ABSTRACT

This project involves the development of a financial / operational database and executive information system for a property and casualty insurance company. Underlying the corporate planning process is the need for an historical decision support database. This database contains financial / operational management information needed to quantify the results of planned actions and to support the development of a quantified business plan.

The flow of information outlined in the following is being developed as an Executive Information System project, utilizing various SAS software products, designed to provide executive management with timely and accurate management information. Access to this operational flow of information will enhance executive management's ability to monitor, identify, and prioritize business issues as they relate to the underwriting statement of income of a property and casualty insurance company.

INTRODUCTION

This paper focuses upon the development of a financial / operational database and an executive information system for a property and casualty insurance company and upon the use of SAS software to meet that need. Initially, we will position the need for an executive decision support data base and information delivery system within the context of a corporate planning process. Next, we will outline the system development objectives and information requirements of a financial / operational database and executive information system for a property and casualty insurance operation. Finally, we will address our experiences in the system development process utilizing SAS software to meet this business need.

THE NEED FOR A DECISION SUPPORT INFORMATION SYSTEM IN THE CORPORATE PLANNING PROCESS

The corporate planning process begins with an affirmation of the purpose and mission of the corporation. The corporate objectives define the desired results of the organization's effort while the corporate strategy answers the questions of how the corporate objectives are to be achieved.

At The ERIE our corporate objectives include underwriting profitability, quality premium growth, superior service to our policyholders, expense control, and employee welfare. Our corporate strategy can be stated as: Efficient and dedicated employees focused upon superior service, who working in partnership with a quality agency force, will provide competitive products and prices to a superior policyholder population whose favorable loss experience in turn perpetuates the cycle.

This general strategic statement is supported by more specific functional strategies that define how the organization will be successful. Such functional strategies define how the organization will approach and react to the market place from specific functional perspectives. Functional perspectives include how you market your product, how you underwrite your products, how you price your products, how you settle your claims, how you process your documents, how you treat your employees, and how you organize your physical plant, among others.

As functional strategies are developed, each division of the organization accepts, as its divisional objectives, the responsibility to implement a piece of the various functional strategies for which it has expertise. For example, our underwriting department may set specific objectives and action plans to visit our agent's office to provide training, promote a product, and/or underwrite a larger risk, which will support our marketing operations strategy as well as supporting our agent training and education strategy.

As the company executives move through the process of developing functional strategies and setting divisional objectives and action plans, they must translate the impact of their business decisions into quantified operating statistics which can be linked to the financial performance of the company. This will impact the major action plans of the organization, which represent the allocation of its limited resources, will provide a satisfactory financial return.

Of course, the ability to translate business action plans into their financial impact is dependent upon a good understanding of the many cause and effect relationships which underlie the financial income statement. This understanding is enhanced by having a data warehouse of operating statistics and an
information delivery system which facilitates the access to that management information and enhances the analysis of historical cause and effect relationships. When you can readily see the impact of your past decisions, you are much better positioned to make the key business decisions about the future.

Thus, a good historical decision support database stands at the foundation of a good corporate planning process. How do you know if your information database provides for a good foundation? You need to asked yourselves questions like the following: Do you know why your financial results are good or bad?; Do you know how your management decisions affect our financial results?; Do you have trouble tracking cause and effect relationships into a desired corporate direction?; Do your employees waste time trying to locate or consolidate data that is already stored electronically? Are you using anecdotal information to make critical business decisions?

It is answers to these types of questions that will lead you to consider the need to develop a financial / operational database and an executive information systems. Such an inventory of information will allow you to drill down through the operating components which support the financial results of your company. This paper focuses upon the use of SAS software in the development of such a decision support database and executive information system for a property and casualty insurance company.

SYSTEM DEVELOPMENT OBJECTIVES AND INFORMATION REQUIREMENTS

If you believe, as we did, that your company needs to strengthen its corporate planning process by improving the flow of executive management information to the decision makers of your organization, you will need to begin by identifying your system development objectives as well as your specific information needs.

There are five basic business objectives associated with the development of our financial / operational database and executive information delivery system. They are:

1) To provide a timely, accurate, and consistent source of monthly financial and operational statistics.

2) To improve the data access, data management, and data analysis of the operating statistics which underlie the financial results and plans of the organization.

3) To improve the decision support processes and to help to proactively manage the corporate direction toward desired financial / operational results.

4) To be able to drill down through multiple levels of the organization and monitor specific key components consistently over time.

5) To focus upon the key operational information which contributes to the financial results. Initially, the focus is upon the Statutory Underwriting Statement of Income components of revenue, losses, and expenses of the property and casualty insurance operations.

The scope of this initial project is focused upon the consolidated property and casualty insurance operation. While company code should be maintained in the system, the information to be presented will be on a consolidated property and casualty group basis. The life insurance operation is beyond the scope of this initial project but will be addressed at a later date.

The focus of the data base will be upon the property and casualty underwriting statement of income for the consolidated property and casualty insurance group. More specifically, the focus will be upon the direct business of the consolidated property and casualty insurance operation. However, operating information regarding the impact of the reinsurance activities of the group will also be maintained on the system for reconciliation purposes.

Our database consists of the four dimensions of information. These basic elements include: 1) Profit/Loss Components; 2) Line of Business or Expense Account detail; 3) Organizational levels detail; and 4) Time elements on a calendar year basis.

The first of the four basic elements, the underwriting profit and loss components, are grouped into three major categories of Revenue, Losses and Expenses. Within each major category, there are a number of key supporting variables which contribute the amount of the revenue, losses, or expenses. Also, there are a number of key variables which link the three major categories making them dependent upon each other. For example, the amount of losses is dependent upon the premium volume written, and the level of staffing and underwriting expenses vary directly and indirectly with the level of the revenue or loss components.

The second basic element, line of business or expense account, must be accumulated at a level which can offer sufficient detail to allow for a meaningful drill down to an actionable level. The line of business focus should serve the marketing and claim processing perspective. The expense account detail should allow for sufficient isolation of accounts to focus on a narrow range of expense account detail. Our current cost report detail account level was felt to meet this
requirement. Improvements in the cost allocation to branch and line of business will be a by-product of implementation and will be further developed in subsequent stages.

The third basic element, the organizational level detail, needs to align revenue and loss components with the producing field office and producing agency. The organizational levels of the staffing and expenses needs to be drilled down to the divisions, departments, sections, and units of the company.

The forth basic element, the time element, needs to be capable of producing month, year to date, three month rolling, and twelve month rolling data. The most important issue regarding the time element is the need to develop consistency in the data over time. Historical changes made to the organization structure must be made consistent with the current organizational alignment.

The fundamental level of information underlying the development of this database is information on the basis of units, total dollars, and dollar average per unit. This concept applies to each Profit/Loss component. The definition of a unit may be unique to the specific component. For example, units could be the number of applications, issued policies, claims reported, claims pending, full-time equivalent employees, number of agents, etc. It is very important that the units and the dollars recorded be consistent with each other. That is, they must be reconcilable to each other in order to insure the integrity of the resulting average dollar value per unit.

Once the information database is developed, an executive information delivery system needs to be developed to provide access to this information, including drill down capabilities to the data, thereby providing for the focusing of management's attention upon specific profit and loss components at an actionable level of the organization.

THE SYSTEM DEVELOPMENT PROCESS UTILIZING SAS SOFTWARE TO MEET THE BUSINESS NEED

Having defined the scope of the project, system development objectives, and the information requirements, the development of the system began with an evaluation of the issues and concerns we anticipated in this process. Next, we defined the necessary steps required to build a financial / operational data base calling upon SAS software. Finally, we designed and created a prototype executive information delivery system using SAS software.

A. Issues and Concerns in the Development

Process

There are a number of general concerns associated with the scope of this project. They include:

1) The information required resides on a number of systems in the company. Defining what information is required is not a problem, but determining where in the management information system the required information resides will be a challenge.

2) Data, in terms of unit measurements, is not readily available in the current management information system. It is necessary to retrieve this information at the transaction level and "bucket" the transactional information into desired component buckets. Such an approach would accumulate both item or unit counts, as well as their corresponding dollar value.

3) Because the volume of the information is large, some accumulation of data will necessarily require mainframe processing. The purpose of this mainframe processing will be to accumulate the desired information to a level and file size which can be moved to the LAN environment for analysis and presentation. Extreme care must be taken to protect the mainframe CPU from any real or perceive degradation in response time in production processing time as a result of utilizing SAS. Some mainframe space and access will need to be identified and allocated to the Financial and Planning Department as well as appropriate security clearances.

4) Control and integrity of the information will require that all information in this system be balanced to control data.

5) Maintaining consistency in the definition of elements in the database over time will be critical to the validity and reliability of the data for decision support purposes.

6) While the executive information system will be created by the business user, the support and assistance of the Information Management Systems (IMS) Division is critical. Data Processing Requests (DPR) will have to be prepared in order to receive support from IMS. The turnaround time will be dependent upon their work load condition and the priority given to the DPR. It is important that all activities requiring DPR activity be identified and submitted to IMS at the earliest possible time.

7) Future plans may include developing a data entry process to allow for input of projection variables to create a quantified business plan. Such a front-end system would also require the addition of plan
months/year and the calculation of the values for dependent profit and loss components. For example, the input of a forecasted level of agent productivity (new business received per agent per month) would require the multiplication of agent productivity times the number of producing agents to produce and store the forecasted number of applications received. The future plans for this approach to delivery of information may also expand into the life insurance operations, the reinsurance operation, and the investment operation. Such expansion will depend upon the success of the implementation of the above.

B. The System Development Process - Database Development

Having identified issues and concerns related to the development process, the following outline of steps was used to begin to create our Financial / Operational Database:

1. Create Defined Information
   a. In concert with the Data Administration Department and IMS Division, we identified the location of existing data to support planning process information needs.
   b. Algorithms were developed to create needed data elements not presently available in legacy systems.
   c. Read and/or accessed data from flat files and SAS views of data held in legacy systems and in large databases. Large databases were accessed using SAS/ACCESS® to ADABAS®.
   d. Data elements were created using a variety of tools including COBOL®, NATURAL® and Base SAS software.

2. Adjust Historical Data to Achieve Consistency
   a. Changes in organization structure, chart of accounts and product lines necessitated updating historical data to present configurations.
   b. The primary method for accomplishing this was through the use of various user-defined formats directing historical variable values to their current configurations.
   c. Due to the data volume still existing at this level, data consistency operations were performed in our mainframe environment.

3. Accumulate and Aggregate Information Over Time
   a. Data was accumulated in monthly files.
   b. Development of historical data required retrieval of data archived to tape from approximately 60 previous generations.
   c. The volume of data was extensive as we were reading transaction files, thus necessitating additional summarization.
   d. Summarized data to low level of summary. This represented the lowest level of combination of organization, line of business (or expense category), and transactional component.
   f. Create the various time perspectives by calculating year-to-date, 3-month moving, and 12-month moving totals from the summarized data for each month.

4. Stage Data into Summary Levels
   a. Upon completion of creation, restatement, and transactional summarization, efforts were directed at summarizing the data to a level which will be commensurate with our ultimate presentation perspective and physical platform, a NOVELL® LAN.
   b. Multiple summarization levels were identified for use in the Executive Information System. These multiple levels were necessitated by the desire to provide information at both a very high level of summary and yet allow for sufficient detail to achieve an actionable level of information.
   c. In general, data sets to be downloaded were summarized to a point where they were reduced to at most one twenty-fifth of their size after initial summarization.
   d. As we are now working solely with SAS data sets, all summarization and manipulation was performed using Base SAS software.

5. Migrate Data to LAN
   a. Upon completion of data summarization on the mainframe, the necessary SAS data sets were downloaded to the EIS presentation platform, a NOVELL®-based LAN running SAS in a Microsoft Windows® environment.
   b. Data downloading was accomplished utilizing
SAS/CONNECT® software.

C. The System Development Process - Executive Information System Development

With the Financial / Operational database completed for the operating expenses and the aggregate statement of income, we turned to the development of an executive information delivery system utilizing SAS software. The following outlines the steps which we followed in this process:

1. Design Data Presentation Structure

   a. The general focus of data presentation is executive management. The presentation was developed with this audience in mind.

   b. Initially we need data at a high level of summary with respect to the organization, the lines of business, and transaction type, with availability of both current and prior year data.

   c. The data presentation should also have the ability to highlight areas of significant variances.

   d. A means to drill-down into data to attempt to isolate the source of these variances also is necessary.

   e. A need to see data in traditional formats and formats which are familiar to our audience, such as income statements and currently used profitability and cost reports, is present.

   f. We also need the flexibility to alter time element and time frame of data in a convenient manner.

   g. Finally, we should be able to graphically present any of the data available in report or other formats.

2. Identify SAS Products to Accomplish Presentation Structure.

   a. Recognized that data presentation needs cannot be met by any single pre-packed software, but that a combination of various SAS products could be used in concert to develop a seamless Executive Information System which meets the various reporting requirements, and thus, informational needs of executive management.

   b. Segregated into Income Statement perspectives related Income, Losses, and Expenses. Presented variance reports with drill-down capabilities for each using SAS/EIS®. Also incorporated the graphical presentation capabilities inherent in the SAS/EIS variance reports.

   c. The production of financial statements in traditional formats used by executive management was accomplished by utilizing the report writing capabilities of Base SAS. Reports were populated by the selection of SAS Macro Variables when a time-frame selection was made. This resulted in the production of a series of pre-defined reports which provided access to different organizational perspectives through the use of pull-down menus.

   d. Trend lines and other means of graphical data presentation was developed through the use of SAS/Graph® software. This trend information will ultimately be incorporated into a forecasting aspect of our EIS through the use of SAS/ETS® software.

   e. Various selection screens and other navigational enhancements were developed for use in our EIS utilizing the FRAME Entry capabilities of SAS/AF® software.

   f. All of the various components of the EIS were linked together using various Screen Control Language programs.

This combination of products thus allowed for the development of a user-oriented Executive Information System which provides information useful, familiar, and of an actionable-level to executive management.

3. Stage Data for Use with SAS/EIS

   a. In order to provide enhanced response time in the use the EIS, data was summarized further from that brought down to the LAN.

   b. Data was placed in separate data sets for each unique time-period and time perspective. As these items are selected from a screen prior to initializing the SAS/EIS variance report, all other data would be superfluous and thus could degrade response time while navigating in the EIS.

   c. This approach resulted in variance reports in which data presented on a product line, organization, or transaction type basis could be drilled down through approximately 6-8 additional levels of detail. This navigation was performed on a PC with 16mb RAM running at 66 mhz. with data resident on the file server. Response time remained reasonable using this hardware configuration and data management approach.

4. Write SAS Report Programs

   a. As the format of the financial statements needed by executive management is a function of both statutory
requirements as well as organizational tradition, the shell for the reports was developed using the report writing capabilities found in Base SAS software.

b. These reports will have the same structure regardless what time period or time perspective selected.

c. When a time period is selected, the reports are generated from data sets on the server. The same code is utilized while generating appropriate titles and headings through the use of SAS Macro Variables initialized by the selection screen.

d. Pull down menus are used to navigate through the various financial statements from an organizational perspective. These pull down menus were developed through the use of the Build Facility in SAS/AF.

5. Develop Selection Screens Using SAS/AF with FRAME Entry

a. To enhance the response time and provide an intuitive navigational approach through the EIS, various selection screens and means of movement were used to limit the data used in the EIS to that for the time period selected.

b. These selection menus were developed using the FRAME Entry capabilities of SAS/AF® software.

c. Various classes of Frames used include Block Classes, Container Box Classes, Graphics Classes, Hotspot Classes, Icon Classes, List Box Classes, and Push Button Classes, among others.

d. Finally, the initial EIS screen was developed to include our logo as converted from a non-SAS graphics format. In order to use our logo, it was necessary to convert it to a GRSEG prior to its use.

6. Develop Additional Trend Graphs Using SAS/GRAPH

a. In order to present data over a period of time and given the manner in which we had set up the selection of data for use in SAS/EIS® and its inherent graphical limitations, we needed to develop trendlines using SAS/GRAPH® in concert with Screen Control Language and SAS/AF® Frames.

b. Time series expense data is presented using PROC GPLOT displayed in a Frame entry.

c. The GPLOT is populated using Screen Control Language allowing for the selection of different views of the data based on time perspective and whether the data is based on organization-level or expense-type.

d. The level of the plot data presented is also selected. It is keyed to the record type previously generated using PROC SUMMARY.

7. Integrate Presentation Components Using Screen Control Language

a. The initial screen encountered upon entry to the EIS is merely a welcome screen with action choices of continue or exit. This screen was built in Frame and required no additional Screen Control Language logic.

b. The primary menu for the EIS offers six paths to follow. A brief SCL program controls this screen and leads to other programs based on the push button selected.

c. Two of the six major paths have been developed in-depth to date. The four remaining paths are supported by simple SCL that leads to a standard "Under Development" message.

d. Each of the remaining buttons is supported by its own SCL program. One program serves to select the data sets for use in the financial statements developed using Base SAS software. The other SCL programs selects data for use in the SAS/EIS application and the related trendlines option. The choice of the SAS/EIS variance report or the plot of trend data is made from a single selection screen developed in FRAME utilizing a separate Screen Control Language program.

8. Test Application for Data Accuracy and Navigational Performance

a. When working with previously existing variables and reports, such Income Statements, the EIS and the source reports were run parallel and results compared for accuracy.

b. With data elements or time perspectives that were developed expressly for use in the EIS, results of the EIS were recalculated on a test basis.

c. As previously mentioned, in order to enhance response time, data sets used in SAS/EIS® were further summarized to contain a single month's data for a single time perspective. Additionally, variables were reformatted within the SAS data sets used in the SAS/EIS to eliminate reformat downs while drilling down in the EIS.

d. A variety of indexes were also utilized on the data sets so as to further improve response time.
9) Present Prototype to Executive Management

On November 16, 1994 a prototype of our Executive Information System was demonstrated at a corporate planning session. The response was positive and further development of the revenue and loss components was encouraged.

CONCLUSION

This paper focused upon the development of a financial / operational database and an Executive Information System for a property and casualty insurance company and upon the use of SAS software to meet that need.

The need for an executive decision support database and information delivery system should be viewed within the context of a corporate planning process. The ability of executive management to easily access and analyze a structured flow of operating statistics enhances their understanding of the cause and effect relationships which underlie the financial results of their planned actions.

In developing a financial / operational database and an executive information delivery system, it is important to properly define your system development objectives and your specific data needs. The information collected should contain the operating statistics which underlie the income statement components of revenue, losses, and expenses. The data should include both unit count as well as dollar measurements in order to facilitate unit revenue and unit cost analysis.

Once system development objectives and information requirements are defined, the process of building the financial / operational database begins. This process involves: 1) identifying data location; 2) accessing data; 3) creating desired management information from transactional data; 4) adjusting historical information to be consistent with current configurations of the organization; 5) accumulate and stage data to various summary levels; 6) and migrate data to the LAN.

Upon completion of the database, the system development process focuses upon the EIS development. This process begins with the data presentation design and understanding of the feature, both content-related and navigational, required by the executive user. The development of the executive information system will require the use of a number of SAS software tools and modules in addition to the SAS/EIS product.

SAS software was found to be an effective and efficient tool to meet the broad range of features required by our Executive Information System as described as described by this paper.

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