INTERNET APPLICATION OF ELECTION RESULTS ON MAPS

Submitted by Statistics Finland[1]

Contributed paper

I. INTRODUCTION

1. Statistics Finland has not only produced national election results as tables, analyses and reports but has also, since 1992, produced them as maps. The results on maps were produced on the night after the election results were published. The Geographical Information (GI) Section in Statistics Finland's Population Statistics Unit was responsible for this election map service aimed at the media, political organisations and other clients. Up to 1999, the election maps were made using GI desktop mapping programs (ArcInfo and MapInfo) during the night after the votes had been counted. The maps were delivered to clients during the night and, on the morning after election day, in file formats and as paper maps. Although some parts of the map-making system were automated, a lot of manual work was still necessary in the making and delivering of the maps.

2. Four national elections are due to be held in Finland in 1999-2000 and the GI Section at Statistics Finland decided to put the maps of elections results on the Internet to give clients even better and faster service. The updated results would be published during the late evening and the night after polling stations had closed.

3. The project to develop an election map application for the Internet was launched at the beginning of December 1998. The first elections where the application would be in use were due to be held in March 1999. The application was developed in cooperation between the GI Section and an outside specialist company, Novo Meridian Ltd, and published in March 1999.

4. After the national parliamentary elections, the same kind of service was built up for the European parliamentary election in Finland, in June 1999.

II. THE APPLICATION

5. The application is built using MapObjects (an ESRI product), Visual Basic and HTML language software. The map server is an NT-based MapObjects Internet Map Server. The database is a Solid Web Engine relational database.

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6. The application permits the study the election results by area as thematic maps and tables. Every application contains hundreds of maps and dozens of tables. The maps can be saved in file formats (PDF and PostScript) and printed out as hard copies of high quality. The tables can also be saved in file formats. The application is available in Finnish, Swedish and English language versions.

7. For the two first elections in 1999, clients needed a user code and a password to use the application. The user code and a password were chargeable. A separate charge was made for downloading the maps. For organisations with several users Statistics Finland made individual contracts. In the latest elections, i.e. presidential election 2000, there was no charge for the viewing of the maps. Only if a client wanted to download maps in printout and file formats did he/she need a user code and password that were chargeable.

8. The data content of the application is divided into two sections: the Voting Turnout/Votes Cast per Party section and the Candidates section. Themes to choose from vary depending on the character of the election. For example, there are themes like voting turnout and changes in it, votes cast per party and changes in them, votes cast for candidates, and different comparative themes.

9. The data can be viewed at several area levels; whole country by municipality, whole country by constituency, each individual constituency by municipality, Greater Helsinki and three other biggest cities by polling station areas.

10. The user interface allows the user to zoom in and out or to focus in the map window. The user can also verify the name (or area code) and the value number of a region by clicking the info tool on the map.
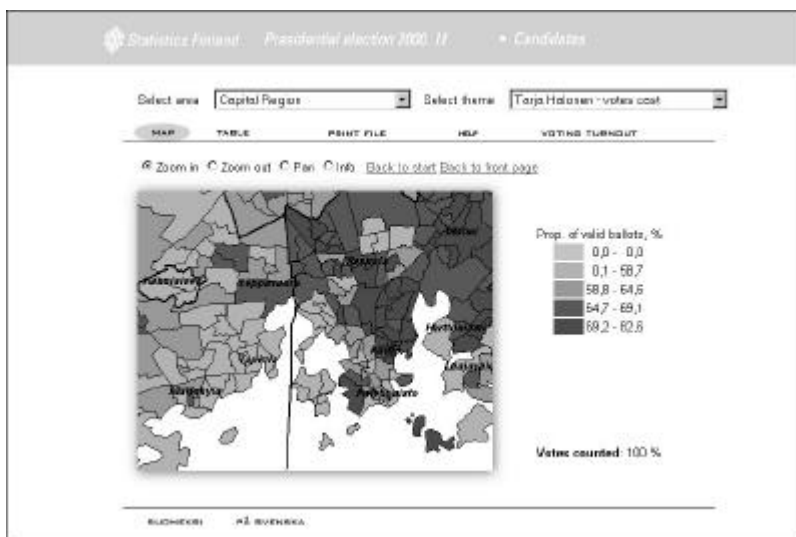

Figure 1 . Application map window (the presidential election)

11. In the application for the European parliament elections and the presidential election, map printouts for candidates can be viewed with their photographs on (Figure 2).
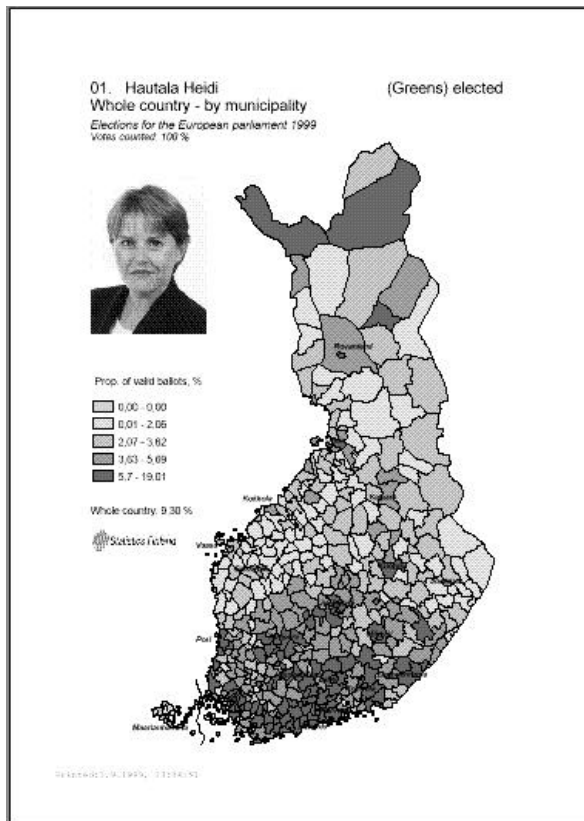
Figure 2. A printout from the European parliament elections application.

12. The classification of data in the results maps of the application was automatized and was based on quantiles, standard deviation and tailored classification. The best statistical and cartographical solution would be to tailor the classes for each map (or for most of the maps), but as this would mean longer responding times, the number of classification types has to be limited. Cartographical solutions might be more limited on the Internet than in traditional map-making. For example, the colour palette might have to be limited since few colours remain constant on all screens when different browser versions are used.

13. Statistics Finland obtains the election results electronically from TietoEnator Ltd., acting as the executor of the official national election results system. The GI Section at Statistics Finland updates the results after receiving them from TietoEnator Ltd. In the national parliamentary elections and the presidential elections, this was done three times during the election day evening and night. In the European Parliament elections a new database was loaded twice. The first results relating to advance votes for all national elections are received from TietoEnator Ltd. a couple of minutes past 8 pm. In the first round of the presidential election, the first results (advance votes) could be viewed on the Internet at 8.30 pm, i.e. half an hour after they had been received. The updating schedule depends on the type of election and the counting situation. Besides this, it is essential that clients (e.g. the media) receive maps with at least 70-90 % votes counted before 11-11.30 pm at the latest. In the second round of the presidential election this schedule was achieved easily: updated data (99 % of votes counted) could be viewed at about 10 pm, two hours after polling stations had closed. The final updated results (100% of votes counted) were on the Internet map application by 11.30 pm.

III. THE TEHCNICAL SOLUTION

14. Microsoft's Internet Information Server (IIS) serves as the www server. MapObjects and MapObjects Internet Server serve as the map server. The software is made by ESRI, a GIS software company. The election data themselves are in a relational database which is a Solid WebEngine database. The application is made by Visual Basic. Figure 3 describes how the service works.
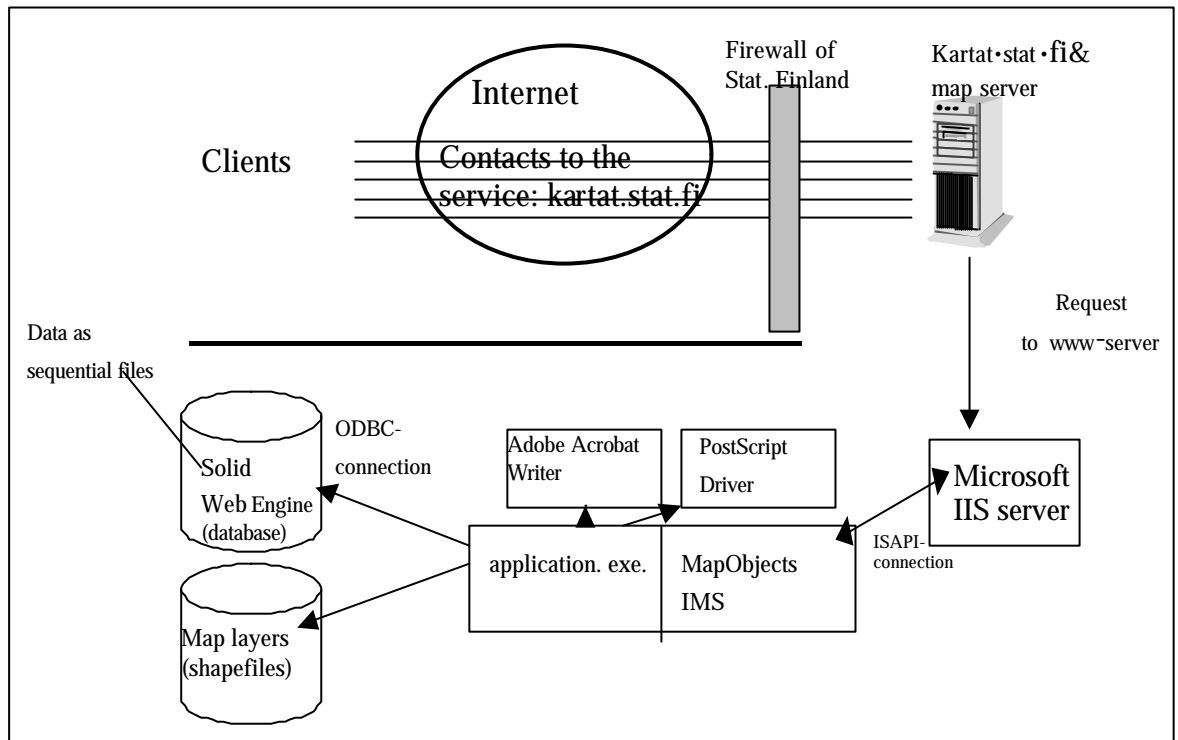

Figure 3. The technical solution of the Internet map service.

15. The election results data are transferred to Statistics Finland electronically as sequential files and are converted to the database using SQL.

16. A client contacts the service via the Internet. The request is received by the www server via a firewall (because of data security) and the request is passed on to the map server. The application on the map server then reads the database in order to retrieve the required data and makes a map (from vector data and results data) and sends it back to the user as an html page. The maps are made dynamically by request; they are not static images. When a client wants to download a map printout in file format, a user code is needed. The server checks the user's identification and passes the request on to the map server.

IV. EXPERIENCES SO FAR AND THE FUTURE OF THE APPLICATION

17. According to clients' comments, the application is easy and quick to use with vast amounts of information. The application not only serves as a map printout producer but also as a tool for analysis of the election results. In all three elections, the coloured election maps that had been

downloaded or were otherwise based on Statistics Finland's election map service could be seen in several newspapers and other media the morning after the elections.

18. What the building of these systems has proved is that, besides GI experience, the building of an Internet GIS application also requires substantial knowledge in many different fields. Building the application GIS is just one part of the application and the application is just one part of building the Internet service system.

19. The next elections after the Finnish Presidential election will be the municipal elections in October 2000. The application will be tailored for these elections by Statistics Finland.

20. The map election service can be viewed on the Internet at: http://kartat.stat.fi.