

ESTTA Tracking number: **ESTTA321561**

Filing date: **12/11/2009**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

Proceeding	91179897
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Date	12/11/2009
Attachments	PX5 of 87- Part 1.pdf (8 pages)(476908 bytes) PX5 of 87- Part 2.pdf (8 pages)(351312 bytes) PX5 of 87- Part 3.pdf (8 pages)(323590 bytes) PX5 of 87- Part 4.pdf (8 pages)(567723 bytes) PX5 of 87- Part 5.pdf (6 pages)(257180 bytes)

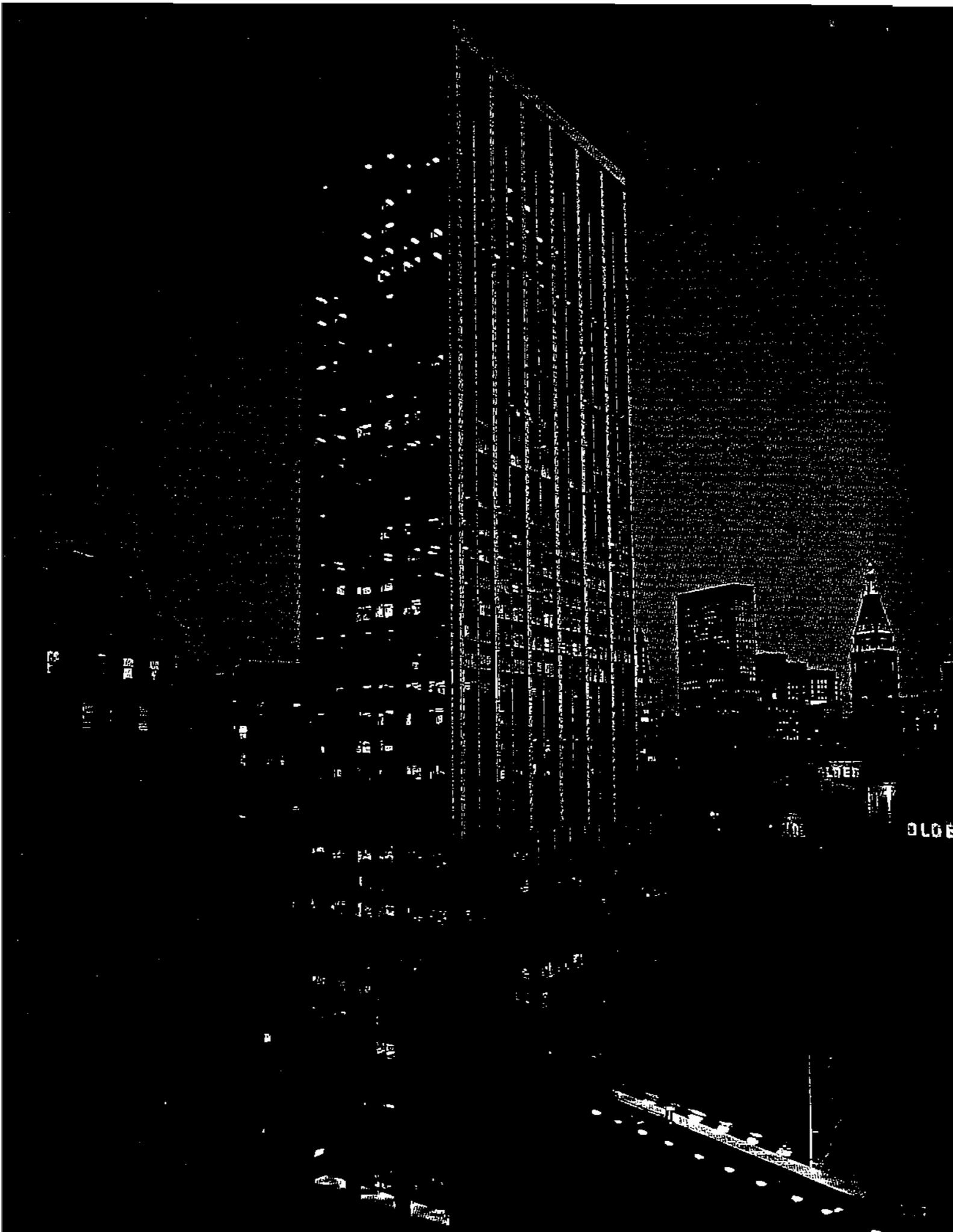
**General
Information
Guide**

PERGAD. Bayonne, N. J.
**PLAINTIFF'S
EXHIBIT**
5
11-13-09

 **FOCUS**

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Introduction

FOCUS, the complete DBMS and Information Control System, has redefined the way computer applications are developed. Replacing conventional programming with non-procedural English sentences, FOCUS is powerful enough to build complete 3270 menu-driven applications, yet is easy enough for non-technical end users to perform their own ad hoc queries and reports.

FOCUS's 4th generation *non-procedural* language frees you to think about what information is needed and the format of the results. FOCUS frees you from the complexities of data retrieval, selection, formatting and display.

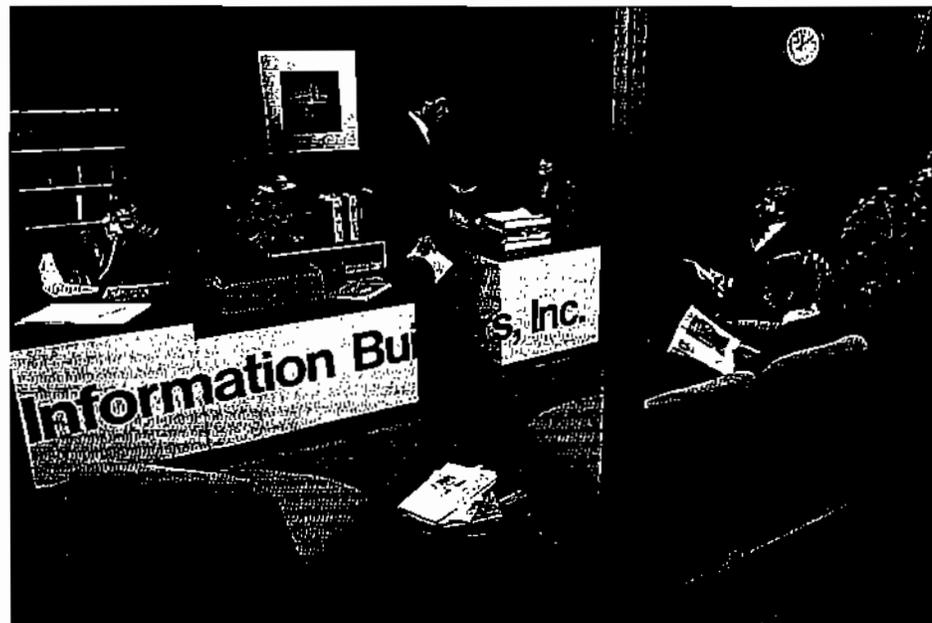
The language is concise and powerful, and can easily handle complex applications. With FOCUS handling all the details, your productivity is increased ten-fold or more — whether you are a DP professional or an end user.

Third generation programming languages such as COBOL, PL/1 and FORTRAN have not materially changed in over twenty years. Consequently they have not been able to handle the growing demand for computer applications. This has resulted in a multi-year backlog of applications at most installations.

And while the backlog grows an increasingly significant portion of your DP budget and personnel resources are committed to the maintenance of existing systems.

FOCUS is a solution to these problems!

This General Information Guide will introduce you to FOCUS — its ease of use and learning, its straightforward English language, its wide-ranging facilities for applications development and end user access — an integrated system solution with substantial benefits for your corporation.



The Concept

The process of information control for most applications is characterized by six major functions: data storage, entry, maintenance, selection, retrieval and analysis.

These six functions encompass the basic capabilities needed to manage data and transform it into useful information. They hold true whether performed manually with a filing cabinet or in an automated system with the latest computer technology.

There currently exist hundreds of computer software products that address one or more of the functions — query languages, data base systems, report writers, graphics packages, decision support systems — the list is quite long. While any given product may perform well in a specialized area, a major problem arises when you need to combine the array of functions into a cohesive system.

The problem is one of *integration*.

Each product was designed and built by a different software vendor. They have separate command languages, varying file handling capabilities, structured formats — differences that create additional training and maintenance requirements for DP personnel and seem bewilderingly complex to end users.

FOCUS solves this problem because it is *by design* an integrated Information Control System. It provides the full range of functions — from selection through analysis — in one integrated system. The system has three major areas:

Data Storage

A complete data base facility using shared-relational files which eliminate data redundancy while providing dynamic file JOINing and logical file views.

Data Maintenance

Full transaction processing facilities including a data base editor, 3270 screen processing and central data base control for multi-user access and processing.

Data Analysis

Reporting, queries, monochrome and color graphics, statistical analysis and financial modeling. The data source is transparent to the user and can be FOCUS data bases, standard QSAM, VSAM and ISAM files or IMS, IDMS, TOTAL or ADABAS files.

The key to this integration is FOCUS's non-procedural language which unites all of the FOCUS facilities. Data analysis, storage and maintenance functions are all accomplished with a handful of simple English (or your natural language) statements that replace thousands of lines of equivalent COBOL or PL/1 program code.

Whether it's a simple query, complex formatted report, timeseries forecast or split-screen data base transaction processing, all the statements are in a natural language!

The Environment

FOCUS is designed to run interactively on IBM or compatible mainframe computers running under VM/CMS or MVS with TSO, CICS and/or IMS/DC. It can also run in batch mode on any OS operating system.

PC/FOCUS is designed to run interactively on the IBM Personal Computer or equivalent compatible PC under MS/DOS.

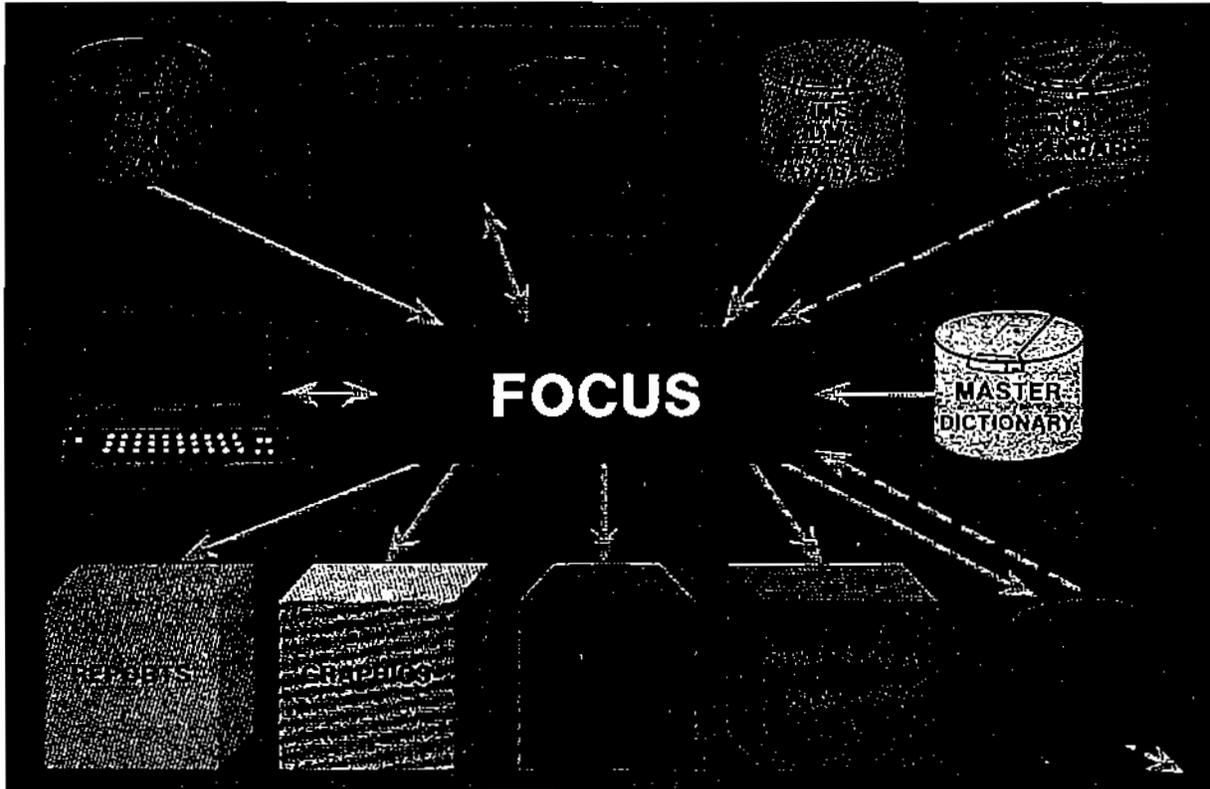
Once you have logged onto your system and entered FOCUS you find yourself in an integrated self-contained environment where you specify what it is you want to accomplish — all the details of making it happen are done for you by FOCUS.

FOCUS minimizes required knowledge of the operating systems that it runs on. All FOCUS requests, which can be saved as catalogued procedures called FOCEXECs, are interpreted and do not require separate compilation steps before execution.

REPORTS
AND
ANALYSIS

DATA
STORAGE

DATA
MAINTENANCE



The FOCUS environment has these distinguishing characteristics:

Easy to Use

FOCUS is conversational and handles all the details for you — details that COBOL and other languages require you to specify at great length. Special User Workbench tools simplify the tasks of file definition and creation, as well as the interactive development of requests and online review of your entire terminal session.

Easy to Learn

Everything in FOCUS is in English (or your native language). The entire FOCUS vocabulary is well under one hundred words, yet it provides a tremendous richness of function and diversity of application.

Four verbs (SUM, COUNT, PRINT and LIST) control the major query and reporting functions.

Online error correction and HELP functions permit immediate correction of mistakes and resumption of processing from the point of error — key factors that facilitate learning, particularly in the Information Center.

Effective

FOCUS is concise and its "built-in-logic" minimizes the amount of user effort required to produce a given result. Data base navigation, file access and thousands of other complexities imposed by older technologies are eliminated with FOCUS.

Efficient

Automatic and user-controlled optimization is performed in all phases of request execution. FOCUS's ability to directly process existing files saves both overhead and time since they do not have to be loaded into a FOCUS data base before they are usable.

Portable

FOCUS applications under VM/CMS are easily migrated to MVS (and vice versa) with little or no change. This includes the FOCUS File Descriptions, the data bases and the FOCEXEC procedure libraries.

The Users

**"Those who
design, build
and deliver
computer
applications"**

- Designers
- Systems Analysts
- Applications Programmers
- DBA

- Managers
- Analysts
- Business Specialists
- Decision Makers

**"Those who
need and use
information to
run their
business"**

Data Processing Professionals

DP professionals find FOCUS's integrated language an ideal tool for application development. The non-procedural language permits an initial design to be rapidly prototyped so that the ultimate users of the application can see the "results" of the system — whether it is reports or graphs or financial statements — *while the system is in its formative stages*. They then can provide constructive feedback to "finalize" the design with greater assurance that the system's objectives will be attained.

The application can then be rapidly fleshed out using the full power of the FOCUS language, which provides:

- Complete menu and screen-creation facilities.
- Full logic and computational facilities.
- Comprehensive transaction processing language for data entry and validation.
- Direct processing of existing files and data bases.
- FOCUS shared-relation data bases that support alternate file views and dynamic file JOINing of separate physical data bases.
- Multi-level DBA security down to the "value within field" level as well as resource limitation security to limit file IO access.
- Encryption of FOCUS data bases, procedures and file descriptions.
- Inclusion of subroutines coded in COBOL, BAL, FORTRAN or PL/1.

Using these facilities and many others, thousands of FOCUS applications have been developed in almost every area imaginable, including marketing, accounting, finance, government, education, consumer products, oil and gas exploration, securities, banking, and manufacturing.

End Users in the Information Center

FOCUS is an ideal cornerstone for the Information Center environment because it accommodates the needs of end users — needs dramatically different from those of Data Processing. While the DP professional draws on the full power of FOCUS functions and facilities, the end user relies on other key characteristics:

- Easy to learn and use English non-procedural language.
- Online operation with immediate error correction and HELP facility.
- Easy file creation, loading and maintenance using simple English statements.
- Integration of queries, reporting, graphics, statistical analysis and financial modeling with one language.
- User Workbench utilities for interactive request development.
- Individualized environment using FOCUS's LET facility and user PROFILE capabilities.

In addition, FOCUS's DBA security functions enable the installation to control file access and establish read/write authority for individual Information Center users.

The Benefits

Numerous benefits accrue to you and your corporation from combining a non-procedural language with a data base employing shared-relational file structures. Areas of significant savings include:

Applications Development

Complete applications can be developed in a fraction of the time they would take using COBOL or other languages. Ratios of 5:1 or more are common.

Rapid Prototyping

FOCUS enables application designers to quickly develop working prototypes of systems. These prototypes can then be reviewed by the end users of the systems. Changes in output format etc. can then be made rapidly, often immediately. This interactive process results in systems that meet their design objectives.

Information Center

FOCUS is a user-friendly environment for end users. Its easy to learn and use features, combined with online immediate error correction makes FOCUS an ideal tool for end users in performing their own ad hoc queries and data analysis.

Application Maintenance

Conciseness is a key attribute of a FOCUS application. What once was tens of thousands of lines of procedural COBOL code is reduced to a few dozen lines of FOCUS statements. This dramatic compression saves on library space and enables changes to be made and tested rapidly.

Documentation

FOCUS requests and applications are concise and in English or your native language. They are readily understood, since they indicate the functions you want to perform, not the detailed logic of how to perform them. Thus, clear and effective documentation is easier to produce.



Data Analysis

Data Analysis is the most familiar aspect of an information control system. It concerns those functions by which data is retrieved, analyzed, formatted and displayed.

With FOCUS, these functions are specified and controlled with an English non-procedural language. A key factor in data analysis is the choice of how the results should be displayed. An ad hoc query may produce only a single grand number, while a financial document has specific formatting and presentation requirements. Summarized analysis for top management may require graphic presentation of results, while business analysts and planners need statistical capabilities for projections and crosstabulations.

FOCUS has a full spectrum of choices for data analysis. The same non-procedural language can produce:

- Ad hoc queries with automatically formatted results
- Formal reports with automatic or user controlled formatting
- Graphics, both color and monochrome
- Statistical analyses that are prompt driven and interactive
- Financial models and reports

The integrated FOCUS environment lets you move easily from one "presentation" form to another *all in one language and independently of data file types or formats.*

For repetitive analysis your requests can be easily saved in a library for easy recall. These FOCEXEC procedures can then be executed on demand by entering a single one word command. Procedures can be menu-driven and customize the nature of the request.

In the following sections of this chapter you will see how comprehensive FOCUS's data analysis facilities are, and how easy they are to learn and use.

Overview

The majority of all computer programs ever written have produced printed reports as their end results. This result may have been a few lines or many thousands of lines. Often, the volume of output bears little correlation to the "number of lines of code" needed to generate it. The original information request may have been phrased as a simple query such as "I need to know how many widgets store 19 sold last month" or it may have been a detailed set of finely drawn specifications whose ultimate result appeared on pre-printed forms.

Analysis of these programs would show that they all embodied several distinct steps in the process of transforming data into information. Each step required a detailed specification of how the task was to be performed, and in what chronological order.

FOCUS Eliminates the Details

FOCUS frees you from the burdensome details of programming. FOCUS allows you to concentrate on the desired results, rather than lengthy computer specifications.

The centerpiece of FOCUS's integrated environment is its non-procedural language. Every phase of data analysis is controlled by simple English commands such as PRINT, SUM, COUNT or LIST. These verbs form concise sentences when combined with the data field-names in your file. Thus to print a listing of employee names, social security numbers and job codes you would merely enter PRINT NAME AND SSN AND JOBCODE.

These command sentences are expanded through the use of phrases which control such functions as sorting, record selection and report formatting.

Thus a complete FOCUS request, as shown in Figure 1, has a beginning, a body and an ending. The beginning major command TABLE indicates that a tabular report is desired from the SALES file. The body of the request tells FOCUS what to do (in this case summarize sales results on a regional basis spread across the years 1983, 1982 and 1981).

The phrases in the request could have been entered on one line or many, and their order is strictly arbitrary. This accommodates differences in individual thought processes where one user may first think of specifying the sort order of the report, while another thinks first of the record selection criteria.

Immediate Error Correction and Help Facility

FOCUS is designed as an online product. As you enter your request it is checked and you are immediately informed of any detected error. If the one line error message is not sufficient you can reply with the word HELP. This will produce a more detailed explanation of the error.

In any case, you reply with your correction and *continue your request from the point of the error* — you do not have to begin all over again!

A formal HELP command gives detailed information on major product areas and command operands, e.g. HELP GRAPH gives details on the GRAPH command.

```
TABLE FILE SALES
SUM AMOUNT
BY REGION
ACROSS YEAR
IF YEAR FROM 81 TO 83
END
```

TABLE command initiates a report request from the SALES file.

The body of the request specifies the desired functions, data fields, sort order and record selection criteria.

Indicates end of request.

Figure 1

Report Output Facilities

Automatic Formatting

FOCUS has a complete set of defaults that *automatically* control all aspects of report formatting. The first columns (from left to right on the page) are your sort fields, with the primary sort field first. After the sort fields, the data fields appear in the same order as indicated in the original request.

The column headings are the data fieldnames and all spacing, alignment and page numbering is handled automatically by FOCUS.

Customized Reports

All Report defaults can be easily overridden to customize the results to suit individual requirements. The FOCUS language formatting controls include:

- Separate report heading and footing pages
- Page headings and footings
- Subheadings and subfootings within the report
- Embedding data values such as grand totals within heading or footing text
- Page numbering control and placement
- Column positioning, line skipping, underlines and more

This extensive range of formatting control is achieved with the addition of a few additional words and phrases in our FOCUS vocabulary.

Output Paneling

Reports that are too wide to fit on the typical 80 character terminal screen can be **PANELED** into a user specified width. Pages are numbered with a decimal notation, i.e. page 1.1, 1.2, 1.3 etc. Thus results can be easily referenced and when produced in hardcopy can be placed side by side — most useful for reports over the 132 character standard line printer width.

Offline Hardcopy

All report results can be easily routed **OFFLINE** for hardcopy printing. In fact you can first generate your result live at the terminal and then enter the commands **OFFLINE** and **RETYPE**. The result will now go to a printer or other hardcopy device — and this is all accomplished *without a re-retrieval of the input data*.

Extract Files

Frequently it is desirable to save an extract file of report results for further analysis. This is especially true if the initial request processed a large volume file. In FOCUS you can automatically save the results from a report or analysis by merely entering a **HOLD** command. This creates a new sequential file of the data on the report that can be used immediately for subsequent analysis.

Request Management Tools

FOCUS has a series of built-in facilities that expand the power of the non-procedural language and gives you great flexibility in the development and management of FOCUS requests. These facilities include:

LET Facility

The LET facility enables you to develop your own shorthand vocabulary. With it you can easily expand FOCUS's language to include special wording particular to your department or profession. Long test conditions or record screening phrases can be reduced to single word equivalents. For example,

```
LET TF = TABLE FILE  
LET MYREGION = IF REGION EQ 'SW' AND EMPCODE EQ 42393
```

The power of this facility can be used to readily translate the entire FOCUS language into other natural languages. All LETs established during your terminal session are easily saved and made part of your User Profile so they are available automatically when you logon.

User Workbench

The User Workbench is a series of interactive tools for creating FOCUS data bases and developing information requests.

Among the tools is **CRTEDIT** which provides full screen "Scratch Pad" for entering your request. You then can **RUN** the request, see the results, change the request, rerun it, etc. while taking advantage of the editing capabilities of the 3270 terminal. When finalized the request can be automatically **SAVED** as a FOCUS procedure.

Session Monitor

The Session Monitor spans all the requests and outputs performed during your entire session. It is activated with a simple **SET SM=ON** command.

From the time of activation it acts like an online historian, capturing every line of terminal input and FOCUS output. This history can then be scrolled directly at the terminal using simple commands or PF Keys. This review can be made at any point during your session, even in the middle of a FOCUS request.

This review may lead you to explore different alternatives or simply re-execute a previous request with a different set of parameters. The Session Monitor can also **SAVE** your session dialogue in a permanent file. This is particularly useful when learning FOCUS since the file can be printed and the dialogue analyzed.

Using FOCUS to Solve Your Problems

Consider that you have two data base files: a SALES file and a SUPPLY file. These files contain the data elements indicated in Figure 2.

SALES FILE	
FIELD NAME	MEANING
REGION	Marketing Region Code
SITE	Store Code
PONUM	Purchase Order Number
DATE	Order Date
NAME	Customer Name
AMOUNT	Total Amount of Order
TAX	State Tax on Order
FILLCODE	Indicator of Shipment Status
PRODUCT	Product Number
UNITS	Quantity Ordered
SUPPLY FILE	
PRODUCT	Product Number
DESCRIPTION	Product Description
COST	Wholesale Cost
RETAIL	Retail Price
VENDOR	Supplier Code Number
QOH	Quantity on Hand in Warehouse

Figure 2

The files have been defined in the FOCUS File Dictionary. The Dictionary entry, called a Master, contains information about the file structure as well as the NAMES of the data elements, their ALIAS name and their FORMATS.

You first need a listing showing customer name, order amount and order date for all order amounts over \$1000. The listing must be sorted by region and by store code.

The FOCUS request to do this is shown in Figure 3. Notice how the request statement parallels the statement of the problem and how it delineates what you want FOCUS to do. FOCUS then handles all the details. The result is shown in Figure 4.

Next there is a requirement to determine which customers placed the three largest orders during the year. This report is needed for each sales region.

```
TABLE FILE SALES
PRINT NAME AND AMOUNT AND DATE
BY REGION BY SITE
IF AMOUNT GT 1000
ON REGION SKIP-LINE
END
```

Figure 3

PAGE 1	REGION	SITE	NAME	AMOUNT	DATE
MA	NEWK	ELIZABETH GAS	\$2,877.30	82 AUG	
		NEWY	KOCH RECONSTRUCTION	\$6,086.23	82 APR
		PHIL	ROSS INC	\$3,890.22	82 JUL
			LASSITER CONSTRUCTION	\$1,120.22	82 SEP
MW	CHIC	BAKESHORE INC	\$5,678.23	82 OCT	
		ROPERS BROTHERS	\$2,789.20	82 AUG	
	CLEV	BOVEY PARTS	\$6,769.22	82 MAY	
		ERIE INC	\$1,556.78	82 JAN	
NE	ALBN	ROCK CITY BUILDER	\$1,722.30	82 JUL	
		HANCOCK RESTORERS	\$8,246.20	82 FEB	
	BOST	WANKEL CONSTRUCTION	\$2,345.25	82 JUN	
		WARNER INDUSTRIES	\$3,155.25	82 OCT	
	STAM	ACORN INC	\$2,006.20	82 MAR	
		KANGERS CONSTRUCTION	\$2,790.50	82 JUN	
		DART INDUSTRIES	\$7,780.22	82 MAY	
		ARISTA MANUFACTURING	\$4,295.90	82 FEB	
SE	ATL	RICHS STORES	\$1,345.17	82 AUG	
		WASH	CAPITOL WHOLESALE	\$3,789.00	82 JUN
			FEDERAL DEPOT	\$2,195.25	82 MAR

Figure 4

This request is in **Figure 5**. Notice FOCUS's powerful RANKing ability that makes it easy to directly select the top or bottom ranges in your data. This is accomplished without creating intermediate work files. The result is shown in **Figure 6**.

You now need a matrix report showing the distribution of units sold for each product, spread across the various regions. The report must have cross-foot row and column totals.

Notice how easily the matrix format is produced using the combination of BY and ACROSS phrases as seen in **Figure 7**. The request also introduces FOCUS's DEFINE capability.

The DEFINE function allows you to dynamically specify new data fields for a file. These new fields can be referenced in your requests equivalently with existing data fields in the file. The DEFINEd fields take up no disk space—they are merely *evaluated* whenever they are used in a FOCUS request.

In addition to the DEFINE, we used the built-in DECODE function. DECODE lets you easily transform data from coded format (on the data base) to translated text (on the report or analysis). DECODE lists can be explicitly listed as in this example (see **Figure 8**), or for large lists, you can maintain a separate lookup file.

```
TABLE FILE SALES
PRINT NAME BY REGION
RANKED BY HIGHEST 3 AMOUNT
ON REGION SKIP-LINE
IF DATE GE 8201
END
```

Figure 5

REGION	RANK	AMOUNT	NAME
MA	1	\$75,120.22	LASSITER BUILDERS
	2	\$56,086.23	KOCH RECONSTRUCTION
	3	\$52,877.30	ELIZABETH METAL WORK
MW	1	\$66,789.20	ROPER BROTHERS
	2	\$56,769.22	BOVEY PARTS
	3	\$54,978.34	COACH AND BODY WORKS
NE	1	\$86,295.90	ARISTA MANUFACTURING
	2	\$68,345.25	WANKEL BROTHERS
	3	\$68,246.20	WARNER CONSTRUCTION HANCOCK RESTORERS
SE	1	\$82,195.25	FEDERAL DEPOT
	2	\$56,345.17	RICHS STORES
	3	\$53,789.00	CAPITOL WHOLESALE

Figure 6

PRODUCT UNIT SALES ANALYSIS					
PRODUCT NUMBER	MID WEST	MID-ATLANTIC	NORTH EAST	SOUTH EAST	TOTAL
10524	164	181	184	115	644
10526	40	126	150	45	361
11275	189	219	133	168	709
11302	179	130	288	172	769
11303	99	121	220	30	470
11537	90	260	110	124	584
11563	297	245	520	371	1433
11567	86	80		20	186
12275				30	30
12345		10			10
13737			29		29
13797	110	160	65	389	724
13938	324	186	441	164	1115
13979		12			12
14156	200	538	120	169	1027
15016	94	257	156	245	752
16394	252	210	187	40	689
16436		132	52	20	204
16934		50			50
17434	166	378	84	174	802
17905	164	70	108	199	541
34562	25				25
34567	100				100
56267	146	190	910	255	1501
TOTAL	2725	3555	3757	2730	12767

```
DEFINE FILE SALES
REGION/A12 = DECODE REGION(NE 'NORTH EAST'
SE 'SOUTH EAST' MW 'MID WEST'
MA 'MID-ATLANTIC' ) ;
END
TABLE FILE SALES
HEADING CENTER
"PRODUCT UNIT SALES ANALYSIS </1
SUM UNITS AND ROW-TOTAL AND COLUMN-TOTAL
ACROSS REGION
BY PRODNUM AS 'PRODUCT,NUMBER'
END
```

Figure 7

Figure 8

Another requirement is for a custom management report analyzing gross sales on a store and region basis. You want to customize the output with a heading that summarizes the total results, followed by a detailed analysis.

This request is seen in **Figure 9**. Notice how easily the heading is specified—it can in fact be 57 lines long! The FOCUS Direct Operators such as TOT and PCT simplify what would have been difficult to calculate and format in COBOL. FOCUS has a complete repertoire of such operators that include Minimum, Maximum, Average and Row and Column percents. The report result is shown in **Figure 10**.

Let's consider what you have achieved so far. You have progressed from a simple listing to a fairly elaborate report — and each increase in request complexity required the addition of only a few additional words and phrases to achieve the desired result, clear evidence of the power and conciseness of FOCUS's non-procedural language.

The last report is perhaps the most critical. Prolonged bad weather in the vicinity of the central warehouse has curtailed the rate of inventory replenishment. You need to know *now* if any shortage conditions exist for any of the products appearing in the unfilled orders.

Report HEADING will be centered and contain embedded result values.

The AS phrase specifies custom column headings for the summarized data.

```

TABLE FILE SALES
HEADING CENTER
"SUMMARY SALES ANALYSIS"
"(AS OF &TOD &DATE) </1"
"TOTAL SALES VOLUME IS <TOT.AMOUNT"
"TOTAL NUMBER OF ORDERS IS <CNT.PONUM"
"AVERAGE ORDER SIZE IS <AVE.AMOUNT"
" "
SUM CNT.PONUM AS 'TOTAL NUMBER OF ORDERS' AND
AMOUNT AS 'GROSS SALES VOLUME' AND
PCT.AMOUNT AS 'PERCENT OF TOTAL VOLUME' AND
AVE.AMOUNT AS 'AVERAGE ORDER VALUE'
BY REGION BY SITE
ON REGION UNDER-LINE
IF DATE GE 8201
END
    
```

Figure 9

REGION		SITE	TOTAL NUMBER OF ORDERS	GROSS SALES VOLUME	PERCENT OF TOTAL VOLUME	AVERAGE ORDER VALUE
PAGE 1 SUMMARY OF SALES ANALYSIS (AS OF 13/27/30/11/29/82) TOTAL SALES VOLUME IS \$2,576,655.45 TOTAL NUMBER OF ORDERS IS 3120 AVERAGE ORDER SIZE IS \$,825.85						
MA	NEWK		256	\$195,869.60	7.60	\$765.12
	NEWY		398	\$234,424.20	9.10	\$589.01
	PHIL		144	\$175,978.96	6.83	\$1,222.08
	PITT		126	\$109,915.62	4.27	\$872.35
MW	CHIC		416	\$247,770.40	9.62	\$595.60
	CLEV		387	\$311,936.80	12.11	\$806.04
NE	ALBN		215	\$115,081.30	4.47	\$535.26
	BOST		306	\$283,277.75	10.99	\$925.74
	STAM		416	\$313,448.29	12.16	\$753.48
SE	ATL		156	\$224,785.69	8.72	\$1,440.93
	RICH		195	\$146,523.74	5.69	\$751.40
	WASH		215	\$217,642.90	8.45	\$967.30

Figure 10

The data to perform this analysis is split between the SALES and the SUPPLY files and *no pre-established linkages exist between the files.*

FOCUS's relational JOIN command enables you to dynamically relate the files together — without any changes to the Master Dictionary — and immediately create your report. The JOIN creates a new *logical* data structure and does not of itself create any projected sets of files. The JOIN statement is seen in **Figure 11.**

After issuing the JOIN you immediately proceed with the TABLE request to generate the exception report. Notice in the request FOCUS's unique ability to test subtotal values and conditionally print only those products meeting the shortage or exception condition. And this was accomplished without the need of producing intermediate result files. The result is shown in **Figure 12.**

This example also introduces the COMPUTE verb which enables you to generate new report columns (in this case SHORTAGE) as a function of existing columns. The COMPUTE verb supports not only the basic arithmetic operators but also complete IF . . . THEN . . . ELSE logic.

These examples typify the conciseness and capacities of the FOCUS language, which is powerful enough to satisfy the needs of complex and demanding applications.

```

JOIN PRODNUM IN SUPPLY TO ALL PRODNUM IN SALES
TABLE FILE SUPPLY
SUM UNITS AS UNITS ON ORDER AND
ONHAND AS INVENTORY LEVEL AND COMPUTE
SHORTAGE UNITS - ONHAND
BY PRODUCT BY DESCRIPTION
IF TOTAL SHORTAGE GE 10
IF FILLCODE NE Y
END
  
```

The relational JOIN command is issued using PRODNUM as a variable common to both files.

A report is requested from the new relation.

UNITS data is from the SALES file.

ONHAND data is from the SUPPLY file.

SHORTAGE is dynamically computed.

The 'IF TOTAL' test enables screening of results prior to printing.

Figure 11

PAGE 1

PRODNUM	DESCRIPTION	UNITS ON ORDER	INVENTORY LEVEL	SHORTAGE
11275	RADIAL ARM SAW (10 INCH)	570	489	81.00
13938	LATHE	735	689	46.00
14156	ENGINE ANALYZER	797	450	347.00
16394	ALTERNATOR (3000 WATT)	533	367	166.00
17905	PAINT SPRAYER	421	344	77.00
56267	ARC WELDER	725	244	1007.00

Figure 12

LE CAR MODEL

INDEX

MODEL

ENTRY THRU AN INDEX

CHECK FILE CAR MODEL PICTURE

GIVES PICTURE OF FILE WITH ALTERNATE ENTRY SHOWS INDEX IF EN FIELD IS INDEXED

ISLU CAR

SI BODY SEATS SE

WAR

AC MODEL

BY

FILE CAR MODEL

AND NO BY

COUNTRY

PRICE

01 COUNTRY

02 COMP ST

03 CAR REC MODEL

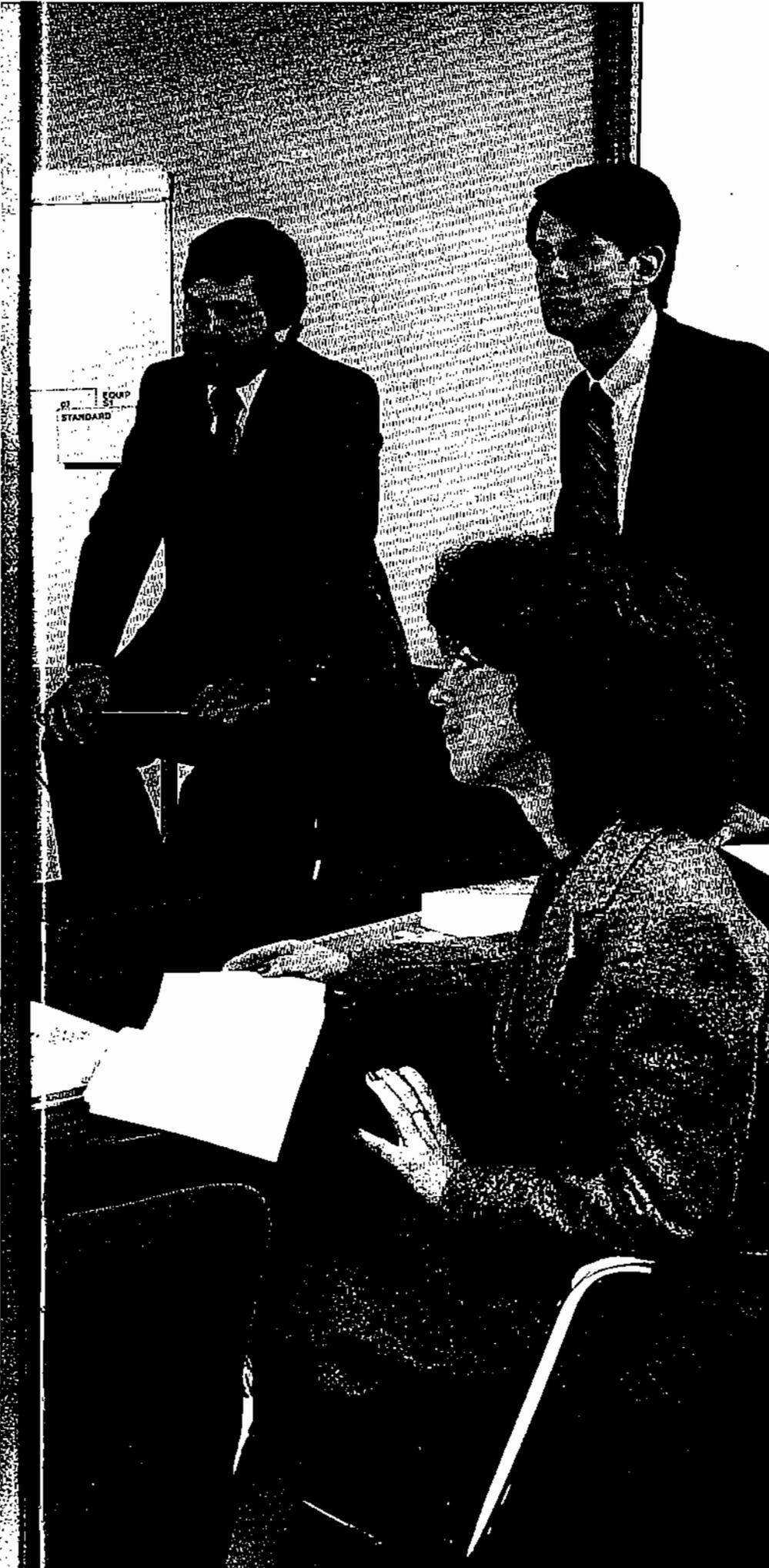
04 WARRANTY

05 BODY SEATS DEALER COST RETAIL COST

06 SPECS U

07 WITH EXT LIGHT





In the previous chapter you saw FOCUS's wide ranging facilities for data analysis.

Before these facilities can be used the data file must first be described with an entry in FOCUS's Master Dictionary. One entry is made for each file, whether a FOCUS data base, a VSAM file or other external files and data bases.

FOCUS also incorporates a comprehensive set of data and resource security provisions. This security is specified as an integral part of the file definition and pertains to both FOCUS and non-FOCUS files and data bases.

FOCUS data bases use a concept called shared-relational structures as a model. The file facilities offer a wide range of flexibility for application design. Files can be designed and treated relationally for easy understanding and ad hoc analysis.

The shared-relational model supports both simple and complex applications with small or large data volumes. These applications benefit from the reduced data redundancy and file inversion facilities that the FOCUS model provides.

This chapter discusses file definition, security and FOCUS data bases.

Overview

The power of FOCUS can be applied to not only FOCUS data bases but also to your existing files and data bases. There is no requirement to load your data into a FOCUS file prior to data analysis.

Thus, FOCUS preserves your substantial investment in existing files.

FOCUS can directly process QSAM, VSAM and ISAM files and has interfaces to IMS, TOTAL, IDMS and ADABAS. A unique feature, the Universal JOIN, permits you to dynamically join these separate files at run time based on common elements such as a social security number or product code. This relational JOIN is accomplished without prior schema definition and does not require that intermediate files be created.

The FOCUS Master Dictionary

All files are defined to FOCUS with an entry in the FOCUS Master Dictionary. The dictionary is a separate physical file as is the FOCEXEC procedure library. This separation of definitions and raw data base values yields several significant benefits:

Independence

Multiple users can create and update dictionary entries or schemas without conflict or forced serialization.

Performance

Separation of schemas and data files permits placement on different disk devices. This reduces the disk arm contention that would occur if they were kept in the same file.

Security

A system or media failure does not jeopardize your entire FOCUS system. Restoration of that file from a backup restores normal operation. If the schemas, FOCEXECs and data were in the same file then your entire operation is shut down until that file is restored.

Making a Dictionary Entry

The file definition is entered and maintained using your standard system editor such as SPF or XEDIT. Further, the FOCUS User Workbench provides a full-screen fill-in-the-blanks form for easy entry of the initial definition.

All files, whether data bases or simple 80 character card images, are composed of one or more data fields. The field is the basic building block of the file, and the smallest directly-referencable element.

Every field has a NAME, and an optional ALIAS name, each of which can be up to twelve characters long. During data analysis you can then refer to the NAME, the ALIAS or any non-ambiguous unique truncation of either one.

For example you can enter SUM AMOUNT or SUM AMT or even SUM AMO — assuming that there is not another field name beginning with AMO.

In addition to the NAME and ALIAS, the dictionary entry indicates the data FORMAT and its EDITING options. The EDITING options enable you to specify how the data is to be printed — for example do you want comma insertion, dollar signs, deletion of leading blanks or zeros etc.

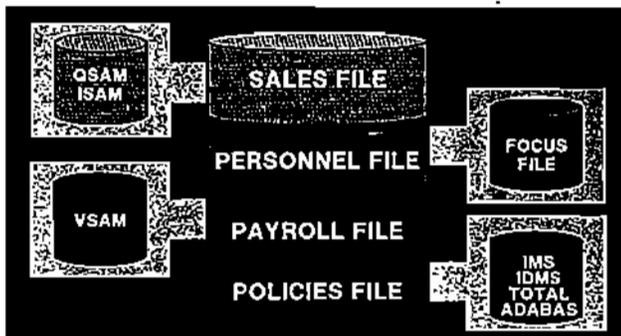
FOCUS's date translation feature enables date oriented information to be retained as numeric, e.g. 821012, and yet print out as 12 OCT 82 on a report or graph.

Since the dictionary entry is separate from the data as well as the FOCEXEC procedures, any changes to the editing options are *automatically reflected in the next execution of the exec* — unlike COBOL where all programs must be recompiled when any changes are made to the file descriptions.

Segments are logical groupings of related data fields. In the case of a simple sequential file you have only one segment, whereas a complex data base may have multiple levels of segments that exhibit specific parent-child relationships.

FOCUS can maintain automatic segment sort sequences, both ascending or descending, based on one or more KEY fields specified in the schema. Additionally, any or all fields can be INDEXED for direct retrieval — this is true for all fields, at all levels, not just the top or root segment in the data base.

Lastly, one or more segments comprise a file. A sample file definition (of the SALES file) is shown in Figure 22.





FOCUS has complete Data Base Administrator facilities that enable you to easily specify data access and updating security.

Security can be structured for all files that FOCUS can access. For FOCUS files you can control all the actions of READ, WRITE, READ/WRITE and UPDATE; for external files you control READ access only, since FOCUS does not update or maintain non-FOCUS files.

Security is divided into two major categories: Access Protection and Resource Protection. All security is implemented via a password decision table.

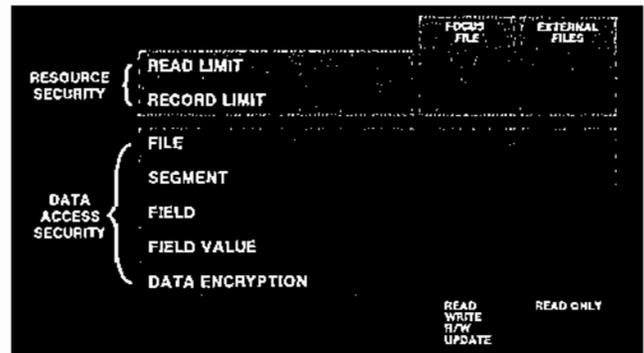
Resource Security

You can limit the number of records read from any file, as well as control the number of retrieved records that may fulfill a set of 'IF' screening tests in your request. Thus the DBA can limit the IO activity against large data bases, particularly during the development phase of the application.

Data Access Security

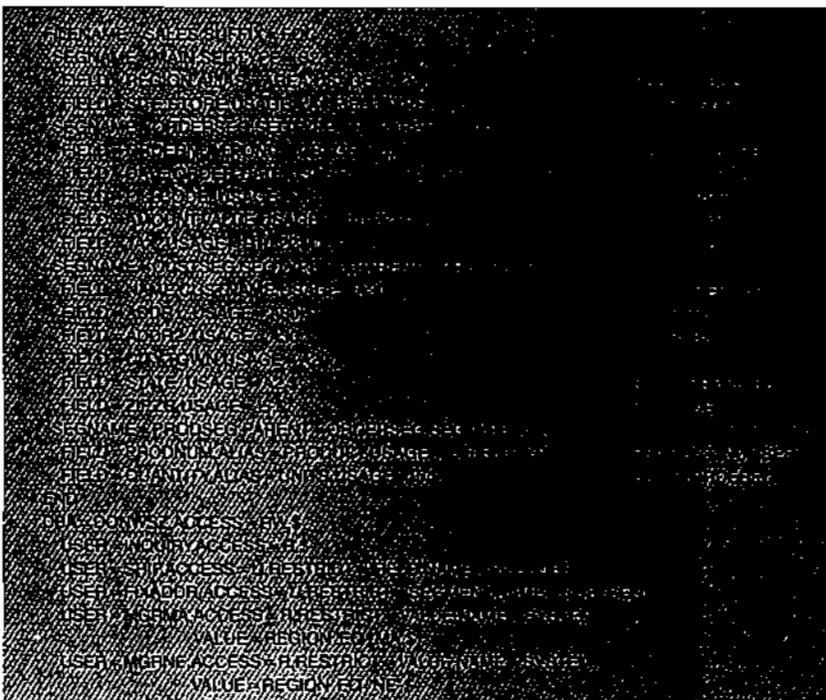
FOCUS can protect data at four different levels — the file, segment, field and "value within field." Security for each FOCUS user is easily tailored in a decision table format. You can accommodate restrictions such as permitting user X to access the salary field if the salary is greater than 20000 and the division code is 739.

A fifth level of security, data encryption, is available for FOCUS data bases only. This facility can not only be applied to the raw data, but also to the Master file description and FOCEXEC procedures. Thus an entire application can be protected from unauthorized inspection.



All security provisions for a file are specified at the end of the Master dictionary entry. Thus both file description and security description are together in one place.

An example of how the security is specified is also shown in Figure 22.



MASTER description for the SALES file indicating the data fields, segments and segment relationships.

The portion of the line to the right of the dollar sign is available for comments.

This section specifies the security structure for the SALES file. It indicates the passwords and their associated access rights.

Figure 22

Overview

FOCUS's data base employs a construct or model called shared-relational structures. This concept permits the data base designer to faithfully model real world data relationships. FOCUS does not force the application to fit a data model for which it may not be suited.

All elements of data base transaction processing — loading, records maintenance and full screen application processing — are accomplished using simple English statements rather than lengthy third generation programs.

FOCUS shared-relational structures draw on the strengths of the four classical data base models — hierarchical, network, inverted and relational — while minimizing or eliminating their weaknesses. The FOCUS model has these salient characteristics:

Multi-path Files

Individual files are structured as multi-path hierarchical structures. Parent-child relationships of one-to-one, one-to-many and many-to-one are fully supported. Short path records (i.e. with missing descendent segments) are properly handled during reporting.

File Cross Reference

Individual structures can be linked together through the schema. These linkages or cross references permit you to construct a dictionary "file" entry that is composed of segments from many different physical files. Cross references can be established between segments at any level within their respective structures — you are not limited to just the root segment.

File Inversion

All FOCUS file segments are linked with bi-directional pointers. Thus the file can be dynamically "inverted" from any point in the structure permitting cost efficient retrievals with minimized IO activity.

Relational Facilities

Structures can be simple one segment flat files or relational tables. Files can be dynamically JOINed to produce new table sets for data analysis. FOCUS structures eliminate the data redundancy overhead associated with pure relational systems, especially when the table sizes grow to thousands of records.

The synthesis of these characteristics gives you tremendous flexibility when designing an application since the model accommodates your needs, not vice versa.

FOCUS FILES

CUSTOMER



ORDERS



HISTORY



PARTS

A single structure (or file) is composed of one or more related segments.

CUSTOMER



ORDERS



HISTORY



PARTS

PART NUMBER



PARTS

VENDOR



PARTS



PRICING

Separate files can be cross referenced via indexed fields.

CUSTOMER



ORDERS



HISTORY



PARTS

PART NUMBER



PARTS

VENDOR



PARTS



PRICING

VENDOR

VENDOR CODE



PARTS



PRICING

Figure 23

Design Modification

Structural changes to the file design such as adding or deleting fields, indexing, security etc. are accomplished by making the changes in the Master description and then running an online REBUILD utility. These changes are transparent to your procedures and applications, and do not require the recompilations, DBDGENS etc. found in traditional data base systems.

Indexes

Any number of data fields, at any level in the structure, can be indexed; FOCUS does not restrict indexing to only the top segment. Further it does not make use of cumbersome separate index files which are difficult to keep synchronized with the data bases. The indexes permit FOCUS to directly retrieve these data segments when a qualifying IF condition is used in your request.

Indexes can be established after a file is initially loaded using an online utility — enabling you to capitalize on frequency of reference patterns without having to change the application!

Keys

Segments in the data base can be maintained in ascending as well as descending order based on one or more KEY fields. FOCUS does not restrict the number of these KEYS nor the levels in the structure on which they can appear. The capability of descending sort order gives you efficient processing for applications where data is being maintained in chronological order and the retrieval requests are primarily for recent data.

Alternate File Views

File views permit you to dynamically "invert" the file about any segment level, logically promoting a descendent segment to the top of the file so it appears as the root segment. It does not create any overhead nor does it involve any physical restructuring of the file. A file view can dramatically alter the retrieval strategy for a given query or request, yielding substantial IO reductions.

This facility separates FOCUS from other systems' inability to enter the file from any level other than the root for a non-qualified query, thereby incurring IO overhead, or requiring the use of very shallow files that limit the product's overall usefulness.

Figure 24 illustrates the Alternate View concept. By initiating the TABLE request with TABLE FILE SALES.C, FOCUS inverts the file about that segment, so that the logical segment relationships flow from segment C as the root.

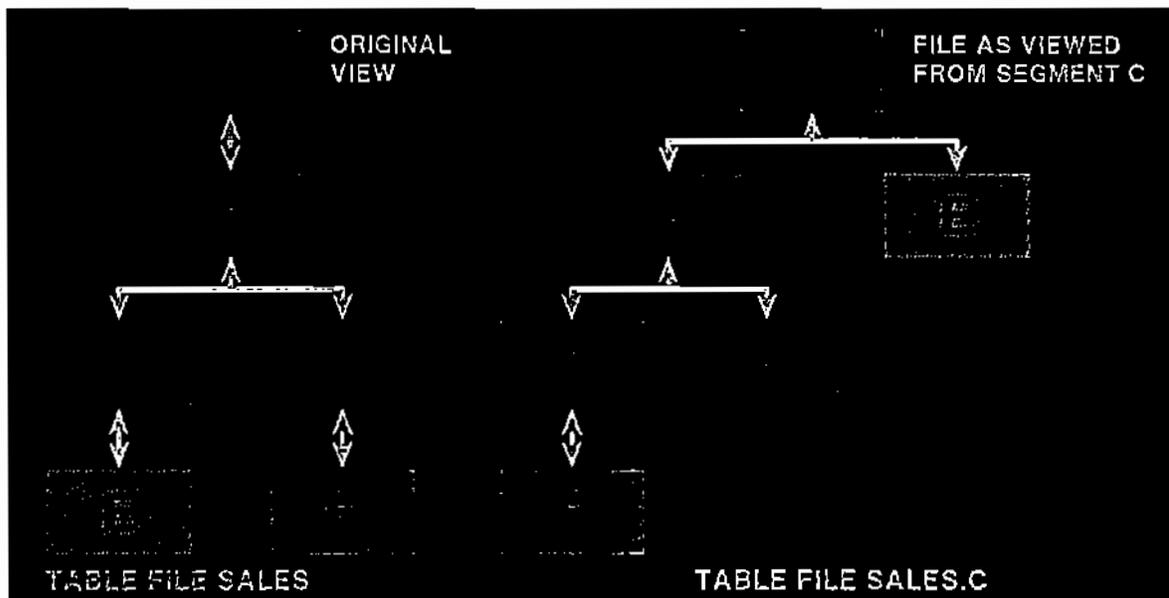


Figure 24

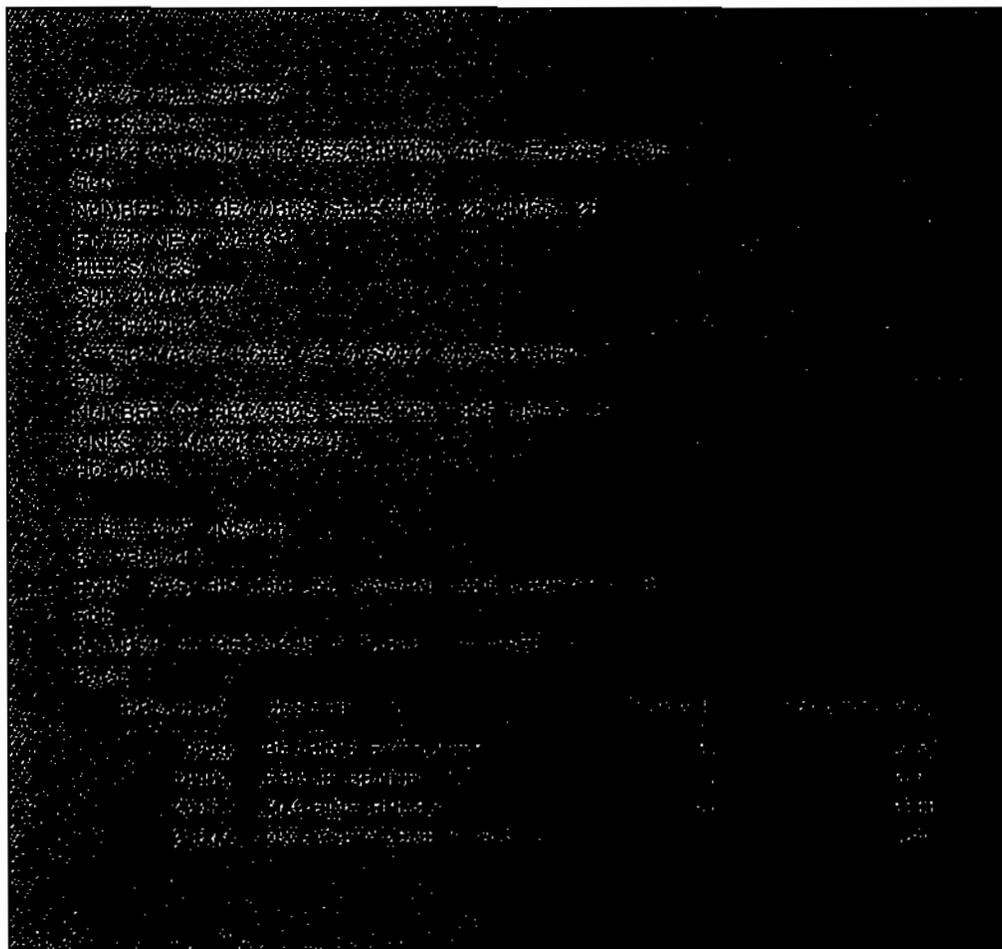
It is often necessary to combine data from one or more physical files. Perhaps your PAYROLL file is a VSAM data set and the EMPLOYEE file is a FOCUS data base. You need to create a new file or *relation* that contains a set of data elements drawn from both files.

FOCUS's file relation facility, performed with the MATCH command, enables you to project data from one or more input files based on one or more common key fields and create a resultant file that represents various subsets of fields and records from the original files.

MATCH is a complete relational process that provides all of the requisite relational functions: selection, projection, union, intersection, division, exclusion, set difference and cartesian product.

File MATCHing is performed online as shown in **Figure 25**. The example shows a relational MATCH operation from the PRODUCT and SUPPLY file producing a resultant file of product numbers and descriptions for which there are no orders. This file is then processed with a TABLE command to produce the desired report.

The MATCH operation can continue to process further input pairs, where the result is paired with yet another file in a subsequent MATCH operation.



- Initiates a MATCH operation using PRODUCT number as a common field.
- ┌ Selects specific data fields from the SUPPLY file.
- Selects specific data fields from the SALES file.
- Creates a new file (UNSOLD) which represents those products from the SUPPLY file for which there are no corresponding orders.
- ┌ The report request now prints the data in this new file or relation.

Figure 25

More powerful than the relational MATCH, FOCUS's dynamic JOIN command permits you to logically relate entire FOCUS file structures based on one or more common keys. The JOIN produces a new logical file *without the creation of a physical intermediate file* and maintains access to all fields within the joined structure.

Data queries and requests can be made of the new JOINed structure — with access to all fields of information. This is unlike the MATCH, where the result file contains only the data fields specified in the MATCH request.

JOINS give you tremendous capability, particularly when making ad hoc requests. Files can be JOINed at will, queries made and the JOIN cleared and new ones instituted. A permanent file of selected data from the JOINed structure can be easily created from any request with a HOLD command.

The example in **Figure 26** shows the same scenario as the relational file MATCH example. Notice how the JOIN command simplifies the production of the desired result. You do not have to worry about matching keys and inadvertently omitting of data fields that you want in the resultant file.

The JOIN command dynamically creates a new logical file relation *without building an intermediate file.*

The report request uses this new file relation to directly produce the desired results.

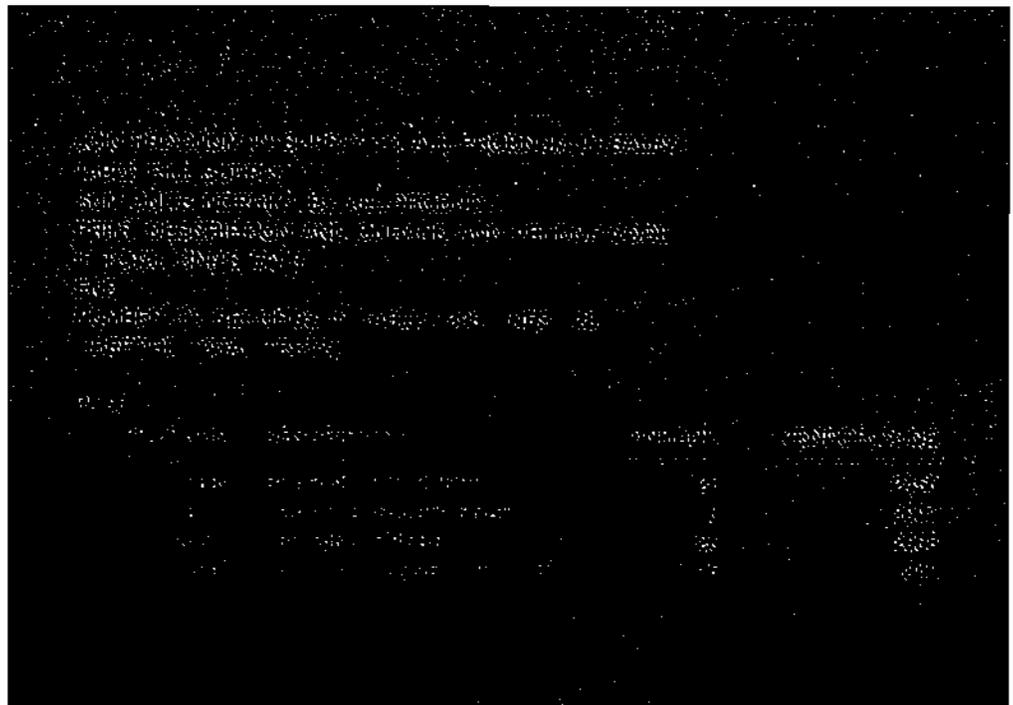
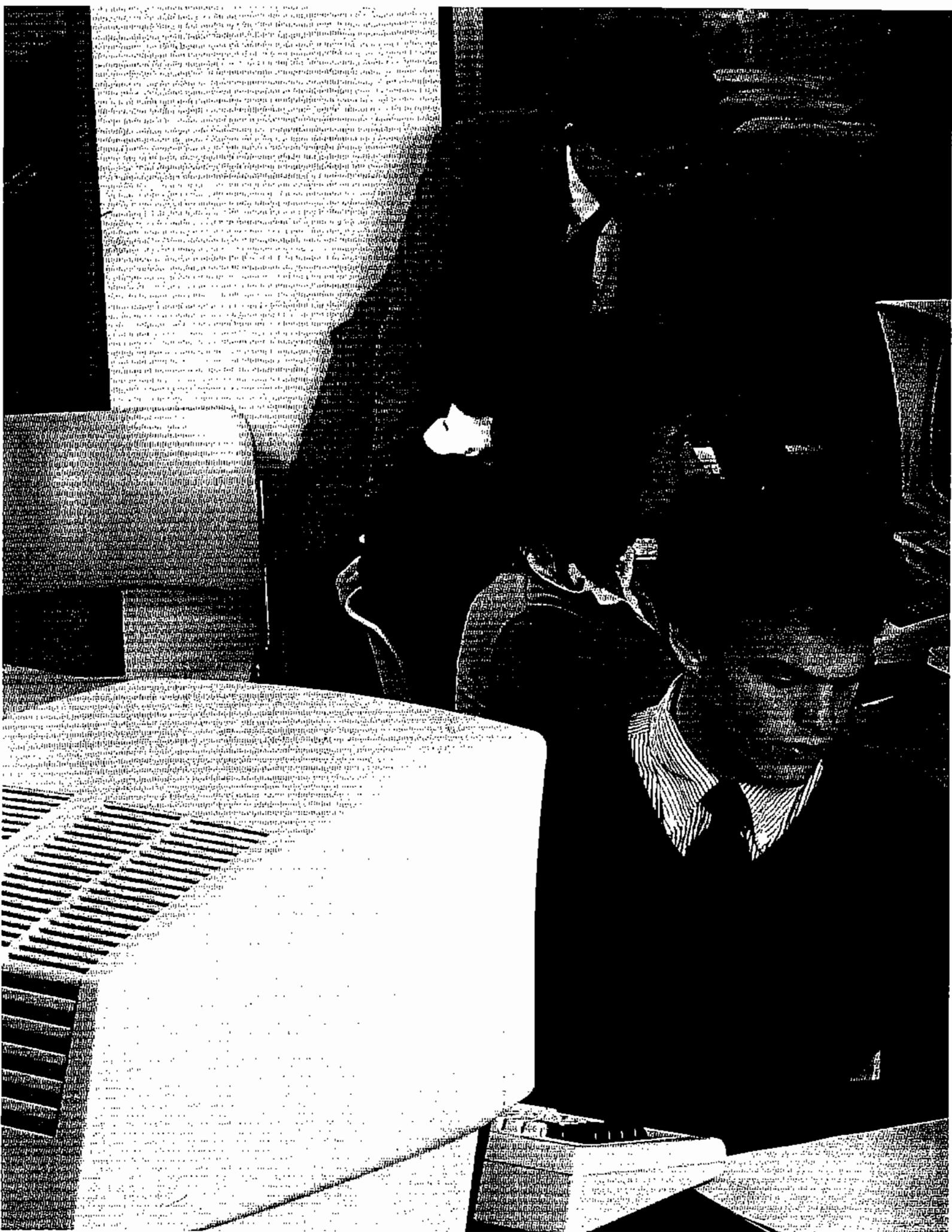


Figure 26



Data Base Management

The objective of FOCUS is to replace programming for application development — whether it's report generation or data base transaction processing. All aspects of FOCUS file management are performed with simple English statements. This relieves you of many details traditionally associated with records management.

FOCUS's complete range of data base management facilities includes:

Data Base Editor

An online, interactive utility for fast, low volume record display, maintenance and global change.

English Transaction Processing Language

A complete set of facilities for processing large volumes of online or batch transactions.

3270 Screen Design

Menu driven applications for data display and/or data maintenance are easily developed with the FIDEL facility.

Central Data Base Processing

MODIFY/SU permits transaction processing by multiple simultaneous users.

Language Interface

The HOST Language Interface provides a standard interface and protocol to access and maintain FOCUS data bases from COBOL, PL/1, BAL or FORTRAN.

This integrated set of functions gives you the flexibility to match application needs with the appropriate facility, as well as establishing a clear migration path for applications that begin small and then experience extensive growth.

This chapter reviews these facilities in more detail.

MODIFY incorporates an easy to use PROMPTing command for soliciting input as well as a TYPE command for relaying messages back to the user.

Figures 28 and 29 show the range of capabilities that MODIFY provides — Figure 28 is a simple online data base load of the SUPPLY file, while Figure 29 shows the case logic procedure for entering the SALES file data.

```

MODIFY FILE SUPPLY
PROMPT
MATCH PRODNUM
ON NOMATCH INCLUDE
ON MATCH UPDATE (END OF DESCRIPTION)
ON MATCH UPDATE (UNREST. RETAIL) (Y) HAVE
DATA
  
```

Figure 28

```

MODIFY FILE SALES
COMPUTE
ACTION=1
PROMPT ACTION PLEASE ENTER DESIRED ACTION (A/C/D)
VALIDATE
GOODACT=IF (ACTION EQ 'A' OR 'D' OR 'C') THEN 1 ELSE 0
ON INVALID TYPE 'ILLEGAL ACTION CODE ENTERED' PLEASE ENTER A/C/D
PROMPT REGION STORE
VALIDATE
OKREG = DECODE REGION (MA 1 NE 1 SE 1 MW 1 ELSE 0)
ON INVALID TYPE 'INVALID REGION CODE' PLEASE CHECK AND RE-ENTER
VALIDATE
OKSTOR = DECODE STORE (STAM 1 NEWY 1 NEWK 1 PIT 1 WASH 1 RICH 1 ATL 1
                    CHIC 1 CLEV 1 DET 1 ELSE 0)
ON INVALID TYPE 'ILLEGAL STORE CODE' PLEASE CHECK AND RE-ENTER
IF ACTION EQ 'A' GOTO ADDSALE ELSE
IF ACTION EQ 'C' GOTO CHNGSALE ELSE
GOTO DELSALE
CASE ADDSALE
PROMPT NAME ADDR1 ADDR2 CITY STATE ZIP
PROMPT ORDERNUM DATE FILLCODE AMOUNT TAX
PROMPT S (PRODNUM QUANTITY)
MATCH REGION STORE NAME ORDERNUM
ON MATCH TYPE 'DUPLICATE ORDER NUMBER FOR THIS STORE'
ON MATCH REJECT
ON NOMATCH INCLUDE
MATCH PRODNUM
ON NOMATCH INCLUDE
ENDCASE
CASE DELSALE
PROMPT NAME ORDERNUM
MATCH REGION STORE NAME ORDERNUM
ON NOMATCH TYPE 'ORDER NUMBER <ORDERNUM NOT ON FILE'
ON NOMATCH REJECT
ON MATCH TYPE 'ORDER NUMBER <ORDERNUM FOR <D> NAME BEING DELETED'
ON MATCH DELETE
ENDCASE
CASE CHNGSALE
PROMPT NAME ORDERNUM
MATCH REGION STORE NAME ORDERNUM
ON NOMATCH TYPE 'ORDER NUMBER <ORDERNUM NOT ON FILE'
ON NOMATCH REJECT
ON MATCH PROMPT ADDR1 ADDR2 CITY STATE ZIP FILLCODE
ON MATCH UPDATE NAME ADDR1 ADDR2 CITY STATE ZIP FILLCODE
ENDCASE
DATA
  
```

PROMPTs are issued for the desired action and the REGION and STORE codes. All replies are validated.

Based on the menu selection, a specific 'case' will be selected. The 'case' contains all the processing logic for the desired function.

Case ADDSALE handles adding a new order to the file.

Case DELSALE will delete a specific order.

Case CHNGSALE permits updating of specific fields in the order.

Figure 29

3270 Screen Development

FIDEL (FOCUS Interactive Data Entry Language) extends the power of the MODIFY facility by enabling you to easily develop formatted 3270 screens for data entry and/or data display. FIDEL permits you to quickly design "logical" screen forms up to 1280 lines long, by simply indicating the desired text, the placement of data entry and data base fields and the positioning of the screen on the terminal.

FIDEL frees you from the burdens of mapping macros, screen linkages, format protocols and other details found in other systems. All these details are replaced with one word, CRTFORM.

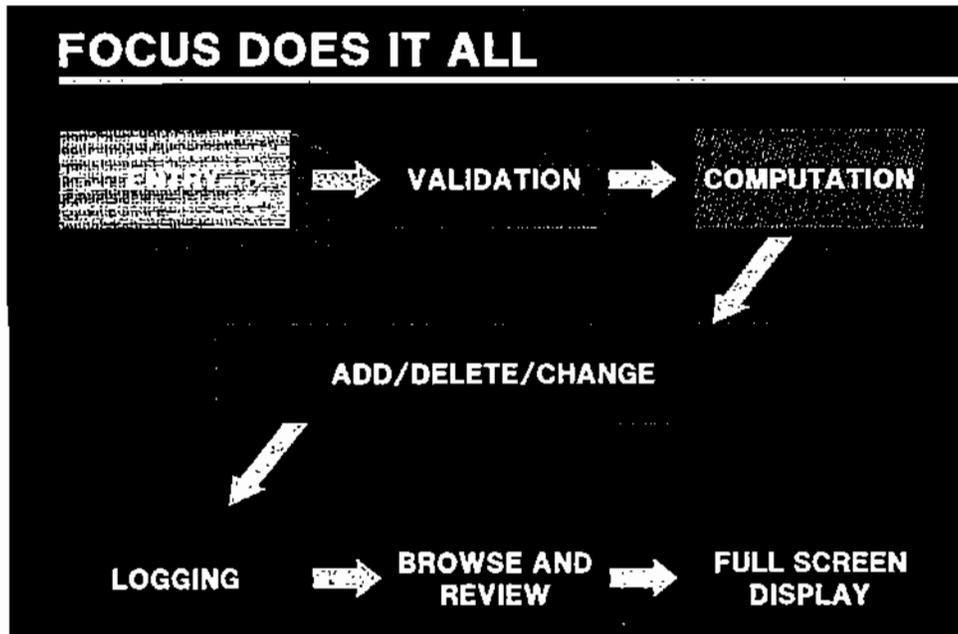
FIDEL's powerful features include:

- Free-form text layout, with spot markers for easy text positioning and alignment
- Full control of all field attributes, including Color, Reverse Video, Blink, Noprint, Intensity and Underline
- Dynamic changing of all field attributes within a procedure
- PF Key assignments
- PF Key scrolling of screen forms larger than the terminal screen
- Multiple screen forms in the same procedure
- Integration with Case Logic for easy development of menu-driven applications
- Display of information in either "protected" or modifiable areas.

In **Figure 30** we have taken the previous prompt-driven procedure from **Figure 29** and transformed it into a 3270 full screen FIDEL application — all done in a matter of minutes!

Figures 31-33 show this application in operation. Notice how the menu is retained in the top area of the screen, while the underlying format changes depending on the menu selection.

Thus, FIDEL lets you easily build complete systems that are flexible, easily documented and easy to maintain.



```

MODIFY FILE SALES
COMPUTE
ACTION/A1 =
CRTFORM LINE 1
***** SALES FILE MAINTENANCE PROCESS *****
"PLEASE SELECT ACTION DESIRED => <ACTION"
"
"ENTER REGION AND STORE CODES: REGION => <REGION"
"                               STORE => <STORE"
VALIDATE
GOODACT = IF (ACTION EQ 'A' OR 'D' OR 'C') THEN 1 ELSE 0
ON INVALID TYPE "ILLEGAL ACTION CODE ENTERED ----- PLEASE ENTER A, C, OR D"
VALIDATE
OKREG = DECODE REGION (MA 1 NE 1 SE 1 MW 1 ELSE 0);
ON INVALID TYPE "INVALID REGION CODE ----- PLEASE CHECK AND RE-ENTER"
VALIDATE
OKSTOR = DECODE STORE (STAM 1 NEWY 1 NEWK 1 PITT 1 WASH 1 RICH 1 ATL 1
                     CHIC 1 CLEV 1 DET 1 ELSE 0);
ON INVALID TYPE "ILLEGAL STORE CODE ----- PLEASE CHECK AND RE-ENTER"
IF ACTION EQ 'A' GOTO ADDSALE ELSE
IF ACTION EQ 'C' GOTO CHNGSALE ELSE
  GOTO DELSALE
CASE ADDSALE
  CRTFORM LINE 7
  " NAME <NAME <70 |
  " ADDRESS 1 <ADDR1 <70 |
  " ADDRESS 2 <ADDR2 <70 |
  " CITY <CITY STATE <STATE ZIP <ZIP <70 |
  "-----ORDER INFORMATION-----"
  " NUMBER <PONUM DATE <DATE FILLCODE <FILLCODE AMT <AMOUNT TAX <TAX <70 |
  " PRODUCT NUMBER <PRODNUM QUANTITY <UNITS <70 |
  "-----"
  MATCH REGION STORE NAME PONUM
  ON MATCH TYPE "DUPLICATE ORDER NUMBER FOR THIS STORE"
  ON MATCH REJECT
  ON NOMATCH INCLUDE
  MATCH PRODNUM
  ON NOMATCH INCLUDE
ENDCASE
CASE DELSALE
  CRTFORM LINE 8
  " FOR DELETION PLEASE SUPPLY ORDER NUMBER AND CUSTOMER NAME"
  " ORDER NUMBER => <PONUM"
  " NAME => <NAME"
  MATCH REGION STORE NAME PONUM
  ON NOMATCH TYPE "ORDER NUMBER <PONUM NOT ON FILE"
  ON NOMATCH REJECT
  ON MATCH TYPE "ORDER NUMBER <PONUM FOR <D. NAME BEING DELETED"
  .ON MATCH DELETE
ENDCASE
CASE CHNGSALE
  CRTFORM LINE 8
  " FOR UPDATE PLEASE SUPPLY ORDER NUMBER AND CUSTOMER NAME"
  " ORDER NUMBER => <PONUM"
  " NAME => <NAME"
  MATCH REGION STORE NAME PONUM
  ON NOMATCH TYPE "ORDER NUMBER <PONUM NOT ON FILE"
  ON NOMATCH REJECT
  ON MATCH CRTFORM LINE 12
  "PLEASE ENTER CHANGES FOR THE FOLLOWING FIELDS"
  " NAME => <NAME"
  " ADDRESS 1 => <ADDR1"
  " ADDRESS 2 => <ADDR2"
  " CITY => <CITY STATE => <STATE ZIP => <ZIP"
  " FILLCODE => >FILLCODE"
  ON MATCH UPDATE NAME ADDR1 ADDR2 CITY STATE ZIP FILLCODE
ENDCASE
DATA VIA FIDEL

```

Figure 30

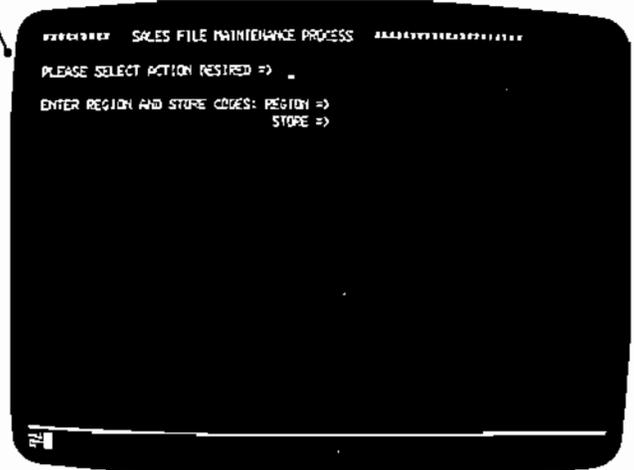


Figure 31

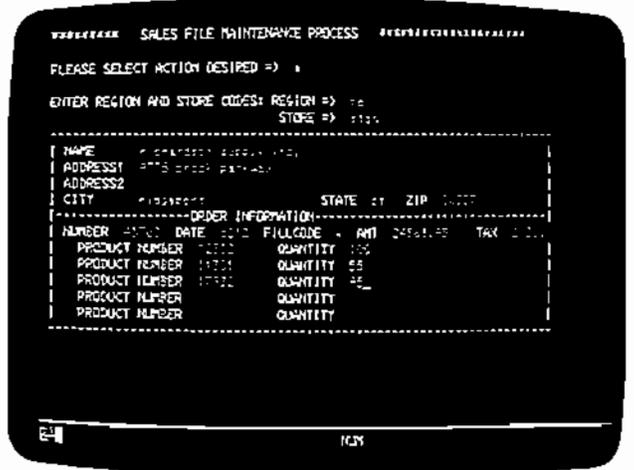


Figure 32

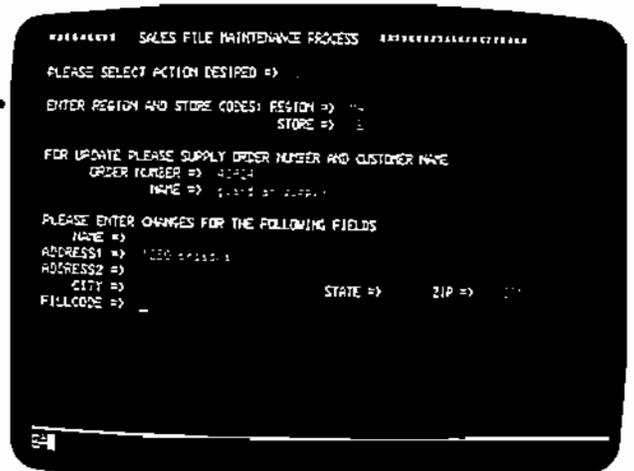


Figure 33

Central Version Database

Simultaneous User Processing

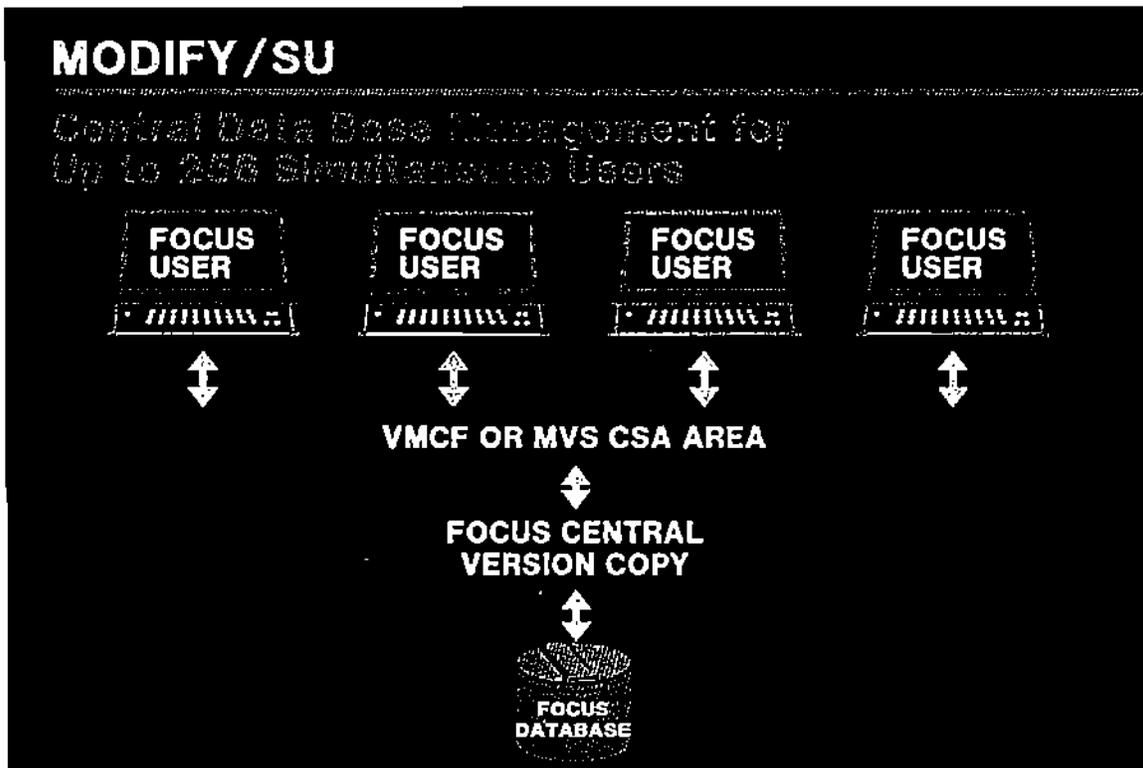
MODIFY/SU is the FOCUS component designed for simultaneous file updating.

It operates with a single copy of FOCUS acting as a central or 'sink' machine into which transaction streams from multiple users are directed. Each user is logged onto a local copy of FOCUS in their own CMS machine or TSO address space.

Communication with the central version is achieved via message packets sent between the local versions and the central machine. A communications path is built for you by issuing a simple USE command that tells FOCUS which file you need.

MODIFY/SU applications use a straightforward 'change/verify' protocol to avoid lockouts for the same records and segments. Your MODIFY procedure specifies what action to take if the record segment you need is currently 'owned' by another user. The same procedure can be used for both local and central operation.

This facility is another example of how, with the addition of a few new commands, the power of the FOCUS language is extended to cover a broad new class of applications.



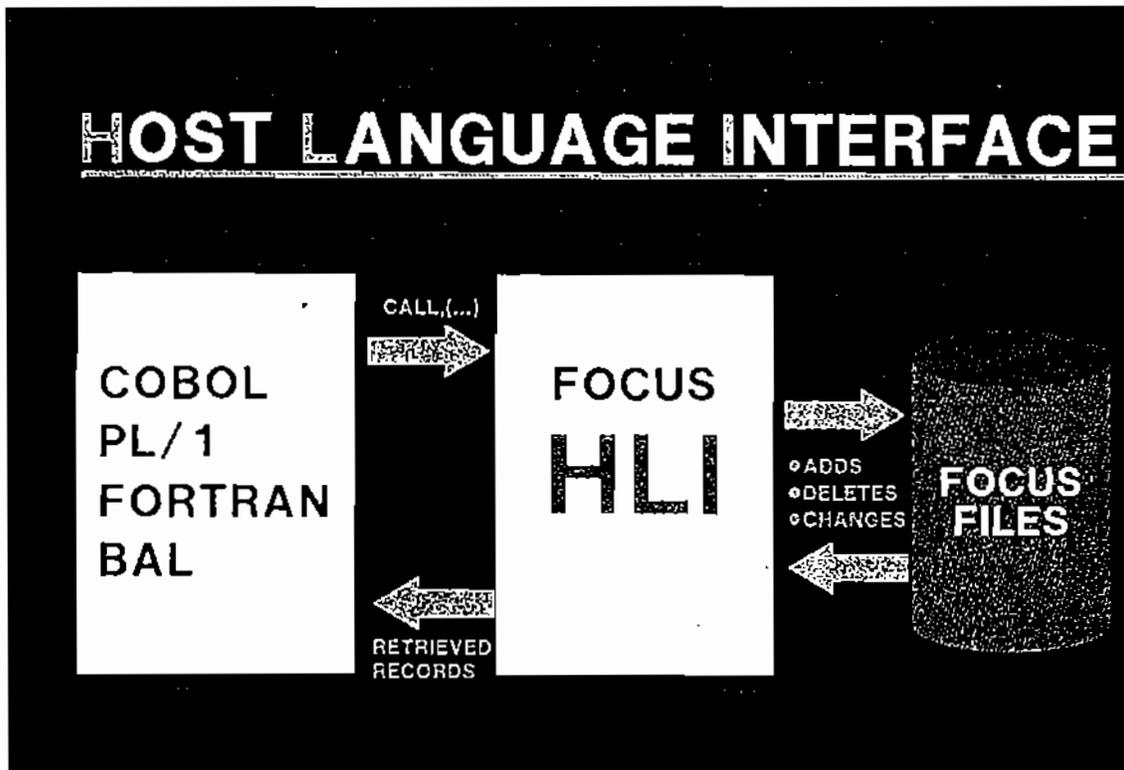
HLI

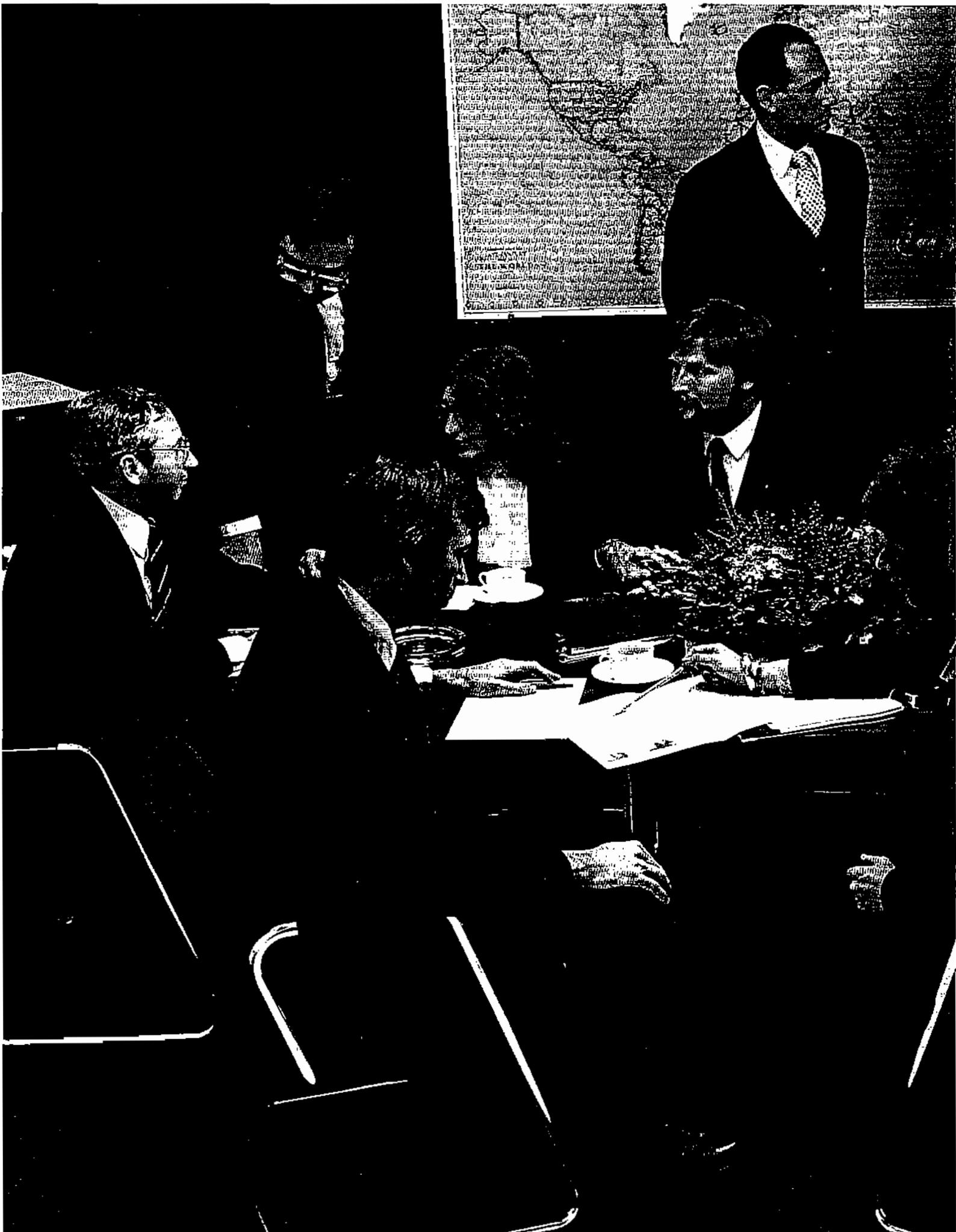
Host Language Interface

The Host Language Interface (HLI) enables programs written in COBOL, FORTRAN, PL/1 or BAL to access and maintain FOCUS data bases.

These programs use standard CALL statements and supply HLI with a series of command codes and arguments to direct the record retrieval and presentation operation. HLI supports the full range of record maintenance functions and all user-defined security for the data base remains in force during HLI operation.

HLI enables you to address those peripheral applications that may require capabilities or functions better suited to traditional programming languages, e.g. extensive computations or reading non-standard transaction files. It is also useful in applications where you need to update multiple data bases and/or non-FOCUS files simultaneously, as well as in situations where multiple transaction input streams are required.





The Company

Information Builders, Inc. is a recognized leader in the development of non-procedural language technology. Founded in 1975, the company has achieved broad based success with FOCUS and related FOCUS services.

The authors of FOCUS pioneered the development of non-procedural language technology in the mid 1960s — and continue to maintain the leading edge in the field.

Our philosophy is simple: We consider our customers partners. Working together we strive to achieve a continually enhanced product so that our customers reap ever increasing benefits from the system.

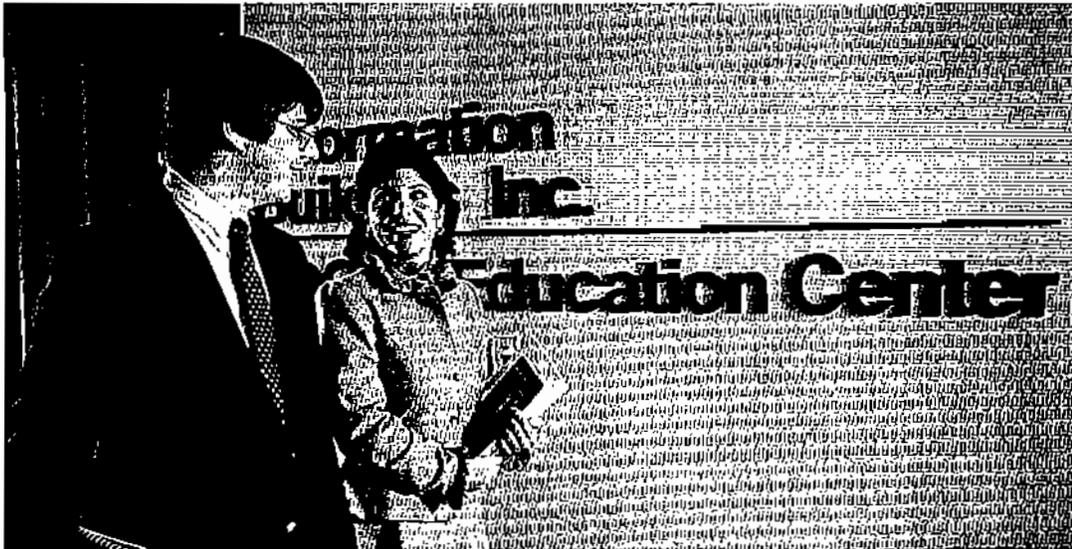
Information Builders, Inc. is a full service company, backing up FOCUS with a complete array of customer support services that include Education, Consulting and Technical Support.

Education

A complete range of educational courses is available covering all phases of FOCUS operation. The primary objective of each course is the acquisition of practical skills that students can put to use immediately within their own organizations.

All courses are taught by highly trained and qualified FOCUS educators. They are conducted either at IBI education centers or on the customer site.

Courses are designed to meet the needs of both the new computer user as well as the skilled DP professional. All courses involve hands-on terminal work with problem sets and exercises to reinforce newly acquired skills and knowledge.



Consulting

A wide range of professional consulting services is available to assist clients in all phases of project development. These services include:

Design Review

A thorough review of the planned design of a proposed FOCUS application with the idea of suggesting improvements to ease implementation and improve operating efficiency.

Implementation Support

Reviews of existing FOCUS applications to revise or improve them.

Turnkey Implementation

Analysis, design, implementation, documentation and training for complete FOCUS applications.

All services are provided by skilled FOCUS consultants with significant experience in the delivery of timely, high-quality consulting services.



Support

FOCUS support is structured into multiple levels to insure you quality service from the point of initial contact through product evaluation and customer status.

Support is provided before and immediately after the sale by technical marketing support representatives located in all IBI field offices. They insure that all phases of product introduction and installation are timely and correct. In addition, they will establish your initial FOCUS training requirements.

Backing up the field technical staff is a trained corporate staff of FOCUS Hot-Line personnel who address any problems that may be encountered by your staff.

Contact with the Hot-Line staff is made through a FOCUS Site Coordinator at your installation. The Site Coordinator acts as a central conduit through which all communications pass. This mechanism insures that problems are identified, weighed and acted upon in an optimal manner.

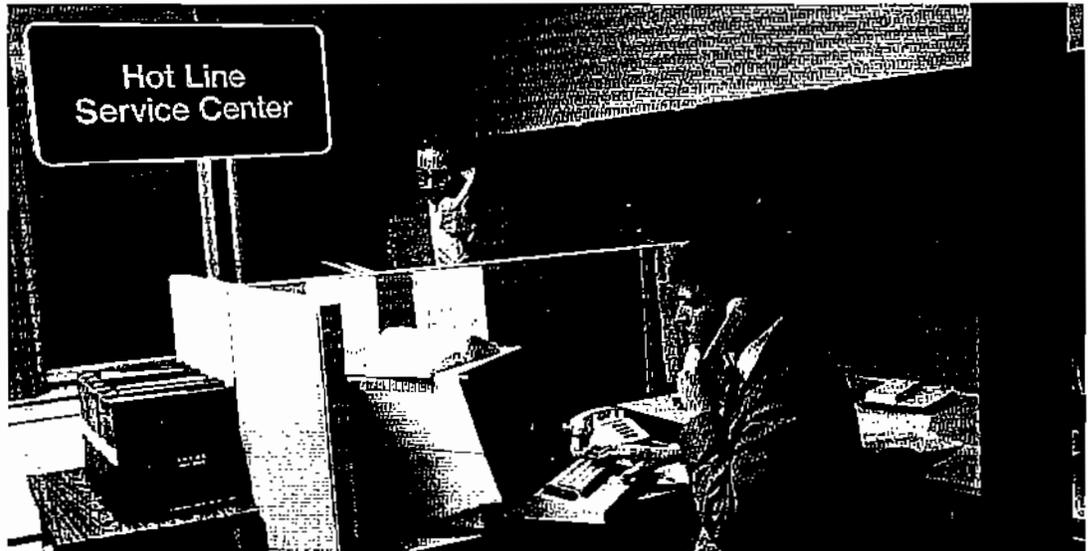
Quality Control

FOCUS is a large and comprehensive system with a well defined new feature and enhancement schedule.

Information Builders is committed to delivering software that is well designed, efficient and thoroughly tested before delivery to our customers.

All aspects of quality control for new and maintenance releases of FOCUS are handled by a separate group that interfaces with the development and support groups. This Quality Assurance Group thoroughly tests all new features and releases. The testing is done on all currently supported releases of the product, in all operating system environments.

The testing not only insures functional correctness but also validates any expected performance improvements — as well as insuring that existing performance levels are maintained.



FOCUS Applications

FOCUS applications are diverse, both in complexity and data base size, and span all industries and functional areas. These areas include:

Accounting	Capital Budget, Expense Accounting, Commitment Accounting, Accounts Receivable and Payable Analysis, Budgeting, Capital Equipment Tracking, Expense Report Tracking, Preparation of Pro-Forma Bills.
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Finance	Financial Reporting and Analysis, Cost Analysis, Commercial Loan Analysis, Option Trading, Loan Delinquency Analysis, Profitability Studies, Market Share Reporting, Budget Preparation, Portfolio Analysis, Properties Administration.
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Personnel	Human Resources Planning, Wage and Salary Administration, Skills Search, EEO Reporting, Manpower Planning, Turnover Analysis, Personnel Directory, Telephone and Mailing Lists, ERISA Reporting.
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Marketing	Demographic Analysis, Subscription Fulfillment, Market Research, Product Market Research, Merchandising Effectiveness Studies, Product Tracking, Market Share Analysis, Exposure Analysis, Advertising Tracking and Analysis, Direct Mail Program.
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Sales	Sales Analysis, Compensation Analysis, Expense Reporting, Customer Profiles, Lead Tracking.
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Manufacturing	Order Analysis, Product Scheduling, Delinquency Analysis, Inventory Control, Order Tracking, Factory Management, Control Systems, Failure Analysis, Quality Control, Change Control, Environmental Data Tracking, Pollution Control Analysis and Reporting.
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Education	Class Scheduling, Tuition/Fee/Salary Management, Institutional Administration, Facilities Management.
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Engineering	Project Control, Product Status and Control, Statistical Analysis of Product Characteristics, Reliability and Yield Analysis, Change Control, Contract Control and Administration.
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Insurance	Policy Administration, Rate Effectiveness Studies, Policy Proposal Reporting, Claims Reporting, Claims Eligibility, New Product Analysis, Rate Escalation.
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