

Summary of Research on Software Opportunities

RTV

Chase

1

- **Worldwide Software Markets**
- **Definitions**
- **Analysis of Decisions on Softw**
- **Who are the Customers**
- **The Role of Object Oriented So**
- **Database for US/Worldwide Markets**

1993

YZB-10

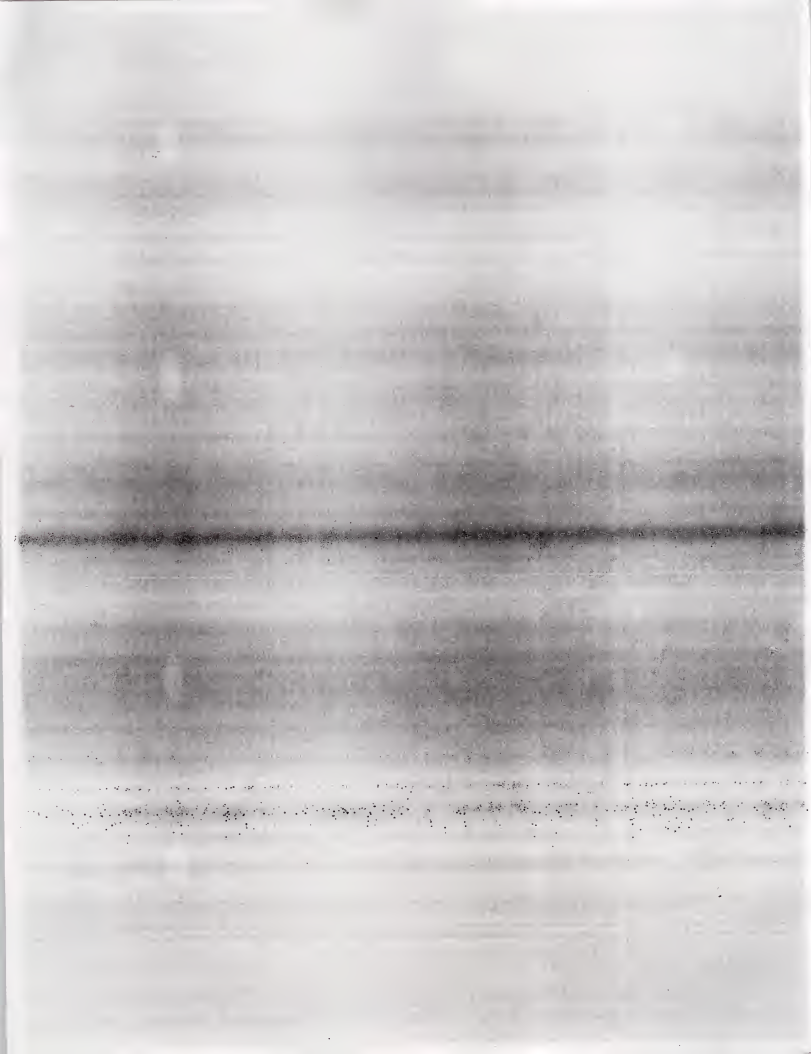
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Worldwide Software Markets

November 18, 1993

Prepared for:

IBM Corporation

Prepared by:

INPUT

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Views Selected by IBM

- **IBM price groupings**
 - **< \$15,000**
 - **\$15,000 - \$50,000**
 - **\$50,000 - \$100,000**
 - **> \$100,000**

- **Platform group as described**

- **Buyer group as described**

For each view, expenditures will be shown by ten functions defined by IBM.



Functions Defined by IBM

- **Operating systems**
- **Distributed file/storage**
- **Networking**
- **Distributed print**
- **DBMS**
- **System/network management**
- **Transaction processing**
- **Application development**
- **Office**
- **Decision support**



Each of these three views will have:

U.S expenditures, 1993-1998

Worldwide expenditures, 1993-1998

and

An accompanying set of

Expenditures for vertical/markets 1993-1998



Use of Data Views

(A comparison of data within a view)

Functions	CAGR (%)	CAGR (%)
	1993-1998 for <\$15,000	1993-1998 for \$15-50,000
Operation Systems	11	2
Distributed file/storage	8	6
Networking	11	7
Distributed print	6	3
DBMS	24	8
System/network management	16	7
Transaction processing	12	2
Application development	23	7
Office	13	8
Decision support	21	11
Total	18	6



U.S. for \$15,000 - \$50,000 Class (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operation Systems	\$1,000	\$1,080	2%
Distributed file/storage	65	85	6%
Networking	260	360	7%
Distributed print	50	60	3%
DBMS	465	680	8%
System/network management	1,300	1,800	7%
Transaction processing	170	190	2%
Application development	1,400	1,950	7%
Office	600	870	8%
Decision support	210	350	11%
Total	5,500	7,450	6%

* Totals may not add up due to rounding.



**U.S. for \$50,000 - \$100,000 Class
(\$MM)**

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	740	770	1%
Distributed file/storage	50	50	1%
Networking	170	190	2%
Distributed print	30	30	-1%
DBMS	460	590	5%
System/network management	970	1,300	6%
Transaction processing	120	130	1%
Application development	1,100	1,350	4%
Office	200	250	5%
Decision support	95	110	3%
Total	3,950	4,800	4%

* Total may not add up due to rounding.



U.S. for >\$100,000 Class (\$MM)

<u>Functions</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$1,720	\$1,240	-6%
Distributed file/storage	130	85	-7%
Networking	320	240	-6%
Distributed print	50	50	0%
DBMS	1,000	1,400	7%
System/networking management	2,600	2,950	3%
Transaction processing	200	190	-1%
Application development	2,150	2,850	6%
Office	150	125	-3%
Decision support	210	310	8%
Total	8,550	9,450	2%

* Totals may not add up due to rounding.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is crucial for ensuring transparency and accountability in the organization's operations.

2. The second part outlines the specific procedures and protocols that must be followed to ensure that all data is recorded correctly and consistently. This includes details on how to handle data entry, storage, and retrieval.

3. The third part addresses the security of the information being recorded. It discusses the various risks associated with data breaches and provides guidelines on how to mitigate these risks through the implementation of robust security measures.

4. The fourth part discusses the role of technology in modern record-keeping. It highlights the benefits of using digital systems and provides recommendations on how to select and implement the most appropriate technology for the organization's needs.

5. The fifth part covers the legal and regulatory requirements that apply to record-keeping. It discusses the various laws and regulations that govern the collection, storage, and disposal of records, and provides guidance on how to ensure compliance with these requirements.

6. The sixth part discusses the importance of regular audits and reviews of the record-keeping system. It explains how these audits can help identify areas for improvement and ensure that the system remains up-to-date and effective.

7. The seventh part discusses the importance of training and education for staff involved in record-keeping. It provides guidelines on how to develop and implement a comprehensive training program to ensure that all staff are equipped with the necessary skills and knowledge to perform their duties effectively.

8. The eighth part discusses the importance of maintaining a clear and concise record-keeping policy. It provides guidelines on how to develop and implement a policy that is easy to understand and follow, and that clearly defines the roles and responsibilities of all staff involved in the process.

9. The ninth part discusses the importance of regular communication and reporting to management and other stakeholders. It provides guidelines on how to develop and implement a reporting system that provides timely and accurate information on the organization's record-keeping activities.

10. The tenth part discusses the importance of maintaining a strong relationship with external vendors and service providers. It provides guidelines on how to select and manage these vendors, and how to ensure that they are providing high-quality services that meet the organization's needs.

U.S. for \leq \$15,000 Class (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$1,160	\$1,900	11%
Distributed file/storage	80	120	8%
Networking	390	670	11%
Distributed print	75	100	6%
DBMS	1,800	5,400	24%
System/networking management	740	1,550	16%
Transaction processing	150	270	12%
Application development	580	1,650	23%
Office	2,300	4,300	13%
Decision support	1750	4,450	21%
Total	9,050	20,450	18%

* Totals may not add up due to rounding.



U.S. Host Mainframe (\$MM)

Function	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$1,900	\$1,450	-5%
Distributed file/storage	140	110	-5%
Networking	340	280	-4%
Distributed print	55	45	-4%
DBMS	1,150	1,300	3%
System/network management	2,900	3,350	3%
Transaction processing	230	220	-1%
Application Developing	2,500	2,700	2%
Office	140	140	0%
Decision support	220	330	8%
Total	9,550	9,950	1%



U.S. Host Mini (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$1,350	\$1,450	2%
Distributed file/storage	95	110	4%
Networking	360	380	1%
Distributed print	70	70	1%
DBMS	600	750	5%
System/Networking management	1,850	2,450	6%
Transaction processing	250	290	2%
Application development	2,200	2,900	6%
Office	620	820	6%
Decision support	160	150	-2%
Total	7,550	9,400	4%

* Totals may not be add up due to rounding.



Section Two
U.S. Workstation
(\$MM)

Function	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$990	\$1,250	5%
Distributed file/storage	60	60	-1%
Networking	300	480	10%
Distributed print	60	55	-2%
DBMS	1,350	3,400	21%
System/network management	590	870	8%
Transaction processing	160	260	10%
Application development	420	1,100	21%
Office	1,900	2,000	1%
Decision	1,450	2,150	8%
Total	7,250	11,650	10%

* Totals may not add up due to rounding.



U.S. Client/server (LAN and WAN) (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$380	\$810	17%
Distributed file/storage	25	60	21%
Networking	140	320	18%
Distributed print	20	65	24%
DBMS	700	2,650	30%
System/network management	230	940	33%
Transaction processing	0	0	0%
Application development	160	1,150	48%
Office	600	2,550	34%
Decision support	430	2,600	43%
Total	2,700	11,100	33%

* Totals may not add up due to rounding



Worldwide Host Mainframe (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$3,450	\$2,650	-5%
Distributed file/storage	250	200	-5%
Networking	610	510	-4%
Distributed print	100	85	-4%
DBMS	2,050	2,350	3%
System/network management	5,250	6,050	3%
Transaction processing	410	400	-1%
Application development	4,500	4,850	2%
Office	250	250	0%
Decision support	400	590	8%
Total	17,250	17,900	1%

* Totals may not add up due to rounding.



Worldwide Host Mini (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	\$2,400	\$2,650	2%
Distributed file/storage	170	210	4%
Networking	660	680	1%
Distributed print	120	130	1%
DBMS	1,100	1,350	5%
System/network management	3,400	4,450	6%
Transaction processing	460	520	2%
Application development	3,950	5,200	6%
Office	1,150	1,500	6%
Decision support	290	270	-2%
Total	13,650	17,000	4%

* Totals may not add up due to rounding.



Totals by Function For Buying Groups (\$M)

	1993	1994	1995	1996	1997	1998	CAGR (%)
Direct	16,900	17,700	18,700	19,750	20,800	22,000	5
SI	1,500	1,650	1,900	2,200	2,650	3,300	17
Outsource	190	20	230	260	310	370	15
Service Provider	1,550	1,750	1,950	2,200	2,500	2,900	13
Software Products	3,300	3,700	4,250	4,800	5,450	6,200	13
Retailer/ small distributor	3,600	4,150	4,850	5,550	6,400	7,300	15

* Totals may not add up due to rounding.



Worldwide Workstation (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	1,800	2,600	7%
Distributed file/storage	110	120	1%
Networking	550	970	12%
Distributed print	110	110	0%
DBMS	2,450	6,900	23%
System/network management	1,100	1,750	10%
Transaction processing	300	530	12%
Application development	770	2,200	23%
Office	3,450	4,050	3%
Decision support	2,650	4,350	11%
Total	13,250	23,600	12%

* Totals may not add up due to rounding.



Worldwide Client/server LAN (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	590	1,400	19%
Distributed file/storage	35	120	26%
Networking	230	560	20%
Distributed print	35	120	28%
DBMS	1,050	4,700	35%
System/network management	350	1,700	37%
Transaction processing	0	0	
Application development	250	2,100	54%
Office	900	4,650	39%
Decision support	660	4,800	49%
Total	4,100	20,150	38%

* Totals may not add up due to rounding.



Worldwide Client/server WAN (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	95	180	14%
Distributed file/storage	10	5	-12%
Networking	30	65	18%
Distributed print	5	5	1%
DBMS	210	410	14%
System/network management	70	140	15%
Transaction processing	0	0	
Application development	50	100	17%
Office	190	370	14%
Decision support	120	210	11%
Total	780	1,500	14%

* Totals may not add up due to rounding

Worldwide for All Platforms (\$MM)

<u>Function</u>	<u>1993</u>	<u>1998</u>	<u>CAGR</u>
Operating systems	8,350	9,450	2%
Distributed file/storage	570	640	2%
Networking	2,100	2,800	6%
Distributed print	375	450	4%
DBMS	6,800	15,750	18%
System/network management	10,100	14,100	7%
Transaction processing	1,150	1,450	4%
Application development	9,500	14,500	9%
Office	5,900	10,750	13%
Decision support	4,100	10,250	20%
Total	49,000	80,100	10%

* Totals may not add up due to rounding

Z..INPUT NJ LIBRARY & SALE
Rpt Library 1 Rpt Sales 1
RB Stock 20 EO Stock 1
RB/EO 1ea Bob

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Definitions of Terms

- Direct buyer** Ultimate user including both the personal user and the corporation that buys software products for their own use.
- SI** An entity that buys software products to deliver to customers with a combination of customization, software development, hardware, network and other services that provide a full solution to a business problem. Some large VARs and turnkey providers would be included in this definition.
- Outsourcers** Vendors of services that include operation of information systems and or management of business applications that utilize information systems for corporate clients on a contractual basis.
- Service providers** Processing, entertainment and other service companies that deliver a service to organizations or individuals which makes use of software products.
- Software Producers** Vendors who develop and sell software products. These vendors can buy and utilize other products during development or repackage software products from other vendors with their products.

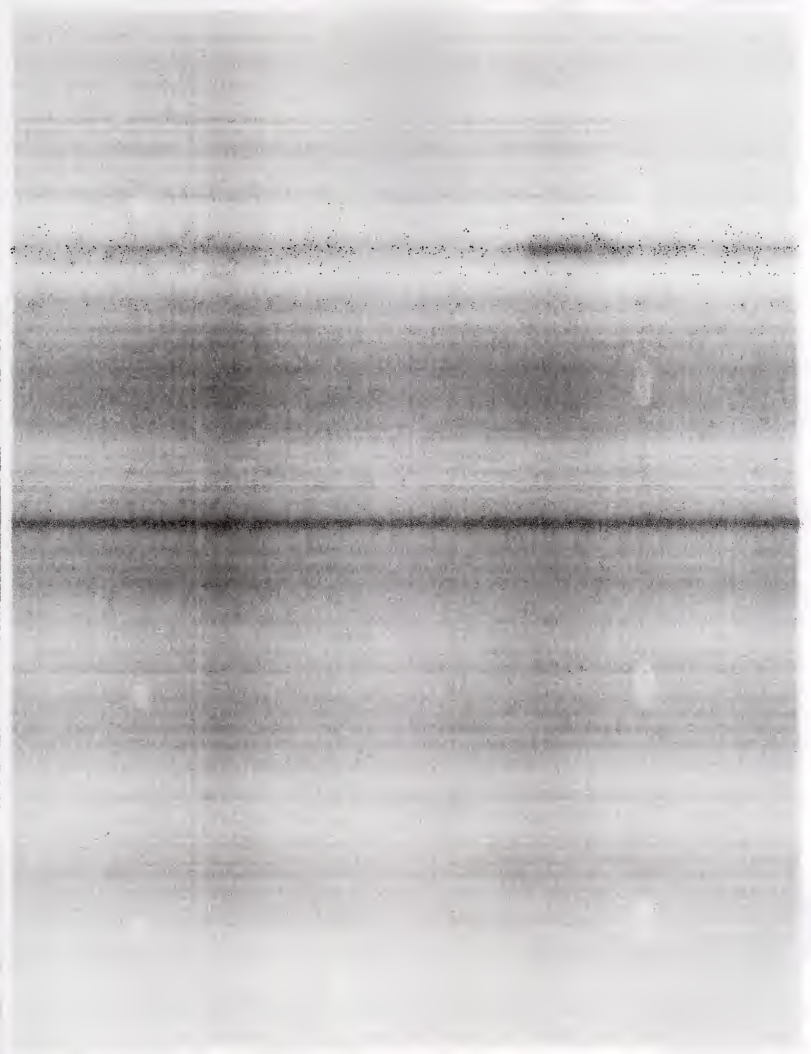
Software Retailers and Distributors

Vendors who buy software from developers for resale to ultimate users or to other organizations who will resell it to ultimate users. During the purchase and resale, no work is performed on the software product other than loading it on computers. These vendors include retail stores, distributors, most VARs, some turnkey firms and some hardware vendors who preload software on computers and resell it with the computers. If the hardware vendor has a software unit that does work with the software, the buying would not be classified as buying by a software retailer, but by a software producer.

Definitions of Terms

Operating Systems	Software products that enable users to control the operation of computer resources before and during the execution of application programs.
Distributed File/Storage	Software products that enable and control the use of remote storage facilities.
Networking	Products that work with or in place of operating systems to control the operation of resources connected to the computing system through telecommunication lines.
Distributed Print	Software products that control the operation of printers connected to a computer by a communications line.
DBMS	Software products that manage the use of specially organized files according to a set of rules.
System/Network Mgmt.	Software products that help to manage the use of computer systems resources more effectively through the use of tools such as scheduling, performance management or problem resolution.
Transaction Processing	A special type of operating system or operations monitor that is used to control the submission and processing of transactions.
Application Development	Software products such as programming languages, 4GLs, CASE products and other tools that aid in the design, implementation and change of application programs.
Office	A cross industry market for software products that serve office needs such as word processing, letter and subject filing, desktop and electronic publishing, electronic mail, time management including appointment and calendar maintenance, integrated office functions and office system graphics.
Decision Support	Cross industry planning and analysis software products including financial modeling, spreadsheets and DSS or EIS (executive information systems) products.





ANALYSIS OF DECISIONS ON SOFTWARE PRODUCTS

I. INTRODUCTION

A. Objectives and Scope

This report was prepared for the purpose of providing information on decision making regarding the purchase of software products based on data collected by INPUT during the past year. Questions of interest to IBM that have been addressed in the analysis of data include:

- What parts of customer organizations are most influential in decision making in regard to software products and other IT solutions?

What type of justification or reasons are given for decision making?

- How important is new technology is of high importance in decision making?

To what extent is aid is sought in decision making from vendors, central IS or other parties?

B. Methodology

INPUT has used the information gathered from its interview process during the past year to address the issues of interest to IBM. A description of the sources that have resulted from this process is shown in Exhibit 1. Sufficient data is available from this process to enable conclusions to be developed across all vertical markets.

Contacts were also made with selected contacts at large and midsized users during the analysis of data to review INPUT assessments and conclusions.



II. ANALYSIS OF DECISION MAKING

A. Current Roles in Decision Making

As Exhibit 2 indicates, individual users and functional user management have a stronger role in decision making for software products and turnkey systems that will provide a solution than they have for SI or SO solutions.

- Their strongest role is in relation to C/S application software. Individual users have their greatest impact in this area and generally include databases and spreadsheet products as part of the solution alternatives.
- Individual users and functional managers also have an impact on the selection of mini and mainframe solutions, but central IS managers and the CIO also exert influence in these choices. When differences of opinion exist, it is seldom that the combined weight of users and functional user executives will not prevail in decision making.

The changes that have been reported in IT decision making since 1983 and are likely to occur by 1998 are reviewed in the next three exhibits. In 1983, top management, CIOs and IS managers and planners made most decisions regarding the use of software products and other IT products and services as shown in Exhibit 3. Functional managers and executives provided input for decision making.

As Exhibit 4 illustrates, considerable change has taken place since 1983.

- Individual users as well as functional managers and executives are having a much greater impact on decisions whereas the role of IS planners and managers and the CIO have decreased.
- Although top management can still play the key role, it occurs much less frequently in regard to decisions.

IS planners and the CIO are more likely to be advising functional managers and executives in many organizations at the current time. In fact, their role is more visible in that regard than it was during the past two years, but they have not increased their power, as a result according to respondents.

- Their power will continue to decrease as shown in Exhibit 5, while the role in decision making of functional managers and executives increases.
- One of the reasons for this increase is the restructuring and re-engineering that is underway in business. This will result in more transfers of central IS staff to functional areas where it can continue to be used for advice and work with growing user IS capabilities. Exhibit 6 provides background on the organizational situation being discussed.



B. Justification for Decisions

As Exhibit 7 indicates, the leading reasons for decision making on software products or other IT actions at the present time are reported to be both the support of business functions and the provision of IT capabilities for functional user areas and individual users.

- The business reasons continue to be the improvement of revenue, productivity and service to users as well as operations, both commercial back room and industrial production.
- Functional and individual users are stressing the need for decentralized capabilities in themselves as a means of meeting business goals.

C. Influences on Decision Making

The influences on decision making for application solutions, particularly software products, that have been reported are summarized in Exhibit 8. Other end users, consultants and IS personnel that report to functional user areas are all mentioned as highly influential by functional user areas. Individual users are more apt to pay attention to similar users in their own or other companies when their information seems relevant.

Two other sources are also mentioned of importance to functional users: C/S software vendors and SI firms.

- Since SI vendors are very interested in the application software products that can achieve a solution, they are becoming of interest as a source of information. Functional managers and executives have expressed interest in the products sold or utilized by some SI vendors such as the manufacturing software of Andersen and SAP.
- C/S software vendors that market either application or enabling software are sources of information for individual users and functional managers. They listen to presentations and try products supplied by these sources.

Traditional application software vendors that offer mainframe or mini solutions can have some influence, particularly if they offer the only solutions available. When a new solution is offered on C/S, such as the PeopleSoft HR products, the level of interest is much higher.

Central IS is less apt to have influence although they may be necessary to plan and implement complex solutions unless external vendors are engaged. The use of external SI, SO and professional services vendors has risen sharply in the last five years.

III. IMPACT OF NEW TECHNOLOGY ON DECISION MAKING

Before reviewing the technology that was reported to be of importance over the next five years, a summary of issues for end users should be reviewed. As indicated in Exhibit 9, individual and functional user management as well as other decision makers report that business solutions are more important than new technology in decision making.

- However, C/S technology and new software for it may be purchased by end users apart from a solution, as already noted, in order to increase user capabilities for business purposes.
- Functional user management and executives as well as individual users are also reluctant to support the use of mini or mainframe technology unless it is part of a solution, and for mainframe solutions, they are reluctant to support increases of capabilities unless they are necessary for complex solutions.

INPUT's assessment of overall interest in new IT technology is reviewed in the next four exhibits. Exhibit 10 illustrates that technology supporting C/S capabilities will gain in importance in the next five years. However, there are a number of other technologies that are of interest as shown in these exhibits (generally in supporting role for providing business solutions).

IV. CONCLUSIONS

There has been a considerable change in decision making roles during the past decade, and more changes are coming. From one perspective, individual end users are much more occupied in decision making as indicated in Exhibit 14. However, the change that has been taking place is driven much more by the realization that business units including individual users in functional areas, functional managers, and functional executives have to increase productivity and effectiveness. This has put more pressure on business analysis as the starting point for decision making and is being reflected in a reversal of the older paradigm for developing software products as illustrated in Exhibit 15.



Exhibit 1

Sources of Information on Individual End User and Functional Management IT Decision Making

- 2,000 surveys in 1993 of application decision making and use in support of INPUT program products
- Knowledge gained from surveys performed in support of custom consulting
- Organizations surveyed are generally midsized to larger users of IT
- Feedback from vendors' experience in marketplace (approximately 1,000 contacts annually)



Analysis of Current Decision Making Roles for IT Solutions

Role in Decisions by:

Type of IT Solution	Individual Users	Functional Mid-Mgmt.	Functional Exec.	IS Middle Mgmt./Planning	CIO	CEO
SI	Med./Low	Med.	High	Neg.	Med.	High/Med.
SO	Low	Med.	High	Low	Low	High
Turnkey	Med.	High	High/Med.	Low	Neg.	Neg.
Mainframe Application Software	Med.	High/Med.	Neg.	High/Med.	Med.	Low
Mini Application Software	Med.	High/Med.	Neg.	Med.	Low	Neg.
C/S Application Software	High/Med.	High	Med.	Neg.	Neg.	Neg.

Neg. = Negligible



Influence of IT Decision Makers: 1983

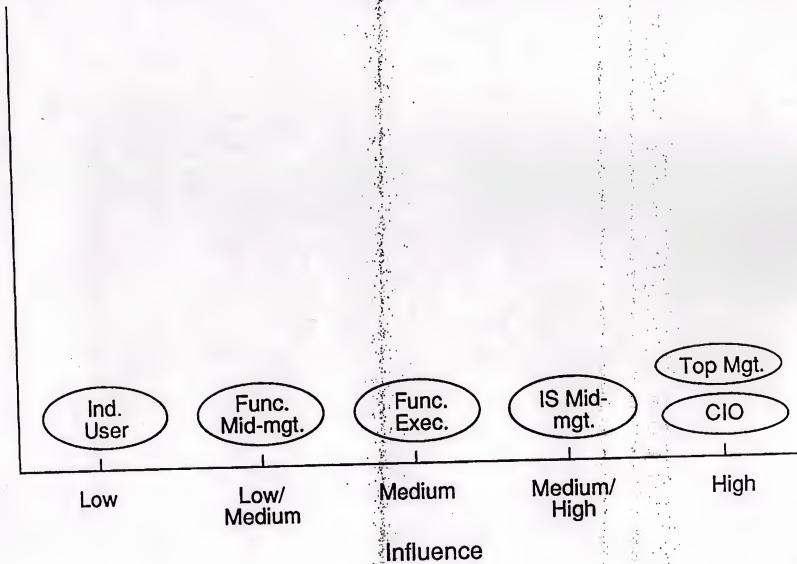




Exhibit 7

IT-Related Justification

IT Project Justification	Example	Overall Importance
Support business functions	<ul style="list-style-type: none"> • Improve revenue, productivity, operations, service 	High
Increase decentralized IT capabilities	<ul style="list-style-type: none"> • "Mini IS" dept. • Workstations • C/S 	High
Improve connectivity	<ul style="list-style-type: none"> • C/S • Networks (enterprise, subenterprise, interenterprise) 	Medium/High
Upgrade existing computing applications	<ul style="list-style-type: none"> • Enhance applications • Outsource • Improve mainframe or mini productivity 	Medium
Upgrade central IS	<ul style="list-style-type: none"> • Upgrade hardware or systems software for technical reasons 	Low/Medium



Application Solutions Selection: Influences

High Importance

- End users (internal, external)
- Consultants
- Decentralized IS

Medium/High Importance

- SI firms
- C/S software vendors
(enabling software; applications)

Medium Importance

- "Traditional" application software vendors
(including turnkey)

Medium/Low Importance

- Central IS



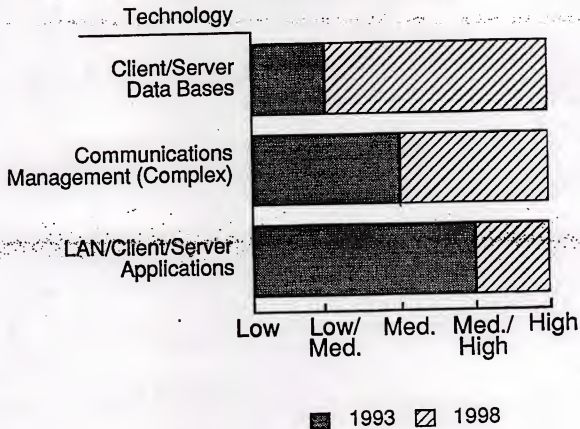
Summary of Issues for End Users Regarding Use of Technology

Issue	User Attitude
<ul style="list-style-type: none"><li data-bbox="256 397 579 461">• Importance of new technology<li data-bbox="256 492 579 523">• Use of C/S technology<li data-bbox="256 626 579 657">• Use of mini<li data-bbox="256 688 579 714">• Use of mainframe	<ul style="list-style-type: none"><li data-bbox="638 388 1059 455">• Business solution is more important<li data-bbox="638 481 1059 585">• Highly acceptable as part of solution. May purchase apart from solution<li data-bbox="638 616 1059 647">• Acceptable as part of solution<li data-bbox="638 678 1059 740">• Acceptable as part of complex solutions.



Exhibit 10

IT Technologies, 1993-98: High Importance in 1998

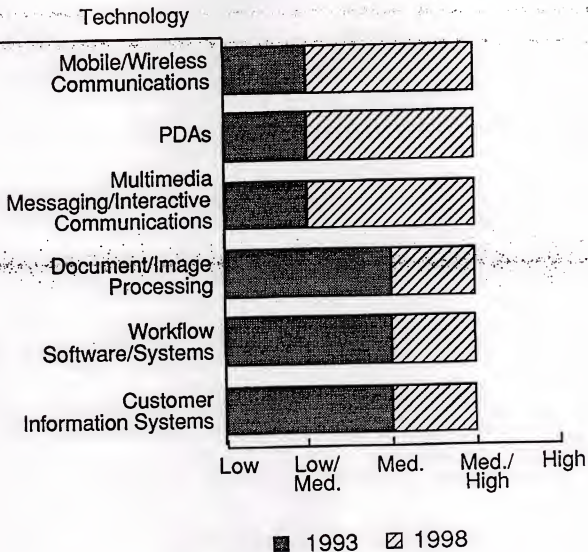


Source: INPUT Assessment



Exhibit 11

IT Technologies, 1993-98: Medium/High Importance in 1998

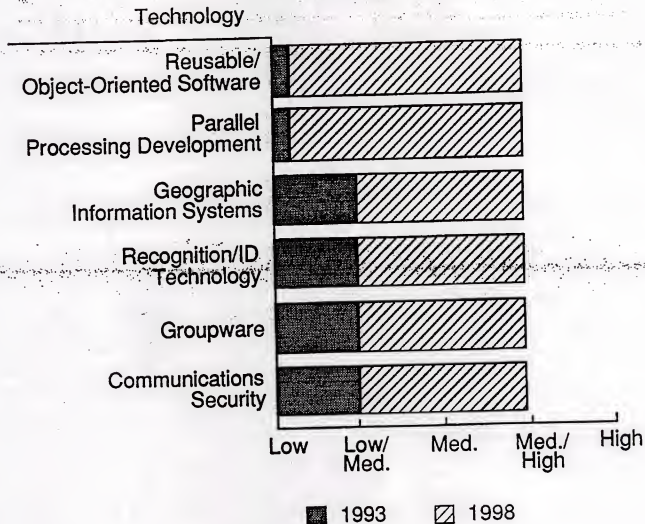


Source: INPUT Assessment



Exhibit 12

IT Technologies, 1993-98: Medium/High Importance in 1998

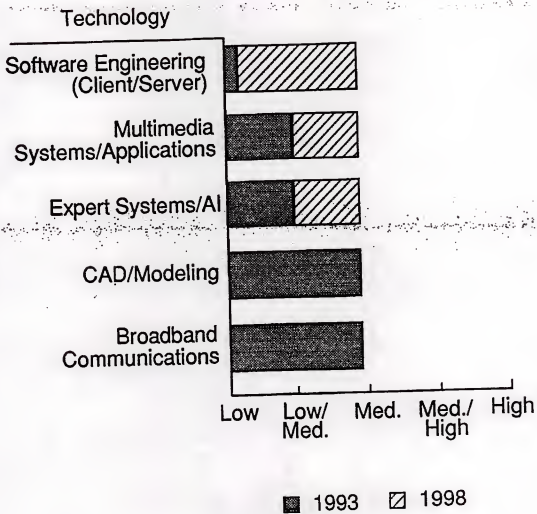


Source: INPUT Assessment



Exhibit 13

IT Technologies, 1993-98: Medium Importance in 1998

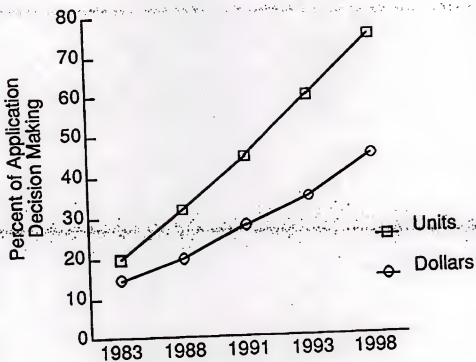


Source: INPUT Assessment



Exhibit 14

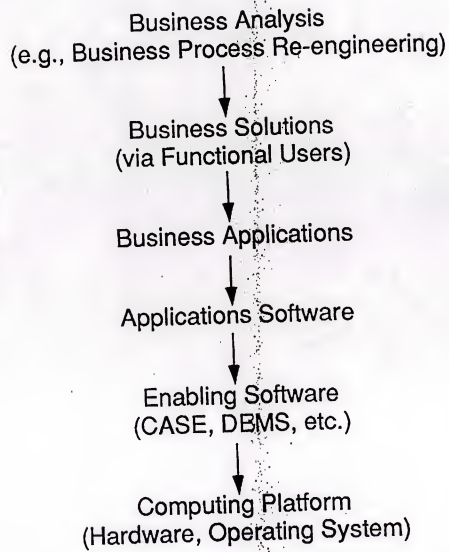
Proportion of Application Decision Making by Individual Users



Source: INPUT Estimate



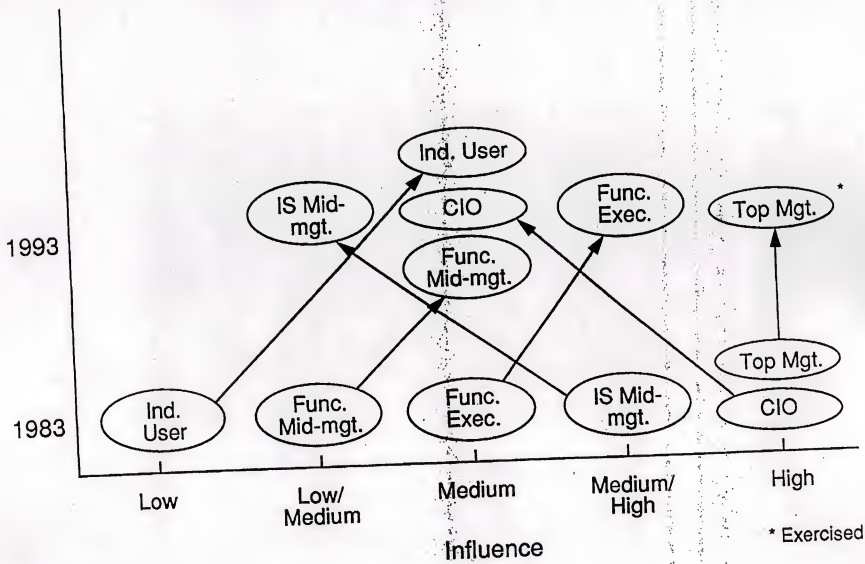
The Software Food Chain



INPUT



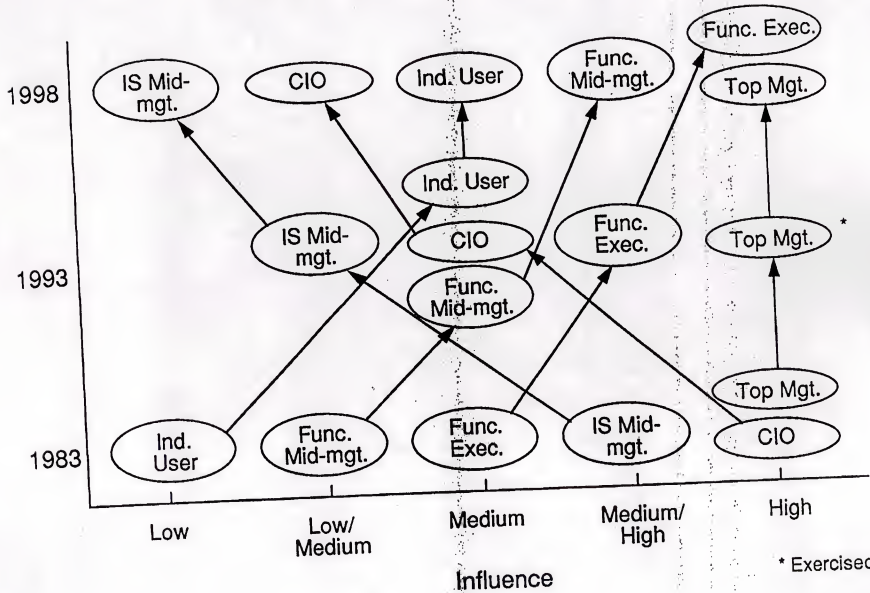
Influence of IT Decision Makers: 1983-93



* Exercised Less

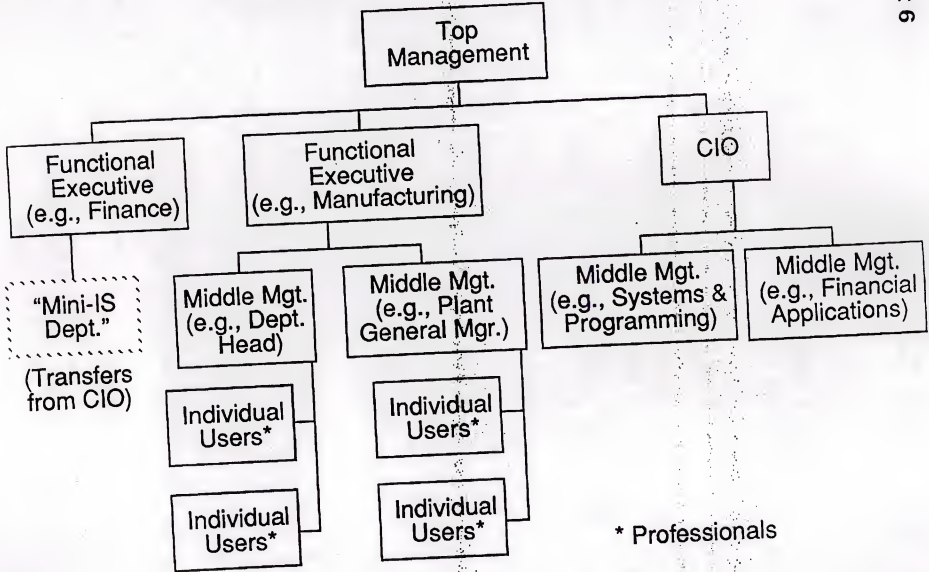


Influence of IT Decision Makers: 1983-93





IT Decision Maker/Influences (Schematic)



* Professionals



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Z

November 22, 1993

To: Stan Krasnow, IBM

Fm: Tom O'Flaherty, INPUT

Re: "Why" is Software Bought? "Who" are the Customers?

The "why" and the "who" are closely linked, according to INPUT's research.

Summary (numbers in parentheses refer to attached exhibits; some proprietary data has been masked)

o Applications are being replaced at a high rate, higher than historic rates (1).

- Applications software packages are increasingly the favored form of applications solutions (2).
- The user department role in this decisionmaking process is already high (and is increasing)[3].

o Applications replacement is being driven primarily by business needs (4).

- Key decisions are being made by functional groups (i.e., "users") [5].
- Business needs are identified as part of the planning/consulting/BPR process (6). This process is dominated by users, executive management and consultants (6).

Central IS plays a diminishing role in the key defining activities (7)

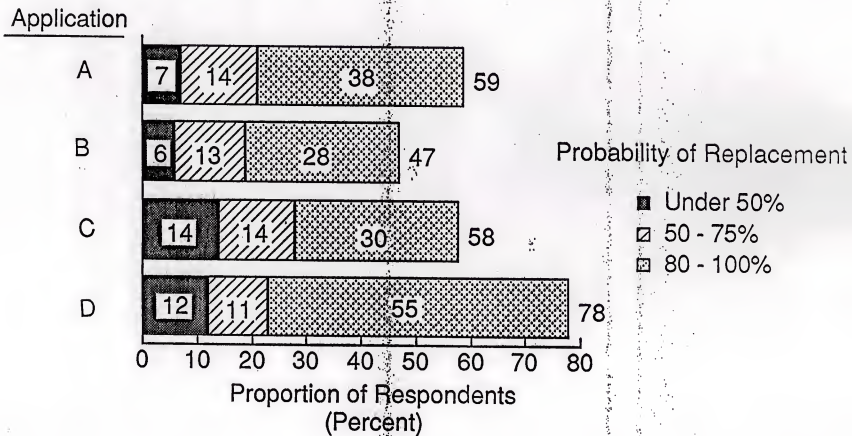
- In most companies it is part of a task force, at best.
- In some companies IS is still strong, but this is more and more the exception.
- More successful IS units (centralized or decentralized) are becoming "user champions", trying to adopt a user point of view.

o Given this user-driven environment, it is not surprising that solution/function selection criteria are critical (8).

- Even client/server technology, as a selection criteria, is relatively unimportant.
 - Client/server technology itself is important but more as an enabler than a goal in itself. Client/server is the most successful when it supports business trends and organizational theory within an organization -- it is not in itself a driving force (9). This fact can be obscured by
 - The trade press's tendency to look at technology in isolation.
 - The tendency for a technically-oriented sales force to talk to technically-oriented prospects (or, what they perceive as prospects).
 - A misunderstanding of the role of the power user.
- o INPUT recently performed research and analysis for a major applications software vendor that wanted to make sure that it chose the "right" systems software as the foundation for its products (operating systems and DBMS environments). Part of the conclusions:
- Customers do not see particular systems software environments as "must-haves".
 - This is quite unlike the situation of even ten years ago where it was quite common [for MIS] to choose the "right" systems software (and/or hardware) environment and then buy/build solutions on top of this foundation.

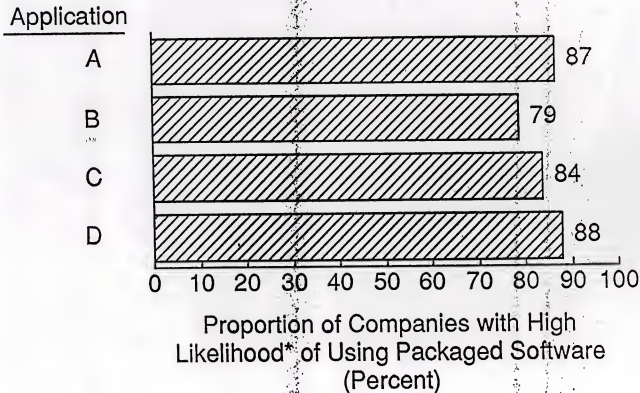


Percent of Companies Planning to Replace Selected Applications in Next Three Years





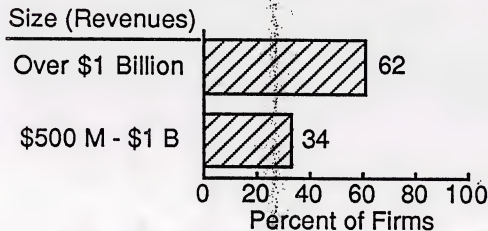
Likelihood of Using Packaged Software in Replacement System



* i.e., Companies giving a probability of using packaged software as 75% or more.



User Departments with More Applications Decision Making Than IS



Source: Interviews with 67 IS departments

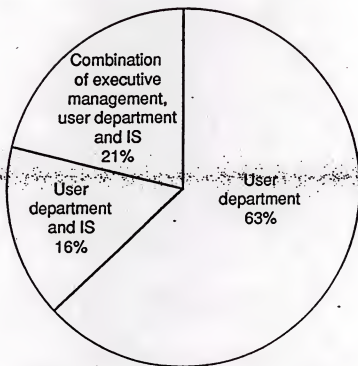


Reasons for Applications Replacement

Percent of Companies Citing	Reasons
20-29%	<ul style="list-style-type: none">• Obsolete applications software; need software upgrade• Improve efficiency of hardware/software environment• Improve functionality
10-19%	<ul style="list-style-type: none">• Effects of changes to underlying business process• Downsizing/client-server• Reduce costs
Under 10%	<ul style="list-style-type: none">• Move to open systems• Growth in underlying business• Other

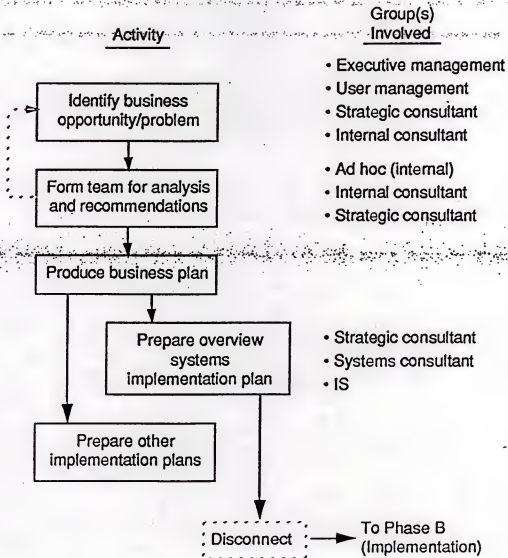
Note: Open-ended answers were classified into the above categories.

Major Responsibility for System Project Initiation



Source: Interviews with executives ✓

Strategic Planning/Consulting Preceding the Systems Implementation Process



Source: INPUT survey

Implementation Players

Potential Implementation Players	Implementation Components			
	Prepare Detailed Implementation Specifications	Produce Custom Software	Supply Products	Integrate
User/functional department(s)	○			
Central IS	○	●		●
User IS	●	●		○
Internal consultant	●			
External consultant	●			○
Systems integrator	●	●	●	●
Professional services vendor		●		*
Hardware vendor		*	●	*
Software product vendor			●	

Key:

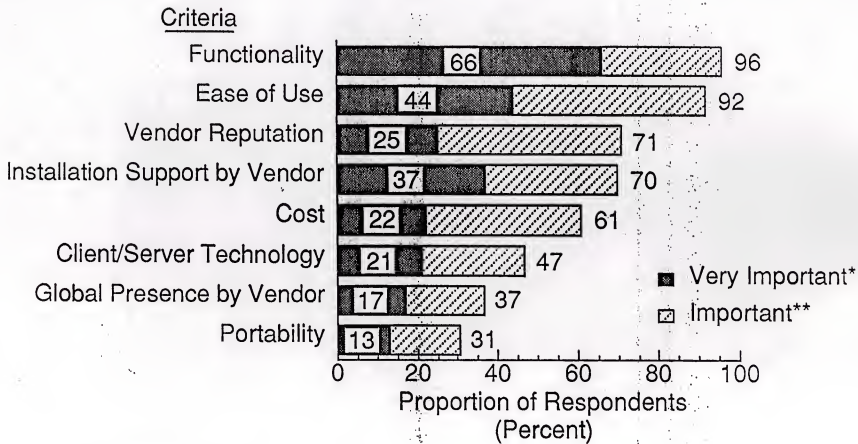
- = Primary player
- = Secondary player

* Key player when assuming that role

Source: Interviews with executives



Package Selection Criteria



* 5 on a scale of 1 to 5

** 4 or 5 on a scale of 1 to 5



Why Decentralized Client/Server?

Driving Forces

- **Organizational change**
- **Business process re-engineering (BPR)**

Enablers

- **Technology changes**
 - **Hardware**
 - **Software**

Rationales

- **Apparent cost savings**
- **"Modern"**





November 22, 1993

To: Stan Krasnow, IBM

Fm: Tom O'Flaherty, INPUT

Re: The Role of Object-Oriented Software

The following analysis is based on the following sources:

- o INPUT research among customers in the U.S. and Europe
- o Investigating current uses and future activities of software producers (including applications and systems software as well as major systems integration firms)
- o Discussions with leading edge thinkers
- o Papers and proposals reviewed by myself in my role as the consulting editor to Software Engineering
- o Client presentations/worksessions where conclusionary material was thoroughly reviewed.

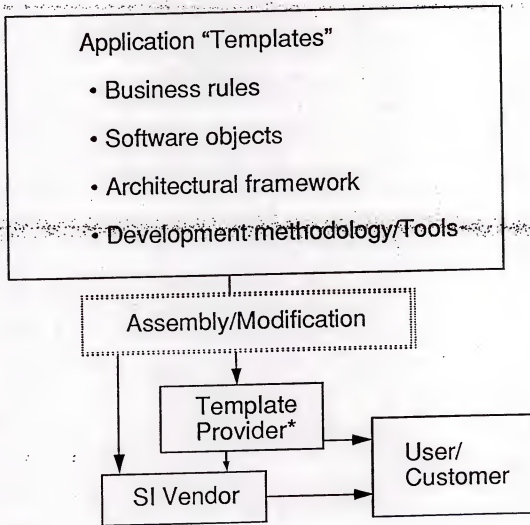
Summary

- o Object-oriented software technology (OOST) may blur the distinctions between packaged software and services (Exhibit 1). This "may" is dependent on having standards
 - For frameworks
 - For business rules
- o Much of OOST will be invisible
 - Software producers need it to produce the classic better, faster, cheaper products (and modifications)
 - The success of enabling technology (operating systems, DBMS, application development tools) will be largely based on transparency.
- o Technical breakthroughs are likely to be incremental, not sudden. Initial uses of OOST for DBMS, DBMS optimized for particular applications and applications software so far represent incremental steps.

On the other hand, customer perceptions of breakthroughs in OOST enabling are likely to be sudden, giving favored vendors a dominant position.

- o The highest value will come from "business templates" (for lack of a better phrase).
 - This value will be based on business process knowledge; this becomes, in essence, a "best practices" data base.
 - The human role of choosing, modifying and creating will be even more important than it is now in system design and implementation.
 - Enablers will be important from the standpoint of making the creation of the business templates faster, more correct or more efficient.
- o Given this environment, it is not meaningful (and possibly misleading) to identify a separate OOST market.
 - If there is a separate, sizable market, then OOST has at least partially failed: It will not have spread tendrils through much of computing.
 - If OOST is an artificial construct, then both vendors and customers will be misled concerning market characteristics.

Year 2000: Merging of Packaged Software and SI?

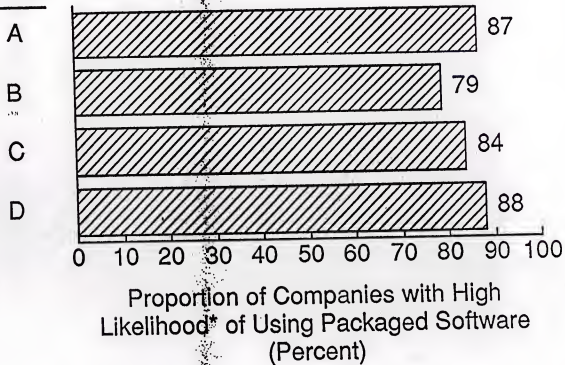


* Packaged software provider



Likelihood of Using Packaged Software in Replacement System

Application



* i.e., Companies giving a probability of using packaged software as 75% or more.

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SOFTWARE PRODUCT CUSTOMER SEGMENTATION AND DECISION MAKING

<u>Product Type</u>	<u>Type of Company Targeted</u>	<u>Specific Department Targeted?</u>	<u>Level of IS Involvement</u>	<u>Personal Choice?</u>
APPLICATIONS (a)				
Vertical	By industry	Keyed to application	Varies	Rare
Horizontal				
o Functional (b)	All	Keyed to application	Varies	Sometimes
o Office (c)	All	All	Low	Often
ENTERTAINMENT	n/a	n/a	n/a	Always
SYSTEMS SOFTWARE				
Systems Control	All	Sometimes	Varies (d)	Sometimes
o Networking	All	Sometimes	High	Rare
Computer Mgt.	All	Sometimes	Varies (d)	Sometimes
o DBMS	All	All	Varies (d)	Sometimes
o Applications Development	All	Rare	High	Rare

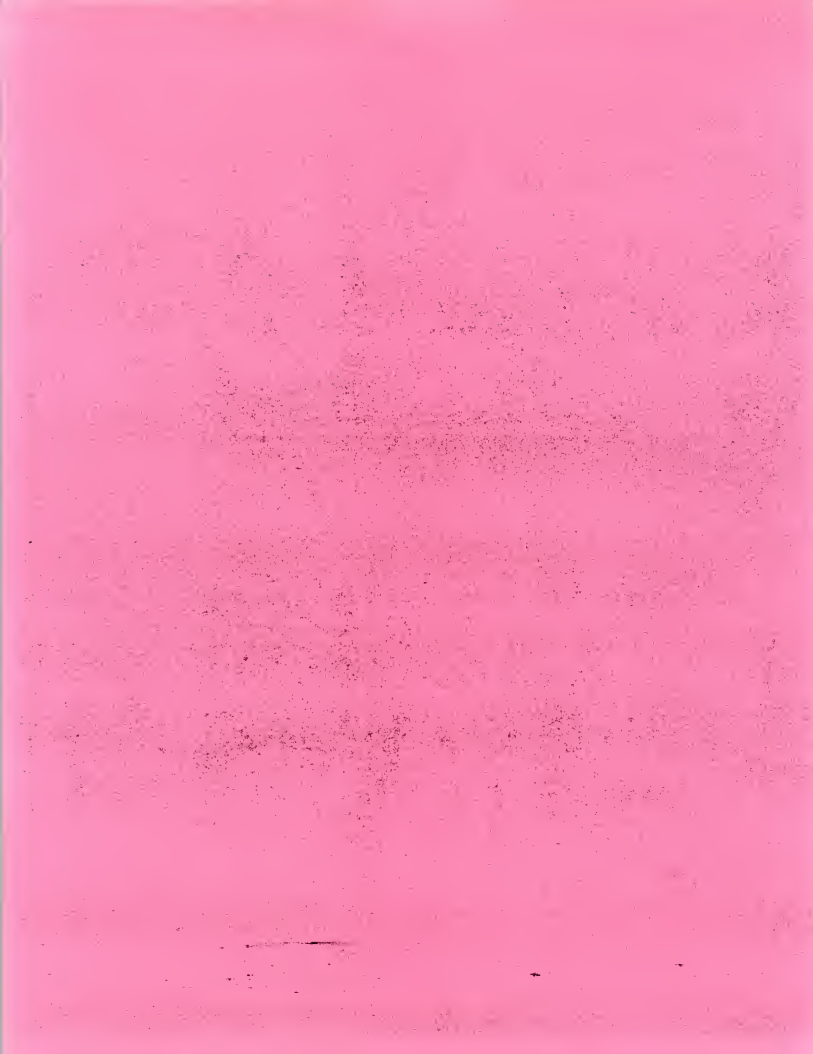
(a) Includes Turnkey

(b) examples: A/R, educational

(c) Includes personal productivity (spreadsheets, organizers)

(d) Varies by platform: High for mainframes, Low for standalone PCs

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RP /RB/EO/NL 1-Field Sales Area
DVN - 20 Stock 1 ea Lib/Sales,



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US
FOR <=15,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1160	1300	1450	1550	1750	1900	11%
DISTRIBUTED FILE/STORAGE	80	90	95	100	110	120	8%
NETWORKING	390	440	490	550	600	670	11%
DISTRIBUTED PRINT	75	80	90	90	100	100	6%
DBMS	1800	2250	2800	3500	4350	5400	24%
SYSTEM/NETWORK MGMT	740	850	1000	1150	1340	1550	16%
TRANSACTION PROCESSING	150	170	190	220	240	270	12%
APPLICATION DEVELOPMENT	580	720	880	1100	1350	1650	23%
OFFICE	2300	2600	2950	3350	3800	4300	13%
DECISION SUPPORT	1750	2100	2500	3050	3650	4450	21%
TOTAL	9050	10600	12450	14600	17250	20450	18%

11-Jan-94

US
FOR 15,000 - 50,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1000	1050	1050	1050	1070	1100	2%
DISTRIBUTED FILE/STORAGE	65	70	75	80	85	85	6%
NETWORKING	260	280	300	320	340	360	7%
DISTRIBUTED PRINT	50	55	55	60	60	60	3%
DBMS	470	510	550	590	640	680	8%
SYSTEM/NETWORK MGMT	1300	1350	1450	1550	1650	1800	7%
TRANSACTION PROCESSING	180	180	190	190	190	190	2%
APPLICATION DEVELOPMENT	1400	1500	1600	1750	1850	1950	7%
OFFICE	600	680	870	920	930	880	8%
DECISION SUPPORT	210	230	250	280	310	350	11%
TOTAL	5500	5900	6400	6800	7130	7430	6%

11-Jan-94

US
FOR 50,000 - 100,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	740	760	760	770	770	770	1%
DISTRIBUTED FILE/STORAGE	50	50	50	50	50	50	1%
NETWORKING	180	180	190	190	190	190	2%
DISTRIBUTED PRINT	30	30	30	30	30	30	-1%
DBMS	460	500	550	590	630	590	5%
SYSTEM/NETWORK MGMT	970	1000	1050	1150	1200	1300	6%
TRANSACTION PROCESSING	120	120	130	130	130	130	1%
APPLICATION DEVELOPMENT	1100	1150	1200	1250	1300	1350	4%
OFFICE	200	220	230	240	250	250	5%
DECISION SUPPORT	95	100	100	110	110	110	3%
TOTAL	3950	4100	4300	4500	4650	4800	4%



11-Jan-94

US
FOR >100,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1700	1600	1500	1400	1300	1250	-6%
DISTRIBUTED FILE/STORAGE	130	130	120	110	100	85	-7%
NETWORKING	330	310	290	280	260	240	-6%
DISTRIBUTED PRINT	50	50	50	50	50	50	0%
DBMS	1000	2000	1150	1250	1350	1400	7%
SYSTEM/NETWORK MGMT	2600	2650	2750	2800	2900	2950	3%
TRANSACTION PROCESSING	200	200	200	190	190	190	-1%
APPLICATION DEVELOPMENT	2150	2200	2300	2450	2550	2850	6%
OFFICE	150	150	150	140	140	130	-3%
DECISION SUPPORT	210	230	250	270	290	310	8%
TOTAL	8550	8600	8750	8900	9100	9450	2%

11-Jan-94

US
FOR ALL CLASSES

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	4620	4650	4750	4800	4900	5000	300%
DISTRIBUTED FILE/STORAGE	320	330	340	340	340	340	1%
NETWORKING	1150	1200	1250	1300	1400	1450	5%
DISTRIBUTED PRINT	200	220	230	240	240	240	3%
DBMS	3750	4350	5050	5900	6950	8100	17%
SYSTEM/NETWORK MGMT	5600	5900	6250	6650	7100	7650	6%
TRANSACTION PROCESSING	650	670	7000	720	750	770	4%
APPLICATION DEVELOPMENT	5250	5600	6000	6500	7050	7800	8%
OFFICE	3250	3650	4200	4650	5100	5500	11%
DECISION SUPPORT	2250	2650	3100	3700	4350	5200	18%
TOTAL	27050	29200	31865	34750	38150	42100	9%



11-Jan-94

SECTION TWO
 US
 WORKSTATION B

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	990	1000	1050	1100	1200	1250	5%
DISTRIBUTED FILE/STORAGE	60	60	65	65	60	55	-1%
NETWORKING	300	330	370	400	440	480	10%
DISTRIBUTED PRINT	60	60	65	65	60	55	-2%
DBMS	1350	1700	2100	2500	3000	3400	21%
SYSTEM/NETWORK MGMT	590	650	730	800	860	870	8%
TRANSACTION PROCESSING	160	180	200	220	240	260	10%
APPLICATION DEVELOPMENT	420	580	720	860	1000	1100	21%
OFFICE	1900	2050	2350	2350	2250	2000	1%
DECISION SUPPORT	1450	1650	1900	2050	2150	2150	8%
TOTAL	7250	8250	9450	10450	11250	11650	10%

11-Jan-94

US
CLIENT/SERVER LAN B

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	330	380	450	520	610	720	17%
DISTRIBUTED FILE/STORAGE	20	25	30	40	55	60	25%
NETWORKING	130	150	180	210	250	290	18%
DISTRIBUTED PRINT	20	25	35	40	50	60	26%
DBMS	580	760	990	1300	1800	2400	33%
SYSTEM/NETWORK MGMT	190	250	330	445	620	870	35%
TRANSACTION PROCESSING	0	0	0	0	0	0	
APPLICATION DEVELOPMENT	140	200	290	440	680	1100	52%
OFFICE	500	700	890	1250	1750	2400	37%
DECISION SUPPORT	360	500	730	1100	1600	2450	47%
TOTAL	2250	2950	3900	5300	7400	10350	36%



11-Jan-94

US
CLIENT/SERVER WAN

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	50	60	70	75	85	95	13%
DISTRIBUTED FILE/STORAGE	5	5	5	5	5	0	-13%
NETWORKING	15	20	25	25	30	35	18%
DISTRIBUTED PRINT	5	5	5	5	5	5	0%
DBMS	120	130	150	170	200	220	14%
SYSTEM/NETWORK MGMT	40	45	50	55	65	75	14%
TRANSACTION PROCESSING	0	0	0	0	0	0	
APPLICATION DEVELOPMENT	25	30	35	40	45	55	16%
OFFICE	100	120	140	160	180	200	13%
DECISION SUPPORT	70	80	85	95	110	120	11%
TOTAL	430	490	560	630	710	800	13%

11-Jan-94

US
HOST MINI

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1350	1400	1450	1450	1450	1450	2%
DISTRIBUTED FILE/STORAGE	95	110	110	110	110	120	4%
NETWORKING	360	370	370	370	380	380	1%
DISTRIBUTED PRINT	65	70	75	75	75	70	1%
DBMS	600	630	660	690	720	750	5%
SYSTEM/NETWORK MGMT	1850	1950	2100	2200	2350	2450	6%
TRANSACTION PROCESSING	250	260	270	280	280	290	2%
APPLICATION DEVELOPMENT	2200	2300	2450	2600	2700	2900	6%
OFFICE	620	670	700	750	790	820	6%
DECISION SUPPORT	160	160	160	160	160	150	-2%
TOTAL	7550	7900	8300	8700	9000	9400	4%



11-Jan-94

US

HOST MAINFRAME

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1900	1800	1700	1650	1550	1450	-5%
DISTRIBUTED FILE/STORAGE	140	130	130	120	110	110	-5%
NETWORKING	340	350	330	310	300	280	-4%
DISTRIBUTED PRINT	55	55	50	50	45	45	-4%
DBMS	1150	1150	1200	1350	1300	1300	3%
SYSTEM/NETWORK NGMT	2900	3000	3050	3150	3250	3350	3%
TRANSACTION PROCESSING	230	230	230	230	220	220	-1%
APPLICATION DEVELOPMENT	2500	2500	2500	2550	2600	2700	2%
OFFICE	140	140	130	130	110	140	0%
DECISION SUPPORT	220	240	260	280	300	330	8%
TOTAL	9550	9600	9650	9700	9750	9950	1%

11-Jan-94

US
FOR ALL PLATFORMS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	4600	4650	4700	4800	4900	5000	2%
DISTRIBUTED FILE/STORAGE	320	330	340	340	340	340	1%
NETWORKING	1150	1200	1250	1300	1400	1450	5%
DISTRIBUTED PRINT	200	210	220	230	240	240	3%
DBMS	3750	4350	5050	5900	6950	8100	17%
SYSTEM/NETWORK MGMT	5600	5850	6250	6650	7100	7600	6%
TRANSACTION PROCESSING	650	670	700	720	750	770	4%
APPLICATION DEVELOPMENT	5250	5600	6000	6500	7050	7800	8%
OFFICE	3250	3650	4200	4650	5100	5500	11%
DECISION SUPPORT	2250	2650	3100	3650	4350	5200	18%
TOTAL	27050	29200	31850	34750	38100	42100	9%



11-Jan-94

US
CLIENT/SERVER (LAN/WAN)

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	380	440	510	600	690	810	17%
DISTRIBUTED FILE/STORAGE	25	30	35	45	55	60	21%
NETWORKING	140	170	200	240	280	320	18%
DISTRIBUTED PRINT	20	30	35	45	55	65	24%
DBMS	700	890	1150	1500	1950	2650	30%
SYSTEM/NETWORK MGMT	230	290	380	500	680	940	33%
TRANSACTION PROCESSING	0	0	0	0	0	0	
APPLICATION DEVELOPMENT	160	220	320	480	730	1150	48%
OFFICE	600	780	1000	1400	1950	2550	34%
DECISION SUPPORT	430	580	810	1150	1700	2600	43%
TOTAL	2700	3400	4450	5950	8100	11100	33%

11-Jan-94

SECTION THREE
US
DIRECT

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	3500	3050	3000	3000	2950	2950	0%
DISTRIBUTED FILE/STORAGE	310	220	220	220	210	210	0%
NETWORKING	700	720	730	740	760	770	2%
DISTRIBUTED PRINT	130	130	130	130	130	130	0%
DBMS	2000	2250	2500	2750	3100	3450	11%
SYSTEM/NETWORK MGMT	4100	4250	4450	4700	4900	5150	5%
TRANSACTION PROCESSING	440	460	470	480	490	500	2%
APPLICATION DEVELOPMENT	3900	4100	4300	4500	4750	5100	5%
OFFICE	1400	1550	1750	1850	1950	2050	7%
DECISION SUPPORT	930	1050	1200	1350	1550	1700	13%
TOTAL	16900	17750	18700	19750	20800	22000	5%



11-Jan-94

US
SYSTEMS INTEGRATION

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	260	270	275	285	300	310	4%
DISTRIBUTED FILE/STORAGE	20	20	20	20	25	25	5%
NETWORKING	65	70	75	80	90	100	9%
DISTRIBUTED PRINT	10	10	15	15	15	20	12%
DBMS	250	300	360	430	540	680	22%
SYSTEM/NETWORK MGMT	310	330	360	390	440	500	10%
TRANSACTION PROCESSING	25	25	25	25	25	25	1%
APPLICATION DEVELOPMENT	270	290	310	350	400	500	13%
OFFICE	160	200	250	320	430	560	28%
DECISION SUPPORT	120	160	210	280	390	570	36%
TOTAL	1500	1650	1900	2200	2650	3300	17%

11-Jan-94

US
OUTSOURCE

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	35	35	35	35	40	40	3%
DISTRIBUTED FILE/STORAGE	0	0	5	5	5	5	4%
NETWORKING	10	10	10	10	10	10	7%
DISTRIBUTED PRINT	0	0	0	0	0	0	9%
DBMS	30	30	40	45	55	70	20%
SYSTEM/NETWORK MGMT	45	45	50	55	60	65	9%
TRANSACTION PROCESSING	5	5	5	5	5	5	1%
APPLICATION DEVELOPMENT	40	40	45	50	55	65	10%
OFFICE	20	20	25	35	45	60	28%
DECISION SUPPORT	10	15	20	30	40	55	37%
TOTAL	190	200	230	260	310	370	15%

11-Jan-94

US
SERVICE PROVIDER

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	250	260	270	280	295	310	4%
DISTRIBUTED FILE/STORAGE	15	20	20	20	20	20	4%
NETWORKING	70	75	80	85	90	100	8%
DISTRIBUTED PRINT	10	15	15	15	15	15	6%
DBMS	245	295	350	420	515	615	20%
SYSTEM/NETWORK MGMT	280	290	320	350	380	420	9%
TRANSACTION PROCESSING	35	35	35	40	40	40	5%
APPLICATION DEVELOPMENT	260	280	310	350	390	450	12%
OFFICE	230	270	320	360	410	470	15%
DECISION SUPPORT	170	200	240	290	360	460	22%
TOTAL	1550	1750	1950	2200	2500	2900	13%

11-Jan-94

US
SOFTWARE PRODUCTS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	520	540	560	590	620	660	5%
DISTRIBUTED FILE/STORAGE	35	35	40	40	40	40	4%
NETWORKING	150	160	170	190	200	220	9%
DISTRIBUTED PRINT	25	30	30	35	35	35	5%
DBMS	540	660	800	970	1200	1400	21%
SYSTEM/NETWORK MGMT	500	540	590	650	720	790	9%
TRANSACTION PROCESSING	70	75	80	85	90	95	6%
APPLICATION DEVELOPMENT	470	520	590	670	760	890	14%
OFFICE	600	650	800	850	950	1050	12%
DECISION SUPPORT	420	500	600	710	850	1050	20%
TOTAL	3300	3700	4250	4800	5450	6200	13%

11-Jan-94

US
RETAILER/DISTRIBUTOR

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	520	540	580	620	670	720	7%
DISTRIBUTED FILE/STORAGE	30	35	40	40	40	40	5%
NETWORKING	160	170	200	220	240	270	11%
DISTRIBUTED PRINT	30	30	35	35	40	40	5%
DBMS	670	830	1050	1250	1550	1850	23%
SYSTEM/NETWORK MGMT	380	420	480	540	610	690	13%
TRANSACTION PROCESSING	70	75	85	90	400	110	8%
APPLICATION DEVELOPMENT	320	390	470	560	680	830	21%
OFFICE	820	930	1100	1200	1300	1350	11%
DECISION SUPPORT	610	720	850	1000	1200	1400	18%
TOTAL	3600	4150	4850	5550	6400	7300	15%

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US
TOTAL BY BUYER GROUPS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	4600	4650	4700	4800	4900	5000	2%
DISTRIBUTED FILE/STORAGE	320	330	340	340	340	340	1%
NETWORKING	1150	1200	1250	1300	1400	1450	5%
DISTRIBUTED PRINT	210	210	220	230	240	240	3%
DBMS	3750	4350	5050	5900	6950	8100	17%
SYSTEM/NETWORK MGMT	5600	5850	6250	6650	7100	7600	6%
TRANSACTION PROCESSING	650	670	700	720	750	770	4%
APPLICATION DEVELOPMENT	5250	5600	6000	6500	7050	7800	8%
OFFICE	3250	3650	4200	4650	5100	5500	11%
DECISION SUPPORT	2250	2650	3100	3650	4350	5200	18%
TOTAL	27050	29200	31850	34750	38100	42100	9%



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WORLDWIDE
FOR <=15,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	2150	2350	2600	2900	3200	3550	10%
DISTRIBUTED FILE/STORAGE	150	160	170	190	200	220	9%
NETWORKING	740	820	910	1000	1100	1250	11%
DISTRIBUTED PRINT	140	150	160	170	180	190	6%
DBMS	3150	3950	4950	6200	7800	9800	25%
SYSTEM/NETWORK MGMT	1250	1450	1750	2050	2400	2850	18%
TRANSACTION PROCESSING	290	320	360	400	450	500	12%
APPLICATION DEVELOPMENT	990	1250	1550	1900	2400	2950	25%
OFFICE	4150	4700	5350	6050	6900	7800	14%
DECISION SUPPORT	2450	3000	3600	4350	5250	6350	21%
TOTAL	15450	18150	21400	25250	29900	35450	18%

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WORLDWIDE
FOR 15,000 - 50,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1800	1850	1900	1900	1950	1950	2%
DISTRIBUTED FILE/STORAGE	120	130	140	140	150	160	6%
NETWORKING	470	510	540	580	620	660	7%
DISTRIBUTED PRINT	85	95	100	110	110	110	5%
DBMS	850	930	1000	1050	1150	1250	8%
SYSTEM/NETWORK MGMT	2350	2450	2650	2850	3000	3200	7%
TRANSACTION PROCESSING	320	330	340	340	350	350	2%
APPLICATION DEVELOPMENT	2550	2750	2500	3150	3300	3500	6%
OFFICE	800	860	910	670	1050	1100	6%
DECISION SUPPORT	2300	250	270	280	290	300	5%
TOTAL	9550	10150	10350	11400	12000	12600	6%



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WORLDWIDE
FOR 50,000 - 100,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1350	1350	1400	1400	1400	1400	1%
DISTRIBUTED FILE/STORAGE	90	90	90	90	90	90	1%
NETWORKING	320	330	340	340	340	350	2%
DISTRIBUTED PRINT	55	55	60	60	60	60	2%
DBMS	840	910	1000	1070	1150	1050	5%
SYSTEM/NETWORK MGMT	1950	2050	2200	2300	2400	2550	5%
TRANSACTION PROCESSING	220	220	220	230	230	230	1%
APPLICATION DEVELOPMENT	2000	2100	2200	2250	2350	2450	4%
OFFICE	360	400	420	440	450	460	5%
DECISION SUPPORT	140	150	150	150	150	160	1%
TOTAL	7350	7700	8050	8300	8650	8800	4%

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WORLDWIDE
FOR >100,000 CLASS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	3100	2900	2700	2500	2350	2250	-6%
DISTRIBUTED FILE/STORAGE	230	230	220	200	180	160	-7%
NETWORKING	580	550	520	500	470	440	-6%
DISTRIBUTED PRINT	90	90	90	90	90	90	0%
DBMS	1830	1950	2106	2250	2400	2600	7%
SYSTEM/NETWORK MGMT	4550	4800	5000	5100	5250	5400	3%
TRANSACTION PROCESSING	360	360	350	350	340	340	-1%
APPLICATION DEVELOPMENT	4230	4350	4500	4550	2550	4450	1%
OFFICE	350	350	360	350	350	350	0%
DECISION SUPPORT	290	320	350	370	400	430	8%
TOTAL	15700	15950	16150	16300	16350	16450	1%



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WORLDWIDE
FOR ALL CLASSES

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	8400	8500	8600	8750	8900	9150	2%
DISTRIBUTED FILE/STORAGE	580	600	610	620	620	620	2%
NETWORKING	2100	2200	2300	2450	2550	2700	5%
DISTRIBUTED PRINT	370	390	400	420	440	440	4%
DBMS	6700	7800	9050	10600	12550	14700	17%
SYSTEM/NETWORK MGMT	10200	10850	11550	12250	13100	14000	7%
TRANSACTION PROCESSING	1200	1250	1250	1300	1350	1400	4%
APPLICATION DEVELOPMENT	9800	10431	10699	11879	12590	13350	6%
OFFICE	5650	6300	7050	7800	8700	9700	11%
DECISION SUPPORT	3150	3700	4350	5150	6100	7250	18%
TOTAL	48100	51950	56000	61250	66900	73300	9%



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WORLDWIDE
WORKSTATION B

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	1800	1900	2000	2150	2350	2600	7%
DISTRIBUTED FILE/STORAGE	110	110	120	130	120	120	1%
NETWORKING	550	600	700	780	870	970	12%
DISTRIBUTED PRINT	110	110	120	130	120	110	0%
DBMS	2450	3150	3950	4900	5950	6900	23%
SYSTEM/NETWORK MGMT	1100	1200	1400	1150	1700	1750	10%
TRANSACTION PROCESSING	300	330	390	430	480	530	12%
APPLICATION DEVELOPMENT	770	1100	1350	1650	2000	2200	23%
OFFICE	3450	3850	4450	4600	4450	4050	3%
DECISION SUPPORT	2650	3100	3600	4050	4300	4350	11%
TOTAL	13250	15400	18100	20400	22350	23600	12%



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WORLDWIDE
CLIENT/SERVER LAN B

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	590	700	830	990	1150	1400	19%
DISTRIBUTED FILE/STORAGE	35	50	60	75	100	120	26%
NETWORKING	230	280	330	390	470	560	20%
DISTRIBUTED PRINT	35	50	60	75	100	120	28%
DBMS	1050	1400	1850	2500	3400	4700	35%
SYSTEM/NETWORK MGMT	350	450	610	840	1200	1700	37%
TRANSACTION PROCESSING	0	0	0	0	0	0	ERR
APPLICATION DEVELOPMENT	2250	360	530	830	1300	2100	54%
OFFICE	900	1200	1650	2350	3400	4650	39%
DECISION SUPPORT	660	930	1350	2050	3100	4800	49%
TOTAL	4100	5400	7250	10050	14200	20150	38%



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WORLDWIDE
CLIENT/SERVER WAN

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	95	110	120	140	160	180	14%
DISTRIBUTED FILE/STORAGE	5	5	5	5	5	5	-12%
NETWORKING	30	40	40	50	60	65	18%
DISTRIBUTED PRINT	5	5	5	5	5	5	1%
DBMS	210	240	370	310	360	410	14%
SYSTEM/NETWORK MGMT	70	80	90	110	120	140	15%
TRANSACTION PROCESSING	0	0	0	0	0	0	ERR
APPLICATION DEVELOPMENT	50	55	65	75	85	100	17%
OFFICE	190	220	250	280	320	370	14%
DECISION SUPPORT	120	140	150	170	190	210	11%
TOTAL	780	890	1000	1150	1300	1500	14%



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WORLDWIDE
HOST MINI

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	2400	2550	2600	2600	2650	2650	2%
DISTRIBUTED FILE/STORAGE	170	190	200	200	200	210	4%
NETWORKING	660	660	670	670	680	680	1%
DISTRIBUTED PRINT	120	130	130	140	140	130	1%
DBMS	1100	1150	1200	1250	1300	1350	5%
SYSTEM/NETWORK MGMT	3400	3550	3750	4000	4200	4450	6%
TRANSACTION PROCESSING	460	470	490	500	510	520	2%
APPLICATION DEVELOPMENT	3950	4150	4450	4700	4900	5200	6%
OFFICE	1150	1200	1300	1350	1400	1500	6%
DECISION SUPPORT	290	300	290	290	280	270	-2%
TOTAL	13650	14350	15050	15700	16300	17000	4%



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WORLDWIDE
HOST MAINFRAME

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	3450	3250	3100	2950	2800	2650	-5%
DISTRIBUTED FILE/STORAGE	250	240	230	220	210	200	-5%
NETWORKING	610	620	590	560	540	510	-4%
DISTRIBUTED PRINT	100	95	90	90	85	85	-4%
DBMS	2050	2100	2150	2200	2300	2350	3%
SYSTEM/NETWORK MGMT	5250	5350	5500	5700	5850	6050	3%
TRANSACTION PROCESSING	410	420	410	400	400	400	-1%
APPLICATION DEVELOPMENT	4500	4500	4500	4600	4650	4850	2%
OFFICE	250	250	240	230	200	250	0%
DECISION SUPPORT	400	440	470	500	550	590	8%
TOTAL	17250	17300	17350	17450	17600	17900	1%



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WORLDWIDE
FOR ALL PLATFORMS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	8350	8500	8650	8850	9100	9450	2%
DISTRIBUTED FILE/STORAGE	570	600	620	630	630	640	2%
NETWORKING	2100	2200	2350	2450	2600	2800	6%
DISTRIBUTED PRINT	370	390	410	430	450	450	4%
DBMS	6800	8000	9450	11150	13300	15750	18%
SYSTEM/NETWORK MGMT	10100	10650	11350	12150	13100	14100	7%
TRANSACTION PROCESSING	1150	1200	1300	1350	1400	1450	4%
APPLICATION DEVELOPMENT	9500	10150	10900	11900	12950	14500	9%
OFFICE	5900	6750	7850	8800	9800	10750	13%
DECISION SUPPORT	4100	4900	5850	7050	8400	10250	20%
TOTAL	49000	53350	58700	64750	71750	80100	10%



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WORLDWIDE
CLIENT/SERVER (LAN/WAN)

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	690	810	950	1150	1350	1600	18%
DISTRIBUTED FILE/STORAGE	45	55	70	80	110	120	23%
NETWORKING	260	310	370	440	530	630	19%
DISTRIBUTED PRINT	40	55	70	85	100	130	25%
DBMS	1250	1650	2100	2800	3750	5100	32%
SYSTEM/NETWORK MGMT	420	530	700	950	1300	1800	34%
TRANSACTION PROCESSING	0	0	0	0	0	0	
APPLICATION DEVELOPMENT	290	410	600	900	1400	2200	50%
OFFICE	1100	1400	1900	2600	3700	5000	35%
DECISION SUPPORT	780	1050	1500	2200	3300	5050	45%
TOTAL	4850	6300	8300	11200	15500	21600	35%



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SECTION THREE
WORLDWIDE
DIRECT

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	5500	5500	5500	5450	5450	5500	0%
DISTRIBUTED FILE/STORAGE	390	400	400	400	390	390	0%
NETWORKING	1250	1300	1350	1350	1400	1450	3%
DISTRIBUTED PRINT	230	230	240	240	240	240	1%
DBMS	3650	4100	4600	5150	5850	6600	13%
SYSTEM/NETWORK MGMT	7350	7650	8050	8500	8950	9400	5%
TRANSACTION PROCESSING	800	830	850	880	900	820	3%
APPLICATION DEVELOPMENT	7050	7350	7750	8200	8650	9300	6%
OFFICE	2600	2850	3250	3500	3700	3900	9%
DECISION SUPPORT	1700	2000	2250	2600	2950	3350	15%
TOTAL	30550	32200	34200	36250	38500	41000	6%



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WORLDWIDE
SYSTEMS INTEGRATION

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	470	480	500	520	550	590	5%
DISTRIBUTED FILE/STORAGE	35	35	35	40	40	45	6%
NETWORKING	120	130	140	150	170	190	10%
DISTRIBUTED PRINT	20	20	25	30	30	35	13%
DBMS	460	540	650	810	1000	1300	23%
SYSTEM/NETWORK MGMT	560	600	650	720	810	930	11%
TRANSACTION PROCESSING	45	45	45	45	45	45	1%
APPLICATION DEVELOPMENT	490	520	560	640	750	930	14%
OFFICE	290	360	460	610	820	1100	30%
DECISION SUPPORT	220	280	380	530	750	1100	38%
TOTAL	2700	3000	3450	4100	5000	6250	18%



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WORLDWIDE
OUTSOURCE

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	60	60	60	65	70	70	3%
DISTRIBUTED FILE/STORAGE	5	5	5	5	5	5	5%
NETWORKING	15	15	15	20	20	20	8%
DISTRIBUTED PRINT	0	5	5	5	5	5	10%
DBMS	50	60	70	85	110	130	21%
SYSTEM/NETWORK MGMT	80	80	90	95	110	120	9%
TRANSACTION PROCESSING	5	5	5	5	5	5	1%
APPLICATION DEVELOPMENT	70	75	80	90	100	120	11%
OFFICE	30	35	45	60	85	110	30%
DECISION SUPPORT	20	30	35	50	75	110	39%
TOTAL	340	370	400	480	570	700	16%



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WORLDWIDE
SERVICE PROVIDER

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	460	480	500	520	550	590	5%
DISTRIBUTED FILE/STORAGE	30	35	35	40	40	40	5%
NETWORKING	120	140	150	160	170	190	9%
DISTRIBUTED PRINT	20	25	25	30	30	30	7%
DBMS	440	540	660	800	990	1200	22%
SYSTEM/NETWORK MGMT	500	540	580	640	710	790	10%
TRANSACTION PROCESSING	60	65	70	70	75	80	6%
APPLICATION DEVELOPMENT	460	510	560	640	730	850	13%
OFFICE	430	500	590	690	800	920	16%
DECISION SUPPORT	300	370	450	560	700	900	24%
TOTAL	2850	3200	3600	4150	4800	5600	15%



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WORLDWIDE
SOFTWARE PRODUCTS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	940	980	1050	1100	1200	1250	6%
DISTRIBUTED FILE/STORAGE	60	65	70	75	80	80	5%
NETWORKING	270	290	320	350	390	430	10%
DISTRIBUTED PRINT	50	50	60	60	65	65	7%
DBMS	990	1200	1500	1850	2300	2800	23%
SYSTEM/NETWORK MGMT	910	990	1100	1200	1350	1500	10%
TRANSACTION PROCESSING	130	140	150	160	170	180	7%
APPLICATION DEVELOPMENT	840	950	1100	1250	1450	1700	15%
OFFICE	1080	1250	1450	1650	1850	2050	14%
DECISION SUPPORT	770	930	1100	1350	1650	2050	21%
TOTAL	6050	6850	7900	9100	10450	12100	15%



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WORLDWIDE
RETAILER/DISTRIBUTOR

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	940	1000	1100	1200	1300	1450	9%
DISTRIBUTED FILE/STORAGE	60	65	70	75	80	80	7%
NETWORKING	290	320	370	420	470	530	13%
DISTRIBUTED PRINT	55	60	65	70	75	75	7%
DBMS	1200	1550	2000	2450	3050	3700	25%
SYSTEM/NETWORK MGMT	690	770	900	1000	1150	1350	14%
TRANSACTION PROCESSING	130	140	160	170	190	210	10%
APPLICATION DEVELOPMENT	580	720	880	1100	1300	1600	23%
OFFICE	1500	1750	2050	2300	2500	2700	12%
DECISION SUPPORT	1100	1350	1600	1950	2300	2750	20%
TOTAL	6600	7700	9150	10700	12500	14450	17%



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WORLDWIDE
TOTAL BY BUYER GROUPS

FUNCTION	1993	1994	1995	1996	1997	1998	CAGR
OPERATING SYSTEMS	8350	8500	8650	8850	9100	9450	2%
DISTRIBUTED FILE/STORAGE	570	600	620	630	630	640	2%
NETWORKING	2100	2200	2350	2450	2600	2800	6%
DISTRIBUTED PRINT	370	390	410	430	450	450	4%
DBMS	6800	8000	9450	11150	13300	15750	18%
SYSTEM/NETWORK NGMT	10100	10650	11350	12150	13050	14100	7%
TRANSACTION PROCESSING	1150	1200	1300	1350	1400	1450	4%
APPLICATION DEVELOPMENT	9500	10150	10900	11900	12950	14500	9%
OFFICE	5900	6750	7850	8800	9800	10750	13%
DECISION SUPPORT	4100	4900	5850	7050	8400	10250	20%
TOTAL	49000	53350	58700	64750	71750	80100	10%

