

# The process of making a new CAI-operation in Statistics Norway

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In 1994 we implemented our first CAI-operation in Statistics Norway. It turned out to be quite successful. We did not have to make any changes in the solution for five years. In this paper I will describe the changes done in 1999, and how we organised the work.

At the beginning of 1999 the procedures and the hardware were almost the same as those we started with in 1994. It was an old server (Pentium 60/32 MB) running under NT 3.5, and 150 laptops, mainly Toshiba 1910 (486/4MB), running under Windows 3.1. We used Blaise 2.5, and for the communication part, Microsoft Mail with some modifications.

It was all growing quite old-fashioned and laptops broke down more and more often.

Both the interviewers and the staff in the office suffered from the lack of a good case management system. "The Data Inspectorate and the protector of privacy in Norway" has very strong restrictions for operations of this kind, and accordingly, they would not appreciate our solution by then. And finally we had the ghost of Y2K. It was obvious that we needed to do something.

## What to renew?

We decided to make a complete new CAI-operation. Some choices were easy to make, and one of the easiest ones was to go for Blaise 4 Windows.

To change from Blaise 2.5 to Blaise 4 Windows meant that every questionnaire had to be rewritten and the data management for the surveys had to be rebuilt to fit the new data input.

Our old operation had very poor case management systems both in the office and out on the laptops. Consequently, these were really areas for improvement.

The interviewers report their time lists in a system built up as a Blaise questionnaire. This questionnaire had to be rewritten.

Another task in this area was to build up one updated register with all necessary information about the interviewers, to be used for all purposes.

One of the major tasks was to purchase the required hardware. This was of course also the most expensive part.

The most complicated part, however, was to build up a convenient and user-friendly communication solution, which still met the restrictions of "The Data Inspectorate and the protector of privacy in Norway".

## Organisation of the project

The old CAI-operation was built up, and was an application running inside the Division for Sample Surveys. We aimed at building the new system in such a way that it was to be seen as a part of Statistics Norway's total IT-structure. It was necessary to pick resources from the whole organisation to build up this new CAI-operation.

To understand the composition of the groups developing the new system it is necessary to have an Organisation map of Statistics Norway (figure 1)

We built up an organisation with working groups for each of these main areas.

- Implementation of Blaise 4 Windows
- Taking care of influences on the surveys that are continually conducted
- Case management system
- Necessary changes in payment and personnel management of the interviewers
- Hardware purchase
- Communication solution

## Statistics Norway

Chairman of the Board						
Director General						
Department						
Economic Statistics	Social Statistics	Industry Statistics	Research	Administrative Affairs	Coordination and Development	Unit without department connection
Division						
National Accounts	Social and Demographic Research	Business Register	Public Economics	Budget and Accounting	Division for IT	International Consulting
Environmental Statistics	Population and Education Statistics	Income and Wage Statistics	Resource and Environmental Economics	Personnel Administration	Statistical Methods and Standards	
External Trade, Energy and Industrial Production Statistics	Health Statistics	Primary Industry Statistics	Macro-economics		Information and Publishing	
Economic Indicators	Sample Surveys	Transport and Tourism Statistics	Micro-econometrics			
Public Finance and Credit Market Statistics	Social Welfare Statistics	Data Registration				
Labour Market Statistics	Population and Housing Census	Construction and Service Statistics				
Office						
Administration	Administration	Administration		Joint Services, Kvgr		
IT	IT	IT		Joint Services, Oslo		

**Fig 1**

The participants in the groups were mainly picked from different divisions in Statistics Norway, according to the task of the group. We could not find any person inside Statistics Norway with the knowledge of making a communication solution meeting the strong restrictions demanded. If someone had the knowledge, they were not idle to do it. It was generally a lack of IT-resources in-house because there were several other Y2K-related projects running in Statistics Norway as well. Therefore we had to hire some consultants for this task. We ended up by hiring two consultants from the company Computas AS.

A steering committee was established to keep an eye on the process and use of resources.

The steering committee consisted of the leaders from

- The Division for IT
- The Department for Social Statistics
- The IT-office of the Department for Social Statistics
- The Administration-office of the Department for Social Statistics
- The Division for Sample Surveys

A representative for the consultant's agency also attended the meetings of this group. The meetings were kept quite regularly, once a month during the period of May to December 1999.

Of course we wanted to develop the new operation in cooperation with the users.

We put together a reference group, consisting of 7 interviewers, one representative from the division of Labour Market statistics, and 1-2 representatives from each of the different groups in the division of Sample Surveys. Members of this group were summoned when they were needed for discussing matters in the working groups.

## **The working groups and their tasks**

### **Implementation of Blaise 4 Windows**

We wanted to develop our competence in Blaise 4 Windows in an efficient way. We hired an instructor from the company Names to give a course in Blaise 4 Windows. He stayed a week in April last year. He pointed out the main issues in the new software. By having a course like that we also gained of getting a dedicated week for training.

We wanted to use the opportunity to make the questionnaires for various surveys more similar than they used to be. Therefore we made a template for questionnaires with standards for layout and a set of administrative variables. We also built up a sort of a question library for background variables. Concerning layout, it was obviously even more necessary with standards in Blaise 4 Windows, with all its possibilities for colours, fonts and so on.

We needed new coding lists for use in the new Blaise questionnaires as well. The list of professions also had to be converted to the International Standard Classification of Occupations (ISCO-88). The old one was built on an older standard, and a number of newer profession titles were lacking. The list was made by picking data from the Labour Force Survey, different registers and the Population Censuses, totally 4 260 cases. Professional coders in Statistics Norway had coded these. It was also made a coding list of municipalities, and a couple of others regularly used lists.

In this group mainly persons from the Division for Sample Surveys took part.

### **Surveys conducted continually**

- Labour force survey
- Household budget survey
- Survey on dwelling and rent

These surveys are always running. It was an important task to avoid them suffering from the changes caused by the switchover. Of course it was necessary to rewrite the questionnaires for the Windows version. As the reception system for the data from the Labour Force Survey could not handle any changes in the data structure, it had to be handled very carefully.

The plans for implementation of the new operation meant that it was no distributed interviewing going on in January 2000. All interviewing for the continuous surveys had to be handled with extraordinary CATI-operations in the office.

A working group was appointed for each of the surveys. They consisted of persons from the Division for Sample Surveys and persons from the divisions with the thematic responsibility for each of the surveys, which are the Division for Labour Market Statistics (the LFS), the Division for Social Welfare Statistics (Household budget survey) and the Division for Economic Indicators (Survey on dwelling and rent).

## **Case management systems**

### **In the office**

We needed a good tool for management of interviewers, surveys, questionnaires and interview objects. It should be a tool for preparation, distribution and delivery of interview objects as well as reception. The management system should also be a tool for supervision during the period of data collection. The field staff wanted a suitable tool for supervision of the interviewers' work, a possibility to locate an interview object when wanted, and a system making it possible to redistribute interview objects from one interviewer to another. The system was built up in Oracle. (For more details on the solution, see Thomas Hoel's paper "Central and local survey administration through communicating data systems")

### **On the laptops**

We wanted to build up a user-friendly solution to handle the installation, information, appointments and return of data for the respondent on the interviewers' laptops. The solution should be an improvement seen from the interviewer's point of view, in that they should have as much information as possible about the respondent in advance. The old operation had no possibility of handling appointments across the surveys. This was absolutely wanted. Since this tool should handle Blaise data, it had to be

written in Manipula/Maniplus (For more details on the solution, see Thomas Hoel's paper "Central and local survey administration through communicating data systems")

The groups developing these systems consist of staff from the IT-office in the Department for Social statistics and persons from the Division for Sample Surveys.

### **Payment and personnel management of the interviewers**

In parallel with our project there was another project going on, handling personnel management and wage system in Statistics Norway generally.

One of the main tasks for our group was to make a new Blaise questionnaire for the CAP-system (Computer Assisted Payment). The data from this questionnaire, it means data of working hours and other expenditures in connection with their work, is handled in a separate system before it is forwarded to the central governmental wages system. This system had to be renewed, as a consequence of changes in input, as well as in output.

There existed several registers and databases with personnel information on the interviewers for various purposes. We aimed at building up one updated register with all necessary information.

The changes made by the other project lead to a solution where all the personnel information was kept in a separate network.

This decision made it impossible to reach our goal of one register.

Still we have no complete register with all the information that we want to have about the interviewers, for use in our division.

This group was staffed from the Administration-office in the Department for Social statistics, the IT-office in the Department for Social statistics and the Division for Sample Surveys. We did also cooperate with people from the central Department of Administrative Affairs.

### **Hardware purchase**

Some of the newer laptops that were in use could have been upgraded. However, it was desirable to have screens handling the resolution of 1024 \* 768 pixels, both for the application for case management (made in Maniplus) and for the Blaise questionnaires.

That meant that we had to replace all the laptops. Beside the economic point, we set great store on the ergonomic points. We ended up with Toshiba Satellite, 4090. It is a model with Celeron processor, 400 MHz, 64 MB Ram and a 14.1" TFT-screen. As we had not employed new interviewers during the year of 1999, we had a vacancy of 20 jobs at the end of the year. It meant we needed to buy 130 of the laptops. They were delivered equipped with network cards.

Another task in the same area was to take care of the process of switching the analogue lines by the interviewers to digital ones. The interviewers installed the necessary equipment themselves. Routers were purchased for all the interviewers. The routers also had analogue ports, making it possible to use the old equipment in the transitional period. The interviewers still use analogue phones.

Of course new servers and central routers were also needed for the new operation.

This group was mainly staffed with persons from the central unit, Division for IT.

### **The communication solution**

This is of course the most critical part in any distributed CAI-operation. And with the strong restrictions it was quite a challenge to build a good solution here.

We wanted an ordinary mail program. This was a feature in our old CAI-system, and we had learned to appreciate this way of communicating with the interviewers.

Of course we needed programs at the laptops making it possible to

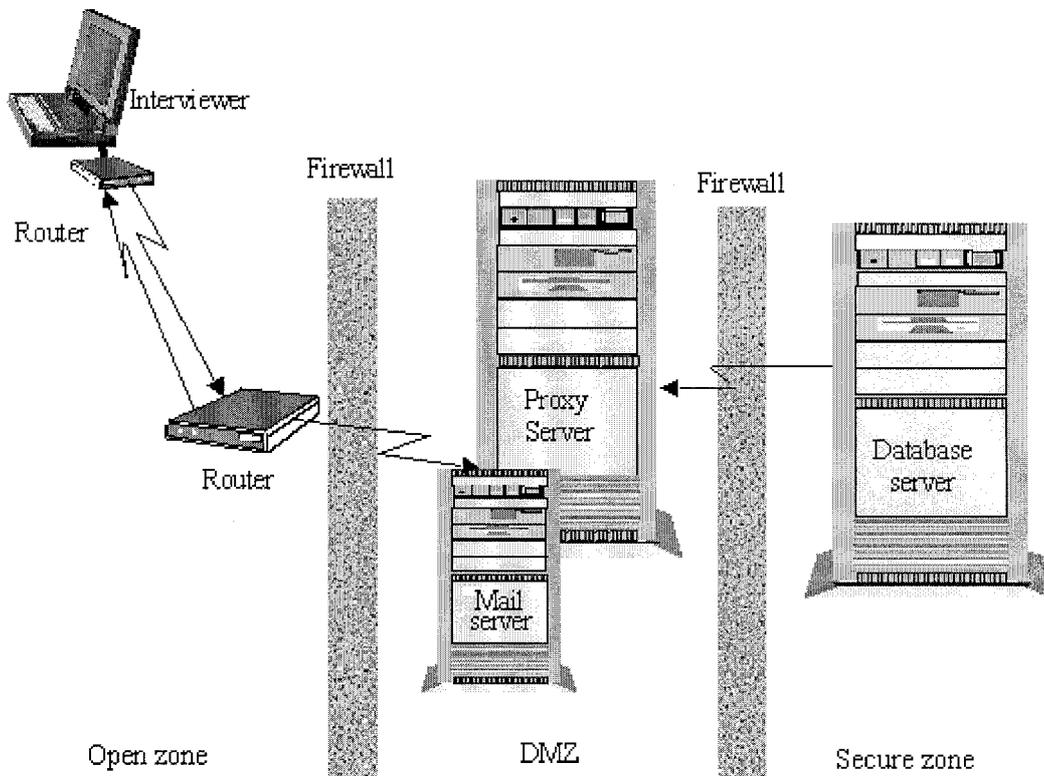
- collect the data for return to the office
- install a new questionnaire
- install respondents (initial and additional)
- upgrade and retrieve files.

The solution should also offer a possibility for the interviewers to reach the database in the office, in order to

- pick up new questionnaires or other updates
- pick up new respondents
- deliver data

- update the status in the database

The data transmission are of course encrypted. We needed firewalls and built up a structure as scratched in figure 2.



**Fig 2**

The greatest challenge was, however, how to meet the requirement from “The Data Inspectorate and the protector of privacy in Norway” at the point “Initiation of access to data inside Statistics Norway shall not be possible from the outside” The communication is using a dial-back RAS connection (Remote Access Server) over ISDN. The interviewer client communication software talks to a reverse proxy server, which is polled from the inside. In this way, all traffic through the firewall is initiated and controlled from the inside.

The main units in the communication solution are the packages. We have packages of different kinds for the different purposes (For more details, see Thomas Hoel’s paper “Central and local survey administration through communicating data systems”)

The tools used in the communication part are Internet Explorer 5.0 and Java. For accessing Blaise databases Java calls Manipula scripts.

The consultants did the main part of the development here. It was done in close cooperation with people from the Division for IT, as well as people from the IT-office in the Department for Social Statistics.

## Schedule

We started planning the process in the autumn 1998. The project was intended to start as early as possible in 1999. The real kick-off of the project, however, was not until the beginning of March. Almost all the groups had their deadline in the end of November. The plan was to use December for testing, and January 2000 for training of the interviewers. However, we got a delay on the communication functionality. This was not complete until the middle of January, 5 days before start of the courses.

## Resources

We received the laptops in December. It was planned that way in order to delay the main expenditure of hardware purchase to 2000. The main burden for software development was in 1999. From an economic point of view it was preferred to have the expenses divided over two different years' budgets. The total budget was 5.5 mill NOK, and additionally 5050 man-hours of work inside Statistics Norway.

## Training of the interviewers

We arranged 5 courses at different locations in Norway. During the courses the interviewers received their laptops, and they learned to use the new software. The training was combined with training for a new big survey starting in February. Only one day was dedicated for learning the new CAI-operation. In addition the interviewers was paid for 10 hours of training and initial preparation at home.

## The experience so far

We have had more "children's diseases" than we wanted, mostly in the area of communication. There have been some problems with session handling, resulting in lack of contact with the database. The solution with the routers has also proved to be somewhat unstable. We started with laptops with encryption of the disk, but this solution led to a lot of hang situations with blue screens. So still we are testing out other sorts of software for this purpose.

All in all I think the new CAI-operation means an improvement for all users. First of all we have far much better administration tools both in the office and on the laptops. The whole solution is built up on modern software. The Web technology is a handsome way of delivering and reaching information. The interviewers really appreciate their home page (an example in figure 3) giving them the status of their workload for the moment.

Period no	Start of the period of data collection	Deadline	Changes in deadline	Number of respondents dedicated for you	Respondents still not transferred to your laptop	Respondents finished by you and returned	Respondents not returned
Survey A	1	08.03.2000	31.03.2000	5	5	5	0
Survey B	9	10.03.2000	01.04.2000	11	0	0	11
Survey C	14	10.04.2000	20.07.2000	14	0	0	14
Survey D	1	01.01.2000	01.02.2001	8	4	2	2

This page also offers access to a lot of information needed from time to time, as lists of postcodes, rules of working conditions, tips on good working habits etc. They also reach reports of their working hours reported, for each day, and month. There are plans for more reports, e.g. a report making it possible for the interviewers to compare themselves with their colleges in question of non response percent for a survey and so on.

Another feature appreciated by the interviewers is the automatic dialling of phone numbers. Using the analogue telephones together with the internal modems in the laptops makes it possible to dial a phone number from buttons in the Maniplus-screen.

We have also succeeded meeting the restrictions from “The Data Inspectorate and the protector of privacy in Norway”. There have been composed several reports for the purpose of supervision, and even more are planned, meaning that the system offers a good tool for supervision.

So, all in all, I think the process has been a success, even though it has not been without complications.

I will also use the opportunity to thank Vesa and his colleagues for several good ideas during our visit in Helsinki in May. We will also thank Lon and Marien for answering countless questions about Blaise/Manipula when we visited them in September and in several mails. Last, but not least, thanks to Leif, for his kind help with the TAPI functionality.