

THE EMERGING DATABASE ADMINISTRATOR

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ABSTRACT

The Database Administrator (DBA) is a direct product of the introduction of text database management system technology into modern corporate administration. As a powerful and versatile administrative tool, the main objective of the database management system is to store and retrieve information through and in the form of natural business language. The power and flexibility of such systems, however, are also the causes of system failure at the implementation stage. Database management systems deal with natural language, and language represents human concepts. They are also designed for end user defined applications. As both concepts and applications fluctuate in any business environment when departmental needs change, it requires human management to ensure that such system changes follow suit. The ultimate need for highly qualified professional human management of database management systems has led in recent years to the emergence of the database administrator as a middleman between user and programmer. Though traditionally resident in the Data Centre, the DBA is increasingly emerging as a member of a user department. Consequently, he is in a strategic position to carry out a role that involves all facets of database management from database design to report construction. This paper therefore outlines his role from the viewpoint that a DBA resident in the user department is more advantageous than one remotely located in a Data Centre, and that his main purpose is to make the system as transparent to his departmental users as possible.

Une nouvelle base de données de gestion.

La Base de Données de Gestion (BDG) est un produit direct de l'introduction de la technologie du système de base des données de gestion à texte à l'intérieur d'un conseil d'administration moderne. Comme outil administratif puissant et versatile, l'objectif principal du système de base de données de gestion est l'entreposage et le recouvrement de l'information à travers et sous la forme d'un langage des affaires naturel. La puissance et la flexibilité de tels systèmes, néanmoins, sont aussi la cause d'une défaillance du système austade de l'implantation. Les systèmes de base de données de gestion opèrent avec un langage naturel, et le langage représente des concepts humains. Ils sont aussi dessinés pour des applications bien définies. Comme les concepts et les applications varient en même temps dans n'importe quel environnement des affaires quand le département a besoin de changements, il demande à la gestion «humaine» de s'assurer que de tels systèmes changent dans la même direction. Le besoin ultime pour du personnel de gestion hautement qualifié dans les systèmes de bases de données de gestion a mené, durant les dernières années, à la naissance du gestionnaire de bases de données qui sert de tampon entre l'utilisateur et le programmeur. Par les résidents habituels du Centre de Données, la BDG apparaît de plus en plus comme faisant partie du département de l'utilisateur. En conséquence, il occupe une position stratégique afin de jouer le rôle qui implique toutes les facettes d'une base de données de gestion, de la conception de la base de données jusqu'à la composition du rapport. Cette communication de ce fait souligne son rôle dans le sens qu'un résident de la BDG dans le département de l'utilisateur est plus avantage que quelqu'un, au loin, localisé dans le Centre de Données, et que son utilité principale est de rendre le système aussi invisible que possible aux utilisateurs de son département.

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In many large corporations, management continues to wrestle with the introduction of computer technology into the office environment as a means of easing the burden of manual office work, improving internal communications and paper management. This technology is defined generally under the umbrella of office automation. The wrestling match however continues as the actual implementation is often confounded by five major pitfalls:

- (a) Vendor claims of what their systems can do are often misleading;
- (b) Systems fail to achieve intended objectives;
- (c) Cost benefits of implementation fail to materialize;
- (d) Systems frequently overlap;
- (e) Adequate professional or high level support where the technology is being introduced is absent.

These symptoms of incomplete or inadequate implementation, especially the lack of professional support, are particularly evident when corporations make the momentous decision to introduce, as part of the office automation package, text database management systems (DBMS).

The common denominator of most office technologies is simply the management of information, frequently in the form of paper documentation. Whatever systems are chosen to perform this function, few are actually designed to store and retrieve large quantities of information over long periods consisting of several years. The exception is the large mainframe-oriented database management system, a sophisticated software package designed to store and retrieve information through and in the form of natural business language. The power and versatility of such software to meet the applications requirements and specifications of end users on one hand and to use other mainframe software and utilities through the Programme Language Interface on the other cannot be denied. Their power and flexibility however are at the very heart of the problems experienced during implementation and the ongoing operation of a DBMS.

The causes of a DBMS to falter can be reduced to two fundamental factors:

- (a) management's serious underestimation of the requirements for supporting such a system;
- (b) the need to deal with natural language.

Language represents human concepts. As both concepts and the applications designed to handle them fluctuate in any business environment whenever departmental needs change, it also requires human management to ensure that the system changes accordingly. The administration and

professional level of support needed to ensure the smooth implementation and continued operation of such a software package are the areas most often neglected by senior management whenever database management systems are introduced as part of office technology. This support consists of close and carefully coordinated co-operation among three areas:

- (a) Systems support from the Information Center;
- (b) Computer Services support for purposes of ensuring adequate mainframe resources to run the software;
- (c) End user administration of the individual applications.

In effect, office automation is living proof that invention is often the mother of necessity, because the need for end user participation in a sophisticated text handling environment has given rise to a very critical need for skilled support staff within the user department. Management frequently ignores this area of administration, equating information handling with low level clerical support functions. Regretably this attitude leads to disaster. The success of a particular application within a user department is solely dependent on database design. In other words, it is technique not technology that is most important. Consequently, as text database management systems are developed and become more sophisticated, the need for proper database management on a high professional level has become essential in order to achieve system stability within the user department and make the system work for the user instead of vice versa. Recognition of this fact has slowly led to the emergence of the Database Administrator.

Although relatively new to the office environment, the qualifications and profession status of a Database Administrator are growing almost in direct proportion as the power and level of sophistication of database management systems increase. The Database Administrator is therefore a direct product of installing text DBMS technology into the administrative framework of any modern corporation. His emergence is directly linked to the nature of the software involved.

The single overriding objective of database management software is to provide end users with an efficient and effective administrative tool that will meet their information handling needs by permitting the user department to define its own database or application. By exposing the end user increasingly to user friendly software, the system decreases the need for constant professional programmer intervention, although it does not entirely eliminate that intervention. This trend towards end user nonprogrammer computing has necessitated a greater knowledge within the user department of the software's user language and main-

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tenance facilities than is generally possessed by the average clerical support staff. The role of the Database Administrator is therefore that of middleman, between end users on the one hand and the system support people and programmers on the other. Though not usually a programmer by profession, the Database Administrator possesses three essential assets:

- (a) He has a thorough understanding of his own department's information needs;
- (b) He has an equally thorough knowledge of the DBMS capabilities and how to use them effectively;
- (c) He understands the needs of Systems Support staff with respect to such areas as database analysis and definition.

With an indepth knowledge of his own department's operational, and hence information handling needs, the DBA is able to effectively perform several vital tasks. First and foremost is database design, that is determining what information is to be stored within a database and how it is to be retrieved from that database. In the case of the INQUIRE installation in Shell Canada, the Systems Support staff has written several CLISTS to help a DBA perform this function. The DATABASE CLIST, for example, is used to set up a test database for purposes of running different types of reports and analyzing the data. Before a test database can be submitted to Systems Support to be put into production, the Database Administrator must determine, through an analysis of the field structure, which fields are to be used for retrieval purposes, the optimum length of each field and the field type.

Changes in departmental information needs may also necessitate a change in database design. Periodic statistical analysis of a database is carried out by Systems Support and given to the Database Administrator. It is the responsibility of the DBA to use the analytical data to determine if a particular application or database requires a partial or complete revision of its field structure. Generally the analysis indicates the degree of usage of a particular field and how it is being used. With this data, the Database Administrator can approach the end users within his department to inform them of what changes are required and why they are necessary. The objective is to streamline a database to improve retrieval and simplify database maintenance.

Knowledge of the database management system's capabilities is equally essential for the Database Administrator to perform three further functions. First the DBA seeks to optimize report formats through the more advanced parts of the system's User Language. In the case of INQUIRE, a further CLIST called the INQUIREB CLIST is used to construct large

batch reports both in test and production databases. In addition, the Automatic Macro facility can be effectively used to design on-line and batch reports interactively.

The second function arising from a thorough knowledge of the system's capabilities is the Database Administrator's ability to select the optimum method of maintaining a database. Again in the case of INQUIRE, the DBA has the choice of three possible approaches, depending on the type of maintenance to be performed. The selection is dependent on the Database Administrator's knowledge of which method is the most efficient. These methods consist of:

- (a) a menu-driven approach through the use of Interactive Macros, generally written by the Database Administrator in the system's User Language;
- (b) the Full Screen Processor (FSP) which is an interactive screen editing function;
- (c) Global changes, again using the system's User Language.

Menu-driven maintenance is achieved by storing several Interactive Macros that are supported by the Data Management Supervisor (DMS). These macros are constructed in User Language by the DBA with assistance from Systems Support. Their function is to provide a sequence of interactive prompts for purposes of correcting data online.

With respect to the FSP, Systems Support is responsible for creating a set of screens, called a Panel, for each database wherever the user group wishes to use this facility. The DBA's role in this instance is to provide Systems Support with the initial Panel design based on a sound understanding of a database's field structure.

The global change function is one of the most powerful and time-saving capabilities of the User Language at the DBA's disposal. This facility allows the DBA, with one query, to search the entire database for the field value to be changed and write the commands to replace the data into a dataset called a SAVE FILE. After checking the SAVE FILE to ensure that the replacement commands are correct, it is then submitted through the INQUIREB CLIST as a batch maintenance job. A recent example involved switching the names of refineries in a database called MATIS from one field to another and deleting the names from their original field. Consequently, the DBA can perform in minutes a task that normally takes days to complete.

The final task performed by the Database Administrator involves optimizing the storage of data within a database. The result can mean

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dramatic savings in computer resources with respect to the amount of storage space taken up by the information. Available to the Database Administrator for this purpose are two utilities, namely the FDT CLIST and the DATABASE CLIST. Both utilities permit construction of such space-saving devices as Flat Files and manipulation of the field structure through the User Language.

Hence, a DBA can determine in test mode which field structure is most efficient for a particular application before giving the database to Systems Support to be put into full production. Weeks of development time can therefore be saved during the transition of an application from test to production mode.

In conclusion, the role of DBA has emerged out of the need for human management of text database management systems within end user departments. That role covers a wide range of activities that are primarily intended to bring stability to the end user as far as getting the most value out of a very complex software. Essentially, the DBA attempts to mask the complexities of the software and render it as user-friendly and transparent to his own end user group as possible.