Database Administration at the Crossroads: The Era of End-User-Oriented, Decentralized Data Processing

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Database administration has traditionally been a function that has been internal to the data processing organization. Contact with corporate personnel outside of data processing has always been limited. But, at this point in the evolution of data processing, end-users, with a variety of new tools at their disposal, are showing a great deal of interest in direct data access. This report describes the results of a survey of 36 companies in the Chicago, New York City, and South Florida regions, with two goals. One was to examine database administration functions today, in terms of their organizations, reporting structures, and responsibilities, as they stand on the brink of this exciting, new era of end-user data access. The other was to learn from the database administration managers the directions in which their organizations are heading, in this context.

The management of a company’s data can be viewed in two ways. One, the technical aspect, is the manner in which software systems store and retrieve the data on and from the computer’s secondary storage devices. The other, the people aspect, is the manner in which the company’s employees are organized to manage these software systems and to control the data itself. Historically, the first ten years of the electronic data processing era, from about 1955 to 1965, saw relatively little sophistication in either of these aspects of data management. Serious technical data management began with the development of database management systems (DBMS) in the late 1960s and their widespread adoption in the 1970s. The development of organizations to manage the database management systems, the data stored in them, and, ultimately, data outside of the DBMS realm, began in a limited way in the early 1970s and became more common by the mid and late 1970s (Gillenson, 1982; McCririck and Goldstein, 1980; Munzenburger, 1980).

Early on, it was recognized that the activities inherent in managing data divided along two lines. One, operational in nature, included such activities as physical (and sometimes logical) database design, database performance tuning, data dictionary operations, control block generation, and so forth. The other, involving analysis and planning activities, included strategic planning for data, support for data flow analysis activities, planning for dictionary usage, etc. (Guide, 1977; Weldon, 1988). An early attempt to set naming conventions for these two activities had the operational activity called database administration (DBA), the planning activity called data management (DM), and the second-level supervisor of both called data administration (DA) (Guide, 1977). During the 1980s, the naming conventions changed somewhat. The operational activity is still called database administration. But the term data management never came into widespread usage for the planning activity. Instead, the planning activity, which in practice has often had an entirely different management reporting path.
than that of the DBA, has come to be known as data administration (Brathwaite, 1985; Durell, 1985; Henderson, 1987; Rosen and Law, 1989). (The term data administration in this report will correspond to this more recent usage.) More recently, another term, information resource management (IRM), has sometimes been used to refer to the combination of database administration and (what is now called) data administration, as well as other, related topics (Trauth, 1989).

The 1980s saw the continuation of the database administration and data administration concepts, and the introduction of the information center (IC) concept (Carr, 1987; Hammond, 1982; Metz, 1988; Perry, 1987). The latter came into being primarily to assist end-users with the tools that were being developed for their direct use, including fourth generation languages and personal computers. More recently, end-users have sought direct access to corporate data that previously had been beyond their direct reach. In some companies, information centers have attempted to help end-users understand and access corporate data, but this seems to be limited and has not caught on in all companies.

Database administration, on the other hand, has traditionally been a function that has been internal to the data processing organization. In its traditional activities of database design, database performance tuning, data dictionary administration, and so forth, DBAs have, for the most part, worked directly with systems analysts, programmers, and other professionals within data processing. If there was any contact with corporate personnel outside of data processing — and this varied considerably with the specific company — it was in the context of major application development efforts.

At this point, in the evolution of data processing, the phenomenon of end-user data access is accelerating (Amoroso, McFadden and White, 1990; Arkush, 1986; Gerrity and Rockart, 1986; Goodhue, Quillard and Rockart, 1988, Rockart and Flannery, 1983). With a new variety of tools, focused primarily around relational DBMSs, at their disposal, and an increasing awareness of the multi-purpose value of the corporation’s data, end-users are showing a great deal of interest in direct data access. The implications of this from a data control point of view are substantial, including issues of data security, data ownership, database access auditing, and data sharing (Arkush, 1986; Goodhue, Quillard and Rockart, 1988). In addition, there are important systems issues, including system access and system performance (Alavi and Weiss, 1985-86; Amoroso, McFadden and White, 1990; Goodhue, Quillard and Rockart, 1988). Even if the control and systems issues are manageable, there is a potentially massive education process in explaining the nature and details of the corporate data to those end-users seeking access to it.

Database administration, in particular, is at a crossroads. Should it expand to provide direct data access services to end-users? Can it provide the services without expanding? What is the role of the information center relative to database administration? In 1989-1990 we undertook a survey which had two purposes in this regard. One was to examine database administration functions in terms of their organizations, reporting structures, and responsibilities, as they stand on the brink of this exciting, new era. The other was to learn from the database administration managers the directions in which their organizations are heading, in this context.

The Survey

Our survey took the form of in-person, on-site interviews with database administration managers (and some, data administration managers and other, related personnel) in 36 companies in the Chicago, New York, and South Florida metropolitan areas. The interviews, each of which lasted about one-and-one-half hours, were conducted in late 1989 and the first half of 1990. In a few instances, a DBA manager represented only a division or an independent corporate headquarters of a company. The “companies”, which represented a very broad array of private and public sector industries and agencies, ranged from large to medium in size.

In fact, we shall be precise about the terms “large” and “medium-sized” companies in this report, defining the terms based on computer hardware: a large company is one having two or more large-scale (e.g. IBM 3090-class) mainframes while a medium-sized company is one having one large-scale mainframe or (in only two cases) a smaller machine. The 36 companies interviewed included 15 large and 21 medium-sized companies, by these standards. Much of our data will be divided along these lines. As a further indication that our two groups fall on either side of a well-defined boundary, all of our large companies have 400 or more data processing personnel (most have over 1,000), while all of our medium-sized companies have 300 or fewer data processing personnel (most have 50-150).

In terms of database management systems, 14 of the 15 large companies are heavily invested in a navigational DBMS (either IBM’s IMS system or Computer Associates’ IDMS/R system, or both). In addition, all but one of these 14 companies, plus the one that does not employ a navigational DBMS, have a mainframe relational DBMS (most have IBM’s DB2, while Ingres Corp.’s Ingres, Oracle Corp.’s Oracle, Tandem Corp.’s database, Terradata Corp.’s database, and IBM’s SQL/DS, are also represented). Virtually all of these companies have their initial relational applications either in place or under development. Nineteen of the 21 medium-sized companies have a navigational DBMS (IMS, IDMS/R, UNISYS’ DMS II or DMS 1100), but only 14 of these companies report substantial use of them. Fifteen of the 21 medium-sized companies have a mainframe rela-
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