

competitive update

VOLUME 6 NUMBER 6

DECEMBER 8, 1986

IBM STRATEGY AROUND THE 9370 SERIES



Also In This Issue:

Replacing Burroughs B1900's, B1800's and B1700's

IN THIS ISSUE

IBM Strategy Around the 9370 Series	1
Replacing Burroughs B1900's, B1800's and B1700's	23
An Update — Meeting the Challenge of Convex	29
Meeting the Challenge of Elxsi	33

digital

FOR INTERNAL USE ONLY

competitive update

Published monthly, **Competitive Update** is the official Corporate publication to communicate information regarding major competitors' products and related Digital products.

distribution

The readership of **Competitive Update** comprises PAC/MSCC members, Sales, Software, Field Service, Headquarters, Order Administration, Literature Contacts and other exempt personnel. Employees must submit their request to Carolyn Smith via memo (OGO1-1/U06), VAXMAIL (SALES::SMITH), or DECMAIL (COMP_UPDATE), stating name, badge number, job code, job title, cost center and location.

change of address

Notification of address changes should be directed to the employee's Personnel Representative or PSA, for incorporation on the individual's Employee Profile form. Processing of this information is accomplished only through the Personnel Department.

administration

Competitive Update is published by HEADQUARTERS SALES, OGO1-1/U06, STOW, and is printed and distributed by Digital's Publishing and Circulation Services in Northboro. Cover design by HEADQUARTERS SALES CREATIVE VISUAL ARTS DEPARTMENT.

SENIOR EDITOR: Carolyn Smith 276-9968



trademarks

The following are trademarks of DIGITAL EQUIPMENT CORPORATION:

ALL-IN-1, DEC, DECmate, DECnet, DECsystem-10/20, DECSYSTEM-20, DECUS, DIBOL, the DIGITAL Logo, MASSBUS, MicroVAX, PDP, P/OS, Professional, Rainbow, RSTS, RSX, ThinWire, ULTRIX, UNIBUS, VAX, VAXBI, VAXcluster, VAXmate, VAXstation, VMS, VT, Work Processor.

TABLE OF CONTENTS

U.S. SALES SUPPORT/COMPETITIVE ANALYSIS
● IBM STRATEGY AROUND THE 9370 SERIES..... 1

MID-RANGE SYSTEMS
● REPLACING BURROUGHS B1900'S, B1800'S AND B1700'S..... 23

LABORATORY DATA PRODUCTS
● AN UPDATE -- MEETING THE CHALLENGE OF CONVEX..... 29
● MEETING THE CHALLENGE OF ELXSI..... 33

FOR INTERNAL USE ONLY

U . S . S A L E S S U P P O R T /
C O M P E T I T I V E A N A L Y S I S

IBM STRATEGY AROUND THE 9370 SERIES

Brad Day
DTN 283-6300
FPO

A Strategic Introduction

The 9370 series, announced on October 7, 1986, is being launched by IBM as a product to be sold strategically first, functionally second, and technically last of all. Rarely before has IBM announced a product and marketing strategy so aimed at a competitor -- in this case Digital Equipment Corp. and the VAX/VMS product set. IBM is undoubtedly tired of hearing the positive accolades from the press which Digital's success in mid-range departmental offerings has evoked. Consequently, the 9370 pre-announcement is an IBM effort to encourage direct VAX competition with a VM System/370 mid-range departmental solution.

While IBM has suffered dramatically in the System/370 mid-range hardware offerings, predominantly because of their high price/low performance (i.e., the 4361 series), Digital's VAX line has soared far beyond IBM's total U.S. installed mainframe base (23,400 units), with a U.S. calculation of over 41,500 units.

With Digital's successes in mind, it must be assumed that the pre-announcement of the new 9370 product is an attempt to fend off any further success for a VAX choice in IBM's Fortune 2000 installed base. Never before has IBM intentionally announced a major system offering over one year before their first quantity shipments (November/December 1987). This pre-announcement articulates the fear, uncertainty and doubt IBM feels in regard to Digital's potential predominance in both mid-range and large systems distributed processing environments. The pre-announcement of the 9370 is intended for customers to "Stop, Look and Think" about their strategic decisions in committing to a VAX/VMS architecture in favor of a 9370/System/370 architecture.

It is no secret that IBM's customer and prospect base has felt that IBM should no longer charge a premium for price/performance when there are equally appealing product offerings from Digital Equipment and others that provide the same or better technological and cost-efficient hardware strategy that IBM attempts to provide. With too many operating systems and architectural disparities, all priced at a premium, IBM had the need to announce again another mid-range System/370 strategy -- hence the announcement of the 9370 series.

The price/performance gap that has plagued IBM for several years has now been eradicated versus the VAX 8000 line. In spite of IBM's loss of momentum in competing with Digital in mid-range departmental solutions, IBM's customer and prospect base has asked for products with a more competitive price/performance, and the 9370 has satisfied this need.

FOR INTERNAL USE ONLY

The IBM Legions Are Forming

With the ill success surrounding the 4361 product set, a product plagued with a non-competitive price/performance premium, the VAX-11/750 and VAX-11/780 (the 4361/Digital equivalent) ultimately accounted for 70% of the VAX U.S. installed base, approximately 29,000 units. On account of IBM's lack of success in their low-end System/370 product, the 9370, with its claim of lower support cost and equal price/performance positioning against current VAX 8200 and 8300 products, offers IBM a new alternative. IBM's F.U.D. (fear, uncertainty, doubt) factor may occur as part of the new 9370 offering with statements like: "With the new developments in the System/370 family, better price/performance, in particular, why would you consider a VAX alternative?"

Moreover, 2,800 corporate staff employees have been decentralized out to the IBM branch offices, both to defend their MIS installed base and penetrate VAX installed departmental end-user environments.

IBM's Model Upgrade Path Sees No Digital Alternative?

One of the easiest product approaches IBM enforces is selling the "model upgrade" path within any of their System/370 product families. In fact, an IBM sales representative gains a higher commission incentive in their ability to upgrade an existing account than they would receive from an initial installation. The new 9370, like the 4361 and 4381 products, also offers a CPU replacement migration path.

In most cases, IBM is on the defensive when selling against VAXcluster technology, mainly because they currently lack VAXcluster functionality. IBM customer reports received on the Hotline indicate that a cluster may be available sometime in the mid-1990s. Consequently, in spite of the modular VAX addition to the cluster growth path, IBM still will not recognize the adding of a CPU node as a competitor to their "model upgrade" or "CPU swap" approach, in part due to their lacking of a "cluster" equivalent. IBM lack of understanding on this point of comparison, coupled with a more cost-efficient VAXcluster migration alternative, is one of the major reasons Digital is installing more and more cluster configurations as a direct competitor (and detriment) to IBM's mainframe model upgrade alternative.

On one hand, the 9370 product family provides smaller increments of model upgrade, at an aggressive cost for migration, but on the other hand, it is limited currently to the highest-end 9377 Model 90, a 3 MIPS VAX 8500 equivalent. IBM's intention for customers who need even greater performance is a full machine replacement incentive, the move to the 4381 (13) and 4381 (14); MVS/XA, IBM's stated "strategic product" of direction is also a predominant incentive for 4381 migration.

Is it Now Easier for Departmental Users to Enter the System/370 Arena?

One of the biggest cost-of-ownership hurdles for IBM mainframe installations has irrevocably been the large amount of system management and system analyst staffs required to properly maintain a 370 operating system environment. The new VM/IS product, a product which remains only a repackaging of the earlier VM/SP product, is promoted as needing no system management attention. IBM's claims of "unattended" operations with VM, however, may soon be forgotten after the first year of 9370 installation.

FOR INTERNAL USE ONLY

For IBM to effectively counter Digital in the mid-range departmental markets, especially the departmental office market, streamlining the immense requirements for a large VM systems staff will be critical.

What About the System/36 and 38 -- Are They Just a 5-Month Strategy?

On June 16, 1986, among a multitude of new announcements, IBM recommitted their commitments to an underpowered and overpriced System/36 and 38 as their "departmental mid-range system" of strategic significance. At that time, large Fortune 1000 MIS and line management felt reaffirmed in their decision to go ahead and purchase large quantities of this technology. The 9370 only enforces the same IBM product weakness -- Big Blue has now announced a second "departmental mid-range system" -- creating a second "strategic" alternative for prospects considering a long-term mid-range system decision. Many analysts feel the 9370 has only angered the IBM customers who have made the corporate decision to go ahead with the System/36 or 38 architectural and associated growth strategy.

THE 9370 AND ITS IMPLICATIONS OR OPPORTUNITIES FOR DIGITAL

The announcement of the 9370 is undoubtedly a product aimed at delaying the current decision in Fortune 1000's choice for the VAX product line. Several major obstacles have been removed in favor of the 9370 product line that were previous reasons for customer's ultimate decision in choosing a VAX alternative.

Change in Price/Performance -- IBM's Biggest Weapon

First, both the 4361 and 4381 had been plagued with a high premium on performance. Both products had difficulty breaking the \$200,000 price per MIP threshold that Digital had successfully provided their customer and prospect base. In fact, even after several price reductions, the 4300 product set could not be purchased for less than \$150,000 price per MIP. Even though technical decision makers thought of the "MIP" as an often "meaningless" or "mythical" instruction per second, a VP of Finance in a corporation who had the ultimate decision for a system based on cost could not understand an "acrith," "megaflop" or debit/credit benchmark; consequently, "MIPS" became the easiest evaluator to understand. Digital enjoyed a 50% to 100% price per MIP advantage versus IBM's 4300 series, a margin so extreme that a "MIP" became a justified advantage. With the exception of MicroVAX, the 9370 has close to eradicated this Digital advantage and, in some cases, provided a better price/performance ratio. More on the details of price/performance and how it relates to overall cost-of-ownership issues will be discussed in the "Product, Positioning and Pricing" section of this report.

A Digital Window Of Opportunity

It is critical to remember that the full QUANTITY shipment of the entire 4-processor 9370 series will not be available until October 1987; take note, however, that the Model 20 and Model 60 will be available in volume by July 1987, while the Model 40 and Model 90 are targeted for October 1987. Consequently, we have about one year to leverage our current superiority in both price/performance and general cost-of-ownership advantages. For those prospects, based on the size of their compute need, who are considering a VAX system, ranging from MicroVAX to VAX 8500 classes of performance, you

FOR INTERNAL USE ONLY

should move to book the business now, reminding customers of the potential volume shipment delays in purchasing 9370 systems!

Networking -- Nothing Really Has Changed

IBM's networking announcements, providing both a Token Ring and Ethernet connection, may only confuse customers who may see a firm IBM commitment to two alternatives as strategic indecisiveness. This indecisiveness may create a perceived multiple strategy, the same reason that has resulted in IBM having too many incompatible operating systems and architectures. Others will feel that IBM's support of Ethernet only blesses the success of Digital's mature DECnet/Ethernet offering, which makes up approximately 48% of all local area networks installed today (according to Datamation surveys). When IBM R&D monies are reviewed and spent, it is doubtful that Ethernet will be enhanced to the detriment of IBM's strategic Token Ring and SNA product offerings.

For IBM's Ethernet product to be competitive, adherence to the 7 levels of the "Open System Interconnect" standards, as well as the intelligence of the DECnet environment, would have to be implemented. Undoubtedly, this IBM emulation could not be accomplished overnight; think of the years of enhancements which occurred to get to the current level of superiority with DECnet Phase IV (i.e., DECnet Phase I was announced in 1976, DECnet Phase IV in 1982).

In IBM's MVS and VM environments, peer-to-peer networking, with the advantages of a common file system, still escapes IBM.

The Strategic Puzzle of MVS and/or VM

Unfortunately, the announcement of the 9370 still does not allow IBM to claim a single operating system, single architectural approach to mid-range and high-end computing environments, irrevocably the biggest benefit for Digital's VAX/VMS argument.

If IBM's "stated strategic product of direction" is the MVS environment for the System/370 architecture, IBM must reaffirm this with an offering for the 9370 (Model 20 or Model 40). Prospects may find it difficult to cost justify entering the MVS environment at the 1.45 Model 60 level of performance, especially when an "extended architecture" (MVS/XA) requires a full machine replacement migration to the higher-end 4381 (Model 13 and Model 14). Digital's VMS offering extends below the 1.45 performance offering limitation, making it easier for smaller budget-conscious prospects to enter the VMS environment and, at the same time, feel convinced that their investment will always be preserved, being Digital's single operating system offering.

Even though operating system support includes both VM and VSE, the use of MVS/SP on the high-end Model 60 and Model 90 precludes the use of any of the new 9370 peripherals and controllers (VM only); consequently, the older 3380 technology must be used in conjunction with an MVS-driven 9375 Model 60 and 9377 Model 90.

VM: The More Strategic Offering on the 9370

In spite of VM's place as IBM's premiere strategic operating system offering for the 9370 series, keep in mind, aside from some special packaging, no

FOR INTERNAL USE ONLY

major enhancement or revision has happened with the new VM/IS packaging. In spite of a new full-function alternative to a rather bounded VM/Entry product, many VM customers have always wanted the ability to purchase whatever VM subsystem functionality they needed at the time -- VM/IS does not permit this flexibility of layering functionality as required.

VM/SP Version 5 (not available until second quarter 1987) may provide some software functionality that will resemble "cluster-like" functionality. TSAF, or Transparent Services Access Facility, coupled with a new Advanced Peer-to-Peer VM facility (APPC/VM), will cooperatively manage access to resources from local or remote functions. The caveats of the TSAF software, and resulting advantages for Digital's VAX and VAXcluster technologies, remain as follows:

- This product will only support eight processors.
- APPC/VM, a TSAF prerequisite, is incompatible with LU6.2/PU2.1 implementation, therefore incompatible with the other VM nodes, as well as the System/36 and System/38.
- Data integrity, high availability and the importance of automatic hot back-up still escapes IBM (i.e., DBMS-based journaling, global volume shadowing, load balancing, checkpoint/restart).
- TSAF transparent access will only support VM-to-VM nodes; MVS processors are not supported. Digital supports clusters in a single operating system environment and therefore accommodates any VAX node as a totally compatible addition.

"Unattended" Operation -- A Questionable Statement

IBM's ability in streamlining the costs associated with the large system management and system analyst staffs required to support a 370 environment is critical to their attempt to capture the departmental, branch or remote mid-range system prospects.

A new VSE product, coupled with an addition of menus in VM/IS will most likely not eliminate the larger system management requirements. This operational issue has always initiated a major cost advantage for Digital, where one system manager can maintain a multi-node cluster, its application workload and associated communications monitoring. VM administration staffs, and potentially VM programmers, will undoubtedly still be an IBM requirement.

Only a year or two of installed 9370s will prove or disprove IBM's statement regarding "unattended operation." On the other hand, the system management capabilities of the "boot member" of an NI cluster will not only provide real "unattended operation" to each of the other CPU nodes in that cluster, but also provides all the high-availability features currently lacking in both MVS and VM environments (i.e., DBMS journaling, checkpoint/restart, global volume shadowing, load balancing, etc.).

Another System/370 Offering and Its Continued Incompatibilities

For customers who chose the System/36 and 38, many in response to IBM's June 16, 1986 mid-range system enhancements and strategic encouragement, confusion may exist as to which stated "strategic" offering from IBM is THE

FOR INTERNAL USE ONLY

MOST STRATEGIC as THE departmental mid-range system -- the System/36/38 or the 9370 system. In contrast, a smooth incremental growth path, provided by Digital's single VAX 8000 architecture, a single operating system environment and a single user interface still remains a cohesive advantage over the disparate environments present with the IBM 9370 series, System/36 and System/38 products.

THE 9370 SERIES: PRODUCT, POSITIONING AND PRICING

The 9370 product series will consist of four basic models, the 9373 (Model 20), 9375 (Model 40), 9375 (Model 60), and the 9377 (Model 90), with a MIPS performance of .5, .6, 1.5 and 2.9, respectively. Hardware configuration, memory alternatives, prices and major system software packages are outlined in the table below. All models range in internal memory offerings from a minimum of 4MB to 16MB.

Hardware Specifications: Price and Performance

<u>Type</u>	<u>Model</u>	<u>Description and Perf.</u>	<u>Purchase Price</u>	<u>\$/MIPS</u>
9373	020	Processor (.5 MIPS) w/4MB mem. and power	\$ 31,800	\$ 64,000
9375	040	Processor (.6 MIPS) w/8MB mem. and power	65,800	110,000
9375	060	Processor (1.45 MIPS) w/8MB mem. and power	93,800	65,000
9377	090	Processor (2.9 MIPS) w/8MB mem. and power	190,800	66,000
4000	--	Automated Power Controls (included on all models)	800	

Additional internal memory increments can be purchased at 4MB or 8MB capacities. Memory module costs \$10,000 and \$20,000, respectively.

9370 Limitations Create 4381 Migration Incentive

Many observers feel that in order for the high-end 4381 not to be entirely retired with the announcement of the new 9370 product, some product incentive (not available on the 9370) must be offered on the 4381 to encourage a migration incentive for those customers who need to move beyond the 3 MIPS performance maximum offered by the 9377 (Model 90). The first restriction, and consequent incentive for 9370/4381 migration, is the 16MB internal maximum memory capacity of the 9370 processor family, and second, the MVS/XA operating system offering, only available on the 4381 series.

9370 Information System Availability

Unfortunately, the IBM salesforce may have to wait one year to ship a full 4-processor 9370 family (as shown on the following page). On the other hand, reports have come in via the Competitive Hotline that for some selective strategic accounts, IBM will install 4381 technology (until 9370 availability) and then swap in the 9370 equivalent upon availability.

FOR INTERNAL USE ONLY

The customer will only have to pay the more cost-efficient 9370 hardware/software pricing, even though they are temporarily using the more expensive 4381 technology. Note that this stop-gap measure has only been implemented in certain accounts; it is not thought to be a widespread sales tactic. Below are the field test and full-ship schedules for each member of the 9370 processor family; these may be moved out or up, depending on IBM's manufacturing and distribution constraints:

February 1987: Selected field test locations.

Second quarter 1987: Early support programs and pilot installations.

Third quarter 1987: Model 20 and Model 60 processors with a selected, fixed set of features and Input/Output devices. General availability of IBM 9347 Magnetic Tape Drives.

Fourth quarter 1987: General availability of remaining Model 40 and Model 90 processors; changes as appropriate to configurations of installed machines.

Digital Product Positioning

Digital's products most competitive to the 9370 will include the MicroVAX, VAX 8200, 8300 and 8500. IBM does not have cluster technology, though some customer sources have reported that an IBM competitive cluster offering may be available in the late 1990s.

MicroVAX Clusters

The one-time graduated licenses for VMS, Local Area VAXclusters and DECnet licenses alone, supporting 2 MicroVAXes and 24 users, will cost less than a fully configured useable IBM 9373-20 system (approximately \$100,000). This example, in reality, offers 4 times the performance of a 9373-20 at a lower cost, with all the added benefits of the VAXcluster environment, such as:

- A centralized database management capability
- A centralized dictionary
- Increases availability of databases
- Expands distribution of VAX ACMS in transaction-processing environment
- Encourages less duplication of information
- Yields higher productivity for the same or lower cost
- Assures that the right amount of computing power and resources are available to support a work group initially and as the group's needs grow
- Integrates with department and organization resources as required

The MicroVAX and Cluster Family Versus the 9370

Duncan Anderson, Marketing Manager for the MicroVAX family offers a comprehensive competitive viewpoint on the benefits of MicroVAX when competing against the IBM 9370 low-end processor systems.

Although volume 9370 shipments are not scheduled until third and fourth quarter 1987, you should be aware of immediate sales activity from IBM. IBM is selling and positioning customers for long-term volume purchases of this product -- today! When availability has become an issue, 4300s at equal price have been proposed as substitutes. As evidence of their aggressiveness in positioning the 9370 as a viable product for immediate

FOR INTERNAL USE ONLY

consideration, over 300 systems are purported to have been installed at customer and IBM sales sites for evaluation and demonstration. Do not consider this product's lack of availability today as a major advantage on your part. You must address the real issues a customer will have for considering a 9370 and counter with Digital's tangible solutions and benefits.

The MicroVAX Advantage

If IBM is proposing either 9370 Model 20 or Model 40, you will enjoy significant advantages on a system-to-system level. The following analysis assumes you have read and understand Sales Update Vol. 18 No. 10 dated November 3, 1986, which covers new packaged MicroVAX systems and the full capabilities of local area VAXcluster systems. What follows is a discussion of how to effectively compete using the MicroVAX as a competitive tool.

MicroVAX Performance

The MicroVAX can compete favorably with the 9370 Models 20 and 40. In IBM's own reference documents, they position both Model 20 and Model 40 systems as having equal performance to Digital's MicroVAX and VAX 8200 systems. They refer to the Argonne National Laboratory "Linpack FORTRAN Benchmark" performance of 9370 models, comparing MicroVAX and VAX 8xxx systems. This scientific performance comparison favored IBM's 64-bit double-precision architectural capability over the 32-bit VAX. Although not considered in this comparison, typical performance results for these applications should have included optimization around the VAX architectural attributes (using subprograms called BLAS, or Basic Linear Algebra Subprograms). The normal usage of these subprograms results in increased performance for all MicroVAX and 8xxx systems.

Nevertheless, IBM maintains that the scientific compute performance of their Models 20 and 40 are comparable to MicroVAX.

For commercial workloads there is strong reason to believe that for strategic applications such as PROFS, the MicroVAX/ALL-IN-1 combination holds a significant edge. (In reality, the combination of two products, PROFS and Displaywrite/370 should be coupled to functionally match the electronic mail and word processing functionality of ALL-IN-1.) Allowing PROFS as an analagous product to ALL-IN-1, however, consider the following chart which compares IBM's suggested number of active users running PROFS on Models 20 and 40, versus recently compiled OIS workload benchmark analyses of ALL-IN-1 running MicroVAX.

These results suggest a performance advantage for MicroVAX over the the 9370 Model 20 and Model 40 for heavy interactive environments such as word processing, mail and integrated office functions covered by PROFS or ALL-IN-1.

9370/PROFS

MicroVAX/ALL-IN-1

<u>Configuration</u>	<u>Recommended</u>		<u>Configuration</u>
	<u>Max. Active Users</u>		
	<u>IBM</u>	<u>Digital</u>	
9370/20/PROFS	4-10	12-16	Config #4 -- 9MB WITH RD53
9370/40/PROFS	6-12	20-24	Config #5 -- 16MB with RA81s

FOR INTERNAL USE ONLY

In summary, use a competitive checklist as you build your system comparisons between the 9370 Model 20 and Model 40 versus the MicroVAX family. Some critical points in this approach are outlined below:

- Push for benchmark performance comparisons of similarly equipped MicroVAX and 9370 Model 20 and Model 40 systems.
- Be sure to configure with equal disk and memory.
- Be equally as aggressive in scientific, commercial and departmental application areas.
- Broaden the comparison to bring into play additional limitations and weaknesses in IBM's strategy.
- When commercial applications are required, point out that MVS/SP is not supported on the Model 20 and Model 40 range of performance (.5-1.45 MIPS), and that MVS/XA is not supported at all on any currently announced 9370.
- Compare this with the fact that any commercial or departmental application which runs under VMS will run and be supported on any MicroVAX or 8xxx system.
- Force the comparison of two different architectures necessary for a typical Info Center VM-based applications and commercial production applications under MVS and MVS/XA versus one architecture for the Digital solution.
- Bring the discussion to the applications level and point out that both technical and commercial departmental users on VAX systems can use the #1 integrated office product on the market today from Digital -- ALL-IN-1. IBM technical and commercial users must split users between VM-based PROFS and MVS/XA-based DISOSS or System/36/38-based Personnel Services.
- Reinforce the ability of a customer to standardize around a single set of applications and user interface methods with Digital, and the associated benefits in terms of user support and training costs.

Some Methods in System Pricing Comparisons

OIS Benchmarks have consistently pointed out the lowest cost per user as being on MicroVAX-based systems. Use the price/performance and equal CPU performance of MicroVAX to compete against the IBM 9370-20 and 40 position.

The following charts will show you significant pricing advantages. This advantage will allow you to compare systems using the older monolithic IBM approach of individual system-to-system analogies, which do not take into account the additional functional advantages offered from Digital. Emphasize the strategic and economic benefits of using one standard Digital operating system, one open flexible networking system (DECnet), one cabling interconnect technology (Ethernet), along with the flexibility in planning modular growth (via clustering) as our most significant benefits.

When comparing individual systems pricing, the more important strategic issues must also be mentioned. In the case of the MicroVAX, however, straightforward single system pricing plays to our advantage.

FOR INTERNAL USE ONLY

The Tangible System Cost Comparison

As you can see from the system comparisons which follow, IBM's systems range from 30% to over 100% more expensive than MicroVAX II. Note that the MicroVAX II compares quite favorably with the Model 40. As indicated earlier, IBM will probably attempt to sell the customer on the Model 40, even though the Model 20 will be used as the "door opener" entry-level system:

I. IBM 9370 Model 20 Versus MicroVAX II

	<u>IBM 9370 Model 20</u>		<u>MicroVAX II DH-630Q4-HA</u>
CPU W/4MB MEMORY	\$31,000 (225/MO)	CPU W/9MB	\$45,400 (PKG. SYS.) (361/MO)
ADDITIONAL 4MB MEMORY	10,000		NOT APPLICABLE
DISK/TAPE CONTROLLER	3,000		INC.
TAPE DRIVE 1600 BPI, 40MB	7,900 (78/MO)	95MB	INC.
DISK (368MB)	14,200 (27/MO)	318MB	INC.
COMM. PROC./2-LINE ADAPT. TOKEN RING ADAPT.	3,600 1,900	ETHERNET	INC.
WORKSTATION CONTROLLER	4,200		INC.
RACK ENCLOSURE	2,500 (4/MO)		NOT APPLICABLE
	<hr/>		<hr/>
HARDWARE/COST TOTAL	\$78,300		\$45,400
OPERATING SYSTEM (VM/IS)	\$26,800	VMS 1-8 USERS	\$4,000
HW/SW COST TOTAL	\$105,100		\$49,400
YEAR 1 MAINTENANCE COST (HARDWARE)	\$4,000		\$4,300

FOR INTERNAL USE ONLY

II.

IBM 9370 Model 20 Versus MicroVAX II

	<u>IBM 9370 Model 20</u>		<u>MicroVAX II DH-630Q5</u>
CPU W/16MB MEMORY	\$61,000 (225/MO)	CPU W/16MB	\$42,500 (STD. SYS.) (339/MO)
DISK/TAPE CONTROLLER (x2 @3,000/each)	6,000		INC.
TAPE DRIVE 1600 BPI, 40MB	7,900 (\$78/MO)	95MB 205MB (CAB)	INC. (\$20,300) (105/MO)
DISK (736MB)	28,400 (54/MO)	912MB	38,000 (190/MO)
COMM. PROC./2-LINE ADAPT. TOKEN RING ADAPT.	3,600 1,900	ETHERNET	INC.
WORKSTATION CONTROLLER	4,200		INC.
RACK ENCLOSURE	2,500 (4/MO)		N/A
	-----		-----
HARDWARE COST TOTAL	\$115,500		\$100,800
OPERATING SYSTEM VM/IS	\$26,800	VMS 1-8 USERS	\$4,000
	-----		-----
HW/SW COST TOTAL	\$142,300		\$104,800
YEAR 1 MAINTENANCE COST (HARDWARE)	\$4,300		\$7,600

FOR INTERNAL USE ONLY

IBM 9370 Model 40 Versus MicroVAX II

	<u>IBM 9370 Model 40</u>		<u>MicroVAX II DH-630Q5</u>
CPU W/16MB MEMORY	\$85,000 (280/MO)	CPU W/16MB	\$42,500 (STD.SYS.) (339/MO)
DISK CONTROLLER	8,500		INC.
TAPE DRIVE 1600 BPI, 40MB AND CONTROLLER	10,900 (78/MO)	95MB 205MB	INC. 17,100 (105/MO)
DISK DRIVE/CAB (856MB)	23,750 (54/MO)	1.3GB	50,400 (284/MO)
COMM. PROC./2-LINE ADAPT. TOKEN RING ADAPT.	3,600 1,900	ETHERNET	INC.
WORKSTATION CONTROLLER	4,200		INC.
<hr/>			
HARDWARE COST TOTAL	\$137,800		\$110,000
OPERATING SYSTEM VM/IS	\$26,800	VMS 1-8 USERS	\$4,000
<hr/>			
HW/SW COST	\$164,600		\$114,000
YEAR 1 MAINTENANCE COST (HARDWARE)	4,900		8,700

Configuration Notes:

1. MicroVAX affords you and your customer a lower-cost entry system. You can configure smaller and less costly systems around MicroVAX standard systems which allow your customer more price effective starting points.
2. Fully configured "larger systems" with 9-16MB of memory and multiple RA81s share similar price advantages when compared to equivalent Model 20s and 40s.

FOR INTERNAL USE ONLY

When IBM Pushes a Model 20

You will have the ability to take the offensive and force IBM's hand. If they try and "sell low" a configuration with a Model 20, you can point out the non-upgradeability of the Model 20 compared to your equal configuration at significantly lower price. If the customer is price conscious and conservative about the level of initial investment, an even lower-cost MicroVAX entry system may appeal once they understand how the systems can be added to, with more memory and disk, and how single systems can be incorporated into clusters with even more cost-effective incremental power and resources made available.

When IBM Pushes a 9370 Model 40

Should IBM take a reverse tactic and propose a Model 40, they will have to justify much more expense with their arguments that the Model 40 offers more high-speed channels and the CPU can be upgraded to the Model 60 at a later date. They will push the customer to believe that CPU upgrades and multi-channel capability of single CPUs is the right and only safe approach to growth management. You must counter with the benefits of growing, not by constantly upgrading or adding to single CPUs, but by clustering with shared CPU and disk and print resources.

The VAXcluster Growth Argument

If your situation calls for multiple departmental systems, make sure your customer understands the benefits of centralized system management, centralized disk storage and the ability to add CPU power in increments as low as \$25,000 (a diskless MicroVAX). Then contrast that with IBM's system management costs of multiple CPUs, IBM's need for redundant applications software and data storage for EACH CPU, and IBM's upgrade costs (i.e., upgrading a Model 40 to a Model 60 versus adding a MicroVAX to a cluster). Point out that all of this Digital technology is available and shipping now, whereas IBM will not even offer upgrades until sometime in late 1987.

FOR INTERNAL USE ONLY

Develop in your customer's mind's eye, the significance of the chart below:

Local Area VAXcluster Comparison

	<u>MicroVAX</u>	<u>MicroVAX</u>	<u>MicroVAX</u>	<u>9370</u>	<u>9370</u>	<u>9370</u>
	YES	YES	YES			
DYNAMIC CPU SHARING	X	X	X	NO	NO	NO
DYNAMIC DISK SHARING	X	X	X	NO	NO	NO
DYNAMIC O/S SHARING	X	X	X	NO	NO	NO
DYNAMIC APPLIC SHARING	X	X	X	NO	NO	NO
DYNAMIC FILE SHARING	X	X	X	YES	YES	YES
DYNAMIC RECORD SHARING	X	X	X	LOTS of PROGRAMMING REQD		
DYNAMIC PRINTR SHARING	X	X	X	WITH	EFFORT	
Single Point For System Mgmt and Support				NO	NO	NO
		!		!	!	!
		!		!	!	!
		!		!	!	!
		!		!	!	!
	! DECServer 200 !			!User!	!User!	!User!
	!			-----	-----	-----
	!					
	!					
	!					

	! VT !					
	! User !					

Sell the Benefits of the VAX/VMS Networking Environment

The diagram above attempts to portray the benefits and differences made available through computer growth with local area VAXclusters. IBM will claim they have the ability to network, and share and exchange files on a peer-to-peer basis. However, those capabilities have not been developed to the extent that without any programming assists a user can have access to a "system" comparably consisting of as many as 14 MicroVAXes and/or an 8xxx boot node member.

In the IBM world, each user is connected to one CPU. The capabilities IBM may propose do not allow single copy sharing of operating system, application or disk. They cannot grow a work group computer power with cost-effective diskless CPUs or CPUs with one small paging disk. They may claim to be able to exchange "files," but they will not have the ability to manage detail to the record level over a network dynamically, such as the way we can with our record lock capability.

FOR INTERNAL USE ONLY

Sell Applications and File Transparency

A given user does not have dynamic and transparent access to any available system at a given time in the cluster, because that capability does not exist today with IBM's form of networking. Reinforce the issue that Digital offers applications integration. Specifically, a given application that runs on VMS can run on any other VMS machine, whereas IBM may say they are the connectivity vendor because they have mastered the capability of exchanging files between their incompatible CPU architectures. In truth, however, they do not have applications portability.

Reference Selling: Our Best Testimonial

Build a personal case study of customers you are familiar with who, over the past 6-7 years, have bought VAX systems for similar uses as your prospect is considering, and point out the benefits of those past decisions. Tell of how your customer previously purchased VAX-11/750s, VAX-11/780s and VAX-11/785s, which still operate in CI Clusters now being populated with new technology, yet compatible 8xxx machines. Point out how MicroVAXes bought in the past two years can now be clustered, how older VAX-11/780s and VAX-11/785s can be candidates as "Boot Nodes" to support developing departmental local area VAXclusters.

Compare this investment protection scenario with a customer who, over the past 6-7 years, has purchased a Series 1, System/36, System/38 or 43xx systems, all of which have been positioned as departmental solutions. Ask how all those systems are sharing resources today versus the Digital story. Use our track record to your advantage!

Package Your Arguments: Leave Them Our Major Benefits

All these pricing and cost-of-ownership points can be summarized into the following basic issues which you may use to your advantage in selling against the 9370.

- MicroVAX can compete very favorably with the Models 20 and 40 on the basis of CPU and interactive user performance.
- MicroVAX configurations hold significant price advantages over similarly equipped 9370/20 and 40 machines.
- MicroVAX style of computing and growth through the addition of local area VAXclusters offers continued advantages over the 9370.
- When considering cost-of-ownership factors in:
 - Cost of system management and applications support
 - Cost of the eventual adding of additional CPU power
 - Cost of supporting multiple architectures for scientific and commercial (versus one for Digital)
 - Cost of supporting multiple integrated office applications versus one for Digital, regardless of compute environment
 - Cost of moving to potentially different operating systems when additional power and capabilities are required (MVS to MVS/XA), versus staying within one VMS

Digital Equipment is the superior choice!

FOR INTERNAL USE ONLY

Sell Our Reputation

Sell on the basis of the strength Digital holds as the #1 computer vendor in the mid-range systems markets of the computer industry. For departmental solutions, with the VAX family you will represent the historical #1 choice of customers worldwide. Computer Intelligence Corporation estimates that shipments of VAX computers versus IBM 43xx systems have taken a dramatic turn in Digital's favor over the past five years. CIC's market researchers' data indicates a 2 to 1 installed unit advantage over the 43xx family. Leadership is measured in the technical, scientific and manufacturing application areas, with very strong increases in commercial areas recently.

Since 1985, an unprecedented increase in VAX/VMS shipments has been seen -- over 30,000 MicroVAX systems have been sold worldwide. In the most recent Datamation survey of "Corporate Buying Trends," MicroVAX has been determined to be the number one preferred system to be purchased over the next 18 months. It holds a 3 to 2 site preference advantage over its closest competitor -- the IBM System/36. An average of 3 units are planned to be purchased by the average site planning MicroVAX purchases.

In a recent Digital-sponsored, independent research project, feedback on the MicroVAX indicated that the comparatively strong favorable attributes given to MicroVAX were its engineering and scientific software, networking capability, compatibility with the VAX family, price/performance compared to comparably priced systems, and word processing and graphics performance. Conversely, the only statistically significant, positive attributes given the 43xx family were its salespeoples' knowledge, hardware service and operating system.

Finally, note that the 9370/370 is not a new phenomena. The 370 architecture is dated and has its detractors. The 43xx family has been largely successful in being positioned and sold as smaller mainframes. Push with your advantages in the VMS architecture, the interactive capabilities of VAX combined with the leadership of DECnet and clustering, and the price/performance of MicroVAX.

Independent opinions from consultants will help in your discussions. Consider what an outside consultant who follows the computer industry has said about the 9370 family.

An Outside View

Here is what one consultant has to say with regard to the 9370. In short, Digital and the MicroVAX II continue to come up winners!

"The 9370 Model 20 is underpowered and overpriced, compared with DEC's MicroVAX II."

"In functionality, DEC maintains a significant lead, due to its VMS operating system, and integrated layered products (including ALL-IN-1 office automation software and its recently released suite of PC integration software)."

"DEC also retains superiority in the networking arena, especially for distributed, peer-level networks."

FOR INTERNAL USE ONLY

"While IBM has significantly improved the price/performance and packaging of the 9370 family, the software is still of the 1960s mainframe vintage."

-- Gartner Group, 10/24/87

IBM 9370 Versus VAXBI -- Price Comparison/Cost of Ownership

For the brief time being, price/performance with the IBM 9370 is now on par or potentially better than Digital's VAX 8200, 8300 and 8500. Cost-of-ownership elements that aid this condition are advantages in 9335 disk price/performance (a lower cost per MB), aggressive graduated one-time software pricing and lower hardware maintenance. Over a five-year period, as you add more disk, controllers and the cost of hardware maintenance, IBM may move ahead.

Take caution, however, when you have to perform cost-of-ownership comparisons versus IBM. REMIND THE CUSTOMER THAT OTHER FACTORS HAVE TO BE INCLUDED WHICH MAY ALTER COST OF OWNERSHIP IN DIGITAL'S FAVOR.

- 1) Positioning -- the positioning compared above is slightly in our favor. Each of the following comparisons allows VAX equivalents a slight edge (MicroVAX/9373-20, VAX 8200/9375-40, VAX 8300/9375-60, VAX 8500/9377-90). For IBM to run a full set of departmental applications, use IBM's own F.U.D. strategy. Remind the customer of the immense system overhead associated with running full VTAM communications software, PROFS and Displaywrite/370, all while maintaining efficient user response times in an interactive departmental environment.
- 2) System Personnel -- the cost of ownership did not include the larger amount of system management and system analysts staff incurred with a single and IBM multiple operating system environment versus VAX/VMS (ratios have been reported as low as a 1:3 system personnel ratio to as high as a 1:12 ratio).
- 3) Memory Constraints -- the 9370 internal memory capacities maximizes only 16MB, so additional users, applications and operating systems may force another migration to the high-end 4381 product -- a significant VAX advantage in cost-of-ownership evaluations.
- 4) No MVS/XA -- MVS/XA is not offered on the 9370 family, in spite of its being another IBM "strategic product of direction" for their System/370 architecture. For those customers whose applications or architectural considerations demand an MVS/XA environment, the 4381 is the only current alternative.

Changes in System Software Offering and Pricing

The following new system software offerings are currently priced at an alternate graduated one-time charge across the System/370 product line: VM/Integrated System (VM/IS), VM/Remote System Programming (VM/RSP), VM/System Product (VM/SP) Release 5, VSE/SP Version 3 Release 1, Decision and Information Support Productivity Facility (DISPF/VSE). Price ranges for these products vary between \$2,640 and \$102,000. BECAUSE OF THE COMPLEXITY OF SOFTWARE POSITIONING VERSUS DIGITAL, AS WELL AS THE GRADUATED ONE-TIME SOFTWARE PRICING METHODOLOGY, PLEASE CALL THE COMPETITIVE HOTLINE WHEN YOU HAVE DETAILED IBM SOFTWARE POSITIONING AND PRICING QUESTIONS.

FOR INTERNAL USE ONLY

Other Software Support

In addition to VM and VSE, the 9370 family also supports Interactive Executive for System/370 (IX/370). IX/370 is IBM's UNIX implementation which runs as a guest host under the VM operating system. IBM's Multiple Virtual Storage/System Product (MVS/SP) is supported only on the 9375 Model 60 and 9377 Model 90.

PROACTIVE QUESTIONING FOR A CUSTOMER CONSIDERING 9370 PRODUCTS

Q. IS IBM COMMITTED TO ENHANCING THE DOS/VSE OPERATING SYSTEM ENVIRONMENT AS AN OFFERING ON THE 9370?

A. No. IBM will only support, not strategically enhance, the DOS/VSE operating system.

Q. IN GENERAL, WHERE DOES IBM DIRECT CUSTOMERS WHO WISH TO REPLACE (CONVERT) THEIR DOS/VSE OPERATING SYSTEM INSTALLATION? AND DOES THIS DIRECTION OFFER A 9370 MIGRATION INCENTIVE?

A. The most expensive and most recommended growth path given to 4341 or 4361 users running a DOS/VSE shop is a migration to the MVS/XA environment. Unfortunately, MVS/XA can only be run on the 4381, 308x or 309x series of processors; the 9370 does not currently run the MVS/XA operating system.

Q. WHEN WILL IBM PROVIDE TRUE PEER-TO-PEER NETWORKING TRANSPARENT ACROSS MVS AND VM ENVIRONMENTS?

A. Currently, the 9370 does not support the APPN communications standard to allow for true peer-to-peer networking across both VM nodes. Some feel that Advanced Peer-to-Peer VM (APPC/VM) functionality may eventually provide an IBM common file capability, but as the Gartner Group reminds us, APPC/VM is "deficient in LU6.2/PU2.1 support, consequently allowing only bisynch and channel-to-channel connection" within the IBM architectures.

Q. WHILE IBM HAS ANNOUNCED A CONNECTION TO THE 802.3 ETHERNET TOPOLOGY, THE MATURITY OF DECnet, FIRST ANNOUNCED IN 1962 (PHASE I), PROVIDES A SUBSTANTIAL ADVANTAGE. CAN IBM DISCUSS WITH YOU A FUNCTIONAL EQUIVALENT TO DECnet, ESPECIALLY AS IT RELATES TO NETWORK FILE TRANSFER TRANSPARENCY AMONG MULTI-VENDOR INSTALLATIONS?

A. No DECnet equivalent is provided in IBM's support of Ethernet, nor the level of protocol support of the various levels of the OSI standards. Moreover, whatever Ethernet enhancements do occur, how functionally compatible will their Ethernet offering be with current SNA specifications?

FOR INTERNAL USE ONLY

- Q. HAS IBM ARTICULATED THEIR GENERAL PRICE/PERFORMANCE OFFERINGS AS IT RELATES TO THE 9370? HAVE THEY OFFERED YOU ANY VAX SYSTEM COMPARISON?
- A. In spite of the aggressive VAX price/performance equivalence the 9370 series now provides, IBM has still not broken the \$50,000 price per MIP ratio that the MicroVAX product set has enjoyed. Moreover, Digital will not stand still in functional and pricing enhancements throughout the next year (reference new MicroVAX cluster and follow-on VAX products). Emphasize that the 9370 will not be available in quantities until late 1987; at that time, Digital's offering will be dramatically different.
- Q. HAVE YOU CONSIDERED THAT MOST OF THE FUTURE COMMERCIAL APPLICATION PRODUCTS RUNNING ON IBM MAINFRAMES WILL MOST LIKELY BE DEVELOPED UNDER THE MVS/XA OPERATING SYSTEM?
- A. MVS/XA is not currently available on 9370 technology, and MVS/SP offerings are only available on the 1.45 MIPS 9375 and 2.9 MIPS 9377-90. In spite of new VSE products which provide the capability for "unattended" operation, VM/IS still has the need for potentially large numbers of system management and system analyst support teams. Consequently, cost to maintain a 9370/VM environment will still be an IBM detriment.
- Q. I UNDERSTAND YOU CURRENTLY HAVE INSTALLED SYSTEM/36 AND SYSTEM/38 IN VARIOUS DEPARTMENTS. IF YOU DECIDE ON THE 9370 SERIES FOR OTHER MID-RANGE APPLICATION AREAS, HOW DO YOU PROPOSE TO SHARE FILES BETWEEN THE TWO DISPARATE ARCHITECTURES?
- A. The 9370 still is not a compatible offering with the System/36 or System/38 (incompatible operating system and architecture, and a different command language). Edward Lucente, IBM Group VP of the Information Systems Group, maintains there will still be three separate architectures (System/370, System/38/36 and the IBM PC) -- down from 9 architectures, of course. In reality, the System/38 and System/36 are not one architecture, although IBM attempts to convey the System/3x as one architecture.
- Q. WHAT WILL IBM TELL CUSTOMERS WHO HAD COMMITTED TO THE SYSTEM/36 AS IBM'S "DEPARTMENTAL COMMERCIAL PROCESSOR" OF STRATEGIC SIGNIFICANCE?
- A. Stay tuned.
- Q. <FOR CUSTOMERS WHO HAD BEEN EVALUATING 4361 AND LOW-END 4381'S OVER THE LAST 18 MONTHS>, DO YOU REALLY WANT TO POTENTIALLY WAIT ONE YEAR FOR THE SHIPMENT OF THE 9370, THE 4361'S REPLACEMENT?
- A. In short, fourth quarter 1987 delivery of the complete 9370 product line may only hasten these same customers to a Digital alternative.

FOR INTERNAL USE ONLY

- Q. WHILE THE INSTALLED NUMBER OF DECnet ETHERNET LICENSES ACCOUNTS FOR APPROXIMATELY 48% OF THE ENTIRE LAN INSTALLED BASE, WHAT EFFECT WILL A FUTURE IBM 9370/ETHERNET CONNECTION CARRY ON THE PERCEPTION OF CUSTOMERS TRYING TO DECIDE ON WHO SETS THE INDUSTRY STANDARDS FOR LOCAL AREA AND "OPEN ARCHITECTURE" NETWORKING?
- A. If my company were counting on the most cost-efficient, most proven LAN technology on the market, I would feel most uncomfortable going with any other vendor than Digital Equipment, especially after witnessing the last DECworld floor display in Boston.
- Q. HAVE YOU ANALYZED THE COST OVER A 5-YEAR PERIOD IN GOING FROM A 1 MIP TO 50 MIPS SOLUTION?
- A. VAXcluster advantages still provide a powerful cost-efficient and modular alternative to an IBM System/370 model upgrade and full machine replacement growth strategy. In spite of the model upgrade approach within each of IBM's System/370 series, full machine replacement must occur from 9370 to 4381, from 4381 to the 308x series, and from the 308x to the 3090 series. Moreover, IBM operating system additions or conversions may also be mandatory. This will never be the case in a VAX/VMS migration.
- Q. THE MAXIMUM INTERNAL MEMORY CAPACITY ON THE 9370 PRODUCTS IS LIMITED TO ONLY 16MB. AS YOU MAY DECIDE TO ADD USERS, APPLICATIONS, AND POTENTIALLY OPERATING OR GUEST OPERATING SYSTEMS TO YOUR IBM INSTALLATION, DOESN'T IT CONCERN YOU THAT 16MB MAY PRESENT PROBLEMS AND FORCE YOU TO MOVE TO THE MORE EXPENSIVE 4381 FAMILY RATHER QUICKLY?
- A. 16MB memory constraints will undoubtedly pose a problem. While IBM may use the 9370 as an enticement to allow departmental users to enter the System/370 arena, as more and more simultaneous users and distributed applications are added, the cost of operation may quickly soar when forced into a high-end 4381 migration.

TO CONCLUDE ON IBM'S 9370 STRATEGY

IBM undoubtedly has felt extensive pressure to offer a System/370 mid-range strategy. On one hand, some critics feel that the 9370 offering will just allow customers who already utilize IBM mainframes the ability to move down the performance curve for applications that reside in departments or branches. Still other critics feel the 9370 may impact IBM's continued success with the System/36 and System/38, presenting customers with a competitive alternative to the once committed IBM "strategic mid-range departmental" product (June 16, 1986).

A significant hurdle for IBM has been eradicated. The 9370 price/performance realities are now (in some cases) on a par with Digital's VAX offering, or at least at first glance. However, emphasize to your customers that machine price/performance should not be the only decision-making criteria. Product positioning should be closely analyzed, system and applications management costs should be factored in, as well as the annual support costs associated with a potentially multiple IBM operating system environment.

FOR INTERNAL USE ONLY

Remember that customers may be hard pressed to purchase 9370s in quantities and implement installation in the next six months. Consequently, until the 9370 technology is installed and utilized, IBM price/performance arguments are not currently a "shippable" advantage. A Digital history of leadership in networking, high-availability distributed processing, minicomputer and superminicomputer technology, superior price/performance, simple open system communications and a single integrated architecture are attributes which still create a Digital advantage. The 9370 pre-announcement has not changed any of these advantages.

If you have any further questions, please contact Brad Day, U.S. Sales Support/Competitive Analysis at DTN 283-6300 or outside at (617) 273-6300.

SPECIAL NOTE: LOOK FOR AN UPCOMING COMPETITIVE UPDATE ARTICLE THAT WILL
FOCUS ON ADDITIONAL MID-RANGE SYSTEMS COMPETITIVE ISSUES AND
DIGITAL PRODUCT COMPARISONS TO CONSIDER WHEN COMPETING
AGAINST IBM'S NEW MID-RANGE SYSTEM STRATEGY.

FOR INTERNAL USE ONLY

REPLACING BURROUGHS B1900'S, B1800'S AND B1700'S

Bill Moore
 DTN 226-6839
 LTN1-2/P14

The 7,000-unit installed base of Burroughs Blxxx's continues to provide significant opportunities for replacement with VAX 8500 or 8200 VAXcluster System Building Blocks. Comparable performance costs significantly less with VAX systems than with the Burroughs upgrade. VAX systems also provide greater investment retention. Other advantages include Digital's proven networking functionality and larger selection of application software and development tools.

This article discusses why Blxxx customers want to change vendors and profiles their computing environment. It also overviews Digital's comparative advantages. Finally, the article discusses products available to assist in the Burroughs-to-VAX migration.

VENDOR DISSATISFACTION

B1900 and B1800 customers are highly dissatisfied with Burroughs for the following reasons:

- Operating system support was dropped long ago.
- Burroughs has redirected future engineering toward other products.
- Little application software is available.
- Those needing to expand capacity (most) face 1-10 man/years of conversion effort to a different architecture.

The Blxxx family constitutes an architecture that Burroughs has abandoned. It was the low end of Burroughs' mainframe line until the A Series 3 was announced in 1984, based on an entirely different architecture. The A Series obsoletes the Blxxx family and is the system Burroughs recommends to those Blxxx customers requiring both capacity and performance expansion.

Obsolescence has had major ramifications on Blxxx customers. First, support of their operating system (Master Control Program) was discontinued about 18 months ago. Customers were given no advance warning of this change and were outraged when it happened. Another ramification was that little engineering has since been applied to enhancing both Blxxx hardware and software (both systems software and applications). This has adversely affected those customers wanting to keep pace with computer industry trends, e.g., office automation, application software, local area networking, etc.

Blxxx customers know that the A Series is Burroughs' mainstream, mainframe architecture. They have been advised they should "migrate" to the A Series if their Blxxx systems are at capacity. In fact, nothing short of a major CONVERSION awaits those pursuing this path. Anywhere from 1-10 man/years of conversion effort is involved for these Blxxx customers, as informally revealed by Burroughs insiders who have monitored these situations. The effort is directly proportionate to the size of the application library to be converted.

FOR INTERNAL USE ONLY

The A Series is a completely different architecture than the Blxxx. They employ different word lengths, instruction sets and data formats. Programs written in native COBOL cannot be transported to the A Series. This is the COBOL version most prevalent on Blxxx's. And...the two systems run different operating systems and utilities, despite being called the same names. The operational parameters for using Master Control Program and SORT, for instance, are completely different between the two product families. Different screen managers are used on these architectures, requiring the "hand painting" of new screens for converted applications.

Blxxx PROFILE

There are 7,000 Blxxx systems installed around the world, according to International Data Corporation. 90% of these are Bl9xx systems and most are at or near capacity. At least half are in Fortune 500 accounts. Most are installed in manufacturing and wholesaling companies, state and local governments, educational institutions and hospitals. They function as both stand-alone systems and as HASP workstations to larger Burroughs and IBM mainframes. These systems run the following applications, as broken down by percentage of customers:

70%	Accounting & Billing
57%	Payroll & Personnel
46%	Order Processing & Inventory
29%	Purchasing
28%	Sales & Distribution
27%	Manufacturing Resource Planning
17%	Educational Administration

These applications were mostly developed by in-house MIS staffs but many customers acquired them from Burroughs. (Relatively little is available from third-party vendors for both the Blxxx and A Series families.) 75% of all Blxxx applications are COBOL, with the majority of the balance being RPG II.

The Bl9xx systems have a performance range from 90%-120% that of a VAX 8200. Although there is a wide variance in the way they are configured, some statistics on Bl9xx systems provide insight:

- 53% have 100-600MB disk storage
- 27% have 600-1.2GB disk storage
- 67% support 6-30 local workstations
- 54% support 1-30 remote workstations

PROPOSED SYSTEMS

Burroughs typically proposes the A3-K or A3-F to replace Blxxx systems, depending on the old system's generation and model. Digital typically proposes the VAX 8500 to replace Bl9xx's and the VAX 8200 to replace the smaller Bl8xx's. Both are typically configured as VAXcluster System Building Blocks. This permits better expandability and provides for the greater I/O requirements characteristic of Burroughs workloads.

FOR INTERNAL USE ONLY

Target System	Blxxx PERFORMANCE		A SERIES PERFORMANCE	
	Relative to VAX 8200	A Series Replacement	Relative to VAX 8200	VAX Replacement
1. B1955/85/90 B1885	.9-1.2	A3-K	1.6	8500
2. B1855/60/70	.6-.8	A3-F	1.0	8200
3. B1815/30 B17xx	.4-.6	A3-F	1.0	8200

DIGITAL'S ADVANTAGES

Digital offers significant advantages over the A Series:

- Less cost of ownership relative to performance
- Expansion with better investment retention
- Proven networking
- More application software
- More software development tools

The VAXcluster 8500 and 8200 have significant advantages in cost of ownership/performance when compared to the A3-K and A3-F systems. "Cost of ownership" encompasses the 5-year costs of monthly lease payments, software rental and hardware maintenance.

Example 1: A B1955 supporting 40 simultaneously active terminals and 3.4GB of disk needs upgrading. Requirements include support of 64 terminals with 50 in simultaneous use. Also needed is 4.1GB of disk, a GCR/PE tape drive, a 600 LPM printer and COBOL.

The cost of ownership of Burroughs A3-K will be \$1,048,000, whereas the VAX 8500 will be only \$910,000 and provide twice the performance as the A3-K. Burroughs must propose the A9-F if they are to offer performance comparable to the VAX 8500. However, the cost of ownership will be \$1,816,000, or 99% more than the VAX 8500.

Example 2: A B1855 must be upgraded and the new system must support 32 terminals, with 20 simultaneously active. Requirements include 1.4GB disk, a GCR/PE tape drive, a 600 LPM printer and COBOL.

The cost of ownership of the Burroughs A3-F will be \$633,000, while a comparable-performance VAX 8200 will cost only \$510,000 over 5 years.

Digital's advantages include much more than superior cost of ownership. VAXcluster Building Blocks can be expanded into multi-node clusters with far greater investment retention than any growth paths available to the A Series. Burroughs offers nothing resembling VAXclusters, and therefore cannot provide the redundancy and flexibility benefits associated with this kind of implementation.

Large accounts with multiple Blxxx's will be interested in computer-to-computer networking. Digital Network Architecture is far more proven than Burroughs Network Architecture, which is installed in few Burroughs accounts.

FOR INTERNAL USE ONLY

Relatively little application software is available for the A Series. Burroughs offers proprietary packages but these are designed for centralized processing. On the other hand, there is a large library of application software available for VAX systems.

Another advantage Digital provides is the extensive library of software development tools. Burroughs does not offer any tools with comparable functionality to Code Management System, Module Management System, Language-Sensitive Editors or SCAN. There are no relational database systems for Burroughs, either from the vendor or third parties. In contrast with VAX systems, there are no products available for Computer-Aided Software Engineering. Finally, there are no Fourth Generation Languages available for Burroughs systems that can also run on computers from other vendors.

MIGRATION

Experience shows that B1900 and B1800 customers will migrate to the VAX in three different ways, typically a combination of all three:

1. Rewrite their applications in a Fourth Generation Language.
2. Discard their current applications and implement software provided by CMPs and other third parties.
3. Convert their existing applications to run on VAX systems.

Several Fourth Generation Languages are available on VAX systems:

- VAX COBOL Generator and VAX Rally from Digital
- FOCUS from Information Builders
- POWERHOUSE from Cognos
- MANTIS from Cincom

Numerous CMPs provide software to satisfy the application needs in the Burroughs base, such as:

Accounting & Billing

- McCormack & Dodge
- Ross Systems
- Software International
- GSI Transcomm
- Computer Data Information Systems

Order Processing/Inventory/Distribution

- Distribution Management Systems
- GSI Transcomm
- Computer Data Information Systems
- Xerox Computer Services

Manufacturing Resource Planning

- NCA
- McCormack & Dodge
- Cincom
- Quodata

Educational Administration

- Information Associates
- Educational Data Center
- Poise

A third party will soon announce tools to convert Burroughs applications over to VAX systems. These tools will address all versions of Burroughs COBOL. They will also convert ISAM files to VAX file format. Finally, these tools will convert Workflow Management Language, which is Burroughs' job control language. These tools will be sold to local Software Services organizations, third-party integrators or the end customer.

FOR INTERNAL USE ONLY

VAX SCAN is another powerful tool permitting users to translate and filter Burroughs applications and data into the VAX environment.

VAX-TO-BURROUGHS COMMUNICATIONS

Applied Informations Systems, in Chapel Hill, North Carolina, offers BURCOM-VAX, a software package permitting communication between VAX and Burroughs mainframes. VAX users can access applications running on Burroughs mainframes, as well as transfer files between the systems.

BURCOM-VAX provides Blxxx customers a phased migration to VAX systems. Both systems can coexist for a time until the customer is confident in removing the Blxxx. It also appeals to Blxxx customers who want the VAX systems to communicate with larger Burroughs mainframes on a permanent basis.

Contact: Mr. Arthur Coston (919) 942-7801

SUMMARY

Blxxx customers are prime selling candidates for VAX 8500 or 8200 VAXcluster Building Blocks. They have been stranded by Burroughs and cannot relieve their capacity and support problems without experiencing a costly conversion. Digital offers a remedy vastly superior to that of Burroughs.

FOR INTERNAL USE ONLY

AN UPDATE -- MEETING THE CHALLENGE OF CONVEX

John Gorczyca
 DTN 297-6843
 MR02-3/M91

In Competitive Update Vol. 6 No. 4 dated October 13, 1986, an article was published focusing on Convex Computer Corp. -- one of the entries in the relatively new field of minisupercomputer vendors. A recent announcement by Convex involving some new products and environments prompted this update, addressing the facts relevant to this new information. Please refer to the original article for the basic facts and information regarding this vendor.

Summary

In summary, Convex announced the following:

- A new higher-speed central processor which is claimed to be as much as 1.5 times the performance of the original C-1. Average performance gains, however, are more in the neighborhood of 25%.
- A new memory option offering as much as 1 gigabyte of memory per system via eight 128 Mbyte boards.
- A new system to house their new CPU and new memory option, calling it the C-1 XP (starting price for the new system is about the same as the old price for the old system at \$475,000).
- A new lower-cost configuration for their old C-1 systems, now labeling them the C-1 XL. The new starting price for the old C-1 is now \$350,000. Note, however, that the maximum memory potential on this new configuration is 64 Mbytes versus 128 on the previous models.
- A system, based on an 80 Mbit/sec. fiber optic, for high-speed connections between their various systems and calling it the Convex Extended Supercomputing Interconnect (CXSI).
- An extension to the system software providing for transparent load management and file sharing, and calling this facility CXS.
- Four preconfigured systems, consisting of from 1 to 4 C-1 XP systems connected via CXSI and CXS (single C-1 XP called XP1; dual system called XP2 [starting at \$775,000], etc.).

A Closer Look

One of the most interesting things about this announcement is that by introducing new products Convex has been able to shed its single product vendor label. The fact that a company can offer a family of products, though that family may be small, lends credence to the viability of that company and thus lessens the stability fears of a potential customer in that vendor. It also gets the attention of the press, which is a must in today's highly competitive minisupercomputer marketplace. We will now take a closer look at what was actually announced.

FOR INTERNAL USE ONLY

- The new CPU and C-1 XP system:

Their initial announcement claims up to 1.5 times the SCALAR performance of the old C-1 and an average speed-up of 1.25 times the C-1. Since the C-1 was rated at about 3 MIPS (typical single process scalar speed measure), that would place the new XP at about 4.5 MIPS, though in their announcement they claimed, separately, 6.4 MIPS for this processor.

Since our similarly priced VAX 8500 can outperform their old, repackaged, repriced C-1 XL in scalar operations in a multi-tasking environment, one would project that our VAX 8550 would clearly outperform their new C-1 XP under the same (normal) conditions.

IMPORTANT NOTE: The vector processing unit for the new systems has NOT been upgraded AND their difficulties in efficiently handling time-sliced use of their systems persist. Therefore, highly vectorizable codes should not derive much benefit from the new processor and sites running systems that are not dedicated to a single task until completion will continue to experience severe performance degradations, even with the new systems.

- Their new maximum memory limits:

This is an important new feature. Greater available physical memory helps in some applications like CAD/CAM or fluid modeling where large data sets usually require much paging. The bottom line, however, is always productivity and we will have to wait and see what real effect this new maximum memory size has on the overall performance of Convex systems used in real environments. (NOTE: More memory DOES NOT help multitasking...slow context must still occur when switching between jobs.)

- Their repackaged C-1 -- the C-1 XL:

Our VAX 8550 is similarly priced and can outperform the C-1 XL in all but dedicated, highly vectorizable application scenarios. However, this price MAY be getting into the ballpark where one MIGHT begin to consider dedicating a machine to such applications, if the workload can justify it. (It is now 4-6 times the speed of an Alliant FX/1, for 3+ times the price.)

- Their high-speed system interconnect, the Convex Extended Supercomputing Interconnect (CXSI) and supporting CXS software:

This is an interesting concept. We have had a similar capability for some time now and call our interconnected systems a VAXcluster. Speeds of the physical interconnects are comparable -- 80 Mbits/sec. for Convex, 70 Mbits/sec. for the CI. It is unclear how I/O fits into this new scheme. Since it was not mentioned explicitly, one must assume that the mass storage is handled locally, though available "CXSI-wide."

- Their new preconfigured systems:

This represents just normal business practice. However, in the case of Convex, one might also speculate that their interest in promoting multi-computer configurations may be due, in part, to the poor performance of their single system in a shared, multi-tasking, multi-user environment.

FOR INTERNAL USE ONLY

Overall Assessment

With these newly announced products and capabilities, Convex has certainly improved their product offerings in terms of both price/performance and expanded capabilities. However, most of their weaknesses mentioned in the October Competitive Update article still apply. Major among these are:

- Poor scalar price/performance compared to our products.
- Poor shared system performance.
- Very few languages and applications available (FORTRAN remains the ONLY language offered which uses their vector capabilities).
- Narrow offering of third-party applications.

Therefore, their target customer set remains the same, though their new products should make their sales task a little easier in cases where a customer has an application that can exploit the architecture of a C-1 and that customer has little need to timeshare the system.

Other Items of Interest

Despite the weaknesses of their system, they are selling systems and becoming an accepted force in the minisupercomputer marketplace.

- In the previous article on Convex it was reported that they had sold some 52 systems; data used was current at the end of June 1986. Recently, in the October 30, 1986 issue of Electronics, Convex announced that the number of their installed systems had risen to 80.
- We have noticed them becoming much more aggressive and winning in more situations. If they get to an account first, they will frequently write the RFP to include a requirement for integrated vector processing with a vector register architecture that coincidentally resembles theirs... exactly. The only way to counter this is to become more aggressive ourselves and be sure the correct management levels are educated as to the appropriateness of a new system in terms of their existing and future site computational plans.
- They are also heavily relying on references from respected sites, such as NASA's Ames Research Center and McDonnell Douglas, to add credence to their message and "sell" into new accounts. We must be prepared to counter.
- Finally, after some difficulties, Convex has made their initial public offering of company stock at about \$7.75/share. This is just another indication of their confidence, and that of the investment community, in their prospects for success.

The bottom line is: though we know their products may be appropriate (at this time) for only a small segment of the total scientific/engineering community, their goal is to fill that segment and expand beyond it. They are hungry, aggressive and can move quickly. However, we can counter their "small company" advantages in a sales opportunity IF we are really willing to compete and:

FOR INTERNAL USE ONLY

- Apply our resources in a timely fashion.
- Have a solid understanding of our customer's application and needs.
- Apply our efforts to influence the correct management level at the customer account.

Need More Information?

For more information on Convex or any other of the "hot-box" competitors, contact the Competitive Hotline at DTN 283-6300 or (617) 273-6300. They will either have the information you need or direct you to the right source.

Additionally, via the engineering network, you may want to visit the High-Performance Scientific Computing NOTES file (CURIUM::HPSC) for a continuing discussion of these vendors, as well as other related high-end scientific computing topics.

FOR INTERNAL USE ONLY

MEETING THE CHALLENGE OF ELXSI

John Gorczyca
DTN 297-6843
MR02-3/M91

This is the third in a series of articles that examine minisupercomputer vendors. This document will address the challenge posed by Elxsi and their System 6400 Series of computers.

The previous articles examined Convex and Alliant in Competitive Update Vol. 6 No. 4 and Vol. 6 No. 5, dated October 13, 1986 and November 10, 1986, respectively. Though there are major design differences between the products offered by these companies, the market appeal and perceptions of their products are somewhat similar. The vendors themselves exhibit similarities in terms of their size and marketing strategies. Therefore, many of the statements made in the previous articles in this series will also be applicable to Elxsi. To avoid repetition, you will be referred to those articles when appropriate.

ELXSI INC.

Company Overview

Elxsi, headquartered in San Jose, California, was incorporated in 1979 and shipped their first production systems in mid-1983. To date they have shipped approximately 60-70 systems. (This figure is far less than their previously published goals.)

Their philosophy in selling their systems continues to embrace the "configure it yourself" approach. Their system can support up to 12 CPUs of 2 different powers; it can support up to 768 Mbytes of memory in 16 Mbyte increments; and it can support up to four I/O processors.

Their system prices range from \$369,000, with their slower CPU and minimum memory, to well in excess of \$3 million for a fully loaded system. The average single CPU system price is about \$475,000. Published OEM discounts for their systems have been as high as 40%.

Of their total installed systems to date, only about half have more than a single processor and, of the remaining systems, only about 25% employ four or more processors. Though they claim to have as many as 70 installed systems, their total customer base is only slightly greater than half that number.

They have a visible sales effort in the Far East via Tata-Elxsi Pte., Ltd.; however, most of their business is domestic (90%).

Their stated target market is the general scientific/engineering arena with applications in aerospace, seismic, structural analysis, CAD/CAM/CAE, real-time and image processing, to name a few.

FOR INTERNAL USE ONLY

Product Overview

As mentioned earlier, Elxsi offers many variants of a single product called the System 6400 -- which employs a 64-bit architecture that supports from 1 to 12 processors of two different types: the 6410 (with advertised speed exceeding the VAX 8600), and the 6420 (with advertised speed exceeding the VAX 8700). Each CPU has a two-way set associative write-back cache: 16 Kbytes for the 6410s and 64 Kbytes for the 6420s. The CPUs can be mixed in a single system which can include from 16 to 768 Mbytes of physical memory, all connected via a 320 Mbyte/sec. internal bus, called their "Gigabus."

For I/O, the 6400 supports up to 4 I/O Processors (IOPs), each capable of driving up to two 8 Mbyte/sec. subchannels. Each subchannel, in turn, can support up to 16 ports. Elxsi makes available fixed and removable disks, magtape drives, printers, RS232/422 communications devices, support for HYPERchannel and a DR11-compatible interface.

There are published prices for a single CPU system of either type, and packaged systems employing either of their CPUs for 2 (DYAD) and 4 (QUAD) processor systems. Apart from those prices, there are published prices for upgrading these basic systems either by adding more CPUs or more memory. These prices are as follows:

• Single 6410 CPU system with 16 Mbytes -	\$369,000
• Single 6420 CPU system with 16 Mbytes -	399,000
• Dual 6410 CPU system (DYAD) with 32 Mbytes -	475,000
• Dual 6420 CPU system (DYAD) with 32 Mbytes -	625,000
• Four 6410 CPU system (QUAD) with 32 Mbytes -	695,000
• Four 6420 CPU system (QUAD) with 32 Mbytes -	???
• Each CPU upgrade from 6410 to 6420 -	140,000
• Each additional 6410 CPU -	140,000
• Each additional 6420 CPU -	200,000
• Each additional 16 Mbytes of memory -	52,000

Note that these prices are VERY subject to change.

Elxsi provides a choice of three operating systems: EMBOS, their proprietary O/S, which presents a user interface having a mixture of UNIX and VMS characteristics, while being compatible with neither; a UNIX System V.2 implementation; and a UNIX 4.2 BSD implementation. Recently, Elxsi also announced an "extension" to their EMBOS O/S and a layered package called "EMS," which is claimed to provide a "VMS" user interface to the System 6400. EMS (selling for \$20,000) includes EMS/ECL, which provides DCL support (selling separately for \$12,500) and EMS/ERT, which provides VMS system services and run-time library support (also selling separately for \$12,500). They also offer an EDT-like editor for \$2,000. (Elxsi claims that in early 1987, it will also support Community, which provides DECnet Phase IV end-node support for \$15,000.)

Elxsi provides support for the following languages: FORTRAN-77, PASCAL, COBOL-74, C, BASIC and MAINSAIL. Note that they also claim their FORTRAN to be VAX-FORTRAN compatible. (Elxsi FORTRAN sells for \$10,000.)

Communication with other systems is accomplished via "standard LANs" and public packet networks. These include TCP/IP on Ethernet (including SMTP, TELNET and FTP), XNS, HASP and HYPERchannel. UUCP is supported on their two UNIX systems.

FOR INTERNAL USE ONLY

The "advertised" performance for a System 6400 varies. Based on their averaged claims and some independent testing, the expected performance for a single CPU, 6410-based System 6400 is about 4-7 MIPS, and for a similar 6420-based system is 8.5-10 MIPS. (Note that in other comments Elxsi claims to observe a 1.7-2.3 performance increase in going from a 6410 to a 6420, depending on application. No explanation is given for these discrepancies.) They also claim almost linear increase in aggregate performance as CPUs are added to the system. (Note that an individual process does not benefit from the addition of CPUs unless it has been reprogrammed to take advantage of this condition.) Since their systems do not feature a vector processing facility, their advertisements seldom include performance measured in MFLOPS.

The LINPACK results for the standard FORTRAN implementation of this test shows the 6410-based System 6400 yielding .58 MFLOPS. More recent results, assumed to be for a 6420-based system (tests performed by Elxsi), yield a 1.1 MFLOPS performance.

Known third-party software packages available for the Elxsi systems include two mechanical engineering applications: Computervision's CADD5-4 and SuperCads from Tasvir Corp.

Elxsi Strengths (Compared To Digital)

Elxsi's major attraction is their ability to expand the aggregate processing power of their base systems in an apparent cost-effective and painless fashion. Their system also offers the potential for substantial physical memory expansion to 768 Mbytes, one of the largest in the industry. Though they offer the "potential" (via software tools) for the execution of a single application in parallel, that is not a primary advertised feature of their systems (although it is IMPLIED by their advertising and actively PROMOTED in sales situations).

Their expansion philosophy seeks to protect the investment of the customer. They have already demonstrated the practicality of their approach with the introduction of a new CPU and new memory modules. Using their approach, various components of the system are upgraded in such a fashion that they can replace, and/or coexist with, similar older components within an existing system environment. They will contrast this approach with our cluster approach for increasing aggregate system throughput.

Another interesting and possibly attractive feature of their system is that it allows all their operating environments to execute in the same system at the same time: EMBOS, EMS, UNIX System V.2, and UNIX 4.2 BSD. This feature may be most attractive to university environments.

Finally, Elxsi's salesforce has the same advantages as the other startups in this field (reference the cover story on Convex in Competitive Update Vol. 6 No. 4 dated October 13, 1986), due to the company's small size and their narrow product set. Since their sales have not been keeping pace with their manufacturing schedules lately, they are especially well positioned to quickly deliver products.

Elxsi Weaknesses (Compared To Digital)

As with the other "niche" companies selling what they call minisupercomputers, Elxsi is really selling their systems for specialized FORTRAN

FOR INTERNAL USE ONLY

applications. (It is not at all clear that the System 6400 really falls into the class of "minisupercomputer," since its single-task execution speeds are more on a par with a superminicomputer.) Though they offer more kinds of languages and environments than the others, they still concentrate their limited resources on more efficient FORTRAN compilers and system improvements geared toward the scientific and engineering applications. (Note that their original version of FORTRAN was almost 50% slower than their current version; the other software products they offer have not benefited from this attention. Single-processor system performance claims for Elxsi systems apply ONLY to applications written in FORTRAN or assembler.) Yet, unlike some of the other vendors, Elxsi offers no integrated vector processing, no automated procedures to apply several processors to a single task and no very attractively priced entry-level system. On any arbitrary FORTRAN benchmark, the performance of a similarly priced System 6400 looks, at best, about the same as a VAX system.

Given all that Digital can offer to the VAX customer in terms of existing applications, corporate and third-party products and peripherals, and support, why would one EVER want to consider Elxsi?

The only two possibilities are "perceived" ease of system expansion and the "perceived" opportunity for implementation of parallel processing applications. We will now take a look at these.

First of all, expansion -- though one need only buy more "boards" to expand the number of CPUs and memory on a System 6400, the cost for these items is not trivial. To add a couple of 6420s and 32 Mbytes of memory to a system costs in excess of \$500,000. That is equivalent to adding a VAX 8800 to a system at about 80% of the list price of the second VAX 8800 system. That relatively small savings should not seem wildly attractive to a customer investing in a multi-million dollar computer system, given the real productive value these systems actually represent.

With the clustered approach, your dollar buys more than just additional throughput when ALL is working well; it buys you real independent redundancy, so that a critical failure in one part of the system does not preclude the availability of the rest of the facilities in the cluster. Your system performance MAY degrade but your system continues to be available and may indeed have no apparent effect for some critical applications.

The other possible lure of Elxsi is their association with the term "parallel processing." Looking at what they actually offer, some interesting observations can be made.

When considering the conversion or development of an application for a parallel processing environment, the user is faced with the task of "hand parallelization" on either the Elxsi or Digital multi-processor systems. (By "hand parallelization" we mean that the user must re-design, decompose and then coordinate the execution of an existing single application across several processors.) Both vendors offer tools to make the process a bit easy. However, due to the "write-back" only "feature" of the cache memory on an Elxsi, versus the "write-through" VAX cache attribute, writing parallel applications for the Elxsi becomes more difficult.

With Elxsi's "write-back" cache, data changed in the cache is ONLY written back to main memory when it is no longer needed in that cache. Even then, none of the other caches associated with other processors are notified of

FOR INTERNAL USE ONLY

this event automatically. In contrast, whenever a datum is changed in a VAX "write-through" cache, main memory and all other caches associated with all other processors ARE notified AUTOMATICALLY. The net user effect is as follows:

- When a user creates a parallelized application that shares memory on an Elxsi System 6400, which is extremely common, the user must CONSCIOUSLY track all conditions under which shared memory could be changed by one of the independent processes. Whenever such an event occurs, the user must then, in his or her own program, take active steps to transmit this information to all other processes that are dependent on the accuracy of this data.
- In contrast, when using a VAX system, a user need not actively maintain the integrity of shared data themselves, since the VAX implementation automatically maintains data consistency between multiple caches and main memory.

Therefore, for applications where a dual-processor system would provide the most benefit to a user who is willing to hand decompose and parallelize their application, Digital's cache architecture makes the process considerably easier by automatically providing for the integrity of shared data.

Though Elxsi can offer systems with more than two processors, the complexity involved with hand decomposing and parallelizing applications, while manually providing for data integrity across each parallel part of that application, increases at least geometrically as processors are added. Made to face this reality, most users should begin to question the worth of the expected benefit, given the magnitude of the effort required to achieve it.

The only answer to the question of why one might consider Elxsi over Digital, therefore, is either confusion about the real cost/benefits of system expansion or the desire to spend large sums of money and time to demonstrate that an application can be hand decomposed to execute in parallel across several processors.

Finally, I will just briefly mention once again the fact that the depth and breadth of both our product set and company's resources offer the customer innumerable benefits that a small company such as Elxsi cannot begin to match.

Our stability and reputation are established and, by most measures, outstanding. The small number of units shipped by Elxsi and their inability to show a profit after three years of shipping product can only make one wonder about the future of this company, especially considering the recent entry of several very competitive vendors into their previously exclusive "minisupercomputer" market.

Sales Situations Favorable To Elxsi

Due again to their narrow product set and relatively small sales contingent, Elxsi enjoys certain benefits in a sales situation which are similar to other small companies selling products that appeal to technologists. For a description of favorable scenarios, please refer to the Convex article in Competitive Update Vol. 6 No. 4 dated October 13, 1986.

FOR INTERNAL USE ONLY

Their particular attraction is that of being a provider of a multiple-processor environment which can be used to implement some aspects of an application concurrently. However, due to the cost of their systems, especially when configured in such a way that they can claim some discernible benefit, most favorable situations will necessarily involve the expenditure of well over a million dollars. Elxsi systems costing less than a million dollars do not distinguish themselves, even on paper, and therefore should not be a serious contender in that price range.

Additionally, Elxsi will now use their VMS emulation software to try to soften any "incompatibility" objections of potential clients, especially when attempting to edge into a Digital account. (Obviously, this strategy could also be used against them...if the customer really wants a VAX system and VMS, why settle for something less?)

Finally, they constantly attempt to influence the technological market through their current ties with Gene Amdahl of Trilogy, Elxsi's parent company since last year's take-over. This association is expected to lend some credence to the Elxsi approach (though both Elxsi and their current parent company -- Trilogy -- have each lost money since their inception).

Successfully Countering Elxsi

There are very few sales situations where a System 6400 is the "right" solution. Elxsi provides no "special" processing features in their system and for general scientific/business applications there are many other vendors who can provide a viable solution in terms of performance at a comparable price when considering total system value. (We just happen to be the best alternative!)

Still, there are those who may be drawn to Elxsi for one reason or another and may be well on their way to being convinced that a System 6400 will provide for their needs. For these situations, we must help the responsible individuals consider a number of key issues which may help to counter any prior emotional commitment to an Elxsi solution.

The investment required by a user to purchase a large enough system from Elxsi such that on paper, at least, it appears to deliver higher performance than an off-the-shelf, non-clustered system from Digital is enormous. Elxsi's offer of great price/performance benefits only really comes into play when many CPUs and much memory is part of the system; thus, the cost of the system is well in excess of a million dollars.

Their claims of decreased cost of expansion, in contrast with our "cluster approach" to expansion, must be weighed against the user's need for system availability. If a critical component of their system fails, potentially all CPUs (up to \$3 million dollars worth) could be left sitting idle. In a cluster, failure of a major component of a single member represents only an inconvenience and a possible decrease in system-wide performance.

Elxsi seems to offer an impressive array of products and development environments. Yet further investigation shows that many of the products they offer for their systems are "public domain" products. Though they have increased their proprietary product set via their new EMS (VMS emulation) products, their new CPU and new memory module, their shrinking number of employees should make one stop to consider the quality and quantity of support that any one customer might expect. (As of March, their total staff

FOR INTERNAL USE ONLY

had been reduced by more than 35% since the previous fall to a TOTAL of 225 including engineering, manufacturing, sales, marketing, finance and administration.)

Their claims to parallel processing capabilities also present problems in the general case. Both the lack of automated tools for task decomposition and their lack of an architecture that simplifies the problem of cache coherency complicate the task of using their systems for parallel executions of a single task. Though Elxsi personnel, intimate with the architecture, may offer to demonstrate how to decompose and parallelize a sample user application, a user should experience this process firsthand before assuming that such a task is trivial or simply mechanical.

If the customer is planning on using the new system for anything other than FORTRAN, be sure to have the user benchmark those applications also. Though execution speeds of a System 6400 may be comparable to a VAX 8550, 8700 or 8800 for certain FORTRAN benchmarks, there is no reason to believe that applications written in other languages offered by Elxsi will be at all competitive.

Finally, though Elxsi has been in business now for about seven years, they do not enjoy any clear business advantage over their highly visible, recent-entry competitors, such as Convex and Alliant (in fact, the opposite seems to be true). Their sales never approached their projections, their published installed base figures have not risen in about a year, their workforce has shrunk by over a third and in their seven-year history they have failed to turn a profit. The merger with Trilogy last year has helped Elxsi's precarious financial situation, but this is only a temporary solution.

Therefore, when a customer is considering a purchase from a company like Elxsi, that customer should also be asked to assess the impact of (a) the hidden costs outlined in the article focusing on Convex in the October 13 issue of Competitive Update, and (b) the prospects for the future of such a vendor, given their financial situation, growth history and position in this highly competitive market.

Need More Information?

For more information on Elxsi or any other of the "hot-box" competitors, contact the Competitive Hotline at DTN 283-6300 or (617) 273-6300. They will either have the information you need or direct you to the right source.

Also, via the engineering network, you may want to visit the High-Performance Scientific Computing NOTES file (CURIUM::HPSC) for a continuing discussion of these vendors, as well as other related high-end scientific computing topics.

FOR INTERNAL USE ONLY