U.S. INFORMATION SERVICES
VERTICAL MARKETS, 1986-1991
SYSTEMS SOFTWARE SECTOR

DECEMBER 1986

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I INTRODUCTION

- Systems software comprises three segments--application development tools (ADT), data center management (DCM), and system control (SC). Products in these categories work with the computer system and related software to develop and support business solutions. Exhibit I-1 highlights the major product types included in each segment.

- The systems software market in 1985 was one of the healthiest segments of the information services industry. It had a 23% growth from 1984-1985, as opposed to the overall information services market which had a 17% growth.

- There are inherent characteristics in most systems software products that contributed to that growth. Most of these capitalized on the fact that there was a tightening in the U.S. ecomony which created the desire to make existing computer resources (i.e., people and products) more efficient. In general, major system software products (excluding operating systems):

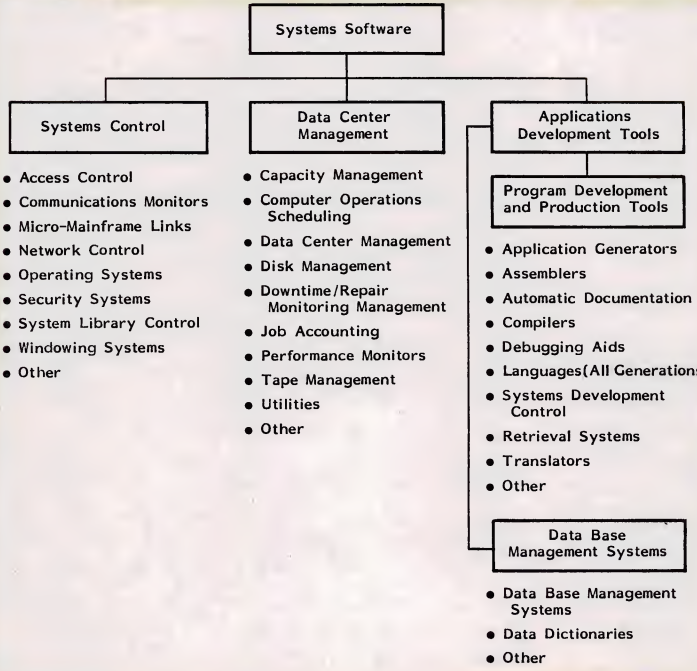
  - Are designed to improve productivity of people and efficiency of systems.

  - Deliver quantifiable results.

  - Are easy and fast to install.

EXHIBIT I-1

SYSTEMS SOFTWARE PRODUCTS MARKET STRUCTURE



- Are low-cost products (less than $50,000) and, consequently, tactical and not strategic products to a corporation. This means that the purchase decision can be made by a few, thus shortening the selling cycle.

II ISSUES, TRENDS, AND EVENTS

A. OVERVIEW

- There are a number of issues and trends in the industry that have or will occur and that will have a significant impact on the systems software market. The combination of all these forces and their positive or negative impact on the market are vital data that led to the analysis which creates the five-year forecast. Major issues, trends, and events are listed in Exhibit II-1.

B. ECONOMY

- As previously mentioned in the introduction, the state of the economy has a direct impact on the systems software market. In 1985 and 1986, the economy was tighter than several preceding years which led to an overall decrease in capital spending. This directly impacted the information services industry.

  - Segments of the industry were impacted either positively or negatively depending on the necessity of application to the overall corporation, the cost of the product, and the degree to which added value could be "squeezed" from existing personnel and/or equipment.

EXHIBIT II-1

SYSTEMS SOFTWARE ISSUES/TRENDS/EVENTS

- Tightening of the Economy
- IBM's Software Thrust
  - MVS/XA
  - DB2
  - Price Increases
  - Strategic Alliances
- Relational DBMSs Increase in Popularity
- AI
- Hardware Trends
- Acquisitions

- Consequently, the professional services market, on-line data bases, and systems software are the segments of the IS industry that have successfully met these criteria and had healthy growth rates between 1985 and 1986.

  . Professional service vendors could be hired on a contract basis rather than hire new full-time employees. They also provided education and training and systems integration that improved the efficiency of users, programmers, and systems.

  . On-line data bases increase the efficiency of financial and other white collar workers.

  . Systems software, again, improves the efficiency of programmers as well as systems.

C. IBM

1. OVERVIEW

- IBM is the leading vendor of hardware and, therefore, operating systems--the major systems software product. The company has firmly stated its commitment to becoming a major player in all four delivery modes.

- In 1985, IBM's worldwide revenue from all types of software was $4 billion, a 30% increase over 1984. Currently, its software revenue is about 8% of overall corporate revenue, but growing at 30% per year would give IBM worldwide software revenue of $15 billion by 1990, representing about 15-20% of overall IBM corporate revenue.

- Specifically in the area of systems software, IBM dominates the list of vendors with $2.5 billion (1985 U.S.) of revenue from operating system (OS) and related software. This is 41% of the total 1985 systems software market of $6.1 billion. See Exhibit II-2 for a 1985-1986 comparison of IBM's software revenue components.

2. XA

- In the late 1970s, as larger capacity host processors became available, effective management of system resources became difficult. As user workload increased the requirement for systems resources, major capacity constraints became apparent.

- To alleviate these constraints, IBM introduced a new systems architecture in 1981. The architecture was called XA (extended architecture), and the OS to complement the hardware was MVS/SP2 or MVS/XA.

- IBM corporate objectives include:

  - Being a complete information provider.

  - Locking out PCMs via hardware design and operating system (OS) software.

  - Minimizing the number of supported OS.

  - Maximizing account control.

- IBM's aggressive support of MVS/XA affirms all four objectives:

  - XA is a major systems software product around which IBM and other vendors can provide add-on enhancement products as well as professional services offerings.

EXHIBIT II-2

IBM SOFTWARE REVENUE
($ BILLIONS)

	1985		1986	
	WORLDWIDE	U.S.	WORLDWIDE	U.S.
Applications	$0.45	$$0.32	$0.60	$0.50
Operating Systems and Utilities	$2.80	$2.00	$3.70	$2.70
DBMS	$0.75	$0.48	$0.90	$0.60
Total Systems Software	$3.55	$2.50	$4.60	$3.30
Total Software	$4.00	$2.80	$5.20	$3.80

- Should IBM choose, it could add micro code assists to XA for efficiency, which at the same time would make it more difficult for PCMs to compete.

- With XA, heavy transaction processing applications can be supported for some years to come, requiring only OS enhancements, not a completely new OS. VM will support information center and mid-range applications.

- Once users have applications developed on one type of OS, switching to other vendor's hardware is very unlikely. Hardware upgrades will most likely be within the same vendor and product line.

- XA is also a major contributing factor to IBM's overall corporate revenue goal of 15% per year growth.

  - IBM receives recurring revenue of about $15,000 per month from each XA installation with associated software and maintenance. This is about three times the monthly charge of MVS and related services and more than ten times the monthly license fee of DOS.

  - Consequently, as the number of XA installations increases (while at the same time the capabilities of XA increase and stimulate price increases), so, too, will IBM's overall revenue.

3. DB2

- IBM is primarily a hardware vendor.

- Taken a step further, the more IBM can do to help users install applications more quickly, the sooner users will be ready to purchase more hardware; hence, the strategic implication of DB2, IBM's relational data base product for large systems.

- DB2 takes full advantage of the XA architecture; thus, users with MVS/XA wishing to maximize system efficiency with the use of a DBMS will need to install DB2.

- Supplemental information regarding versus hierarchical DBMS will be disclosed in a subsequent section of this report.

- Historically, a DBMS has been used for transaction processing. For this type of function, IBM has a large installed base (with recurring revenue) of IMS, its hierarchical DBMS product (about 6,000 units worldwide).

- With the increase of end-user computing, a need has evolved for an easier-to-use host DBMS product, thus the evolution of relational DBMS. IBM has positioned DB2 as a complement to IMS to be used for new applications so as not to "initially" replace IMS. INPUT believes that within the next five years, as IBM improves the performance of DB2 with hardware assists and software enhancements, DB2 will begin to be marketed as a replacement for IMS as well. In about ten years, most applications presently under IMS will be under DB2.

  - In 1985, IBM had about $15 million in revenue from DB2 sales. This small revenue amount in no way discounts the strategic importance of DB2.

  - In 1985, there were about 500 units of DB2 installed worldwide.

  - In 1986, to encourage the use of DB2, IBM gave users the opportunity to use DB2 free for six months if the product was licensed prior to September 1986.

  - The price of DB2 is surprisingly low compared to other host DBMS products ($16,000 initial license and $2,500 per month).

- Short-term year-to-year revenue from DB2 is of less importance to IBM than a long-term installed base of the product and the ensuing sale of hardware.

- In spite of the fact that DB2 is a strategic product for IBM, independent vendors can capitalize on its deficiencies as well as provide links between DB2 with their products. DB2 presently lacks a wide variety of tools, a data dictionary, and strong security functions.

  - Software AG will have interfaces from its host data base, ADABAS, to DB2 and will rewrite its fourth generation language, NATURAL, to work with DB2.

  - Relational Technology, Inc. has tools to develop applications to run on top of DB2.

- Long-term, IBM will improve upon DB2 deficiencies. It is said to be working on a central "repository" that will manage data definitions as well as terminal definitions. IBM also has a 4GL, CSP, that is similar to Cincom's Mantis and runs on VSAM, DL1, IMS, DB2, and System/36.

4. PRICE INCREASES

- IBM has been criticized for raising the prices of its software at least once a year, regardless of product enhancements. This has historically been true.

  - Consequently, price increases can limit the opportunities of independent vendors since they decrease the overall budget available for companies to spend on other products.

  - In less strategic areas (not OS), however, IBM price increases provide vendors with quality products with the ability to be more competitive due to lower cost products.

- In 1986, however, IBM was more selective on raising prices of products; this comes as a response to customer complaints. In the face of increased hardware competition (notably DEC), IBM has an added desire to keep customers happy and maintain its installed base as well as increase sales.

  - The newly-announced 9370 family will have certain software priced according to product capability, meaning that the same OS would be priced differently based on the capability of the machine.

  - Changes to the XA OS were announced in October 1986 with no change in price.

5. STRATEGIC ALLIANCES

- All the major software markets that IBM and independents have targeted are growing rapidly. In most markets there is no leader. This is not, however, the case in two segments of the systems software market--OS and DBMS. Excluding these segments, there is a variety of opportunities for vendors.

- The markets, however, are rapidly changing, and buyer requirements are becoming more complex. IBM and independents are finding mutual benefits from strategic alliances.

- Most of IBM's alliances to date were not in the systems software area. There are, however, some notable exceptions. IBM has the following alliances in systems software:

  - VM Software - VM DCM products.

  - Microsoft - PC-DOS license.

  - Oracle - Oracle DBMS for IBM System/88 (Stratus) computer.

- IBM will continue making alliances as long as the software products enhance and encourage the sale of hardware.

D. RELATIONAL/DISTRIBUTED DBMS

- DBMS are application development tools (ADTs) that make the filing, sorting, and retrieving of data more efficient. Historically, DBMSs have been hierarchical, i.e., data structures are organized in a "parent to child" relationship.

- Due in large part to the major infusion of end-user computing in corporations, a major thrust has been made toward relational DBMSs. Relational DBMSs structure data in "table type" relationships. IBM SQL (Structured Query Language) is evolving as the standard access method for relational data bases. SQL is a Data Manipulation Language (DML). A DBMS is a compiler or interpreter for a DML, whereby simple statements can make a complex update.

- The next evolutionary step is distributed DBMS (DDBMS), which must be relational. There are two approaches to distributing data bases:

  - Split one DBMS among many machines.

  - Have separate DBMSs on separate machines transparent to users.

- Products of this type are in the beginning stages.

  - Oracle has just announced SQL Star that links SQL DBMS from mainframe to PC and allows data to be viewed as a single source even though it may be geographically separate.

- RTI (Relational Technology, Inc.) is presently working with the federal government and DoD for the development of a distributed DBMS with remote access and update.

- Sybase has a SQL-based DataServer.

- IBM is known to be working on a distributed DBMS, RStar, that is still in beta test.

- Although DDBMS products soon will be available, they have been designed for access without updating the data. Security and data integrity are key concerns and must be successfully addressed before update products are available.

- Users are in the planning stages now for DDBMS and will purchase products only after they have proven themselves over time.

E. ARTIFICIAL INTELLIGENCE (AI)

- Rather than being a product, artifical intelligence (AI) is a collection of technologies. AI techniques incorporated into software products will be used for a number of different applications:

  - To access corporate mainframe data bases with a natural language system.

  - To provide expert systems that assist users in improving the quality of their work and allow them to make better decisions.

  - To provide natural languages on the front end to simplify the accessing of CD-ROM.

  - To provide software that learns and adapts to a user.

- AI technologies will be increasingly added to systems software products, especially in the application development tools area, to increase productivity and simplify the access of DBMS.

F. HARDWARE TRENDS

1. OVERVIEW

- The number of units in the installed base has a direct correlation to the number of system software products that can be sold.
  - In the case of OS, there is generally one OS per CPU. For large IBM 370 architecture systems the ratio is 1.3 OS units per CPU, on average.
  - In the case of utilities and tools performing specific functions, a much larger number of products are run per CPU. However, there is a limit to the number of utilities that can be run per CPU.
- Consequently, changes in the number of units, as well as hardware systems and architecture capability, in the installed base directly impact the design as well as the number of shipments of systems software products per year.

2. DECREASE IN MAINFRAME SALES

- In 1986, INPUT estimates that there are about 40,000 large systems (IBM 4300 and above and "BUNCH") installed in the U.S. The year-to-year growth rate of these systems has slowed in 1986 to about 8% for IBM and less for non-IBM large systems. Decreases in 1985-1986 growth are due to:
  - The perceived discontinuance of the Investment Tax Credit at year end 1985. As a result, many users pushed purchases planned for early 1986

ahead to fourth quarter 1985, so they could still get full tax credit for the hardware investment.

- Confusion due to connecting diverse hardware systems within the corporation postponed new purchases.

- Economic conditions postponed new sales of large systems over $1 million.

- In the near past, the yearly increase in mainframe capacity (MIPS) installation was about 50%; in 1986, this increase per year has slowed to 30% or less.

- INPUT projects that the impact of the aforementioned factors will lessen over time and, due in large part to the drive toward connectivity, large system (43XX, 308X, and 3090) sales will increase in growth rate.

3. POPULARITY OF DEC VAX

- In 1986, there were about 50,000 DEC VAXs (including MicroVAX) installed in the U.S. That number is increasing at 15-20% per year. Connectivity and the desire by users for a consistent architecture from large to small systems are spurring this growth.

- Of the installed base of VAXs, only one-half have some type of DBMS (as opposed to large IBM and "BUNCH" systems where about 90% have at least one DBMS). Of those that do have a DBMS, about 30% have RDB (DEC's product), 7% have RTI, 6% Oracle, and 6% Intergraph. The remaining systems have any of a number of products supplied by 20 other vendors.

  - The large growth in the VAX installed base presents opportunities for systems software vendors.

- Cullinet has announced its commitment to enter the VAX DBMS market in mid-1987.

- Software AG and Cincom are moving their products to the VAX line.

- There are two major caveats:

  - The sale of a VAX product into a corporation, in general, is not to the same department where traditional mainframe vendors are accustomed to selling; therefore, a new selling strategy may be in order.

  - Although there is a lack of DBMS products on VAXs, there are established leaders in that market (previously mentioned vendors) whose products were designed, not reworked, for the VAX environment.

4. PC AND 80286 AND 80386

- In 1986, there were about nine million microcomputers installed in U.S. businesses. This number is expected to more than double from 1986-1991. Contributing to the increases in the installed base are:

  - Increased system capacity.

  - Increased end-user computer literacy.

  - Increased availability of applications software.

  - Decreased system cost.

  - Development of comprehensive micro strategies in large businesses.

- IBM (and clone product makers) have been reasonably successful in the past two years selling AT-type products. This is in spite of the fact that due to OS constraints, the products were able to only run existing PC-DOS applications faster, but could not address the two megabytes of memory nor address the protected mode. In early 1987, IBM and Microsoft will announce a DOS286 to alleviate these constraints.

- In mid-1986, Compaq was the first hardware vendor to introduce a micro based on the 80386 chip, and other hardware vendors are expected to follow suit. Software providers of sophisticated OS and software will announce products in late 1987 to take advantage of the system capabilities. At that time IBM will also introduce an 80386-chip micro.

- Consequently, new opportunities will appear for vendors of systems software products in all segments (ADT, DCM, SC) using these new micros.

G. ACQUISITIONS

- Acquisitions are increasing in the systems software area as well as in most other segments of the information services industry. Due to rapid industry changes, companies are finding that acquiring smaller players with established quality products and distribution channels is more cost- and time-effective for market penetration than developing similar products internally.

  - In late 1985, Ameritech acquired Applied Data Research, known to be an innovator and one of the first independent manufacturers of IBM 370 DBMS, as a first step in entering the information services market.

  - Pansophic, one of the leading suppliers of mainframe tools, acquired the D-PICT graphics product and the INGOT DSS product in early 1986

and SPSS, developer of SPSS statistical software, later in the year to broaden their product line.

- Computer Associates International acquired the mainframe security product, Topsecret, from CGA and Software International.

- In 1985, Sterling Software acquired Informatics General and has since consolidated the company to make it a higher revenue generator.

III MARKET FORECASTS

A. OVERVIEW

- The systems software market continues to experience strong growth. In 1985, over $6 billion was spent on systems software. With an expected 24% AAGR for 1986-1991, almost $22 billion will be spent in 1991 (see Exhibit III-1). In 1986, systems software accounted for 47% of the overall software market; in 1991 this percentage will increase to 51% (see Exhibit III-2), highlighting the need for tools and aids to support increasingly complex application solutions.

- Of the more than $6.1 billion in user expenditures in 1985 for systems software, 62% ($3.8 billion) was for mainframe packages, 26% ($1.6 billion) for mini packages, and 12% ($0.7 billion) for micro products.

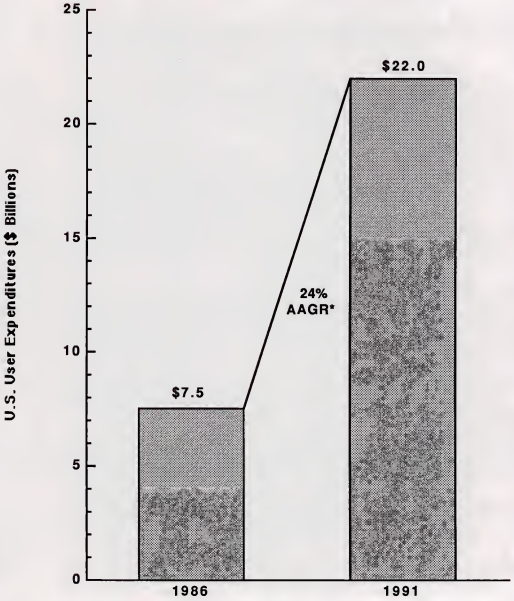
  - The higher percentage for mainframe and mini products is not surprising as those types of software products systems have a higher average unit price.

  - Stimulating the increase of mainframe percent of market is the increased sales of IBM large systems and the ensuing OS licenses.

- With the growth of micros and their increasing usefulness as productivity tools, rapid systems software expansion will occur. Starting from a much smaller base than systems software products for larger systems, the micro

EXHIBIT III-1

SYSTEMS SOFTWARE MARKET, 1986-1991

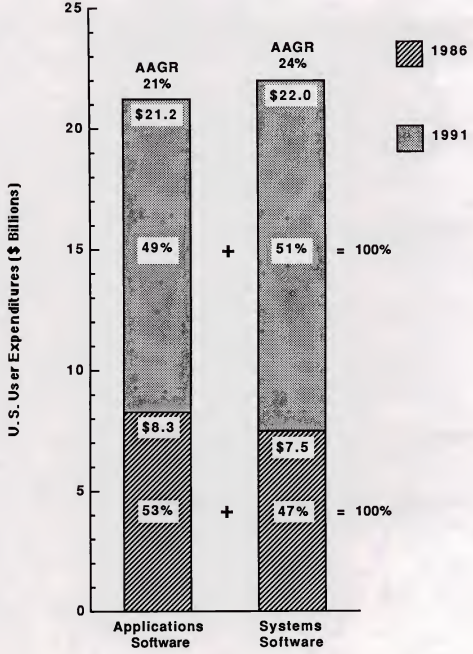


*Average Annual Growth Rate

MSPA-SS.Jz

EXHIBIT III-2

SOFTWARE PRODUCTS MARKETS, 1986-1991



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segment will have a 36% AAGR from 1986-1991 (see Exhibits III-3, III-4, and III-5).

B. LEADING VENDORS

- In the systems software market in 1985, hardware vendors accounted for the vast majority of user expenditures. The major segment from which these vendors derive revenue is systems control (due to vendor-supplied and often proprietary OS).

- IBM is the only major hardware vendor that provides a significant amount of micro systems software (primarily the PC-DOS OS). Since the average revenue to IBM per system is relatively small, IBM's micro systems software revenue and, consequently, the revenue of hardware vendors as a whole in this micro segment is relatively small.

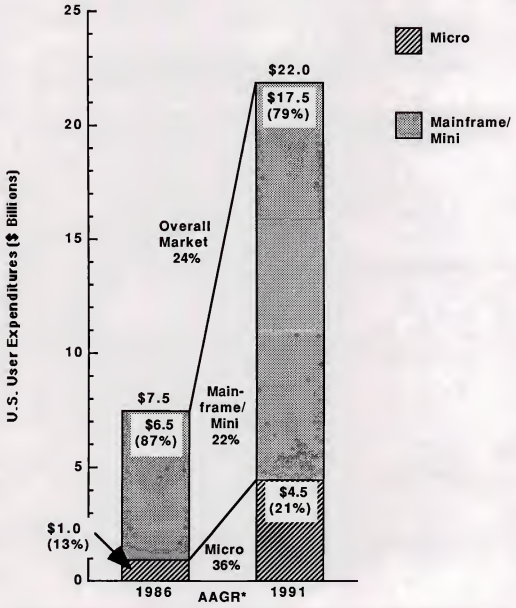
- Leading systems software vendors and their market shares for 1985 are listed in Exhibit III-6. Since IBM has such an overwhelming percentage of the market, Exhibit III-7 is provided listing the top independent (non-hardware) systems software vendors.

C. SEGMENT OVERVIEW

- Systems software market segments are highlighted in Exhibit III-8. All three segments will have healthy five-year growth rates, but the systems control segment will be the largest market segment in 1991 by a significant margin. An explanation for the growth in specific segments follows.

EXHIBIT III-3

SYSTEMS SOFTWARE GROWTH, 1986-1991

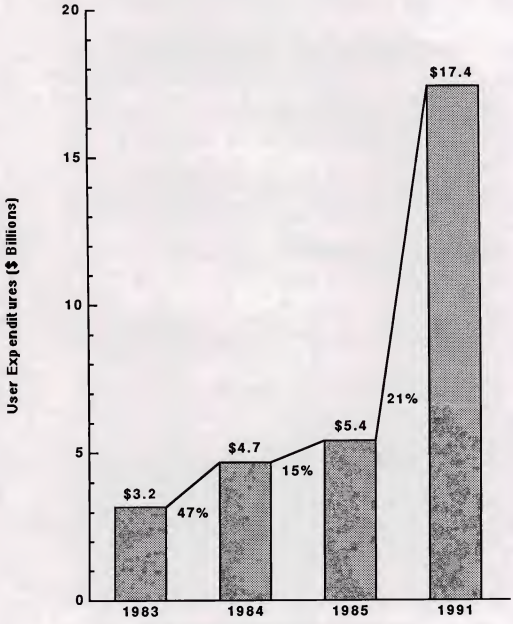


Note: Percent of 1985 and 1991 systems software markets are shown in parentheses.

*Average Annual Growth Rate

EXHIBIT III-4

MAINFRAME/MINI SYSTEMS SOFTWARE*
U.S. BUSINESS

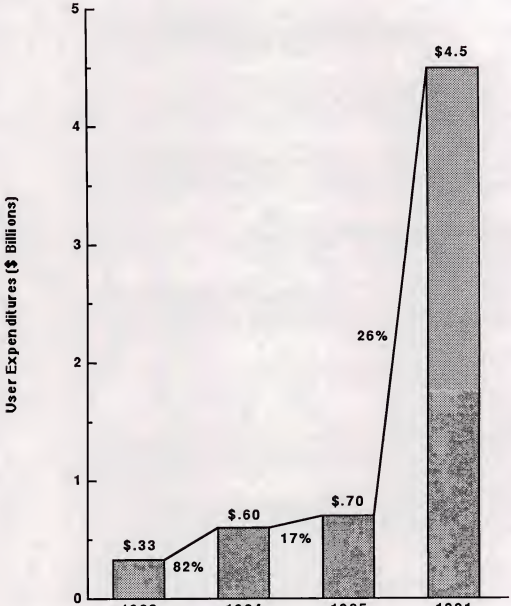


*Includes Application Development Tools, Data Center Management, and Systems Control.

MSPA-SSJz

EXHIBIT III-5

MICROCOMPUTER SYSTEMS SOFTWARE*
U.S. BUSINESS



*Includes: Application Development Tools, Data Center Management, and Systems Control.

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EXHIBIT III-6

SYSTEMS SOFTWARE PRODUCT LEADERS, 1985

RANK	COMPANY	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
1	IBM	$2,500	41%
2	DEC	$300	5%
3	Microsoft*	$190	3%
4	Hewlett-Packard	$150	2%
5=	Ashton-Tate	$120	2%
5=	Burroughs	$120	2%
5=	Cullinet	$120	2%
8	NCR	$115	2%
9	ADR	$110	2%
10=	Computer Assoc. Intersil	$105	2%
10=	Sperry	$105	2%

Total Systems Software Product Market = $6,100 Million.

Top 10 = 63% of Market.

*Includes distribution revenue for micro software.

EXHIBIT III-7

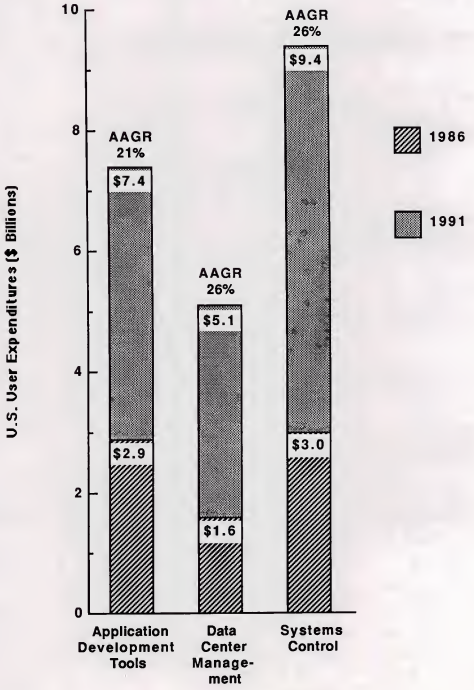
SYSTEMS SOFTWARE PRODUCT LEADERS (NON-HARDWARE), 1985

RANK	COMPANY	USER EXPENDITURES ($ Millions)
1	Microsoft*	$190
2	Cullinet	$120
3	Ashton-Tate*	$120
4	ADR	$110
5	Computer Associates	$105
6	Pansophic	$60
7	Uccel	$55
8=	Candle	$50
8=	Cincom	$50
8=	Information Builders	$50
9	Software AG	$45
10	Sterling Software	$38

*Includes distribution revenue for micro software.

EXHIBIT III-8

TOTAL SYSTEMS SOFTWARE MARKET BY SOFTWARE TYPE, 1986-1991

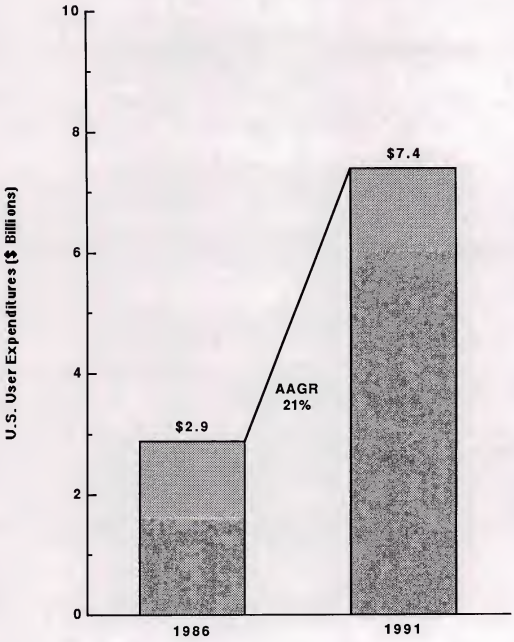


D. APPLICATION DEVELOPMENT TOOLS (ADT)

- The application development tools segment of the systems software market includes:
  - DBMS.
  - Languages (including 4GL).
  - Data dictionaries.
  - Compilers.
  - Retrieval systems.
- The application development tool market will have the lowest 1986-1991 growth rate of all the systems software segments at 21% (see Exhibits III-9, III-10, and III-11). This percentage growth may, however, be deceiving in that the user expenditures in 1991 will be substantial ($7.4 billion).
  - Impediments to market growth are:
    - IBM's drive to make DB2 a standard has lengthened the selling cycle of large system DBMS products due to user confusion.
    - With the introduction of more capable micros, a lower-cost micro will be able to be purchased where once a higher-priced mainframe or mini product sufficed. This will, however, be a stimulus to the micro DBMS and tool market.

EXHIBIT III-9

APPLICATION DEVELOPMENT TOOLS, 1986-1991



MSPA-SSJz

EXHIBIT III-10

APPLICATION DEVELOPMENT TOOLS, 1986-1991
MAINFRAME/MINI-BASED

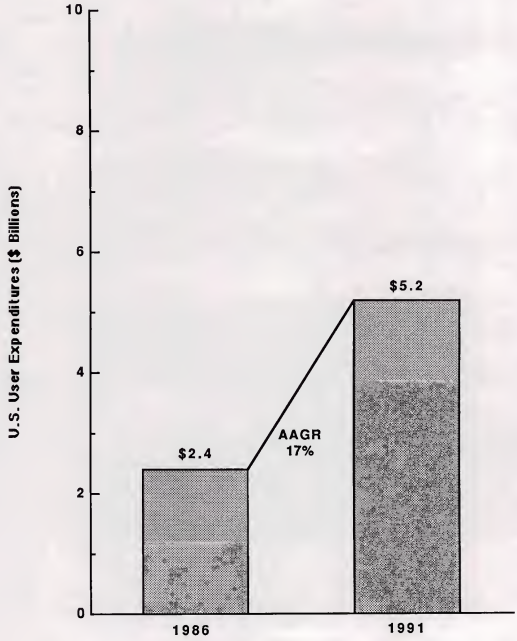


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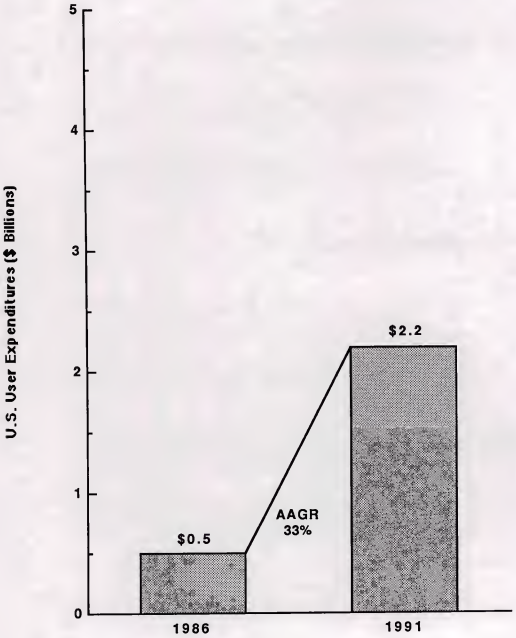
EXHIBIT III-11

APPLICATION DEVELOPMENT TOOLS, 1986-1991
MICROCOMPUTER-BASED



MSPA-SSJz

- Stimulants to the market are:

  . The increase in the installed base of hardware that will need DBMS and tools.

  . End-user computing demand. End users will increasingly demand more tools to access information and create systems. They will realize that many off-the-shelf applications packages will not satisfy their specific needs and will resort to fourth generation languages either on hosts or on micros to build or rework programs.

  . Easier to use retrieval tools that will increase in popularity for nonprogrammers.

  . The desire for increases in user and programmer productivity that many ADTs are said to deliver.

- The major vendors in the application development tools market are listed in Chapter IV.

  - The leading vendor in this category is, again, IBM due to recurring revenues from IMS.

  - In 1985, most vendors had significant growth which has continued into 1986, specifically:

    . Pansophic (also a provider of SC products).

    . Computer Associates International.

    . Ashton-Tate.

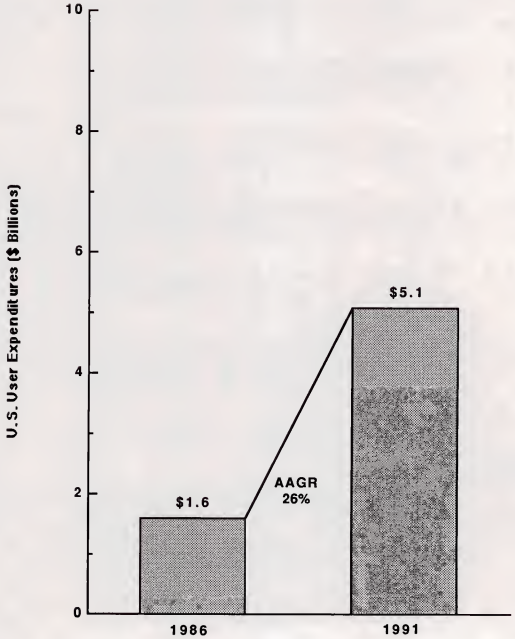
    . Oracle.

E. DATA CENTER MANAGEMENT (DCM)

- There are two broad types of data center management software products:
  - Products that optimize a machine's internal resources.
  - Products that help increase the productivity of the entire computer center.
- DCM products include such things as:
  - Capacity management.
  - Disk management (e.g., Sterling Software DMS/OS).
  - Performance monitoring (e.g., Goal Systems products).
  - Performance evaluation (e.g., CAI, JARS, UCCEL Express).
- The data center management (DCM) segment is expected to more than double within the forecast period (see Exhibits III-12, III-13, III-14).
  - Ninety-eight percent of the 1986 DCM market is for mainframe and mini-based products (2% micro products). As micros become more complex, interconnect, and utilize host data, the need to optimize the use of costly large host systems will continue to be a stimulant to the mainframe/mini DCM market throughout the forecast period.
  - The micro segment will experience significant growth (an AAGR of 80%), but this is primarily due to a low 1986 user expenditure base.

EXHIBIT III-12

DATA CENTER MANAGEMENT, 1986-1991

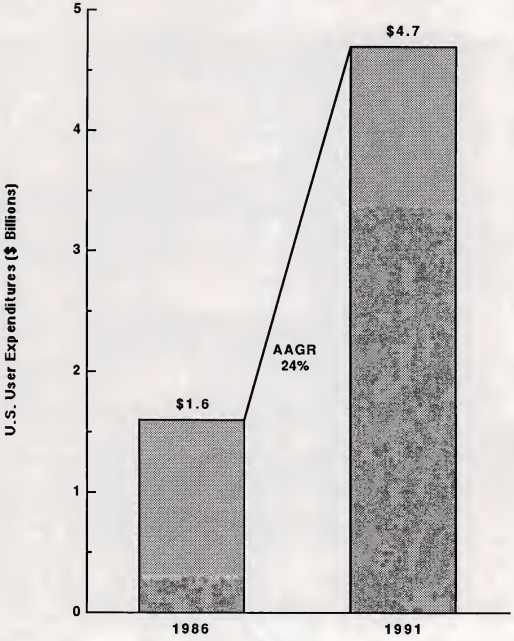


MSPA-SSJz

INPUT

EXHIBIT III-13

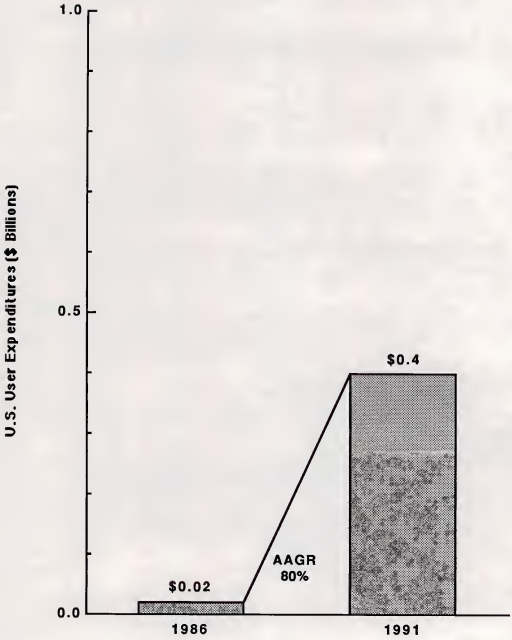
DATA CENTER MANAGEMENT, 1986-1991
MAINFRAME/MINI-BASED



MSPA-SSJz

EXHIBIT III-14

DATA CENTER MANAGEMENT, 1986-1991
MICROCOMPUTER-BASED



MSPA-SS.Jz

- As micros become more complex and interconnect, firms will require additional overhead of software, services, and people to coordinate their use. This will help fuel data center management growth so that in 1991 micro software-related products will be 9% of total systems software user expenditures.

- Stimulants to the market include:

  - Economic conditions and confusion over buying options that decrease the purchasing of new systems and encourage the optimization of existing products.

  - Micros now costing $3,000 will in many cases be replaced within the forecast period by more sophisticated multiuser systems connected to terminals.

    - Consequently, management of these computing resources will become an issue. Individual departments within a corporation will become "mini" DP departments.

    - As LANs increase in importance, keeping track of files, scheduling, and backup will become major issues that data center management products address.

  - The evolution of the data center that puts the ability to access host data in the hands of nonprogrammers.

- Major vendors in this segment are again found in Chapter IV. Most vendors, such as VM Software, Duquesne Systems, and UCCEL, are expected to retain or increase market share due to quality products and name recognition.

F. SYSTEMS CONTROL (SC)

1. OVERVIEW

- The systems control market includes such products as operating systems, communications software, and security packages--products that help direct, schedule, and/or control a computer's internal resources.

- In 1991, the systems control segment will account for over $9 billion in user expenditures as a result of a five-year 26% AAGR (see Exhibit III-15). This will make the systems control sector in 1991 one-third larger than the entire systems software market in 1986 ($7 billion).

  - In 1986, the mainframe/mini segment of this market accounted for 87% of the user expenditures. In 1990, the mainframe/mini share of the segment is expected to decrease to 80% of the market.

  - The increase in micro share can be attributed in most part to the micro shipments of systems with more functional and more expensive operating systems, as well as the incorporation of micro-mainframe links and LANs on new and existing micros.

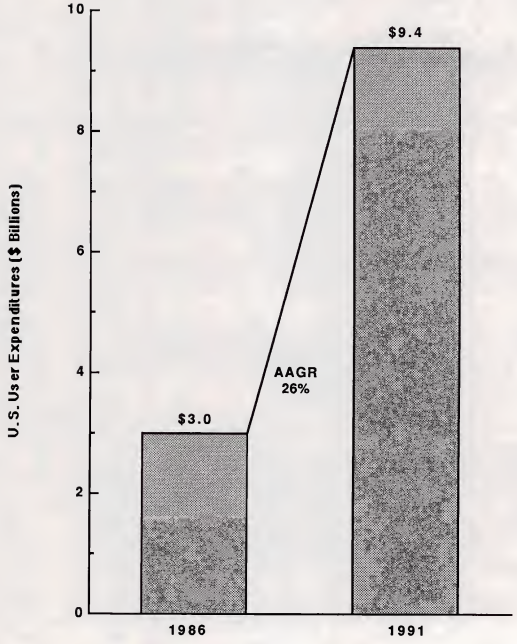
  - Both the mainframe/mini and micro segments will have growth rates in excess of 20% throughout the forecast period (see Exhibits III-16 and III-17).

- Factors that serve to stimulate systems control growth include:

  - The drive toward connectivity that leads to increased sales of micro-mainframe (M-M) links and new security packages for three-tiered systems.

EXHIBIT III-15

SYSTEMS CONTROL, 1986-1991

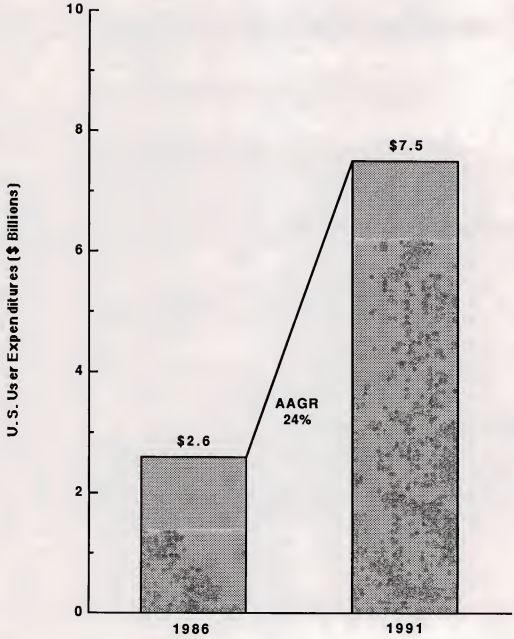


MSPA-SS.Jz

INPUT

EXHIBIT III-16

SYSTEMS CONTROL, 1986-1991
MAINFRAME/MINI-BASED

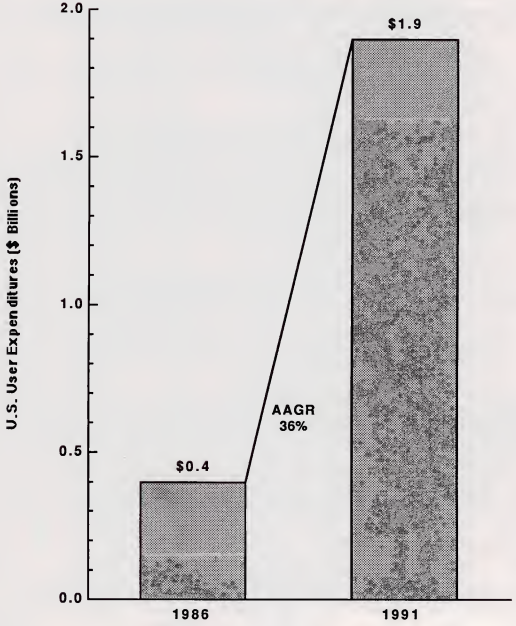


MSPA-SSJz

INPUT

EXHIBIT III-17

SYSTEMS CONTROL, 1986-1991
MICROCOMPUTER-BASED



MSPA-SS.Jz

- Sales of hardware systems, especially large systems with large licensing fees.

2. OPERATING SYSTEMS

- In order for the application software market to develop, an operating system (OS) standard must be available to serve as the foundation for families of software products. Knowing which OS will emerge as the dominant standard is therefore crucial.

  - On large systems, IBM's MVS/XA and VM will be the two major products.

  - On mid-range systems, DEC's VAX/VMS and IBM's VM and SSP will remain the leaders.

  - On the micro level, PC-DOS or MS-DOS will remain the leader with such other OSs as UNIX and VM gaining in favor with 80286 and 80386 machines. Multiuser, multitasking, shared-file, and interconnected personal processing are the new markets that await OS development.

3. MICRO-MAINFRAME LINKS

- Micro-mainframe links are increasing in importance to users as:

  - End-user computing continues with an increasing installed base of standalone micros in all departments

  - Standards evolve in M-M products.

- A 1986 INPUT survey found users estimating M-M importance increasing by an average of 60% over the next two years, a finding consistent with earlier research.

- INPUT projects that there were over 350,000 M-M links installed in 1985 (direct connect via an emulation board versus by a modem). M-M links installed in 1991 will exceed three million.

4. LANS

- Personal computing is evolving beyond its original standalone role. The focus of the next wave of personal computers will be on connecting them, easing the process of getting information from the mainframe, and exchanging information. This can all occur over a local area network (LAN).

- Local area networks represent the obvious next step for large corporations to take to increase the productivity of end users and the computer systems that they use.

  - Companies are standardizing on hardware and software because any incompatibilities would hamper efforts to move users to LANs.

  - In many companies, the PC will emerge as a multipurpose terminal tied to departmental minicomputers which, in turn, will be tied to the corporate data base. In such a configuration, the PC would be used for spreadsheets and local data base work, yet have the transparent connections through information directories to departmental and corporate data. Either M-M links or LANs could be used in this scenario.

IV COMPETITIVE DEVELOPMENTS

A. INTRODUCTION

- The number of vendors in the systems software area continues to grow especially in the area of ADT (with tools and aids) and SC (with gateways, link products, and interfaces).

- In such well-established markets as DBMS and OS, significant penetration by unknown vendors is highly unlikely.

- Key vendors in each of the systems software segments follow. In several instances, vendors have products in more than one segment but are categorized by the segment where they receive the largest revenue.

B. VENDOR PROFILES

1. APPLICATION DEVELOPMENT TOOLS

   a. Applied Data Research, Inc.

- Applied Data Research, Inc., Route 206 & Orchard Road, Princeton, NJ 08540.

- Applied Data Research (ADR), founded in 1959, is engaged in the design, development, marketing, and support of systems software products primarily in the area of ADT. Specifically, ADR products include data base management (DATACOM/DB), application development (IDEAL), on-line programming (ROSCOE), office automation (ADR/EMAIL), decision support (EMPIRE), and performance measurement (ADR/LOOK).

- In January 1986, a regional Bell Operating Company, Ameritech (Chicago, IL), acquired ADR for $215 million, thus entering into the competitive computer services industry. Ameritech publicly announced its intention to operate ADR as a separate subsidiary under ADR's existing management, but less than a year later ADR president Martin Goetz voluntarily stepped aside. He was replaced by a former president of Ameritech Mobile Communications.

- In March 1986, ADR announced a change in pricing policy, reducing leasing rates of certain term leases. This was to reflect the expected long-term life of its software and to make term leasing economically attractive to clients. At the same time, ADR maintained the same permanent license prices for all products.

- In order to increase its presence in the personal computer software market, ADR signed a development agreement with Ashton-Tate. This agreement permitted direct information exchange between ADR's Datacom/DB mainframe data base management system and Ashton-Tate's dBASE and Framework packages, both working through ADR's PC Datacom.

- In response to the trend toward distributed or departmental processing, ADR has declared its intent to focus new product development on the LAN market as opposed to the DEC market as most of its third-party DBMS competitors have chosen to do.

b. Cullinet Software, Inc.

- Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02020.

- Cullinet Software, Inc. develops, markets, and supports software primarily in the areas of:

  - DBMS and tools.

  - Applications software for manufacturing, banking and finance, and human resources.

- The foundation of Cullinet's software line is its Integrated Database Management System (IDMS) and its relational counterpart (IDMS/R). Seventy-two percent of the company's revenue revolves around this data base product line. A rapidly growing area of the company's business is information center software, such as Cullinet's Information Center Management System (ICMS) which provides customers with the means to access and analyze mainframe-resident corporate information through their personal computers. Information center software products accounted for 9% of Cullinet's 1986 revenue. The remaining 19% was divided between various applications software packages.

- Cullinet sales were essentially flat between fiscal 1985 and 1986 after a previous growth of 53% (1984-1985). Cullinet attributed this to an overall slowdown in the growth of the software industry along with significantly reduced capital spending on the part of its prospective customers. Pricing changes within the overall DBMS market also contributed to the flat growth, particularly the increased acceptance of IBM's competitively-priced DB2 product and ADR's decision to emphasize lower-priced leased software.

- In early 1986, major management changes occurred. New management has since focused Cullinet to take a number of steps to improve the revenue outlook of fiscal year 1987. Cullinet acquired two minicomputer software

companies, ESVEL, Inc. of San Jose (CA) and Computer Strategies, Inc. of Grand Rapids (MI). ESVEL offers a data base management system for 32-bit minicomputers systems such as the DEC VAX line as well as competitive systems from Honeywell, Hewlett-Packard, and Data General. Computer Strategies markets software for manufacturing industries using DEC VAX and other minicomputer systems. These acquisitions signal a strong thrust by Cullinet into the high-growth VAX market.

- In August 1986, Cullinet announced that it would provide some level of support for IBM's SQL in its products. While announcing support of the SQL standard, Cullinet was quick to add that it would not provide support for the competing DB2 product.

c. Software AG Systems, Inc.

- Software AG Systems, Inc., 11800 Sunrise Valley Drive, Reston, VA 22091.

- Software AG Systems, Inc. (Software AG) develops, markets, and supports an integrated line of systems software products, specializing in data base management systems (DBMS) and application development tools.

- Fiscal 1985 revenue was $52 million, a 27% increase over 1984. Software AG management attributes revenue increases principally to a greater volume of licenses for its products. Declines in net income during fiscal 1985 of 12% resulted from a change in the method of accounting for contract revenue. The new policy is to recognize revenue at the time the product is installed as opposed to its former policy which had been to recognize 90% of the revenue at contract execution and the remaining 10% at installation. The company's primary products for IBM mainframes, ADABASE (DBMS) and NATURAL (4GL), account for the vast majority of yearly revenue.

- In 1986, Software AG announced its intention to have NATURAL support for DB2. The product already supports the DEC VAX line.

- Software AG has joint agreements with numerous applications software vendors to:

  - Develop new applications software products around Software AG products.

  - Integrate Software AG products into existing applications.

  - Provide interface capabilities that permit Software AG products to be used with existing applications.

d. Cincom Systems, Inc.

- Cincom Systems, Inc., 2300 Montana Avenue, Cincinnati, OH 45211.

- Cincom provides data base management, data communications, and related systems software; applications software; and associated educational and support services to over 7,000 clients.

- Fiscal 1985 revenue reached $92 million, an 8% increase over fiscal 1984 revenue of $85 million. Cincom expects a 25% growth rate for fiscal 1986.

- Revenue for fiscal 1985 was derived from the following sources:

Total Information System (TIS)	28%
TOTAL	25
MANTIS	22
ULTRA	4

NET/MASTER	3
Other systems software products	8
Applications software products	10
	100%

- Cincom's products include:

  - SUPRA, introduced in 1985, the replacement product for Cincom's Total Information System (TIS). SUPRA is an advanced relational data base management system for the IBM mainframe environment.

  - TIS (SUPRAS's predecessor product), an integrated data base system designed for the high-volume data processing environment. TIS was installed at 275 sites as of October 1985. ULTRA is the DEC VAX version of TIS.

  - The TOTAL Data Base Management System, with data independent and structuring capabilities that allow users to develop applications on a modular basis.

  - MANTIS, an on-line application development system and programming language using structured coding and top-down design techniques.

e. Computer Associates International, Inc.

- Computer Associates International, Inc., Computer Associates Building, 125 Jericho Turnpike, Jericho, NY 11753.

- Computer Associates International, Inc. (CAI) designs, develops, markets, and supports systems, data base management, and applications software products for mainframes, minicomputers, and microcomputers.

- The company's primary systems software products include CA-DYNAM, CA-OPTIMIZER, CA-SORT, and CA-UNIVERSE.

  - The CA-DYNAM/CMS tape management family was introduced in June 1983. The products consist of a VM/CMS version of CAI's CA-DYNAM/T tape management system and CA-DYNAM/B, a flexible backup and restore facility for the VM/CMS environment.

  - CA-OPTIMIZER and CA-SORT are a code optimizer and sort package, respectively.

  - CA-UNIVERSE, introduced in April 1983, is a relational data base management system written in the C language and transportable across various vendors' hardware.

- CAI entered the microcomputer applications software market as a result of its June 1983 acquisition of Information Unlimited Software (IUS) and Sorcim and has continued to be very aggressive with acquisitions (Software International and ISSCO) in 1986.

f. Ashton-Tate

- Ashton-Tate, 20101 Hamilton Avenue, Torrance, CA 90502.

- Ashton-Tate develops, markets, and supports data base management, word processing, integrated, and graphics software for microcomputers.

- Fiscal 1986 revenue reached $122 million, a 48% increase over 1985. Net income for the same year increased 122%.

- In 1986, Ashton-Tate introduced a LAN version of its popular dBASE product and has announced its intentions of entering the mainframe software market sometime in the near future.

g. Oracle Systems Corporation

- Oracle Systems Corporation, 20 Davis Drive, Belmont, CA 94002.

- Oracle develops and markets data base management, applications development, and decision support software products.

- In March 1986, Oracle made an initial public offering of 2.1 million shares of Oracle common stock. One million shares were offered by Oracle Systems Corporation and the remaining 1.1 million shares by selling shareholders. Net proceeds of approximately $14 million will be used for repayment of notes payable and for general corporate purposes, including continued product development and possible acquisitions of related businesses or software products.

- Oracle's principal product is the ORACLE relational data base management system. ORACLE allows users to define, retrieve, manipulate, and control data stored in a computer using the IBM compatible SQL nonprocedural language.

- ORACLE was designed and written to make it adaptable or portable to most computer hardware and operating systems, specifically MVS, VM, VMS, PC-DOS, and UNIX. This portability allows customers to use the same data base management software and user interface on all their machines. ORACLE has been ported to a variety of microcomputers, minicomputers, and mainframes. The price for a microcomputer version ranges from $1,000 to $24,000. A minicomputer or mainframe version ranges in price from $12,000 to $160,000.

- In late 1986, Oracle announced SGL Star, a distributed relational (DBMS), as well as a menu interface for novice users called EASY.

h. Relational Technology, Inc.

- Relational Technology, Inc., 2855 Telegraph Avenue, Berkeley, CA 94705.

- Relational Technology, Inc. (RTI), founded in 1980, develops and markets relational data base management systems software and related utility packages.

- RTI's primary software product was originally developed by computer scientists at U.C. Berkeley in the early 1970s. The founders of RTI acquired the commercial licensing rights in 1980 and developed an enhanced commercial version called INGRES.

- Since then, RTI has announced a DDBMS to be shipped in early 1987.

i. Pansophic Systems, Inc.

- Pansophic Systems, Inc., 709 Enterprise Drive, Oak Brook, IL 60521.

- Pansophic Systems, Inc., founded in 1969, develops, markets, and supports standardized computer applications development software products. The company's primary products are EASYTRIEVE-PLUS, which facilitates the retrieval of data stored in computer systems; PANVALET and PAN EXEC, which store and protect software program libraries; and GENER/OL and TELON, which facilitate computer applications development.

- Pansophic's product line includes:

  - EASYTRIEVE (data retrieval tool) - 50% of 1985 revenue.

  - PANVALET (library control system) - 30% of 1985 revenue.

  - TELON, GENER/OL (development tools) - 20% of 1985 revenue.

- Pan-link (micro-mainframe link).

- Ingot (DSS acquired in February 1986).

- D-Pict (graphics acquired in January 1986).

- SPSS (DSS company acquired in November 1986).

- Noting the above list, it is apparent that Pansophic is actively increasing its product offerings by aquisitions of products as well as companies. They are forming a separate sales organization to sell their applications products.

- Pansophic's 1985 revenue in 1986 (April) was $80 million. Projected revenue for 1987 is over $100 million.

- Pansophic has also been active in acquiring software companies. For example, Pansophic acquired the graphics division of British Petroleum PLC's data plotting services unit in January 1986, and in August 1986, Pansophic signed a letter of intent to acquire Fusion Products International, Inc., a developer of information retrieval and report writing systems, for $7.2 million in stock. Also, Pansophic recently purchased SPSS, Inc.'s statistical software package for service demographics.

- The fact that Pansophic is targeting "all segments of the business computing environment" may be overextending resources and expertise too far outside the market where they are known and respected.

- In late calendar 1985, Pansophic had a major sales reorganization and started a telemarketing group. This was to combat decreasing U.S. sales (international sales remained strong). In January 1986, the company increased the price on maintenance of products by 25%.

- Pansophic was extremely active in 1986, reinvesting revenue into the company's future in both product development (almost $10 million) and product marketing (developing an extensive in-house training and development program for its sales and marketing personnel and its independent marketing representatives).

2. DATA CENTER MANAGEMENT

a. VM Software, Inc.

- VM Software, Inc., 2070 Chain Bridge Road, Suite 355, Vienna, VA 22180.

- VM Software, Inc., founded in 1981, develops, markets, and supports systems software products for IBM's VM operating environment.

- VM Software markets a family of standard system software products for use with IBM's VM operating system that are designed to enhance the control, productivity, and security of a customer's data processing resources. The family consists of seven individual products which can be licensed separately or as an integrated product called VMCENTER T.M.

- 1985 net revenue reached $18 million, a 62% increase over $11.1 million for 1984. Net income rose 74%, from $1.8 million in 1984 to $3.1 million in 1985. In 1986 revenue is expected to increase by 50%.

- VM Software management attributes revenue growth primarily to the increase in unit product licenses, the introduction of new products and new releases of existing products, general price increases, and a decrease in the level of product returns.

- In May 1985, VM Software made an initial public offering of almost two million shares. Funds raised will be used to repay debts and for general corporate purposes, including working capital and possible acquisitions.

- In March 1985, VM Software entered into an agreement with IBM granting to IBM a ten-year, worldwide, nonexclusive right to license VM Software's VMBACKUP, VMARCHIVE, and VMTAPE systems software packages. In 1985, VM Software recorded $575,000 in revenue under this marketing agreement with IBM. In third quarter 1985, IBM corporate purchased a significant amount of product for internal use but resold very little.

- In early 1986 the company introduced:

  - VM Batch - improves VM in doing batch-like functions.

  - VM Operator - whereby an operator needs fewer functions to run VM.

  - VM Monitor - for capacity planning and performance monitoring.

- In the near future, the company will be developing products to fill the functionality holes of SQL.

b. Duquesne Systems, Inc.

- Duquesne Systems, Inc., Two Allegheny Center, Pittsburgh, PA 15212.

- Duquesne Systems, Inc. (DSI), founded in 1970, provides systems software products for computer performance management and capacity planning.

- Revenue for fiscal 1985 increased 49% to $11.1 million from $7.5 million in fiscal 1984. Net income for the year increased 58% to $2.4 million from $1.5 million the previous year.

- DSI's system productivity enhancement software products are designed to run on IBM and compatible mainframes under MVS. There are currently over 3,500 product installations in over 1,200 computer sites worldwide.

- DSI's product line consists of five distinct product groups:
  - Performance Management Facilities (PMF).
  - Shared Service Management (Shared Device Management).
  - Dynamic Performance Optimization (DPO).
  - System Utilities (SYSLOG, JOBLOG).
  - Terminal Productivity Executive (TPX).

c. Candle Corporation

- Candle Corporation, 10880 Wilshire Boulevard, Los Angeles, CA 90024.
- Candle Corporation, founded as a privately held corporation in 1977, develops, markets, and supports performance monitoring systems software products for IBM and plug-compatible mainframes. Candle's first (and major) product, OMEGAMON, is currently installed in over 3500 different sites worldwide.
- Candle is broken down into two divisions, the Computer Services Division, which develops, markets, and supports Candle's proprietary performance monitoring software products, and the Information Services Division, which develops software products for office automation and electronic mail systems.

d. Boole & Babbage

- Boole & Babbage, 510 Oakmead Parkway, Sunnyvale, CA 94086.
- Boole & Babbage, Inc., founded in 1967, designs, markets, and supports packaged software products and related services.

- Boole & Babbage's software products can be classified into two broad categories--performance management and capacity management. The major market for the company's products are IBM systems using MVS and MVS/XA operating systems with or without IMS as a subsystem.

- Most of Boole & Babbage's products are included within its Information Resources Planning and Control (IRP) framework, a family of performance and capacity management products which collectively provide data extraction, data base management, analysis and monitoring, and planning and modeling capabilities. There are at least 17 distinct modules that can be added separately to form a complete integrated system.

- Boole & Babbage did not perform well financially in fiscal 1985. Changes in MVS and IMS required significant (and costly) changes in IRP products.

- More recently, Boole & Babbage sales have rebounded, with fiscal year 1986 revenues increasing 21% over 1985 ($28 million) and fiscal 1986 income at $1 million up from a loss of almost $6 million in 1985. A slowly improving economic environment, along with increased sales of VM systems, has combined to provide optimism by the company for continued improved sales.

e. UCCEL Corporation

- UCCEL Corporation, UCCEL Tower, Exchange Park, 6303 Forest Park, Dallas, TX 75235-5499,

- UCCEL provides systems software and financial management applications software products for IBM and compatible mainframes.

- Through 1985 UCCEL provided systems and applications software products, processing services, and turnkey systems worldwide. During early 1986 the company sold off its domestic and international processing services businesses

and its mainframe commercial applications (cross-industry) software product line.

- UCCEL's 1985 revenue was $204.7 million.

- UCCEL has become very aggressive with acquisitions recently. Several major acquisitions include:

  - In December 1985, UCCEL acquired the operating environment conversion software product and support business (Conversions, Inc.) of Rand Information Systems, Inc. The acquisition included Rand's EXITDOS and TRANSIT products.

  - Corodale was also acquired in mid-1985. Corodale, a vendor of IBM DOS/VSE systems software for tape and disk management and job scheduling, now operates as UCCEL VSE & Conversion Systems within UCCEL's Systems Software Group.

- The company has also begun a diversification campaign to focus the company as highlighted below:

  - In December 1985, UCCEL sold its domestic Dallas-based processing services to Babcock & Wilcox Company for $4.8 million.

  - In January 1986, UCCEL sold its mainframe commercial applications software product line to Global Software, Inc. for $3.1 million. The sale included cross-industry products for accounts receivable, fixed assets, accounts payable, and tax applications.

  - In April 1986, UCCEL sold its Computer Integrated Manufacturing Company (CIMCO) subsidiary to Automated Industrial Systems, Inc. of Austin (TX).

- During August 1986, UCCEL announced it had signed a letter of intent to sell its Open Systems, Inc. microcomputer software subsidiary and Digital Systems turnkey system division to Convergent Technologies for $28.5 million.

- UCCEL has restructured its operations into three primary business units, as follows:

  - The Systems Software Group is composed of North America and International Software Divisions, UCCEL Express Software, and UCCEL VSE and Conversions Systems.

  - The Financial Systems Division provides applications software products to the banking and thrift industries.

  - The Micro and Turnkey Group includes the operations of Open Systems, Digital Systems, and Spectrum Training Corporation, a provider of computer-based training products and services.

- Approximately 60% of UCCEL's 1985 revenue was derived from software products, 31% from remote computing services and other professional services, and 9% from minicomputer-based turnkey systems.

3. SYSTEMS CONTROL

   a. Microsoft Corporation

- Microsoft Corporation, 16011 N.E. 36th, Redmond, WA 98073-9717.

- Microsoft designs, manufactures, and markets microcomputer systems and applications software.

- The company is the provider of the PC-DOS OS to IBM. They also market Xenix, a multiuser OS based on UNIX.

- Fiscal 1985 revenue reached $140.4 million, a 44% increase over $97.5 million reported for fiscal 1984.

- In February 1986, the company sold 2.5 million shares of Microsoft common stock on the over-the-counter exchange. The company's proceeds from the sale will be used for general corporate purposes, primarily working capital, product development, and capital expenditures.

- Approximately 92% of Microsoft's fiscal 1985 revenue was derived from software products (54% systems software and 38% applications software). The remaining 8% of revenue was derived from hardware and book sales.

b. On-Line Software International, Inc.

- On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, NJ 07024.

- On-Line Software International was founded in 1969 as a software consulting company specializing in large-scale data base and data communications systems. Currently, 65% of On-Line Software's revenue is derived from systems software products designed for IBM mainframe users. The company also offers CICS, IMS, VSAM, and VTAM courses and publishes reference handbooks relating to CICS, IMS, and VTAM software.

- Fiscal 1985 revenue reached $29 million, a 12% increase over fiscal 1984 revenue of $25.9 million. Net income was $871,000 compared to a net loss of $836,000 in fiscal 1984.

- On-Line Software management attributes the company's return to profitability in fiscal 1985 to the following factors:

- The continuation of a cost control program first implemented in late fiscal 1984.

- Substantial completion of product development efforts initiated in fiscal 1983 and fiscal 1984, which provided the ability to realize revenue from the license of these products in 1985.

- The introduction of a new product, VERIFY T.M., an automated quality control software product.

- Expansion of existing products into new areas of operation.

- During fiscal 1985, On-Line Software acquired two CICS security software packages. SECURE/CICS was acquired from Boole & Babbage, Inc., and COSS was acquired from Oxford Software, Inc.

- In December 1984, On-Line Software acquired CICS/TCA T.M., a programming tool, from D.A. Brask Systems, Inc. VERIFY, On-Line Software's automated quality control testing tool, introduced in April 1985, is based on CICS/TCA.

c. Sterling Software, Inc.

- Sterling Software, Inc., 8080 North Central Expressway, Suite 1140, Dallas, TX 75206.

- Sterling Software, through its wholly-owned subsidiaries, acquires, develops, markets, and supports a broad range of systems and applications software products and professional services. The company was incorporated in February 1983 and has successfully followed a strategy of software revenue growth through its decentralized subsidiaries. The company is organized into six operating groups:

- Systems Software Group.
- Federal Systems Group.
- Professional Services Group.
- Information Services Group.
- Financial Software Group.
- Business Management Group.

- The company was started in 1981 by a group of investors whose strategy was to acquire companies that were specialists in key markets and vertical niches and to allow these specialists a free hand in developing and growing these organizations. Sterling was to provide financial and market assistance, but each operating company was allowed full independence in all areas of their companies, from product development to the setting of product pricing and support policies.

- In August 1985, Sterling acquired Informatics General Corporation for $126 million. This acquisition increased Sterling from a $19 million company to a $236 million company. While some analysts have questioned the acquistion from the standpoint of debt and the risks involved in the IBM mainframe software market, Sterling officials felt that Informatics was present in markets that Sterling should either enter or increase their presence in. In addition, Informatics is a clearly recognizable name in the industry.

- Sterling has moved quickly to blend Informatics into the company. The company cut $20 million in corporate overhead, primarily through management firings. And to further lessen the debt incurred by buying Informatics, Sterling began a divestiture program that involved the sale of four divisions.

- Pacesetter Systems (to Shared Financial Systems of Dallas).

- Management Control Systems (to Simon & Schuster of New York).

- Legal Systems (to Baron Data Systems of San Leandro, CA).

- The company has not announced the fourth division targeted for divestiture.

V CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

- The systems software market in 1985 was one of the healthiest segments of the information services industry. It had a 23% growth from 1984-1985 as opposed to the overall information services market that had a 17% growth. It will continue from 1986-1991 with a 24% AAGR

- There are inherent characteristics in most systems software products that contributed to that growth. Most of these characteristics capitalized on the tightening in the U.S. ecomony which created the desire to make existing computer center resources more efficient.

- IBM will continue to be the major competitor in the systems software market with over 40% market share in 1985, primarily from OS licenses. There will, however, continue to be opportunities for vendors of products that enhance or complement IBM hardware, OS, and DBMS products.

- The ADT market will have a 21% AAGR throughout the forecast period, becoming a $7 billion opportunity by 1991. Spurring this growth will be:

  - The growing installed base of hardware systems that will be able to utilize DBMS and tools.

- Increases in end-user computing that stimulate the need for easy to use ADT products and RDBMS.

- Technological changes that will make the above mentioned "easier" ADT and RDBMS possible.

- The DCM market will have a 26% AAGR, higher than ADT but beginning from a smaller base. The need to optimize the efficiency of computer resources as well as personnel will be the primary driving forces in this segment.

- In 1991, the systems control segment will account for over $9 billion in user expenditures as a result of a five-year 26% AAGR. This will make the systems control sector in 1991 one-third larger than the entire systems software market in 1986 ($7 billion).

  - Recurring revenue from OS licenses by major hardware vendors will be the major area of growth.

  - LANs, M-M links, and security packages will also experience healthy growth due to the drive toward connectivity.

B. RECOMMENDATIONS

- To take advantage of the opportunities available in the systems software marketplace, vendors should:

  - Integrate product lines. Systems should be designed so they can be easily integrated with related applications either now or later.

  - Spend more effort tracking and evaluating new technology. Technology will continue to be a major factor in product differentiation, and consequently, its creative use will be a key to vendor success.

- Be more aggressive internally with the use of systems development tools that can enhance the productivity of R&D efforts.

- Evaluate alternate distribution channels, such as subcontracting to system integration vendors who win large contracts for acquiring, combining, and installing complex hardware/software systems.

- Emphasize customer service. Post-sales support is a major opportunity for vendors to acquire a predictable annual revenue stream as well as better satisfy customers who will then return for future products.

- Be on the lookout for partners. Aggressively seek partnering activities, be they acquisitions, joint ventures, or R&D partners. This will help increase chances for sales opportunities, especially in markets where the window of opportunity is narrow.

- Focus on recurring revenues. Place more emphasis on monthly rather than up-front, one-time payments. This increases vendor financial stability plus helps stimulate sales to buyers with short-term budget pressures.

VI DATA BASE AND RECONCILIATION

- INPUT's data base of market forecasts for the system software market is contained in Exhibit VI-1.

A. 1985 MARKET

- A reconciliation between systems software market forecasts made by INPUT in 1985 compared with the 1986-1991 forecasts made in this report shows similar base year (1985) numbers (see Exhibit VI-2).

- This reflects the overall stability of the systems software market as compared to other information service market segments.

- There are, however, significant changes in several of the segments within the market:

  - The mainframe/mini segments of ADT and DCM decreased 13% and 11%, respectively, from the 1985 to the 1986 forecast. This was due to the overall softness in the information services industry encountered late in 1985, after INPUT's forecast for the year had been formalized.

  - The systems control segment for mainframe/mini was raised by 10% in this year's forecast due to an increase in MVS/XA sales for 3090 products that were shipped at year end.

EXHIBIT VI-1

SYSTEMS SOFTWARE USER EXPENDITURE FORECAST BY DELIVERY MODE, 1986-1991

SEGMENTATION BY DELIVERY MODE	1985 ($ M)	1985-1986 GROWTH	1986 ($ M)	1987 ($ M)	1988 ($ M)	1989 ($ M)	1990 ($ M)	1991 ($ M)	AAGR 1986-1991
Application Development Tools									
Mainframe/Mini	$2,100	12%	$2,352	$2,530	$2,985	$3,582	$4,370	$5,200	17%
Micro	$390	36%	$530	$760	$1,005	$1,301	$1,690	$2,210	33%
Total Application Develop. Tools	$2,490	16%	$2,882	$3,290	$3,990	$4,883	$6,060	$7,410	21%
Systems Control									
Mainframe/Mini	$2,000	30%	$2,600	$3,206	$3,688	$4,185	$5,106	$7,520	24%
Micro	$325	26%	$408	$549	$795	$1,101	$1,395	$1,892	36%
Total Systems Control	$2,325	29%	$3,008	$3,755	$4,483	$5,286	$6,501	$9,412	26%
Data Center Management									
Mainframe/Mini	$1,250	27%	$1,588	$2,040	$2,519	$3,145	$4,025	$4,700	24%
Micro	$20	15%	$23	$43	$72	$135	$240	$440	80%
Total Data Center Management	$1,270	27%	$1,611	$2,083	$2,591	$3,280	$4,265	$5,140	26%
Total Mainframe/Mini	$5,350	22%	$6,540	$7,776	$9,192	$10,912	$13,501	$17,420	22%
Total Microcomputer	$735	31%	$961	$1,352	$1,872	$2,537	$3,325	$4,542	36%
Grand Total	$6,085	23%	$7,501	$9,128	$11,064	$13,449	$16,826	$21,962	24%

EXHIBIT VI-2

SYSTEMS SOFTWARE DATA BASE RECONCILIATION

DELIVERY MODE	1985 FORE-CAST ($ M)	1986 REPORT ($ M)	VARIANCE AS PERCENT OF 1986 REPORT	1985 FORE-CAST ($ M)	1986 FORE-CAST ($ M)	VARIANCE AS PERCENT OF 1986 FORECAST	1985-1990 AAGR FORECAST IN 1985 REPORT (%)	1986-1991 AAGR FORECAST IN 1986 REPORT (%)
Application Development Tools								
Mainframe/Mini	$2,383	$2,100	13%	$7,917	$4,370	81%	27%	17%
Micro	$402	$390	3%	$2,394	$1,690	42%	43%	33%
Total Application Develop. Tools	$2,785	$2,490	12%	$10,311	$6,060	70%	30%	21%
Systems Control								
Mainframe/Mini	$1,800	$2,000	-10%	$4,613	$5,106	-10%	21%	24%
Micro	$337	$325	4%	$1,489	$1,395	7%	35%	36%
Total Systems Control	$2,137	$2,325	-8%	$6,102	$6,501	-6%	23%	26%
Data Center Management								
Mainframe/Mini	$1,386	$1,250	11%	$3,010	$4,025	-25%	17%	24%
Micro	$14	$20	-30%	$228	$240	-5%	75%	80%
Total Data Center Management	$1,400	$1,270	10%	$3,238	$4,265	-24%	18%	26%
Total Mainframe/Mini	$5,569	$5,350	4%	$15,540	$13,501	15%	23%	22%
Total Microcomputer	$753	$735	2%	$4,111	$3,325	24%	40%	36%
Grand Total	$6,322	$6,085	4%	$19,651	$16,826	17%	25%	24%

- The DCM segment for micros increased by 30%, but considering the small base number, the change is insignificant.

B. 1990 MARKET

- The 1990 forecasts changed due to a decrease in the overall projected growth rate for the systems software market. The lowered growth rate caused 1990 user expenditures to be less in the 1986 forecast than in the 1985 forecast.

- The growth rates reflected the impact of the economic and corporate issues elaborated on in the preceding text.

  - The ADT segment growth rate was decreased due to ecomonic tightness and user confusion.

  - The DCM segment was increased due to user desire for increased productivity of people and computer resources.

  - The systems control market remained similar in growth rate and 1990 user expenditures in both the 1985 and 1986 forecasts.