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Database Management Systems

Politecnico di Torino – School of Information Engineering

Data warehouse design – Telco exercise

Now we'll look at a **telephone company** that has some basic information about its customers, and see how this information is used by marketers. The phone company knows a lot about its **customers**. After all, it must have a name and address to which to send a monthly bill. Despite the fact that this information is available, it is often difficult for the phone company to know just who its customers are, or what **services** they buy. The reasons stem from the history of the industry.

Until the 1980s, the phone company was a regulated monopoly. With little direct competition, the phone company worried less about individual customers and more about delivery of various services. Entire organizations within the phone company worked almost independently of one another to provide different types of services. This independence meant that systems designed to support these services were also isolated from one another. Standards were not in place to ensure that similar information was entered the same way in various systems. And because there was little competition, there was little need to carefully identify an individual customer.

Consider a midsized business customer. They would likely receive several different bills from the phone company for POTS alone. (POTS stands for "Plain Old Telephone Service", i.e., standard phone lines.) Individual lines were to be billed to the person within the organization who ordered them. Though a company name was recorded, no effort was made to standardize how it was entered. Little if any effort was made to relate all the lines billed to a single company. Even the same person might not have been identifiable. The record for each line billed to an individual might have had his or her name spelled in different ways.

Other services, such as 56K or T1 lines, were managed by separate organizations, resulting in more individual bills to the business. Ads in the telephone directory were placed with another organization within the phone company. This group only recorded enough information to send an invoice; the billing name was not associated to a particular business. Calling for service required interfacing with yet another organization. The support groups logged enough information to get to the caller and solve the problem. The effort to correlate trouble calls with a given telephone line or business was weak at best. With all these groups working in relative isolation, using their own systems, and taking no steps to ensure a consistent picture of the customer, the phone company was unable to answer several basic questions: ***Who are our biggest customers? Which customers use more than one of our products? What is the average number of service calls per year for a business with less than 25 telephone lines?***

Deregulation and diversification are forcing changes in the way the telecommunications industry looks at customers. Despite recent legislation, the phone company remains largely unchallenged for your local telephone service; however, they have branched out into other services for which there is competition. With more to sell, and the possibility of other companies selling the same thing, the importance of understanding the customers increased. A new emphasis on marketing has emerged; customer information can provide a competitive edge.

This new view presents serious challenges for the telephone company. Information from numerous systems must be combined. Each system may have different standards for entry of data, different requirements for the population of important fields, and varying levels of data quality. As the data warehouse team works to merge data from these systems, the systems themselves are being modified to support a future customer view that is more coordinated.

Deregulation also allows the phone company to get involved in new lines of business, such as cellular service. These businesses add to the number of systems that may contain important information on their customers. To make matters more complicated, local telephone companies are now merging with one another. Each merger doubles the number of systems to contend with, and increases the complexity of the problem.

The Telco Marketer

We will now speak with the recently hired vice president of Residential Marketing for a regional telephone company. A new position created as part of a corporate restructuring effort, he is charged with bringing together and coordinating marketing efforts from various product groups, and we are charged with developing a data warehouse to help him. Here's what he has to say.

We are in the midst of a major change in focus. Our sales and marketing forces are being reorganized to reflect a shift from product focus to customer focus. It is a big change that will probably take us several years, because our systems are organized around products and regions. It is still very hard for us to get a good picture of who a customer is. The information is out there, but it's scattered across a bunch of different systems and entered in many different ways. We really have two major customer categories: consumers and businesses. We need to know a lot of the same information for these groups, but each has some unique requirements as well. I am in charge of our Residential Marketing efforts. Sometimes we call this consumer marketing.

For consumers, we need a good composite picture of all the services provided to a given home. We can get a lot of the information pretty easily, because most homes already receive a single invoice; however, we still have two invoice systems for different regions.

Also, we go elsewhere for a lot of additional information. Some services, such as ISDN and Internet access, are still billed separately. Our parent company provides information on the use of cellular phones.

It would be useful to have all this information available monthly. We would like to look at a composite picture of a residential customer. What combination of services does he or she have, how much time is spent on the phone; what is the total billing amount? We try to pull this information together so that we can identify likely candidates for selling additional products. We call this cross-selling.

In the future, as our marketing efforts become more sophisticated, we will also want to be able to look at the changes in service on a monthly basis: what was added, what was dropped, and so forth. Drops can help us identify services that may be in need of retention efforts, and additions will be useful in reviewing the success of our campaigns.

One other thing we are gearing up to try is making special offers to customers who are moving within our coverage area. This is an ideal time to sell them new services, because they contact us, rather than vice versa.

This executive is facing some major challenges, but he has given us a solid idea of what he needs in the short term. He has also hinted at some things that will be needed in the future, and has given us an idea of how the information he needs overlaps with needs in another subject area.

We have been told by the vice president that a key requirement is the ability to analyze the combination of services sold to each customer. He wants to use this to target likely prospects for the sale of additional services.

In the future, he will want to use the data mart to look at changes in service over time, presumably to gauge the effectiveness of marketing efforts. He also pointed out that looking at services being dropped will allow him to identify at risk customer profiles. Contacting others who fit the profile can possibly prevent them from dropping the service.

Key Business Terms

Cross-selling. The technique of selling additional services to existing customers.

Retention effort. A marketing activity aimed at preventing loss of existing customers.

We have also learned something extremely important to our effort: the needs of the Residential Marketing team have significant overlap with the Commercial marketers. Although we are not building the data mart for the commercial side of the business, it is important for us to consider it. If we do not, future expansion may be difficult. We have been told that much of the information in each subject area is the same, which implies that there may be some analysis that can be done across all customer types. If an effort is under way to build a data mart on the commercial side, both teams will benefit from coordination. If there is not a current effort, we can ensure that our design will mesh well with anything that is built in the future.

The executive has revealed that the commercial and residential marketers have some identical requirements, and that there is some additional unique information in each area. In the long run, the most flexible solution may include not two, but three stars. One, called the core star, would contain all information common to both types of customers. Separate custom stars for Commercial and Residential Marketing contain the same information that is in the core star, as well as any additional facts and dimension attributes specific to their respective subject areas.

In this scheme, our Residential Marketing data mart would be one of the custom stars. We will be building it before there is a data mart for the commercial customers, but we have been told that there are equally important needs in that area. We need to be sure that we choose our grain and set up our dimensions to maximize the amount of overlap we will eventually have with the commercial side. This effort will allow future construction of a core star for cross-functional analysis of all customer types.

The Residential Billing Data Mart

We're ready to put together a design for the telco's Residential Billing data mart. As we design the data mart, keep in mind our primary objectives:

- **Provide a composite picture of services provided to each customer**
- **Facilitate cross-sell analysis**
- **Follow individual customers when they move**
- **Monitor changes in service**

Data for our schema will come from five different source systems: our two call-billing systems, ISP billing, the parent company's cellular billing, and the ISDN system. There are a large number of sources, so this will be a significant project.