MARKET STUDY OF A DATA BASE COMPUTER

VOLUME I

ANALYSIS AND RECOMMENDATIONS

APRIL 1983

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EXHIBITS

1 INTRODUCTION

I INTRODUCTION

- This report details the findings of phase II of the INPUT study on the market for a data base computer (DBC). This study is a qualitative analysis of the market for such a product, and the data from the 45 interviews carried out cannot be used in any statistical analysis.

A. REPORT SCOPE

- Among others, the report aims at answering the following questions:

  - Is there a market for the Servio Logic DBC?

  - What product characteristics, software and hardware, qualify its acceptance by users and its success in the marketplace?

  - What is the minimum functionality the product must have in order to be viable?

  - What is the competition in the marketplace today and that expected in the near future?

- Which vendor installations are the best targets, and what are the market windows for each?

- In the final analysis should Servio pursue this market, and if so how?

- The data base computer market has now extended down to the dedicated board for an individual personal computer (i.e., beyond the data base system shared by many PCs). INPUT was mandated to concentrate on the mini-computer and small mainframe market. Where relevant, however, INPUT has included data on the single-station micro, microcluster, DBMS software, and mainframe DBC markets.

B. METHODOLOGY

- Three categories of interviews were carried out:

  - Interviews with users (35), exploring the applicability of the DBC to their application environment and their DBMS needs and evaluating their reaction to product characteristics. Members of Servio Logic participated in some of these interviews.

  - Interviews with OEMs (8), looking at how their decision process is accomplished and what their views on the market are for such a product.

  - Interviews with four direct competitors (Britton Lee, Datafusion, Intel and RTI), gauging their strategies, products, successes, and difficulties.

- The user interviews were with the decision makers (usually IS managers and vice presidents, but in rare occasions system analysts whose job it would be to evaluate such a product and make recommendations). The list is provided in Exhibit I-1.

EXHIBIT I-1

USER INTERVIEWS

INTERVIEW NUMBER	COMPANY	EQUIPMENT INSTALLED	INTERVIEW FUNCTION	DATE
1.	DALGETY, Inc.	2 DEC 11/70 1 DEC VAX	DP Manager	2/22
2.	Lawrence Berkeley Labs	2 DEC 11/70 3 DEC VAX 11/780	Staff Scientist	2/23
3.	AT&T Long Lines	IBM 4341 II DEC VAX 11/780	DP Manager	2/23
4.	San Mateo Times	IBM S/38	DP Manager	2/24
5.	Boeing Computer Services	DEC PDP 11/70 DEC VAX 11/780	DB Manager	2/24
6.	Foss, Launch & Tug	IBM 4331	DP Manager	2/24
7.	Nalley's Fine Foods	IBM 4331		2/24
8.	Central Automotive Wholesale	IBM S/38	V.P. & General Manager	2/25
9.	Cordis Dow Corporation	2 DEC 11/70 IBM System 34	DP Manager	2/25
10.	Systems Development Corporation	Britton Lee	Analyst	3/1
11.	Global Van Lines	HP 3000/44	Director EDP	3/1
12.	Criterion Corporation	Prime 750	Director Systems Development	3/2
13.	Miller Freeman Publisher	Burroughs 1855	DP Manager	3/3
14.	Gould Corporation	HP 3000/44	DP Manager	3/2
15.	International Harvester Solar Division	DEC VAX 11/780	Manager Systems Planning	3/2
16.	Western Pacific Railroad	DEC 11/70	DP Manager	2/28

Continued

EXHIBIT I-1 (Cont.)

USER INTERVIEWS

INTERVIEW NUMBER	COMPANY	EQUIPMENT INSTALLED	INTERVIEW FUNCTION	DATE
17.	Farinon Electric	DEC VAX 11/780	DP Manager	2/28
18.	Alameda Water District	IBM Sytem/38	DP Manager	3/1
19.	CA NORGREN Co.	DEC VAX 11/780	DP Manager	3/2
20.	Walter Carpet Mills	IBM 4331	DP Manager	3/3
21.	Hydro Aire Division	IBM 4331	DP Manager	3/7
22.	Granger Associates	HP 3000/3	DP Manager	3/7
23.	Orion Research	Prime 750	Director Information Systems	3/4
24.	Jeffersen Sanderson	DEC VAX 11/780	DP Manager	3/1
25.	City of Portland	DEC VAX 11/780	DP Manager	3/2
26.	Colwell Systems, Inc.	DEC VAX 11/780	DP Manager	3/2
27.	Minute Maid Distributors	Wang VS80	DP Manager	3/2
28.	Record Bar, Inc.	2X Prime 750	DP Manager	3/7
29.	Insurdata	2 Prime 750	Vice President	3/3
30.	Davis, Polk and Wardwell	Britton Lee IDM 500	Information Manager	3/4
31.	Black & Veatch	Britton Lee Univac 1100/60	Manager MIS	3/14
32.	Benson	Wang VS 80	Director MIS	3/3
33.	Neo Life Company of America	IBM System/38	DP Manager	3/4
34.	Summit University Press	DG C/330	Sales Manager	3/7
35.	Brandeis University	DG MV8000	DP Manager	3/14

- The list of the competitor and OEM interviews accomplished is given in Exhibit I-2.

- The summary of all 46 interviews is shown in Exhibit I-3.

C. LIMITATIONS

- Servio decided at the project launch not to provide the users interviewed with a product description. This caused some difficulties with certain users who answered questions such as "What is a DBC worth to you?" with comments like "You tell me exactly what the product is, and I'll tell you my idea on price."

- Some of the data sought were beyond the capabilities of the average IS manager, in particular distinctions between hierarchical, network, and relational data base structure.

- The size of the sample was sufficient with regard to the competitor interviews and adequate with regard to OEM interviews. But the user sample can only be used in a qualitative manner, since 35 users do not represent a statistical sample of any of the major market categories:

  - Non-DBMS users (not sampled).

  - DBMS users (sampled but insufficiently).

  - System manufacturer installed bases (sampled but insufficiently).

  - Industry sector user categories (sampled but insufficiently).

EXHIBIT I-2

COMPETITOR AND OEM INTERVIEWS

COMPANY	INTERVIEW FUNCTION	DATE
A. Competitors		
1. Britton Lee	Product Marketing	2/16/83
2. Datafusion	Product Marketing	2/15/83
3. Intel	Product Marketing	3/14/83
4. RTI	President	3/9/83
B. OEMs		
1. Wang	DB Design	3/10/83
2. Prime	Product Planning	3/10/83
3. DG	DB Planning	3/9/83
4. Memorex	Director Product Planning	3/14/83
5. CDC	Manager Research	3/14/83
6. HDR Systems	Product Marketing	3/4/83
7. Freedom Technologies	Product Marketing	3/4/83

EXHIBIT I-3

INTERVIEW SUMMARY

COMPANY	EQUIPMENT	INTERVIEWS	VENDOR INTERVIEWS	
			OEM	COMPETITION
Burroughs	1800	1	-	-
IBM	Systems 38	4	-	-
	4331	4	-	-
DEC	PDP 11/70	2	-	-
	VAX	10	-	-
Prime	550-750	4	1	-
Data General	MV 6000/8000	3	1	-
HP	3000/44/64	2	-	-
Memorex	-	-	1	-
Wang -	-	2	1	-
HDR Systems	-	-	1	-
Freedom Technologies	-	-	1	-
CDC	-	-	1	-
Britton Lee	-	3	-	1
Intel	-	-	-	1
Datafusion	-	-	-	1
RTI	-	-	-	1
Total	-	35	7	4

D. DEFINITIONS

- For the purposes of this report a number of straightfoward shorthand definitions have been used to reduce repetitious text and clarify which of the several distinct DBC markets is being referenced at any given moment.

- Although it was not in the scope of the study requested by Servio, INPUT has also included data on the DBMS software product market with which any DBC product competes.

- A summary of these shorthand notations is given in Exhibit I-4.

EXHIBIT I-4

SHORTHAND NOTATIONS USED

- DB - DBC + DBMS
- DBC - A "black box" hardware product providing multi-host DBMS logic and disk-controller functions plus front-end software drivers and an access language (e.g., Query). DBC/M + DBC/m + DBC/μ
- DBMS - A software package providing structured data management and application program "protection" from physical storage activity.
- DBC/M - DBC aimed at mainframe market (IBM 4341+).
- DBC/m - DBC aimed at minicomputer market (DEC 11/23 up to VAX).
- DBC/μ - DBC aimed at microcomputer market.
  suffix (i) single station micro.
  suffix (ii) cluster of micros.
- RCS - Remote computing services companies.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. MARKET REQUIREMENT FOR A DATA BASE PROCESSOR

1. SOFTWARE SOLUTION OR HARDWARE SOLUTION?

- The majority of major data processing users recognize the need for a centralized file processing capability early in the development of an installation but, in the absence of any knowledge of "black box" solutions, assume that a software solution (DBMS) is required.

- Significantly, this does not lead to the immediate purchase of such a product, since DBMSs are notorious for their use of scarce resources: memory, processor cycles, and programmers.

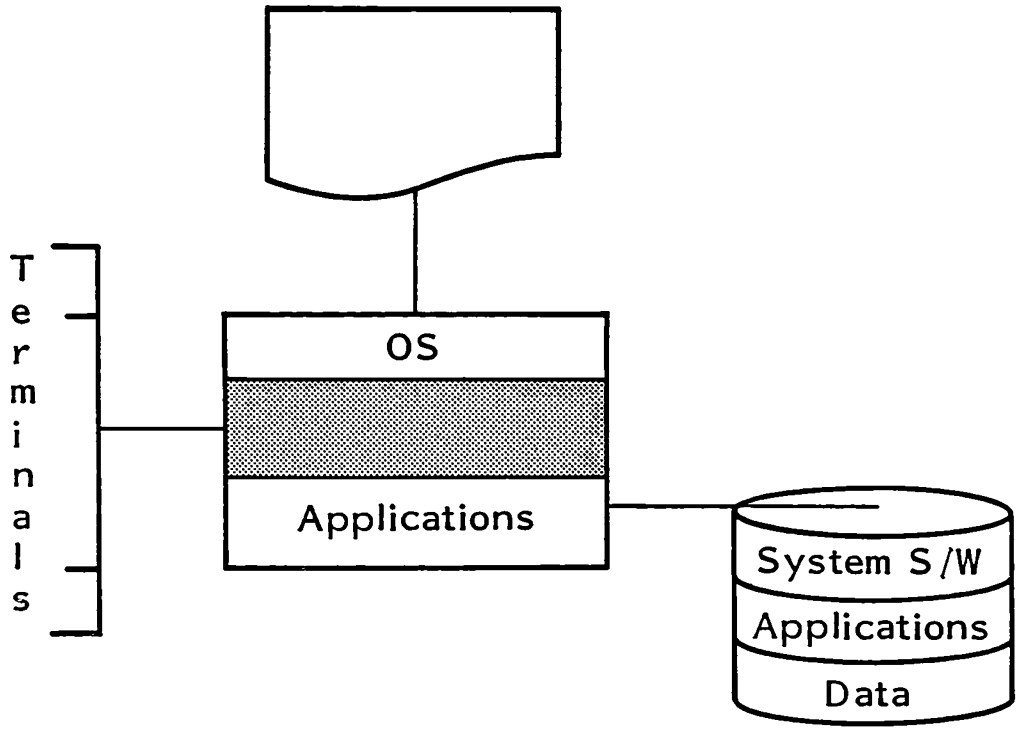
- Thus while the need for a capability that the DBC fulfills is recognized, the need for a DBC is not. In fact the market resistance to such a product is high, both from computer manufacturers and their user bases (even though users are delighted with the concept).

- Faced with a decision on whether to go the software route (DBMS) or the hardware route (DBC), most of today's users will choose the DBMS (see Exhibit II-1).

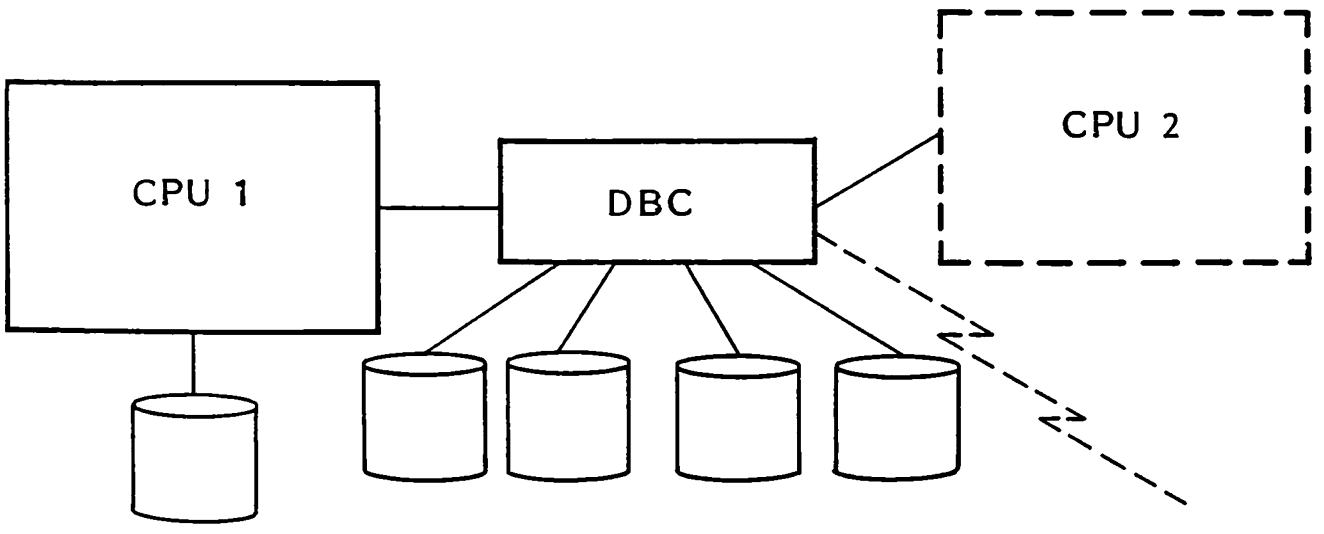
EXHIBIT II-1

WHERE DOES THE DB FUNCTION BELONG TODAY?

A. TODAY'S DBMS



B. TODAY'S DBC



2. LOCATING THE DATA BASE

- The rapid influx of personal computers into the corporate environment has raised another question: where should the corporate data base be located? Does it belong in a centralized IS facility, managed by a DBMS? Should it be divided into logical parts, each held at or near the facility/division responsible for the content, and the whole tied together by a network link? Does each office have a need for a shared resource attached to the local area network, which in turn ties to a central IS data base facility through a network link? Do the personal computers each retain a microsubset of the data base, pushing distributed data bases to a new level?

- The user doesn't know and looks to vendors to decide in which direction(s) he should move. INPUT's views are summarized in Exhibit II-2:

  - The local area network can serve as the universal interface that attaches the DBC resource to the host(s).

  - The shared data base system needed by personal computer clusters should also have a remote communications link to other clusters.

B. THE MARKETS

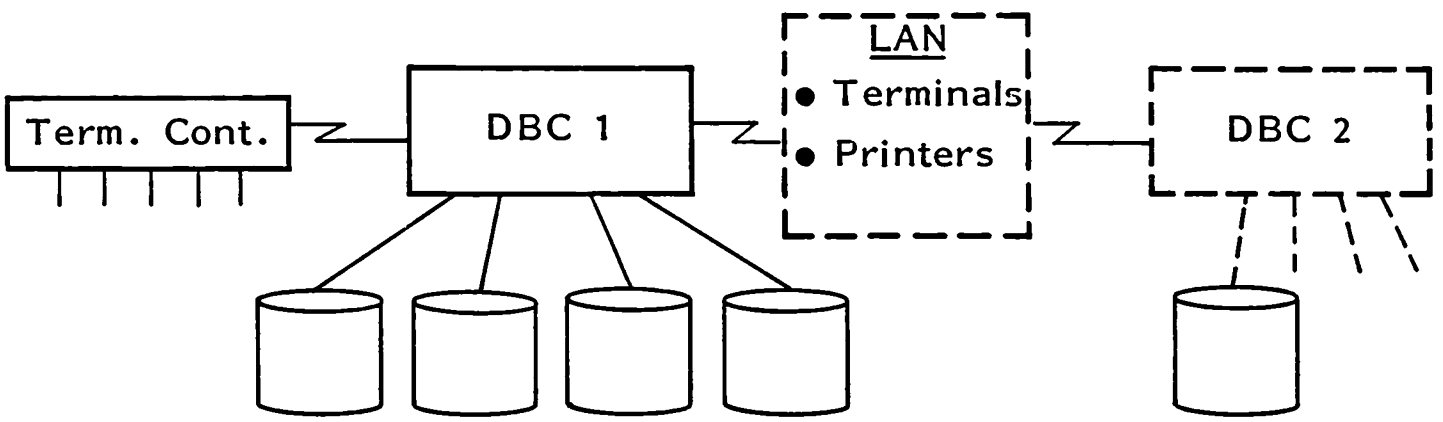
- The applicability of the DBC increases as the size of the system it serves decreases. The bandwidth, clock rate, and memory size of mainframe systems are usually adequate to overcome software inefficiencies to the point where a DBC will not provide more than 20-30% improvement in performance (CDC's own benchmarking with a Britton Lee IDM 500 attached to a Cyber 175 suggests only minimal improvements).

- The impact on minicomputers is far more dramatic. In benchmarks, Signal Technology, a Britton Lee OEM, claims to achieve a threefold performance

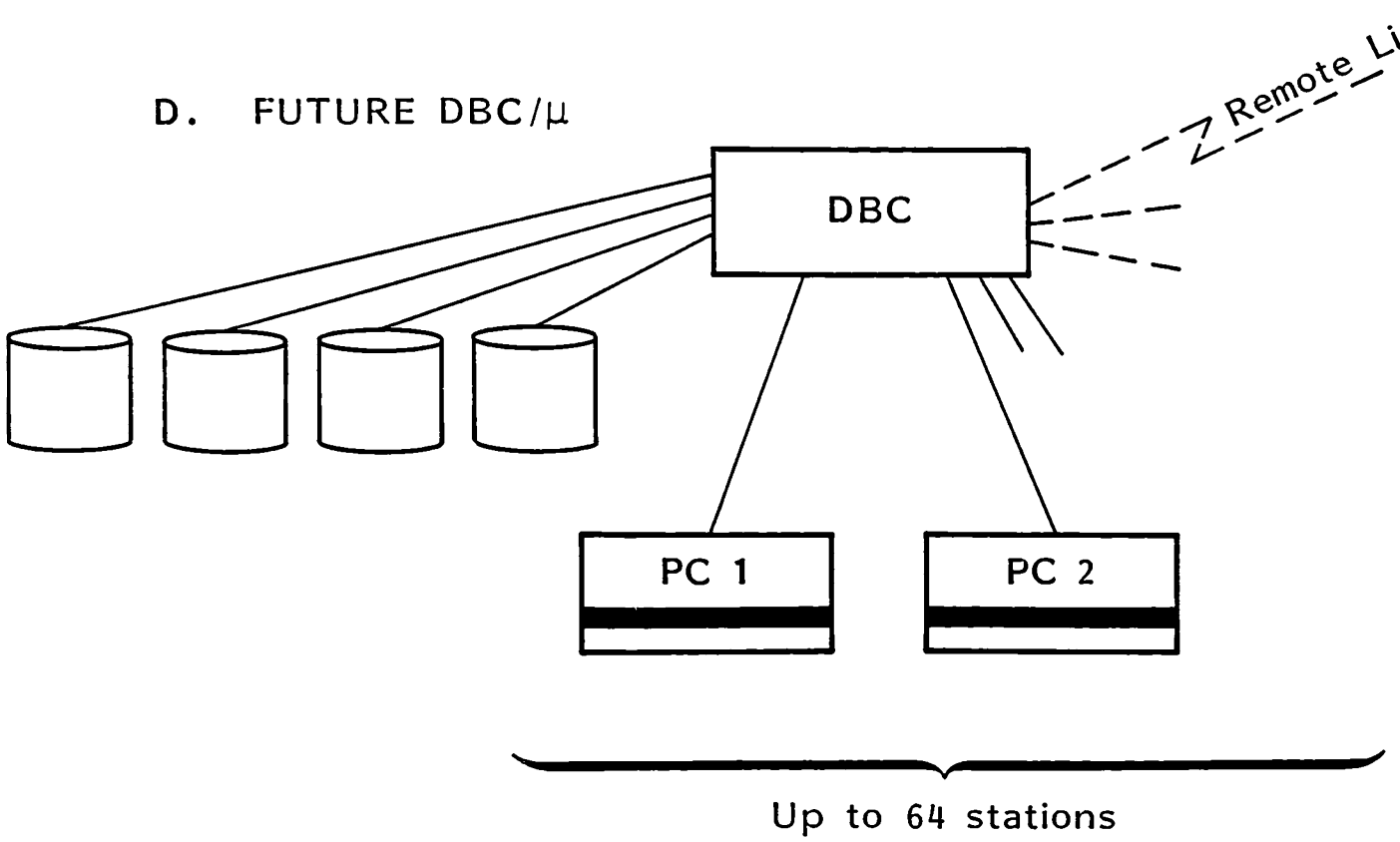
EXHIBIT II-2

WHERE DOES THE DB FUNCTION BELONG TOMORROW?

C. FUTURE DBC/m



D. FUTURE DBC/μ



improvement on a DEC VAX 11/780. This is dependent on application mix, of course, but it is the magnitude needed to catch a user's attention.

- The shared DBC market for clustered personal computers (PCs) is stronger still. Intel and Britton Lee are concerned with the speed at which market demand is developing.

- Three major DB markets have emerged that are (currently) mutually exclusive. These markets and their principal characteristics are summarized as follows:

1. MAINFRAME MARKET

   - Entrenched vendors (IBM and BUNCH and CRAY), who are resisting any move to DBC.

   - Software market mainly.

   - Some signs of DBMS market saturation.

2. MINICOMPUTER MARKET

   - Software and hardware product market.

   - Significant competition between S/W and H/W.

   - Main system vendors are reluctant to go with DBC.

3. MICROCOMPUTER MARKET

- Mainly hardware market (board) at workstation level, (DBC/μ (ii)).

- Hardware market only at cluster level, (DBC/μ (i)).

- Market is wide open; start-up competition is flourishing.

4. FACTORS LIMITING THE DBC/M MARKET

- A number of negative factors are conversely influencing the development of what would otherwise be a very strong market for the DBC serving mini-computer products.

- First and foremost there have been no computer manufacturer endorsements of either the concept or the product as yet. Also, some manufacturers are talking to their user groups in veiled terms about new product developments they have in hand.

- The disruption caused by the installation of a DBC/m on an existing computer is enormous, requiring file reconversion and substantial application program rewrites. This is almost a deterrent to sales.

- Many of the vendors selling the DBC/m are small companies, so users have a natural concern about the ongoing viability of these vendors, which again dampens sales.

- Finally there is wide acceptance in the marketplace of using a second supplier in-house (i.e., different from the vendor of the systems hardware in use) if that supplier is a software house selling software. There is widespread reluctance to use a second supplier if he is selling hardware.

5. SALES FORECAST FOR THE SERVIO LOGIC DBC/m

- A number of assumptions have to be made as to the technical capabilities, price, and availability of the Servio Logic DBC/m, but on the basis of its being competitive with Britton Lee products, introduced no later than January 1

1984 (with DEC VAX capability) and January 1, 1985 (with IBM 4350 capability), the unit sales shown in Exhibit II-3 can be expressed.

- Software sales are entirely dependent on functional capabilities and pricing, but assuming the minimum capabilities and pricing levels described later in the report, they should average 12-13% of equipment sales.

- Support services should average 5% of equipment sales, and pricing for these is also suggested later in the report.

- The total sales value that results assumes product introduction in 1984. If introduction dates are delayed beyond this date, then the entire forecast must be shifted accordingly. If the delay is beyond 1985, the forecast would have to be substantially modified because of the competitive developments from other vendors.

- If the Servio Logic product is substantially better (functionally) than the Britton Lee product, then again the forecast would have to be revised (upward).

- The net outcome of the INPUT survey and analysis is that it is likely that in the near future the DBC/m represents a rapidly developing opportunity and the market for such products could be at the early stages of takeoff.

EXHIBIT II-3

SALES FORECAST FOR THE SERVIO LOGIC DBC/m

COMPONENT	1984	1985	1986	1987	1988
Available Market	4,300	7,300	12,400	20,000	33,000
Total Sales (units)	800	1,500	2,400	4,400	7,300
SERVIO Logic (units)	24	60	120	175	220
SERVIO Market Share (percent)	3%	4%	5%	4%	3%
Sales Value ($ millions)	$1.3	$3.1	$5.4	$7.0	$7.7
SOFTWARE SALES					
Sales Value ($ millions)	0.1	0.4	0.8	1.0	1.1
SUPPORT SERVICES					
Sales Value ($ millions)	-	0.1	0.2	0.3	0.4
TOTAL SALES					
($ millions)	$1.4	$3.6	$6.4	$8.3	$9.2

III MARKET OVERVIEW

III MARKET OVERVIEW

A. STATUS OF THE DB MARKET

- The market's acceptance of the DBMS software package concept is excellent and continues to provide a very good market for vendors such as Cullinane, Cincom, Software AG, ADR, Advanced Data Management, Information Builders, Intel (MRI), Mathematica, Relational Software Inc., and Relational Technology Inc.

- In contrast, the most significant point to emerge from INPUT's study of the DBC market is that while it is acceptable to most data processing managers (DPMs) to purchase a software data base management system from a vendor other than the manufacturer of his system hardware, he generally balks at the idea of purchasing a hardware-based data base management system on the grounds that:

  - Introducing a "third" vendor into his installation increases the number of sources of potential problems.

  - Adds another maintenance contract.

  - Inserts an unknown quantity (new product) between him and his data.

  - Increases the risk of friction between him and his system vendor.

- All of these criticisms apply equally well to a DBMS but seem, in general, to have been accepted by the market. In other words, different vendors are not a problem if they do not appear to compete in any serious way, but a DBC is undesirable if it is being sold as an add-on to an existing installation, since:

  - It raises an interface problem with existing hosts, disks, operating systems, and applications.

  - It demands a restructuring of all the files.

- Many potential OEMs of a DBC (e.g., HP, Wang) who do not have a satisfactory DBMS yet will nevertheless only go the software route for these reasons.

- As we will see later in the report, other minicomputer manufacturers can nevertheless be persuaded, by the marketplace that they serve, that a DBC is a required product.

- From the end-user standpoint the market education on what a DBC is and can do for them is progressing well with over half of those interviewed having prior knowledge of at least one vendor (and usually the same one - Britton Lee). Most users, including those without prior knowledge of the product, found the concept of a DBC appealing.

- The DBC product has very uneven potential in the three main markets (DBC/M, DBC/m and DBC/μ, with the largest potential in the DBC/μ market. For all intents and purposes the DBC/M market is nonexistent, although some DBCs will be sold there.

- The OEMs who can provide the front-end software (system and application) to "personalize" the DBC are, generally speaking, very supportive of the concept. However, many have been disappointed at the market's slow devel-

opment over the last three years. This can be attributed to the lack of product endorsement by the major manufacturers (IBM, Burroughs, Univac, CDC, Honeywell, NCR, Cray).

B. MARKET PENETRATION

- It is difficult to assess the precise penetration of the DBMS packages into the existing markets, but on the order of 12,000 mainframe sites have installed a DBMS. This represents three-quarters of the available market, so that continued sales of such packages will be increasingly tied to new system sales.

- This will mean greater concentration of software package competition in the minicomputer area in the years ahead, which will compete with the DBC/m. At this point, however, less than 20% of the installed minicomputers have a DBMS, and shipments of new systems continue at a rapid pace.

- Further down the scale, the market for DBCs serving a cluster of personal computers is a major opportunity that few vendors have yet addressed. All of Servio Logic competitors are active in this area.

C. MARKET DRIVING FORCES

- Until recently the only impetus to DBC sales came from the small number of DBC vendors and their respective OEMs. As a result, the market was sluggish in its growth, and the success of current DBC vendors was limited.

- In January of this year, according to Prime and DG, the Department of Defense and other government agencies began including a DBC requirement in their RFPs. The concern this raised for Prime and DG is that government contracts represent about 20% of their sales.

- It is possible, in the short run, to minimize the impact of such a requirement by contesting it on the basis that is discriminates against most vendors (since so few DBC vendors exist). In the long run, however, a solution must be found.

- For Prime and other minicomputer vendors, this will probably mean the need for an OEM contract with a DBC vendor coupled with a contract for a front-end query language that fits their long-term "system strategy" (for Prime this means an SQL type front-end query capability). Sources such as Inco can provide such a front-end query language on an OEM basis.

- The source of this new development appears to be James Martin, who has convinced certain government agencies that it would make eminent sense for them to secure their data bases on a hardware resource that is independent of the host CPU (providing them with the ability to swap out systems that do not perform and interconnect different system vendors' hosts).

- Whatever the reason, if this trend is confirmed it is likely to provide the long awaited launching pad for DBC sales. Initially system vendors will scramble to sign up an OEM agreement with a DBC vendor (preferably with a competitive product to the one chosen by their competition - which will ensure that business will be spread). Subsequently, as soon as the necessary hardware and software interfaces are established for government sales, the commercial divisions of each system vendor will be anxious to obtain the product for such markets as banking, finance, insurance, and manufacturing.

- The second most important development has been the emergence of the demand for a DBC capable of sharing its resources with a cluster of local, direct connect personal computers. The advantages of such a device are numerous:

- It enables each PC user to share files and communicate with other PCs in the same locality.

- It secures the corporate data resource (which was in danger of being spread out over a large number of uncontrolled PC users, each with his own unique combination of hardware, software, and file structure).

- It returns the control of the PC population to the man controlling the central file resource (the DPM, who was in danger of losing control of the PCS altogether).

- Currently Britton Lee and Intel are both providing a DBC/μ (ii), but neither offers the capability of interconnecting DBCs located in separate locations (through a remote network link). In INPUT's view such a requirement is mandatory; otherwise each cluster of PCs will be just as isolated as each individual PC was before the arrival of the DBC/μ (ii).

D. GROWTH OF THE DBC/M MARKET

- The market growth for the DBC/m can be anticipated from the following elements:

  - Past shipment totals of the present DBC/m vendors (vendor interviews).

  - Expected growth of same (vendor interviews).

  - Expected performance of new entrants (speculation).

- INPUT's evaluation of the market growth was established by the above methodology. During conversations with the marketing director of Intel, these

estimations were confirmed as substantially the same as the market plan for that company. On a compound average annual basis, the market for DBC/m is expected to grow 49% between 1982 and 1987.

- This is not a true reflection of the actual size of the available market (which INPUT estimates to be five times the current rate of DBC/m sales). Many factors impede the adoption of the DBC/m (see next section).

- Most significant of the main market assumptions made by other DBC/m vendors is the expectation that add-ons (additions of DBC/m to an existing installation) will represent only 20% of the expected shipments. The remaining 80% will be composed entirely of new system sales.

- The four main industry sector markets are expected to be, in order:

  - Federal government.

  - Manufacturing.

  - Banking/finance.

  - Insurance.

- There is ample evidence that DB applications will grow rapidly and continuously (see User Requirements section) across the entire spectrum of industry sectors.

- Office automation has a huge potential for the DBC/m and the DBC/μ (ii), but the market has not yet begun to be developed. Intel is sure that this will become a growth market and has ongoing talks with word processor (WP) manufacturers on the need for a shared data base processor with direct connect WPs.

E. LIMITING FACTORS

- While the potential for the DBC/m is undisputed by both the user community and the vendor community, a number of factors have conspired to limit the market.

- First and foremost, not a single system vendor has endorsed the concept by adopting an OEM product or manufacturing one of its own. In addition, some vendors (e.g., DEC) have leaked "advanced knowledge" of their "plans" in this market (essentially the intelligent disk controller, which has only minor functional overlays with the DBC/m).

- Second, none of the DBC/m vendors offers benchmarks. While this is understandably difficult to do, users are reluctant to make decisions based on "paper" benefits.

- Third, conversion costs and system disruption are high for the add-on market that DBC/m vendors have sold to in the past.

- Fourth, none of the DBC/m vendors is a substantial, established company, so that each has the disadvantage of the new vendor/new product image. Moreover, maintenance is accomplished primarily through remote diagnostics, not on-site service.

- Fifth, a DBC/m requires a front-end query interface to maximize its usefulness. Each DBC/m vendor (and his OEMs) has chosen/written his own special brand, which does not coincide with anything the user already has or recognizes.

- Finally, with hardware costs dropping continuously, the user reasons that even if his DBMS is cumbersome and slow now, in the near future technology ad-

vances will ensure that (1) it will perform better, and (2) it will be less significant in terms of memory occupancy (percent occupied and cost of memory). IBM has told IMS users this fable.

F. MARKET SIZING

- To size the marketplace it is necessary to include the values of each category in the total DB market (particularly DBMS software packages). Exhibit III-1 provides the five-year forecast for each.

- In 1982 slightly less than $500 million of product were sold in the U.S., 90% of which was in the form of a DBMS software package. The $450 million represents DBMS sales to all categories of equipment (mainframes, minicomputers, and microcomputers).

- Growth in the DBMS market will be fueled principally by the mainframe and minicomputer markets since:

  - The sales value of a microcomputer DBMS is small ($700 average).

  - It is likely that relational DBMS products in the form of a printed circuit board will not significantly improve this value (probably a $2,500 sales price).

  - DBMS penetration of the microcomputer market is and will remain limited for the five-year forecast period.

- Sales in 1982 of DBC/m were only 7% of the total DB market, but growth will quickly exceed that of the DBMS.

EXHIBIT III-1

MARKET SIZING

MARKET	SALES ($ millions) 1982	1987	AAGR
• DBMS	$450	$1,670	30%
• DBC/m	30	220	49
• DBC/μ	15	430	95
Total DB	$495	$2,320	36%

DBC/m MARKET	1982	1987	AAGR
• Available Market	150	880	43%
• Sales	30	220	49
(Transparent Products)	-	(100)	N/A

- Microcomputer DBC sales in 1982 were entirely products such as the Corvus shared file systems. This market is the best growth opportunity of them all and will be quickly expanded by the volume shipments of the Britton Lee and Intel products.

- If it were possible to offer a DBC/m that provided transparent access to existing file formats as well as processing the DBC/m's own file structures, INPUT estimates that an additional $100 million of DBC/m could be added to the 1987 market value. Realistically, this is unlikely to happen.

IV USER REQUIREMENTS

IV USER REQUIREMENTS

A. ACCEPTANCE OF THE DBC

- To date, the education of the marketplace as to what a DBC can do, its advantages over a DBMS, and the opportunities that can be addressed by the DBC have been assured by a small number of vendors, only one of whom (Intel) has significant stature in the market.

- As a result, INPUT anticipated finding a very low level of product comprehension among data processing managers, but the actual results were quite encouraging: over half of the users interviewed know what a DBC is (see Exhibit IV-1).

- The primary source of information on the product was press coverage, not sales calls, but nevertheless the level of understanding was fairly accurate. One very useful information channel that has not gotten sufficient coverage so far is the user group (i.e., the association of users of a given computer manufacturer). Product presentations to such groups provides a forum of first-level sales contacts that offers high leverage for DBC manufacturers such as Servio Logic and Britton Lee, whose sales coverage is necessarily limited at this time.

- The principal beneficiary of press coverage to date has been Britton Lee and, as a result, users have a tendency to equate DBC with Britton Lee. Signal

EXHIBIT IV-1

USER KNOWLEDGE OF THE DBC/m

- Do you know what a back-end processor is?

No	51%
Yes	49%

- What is your source of information?

Trade Shows	6.7%
Press Articles	60.0
Advertising	6.7
Sales Calls	13.3
Other	13.3

- Vendors you have heard of:

Britton Lee	69.0%
Signal Technology	15.4
Freedom Technology	7.7
Other	7.9

Technology was also mentioned due to the publicity of their Omnibase product. They are a Britton Lee OEM.

B. PURCHASE PREFERENCE

- Users were asked to rank the type of vendor from whom they would prefer to purchase a DBC. The answers have implications for the marketing strategy that Servio Logic should adopt but must be carefully interpreted (see Exhibit IV-2).

- The first preference (74.3%) is for the manufacturer(s) of their currently installed system(s). This is mainly a vote for:

  - A known supplier rather than an unknown supplier.

  - A single source of hardware maintenance.

  - Avoiding intercompany squabbles if multiple vendors supply the installation.

- The second preference is a variation of the first, i.e., purchasing from a known vendor. The intent here is to avoid suppliers who do not have a known track record and who may be here today and gone tomorrow.

- The third preference was for the product manufacturer, if he is not included in the above. This essentially says, "If I can't get the product from my normal supplier or from someone I recognize, then at least let me deal directly with the manufacturer."

- Other sources (turnkey systems from OEMs, software houses, etc.) ranked last. In particular, users did not like the idea of buying hardware from a software vendor (87.5% said no to this option).

EXHIBIT IV-2

DBC PURCHASE SOURCE

Would you be reluctant to deal with a new vendor?	Yes	No
• Overall	62.9%	-
a. Would you prefer to purchase a DBC from known vendor?	74.3	-
b. From a software vendor?	-	87.5%
c. Would you accept third-party maintenance?	64.7	-
Software Interface Needed		
a. Would you prefer the DBC to have a query language?	81.3	-
b. Are high-order language mainframes needed?	55.9	-
c. Do you have strong need for CODASYL interface?	-	86.7

- The software interfaces needed include a front-end query language and high-order interfaces but do not include a CODASYL interface.

C. CURRENT DBMS/SYSTEM USAGE

- The user sample interviewed was almost entirely users of a DBMS. Those that were not, were users of an operating system or software system that offered DBMS function (e.g., Prime Information System, which is a transaction-oriented system incorporating its own DB structure and language).

- Not all of the applications being processed make use of the data base system. On average, 26% of the applications being processed do not access files via the DBMS (see Exhibit IV-3).

- In terms of CPU cycle resources absorbed by the DBMS, slightly more than one-third of available processing time is currently used, on average.

- On-line applications continue to grow as a proportion of the total installation workload, and batch applications continue to decrease. However, there is evidence that a hard core of batch applications will remain after most of this conversion is accomplished.

- Most of the users interviewed used their DBMS as a dedicated system.

D. MAIN JUSTIFICATION FOR PURCHASING A DBC

- The principal benefit expected from a DBC is a performance improvement in response to queries. Associated with this are all of the equipment-related benefits:

EXHIBIT IV-3

USER SAMPLE DBMS AND SYSTEM USAGE

- Percent of Applications on the System Using DBMS: 74% (average)

- Percent Processing Time Used in Accessing the DBMS: 35.6%

- What are You Using Your System For?

On-line Applications	44.4%
Batch Applications	19.4
Developement Work	18.1
Other	18.1

- How are You Operating Your DBMS?

Dedicated System	71%
Multiple System	29%

- Reduces the need for system upgrades.

- Off-loads the central processor.

- Stops forced migration through the product line.

- Hardware/software savings.

- Allows new applications to be added (currently in the backlog and not implemented due to system congestion).

- User ranking of the savings expected from the implementation of a DBC was:

  - Responsiveness to user queries.

  - Reduced application development time.

  - Reduced software maintenance time.

  - Reduced need for DBMS training.

  - Optimized utilization of storage hardware.

- Users' rating of their current DBMS is shown is Exhibit IV-4. Very few of the characteristics listed highlight a dramatic user need that can be targeted by a DBC. (In fact, it is INPUT's recommendation that the DBC add-on market not be addressed and that most of Servio Logic's efforts be concentrated on three other markets. See section VII, Summary Recommendation).

EXHIBIT IV-4

HOW DO YOU RATE YOUR DBMS?

Feature	Average rating(*)
On-line Performance	7.2
Maintainability	7.0
Update Features	6.8
Recovery	6.9
Security	6.5
Transportability	5.3
Transparency	6.9
Upward Compatibility	6.3
Ease-of-Application Development	7.2
Installation and Use	7.0
Vendor Support	6.7
Support Personnel Needed	7.2

* 1 = Poorest 10 = Best

E. USER DBC REQUIREMENTS

- In examining the user's view of his ideal requirements, the reader must bear in mind that the list does describe the ideal requirements (which correspond to the forecast of the total available market).

- In the real world no DBC product, available or planned, satisfies all of the listed needs. Bearing this in mind, the list is:

  - Improved performance on query response (no qualification provided as to how much of an improvement, number of queries per second, etc.).

  - Compatibility with existing query language (to facilitate end-user adoption of the product).

  - Easy loading of existing files (to avoid lengthy downtime at installation, which DPMs say they cannot afford).

  - Transparent access to existing files (to enable use of existing applications and files).

  - Product endorsed by CPU vendor (already discussed).

  - Product sold and maintained by the CPU vendor (already discussed).

  - Compatibility with existing disk drives (usually CDC's SMDs).

  - Simple high-order language interface (principally COBOL, FORTRAN, BASIC and E-BASIC, in that order).

  - Shared data base capability (multiple host).

- Demonstrable cost/performance benefits (benchmarked).

- Very high reliability (automatic recovery, power backup).

F. FUNCTIONS NEEDED

- An attempt was made to obtain user views on the functionality of the DBC, broken down into four categories:

  - Immediate, mandatory needs.

  - Immediate, necessary options.

  - Future, mandatory needs (next five years).

  - Future necessary options (next five years).

- This attempt was not successful for future needs. User's views are almost exclusively concentrated on today's requirements and very little useful data was obtained on future requirements.

- Exhibit IV-5 nevertheless documents the data obtained, which should be interpreted in the following manner:

  - In the "mandatory/now" column, only scores above 50% are relevant.

  - In the "important option/now" column, only scores above 40% have major significance.

  - Data in the "next five years" columns should be largely ignored.

EXHIBIT IV-5

USER CLASSIFICATION OF FUNCTIONS NEEDED

(percent)

	Now		In Next Five Years	
	Mandatory	Important Option	Mandatory	Important Option
Ad hoc, complex queries by non DP users	74.3%	11.4%	22.9%	5.7%
Enhance the life of current hardware	28.6	42.9	8.6	17.1
Enhance life of current software investment	31.4	45.7	5.7	17.1
Reduce DB admin-stration complexity	22.9	37.1	11.4	11.4
Off-load mainframe computer	51.4	28.6	17.1	-
Ability to process more data base applications simultaneously	31.4	31.4	11.4	14.3
Improved performance	54.3	20.0	14.3	-
Local data base sharing by multiple hosts	31.4	22.9	14.3	8.6
Local data base sharing by mixed hosts	20.0	25.7	17.1	5.7
User transparent distri-buted data bases	31.4	37.1	17.1	14.3
Text files treated same as data file	31.4	37.1	14.3	11.4
Ability to change main-frames without altering file structure	28.6	31.4	17.1	20.0
System expansion with-out CPU upgrade	22.9	28.6	17.1	22.9

NOTE: Multiple choice questions

- Having proposed a fixed list of options to the users, INPUT then asked them which requirements (if any) were omitted. Two main topics emerged:

  - A need for software transparency (or at least compatibility) with existing software systems.

  - A need for a user friendly front-end query system.

- Taken together, these two items show a concern for the ability of the DBC software to cohabit with the existing installed software environment. If the DBC is being sold as an add-on product to an existing system, the interface need will be very high. On the other hand, if the DBC is being sold as part of a new, dedicated query system, then the interface need is less important.

- A number of other issues emerged as serious concerns that the user has when considering the purchase of a DBC. They are listed in Exhibit IV-6. In each case it is important to realize that these are stumbling blocks in purchasing, but not <u>barriers</u>.

- For example, users strongly oppose application rewrites. However, if the attendant benefits are sufficiently strong, then the argument is overcome.

- Other concerns are more fundamental. It is important for Servio Logic to realize that the user values his relationship with his existing computer vendor and that any strong resistance expressed by this vendor (overtly or covertly) against the use of a DBC connected to his system will be a strong deterrent to the user.

G. BUYING DECISION PROCESS

- The evaluation process for the purchase of a DBC is largely dependent on two people:

EXHIBIT IV-6

WHAT THE USER DOES NOT WANT
(i.e., would ideally like to avoid)

- Have to convert existing files to new formats.
- Application rewrites.
- "New" query language, data base methodology ("set theoretic" is not a sales argument).
- "Third" vendor to deal with.
- "Paper" benefits.
- Irreversible product installation.
- Trouble with the CPU vendor.
- Vulnerable link between CPU and disk subsystem.

- The IS manager, who is the focal point for the final decision but usually has no technical ability in evaluating the finer points of a set theoretic data base capability (or any other for that matter).

- The in-house "specialist," who is relied on for his technical judgment but who also often does not have a full grasp of the benefits or applicability of one data base methodology over another.

- Benchmarking is the route to the shortest sales cycle in such instances, but it does not lend itself very well to the product considered by Servio Logic. As a second best alternative, a clear analysis of the cost/benefit is expected by the DPM for his particular installation. Servio Logic should be prepared to offer this.

- The DPM also needs to be reassured of Servio Logic's ability to survive (as a company), and on the relationship between Servio Logic and the system vendor to which the DBC will be attached. This reassurance should come (ideally) from the system vendor, not Servio Logic.

H. PRICING

- Establishing a finite value on the DBC was a difficult task for the users interviewed because they were not provided with a finite product specification. The question was nevertheless put to them, and the results are summarized in Exhibit IV-7.

- The average value shown is nothing more than an average (and not a precise value for use for planning purposes). Nevertheless, it accords well with the $40,000-50,000 range Servio Logic has proposed.

EXHIBIT IV-7

WHAT WOULD A DBC BE WORTH TO YOU?

Range	$10,000-125,000
Average	$54,368
Don't know	46%

MAIN JUSTIFICATION IN MIND

- Delayed H/W upgrade/migration (5)
- New applications that can be added to the system (backlog)
- Performance improvement (9)
- Off load the host (3)
- Replace/improve DBMS function (2)
- People, software savings

- The justifications that arise in a user's mind (and which he must justify to his management in order to give approval for the purchase of a DBC) relate to delayed expenditures/savings in other areas and to performance improvements.

- It is important to note that pricing is not a major consideration in the buying process, provided that visible benefits are forthcoming and the product cost is not totally unreasonable.

V PRODUCT ANALYSIS

V PRODUCT ANALYSIS

A. INTRODUCTION

- It is highly speculative for INPUT to define product characteristics on the basis of 35 user interviews. However, in the course of executing the user interviews, the vendor interviews, and the OEM interviews, INPUT formed an opinion on both the hardware and software characteristics that appear to be justified, and this opinion is presented here.

B. HARDWARE FEATURES NEEDED

- The hardware feature summary is:

  - Channels are expected to be both RS232C and IEEE-488 (Britton Lee sold all of its IDM with RS232C initially, and most of these have since requested a parallel interface).

  - Multiple host connect (2-8) needed.

  - Mixed host (for federal government market, mainly).

- Network connect (LAN - Ethernet) and remote connect capability, probably X-25.

- Memory size is function-related only and cannot be specified.

- Processor speed is performance-related only and cannot be specified.

- Four to sixteen disk drives of the CDC SMD series covers 60% of non-IBM, available market.

- MTBF must exceed disk controller, equal CPU rate (approximately 8000 hours).

- Self-sustaining power backup for controlled shutdown of:

  . DBC.

  . Disk drives.

  . Completion of initiated transactions for recovery/restart (audit logging).

- Self-testing at power up, remote diagnostics capability.

C. DESIRABLE SOFTWARE FEATURES

- The software features that are desirable are heavily dependent on the market targets selected. The list presented below is not exhaustive and must be revised in the light of the strategic options chosen.

- Software characteristics summary:

- Front-end query language essential.

- Ideally, query language is a developing standard (e.g., SQL for IBM marketplace).

- High-order language interfaces needed: FORTRAN, COBOL, BASIC, E-BASIC.

- C language, DBC utilities are desirable for a number of markets.

- Data entry, report writer, forms and graphics capabilities mandatory by 1984.

- Loading of commonly found DB file structures in less than one day is desirable.

- Access security (element), stored command feature, and automatic data dictionary.

D. SET THEORETIC VERSUS RELATIONAL

- The majority of the IS managers interviewed were unable to distinguish between the benefits of hierarchical, network, or relational data bases. This was particularly the case when applied to the applicational mix being processed by the current installation.

- In general, the user consensus was that relational structures are the new wave products. In arriving at this conclusion the DPM relies heavily on press articles and what he believes the industry is moving toward.

- It is important that Servio Logic should not go against this trend. Therefore it should not tout the superiority of the set theoretic model but rather emphasize the compatibility of the Servio Logic DBC software with existing operating systems, file structures, etc. (where possible), the ease of implementation and installation (where possible), and above all the <u>benefits</u> the DBC brings (performance, CPU off-loading, etc.).

INPU

VI MARKETING RECOMMENDATIONS

VI MARKETING RECOMMENDATIONS

A. STRATEGIC OPTIONS

- The options open to Servio Logic are based on the product directions decided on. This has yet to be achieved fully; nevertheless the major options are clear:

  - If the DBC/m can be made transparent to a given software environment (i.e., can process files in native DBC/m mode and accept the data I/O commands of a specific system), then the market targets can be readily defined.

  - If the DBC/m cannot be made transparent, then the add-on sale market should not be addressed since the sales effort required would be high and the market potential low. Dedicated support systems, preferably with a recognized front-end query language, should then be sold alongside existing systems.

  - In either case a significant market exists for the sale of DBCs connected as a resource to a Local Area Network (LAN). This approach eliminates the need for multiple interfaces and standardizes one protocol (probably Ethernet). The only drawback is that the LAN market is developing slowly at this point.

- Additional to any of these markets is the shared data base resource requirement of clusters of word processors in the office automation market. This is best served by joint marketing agreements with selected word processor vendors. Intel is already negotiating such arrangements.

- Also additional, and probably the strongest market of all, is the shared data base resource of the personal computer market. Like the office automation requirement, this calls for servicing clusters of direct-wired workstations (in this case personal computers). Britton Lee has a product in beta test at the Boston Globe newspaper, and Intel will shortly follow.

B. DISTRIBUTION CHANNELS

- The OEM market is an attractive option for Servio Logic since it provides a number of desirable, immediate benefits:

  - Instant availability of a trained sales force.

  - Personalization of the DBC product to a number of vertical markets through application software.

  - Initial sales of test/demonstration models.

- The drawbacks are just as strong:

  - Reduction of margins.

  - Dilution of brand name.

- Loss of control of sales plan.

- Loss of control of the end user.

- Potential competition from your OEM force (as has happened to Britton Lee with HDR Systems).

- Long sales cycle.

- Direct sales represents a slow (and initially small) channel for the development of the market but eliminate many of the control problems mentioned above.

- One possibility within the OEM market is the sale of the DBC to the end user base of software houses that utilize a single, homogeneous set of code. This might be a unit of application modules that have a central kernel of I/O routines. Once the file formats have been restructured, the DBC can be sold as a performance upgrade to a captive user base. Typically such a software house will have 300 to 1500 users on a single set of application code.

C. DBC PRICING

- The current market rate for the DBC/m is between $35,000 and $100,000, depending on the configuration provided. This is directly comparable to the range of DBMS prices. The DBC prices are expected to erode at 15% per annum (for the hardware). The DBC software content will totally offset this reduction, however, because the software functionality will need to cover a wide range of integrated requirements:

  - Spreadsheet processing.

- Forms and menu processing.

- Graphics capability.

- Word processing.

- Electronic mail.

- COBOL/FORTRAN/BASIC interface.

- SQL (for marketing into IBM/Fortune 500 companies).

- All of these software items command their own revenue streams.

- The price erosion expected is shown in Exhibit VI-1.

- The market window for the DBC/m is expected to be no longer than 4 years, (1983-1986) before system vendors begin shipping their own products. Given the expected shipment data of January 1, 1985 for the Servio Logic product, the market window is reduced to two years.

- All ancillary services should should be separately priced also, including:

  - Conversion assistance (approximately $450/day plus travel and living expenses).

  - Installation charge (usually one month's maintenance fee).

  - Training ($600/day plus travel and living expenses).

  - Hardware maintenance (3-5% per annum of purchase price for remote diagnostics, 12% per annum of purchase price for on-site services).

EXHIBIT VI-1
PRODUCT PRICE RANGES, 1983

- DBC/M $100,000-400,000
- DBC/m $ 35,000-105,000
- DBC/u (i) $2,500 including S/W

  (ii) DBC/m + $2,500
- DBMS $35,000-250,000

DBC PRICE EROSION FORECAST

PRODUCT	AVERAGE SALES PRICE IN YEAR ($ thousands)				
	1984	1985	1986	1987	1988
DBC/M	200	170	145	120*	100
DBC/m	70	60*	52	44	38
DBC/μ (i)	2.1*	1.8	1.5	1.3	1.1
(ii)	60	52	45	40	35
DBMS	80	72	65	60	55

*Year in which CPU vendor announces own product.

- Software maintenance (10% of software purchase/license fee per annum).

- Third-party maintenance, acceptable to some users and unacceptable to others, is usually priced around 14-15% of purchase price per annum.

D. COMPETITION

- Competition is real between:

  - System vendor-supplied software (particularly DBMS products but also some operating systems, e.g., Infos II, Prime Information).

  - Independent software vendor products (e.g., Cincom's Total, Cullinane's IDMS, RTI's Ingres, RSI's Oracle).

  - Remote computing service vendors that supply query/language tools such as Nomad, Commander IV.

  - Other DBC vendors, both manufacturers and OEMs.

- Some new products that are developing and that will increase the competition in the marketplace include:

  - In-board relational DBMS (e.g., Datafusion).

  - Intelligent disk controllers (e.g., DEC).

- Ongoing competition to the DBC are the decreasing cost of central processor memory (because it is an encouragement to solve throughput/response problems by adding memory), increasing power of CPU models, and the

willingness of leading edge DBMS vendors to sell their service code to hardware vendors (who can resolve their DBMS shortcomings this way rather than through a DBC product).

- A brief summary of some of the major competition in the DBC field follows.

I. VENDORS

- Britton Lee, the leading supplier of DBCs to the U.S. market, has had a rapid rise to $8 million of 1982 revenue from start-up in 1979. The principal recent moves have included:

  - The change from dependence on OEM sales to direct sales.

  - Announcement of the shared data base system for the IBM PC.

  - The shortly to-be-announced IBM 4300 series DBC.

- The data is summarized in Exhibit VI-2.

- Relational Technology, Inc. is a major competitor in the relational data base management system market and competes with Oracle (Relational Software, Inc.) and System 2000 (MRI). The initial launch of the company was achieved on the back of the development work accomplished by Berkely, which rewrote Ingres three times before handing over the product to RTI (along with more than 120 installations of the package).

- RTI's goal has been to develop as many front-end software personalaties/tools as their resources permit to facilitate the utilization of the DBMS main core product. These include recent additions such as:

  - Query by forms (QBF).

EXHIBIT VI-2

BRITTON LEE

* GROWTH	1979	1980	1981	1982
• Sales ($ millions)	none	0.5	4.0	8.0
• Employees	12	35	85	110
• Market	none	OEM	OEM	OEM/ End User
• Installations	none		50	165

* PRODUCTS	Announced	Price
• IDM 500	3/80	$60-85K
• IDM 200	2/82	$35K
• System 300/600	7/82	$54-105K
• (Shared DB/PC)	(2/83)	$2,500 (S/W)
• (IBM 4300 Series DBC)	4Q/83	See IDM 200/500

* COMPETITION
• ORACLE (Relational Software Inc.)
• INGRES (Relational Technology Inc.)

* B/L has concentrated on hardware development and left S/W to OEMs/users. They acknowledge this was a mistake.

- Applications by forms (ABF).

- Graphics by forms (GBF).

- Report by forms (RBF).

- In addition, RTI has produced a Motorola 68000 chip version of Ingres that will retail for $1,195. A summary of the RTI data is provided in Exhibit VI-3.

- Intel has tried to enter the DBC market several times and has finally decided they know where the market is going. There are three major marketing thrusts:

  - Office automation vendors.

  - Vertical markets (e.g., Dec/Vax) through OEMS.

  - "Brilliant" data resource controller (connecting a DBC to a local area network to make it into a shared data base resource).

- Intel believes that since one of its main markets will be the IBM world and major (Fortune 1500) companies, it will need to provide an SQL-like front-end interface (which it believes will develop into a standard).

- Intel has approached most of the minicomputer vendors and has recently noted a resurgence in the level of increases these vendor have in their products.

- Intel expects to have to interface their iDAS products to Ethenet and has already developed forms/menus, spreadsheet, word processor, electronic mail, graphics and COBOL, FORTRAN, C interfaces for iDAS.

- Another major strategy is to offer the ability to down-line load the iDAS from data base mainframe systems running Intel's system 2000 DBMS.

EXHIBIT VI-3

RELATIONAL TECHNOLOGY INC.

* Research project from Berkely; three rewrites before start up.

* GROWTH	1980	1981	1982
• Sales ($ millions)	(Nil)	2.1	5.8
• Employees	14	35	60
• Market	(PDP/11)	(+VAX)	(NCR/M68K)
• Installations	(125)	60	165
* PRODUCTS			
• UNIX/C INGRES, $35,000 • 68000 chip INGRES, $1,195 • (IBM, SQL, DL/I, IMS compatibility next) • RBF, GBF, ABF, INGRES/GRAPHICS, QBF			
* COMPETITION			
• ORACLE (Relational Software Inc.) • SYSTEM 2000 (INTEL)			

* RTI has structured INGRES so that function is hardware and operating system independent. INGRES can be written to run on any machine in two to six weeks, where C is native.

- Intel has less than 100 DBC units installed and admits that B/L is the market leader.

- Datafusion is the company that sells an associative file processor connected to a DEC PDP-11 series via the Unibus to automate text file handling. Products are aimed at the office automation, message handling, and publishing industries.

- The product is essentially a special purpose, parallel pipeline processor (called Associative Crosspoint Processor, AXP). The AXP performs the term-matching function. System architecture and functional diagrams are provided in Exhibit VI-4.

- Datafusion says it can handle 50 to 100 queries simultaneously with searches on 1,000 key words. The product has a front-end query language that is close to English.

- Developments include an IBM 4300 compatible product and miniaturization of the AXP to a single board. Two versions of the board are intended:

  - Unibus compatible, for less than $10,000.

  - QBUS and microprocessor compatible, for $5,000.

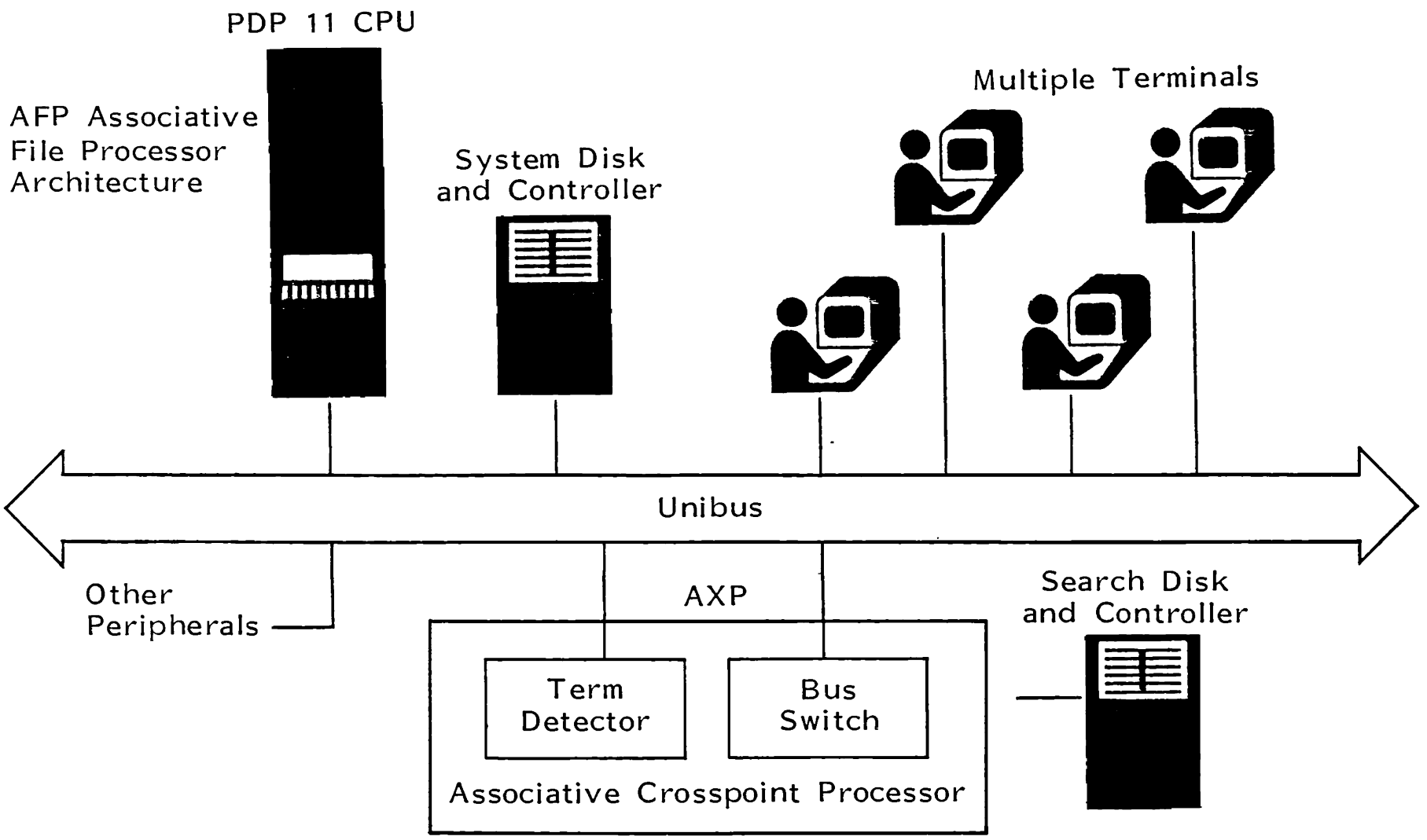
  - Datafusion has no sales office or service office other than their headquarters.

2. OEMS AND POTENTIAL OEMS

- HDR Systems is a Britton Lee OEM whose principal role in life is (or perhaps was) to provide professional services consulting on data base design, with a specialty in local area networks.

EXHIBIT VI-4

DATAFUSION

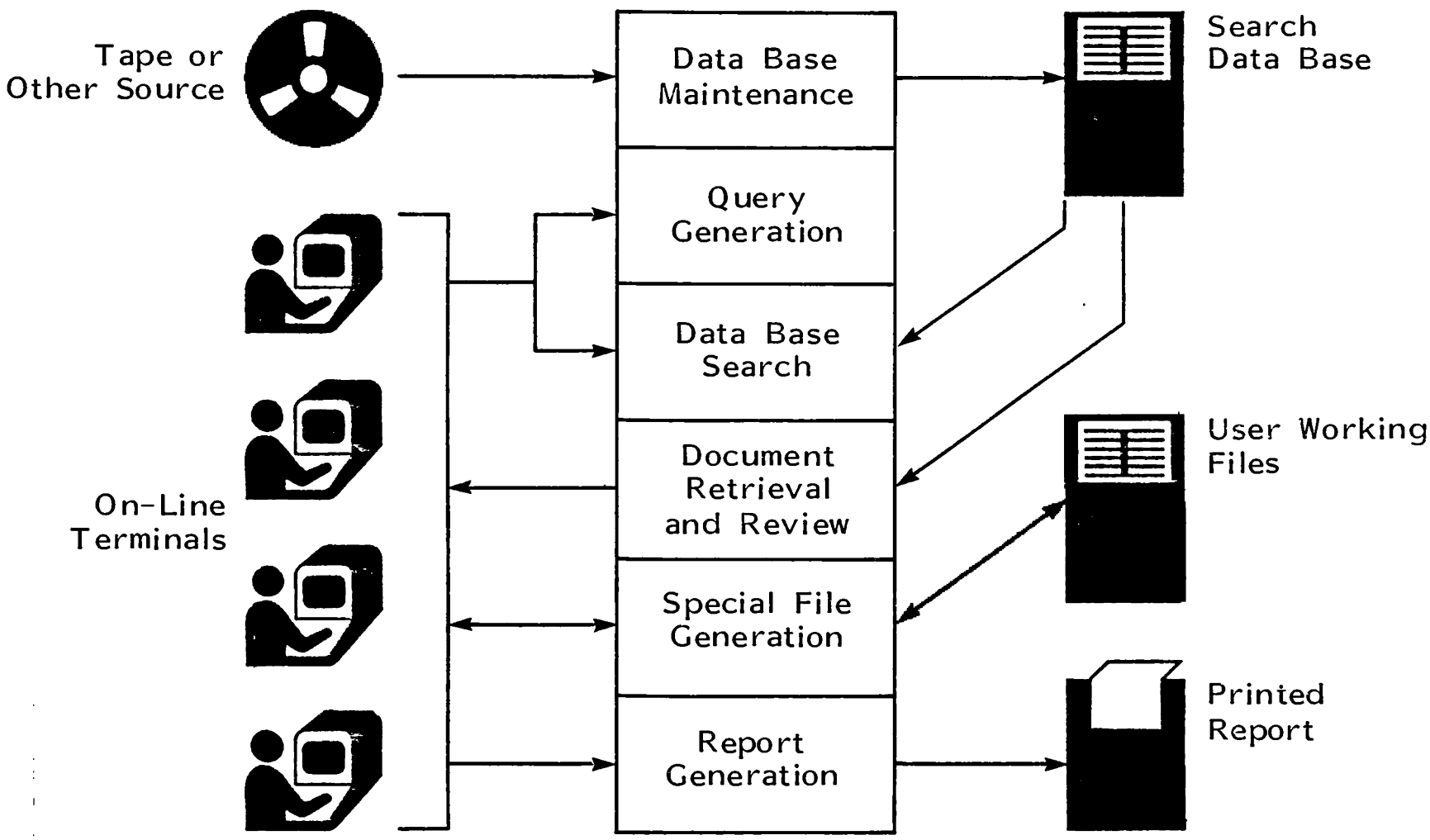


(Continued)

EXHIBIT VI-4 (Cont.)

DATAFUSION

Functional Diagram of AFP



- They view the Britton Lee DBC as a "primitive" product (i.e., without the necessary software packaging that makes it saleable) and have developed part of what they see is the software requirement themselves.

- This includes a Z-8000-based parser function that sits in front of the B/L box, an interface for using the B/L as a shared resource on a Datapoint network of terminals, an IBM compatible SQL query capability, and an unspecified interface for connecting the B/L to CDC Cyber products.

- Their clients include the U.S. Airforce, Army, and Navy, and banks for low-volume transaction environment (complex queries, what if markets).

- HDR is now working with three start-up companies to increase the hardware context of their offering.

- Signal Technology, Inc. is a Britton Lee OEM that has added its own interactive query language (IQL), an embedded query language for FORTRAN and COBOL (EQL), an interactive report writer, an interface to DEC's command language (DCL), a forms management system (FMS), and an embedded query language interface for the VT100 terminal.

- STI targets VAX users and claims a minimum of 3:1 improvement on terminal response times and an 80% saving on VAX memory requirements. Multi-VAX environments are particular targets.

- STI has so far been very disappointed with the response to their advertising compaigns and has reduced them by 60%. The principal problem appears to be that STI has approached the market from a system software/tool angle with no application software personalization.

- CDC Cybernet Services has purchased a B/L IDM 500 for evaluation and found no significant improvement on response time or throughput when connected to

a Cyber 175. Not content with this result, CDC ordered the accelerator (IDM 500/2) to reevaluate.

- The initial idea was to use the B/L products both at their RCS users' sites and in-house as a node processor. They are also considering using the B/L attached to their minicomputer series.

- CDC evaluated Intel's iDAS and found it less performant than the B/L IDM 500.

- Prime Computer has a series of minicomputer offerings that address transaction-driven environments with a front-end query language and an integrated data base. The series is called Prime Information and was originally based on outdated Prime hardware. This hardware is no longer manufactured, and so Prime Information will be transported to the standard 50-series hardware.

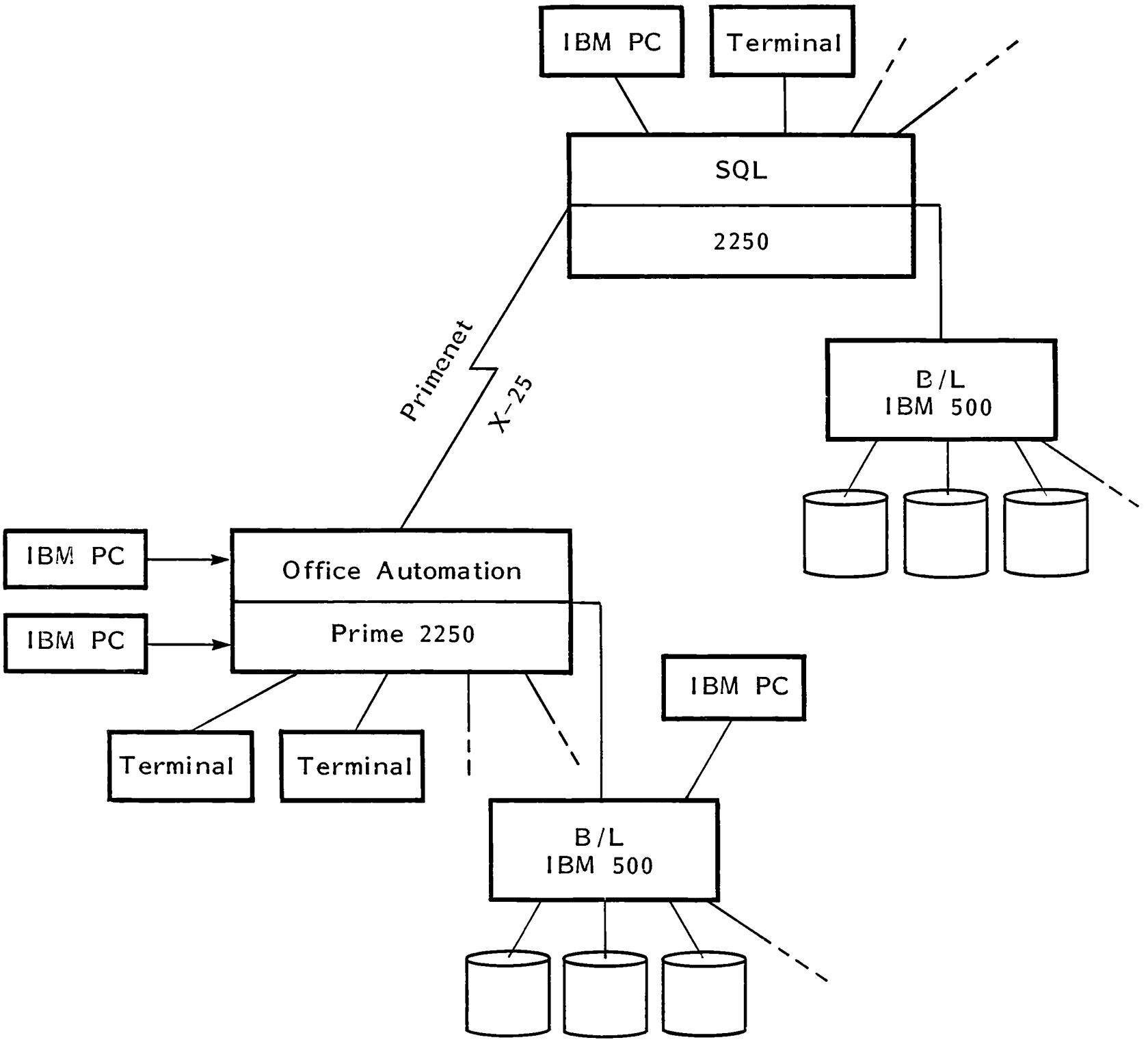
- Prime's DBMS is CODASYL compatible and has been enhanced by DBMS/Query and a report work. Prime also has a third-party software arrangement for Cincom's Total.

- Prime has a strong interest in the Unix environment, which it believes it will have to offer in the future. Prime is considering taking B/L's IDM 500 and Inco's SQL software in order to respond to the federal government's RFPs for equipment that include a DBC. Also one of their main commercial customers (Ford) is building scientific DBs on a B/L-Vax system and has asked Prime to interface its 50-series to the system.

- Another major target market for Prime is office automation, which they are serving with the Prime 2250. The usefulness of the B/L (or other) DBC is in servicing the very high level of file searches that the 2250 cannot handle. The architecture they see is given in Exhibit VI-5. Note the part played by IBM's PC and Inco's SQL.

EXHIBIT VI-5

PRIME OFFICE AUTOMATION



- Wang has approximately 6,000 VS Series machines installed and expects the VS to produce $1 billion in sales per year by 1985. Wang has its own PC and expects it to be 40% of all terminals it ships in the next 12 months.

- Wang's system architecture calls for each PC to have its own single user, menu-driven relational DB, fed by the VS Alliance product, in a truly distributed data base environment.

- Wang sees the DB need, not as IS requirement, but ultimately as the integration of a text, data, image, and graphics server. (Note: Wang does not see itself as an IS company but as an office products company entering the IS world). As a result, planning efforts are being focused on the coordination of data sets for each of these separate environments.

- It is highly unlikely that Wang will externally source any DBC hardware functions.

- Memorex, now part of Burroughs, has to supply all of their products with a Burroughs interface, which is a drain on their resources. Their initial back-end processor offering was not successful, but a task group within Memorex (and another within Burroughs) constantly review the market needs of this area.

- Memorex sees the DBC marketplace as being either for a new application system (i.e., the impetus to buy coming from the implementation of a new system) or for an inquiry-dedicated system (complete, new system again).

- The STC fiasco with the VSS product had a dramatic, cooling effect on their interest in the DBC market, but Memorex remains open to discussion and retains an ongoing interest in available products.

- Data General remains uncommitted to any DBC vendor at this point and is basically waiting for the market to develop. It is committed to being com-

petitive in the federal government market, and if the trend in federal RFPs continues it will have to decide how to handle the requirement (internal development, software or hardware, external DBC purchase).

- DB has a Prime Information-like capability in Infos II, which allows complex queries. Also Freedom Technologies has interfaced DG to B/L's IDM 500 (and the interface board is the DG standard products catalog).

- So DG is currently sitting on the fence waiting to see how the market develops and whether a more formal solution to the DBC need is necessary. Over the long term DG expects relational DB methodology to predominate.

- Freedom Technologies is a typical small software OEM, with an Ingres-like query language (Ideal) plus format control, report writer, and data entry capabilities.

- Freedom's main claim to fame is the DG/B-L interface (which is software driven). On the hardware side, DG supports the DMA/IEEE board as a standard product and maintains it.

- Freedom also offers a COBOL/FORTRAN/Business BASIC/Extended BASIC interface capability. Their main customer is Hughes Aircraft. They are essentially a consulting company with a small staff.

3. RCS VENDOR OVERVIEW

- RCS companies originally supplied shared computing resources, and their pricing still reflects that (they sell connect time, storage and computer resource units, or CRUs).

- As a group, they are now split into three categories:

- Vertical market service companies (supplying integrated services to a very narrowly focused market).

- Data base service companies (e.g., Quotron, TRW Credit Services, Telecredit).

- Horizontal service companies providing a commonly found processing requirement to a broad category of industries (e.g., ADP with payroll services).

- As a tool for rapid customer application development, many have developed their own user friendly languages, most of which are data base driven. Examples include National CSS with Nomad, and Comshare with Commander IV. The last named is incidentally based on set theoretic methodology.

- RCS competition to the DBC comes mainly from these tools but also from data base services if the prospect has a need for access to a specialized data base (which RCS companies possess).

- The DBC can be sold to and through RCS vendors, as in the case of CDC Cybernet services.

VII SUMMARY AND RECOMMENDATIONS

VII SUMMARY AND RECOMMENDATIONS

A. OPPORTUNITY REVIEW

- The market for DBCs is still very much in its infancy, mainly because after four years of product marketing, no major system vendor has endorsed the concept. Nevertheless, users continue to express a high level of interest.

- There seems to be no doubt that there is a very good market opportunity for dedicated query application systems (as opposed to DBC add-ons) and even better opportunities in the areas of shared data base resource for local area networks and personal computer clusters.

- The principal negative against the DBC add-on is the high level of disruption caused by the installation (conversion of files, rewriting of applications, retraining of end users). In addition, the market is very competitive, with the highest level of competition coming from DBMS products.

- In terms of industry sectors, the federal government, large financial institutions, banks, and Fortune 500 companies in general are the best targets. The marketing channels to these markets can be through specialist consultant groups, direct sales, and application OEMs. Care must be taken in choosing the OEMs in order to avoid building competition to Servio Logic and losing control of the end-user markets.

- It is likely that the sales cycle for the initial systems will be long, both through direct sales and OEM markets. This may be as much as 8 to 12 months.

B. INPUT EVALUATION OF SERVIO LOGIC

- INPUT was not made privy to the product characteristics of the Servio Logic DBC (hardware or software). This was to ensure that there was no bias in the field research and in the results. INPUT is not able therefore to fully appreciate the competitive strength of Servio Logic.

- Nevertheless the following "critique" is provided to assist Servio Logic in developing its own market prositioning.

- The DBC market is software driven, not hardware driven, so that the competitive strength of the DBC vendor relies largely on the nature of the personalization tools (e.g., query language) and application software that is offered, not on channel speeds and memory sizes.

- INPUT does not know of any Servio Logic software advantages over the products provided by the competition.

- The main competitor has had a DBC/m in the field for three years, and new products are due in:

  - 4Q 1983 IBM 4300 series.

  - 2Q 1986 (confidential).

- Servio Logic needs to compete with the new products from the start (and not with the current DBC/m). At least four DBC/m products are needed to compete fully:

- IBM 4300 series application query system.

- DEC VAX series application query system.

- LAN shared DB resource system.

- Personal computer shared DB resource system.

- Servio Logic needs to clearly identify the significant advantages its products will have in order to justify its market entry. It is not clear to INPUT what those advantages are at present.

C. SALES STRATEGY

- It is important to identify exactly which DBC/m market(s) the Servio Logic products are aimed at so that the correct sales approach and competitive argumentation can be developed for each DBC/m:

  - Is it a "self help" inquiry tool? (If it is, the competition will be system hardware manufacturers, RCS vendors, and DBMS vendors, i.e., probably the strongest competitive end of the market).

  - Is it a DBMS processor/DB resource handler? (If it is, the competition is limited to the DBC vendors and their OEMs).

  - Is it an application query system? (If it is, the competition will be the minicomputer vendors).

  - Is it a query performance accelerator? (If it is, the competition will be limited, and the main obstacle to market entry will be the software compatibility and file-handling compatibility issues).

- In each case the message must be clear to users and not obscured by unnecessary emphasis on technical characteristics (e.g., new model theory, new technology, new query language, etc.). This is important because the users of DB products and services will be increasingly nontechnical.

- The principal strategic options appear to be:

  - Carefully select OEM outlets that can personalize the DBC/m with software additions.

  - Software houses that can upgrade their captive user bases with a customized DBC/m (for performance upgrade purposes).

  - LAN consultancies that can expand the size of the contracts they service by adding the power and storage of the DBC/m to their current hardware competence.

  - Federal government consultancies that can enhance their abilities to respond to RFPs by the addition of the DBC/m that some agencies are now requesting.

  - RCS vendors with knowledge of single-location application needs that are currently not serviceable by timesharing alone, or that can use the DBC/m as a network service node internal to their company or at the customer's site.

  - Very large users that are technically self-sufficient (e.g., Ford, GM, banks, the scientific/engineering community).

  - The hardware system integrators (e.g., Computer Consoles).

- All of the above have common characteristics: they add software expertise and are largely self-sufficient from an after-sales-support viewpoint.

APPENDIX A: USER QUESTIONNAIRE

INSTALLATION ANALYSIS

MAIN EQUIPMENT: Purchase _____ Leased _____	INSTALLED	ON ORDER (Installation)	PLANNED (Date)
A. Hardware			
System Vendor			
Model			
Memory (MB)			
No. Disk			
Disk Model			
Total Storage (MB)			
No Terminals			
- Vendor 1			
- Vendor 2			
- Vendor 3			
Backend Processing			
B. Software/File Handling			
Operating System			
DBMS			
Transaction Processor (e.g., CICS)			
Principal Application			
Timesharing Usage	$ /annum		$ /annum
C. Network			
Local Area Network			
Host/Host			
Workstation/Host			
Personal Computer/Host			

CATALOG NO. ZJR2[ ][ ][ ]

USER QUESTIONNAIRE

Introduction

- INPUT is a market research firm retained by a new company to evaluate the markets receptivity for a new product. The purpose of this visit is to obtain your views on the need for, and desirable functionality of, a back end processor. Are you familiar with the term? Y/N (If no, read definition/narrative.) If yes, how have you heard about it:

  - Trade Shows _____
  - Press Articles _____
  - Advertising _____
  - Vendors You Have Heard Of _____
  - Sales Call _____
  - Other (specify) _____
    _____

Definition/Narrative

- The evolution of data processing systems has created a need for specialization of the various component parts of information system. One example is the front end processor, (FEP) the role of which is to off-load from the central processor (or host) terminal handling, protocol handling, routing, transaction assembly and network management, so that the host can properly execute its true role. Without the FEP the software overhead resident in the host would require unnecessarily large amounts of memory.

The same applies to file storage management. Programming an effecient, high performance data base management system is beyond the capabilities and resources of most users, so off-the-shelf software packages such as TOTAL, IMS, IDMS, ADABAS etc. have become very popular. The host overhead they require is enormous, however, and beyond the capabilities of medium/smaller systems. Even the larger systems are being burdened with software functions that do not belong in the host.

The back end processor houses data base management logic (software) and the storage device handling logic (controller) allowing the host to concentrate once again on its true role.

CATALOG NO. ZJR2 | | |

DATA BASE COMPUTER QUESTIONNAIRE

We would like to begin by examining your current or intended use of data base management systems.

1. What percent of your applications require the use of a DBMS? _____%

   a) Which of your applications are best suited? _____

   _____

   _____

   b) Which are least suited? _____

   _____

   _____

2. What DBMS system, if any, are you currently using? _____

   _____

   _____

   a) Percent of applications using DMBS: _____%

   b) Percent of processing time used in accessing DBMS: _____%

   c) Cost to convert from former mode of operation (hardware, software, personnel?) _____

3. What are you using your system for?

   - On Line Applications _____
   - Batch Applications _____
   - Development Work _____
   - Other (e.g.,ad hoc queries)_____

4. How are you currently operating your DBMS? (Dedicated system, multiple systems.) _____

_____

_____

5. Do you estimate your use of DBMS will change in the next few years?

_____

a) 1982 _____% of increase/decrease (circle)

b) 1983 _____% of increase/decrease (circle)

c) 1984 _____% of increase/decrease (circle)

6. How do you rate on a scale of 1-10 your current DBMS?

_____ On-line Performance

_____ Maintainability

_____ Update Features

_____ Recovery

_____ Security

_____ Transportability (from one host to another)

_____ Transparency

_____ Upwards Compatability

_____ Ease of Applications Development

_____ Installation and Initial Use

_____ Vendor Support

_____ Amount of Specialized Personnel to Support

_____ Other (please specify) _____

7. There has been a great deal of discussion concerning different data models. What is your assessment of the advantages and disadvantages of:

a) Hierarchical structures _____

_____

_____

b) Network structure (CODASYL) _____

_____

_____

c) Relational structures _____

_____

_____

d) Other (specify) _____

_____

_____

_____

e) What percent of your applications can be satisfied by each?

_____

_____

_____

f) Receptivity to new model. (e.g., set theoretic): _____

_____

_____

_____

8. Our client has proposed developing a Data Base Computer based on set theoretic logic. All other DB models (relational, network, (CODASYL), hierarchical etc.) are a subset of set theoretic. Many potential benefits are claimed for such a system. How important do you consider these benefits?

	Now		In Next Five Years	
	Mandatory	Important Option	Mandatory	Important Option
Ad hoc, complex queries by non DP users				
Enhancing the life of current hardware				
Enhance life of current software investment				
Reduces DB administration complexity				
Off-load mainframe computer				
Ability to process more Data Base applications simultaneously				
Improved performance				
Local Data Base sharing by multiple hosts				
Local Data Base sharing by mixed hosts				
User transparent distributed Data Bases				
Text files treated same as data file				
Ability to change mainframes without altering file structure				
System expansion without CPU upgrade				

9. Would these benefits prompt you to convert from your current systems? (Dialogue: explore the real need, the thinking behind the judgement and the decision process.) _____

_____

_____

10. If not which benefits are missing? _____

_____

_____

11. Assuming you decided to purchase the product, would you need conversion assistance?

a) Software tools? (specify) _____

_____

b) Implementation assistance? _____

_____

c) What would you expect the conversion to cost? _____

_____

d) At what point does conversion become prohibitive? (time, $) _____

_____

12. What would be the most important savings you would expect? (Rank in order of importance)

		Rank
a)	Optimized utilization of storage hardware	_____
b)	Reduce application development time	_____
c)	Reduce software maintenance time	_____
d)	Reduced need for specialized DBMS training	_____
e)	Responsiveness to non EDP user ad hoc queries	_____
f)	Other (specify) _____	_____

13. What would a system, such as we have described, be worth to you?

a) $000/s: _____

b) Main justification in your mind: _____

14. Would a Data Base Computer with the indicated performance characteristics help you to implement new applications?

    a) What kind? _____

    _____

    b) If no, why not? _____

    _____

15. Would you be reluctant to deal with a new vendor (i.e., one who is not known in the industry at present)? _____

    _____

    _____

    a) Would you prefer to purchase the product from a known hardware vendor (e.g., CDC, Memorex, DEC?) _____

    _____

    b) Would you prefer to purchase the product from a known software vendor who could install it in your installation? _____

    _____

    c) Would you accept product service from a third-party maintenance vendor?

    _____

    _____

16. Would you prefer the product to offer a query language or would high order language interfaces be sufficient?

    a) Query language required? _____

    _____

    b) High order language interfaces desired? _____

    _____

    c) How strongly do you feel about a CODASYL interface? _____

    _____

17. How would you characterize your overall reaction to the DBC?

_____ Enthusiastic

_____ Interesting

_____ Skeptical

_____ Confusing

_____ Who needs it

18. What do you think will be its strengths in the marketplace? _____

_____

_____

_____

_____

19. What will be the primary thing inhibiting its acceptance? _____

_____

_____

_____

_____

20. Any other comments. _____

_____

_____