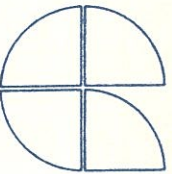


DATA BASE ADMINISTRATION

Introduction

In an environment where a data base includes data which is shared by many user programs, it becomes necessary for a data base definition to be developed centrally. In such a shared environment, a data base is, in a sense, a compromise between the needs of the various user programs, and the proper trade-offs can only be made centrally by a "Data Base Administrator".

On the basis of information as to the data required by individual programs, statistics on usage of data, and response requirements, the "Data Base Administrator" must make decisions; for example, on whether to repeat data redundantly and on what relationships to build into the data base. Based on these decisions it must declare the areas, records, data items, and sets required, and if necessary, restructure the data base.



Functional Overview

The Data Base Management system consists of three principle functions, the Requestor, the Data Base Administrator (DBA), and the Data Base Manager (DBM). The Requestor is the individual desiring to use the data in the system. The Data Base Administrator defines the rules which control the access to the data and determines the manner in which the data will be stored. The Data Base Manager is a combination of hardware and software functions that give access to the data as instructed by the Requestor and Data Base Administrator.

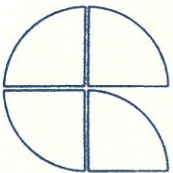
The Requestor communicates with the DBA through formal and informal channels. The Requestor establishes a need and authority to access data. The DBA provides system authorization and an access strategy for the Requestor which is consistent with the overall use of the data base.

The DBA communicates with the DBM via a Data Base Description Language (DBDL), a Data Base Management Language (DBML), and a set of system utilities. The DBDL provides a formal and precise definition of the data, how it is stored, and how it is associated. The DBML provides a series of commands to the DBM to access the data. The DBA commands the DBM at both levels; namely the descriptors of the data and the data itself. The utilities provide the DBA with facilities for protecting, transforming, and manipulating data.

The Requestor communicates with the DBM via the DBML. Every action taken on the data base by the Requestor must have been authorized explicitly or in broad terms by the DBA.

The Requestor has primary responsibility for specifying the retrieval of data from the data base. He does this as part of his task of responding to management requests for information about the enterprise. Typically, this is accomplished through the writing of an application program. Those specific statements within the program that reference logical data will be drawn from the DBML which is designed to operate on the logical or application-related data. These statements are in turn interpreted by the DBM. This technique allows the physical nature of the data to be changed by the DBA without affecting the application programs, thus achieving the objective of data independence.

The Requestor refers to the system designer or application programmer who is acting as an agent for a user who has a need for data. This data may or may not be present in the data base. If the data is available, the Requestor presents his needs to the DBA. In addition, he would provide any special parameters needed to characterize his requirements. The DBA then has the responsibility of making any modifications to the data base to insure that this request can be materialized. The DBA would be responsible in seeing that this relationship is maintained as long as the need for such is present. If the data is not available, then the DBA would review with the Requestor the data to be added, the rules by which this data is to be maintained, and the



logical requests that are to be made on this data. The Requestor may also state any security rules that are to be applied. The DBA would then define to the system through the DBDL the necessary physical and logical descriptors associated with the Requestor's needs.

The Data Base Management Language (DBML) is the facility which provides the Requestor with the ability to manipulate logical data according to his requirements. Using the DBML, the Requestor asks only for the data that he needs. The access methods employed and the physical data are completely transparent to the Requestor.

The DBML contains certain commands which can be executed without further intervention by the Requestor. These commands are: OPENM(V), READM(V), ADD-M(VC), DEL-M(VD), and CLOSM(V).