Relevance of Data Warehouse Solutions for the Telecom Business

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Abstract

How to increase business opportunities and customer care by implanting a Data Warehouse and an Intranet solution in a telecom environment.

Introduction

Telia Mobitel AB (TMAB) is a part of Telia AB which is a Swedish state owned telephone company. TMAB is one of the world’s leading companies in mobile telecommunications with approx. 1.5 million customers today, with the number growing rapidly. TMAB has locations all over Sweden, with a total of 1,500 employees. It operates two analogue (NMT) networks and a digital (GSM) network, a new network (DCS 1800) will be launched in the beginning of 1997. TMAB has many mobile communication products such as Paging, Maritex, Flight Telephone Traffic (FTT) and Aviation Communication.

Today’s competition on the mobile side consists of two other operators, with several more coming in the DCS 1800 networks. The competition is already very hard, with aggressive campaigning from all operators. Today has approximately 25% of the Swedish population a mobile telephone, but the vision is that 90% of the population would have a personal pocket telephone by the year 2000.

For success on this growing and aggressive market TMAB has decided on a strategy consisting of product development, investments, active marketing aimed at customers, and fast and easily accessible business information.

BOSS, our system

To meet this demand of fast and easily accessible information TMAB has decided on an IT strategy built on a Data Warehouse (DWH) and distribution of information by an Intranet WWW and a reporting application. To fulfill this strategy TMAB has built a system called BOSS, Business Operations and Support System. The system is designed to hold data about billing, subscriptions, telephone traffic and much more.
Why an Intranet and SAS Software?

Telia has already an Intranet, Telia Corporate Network (TCN), as shown in the picture below.

The Web-browser Netscape Navigator is a part of every employees computer configuration at Telia and the employees are already used to Netscape Navigator, and no education is needed. WWW is also a very fast and easy way to deliver and post information, and could be made interactive where applicable. Therefore a Web-browser was choosen as an interface to deliver information from the DWH.
The Intranet can also be used for interactive communication with the users, for example parameters for a report can be choosen or forms can be filled in where the users can give feedback and order new kind of reports. Knowledge about the content in the information can also be distributed by the Intranet, within the application.

The thought behind the system is that all involved staff should have easy access to the information, and not only some specialists.

Telia Data AB (TDAB) who delivered the DWH choose SAS Software because it’s a complete tool who can easily be reused in different environments and is designed to handle big amounts of data. It also has statistical functions to help analyze data in an advanced way. TMAB who develops the application has been using SAS Software for end user applications before and saw the advantages to have the DWH in SAS as well.

For more advanced information seeking in the DWH a SAS application is to be developed and distributed to market analysts and business responsibles. With this application they could do ad-hoc questions, more advanced database seeking and so on. The results of the ad-hoc questions can then be posted on the Intranet for distribution.

**Project Organization and Development Model**

TMAB has ordered the DWH from Telias internal supplier, Telia Data AB (TDAB), and TDAB has developed the DWH with the insight from representatives from TMAB. The development was performed by TDAB with the help from a small consultant company, with expertise in development in SAS and data warehousing.

The application to get data out from the DWH is on the other hand under development by TMAB, who wants full control over the development of the application. The application is developed by employees at TMAB in an iterative way, with input and feedback from the end users, and testing of new techniques on the way. To help with their development TMAB has also hired a SAS consultant for some time.

This means that the system is split on two hands, with the ownership and control by TMAB and the operation of the DWH by TDAB. This is quite a natural way, since TDAB who developed the DWH has control over the hardware and has the organization to operate the system, and also sits closer to the productionsystems. TMAB on the other hand knows what kind of information they want from the DWH, and how it is best presented and distributed to the end users.
The benefits seem obvious, each part do what they are best one and have the organization for. But TMAB has to extend their development department to have the resources to develop and run the application, and receive input and feedback from the users. Good communication and relations are needed with the internal supplier to get it working without problems, and so are the situation in this case.
The BOSS System

The system receives data each night from the production systems, for example: Billing, subscriber information, traffic information from switches. BOSS also receives data from other sources outside TMAB on a regular basis. An example of this is data about all companies in Sweden from the National Statistics Office of Sweden.

Data is sent in from the different production systems via FTP and is read into tables by a SAS program package. This program package verifies data and loads SAS data tables.

Then data is aggregated into smaller tables, divided into different subjects such as traffic, subscriber and billing information.

Two different applications exist to retrieve information from the DWH, the first is a SAS application using Client/Server technique, the second is the Web application. Both of these use SAS Institute Software to handle the data and create reports, but with different approaches.

The SAS application is built in SAS/AF and with this application more complex reports can be performed on-line (OLAP), and ad-hoc questions can be done.

The Web-application uses SAS and presents information in two ways:
1/ Running nightly batches with SAS programs who creates predefined reports and distributes the result by Web-pages.
2/ The user chooses what kind of report and report parameters he wants and submits these parameters to the DWH server. The server then starts a SAS program who receives those parameters and creates a report and presents the result in chosen form, all within a few seconds.
Business Operations and Support System

Receivers and demanders of information

Web-pages in an Intranet
- Tables, graphs and Excel worksheets
- Parameters
  - Tables, graphs and Excel worksheets
  - Aggregated data
  - Batch-programs who further aggregates data

Aggregated data
- Batch-programs who load data from the in-systems each night

BOSS Data Warehouse
- From different FTP locations
  - SAS application with on-line queries and ad-hoc reports

Report programs who receive parameters and run online
- Parameters

Batch-programs who deliver predefined reports to the Intranet
- Batch-programs who deliver predefined reports to the Intranet
Facts

Hardware:
- Hewlett Packard HP 9000/K400
- 512 Mb RAM
- 100 Gb discspace

Software:
- For the data warehouse: SAS Institute software.
- For the intranet: Netscape Commerce Server, Netscape Navigator.

Number of users:
- SAS-application: about 5
- Netscape Navigator: today about 50, maybe 200 WWW users in a few months.

Security

The security is of course a big issue in a system like this. The physical security is solved by having the computer for the DWH located in a fireproof bunker. It’s connected to the Telia Corporate Network, which is protected by a number of ”firewalls”. Data is distributed by Netscape Commerce Server who has a secure WWW-communication between client and server based on SSL (Secure Socket Layer), and an access system. Access to different parts of the application is granted to users by executives of the different departments of TMAB.

Existing and expected benefits from the BOSS system

Today the information is in one single source, already the day after it’s originated. This means access to vital information much faster than before, when it could take days and weeks with the information spread on different mainframes and systems. This problem is eliminated now.

With the WWW interface the information is easy to access and distribute. No installation of client software is required. The staff at Telia AB already know how to use Netscape and the application is quite simple, because of this no education is needed. Easier access to information leads to more use of it and business opportunities may increase.

As soon as a new application/report is developed it’s immediately distributed to all authorized users. This saves installation costs and time compared to a normal client/server application.
TMAB will use BOSS to analyze trends and customer habits, find better charging structures and much more. Salesstaff can use the information for better customer care, and to follow up and make new contracts with customers.

**To think of**

It’s important to have consistent definitions of the content in the DWH, especially when the data comes from many different sources.

It’s better to run online applications against rather small amounts of data, preferably less than 1 million rows. This is achieved by aggregating data into non-normalized tables.

Knowledge about the information is needed, and this knowledge can easily be distributed by WWW.
Welcome!

- Short about Telia Mobitel
- The Telecom market today and in the future
- Strategy to meet demands
- Choice of IT solution
- Project Organization
- The system
- Facts
- Demonstration
- Questions, answers and handouts
Telia Mobitel

- Swedish state owned mobile operator
- 1.5 million customers
- Many different locations around Sweden
- 1,500 employees
- Annual turnover 1.1 billion dollars
- 20% of annual turnover invested, expanding nets and adding new products
The telecom market

- Hard competition on growing market, getting harder day by day
- High goals, from 25% of the population today having a mobile telephone to 90% in a few years
- Three different national operators today
- A new frequency opening, adding more operators
Strategy

- Product development
- Investments
- Customer care and intelligence
- Efficiency and cost hunting
- Fast, accurate, easily accessible information
Choice of IT solution

- A Data Warehouse to get the data together from many different sources
- An Intranet to give easy access to users with low level of computer knowledge
- A classic application for more complex reporting needs, for users with higher level of computer and business knowledge
- SAS Institute Software, for all uses and platforms
Project Organization

Telia Mobitel buys a DWH from an internal supplier.

Telia Data develops the DWH with some help from consultants.

DWH generates aggregates after demand from Telia Mobitel.

Telia Data runs the DWH.

Aggregates are used in the Application developed by Telia Mobitel.

Telia Data runs the DWH.
Project model

- DWH developed by internal supplier, Telia Data, with representatives from Telia Mobitel
- Intranet and SAS application developed by Telia Mobitel with help from consultants
- Intranet and SAS application developed without rigid specifications in an iterative process
- Resources for the development at Telia Mobitel: ½ person for Intranet applications and security and 1-2 SAS programmers for SAS application and SAS programs supporting Intranet
The System:

IN-systems:
FTP from different locations

Loading programs in SAS, runs each night

IN-systems:
FTP from different locations runs each night.
FTP from different locations

IN-systems:

Aggregated data

Aggregation programs

BOSS D WH

Loading programs in SAS, runs each night
Batch-programs who create predefined reports

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Web-pages in an Intranet with Netscape Navigator

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SAS-programs who receive parameters and create reports

Application in SAS for queries, ad-hoc and standard reports

Tables in HTML-format, graphs in GIF-format, Excel spreadsheets

Aggregation programs

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IN-systems:
Receiver (and demander) of information

Web-pages in an Intranet with Netscape Navigator

Tables in HTML-format, graphs in GIF-format, files for spreadsheets

Batch-programs who create predefined reports

Application in SAS for queries, ad-hoc and standard reports

Tables in HTML-format, graphs in GIF-format, Excel spreadsheets

SAS-programs who receive parameters and create reports

Parameters

Aggregated data

Aggregation programs

BOSS D WH

FTP from different locations

Loading programs in SAS, runs each night

IN-systems:
Facts

- HP 9000 with 512 Mb RAM and 100 Gb harddrive
- 9 IN-systems with FTP from different locations
- SAS Institute Software for all programs and data
- Appr. 50 users of the information on Intranet
- Appr. 5 users of SAS application
- Appr. 80 tables in DWH and 100 programs
- Netscape Navigator and Netscape Commerce Server for the Intranet, MS Excel for worksheet
- 3 months of un-aggregated data, continuous aggregated data
Demonstration time ...