

Successful Data Warehousing for Telecommunications Business Solutions (The Philos Method)

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ABSTRACT

The telecommunications industry is rapidly becoming the largest user of high volume information systems. This is especially true in the United States, where telecommunications, the Internet, video and audio services all fall under the larger umbrella of the information superhighway.

Our project team is adept at providing customized business solutions to telecommunications managers by creating specialized information systems to meet their individual needs. We design personalized systems that transcend the boundaries of traditional data warehousing systems by gathering and storing important data, analyzing and transforming the data, and then summarizing and reordering it in accordance with the demands of the user. *This* provides a dynamic and efficient front-end presentation and reporting tools that transform the users from reactive recipients of hard copy reports to competitive executives poised to make efficient, well-informed decisions.

This paper will discuss how we exploited the power and versatility of the SAS system to provide data warehousing business solutions to one of the largest telecommunication companies in the United States. It will demonstrate how we implemented a successful data warehousing solution using the bottom up approach instead of the big bang method.

THE PROBLEM

In a large industry such as telecommunications, companies store information in a variety of ways: in a myriad of platforms and structures, in multiple operating systems, and in large or small volumes.

The problem arises when users – either managers or high-level executives – need access to the stored information. If they have unlimited time to devote to retrieving the data, then using the information once they have accessed it is not a big problem, provided that they can find what they need. However, what if they have limited time and they need to gather the information from multiple systems and then compile it into a report format on a monthly basis? In this case, we need better planning to design a system to extract and organize the relevant data on a regular basis. Now let us take this scenario one level higher. The decision makers of the company want a point-and-click application that will give them instant results on a real-time basis. The problem now requires a well-thought-out business solution, which creates a customized information system tailored to their specific needs.

THE BIG BANG METHOD

After the break-up of the Bell companies in the United States, many telecommunications monopolies were created across the country. These companies enjoyed their monopolistic

environments for a number of years, until telephone deregulation became a reality again in 1997.

Monitoring existing customers and adding new ones did not require a great deal of extra work or use of the latest technologies. The telephone companies, therefore, were concentrating on producing new revenues by providing new products to their customers. Long distance services were left to non-local companies and were not a market of immediate interest to the local telephone companies.

When deregulation went into effect in 1997, competition was no longer a thing of the past. It became a current reality that would threaten existing local customer acquisition and would open the doors for the local Bell companies to compete for the lucrative long-distance market.

With the new threat of local competition and new opportunities in the long distance market, together with the Year 2000 issues, the telephone companies who used to enjoy a stable and safe business environment, were now looking to new technologies and new ideas for solutions.

Data Warehousing ideas were the hottest subject in information technology and the Bell companies jumped at the idea without wasting any time. The “quick and safe” thing to do was to hire some big and well established consulting companies and have them build a corporate warehouse with all its gadgets, and their problems would be solved. It was not uncommon to hear about telephone companies across the world spending millions and millions of dollars hiring the big five consulting firms with hundreds of consultants, who produced thousands of paper reports along the way, to finally reach a point of closing the project a couple of years later, with nothing to show for their efforts but a huge waste of time, money, and internal resources.

The approach in the scenario above is what I call the Big Bang method. That is the premature development of a corporate data warehouse by throwing a lot of money to big brand name consulting companies and trusting that the problems would now go away.

It is not my belief that big brand name consulting companies are incapable of providing workable solutions to business problems, or that a corporate data warehouse is the wrong approach. It is rather that the idea of hiring an expensive consulting company to put together a corporate data warehouse, without adequate design and pilot work, is not the answer to the challenges of local competition.

THE PHILOS METHOD

Under the Philos method, before we start building the corporate data warehouse, we select a pilot data warehouse that represents the company’s overall data needs, but on a much smaller scale. A major benefit of this approach is that you deal with data warehousing issues first, before you expand to data volume issues. Otherwise, huge volumes of data can delay, paralyze and complicate enormously your efforts for a successful data warehouse, right from the beginning.

After you successfully design and develop the pilot data warehouse, you are then ready to address large or very large data volume issues. This will allow you to expand your design to include the remainder of your company’s data, resulting in the successful implementation of a company-wide data warehouse. In the following sections we will describe how we put a pilot data warehouse together, and we will show some of the benefits of this development method.

THE SOLUTION

In our pilot project, we needed to provide a dynamic, efficient front end processing and reporting tool that would transform the users from reactive recipients of hard copy reports to proactive, competitive executives poised to make effective, well-informed decisions.

Given the complexity and variety of existing systems, we determined that the strength and flexibility of SAS made it the best choice as an operating system to provide the data warehousing solution to this problem.

Our objectives were to build a diagnostic system that would:

1. provide proactive rather than reactive support capabilities,
2. help to avoid any future emergency situations and
3. allow early detection of reductions in call volumes.

At the time we began our project, the limitations of the existing system included:

1. inability to identify calls not going through due to undetected equipment failures,
2. delayed billing due to messages in connection stage,
3. inability to track removed telephone sets (vacant buildings),
4. inability to identify geographic or market-specific trends, and
5. inability to identify specific call detail because systems did not “talk” to each other

At the time, these problems were dealt with using paper-based manual systems or PC-based data retrieval. There was no common database for call usage by telephone number. Data was not available until 1-2 months after actual activity date. Data was available only as a summary of monthly activities.

The overriding problem with all of this was that compensation/commission could not be tracked to specific calls.

The new system had to be able to provide as close to real time usage information as possible on calls, lines, and fraud. The usage information on calls needed would have to reflect:

1. attempted versus completed calls.
2. types of calls (Collect, Calling Card, etc.),
3. length of calls,
4. originating and terminating numbers,
5. rating, and
6. time of day.

The usage information on lines needed would have to reflect:

1. changes in usage patterns: over, under, or no use,
2. blocking effectiveness and appropriateness,
3. screen codes and IDDD errors,
4. routine verification, and
5. provisioning information.

The usage information on fraud would have to reflect history and data. The design approach taken was a time-critical project approach including Rapid Application Development (RAD) phase design and implementation, and targeted initial roll-out. It would have the capabilities to interface with future or pending projects but with no direct dependencies.

The benefits of this system to the client were enormous. It decreased the risk of future emergency situations by providing on-line, alarm-triggered, real-time analysis, and access to both summary and detail information.

It improved fraud prevention efforts by allowing analysis by call and by line. Unusual trends could be identified. It also provided faster, more accurate response to billing and compensation/commission

problems by decreasing wait time for and dependency on microfiche and other reports.

The client realized millions of dollars in benefits, resulting from:

1. faster troubleshooting and repair of phones,
2. increased staff production in sales offices,
3. quicker response to customers' billing questions,
4. accurate tracking of 0+ call details, and
5. minimized fraud settlements.

The system provided additional benefits to customers by contributing to and endorsing their bottom line, by improving reliability of current systems and identifying new markets. To the end-user, it ensured higher quality and better availability of service.

To the sales teams, it provided "real-time" information on trouble lines and allowed timely intervention. It also allowed responses to inquiries without labor intensive microfiche look-ups.

METHOD

When the project began, we needed to test the existing system for accuracy and sufficient time processing. Using the SAS/FSP product we were able to put together quickly source data entry and validation screens needed to create a preliminary database for analysis. After a period of two months of testing, validation, and analysis, we identified key data sources and processes that track each message from the actual originating phone to the final bill to the customer.

The next challenge was to put together the data warehouse that would enable the user to

NEXT STEP IN THE PROCESS

Philos is privileged to have been chosen as one of the first companies to test and help

monitor phone usage better, to identify trends, to isolate problems and to market their products more effectively.

We identified the SAS system as the best instrument to deliver the end-to-end application to the customer in a timely manner, and to provide both simplicity in operation and ongoing ease of maintenance.

We gathered files from personal computers and from UNIX, MVS, IMS, and DB2 systems into an MVS SAS data warehouse that contained every message that originated from a pay phone. We tracked more than 200 thousand phones, each with an average of 500 messages per month.

We kept detail data on disk for three months to provide fast access and then transferred it to tape as historical data. Consultants from Philos Computer Solutions, Inc., in collaboration with managers from the client company, incorporated into the well-thought-out design multiple levels of summarization for the data warehouse.

The new system notified managers if any phones showed unexpected behavior. With the click of a mouse, they could identify any problems through comparative statistics, consult the detail data, and have service support correct the phones if necessary.

The gains realized through more satisfied customers and recovery of potentially lost revenue was evident within the first month of operation.

with the improved development of the SAS Multi-Dimensional Data Base. In cooperation with our client, we were able to use the strength of the MDDB to expand even more

the accessibility of information to the user from their data warehouse. The different levels of summarization were easily turned into hierarchies, and the dynamic system gave new meaning to OLAP applications for our customers.

Off-loading of queries against the data warehouse, thus reducing the number of transactions accessing the large-volume data file, gave instant results to the executives that could not be satisfied with anything less than that. At the same time, with the passthrough facilities on MDDB viewer, they were able to view the original files of individual records.

Having worked with artificial intelligence systems before, we designed our system with the ability to learn by tracking requests to different hierarchies and to the detail information. We also designed into it the flexibility to improve productivity and efficiency by building additional hierarchies, based on patterns of demand for specific information. Also, unused hierarchies can easily be put aside for future use.

As the Data Warehouse Administrator product became available, we saw an ever greater opportunity to expand this system to the rest of the payphone industry. Expansion of our Data Warehouse for another of our telecommunications client was a very straightforward process, since the business rules were very similar and the design was already in place.

As part of this development, the use of our *system agent* provided constant monitoring of calls and new marketing opportunities for our client.

The use of the SAS/Intrnet product provides the telephone company and the vendors with easy access to detailed information about their calls. As a result, better and faster evaluation of the calls is available to anybody with a web browser and the right access. The results of the inquiries can be viewed on-line, printed, cut and pasted to

another document, sent to an email address or faxed to an appropriate location.

CONCLUSION

The system is getting better and more efficient by the day, making our users stronger and happier in a market where competition demands the best just for survival.

As we work with the SAS Institute, we expect to upgrade every system we can get our hands on to this new dimension of software technology.

As we approach the Millennium, freed of the constraints of Year 2000 problems, we can redouble our efforts to provide the very best service and the very best systems possible with the very best software tools available on the market.

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ACKNOWLEDGMENTS:

The author would like to acknowledge the following members of the original project team:

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Philos Computer Solution, Inc.

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