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               SYSTEMS) PACKAGES(U) PRC GOVERNMENT INFORMATION
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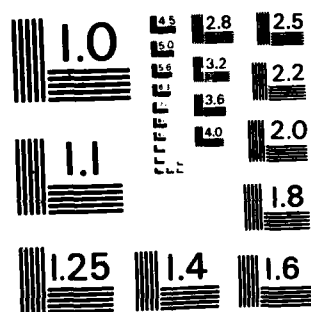
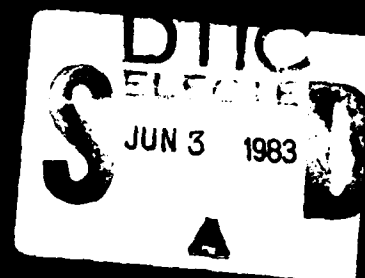UNCLASSIFIED                                        F/G 5/2        NL

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| | | | 3.2 | 2.2 |
| | | | 3.6 | |
| | | | 4.0 | 2.0 |
| | 1.1 | | | 1.8 |
| | 1.25 | 1.4 | | 1.6 |

MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

Comparative Analysis of DBMS PACKAGES

# prc

**PRC Government Information Services**

Comparative Analysis of DBMS PACKAGES

**Prepared for the**

# Defense
# Communications
# Engineering Center

## Under Contract
## DCA100-82-C-0038

MARCH 1983

DTIC

JUN 3   1983

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**PRC Government Information Services**

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| 11. CONTROLLING OFFICE NAME AND ADDRESS<br>Defense Communications Engineering Center<br>1860 Wiehle Avenue (ATTN:  Code R822)<br>Reston, VA 22090 | | 12. REPORT DATE<br>Mar 1983 |
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DBMS

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

An investigation of data base management systems (DBMS) available in commercial market place.  Only those DBMSs meeting certain computer and environmental restraints are included.

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1 JAN 73

An investigation was conducted on the data base management systems (DBMS) available in the commercial market place. The purpose of this investigation was to identify a DBMS for installation at DCEC. The following candidate DBMS packages were identified:

| | | | |
|---|---|---|---|
| 1. | ADABAS | 9. | MODEL 204 |
| 2. | DATACOM/DB | 10. | ORACLE |
| 3. | DRS | 11. | RAMIS II |
| 4. | FOCUS | 12. | RAPPORT |
| 5. | IDMS | 13. | SEED |
| 6. | IMS | 14. | SYSTEM 2000/80 |
| 7. | INFO | 15. | TIS |
| 8. | INQUIRE | | |

After evaluating all packages using the criteria listed in Figure 1-1, it was determined that nine of the fifteen packages met all mandatory requirements. The comparative analysis of all packages is shown in Figure 1-2. The following packages met all mandatory requirements and were investigated in more detail:

| DBMS | Detailed Analysis |
|---|---|
| ADABAS | Figure 2-1 |
| DATACOM/DB | Figure 2-2 |
| FOCUS | Figure 2-3 |
| IDMS | Figure 2-4 |
| INQUIRE | Figure 2-5 |
| MODEL 204 | Figure 2-6 |
| RAMIS II | Figure 2-7 |
| SYSTEM.2000/80 | Figure 2-8 |
| TIS | Figure 2-9 |

The ranking of the packages above was as follows:

The top three were ADABAS, DATACOM/DB and IDMS, not necessarily in that order. These three met more of the desired requirements than any of the other packages. All three had 24 hour hotline service provided for technical support. But, each had trade-offs against the other two, depending upon the weighting of the criteria.

ADABAS required the modification and recompilation of existing
source programs, while DATACOM/DB and IDMS required no changes to
existing programs. DATACOM/DB and IDMS required TP monitor inter-
faces, while ADABAS was compatible with the current system.

The next four were FOCUS, INQUIRE, MODEL 204 and SYSTEM 2000/80
They met most of the desired requirements, but not as many as the
three top rated packages. Order, again depends upon the weighting
of the criteria. All four have limited hotline support. FOCUS,
MODEL 204 and SYSTEM 2000/80 required modification and recompila-
tion of existing source programs, while INQUIRE required no changes
to existing programs. FOCUS had a TOTAL interface and the other
three did not. INQUIRE had no other versions available, while the
other three each had at least one other version available. SYSTEM
2000/80 required some modification to the operating system.

The bottom two packages were RAMIS II and TIS. The met the least
number of requirements. RAMIS II did not have either concurrent
updating or concurrent batch/online activities. It also had a very
limited data dictionary and limited hotline support. TIS required
major manipulation of the current TP monitor facilities and did not
have an online sort capability. No other versions of TIS were
available.

Sources used in this study are listed in Figure 3-1.

DATA BASE MANAGEMENT SYSTEM

MANDATORY REQUIREMENTS

Compatible with Current Environment
     IBM 158-3 or 4341
     MVS/SP (current release)
     Standard IBM Access Method
     Operating System Modifications (minor)
     TP Monitor Impact

Data Integrity/Security
     Error Recovery/Restart Facilities
        (transation level recovery per application)
     Restore/Backup Facilities
     Audit Trail Facilities
     Security at Data Element Level

Comprehensive Package/Product (degree of integration)
     Active Data Dictionary
     On-line Query Facility (with sort, query and file creation
        capabilities)
     High Level Language Interface (Fortran, PL/I)
     Restore/Backup/Error Recovery/Restart Facility
     Teleprocessing Capability
     Report Writer Facility
     Interactive Programming Facility

FIGURE 1-1 DBMS REQUIREMENTS
(Page 1 of 2)

DATA BASE MANAGEMENT SYSTEM

DESIRABLE REQUIREMENTS


Capabilities (ease of use)
    Concurrent Updating
    Concurrent Batch/On-line Activities
    Multiple Views
    Data Independence
    Multiple Keys
    Support Various Data Types (e.g. packed, binary, fixed point,
        floating point, character)
    Single Copy of Data Base
    Active Data Dictionary
    High Level Language Interface (Fortran, PL/I)
    On-line Query (with sort, query and file creation
        capabilities)
    Report Writer Facilities
    Interactive Programming Facilities
    Data Base Design Facilities
    Interface to Other DBMSs (e.g. TOTAL)
    Versions Available for DOS/VSE, Minicomputers (e.g. IBM 4331,
        VAX), and Personal Computers
    Effect on Current Files and Software


Performance
    Data Storage Management
    Favorable Response Time
    Tuning/Reorganization Utilities
    Usage/Performance Statistics (especially writing stats to SMF file)
    Low System Overhead


Vendor Support (Quality, Amount)
    Documentation
    Training
    Installation/Maintenance Support
    Customer Assistance
    Location of Technical Support Staff
    User Organizations


FIGURE 1-1   DBMS REQUIREMENTS
(Page 2 of 2)

| MANDATORY REQUIREMENTS | ADABAS | DATACOM/DB | DRS | FOCUS | IDMS | IMS | INFO | INQUIRE | MODEL 204 |
|---|---|---|---|---|---|---|---|---|---|
| COMPATIBLE WITH CURRENT ENVIRONMENT:<br>IBM 158-3 OR 4341 | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| MVS/SP (CURRENT RELEASE) | YES | YES | NO | YES | YES | YES | NO | YES | YES |
| STANDARD IBM ACCESS METHOD | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| OPERATING SYSTEM MODIFICATIONS | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE |
| TP MONITOR IMPACT | NONE | YES | UNK | NONE | YES | NONE | NONE | NONE | NONE |
| DATA INTEGRITY/SECURITY: | | | | | | | | | |
| ERROR RECOVERY/RESTART FACILITIES<br>(TRANSACTION LEVEL RECOVERY PER<br>APPLICATION)? | YES | YES | YES | YES | YES | YES | NO | YES | YES |
| RESTORE/BACKUP FACILITIES? | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| AUDIT TRAIL FACILITIES? | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| SECURITY AT DATA ELEMENT LEVEL? | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| COMPREHENSIVE PACKAGE/PRODUCT:<br>(DEGREE OF INTEGRATION) | | | | | | | | | |
| ACTIVE DATA DICTIONARY? | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| ON-LINE QUERY FACILITY (WITH SORT,<br>QUERY AND FILE CREATION)? | YES | YES | YES | YES | YES | NO | YES | YES | YES |
| HIGH LEVEL LANGUAGE INTERFACE? | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| RESTORE/BACKUP/ERROR RECOVERY/<br>RESTART FACILITY? | YES | YES | YES | YES | YES | YES | NO | YES | YES |
| TELEPROCESSING CAPABILITY? | YES | YES | NO | YES | YES | YES | NO | YES | YES |
| REPORT WRITER FACILITY? | YES | YES | YES | YES | YES | NO | YES | YES | YES |
| INTERACTIVE PROGRAMMING FACILITY? | YES | YES | YES | YES | YES | YES | YES | YES | YES |

FIGURE 1-2   DBMS Comparative Analysis
(Page 1 of 3)

| FOCUS | IDMS | IMS | INFO | INQUIRE | MODEL 204 | ORACLE | RAMIS II | RAPPORT | SEED | SYSTEM 2000 | TIS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| YES | YES | YES | NO | YES | YES | NO | YES | YES | YES | YES | YES |
| YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE | YES | NONE |
| NONE | YES | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE | NONE | YES |
| YES | YES | YES | NO | YES | YES | YES | YES | YES | NO | YES | YES |
| YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| YES | YES | YES | YES | YES | YES | YES | YES | NO | YES | YES | YES |
| YES | YES | YES | YES | YES | YES | YES | YES | YES | NO | YES | YES |
| YES | YES | YES | YES | YES | YES | YES | YES | LIMITED | YES | YES | YES |
| YES | YES | NO | YES | YES | YES | YES | YES | YES | YES | YES | YES (INC. |
| YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| YES | YES | YES | NO | YES | YES | YES | YES | YES | NO | YES | YES |
| YES | YES | YES | NO | YES | YES | NO | YES | NO | NO | YES | YES |
| YES | YES | NO | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |

JRE 1-2   DBMS Comparative Analysis
          (Page 1 of 3)

2

| DESIRED REQUIREMENTS | ADABAS | DATACOM/DB | DRS | FOCUS | IDMS | IMS | INFO | INQUIRE | MODEL 204 | ORACLE |
|---|---|---|---|---|---|---|---|---|---|---|
| **CAPABILITIES (EASE OF USE):** | | | | | | | | | | |
| CONCURRENT UPDATING? | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| CONCURRENT BATCH/ON-LINE ACTIVITIES? | YES | YES | YES | YES | YES | YES | NO | YES | YES | YES |
| MULTIPLE VIEWS OF DATA BASE? | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| DATA INDEPENDENCE? | ELEMENT LVL | ELEMENT LVL | YES | YES | ELEMENT LVL | YES | YES | ELEMENT LVL | ELEMENT LVL | YES |
| MULTIPLE KEYS? | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| DEGREE OF INTEGRATION? | TOTALLY | TOTALLY | FAIRLY WELL | YES | TOTALLY | SOME WHAT | TOTALLY | TOTALLY | TOTALLY | TOTALLY |
| SUPPORT VARIOUS DATA TYPES: B-BINARY, C-CHAR STRING, F-FIXED PT, L-FLOATING PT, P-PACKED | B,C,F,L,P | B,C,F,L,P | C,F,L | B,C,F,L,P | B,C,F,L,P | B,C,F,L,P | B,C,F,L,P | B,C,F,L,P | B,C,P L VIA MANIPULATION | B,C,F,L,P |
| SINGLE COPY OF DATA BASE? | OPTIONAL | OPTIONAL | YES | YES | YES | YES | OPTIONAL | YES | YES | YES |
| ACTIVE DATA DICTIONARY? | YES | YES | YES | YES | YES | YES | YES | EDICT | YES | YES |
| HIGH LEVEL LANGUAGE INTERFACE: B-BASIC, C-COBOL, F-FORTRAN, P-PLI, S-PASCAL | F,C,P | ANY LANG. WITH CALL | B,C,F,P,S | C,F,P | C,F,P,S | C,P | C,F,P | C,F,P | C,F,P | B,C,F,P,S |
| ON-LINE QUERY FACILITY (WITH SORT, QUERY AND FILE CREATION)? | ADASCRIPT | DATAQUERY | YES | YES | ONLINE QUERY ONLINE ENQL | NO | YES | PROVIDED BY USER LANGUAGE | PROVIDED BY USER LANGUAGE | SQL |
| REPORT WRITER FACILITY? | ADACOM | DATAREPORTER | RPW II | YES | CULPRIT | NO | YES | | | RPT WRITER |
| INTERACTIVE PROGRAMMING FACILITY? | NATURAL | ADR/IDEAL | YES | YES | INTERACT | YES | YES | | | YES |
| DATA BASE DESIGN FACILITIES? | YES | DATADESIGNER | NO | NO | OUT SHORTLY | YES | NO | | | NO |
| INTERFACE TO OTHER DBMS: A-ADABAS, D-DATACOM/DB, I-IMS, M-IDMS, T-TOTAL | T | T-DIRECT, INTERFACE OTHERS THRU EXTRACT PROC | NO | A,I,M,T | I,T | NO | NO | NO | NO | NO |
| **VERSIONS AVAILABLE:** DOS/VSE | YES | YES | YES | NO | YES | SUBSET IMS | END OF YR | NO | YES | NO |
| MINICOMPUTER: I-IBM 4331, P-PDP 11/70, V-VAX | P,V | I COMING | I,P,V | NO | NO | NO | V | NO | NO | I,P,V |
| PERSONAL COMPUTERS? | NO | COMING | COMING | YES | YES | NO | NO | NO | NO | YES |
| EFFECT ON CURRENT FILES AND SOFTWARE? | PROGRAMS MOD USING INTERFACE TO NEW FILE DESC | NO CHANGE | NO CHANGE | MODIFY & RECOMPILE | NO CHANGE | MODIFY & RECOMPILE | NO CHANGE | NO CHANGE | MODIFY & RECOMPILE | MODIFY & RECOMPILE |

FIGURE 1-2  DBMS Comparative Analysis
(Page 2 of 3)

| FOCUS | IDMS | IMS | INFO | INQUIRE | MODEL 204 | ORACLE | RAMIS II | RAPPORT | SEED | SYSTEM 2000 | TIS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | YES | YES | YES | YES | YES | YES | NO | YES | NO | YES | YES |
| YES | YES | YES | NO | YES | YES | YES | NO | YES | YES | YES | YES |
| YES | YES | YES | YES | YES | YES | YES | YES | NO | YES | YES | YES |
| YES | ELEMENT LVL | YES | YES | ELEMENT LVL | ELEMENT LVL | YES | YES | YES | RECORD LVL | ELEMENT LVL | ELEMENT LVL |
| YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| YES | TOTALLY | SOME WHAT | TOTALLY | TOTALLY | TOTALLY | TOTALLY | TOTALLY | TOTALLY | TOTALLY | TOTALLY | TOTALLY |
| B,C,F,L,P | B,C,F,L,P | B,C,F,L,P | B,C,F,L,P | B,C,F,L,P | B,C,P L VIA MANIPULATION | B,C,F,L,P | B,C,F,L,P | B,C,F,P | C,F,L,P | C,F,P | B,C,F,L |
| YES | YES | YES | OPTIONAL | YES | YES | YES | OPTIONAL | YES | YES | OPTIONAL | YES |
| YES | YES | YES | YES | EDICT | YES | YES | LIMITED | LIMITED | YES | IDD | YES |
| C,F,P | C,F,P,S | C,P | C,F,P | C,F,P | C,F,P | B,C,F,P,S | C,F,P | C,F,S | C,F | C,F,P | C,F,P |
| YES | ONLINE QUERY ONLINE ENGL | NU | YES | PROVIDED BY USER LANGUAGE | PROVIDED BY USER LANGUAGE | SQL | YES | YES | HARVEST | QUEST | QUERY - NO ONLINE SORT |
| YES | CULPRIT | NC | YES | | | RPT WRITER | YES | PROVIDED BY ONLINE QUERY | BLOOM | RPT WRITER | YES |
| YES | INTERACT | YES | YES | | | YES | YES | | GARDEN | PLEX | MANTIS |
| NO | OUT SHORTLY | YES | NO | | | NO | YES | NO | NO | IDD | NO |
| A,I,M,T | I,T | NO | NO | NO | NO | NO | A,I,M,T | NO | NO | NO | T I COMING '83 |
| NO | YES | SUBSET IMS | END OF YR | NO | YES | NO | YES | NO | NO | YES | LATE 1983 |
| NO | NO | NO | V | NO | NO | I,P,V | NO | I,V | I,P,V | NO | NO |
| YES | YES | NO | NO | NO | NO | YES | NO | YES | YES | NO | COMING |
| MODIFY & RECOMPILE | NO CHANGE | MODIFY & RECOMPILE | NO CHANGE | NO CHANGE | MODIFY & RECOMPILE | MODIFY & RECOMPILE | NO CHANGE | MODIFY & RECOMPILE | MODIFY & RECOMPILE | MODIFY & RECOMPILE | NO CHANGE |

FIGURE 1-2   DBMS Comparative Analysis
(Page 2 of 3)

| DESIRED REQUIREMENTS (CONT'D) | ADABAS | DATACOM/DB | DRS | FOCUS | IDMS | IMS | INFO | INQUIRE | MODEL 204 | O |
|---|---|---|---|---|---|---|---|---|---|---|
| **PERFORMANCE:** | | | | | | | | | | |
| DATA STORAGE MANAGEMENT? | ALLOWS FOR GROWTH W/O REORG | MINIMUM REORG | SIMPLE, UNCOMPLEX | UNK | NO PERIODIC REORG | CUMBERSOME | UNK | UNK | UNK | |
| FAVORABLE RESPONSE TIME? | YES | YES | UNK | YES | YES | NO | YES | YES | YES | |
| TUNING/REORGANIZATION UTILITIES? | YES | YES | UNK | YES | YES | YES | UNK | YES | YES | |
| USAGE/PERFORMANCE STATISTICS (ESP. WRITING STATS TO SMF FILE)? | YES | EXTENSIVE MAY MERGE WITH SMF | YES | SOME | CREATES & USES SMF REC | YES (YES) | YES | YES (NO) | YES (YES) | |
| LOW SYSTEM OVERHEAD? | 500K | 80K + | 500K | 600K | 500K | 384K + | 750K | 300K | 700K | |
| **VENDOR SUPPORT (QUALITY, AMOUNT):** | | | | | | | | | | |
| # SOFTWARE SURVEY (SCALE 1:10): OVERALL SATISFACTION: | 8.0 | 7.2 | | | 7.9 | 7.7 | | | | |
| INSTALLATION/INITIAL USE: | 8.0 | 6.7 | | | 7.4 | 6.1 | | | | |
| SERVICE: | 7.3 | 6.5 | | | 7.5 | 7.6 | | | | |
| OPERATIONS: | 7.7 | 7.4 | | | 7.8 | 7.7 | | | | |
| DOCUMENTATION (COVERED IN SURVEY) | | | | | | | | | | |
| TRAINING? | 5 DAYS DBA 4 DAYS ON SITE | 5 DAYS | 5 DAYS | 3 DAYS/ 15 PEOPLE | ON SITE/ VIDEO | TRAINING EXTRA | 2 DAYS | 4 DAYS ON SITE | 5 DAYS | 2 C EACH |
| INSTALLATION/ MAINTENANCE SUPPORT? | 1 DAY MAINT 1 YR 10% CURRENT PRICE AFTER | 1-7 DAYS MAINT 1 YR PRICE AFTER | 1-2 HR MAINT 2 YR INCLUDED | 1 HR UNK | 1-3 DAYS MAINT 1 YR 10% LICENSE FEE AFTER | 1 DAY MAINT INCLUDED IN LEASE | 5 MIN MAINT 1 YR 12% OF PURCH AFTER | 1/2 DAY CONTRACT | 1 DAY MAINT 1 YR 9% CURRENT PRICE AFTER | MAI 10% AL |
| CUSTOMER ASSISTANCE? | 24HR HOTLINE | 24HR HOTLINE | BUSINESS 9-6 HOTLINE | BUSINESS 9-6 HOTLINE | 24HR HOTLINE LOCAL TECH SUPPORT | UNK | BUSINESS 9-7 HOTLINE | BUSINESS 9-8 HOTLINE | BUSINESS 9-8 HOTLINE | BU 9:3 |
| LOCATION OF TECHNICAL SUPPORT STAFF? | RESTON, VA | VIENNA, VA | KINGSTON, NJ | ROSSLYN, VA | FALLS CHURCH VA | BETHESDA, MD | WALTHAM, MA | FALLS CHURCH VA | ROSSLYN, VA | BE |
| USER ORGANIZATIONS? | YES | YES | YES | YES | YES | YES | YES | YES | YES | |

FIGURE 1-2   DBMS Comparative Analysis
(Page 3 of 3)

| | FOCUS | IDMS | IMS | INFO | INQUIRE | MODEL 204 | ORACLE | RAMIS II | RAPPORT | SEED | SYSTEM 2000 | TIS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IMPLE, COMPLEX | UNK | NO PERIODIC REORG | CUMBERSOME | UNK | UNK | UNK | UNK | UNK | UNK | UNK | DATA STORED IN COMPRESS- ED FORM | UNK |
| UNK | YES | YES | NO | YES | YES | YES | YES | YES | UNK | UNK | YES | YES |
| UNK | YES | YES | YES | UNK | YES | YES | YES | YES | YES | YES | YES | YES |
| YES | SOME | CREATES & USES SMF REC | YES (YES) | YES | YES (NO) | YES (NO) | SOME (YES) | YES | YES (NO) | YES (UNK) | YES (NO) | LIMITED |
| 500K | 600K | 500K | 384K + | 750K | 300K | 700K | 500K | 512K + | 150K | 350K + | VARIES | VARIES |
| | | 7.9 | 7.7 | | | | | | 6.9 | | | 6.2 | |
| | | 7.4 | 6.1 | | | | | | 7.4 | | | 6.6 | |
| | | 7.5 | 7.6 | | | | | | 6.4 | | | 6.3 | |
| | | 7.8 | 7.7 | | | | | | 6.4 | | | 6.4 | |
| DAYS | 3 DAYS/ 15 PEOPLE | ON SITE/ VIDEO | TRAINING EXTRA | 2 DAYS | 6 DAYS ON SITE | 5 DAYS | 2 COURSES EACH 3 DAYS | 10 DAYS | 3 DAYS | 5 DAYS/ 12 PEOPLE | VARIES | 4 WEEKS |
| 2 HR IT 2 YR CURRENT LUDED | 1 HR UNK | 1-3 DAYS MAINT 1 YR 10% LICENSE FEE AFTER | 1 DAY MAINT INCLUDED IN LEASE | 5 MIN MAINT 1 YR 12% OF PURCH AFTER | 1/2 DAY CONTRACT | 1 DAY MAINT 1 YR 9% CURRENT PRICE AFTER | 1 DAY MAINT 1 YR 10% PERPETU- AL LICENSE | 1-2 HR MAINT 1 YR 10% LICENSE FEE AFTER | 1 DAY MAINT 1 YR 7% CURRENT PRICE AFT1 | 1 DAY MAINT 1 YR 1?% CURRENT PRICE AFTER | 1 DAY MAINT 1 YR CONTRACT AFTER | 1 HR CONTRACT |
| INES3 HOTLINE | BUSINESS 8-6 HOTLINE | 24HR HOTLINE LOCAL TECH SUPPORT | UNK | BUSINESS 8-7 HOTLINE | BUSINESS 8-8 HOTLINE | BUSINESS 8-8 HOTLINE | BUSINESS 8:30-8:30 | BUSINESS 7-8 HOTLINE | BUSINESS 8-7 HOTLINE | BUSINESS 8-9 HOTLINE | BUSINESS 8-7 HOTLINE | 24HR HOTLINE |
| STON, | ROSSLYN, VA | FALLS CHURCH VA | BETHESDA, MD | WALTHAM, MA | FALLS CHURCH VA | ROSSLYN, VA | BETHESDA, MD | WASHINGTON, DC | NEW YORK, NY | FALLS CHURCH VA | SILVER SPRNG MD | FAIRFAX, VA |
| ES | YES | YES | YES | YES | YES | YES | YES | YES | NO | YES | YES | YES |

FIGURE 1-2   DBMS Comparative Analysis
(Page 3 of 3)

The software survey (DATAMATION DEC82) was based on a forth-coming report in Data Decisions' Software Service.  The ratings represent the following:

OVERALL SATISFACTION encompasses:
    satisfaction with package features, capabilities, and
        utility with respect to user requirements
    frequency of failures requiring extra effort for recovery
    vendor installation, documentation, modification and
        training support


INSTALLATION and INITIAL USE represents composite including:
    freedom from bugs/errors
    time required for initial installation
    ease of implementation
    quality of documentation and training


VENDOR SERVICE guages:
    vendor's speed and thoroughness in fixing bugs/errors
    quality of vendor modifications
    frequency of package updating


OPERATIONS measure of:
    package's ability to handle expanding processing volumes
    evaluation of initiation/calling and backup/recovery
        procedures



SCALE 1:10

        Superior    -   10 to 9
        Very good   -    8 to 6
        Acceptable  -    5 to 4
        Not graphed -    3 to 0







FIGURE 1-3  Software Survey

| *** MANDATORY REQUIREMENTS *** | ADABAS - SOFTWARE AG OF NORTH AMERICA |
|---|---|
| ERROR RECOVERY/RESTART, SECURITY: | THE ERROR RECOVERY/RESTART FACILITIES ARE TAILORED BY THE DBA. THE BACKUP RECOVERY AND DATA SECURITY FACILITIES ARE RATED EXCELLENT. THE SECURITY FEATURES ARE AMONG THE BEST FOUND ANYWHERE. UP TO 15 LEVELS OF SECURITY CAN BE SPECIFIED TO INHIBIT UNAUTHORIZED ACCESSING AND UPDATING OF DATA DOWN TO THE FIELD LEVEL. ADABAS ALSO CIPHERS THE DATA BEFORE STORAGE. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): MULTIPLE VIEWS OF DATA BASE: | VIEWS OF THE DATA BASE MAY BE USER DEFINED. |
| ON-LINE QUERY FACILITY: | ADASCRIPT INQUIRY LANGUAGE CAN BE LEARNED BY NONPROGRAMMERS AFTER ONE HOUR OF TRAINING, ACCORDING TO THE VENDOR. |
| REPORT WRITER FACILITY: | ADACOM ALLOWS BATCH GENERATION OF REPORTS. AN ADACOM REPORT IS GENERATED BASED UPON THE NATURAL LANGUAGE REPORT REQUEST, THE FILE AND FIELD DESCRIPTIONS IN THE ADACOM DIRECTORY, THE OPTIONS AND RESERVED WORDS IN THE ADACOM SITE DECK, AND THE ADACOM OPTIONS DEFAULTS. |
| INTERACTIVE PROGRAMMING FACILITY: | NATURAL IS A POWERFUL, NATURAL LANGUAGE THAT PROVIDES END USERS AND PROGRAMMERS WITH A DATA COMMUNICATIONS LANGUAGE CAPABLE OF INQUIRING, REPORTING AND UPDATING ADABAS DATA BASES. IT SUPPORTS FULL LOGICAL RELATING OF DATA AS WELL AS LOOPING AND ITERATIONS: ITS DESIGN ALLOWS STRUCTURAL PROGRAMMING IN THE USER'S NATIVE LANGUAGE. A FULL BROWSE FUNCTION IS SUPPORTED AS WELL AS FULL ARITHMETIC CAPABILITIES AND EXPONENTIATION. |
| INTERFACE TO OTHER DBMS: | ADABAS CAN BE INTERFACED WITH TOTAL BY USING INTERMEDIATE WORK FILES. |
| PERFORMANCE: | OUT OF 39 USERS RESPONDING TO THE SOFTWARE SURVEY, 62% JUDGED THE FEATURES/CAPABILITIES OUTSTANDING: 3% WERE CONSIDERING REPLACEMENT WITH 0% DUE TO UNSATISFACTORY PERFORMANCE. |
| ANALYSIS: TYPE: | INVERTED LIST WITH QUASI-RELATIONAL FEATURES: HOST-LANGUAGE DRIVEN |
| STRENGTHS: | STRENGTHS ARE FULLY INVERTED FILE STRUCTURE: ABILITY TO ACCOMMODATE VERY LARGE DATA BASES: DATA COMPRESSION FACILITY: AND DATA INDEPENDENCE TO THE INDIVIDUAL ITEM LEVEL. THE MAJOR FEATURE IN THE SYSTEM'S FAVOR IS ITS USE OF FULLY INVERTED FILES. WITH THIS FILE STRUCTURE, RECORD ADDRESS CAN BE CALCULATED DIRECTLY FROM THE VALUES IN THE INDEX(ES). NO CHAIN CHASING IS INVOLVED. THE ADABAS ASSOCIATION INDEX, WHICH IS DIVIDED INTO BLOCKS, ALSO SPEEDS SEARCHES. WITH THE RIGHT BLOCK LOADED, ALL SEARCHES CAN BE MADE IN CORE AND A LIST OF INTERNAL SEQUENCE NUMBERS (ISN) CAN BE ASSEMBLED. EACH RECORD CAN THEN BE RETRIEVED DIRECTLY USING ITS ISN. <br><br> THE ADABAS SYSTEM'S COMPRESSION ROUTINES ELIMINATE THE LEADING ZEROS FROM NUMERIC DATA AND TRAILING BLANKS FROM ALPHANUMERIC FIELDS. FOR MOST BUSINESS APPLICATIONS, SUCH COMPRESSION CAN RESULT IN TREMENDOUS AUXILIARY STORAGE SAVINGS (AS MUCH AS 25 %, ACCORDING TO THE VENDOR). <br><br> USERS PRAISED ADABAS FOR ITS ELEMENT-LEVEL INDEPENDENCE. NOT ONLY IS ACCESS (AND SECURITY) POSSIBLE AT THE ELEMENT LEVEL, BUT, FILE REORGANIZATION IS NOT USUALLY REQUIRED WHEN A NEW FIELD TYPE MUST BE ADDED TO A RECORD TYPE. THE ABILITY OF ADABAS TO ACCOMMODATE VERY LARGE DATA BASES IS GREATLY ENHANCED BY THIS INHERENT FLEXIBILITY FOR GROWTH WITHOUT THE NEED FOR DIFFICULT AND TIME-CONSUMING REORGANIZATIONS. <br><br> A VERY USEFUL FEATURE OF ADABAS IS THE WAY IN WHICH THE RELATIONS AMONG RECORDS CAN BE SPECIFIED TO ATTAIN NETWORK CAPABILITY. RECORDS IN EACH FILE CAN BE LOGICALLY COUPLED TO ANY NUMBER OF RECORDS IN UP TO 80 OTHER FILES. THE COUPLING RELATIONSHIPS ARE DEFINED AFTER INITIAL FILE LOADING. |

FIGURE 2-1   ADABAS Detailed Analysis

| *** MANDATORY REQUIREMENTS *** | DATACOM/DB  -  APPLIED DATA RESEARCH (ADR) |
| --- | --- |
| TP MONITOR IMPACT: | DATACOM/DB REQUIRES DATACOM/DC. CICS OR TSO WITH LIBRARIAN. |
| AUDIT TRAIL FACILITIES: | DESCRIBED BY VENDOR AS EXTENSIVE. |
| ERROR RECOVERY/RESTART: | A CHECKPOINT/RESTART CAPABILITY IS PROVIDED FOR SOFTWARE OR DATA ERRORS, AND A SPECIAL UTILITY IS PROVIDED FOR RESTART WITH SUCH HARDWARE PROBLEMS AS A DISK-HEAD CRASH.  LOGGING CAPABILITIES ARE PROVIDED FOR ROLL-FORWARD OR ROLL-BACKWARD RECOVERY TECHNIQUES. |
| | THE RESTORE/BACKUP/ERROR RECOVERY/RESTART FACILITY IS DATACOM/DB'S STRONGEST FEATURE, ACCORDING TO THE VENDOR. |
| SECURITY: | ALSO AVAILABLE WITH DATACOM/DB IS DATASECURE, A FEATURE THAT PROVIDES DATA BASE SECURITY THROUGH THE USE OF THE DES ENCRYPTION/DECRYPTION ALGORITHMS. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): MULTIPLE VIEWS OF DATA BASE: | MULTIPLE VIEWS OF THE DATA BASE CAN BE USER DEFINED, BUT THE VENDOR RECOMMENDS THAT ALL DATA BASE VIEWS BE DEFINED BY THE DBA. |
| MULTIPLE KEYS: | THE USER CAN DEFINE ANY NUMBER OF UNIQUE KEYS OR SEARCH ARGUMENTS.  THE SYSTEM SUPPORTS UP TO 255 UNIQUE KEY DEFINITIONS PER DATA BASE. |
| ACTIVE DATA DICTIONARY: | ADR DATADICTIONARY PERMITS THE ESTABLISHMENT OF ANY DEFINITIONS, SPANNING AND GROUPING THE INFORMATION ELEMENTS INTO WAYS THAT ARE MEANINGFUL TO A SPECIFIC ENVIRONMENT. DATADICTIONARY ALSO ACCEPTS NON-DATA-BASE INFORMATION AND ALLOWS UNLIMITED TEXT STORAGE. |
| ON-LINE QUERY FACILITY: QUERY AND FILE CREATION): | DATAQUERY IS A SIMPLE AND STRAIGHTFORWARD QUERY LANGUAGE THAT ALLOWS SORTING ON ANY NUMBER OF FIELDS FROM ANY COMBINATION OF RECORDS WHICH HAVE BEEN QUALIFIED BY THE QUERY.  FILE CREATION CAN BE ACCOMPLISHED THROUGH THE USE OF DATAQUERY'S RECORD COLLECTION FACILITY WHICH MAKES IT POSSIBLE TO STORE RESULTS OF A QUERY. |
| REPORT WRITER FACILITY: | DATAREPORTER IS A FILE RETRIEVAL AND REPORTING SYSTEM THAT LETS PROGRAMMERS AND END USERS ACCESS AND REPORT ON DATA CONTAINED IN DATACOM/DB DATA BASES AND CONVENTIONAL FILES.  IT HAS SIMPLE ENGLISH-LIKE COMMANDS AND FREE-FORM SYNTAX.  IT ALSO INCLUDES INTERNAL DATA MANIPULATION, SORTING AND COMPREHENSIVE REPORT FORMATS. |
| INTERACTIVE PROGRAMMING FACILITY: | ADR/IDEAL INCLUDES THE FOLLOWING:  POWERFUL COMMAND LANGUAGE FOR EXPERIENCED USER, ONLINE 'HELP' FACILITIES, SPLIT-SCREEN CAPABILITY FOR VIEWING, OR PERFORMING, TWO OR MORE RELATED ACTIVITIES SIMULTANEOUSLY, SUPPORTING SERVICES, 'INTELLIGENT' EDITORS SENSITIVE TO SYNTAX, ONLINE CHECKOUT, COMPILATION, DEBUGGING AND EXECUTION, CENTRAL DATA DICTIONARY, SECURITY AND COMPLETE INTERACTIVE CONTROL. |
| DATA BASE DESIGN FACILITIES: | DATA DESIGNER (OUT SHORTLY) AUTOMATES AND SIMPLIFIES DATA BASE DESIGN BY PRODUCING CONCEPTUAL DATA MODELS FOR DATACOM/DB FROM INFORMATION IN DATADICTIONARY. |
| PERFORMANCE: | OUT OF 20 USERS RESPONDING TO THE SOFTWARE SURVEY, 40% JUDGED THE FEATURES/CAPABILITIES OUTSTANDING! 5% WERE CONSIDERING REPLACEMENT WITH 0% DUE TO UNSATISFACTORY PERFORMANCE. |

FIGURE 2-2  DATACOM/DB Detailed Analysis

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:   DATACOM/DB  -  APPLIED DATA RESEARCH   (CONT'D)
-------------------------------:----------------------------------------------------------------------
ANALYSIS:                      :
   TYPE:                       : INVERTED LIST WITH QUASI-RELATIONAL FEATURES; TABLE DRIVEN FILE CREATION AND ACCESS
                               : CONCEPTUAL DATA MODELS FOR DATACOM/DB FROM INFORMATION IN DATADICTIONARY.
   STRENGTHS:                  : STRENGTHS ARE FAST ACCESS; EFFICIENCY OF OPERATION; AND EASE OF ADDING OR DELETING
                               : RECORDS.  THE COMBINATION OF FULLY INVERTED FILES WITH FULL REENTRANCY PLACES DATACOM/DB
                               : AMONG INDUSTRY LEADERS IN TERMS OF SPEED AND EFFICIENCY.  ALSO, DATACOM/DB'S USE OF
                               : MULTIPLE INDEXES AND ITS DATA COMPRESSION TECHNIQUES REDUCE STORAGE REQUIREMENTS,
                               : RESULTING IN ECONOMY OF OPERATION.
                               :
                               : ANOTHER ADVANTAGE OF INVERTED FILES IS THE EASE WITH WHICH RECORDS CAN BE ADDED OR
                               : DELETED.  ANY CHANGES TO THE DATA BASE CONTENTS NEED ONLY BE REFLECTED IN THE INDEX;
                               : THE ENTIRE DATA BASE NEED NOT BE REORGANIZED TO RESET POINTERS.  TO AVOID EXCESSIVE
                               : ADDITIONS THAT COULD RESULT IN FRAGMENTED INDEXES REQUIRING RESTRUCTURING, DATACOM/DB
                               : SPECIFICALLY MINIMIZES SUCH OVERFLOW EFFECTS BY SUPPLYING USER OPTIONS WHICH ESTABLISH
                               : THE NUMBER OF OVERFLOWS BEFORE A FULL BLOCK IS ALLOCATED FOR ADDITIONS.  WHILE THIS
                               : IS AN OVERHEAD OPERATION, IT IS FELT THAT THE SPEED AND FLEXIBILITY OFFERED BY FULLY
                               : INVERTED FILES IS WORTH IT.  CONSEQUENTLY, NO RECODING OR RECOMPILATION OF APPLICATIONS
                               : IS NECESSARY WHEN THE DATA BASE IS CHANGED.
                               :
                               : A GOOD FACILITY FOR CONSTRUCTING MULTIPLE DATA PATHS IS PROVIDED BY THE LOGICAL ACCESS
                               : METHODS: DIRECT, SEQUENTIAL, AND RANDOM BY ANY DEFINED KEY.  THE FIELD-LEVEL
                               : ADDRESSING PROVIDES A HIGH LEVEL OF DATA INDEPENDENCE AND SECURITY.  SINCE THE
                               : PROGRAMMER NEED ONLY SPECIFY THE FIELDS BEING WORKED WITH, THE DATA BASE CAN BE
                               : ALTERED WITHOUT CHANGING THE APPLICATION AND SECURITY PROGRAMS.
-------------------------------:----------------------------------------------------------------------
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FIGURE 2-2  DATACOM/DB Detailed Analysis

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| *** MANDATORY REQUIREMENTS *** | FOCUS - INFORMATION BUILDERS, INC |
|---|---|
| AUDIT TRAIL FACILITIES: | AN OPTIONAL TRANSACTION LOG IS AVAILABLE FOR PURPOSES OF AUDIT TRAIL. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): MULTIPLE VIEWS OF DATA BASE: | VIEWS OF THE DATA BASE ARE DEFINED BY THE DBA. |
| DATA INDEPENDENCE: | FOR REPORTING, DATA IS INDEPENDENT TO THE ELEMENT LEVEL. FOR UPDATING, DATA IS INDEPENDENT TO THE SEGMENT LEVEL. (FIELDS RELATED ONE-TO-ONE ARE GROUPED INTO A SEGMENT.) |
| PERFORMANCE: | NO IMPARTIAL EVALUATION OF PERFORMANCE WAS AVAILABLE. |
| ANALYSIS: TYPE: | HIERARCHIACAL/NETWORK; FREESTANDING OR HOST-LANGUAGE DRIVEN |
| STRENGTHS: | THE MOST SIGNIFCANT STRENGTH IS ITS REPORT WRITER. THE REPORT GENERATION LANGUAGE IS SIMPLE AND APPROXIMATES THE ENGLISH LANGUAGE SENTENCE 'FEEL'. EACH STATEMENT CONSISTS OF A COMPACT 5-PART STRUCTURE THAT CLEARLY SPELLS OUT SELECTION, SORTING, CALCULATION AND SOME FORMATTING CRITERIA. ANOTHER IMPORTANT STRENGTH IS EVERY POSSIBLE USER SELECTION IS BACKED UP BY AN INTELLIGENT DEFAULT. |
| DRAWBACKS: | THE MOST SIGNIFICANT FUNCTIONAL LIMITATION IS ITS DBMS. THE FOCUS DBMS, THOUGH CLAIMING 'RELATIONAL' CAPABILITIES, SIMPLY USES AN AGING HIERARCHY APPROACH WITH SOME NETWORKING FACILITIES. |

FIGURE 2-3  FOCUS Detailed Analysis

| *** MANDATORY REQUIREMENTS *** | IDMS - CULLINANE DATABASE SYSTEMS, INC |
|---|---|
| TF MONITOR IMPACT: | COMPATIBILITY WITH ANY TELECOMMUNICATIONS MONITOR PROVIDED THROUGH A UNIVERSAL COMMUNICATIONS FACILITY (UCF) OPTION. |
| AUDIT TRAIL FACILITIES: | ACCORDING TO THE VENDOR, THIS SYSTEM CAN NOT LOSE DATA. |
| ERROR RECOVERY/RESTART: | IDMS SENSES USER-PROGRAM ABENDS DURING UPDATING AND ROLLS OUT ANY EFFECT THE FAILING PROGRAM HAS HAD ON THE DATA BASE. IT PROVIDES FOR ONLINE RECOVERY WITHOUT REQUIRING DATA BASE ADMINISTRATOR OR OPERATOR INTERVENTION. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): MULTIPLE VIEWS OF DATA BASE: | VIEWS OF THE DATA BASE ARE DETERMINED BY THE DBA. |
| ACTIVE DATA DICTIONARY: | THE INTEGRATED DATA DICTIONARY (IDD) INCLUDES ACTIVE INTEGRATION, ENGLISH-LIKE DEFINITION LANGUAGE, ONLINE REPORTING, SYNTAX CONVERSION, PROGRAM ANALYZER (COBOL), SOURCE LANGUAGE PROCESSORS, 23 STANDARD ENTITY TYPES, USER-DEFINED ENTITY TYPES, STANDARD REPORTS, AUTOMATIC CROSS-REFERENCE, TEXTUAL DESCRIPTIONS, UTILITY PROGRAMS, MULTIPLE DATA DICTIONARIES, SECURITY, SYNONYMS AND EXTENSIBILITY. |
| ON-LINE QUERY FACILITY: | ONLINE QUERY IS PROVIDED BY ON-LINE QUERY (OLQ) AND ONLINE ENGLISH. OLQ IS A FAST ANSWER SYSTEM WHILE ONLINE ENGLISH IS AN ENGLISH SENTENCE QUERY SYSTEM. FILE CREATION IS PERFORMED BY CULPRIT, NOT BY THE QUERY FACILITIES. |
| REPORT WRITER FACILITY: | CULPRIT IS A FREE FORM, EASY-TO-USE REPORT GENERATOR WITH AN EFFICIENT LOAD AND GO DESIGN. IT SORTS UP TO 20 FIELDS PER INDEPENDENT REPORT ON A FIELD-BY-FIELD BASIS. |
| INTERACTIVE PROGRAMMING FACILITY: | INTERACT IS AN ONLINE, INTERACTIVE SYSTEM DESIGNED FOR TEXT ENTRY, EDITING AND FORMAT-TING; REMOTE JOB PROCESSING; AND PROGRAM DEVELOPMENT. IT PERFORMS A WIDE RANGE OF FUNCTIONS AND CAN BE USED BY PERSONNEL OF ALL LEVELS OF TECHNICAL EXPERTISE. |
| DATA BASE DESIGN FACILITIES: | DATA BASE DESIGN IS ACCOMPLISHED THROUGH A TWO-PART LANGUAGE CALLED THE DATA DEFINITION LANGUAGE (DDL). DDL IS USED FOR BOTH THE DESCRIPTION AND SUBDESCRIPTION OF THE DATA BASE. |
| INTERFACE TO OTHER DBMS: | THE NEW RELEASE OF IDMS WILL INCLUDE INTERFACES TO DATACOM/DB AND ADABAS THROUGH THE USE OF ESCAPE. |
| EFFECT ON CURRENT FILES AND SOFTWARE: | ESCAPE ALLOWS NON-IDMS USERS TO CONVERT TO AN IDMS DATA BASE WITHOUT RECODING DATA DEFINITIONS OR APPLICATION PROGRAMS THAT ACCESS AND UPDATE THE DATA BASE. THE NON-IDMS DATA DEFINITIONS ARE AUTOMATICALLY TRANSLATED TO IDMS DATA DESCRIPTIONS, AND THE NON-IDMS DATA IS AUTOMATICALLY LOADED TO AN IDMS DATA BASE. ESCAPE INCLUDES A RUN-TIME INTERFACE THAT ALLOWS EXISTING BATCH APPLICATION PROGRAMS TO ACCESS AND UPDATE AN IDMS DATA BASE. |
| PERFORMANCE: | OUT OF 29 USERS RESPONDING TO THE SOFTWARE SURVEY, 55% JUDGED THE FEATURES/CAPABILITIES OUTSTANDING; 3% WERE CONSIDERING REPLACEMENT WITH 0% DUE TO UNSATISFACTORY PERFORMANCE. |

FIGURE 2-4   IDMS Detailed Analysis

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|  | IDMS - CULLINANE DATABASE SYSTEMS, INC (CONT'D) |
| --- | --- |
| ANALYSIS:<br>TYPE: | HIERARCHICAL/NETWORK WITH INVERTED-LIST CAPABILITIES |
| STRENGTHS: | STRENGTHS ARE FLEXIBILITY TO LOGICALLY ESTABLISH THE DATA BASE ORGANIZATION; DATA INDEPENDENCE; FREEDOM TO SPECIFY RECORD PLACEMENT; GOOD RESTART AND RECOVERY FACILITIES; AND AVAILABILITY OF THE NEW UCF FACILITY.<br><br>THE ABILITY TO LOGICALLY ORGANIZE THE DATA BASE ALLOWS THE USER TO SELECT THE BEST STRUCTURE TO MEET THE NEED. DATA INDEPENDENCE THROUGH SUBSCHEMAS PAYS DIVIDENDS IN BOTH DATA MANAGEMENT AND APPLICATION PROGRAM MODIFICATION.<br><br>THE UCF FEATURE ALLOWS PROGRAMMERS TO USE A COMMON DATA MANIPULAT:ON LANGUAGE FOR BOTH DATA BASE AND DATA COMMUNICATIONS REQUESTS, WITHOUT THE NEED FOR SPECIAL OPERATING SYSTEM INTERFACE OR KNOWLEDGE OF THE TP MONITOR PROGRAMMING CHARACTERISTICS. ONLINE APPLICATIONS DEVELOPMENT CAN BE STANDARDIZED WITHOUT FEAR OF OBSOLESCENCE. |
| DRAWBACKS: | ONE SHORTCOMING IS THE ABSENCE OF AUTOMATIC EDIT ROUTINES TO HANDLE ALPHABETIC AND NUMERIC DATA. THIS SHOULD BE OF CONCERN ONLY TO FORTRAN USERS. |

FIGURE 2-4   IDMS Detailed Analysis

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| *** MANDATORY REQUIREMENTS *** | INQUIRE - INFODATA SYSTEMS INC |
|---|---|
| DATA INTEGRITY/SECURITY: | WHEN USING THE DATA MANAGEMENT SUPERVISOR, TRANSACTIONS IN PROGRESS DURING A SYSTEM CRASH ARE AUTOMATICALLY BACKED OUT. DATA BASES, RECORDS, FIELDS AND COMMANDS CAN BE PROTECTED FROM UNAUTHORIZED USE BY USING PASSWORDS AND SPECIAL SECURITY ROUTINES. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): MULTIPLE VIEWS OF DATA BASE: | THE DATA BASE VIEWS CAN BE DEFINED BY EITHER THE USER OR THE DBA. |
| ACTIVE DATA DICTIONARY: | EDICT GENERATES AND MAINTAINS A CENTRALIZED DATA ELEMENT DIRECTORY FOR BOTH INQUIRE AND NON-INQUIRE DATA BASES. THE DIRECTORY CONTAINS DATA ELEMENT NAMES, DESCRIPTIONS, AND DEFINITIONS AS WELL AS IDENTIFICATION OF THE DATA BASES IN WHICH THE DATA ELEMENT EXIST. |
| ON-LINE QUERY FACILITY: | THE INQUIRE USER LANGUAGE QUERIES CAN RETRIEVE DATA EITHER BY DIRECT (KEYWORD) OR SEQUENTIAL (FIELD-VALUE CONDITION) SEARCHING OF DATA BASES OR BY A COMBINATION OF BOTH METHODS. |
| REPORT WRITER FACILITY: | IN THE INQUIRE USER LANGUAGE, STANDARD FORMATTING, EDITING, AND TITLING OPERATIONS ARE COMBINED WITH SUCH OPERATIONS AS SORTING, PAGING, SUBTOTALING AND GRAND TOTALING FOR DATA RETRIEVED FROM THE DATA BASE OR COMPUTED OR DEFINED IN THE QUERY. CONDITIONAL PRINTING OF DATA, TEXT INSERTION, TABLE LOOKUP, CROSS-TABULATION, AND BAR CHARTS ARE ALL POSSIBLE THROUGH THE USER LANGUAGE. RETRIEVED DATA CAN ALSO BE FORMATTED INTO RECORDS THAT CAN BE STORED AS A SEQUENTIAL FILE. |
| INTERACTIVE PROGRAMMING FACILITY: | THE MACRO FACILITY OF INQUIRE'S USER LANGUAGE PROVIDES THE PROGRAMMING FACILITY FOR THE TECHNICAL PROGRAMMER. |
| DATA BASE DESIGN FACILITIES: | THE DATA BASE DESIGN FACILITIES ARE PROVIDED BY INQUIRE'S USER LANGUAGE. |
| PERFORMANCE: | NO IMPARTIAL EVALUATION OF PERFORMANCE WAS AVAILABLE. |
| ANALYSIS: TYPE: | NETWORK/HIERARCHICAL/RELATIONAL-LIKE; KEY INDEX ACCESS |
| STRENGTHS: | THE STRENGTHS ARE UNIQUE. FLEXIBLE INDEXING SCHEME; SUPPORT OF MULTIPLE DATA BASES WITH DYNAMIC EXECUTION-TIME LINKING; MULTITHREADED OPERATION; CAPABILITY FOR STORING AND RETRIEVING TEXTUAL INFORMATION; AND DATA INDEPENDENCE TO THE FIELD LEVEL. THE INQUIRE UNIQUE SEARCHFILE APPROACH TO INDEXING, ALONG WITH ITS USE OF MODULAR DATA BASES, ALLOWS THE SYSTEM DESIGNER TO WORK WITH RELATIONAL DATA STRUCTURES AS WELL AS WITH HIERARCHICAL AND NETWORK CONFIGURATIONS. WITH THIS KIND OF INDEXING, CONJUNCTIVE QUERIES ARE PERFORMED WITH EASE, AND HIGHLY EFFICIENT UNIDIRECTIONAL SEARCHING CAN BY UTILIZED. IN ADDITION, THE ABILITY TO HANDLE A LARGE NUMBER OF INDEPENDENT DATA BASES, WITH DYNAMIC LINKING, YIELDS IMPORTANT BENEFITS BECAUSE COMMON DATA CAN BE SHARED AMONG APPLICATIONS. SENSITIVE DATA CAN BE SEPARATED FROM PUBLIC DATA; NEW APPLICATIONS DO NOT HAVE TO WAIT FOR MODIFICATION OF DATA BASES; ALL DATA BASES CAN BE USED INDEPENDENTLY WHENEVER NECESSARY.<br><br>INQUIRE HAS THE ABILITY TO SUPERIMPOSE AN INVERTED INDEX ON AN EXISTING TEXTUAL BASE, WITH INDEX REINVERSION NECESSARY ONLY FOR CHANGED PORTIONS OF THE TEXT. |
| DRAWBACKS: | ALTHOUGH IT IS FELT THAT THEY ARE PROBABLY OF MINOR CONSEQUENCE, TWO CRITICISMS OF INQUIRE SURFACED AND SHOULD BE ASSESSED AS TO THEIR POTENTIALLY NEGATIVE IMPACT. THE FIRST CRITICISM IS THE LACK OF A SUBSCHEMA CAPABILITY. THE SECOND IS THE OPINION THAT, POSSIBLY BECAUSE OF THE SYSTEM'S INFORMATION STORAGE AND RETRIEVAL ROOTS, INQUIRE DOES NOT EXHIBIT THE STRINGENCY OF DATA INTEGRATION USUALLY FOUND IN A DBMS. |

FIGURE 2-5  INQUIRF Detailed Analysis

| *** MANDATORY REQUIREMENTS *** | MODEL 204 - COMPUTER CORP OF AMERICA |
|---|---|
| RESTORE/BACKUP/ERROR RECOVERY RESTART FACILITY: | UTILITIES INCLUDE CHECKPOINT/RESTART, FILE ROLLBACK AND ROLL FORWARD FACILITIES AND DUMP AND RESTORE FILES. THE USER CAN SPECIFY SELECTIVE RESTART BY FILE AND AUTOMATIC TIME-INITIATED CHECKPOINTS. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): MULTIPLE VIEWS OF DATA BASE: | VIEWS OF THE DATA BASE ARE DEFINED BY THE DBA. |
| MULTIPLE KEYS: | NON-KEYS ARE NOT RECOMMENDED FOR USE IN DATA RETRIEVAL, ACCORDING TO THE VENDOR. |
| SUPPORT VARIOUS DATA TYPES: | THE PACKED DATA TYPE IS SUPPORTED FOR USE WITH APPLICATION PROGRAMS ONLY. IT IS NOT SUPPORTED FOR USE WITH MODEL 204 USER LANGUAGE. |
| ON-LINE QUERY FACILITY, REPORT WRITER FACILITY, INTERACTIVE PROGRAMMING FACILITY, DATA BASE DESIGN FACILITIES: | ONLINE QUERY, REPORT WRITER, INTERACTIVE PROGRAMMING AND DATA BASE DESIGN ARE ALL PERFORMED BY THE OPTIONAL, ENGLISH-LIKE MODEL 204 USER LANGUAGE. THE USER LANGUAGE IS HIGHLY RATED FOR FUNCTIONAL ADEQUACY AND IS RELATIVELY EASY TO LEARN. |
| CUSTOMER ASSISTANCE: | COMPUTER CORP OF AMERICA PROVIDES A 24HR ELECTRONIC MAILBOX SYSTEM. |
| PERFORMANCE: | NO IMPARTIAL EVALUATION OF PERFORMANCE WAS AVAILABLE. |
| ANALYSIS: TYPE: | INVERTED FILE WITH RELATIONAL FEATURES |
| STRENGTHS: | THE STRENGTHS ARE FULLY INVERTED FILE STRUCTURE WITH HIGHLY DEVELOPED SEARCH CAPABILITIES; MULTITHREADED OPERATION; AND DATA INDEPENDENCE TO THE INDIVIDUAL ITEM LEVEL. IN ADDITION TO ITS MULTITHREADED OPERATION, MODEL 204 ACHIEVES HIGH PERFORMANCE THROUGH THE INVERSION OF MULTIPLE FIELDS, ALLOWING RUN-TIME REQUESTS TO BE SATISFIED BY COMPARISON OF INDEX VALUES RATHER THAN BY ACTUAL DATA SEARCH. PROVISION HAS BEEN MADE, HOWEVER, TO CONTROL THE PHYSICAL STORAGE OF RECORDS SO THAT SEQUENTIAL REPORTING TASKS AND OTHER BATCH PROCESSING OPERATIONS ARE PERFORMED EFFICIENTLY. THE DESIGN OF MODEL 204 SHOWS NOTABLE ATTENTION TO SEARCH CAPABILITIES, PROVIDING A SET OF POWERFUL RELATIONAL OPERATORS ALONG WITH THE NUMERIC 'RANGE' RETRIEVAL CAPABILITY. FIELD-LEVEL INDEPENDENCE MEANS THAT PROGRAMMERS NEED SPECIFY ONLY THOSE FIELDS BEING WORKED WITH, AND FIELDS CAN BE ADDED WITHOUT PROGRAM CHANGES. SEVERAL ADVANTAGES ARE GAINED FROM THE RECORD PLACEMENT AND CROSS-REFERENCING METHODS PROVIDED FOR IN THE MODEL 204 PACKAGE. A USER CAN HAVE FOUR LOGICAL ACCESS METHODS TO HIS DATA RECORDS - INVERTED, DIRECT, SEQUENTIAL AND LINKED OR CHAINED LIST. MODEL 204 MITIGATES THE USUAL SACRIFICE OF MEMORY CAPACITY FOR SPEED BY ENHANCING SPACE UTILIZATION THROUGH ITS ENCODING AND DATA PACKING TECHNIQUES AS WELL AS THROUGH ITS VARIABLE-LENGTH, VARIABLE-FORMAT RECORD STRUCTURE. |
| DRAWBACKS: | ALTHOUGH THE VARIABLE-LENGTH, VARIABLE-FORMAT RECORD STRUCTURE CAN RESULT IN SIGNIFICANT SPACE SAVINGS FOR SOME USERS, OTHER USERS WITH HEAVY UPDATE FIELD ADDITIONS WILL CONSIDER THEIR DATA SPACE REQUIREMENTS TO BE EXCESSIVE. THIS PROBLEM CAN BE RELIEVED BY EFFECTIVE PLANNING PRIOR TO SYSTEM INSTALLATION AND THROUGH THE USE OF PREALLOCATED FIELDS. NONETHELESS, FOR THOSE INSTALLATIONS THAT HAVE BEEN PLANNED WELL, THE SPACE OPTIMIZATION TECHNIQUES FOR BOTH DATA AND INDEX ALSO INCREASE CHANNEL UTILIZATION BY INCREASING THE NUMBER OF INFORMATION UNITS TRANSFERRED FOR EACH BLOCK. IN ADDITION, SEARCH/SELECTION TIMES ARE OPTIMIZED THROUGH THE USE OF VARIOUS WELL-KNOWN PROCESSING ALGORITHMS. USERS HAVE FOUND THAT SYSTEM OVERHEAD IS NOT EXCESSIVE AS LONG AS REASONABLE RESTRAINT IS EXERCISED DURING THE INVERSION PROCESS. |

FIGURE 2-6   MODEL 204 Detailed Analysis

| *** MANDATORY REQUIREMENTS *** | RAMIS II — MATHEMATICA PRODUCTS GROUP, INC. |
|---|---|
| ERROR RECOVERY/RESTART CAPABILITIES: | ERROR RECOVERY AND RESTART IN NOT AUTOMATIC. IT IS DONE MANUALLY USING THE AUDIT TRAIL LOG. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): CONCURRENT UPDATING: | APPLICATIONS CAN BE BUILT BY THE USER TO HANDLE CONCURRENT UPDATING. |
| MULTIPLE VIEWS OF DATA BASE: | VIEWS OF THE DATA BASE MAY BE DEFINED BY BOTH THE DBA AND THE USER. |
| REPORT WRITER FACILITY: | THE REPORTING SYSTEM OF RAMIS II IS A LANGUAGE PROCESSOR THAT ACCEPTS FREE-FORM, NONPROCEDURAL, ENGLISHLIKE STATEMENTS; IT HAS A LARGE REPERTOIRE OF COMMANDS FOR CREATING VARIABLE-FORMAT REPORTS FROM BOTH RAMIS II AND NON-RAMIS II FILES, EITHER SEPARATELY OR JOINTLY. |
| PERFORMANCE: | OUT OF 15 USERS RESPONDING THE THE SOFTWARE SURVEY, 47% JUDGED THE FEATURES/CAPABILITIES OUTSTANDING; 6% WERE CONSIDERING REPLACEMENT WITH 0% DUE TO UNSATISFACTORY PERFORMANCE. |
| ANALYSIS: TYPE: | HIERARCHICAL WITH NETWORKING FEATURES; FREESTANDING OR HOST-LANGUAGE DRIVEN |
| STRENGTHS: | THE MAJOR STRENGTH OF RAMIS II IS ITS REPORT WRITING CAPABILITY. ANOTHER STRENGTH IS THE UNIQUE USE OF A NONPROCEDRAL ENGLISH-LIKE LANGUAGE FOR RECORD MAINTENANCE. THIS HAS THE POTENTIAL TO SAVE THE TIME AND EFFORT OF DEVELOPING PROCEDURES TO READ, VERIFY AND CORRECT DATA. RAMIS II PROVIDES A MIXTURE OF NETWORKED HIERARCHICAL STRUCTURES WITH THE POTENTIAL TO CREATE RELATIONAL DATA BASES. THE SYSTEM HAS BEEN DESIGNED WITH THE END USER IN MIND. |
| DRAWBACKS: | RAMIS II DOES NOT HAVE A TRUE QUERY LANGUAGE, NO AUTOMATIC CHECKPOINT RESTART ROLL FORWARD/ROLL BACKWARD FACILITIES, NO MULTITHREAD CAPABILITY AND A VERY LIMITED DATA DICTIONARY. |

FIGURE 2-7   RAMIS II Detailed Analysis

| *** MANDATORY REQUIREMENTS *** | SYSTEM 2000/80 - INTEL CORP |
|---|---|
| OPERATING SYSTEM MODIFICATIONS: | SYSTEM 2000/80 REQUIRES TYPE 2 SVC TO INTERFACE WITH OPERATING SYSTEM. |
| ERROR RECOVERY: | FOR EACH PHYSICAL DATA BASE, THE DEFINE/CONTROL FACILITY OF THE INTEGRATED DATA DICTIONARY (IDD) IS USED TO SPECIFY THE RESTART AND RECOVERY OPTIONS FOR EACH DATA BASE. VARIATIONS INCLUDE DATA BASE ARCHIVING, UPDATE JOURNALING AND BEFORE-IMAGE LOGGING. |
| SECURITY: | A PASSWORD SYSTEM IS CONTROLLED BY THE DBA AT DATA BASE, RECORD AND ITEM LEVELS. ADDITIONAL CUSTOMER-DEVELOPED SECURITY, SUCH AS ENCRYPTION AND DECRYPTION ROUTINES, IS SUPPORTED BY STRATEGICALLY PLACED USER EXITS. |
| *** DESIRED REQUIREMENTS *** | |
| CAPABILITIES (EASE OF USE): MULTIPLE VIEWS OF DATA BASE: | VIEWS OF THE DATA BASE ARE DEFINED BY THE DBA. |
| ACTIVE DATA DICTIONARY: | THE INTEGRATED DATA DICTIONARY (IDD) CONTROLS AND DOCUMENTS THE ENTIRE SYSTEM 2000/80 DBMS ENVIRONMENT. |
| ON-LINE QUERY FACILITY: | QUEST IS A "USER-FRIENDLY" RELATIONAL LANGUAGE FACILITY THAT PROVIDES AN ENGLISH-LIKE SYNTAX FOR UPDATING AND RETRIEVING DATA FROM SYSTEM 2000/80 DATA BASES IN EITHER BATCH OR INTERACTIVE MODE. FOR THE APPLICATION PROGRAMMER, QUEST PROVIDES A TESTING FACILITY FOR TRYING OUT BASIC REPORT AND UPDATE PROCEDURES PRIOR TO COMMITTING TO A PLEX PROGRAM. |
| REPORT WRITER FACILITY: | REPORT WRITER PROVIDES ONLINE AND BATCH-MODE REPORT GENERATION TO ACCOMODATE COMPLEX REPORTING REQUIREMENTS. BOTH END USERS AND PROGRAMMERS CAN DESCRIBE SPECIFICATIONS FOR MULTIPLE REPORTS USING A FREE FORM LANGUAGE. REPORTS CAN BE PROCESSED IN PARALLEL ON A SINGLE PASS OF THE RELEVANT PARTS OF THE DATA BASE. |
| INTERACTIVE PROGRAMMING FACILITY: | PROGRAMMING LANGUAGE EXTENSION (PLEX) ALLOWS APPLICATION DEVELOPERS TO COMBINE COBOL, FORTRAN OR PLI WITH SYSTEM 2000/80 SYNTAX TO PRODUCE A PLEX PROGRAM. FEATURES INCLUDE PLEX PROCESSOR, PLEX DATA MANIPULATION LANGUAGE, PLEX HIGH-SPEED UPDATE, PLEX LOAD UTILITY AND PLEX DYNAMIC NETWORK STRUCTURE. |
| DATA BASE DESIGN FACILITIES: | DATA BASE DESIGN IS PROVIDED BY THE DEFINE PROCESSOR OF THE IDD. |
| PERFORMANCE: | OUT OF 24 USERS RESPONDING TO THE SOFTWARE SURVEY, 38% JUDGED THE FEATURES/CAPABILITIES OUTSTANDING; 25% WERE CONSIDERING REPLACEMENT WITH 4% DUE TO UNSATISFACTORY PERFORMANCE. |
| ANALYSIS: TYPE: | LOGICALLY HIERARCHICAL WITH INVERTED-LIST CAPABILITIES; HOST-LANGUAGE DRIVEN |
| STRENGTHS: | STRENGTHS ARE FLEXIBILITY AND END-USER ORIENTATION OF THE INVERTED STRUCTURE WITH EFFICIENT UPDATE PROCESSING AND MODERATE STORAGE REQUIREMENTS; MULTITHREADED OPERATION; DATA INDEPENDENCE TO THE FIELD LEVEL; AND HIGHLY EFFECTIVE SECURITY PROVISIONS. SYSTEM 2000/80 ACHIEVES GOOD EFFICIENCY BY EMPHASIZING THE CONSTRUCTION OF EFFICIENT INDEXES FOR DATA RECORDS BASED ON INVERSION OF INDIVIDUAL DATA FIELDS AND THROUGH THE MULTITHREAD-ING FEATURE, WHICH ALLOWS MULTIPLE-APPLICATION ACCESS TO THE SAME DATA BASE. WITH FIELD-LEVEL INDEPENDENCE, PROGRAMMERS NEED SPECIFY ONLY THE FIELDS BEING WORKED WITH AND CAN ADD FIELDS WITHOUT CHANGING APPLICATION PROGRAMS. PASSWORD PROTECTION TO THE FIELD LEVEL ALLOWS SYSTEM 2000/80 TO PROVIDE ONE OF THE BEST SECURITY SUBSYSTEMS AVAILABLE.<br><br>THE USERS CONTACTED WERE PLEASED WITH THE SYSTEM 2000/80 EFFICIENCY AND EASE OF USE FOR ALL FACETS OF DATA BASE MANAGEMENT. THEY LIKED THE SYSTEM'S INDEX FUNCTIONS, ITS FLEXI-BILITY IN REDEFINING FILE FORMATS, AND ITS RETRIEVAL CAPABILITIES THROUGH WHICH NON-PROGRAMMERS CAN READILY LEARN TO STRUCTURE BOTH BATCH AND ONLINE REQUESTS. |

FIGURE 2-8   SYSTEM 2000/80 Detailed Analysis

| *** MANDATORY REQUIREMENTS *** | # TIS  -  CINCOM SYSTEMS |
|---|---|
| TF MONITOR IMPACT: | TIS REQUIRES CICS OR CINCOM'S E1.  ACCORDING TO THE VENDOR, AN ARRANGEMENT CAN BE MADE TO HANDLE THE TCAM INTERFACE DIFFICULTY. |
| **\* DESIRED REQUIREMENTS **\* | |
| CAPABILITIES (EASE OF USE): | |
| MULTIPLE VIEWS OF DATA BASE: | MULTIPLE VIEWS OF THE DATA BASE ARE PROVIDED THROUGH DBA DEFINED LOGICAL USER VIEWS. |
| ACTIVE DATA DICTIONARY: | TIS IN-LINE DIRECTORY IS THE CONTROL POINT FOR EFFECTIVE USE OF TIS, INTEGRATING ALL COMPONENTS AND SUPPLYING ALL SYSTEM INFORMATION AND DATA DESCRIPTIONS. |
| ON-LINE QUERY FACILITY: | TIS QUERY IS A HIGH LEVEL, EASY TO USE LANGUAGE WITH "BOTTOM-UP" PARSER, GENERALIZED "HELP" FACILITY, SPELLING CORRECTOR AND AUTOMATIC DISPLAY LOGIC.  IT PROVIDES A BATCH SORTING CAPABILITY, BUT NO SORT IN ONLINE QUERY. |
| REPORT WRITER FACILITY: | COMPREHENSIVE RETRIEVAL IS USED FOR COMPLEX PROCESSING OR SPECIALLY FORMATTED REPORTS. THIS FACILITY USES THE SAME LOGICAL VIEWS AS QUERY. |
| INTERACTIVE PROGRAMMING FACILITY: | MANTIS IS A FULLY PROCEDRAL HIGH LEVEL INTERPRETIVE LANGUAGE THAT MEETS THE REQUIRE- MENTS OF A 4TH GENERATION LANGUAGE.  APPLICATIONS CREATED UNDER MANTIS ARE INDEPENDENT OF OPERATING SYSTEM OR COMMUNICATIONS MONITOR. |
| DATA BASE DESIGN FACILITIES: | DATA BASE DESIGN CAN BE PERFORMED THROUGH THE USE OF THE HELP FACILITY. |
| PERFORMANCE: | NO IMPARTIAL EVALUATION OF PERFORMANCE WAS AVAILABLE. |
| ANALYSIS: | |
| TYPE: | RELATIONAL |
| STRENGTHS: | STRENGTHS ARE SUBSTANTIALLY LESS CPU CYCLE UTILIZATION; HIGH PERCENTAGE OF "IN MEMORY DATA ACCESS"; SIGNIFICANT REDUCTION IN POINTER OVERHEAD; AND COMPLETE PACKAGE INTEGRATION. |
| | THE CINCOM DBMS USES LOGIC SIMILAR TO "MOST-FREQUENTLY-USED" ALGORITHM IN VIRTUAL OPERATING SYSTEM TECHNOLOGY.  THE RESULT: A LARGE PERCENTAGE OF DATA ACCESSES ARE IN FACT "IN MEMORY BUFFER HITS", NOT READS FROM DISK STORAGE.  THIS FACILITY, WHICH CINCOM CALLS "VIRTUALLY VIRTUAL" DBMS PROCESSING, IS A SIGNIFICANT FACTOR IN PERFORMANCE SUPERIORITY.  THE CINCOM DBMS USES AN ADVANCED TECHNOLOGY KNOWN AS "HYBRID RELATIONAL" TO SERVICE DATA STRUCTURING REQUIREMENTS.  WITH THIS TECHNOLOGY, VALUES INHERENT WITHIN THE DATA ITSELF ENABLE RETRIEVAL OF ASSOCIATED RECORDS WITHOUT THE USE OF POINTERS OR INDEXES. |

\* ALL INFORMATION PRESENTED HERE WAS OBTAINED FROM THE VENDOR AND CINCOM'S LITERATURE.
TIS WAS NOT COVERED BY ANY OF THE IMPARTIAL SOURCES USED.


FIGURE 2-9   TIS Detailed Analysis

| | | | |
|---|---|---|---|
| ADABAS | Software AG of North America, Inc | | |
| | 11800 Sunrise Valley Dr, | 860-5050 | |
| | Reston, Va. 22091 | Ted Westerman | |
| | | | |
| DATACOM/DB | Applied Data Research Datacom Division | | |
| | 8515 Greenville Avenue | 281-2011 | |
| | Suite 101 | Chuck Taylor | |
| | Dallas, TX 75243 | | |
| | | | |
| DRS | Advanced Data Management | | |
| | P.O. Box 601, 15-17 Main Street | (609) 799-4600 | |
| | Kingston, NJ 08528 | Jim Meidel | |
| | | | |
| FOCUS | Information Builders, Inc. | | |
| | 1250 Broadway, | 276-9006 | |
| | New York, NY 10001 | John Derbyshire | |
| | | | |
| IDMS | Cullinane Database Systems, Inc | | |
| | 400 Blue Hill Dr. | 370-8000 | |
| | Westwood, MA 02090 | Dick Saunders | |
| | | | |
| IMS | IBM Corporation | | |
| | 1133 Westchester Avenue | (301) 897-4494 | |
| | White Plains, NY 10604 | Helen Cleveland | |
| | | | |
| INFO | Henco, Inc | | |
| | 35 Walnut Street | (617) 890-8670 | |
| | Wellesley, MA 02181 | Bill Weimar | |
| | | | |
| INQUIRE | Infodata Systems, Inc. | | |
| | 5205 Leesburg Pike, | 578-3430 | |
| | Falls Church, VA 22041 | Ed Carlson | |
| | | | |
| MODEL 204 | Computer Corp. of America | | |
| | 675 Mass. Avenue | 522-1717 | |
| | Cambridge, MA 02139 | Brenda McLean | |
| | | | |
| ORACLE | QRACLE Corp. | | |
| | 300 Sand Hill Road | (301) 657-4475 | |
| | Menlo Park, CA 94025 | Dave Roberts | |

FIGURE 3-1 REFERENCES

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RAMIS II       Mathematica Products Group, Inc.
P.O. Box 2392,                             484-5752
Princeton, NJ  08540             Jack Hadder


RAPPORT       Logica, Inc.
666 Third Avenue,               (212) 599-0828
New York, NY  10017             Dave Anker


SEED          International Data Base Systems
2300 Walnut Street,              821-1022
Philadelphia, PA  19103         Dennis McCann


SYSTEM 2000   Intel,
3065 Bowers Avenue,            (301) 431-1200
Santa Clara, CA  95051


TIS           CINCOM SYSTEMS, INC.
2300 Montana Avenue,           591-1740
Cincinnati, OH  45211          Linda Difillippo


Auerbach Technology Reports     (March 1983)
Auerbach Publishers Inc.
6560 North Park Drive
Pennsauken, NJ 08109

Data Decesions Software Volume 2   (March 1983)
Ziff-Davis Publishing Company
One Park Avenue
New York, NY 10016

Data Management Decisions      (January 1982)
Real Decisions Corp
123 High Ridge Road
Stamford, CN 06905

DATAMATION    December 1982

Datapro Directory of Software    (January 1983)
Datapro Research Corp
Delran, NJ 08075


FIGURE 3-1  REFERENCES

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