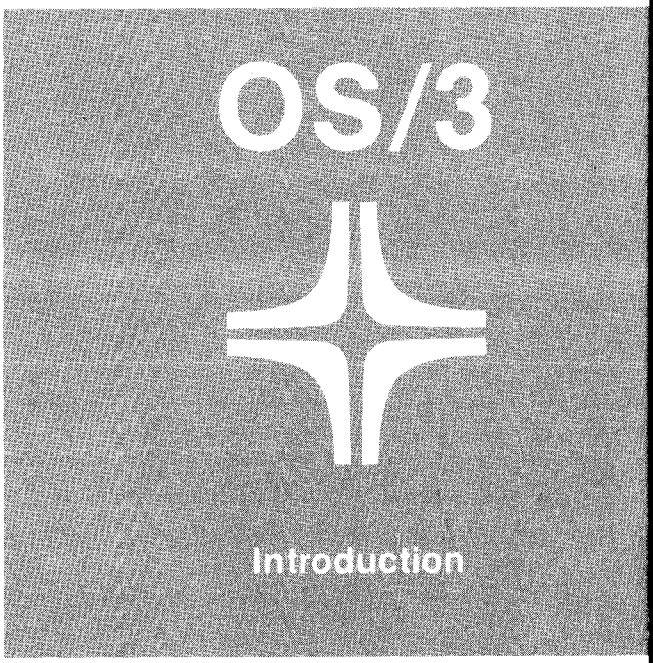
Data Management System (DMS)



SPERRY UNIVAC

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the data problem

Within most business organizations, the volume of data and the requirements for it have become so large and complex that it is difficult to anticipate all the demands made on the data. How do you organize this mass of data into a single, accessible entity that is readily available and up-to-date?

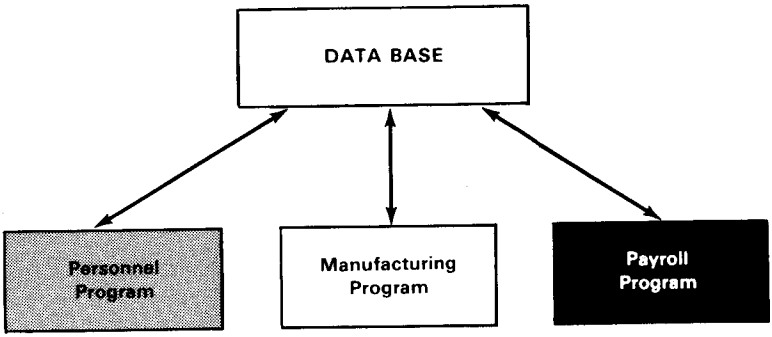
The traditional approach to solving this problem was to develop the program logic, then design the files to fit this logic. Each time there was a new problem to program, it created a new file. Data was unnecessarily duplicated and files were in different formats and sequences. Updating these files became a problem; data for one program would be updated, while the same data in another file wouldn't be updated. The question then became how to develop the proper management tool to produce accurate and current management reports.

DMS - what it can do for you

The SPERRY UNIVAC Data Base Management System (DMS) solves your data problem. DMS allows you to design a single data-oriented file – a data base – that contains a variety of file structures and definitions stored in a common area. Through DMS, a common access to the data is available to all applications programs so that any program can access the data it needs. Redundant coding is eliminated and efficient programming is achieved. Data is available for profit-making decisions because data descriptions are not hidden away in program coding.

SPERRY UNIVAC DMS is based on the specifications of the CODASYL Data Base Task Group Report of 1971. You can use DMS with your COBOL programs for ease of learning and programmer efficiency.

DMS PROVIDES A COMMON DATA BASE FOR ALL USERS



how to design your data base

Many factors influence the design of your data base. These factors include your data processing requirements, storage utilization, file security, and many more.

Let's take a small company and develop a data base for it. The following steps show you how to take your data items and set them up so that you can store, access, modify, and maintain them.

Step 1:

> First, working from output reports and screen displays, you define the characteristics of all items of data to be included in the data base. For example, a company has the following series of data items:

CUSTOMERS

Customer Number	Name	Address
1	Melcher Oil Company	2100 South Bay Street
2	Red Star Service	15201 North Main
3	Atlantic Tires, Inc.	1802 Highland Square Rd.

PRODUCTS MADE BY COMPANY

Product Number	Code	Description	
1	5301	Super V Radial Tires	FR70-14
2	5302	Tubeless Belted Tires	GR70-15

The company receives any number of orders from these customers for their products.

Step 2:

Now you define the input records for the data base. A record is a collection of one or more data items, and records are grouped according to type. For our example, we need four input records:

1. customer (customer)

2. product (product made by company)

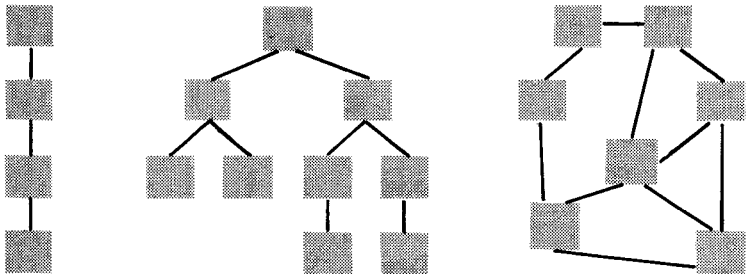
3. cust-order (orders from customers)

4. order-item (quantities of products requested by customer)

Step 3:

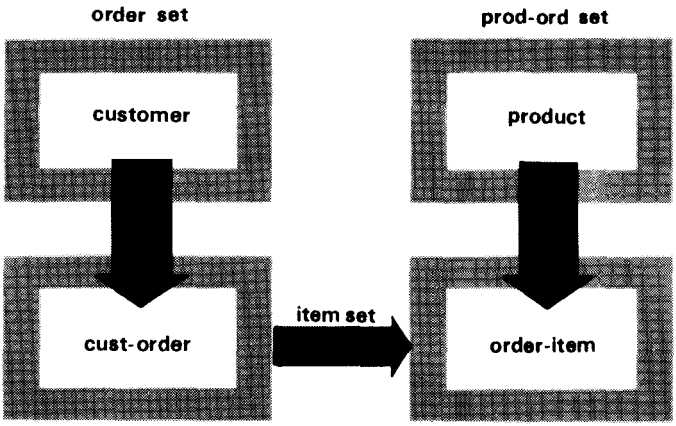
You develop the set relationships among these records. As data items are grouped to form record types, so are record types grouped according to logical relationships to form set types. DMS allows you to group records in three basic structures:

SEQUENTIAL **TREE** **NETWORK**



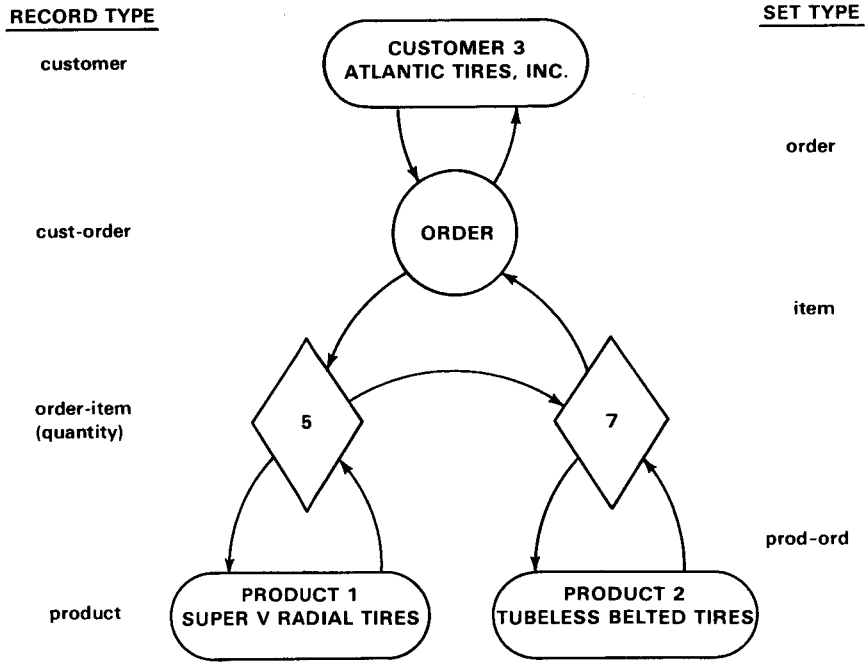
The same record type can be a member of many different structures simultaneously. This gives you the means for efficient data access in a wide variety of applications without data redundancy.

For our example, the logical relationship among the four record types is the following network structure:



Each rectangle represents a record type and each arrow represents the set relationship. From the diagram, we see that the customer submits an order for a certain number of items in a product line.

Next, you must consider how the logical relationship of the record types within a set is physically represented. Based on our example, we single out customer 3 and then show the linkage for an order for two products. The arrows indicate the linkages and the order in which the records are accessed.



Step 4:

You define the physical storage structure of the records. Now that the items have been collected to form records and the records have been linked together in sets, you are ready to determine the physical storage of these records so that they can be controlled for efficient programming. This structure must take into consideration how you plan to

store the records and access them during execution. The selection of the proper storage structure is one of the keys to good data base design. Sperry Univac provides facilities to give you a design that is best for your business. The method you use to specify the physical storage structure depends on your processing requirements.

Step 5:

You define the areas within the data base. An area is a subdivision of storage and each area consists of one or more pages. The proper use of areas improves security, recovery, and system efficiency. In our example, areas, pages, and record types are defined as being:

Pages	Areas	Record Type
00–10	CUSTOMERS	customer
11–30	ORDERS	customer-order order-item
31–40	PRODUCTS	product

Step 6:

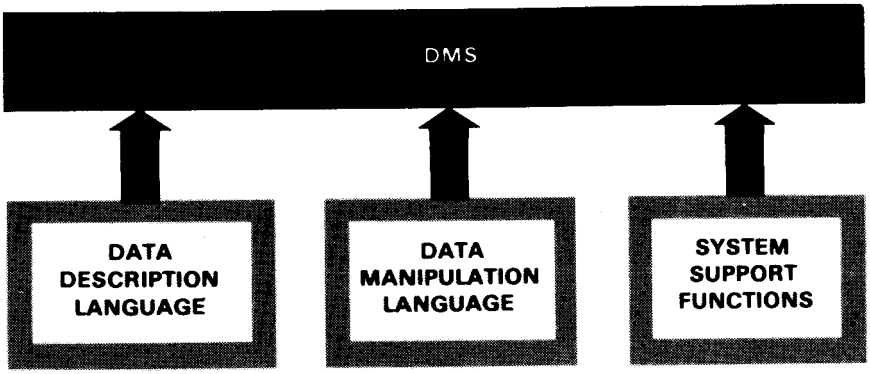
Finally, you define the data base integrity requirements. An objective of data base design is the preservation of the quality of the data. Individual items, records, or areas may be destroyed or incorrectly modified due to hardware, software, or operational errors. You must determine what your requirements are to restore the data base after such errors have occurred. Once again, Sperry Univac provides flexible alternatives under your control to ensure a data base design that best serves your system requirements.

Now that your data base has been thoroughly analyzed and designed, it is time to put all this information into a form DMS can interpret. You do this by using a certain language and specific functions that provide for the description, creation, initialization, accessing, maintenance, backup, and recovery of data bases.

DMS languages and functions

You describe, create, manipulate, and maintain your data base by using two languages – the data description language and the data manipulation language.

DMS CONSISTS OF THREE MAJOR PARTS



DATA DESCRIPTION LANGUAGE

You use the data description language to define the characteristics of the data base. One part of the language describes the total data base (called the *schema*), and the other part describes the portion of the data base required by a specific application (called a *subschema*). There is only one schema for a data base; there may be any number of subschemas. Included in the data description language is a *device media control language* that you use to describe the physical structure of a data base. A description of the data base is stored in a special data base called the *data dictionary*.

DATA MANIPULATION LANGUAGE

You use the data manipulation language to manipulate the data base defined by the data description language. You can retrieve, modify, add, and delete records by embedding these procedural statements in COBOL programs. In addition, you can update related records as a unit and then make those changes permanent or nullify them. The data manipulation language is entirely separate from the data description language. This results in a higher degree of data independence for programs.

SYSTEM SUPPORT FUNCTIONS

System support functions comprise all activities to create, establish, and maintain a data base. DMS utilities allow you to audit the activity in the system and recover the data base in the event of a hardware or software failure.

IMS action programs

You can use SPERRY UNIVAC Information Management System (IMS) action programs to access a DMS data base. IMS action programs allow you to use an interactive question-and-answer dialog at a workstation or remote terminal to obtain and update data on the data base.

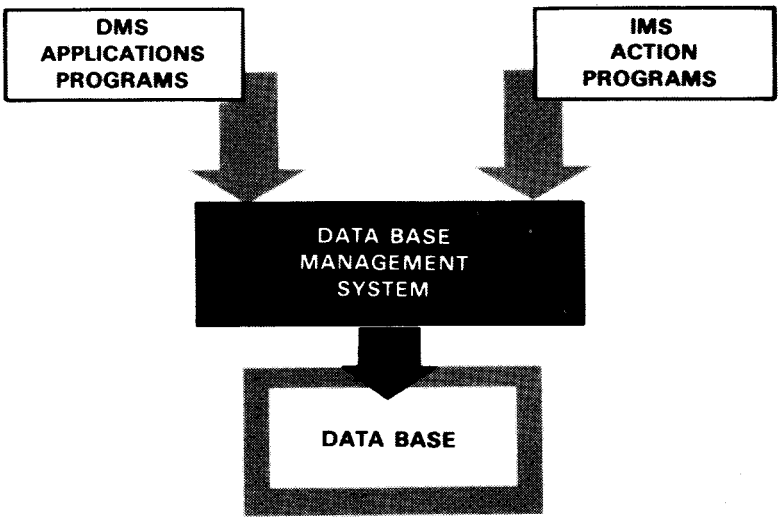
You can directly access a DMS data base by writing COBOL action programs that contain embedded DMS data manipulation language statements. Or, you can use DMS records and structures to build a special IMS file that you would then access by writing COBOL, RPG II, or BAL action programs or by using the UNIQUE action programs supplied by Sperry Univac.

For example, if you want to access payroll information in your data base, you write a set of COBOL action programs containing the DMS data manipulation language. When you enter a message at a workstation, those action programs cause the payroll information to be displayed on the screen. To then update an employee file, you simply provide the answers.

data base management system

The data base management system is the key operational component of DMS. It handles all access to the data base from your DMS COBOL applications programs and IMS action programs. This enables the data base management system to maintain control over data and structural integrity and to log all data base modifications.

DATA BASE MANAGEMENT SYSTEM CONTROLS ALL ACCESS TO THE DATA BASE



what DMS offers

SPERRY UNIVAC DMS has many features that make it a valuable management tool:

- *Uniform definition of data* within the data base ensures easy use of the data. Data is available to all users; it is not hidden away in programs.

- *Full recovery procedures* guarantee data base integrity because *automatic* and centralized recovery facilities restore the data base in the event of inadvertent destruction of records. In addition, the IMS/DMS interface gives you automatic coordinated recovery operations. Important records can't get lost.

- *With DMS, there isn't as much redundant data* as there would be with conventional data management.

- *Efficient updating of data* is achieved, even if you have many programs with different update cycles, because common methods to add, modify, and retrieve data are provided.

- *Processing cost is reduced* even if you use many source inputs or programs to update the data base.

- *Application development times are improved* because data definitions are centralized and uniform.

- *Data definition is separate* from the programs that use the data.

- *Information security* is improved when you have data such as planning or personnel information that is considered confidential.

- *A full range of utilities* is provided for the description, creation, initialization, accessing, maintenance, backup, and recovery of data bases.

- *Interactive updating or access from workstations or terminals* is achieved through IMS action programs and DMS COBOL applications programs.

- *Multithread concept* allows multiple applications programs to access the same data base concurrently for inquiry and updates.

- *Multiple data bases* allow you to run many programs concurrently, with each program accessing the same or different data bases.

- *Multifile data bases* permit data bases to be larger than disk drive capacity and to be separated into files for improved performance and security.

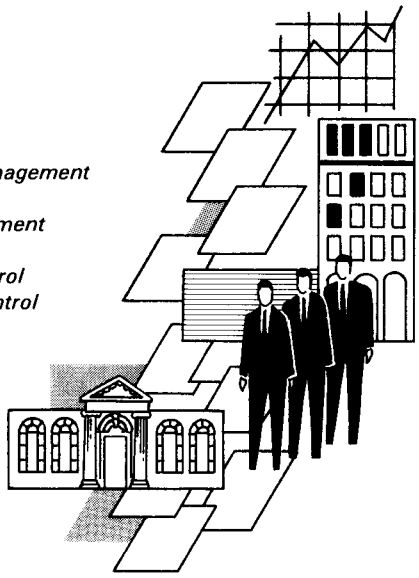
- *Flexibility in data base design* allows you to select the data base options that best service your business requirements.

summary

SPERRY UNIVAC DMS lends itself to many applications. Production inventory control systems, personnel files, billing, order entry, utility information packages, and medical records systems are only a few of the possibilities. Major industries, such as insurance, banking, and manufacturing, can use the integrated data base approach of DMS as their prime software development of the future.

SPERRY UNIVAC DMS LENDS ITSELF TO MANY APPLICATIONS

Banking
Schools
Colleges
Hospitals
Insurance
Personnel Management
Sales Analysis
Sales Management
Credit
Inventory Control
Production Control
Order Entry
Government
Mass Media
Brokerages



DMS is a large step toward meeting the increased demands by industry for data management capabilities. It meets the continuing trend toward standardization and the use of higher level languages. Yet, DMS offers flexibility of data base design, manipulation, integrity, and maintenance.

SPERRY UNIVAC DMS may be just what you have been looking for to aid your management in making timely analyses and necessary decisions.