Does a Data Warehouse Deliver the Goods?

Glen Payne, National Mutual Health Insurance, Australia

ABSTRACT

This paper focuses on the business value of a data warehouse by examining the experience of National Mutual Health Insurance. The success of the data warehouse is measured against its original objectives.

The lessons learnt include how users responded to the data warehouse, the need to create a user interface that caters for distinctly different styles of usage, and the effectiveness of integrating with the users' existing software preferences. The conclusion drawn is a data warehouse does deliver the goods if it caters for users' wide-ranging needs.

INTRODUCTION

National Mutual Health Insurance operates in Australia and New Zealand, insuring the health of around 800,000 people. Progressive implementation of a data warehouse commenced in January 1996. Currently, the data warehouse covers virtually all subject areas of the business (sales, hospital claims, ancillary claims, customer demographics, policy changes etc). The user interface is written in SAS/AF® and is now in its third version. Forty staff are licensed to use the interface, however they use it to access the data warehouse in distinctly different ways.

ORIGINAL OBJECTIVES

The main operational system runs on an IBM® mainframe. Prior to the data warehouse, the business relied on the Information Center to retrieve information from the operational system in the form of reports, data files and customer mailings. Requests for information were prioritized and placed in a queue until an Information Center Programmer wrote an individual program to meet the specific request. In this way, the Information Center had built up a library of over 3,000 programs and was writing 500 new programs each year. It was difficult to keep track of what programs had already been written and each program was written to business rules defined by individual users. This lead to inconsistency of results. Users were frustrated with the delay in obtaining information and Information Center staff were beginning to 'burn-out' from the constant pressure and duplication of effort.

It was decided to re-engineer the way information was managed by creating a data warehouse with the following objectives:

1. Improve the quality and consistency of information
2. Enable business specialists to access information themselves
3. Reduce the need for ad hoc reports
4. Support strategic initiatives

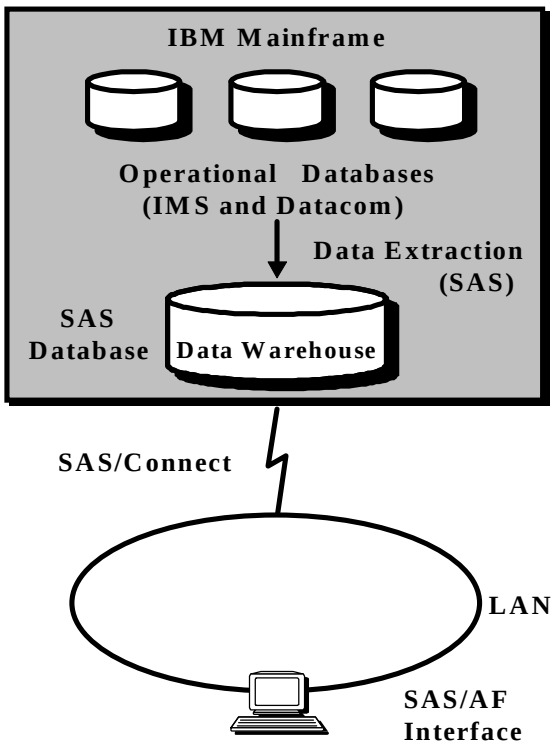
WHY THE SAS® SYSTEM WAS CHOSEN

After researching the data warehouse solutions available at the time, the SAS system was chosen on the basis of:

1. **Extensive data access.**
   The main operational system is based on a mixture of IMS and Datacom databases. Supplementary systems have been added which use Oracle® and Informix databases. The SAS System is renowned for its ability to access a vast array of data sources.
2. **Internal programming language.**
   The health insurance business involves complex data. An integral programming language designed for data manipulation is a distinct advantage of the SAS System.
3. **Flexible data warehouse.**
   Many fundamental processes within the organization were being re-engineered and so the structure of the data warehouse would need to change regularly. The SAS System offered a data warehouse that could be created and maintained easily without the overheads of other database management systems.
4. **Adaptable user interface.**
   Preliminary interviews indicated users were unclear as to how they wanted to view and use the data. The diverse data presentation options within the SAS System promised a solution to most business requirements.
5. **Cost effective solution.**
   Our parent company already held a SAS System site license for the mainframe, and by adding SAS/Connect® and the SAS System for PCs we could build a client-server data warehouse at a fraction of the cost of high-end EIS software. It would be a more complete solution than the 'shrink-wrapped' low-end packages.

THE SOLUTION IMPLEMENTED

A conservative approach was taken to developing the data warehouse. It was created on the mainframe, as that is where the data resides and additional hardware didn't need to be purchased.



The data warehouse has been expanded incrementally with new subject areas being added and the functionality of the user interface extended. The original strategy was, once the data warehouse had proved itself, a review would be undertaken as to whether to move it to a mid-range platform (another reason the SAS System was chosen). The review is currently under way.

The data warehouse was created before the SAS/MDDB™ was released and provides dynamic drill-down through summarized data sets by the use of _TYPE_ values.

As an indication of the size of the data warehouse, it contains 500,000 customer records, 600,000 hospital claim records and six million ancillary claim records.

HAS THE DATA WAREHOUSE DELIVERED THE GOODS?

Perhaps the best way to consider the question is to measure the results of the data warehouse against its original objectives:

1. Improve the quality and consistency of information

The data warehouse has provided, for the first time, a measure of profitability down to the level of the individual customer. This can be rolled up by any dimension such as product, age, sales region etc. This has provided a new insight into the business.

Patterns of how our customers change products and payment methods are now being tracked. This is beginning to determine sales and retention campaigns.

The most accurate view of hospital episodes the company has known has been created as part of developing the data warehouse. For instance, prosthesis expenses worth $200,000 have been attributed to the relevant hospital episode. Previously they could not be assigned to individual patients.

Almost as a side effect, the data warehouse is acting as a catalyst for the agreement of business rules. Users are now taking an interest in coming to a common definition of their data because they can see the accuracy of the data warehouse, and therefore their own information, depends on it. They now have a motive for sitting down and working through the issues, whereas before they could simply use their own reports based on their own business rules.

As expected, the process of thoroughly investigating the data contained in the operational system as part of building the data warehouse has uncovered some inadequacies in the data. This has been fed back to the system development staff and thereby is improving the operational system.

2. Enable business specialists to access information themselves

A member of the marketing department commented, 'Being able to explore the data ourselves is having a big impact on the way we work'.

The actuaries stated, 'We hate the data warehouse because now we can't use the I.T. department as an excuse when we are asked to provide information. We know we can get the data ourselves!'

The manager of the group that negotiates with hospitals did not want her team to drill down to get at their key indicators. Instead, a suite of Excel workbooks is produced automatically with each refresh of the data warehouse. These spreadsheets contain various views of the key indicators and now form the basis of negotiations with hospitals.

3. Reduce the need for ad hoc reports

An external consultant visiting National Mutual Health Insurance calculated it cost $200 in labor to obtain the answers to a set of complex business questions using the data warehouse as opposed to $2,000 using the traditional method of a programmer writing ad reports. It also took hours instead of days.

The actuaries are now able to more accurately analyze our client base and set premiums independent of the Information Center. Prior to the data warehouse, they would request a large volume of reports to support a premium review.

The reduction in ad hoc reports is beginning to relieve Information Center 'burn-out'. The spare resources are now being used to commence data mining and database marketing projects.

4. Support strategic initiatives

The National Mutual Health Insurance data warehouse is currently supporting a number of confidential strategic initiatives. Comments from one of the actuaries sum up the performance of the data warehouse against the fourth objective:

'Information obtained directly from the data warehouse is influencing government policy and is driving change in the Australian health insurance industry'.

'Most of our competitors cannot readily produce the data we can'.

LESSONS LEARNED

Although the data warehouse has been a success, it has been a challenging project. A number of lessons have been learned along the way:

1. Initial design interviews with a broad range of users yielded little as they spoke in vague terms and couldn't appreciate the design decisions being asked of them. **It was necessary to create a generic user interface and then add specific functionality required by individual departments.**

2. However, the philosophy of 'build it and they will come' proved to be risky. Unlike the operational system, the users don't have to use the data warehouse. Some users prefer the old way of specifying hardcopy reports. No matter how simple the user interface is made, some users are reluctant to navigate through the data themselves, they prefer to let someone else do it and present them with the results. **Building the data warehouse has been just as much about selling and influencing people as about developing a system and getting the data right.**

3. Knowledge is power. A few users subtlety opposed the data warehouse because they perceived it threatened their power base built upon their own store of information. **However, as the data warehouse is providing the most accurate data, it is becoming the authoritative information source.**

4. Some champion users of the data warehouse have left the company or changed roles. They had contributed detailed design specifications, however not all of these were agreed to by their successors. **Tailoring the data warehouse too specifically for individual users created re-work.**

5. Bill Inmon, a data warehouse consultant, talks about 'tourists, explorers and farmers' of the data warehouse. Standard reports have been incorporated into the user interface to cater for the 'tourists'. The 'explorers' slice and dice the data using the purpose-built SAS/Frame interface. The 'farmers' use either SAS/SQL Query Window or the equivalent 'Data Explorer' that was created in-house. They query the detailed records in the data warehouse and export them to spreadsheets or personal databases for further analysis.

Users access the data warehouse in distinctly different ways and it was necessary to provide various styles of user interface.

6. National Mutual Health Insurance, like many organizations throughout the world, has settled on Microsoft Office as the standard business software. **It has been more effective to provide the means to export data from the data warehouse to Microsoft Office software than to try to develop a user interface capable of providing all things to all users.**

CONCLUSION

Our experience reflects many of the findings of industry commentators who have investigated data warehouses:

Bill Inmon: 'Organizations that are using data warehousing properly are finding massive benefits'.

CFO Magazine: ' Because of their nature, data warehouse projects are considerably riskier than most I.T. projects'.

The Gartner Group: 'A data warehouse is an architecture not a product'.

International Data Corporation: 'Better returns on investment can be gained by starting with data marts for particular business areas rather than a full scale data warehouse.'

Overall, the National Mutual Health Insurance experience proves a data warehouse can delivering the goods, if implementation is cost-effective and the project is carefully managed.

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Glen Payne
Information Center Manger
National Mutual Health Insurance
Private Bag 10 Camberwell VIC Australia 3111
Telephone **61 3 9805 8358**
Fax **61 3 9805 8257**
Email **glenpayne@hotmail.com**