

# Relational Database Management Systems: The Formative Years

Burton Grad

Prior to relational database management systems, the best-selling mainframe software products were the hierarchical and network database management systems (DBMS), which were developed in the late 1960s and early 1970s. These products continued to be heavily sold and widely used through the 1990s (and are still in use today at many companies). DBMS products were marketed, delivered, and supported by some of the most successful independent software companies and became major money makers for those companies as well as for IBM. The DBMS products, with their accompanying data communications systems (often called DB/DC systems), enabled users in all industries to construct online transaction processing applications far more rapidly and at much lower cost than if they were done as stand-alone applications. DBMS products became the foundation for many (some say most) of the core applications in every industry, commercial business, and government agency. They became the engine that drove the sale of mainframe computers during the 1970s and for many years afterward. The October–December 2009 special issue of the *Annals* covered the history of the principal DBMS companies.

And yet their success was soon overtaken by the new relational DBMSs. One of the most interesting stories in the history of software products is how the new relational model, published in 1970 by E.F. (Ted) Codd, spawned a whole new set of independent software companies. Together with IBM, they developed the RDBMSs that supplanted the DBMS companies and their DBMS models in both query-oriented usage and in many transaction-processing applications. This *Annals* special issue tells the story of how this transformation began and describes how three companies pioneered the development of relational database management products to meet the relational challenge and build the foundation for the growth of a multibillion dollar industry.

## Special Issues

This special issue of the *Annals* is introduced by articles from two of the premier computer historians: David Alan Grier and Martin Campbell-Kelly. Grier examines the history of the search for better ways to manage information and to produce more effective information systems and how this led up to Codd's conceptual breakthrough with the Relational Algebra. Campbell-Kelly provides a business history of the RDBMS industry, focusing on its roots in California's Silicon Valley. These two articles are followed by an overview article by Hugh Darwen, who with Chris Date, was a major proselytizer of the relational principles. Darwen's article describes Codd's new mathematical approach to database structures and provides an introduction to some of the key elements of the relational concept.

After these foundation articles, the issue then consists of three feature articles that cover the recollections by industry pioneers about the history of the companies that they worked for: IBM, Oracle and Ingres.

As a result, we have in this issue the history of how these three different companies entered into the relational database management marketplace. Each was unique in its approach from a technical and management standpoint. Each of these stories is a mixture of recollections of technology innovation and challenges and how they were addressed.

In addition, thanks to the assistance of Anecdotes Editor Craig Partridge, we have been able to enhance the issue by including an Anecdote by industry pioneer Donald Chamberlin, who tells the history of developing SQL, which became the query and programming language used with the RDBMS products.

A second special issue of the *Annals* in 2013 will cover the explosive business growth of the principal companies producing RDBMSs and show how they grew to be billion dollar corporations. That issue will include articles about IBM, Oracle, Informix,

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and Sybase as well as department articles on setting SQL standards, the history of SQL/DS, IBM's first RDBMS product, and Oracle's targeted marketing advertisements.

### **Preservation Efforts**

This is the fifth special issue of the *Annals* edited or coedited by Luanne Johnson and myself, the cofounders of the Software Industry Special Interest Group (originally the Software History Center), which is now affiliated with the Computer History Museum in Mountain View, California. These special issues have been supported by a wealth of material that has been collected since 2000, including transcripts of workshops, oral histories, personal stories, and other online and physical materials. All of these materials now reside at either the Charles Babbage Institute at the University of Minnesota in Minneapolis, Minnesota, or the Computer History Museum. We are especially appreciative of the support from Thomas J. (Tim) Bergin, David Alan Grier, and Jeffrey Yost, the three previous editors in chief of the *Annals*, who have encouraged and assisted us over the last 12 years. And we are particularly indebted to all of the other computer historians who have worked with us by helping to structure as well as to participate in this long-term project of collecting and communicating the history of the computer software and services industry. Among them, the following historians have been prime players in this work: David Allison, William Aspray, Martin Campbell-Kelly, Paul Ceruzzi, Thomas Haigh, and Michael Mahoney (who passed away in 2008).

The two special issues on RDBMSs were motivated by the results of a two-day

RDBMS Industry Pioneer Meeting held at the Computer History Museum in June 2007. The meeting consisted of two plenary sessions and nine workshops, each of which focused either on a technology or business subject or on a particular company's experience. The participants were a "who's who" of the industry, with 21 representatives from IBM, Oracle, Ingres, Informix, and Sybase. They were joined by computer historians Glenn Bugos, Peter Capek, Thomas Haigh, and Michael Mahoney. In addition, Software Industry SIG members served as session moderators, and Dag Spicer, Doron Swade, and other Computer History Museum staff members attended some of the sessions.

All the sessions were video recorded by the Computer History Museum staff and have been transcribed and are in the process of being edited so that they can be posted on the Computer History Museum website. In addition, at the meeting and subsequently, six individual oral histories were conducted and these too were video recorded and transcribed and will be edited and posted on the Computer History Museum website. Most of the authors of the articles in this special issue participated in the RDBMS Pioneer Meeting, and we thank them for being gracious enough to take the time and effort required to produce the articles that appear in this issue and the second 2013 issue. In combination, the materials collected during the Pioneer Meeting and the articles produced for these two special issues provide a treasure trove for historians to be able to access first-hand accounts of how the RDBMS industry was founded and grew to be such a significant part of the software industry.

**Burton Grad** has been an active participant in the computer software field since 1954, with General Electric, IBM, and in his own company, Burton Grad Associates. He is currently the cochair of the Software Industry Special Interest Group at the Computer History Museum, which has focused on conducting pioneer meetings, collecting oral histories, and obtaining software company business files. Contact him at [burtgrad@aol.com](mailto:burtgrad@aol.com).

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