INTRODUCTION

The evolution of data models from reflections of physical database management systems to powerful conceptual tools has had a profound impact on the way systems have been developed at Pacific Bell over the past decade. We will focus on the impact data models have had on our System for Building Systems, will describe our migration from classical data models to more advanced models, and will consider the impact future classes of models may have on our capability to develop applications.

SYSTEMS DEVELOPMENT HISTORY

Prior to divestiture, many of our operational systems were built by Bell Labs or AT&T. Many of these systems continue to this day and are either supported locally or through Bell Communications Research. Internally built systems tended to be in the business support arena including accounts payable, accounts receivable, general ledger, payroll, facilities tracking, and order distribution.

In the 1960s and early 1970s, formal data models played almost no part in the systems development lifecycle at Pacific Bell. Systems were developed independently around applications areas with no emphasis on data sharing among applications. These applications for the most part made no use of database technologies, or if they did it was only to use the DBMSs as if they were an access method.

In the late 1970s and early 1980s the structured revolution, which began several years previously, was “discovered” at Pacific Bell. A small number of internal systems developers embraced the process-oriented structured approach as taught by Yourdon, DeMarco, and Gane & Sarson.

One of Pacific Bell’s most stable and well designed systems was built using the DeMarco approach. It was originally implemented using a network data model, but was subsequently rewritten as a relational design. The final database consisted of 32 tables in 3NF.

Though the process-oriented methodologies were a great improvement over the previous chaos, as our applications became increasingly database and management information system oriented, the inability of the process-oriented methodologies to directly support database design became more troublesome.
As a result, we went looking for a more suitable approach when confronted with a large personnel application intended to activate our first subject database, employee. We adopted a methodology developed and marketed by Ken Orr & Associates. Known as the Data Structured Systems Development (DSSD) approach, this methodology directly yields a tabular logical database design in at least 2NF and usually in 3NF. This approach uses a combination of top-down and bottom-up methods which combine aspects of both the Entity-Relationship Approach and the Relational Approach.

We have found this methodology to work well; however, there is a danger that the logical database design will be too biased toward the single application's view of the data. Therefore, it is important for a company entity-relationship data model to provide guidance and context while applying the DSSD methodology. This mixture of models is the approach currently being used for new application development at Pacific Bell.

In the future we hope to find even more support for our application development efforts from advanced data models and database management systems based on those models. Our research indicates that commercially feasible DBMSs based on the entity-relationship model or other models which express more of the business "semantics," such as the SDM model proposed by Hammer and McLeod, will be available in the near term. We look to the vendor community to develop robust systems development methodologies which will enable large corporations such as Pacific Bell to utilize these tools to their greatest advantage.

REFERENCES