

## 4. **Conclusions**

There is no recipe in how to get volume in GIS-business, nevertheless I want to share experiences we have had in Sweden regarding the matter of promoting the use of geographical data and the distribution of GIS-knowledge. Instead of formal institutions and decrees on national level we have chosen to form organisations called SamGIS. Informal organisations of ad-hoc character is necessary due to the fact that;

- GIS is a interdisciplinary subject
- the focus of GIS-applications alters over time
- SamGIS is regarded as an objective part in its relations to the actors on the GIS-market

The GIS-area needs political recognition, GIS is a part of the IT-society. Recently there has signals that this recognition is on the way, after the presentation of the Bangemann report the European Commission included the matter in its agenda. The same thing is happening in Sweden.

Technical development. We will experience a development of the market segment "object-oriented" GIS-software with open architecture towards relational databases. This will replace software built in elderly programming structures. Hopefully the work with standards will be completed so that exchange of geographical data can be executed in a heterogeneous environment

Spatial awareness. The time must come when entrepreneurs of various sorts comprehend the spatial concept and when the spatial analysis is part of the daily routine. This is a question of how we as humans look upon our reality, things that you can not change momentarily. However there is a great challenge to educate the coming generations.