

BUY-LINE

COMPENDIUM

THE BEST of BUY-LINE

May 1980 - April 1981



digital

COMPANY CONFIDENTIAL



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May 1980 - April 1981

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Submit a memo/TWX to BUY-LINE Editor MR1-2/E78 and include Name, Badge Number, Department, Job Title, Location.

COME JOIN BUY-LINE

The Publishing Council

How about sharing some of the real-world happenings in your DECsystem-10 -20 accounts? What about problems solved, interesting adaptations, new ideas, new name accounts, any other shebangs? Or, have you seen a good press article which you found to be helpful or especially entertaining?

Come Join BUY-LINE and share it with us. All contributions will be acknowledged (or treated anonymously - if you wish)!

Listed below are guidelines to follow when sending articles to BUY-LINE:

1. Include your name, department, mailstop and phone extension in the upper right corner of each article submitted.
2. Photos are always an asset. Black and white photos are preferred, but color will be accepted if that is all that is available. The size of the photo does not matter (we can reduce or enlarge it).
3. Get customer approval for success/application stories.
4. Mail your material to Editor, Barbara Holtz, MR1-2/E78. Contributions are welcome at any time!

If you have any comments, ideas, suggestions, we'd be happy to hear from you. Feel free to call Barbara Holtz DTN 231-4996 in Marlboro. (Teri Stokes and Ellen Lekberg are also available to assist you.)

THE BEST of BUY-LINE: A Compendium

A message from the Publishing Council:

As most of our readers know, LCG (DIGITAL's Large Computer Group, located in Marlboro, Mass.) publishes BUY-LINE every two months. Principally intended as a tool for DIGITAL Large Systems sales, marketing, and field service personnel, BUY-LINE is distributed to over 1500 subscribed readers.

For the first time, we are bringing you this special Compendium issue. THE BEST of BUY-LINE encompasses, in the opinion of the Publishing Council, the most significant articles appearing in BUY-LINE from May 1980 through April 1981. We plan to present LCG readers with THE BEST of BUY-LINE Compendium every year, and hope that you will make good use of the information which it - or which any regular BUY-LINE issue - contains.

Please take note of a few "digressions" from the BUY-LINE norm:

We have organized THE BEST of BUY-LINE into four subsections, entitled GENERAL INTEREST; SALES NOTES; PRODUCT ANNOUNCEMENTS; and APPLICATIONS. These section titles differ slightly in the name and number from those normally appearing in BUY-LINE.

As you will see in this Compendium issue, page numbers are listed as "C-number" on page corners. If page numbers appear bottom center, it signifies the page number of the original BUY-LINE article.

The Table of Contents provides a good paging reference with regard to this issue as well as to the previous issues from which the articles were taken. (If you wish to receive particular back-issues, please contact Barbara Holtz, MR1-2/E78; DTN: 231-4996.)

Those of you who, via this Compendium, are getting acquainted with BUY-LINE for the first time and who wish to receive it on a regular basis are invited to fill out and return to us the mailer attached in this issue.

While we think that BUY-LINE is a useful and informative LCG magazine to read at any time, we also think that this Compendium reflects truly the best of the past year's issues.

So, enjoy THE BEST of BUY-LINE!!

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GENERAL INTEREST

(Editor's Note: Reprinted from News & Comment Section of September 1988 issue of Computer World)



... of the ... plus postage and handling
from Real Decisions Corp., 273 Main Ridge Rd., Stamford, CT
06901 (203) 358-9780.



(Editor's Note: Reprinted from News & Comment section of September 1980 issue of Computer Decisions)

DEC-20 BEST FOR TIMESHARING?

If you use a local timesharing service based on a DECSYSTEM-20, you're probably getting the most computing for your dollar expenditure.

That's the conclusion reached by Real Decisions Corp. in its recently published report, *Timesharing Decisions*, which compares 22 remote computing services by means of 22 benchmarks designed to test computational power and I/O data-handling capabilities. The report offers end-users a comparison of their current timesharing service with the offerings and charges of various competitive vendors.

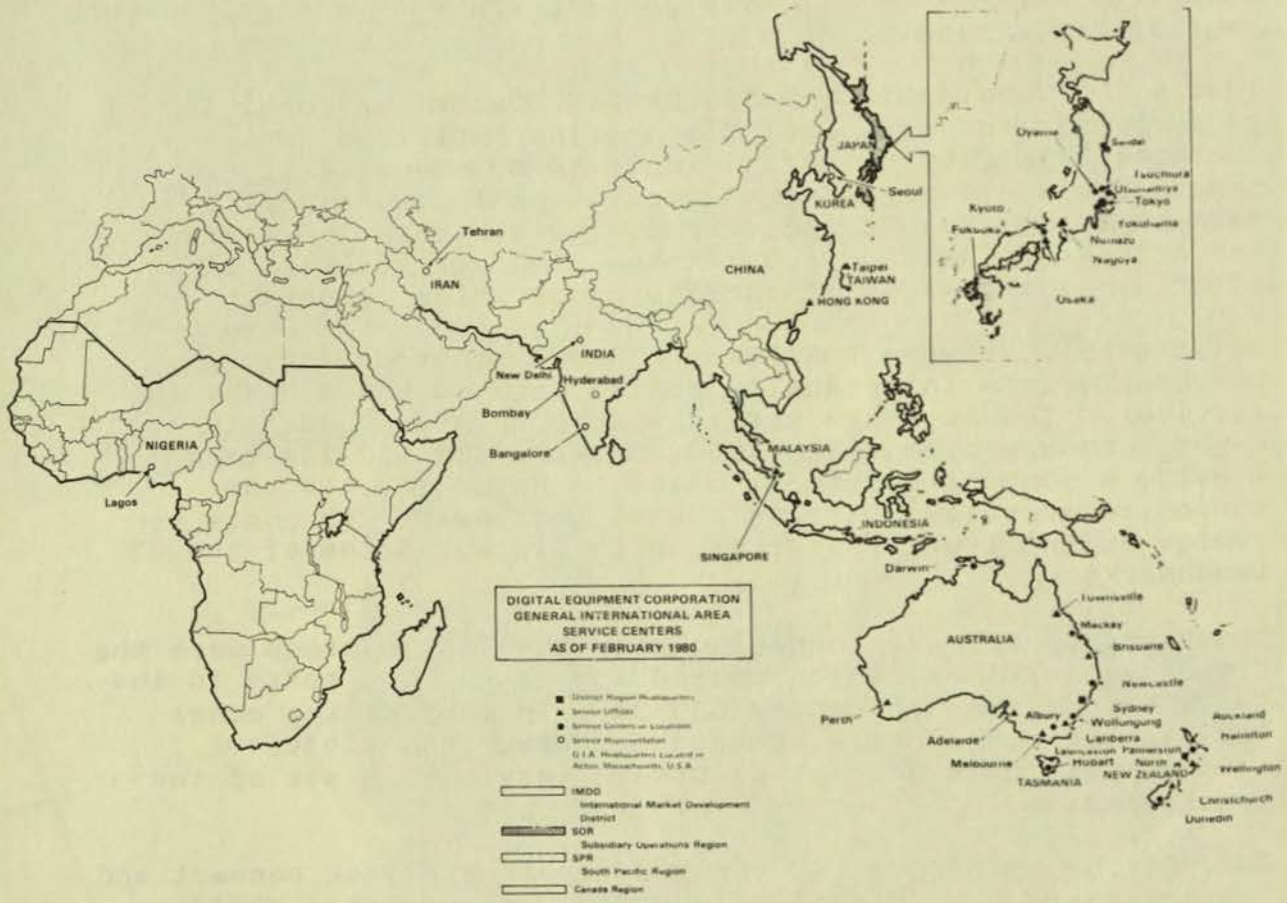
Split evenly between FORTRAN and BASIC programs, the 22 benchmarks were individually run on each of the timesharing services. The separate services were then grouped into four major hardware types--IBM, CDC, DEC-10, and DEC-20--to provide a composite summary based on hardware. In the composite overview, DEC-20s netted the lowest CPU costs to emerge as the front-runner group in all but three of the 22 benchmarks.

The nearest hardware competing with the DEC-20 group were the CDC-based services, which posted the lowest CPU costs in the three benchmarks not won by DEC-20. In many of the other runs in the composite, CDC hardware came in a close second--within 10 percent of DEC-20 services in six of the benchmarks.

In addition to CPU costs, the RDC report analyzes connect and storage charges to provide a rounded view of total costs users can expect per vendor and per hardware grouping.

The RDC report also provides an informational overview of each vendor in terms of facilities, support services, and standards of performance. Also included are extracts from the vendors' published price schedules in effect on June 1, 1980. Cost of the report is \$695 plus postage and handling from Real Decisions Corp., 123 High Ridge Rd., Stamford, CT 06905 (203) 356-9200.

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ACCOUNT MANAGEMENT IS KEY...To Selling Large Systems
in the World of GIA

Don Mallinson
MR1-1/M55

How do you sell large computer systems that are based on a 15 year architecture in a country that is trying to leap frog the computer technology of the rest of the computer world? How do you sell large computer systems in a country that actively uses not one, or two, but three different alphabets, one of which has over 40,000 characters? How important is it to be successful in the world's largest computer market outside the U.S.? One country with any one of these three parameters would be a thorny selling situation, but all three parameters apply to just one country - Japan.

Such are some of the sales situations GIA sales persons encounter when selling Digital's large, or small systems outside the U.S. and Europe. And Japan is only one of a dozen countries that GIA sells Large Systems in.

How do you sell a DECsystem-10/20 to a university trying to meet the academic and administrative needs of 250,000 enrolled students (Mexico)? Or to a country that has only 200 telex machines and a population of 1 billion people (China)? How do you adequately service 21 DECsystem-10/20 computer systems spread over a continent the size of the U.S. (Australia)?

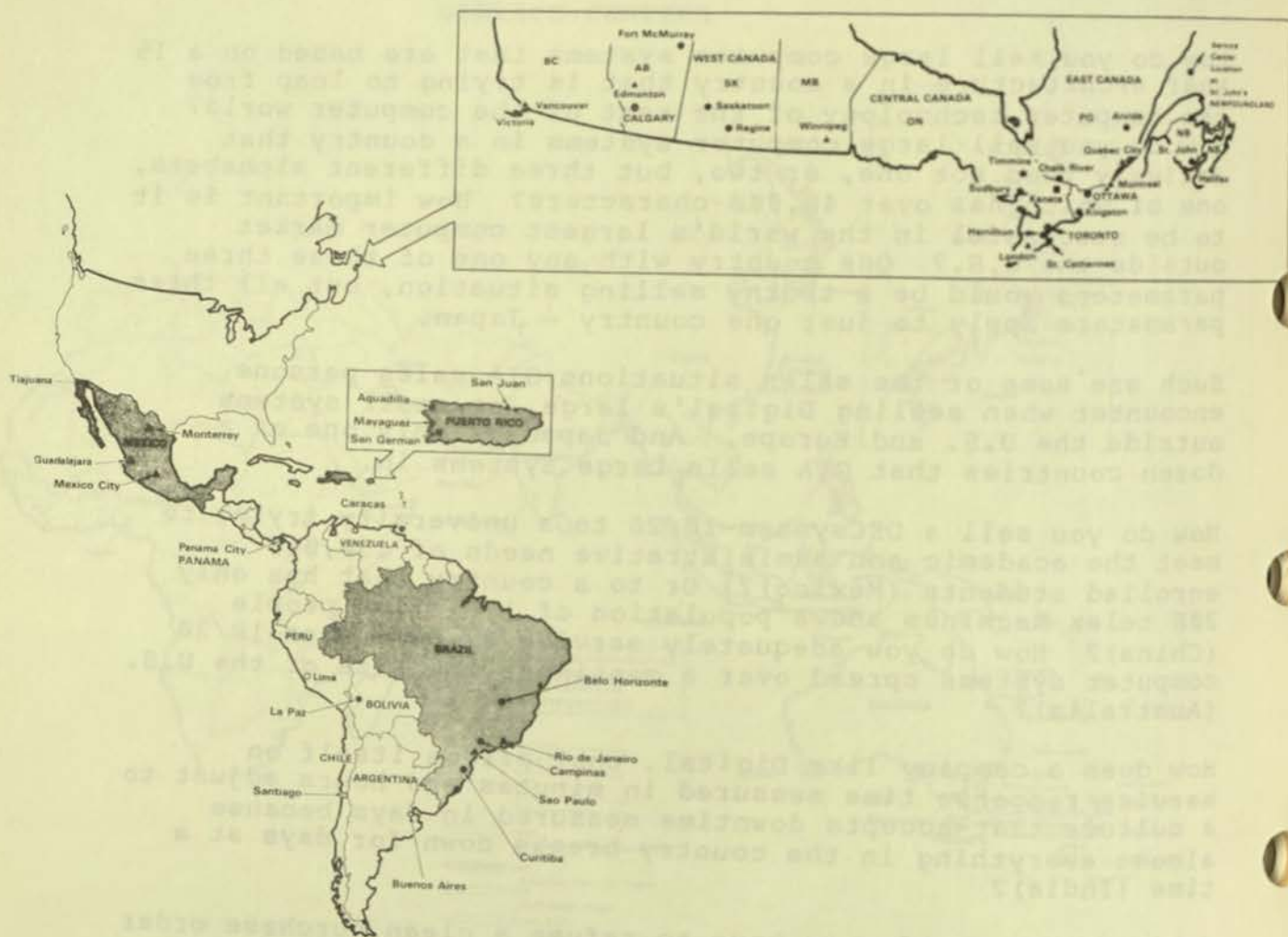
How does a company like Digital, that prides itself on service response time measured in minutes and hours adjust to a culture that accepts downtime measured in days because almost everything in the country breaks down for days at a time (India)?

Isn't it frustrating to have to refuse a clean purchase order because the government will not grant an export license to allow a particular technological product to be sold to certain countries?

To a typical domestic sales situation add cultural differences, language differences, poor telecommunications systems, time zones, multiple governments and a feeling of being remote from the action in Maynard--and you can understand that the key to the successful GIA sales situation is account management. This is especially true in the large systems area where the computer will be the linchpin in an organization's array of resources.

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GIA, Continued



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Because of account management, Large Systems sales has made significant penetration in Australia, India, Puerto Rico, Brazil in and other countries.

Since the first PDP-6 was installed at the University of Western Australia, Perth, in 1966, there have been 21 systems installed in that country and in New Zealand. Interesting to note that 15 of these systems are in educational institutions.

In India, Digital is one of the major suppliers of computers of all sizes, even mainframes. Service is not a problem in this sub-continent because users do self-maintenance. Labor, even professional labor is inexpensive. In this unusual situation, the insistence on field service is replaced with an insistence on spare parts.

Digital has always had strong sales in Puerto Rico. How much of this is aided by our manufacturing presence or by geo-political closeness is difficult to measure.

Elsewhere in South America, Digital has 36-bit market shares in Brazil and Argentina--larger than its market share in the U.S. As for Japan, Digital is doing very well. Six DECSYSTEM-20s have been sold or ordered in the past two years, primarily for university and research applications. Most terminals in Japan utilize the Katagana alphabet with its 47 characters. Work is proceeding to develop a cost-effective terminal that can handle at least 8,000 of the 40,000 Kanji "alphabet" characters.

All told, Digital's 36-bit systems have been sold in eleven different countries outside the U.S. and Europe: Australia, Bolivia, Brazil, Canada, Chile, Japan, India, Mexico, New Zealand, Puerto Rico and Taiwan.

To paraphrase a popular travel card advertising theme "Account Management...don't leave the USA without it."

LARGE SYSTEMS LEDGER - FEATURES/BENEFITS

Ernie Racine, TOPS-10 Program
Manager

The DECsystem-10 is the "grand master" of general-purpose timesharing. The -10 has long been the mainstay of some of the largest and most prestigious data services corporations in the world. It has developed an outstanding reputation for timesharing in scientific industry and education. As I see it, the main attractions of the DECsystem-10 have been flexibility, price/performance, growth potential, and communications capabilities.

The -10 is very flexible in its range of applications. We have -10s doing everything from hotel reservation systems to high-technology applications in nuclear research. Over the years, a vast amount of applications software has been developed. There is also a wide variety of language compilers and interpreters available. At the nuts-and-bolts level, the TOPS-10 operating system was designed to be versatile. Well-defined standard hooks are available to accommodate special commands, system calls, and device drivers. Of course, a full source kit has always been included with the product.

Performance capabilities and price/performance ratio are other traditional strengths of the DECsystem-10. The -10 benchmarks very well on a timesharing load. This is due to an efficient scheduler, a well-designed file system, and a full complement of native mode languages and utilities. Performance features are bundled into the system and don't require optional purchases. A variety of performance monitoring and tuning parameters are available but are seldom needed as the system does a good job of dynamically adjusting to varying system load. The -10 will continue to take advantage of state-of-the-art hardware technology improvements both in higher performance and lower cost.

Another strength of the DECsystem-10 is its growth potential. TOPS-10 is run on the smaller DECSYSTEM-2020 to very large, dual-processor KL10 configuration --- all with the same native mode languages, identical file structures, and no required conversion. The most recent addition to this has been 1090 SMP. This is a symmetric multi-processor configuration providing growth beyond what was provided by master-slave KL10 systems.

Communications capabilities are critical in the timesharing environment and the DECsystem-10 has been an industry leader in this respect. ANF-10 has supplied large networks with the ability to communicate between tasks on separate -10s, reroute messages through intervening nodes, and select a different -10 on the network for terminal command processing (network virtual terminal or network command terminal capability). More recently, we have introduced products which support multiple paths between nodes (complex topologies) and dynamic reconfiguration.

IT IS IMPORTANT TO NOTE THAT EVERYTHING I'VE MENTIONED IS AVAILABLE TODAY.

DECSYSTEM-20 THE "EASE OF USE" SYSTEM

Dave Braithwaite
10/20 Data Management
& Layered Products
MR1-2/E37

A discussion on the uniqueness of the DECSYSTEM-20 and its operating system, TOPS-20, normally centers around concepts pertaining to "Ease Of Use." Of all the large, general purpose, timesharing systems on the market, the DECSYSTEM-20 is considered by most people to be the easiest to learn, the most productive to use, and the most flexible to grow with. A prime reason for these characteristics is that "Ease Of Use" has been designed into all levels of the system, not merely tacked on as an outer layer. New features such as Archiving, DECnet, HASP support, and Scheduler controls have been recently added without compromising the principle of "Ease Of Use."

In a system with as many facilities and as much generality as the DECSYSTEM-20, the in-depth attention paid to ease-of-use is necessary for the system to be successful in all environments and by all types of users. The users of such a system have many different experience levels (novice to system programmer) and needs (data entry to system installation). In order for the system to be a success, it must have a broad set of capabilities which can be utilized by users of any experience level. Many systems limit productivity because users must learn the intricacies of each facility. Thus, most users only learn to utilize a subset of a system's capabilities. The DECSYSTEM-20, on the other hand, presents each user with the same friendly and helpful command interface for nearly all facilities, therefore making it possible for the most casual user to utilize the full potential of the system.

On one side, "Ease Of Use" is provided by the environment created by the TOPS-20 command language. The command language provides many unique facilities which enhance user productivity and which provide an instructive environment for the novice user.

1. Intra-line help -- At any point in a command, the user can type a "?" to receive a list of alternatives. Thus, typing "C?" would list all the commands beginning with the letter "C". This is extremely helpful when a command has many options.

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2. Abbreviations -- It is never necessary to type more than is required to make a command or keyword unique. This minimizes the key strokes and increases the efficiency for the skilled user.
3. Command Completion -- The ability for a user to type an abbreviation and (with a single keystroke) ask the system to complete the word (command, keyword, or file name). This gives immediate feedback that the abbreviation was correct.
4. Intra-line editing -- It is possible to backup a character, word, or line to correct a field. After a syntax error has been detected by the system, it is possible to have the command reinstated up to the erroneous part.
5. Guide words -- It is often helpful for the user to be given a hint (such as "the next argument should be a file name") as part of the prompting. Such hints can be requested by a single keystroke. This enables users to be shown the order in which information is to be presented to the command and indicates the type of information needed by each option.

One premise of the command language is that users do not like to be prompted for information (that's like being led by the nose), but like to do as much as they can and only receive help when they determine that they (themselves) require it. Thus the help information is available DURING the processing of a command so that the user can get help when required and merely continue to work. This is much more effective than systems where the help information must be requested and digested before using a system resource. This interactive nature of the system is supportive of a friendly, efficient environment in which users of all levels of expertise can work effectively.

Another side of "Ease Of Use" involves the access to on-line files. Creating, processing, and exchanging information is the essence of on-line, timesharing system. The TOPS-20 file system can be used by the novice with very little knowledge. Space for files is allocated and deallocated dynamically so that the user does not have to get involved. Many defaults are applied, so that files are reasonably protected from unqualified access without the user having to get involved. Thus, the novice user can utilize the file system merely through commands such as CREATE, DELETE, TYPE, and COPY; treating files as named objects without worrying about how they are stored nor how they are accessed.

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The sophisticated user has a full range of file manipulation tools and capabilities. Files can be put into special libraries and they can be made read only, append only, or execute only. They can be made accessed sequentially, randomly, through data base or ISAM techniques. Files can be given long names like "PAYROLL-MASTER-APRIL-1980" so that the content can be easily recognized. Files that are not currently required on-line can be "ARCHIVED" and later "RETRIEVED". These facilities can be made available through easily remembered commands. Ease-of-Use is thus extended to the experienced user through a file system which provides the user with many sophisticated and powerful facilities.

Ease-of-Use also extends to both the operation and the administration of the system. The utilities and tools used by the administrative staff utilize the same command interface that makes other users so productive. Through simple, English-like commands, the operator may vary the selection criteria for the batch and spooling system, may get detailed reports on outstanding requests, and may change the system job scheduling criteria. The system administrator seldom needs to do a "SYSTEM GENERATION" because the operating system dynamically configures itself to accommodate the hardware configuration. Many of the administrator's functions can be delegated to other users in such a way that system control is not lost, but the work of registering users and controlling their resources is placed in the hands of "account administrators".

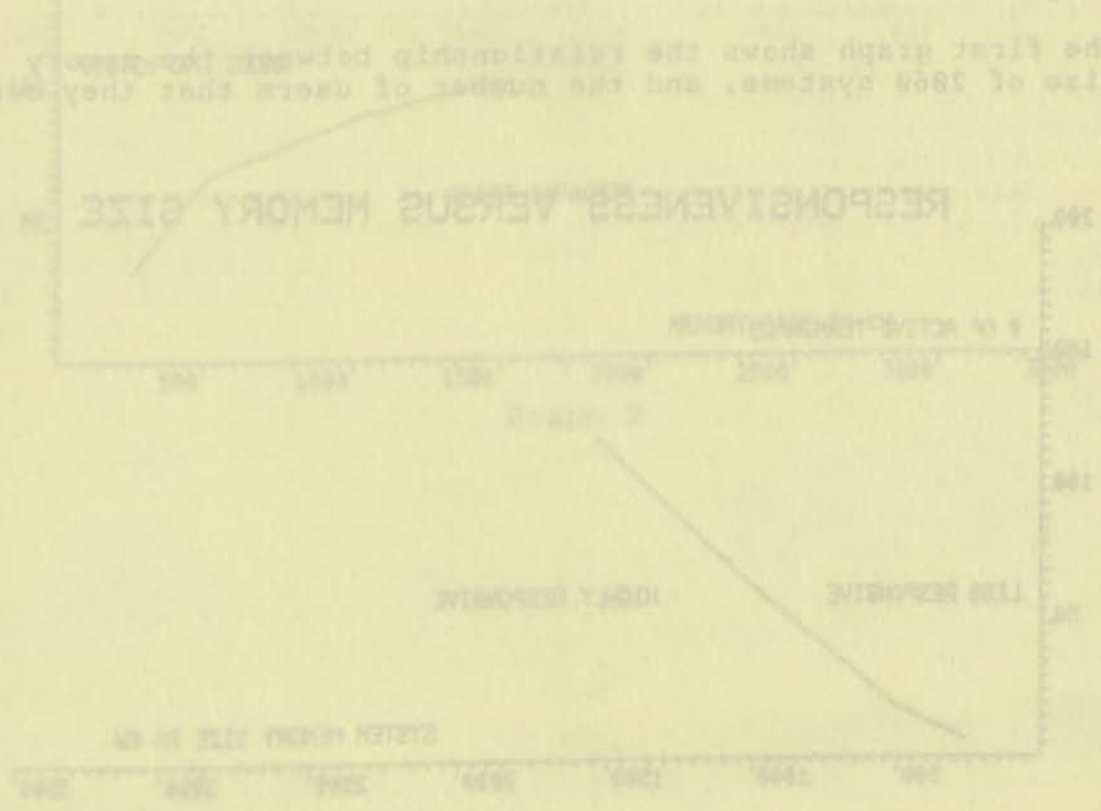
The above are only a few of the areas in which "Ease-of-Use" has been designed into the DECSYSTEM-20. Other areas include the availability of power system calls for systems and application programmers, the existence of sophisticated tools like editors and debugging systems, the use of the batch system to execute repeated procedures off line, the availability of procedure files to do repeated command sequences at the terminal, and many many others. The DECSYSTEM-20 is an extremely mature operating system, stemming from a heritage which includes TOPS-10 and the TENEX system used on the ARPANET. Both of these systems pioneered timesharing, interactive access, and human engineering. TOPS-20 is a blend of the best of both along with good ideas from many other sources. It is the one timesharing system available today which can truly claim to be of the second generation.

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Ease-of-Use is often overused in our industry. Too often, a vendor will give one facility of the system a simple interface while at the same time making other facilities very difficult to use. The DECSYSTEM-20 provides true "Ease-of-Use" at all levels. New facilities such as file archiving, networks, scheduling controls, and access control have been added in such a way that "Ease-of-Use" is not compromised. Over the years, the customer base has consistently responded with testimonials for the friendliness, consistency, and power of the DECSYSTEM-20. The system has proved itself again and again as easiest to use of the large general purpose timesharing systems.

Performance can be measured in two basic ways. The first is to determine how many terminals a given system can support before the system becomes unresponsive. The second is to determine how many terminals the system can support before the CPU becomes saturated. Most terminal users are not concerned with responsiveness (as with throughput, whereas system administrators are concerned about throughput) because changing algorithms usually are based upon CPU usage.

The first graph shows the relationship between the number of active terminals and the number of users that they can support. The second graph shows the relationship between the number of active terminals and the amount of system memory size.



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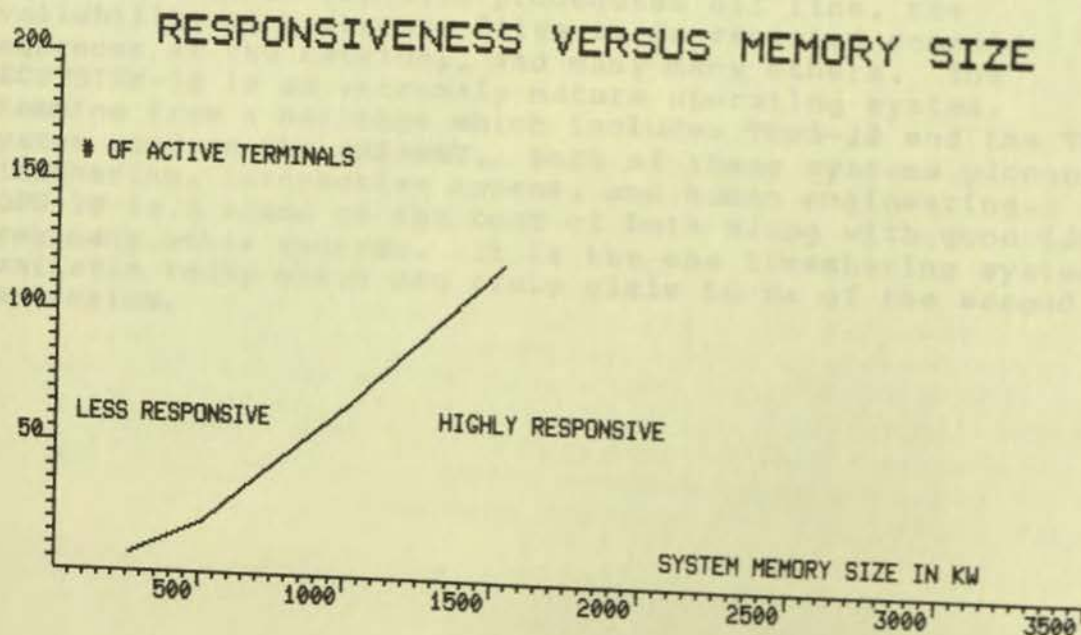
Anker Berg-Sonne
ECS Technical Support
MR1-1/M82

The purpose of this article is to demonstrate the price/performance of various 2060 configurations. The performance was determined using the benchmark described in BUY-LINE Vol. 3, No. 2, Pg. 45. The price was taken as the basic system price plus the MLP of the memory needed to bring the configuration up to the one tested.

Naturally price/performance should also take the price of peripherals and software into account, but since all configurations differ in these areas, I have chosen to ignore them. Various tests have shown that memory size impacts performance much more so than any factor.

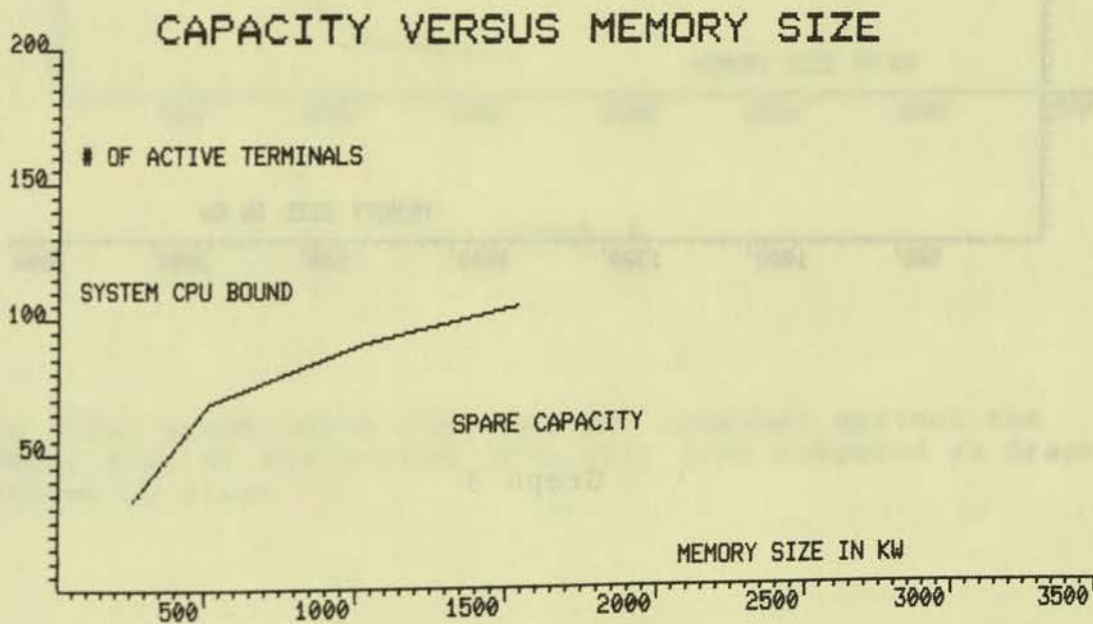
Performance can be measured in two basic ways. The first is to determine how many terminals a given system can support before the system responsiveness degrades. The other is to determine how many terminals the system can support before the CPU becomes saturated. Most terminal users are more concerned with responsiveness than with throughput, whereas system administrators are concerned about throughput, because charging algorithms usually are based upon CPU usage.

The first graph shows the relationship between the memory size of 2060 systems, and the number of users that they can



support with good response. The data is gathered using a standard workload, and the absolute numbers would, of course, be different if another workload were used. From the graph we can see that the number of users that a system can support is highly dependent on the memory size of the system. The relationship is actually almost linear when the memory size exceeds 512 KW. The abnormality below 512 KW is caused by the fact that the system can only compensate for a lack of memory to a certain degree, at a high cost in terms of overhead.

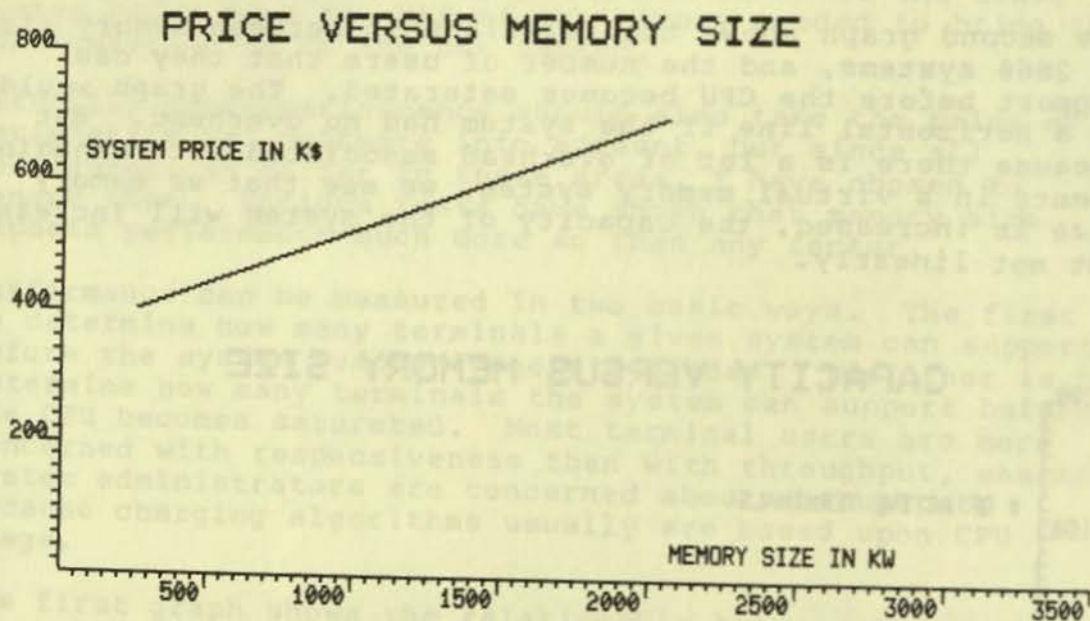
The second graph shows the relationship between memory size of 2060 systems, and the number of users that they can support before the CPU becomes saturated. The graph would be a horizontal line if the system had no overhead. But because there is a lot of overhead associated with managing memory in a virtual memory system, we see that as memory size is increased, the capacity of the system will increase, but not linearly.



Graph 2

The capacity of the system can, of course, not increase indefinitely because there is only so much power in the CPU. As the memory size increases, the gain in capacity derived from a given increment of memory will become less and less.

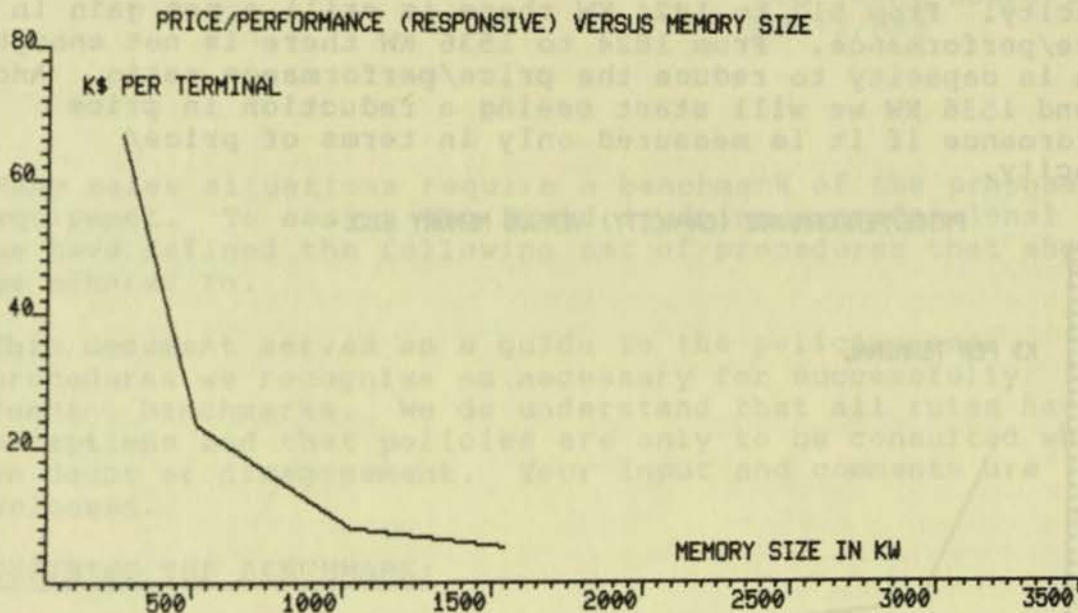
The third graph shows how basic system price increases with memory size. Because of the constant nature of our pricing policies, the relationship is completely linear.



Graph 3

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The fourth graph shows the cost per terminal against memory size. It is computed as the system price for a given configuration (Graph 3) divided by the number of terminals that the configuration can support with good response (Graph 1). This graph shows that the most cost-effective 2060 configurations are large.

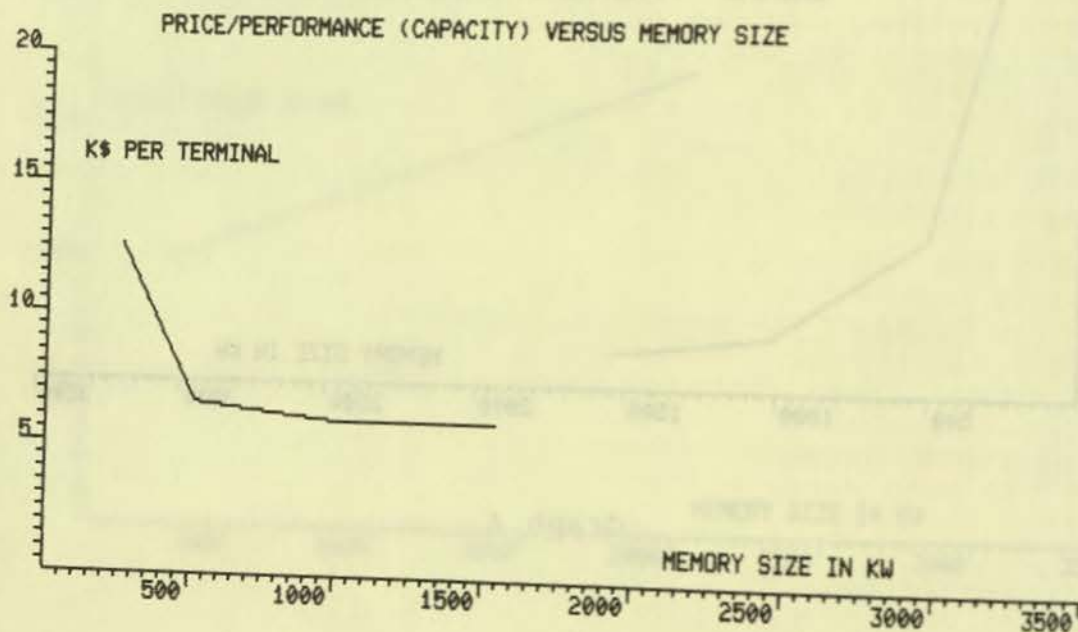


Graph 4

The fifth graph shows the cost per terminal against the memory size of the system, but this time computed as Graph 3 divided by Graph 2.

This graph drops dramatically between 256 KW and 512 KW, drops much less from 512 KW to 1024 KW, and is completely level from 1024 KW to 1536 KW. Beyond 1536 KW, it will start increasing.

A way to read the graph is that the price of going from 256 to 512 KW is more than outweighed by an increase in capacity. From 512 to 1024 KW there is still a net gain in price/performance. From 1024 to 1536 KW there is not enough gain in capacity to reduce the price/performance ratio. And beyond 1536 KW we will start seeing a reduction in price performance if it is measured only in terms of price/capacity.



Graph 5

A couple of general guidelines can be derived from the above:

- * We can see that up to 1024 KW the price/performance improves, no matter how we measure it. (Remember again that these figures apply only to this specific workload which has proven representative of an academic timesharing environment.)
- * Beyond a megaword, throughput will not increase enough to offset the increase in price, but the number of terminals the system will support will still offset the price increases.

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BENCHMARK GUIDELINES

Anker Berg-Sonne
ECS Tech. Support
MR1-1/M82

Many sales situations require a benchmark of the proposed equipment. To assist the Field in doing a professional job we have defined the following set of procedures that should be adhered to.

This document serves as a guide to the policies and procedures we recognize as necessary for successfully running benchmarks. We do understand that all rules have exceptions and that policies are only to be consulted when in doubt or disagreement. Your input and comments are welcomed.

DEFINING THE BENCHMARK:

The necessity of running a benchmark is usually stated in the original request for proposals (RFP) issued by the prospect.

If the RFP does not specifically detail how the benchmark is to be run, it is important that we (Digital) use this opportunity to guide the prospect into defining the benchmark requirements. The Technical Support Group can provide valuable assistance in this phase. A software specialist from the field should also be appointed as the person responsible for the benchmark.

Most prospects will be grateful for the assistance we can provide in formulating the benchmark specifications. A copy of the RFP should be forwarded to the Technical Support Group for review as soon as it is received.

A good benchmark will emulate the load that the prospect expects to put on the system being bid. This load is best exemplified by typical programs for the customer's current system. If the application is an entirely new one, this obviously cannot be done and programs must be written or acquired from other sources. If the other source is our competition we are probably in trouble.

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Because of programs that exercise a specific feature that no application could ever exercise. We have seen, for example, a tiny COBOL program that several thousand times opened a file for output, wrote a record, and closed the file. The more unsophisticated a file system is, the faster this program would run, and might have run orders of magnitude faster on competitive systems. Any program used in a benchmark should be a realistic production program, rather than an artificial construction.

On the other side of the coin are problems with large volumes of production programs. The greater the volume of programs, the greater the conversion effort to make the code run on our machine and the greater the advantage of the incumbent vendor. Insist that we be given enough time to convert the programs properly.

Some prospects insist that the vendors change only what is necessary to make the programs run, and explicitly forbid making changes that suit the programs to the environment on the vendor's machine. These requirements should be strongly resisted since they give the incumbent vendor an unfair advantage.

RTE BENCHMARKS:

Most benchmarks will require emulation of timesharing users on a Remote Terminal Emulator (RTE). This complicates the benchmark and the risk of misinterpretation of results grows. On the other hand RTE benchmarks give us an opportunity to show what Digital systems do best. A high level of cooperation with the customer is essential.

Almost all RTE benchmarks will place an unrealistically high load on the System Under Test (SUT), mainly because the prospect underestimates the time a typical terminal user will spend thinking, and overestimates the rate at which characters will be input.

On TOPS-20 we have a script generating program that will record a terminal session including the think times between interactions. This program may be used to provide a realistic script.

If several vendors are to run the emulation you must ensure that the combined type in and think times are the same for all vendors. No comparisons will be meaningful unless this is required. A typical example of this common problem is a benchmark (again a real one) where the timesharing script is intended to provide a load against which a batch stream is run. The thing being measured was the turnaround time for the batch stream. Vendors with verbose command languages requiring many commands to complete the script had an advantage over vendors with sophisticated, more concise command languages.

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It is essential for the field specialist working with the prospect to have a copy of the SIM-11 Users Guide. Used as a reference, this guide can help the specialist avoid requirements beyond the capability of our RTE. REPORT is a more sophisticated RTE reporting program than SIMRED. Upon request I will mail you documentatin on REPORT's reporting capabilities. I also have documentation on SCRIPT, the TOPS-20 script generating and testing program.

Often a prospect will compare vendors' timesharing performance by comparing the average response times reported for a session by the RTE reporting programs. This number is absolutely useless as a comparative measure across vendors. Even different systems from the same vendors will show widely differing average response times. The following example will illustrate this problem.

The test is to compile, link and run a small COBOL program:

TOPS-20	Response
Execute FOO	
COBOL: FOO [FOO CBL]	1 second
LINK: loading	
LINKXCT FOO executing	
EXIT	
\$COBOL FOO	
\$LINK FOO	10 seconds
\$RUN FOO	3 seconds
\$	2 seconds

We are obviously measuring different things, therefore reponse comparison would be meaningless. A meaningful comparison between these two examples would measure the time passed between the first command and the end of execution, assuming that the think & type times for the VMS LINK and RUN commands are negligible.

The point is that we must understand what is being measured and compared in order to do well in the benchmark. Flexibility in the interpretation of a benchmark is useless unless we understand how we can use this flexibility to our advantage.

PREPARING THE BENCHMARK:

When we have a complete benchmark specification we should determine:

- a) Are we able to run the benchmark?
 - 1) at all
 - 2) in the given timeframe
 - 3) with the people resources available

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- b) Have we access to the hardware configuration to be benchmarked?
- c) Have we have the software needed for the benchmark? Our policy is that all software must be provided by the customer or be standard Digital software. This does not preclude benchmarks using third party software, but the prospect must sign the license, not Digital. Most software houses will be happy to provide their software to a prospect for evaluation. Digital cannot accept responsibility for the performance and reliability of non-Digital software. In the section about acceptance tests there is a further discussion of third party software.
- d) Does the probability of winning the business justify the expense of running the benchmark?

This checkpointing effort requires a high level of cooperation between the field and the Technical Support Group. The entire benchmark should be scheduled and the division of responsibilities should be agreed upon in order to avoid a wrong level of expectations from either party.

The Technical Support Group (TSG) will schedule computer time, disk packs, tapes and software based upon an agreed amount of resources required. The TSG has a great deal of experience in estimating resource requirements and will prevent undue optimism on the part of the field. The TSG will also be anxious to reduce waste of resources that we must pay for - so expect to have a detailed description of the benchmark requirements at this time.

CONVERSION:

If programs and data are to be converted, the conversion must be done either on a system in the field or on a timesharing system in the home office. Stand alone time is much too expensive to be used in this phase.

Even though the TSG has a lot of experience in conversions, we cannot undertake the responsibility for the conversion. We are happy to provide assistance to field specialists.

TUNING:

When all programs are converted, the time has come to tune and run a dress rehearsal of the benchmark. We usually plan to spend a week in this phase. If the benchmark is very complicated we allow an even longer time.

A full dress rehearsal of a customer-witnessed benchmark must be run before the customer departs from home. A prospect arriving at the home office of a computer vendor expects to see a smoothly run benchmark, not a frantic last-minute effort to make it work.

Always arrange an entertaining program of presentations, plant tours, etc. Such program prevent boredom of the prospect & nervousness of the benchmarkers, as well as offering opportunities to smoothly reschedule around unforeseen disasters. Set up these programs with the Customer Visit Coordinator.

Avoid running the benchmark at night. The prospect may associate the unpleasantness of fatigue with the quality of the benchmark.

RUNNING THE BENCHMARK:

Begin with a presentation explaining what the prospect is about to see. This presentation eliminates the embarrassment of having the customer suddenly declare in the middle of the benchmark that we have not run it as specified.

If the prospect wants to do some work on a terminal while the benchmark is running, you should insist on making two runs: a reproducible one without the load of the extra terminal, and another run with the terminal, preferably without reporting these results.

Oppose any changes in how the benchmark should be run. In only the fewest of cases can one predict the effect of changes. Most benchmarks are very finely tuned and consequently highly sensitive to any form of change.

If the bid system does not perform perfectly under the benchmark load, it is advantageous to rerun the benchmark on a configuration that will run it well. Even though that configuration has not been bid, the prospect can see the system's potential. In several cases such a strategy has won sales for us.

When the benchmark has been run you should save all programs, data, and output from the benchmark. The former for eventual reruns, the last in case the prospect loses the result data (it has happened).

FOLLOW-UP WORK:

Help the prospect analyze the results and, if in doubt, consult the TSG for any advice. Try to gather competitive data in this phase. Often exact data is difficult to obtain, but relative data can be gathered from statements like "vendor xxxx ran the batch faster than you did." Any competitive data obtained should be reported back to the TSG. We need feedback not only from the sales we have won but, more importantly, from the ones we have lost. This information can help us win the winnable sales and pull out early from the unwinnable.

RERUNS:

We are occasionally asked to rerun a benchmark. Do not underestimate the work involved. The longer the time between the original run and the rerun, the greater the difficulty of reproducing the results. Even if no part of the benchmark is changed, changes in software and hardware can greatly affect the benchmarking environment. If the benchmark has been changed, the rerun will usually require as much work as the original run required.

We can usually avoid reruns by following the rules outlined in this document.

ACCEPTANCE TEST:

Many prospects will require that the benchmark be rerun as part of the acceptance test to prove that the delivered equipment is indeed equal in performance to the benchmarked equipment.

We cannot rerun RTE benchmarks in the field because of the complex hardware and software requirements. If the benchmark must be rerun, we should have it run in two parts: one part that is run with batch to be used as an acceptance test, and another part to demonstrate the system's timesharing capabilities, using an RTE.

If live terminals were used during the benchmark it is obviously non-productive and cannot be used as an acceptance test.

Other requirements or restrictions we must place on such an acceptance test are:

- a) The software must be identical to the software benchmarked. New releases behave differently and may make the system unacceptable even if it performs better overall.
- b) Customers must accept results reproduced within a 10% margin. Subtle differences, disk allocation for example, may easily affect the results severely.
- c) If any single run falls within the 10% margin, the system shall be accepted. A failing run shall not lead to a non-acceptance but shall lead to a new try.
- d) Digital may modify the hardware or software in any way that may lead to an acceptable run, as long as the modifications are delivered free of charge and supported by Digital.

KL SERVICE ENHANCEMENT PROJECT

Art O'Donnell
LS Maintainability Eng.
MR1-1/S35

Background

The KL Service Enhancement Project (KLSEP) was initiated by John Leng and Jack Shields in January of 1978. The major objective of the project was to increase customer satisfaction by improving our KL-based Systems' reliability and maintainability. The three factors identified as being the major contributors to potential customer dissatisfaction were: intermittent failures, process problems, and management issues.

During the KL's first three years in the field, its rate of intermittent failures (or "intermittents") was far beyond that which had been anticipated. The KL contains extensive error checking and detection logic (which the KA and KI do not have). In fact, its error detection capabilities are still superior to many newly released competitive products. These error detection capabilities, however, were not initially supported by comparable recovery and fault isolation mechanisms. The imbalance between the ability to detect failures, and the ability to recover from or isolate the cause of these failures considerably magnified the negative effect of intermittents on systems availability.

Both hardware and software's difficulty in leaving adequate foot prints (or other clues) for Software or Field Service Engineers to use in isolating problems meant that our service organizations had to expend manpower resources, (which were scarce in number), trying to glean an additional clue out of each occurrence. Intermittents were fixed by a lengthy trial and error process of elimination - which was disruptive to customers' operations, and was damaging to field morale as well.

The impact of intermittents was further heightened by internal process problems, among them: manufacturing quality problems in backplane wiring; field service spares, errors in (or lack of) adequate technical documentation; ineffective training; and an inability to grow the field level of expertise at the rate needed to efficiently maintain KL's.

KLSEP to the Rescue

The resolution of these issues was spread across and would require the involvement and support of the entire Large Systems Development Group, as well as that of Manufacturing and Customer Services. As part of the KLSEP project, each department reviewed their area of responsibilities, and made constructive recommendations for improvements.

These inputs formed the basis for the specific projects committed for implementation under KLSEP program. The departments involved were: Hardware Engineering, Software Engineering, Manufacturing, Logistics, Diagnostic Engineering, Technical Documentation, Educational Services, Software Services, Sales, Product Management, and Field Service.

Improvements in KL Ramp Performance

A major share of serviceability improvements which software and hardware engineering committed to this program have already been implemented via TOPS-10, version 7.01 and TOPS-20, version 4.0 and via Field Change Orders contained in KL revision 12/4. Continued improvements in systems availability attests to the positive impact of these improvements, as noted below:

KL Availability

	<u>Q1/78</u>	<u>Q2/81</u>
DECsystem-10s	95.8	97.9
DECSYSTEM-20s	94.4	98.1

Crash Rate

	<u>Q1/78</u>	<u>Q2/81</u>
DECsystem-10s	6.2	2.5
DECSYSTEM-20s	5.4	1.5

We have seen better than 2% increase in KL system availability since the inception of the program. If we assume that one hour of customer computer time is worth \$1,000 and assume an average system usage of 100 hours per week, then the annual savings to our customers equals \$104,000!

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Dollar Value of Availability

Average Systems Usage	100 hours per week
Weeks per Year	X 52
Annual Systems Usage	5200 hours per year
Increased % Availability	.02
Annual Increased Productive Hours	104 hours per year
Cost per hour of Computer	1000.00 dollars
Annual Productivity Savings	104,000 dollars per year

Customer Satisfaction

This estimate of the dollar value of systems availability is fairly conservative. However, it serves to illustrate the potential financial benefits our customers are receiving as a result of KL's improved ramp performance.

In a recent Data Pro survey of large systems users, DIGITAL finished #1, when 92% of the customers presently using DECsystem-10s and -20s recommended the purchase of their system again.

The information contained in this article was presented at DECUS in November 1980 at San Diego. At that time, customers expressed their agreement and high degree of satisfaction with the significant improvements they had experienced in their system's ramp performance. We are extremely pleased with the positive benefits we have seen so far, and expect a continued improvement in the ramp profile as additional features are delivered.

DBMS ON LARGE SYSTEMS

Hal Berenson
MR1-2/S43
DTN: 231-5506

With the introduction of DBMS-10 in 1973, Digital became one of the first computer vendors to offer a CODASYL-compliant data base management system. Since that initial release, we have introduced a native-mode version for the DECSYSTEM-20, provided simultaneous access capability, added a journaling/recovery facility, introduced the concept of data base transactions and reduced memory and run-time requirements. Work is currently under way to improve performance, reduce journal disk requirements and to make DBMS-10/20 easier to use.

DBMS-10/20 is based on the 1971 report of the CODASYL Data Base Task Group. This report forms the basis of the current work aimed at creating an ANSI data base standard. Other vendors offering CODASYL-based DBMS include Honeywell, Prime, and Univac. A version for IBM mainframes is available from Cullinane Corporation. Data General recently introduced a version for the Eclipse family. DBMS-10/20 is competitive with and in many ways superior to these offerings.

DBMS-10/20 is the perfect base upon which to build production-oriented applications. It is well suited to organizing and maintaining large amounts of complexly related data with great reliability and integrity. Applications in which we have had great success include order processing, bill of materials processing, inventory control, personnel/payroll systems, customer/member records, student registration/scheduling, patient records and financial applications such as accounts receivable and general ledger. These and other applications are being used by a variety of organizations including electronics and other manufacturers, chemical companies, universities, non-profit organizations, banks, insurance companies, DOD contractors and hospitals.

DBMS-10/20 can be used with COBOL, FORTRAN and IQL. It complements the sequential, relative, and ISAM capabilities of these products. Utilizing DBMS-10/20, a user can create multi-key ISAM-like structures, gain very fast keyed access to specific records and directly represent the relationships between different record types. DBMS-10/20's journaling and

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recovery facility can be used to insure data integrity, a facility not currently available with data management facilities such as ISAM. DBMS-10/20 data definition is centralized resulting in lower program maintenance costs and increased administrative control. Finally, facilities are provided within DBMS-10/20 to allow the tuning of applications for maximum performance.

Data Base Management Systems are playing an increasingly important role in data processing. They are available from all major vendors and are becoming popular on computer systems from micros through mainframes. The large number of vendors offering CODASYL based DBMS products has led to its acceptance as a de facto industry standard and virtually assured it will become an ANSI standard. DBMS-10/20 is a superior CODASYL DBMS which when combined with the capabilities of TOPS-10 or TOPS-20 and our other layered software yields an attractive solution to almost any application problem.

DBMS-10/20 is a layered software system which provides a complete solution to data management problems. It is designed to be used in conjunction with TOPS-10 or TOPS-20. The system consists of several layers of software, including a data definition language, a query language, and a data manipulation language. The data definition language is used to define the structure of the data base, including tables, fields, and relationships. The query language is used to retrieve data from the data base, and the data manipulation language is used to insert, update, and delete data. DBMS-10/20 also includes a variety of other features, such as backup and recovery facilities, security, and performance tuning. The system is designed to be easy to use and to integrate with other software systems. It is a complete solution to data management problems, and it is the only system of its kind.

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BUY-LINE APPLICATION

NAME:

MAIL STOP:

BADGE #:

COST CENTER:

DEPT:

OFFICE LOC:

- Please add my name to the BUY-LINE mailing list.
- Please retain my name on the BUY-LINE mailing list.
- Please delete my name from the mailing list.

My responsibility is in:

- LCG Sales
- LCG Marketing
- LCG Service
- Another product line or corporate function

Please detach and mail to Barbara Holtz, MR1-2/E78. Thank you.

FIRST EDITION APPLICATION

NAME:

BADGE #:

COST CENTER:

DIGITAL MAIL ADDRESS:

DTN Telephone:

Job Title:

What is your 10/20 sales responsibility?

Sales Unit Manager Approval:

(Printed Name)

(Signature)

TO: BARBARA HOLTZ

MR1-2/E78

ATTN: TERI STOKES

MR1-2/E78

CAD and the PCB

Rogert Pothier and
Charlie Hall
LCG Design Services
MR1-2/E74

Hidden away in the labyrinth of DIGITAL's Marlboro Mass. plant is the Printed Circuit Design Lab. Established and operated by the Large Systems Design Services group, the Lab is also known as the CAD (Computer Aided Design) Room.

Walk down Building MR1-2's endless corridor toward the cafeteria, and you could almost pass by the Lab entirely. (We've taken care to protect it from traffic.) If you happen to take a look through the demo window into a work area with subdued blue lighting you'll see someone at one of seven work stations, using a light pen, and keyboard, with a VS60 CRT.

The Lab is a combination of "secret" and "famous".
What is going on in there????

We commissioned the design and equipment of the CAD room for the development and design of high-density printed circuit boards (PCBs) and integrated circuits (chips or ICs). They will be used in DIGITAL's high-performance 32- and 36-bit machines. Currently, we use DECsystem-10s and -20s for: layout analysis and the physical design for multi-layer modules and backpanels, and for PCB drawings and logic.

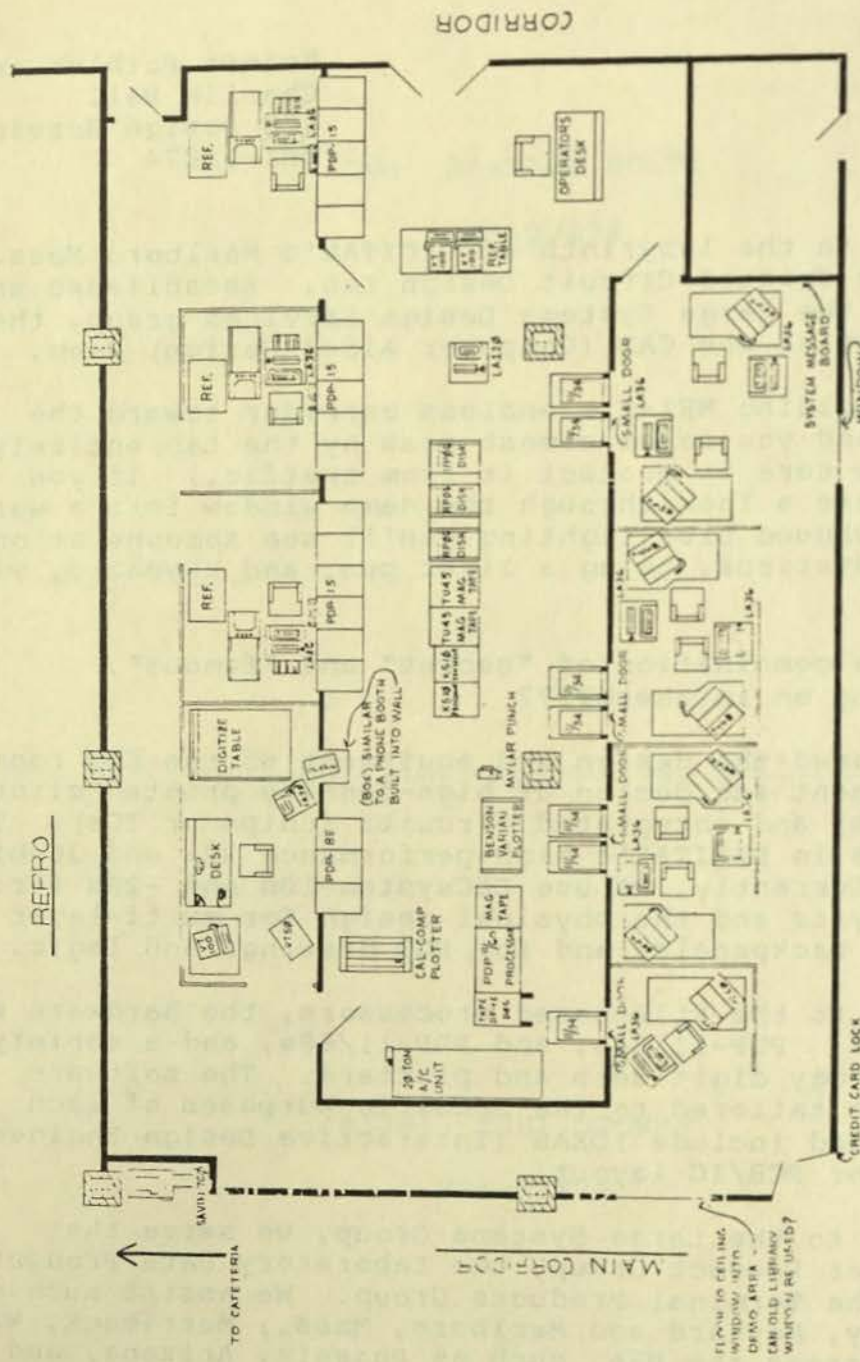
In addition to the KL10-based processors, the hardware we use includes: PDP-11/34s, and PDP-11/60s, and a variety of high-technology digitizers and plotters. The software programs are tailored to the specific purposes of each processor, and include IDEAS (Interactive Design Engineering Analysis) for PCB/IC layout.

In addition to the Large Systems Group, we serve the Microcomputer Product Group, the Laboratory Data Products Group, and the Terminal Products Group. We assist such sites as Tewksbury, Maynard and Marlboro, Mass.; Merrimack, N.H.; and sites across the USA, such as Phoenix, Arizona, and Colorado Spring, Colorado.

About a year ago, we were working in a huge open production space, surrounded by noisy equipment, computer checkout area, cartons, and people always coming and going. We knew that our personnel needed a more humanly-engineered work environment - an enclosed room with no glare on their CRT's, no distracting equipment noise, no temperature

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PRINTED CIRCUIT DESIGN LAB: FLOOR PLAN



REVISED & REDRAWN BY: [Signature] 11-10-64

SCALE: 1" = 4'

CORRIDOR
CORRIDOR
CONCEPTUAL LAYOUT
CALDEC IDEAS LAB

extremes (which often exist to suit equipment requirements).

To be productive in high precision work of this sort, you need a quiet environment with no interruptions. After all, PCB design is extremely delicate and exacting work. To interrupt someone who is doing logic design on a PCB is like tapping Bobby Fischer on the shoulder in the middle of a chess tournament to ask him if he'd like a glass of water!

We decided to create the optimal environment which was needed, and which would enhance our designers' work, not interrupt or inhibit it. The beauty of this is that our entire staff had a say-so as to their desired environment: lighting without screen glare, padded insulation, and other related ambient conditions. We also had the full support of top management.

The result was an ingenious arrangement: an "outer-belt" (the work station areas) surrounding the "inner" room (the central equipment area). Note the floor plan accompanying this article.

An even better result is that we have far more productivity than ever before: lower fatigue, better ambient conditions, no traffic or noise patterns which interrupt designers' train of thought in this precision work. And - better yet - our people have pride in their work environment! This PCB Lab represents Distributed Data Processing at its very best.

The following excerpts are from an article which appeared in the Jan. 26 '81 issue of "Computerworld", a U.S. weekly trade publication.

PACKAGES CITED FOR KEEPING GOP CAMPAIGN OUT OF RED



-by-
Marguerite Zientara
CW Staff

Washington, D.C. - The wealthy Republican National Committee (RNC) and Reagan-Bush Committee attributed their considerable success in financial management during the 1980 presidential campaign largely to a set of modified software packages.

"Officials from the RNC's Computer Services Division began searching for an accounting package early in 1979 when the committee expanded its computer operations by purchasing a Digital Equipment Corp. 2040 computer," recalled Marcus Heth, director of systems/software for the Division.

Recognizing the need for a package that was "efficient, economical and which could be used on a timesharing basis," the officials "conducted a thorough investigation of the systems currently available."

That investigation resulted in choosing the accounts payable and general ledger packages offered by Timesharing Consultants, Inc. (TCI) of Tucson, Ariz. (TCI is a five-year-old service bureau and OEM that specializes in Digital Equipment Corp.'s hardware and software.) The choice was based on four basic criteria:

1. TCI's software met the stringent audit and reporting standards required by today's political environment.
2. The modular packages could be easily modified to meet specialized needs, such as a special reporting function required by the Federal Election Commission.
3. Both packages were designed on and for the DECSYSTEM-20.
4. The systems were easy to learn and operate, so the RNC could quickly and efficiently train a large number of operational and clerical personnel, "crucial because of the short, fixed time schedule placed on the RNC by the election," Heth observed.

During the election campaign, the RNC, with TCI's help, modified TCI's standard accounts payable and general ledger packages, followed by a testing period.

The RNC began its installation process in early June 1980. In late July, after Gov. Reagan's nomination, both the RNC and the Reagan-Bush Committee were utilizing both packages.

"Usually TCI sets its installation time for one package to be utilized by an organization at three months," Heth reported, "but in this case, the RNC and TCI were able to modify and install two packages for use by two organizations in two months. Remarkably, the system has yet to produce a major error."

The RNC utilized the software through terminals linked directly to the 2040 here, while the Reagan-Bush Committee used remote terminals and auxiliary printers placed in their offices in nearby Arlington, Va.

Check Processing

From late July to the end of the campaign accounting cycle in early December, the system produced approximately 200 checks per day, totalling around \$29 million, for the Reagan-Bush Committee.

At the same time, it produced for the RNC another 200 checks per day, totalling approximately \$30 million. The system also produced daily accounts payable and general ledger reports, some containing as many as 2,000 pages.

"For all that processing, the system never output an incorrect check or an out-of-balance report," Heth claimed.

A major portion of the system's success may be attributed to the administrative guidelines and techniques provided by TCI. These guidelines focus on the control and auditability of the data base, as well as on the ease of backup and recovery.

Based on the success of the two systems, the RNC now plans to purchase TCI's payroll package,

January 26, 1981



DECSYSTEM-2040 AT THE REPUBLICAN NATIONAL COMMITTEE
HEADQUARTERS PLAYS MULTIPLE ROLES IN ELECTIONS

Marcia Donaldson
CSI Mktg. Comm.
MK1-2/N38

Inauguration Day 1981 is the last milestone in the long process necessary to place an individual in the White House. If you were surprised by the early hour at which this particular U.S. Presidential election was called, it can be partially attributed to the technology of the computer age in which we live.

Computer technology has been closely involved with presidential election campaigns for years. Elections today take time, hard work, strategy and commitment on a monumental scale. And, as each election year goes by, political campaign committees as well as the news media are getting smarter and smarter in computer-assisted work.

The Republican National Committee (RNC) headquarters in Washington, D.C., and the Democratic National Committee (DNC) headquarters use computers more extensively than ever. While the DNC uses computers via a timesharing bureau, the RNC has one of its own. A year and a half ago, they began

to investigate purchasing a computer system, one that was highly interactive, with large memory capability, and one that could support a potentially large number of users. The decision was made to buy a DECSYSTEM-2040 from DIGITAL.

The 2040 was initially put to work developing REPNET, a data base on which the RNC staff could build a contribution tracking system for state parties, as well as a tool to use for party mailings. From this point they developed a capability to maintain Republican National Committee financial accounts by tracking funding within individual state campaigns - with a specific view toward Federal Election Committee reporting.

Another major use of the 2040 is in tabulating results from voter surveys to develop demographic data. On the state and congressional levels, the 2040 is used to collect precinct election returns, currently consisting of approximately 175,000 precincts.

The 2040 was also used before and during the Republican National Convention to coordinate reservations and housing for convention attendees as well as to maintain an up-to-date list of delegates and alternates. Once the convention was over, the RNC staff developed further uses of the 2040 to assist the Reagan presidential campaign in tracking major events nationwide, thereby enabling them to schedule campaign appointments and stopovers. Because one candidate cannot be in all key places at one time, the 2040 scheduled and tracked all of Reagan's spokespeople. The 2040 is also used to maintain an up-to-date list of the party's network of volunteers.

A good deal of time and money is used by both parties today to develop advertising campaigns. The RNC staff used the 2040 to research Areas of Dominating Influence (ADI), the results of which assisted them to target areas for print and television advertising.

An interesting sidelight of this year's presidential election was that each candidate frequently quoted the other, some statements having originated several years prior to the 1980 campaign. The 2040 was used to develop a "publication quote finder" into which the staff logged Democratic candidate quotes by key words and subject.

The Republican National Committee staff plans to tie in state committee headquarters with their 2040; six committee headquarters are currently on the system. Jon Adams, CSI sales representative for the RNC account, is developing a proposal for small systems to be placed among the state Republican committees.

During the closing hectic days of this presidential campaign, DIGITAL's site manager Dan Coburn was responsible for maintaining the peak operating efficiency of the DECSYSTEM-2040.

DNA/SNA - AN ANALYSIS

Dick Hill
CSI Marketing Programs
MK1-2/K34

ABSTRACT

SNA provides centralized control and distributed access. It is costly in terms of human resources, computer resources and dollars. It is fairly inflexible and hard to use for the professional manager. SNA should win when the application or data resides completely on the host, and when the only communication desired is to provide access to those applications. DNA provides local control, distributed access and distributed processing. It is adaptable, flexible and easy to use both in terms of the programmer and the end user requirements.

DNA provides the tools and capabilities required to meet the needs of the customers to solve their business problems. DNA strongly facilitates interdepartment communication while Digital's systems supporting DNA strongly facilitate professional specialization. In almost all situations, the best solution would be to have both DNA and SNA cooperating to solve the problems. Let SNA do what it does best: provide distributed access to applications, and let DNA do what it does best: provide distributed processing; then, use both to effectively solve the business problems in question.

The buzzword filling every computer magazine, seminar, symposium and discussion is "Distributed Processing." The definitions of this concept are as varied as the background and experience of those talking about it. Underlying the Distributed Processing concept is equally misunderstood technology: Communications and Networks.

Two successful network architecture philosophies are DNA (Digital Network Architecture) and SNA (Systems Network Architecture). Each has advantages and disadvantages which can be related to the distributed processing market space through the use of a marketing model.

DNA and SNA are not direct competitors. However, the alternative architectures often overlap in customer purchase decisions. Each architecture is designed to attack separate and distinct computer system implementation problems. To understand the major differences, the history of the products and the companies that produced them can be examined.

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SNA is a product of IBM's Data Processing Division. When marketing its mainframes, IBM has always espoused economies of scale. They have produced application and system software to take advantage of the mainframe environment. This software is complex and often not compatible across a wide range of products. For example, to move from a System 3 (a DECSYSTEM-2020 class machine) to a 370/158 (a DECSYSTEM-2040 class machine) requires a significant software conversion for IBM customers, both in application software and terminal handling. IBM in particular has been a follower rather than a leader in the ability to "connect" terminals to applications.

In the high capacity, high efficiency batch mainframe environment which IBM pioneered, terminals are not wonderful devices. They do not fit well into the spooling, "number crunching" philosophy of the mainframe. In early implementations, terminals were essentially "tied" or dedicated to specific applications. When the user wanted access to two different applications, two terminals were required. To achieve some measure of efficiency from an operations standpoint, IBM then created an architecture to allow a terminal to access several applications.

The primary design objective of SNA, then, is to allow terminals to get at an application regardless of the mainframe on which the application is running--a dramatic step forward. As a by-product, SNA has the capability of task-to-task communication, but this communication always must be passed through a mainframe which acts as a network master. In addition, the task-to-task communication is performed in a master/slave relationship, with one of the tasks acting as a terminal and the other as the master application.

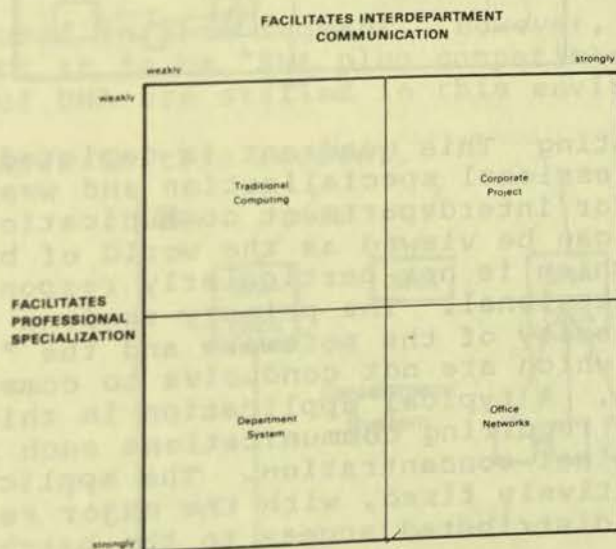
DNA, on the other hand, is provided by Digital Equipment Corporation, and Digital builds interactive computers. Digital has traditionally stressed ease of use, local control, and cost effectiveness in its products and as part of marketing strategy. Digital has built hardware, applications software and systems software to meet the needs of the individual using the computer. Terminals have always been a way of life for Digital users, and the software necessary to provide terminal access methods and communication control are integral to the various operating systems supplied. Digital also has perceived the need for different applications to communicate easily with each other, regardless of the supporting configuration, operating system, or system network topology. The primary design goal of DNA is to allow easy, cost-effective, flexible communications among two or more computer systems in a cooperative network, while allowing each system to maintain local control.

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This points to the primary differences between DNA, and SNA, which allows users to distribute access (i.e., terminals) to applications while maintaining central control. DNA allows users to distribute the processing (i.e., computers) while allowing local control. SNA can provide distributed processing capabilities, but they are "grafted" onto the architecture--not an integral part of it. This overall capability is also limited to mainframes, i.e., any system which contains an SSCP (System Services Control Point) such as IBM's 3033, 4300, etc. DNA has the capability of distributed access as an integral part of the architecture, but not as the primary element of the architecture. This situation is similar to what happened when IBM imposed timesharing on their batch system and when Digital integrated batch into a timesharing environment. DNA is the more general architecture in that it is easier and more straightforward to add terminal handling to DNA than it is to add process to process communication SNA.

In the following discussion, it is assumed that the user has a combination of IBM's and Digital's equipment, and that they must be considered together. If there is a possibility of a total Digital solution (such that TOPS-10/20 or VAX/VMS can be used as the "mainframe" system), much of the discussion changes. It can change to the point that DNA is clearly the best alternative.

Figure 1, a marketing segmentation model, can be used to examine the specific advantages/disadvantages of various communication approaches.



The model represents a two-dimensional space of varying degrees of dependence on interdepartment communication and varying levels of the need to support professional specialization. For the purposes of this document, each of the four quadrants is viewed as separate and distinct. For example, Traditional Computing is viewed as weak with respect to support of professional specialization and weak with respect to the need for interdepartment communication. Clearly, the market space is a continuum, but for the purposes of understanding, the model provides a convenient tool. A more complete discussion of the model can be obtained from CSI Marketing. Each of the four "quadrants" will be explored from an interconnect or communications viewpoint.

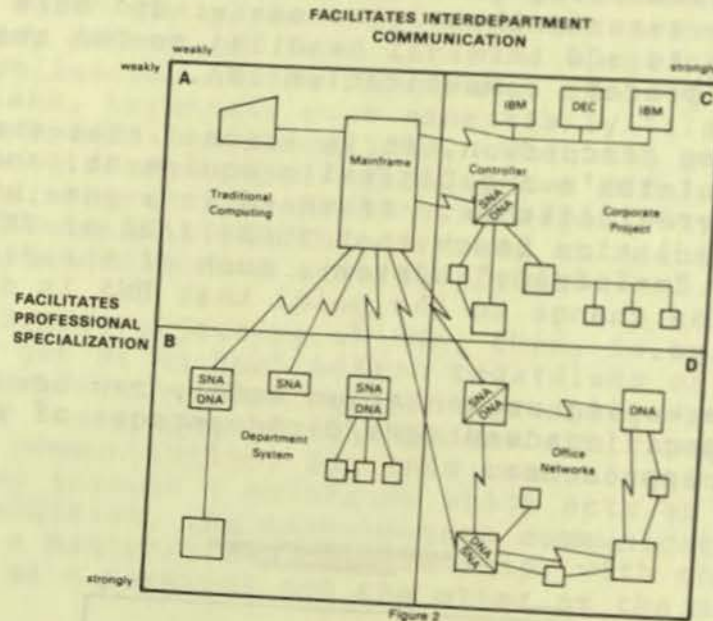
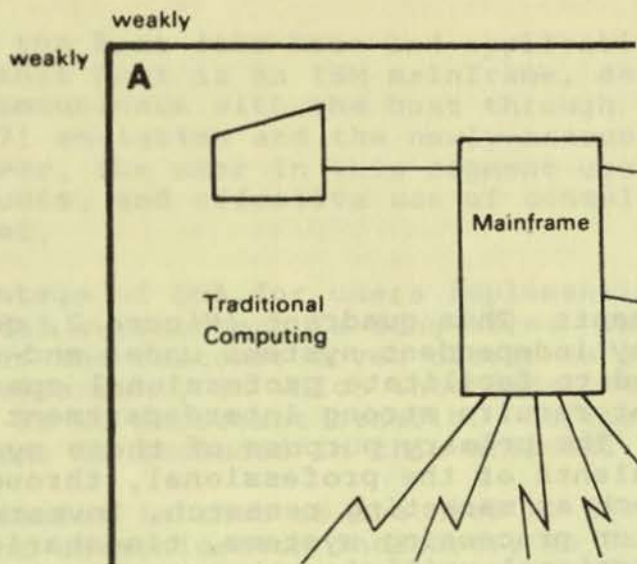


Figure 2

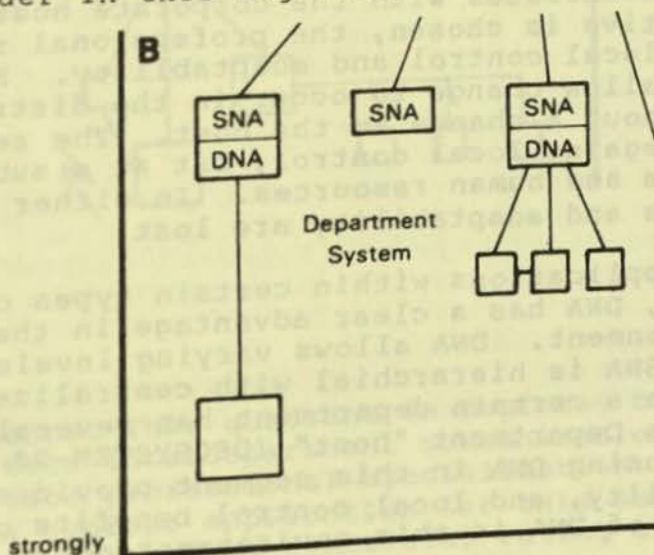
Traditional Computing This quadrant is depicted as weakly facilitating professional specialization and weakly supporting need for interdepartment communication (Figure 2, quadrant A). It can be viewed as the world of batch production, one which is not particularly responsive to the needs of the professional. The primary reasons for this include the complexity of the software and the "aloofness" of the environment, which are not conducive to communication among departments. A typical application in this environment might be payroll, requiring communications such as remote job entry and/or terminal concentration. The applications are standard and relatively fixed, with the major requirement being to provide distributed access to the batch host.



SNA performs very well in this environment. After all, this is the environment in which SNA had its beginnings. SNA has the advantages of centralized control and distributed access. It resides on a large host and directs network activity.

DNA could be used in this segment. However, the user would probably expect it to be "SNA plug compatible." The capabilities of DNA are stifled in this environment.

SNA is the leader in this segment.



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Department Segments This quadrant (Figure 2, quadrant B) is characterized by independent systems under end-user control. The system, used to facilitate professional specialization, usually does not require strong interdepartment communication. The primary purpose of these systems is to leverage the talents of the professional, through applications such as marketing research, investment analysis, small transaction processing systems, timesharing systems, etc. The professional utilizing the system requires local control so the system can be responsive to his needs. In addition, the professional may not have data processing experience or training, so the system must provide solutions as well as tools that are easy to use. Besides being easy to use, the complex applications must be easy to change and modify, to adapt to changing user needs. At the same time, the user may require access to a corporate data base and accompanying applications to integrate and analyze data not available locally.

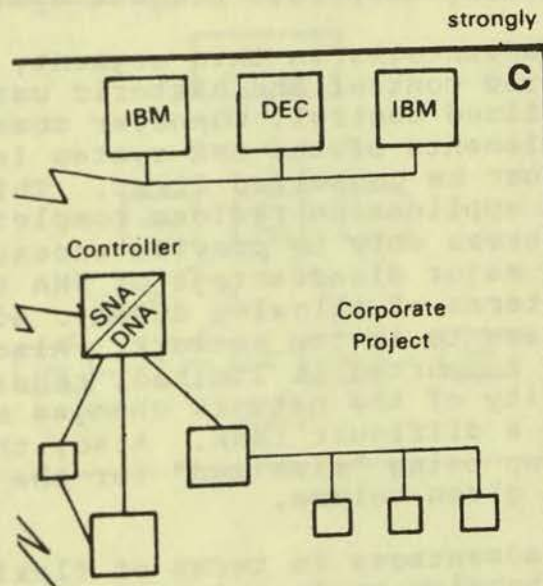
SNA has an advantage with respect to providing access to the corporate data base and mainframe applications because the mainframe on which they exist is assumed to utilize SNA already. The disadvantages of SNA become apparent when the needs for ease of use, local control and adaptability to change are examined, i.e. facilitating professional specialization. With SNA, the department system is either a portion of the corporate host or the professional maintains a host which communicates with the corporate host. If the first alternative is chosen, the professional relinquishes ease of use, local control and adaptability. For example, SNA does not allow change to occur in the distributed locations without a change in the host. The second alternative regains local control, but at a substantial cost in both system and human resources. In either case, response to local needs and adaptability are lost.

In specific applications within certain types of organizations, DNA has a clear advantage in the Departmental Systems environment. DNA allows varying levels and degrees of autonomy; SNA is hierarchical with centralized control. In the case where a certain department has several systems connected to a Department "host" (DECSYSTEM-20 or VAX-11/780), using DNA in this segment provides the ease of use, adaptability, and local control benefits of DNA. The disadvantages of DNA in this environment occur in the need to

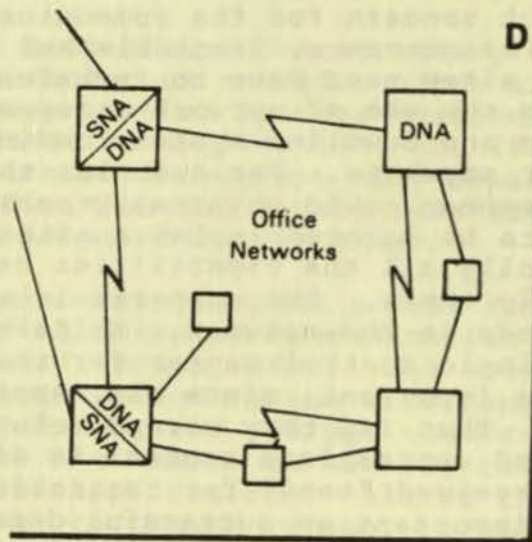
interact with the host data base and applications. It is assumed that this host is an IBM mainframe, and tools are provided to communicate with the host through 2780/3780 emulation, 3271 emulation and the newly-announced RSX-11M SNA/PE. However, the user in this segment usually requires end-user products, and effective use of consulting services may be required.

The real advantage of DNA for users implementing systems in the Departmental environment is long-term. DNA capabilities are critical as the customer moves closer to the distributed processing environment, in which interdepartment communication is an important benefit. Further discussion of this environment is included in this article.

Another observation is that as the need to facilitate interdepartment communication increases, so do the advantages of DNA and DNA becomes the clear segment leader. As the need to facilitate professional specialization increases, it is not DNA or SNA that offers a clear distinction but rather a feature of the systems themselves. The interactive systems which Digital pioneered and the ease of use of those systems become paramount.



Corporate Projects. This quadrant is depicted by a strong need to facilitate interdepartment communication but a weak need to facilitate professional specialization (Figure 2, quadrant C). A typical application for this segment would be insurance claim processing, commercial rating and writing,



Office Networks. This quadrant is depicted by a strong need for interdepartment communication and a strong need for facilitating professional specialization (Figure 2, quadrant D). Applications in this environment are perhaps less utilized, at the present time, than those of previously discussed segments. This segment is the world of distributed processing. The typical environment would consist of dispersed, largely autonomous department systems, interconnected to share information. The units would each perform their own development, procurement, maintenance, operations, etc. This is a strong area for future emphasis.

The example applications range from consolidation of various groups within a particular department to a consortium of independent banks. Future applications might include any combination of word processing, electronic mail, data processing, and information processing as well as the need to interface copiers, FAX, video, etc. The requirements include the ease of use, interactivensess, local control and adaptability of the department system segment and the wide range of system capacity, the wide array of communication tools of the corporate project segment. In addition, there is a definite requirement for flexible interconnectability.

SNA has no major advantages in this environment. The SNA disadvantages include the requirement for central control. SNA is a hierarchical network architecture that requiring host cooperation in all applications in an environment that requires local control, peer connectability, and

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communication. Today, SNA does not allow communication to occur between two separate elements of the network unless one of the elements is a host, or there exists an application in the host with which each of the elements communicate.

DNA performs best in this market segment. The local control, the range of systems and ease of use, all respond to the needs of this environment. DNA is designed to provide communication between two or more totally independent systems. In addition, DNA provides better interconnectability given that some of the systems may be neither Digital's nor IBM's gear.

DNA is the clear leader in this market segment.

There is another case that is not addressed when each of the market segments are discussed separately and uniquely. That is the view of the model as a whole. Perhaps this is the area that best demonstrates the major advantages of DNA over SNA. Taken as a whole, the model shows a continuum of varying degrees of interdepartment communication and professional utilization. Due to internal and external forces, such as technology, legislation, new management, etc. the system may move from one segment to another. As this change occurs, the system and application requirements change.

DNA has the advantage of providing the adaptability and general interconnectability dictated by these forces. The flexibility and adaptability of the architecture and the ease of use and general interconnectability of the implementations of that architecture are all major reasons for selecting DNA with an eye to the future.

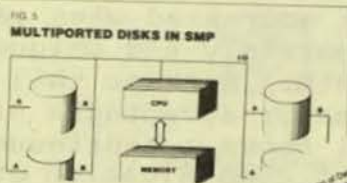
DATAMATION SMP REPRINT

Peggy Sullivan
LDP Marketing Comm.
MR2-4/M16

A feature of SMP is that it permits I/O load balancing.

SMP is administratively simpler and more economical than multiple independent systems or loosely coupled microprocessors.

is integrated from the beginning of the development.
Then, because of the so-called cache implementation, a job usually may continue to execute on a particular job. However, if a job is interrupted, it will be scheduled to run on a different processor. When a job is interrupted, it will be scheduled to run on a different processor. When a job is interrupted, it will be scheduled to run on a different processor.



one aspect is that a job may look for work as the result of a finished job that is scheduled to run on a different processor. While looking for work, the processor will check the status of the job and then schedule it to run on a different processor.

and the system can still process other jobs. With a disk, the processor will check the status of the job and then schedule it to run on a different processor. While looking for work, the processor will check the status of the job and then schedule it to run on a different processor.

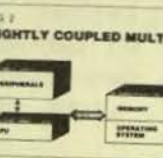
job and more economic than multiple independent systems or loosely coupled microprocessors. No matter how varied a multiple system of the operating system, the processing software system does not, in keeping software systems, control or multi-processor systems, particularly the user community among systems, and instead had following are all available.

ALLAN B. WILSON
Mr. Wilson is currently responsible for managing the



Symmetrical multiprocessing gives large-scale computer power at a lower cost and with higher availability.

MORE POWER TO YOU
by Allan B. Wilson



Master-Slave Setup
The master processor is responsible for scheduling and controlling the slave processors. The slave processors execute the instructions received from the master processor.

...the system can still process other jobs. With a disk, the processor will check the status of the job and then schedule it to run on a different processor. While looking for work, the processor will check the status of the job and then schedule it to run on a different processor.



Reprints of Allan Wilson's article on SMP are now available from Northboro Printing & Circulation Services. The order number is EJN055 730.

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Symmetrical Multiprocessing on the DECsystem-10 *

Allan B. Wilson
LDP Product Line
MR2-3/M91

Multiprocessing is a computer organization in which multiple central processing units (CPUs) are interconnected. Just as more memory, disks, and other peripherals can be added to a system to provide additional storage and input/output (I/O) resources, multiprocessing uses additional CPU's to provide more computing resources.

A multiprocessing solution can be used to satisfy different system design goals. Multiple CPU's are used on spacecraft to provide high availability. If one or more CPU's fail, system hardware and software assure continued system operation. Other multiprocessing design projects underway seek to provide large-computer power by using many interconnected micro or minicomputer CPU's. The basic idea is that one can obtain a minicomputer relatively inexpensively that is, say, one tenth the speed of a large-scale "number cruncher". Ten of these minis (presumably still cheaper than the big number cruncher) with suitable hardware and software will give large-scale computer power, but at a lower cost and with higher availability (if one of the ten minis goes down, the remaining nine continue working while the tenth is being repaired; thus the system is still available with only small degradation in service).

Another reason for multiprocessing is that it offers uniprocessor sites a means of obtaining more CPU power with little hardware or software investment. The additional CPU(s) will be of the same type as the existing CPU, so hardware and software compatibility are assured. Also hardware maintenance is not compromised: site engineers need no additional training to deal with the new CPU, and system spares are the same.

Certainly one option a site with a uniprocessor system has is to acquire another independent system, that is, one with its own CPU, memory, and peripherals. Again, maintenance engineers need no additional training and spares are the same; however, there are economic inefficiencies resulting from multiple copies of the operating system, supporting software, system disks, etc. The system is also more difficult to administer. The user community must be partitioned between the two systems, so manual load balancing is necessary, and both systems must be kept current with software updates (did bug X get fixed on both systems?). Additional operators may be required.

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The rest of this document is divided into two main sections. The first describes general multiprocessing organizations, then summarizes TOPS-10's former multiprocessing offering and its potential deficiencies, and the new TOPS-10 multiprocessing system developed to address those deficiencies. The second section deals with implementation considerations and features in the new multiprocessing system.

* Editor's Note: This article was written by Allen Wilson, for publication in DATAMATION.

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SECTION I - Multiprocessing

Types of Multiprocessing

There are two generic multiprocessing organizations: loosely-coupled and tightly-coupled. Loosely-coupled multiprocessing connects two or more individual systems by means of a communication link. Each system is capable of independent processing, but supports the link to allow at least file-system access, and perhaps task interchange for a form of load balancing. File-system access would provide not only a file transfer mechanism among systems, but more generally would allow a task on one system to open a file on another system. File I/O would be transparent to the task so that records going to/from a file on another system would be passed across the link instead of requiring direct file I/O on the task's CPU and peripherals. It is certainly desirable that system software be able to support various types and speeds of links so that the most appropriate for particular operating environments can be selected.

A tightly-coupled multiprocessor organization has a single shared memory and a single copy of the operating system and supporting software.

Master/Slave Multiprocessing

Digital has offered a tightly-coupled multiprocessing system since 1971 under the TOPS-10 operating system, and has made it available on all DECsystem-10 family models. The DECsystem-1099 uses Digital's latest large-scale CPU (the KL-10 in Digital nomenclature) with a Master/Slave multiprocessing architecture.

In Master/Slave, the Master is the general-purpose CPU: it does both computation and all system I/O. The Slave has no I/O devices except a console terminal and therefore is present only for computation.

In TOPS-10 Master/Slave organization, the Slave does not take orders from the Master. Both CPUs execute the TOPS-10 scheduling routines looking for jobs to run; there is code to prevent both CPUs from selecting the same job. The Slave differs from the Master when the job it is running makes a monitor call for some system service, typically I/O. Except for some non-I/O monitor calls, the Slave cannot proceed. It simply marks the job as needing the Master's attention, enters the scheduler, and selects another job to run. The Master, in the meantime, is working on other jobs, and when it schedules again it will find and run jobs marked as "run-on-Master" by

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the Slave. Thus the Slave is a slave by virtue of the fact that it simply cannot perform all system duties and relies on the Master for many services.

In terms of performance, the Master/Slave organization can be very successful, especially if there are plenty of compute-bound jobs it can work on: as long as jobs do no Master-only monitor calls, the Slave can continue to run them. Availability of peripheral switches contributes to the utility of Master/Slave. If the Slave fails, only some some CPU power is lost; if the Master fails, devices can be switched and the former Slave reloaded as Master.

Three generations of DECsystem-10 processors have supported Master/Slave multiprocessing. Each new family member offered a two- to three-fold increase in CPU speed over its predecessor. Meanwhile, the speed of I/O devices (being essentially mechanically limited) remained relatively constant. The result of running a set of jobs on a faster CPU with approximately the same speed I/O devices as on a slower CPU, is that the new system tends to be more I/O bound. For example, if a program does I/O every 10,000 instructions, a faster CPU will execute the 10,000 instructions much more quickly and reach the I/O requests sooner than a slower CPU. Thus the faster CPU spends a larger percentage of its time waiting for I/O. This phenomenon means that job mixes well-suited to Master/Slave multiprocessing on older CPU's are not necessarily well balanced on later CPU models. Thus, the definitions of "compute-bound" and "I/O-bound" change with introduction of faster CPU's, and since Master/Slave efficiency depends on having adequate "compute-bound" jobs in the mix to work on, Master/Slave may or may not be satisfactory when existing customers upgrade to newer CPU's, or when vendor or user software characteristics tend to make software I/O-bound.

Master/Slave offers some degree of high availability and, depending on workload, good performance; however, Master/Slave's approach to high availability is often insufficient by today's standards of availability, and performance that depends on workload can result in user dissatisfaction. The underlying basis for Master/Slave deficiencies is system architectural asymmetry, i.e., that CPU's are not functionally equivalent--only the Master can do both computation and I/O.

Symmetrical Multiprocessing

Eliminating Master/Slave restrictions by extending full functional capabilities to all CPU's has been the goal of TOPS-10's new Symmetrical Multiprocessing (SMP) organization. SMP hardware configurations are quite similar to Master/Slave configurations, except that with SMP, I/O devices can be

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connected to both CPUs. Memory is still shared between processors and there is still a single copy of TOPS-10. With SMP, however, the entire monitor is reentrant and all monitor calls can be executed on all CPUs. (While the SMP release officially supports only two processors, the SMP software has been designed and written to support up to six. We are anxious to configure hardware to do analysis of multiprocessor systems with more than two CPUs.)

Because monitor calls can be executed by any CPU, a CPU can continue to run a job even if the job requests I/O on devices that are connected to a different CPU in the system. A queued I/O protocol has been developed to implement this capability.

In SMP, the CPU running a job is called the executing CPU; the CPU which is connected to devices used by the job is called the owning CPU. If a job requests I/O to devices on the executing CPU, the request is processed straightforwardly, simply putting it in that CPU's I/O queues. If a job requires devices on a different CPU, then a request is made by the executing CPU that will cause the owning CPU to queue the request for action. Once the request is made, the executing CPU can complete the monitor call and resume the job, relying on the owning CPU to deal with the I/O transfer(s). Context-switching overhead is much reduced in this organization; in Master/Slave each I/O request on the Slave requires a context-switch to the Master. (Context-switching is the action of stopping execution of the currently executing job, appropriately saving its status ("context") for later execution, scheduling to select another job to run, and setting up and starting the new job. Context-switching can take from several microseconds to several milliseconds, depending on hardware characteristics, scheduler design and implementation, and amount of context to save/restore.)

Note that SMP scheduling, both CPUs executing the scheduling routines to find jobs to run, will typically result in the same job being run at different times by different CPU's throughout the course of its processing. The queued I/O protocol ensures that I/O requests are handled properly regardless of which CPU executes a job or where the job's files and devices are physically located in the system.

This scheduling technique of multiple CPUs working on a single queue of jobs is efficient. Queueing theory shows that multiple servers working from a single queue give better response than multiple servers and multiple queues, which would be the case in a loosely-coupled multiprocessing organization or with multiple independent systems, where each CPU has its own operating system and thus its own scheduler and scheduler queue. Therefore, SMP offers automatic and dynamic load balancing, which neither of the other multi-CPU approaches provides.

Another feature of SMP permits I/O load balancing.

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Another feature of SMP permits I/O load balancing. Multiported disks can have dual port access by a single CPU (also supported by TOPS-10's Master/Slave system) or by two different CPU's. Load balancing is thus dynamic and automatic on dual-ported disks and yields higher availability and throughput.

EDITOR'S NOTE: Section II SMP Implementation will be in the September/October issue of Buy-Line.

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(Editor's Note: This is Section II of Alan Wilson's SMP article published in June Datamation. Section I appeared in July/August Buy-Line.)

SECTION II - SMP Implementation

Scheduling

Scheduling in a multiprocessor system provides additional flexibility over a single-CPU system. While details of the TOPS-10 scheduler are not necessary to understand the scheduling implications in SMP, a simplified description is useful. Basically, the TOPS-10 scheduler runs both periodically, driven by a clock, and when the currently executing job is finished or temporarily unable to continue (waiting for I/O completion, for example). In selecting the next job, TOPS-10 gives designated jobs and interactive work higher priority to use the CPU than "normal priority" and compute-bound work. TOPS-10 attempts to run high priority and interactive jobs when they request the CPU; other jobs are run in the "background". Optionally, the system administrator can partition background jobs into classes, and allocate percentages of CPU time to individual classes.

Currently in SMP, one CPU processes work using these priorities. The other CPU, however, looks for background work first, and will process such jobs as long as they are available; designated high-priority jobs and interactive jobs are serviced by this CPU only if there is no background work to do. This "asymmetric scheduling" has the basic effect that one CPU works on interactive jobs, while the other runs compute-bound jobs. If there are sufficient compute-bound jobs in the mix, the second CPU processes them with little context-switching overhead even if there is also a heavy interactive load. The disadvantage is that if the mix is predominantly interactive, the second CPU wastes time looking for compute-bound work before it gets to the interactive jobs.

It is possible in SMP that the system administrator will be given the option of dynamically specifying symmetric scheduling or asymmetric scheduling to reflect current operating demands. Alternatively it has been considered to have the system alter scheduling itself, based on mix characteristics.

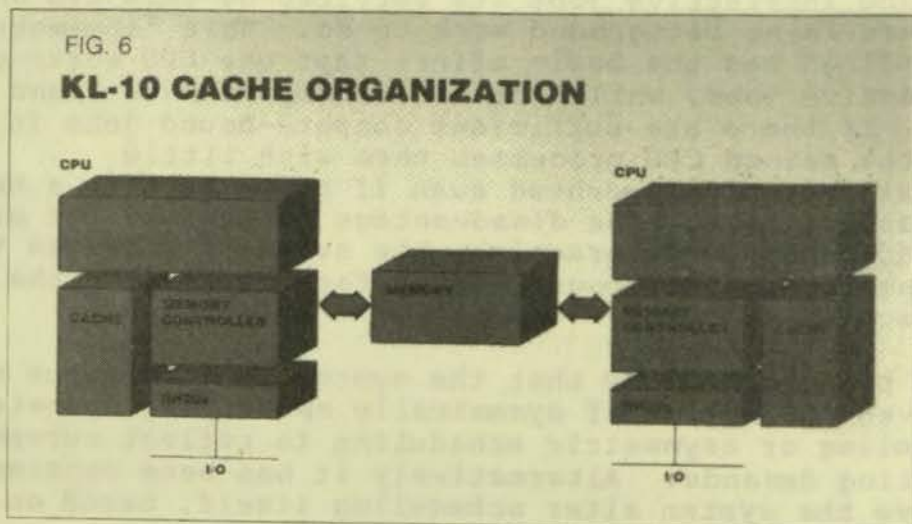
An important aspect of scheduling in a multiprocessor environment is inter-CPU interference. For example, if both CP's enter the scheduling routines simultaneously they can compete for accesses to instructions and data, and, even more significantly, cause each other to wait for various interlocks (such as the one to prevent CPUs from selecting the same job to run). While studies show that most scheduling is done as a result of jobs blocking for I/O or other events, and not because of periodic timer interrupts, SMP skews the clocks on all CPUs to ensure that their clock interrupts occur at different times. Each CPU gets the same frequency of timer interrupts, but none occur at the same time as interrupts on other CPUs. Thus CPU clocks in SMP are intentionally skewed to prevent periodic simultaneous scheduling and attendant overhead.

Queued-I/O

While it has nothing to do with scheduling, the periodic timer interrupts which cause a CPU to run the scheduler are also the occasions on which the CPU scans a global queued-I/O request queue to see if there is I/O the CPU needs to perform for jobs run on other CPUs. The requests are removed from the global queue and placed on a CPU-local queue for processing. Any jobs waiting for the requested I/O to finish are marked as runnable when a transfer completes. Thereafter, the job can be run by any available CPU in the system.

Cache and Cache Management

A hardware characteristic of the KL-10 deserves comment regarding its performance and availability implications in SMP. Figure 6 is a simplified diagram of multiple KL-10 CPUs with emphasis on the memory controller and cache memory.



The memory controller portion of the KL-10 coordinates memory access requests from the CPU and from peripheral devices such as disks and magnetic tapes connected via internal channels/controllers (RH20's). The cache is a high-speed semiconductor memory of 2048 words that serves as a buffer for primary memory. Read references to primary memory by the CPU result in the memory controller checking to see if the referenced words are in the cache. If so, the memory controller supplies the CPU with the data directly from the cache; this results in very rapid effective memory access times, because the (5 or 6 times) slower primary memory need not be accessed.

If the requested data is not in the cache, the memory controller gets the data from primary memory, supplies them to the CPU, and places them in the cache, where they will be found on subsequent references. (Actually, accesses to primary memory and cache-fills are done in "quad-words", such that the referenced word and three adjacent words are fetched; thus speed of sequential accesses to instructions and data is improved by preloading cache locations.)

Memory write operations are done only in the cache (not in both cache and primary memory as in a write-through cache organization). The CPU has instructions to explicitly validate memory with updated cache contents ("sweep the cache"); memory validation is automatic if the memory controller needs in-use cache locations for new data. The memory controller also deals with memory accesses by the internal channel/controllers and will supply updated data from the cache on "write-from-memory" (output) transfers.

Typical program characteristics and system operation result in using data in the cache 90-95% of the time, thus improving effective primary memory access times and thereby increasing effective CPU speed. Equally important is that 90-95% of CPU primary memory references are avoided, which reduces contention for primary memory substantially, and so eliminates many of the memory interference problems inherent in other multiprocessor implementations.

While the KL-10 cache organization is efficient with respect to primary memory accesses and improved CPU speeds, it does cause two problems. The first, and certainly most significant, is that when a CPU runs a job or does anything which causes job data to be modified in its cache, the CPU must sweep its cache to validate primary memory before another CPU can run the same job. Otherwise the new CPU could use "stale" data in primary memory because updated values would be in the other CPU's cache. The new CPU cannot recognize the data as stale, and thus would not be working with the job's proper context. Such operation is incorrect and can result in very subtle bugs which are difficult to track down.

The second problem is important for availability reasons. It may be the case that a CPU has modified data in its cache for several different jobs before a sweep completes. If the CPU suffers a failure before the sweep completes, other system CPUs cannot select any of these jobs since they are unrunnable with respect to cache. Therefore these jobs are effectively lost and can not and will not be continued by remaining CPU's. The jobs must be manually restarted from the beginning or the last checkpoint.

Thus, because of the KL-10 cache implementation, a CPU failure may cause from zero to several jobs to be lost. Nevertheless, losing a few jobs would still be preferable to losing 80 to 100 jobs as would be the case if a loosely-coupled or completely independent system CPU failed. So, a CPU failure in SMP, while possibly causing loss of some jobs, fares better than a CPU failure in any other system configuration.

A cache-sweep-serial-number scheme is used to keep track of primary memory currency with respect to cache. Every time a CPU completes a sweep of its cache, it increments its cache sweep serial number. When a job is stopped or requests I/O, the current CPU and cache sweep serial numbers are saved. TOPS-10 can tell if a cache sweep has completed for a job by comparing the current cache sweep serial number for the CPU with the saved value. If the current cache-sweep-serial-number for the CPU is greater than the saved value, at least one sweep (and a single one is sufficient) has completed. Thus the system can safely manipulate the job, knowing that primary memory is up-to-date.

If during a CPU's scheduling cycle, jobs are available to run but cannot be run because cache has not been swept for them yet, the scheduling CPU keeps track of this "cache lost time" as a CPU operational statistic. High cache lost time is bad, because it means that a CPU is available to run jobs but has to remain idle since jobs are unrunnable with respect to cache. To minimize cache lost time, a CPU can request that another CPU sweep its cache, thereby updating primary memory with cache data from jobs the other CPU has processed. Every major scheduling cycle, each CPU honors any sweep requests from other CPUs (one sweep suffices for all requests). To further reduce cache lost time, if a CPU selects a job to run and is context-switching from another job, it starts a cache sweep so that the "old" job will become runnable with respect to cache on other CPUs when the sweep completes (about 250 microseconds later).

The KL-10 cache implementation does permit cache to be enabled or disabled for each page in memory. This facility allows the monitor to "uncache", i.e., selectively disable cache for, pages containing certain monitor data for which sweeps would be impractical. Terminal I/O buffers and CPU cache sweep serial numbers are examples of data stored in uncached pages. Accesses to such data are relatively infrequent, so no large CPU speed or primary memory access penalties are incurred.

Inter-CPU Communication

CPUs in SMP communicate continually since a single copy of TOPS-10 is shared among all CPUs. Accessing and modifying global values such as job status information is a common form of communication. Reading another CPU's cache sweep serial number is a typical example of one CPU needing specific information about another CPU. However, there is no CPU hardware such as a "doorbell" for one CPU to interrupt another CPU or get its attention. The design and implementation of SMP revealed that for scheduling or cache management no such doorbell is necessary. In fact, a hardware doorbell would only be useful during emergencies ("I'm dying" or "get out of my way").

Rather than implement a hardware doorbell, a software doorbell was chosen for SMP. The basic mechanism allows a CPU to ring another CPU's doorbell, or the doorbells of all other CPUs, on a "significant event", such as cache sweep done (jobs may have become runnable with respect to cache), I/O done (job is runnable because I/O request has been satisfied), and queued-I/O request made (I/O to do for job run on another CPU).

A CPU has to "listen" for a doorbell; a doorbell will not interrupt or otherwise disturb a CPU. Currently, the only time a CPU pays attention to doorbells is when it is idle, that is, when it has scheduled, found nothing to do, and runs the "null job" until something happens to make work available.

This software doorbell implementation is good in that a CPU is not taken away from useful work with interruptions. A negative aspect is that a CPU may look for work to do as the result of a doorbell yet find nothing to do. While looking for work to do, it holds interlocks and increases memory contention, and thereby possibly interferes with other CPUs that do have work to do.

Networks and Communications

Route-through and multipathing extend the utility and availability of SMP systems. Route-through means that intermediate nodes pass along data destined for other nodes in the network; multipathing allows alternate paths to destination nodes such that a failure in one path does not prevent the arrival of messages through an alternate path (transparent to users). Computer-to-computer networks and remote job entry (RJE) stations with optional terminal concentration capability are standard products on the DECsystem-10, and the ability to support route-through and multipathing offer topological flexibility and high availability.

Availability

Redundancy, or duplication of critical components, increases availability by providing additional units to handle a particular function should one unit fail; the failing unit can be repaired while the backup units assume the workload. The Master/Slave system provides CPU redundancy but requires additional operator action for switching and reloading after certain failures.

SMP has better inherent availability than Master/Slave. In SMP, all devices can be duplicated and placed on all CPUs. Thus any device in an SMP system can fail ("single point failure") and the system can still provide all critical functions and services. With dual-ported disks, failure of a CPU, channel, controller, or disk port will not prevent the system from accessing the database through the other path. Such operation is automatic and the operator is simply notified of the failure so corrective maintenance can be scheduled.

Memory parity errors are rare, but will be automatically retried up to three times per word. A hard error, that is, an access unsuccessful on all retries, causes the associated job to be stopped and an error message issued to the user if the access is to a private page. A hard error in a shared page causes the system to get a new copy from the disk area used for shared pages and continue automatically. Parity errors within the monitor itself are also handled. If the situation warrants it, TOPS-10 moves itself into better memory.

Provisions are planned for SMP to allow the operator to change the hardware configuration dynamically, without uncertainty and mistakes. (Reconfiguration means physically changing the hardware configuration, such as when hardware fails and needs to be taken out of the system for maintenance, or has been repaired and can be used again; mounting and dismounting tapes and disks are normal, expected activities and do not require unusual procedures.) SMP will provide a reconfiguration dialog with the operator and a "system sleep". The dialog allows the operator to specify what changes should be made to the configuration. When he is satisfied with the specification, the system will suspend all activity in an orderly fashion and write a copy of itself to disk. Then it "sleeps", waiting for the operator to reconfigure the system--adding or removing peripherals,

CPU, memory, etc. The sleep is desirable because switching hardware on and off can adversely affect the system, especially if something is done incorrectly (like switching two boxes of memory so that they have conflicting physical memory addresses). Once everything is ready the system wakes up and verifies that the new configuration corresponds to the operator's previous specifications. If so, the system proceeds with normal operation, using the copy of itself from disk. If not, the operator is notified of the problem(s) and the system goes back to sleep. The wake-up sleep cycle is repeated until the operator sets everything up correctly.

TOPS-10 logs all system errors and failures so that the system administrator and maintenance personnel have a history of system operation and can detect trends. Components configured into and out of the system are also logged.

The summary below covers the total project.

Summary

Digital's SMP project was undertaken with the intention of achieving several major goals. Growth potential is a key requirement for most users, and is particularly attractive if complete hardware and software compatibility with installed equipment is available. SMP offers such growth potential plus increased capacity over the formerly available multiprocessor architecture. Extra capacity can be used to provide service to additional users or better service to existing users.

High availability is especially critical for a primarily interactive system such as the DECsystem-10. With 150 to 200 general purpose timesharing users such as SMP systems support, failure is very noticeable. In batch systems with fairly long turnaround times, users may be completely unaware of system failures; however, when users depend on regular interaction with a system, they are very sensitive to interruptions of service. Finally, SMP provides administrative simplicity and economy over multiple independent systems or loosely-coupled multiprocessors.

There are no resources wasted in duplication such as multiple copies of the operating system, supporting software, system disk areas, etc. Keeping software versions current on multiple systems, partitioning the user community among systems, and manual load balancing are all avoided.

There are other features and improvements done during the SMP development; however, the elements covered here are the key points of the new Symmetrical Multiprocessing project.

DIGITAL's LAW DEPARTMENT and SALES-RELATED ISSUES

Barbara Holtz
LS Mktg. Comm.
MR1-2/E78

DIGITAL's Law Department has an important role in supporting the Corporate philosophy, which stresses consistent maintenance of ethical standards. According to portions of this philosophy, DIGITAL employees should always take care to: properly identify our products; make statements which set customer expectations; not oversell our products. In short, every department, manager, and employee should strive to be honest and forthright in all dealings.

Whenever any kinds of problems occur which could give rise to litigation, the Law Department looks at them, examining legal and related legislative issues. It then investigates any potential risks or liabilities to the corporation involving these issues - within the context of the ethical standards we are known to maintain.

I had a conversation recently with John Gunther, Counsel for DIGITAL's Technical Products Groups, who pointed out some of the Law Department's areas of potential concern regarding sales and marketing related activity.

Confidential Information

Whether or not information is considered classified, confidentiality is a function of the nature of the information, and in some instances is a function of timing. It is therefore inappropriate to publish information about corporate earnings or about new products under development and testing until a public announcement is made. More importantly, certain types of highly sensitive information (such as customer lists, manufacturing processes, certain organizational charts, etc.) should never be published for outside use. If published for internal use, this information should have a controlled distribution.

In John's opinion, it is inadvisable to publicly distribute charts showing lower level organizational structure; the only charts to publish should be Ken Olsen's (Operations Committee), and his direct reports.

BUY-LINE cannot go to print until it has been "signed off", not only by its editorial and production staff, and by various contributors and product managers, but also by the Law Department and by the Editorial Review Board as well.

COMPANY CONFIDENTIAL

There are several reasons for BUY-LINE's confidential nature, the chief ones being protection of corporate proprietary information, and protection of our installed customer base. If in a sales profile you are identifying a new sale, or new client, you are mentioning potentially sensitive facts, such as: client name/location; product configuration; current and future applications; winning strategy, etc. In application stories, you are usually repeating statements which customers have made about our equipment and systems; while we always urge that you clear these articles with the customers prior to printing, there is always the chance that your text comprises comments which clients would prefer not to have publicized.

According to Gunther, sales personnel are asked to observe a certain fidelity toward their customers as well as toward our Corporation. DIGITAL views this interaction as a fiduciary relationship. Sales persons should have a basic ethical sense about what they are doing. On the whole, John said, the sales force is very good about this.

Because of BUY-LINE's perforated pages, it is easy to detach articles and insert them into 3-ring notebooks; and it's certainly easy enough to distribute some of these pages after photocopying them. Yet we urge you not to do so for some of the above-mentioned reasons.

John cited the "seductive" smokescreen effect, by which a sales representative may tear off a few sheets of BUY-LINE from a company confidential publication to give "something special" to the customer. "Think of it on the flip-side: If you show a confidential document to a client, or to a potential client, how does that client know you're not giving away his information?"

Libel, Fraud, and Misrepresentation

Libel is defined as the malicious written publication of statements or pictures which could injure the reputation of a person or corporation. "Malice" may arise from ill-will or from gross negligence in failing to ascertain the truth about statements made. Statements could be construed as derogatory about: competitors, customers, former employees, former suppliers, distributors, and persons with whom DIGITAL is in litigation.

Fraud and misrepresentation could very likely occur in advertising or in sales materials by means of statements which are known to be intentionally deceitful, or statements which are unintentionally false. If there was no reasonable basis for making the statement, or if steps were not taken

to ascertain the truth before making the statement, then there may be negligence for which the company is liable. Statements about a DIGITAL product should always be approved by the responsible product line.

Customer Retaliation

"The Wall Street Journal" has written several articles about an embittered customer who not only sued Burroughs for about \$2 M (based on fraud, deceit, malfunctioning product, etc.) but also published an ad in that newspaper to initiate a class action suit involving tens of others disgruntled users.

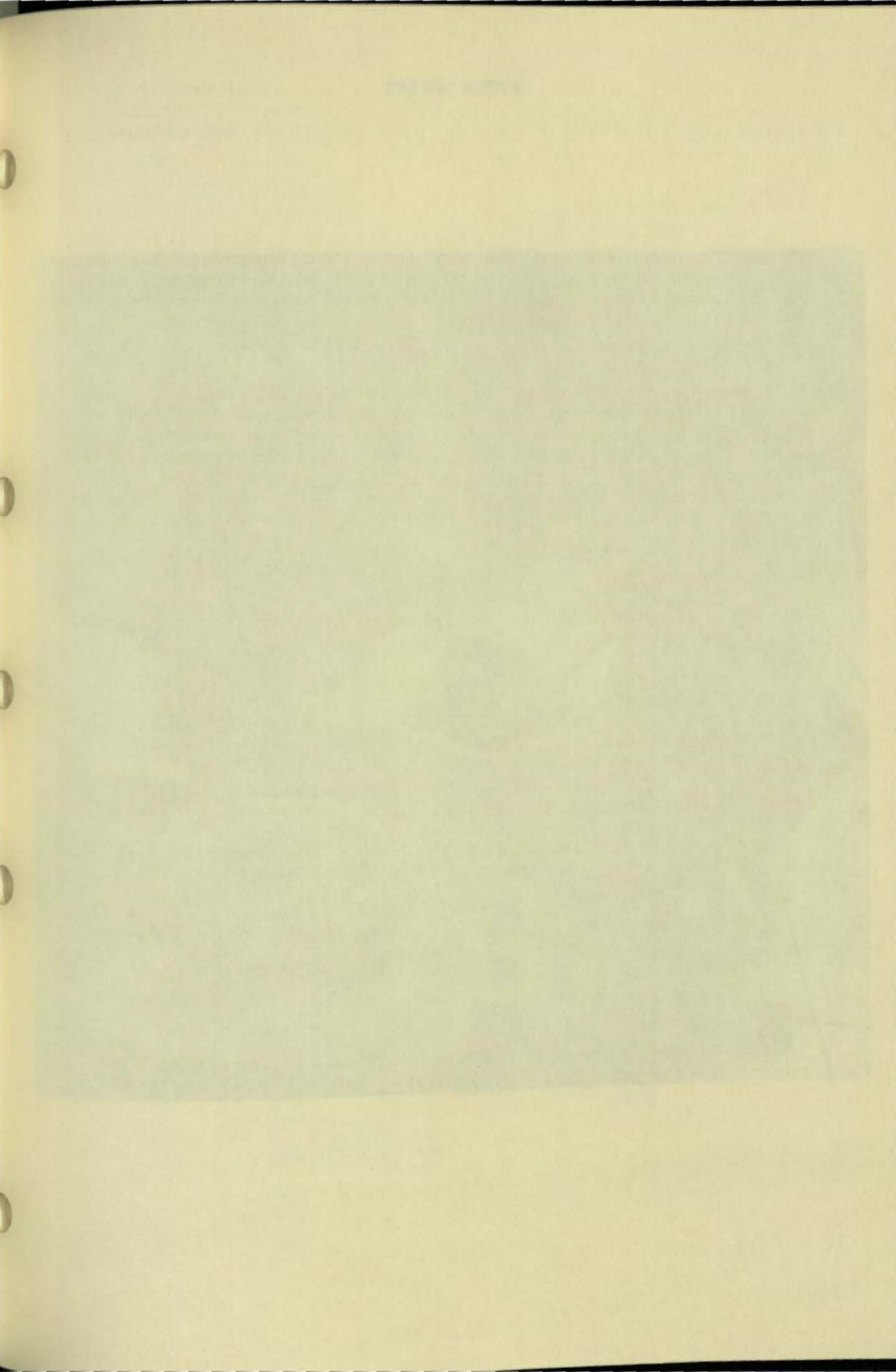
Ed Schwartz, DIGITAL Law Department's VP and Legal Counsel, circulated a memo on this recently because he felt that there are good lessons to be learned on "how people should address both the quality issues of bringing a product to the marketplace, and the method by which sales into the marketplace are effected... We must observe these lessons in order to keep DIGITAL from having to tread similar quicksand."

Among some of the cited lessons are:

- * a disgruntled customer can create enormous problems, if not handled correctly
- * a customer's complaint should not be taken lightly
- * the press can be used by an irate customer against the seller
- * our sales statements must be clear and accurate regarding products and in customer expectations
- * our product test results, both in engineering and in manufacturing, should be simple, accurate, and uniform
- * products should not be announced prematurely without a proven record of performance

To be Continued

In the May-June BUY-LINE, John will cover topics such as patents, trade marks, disclaimers, copyrights, and trade regulations.



... whenever the truth before making the statement, then
... the company is liable.
... should always be approved
... perfect type.

Customer Satisfaction

"The Wall Street Journal" has written several articles about
... not only good for the customer but also
... malfunctioning product, would
... to initiate a
... of others' disgruntled
... .

of Edward G. DODD, law department's VP and Legal Counsel,
... because he felt that
... how people should
... bringing a product to the
... which into the
... . We must observe these lessons
... to avoid having to tread similar
... .

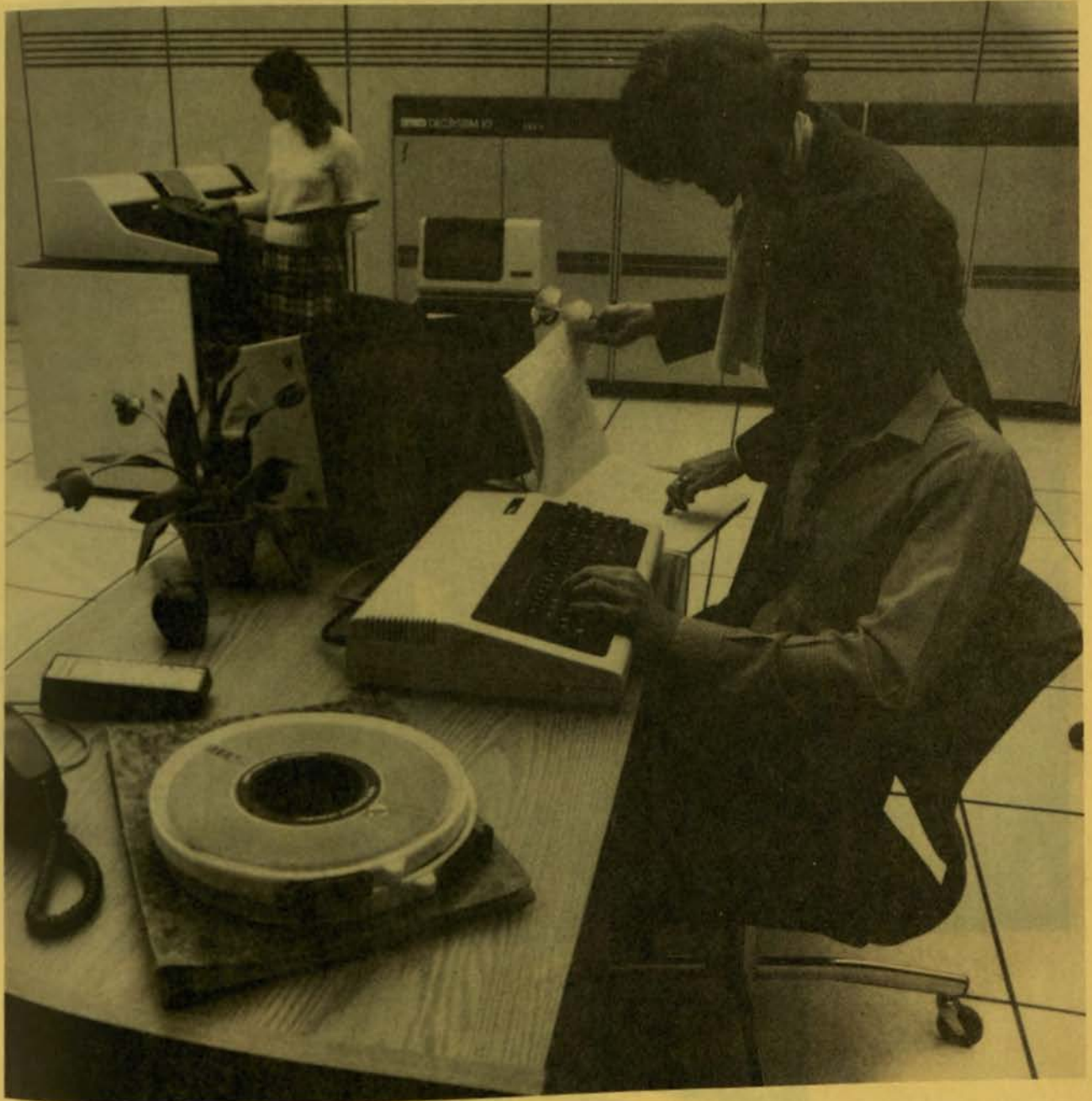
Among other things, the cited lessons are:

- * a disgruntled customer can create serious problems, if not handled correctly
- * a customer's complaint should not be taken lightly
- * the press can be used by an irate customer against the seller
- * our sales literature must be clear and accurate regarding products and in customer expectations
- * our product test results, both in engineering and in manufacturing, should be simple, accurate, and uniform
- * products should not be announced prematurely without a proper record of performance

Legal Considerations

... will cover topics such as
... , copyrights, and trade
... .

SALES NOTES



CONFIDENTIAL



THREE DECsystem-1091s at BAC (BOEING AEROSPACE CO.), Seattle

Ron Quarles (GSG)
Boeing Sales Rep
SE (Seattle office)

SALES REPS

Jim Miller (1978) and Ron
Quarles (1980)

SOFTWARE SPECIALIST

Chris Marshall

SALES OFFICE

Seattle, Washington

SALES HISTORY

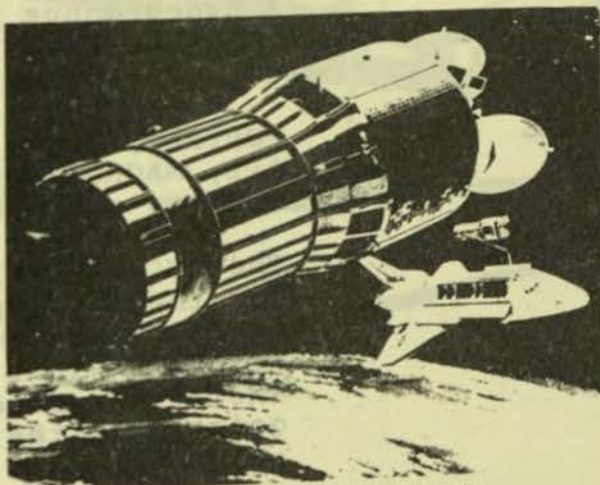
The first 1091 - in fact the
very first one which DIGITAL
shipped - was sold by Jim
Miller in January 1978; we will
refer to it as "System A".

The second 1091 ("System B")
was purchased by BAC in June
1979.

Ron Quarles sold the third 1091
("System C") to BAC in March
1980.

GENERAL APPLICATION

All three DECsystem-1091s are
engaged in developing in-flight
software, in-flight simulation



Boeing's rocket motor system and Space Shuttle

COMPANY CONFIDENTIAL

models and the associated documentation for the IUS (Inertial Upper Stage) program, which crucially affects the country's entire space program.

The 1091 host performs simulations of the two on-board flight computers in the flight environment. Operating in a non-real-time mode, the 1091 simulates: flight computers, gravitational models, environmental conditions in space and their effect upon the space vehicle's hardware - including the Inertial Guidance System and the Star Sensor. The result is an integrated checkout of all operations in the IUS and its spacecraft.

SYSTEM A
CONFIGURATION

KL10E CPU
512 KW OF MOS memory
1 RP06 disk drives
3 TU45 tape drives
1 DN87S communications front-end
16 asynchronous ports
1 synchronous port
1 LP10-H Line Printer
1 CR10-F Card Reader

SYSTEM A SOFTWARE
RUNNING TOPS-10

FORTRAN, ALGOL, BASIC, COBOL, APL, MACRO, CPL, JOVIAL, DBMS, DECnet, and ANF-10.

APPLICATION

The DECSYSTEM-1091 is intended for the development of in-flight software for the IUS program. This application includes: developing software going into the Delco computers which are part of the IUS

navigation computers; software used by BAC's navigational group, to perform simulations; and software to be used in graphic (also called structural) analysis of IUS hardware.

REASON FOR WIN

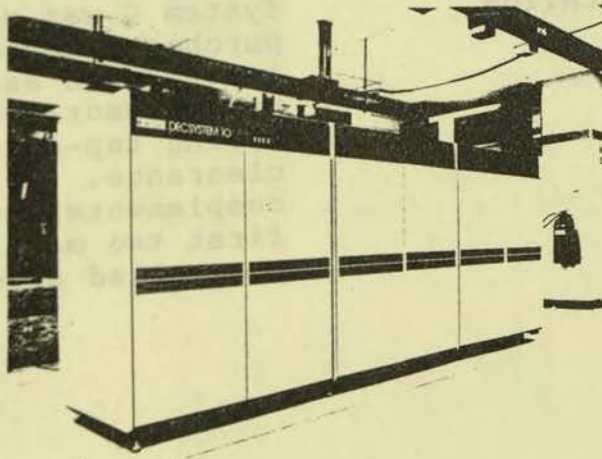
We could offer the USAF standard required language, JOVIAL; JOVIAL rev. J73 was written especially for DIGITAL.

SYSTEM B CONFIGURATION

Essentially, the same as System A, with: 1 LP20 Line Printer
1 CR20 Card Reader
Same software

APPLICATION

The same as System A. Systems A and B are tied together through a DN81H synchronous link which allows users under ANF-10 to log into either machine by using a SET HOST command. Each machine has 36 ports with a synchronous interconnecting link. Both



The DECsystem-1091

systems also have two DN200s, assigned respectively to remote connections in El Segundo and Seattle. Either DN200 can be manually switched over to the other system.

REASON FOR WIN

Boeing was tremendously pleased with the first 1091 and had increasing demand for the same kind of interactive programming as well as a continued need for the type of software previously developed on System A.

SYSTEM C
CONFIGURATION

- KL10E CPU, 512 KW of internal MOS memory
- 4 RP06 disk drives
- 2 TU77 tape drives
- 1 LP200 Line Printer
- 24 asynchronous lines (front-end utility processor)
- 3 synchronous lines (DN200 communications processor)

SOFTWARE

Same as designated for Systems A and B; TOPS-10 version 7.01.

SPECIAL APPLICATION

System C was primarily purchased to achieve the same information as its predecessors, but for projects having top-secret security clearance. It completes and complements the efforts of the first two machines, but in a controlled access environment.

SYSTEM LINKS

System A and B are "tied" to System C via a synchronous interconnection, so that the three machines can "talk to" each other whenever appropriate (that is, whenever one system is not running classified data).

KEY SALES ISSUE

Continued success of the product; ANF-10 and DN200 ability to have remote computing; meeting current demand as well as demand anticipated for the course of the next three years.

FUTURE PLANS

This project is still youthful in its development. The opportunity for additional add-on systems in the next 2-3 years is anticipated to be extremely promising.

1090-SMP SYSTEM

Mitchell Perlitch
ECS/Marlboro
DTN: 231-5975

ACCOUNT: Tufts University

SALESPERSON/OFFICE: Jim Roche, Waltham, Massachusetts

CONFIGURATION: 1090-SMP (2 KL10 processors)
1 Megaword of Core Memory
6 RP06, 6 RP04
150 Lines

APPLICATION: Supplies all academic and administrative computing for the campus. This site uses most of the major languages as well as many application packages.

KEY ISSUES IN SALE: Tufts had an installed 1090 and added the second processor to the configuration in November 1979. The decision to go to SMP to provide more computing power was based on several major issues:

1. No need for conversion.
2. Minimal additional support required.
3. Automatic load leveling that would not be possible on two separate systems.

DIGITAL EQUIPMENT WINS \$12.8M NIH CONTRACT

Edward J. Canty

PK3-2/M18

X223-2268

MAYNARD, MASS. --- August 28, 1980 --- Receipt of a \$12.8 million contract for multiprocessor mainframe computer systems and peripherals from the National Institutes of Health was announced today by Digital Equipment Corporation. During the course of the six-year contract the multiprocessor systems will be connected to many Digital minicomputers and other mainframes throughout NIH's Bethesda, Md., campus.

Terms of the contract call for Digital's Laboratory Data Products (LDP) Group in Marlboro, Mass., to supply two DECSYSTEM-1090 mainframe computers with full symmetric multiprocessing (SMP) capability. Each system will have dual KL10 processors that are operationally equivalent or "symmetric"; each performs both computation and input/output functions. The systems will have 10 to 12 megabytes of main memory, 10 billion bytes of disk storage, 14 magnetic tape drives, 20 terminal lines and a large number of synchronous lines to link them to the Digital minicomputers at various campus sites.

The mainframes will be housed at NIH's computer center, where they will be made available to researchers involved in a variety of medical research applications ranging from molecular modeling to chemical analysis. Delivery of the first DECSYSTEM-1090 SMP is scheduled for September. The second multiprocessor will be phased in starting in 1982 to meet the anticipated increased research workload.

Michael A. Flitterman, Large Systems Marketing Manager for the LDP Group, said Digital won the contract after successfully participating in a competitive procurement and a large benchmark.

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"NIH wanted systems that were not only powerful and flexible but had availability. The SMP feature of the DECsystem-10 allows us to design no-single-point-failure programs. This means no single fault will bring a system down," Flitterman said.

Other bid criteria called for the computer systems to be expandable and capable of communicating with other vendors' mainframes and smaller laboratory systems.

Flitterman said the contract makes provision for NIH to avail itself of Digital's newer technology as it becomes available.

INSTITUTE von LAUE-LANGEVIN
Grenoble, France

Dale Brandt
LDP Marketing
Geneva

SALESMAN/OFFICE: Michel Corjon, Paris

CONFIGURATION: CPU: 1091 (KL-10)
MEMORY: 1,000KW MF20 MOS
DISK: 2-RP06, 2-RP20 over 2
gigabytes of storage
Tape Printers: 1-LP200 900/1200
1 pm charaband, 1-LP07
Communications: 64 asynchronous
lines, 8 low speed synchronous
lines, 4 high speed synchronous
lines.

APPLICATION: Joint Franco-German-British
Scientific research in the fields
of solid state physics,
metallurgy, chemistry, biology,
nuclear and elementary particle
physics. On-site nuclear reactor
is a source of continuous neutron
flux for the various experiments.
The KI-10 (DECsystem-1070)
currently installed (soon to be
replaced by the DECsystem-1091)
is used by staff and numerous
visiting scientists from
throughout the world to analyse
and collect the results of their
experiments - most of which are
fed to the DECsystem-10 by
multiple PDP-11s throughout the
institute.

COMPETITION/KEY ISSUE
IN SALE:

The heavy competition in this
joint Franco-German-British
Institute was from the mainframe
suppliers indigenous to these
countries: CII/Honeywell-Bull,
Siemens, and ICL respectively.
This coupled with the highly
visible and large funding for
this project brought a heavy

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FUTURE EXPANSION:

- o Calgary plans to upgrade to a DECSYSTEM-2060.
- o DECnet to be installed between PDP-11/70s and DECSYSTEM-2020.

UNIVERSITY OF MUNICH ACCELERATOR LABORATORY

DECsystem-10 UPGRADE

Dale Brandt
LDP MKTG.
Geneva Office

Manfred Siebert, Munich, sold a DECsystem-1090 a to the University of Munich Accelerator Laboratory. By upgrading from a DECsystem-1040 to a DECsystem-1090, they have a totally new system with a five-fold performance increase. Of particular importance is the ability to upgrade in this fashion has locked-out competition for this business. The University did not have to solicit competitive bids as they would if it were necessary to entirely replace this system.

This is a KL10, memory and disk upgrade to the 11-year-old DECsystem-1040. The new configuration now consists of 1.3 MB of memory, 5 disk drives and 32 lines.

The 1090 protects a large software investment for the University. They have a special interface to DECsystem-10 memory to host PDP-15s and PDP-8s which include special software. The 1090 enables them to carry-over the network without change. The memory interface has been upgraded from the 18-bit address format of the KA10 to the 22-bit address format of the KL10.

The PDP-8s and PDP-15s collect data from the linear accelerator and pass it to the DECsystem-10. The DECsystem-10 which houses a large analysis program responds in real-time (through the PDP-8s and PDP-11s) to the experiments. While the real-time load consumes most of the KA10, allowing for little or no simultaneous timesharing, the DECsystem-1090 (KL10) allows them to conduct timesharing concurrent with the real-time activity.

In addition, the University has designed a system of microprocessors (cross-compiled on the DECsystem-10) which compute in parallel, and are interfaced to the DECsystem-10 via an asynchronous line.

Congratulations to Manfred and the Munich team, especially Gerald Falke of Munich Field Service who, as the responsible site engineer, was a big help in the overall sales effort.

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SALES SUCCESS AT UNIVERSITY OF MUNICH ACCELERATOR LABS

Dale Brandt
LCG Marketing
Geneva Office

SALESPERSON: Manfred Siebert/Munich Office

MARKET SPECIALIST: Dale Brandt/Geneva

FIELD SERVICE ENGINEER: Gerald Falke/Munich

CONFIGURATION: 1090 CPU
320 KW Core
Two RP06 disks
Three TU45 Tape drives
TOPS-10
FORTRAN
DA25 (modified by customer)

INSTALLED SYSTEMS: KA10 (replaced); CYBER 175; several others. CRAY-1, Amdahl, IBM and VAX on same campus.

CUSTOMER BUSINESS: Nuclear research with a linear accelerator.

SYSTEM APPLICATIONS: The 1090 is connected to two PDP-15s and several PDP-8s and PDP-11s to control the accelerator and gather data from experiments. Timesharing for 32-lines is an additional benefit and competes very successful with the NOS (CY-175) timesharing.

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DUAL DECsystem-1077 AT UNIVERSITY OF NEW HAMPSHIRE

Jane Goldman
ECS
MR1-1/M40

ACCOUNT: University of New Hampshire

SALESPERSON/OFFICE: Dave White, Bedford, New Hampshire

CONFIGURATION; Dual DECsystem-1077
Eighteen disk drives
2 line printers
2 card readers
2 DECTape drives
1 plotter
1 card punch
1 7-track tape drive
6 9-track tape drives
1-5 million words memory
4 front ends - 2 DN87s, 1 DN87, 1 DC76
100 dial-up terminals
10 remote stations

APPLICATIONS: Professors at the UNH have learned to apply Charybdis, the Greek mythological name for their DECsystem-1090, to their non-computer subjects. The 1090 is increasingly being used in such social science applications as:

Humanities
History
Sociology
Music
Plant Disease Analysis

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UNH APPLICATIONS: The friendliness of the TOPS-10 operating system, which is supplemented by extensive on-line documentation, has contributed greatly to increasing its user fold. In addition to the applications already cited, the departments of Home Economics, Psychology, Chemistry, Philosophy, Physics, Geography, Education and Engineering, all make use of the DECsystem-10.

Scylla, the sister machine to Charybdis, handles the administrative data for UNH. While the administrative applications supported by Scylla are fewer in number than Myriad applications run on her sister, they are generally larger in scope. Still largely centralized, the University's evolving Management Information System (MIS) is gradually being distributed.

Professors and school administrators are quite satisfied with the 1090s performance. They are also pleased with Digital's Field Service organization. (Two Field Service Representatives are resident on site and consider their work to be most reliable.)



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ASTRA PHARMACEUTICALS

Lou Othote
MDC Marketing
MR1-1/M75 X5612

SALESPERSON/OFFICE: Mike Maione, Woburn

SOFTWARE SPECIALIST: Tim Litt

FIELD SERVICE SUPPORT: John Bernard

CONFIGURATION: CPU: 1091
Memory: 256KW
Disk: Two RP06s
Tape: Two TU77s
Communications: 48 Lines
Software: DBMS, COBOL,
FORTRAN

APPLICATION: Central data processing facility providing all business-related functions along with scientific and manufacturing applications in an integrated system.

COMPETITION: H-P was major competition. H-P approach was to distribute with segmented data base over three systems and rewrite all applications and network them together. Digital's solution was to enhance system capabilities via major upgrade and maintain continuity via DBMS in a centralized system.

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THE NEW KL10 VS. THE OLD
AN EVALUATION BY TEKTRONIX, INC.

Bill Oxford
ESG
MR1-1/M42

Tektronix, Inc. recently installed a new KL10 configured with MOS memory (MF20) and performed acceptance testing with a 7.01 pre-release and the new MOS LIR (i.e. the 1091-S).

They are finding the new system running approximately 30-40% faster than their Model A DECSYSTEM-1090 running 6.03. The following are the most likely reasons for this increased performance.

- faster processor
- improved performance in 7.01 especially in the areas of SCANSER and file handling
- reduction in monitor overhead due to elimination of cache sweeps (a feature with MOS memory).

They are obviously pleased. In addition to the marked improvement in speed, the installation went very smoothly and system availability has been high.

Primary applications are: Printed circuit board design using Bell Northern Circuit Pack System; text editing and manual/product documentation preparation; micro-processor software development.

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Gail Coutts
ESG 231-6900

DECSYSTEM-2020 AT RCA

ACCOUNT: RCA Laboratories
Consumer Electronics Division

SALESPERSON/OFFICE: Paul Shaneck, Somerset, New Jersey

SOFTWARE SPECIALIST: Bob Brown

F. S. SUPERVISOR: Jerry Whitman

CONFIGURATION: CPU: 2020
Memory: 256KW
Disk: 2 RM03s
Tape: 1 TU77
Communications: 16 lines
Line Printer: LP20
Software: FORTRAN, SITBOL, PCS

APPLICATION: Primary application is as a software development environment for microprocessors. In addition to the 2020, RCA has 9600 baud asynchronous communications lines to target microprocessors for downline loading. Some of the software currently running on the system includes:

- Microprocessor cross assemblers and simulators (Microsoft Co.)
- Electronic mail (University of Arizona)
- Portable PASCAL - interpreter or compiler
- ACOLYTE document processor (University of Arizona)
- FLECS
- LISP
- Enhanced SOS (University of Arizona)

COMPETITION/KEY
ISSUES IN SALE:

Software was the key to this sale. RCA felt the powerful DECSYSTEM-20 development tools and rich availability of software will give them the tools to be successful on the intended and future projects. RCA was also, impressed with the DECSYSTEM-2020s reputation for reliability and low support requirements.

TOTAL OIL Sydney, Australia

Lou Othote
MDC/Marlboro
DTN: 231-5612

SALESPERSON/OFFICE: Kim Brebach/Sydney

CONFIGURATION: 2020
256KW
3 RM03
1 TU45
16 Lines
COBOL, BASIC-PLUS-2, FORTRAN IV,
TRAFFIC-20

INSTALLED SYSTEM: CDC Service Bureau

CUSTOMER BUSINESS; Australian Division of French
Petroleum Company. Supplier of
Petroleum Products.

APPLICATIONS: On-line order processing, billing,
stock control, financial management.

BENCHMARK RESULTS: Ran against 370/115 CICS and PRIME400
and consistently beat both.

KEY ISSUES IN SALE: Competition was IBM and PRIME. TOTAL
OIL was convinced that the 2020 was
what they needed after the benchmark.

MONENCO

John Anderson
ESG Canadian Mktg. Mgr.
DTN: 231-5844

ACCOUNT MANAGER/OFFICE: Louis Bianchin, Quebec, Canada
Eleanor Lester, Calgary
Henry Kalisky, St. Catherins

CONFIGURATION: o Montreal - DECSYSTEM-2040
 o Calgary - DECSYSTEM-2020
 2 PDP-11/70s
 o St. Catherins - DECSYSTEM-2020

CUSTOMER TYPE: Engineering Consulting

APPLICATIONS: Project Management, Accounting,
 Engineering, Time Sharing,
 Program Development, Batch
 Engineering, Bill of Material
 Processing.

ACCOUNT PROFILE: Monenco Limited is a diversified
 engineering and consulting firm
 headquartered in Calgary with
 regional offices of other
 associate and subsidiary
 companies located throughout
 Canada. Monenco companies
 operate independently or in
 association with other members to
 provide specific engineering
 design and management expertise
 to projects all over the world.

Monenco is a fully integrated
"DEC SHOP". For example, in St.
Catherins 2 PDP-11/70s are
performing CAD functions and
feeding that data onto a
DECSYSTEM-2020. In Montreal, the
DECSYSTEM-2040 is involved
chiefly with accounting systems
running COBOL and DECSYSTEM-10/20
DBMS. It also performs project
management functions in COBOL,
and offers engineering time
sharing in FORTRAN, program
development in COBOL, and batch
engineering.

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pressure to buy from a supplier indigenous to Europe. These forces resulted in a prolonged sales effort which we ultimately won because of: 1) the persistence of the Digital Sales effort; and, 2) the lower cost of the Digital solution given that no software conversion will be necessary; 3) also, the technical people wanted to stay with Digital for superior timesharing.

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WRC - BELGIUM

(WETENSCHAPPLIK REKEUCENTRUM)

Guy Marque Pucneau - Geneva
Jean Paul Bergmans - Brussels

SALESPERSON/OFFICE:

Alfred Wilms, Brussels

CONFIGURATION:

2020 and VAX 11/780

APPLICATION:

Engineering services for mechanical and structural fields, operational research, and continuous modeling.

A computing system was needed that could provide large virtual address space, high number crunching, application packages (engineering), mature (proven) operating system, ease-of-use, and a DBMS package.

COMPETTIVE SITUATION:

When Digital came into the picture (June 78) they had an installed system IBM 3/15 and used outside computing power. They also had a 370/125 on order. Although the 370/125 eventually could satisfy some of these requirements, W.R.C. was not enthusiastic about the overall potential and price performance of their future system. The Digital proposal came in as a combination of a VAX 11/780 and 2020 with switchable RP06s. The Digital proposal was slightly more expensive than IBM's but the 2020/VAX price/performance was incomparably better.

Prime bid a dual 550 configuration that was priced below Digital and IBM. Prime was also the installed vendor of a Dutch engineering company that collaborated closely with W.R.C. placed an order to us for the combined 2020/VAX configuration and cancelled the 370/125 order. Both systems were installed within nine months of order and run with customer satisfaction. W.R.C. eventually will consider installing a second dedicated 2020 for an integrated DBMS application. For additional information please contact: A. Wilms, Digital, Brussels

Editor's Note: The "Ten Commandments" was taken from the December 1972 issue of COMPUTER DECISIONS.

THE TEN COMMANDMENTS

I AM THE PROGRAM OF HIGHEST PRIORITY, THOU SHALT HAVE NONE IN CORE BEFORE ME

THOU SHALT NOT CREATE GRAVEN SIMULATIONS

REMEMBER THY DOWN TIME AND KEEP RECORD OF IT WHOLLY

HONOR THY INTERRUPT AND PRIORITY

THOU SHALT NOT KILL THE SYSTEM

THOU SHALT NOT STEAL CYCLES

THOU SHALT NOT COMMIT SWAPPING

THOU SHALT NOT TAKE MY MAIN IN VAIN

THOU SHALT NOT BEAR FALSE PASSWORDS AGAINST THY NEIGHBORS DATA

THOU SHALT NOT COVET THY NEIGHBOR'S OS, NOR HIS ASP, NOR HIS BURROUGHS, NOR HIS BAUD

GOVERNMENT SYSTEMS GROUP
John Reilly x264-5200

Account Name: Arms Control and Disarmament Agency (ACDA)

Salesman: John Haskard

System: 2040

District: DC

Marketing Manager: Bill Albertson

Application: FORTRAN Modeling

Key Sales Issues: Ease of Use, 64 user timesharing benchmark.
Upgrade to 2060

Competition: IBM 4341

Account Name: EPA (Environmental Protection Agency)

Salesman: John Haskard

System: 2020

District: DC

Marketing Manager: Bill Albertson

Application: Database for Toxic Substances

Key Sales Issues: Upgradability, HASP (DN 22)
Ease of Use. Ease of program
development re: IBM 371-68 & 1170
running IAS

Competition: IBM 4331, ITEL AS-5

JEFFERSEN-SANDERSON Englewood, Colorado

Lou Othote
MDC/Marlboro
DTN: 231-5612

SALESPERSON/OFFICE: Rick Giardino/Denver

CONFIGURATION: 2040
256K MOS
3 RP06
1 TU45
24 ASYNCH Lines
COBOL, SORT/MERGE, DBMS
Card Reader, 2 Line Printers

INSTALLED SYSTEM: CRITERION 8550

CUSTOMER BUSINESS: Manufacturing of air navigation charts, educational video films, and flight training programs (Division of Times-Mirror Corporation).

APPLICATIONS: Navigation data systems and financial services, manufacturing and production control systems and all division financial applications.

KEY COMPETITION: IBM370/148, IBM4331. Issue in sale was the overall cost of IBM system in five-year period versus 2040.

SALES SUCCESS AT TEKADE, Nuremberg

Manfred Siebert
Munich - A3

SALESPERSON: Klaus Ratzler/Munich Office

MARKET SPECIALIST: Wolfgang Mueller/Geneva

FIELD SERVICE ENG: Gerald Falke/Munich

SOFTWARE SERVICE ENG: Klaus Steiger/Frankfurt

CONFIGURATION: 2040 CPU
512 KW MOS
Two RP06 Disks
TU77 Tape
DC20 32 Lines
DN20 4 Lines 56 Kbps
TOPS-20
FORTRAN, DECnet V2.0

INSTALLED SYSTEMS: Several PDP-11s and VAXs

CUSTOMER BUSINESS: Subsidiary of the Philips Corporation.
Tekade, Feltenund Guillaume
Fernmeldeanlagen GMBH, Nuremberg,
is 100 % Philips owned (2,000
employees). It is mainly involved in
the telephone business. They are well
known because of their CAR telephone
systems in Germany. But in general,
they are producing intelligent
telephone switching sub-networks,
mainly for private companies.

SYSTEM APPLICATION: Software development for microcomputer
based switching networks with the
chill-compiler.

COMPETITION: At parent company - Phillips Holland -
IBM 4300 series was the strongest
competitor. Digital won the sale
because of a better distributed
processing solution.

NOTE: System to be installed in Q'3.

FIRST DECSYSTEM-2060 SOLD IN GERMANY

Gail Coutts
ESG X231-6900

DECSYSTEM-2060 AT KIENZLE APPARATE GMBH

Klaus Ratzer - Munich, Germany

ACCOUNT: Manufacturer of business computer systems data collection systems such as electronic taximeters, counters, OCR equipment.

SALESPERSON/OFFICE: Klaus Ratzer, Munich

MARKET SPECIALIST: Wolfgang Mueller, Geneva

F.S. ENGINEER: Gerald Falke

CONFIGURATION: CPU: 2060
Memory: 512 KW
Disk: 2 RP06s
Tape: 1 TU77
Communications: 64 lines
Unit Record: 1 LP20
Software: FORTRAN, COBOL

APPLICATION: General technical timesharing in operating system software development, simulation, microprocessor cross assembler application, printed circuit layout (planned).

BENCHMARK & RESULTS: Extensive testing done to determine performance of 2060 based on estimated workload increase over next five years.

CONVERSION: None

COMPETITION/KEY ISSUES IN SALE: IBM and Univac; this is the first DECSYSTEM-2060 sold in Germany

DECSYSTEM-2060 OPERATING AT UNIVERSITY OF TEXAS AT AUSTIN'S
COMPUTATION CENTER

Dave Morosas
ECS Mktg. Comm.
MR1-1/M82

SALESPERSON/OFFICE

Bill Faris, Austin, Texas

SOFTWARE SPECIALIST

Karl Hanz, Austin, Texas

MARKETING SPECIALIST

Dave Morosas (ECS)

CONFIGURATION

CPU: 2060
Memory: 1024 K
Disks: 3 RPO6s and 1
RP20
Tapes: 2 TU77s
Comm: 80 lines
Line Printer: 1 LP20
Software: FORTRAN,
COBOL, BASIC-PLUS-2,
ALGOL, DECnet-20,
2780/3780, TOPS-20 Source

APPLICATION

University of Texas has a student community of 44,000. Students in computer sciences and business will make use of the computation center's newly purchased "Academic 2060" for academic timesharing in their curricula. A previously installed "Research 2060" is used by teaching and research staffs.

PREVIOUS INSTALLATIONS

DECsystem-1070, installed in 1975; the first ("Research")
DECSYSTEM-2060, installed in the summer of 1980.

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KEY SALES ISSUES

DIGITAL entered into a joint agreement with the University, late in 1979, to promote research in computer security. The University acquired the "Research-2060" as a condition of this agreement. Commonality of staff and software development thus enabled DIGITAL to be the sole source of procurement for the "Academic-2060".

DIGITAL'S rapid delivery was an element in satisfying customer needs. Although the purchase was discussed and negotiated over a number of months, would you believe that we shipped in less than two weeks after the purchase order was received?

Installation is anticipated to be complete as of March 1981.

NOTE

Installation of the system was completed in March 1981. The system is currently in use at the University of Texas at Austin. The system is currently in use at the University of Texas at Austin. The system is currently in use at the University of Texas at Austin.

UNIV. OF DISTRICT COLUMBIA

Mitchell Perlitch
ECS 231-5975

SALESPERSON/OFFICE: Paul Casavant/Washington, D.C.

CONFIGURATION: 2060
2 MB
(3) RP06 on 3 separate disk channels
(2) TU45
88 (3 synch, 85 asynch)
COBOL, FORTRAN, APLSF, BASIC+2
DECNET 20, 2780/3780

OTHER EQUIPMENT: 600 lpm printer
285 cpm reader, software resident 1 year.

CUSTOMER TYPE: Used by entire University.

APPLICATIONS: Academic

COEXISTENT SYSTEMS: IBM 370/148

COMPETITION: IBM

BENCHMARKS: Mix of 90 different jobs using
different languages.

KEY ISSUES IN SALE: Satisfied benchmark, IBM did not.
Could handle 90 users simultaneously
and still meet response time
requirements.

GENERAL MOTORS - Warren, Michigan

Lou Othote
MDC/Marlboro
231-5612

SALESPERSON/OFFICE: Ed Szabo/Detroit

CONFIGURATION: 2 2060
Memory: 768KW each
6 RP06 each
4 TU72
64 Communications lines each

INSTALLED SYSTEM: 5 IBM3303
4 H-6600

CUSTOMER BUSINESS: General Motors, manufacturer of automobiles, trucks, locomotives, construction equipment, etc. GMISCA is Information Services Division of General Motors.

APPLICATIONS: General purpose timesharing.

KEY ISSUE IN SALE: 2060s will co-exist with IBM and Honeywell systems in GMISCA Data Center.

3M

Lou Othote
MDC Marketing
MR1-1/M75 X5612

SALESPERSON/OFFICE: Cliff Douglas, Minnesota

SOFTWARE SPECIALIST: Bruce Davis

FIELD SERVICE SUPPORT: Ken Thompson

CONFIGURATION: CPU: 2060
Memory: 512KW
Disk: Four RP06s
Tape: TU72
Communications: 48 lines
Software: FORTRAN,
BASIC-PLUS-2

APPLICATION: This is the fourth 2050/2060 system ordered by 3M for their in-house timesharing service. The in-house timesharing service now supports over 400 terminals with 5,000 users representing 80% of 3M's total timesharing usage in the United States. In addition, 3M is now providing the in-house timesharing service via Tymet, to European users and will soon provide the service for Japan and Australia.

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C-97

DECSYSTEM 2060 AT GTE SYLVANIA

Carl Gartley
GSG
DTN: 264-7212

ACCOUNT: GTE Sylvania

SALESPERSON: Dave DiGirolamo, Waltham, Massachusetts

CONFIGURATION: CPU: 2060
Memory: 2048 KW
Disks: 5 RP06s
Tape: 2 TU77s
Communications: 40 Lines
Line Printer: 2 LP200s
Software: FORTRAN, BASIC-Plus-2,
2780/3780, DECnet

APPLICATION: Primary application is to develop the software to simulate 4800 different inputs from satellite, missile, ship, aircraft, etc. for the MX Missile. Software will simulate 4799 of these inputs while the on-board unit is performing its calculations based on these inputs. The on-board units will be Mil Spec 11s from NORDEN, a team member on the Program Proposal.

COMPETITION/KEY
ISSUE IN SALE: Availability of Jovial J-73 was essential to this procurement. IBM 4341 was the competition and after a letter describing the functionality and performance characteristics and careful analysis of the financials, Digital was selected in this very competitive procurement.

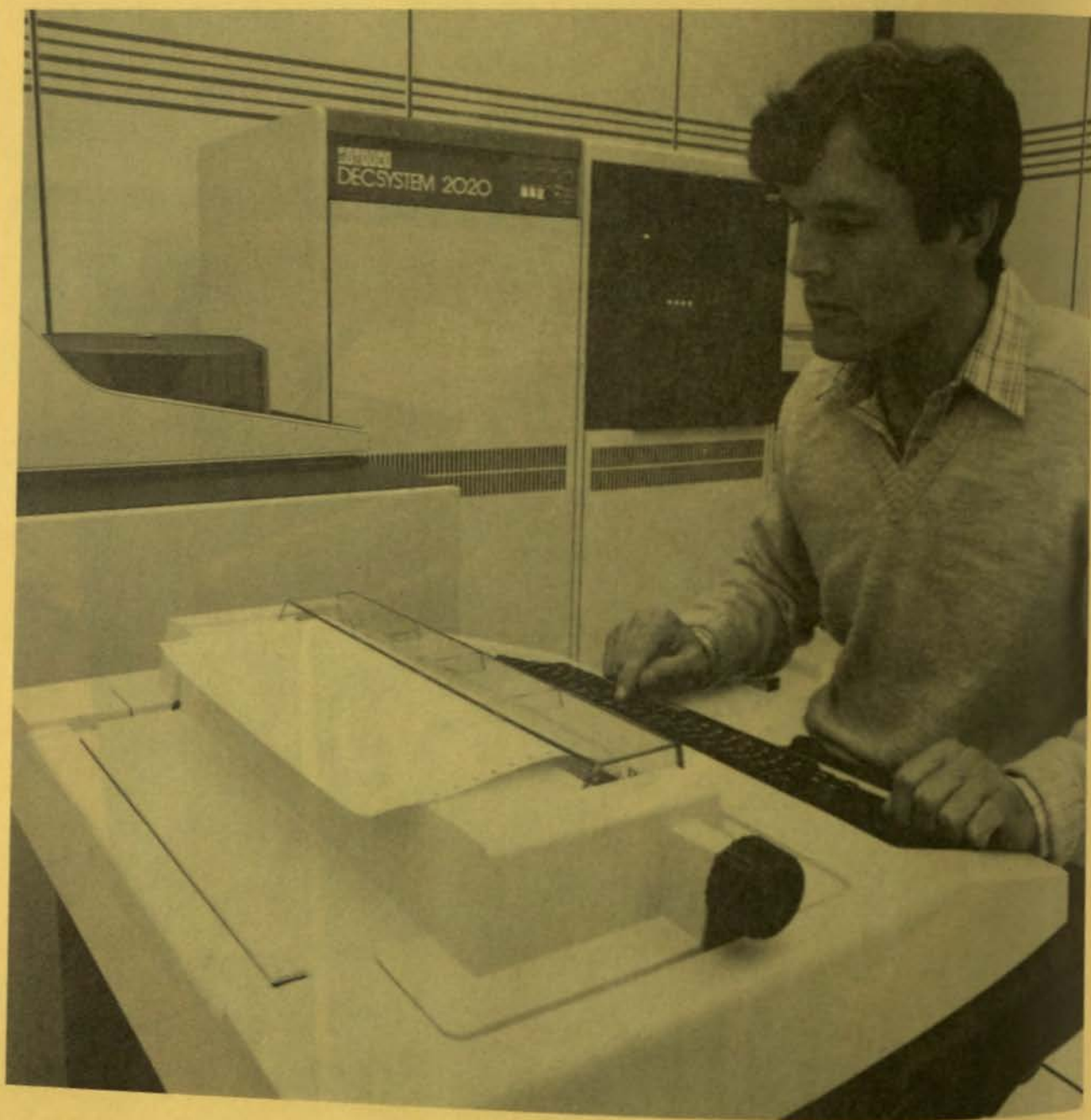
PRODUCT ANNOUNCEMENTS

DEC SYSTEMS
30 Product Management
617-275-1000



For more information on these products, call DEC at
1-800-541-2272. For a complete list of products, call 1-800-541-2272.
For the information on any of these, the following
product numbers may be of specific interest: DEC 2000
and DEC 2001 for availability and reliability.

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ANNOUNCING TOPS-10 VERSION 7.01

Joe Viula
LS Product Management
MR1-2/E78

The Large Systems Group recently announced a greatly enhanced TOPS-10 operating system. This version contains both new features and improvements aimed at increased availability and reliability of the DECsystem-10 and major enhancements to ANF-10 Networks, timesharing user facilities and administrative and operational facilities.

Basic 7.01 Package

TOPS-10 Version 7.01 is the operating system for single-processor DEC-system 10s and as such is only available packaged with any DECsystem-10 single-processor system. DECsystem-10 sites currently under warranty or software maintenance service contract will automatically be updated to release 7.01. DECsystem-10 sites which are not under warranty or maintenance service may purchase an out-of-warranty update kit and subsequently may also contract for the Self-Maintenance Service for Software.

Optional DPE Package

TOPS-10 DPE (Dual-Processor Extension), Version 7.01 software extends the capabilities of TOPS-10 to dual processor, KI10 (DECsystem-1077) and KL10-B/D (DECsystem-1099 Model A/B) configurations. These configurations make use of shared memory and a single copy of the operating system to provide improved system capacity and performance over single-processor configurations.

TOPS-10 DPE updates Version 7.00 and remains optional. As in Version 7.00, Dual 1090 (KL10) support includes fully symmetric configurations (SMP). Additionally, TOPS-10 DPE also operates on dual KI10 (1077) configurations; however, in the case of KI10s, all I/O equipment is connected to the Policy CPU. Dual DECsystem-1099 (SMP) sites running TOPS-10 Version 7.00 will automatically be updated to dual-processor software Version 7.01, provided they are under a software maintenance service contract or warranty.

AVAILABILITY/RELIABILITY IMPROVEMENTS

A large portion of the 7.01 effort focused on availability and reliability improvements. These improvements were made in the operating system, CUSPs, network software, RSX-20F, and the documentation for all of these. The following sections describe some of the specific changes that have been made with respect to availability and reliability.

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Rewritten Parity Handlers

The parity recovery and reporting code in TOPS-10 has been rewritten to take full advantage of the capabilities inherent in the KL10 and KS10 hardware. Additional information is provided in the error log. Better retry algorithms are used and documented in the SYSERR manual. The recovery attempts include a replacement of bad monitor high-segment pages. This means an attempt is made to recover by getting a new copy of the page containing the parity error from disk.

Monitor Dump Process

A new monitor resident bootstrap, called MONBTS, has been written which provides a "dump and continue" facility. This bootstrap is capable of dumping one million words of memory in about seven seconds on a KL10 with RH20s and RP06s. This means that a system dump can be taken on a continuable stopcode without significantly disrupting user operations. MONBTS also replaces monitor high-segment pages that encounter parity errors, thereby improving the ability of the system to survive a section of bad memory.

More Information at STOPCD Time

The monitor now types the date and time of the STOPCD and a CPU status block on the CTY of the CPU that detected the STOPCD. The status block shows the important hardware status bits for the CPU and memory systems.

Improved Error Logging

Both SYSERR and DAEMON have been updated to provide more complete error logging. The new entries include:

- o DX20 error logging -- for TU70/71/72 errors on DX20s
- o CPU status block dumping
- o Logging network node on-line/off-line transitions
- o Additional RSX-20F front-end device error logging

RSX-20F Improvements

Many new features and commands have been added to RSX-20F to make it a better diagnostic tool and to allow recovery from more failure types. A few of the notable improvements include: new PARSER commands; improvements in KLERR and KLINIT; and changes in EXEC which make the front end more tolerant of errors.

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Product Qualification

7.01 has undergone the most extensive testing and qualification effort ever given to a TOPS-10 operating system. This has included the usual in-house and field testing, plus several new test processes. A fault insertion effort was undertaken to verify recovery and logging algorithms for parity errors and other faults. Performance testing was performed to verify that the product's response characteristics met design goals. Simulators were used to verify the ability of the product to operate under significant load. We believe that the reliability of 7.01 will attest to the success of this program.

ANF-10 NETWORK IMPROVEMENTS

The 7.01 release provides a number of improvements to ANF-10, resulting in improved reliability and greater capabilities than prior versions.

ANF-10 Support on 2020 Systems

ANF-10 is now available on KSI0-based systems. 2020 Systems running TOPS-10 Version 7.01 with DN20 (KMC11/DUP11) hardware are full routing nodes to ANF-10. Users on the 2020 can SET HOST to other systems on the network and other users can set host to the 2020. Sequential nodes (DC72 and DN92) are not supported by the 2020.

Reliability Improvements

Much of the ANF-10 software has been rewritten for improved network reliability. Focus was placed on areas in the code that were known to be susceptible to failures. For example, most of the interrupt level code was eliminated to prevent race conditions.

Network Features

The 7.01 version of ANF-10 features multipathing (the ability to have several paths between two points), dynamic reconfiguration (automatic redefinition of network topology and rerouting of messages if a node fails), and route through (the ability to send messages via intermediate nodes). Multipathing was achieved by making the CPU a full node rather than just a sequential node in the network.

TTYs in the network are not automatically connected until the user types a character. This has the advantage that only active lines require CONNECTS. This allows more than 512 physical terminals to be attached to the network. SEND ALL does not output to non-connected lines and INITIA is not run on a terminal until there is activity. In addition, a terminal is disconnected after two minutes if no job is logged in and there is no activity.

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SCNSER Improvements

SCNSER has been largely rewritten to improve performance. Output is now faster because of the following:

1. Reorganization of chunk handling
2. Use of macros to generate in-line code rather than calling subroutines
3. SCNSER PI interlock scope has been reduced
4. Output characters are sent in groups rather than one at a time
5. On 1090 SMP systems SCNSER is re-entrant

TIMESHARING USER FACILITIES

Several new facilities and improvements to existing facilities have been made for the timesharing user. In particular:

Additional SFD (Sub-File Directory) Support

SFD support has been expanded to include RUN, SAVE, and GET commands. This means that SFD support is now complete in the monitor.

Command Level Editing

Command level editing has been improved for video terminals. The ability exists to delete an individual character, word, or entire line. The operating system uses information about your terminal type to adjust the display accordingly.

Increased Number of I/O Channels

The number of software channels available to a program has been increased from 16 to 80. This was accomplished by extending the FILOP.UUO. Applications with the need to access many files can use this capability to do so without the overhead of unnecessary OPENS and CLOSES.

Improved Software Interrupt System

The software interrupt system (PSISER) has been rewritten for improved reliability and efficiency. The software is now much simpler, while providing an expanded number of events on which to operate. The main reliability improvements were the result of removing much of the interrupt level code to eliminate race conditions.

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Terminal Type Command

A TERMINAL TYPE command exists which allows the user to specify the type of terminal being used (VT52, etc.). TOPS-10 uses this to set up information on screen size, fill class, and other terminal-specific parameters.

ADMINISTRATIVE/OPERATIONAL FACILITIES

Several facilities have been added or improved to assist in the administration and operation of the DECsystem-10. These include: Dual-Processor Software operating on dual KL and KI configurations; a new Report Generator program; a new crash dump copy program; and a new Network Status Reporting program. Other improvements include: TU70 tape performance; bootstrap speed; and RSX-20 Front End capabilities. Dramatic performance improvements have also been made on DX10 tape subsystems for variable-length records for dual KI systems and variable record length tapes.

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Digital's Large Systems Group is pleased to announce significant enhancements to the TOPS-10 Operating System aimed at increasing availability and reliability of the DECsystem-10. Also included are major enhancements to ANS-10 Networks, time-sharing user facilities, and administrative and operational facilities.

Product Qualification

Version 7.01 has undergone the most extensive testing and qualification effort ever given to a TOPS-10 Operating System. This has included both in-house and extended field testing plus several new test procedures. A fault injection effort was undertaken to verify recovery and logging algorithms for parity errors and other faults. Performance testing was done to verify that the product's response characteristics met design goals. Stress testing was performed with the use of simulators which verified the ability of the product to operate under significant load. The reliability of Version 7.01 will adhere to the success of this program.

Version 7.01 of the TOPS-10 Operating System operates on R30, R30 and R30 single processor configurations. Additionally, optional TOPS-10 Dual Processor Extension Software (TOPS-10 DPE) Version 7.01 extends the capabilities of TOPS-10 to dual processor R30 (DECsystem-1077) and R30-R30 (DECsystem-1099) Mapped A/B configurations. These configurations use shared memory and a single copy of the operating system to provide improved system capacity and performance over single processor configurations. As in TOPS-10 Version 7.00, Symmetric Multi-Processing (SMP) is supported on Dual Processor R30s. With R30s, I/O equipment is connected to the Policy CPU.

Availability and Reliability Improvements
Much of the 7.01 effort focuses on improvements to availability and reliability. Improvements have been made in the operating system, CLM[®] network software, R3X-20P, and the re-documented. The following are some of the specific changes made with respect to availability:

- **Revised Parity Map**
The parity map for TOPS-10 has been taken full advantage of K15 and R30 parity, but is provided in the algorithms are used and documented in the ST323 error status in the monitor conditions by getting a new bit, containing the parity error flag.

Monitor Dump Process

A new monitor resident bootstrap, called MONNET, has been written which provides a "hang and continue" facility. This bootstrap is capable of dumping one million words of memory in about seven seconds on a K15 configured with R30s and R30s. This means that a system dump can be taken on a recoverable stoppage without significantly disrupting user operations.

More Information at STOPC21 Time

The monitor now reports the date and time of the STOPC21 and a CPU status block on the CPU of the CPU that detected the STOPC21. The status block shows the important hardware status bits for the CPU and memory systems.

Improved Error Logging

Both SYERR and DADACH have been updated to provide more complete error logging. The new errors include:

- D320 error logging for TUTS writes errors on D320s
- CPU status block dumping
- Logging network node on-line/off-line transitions
- Additional R3X-20P hang-end device

IRAPING

In addition to the SYERR hardware switch that sets up an IAPC[®] to report errors on a remote console the error file.

R3X-20P Improvements

Many new "added" features:

ANS-10 Support on DECsystem-10 8000 Systems

ANS-10 is now available on R30-based systems (DECsystem-1000s running TOPS-10 Version 7.01 with D320 hardware and full memory system to ANS-10 Users of the 2000 can GET BOST or other systems in the network and other users can set host to the 2000.

Reliability Improvements

Much of the ANS-10 software has been rewritten for improved network reliability. Focus was placed on areas in the code that were known to be susceptible to failure. As an example, most of the network level code was eliminated to prevent race conditions.

Network Features

The 7.01 release of ANS-10 features multipathing (the ability to have multiple paths between two points), dynamic reconfiguration (automatic redistribution of network topology and re-routing of messages if a node fails), and route through (the ability to send messages via intermediate nodes).

Transmits in the network are not automatically retransmitted until the user types a character. This is to achieve that only active lines require RTCS. This allows more than 512 physical lines to be attached to the network. SEND-out output to non-connected lines and to wait on a terminal until there is a flush, a terminal is disconnected, or if no job is logged in and then

gets resources to improve new better because of the

handling

to line make rather

to been reduced

was rather

to return

Time-sharing User Facilities

Several new facilities and improvements to existing facilities have been made for the time-sharing user. They include:

- **Joblib Directory (JSD)** Support which has been expanded to include R30, R30, and GET commands. This means that JSD support is now available in the monitor.

- **Terminal Time Command** option which allows the user to specify the type of terminal being used (VT32, etc.). TOPS-10 uses this to set up information on screen size, 80 lines, and other terminal specific parameters.

- **Command Level Editing** has been improved for better terminals. The ability now is done on individual characters, rather than lines.

The operating system information data is removed from the screen to display messages.

- **100 Channels** have been increased to number from 80 to 100. This was done by redefining the FLEAF I/O. Applications with the need to access more files can use the capability to do so without the overhead of intermediate CPUs and CLMs.

- **Software Storage System (SSSR)** has been rewritten for improved reliability and efficiency.

The software is now read single while providing an expanded number of errors on which to operate. The main reliability improvement was the result of removing much of the network level code to eliminate race conditions.

Administrative and Operational Facilities

With TOPS-10 DPE, facilities have been added to improve the administration and operation of the DECsystem-10. Performance improvements have also been made for the R30 console and remote console length gaps.

Dual Processor Facilities

TOPS-10 DPE Dual Processor Software controls the dual processor facilities supported in Version 7.01. In its Version 7.01, Dual R30 support

includes fully symmetric configurations, in the configurations, disks can be shared between both processors' tape drives, tape systems, and D320s and D320s communications equipment can use on each processor. Dual-ported disks can now be used for swapping as well as user storage.

**TOPS-10
VERSION 7.01**

TOPS-10 VERSION 7.01 FLIER

The Large Systems group has recently published a four-page flier describing Version 7.01's features and benefits. Available at PC&S in Northboro, you can order the flier via #EA19823 26.

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RP20 PERFORMANCE NOTES (TOPS-10)

John Hallyburton, Jr.
 Ron Higgins
 MR1-2/E37

Introduction of a new product, such as the RP20, always invites comparison with the current product. SWE has spent a lot of time in examining performance of the RP20 for our own enlightenment. Here are some of the more interesting results:

1. First, there is no general rule. Depending upon the application, an RP20 can be made to run faster or slower than RP06s. This occurs because the RP20 transfer rate is faster, but there are fewer heads (per byte of storage) available for seeking. Thus you can say that operations that are "transfer bound" will probably do a little better; operations that are "seek bound" will probably do somewhat worse. Sites which are not disk-bound will not notice much difference either way.

2. Time-to-BACKUP

We have run a number of timing tests to determine if customers will encounter problems when trying to run BACKUP to save their disk files. The answer is that the BACKUP time for RP20s is roughly equivalent to the BACKUP time for an equivalent amount of RP06 storage. Customers should have TU70-series tape drives, simply because it is impractical to try to save such huge amounts of data onto slower tapes. The following table summarizes BACKUP time for a near-optimal placement of files on disk (customer times will be somewhat longer).

		Tape subsystems			
		DX10 TU70	DX10 TU72	DX20 TU72	
		----	----	----	
density		1600	6250	6250	bpi
time		75.	65.	63.	minutes to BACKUP one RP20 spindle containing two RP06s worth of files.

As you can see, the results are comparable across all types of tape subsystems. Tape reel change time was about 90

seconds, and is included in the times listed above. Altogether, 3 reel changes were required for the 6250 bpi drives, 10 changes for the 1600 bpi case. When this reel change time is factored out, the TU70 time approaches the TU72 times.

Again, the conclusion is that IT TAKES A LOT OF TIME TO BACK UP A LOT OF STORAGE -- IT MAKES NO DIFFERENCE WHAT THE STORAGE MEDIUM IS -- RP06 or RP20.

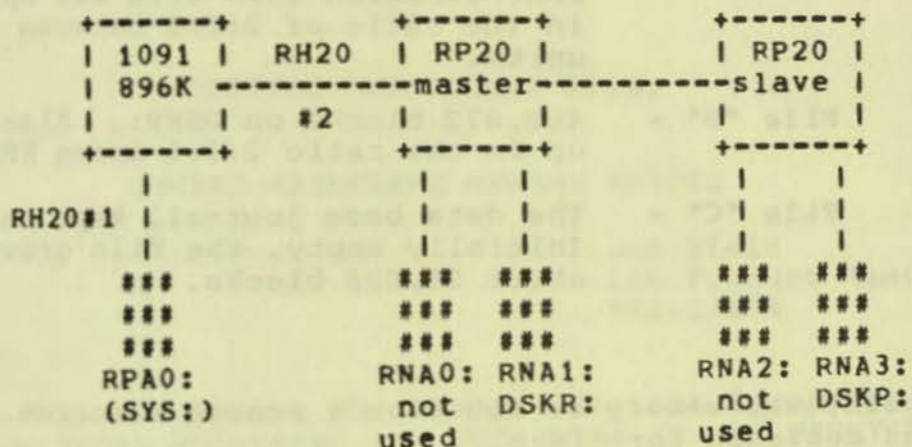
3. DBMS Performance

Since one of the markets for the RP20 is the "Large Data Base" market, we thought it would be worthwhile to see how the RP20 performed relative to the RP06 in a data base application. We designed a comparative test, and ran it on the Engineering systems one weekend. This particular test involved eight batch jobs accessing and updating one data base as described below. The results proved to be quite surprising: it was a TIE! The two systems were in a dead heat all the way and finished within 2% of each other after a 100-minute span. CAUTION: performance estimates may vary widely depending upon algorithms selected, system load, and a host of other parameters. Nevertheless, this was felt to be a fair test and was NOT designed to favor one configuration over another.

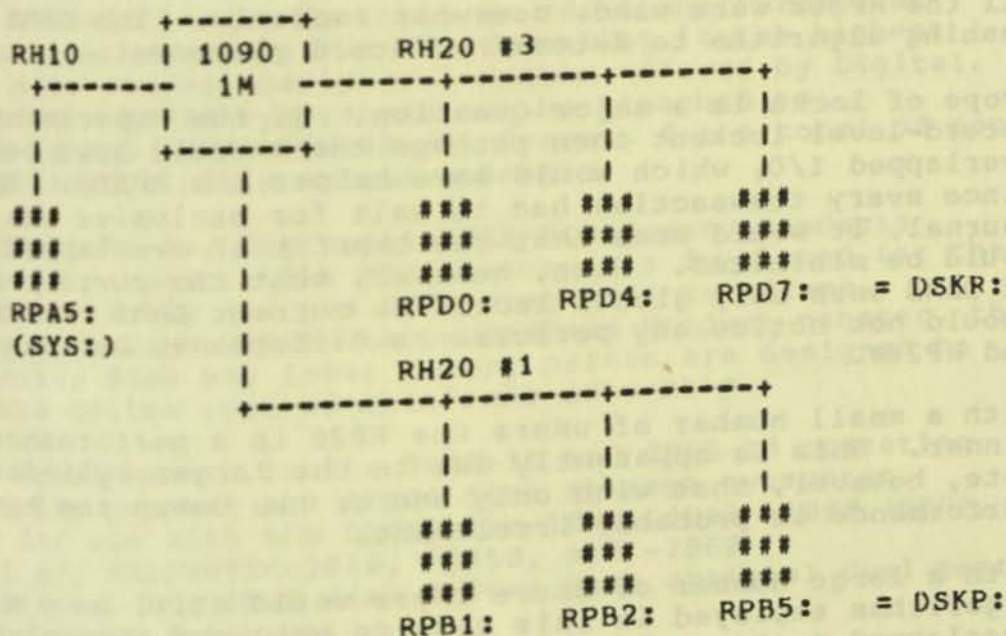
The batch jobs were simulating a university registration system. Each job entered (different) names into the data base, defined courses, registered students for courses, and listed the students in each course. Most of these tasks required many lines of typein before performing any data base I/O. Clearly BATCON can type faster than the average timesharing user so the eight batch jobs are probably representative of a fair number, say 30 to 40, of data entry clerks. During the experiment most of the jobs were waiting for permission to access to the data base or the journal. Hence, adding more jobs is not expected to change the results significantly.

The following configurations were used:

RP20 DBMS test configuration (figure 1)



RP06 DBMS test configuration (figure 2)



The "SYS:" structure was used only for control and log files. The data base involved three files:

- File "A" - 400,000 blocks on DSKR:. For the RP06 configuration this file was split up in the ratio of 2:2:1 between the 3 units.
- File "B" - 400,072 blocks on DSKP:. Also split up in the ratio 2:2:1 among RP06s.
- File "C" - The data base journal, kept on DSKR:. Initially empty, the file grew to about 55,000 blocks.

Notes:

At no point was memory or CPU time a scarce resource. This test was designed for disks.

The RP06 configuration featured two channels, compared to just one for the RP20. This was selected because it seemed quite likely that a customer with 6 RP06s would have 2 channels. From watching the experiment it became clear that the extra channel had little effect upon performance.

All the RP06s were used, somewhat randomly. The DBMS used a hashing algorithm to determine record placement.

Scope of locks is a major question. If the experiment used record-level lockout then perhaps there would have been more overlapped I/O, which would have helped the RP06s. However, since every transaction had to wait for exclusive use of the journal, it would seem that the benefit of overlapped I/O would be minimized. Note, however, that the current version of DBMS uses only global locks, so current DBMS customers should not notice any performance differences between RP06s and RP20s.

With a small number of users the RP20 is a performance winner. This is apparently due to the larger cylinder size. Note, however, that with only one or two users the hardware's performance is probably irrelevant.

With a large number of users there would still be a tie. The algorithms employed in this test do not lend themselves to overlapped seeks on idle units. Even if they did there would still be a problem of updating the journal on a write.

RP20 PRESS RELEASE

...New Disk, Reduced Memory Prices...

DIGITAL INTRODUCES RP20,

LOWERS MAINFRAME MEMORY PRICES

Joe Viula
LSG Product Mgmt.
MR1-2/E78

MARLBORO, Mass. -- August 29, 1980 -- Digital Equipment Corporation today bolstered the DECsystem-10 and DECSYSTEM-20 families of mainframe computer systems with the introduction of the RP20 high density 1.2 gigabyte disk storage unit, new lower prices, and enhancements to the TOPS-10 and TOPS-20 operating systems.

The new RP20 is the highest capacity disk offered by Digital. The RPT20 is a new disk subsystem consisting of an RP20 disk unit and a controller. Up to three additional RP20 disk units can be attached to the RPT20, making it the highest capacity mass storage peripheral system offered by Digital. A total of six RPT20 subsystems can be attached to DECsystem-10 and DECSYSTEM-20 mainframes, for a total of more than 22 gigabytes of formatted storage.

Price reductions for Digital's MF20 MOS memory products amount to 35 percent. The MF20 memory was developed for the DECSYSTEM-20 family and the DECsystem-1091 mainframe. According to Joseph Viula, Large systems Product manager, the high capacity disk and lower memory prices are designed to improve the system cost of mainframe ownership.

Software enhancements in the TOPS-10 and TOPS-20 operating systems fully support the RPT20 disk storage subsystem. Designed for use with the DECsystem-1090, dual -1090 (SMP), and -1091 and DECSYSTEM-2040, -2050, and -2060 configurations, the RP20 disk drives have optional dual port and dual channel features.

Each RP20 data module has fifteen recording surfaces with two read/write heads per surface and a transfer rate of 1.2 megabytes per second. Each data module may transfer data independently with the optional dual port feature.

The RPT20 subsystem with one RP20 disk unit is priced at

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\$140,000. Additional RP20 disk units are priced at \$49,000. Deliveries are scheduled for late fall, 1980. MF20 memory is priced at \$42,000 per 256K word expansion unit, effective immediately.

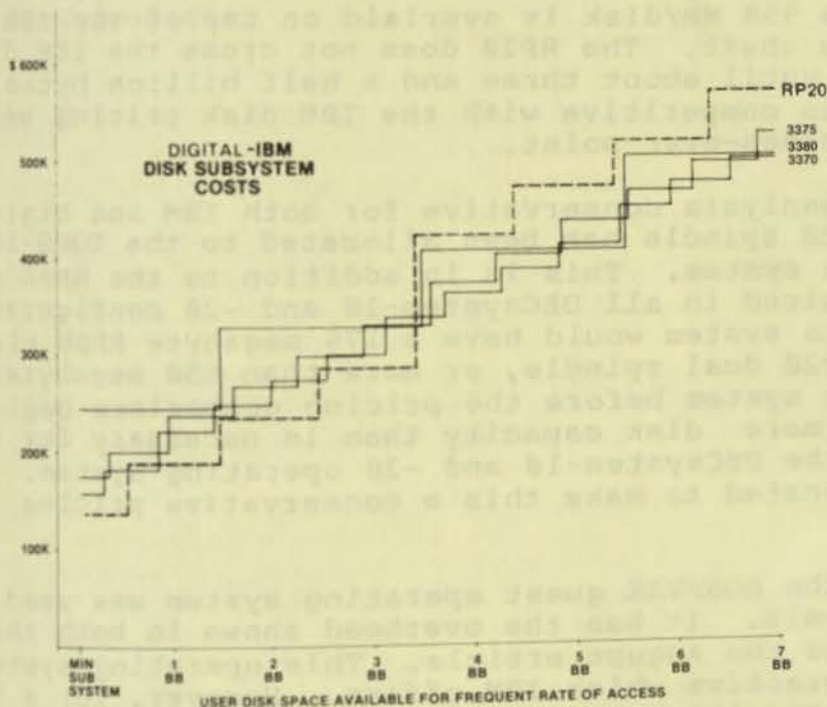
According to Viula, the new disk drive and subsystem and the lower cost memory will enable users to increase the capacity of their systems at lower costs. "System costs are effectively lowered from 10 to 30 percent in typical configurations. This enables users to take full advantage of the systems' capabilities," he said.

Digital Equipment Corporation, headquartered in Maynard, Massachusetts, is the world's leading manufacturer of interactive computers and a leader in distributed data processing. Its products include small, medium, and large-scale computer systems. Additionally, the company manufactures a complete range of peripheral devices and interfacing equipment and provides comprehensive customer support services. Digital employs more than 55,000 persons worldwide and has shipped more than 223,000 computers. For its fiscal year ended June 28, 1980, the company reported sales of \$2.4 billion.

(Editor's note: This Press Release will be sent to various computer magazines.)

THE RP20 VERSUS IBM DISKS

Richard Case
IBM Competitive Analyst
Commercial Marketing



In August the corporation introduced the RP20 disk, which provides more than 900 megabytes of formatted disk storage for the DECsystem-10 and -20 family.

In the August issue of ACCESS (Commercial Group Monthly Newspaper) an analysis was presented of IBM's disks vs Digital's RM05. This article extends that analysis to include the new RP20 disk.

The RM05 analysis showed that IBM disk drives are very complex and difficult to configure; that there are many components of the price of an IBM subsystem disk that must be added together before a true price/performance can be calculated. The IBM operating systems' software overhead must be taken into account as well as disk controllers and disk string controllers. When these costs are totaled, the IBM disk drives are not as price competitive as previously thought. Indeed Digital's new disk drives, the RM05 and the RP20, are very price competitive with IBM disks.

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In the August article IBM's prices for the 3370, 3375 and the 3380 disk drives were calculated out to three billion bytes. To show the relationship between the RP20 and the IBM disks, the analysis must be carried out to seven billion bytes because the RP20 competes with the IBM disks in this range. Based on these calculations, the chart shows the pricing of the three IBM disks. Not shown is the low end IBM 3370 disk attached to the 4331 processor, as the 4331 is a low performance system.

The RP20 with 950 MB/disk is overlaid on top of the IBM disk drives on the chart. The RP20 does not cross the IBM disk pricing line until about three and a half billion bytes. It is still quite competitive with the IBM disk pricing well beyond this cross-over point.

To keep the analysis conservative for both IBM and Digital, the first RP20 spindle has been allocated to the TOPS-10 or -20 operating system. This is in addition to the RP06 disk which is required in all DECsystem-10 and -20 configurations. Thus Digital's system would have a 176 megabyte RP06 plus one half of an RP20 dual spindle, or more than 650 megabytes for the operating system before the pricing comparison begins. This is much more disk capacity than is necessary for the overhead of the DECsystem-10 and -20 operating system. It has been allocated to make this a conservative pricing analysis.

VM/370 with the DOS/VSE guest operating system was used in the IBM analysis. It has the overhead shown in both this comparison and the August article. This operating system is the most interactive which IBM offers. However, for a large scale system requiring large disk capacity another likely IBM operating system would be OS/VS2 MVS. This operating system has even more overhead than the VM/DOS software, making the analysis even more in favor of Digital's disk offering.

It should be noted that the disk overhead for IBM's software is the minimum recommended by IBM. In a recent update announcement to IBM's VM/DOS IPO/E release 2 dated June 30, 1980, IBM stated that the disk overhead of five access arms is indeed the minimum. In the following paragraph from the announcement IBM added:

"The minimum DASD (disk drive) recommendations will accommodate base product installation and service application. Users of optional features should assess the applicability of these minimums to their environment. The customer is responsible for installing configurations sufficient to permit use of the products selected."

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The IBM software required to match Digital's operating systems includes many optional IBM program products which may require additional disk capacity. Therefore, this disk analysis should be considered based on minimum disk requirements for the IBM system.

The analysis shows the RP20 will be very competitive against IBM disk products.

SOFTWARE NEWS RELEASE
DECSYSTEM-20 GETS EXPANDED COMMUNICATIONS FACILITIES

Sharon Passon
10/20 Comm./Networks
Product Manager
DTN:223-5287

Keeping right in step with the rest of DIGITAL's computer family, the DECSYSTEM-20 has had its communications facilities greatly expanded with the addition of four important new product offerings.

First there's the newly announced DECnet-20 V2.0 that extends the TOPS-20 DECnet capability from Phase I to Phase II, making it possible for the DECSYSTEM-20 to participate as a node in a Phase II or Phase III network. Then there's RJE-20 V1.0, a DECnet-20 option that provides support for the remote job entry functions of the DN200 RJE station using the DECnet-20 protocol.

Added to this there are two IBM interconnect products. The TOPS-20 2780/3780 V2.0 Emulator/Terminator provides protocol support for six synchronous communication lines. The remote job entry station side (emulation mode) or host computer side (termination mode) of either the IBM 2780 or 3780 protocol can be specified on an individual line basis. And, finally, the TOPS-20 2780/3780/HASP V1.0 Emulator/Terminator goes one step further by including HASP in the set of IBM protocols emulated terminated.

In addition to task-to-task communications, DECnet-20 V.2 provides file transfer operations that can copy, delete, type a file, submit a batch control file, and obtain the file directory of a remote DECSYSTEM-20. It can also perform network support functions such as logging network load and line statistics, loopback testing of lines, and downline loading/upline dumping of front-end software.

When the RJE-20 option is used, up to four DN200-based remote job entry stations can be connected to a DECSYSTEM-20. RJE-20 accepts and processes TOPS-20 batch jobs and interactive operator commands received from terminals. It also directs RJE station output to the appropriate lineprinter and supports downline loading and upline dumping of the RJE station memory.

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RELEASE 4.0

Joe Viula
Large Systems Product
Managemnt
MR1-2/E78 X6857

DESCRIPTION:

TOPS-20 Release 4.0 System Software Package is a multiuser, multilanguage interactive processing system with multistream batch capabilities. The Release 4.0 Software Package includes:

- o TOPS-20 Operating System
- o RSX-20F Operating System (except DECSYSTEM-2020)
- o EXEC, the TOPS-20 command language processor
- o EDIT, the TOPS-20 line-oriented text editor
- o TV, A video editor
- o GALAXY 4.0, the TOPS-20 spooling/batch system
- o MACRO-20 assembly language
- o LINK overlay loader
- o system utilities.
- o user utilities

The package optionally supports FORTRAN, COBOL, ALGOL, APL, BASIC-Plus-2, and CPL languages. The Data Base Management System (DBMS) package is also optionally supported, interfaced to either FORTRAN or COBOL. The SORT program is an additional option that interfaces to COBOL and FORTRAN.

The system features:

- o virtual memory system with multiprocess job structure
- o advanced file system
- o optimized, highly reliable system resource allocation
- o ANSI standard tape label and record support

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- o administrative scheduler controls
- o a front-end operating system for asynchronous communications and unit record control (except DECSYSTEM-2020)
- o system tuning mechanism
- o integrated operator interface
- o easy-to-use system command language
- o system utilities to enhance system use and operation.

The TOPS-20 Operating System provides a virtual memory user environment of 256K 36-bit words. This virtual address space is demand-paged in 512-word pages. The user environment is structured to provide a multiprocessing job structure that services complex as well as simple applications. Several powerful forms of interprocess communication are provided.

- o IPCF -- interprocess communication facility; facilities for sending/receiving messages between processes.
- o PSI -- programmed software interrupts, generated by the system for event posting between processes.
- o ENQ/DEQ -- a resource queueing mechanism for the synchronization of two or more processes, commonly used for record-level interlocks.
- o Page Sharing -- system and user level code and data sharing on a per page basis.
- o Process Control -- direct functional control of an inferior process by its superior; used to implement the TOPS-20 command processor EXEC. Available for user application subsystems

The TOPS-20 file system is a general-purpose named file system providing:

- o mountable disk structures
- o up to 4000 user accounts/directories per structure on a 2020, 2040P or 2050P. Up to 12,000 accounts/directories on 2040S or 2060P

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- o multilevel directory structures
- o interuser security through directory and file access protection mechanisms
- o interuser cooperation specification through the user group definition facility, which allows arbitrary definition of user groups for common access to files
- o simultaneous update capabilities within a file, thereby allowing two or more cooperating users concurrent update access to a file
- o user-level disk space quotas for disk space management
- o automatic space allocation and deallocation during program run-time for file creation and deletion
- o automatic optimized file placement and I/O
- o centralized file name parsing and look-up monitor facility (eliminates the need for file name syntax checking in user programs and provides file naming consistency between programs)
- o centralized file operations facilities that provide device independent I/O operations
- o file archiving and retrieval capability under user and operator control.

These capabilities are provided to the user through TOPS-20 system calls.

The TOPS-20 Operating System performs process scheduling, memory management, and file system management. It also provides the environment for the batch system's queueing, job scheduling, job accounting, and device spooling operations. Specific percentages of the central processor can be allocated to individual users.

The TOPS-20 Operating System enhances system efficiency by optimizing system resource utilization. Memory, disk, and CPU are dynamically allocated to promote good response and high throughput.

The TOPS-20 Operating System supports hardware error detection and recording in a system disk file. A system error reporting program is provided which processes this error file to enable Digital's service personnel to monitor system availability.

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The RSX-20F operating system controls the front-end processor and communicates with the DECSYSTEM-2040, 2050 or 2060 processors. RSX-20F controls the unit record equipment and the asynchronous terminal lines. The asynchronous terminal lines can be either local or modem controlled (dial-in). Automatic baud rate detection is supported on modem controlled lines at 110, 150, 300 and 1200 baud. RSX-20F also provides the system console facilities.

The TOPS-20 command processor, EXEC, implements the system command language for interactive and batch processing. It provides command level facilities for controlling creation, compilation, execution, debugging, and deletion of user programs and their data. Commands exist to allow user assignment of resources, and to provide user/operator and user/terminal communications. The TOPS-20 command processor, EXEC, also provides file handling commands, privileged commands, and a number of system information commands. Additional user level system facilities are provided to further aid system use and operation.

The TOPS-20 Operating System supports DECnet-20 (SPD 12.2.2) RJE-20 (SPD 23.6.0), and 2780/3780 emulation/termination (SPD #23.1.3). A discussion of these improved features will appear in a future issue of this publication.

TOPS-20 GALAXY is a high performance multistream batch and spooling system providing:

- o the same command language used in timesharing
- o multistream batch operation with centralized operator control of the number of active streams
- o automatic line printer and card reader spooling with job accounting and control, including special forms scheduling
- o job dependency scheduling allowing creation of multi-job batch applications
- o job limit parameters to define a batch job's resource bounds
- o job control language error recovery facilities that allow command level recovery from expected or unexpected errors

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- o support of all language processors, application tools, and system utilities
- o capability to request automatic job restart should a system fail during job execution

TOPS-20 EDIT is the DECSYSTEM-20 file line-editing program. EDIT is a line-oriented editor with many character-oriented editing facilities. The novice user can choose to edit a file using simple line replacement, while the more experienced user can perform string searches, string replacements, and other advanced editing operations.

The TOPS-20 video editor, TV, usable on both video and hardcopy terminals, combines sophisticated editing features of the TECO (Text Editor and Corrector) editor common to many of Digital's systems with easy-to-use video terminal screen editing facilities.

TOPS-20 MACRO-20 is a two-pass symbolic assembler for the DECSYSTEM-20. Its features include:

- o powerful macro facilities with nesting
- o extensive pseudo operations
- o expressions with constant, absolute, or relocatable symbols
- o capability to declare symbols available to FORTRAN or COBOL
- o conditional assembly
- o support for writing re-entrant code
- o symbolic debugging facility
- o parameter file searching
- o multiple program counters

TOPS-20 LINK is a linking loader for the DECSYSTEM-20. In addition to the basic loading functions, LINK provides:

- o single region, tree-structured overlay facility
- o load-time-defined overlay structure, independent of FORTRAN, COBOL, or ALGOL programs

The script are run in the ratios:

BIG:	1
DATAGEN:	1
INSORT:	1
EDIT:	2
TRANS:	2

The data is presented in graphical form with the number of simulated terminal users on the horizontal axis, and the time taken to perform some specific event on the vertical axis. The data is shown in scattergram form where a point with a given x and y coordinate shows that with x simulated users at least once the event had been seen to take y seconds. This format preserves a maximum of information.

The events shown are:

Time taken from an EDIT command is entered till the editor prompts for a command. The EDIT command is the most commonly used command that uses a small amount of disk I/O and CPU time. Users expect this time to be fairly short, but can accept some variability.

Time taken to compile a 300 line FORTRAN program. This is a fairly CPU intensive event that users expect to take some time when the system load is high.

Response time within the editor. These response times are the most critical, and must be short if the terminal users are to be happy. The least acceptable performance is both sluggish response and unpredictability in these responses.

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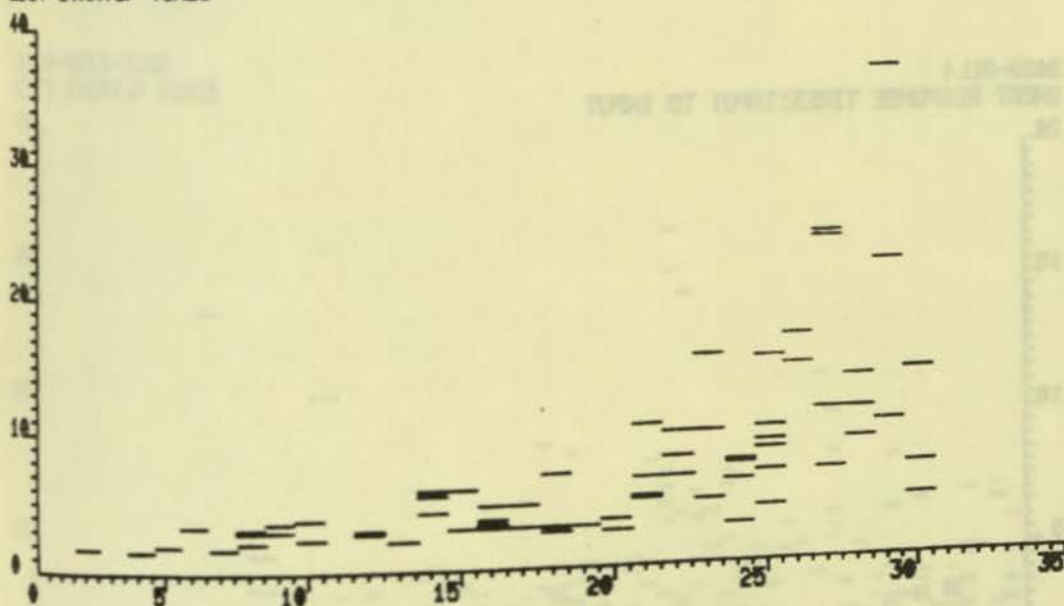
2020 WITH 512K WORDS

This is the maximum configuration of the 2020 and shows what the optimum performance of the 2020 is.

With fewer than 21 active terminals, the system performs admirably with all events running almost as fast as if the users were running stand alone.

From the 21st user the system becomes CPU saturated and all events take longer and longer as the number of users increase. As expected the trivial interactions suffer less than the CPU intensive interactions.

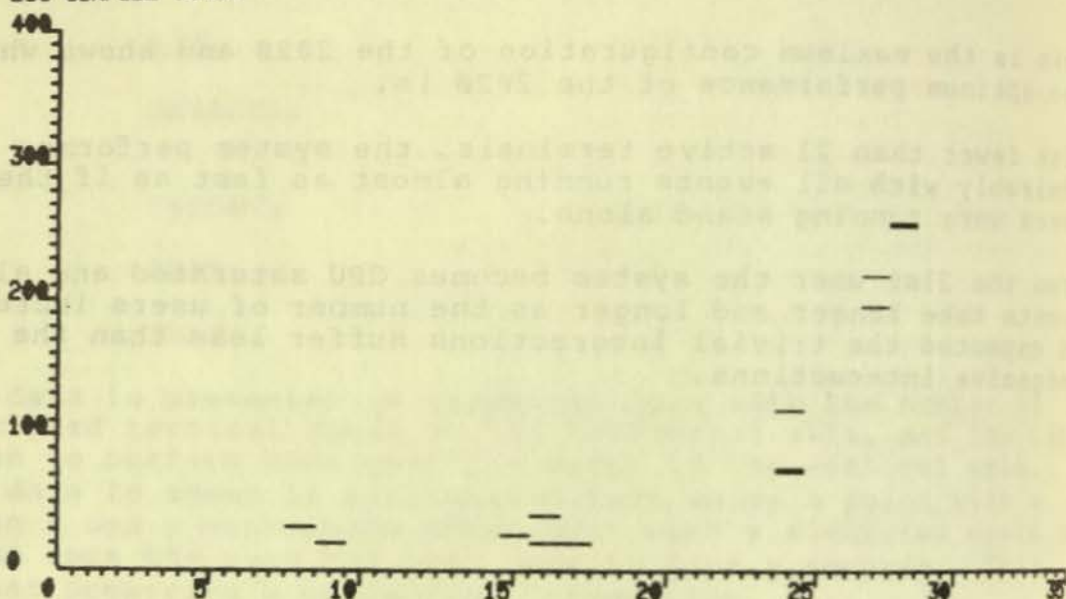
2020-REL 4
EDIT STARTUP TIMES



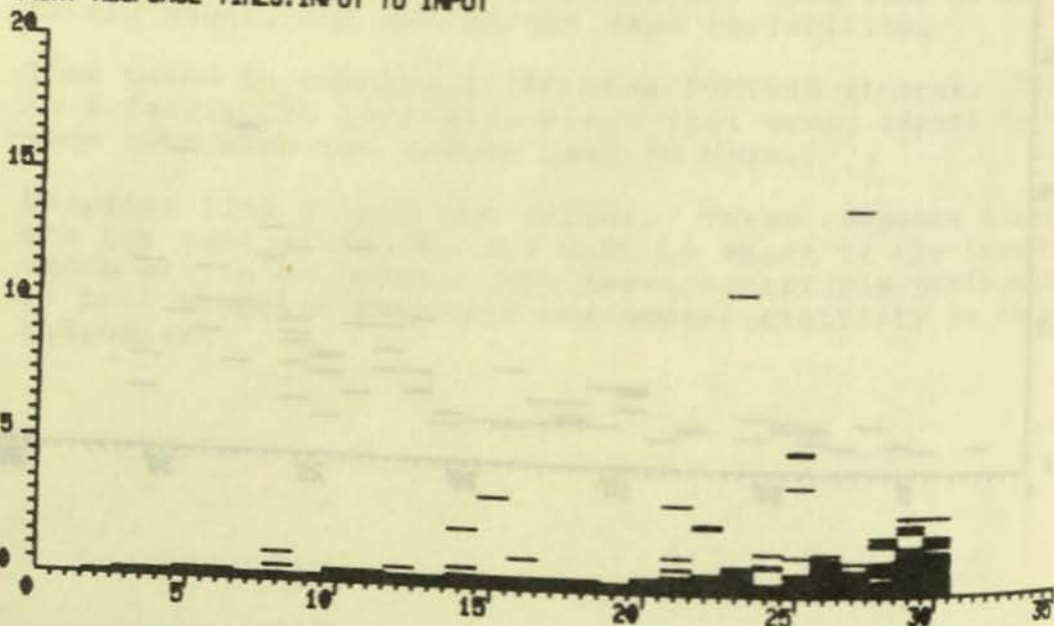
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2020-REL4
BIG COMPILE TIMES



2020-REL4
SHORT RESPONSE TIMES: INPUT TO INPUT



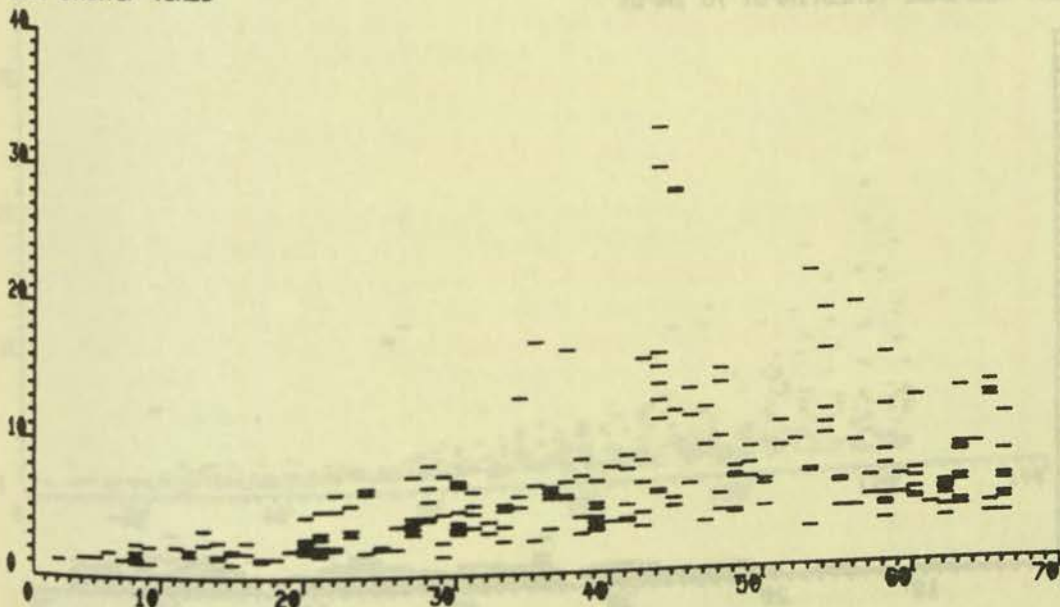
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2040 WITH 512K WORDS

Few 2040 systems get upgraded to more than 512K before cache is added, so these data show what most users can expect from the biggest 2040 system normally used. Other tests have shown that performance does not increase significantly if more memory is added.

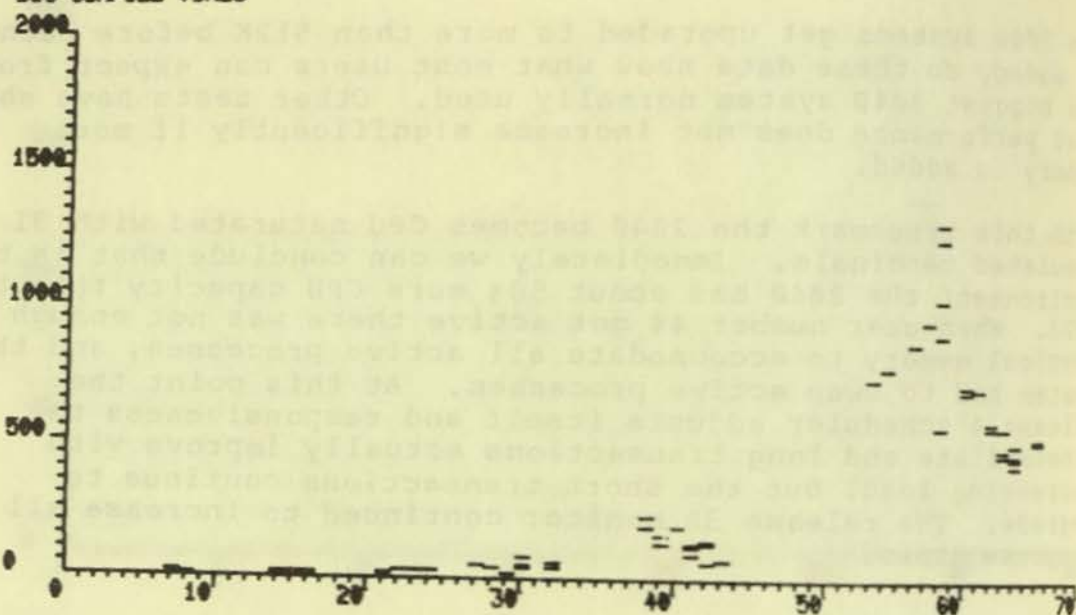
With this benchmark the 2040 becomes CPU saturated with 31 simulated terminals. Immediately we can conclude that in this environment the 2040 has about 50% more CPU capacity than the 2020. When user number 44 got active there was not enough physical memory to accommodate all active processes, and the system had to swap active processes. At this point the release 4 scheduler adjusts itself and responsiveness to intermediate and long transactions actually improve with increasing load, but the short transactions continue to degrade. The release 3A monitor continued to increase all response times.

2040-REL4-512K
EDIT STARTUP TIMES

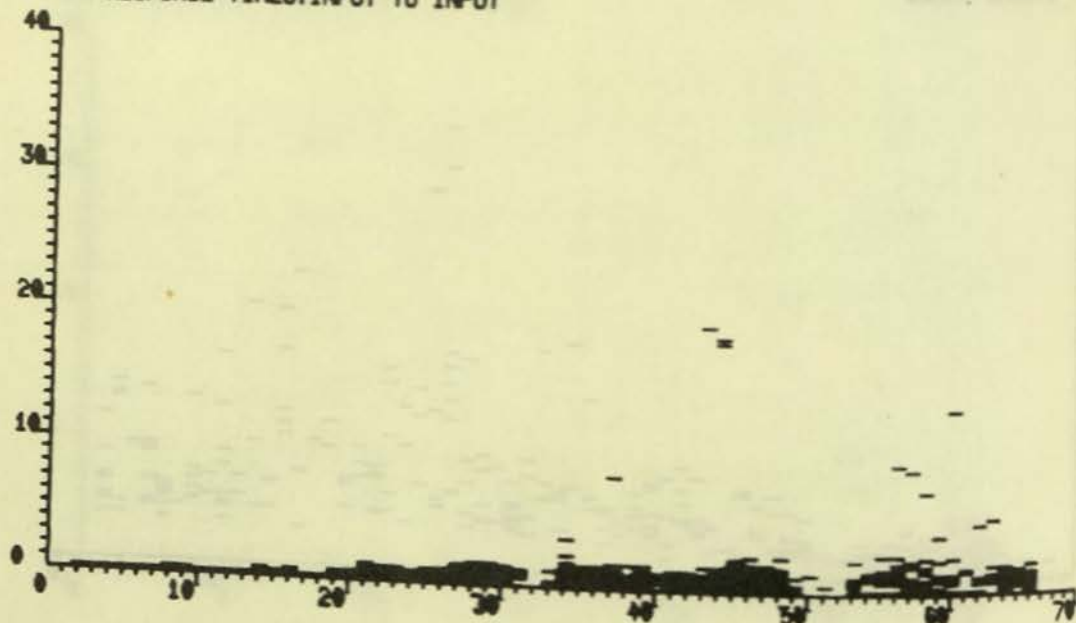


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2040-REL4-512K
BIG COMPILE TIMES



2040-REL4-512K
SHORT RESPONSE TIMES: INPUT TO INPUT



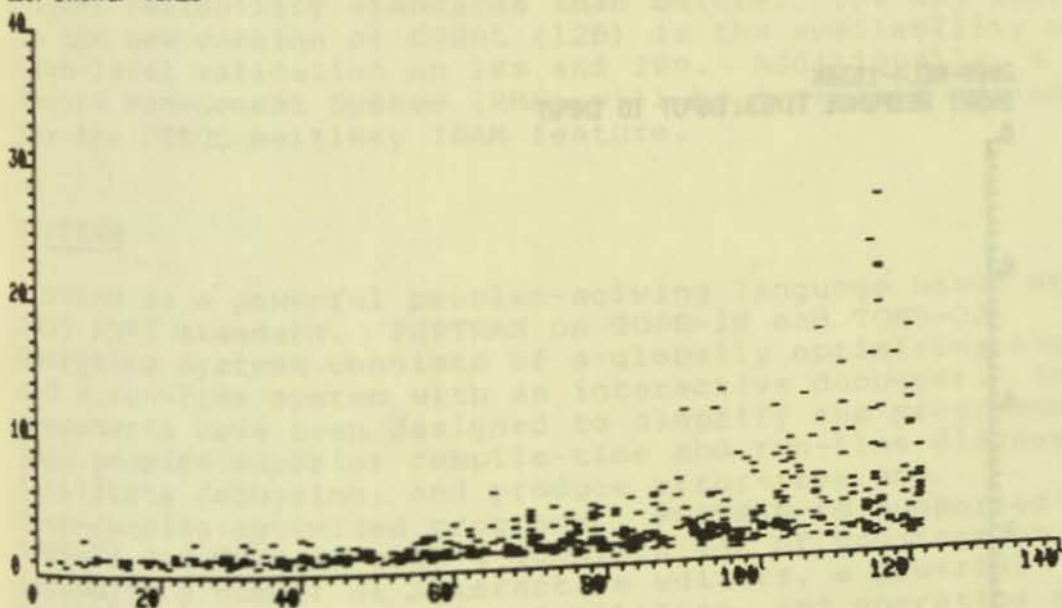
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2060 WITH 1536K WORDS

I chose to show a fairly large 2060 configuration in order to demonstrate that the 2060 with release 4 comfortably handles the maximum number of terminals that can currently be attached to the system. More memory does improve the performance further, and less memory would show a point of sharp degradation.

This 2060 configuration became CPU saturated with 96 active users, and with this mix has a CPU capacity of 3 times the 2040, and 4.5 times the capacity of the shown 2020 configuration.

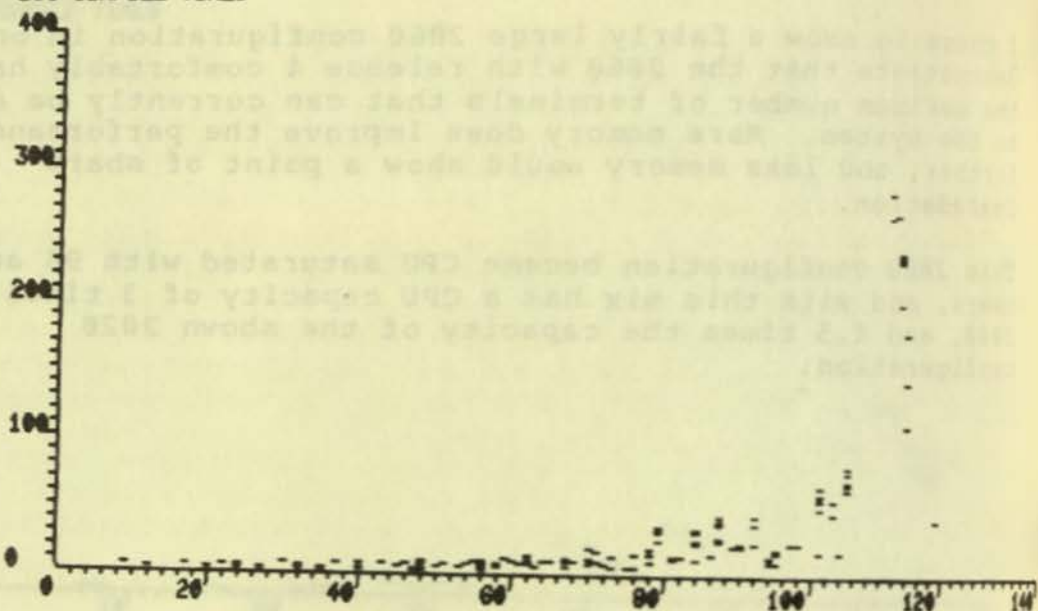
2000-REL4-1536K
EDIT STARTUP TIMES



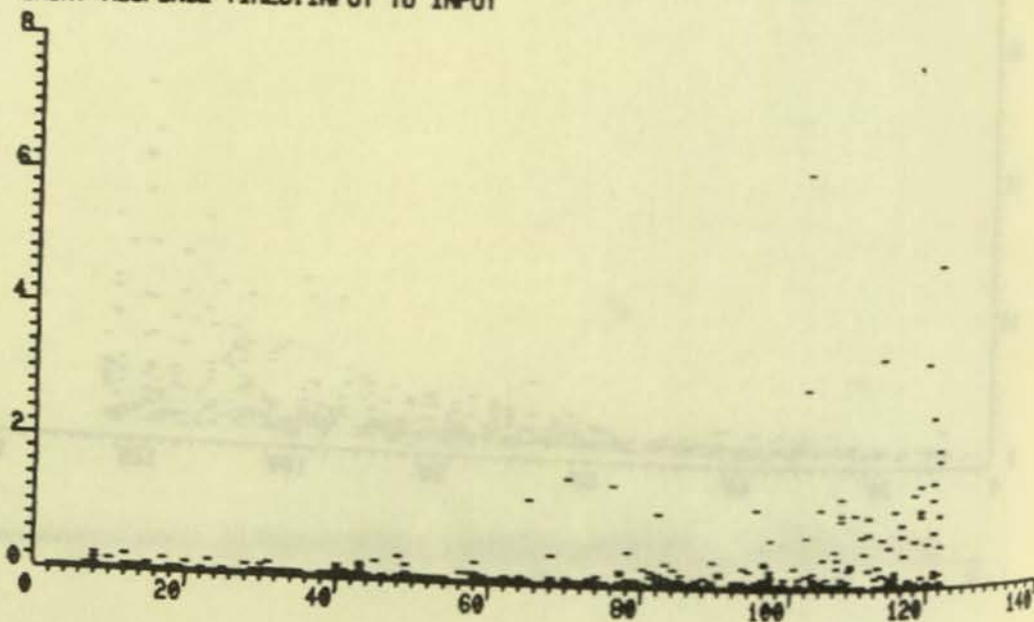
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2060-REL4-1536K
BIG COMPILE TIMES



2060-REL4-1536K
SHORT RESPONSE TIMES: INPUT TO INPUT



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IT AIN'T THE SAME OL STUFF

Cindy Lyman
LS Product Management
MR1-2/E78

In the continuing effort to improve the layered products offered on DIGITAL'S 36-bit DECSYSTEM-20s, three new versions of layered products are being offered: COBOL, Version 12B; SORT/MERGE, Version 4C; and FORTRAN, Version 6.0. All of these products are fully supported by Digital. A summary of the features and benefits of each of these languages follows.

The key features of Version 6.0 of FORTRAN are:

- * native FOROTS (speeds run time with one-step compiling)
- * high accuracy math library
- * FORTRAN-77 open statements and format description
- * performance improvement for random I/O
- * improved COMPILE-TIME and RUN-TIME diagnostics

Version 4C of SORT/MERGE, due to customer feedback, has higher reliability standards than before. The key feature to the new version of COBOL (12B) is the availability of high-level validation on 10s and 20s. Additionally, a Record Management System (RMS) will be available optionally for the COBOL multikey ISAM feature.

FORTRAN

FORTRAN is a powerful problem-solving language based on the 1977 ANSI standard. FORTRAN on TOPS-10 and TOPS-20 Operating Systems consists of a globally optimizing compiler and a run-time system with an interactive debugger. Both components have been designed to simplify the programmer's job, provide superior compile-time and run-time diagnostics, facilitate debugging, and produce error-free and fast-running optimized programs. FORTRAN is supported on TOPS-10 and TOPS-20 with a complete set of programming aids, including a number of interactive editors, a powerful linking loader with overlay facilities, and operating system support that enables FORTRAN programs to be developed and run under both timesharing and batch with no conversion.

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FORTRAN can be used to program large-scale simulation of discrete and continuous systems including: electronic circuit simulation, nuclear reactor fuel management studies, and pollution control studies. Linear programming applications are simpler with FORTRAN. TOPS-10 Operating Systems running FORTRAN also allow data collection and analysis from large experimental apparatus requiring high-capacity computation.

SORT/MERGE

SORT/MERGE is a sort utility for either the TOPS-10 or TOPS-20 Operating System and is operable as stand-alone with COBOL or with FORTRAN. SORT/MERGE reorders the records of EBCDIC, ASCII and SIXBIT files, as well as binary files produced by COBOL or FORTRAN in a sequence determined by the sorting parameters prepared by the user. SORT/MERGE automatically controls the use and allocation of disk work space and memory work space. The user can also specify memory limits. SORT/MERGE provides error diagnostics and statistics upon completion. The MERGE capability permits the merging of sorted files into a single sorted file. This function can be invoked either in the stand-alone use of SORT/MERGE or the COBOL MERGE verb.

COBOL

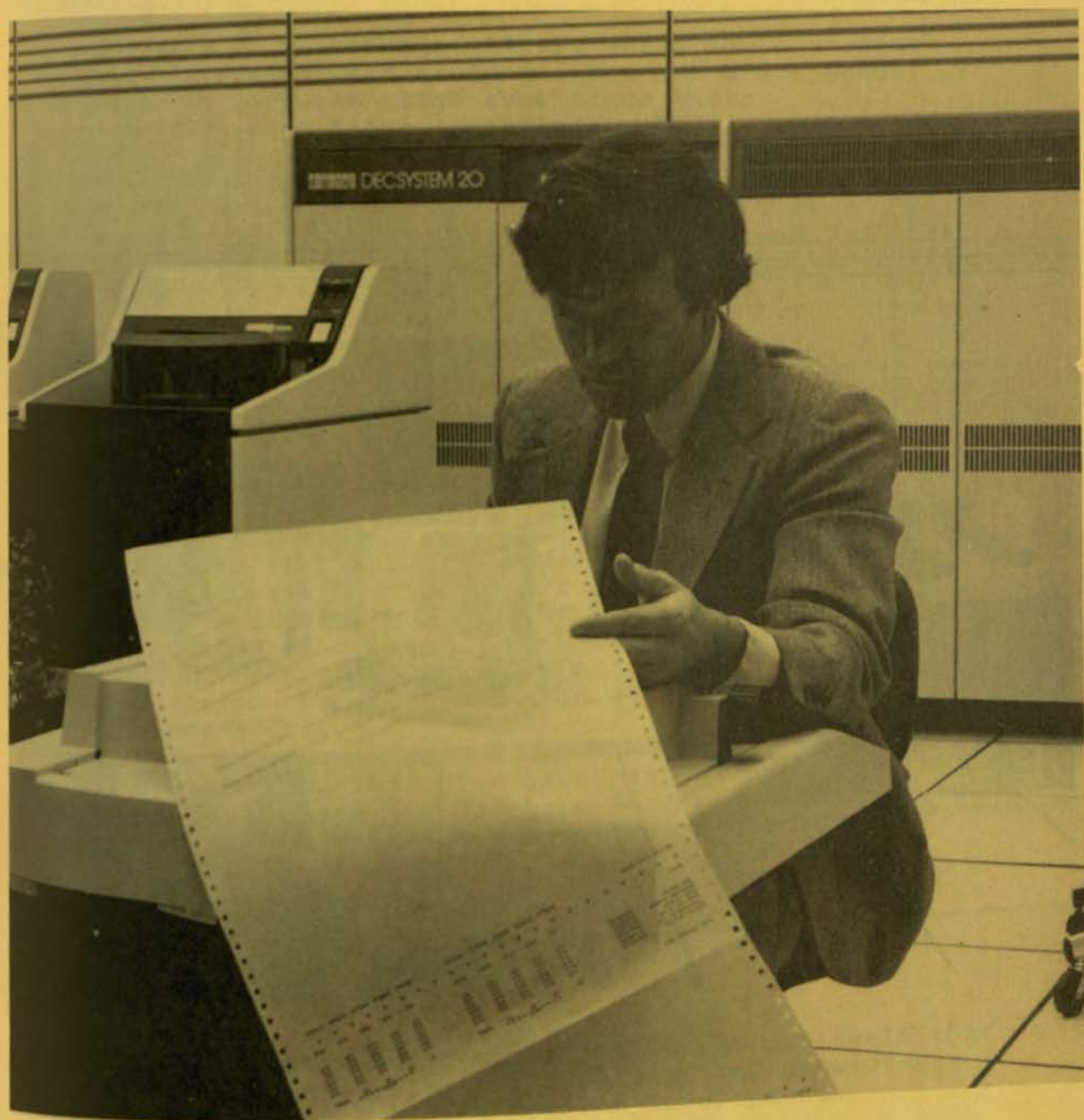
COBOL is a powerful and flexible high-level business-oriented data processing language. It is an internationally standardized language, enabling programs to be written at one installation and transported to another with minimal conversion, even if the two computer systems are not compatible. Programs written in COBOL are much easier to read and maintain than those written in other, less English-like languages.

COBOL for both the DECsystem-10 and DECSYSTEM-20 has been validated against the ANSI 1974 COBOL (COBOL-74) standard. COBOL programs can be compiled and executed in both interactive and batch modes. A future article will discuss performance specifics of FORTRAN and COBOL.

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APPLICATIONS

John Golden
IBM Marketing
PH 3/78



IBM CORPORATION

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TIMESHARING EXPANDS COMPUTER USAGE AT
UNIVERSITY OF PITTSBURGH

Jane Goldman
ECS Marketing
MR1-1/M40

The University of Pittsburgh (Pitt), which has a student population of over 34,000 students, has had a 27% annual growth rate in computer usage ever since their DECsystem-1050s were first installed in 1971.

The University originally purchased the DECsystems because the Computer Center needed an on-line, interactive timesharing facility. The DECsystems ease-of-use has been important in accommodating the demands of Pitt's diversified user community. Today, four KL10s (dual DECsystem-1099s) run academic and research applications, and a fifth KL10 (a stand-alone DECsystem-1090) runs administrative applications. The Computer Center frequently processes over 7,000 batch jobs per day and up to 25,000 connect hours per month in timesharing.

Data from the Computer Center's off-campus computing facility at the Regional Industrial Development Corporation Industrial Park is transmitted to its Cathedral of Learning computing facility, which is 5.7 miles away, via a microwave link. The microwave system connects the five KL10 processors to twelve remote job entry sites (RJE's) at various locations on campus. Each RJE is a PDP-11 based configuration. The Pitt Computer Center staff have found the PDP-11 equipment "easy to use in developing a successful communications system."

The Center's Director said, "We have been pleased with Digital's Field Service and Software Support which is a solid business relationship based on cooperation between the vendor and the customer."

TIMESHARING AIDS RESEARCH

The Assistant Director for Systems and Operations feels that the TOPS-10 operating system's flexibility and ease-of-use has further facilitated Pitt's program development.

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"TOPS-10's capacity to support a large number of on-line simultaneous users is extremely important" he said. "In addition, since the DECsystem-1099s can handle major statistical packages and a variety of languages, they have been used extensively in research applications at Pitt."

Pitt's Bio-Statistical Unit uses the DECsystem-10 in virtually every phase -- from patient entry and data base management to statistical analysis and report writing -- involved in coordinating nine clinical trials conducted by the National Surgical Adjuvant Project for Breast and Bowel Cancers (NSABP). One of the Coordinating Statisticians explained "The excellent timesharing support and stability of the DECsystem-10 is essential for our work."

DECsystem-1099 USED TO MAP STARS

The DECsystem-1099 has also been used in research at the University's Allegheny Observatory, which is internationally known for measurements of stellar distances, velocities and masses, and for the search for extrasolar planetary systems. Astronomy professors recently developed an electronic device called Multi-Channel Astrometric Photometer (MAP), connected to a PDP-11/03, which is then in turn connected to the dual DECsystem-1099s. Data that is gathered on the PDP-11 to determine relative light curves is transmitted to the DECsystem-1099.



Dr. Steven Kipp, a graduate from the University's Doctoral Program, peers into their 36-inch Thaw photographic refractor, the world's only telescope currently employed in the search for extrasolar planetary systems.

MAP is used to determine: the relative positions of stars to one another, the masses of stars orbiting one another, and the existence of extrasolar planetary systems. In 12 minutes, disks are filled with 500,000 words of information. The DECsystem-1099's ability to handle large amounts of data in data analysis is invaluable to the research performed.

WRITING AND EDITING WITH TOPS-10

Chemistry Department personnel find the pair of DECsystem-1099s valuable in research and teaching. One professor has developed a 55-lesson chemistry Computer-Assisted Instruction (CAI) library, which includes lessons for Nursing, Engineering, and Chemistry undergraduates on the DECsystem-1099s. He said, "The DECsystem has the one-to-two second response time required for CAI. It is a responsive, reliable timesharing system. TOPS-10 has a very easy command language. Students can reliably access the system from remote terminals."

He has also used the DECsystem-1099 to write and edit two books using a word processing utility, entitled "Numerical Methods In Chemistry" and "Preparation For General Chemistry". Another professor has used the DECsystem-1099 to write and edit books. He likes the simplicity of the TOPS-10 monitor control language. "You don't need different languages and programs", he said. "TOPS-10 is easy-to-use for students, as well as professors. And I believe this interaction with the machine is the most important part of learning."

COMPUTER USED IN COMPOSING

The DECsystem-1099s are used in still another experimental research application. Music is composed on the Music Department's system by using a DECLAB-11/03 computer hooked up to a DECsystem-1099 to generate control voltages on a synthesizer in their electronic music studio. The computer then stores the music for later editing and manipulation by the composer. "The composer can call back aspects of the score from the computer's memory during composition", explained a music professor, "thereby providing interaction between composer and computer. You can hear the music you compose, strand by strand; there is very little delay. The immediacy of the computer's response is one of the most attractive features in composing complex musical compositions."



According to music student Peter Wannemacher, the computer gives composing a new dimension.

USED IN ADMINISTRATION

Pitt's University Computer Center is used extensively by the administration as well as by faculty and students. In 1978, when Pitt started using its stand-alone DECsystem-1090 for administration, one of the first major administrative applications developed was for the Office of Development and Alumni Affairs. Today, The Alumni System contains a database that exceeds 165,000 records, and includes on-line query and data entry facilities, as well as standard and ad hoc report generation features. The system also has an on-line capability to produce address labels for the Alumni Times, a quarterly publication.

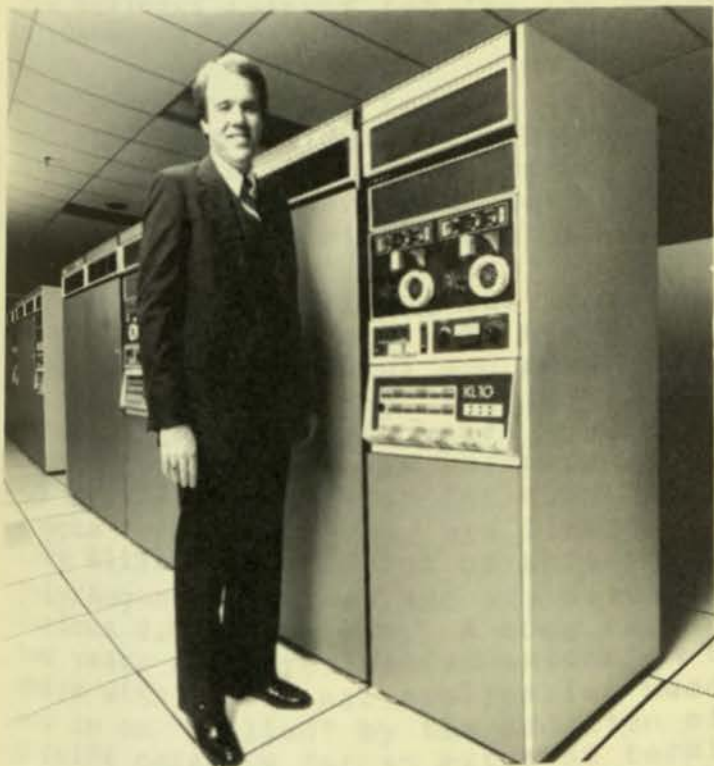
Pitt's Admissions Office has on-line data for recruitment on such specifics as: the annual number of applicants, the profile of the students who do apply, how many they accept, who makes a deposit, who will enroll, and who will eventually graduate.

A payroll system and a financial accounting system are currently under development for implementation on the University's administrative DECsystem-10.

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PITT'S LIBRARY AUTOMATION

Pitt's extensive library automation system, developed by the Library Systems Development Department, utilized the DECsystem-1099 for a sophisticated computerized information network for on-line circulation control. The On-Line Circulation system enables not only the main library, but also three branch libraries in other locations across the campus, to control their circulation collections. The On-Line system automatically suspends the borrowing privileges of delinquent patrons, processes holds, and generates call-ins and overdue notices. The system also provides query capabilities into the status of patrons and/or library materials. Statistical information gleaned from the On-Line Circulation system provides a means to make decisions in the areas of collections development and library resource allocations. The library also utilizes the DECsystem-1099 for its Book Fund Accounting, Books In-Process, Serials Subscriptions, and Serials Holdings systems.



Dr. Paul A. Steiman, Director of Pitt's University Computer Center, believes that the DECsystem-10 has excellent timesharing capabilities.

DECsystem's TIMESHARING IS UNLIMITED

In addition to the computing applications already mentioned, Pitt also uses the DECsystem-10 in other departments throughout the University. The football team analyzes scouting data on offensive plays of other teams on the DECsystem! Professors and administrators alike are clearly pleased with the interactive capabilities of their DECsystems. As Computer Center Director Paul A. Stiemann said, "The DECsystem has excellent timesharing capabilities. With this as a base, there seems to be no limit to the range of computing applications that can be developed."

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BRITISH AIRWAYS - LONDON SMP

David Rycroft
ESG Sales - Welwyn

Having read all about SYMMETRICAL MULTIPROCESSING in the July/August issue of Buy-Line (page 30, 31, and 32) you could be asking "so what?" and "who uses SMP?" Well, it might interest readers to know that among others, British Airways is using this latest most powerful 36-bit word weapon to kill an overload problem.

Now that you know the technical merits of SMP, I thought perhaps the not-so-technical among you would like to hear a few business reasons for its implementation at British Airways.

For those who didn't realize it, British Airways is a major contender for world airline business being, about twice the size of Digital in revenue terms, with about the same number of people. They manage to keep their head above water by competing smartly with the other big names in the business. This year is one of slim profits for British Airways, due mainly to rapidly rising fuel costs and to competition from cut-price seat vendors. To stay one jump ahead of the game, they need to do careful and repetitive route planning, performance, modelling, seat costings and other related tasks. For some eight years now, they have made extensive use of our DECsystem-10 hardware for this purpose. Two KI10s are providing a service for about 100 simultaneous users on remote terminals. They are linked in a Master/Slave mode (see Allan's description of this on page 29 of the July/August Buy-Line) and are served by networking nodes from various U.K. locations. A more recent KL10 processor (about two years old) provides an extension of this service to other users with additional application needs. This later KL10 is now to be "dualled" by the addition of a second processor to provide capacity for an extra 50 terminals. "Dualling" will take place under SMP software using TOPS-10 Version 7.01. This will then become the third 1090 SMP site in Europe and the second in the U.K.

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Why did we sell British Airways a 1090 SMP?

Well, for one reason, I had an excellent Software and Field Service support team behind me and their enthusiasm was second to none. There were a few other reasons however, and I have summarized them below.

Cost

Always an emotional issue, but in this case practical calculations showed significant savings over the alternative stand-alone system. Depending on how we did these calculations, it varied between 20% and 40% saved. (Variations included different numbers of disc drives, channels, tapes, etc.)

Redundancy

This was a major feature in the decision making process. The service offered to their users is just as time critical as any timesharing bureau service. The ability of either processor to automatically take over its neighbor's workload (with some reduction in response) was most attractive.

Successful Benchmark

Conducted by Surinder Khurana on the Marlborough Software Engineering 1090 and showing a performance ratio of at least 1.75 to 1. This exceeded the minimum performance requirement laid down by British Airways.

British Airways Awareness

Not to be underestimated in a sale of this kind is the ability of the prospective customer to fully understand the implications of buying and using sophisticated tools. The team at British Airways must be placed second to none in this respect being very experienced in TOPS-10 software and self-maintaining from a hardware point of view.

What did they Buy?

- 1 1090s-UD upgrade package
- 3 RH20s
- 1 RP06-BB

Plus communications options and a field service/software support package to "bolt" the system together.

Delivery and installation are scheduled for February/March 1981.

(Editor's Note: In the October 1980 issue of ACCESS, Vol.2, Issue 10, the MDC Group submitted an interesting article which I have republished below.)

Kansas City Star Celebrates 100th Year

Elaine Mileo
MDC Mktg. Comm.
DTN: 264-5441



Pictured left to right: Jim Davis, MDC Sales Representative, Jim Payne, K.C.Star Vice President Finance.

Midwest newspaper enters second century; orders DECsystem-10 upgrades.

Tradition. Newspapers tend to nurture it, The Kansas City Star being no exception. The metropolitan evening paper for the greater Kansas City area, The Star enters its second century with a rich history.

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C-139

From the tenacity and talent of its founder William Rockhill Nelson to general assignment reporter Ernest Hemingway and writer William Allen White, later publisher of the Pulitzer Prize-winning Emporia (Ks) Gazette, The Star and its staff have earned nationwide reputations.

This reputation doesn't rest on tradition alone. In the early 1960s, The Star was among the first of the major metropolitan newspapers to automate its composing room. By 1972, The Star had reached a major crossroad. Faced with the need to expand applications on both the business and editorial sides of the operation, The Star either could upgrade its existing IBM equipment or turn to a new vendor. The new vendor proved to be Digital and its large systems products.

The transition period wasn't without headaches. As the newspaper's vice president of finance Jim Payne recalls, "We hired two software wizards who worked on the systems 20 hours a day. Eight years later, both men are still with us and together they know the systems inside out."

Today, Payne added, virtually every aspect of The Star's operation is handled by DECsystem-10s. Business applications include payroll and accounts receivable--handled on-line via terminals in the departments responsible.

In the newsroom, terminals are replacing the electric typewriters which had replaced the old black uprights. While the manual typewriters and green eyeshades are gone, The Star's newsroom would still be recognizable to the newspaper's founder. Organized chaos reigns--while no longer punctuated by clanging typewriters, telephones still ring incessantly.

The present configuration consists of two DECsystem-1090 KLS and two KAs. The KAs will be replaced in January on delivery of a new DECsystem-1091 with the new RP20 disks. The RP20 disk, according to Digital's account manager Jim Davis, was a key factor in the sale of this system. "The pricing of the disk enabled us to compete head-to-head with other large system vendors--and win!" More than 180 terminals can be found throughout the Star's complex.

Payne commented that a major advantage of Digital's systems is the backup capability. Editorial applications and business applications can be transferred among systems as needed.

The system upgrade should allow development of a major new application, placing the entire classified advertisement process on-line. While segments of the classified department already are handled by the 10s, the new application would

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input ads at the time they are telephoned in. The ads would then automatically be sorted, typeset, composed and paginated. The system would also compute and generate bills for the ads, handling more than two million ads a year.

With this increased activity, Jim Davis has been juggling several balls at once. Davis has had the MDC account for the past year, in that time working to implement account management concepts. "Weekly account status meetings have proved extremely beneficial," Davis said. "A firm account team approach has helped us through some volatile situations."

In addition to Davis, D.J. Belt, Field Service supervisor, and Ken McClung, the site representative for Field Service, have worked closely with The Star's staff. Also instrumental in this "team sell" was the MDC Large System Marketing Group. Delivery was a key issue and through close work between the MDC Large System Group and the field, the requested delivery dates were secured.

HARVARD BUSINESS SCHOOL

USES DECsystem-1090
IN ACADEMIC AND ADMINISTRATIVE APPLICATIONS

Jane Goldman
ECS
MR1-1/M40

Harvard Business School's Division of Computer Services has been associated with Digital Equipment Corporation since August of 1972, when their first DECsystem-1070 was installed. Since that time, the Business School has contracted for a facilities management staff provided by Digital Software Services. Digital employees include an operations manager, a technical specialist, an operations supervisor and four operators.

This past July, the Business School upgraded their DECsystem-1070 to a new DECsystem-1091 in order to provide additional support for a wide range of academic and administrative applications.

The new DECsystem-1091 is considerably more powerful than the DECsystem-1070. It has additional storage space and printer capacity, greater speed, more terminal input ports and improved communications protection. The 1091 system can be connected to 24 data sets and 56 terminals at one time. It also has four times the disk storage and twice the memory capacity of the 1070. Since the data channels and memories are housed in three cabinets, the 1091 is most advantageous in saving space.

In the October '79 issue of Harvard Business School's Computer Services Newsletter, the 1091 system's reliability was highly commended. At present, primarily FORTRAN and BASIC are used in its academic applications, while COBOL and SYSTEM 1022 (Data Base Management System) are used in administrative applications.

While the new 1091 mainly supports academic applications, this past fall the 1091 was used for the first time to support a major administrative application. In support of this application, the 1091 system is connected to a Digital WS222 Word Processing System in their External Affairs Office (Alumni Records, Fund Office, Corporate Relations, Alumni Bulletin). It is currently assisting the staff in administering fund raising activities and in maintaining alumni records. Additional major administrative applications are planned for the future.

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In addition to its new administrative role, the DECsystem-1091 is still primarily used as a learning tool for business analysis. A number of business school courses include formed exercises and other assignments requiring its use. In the MBA Program, for example, a management simulation game is included in the first year curriculum. Classes are divided into teams which input business decisions, while the 1091 simulates the activity of a competitive business marketplace.

The interactive 1091 system enables many students to play this management game simultaneously at different terminals. The Business School has occasionally made this management simulation game available to other schools.

Harvard Business School has been satisfied with their DECsystem-10 ever since it was first installed in 1972. They were among the first to purchase the DECsystem-1070s, LA30s, and VT05s. Their new KL processor is more powerful than the KI processor, and preserves their large investment in Digital hardware. Due to the DECsystem-1091's excellent timesharing capability, the DECsystem-1091 has positioned the School well to provide improved support for a wide range of academic and administrative activities.

Key DECsystem-1091 Components

1. Central Processor (KL10E)
 - * 80 simultaneous jobs
2. DECTape Units and Controller (TD10)
 - * Pocket-sized, personal, magnetic tape storage
 - * Two TU56 dual DECTape drives
3. Magnetic Tape Storage Unit (TU45Z)
 - * Stores 800 or 1600 bits/inch
 - * Reads and writes at 75 inches/second (16666 characters/second)
 - * Three drives
4. Operator's Console Terminal (LA-120)
5. Card Reader (CR10E)
 - * Reads 1,200 punched cards/minute
6. CRT Terminal (VT100)
 - * Up to 960 characters/second video display
7. Line Printers (LP10H and LP200)
 - * Prints 1,250 and 1,200 lines/minute

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8. Disk Storage Unit (RP06)
 - * 200 million characters of storage per unit
 - * Average access time of 28 milliseconds
 - * Five drives
9. Terminal Interface (DC20)
 - * Connects up to 80 terminals to the system
 - * Connected to Word Processor (WS-222)
10. Core Memory (MB20)
 - * Stores a total of 524,288 words
 - * Takes an average of less than one-millionth of a second to access any word
11. Line Printer/Card Reader Control (BA10)
 - * Controls a card reader and the LP10H line printer.

*Editor's Note: Available in ECS brochure - Northboro Order #ED 1927987.

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DECSYSTEM-20s GO TO MARLBORO COUNTRY

Steve Nagy
LDP IR&D Marketing
MR2-3/M38

Philip Morris, manufacturer of the world's largest selling cigarette brand--Marlboro, has long been recognized for their marketing expertise in the consumer goods arena. Philip Morris purchased Miller Brewing in 1970 and took it from a stodgy family owned enterprise to the slick number two brewer in the U. S. where it now challenges Anheuser Busch for the top spot in the market.

Interesting? Maybe, but what does this have to do with DECSYSTEM-20s? It turns out that while Philip Morris is recognized primarily for their marketing excellence, the corporation is committed to provide the highest quality products in whatever market they sell into. Toward this goal of high quality, PM has built a large research and development complex adjacent to their world's largest cigarette manufacturing facility in Richmond, VA. The R&D center is dedicated to tobacco research to develop new brands, improving existing brands and maintaining a close watch on the competition.

The research staff got accustomed to interactive computer systems through SDS and the Sigma series (remember them?). PM made the transition to XDS (remember them too??) and have maintained a network of computers based on the Sigma 6 and Sigma 8 (or whatever XDS called them!). The Sigmas are interfaced to a variety of laboratory instruments, both commercially available units and custom-made devices for unique PM test procedures. The interface is actually by means of a number of Honeywell Level 6 minicomputers using a home grown network package developed of necessity over the years.

In addition to the real-time interface to laboratory instrumentation the systems provide time sharing services to the research scientists at the complex. PM maintains an on-going consumer test panel where thousands of consumers are sent sample cigarettes and data forms to register their opinions. This consumer testing data base is maintained in the R&D computer network for future analysis.

Early in 1980 PM realized they had reached the limits of expansion with their existing Sigma 6 and 8 network hosts. The XDS customer base was purchased by Honeywell who offers a machine which runs a version of the old Sigma series

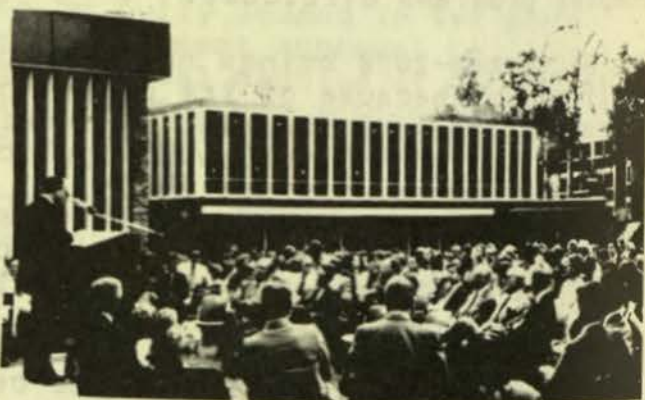
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I N S E A D

Philip Caldwell, chief executive officer, Ford Motor Company and Chairman of INSEAD's US Advisory Committee, presents the first Henry Ford II prize to MBA student Yoav Chelouche of Israel.



Dr. Mark Syskens, Belgian minister of Cooperation, Development and Technical Assistance gives the keynote speech at the graduation of the twentieth MBA programme. The new buildings can be seen in the background.



Seen with the DECSYSTEM-20 shortly after installation are, (1) Jim Philbin, manager of the computer centre and Professor Jim Lyons, director.



BEATING THE BACKLOG AT TRINITY

Guy-Marque Pucheu
LS Technical Group European
Marketing Manager
Valbonne, France

During the four centuries of its existence, Trinity College Dublin has amassed a library of two and a half million volumes, including every book published in the British Isles in the last 200 years. Digital Equipment DECSYSTEM-20s keep control of this immense bookstock.

Trinity College, Dublin, founded in 1592, is the Republic of Ireland's oldest university, housing the biggest research library in the country, and using DECSYSTEM-2020 for its computerized library system.

The two and a half million volumes which make up its collections of books, documents, maps and music, include one of the finest mediaeval illuminated manuscripts, the Book of Kells.



The Trinity College Long Room contains the old library of 1732 (some books date back to 1592!)

Administering and controlling such a huge collection is a complex task. "In the last 50 years, more books have been published than in the previous two or three hundred years," explains a Trinity College spokesman. "Coping with this information explosion in terms of cataloguing became increasingly time-consuming and backlogs began to build up."

In 1968 a card index catalogue established five years earlier had grown to cover 225,000 books with an average of 1.4 entries a book. But the backlogs grew as the inflow of copyright accessions increased. The library therefore decided to go into partnership with Trinity's recently-formed Computer Laboratory to establish a Machine-readable Record (MARC) based system of cataloguing.

The Computer Laboratory had been set up in 1968 with an IBM 360/44-based central service unit.

Nearly two thirds of the Computer Laboratory's workload was providing a computing facility for staff and students. The rest of the workload was taken up by university administration, and the library. The staff for these functions is known as the Information Systems Group consisting of three systems analysts and seven programmers.



A librarian in the cataloguing area enters details concerning books into a VT100.

According to a Computer Laboratory spokesman, a major aspect of a computerised cataloguing system is data entry. "Each book requires in machine readable format, about 900 characters of information with upper and lower case letters, punctuation, special characters and symbols. In 1968 such information was not commonly available. But the British National Bibliography, the agency responsible for the bibliographic details of all books published in the United Kingdom, was setting up a computer system of its own.

"It was prepared to make available to us a magnetic tape containing the basic bibliographic data for each week's shipment of copyright books. Thus we began to develop our system based on the availability of the British National Bibliography MARC tape."

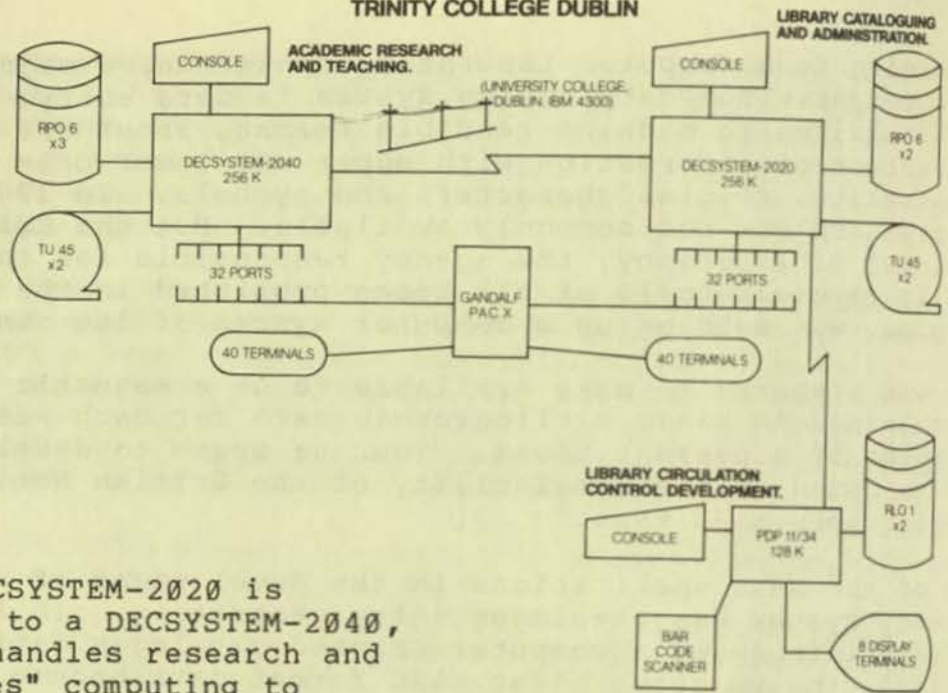
One of the main applications in the development of the library system was catalogue entry generation. In 1971, the library introduced a computer-printed catalogue dating back to 1969, the year the first MARC format data became available. Shortly afterwards the catalogue was switched to microfilm and then to microfiche, in which form it exists today.

In 1973, the Computer Laboratory installed terminals in the library as a subsystem to generate catalogue entries for the 20 percent of books acquired outside the copyright system. The records are now merged with those coming from the British National Bibliography and are incorporated into the same microfiche.

By 1976 the IBM 360 was becoming overloaded in its task of handling academic, administrative and library requirements. The system was supporting its maximum of 16 terminals while the demand for terminals was growing.

"We examined the alternatives available on the market, having set as our criteria a machine that was in the forefront of technology; that supported a maximum number of terminals; that would be readily expandable; and that was within the amount of funding set by the government," says the spokesman. "On that basis we chose a DECSYSTEM-2040 from Digital Equipment Corporation."

TRINITY COLLEGE DUBLIN



The DECSYSTEM-2020 is linked to a DECSYSTEM-2040, which handles research and "teaches" computing to students.

The DECSYSTEM-2040 with 128k words of memory and two RP06 disc drives was installed in July 1977. While running parallel with the IBM system it was built up to 256k words of memory, three disc drives, two TU45 tape units and 32 ports.

According to the spokesman, the increase in computing power which the DECSYSTEM-2040 represented encouraged more computing tasks such as heavy computational work arising in the Chemistry department.

Furthermore, its ability to support more terminals meant a growth of terminals around the campus. The academic users found the TOPS-20 operating system easier to use and this enabled more people to tackle more tasks.

Eight months after the DECSYSTEM-2040 was installed it became apparent that Trinity College needed another system.

JANUARY 1978

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In October 1979, therefore, the college took delivery of a DECSYSTEM-2020 with 256k words of memory, two RP06 disc drives, two TU45 magnetic tape drives, a console and 32 lines.

The DECSYSTEM-2040 and the DECSYSTEM-2020 are software compatible and together support 64 terminals. Both systems are linked by a Gandalf PACX electronic exchange and there are plenty of applications that can run on either system.

However the library system and all administrative applications have been switched to the DECSYSTEM-2020, leaving the DECSYSTEM-2040 to handle academic tasks including research and teaching computing to students.

The library system had meanwhile undergone two years of conversion from PL/1 to COBOL and many of the administrative routines had been upgraded. Once fully developed, the library package will be put into the Digital Equipment Computer Users Society (DECUS) collection to be made available to other universities, government bodies and commerce.

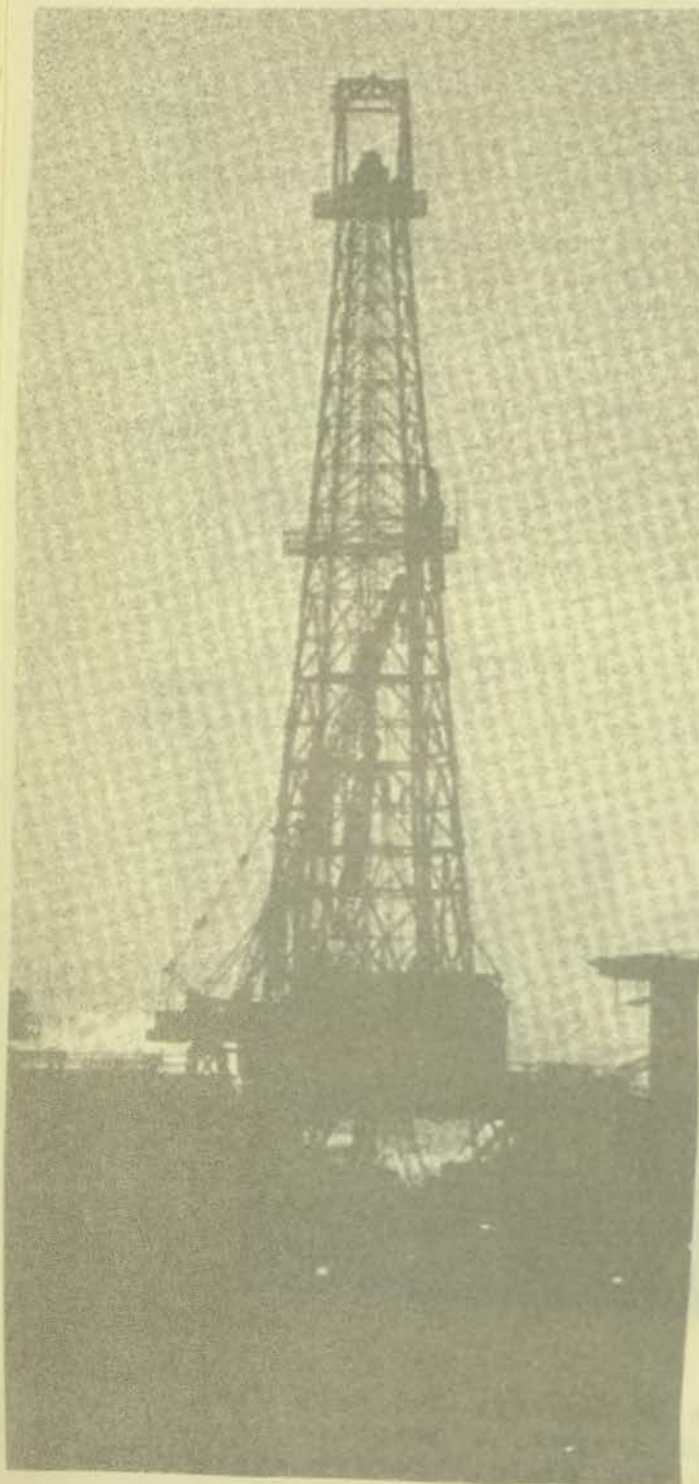
The information Systems Group which looks after the administration and library applications is working on some changes in filing techniques which will be highly desirable to librarians.



DECSYSTEM-2020 with 256 words of memory, two RP06 disk drives, two TU45 magnetic tape drives, a console and 32 lines looks after all library and administrative applicants.

DECSYSTEM-2040 AT UNION TEXAS PETROLEUM CORPORATION

Gail Coutts
ESG
MR1-1/M42 231-6900



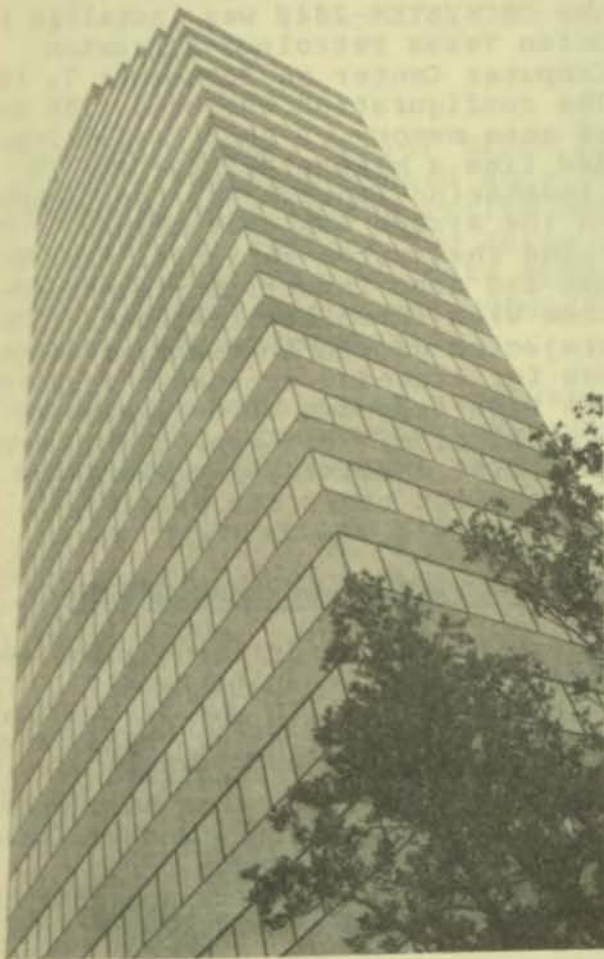
THE CHALLENGE OF EXPLORATION AND PRODUCTION

As the demand for energy grows and costs of developing energy sources spiral, it becomes critical to find better and more efficient means of locating and producing oil, gas and other sources of energy. At Union Texas Petroleum, where oil and gas exploration and production is its business, continual efforts are being made to improve and streamline the process of developing a producing oil or gas source.

THE NEED FOR INTERACTIVE COMPUTING

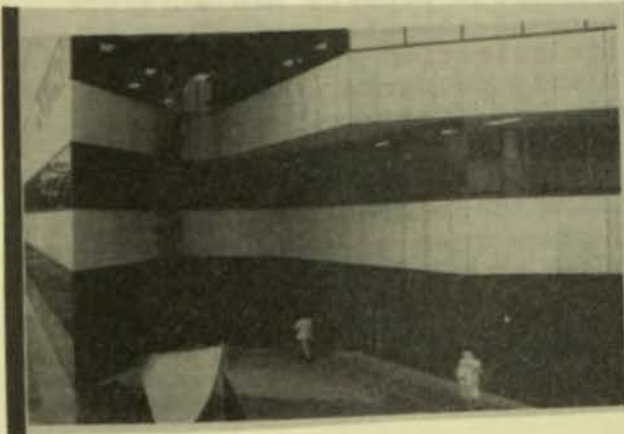
To meet the challenge associated with exploration and production in a world of expanding technology, the scientists and engineers at Union Texas Petroleum have found computer assistance to be essential. "We must provide management with an entire suite of possibilities to evaluate" says Norm Mason, Senior Evaluation Engineer in Exploration and Production. "The key is turnaround. There are so many ways of looking at the data that the time to do this would be prohibitive without a computer. We tried computing but you can't get enough answers fast enough," he concludes.

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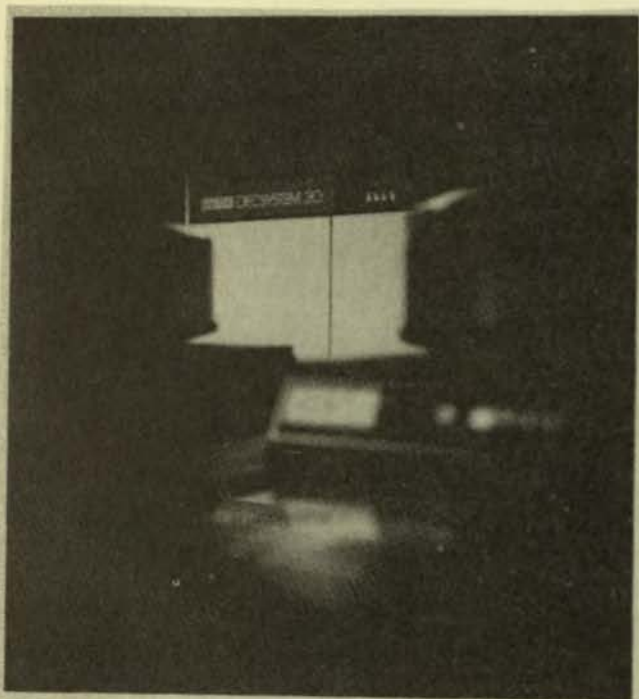
After incurring consistently increasing monthly computer costs and experiencing unacceptably slow turnaround by employing an outside timesharing service to provide computing capabilities for its scientists and engineers, UTP's Houston Computer Center was chartered with conducting a feasibility study for bringing the timesharing applications in-house for a reasonable cost.

The study was initiated early in 1975 by a committee of eight headed by Jerry Blalock. Five criteria had to be met by any potential in-house system. First POGO (Profitability of Oil and Gas Opportunities), an application program developed by PSI Energy Software, had to run on the system. At the time POGO was the single largest application on the timesharing service. Secondly, the computer had to perform the seismic processing required by the Exploration and Production group. It had to support the FORTRAN language and an interactive data base. Finally the corporate guideline specified a 2.5 year payback period or less. Expandability without reprogramming was also a consideration for a company experiencing a growth rate in excess of five hundred percent in its timeshare computing.



In 1976, the vendors submitted their bids. Many vendors were eliminated on the basis of cost alone. The specified 2.5 year payback just wasn't there. Several vendors attempted to run POGO on their systems but Digital was the only one able to run POGO on its proposed system without a major conversion effort. In fact, Digital was able to meet all five criteria with its DECSYSTEM-2040 AND WAS AWARDED THE CONTRACT.

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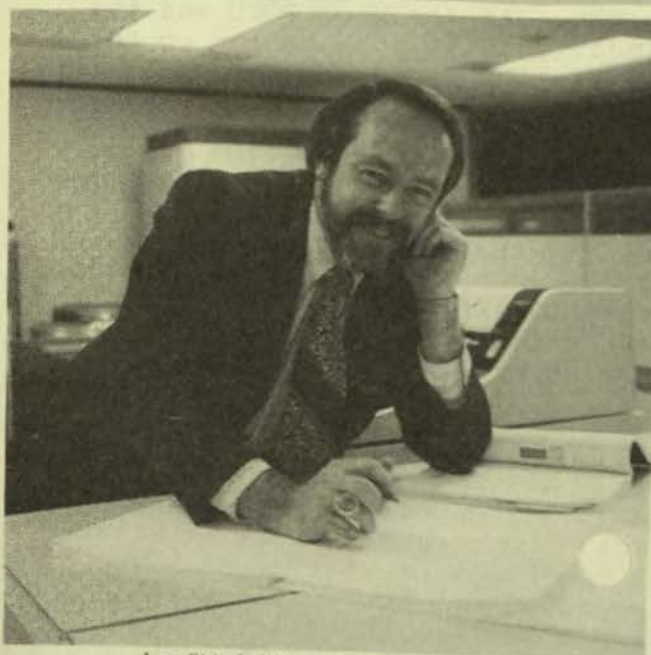
THE DECSYSTEM-20 FILLS THE NEED

The DECSYSTEM-2040 was installed in Union Texas Petroleum's Houston Computer Center on September 7, 1977. The configuration included 128K words of core memory, 2 RP04 disk drives, a 300 line a minute printer and 16 timesharing lines. The user response to the system was overwhelming. They found the system reliable, easy to use and most important, it provided them with immediate response. The projected growth in computer usage was far exceeded so that the system has been expanded twice since its installation. One application area, financial analysis, increased its usage eight times the original estimate.

SEISMIC STATION OF EXPLORATION

Determination of drilling locations for new wells is an extremely critical process in the oil and gas industry. Selecting the wrong site can result in an expenditure of millions of dollars on a "dry hole." "As known areas mature and you have to consider more exotic possibilities, the risk and cost goes up," Norm Mason states.

In light of this exposure it is not surprising that UTP expends tremendous efforts and utilizes state-of-the-art technology in well site selection and development. The ability to perform the seismic and well log data evaluations necessary for this activity was a major criteria for choosing the DECSYSTEM-2040.



Jerry Blalock, Manager Computer Operations

*Editor's Note: This article is an excerpt from the ESG brochure - Northboro order #EA 1877737.

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DECSYSTEM-2020 AND 2060 SALES

Bill Kania
Industrial Research Mktg.
DTN: 231-4716

Dick Groseclose, Senior Sales Representative, Richmond, Virginia recently closed an order for a DECSYSTEM-2020 and a DECSYSTEM-2060 at the Philip Morris Research Center. These systems will replace two Xerox Sigma systems used for research timesharing, data acquisition, data management and report preparation. We congratulate Dick Groseclose on this \$1,000,000 systems sale.

A comprehensive sales plan was developed and executed in order to win this order against stiff competition from Honeywell. Some major elements of the team effort were:

- * Initial R&D sales calls made by Dick Groseclose.
- * A MINC sale increased Philip Morris' awareness of LDP.
- * Philip Morris spent two days in Marlboro meeting with LDP marketing, product managers, and DECSYSTEM-20 engineers.
- * John Mucci, Marketing Manager, and Bill Kania visited Philip Morris Research Center to learn more about the customer's application.
- * Dick Groseclose and John Churin (software specialist) ran a benchmark and developed a response to the RFP.
- * Final proposal was presented by Dick Groseclose and Michael Smith, Industrial Research Marketing Manager.
- * George Doble, Digital Customer Finance Manager negotiated a lease with customer, assisted by Jack Trent, LDP contracts.
- * Gerry LeBlanc, LDP Order Processing, rushed the order through to help meet LDP's commitment to ship DECSYSTEM-2020 in March.

This order demonstrates that teamwork can help replace old Xerox systems with a DECSYSTEM-20. TOPS-20 offers improved timesharing functionality over Xerox systems along with better hardware performance and reliability. Dick Groseclose has led the way in capturing a significant Xerox user. Use his efforts to help leverage your sales.

BIRMINGHAM UNIVERSITY CHOOSES FRIENDLY DECSYSTEM-20

Elisabeth Vogler
Digital: Geneva

Birmingham University has purchased a DECSYSTEM-20 interactive mainframe computer from Digital Equipment Corporation.

The university regards interactive computing as one of the important trends of the future and expects the DECSYSTEM-20 to be a major element in the development of computing on campus.

Major factors influencing the decision to buy the DECSYSTEM-20 were the user friendliness of the TOPS-20 Operating System for interactive use, the wide variety of readily available software applications and extensive debugging facilities.

The DECSYSTEM-2050 (with 512K words of core memory, two 167 megabyte disk drives, two TU45 Tape Drives, and one LP05 Line Printer) can have 80 terminals connected simultaneously, although the total number on campus will be up to twice that number.

The computer will form the basis of the West Midlands Interactive Facility in which both Aston and Warwick Universities have a substantial interest. Eventually the DECSYSTEM-2050 will be linked through MIDNET to the University of Manchester Regional Computer Centre (UMRCC) making it possible for a job originating on the DECSYSTEM-20 to go through Manchester's CDC 7600.

Dr. Kathy Lang of the Birmingham University Computer Centre responsible for user guidance services, said that the helpfulness to the user of the TOPS-20 Operating System was the most significant feature separating the DECSYSTEM-20 from the competition.

"We have a large number of users who are not computer professionals...their main business is engineering, economics, metallurgy, etc. TOPS-20 is the friendliest system we have seen and helps users considerably in designing and developing their own programs."

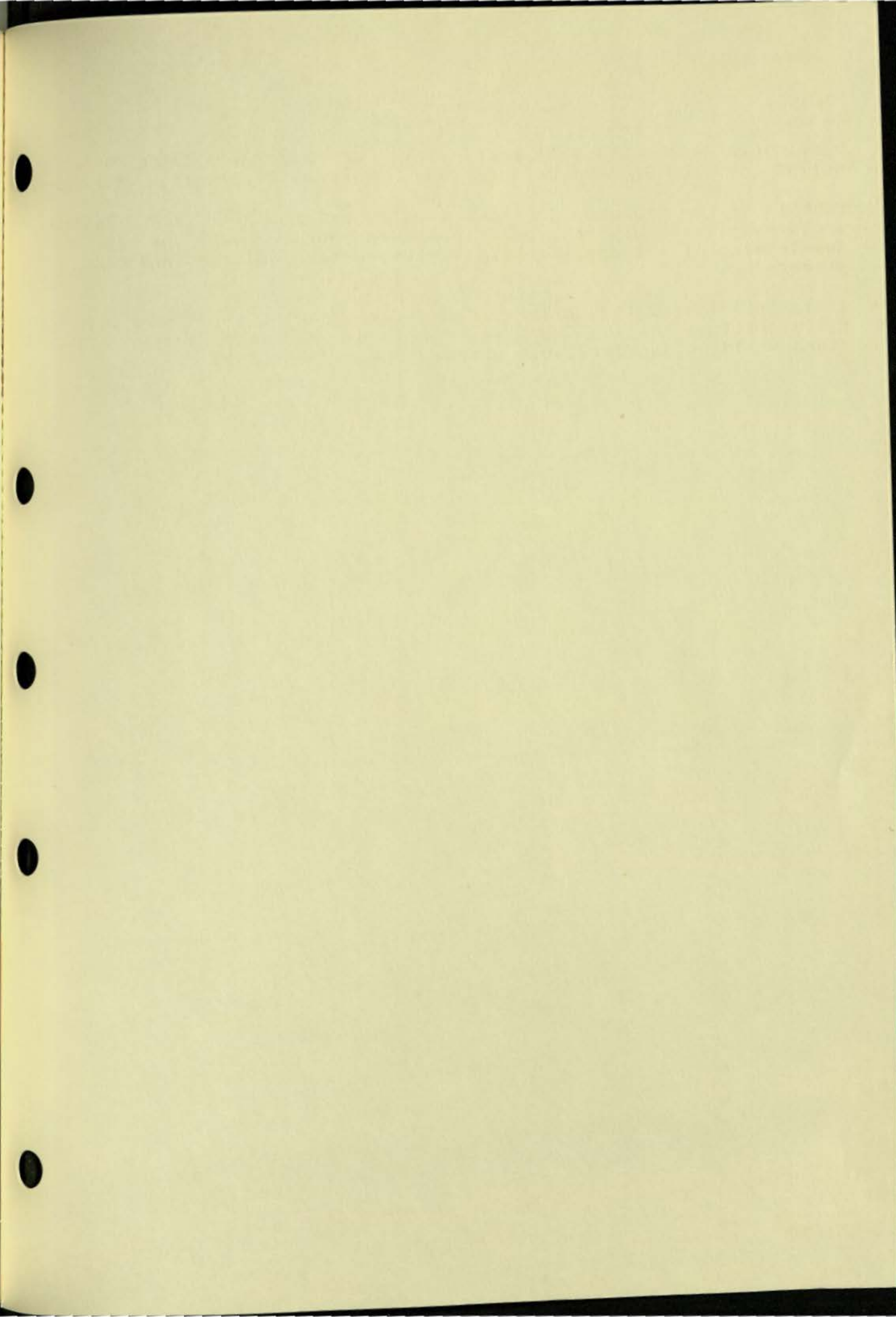
Add to that the wide variety of applications software available through DECUS and other universities in the US where the DECSYSTEM-20 has already gained a strong reputation among like-minded users, and you have the main reasons for the University's choice of this system.

The demand for a powerful interactive facility came from every group of users on the campus. Users had never been able to perform interactive modelling, but with the software's ability to handle graphics equipment, many users are already discovering the DECSYSTEM-20's advantages in interactive design, statistical analysis and model building techniques. The University's graphics laboratory is expected to become a focal point for users as more equipment is added.

Birmingham University will retain their ICL 1906A for batch work, whilst the DECSYSTEM-20 will provide major new interactive facilities.

Members of the Computer Centre and early users of the DECSYSTEM-2050 are very pleased with the user image, and future plans include development of the on-line help system, screen editing, and text processing.

It is anticipated that user guidance resources of the system will be fully utilized to give the University's users greater access. These plans would be impracticable without the DECSYSTEM-20.



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Digital Equipment Corporation
Marlborough, Massachusetts 01752

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Digital Equipment Corporation
Marlborough, Massachusetts 01752

LARGE COMPUTER GROUP

BUY-LINE

For Internal Use Only



BUY-LINE
JANUARY 1983
VOL. 5 NO. 7

digital



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AUTO-QUOTE SUPPORT FOR NEW CONFIGURATIONS



Per Hjerppe
LCG Marketing
MR02-2/C2

LCG Marketing is pleased to announce that AUTO-QUOTE now supports the new hardware and software options announced at Fall DECUS last month.

The new supported options are the following:

- o The CI20 Multi-processor Interconnect Port
- o The SC008 Star Coupler
- o The HSC50 Intelligent Mass Storage I/O Server
- o The RA60 and RA81 disks
- o The TA78 Magnetic Tape Subsystem
- o The LP27 High-Speed Line Printer

AUTO-QUOTE offers LCG Sales Representatives significant benefits in terms of reduced time and increased accuracy in preparing quotations. The system employs an easy-to-use question and answer session to develop the configuration and pricing for any DECsystem-10/20. The program checks the configurations for validity and will automatically prompt the user for required system elements, such as the necessity of including at least one tape drive with a system. The user can also go back and "edit" a given system configuration by changing the answers to a few questions. In this way, several alternative quotes on one basic configuration can be put together very quickly.

To access AUTO-QUOTE on Marketing System 2244:

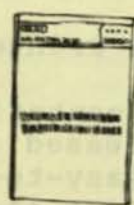
Dial-up lines: (617) 467-1120, -1125, -1128,
-7437, -7438, -7439, -7447 to -7451

@LOGIN AUTO-QUOTE (PASSWORD) LCG

AUTO-QUOTE SUPPORT FOR NEW CONFIGURATIONS

When the user logs in, AUTO-QUOTE runs automatically. When the AUTO-QUOTE session has completed, or if the user tries to use Control-C to interrupt the session, then AUTO-QUOTE automatically logs the user out.

Access problems that have occasionally plagued AUTO-QUOTE during the last year have now been cleared up. We think AUTO-QUOTE can really help you. Let us know if you have any suggestions or comments.



OPERATION MEGAPHONE: LCG IN THE NEWS



Beryl Sachs
LCG Mktg. Pgms. Mgr.
MRO2-2/8D2

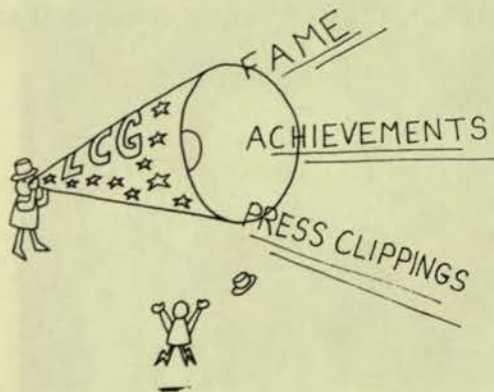
If you are learning about the LCG Megaphone for the first time, please refer to page 19 of the November 1982 BUY-LINE for the description of our Megaphone's goals and purpose.

LCG product offerings are attracting lots of attention in the trade press these days. The greatest excitement comes from LCG's announcements made at Fall DECUS, and described in our special literature mailing to you, last month.

The following are some brief highlights on LCG in the news, during Q2 FY83. For more in-depth coverage, read some of the publications quoted below:

COMPUTERWORLD, Nov.29, p.5: "System Lets Users Link, Share DECSYSTEM-20s...Gives Flexibility to System Planners"

"...The Advanced System Interconnect Structure was developed to give system planners a high degree of flexibility in building and expanding computer resources..By giving users access to shared computers and mass storage, user productivity improves, and the reliability of data files is increased..."



COMPUTER SYSTEMS NEWS Nov. 29, p. 30: "DEC Introduces New Communications Interconnect Strategy"...the new interconnect plan is designed to allow users to link previously independent systems into a cohesive set of processing tools...Users will be able to go across systems and across peripherals, using our protocols or other people's protocols... the new strategy will ..eventually tie together everything from a DECSYSTEM-20 to a personal computer.."

INFORMATION SYSTEMS NEWS, Nov. 29, p.1: "File Server Connects DEC 20s"...The advantage of loosely coupling the DEC 20s with the new interconnect system is that files need not be duplicated from machine to machine in order to ensure data base security...If parts of the memory are failing, the system will work around those points and will notify the host ...users have access to all four of the connected DEC 20 data bases and can reach the data without having to log on to additional machines..."

MIS WEEK, Dec. 1, p.1: "New DEC Bus Links Four CPUs; New DEC Hardware Links Four Mainframes" George Colony, analyst with the Yankee Group, Boston, termed the new structure a 'crucial development' by DEC...it places the firm one notch above Wang, Data General, Hewlett-Packard and other so-called 'integrators'; it's IBM and DEC now..."

LCG has been getting rave reviews in recent "Sales Update" magazines and in DIGITAL publications such as "Insight", "Real Times", "DEC World" and other media. We're preparing another collection of press clippings concerning LCG; each LCG Coordinator will receive a copy of the Q2 News Clips. If any of you wish to have your own copy, please contact Jean Catto at DTN:231-5837.

Q2's Megaphone is blasting even louder and farther than the Q1 Megaphone!

DIGITAL, M/A-COM LINKABIT INC.
SIGN CO-OPERATIVE MARKETING AGREEMENT

Marlboro, Mass. -- December 7, 1982 (Contents of Press Release)

Digital Equipment Corporation today announced a cooperative marketing agreement with M/A-COM Linkabit Inc., of San Diego, California, to promote the IDX (Integrated Digital Exchange) switch. Developed for use with Digital's DECSYSTEM-20 mainframe, the IDX-3000 switch is designed to reduce cabling costs in configuring systems, improved port management, and in dynamic resource selection.

The IDX-3000 can service up to 3,072 lines. It has a total throughput of 393 Mb/sec, and enables system developers to place connection modules close to users.

The M/A-COM Linkabit switch is composed of three basic elements: multiplexer (MX) units, which accommodate 24 or 48 lines; a network exchange (NX) switch processor; and a System Control Program (SCP) that provides control and site-customized software. The system control program runs under the TOPS-20 operating system.

The Network Exchange and multiplexers are linked by high-speed lines, typically twisted-wire pairs. Communications between these elements use the Bell Standard DS-1 format, at 1.544 Mb/sec over distances up to 1.2 miles.

A typical 500-line IDX-3000 is priced at \$230 per line, though prices vary with switch size and options. The switches are available 30 days after receipt of order.

L to R:
Seated: Ken Senior
Former Acting Head
of LCG and Tom
Bernard, VP, Net-
work and Comm. Grp,
Linkabit;
Standing: Celeste
Moore, LCG Comm.
Specialist, Ken
Cohen, Mgr. Network
and Communications
Grp., Linkabit,
Susan Marie, LCG
Engin. & Comm'l
Mktg. Spec., and
Ed Schmidt, Corp.
Counsel, Linkabit



A MESSAGE FROM M/A-COM LINKABIT INC.

"Digital Equipment Corporation's decision to join us in marketing the IDX-3000 is a very exciting step for us. We believe that it is a significant testimonial to the quality and performance of our third generation Digital Data Switch," said Harvey P. White, Executive Vice President and Chief Operating Officer of M/A-COM Linkabit at the signing of the cooperative marketing agreement between DIGITAL's Large Computer Group and M/A-COM Linkabit.

Tom Bernard, Vice President of M/A-COM Linkabit's Communication Networks Group, added that "we are delighted to have this close working relationship with DIGITAL's salesforce, particularly with those persons engaged in LCG products. We believe that the IDX-3000 will provide DECSYSTEM-20 computer users with a cost effective solution for distributed computing communication needs."

Ken Senior of LCG and Tom Bernard of M/A-COM Linkabit congratulate each other on the signing of the Cooperative Marketing Agreement.



LINKABIT IDX-3000 SALES



Celeste Moore
LCG Marketing
MRO2-2/8D2

LCG has just signed a Cooperative Marketing Agreement with M/A-COM Linkabit Corporation of San Diego California. We will be helping them to market their IDX-3000 (Integrated Digital Exchange) switch to our customers.

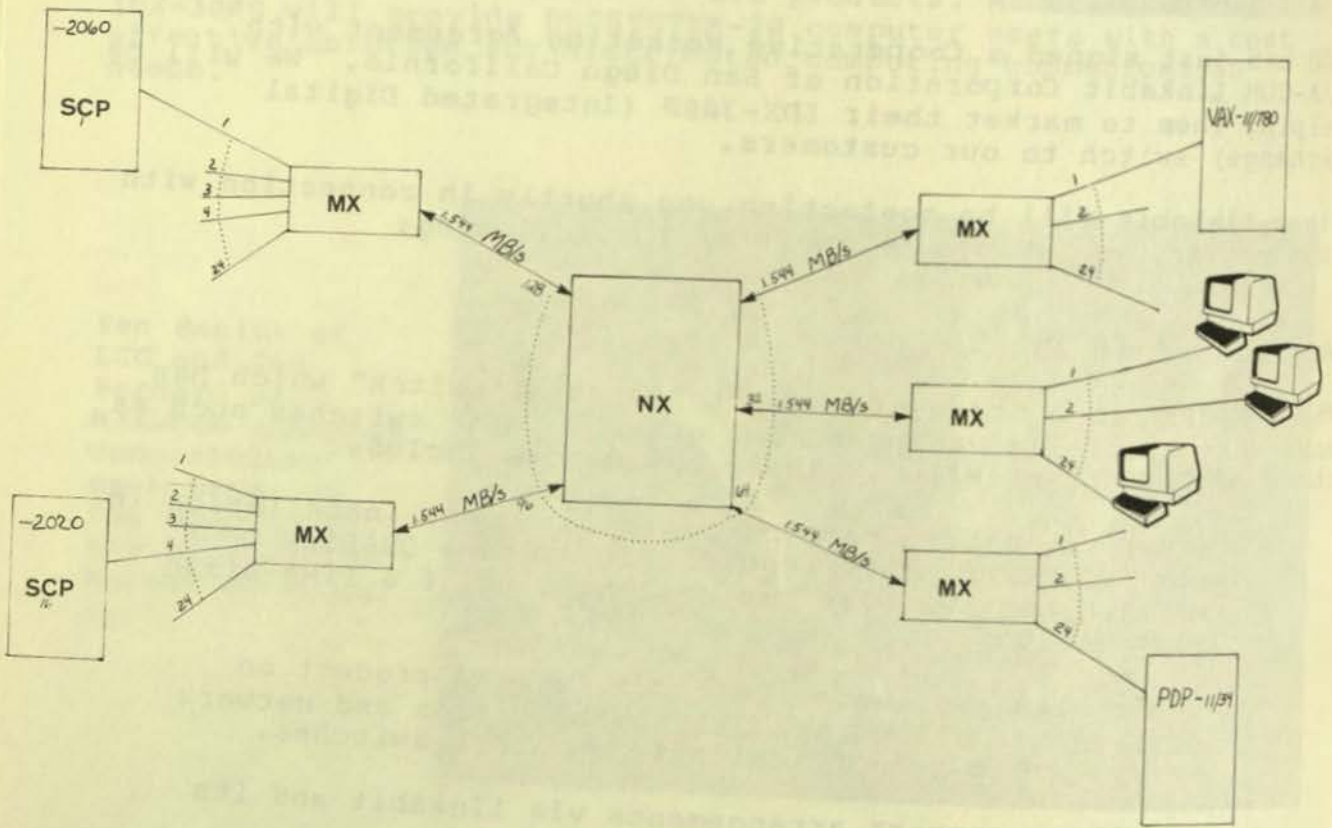
Since Linkabit will be contacting you shortly in connection with this matter, you should be aware of the following:

What The Switch Is:

The IDX-3000 is a state-of-the-art "terminal switch" which has some very special advantages over other popular switches such as those of GANDALF or MICOM. These advantages include:

- * Great savings in cabling costs (a recent installation in our own MK2 facility could have saved a QUARTER OF A MILLION DOLLARS over the cabling cost of a like-sized MICOM switch.)
- * Controlling software that is a layered product on TOPS-20. It allows special customization and network control that is not available on other switches.
- * Excellent support arrangements via Linkabit and its M/A-Com sister company, Alanthus.
- * Large capacity with small footprint: 3,072 lines served by a single switch processor in a single narrow cabinet (small, 24 line multiplexing boxes distributed near to terminals, with each box connected via a single high speed trunk to that switch processor).

IDX-3000 System Configuration



Procedure:

You need to make available to the Linkabit people a contact list which includes the name of OUR SALESPERSON and the name of OUR CUSTOMER. Linkabit people will then work with our sales personnel to make the sale.

It is important that our SALESPERSON be identified, and that s/he keep a record of calls made, in order for the appropriate booking credit and budget records to be kept. It is also important that our salespeople let their Operations Representative know of the activity, so that we can track it here.

Linkabit is responsible for Technical Sales Support and for PRICING QUOTATION. Our people need only provide introduction, enthusiasm, and follow-up.

Sales Training:

The formal product announcement was at Fall DECUS. Linkabit participated in our LCG DECUS Booth. They were also at DEXPO, where more "commercial" information was available.

The Pre-DECUS LCG Sales Training Seminars included information on the IDX-3000. The product is especially attractive in the context of Loosely Coupled Systems, and is therefore ideally timed for introduction to our Sales Force and to our Customers.

You will be getting additional materials and information. You should have received a copy of our Data Sheet on the product in last month's special mailing.

Linkabit Contact:

Salespeople should contact JEFF SMITH or KEN COHEN at Linkabit for sales assistance and information. Tell Jeff or Ken that you are from LCG. Jeff Smith is the preferred contact -- he has been hired by Linkabit specifically to serve our LCG needs for sales support. Phone number of Linkabit: (619)457-2340 Address: 3033 Science Park Rd., San Diego, California 92121.

Pricing Info:

I will be sending out to you a couple of example system prices. Per line price decreases dramatically as the number of lines increases. The system prices will serve as a guide -- but Linkabit MUST do the final price quotation and must work with customers respecting suggested configuration. (Considering the technical expertise that is involved in doing this, we should be

grateful that this is the case!) In short, Linkabit should be involved in the selling process as early as possible.

Target Customers:

Ideal prospects are the following:

- * Multiple TOPS-20 systems running on DECSYSTEM-2060s or -2020s;
- * Candidates for Loosely Coupled Systems, with or without the Common File System;
- * Educational institutions having large numbers of terminals which must be managed in relation to small numbers of TOPS-20 lines;
- * Any customer having large numbers of terminal users and/or other asynchronous devices which must be connected to a variety of computers (at least one TOPS-20 system is necessary, preferably two);
- * Customers who have TOPS-20 on both -2020(s) and -2060(s).

The IDX3000 DOES NOT PROVIDE ANY MORE JOB SLOTS ON TOPS-20, BUT IT DOES HANDLE PORT CONTENTION FOR THE AVAILABLE LINES AND ALLOWS THE PHYSICAL CONNECTION OF MORE THAN THE STANDARD COMPLEMENT OF TERMINALS.

Availability for Europe

The IDX-3000 will be available in Europe within one year. Linkabit expects to be able to handle orders as early as the summer of 1983, with deliveries starting 12 to 18 months later. Initially, support will be centered in the U.K., and provided by Alanthus, a M/A-COM subsidiary. Appropriate equipment certifications for the European community will start in the U.K., followed by France, Germany, and other major countries.

The IDX-3000's biggest selling points are:

- * competitive per line price for 200 or more lines, and
- * STARTLING CABLING COST SAVINGS.

These are coupled with special "goodies" in the TOPS-20 environment, such as login validation for security purposes, and special maintenance aids.

NEW PROSPECTS FOR AN OLD PRODUCT LINE



Richard Smith
Principal Mktg. Spec.
MR02-2/8D2

Try to answer this riddle.

What DIGITAL product family fits the following description?

- Has a distinguished history extending back more than a decade.
- Offers two major operating systems: one with real time capability and another praised for its timesharing features.
- Will introduce a powerful new processor (whose code name begins with J) featuring a pipelined architecture.

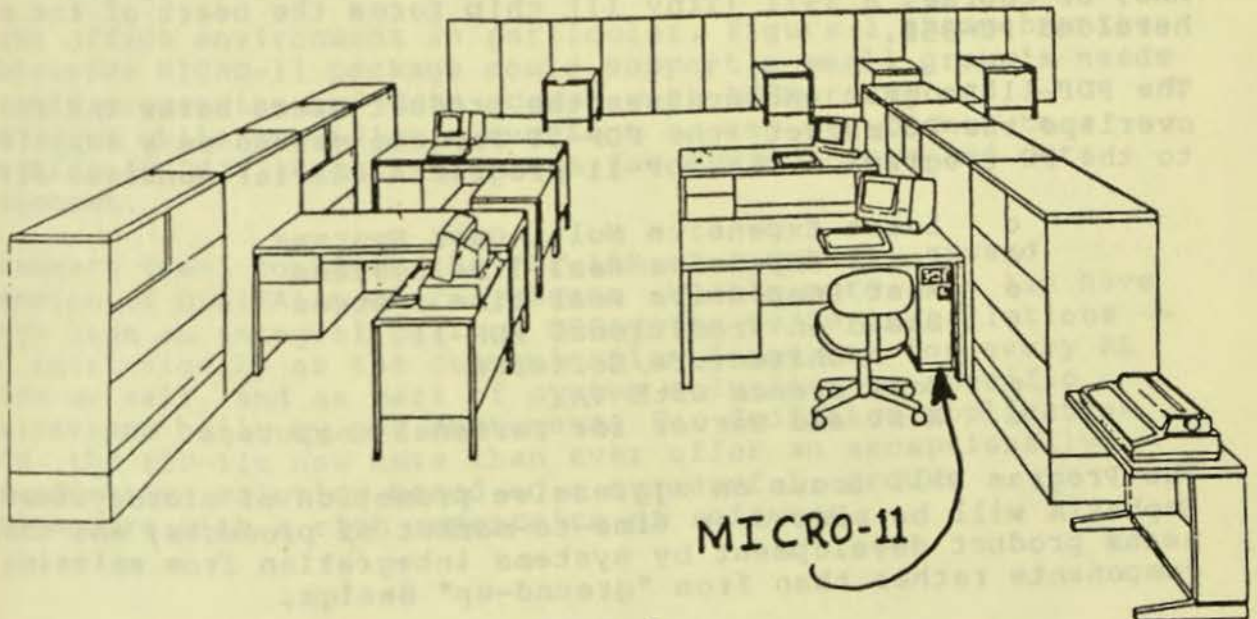


Figure 1

Answer: PDP-11's; first announced in 1970, offer RSX-11M for real time and RSTS/E for timesharing, and will have the J-11 pipelined processor with the power of a PDP-11/70 on one chip.

If you guessed DECsystem-10/20 instead, you're also right; but you probably need to find out more about the 16 Bit Program. LCG has much in common with the PDP-11's, and exciting opportunities will come out of the close working relationship that LCG has with the 16-bit Program Office. The new PDP-11 products can serve as very attractive dedicated application machines that complement the general purpose interactive environment of LCG systems.

Peter Conklin, Manager of the 16-Bit Program Office and former Development Manager for TOPS-10 software suggests that LCG customers could benefit from integrating some of these new offerings into their growth plans:

- o The MICRO-11
 - Same package as the PC-350
 - Just a little more money than the PC-350
 - Four users
 - Runs RSTS, RSX, or RT-11
- o The J-11, an -11/70 that will fit under a desk
- o Office Automation on PDP-11's
- o Future Directions for PDP-11's.

Peter points out that the PDP-11s still have a big role to play. Believe it or not, PDP-11s still account for over a billion dollars of DIGITAL's sales; and the volume is still growing. And, of course, a T-11 (Tiny 11) chip forms the heart of the much heralded PC-350.

The PDP-11 Program encompasses the product space below VAX and overlaps the PC market (the PDP-11 Program serves as a supplier to the PC Program). The PDP-11 program's charter consists of:

- o Least Expensive Multi-User Systems
- o Least Expensive Real-Time Systems
- o Most Responsive Real-Time Systems
- o Based on Traditional PDP-11 Architecture/Software
- o Coexistence with VAX
- o Host and Server for Personal Computers

The Program will focus on aggressive promotion of microsystems. Emphasis will be placed on time-to-market of products; and that means product development by systems integration from existing components rather than from "ground-up" design.

For Internal Use Only

The MICRO-11 represents a good example of the product direction for the PDP-11 Program. MICRO-11 uses the same packaging, power supply, and disks as the PC-350; and as consequence offers full PDP-11 functionality for up to four users at little more than the price of the PC 350. Positioned above the PC 350 and below the PDP-11/23, the MICRO-11 will compete with multi-user microsystems such as ALTOS. Advantages of the MICRO-11 include:

- o Lower cost per user than standalone PC's
- o Shared access to data and applications
- o Proven RSTS, RSX, and RT-11 operating systems give access to a huge selection for applications
- o Expansion with standard Q-Bus peripherals
- o Full DECnet III support

MICRO-11s can serve as either dedicated application systems for the office or real time front ends. In either capacity, the MICRO-11 will couple easily and intimately with DECsystem-10 or DECSYSTEM-20.

In the office environment in particular, Figure 1 shows how the unobtrusive MICRO-11 package could support a small group's needs for word processing and data access with DECword/DP and DATATRIEVE while providing convenient access via DECnet to a DECsystem-10/20's larger resources for applications and data management.

In summary then, consider the PDP-11s as a natural upward extension of DIGITAL's microsystems. What's more, the 11s have always been an integral part of DECsystem-10/20 installations -- both intrinsically as the communication front end for every KL system we sell, and as part of system solutions to specific applications built by our customers. For dedicated application needs, the PDP-11s now more than ever offer an exceptionally cost-effective solution based on a successful, proven architecture with a rich repertoire of software.

LCG WAS BIG IN ANAHEIM



Don Mallinson
 LCG Mktg. Comm. Mgr.
 MR02-2/8D2

LCG was a big hit, in a big booth, with two big systems and a big number of big announcements at the U.S. Fall DECUS meeting in Anaheim, California, December 6-10, 1982.

In a booth 18m x 18m (60' x 60') which was the largest product line booth (and LCG's largest booth ever) and which matched the size of the Central Engineering booth, LCG had 2 KL systems with a total of 70 terminals. Other equipment in the booth included a new TA78 tape drive, an RA81 disk drive, HSC50 intelligent mass storage controller, star coupler, and RP07 and RP06 disk drives. One system was a DECSYSTEM-1091 with TOPS-10, and the other was a DECSYSTEM-2060 with TOPS-20.

The many new product announcements included:

- CFS-20
- CI-20
- HSC50
- TA78
- TCP/IP
- X.25
- TOPS-20 Release 6
- TOPS-20 Release 4.1
- LP-27
- TOPS-10 Release 7.01A
- TA78
- TOPS-10 Release 7.02 (DECnet III)
- 1091 SMP
- FORTTRAN Version 7
- Linkabit marketing agreement
- DIGITAL's System Interconnect Strategy
- TOPS-20 Ethernet Program

Customers were impressed with LCG's effort. Many of them commented about DIGITAL's significant commitment to the mainframe space.

* AI GAINS VIABILITY COMMERCIALY

Artificial intelligence, or AI, is the science of having machines engage in activities that normally require human intelligence. The concern of AI researchers is to get computers to emulate such unstructured and vaguely defined mental operations as: speculating, reasoning, inferring, hypothesizing, drawing conclusions, and making logical guesses.

DIGITAL's computers have been used in AI from the early theoretical and research stages of the science when it was still primarily an activity confined to university labs and think tanks. Now that AI is gaining commercial viability, DIGITAL's computers are understandably in the forefront of AI application development.

TEKKNOWLEDGE, a well-known Palo Alto, California firm engaged in one particular aspect of AI, uses a DECSYSTEM-2060 to develop customized applications for clients. Jerry Kaplan, Vice President of business development of the company, says of TEKKNOWLEDGE's decision to invest in the DECSYSTEM-2060, "We turned to DIGITAL because of its continual support for AI development. DIGITAL has been encouraging AI activity since the science's beginnings in the university environment. In this regard, DIGITAL is one of the most forward-looking companies. Consequently, DIGITAL's computers have many tools needed for AI work."

Jerry Kaplan,
Vice President,
business development,
Lee Hecht, Chairman
and Chief Executive
Officer, Dennis Brown,
Director of Training
and Education, with
the DECSYSTEM-2060
at Teknowledge. The
computer is used to
develop knowledge-
based systems.



* Portions reprinted from the November 1982 issue of "Insight", published by NPM. The author is Rajini Srikanth.

AI systems and applications stand in marked contrast to traditional data processing applications that perform sequences of mathematical calculations. Rather than working with numbers, AI programs handle symbolic concepts. Yet another difference between data processing applications and AI applications is that while the former automated manual tasks that are clearly defined, structured, repetitive, and time consuming, what the AI industry calls intelligent computers are designed to duplicate the rapid mental processes that generate insights and perceptions.

Among the AI tools available on the DECSYSTEM-2060 is LISP, the language of choice for AI programs. Dennis Brown director of education at TEKKNOWLEDGE explains that LISP is a very convenient means of manipulating and representing symbolic information. "In AI applications, in contrast to data processing applications, there is often only a very vague notion of what the solution is," he says. "You learn as you develop the programs. You rarely write a specification for an AI application," he adds. "LISP is an extremely good tool in such a speculative development environment." Currently, there are only a few vendors, in addition to DIGITAL, for whose systems LISP is made available.

There is now commercial need for three types of AI applications:

1. Knowledge-based (or "expert") systems that can emulate the thinking of experts and can give advice on how to proceed in certain circumstances - for instance: interpret geological data and suggest where to drill an oil well or diagnose possible pulmonary disorders given a variety of symptoms;
2. Vision systems, or computers that can see and interpret satellite photographs or can identify objects coming down an assembly line and direct robots to pick them up;
3. And natural-language systems, or computers that can fetch data from storage in response to statements in plain English from users who may be entirely ignorant of computers.

TEKKNOWLEDGE specializes in designing, implementing, and installing knowledge-based systems for its clients. The process of building a computer representation of a body of knowledge and constructing the inference procedures needed to interpret that body of knowledge is known as knowledge engineering. At present, TEKKNOWLEDGE has a full-time staff of 35 and 12 part-time consultants whose experience dates back to the mid-1960s.

The similarity between the approach of human experts to problems and that of knowledge-based systems is striking. Knowledge-based systems work much like human experts who rely heavily on experiential and subjective knowledge in their work. For

example, experts often arrive at solutions by making good or informed guesses. An expert on pulmonary disorders may be able to diagnose accurately the extent of pulmonary damage on the basis of symptoms, because s/he has encountered similar cases in the past. Knowledge systems are capable of using this same type of heuristic, uncertain knowledge to reach conclusions.

Knowledge such as "failure of the headlights to come on suggests an electrical problem," or "traffic accidents tend to occur at dawn or dusk" are good guesses that can lead to solutions expeditiously.

AI programs are able to benefit from these types of good guesses. They are able to deal with incomplete information or inexact reasoning.

Another similarity between knowledge-based systems and human experts is the ability to explain to a "user" the rationale behind a particular action taken. Typically, a user of a knowledge system can halt system operation at any point and can request an explanation of the system's current line of reasoning. This characteristic of knowledge-based systems makes them particularly useful in training novices in the complexities of a discipline.

But the primary benefit of knowledge systems is in situations in which expertise is scarce, in which the expertise is distributed among different people, or where the expertise is simply not available on a reliable and ongoing basis.

Kaplan emphasizes that in such environments the economic payback of knowledge-based systems is substantial and could occur in as little as a few weeks.



Using the DECSYSTEM-2060, TEKNOLEDGE is currently developing an oilwell-drilling advisor for Elf Aquitaine, the French national oil company. What this knowledge system will do is identify the cause of and suggest solutions to certain problems that might occur on a drilling rig.

Suppose that an oil rig shuts down automatically in the midst of a \$100,000-per-day drilling operation. The foreman then consults with an onsite drilling advisor, which is in reality a knowledge-based system that incorporates the expertise of someone with 25 years of experience in the field. The expert system suggests that the drill bit's hardness is incorrectly matched to the substrate one mile below. The drill bit is then replaced, thereby avoiding a very expensive delay.

TEKNOLEDGE is in the process of developing other knowledge systems as well.

Other AI projects under consideration at DIGITAL span areas as wide-ranging as hardware diagnostics; configuration of VAX-based orders; VLSI design; and office automation.

TEKNOLEDGE was created in 1981 by a group of distinguished computer scientists from Stanford University, the Massachusetts Institute of Technology, and the Rand Corporation. A spokesman for the company says that its staff represents about one-third of the world's high-level expertise in the design and development of knowledge systems.

* THE LP27: NEW 1200 LPM PRINTER FOR LCG CUSTOMERS

Bruce Campelia and
Art Zina
MR01-2/E78

LCG endorses the LP27 as the reliable high-speed line printer to meet your customers' requirements. The LP27 has the long line and DAVFU capabilities that DECsystem-10 and -20 users expect as standard features, along with complete compatibility with other LCG products, at a price of \$30,990, 40% lower than previously offered by DIGITAL.

Maintenance features inherent in the LP27's design are crucial to DECsystem-10 and -20 users, because they ensure uptime throughout a 60% duty cycle, while streamlining preventive and repair service.

Customers will be delighted with the easy ordering process that has been instituted by LP27 Product Management. By specifying only one option number, your customer receives a printer, LP20 controller, 100 feet of cable, two durable bands (64 and 96 character EDP) and a fifteen foot towel ribbon.

If needed, additional bands, cables, and ribbons can be purchased as standard items through A&SG (Accessories and Supplies Group).

In the heavy-duty processing environment of LCG systems, the LP27 will provide a durable and cost-effective solution to our customers' printing requirements.

<u>Option No.</u>	<u>MLP</u>	<u>BMC</u>	<u>Add-On Inst.</u>
LP27--2A/2B	\$30,990	\$292	\$525



* Reprinted from "Sales Update", Nov. 8, 1982

* ANNOUNCING LINK VERSION 5.1 FOR TOPS-10/20 SYSTEMS

Hirak Sengupta
Large Systems Prod. Mgr.
MR01-2/E78

Large Systems Engineering announces LINK Version 5.1, a new version of LINK software for the TOPS-10 and TOPS-20 operating systems, that provides significant new functionality to support new language features.

LINK Version 5.1 is a part of DIGITAL's commitment to make continuous enhancements in linking capabilities. It provides specific functionality to support FORTRAN-10/20 Version 7.0.

Significant Features

- o Argument checking
- o Character to Hollerith conversion
- o Character data.

The following new functionality is included in the LINK for the TOPS-10 operating system:

- o MAXNODE Switch
- o CPU Switch changes
- o DEBUG Switch
- o SET Switch
- o LIMIT Switch
- o MESSAGE Switch
- o LINKLMN Message
- o SUPPRESS Switch
- o Writable Overlays, which permit support for the FORTRAN-77 SAVE statement.

These TOPS-10 features are already included in LINK Version 5.0 for TOPS-20 V5.0 on KL Model B processors.

LINK Version 5.1 will support all the DIGITAL-supported layered products that operate on KI, KS or KL processors under the following operating systems:

TOPS-20 Version 4.1
TOPS-20 Version 5.1
TOPS-10 Version 7.01A
TOPS-10 Version 7.02

LINK is packaged with the above operating systems and therefore enjoys the full range of DIGITAL services. LINK is included in the pricing of the operating system.

The FCS of this product is planned around April-May 1983 timeframe.

* Portions reprinted from "Sales Update" November 8, 1982

BUY-LINE APPLICATION

NAME:

MAIL STOP:

BADGE:

COST CENTER:

DEPT:

OFFICE LOC:

Please add my name to the BUY-LINE mailing list.

Please delete my name from the mailing list.

My responsibility is in:

LCG Sales

LCG Marketing

LCG Service

Another product line or corporate function

Please detach and mail to Barbara Holtz, MRO2-2/8D2. Thank you.

(CUT)

BARBARA HOLTZ
MR02-2/8D2

(CUT)

TENVAX FACILITATES DECsystem-10/VAX MAGTAPE TRANSFER

Dave Doxey
ADS (Appl. Dev.Sys.)
CFO2-1/J12

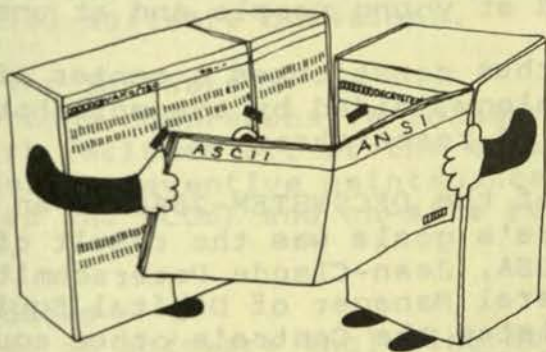
The Application Development Systems Group (ADS) of Digital Information Systems has funded the development of a TENVAX, a new software tool that allows the DECsystem-10 to read and write magtapes in VAX format, thus permitting the transfer of ASCII data files between the systems.

The TENVAX runs on the DECsystem-10, and reads and writes ANSI labeled tapes in the exact format used by the VAX/VMS COPY command. The utility features a user-friendly interface that allows users to create tapes very easily.

TENVAX files may save records of any length, and can span multiple volumes of tape. Any number of files can be put on a single tape set. Full wildcard and file switch support is provided.

Groups that would like to get a copy of TENVAX should have their systems managers send an EMS or memo to me at ADS, DTN:251-1035.

ADS asks that only systems managers request the software, to prevent multiple copies on a single system. The system manager can install TENVAX on a public area, and can announce its availability to all users on a system.



DIGITAL DONATES DECSYSTEM-2060 to WORLD COMPUTER CENTER

Jean-Pierre Bourbon

EVO (Evry, France)

Digital Equipment Corporation recently donated its powerful DECSYSTEM-2060 to The Centre Mondial (The World Computer Center) located in Paris, France. Installed in June 1982, the -2060 is the Centre Mondial's technological "heart", and is of great help to international research teams as well as to networking applications.

The Centre Mondial was created in January 1982 in Paris, with the endorsement of President Francois Mitterrand, and is presently headed by Jean-Jacques Servan-Schreiber. Eminent scientists and research personnel from institutions and corporations around the world are dedicated to helping the Centre pursue many exciting goals, including:

- * developing new hardware and software technologies allowing the design of a true personal computer;
- * assisting third world countries in launching pilot experiments in the use of microcomputers; and
- * creating and assessing social projects in France, chiefly aimed at young people and at unemployed persons.

The Centre Mondial thus constitutes a center of expertise in microcomputer technology, aided by the collaboration of a worldwide network of researchers.

DIGITAL's donation of the DECSYSTEM-2060 as an important means of supporting the Centre's goals was the result of a decision made by VP Gordon Bell, USA, Jean-Claude Peterschmitt, VP Europe, and Claude Sournac, General Manager of Digital Equipment France. The DECSYSTEM-2060 completes the Centre's other equipment, which consists of a VAX-11/780, and of many mini- and micro-computers from various manufacturers. All are used for education, experimentation analysis, and for research purposes.

INTRODUCING SPS FOR ALGOL, APL-SF and BLISS-36 on TOPS-10/20

Don Fitzgerald
Swa. Prod. Services
OG01-2/V08

Software Product Services (SPS) announces the availability of Basic and DECsupport for ALGOL and APL-SF plus Self-Maintenance, Basic and DECsupport service for BLISS-36.

The introduction of the following levels of service provides the ALGOL, APL-SF and BLISS-36 customer the opportunity to select the level of software product support that best meets their needs.

Service Offerings:

Self-Maintenance Service for Software (SMS)

This service provides the tools necessary for self-sufficient customers who prefer to maintain their own system software. This service includes Software Product and Documentation Updates sent automatically upon release, newsletters containing information about new software developments, programming enhancements, and program change orders, plus a formal communications channel, called the Software Performance Report (SPR) for suggestions and non-critical questions. SMS also includes machine-readable Program Change Orders (PCOs), sent automatically upon release.

Basic Service for Software

This comprehensive service is appropriate for customers who require a higher degree of responsiveness from DIGITAL in order to maintain their system software. It includes all of the elements of Self-Maintenance Service for Software, plus Telephone Support for usage and remedial software questions.

DECsupport Service for Software

This service is the most comprehensive Software Product Service available. DECsupport includes all of the elements of Basic Service, plus scheduled preventive maintenance (delivery and installation of updates and PCOs) and on-site remedial support for critical situations.

Software Product Updates

Single major releases of software including documentation. No services are included; however, they may be purchased at per-call rate.

For Internal Use Only

Ordering/Pricing Information

Product	Q #	* DPMC	*BSMC	SMMC	Service Right to Copy	One Time Update Kit	Add-on
ALGOL	QH502	165	110	72	33	2200	* 600
	QT002	165	110	72	33	2200	* 600
APL-SF	QH071	250	180	145	*66	4400	* 600
	QT012	250	180	145	*66	4400	* 600
BLISS-36	QH115	190	135	*100	*50	*1800	* 600
	QT115	190	135	*100	*50	*1800	* 600

* New prices

DPMC = DECsupport Service Monthly Charge

BSMC = Basic Service Monthly Charge

SMMC = Self-Maintenance Monthly Charge

Distribution Media: 9 track 1600 PBI magtape and 9 track 800 BPI magtape (TOPS-10 only).

Prepayment Discount: Usual 5% discount will be available to customers who prepay one year's service.

Prerequisites: Proper software license plus SPS for host Operating System.

The above-mentioned pricing information is for the U.S. area only. For specific Software Product Service availability and pricing information, please contact your local Software Services manager. DECsupport Service is available as per Area needs and resources.

TOPS-20 V4/V5 PERFORMANCE ANALYSIS

Laura Gawronski
 LCG Technical Support
 MR02-4/C2

Although TOPS-20 Version 5 increased flexibility with extended addressing, SPEAR, and EXEC enhancements, V5 also included some unexpected features. Performance data was gathered running an educational benchmark with different memory configurations.

The following information should be reviewed by both Sales Reps and Software Specialists because the changes in TOPS-20 V5 were fairly subtle and were not documented. This article attempts to document some of the changes.

The following graphs illustrate responsiveness, power, and throughput based upon the data gathered from a benchmark run under both TOPS-20 V4 and V5. Under V4, the Bias Control Knob setting was 11 but under V5 the bias setting was 10. For simplification, only the data depicting the 1MW and 1.5MW configurations will be illustrated. The 2MW V5 data is also shown to indicate the differences in performance as each additional 512K of memory is added.

This benchmark emulates a student timesharing environment performing simple edits, FORTRAN compiles, links and runs.

RESPONSIVENESS

The first measurement examined is Responsiveness. This is defined as the ability of the system to respond quickly to trivial interactions. In this benchmark we measure responsiveness as the response times from edit input to input commands (how fast the system will respond with the edit prompt after the completion of a previous edit command).

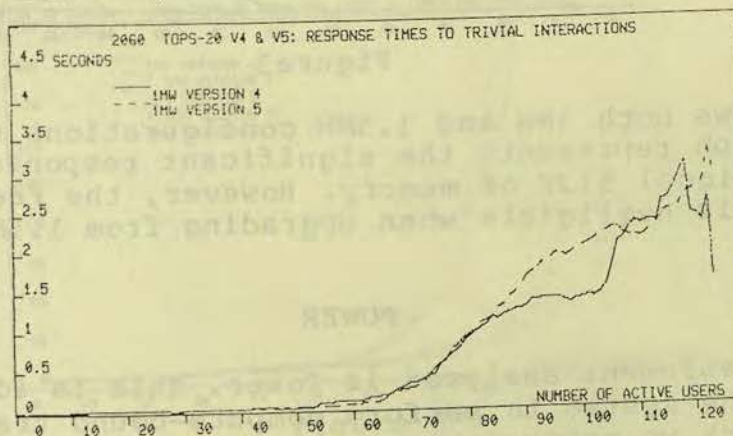


Figure 1

As can be seen in Figure 1, the response time remains consistent between the two versions until around 84 users. At this point V4

levels off roughly maintaining the same average response time until 103 users at which it peaks rapidly. V5 behaves quite differently.....it does not maintain an average response time but continues to decline in a much more graceful manner.

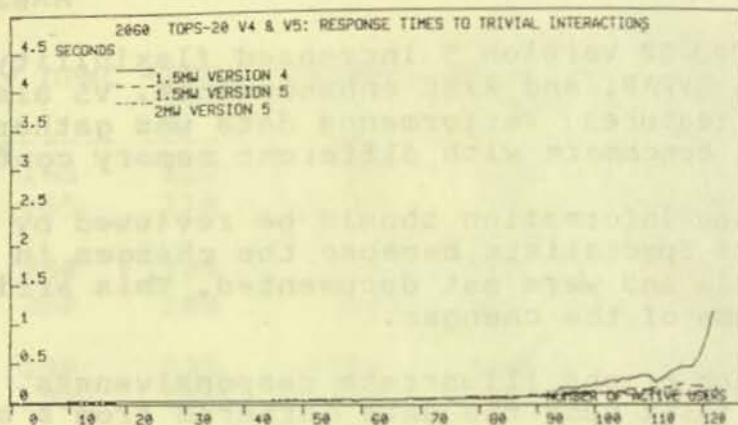


Figure 2

Figure 2 portrays a very different story at 1.5MW. The average response time remains fairly constant between both versions until around 92 users. At this point the responsiveness actually improves under V5 compared with V4.

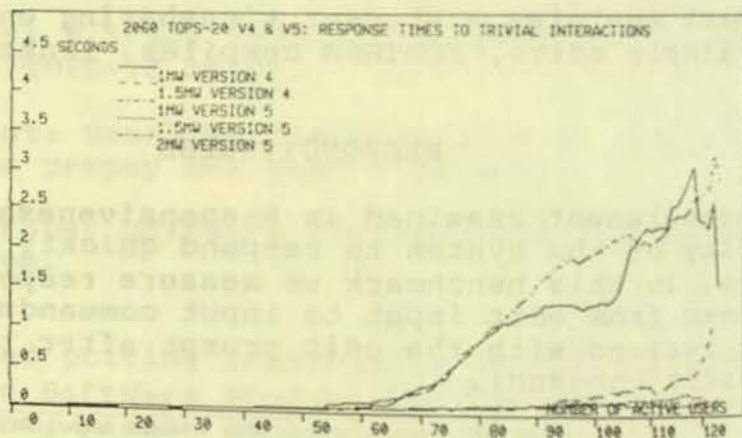


Figure 3

Figure 3 shows both 1MW and 1.5MW configurations run under V4 and V5. This graph represents the significant response improvement with an additional 512K of memory. However, the response improvement is negligible when upgrading from 1.5MW to 2MW.

POWER

The next measurement analyzed is Power. This is identified as the ability of the system to perform compute-bound transactions. In this benchmark we measure power as the compile times for a 300 line FORTRAN program.

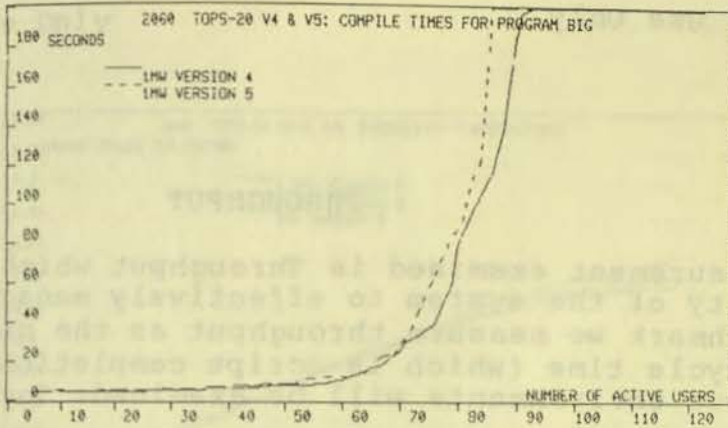


Figure 4

The curves appear consistent until the 71 user mark where each version degrades drastically. V4 is fully saturated at 91 users but V5 becomes saturated at 86 users.

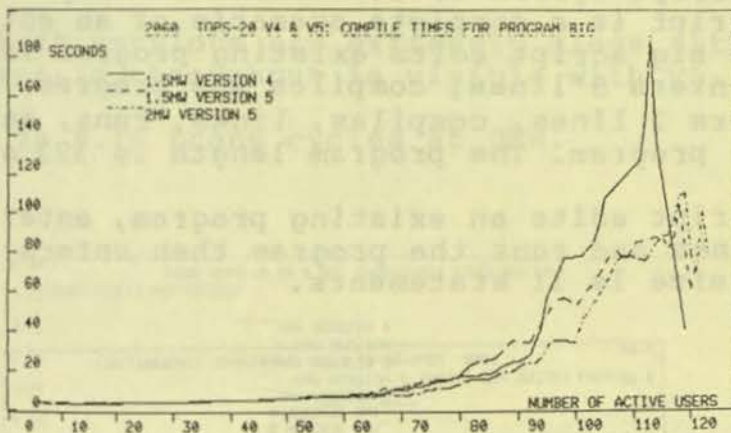


Figure 5

Under V4, the system begins to degrade dramatically after 92 users and the system saturates with a maximum compile time of 190 seconds at 110 users. V5 begins to degrade gracefully around 80 users and continues to decline with a maximum compile time of 110 seconds until it reaches 118 users.

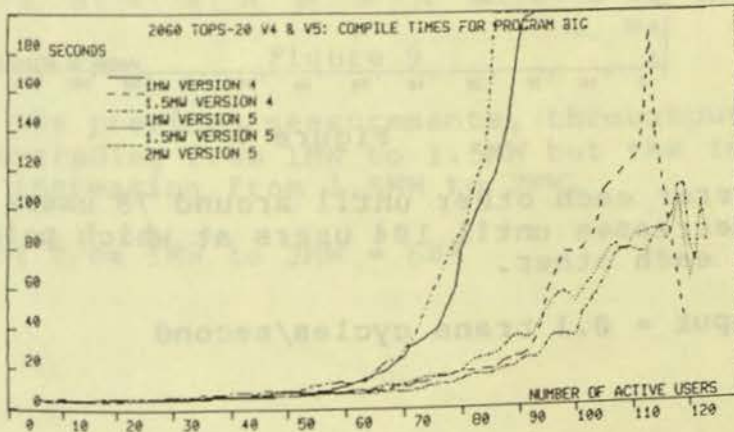


Figure 6

What is important to notice in Figure 6 is the tremendous improvement in compile time with the upgrade of memory from 1MW to 1.5MW. Although some improvement is also evidenced by upgrading from 1.5MW to 2MW, it is not very significant.

THROUGHPUT

The last measurement examined is Throughput which by definition is the ability of the system to effectively manage its resources. In this benchmark we measure throughput as the number of users divided by cycle time (which is script completions per second). Two throughput environments will be examined: Interactive and CPU Intensive.

The grid on the right of the following graphs indicates how many cycles of a script were completed (e.g., 0.02 of a script were completed in a second therefore it would take 100 seconds to complete 2 script cycles or 50 seconds to complete 1 script cycle). A script is a complete scenario of an edit, compile, link and run. The Big script edits existing program source, prints the last line, enters 8 lines, compiles the program, edits the new source, enters 2 lines, compiles, links, runs, enters 20 input lines to the program. The program length is 323 statements.

The Trans script edits an existing program, enters five lines, compiles, links and runs the program then enters 20 input lines. The program size is 11 statements.

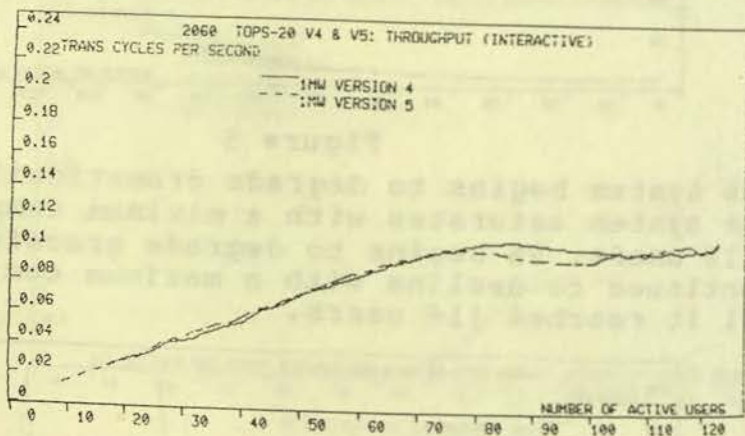


Figure 7

V4 and V5 mirror each other until around 78 users where V5 throughput decreases until 104 users at which point they once again mirror each other.

Peak throughput = 0.1 trans cycles/second

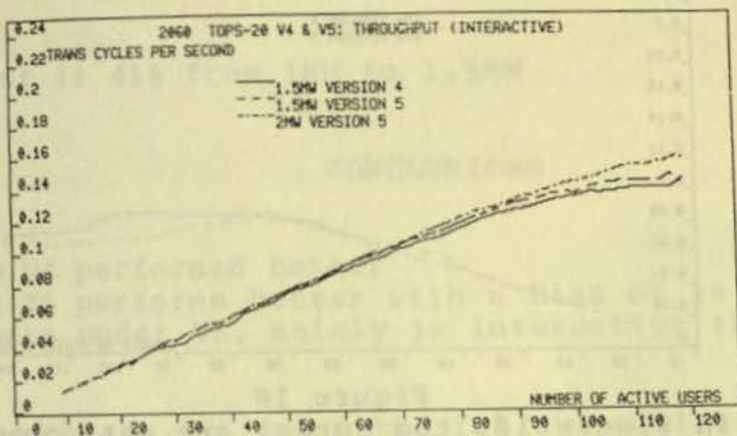


Figure 8

The curves for both versions are extremely close although a slight improvement in throughput is visible with V5.

Peak throughput is 0.16 trans cycles at 2MW.

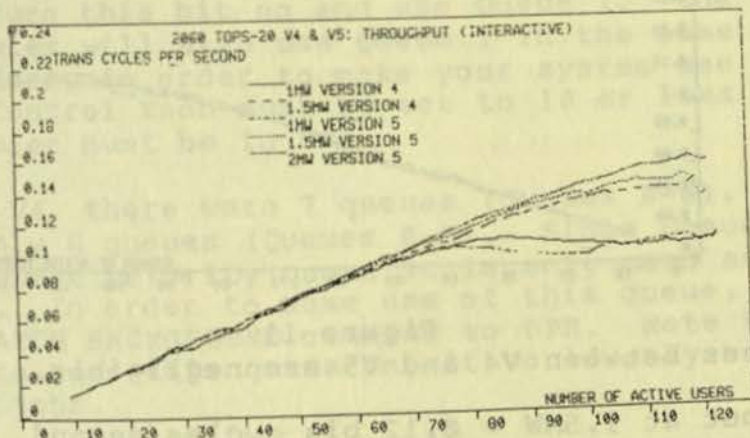


Figure 9

As evidenced in the previous measurements, throughput is augmented when upgrading from 1MW to 1.5MW but the improvement is negligible when increasing from 1.5MW to 2MW.

Total improvement from 1MW to 2MW = 60%

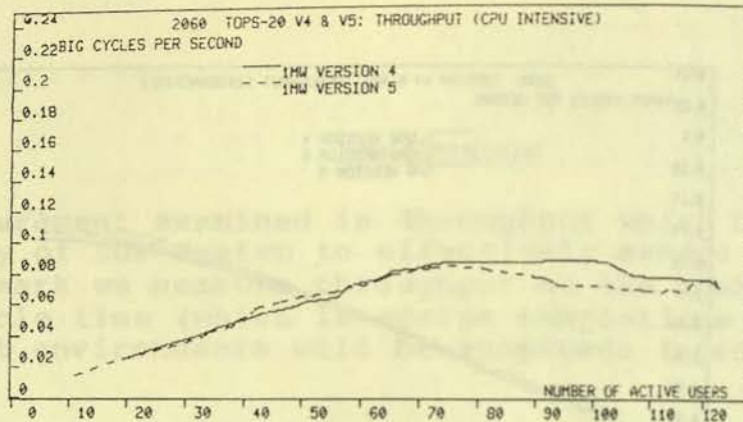


Figure 10

As indicated in Figure 10, the curves are very close until 40 users where V5 throughput increases slightly until 64 users at which point it begins to decline.

Peak throughput = .085 cycles/second

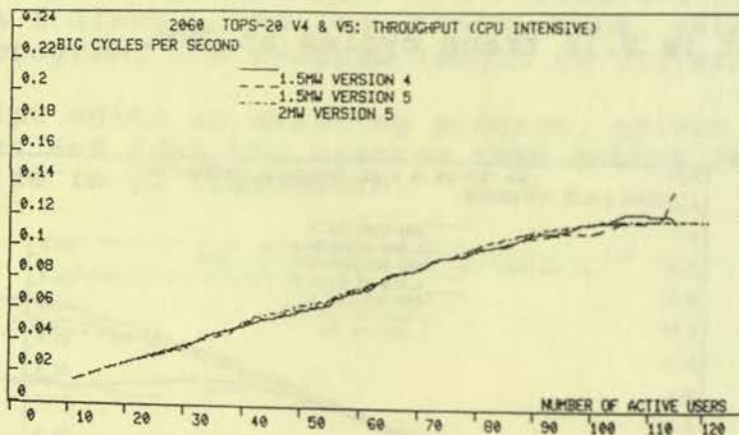


Figure 11

The differences between V4 and V5 are negligible.

Peak throughput at 1.5MW = 0.12 big cycles/second

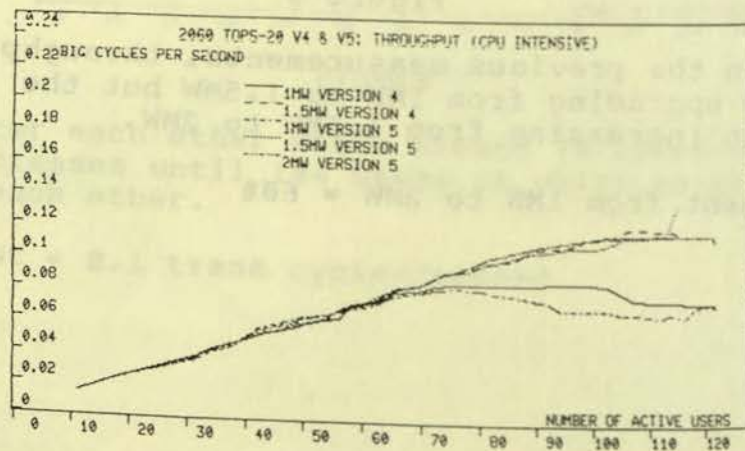


Figure 12

Once again, throughput is augmented when upgrading from 1MW to

1.5MW but the improvement is negligible when increasing from 1.5MW to 2MW.

Total improvement is 41% from 1MW to 1.5MW

CONCLUSIONS

1MW - TOPS-20 V4 performed better
1.5MW - TOPS-20 V5 performs better with a Bias of 10 2MW -
Small improvements under V5, mainly in interactive throughput

As we ran the benchmark, we found the following alterations:

- 1) The default Bias Control Knob setting under V4 was 11. The V5 default setting has not changed, but the functionality has. The Bias Control Table contains a bit that turns the use of Queue 1 on or off. When this bit is set, any process waking up from terminal I/O is requeued to Queue 1. In V4, the default setting of this bit was on; however, in V5 the default setting of this bit is off. Setting the Bias Control Knob to 10 or less will turn this bit on and use Queue 1. The Class Scheduler will also use Queue 1 in the same manner. Therefore, in order to make your system use Queue 1, the Bias Control Knob must be set to 10 or less or the Class Scheduler must be in use.
- 2) Under V4, there were 7 queues (Queues 0-6). In V5 there are only 6 queues (Queues 0-5). Since Queue 5 is now the lowest priority queue it is only used as the Dregs queue. In order to make use of this queue, you can use the BATCH BACKGROUND command to OPR. Note that if you were to turn this queue on, it would only be used by batch jobs.
- 3) Processes coming out of a wait state never move back up the queue line but remain cyclic in the same queue. PCO #20-MONITO-488 in response to SPR #20-18346 will resolve this problem.
- 4) Performance data indicates that configurations with 1 MW or less will experience some degradation in performance. However, configurations with more than 1 MW will experience improved performance for this particular workload.

CAVEAT

This benchmark is important for demonstrating a controlled environment but is NOT necessarily representative of all customer environments.

TOPS-20 V5 SOURCE UPDATE



Doug Ruby
 LCG Tech. Support
 MRO2-2/8D2

We have received complaints about TOPS-20 source customers who received incorrect software - largely due to the wrong software being ordered. The following is intended as a corrective action "memo", and outlines the correct Q numbers to use for TOPS-20 Version 5 (KL Model B) customers and for TOPS-20 Version 4 (KS, and KL Model A) customers:

Version 4: KS,
 & KL Model A

Version 5: KL Model B

QT029-N(K,L) Front end Sources	QT029-N(K,L) Front end Sources
QT030-N(M) Monitor Sources	QT100-N(M) Monitor Sources
QT038-N(M) EXEC Sources	QT101-N(M) EXEC Sources
QT040-N(K,L) Source Package	QT102-N(K,L) Source Package

TOPS-20 V4 (SPD 21.1.X) sources released in May 1980.

TOPS-20 V5 (SPD 21.20.X) sources released in June 1982.

The above information and pertinent ordering information for customers purchasing sources for the first time is contained in the appropriate TOPS-20 Software Product Description (SPD).

Any orders in process for Source Updates which are determined to be incorrect must be handled by Software Services Order Processing. The contact is Ginni O'Connor, DTN: 223-4105. Mail stop is PK03-2/K43.

New orders for TOPS-20 Sources (as opposed to Source Updates) should be handled by LCG Order Processing.

*SPEAR SIMPLIFIES LARGE SYSTEM ANALYSIS And REPORTING

Last August, DIGITAL introduced SPEAR (Standard Package for Error Analysis and Reporting), a sophisticated new package that performs automated analyses of large-computer system failures.

The first release of SPEAR, field-installable on VMS, TOPS-10 and TOPS-20 operating systems, is being offered to customers with DECsystem-10s and -20s, and with VAX-11/780s.

Run on a daily basis, the software is designed to:

- o Identify customer-correctible disk or tape problems,
- o Assist field service engineers in diagnosing hardware failures
- o Anticipate system failures. According to Joe Sullivan, Market Development Manager for the Systems Services Group, SPEAR should benefit the Field Service engineers and branch managers.

"This is a powerful new analytical tool which allows engineers to make the best possible use of their time," says Joe. "It's the first time that anyone, anywhere in the industry, has released a practical application of rule-based technology similar to what is employed in artificial intelligence systems. SPEAR is based on the assumption that as hardware failures occur, they'll be accompanied by a corresponding set or series of physical events or 'symptoms' that might indicate the source of the problem." SPEAR's precursors simply produced a detailed report of the system "event file," a massive body of raw data on the system's day-to-day operations. When the computer failed, says Joe, the field engineer would manually sift through bulky printouts looking for telltale symptoms that might indicate the source of the failure. Furthermore, the engineer's accuracy in identifying symptoms and then correlating them to the fault was limited by personal experience and human memory.

SPEAR automates the interpretive process. A body of human expertise has been designed into the software so that SPEAR can identify a wide range of "if-then" relationships between symptoms and causes. An engineer running the ANALYZE fault-isolation module will be presented not with a massive event file printout, but with a brief summary of symptoms and a suggestion as to the likely source of the failure.

"This takes a lot of the drudgery out of the engineer's job," says Joe. "Before SPEAR was developed, about 85 percent of the time spent on a typical service call was devoted to diagnosis. We expect this figure will be greatly reduced, and that mean time to repair will drop by about 20 percent."

"We looked at other approaches for enhancing error-analysis for large systems in the field," says Jack Walden, Senior Maintainability Engineering Manager. "For example, one of our competitors uses system-directed analysis, where your program asks questions about your system's configuration and about errors the system has reported. Then, based on your response, the program directs you to a potential source of failure. We rejected that approach, because it requires an experienced person to interact with the data. SPEAR incorporates the expert's knowledge and draws its own conclusions about what is failing."

Jack's prior experiences repairing KL-based systems all over the world confirmed for him the wisdom of SPEAR's rule-based methodology. "Though I couldn't read schematics, some of my colleagues with hardware expertise taught me 15 or 20 simple rules to follow in tracking down systems failures: 'If you see this, check the following things.' It was a successful technique, and we wanted to incorporate that technique into our new error analysis product."

SPEAR is "smart" because a lot of thought went into the conception and design of the software package. "One of our first objectives was to provide a software product for the field that would resolve some of the problems associated with intermittent failures," says Nick Howgate, manager of the SPEAR Development Group, a part of Customer Services Maintainability Engineering. "Intermittent crashes are difficult to diagnose; they're time-consuming; they often require repeat visits; they cause a lot of customer dissatisfaction; and they're very frustrating for the engineer. Generally, we wanted to reduce repair time, by developing a process of symptom-directed diagnosis rather than the conventional test-directed approach. On an even wider scale, we wanted to capture a high level of expertise and make it available to the whole population of field service engineers."

The initial release of SPEAR supports MASSBUS disk and tape devices. In nine months of field testing, the TOPS-10 and -20 versions of the SPEAR package were greeted enthusiastically, says Nick. "The customers were very impressed with the system's ability to diagnose failures caused by media problems such as a scratched disk or a dirty tape. They can deal with those things themselves, by purging or cleaning the media, thereby avoiding an unnecessary service call to DIGITAL. One user said SPEAR had already saved his company hundreds of hours in media-related downtime."

Nick said both formal and informal polling showed that the engineers felt SPEAR gave them greater speed and accuracy in

solving problems and in analyzing a system's overall performance. "They also seemed to appreciate INSTRUCT, the computer-aided instruction module which teaches them how to use SPEAR and then doubles as a reference manual/troubleshooting guide."

He feels that customers, managers, and engineers will also come to appreciate another of SPEAR's functions, COMPUTE, which provides quantifiable data on the system's availability and effectiveness at any given moment or across time.

Joe says that initial release of SPEAR "is just the beginning, the first generation of error analysis tools to embody the principles of artificial intelligence. As the technology advances, and as we get feedback from the field, SPEAR-type systems are going to get smarter and smarter, representing more expertise, applicable to a wider array of hardware devices, and able to diagnose a greater variety of problems with increasing accuracy. And without a doubt, DIGITAL will continue to set the standard for the entire industry.

* Reprinted from the November 1982 issue of "U.S. Area News".

OFFERINGS FROM ED SERVICES SEMINARS

Susan Scown
Ed Services Mktg.
BUO/E58

Increasing Business Productivity with Personal Computing

This two day seminar approaches business personal computing practically, explaining the fundamental computer terms and concepts and taking a realistic look at PC applications/potential benefits. Attendees examine applications including financial modeling and word processing to computerized accounting systems, such as accounts receivable and general ledger.

Jan. 10-11	Ramada Remaissance	Denver, Colo.
Jan. 13-14	Hyatt Seattle	Seattle, Wash.
Jan. 20-21	Hyatt Regency Phoenix	Phoenix, Arizona

The Role of Personal Computing in Your Future

This seminar focuses on the many uses of personal computing in business and professional environments from the user's perspective. Capabilities and limitations of personal computing for business are examined.

Jan. 14	Stouffer's Inn	Cleveland, Ohio
Jan. 19	Marriott Inn	Columbus, Ohio
Jan. 21	Stouffer's Towers	Cincinnati, Ohio

Local Area Networks

This seminar examines the key design issues involved in the selection and/or implementation of a Local Area Network.

Jan. 18-20	Parker House	Boston, Mass.
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Networking: Design and Implementation

This seminar is for anyone involved in the design, use, or selling of networks, and includes an in-depth discussion of network architectures, components, and structures.

Jan. 25-27	Hyatt Long Beach	Long Beach, Calif.
Feb. 1-3	Sheraton	Washington, D.C.

DATA SERVICES WELCOMES ART ZINA



Donald Turner
Data Serv. Mktg. Mgr.
MRO2-2/C2

I am pleased to announce that Art Zina has joined LCG as Principal Marketing Specialist for the Data Services Market segment.

Art comes to the LCG Product Group with over 12 years of experience at DIGITAL. Art's most recent assignment was as -10/-20 Product Manager in LSG Central Engineering. Prior to that, Art was Program Manager in LSG Engineering.

Art will be responsible for Data Services accounts in the U.S. Western, Southwest, and Ny/NJ Regions, and will share account responsibility with John Montesion concerning other Regions. We look forward to Art's valuable contribution to LCG.

Please join me in welcoming Art to our group.

Art Zina



LCG G&IR WELCOMES KATHLEEN HEALY



Michael Flitterman
LCG G & IR Mktg. Mgr.
MRO2-2/8D2

LCG's Government and Industrial Research Group would like you to welcome our newest member: Kathleen (Kathy) Healy, as part of the G&IR marketing team.

Kathy started with LCG on December 6 and came to us after having been a Marketing Specialist with DIGITAL in Merrimack, NH. She has been with DIGITAL for over five years.

We look forward to having Kathy join us, and we know that she will be an asset to our LCG efforts.

Kathleen Healy





LCG NAVIGATION LIST

DTN:

Rose Ann Giordano	231-4049	LCG Product Group Mgr.
Per Hjerppe	231-7444	LCG Group Marketing Mgr.
Carl Cargill	231-6127	Strategic Planning Mgr.
Ray Ochester	231-4117	Product Marketing Mgr.
Paul Feresten	231-4371	Mktg. Mgr. DECsystem-10/20
Diana Miller	231-4537	Language/Layered Product Spec.
Celeste Moore	231-4510	Oper. Systems/Communica. Spec.
Ira Machefsky	231-6863	Future Systems Spec.
Peter Gray	231-5829	European Support Mgr.
Larry Vifquain	231-4439	Market Development Mgr.
Rebecca Alexander	231-6469	Govt. & A.I. Mktg. Spec.
Marilyn Davison	231-5815	Commercial Mktg. Spec.
Richard Smith	231-7493	Eng./Office Automa. Mktg. Spec.
Ward Davidson	231-5657	LCG Product Line Mgr.
Connie Davis	231-4291	Installed Base Mktg. Spec.
George Harlow	231-4455	Technical Services Mgr.
Richard Colarusso	231-7424	Sr. Technical Supp. Spec.-H/W
Jack Lucier	231-4080	Technical Supp. Spec.
Ammie Herring	231-5963	Shift Supervisor
Wayne Garber	231-6107	Computer Operator
Carol Orton	231-6107	Computer Operator
Jim Rehill	231-5562	Senior Software Spec.
Doug Ruby	231-6884	Tech. Supp. Mgr.- S/W
Laura Gawronski	231-6480	Technical Supp. Spec.
Reed Powell	231-4261	Technical Supp. Spec.
Debra Rio	231-5612	Technical Supp. Spec.
Rita Tillson	231-6615	Technical Supp. Spec.
Peter Wysocan	231-7360	Technical Supp. Spec.
Jim Miller	231-4265	GIA Operations Mgr.
Joe Viula	231-4372	GIA Mktg. Mgr.
Sergio Kogan	231-7409	Latin America Prin. Mktg. Spec.
Allan Titcomb	231-4849	Applications Mktg. Mgr.
Bernie Eiben	231-4431	Applications Supp. Spec.
Mitch Perlitch	231-5975	Applications Supp. Spec.
Dee Ramee	231-6431	SOFTWARE REF. CATALOG Editor
Beryl Sachs	231-6691	Marketing Programs Mgr.
Beverly S. Mansfield	231-6584	Mktg. Supp. Spec. (Cust. Visits)
Don Mallinson	231-4285	Mktg. Communications Mgr.
Barbara Holtz	231-4996	BUY-LINE Editor (Salesforce)
Don Waite	231-5256	LARGE SYSTEMS NEWS Editor (Customer)
Peggy Sullivan	231-6878	LCG Literature Co-ordinator

For Internal Use Only

LCG Operations (cont'd)

DTN:

Rich Whitman	231-7498	US Area Operations Mgr.
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Barbara Holtz
 LCG Mktg. Comm.
 MRO2-2/8D2

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EDITOR'S NOTE: You may order these publications by contacting Jane Fitzgerald at P&CS in Northboro. The DTN is 234-4325. Mail stop is: NR2-2/W3, RCS code is NR12 (for telexes).

If you find an item to be out of stock or incorrectly numbered, please phone me or Gail Breslin at DTN: 231-4996 or 231-4013, and we'll try to help you out.

ATTENTION ! ! ! This list (and order numbers) supersedes all prior lists.

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DECSYSTEM-20 Layout Kit	EK-DEC20-LK-003

* Corporate Field Service has just introduced a Generic Site Planning Kit worldwide, enabling site planners to do floor layouts and site planning for all DIGITAL products including the DECsystem-10 and-20 product set. This Kit is designed to be Field Service's standard Site Planning tool. The new Kit's order number is EK-SPKIT-SP, available from P&CS, Northboro.

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* New order numbers for recently produced editions

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SALES AIDS*

*Sales Aids are ordered by sending a memo/TWX to Jean Catto (MRO2-2/8D2) containing your name, badge number, cost center, shipping address, and the signature of your cost center manager. Minimum charge for an order is \$150.00. Pens cost either \$1 or \$2 each, and mugs cost \$2 each. Mugs are packed in boxes of 12. Orders can be mixed to meet the minimum.

MUGS: Large Computer Group Mugs - sand colored china with blue sail boat design.

PENS: Gold chromatic pens with DIGITAL logo and Large Computer Group in brown. Cost: \$1.

Also: white No-nonsense pens with LCG logo; cost: \$2.

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Kathie Stanton, Bedford MA, DTN 249-4068	
Supplementary Slide Package	Memo Don Waite MR2-2/8D2

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Office of the Eighties: Digital vs IBM	EF 16279 05
DIGITAL vs IBM: Information Management	EF 16278 05
DIGITAL Disks vs IBM Disks	EF 16245 05
(the four above-mentioned may be obtained for \$200 per copy. Send telex, to Nora Fleming-Peaslee at BG51.	MR2-2/8D2

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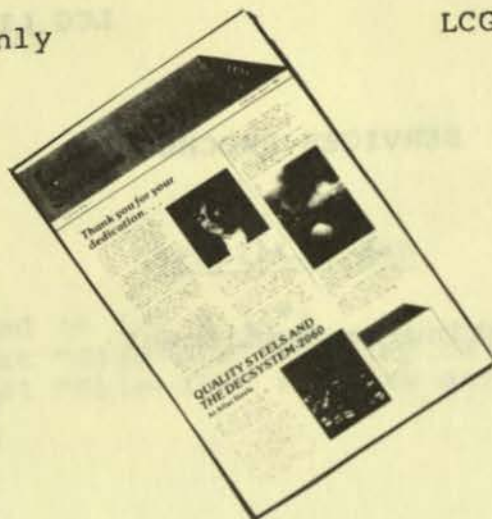
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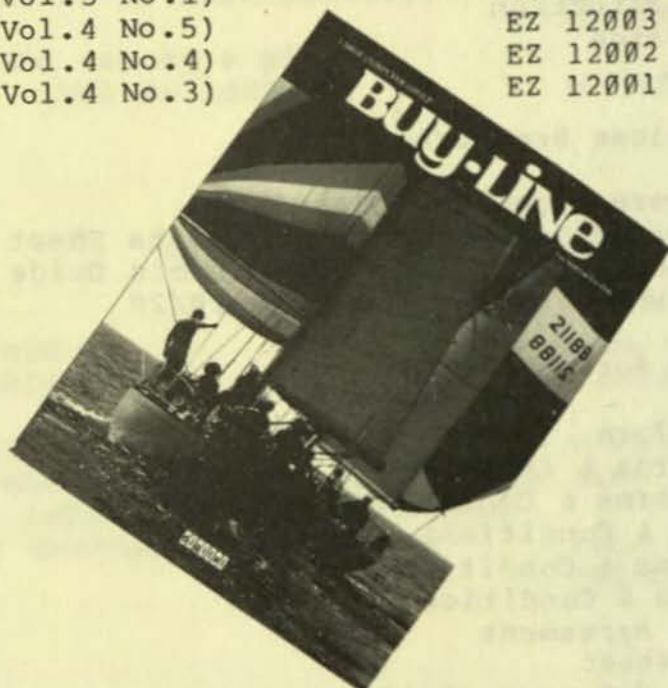
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Compendium	1982	Vol.II	EZ 09016 82
May/June	1982	Vol.5 No.1	EZ 08120 82
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Barbara Holtz
LCG Mktg. Comm.
MR02-2/8D2

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LARGE COMPUTER GROUP

BUY-LINE

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BUY-LINE
FEBRUARY 1983
VOL. 5 NO. 8

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Laura Gwizdzki
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WSP-2/013

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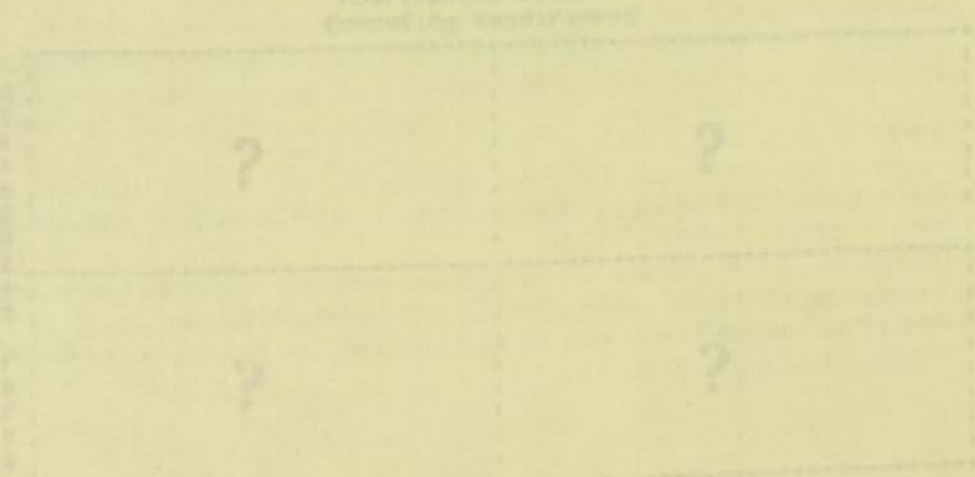


Figure 1

The addition of the -11/782 to the VAX family appears (when compared with the DECSTATION-2060) to offer an overlap in both CPU performance and in price. A new customer considering satisfying his computing requirements with a DIGITAL product and confronted with an apparent price-performance overlap, needs assistance in clarifying and in differentiating these products.

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VMS/TOPS PRODUCT POSITIONING



Laura Gawronski
LCG Technical Support
MR02-2/D13

Are you sometimes confused about where the VMS and TOPS operating systems fit in the marketplace?

Has the issue of price/performance been raised by existing and/or new customers?

Do you wonder how to differentiate between VMS and TOPS as their overlap increases?

With upcoming product announcements in both the DECsystem and VAX product families, you will find it increasingly important to differentiate between these two product families using more than price, performance, or a combination of the two.

The following positioning model (or matrix) will help you to resolve this dilemma. This model (NOT for general distribution) is being provided to the field as a guide in determining the best total solution for a customer. It is based upon a slide presentation (without script) which you can order from Beryl Sachs.

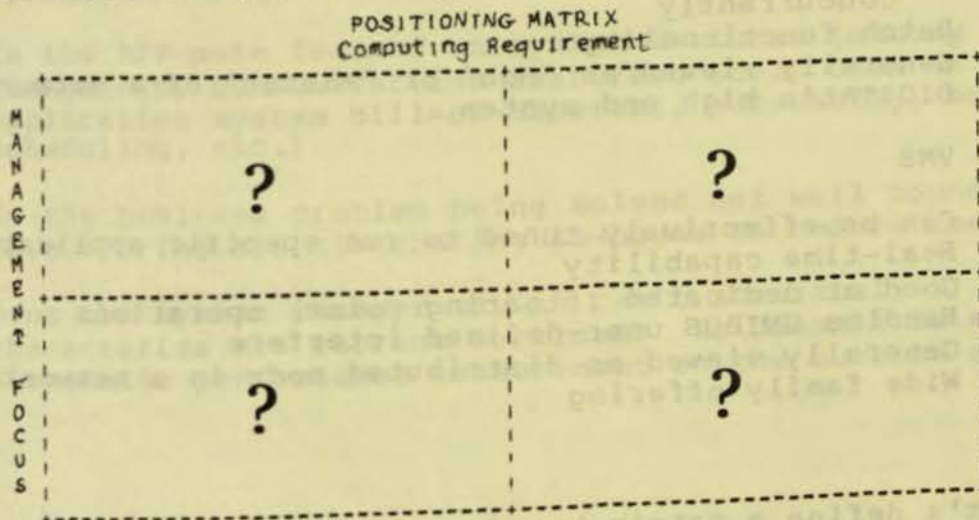


Figure 1

The addition of the -11/782 to the VAX family appears (when compared with the DECSYSTEM-2060) to offer an overlap in both CPU performance and in price. A new customer considering satisfying his computing requirements with a DIGITAL product and confronted with an apparent price-performance overlap, needs assistance in clarifying and in differentiating these products.

Positioning TOPS and VMS

The key differentiation issues focus on the kind of problems to be solved and on the organization environment that the system must support. Dimensions of product positioning are:

1. Computing Environment - the type of computing being done in the customer's environment.
2. Management Environment - the structure of the organization that the system must support.
3. Product Strengths - the positions TOPS and VMS fit into.

The importance of differentiating products in these dimensions is based on the thesis that computing systems (hardware and software) should model the problems being solved, rather than the problem modeling the computing system. Further, computing systems tend to reflect the management priorities of the organization using them.

Product Strengths

TOPS

- General purpose timesharing
- Management tools for centralized control
- Self-tuning for unpredictable workloads
- Handles wide variety of jobs in multiple-languages concurrently
- Batch functionality
- Generally viewed as "Hub" or "Master" of a network
- DIGITAL's high end system

VMS

- Can be effectively tuned to run specific applications
- Real-time capability
- Good at dedicated (floating point) operations
- Handles UNIBUS user-defined interface
- Generally viewed as distributed node in a network
- Wide family offering

Next let's define a matrix based on the computing environment and on the management focus of the organizations to which we sell.

1) Computing Environment

In defining the computing environment, let's draw two extremes and call them Ad-Hoc Computing vs. Production Computing.

Ad-Hoc Computing

Unpredictable workload
Variety of applications
Problems being solved not well-bounded
(either in terms of definition of the problem
or the amount/kind of resources
necessary to solve the problem)
Emphasis on system features (memory management,
communications, etc.) than on an application system

Examples: In-House Timesharing, Service Bureaus,
Interactive Decision Support,
Financial Analysis,
Ad-Hoc Query, Relational DBMS.

Qualifying Questions (affirmative answers indicate Ad-Hoc environment):

- o Does the RFP call for a system to support a variety of applications rather than a single one?

Is the RFP more focused on system features (memory management, communications features, etc.) than on an application system bill-of-material, accounting, student scheduling, etc.)

- o Is the business problem being solved not well bounded (e.g.: bring all timesharing in-house to reduce costs)?
- o Does the system manager say he can't accurately characterize his current workload? He doesn't do any systematic performance measurement on the current system?

Production Computing

Predictable workload
Primary focus on products (both hardware and software)
that solve particular application-level problems
Problem (business or technical) can be well defined or
well bounded
System dedicated to one application

Examples: Payroll, Accounting, Computer Aided Draft-
ing, Real-Time Processing, Process Control.

Qualifying Questions (affirmative answers indicate production environment):

- o Does the RFP call for specific application requirements? (Bill of Material/MRP as opposed to CPU, Memory, etc.)
- o Is the system going to be dedicated to one application? One language?
- o Is the problem (be it business or technical) well defined or bounded? Do customers know what they want from their system?
- o Can the customer easily characterize the current or projected workload? (Transactions/hour, micro-sec response time, I/O bandwidth, # of terminals doing specific application, etc.)

Now let's define extremes of organizational environments (i.e. centralized or decentralized) that we currently sell into:

2) Management Environment

DIGITAL has leveraged much of its success on promoting distributed processing. Both VMS and TOPS can support distributed processing, though they tend to do so from different points of view.

Centralized Management Focus:

- Corporate Center provides computing services to functional groups for reasons of efficiency or cost control;

- Sell cycle focused around DP manager;
- Purchase decisions are focused in some "corporate" group
- Strong "community of interest" among the users of the system (central data base, common source library, etc.);
- Profit/Loss responsibility focused centrally in the organization;

Examples: Internal Timesharing
Large Engineering/Research Organizations
University-Wide Computing.

Decentralized Management Focus:

- Focus on USER ownership of the computing resource;
- Sell cycle focused around end-user departments;
- Purchase decisions made by the users or agents of the users;
- Computer support services distributed to the functional organizations being serviced for reasons of flexibility or responsiveness;
- Quality of service is a local management problem and not viewed from a central organization;
- Profit/Loss responsibility focused well below the corporate center at a branch, divisional, or departmental level;

Example: DIGITAL

Positioning VMS and TOPS Using This Matrix

Given that we have just discussed the differences of Production vs. Ad-Hoc Computing and Centralized vs. Decentralized Organization Focus, how do we position TOPS and VMS using this model?

This process requires that we understand the strengths of each system and that we map them onto the model described above. Let's use a simple 2 X 2 matrix (see Figure 2) to show the basic

positioning. The strength of this model is that it takes into account both the computing characteristics of the customer as well as the organizational preference.

POSITIONING MATRIX

Computing Requirement

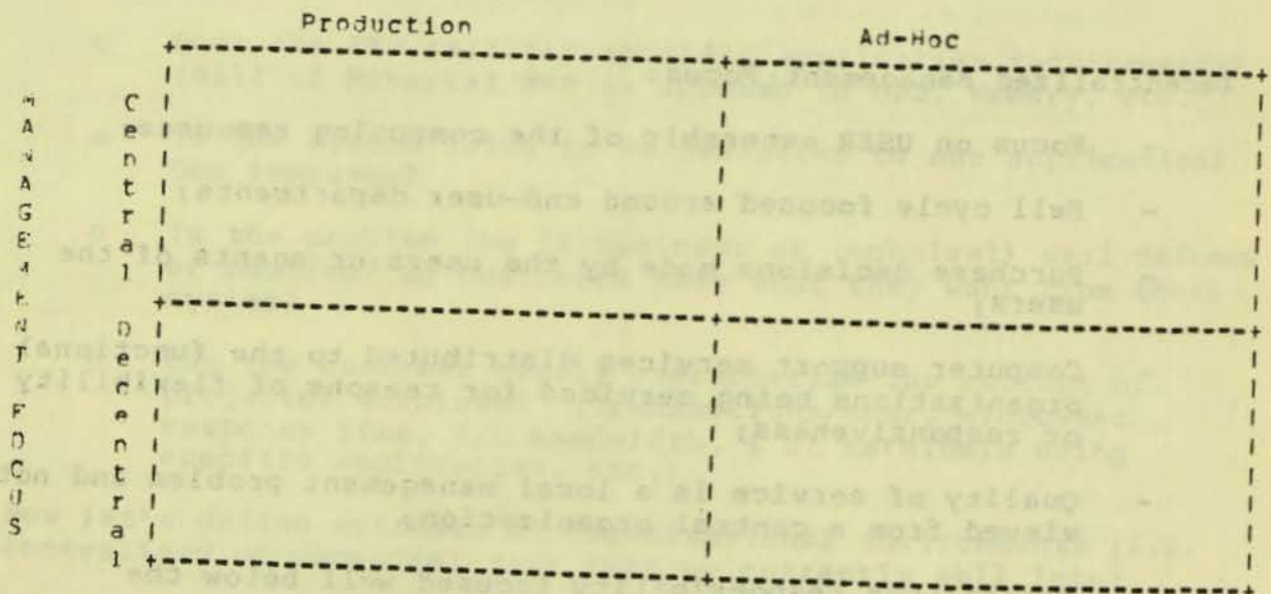


Figure 2

Let's first look at the centralized, ad-hoc computing environment. In this quadrant of the positioning matrix there is a requirement for a computing system which will respond very well to a changing environment and will also provide the tools and system capability for centralized control of that resource. Both TOPS-10 and TOPS-20 were designed to support this environment and have been developed over the years to fit the centralized, ad-hoc computing environment.

At the other extreme is the decentralized, production environment. In this quadrant the requirement is for a system which fits in the "departmental" computing needs of the decentralized organization and offers the "tune-ability" necessary for bounded or well-defined applications. VMS was originally developed to support this approach in the technical market, and has been developed over the years to further enhance its capabilities in commercial markets as well.

POSITIONING MATRIX

Computing Requirement

		Production					Ad-Hoc				
CENTRALIZED	C						T	T	T	T	T
	e						T	P	P	P	P
	n						T	P	P	P	P
	t						T	P	P	P	P
	r						T	P	P	P	P
	a						T	P	P	P	P
DECENTRALIZED	D	V	V	M	M	SS					
	e	V	V	M	M	S S					
	c	V	V	M	M	S					
	e	V	V	M	M	SS					
	n	V	V	M	M	S					
	t	V	V	M	M	S S					
JURIS	r	V	M	M	SS						
	a										

Figure 3

When looking at two of the four quadrants, the picture becomes clearer. For centralized, ad-hoc computing, TOPS-10 and -20 are the preferred systems. For the decentralized, production computing system, VMS is the DIGITAL system of choice (See Figure 3).

What To Do When The Picture Is Less Clear

What do we do when the customer's computing needs and organizational profile place the system requirement in one of the other two quadrants? At this point, we must ask a set of questions.

For Internal Use Only

The answers to these questions, when mapped against known product strengths of TOPS and VMS will provide a clearer picture on a case-by-case basis.

Application:	Specific package Multiple or dedicated
Management Tools:	System accounting Security Resource allocation
Technical Positioning:	Performance and capacity for application
Tools:	Decision support systems DBMS, Relational, Financial Analysis Languages Network management tools Networking capabilities
Community of Interest:	Centralized data base

Quite often, the correct product choice is a technical one which requires pre-sales technical support from Software Services. With sufficient information, the choice between TOPS and VMS can be made to provide the solution for the computing requirements.

If the final solution must support only ONE operating system and if the solution is still not apparent, BOTH SYSTEMS SHOULD NEVER BE PROPOSED. This leaves the final decision to a very confused customer and two product lines in competition with each other. Experience has shown that in these cases, the business almost always goes to another vendor. The customer is expecting a solution to his computing needs, not an additional dilemma.

The sales person would do well to provide one solution based upon your careful evaluation of the customer's needs and on some (or all) of the guidelines suggested in this article.

U.S. FALL DECUS PRESENTATIONS

The following summarizes some of the presentations given by our LSG Software Engineers, and provides a photo essay on activities around our largest-ever LCG demo "booth".

The LCG Product Group Panel, is being introduced by LCG SIG Chairman, Bill Miller, Proj. Coordinator, State Purchasing & Gen'l Services Comm., Austin, Texas.



Seated L to R are: Rose Ann Giordano, Per Hjerpe, Ulf Fagerquist, and Ward Davidson. Hundreds of users attended this major session to hear about LCG's latest product developments, and to ask questions.

LCG's booth, crowded with users. At left is the TOPS-10 ("Chip's") terminal room; at right of picture is the TOPS-20 ("Dales'") terminal room.



FORTRAN-10/20

Sara Murphy

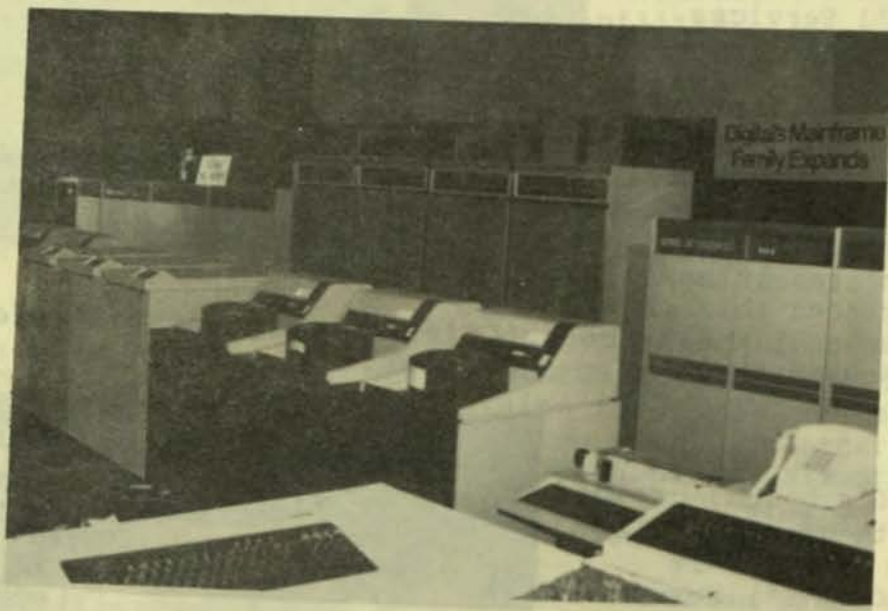
Customers were very happy that the announcement of FORTRAN-77 (or, FORTRAN V7.0) followed so quickly after that of FORTRAN V6. My session on our latest FORTRAN product presented many features including:

- * The fact that FORTRAN-10/-20 is a validated FORTRAN-77;
- * It supports character data in accordance with the full language FORTRAN-77 standard;
- * New structured programming features, including block structured IF statements and DO WHILE/END DO construct;
- * Supports G-floating double precision on TOPS-20 KL Model Bs;
- * The compiler is native on TOPS-20.

I discussed the incompatibilities between Versions 6 and 7, and gave my recommendations to customers preparing for conversion.

A field test site panel discussion was held; feedback was very positive concerning field test progress.

Wish list: customers are eager for FORTRAN to support extended addressing.



Disk drives for both systems

DBMS-20 Internals
John Maslanka

My presentation was targeted at customers who wished to examine internal data structures for their program planning. They had been asking for this for some time and their positive response was gratifying. I showed them how to get inside the in-core data base, something which our customers who have large DBMS applications want to access. In addition, I showed them how to do diagnostics.

DBMS-20 customers' wish list included:

- * Interactive data manipulation;
- * Common data dictionary;
- * Utilities to unload, reload, and reorganize data bases;
- * Greater flexibility with the physical environment and with the sub-Schema concepts.

Customers' chief concern is that we provide them with a full-working DBMS system.

TOPS-20 Common File System
Dan Murphy

A functional enhancement to the TOPS-20 Operating System, CFS-20, the Common File System supports configurations of multiple CPUs which can reference a common set of disk structures. The interconnect medium between the CPUs is the DIGITAL Computer Interconnect (the CI, or CI-20).

Expandability

CFS-20 allows a second processor to be added to existing DECSYSTEM-20 configurations, to provide additional compute capacity. System availability is also increased, because the system can be operated with either processor alone as well as with both.

The system administrator can allocate the CPUs as best meets his needs. For example, both can provide timesharing and batch services to a community of users; alternately, one can provide time sharing while the other provides only batch or runs certain critical applications. In general, all disk structures are available to both processors; however, the system administrator may at his discretion limit availability or particular structures to one CPU or the other.

COBOL-10/20 V13 ANSI 8x Standard
John Maslanka

This talk concerned issues related to the ANSI 8x standard. I discussed:

- * New aspects of file management involving new usages, as well as new approaches to the problem of error handling in file management. The draft ANSI 8x Standard gives more latitude re: handling file access failures.

- * Alphabets Collating Sequence, special characters and symbolics, which provide customers with a lot more flexibility in the way in which sorting is done and the way in which character set representations are done on various devices.

Customers received this presentation with enthusiasm; I believe that the "hand-holding" aspect was even more important to them than the actual content of the presentation. The session was unusually well attended, considering that I gave it during lunch the last day of the Symposium; pretty strong interest comes from a dedicated group of customers.



GALAXY 4.2 (TOPS-20)
Dave Kovalcin

Charlie Dunn explains CFS-20.

My talk was a technical overview of GALAXY 4.2 which had just exited field test. As the customers had recently received the GALAXY 4.1 release for TOPS-10, they used some of this session to discuss their reactions to that release. It was a fairly lively session; among the wish list items were:

- * Driving terminals as line printers (this topic arose often)
- * General purpose spooler interface.

My general feeling is that the session went well; we showed that we were responding to serious customer concerns.

IBM COMMUNICATIONS
Dave Kovalcin

IBM Communications on TOPS-20 software exited field test the week before. In the new release, we were responding to some major problems which were identified in the previous release. Specifically we implemented:

- better error recovery messages;
- a new termination node handling scheme;
- more functionality, and performance improvements.

Customers seemed to like the fact that the new release specifically responded to the needs which they had expressed in prior symposia. Their wish list included:

- * Support for more, different kinds of IBM machines;
- * Higher channel speeds than what we now provide;
- * Communication with more types of foreign hardware.

Data Interchange Library (DIL), DECsystem-10/-20, VAX
Dave Scheifler

The DIL session had three goals:

- * A technical overview of DIL capabilities
- * Inform attendees of LSG Software Engineering's plans regarding Data Interchange
- * Feedback on our product development strategy, insuring that we are addressing the "right" set of problems, now and in the future.

In a distributed processing environment, data bases on one system must often be transferred to other systems, or accessed directly by remote applications. Several LCG projects are under way, to allow data sharing between DIGITAL systems in a DECnet environment. The first part of this session was a technical overview of the first such product: the DIL, a library of routines that provide application programmers with basic network data transport and conversion capabilities under TOPS-20, TOPS-10, and VAX/VMS. Features included:

- * Translation for string, fixed binary, and floating point data between -10/-20/VAX formats.
- * Remote access to ASCII sequential files: -20/VAX only.
- * Task-to-task communication between network application programs at the record level; -20/VAX only.

The second part of this session provided a look at LCG's Data Interchange product strategy for the future.

Audience response to this session was very enthusiastic. They were pleased with DIL capabilities, product goals, delivery date, and price (it is bundled with TOPS-10 and -20), as well as with our future product plans. Discussions following the presentation led to the following conclusions:

- * Our timing is right. We have customers that are ready to begin designing network applications, and who look forward to getting the DIL.
- * Source availability is highly desired by customers so that they can tailor the DIL to their needs; as a result, we have decided to sell Version 1 sources.
- * Customers anxiously await DIL Version 2 support for Remote File Access and Task-to task under DECnet-10.

Layered Product Panel
Hirak Sengupta

I covered a portion of all of our Layered Products which include: COBOL, RMS, BASIC-PLUS-2, BLISS, ALGOL, CPL, and PASCAL. Before giving a status report on these, I discussed our anticipated future directions. We plan to have more releases than we have historically provided, which means less time between releases, and smaller sizes of individual projects in order to accomplish this. Some of these will include:

- * more usage RMS
- * more DBMS tools
- * more focus on serviceability and maintainability of products.

In the context of the latter, I emphasized that LSG S/W Eng. is now developing and maintaining codes (previously, maintenance was done by TSG). This will result in better products.

In my status report, some of the topics reviewed were:

- * PASCAL: at this time, we have no new announcements, yet we are making very good progress on this product, and look forward to field test before spring.
- * COBOL: we're working toward the next development release, (Version 13) which will implement proposed ANSI-8X standards.
- * RMS: our next version (2.0), now in development, will have simultaneous update capabilities of multi-key ISAM files.
- * BASIC-PLUS-2: currently a new release (v 3.0) is under serious consideration.

I found good representation among customers, and a positive audience reception. People are very happy with the FORTRAN announcement, and very positive re: PASCAL status, and COBOL and RMS development plans.

LCG DEMO BOOTH AT U.S. FALL DECUS



Jim Rehill
Laura Gawronski
LCG Technical
MR02-2/D13

As computer trade shows go, U.S. Fall DECUS in Anaheim, California was LCG's most ambitious undertaking, so far, in terms of equipment range and capacity. Equally impressive was the speed with which our LCG "booth crew" (see end of article for credits) installed and later disassembled and repacked all components.

The LCG booth consisted of the following products which accommodated crowds of thousands:

- 1 DECSYSTEM-2060 with 1MW internal memory
- 1 DECsystem-1091 with 1MW internal memory
- 4 MH10s providing another 1MW of external memory

Each machine supported:

- 1 DN20
- 2 RP06 disk drives
- 1 RP07 disk drive
- 1 TU78 tape drive
- 32 asynchronous terminal lines;

30 VT125s, 30 VK100s (GIGIs) and 15 VT100s were allocated between the two systems;

2 VT180s and a Rainbow provided remote file transfer demonstrations upon request;

A DECmate I demonstrated file conversion and transfer (CX/DX);

In addition....we ANNOUNCED and DEMONSTRATED

- A CI20 port adapter
- CI cables
- and an HSC50/RA81 disk system.

Ready to go in
only 11 hours!



LCG's largest and
busiest ever DECUS
booth shows TOPS-20
terminal room
running HSC50, RA81,
and CI20.

LCG PRESENCE at JAPAN DECUS



Jim Miller
GIA Marketing Mgr.
MRO2-2/8D2

Approximately 500 members attended the 2nd annual symposium for Japan DECUS, held in Mid-December 1982 in Tokyo. The specific LCG focus was aimed at the DECSYSTEM-20 in AI (artificial intelligence) applications.

We have been successful in selling DECSYSTEM-20s in Japan to several key customers, including ICOT (Institute for New Generation Computer Technology), a newly-formed government institution whose purpose is the development of Japan's "fifth generation" computer project. ICOT and Japanese private industry are using the DECSYSTEM-20 running the language PROLOG as a development tool for the fifth generation project.

Other key DECSYSTEM-20 accounts in Japan include: MITI (the Ministry of International Trade and Industry), Nippon Telephone and Telegraph, and Hitachi.

To specifically support DECUS, LCG sponsored Dr. Eric Ostrom as a guest speaker on AI applications. Dr. Ostrom heads MIT's computing facilities at its AI Lab in Cambridge, Mass. In addition, Mitch Perlitch of LCG's Applications Marketing group, presented to an audience of 150 a summary of worldwide DECSYSTEM-20 AI applications.

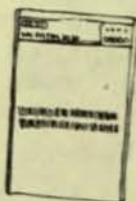
Both NTT (Nippon Tel & Tel) and ETL (MITI's Electronic Technology Labs) are using the DECSYSTEM-20 running MACLISP for research in automated translation from Japanese to English and English to Japanese. Automated translation is an application of natural language processing - the computer's ability to recognize and parse human languages.

LCG hosted a private reception for our key customers in which

they received a presentation of new products announced the previous week at US Fall DECUS in Anaheim, California.

We found audience reaction to be outstanding. The DECSYSTEM-20's overall popularity in Japan is growing at an accelerated rate, due to its unique adaptability as a development tool for designing new computer technology.

The foundation of our success was established well in advance of this DECUS Symposium, due to the efforts of our SUMs in Japan, Norio Murakami, and Tak Matsumoto, who have worked long and hard to bring LCG business to its current and most successful level of activity.



BUY-LINE APPLICATION

NAME:

MAIL STOP:

BADGE:

COST CENTER:

DEPT:

OFFICE LOC:

Please add my name to the BUY-LINE mailing list.

Please delete my name from the mailing list.

My responsibility is in:

LCG Sales

LCG Marketing

LCG Service

Another product line or corporate function

Please detach and mail to Barbara Holtz, MR02-2/8D2. Thank you.

CUT

BARBARA HOLTZ
MR02-2/8D2

CUT

*POSITIONING THE HSC50

Ron Brown
Storage Systems Devel.
CX01-1/P27

Relationship To Other DIGITAL Products

The announcement of the RA81 and RA60 sent a clear message that DIGITAL has leadership products at competitive prices. The HSC50 announcement was the next step in the continuation of this strategy. As a high-end intelligent server its subsystems will impact existing storage devices. Large system customers who currently buy RP06, RP07 and RP20s will be faced with the choice of these devices or the RA81 and RA60. Table 1 shows a subsystem comparison of the HSC50 against DIGITAL's existing storage products.

TABLE 1

SUBSYSTEM COMPARISON

Subsystem MLP Cost (K\$) (Q2/FY83)

# Spindles	1	2	4	8	16
RP06	53.0	87.0	155.0	291.0	582.
Capacity (MB)**	176	352	704	1408	2816
\$/MB	301	247	220	207	207

RA60/HSC50*	56.6	71.6	103.6	172.2	315.5
Capacity**	210	420	840	1680	3360
\$/MB	270	170	123	103	94

RP07	57.0	95.0	171.0	323.0	646.0
Capacity**	498	996	1992	3984	7968
\$/MB	114	95	86	81	81

RA81/HSC50*	60.6	79.6	110.6	186.7	334.5
Capacity**	463	926	1852	3704	1408
\$/MB	131	86	60	50	45

RP20**		149.0	200.0	302.0	506.0
Capacity		965	1930	3860	7720
\$/MB		154	104	78	66

*Does not include CI

**FORMATTED

NOTE: All of the above disk capacities are based upon TOPS-20 disk format.

* Portions of this article excerpted from "Sales Update" p.15, January 15, 1983.



LCG CUSTOMER VISITS TO MARLBORO

Beverly S. Mansfield
 LCG Operations
 MRO2-2/8D2

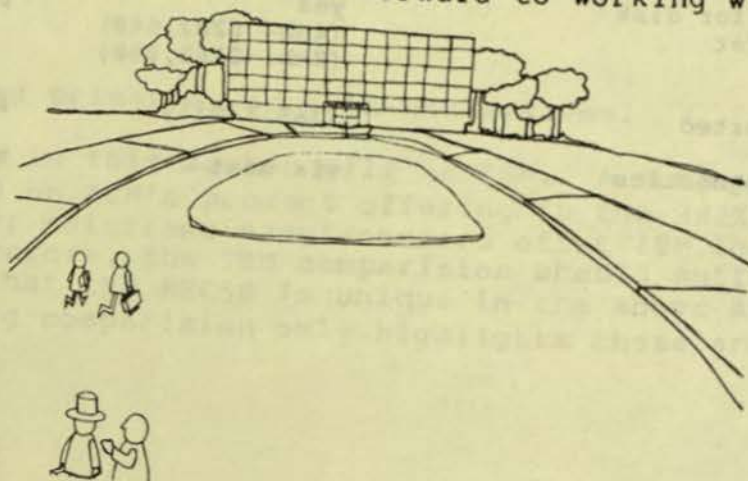
I would like to take this opportunity to welcome LCG Sales personnel and Account Managers to Marlboro. The experience and knowledge of the LCG Product Line personnel - combined with yours - give us a unified team approach to selling.

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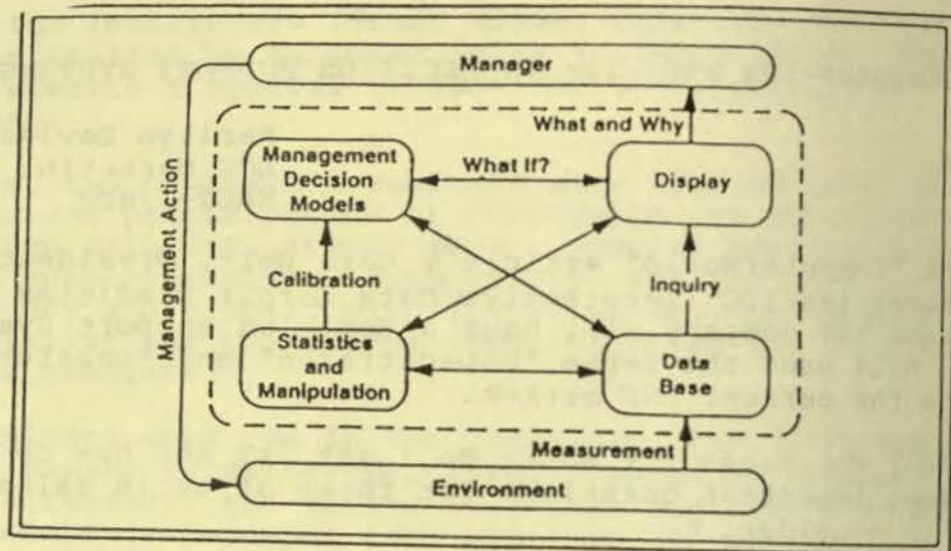
In FY82, LCG successfully hosted 169 customer visits to Marlboro. So far in FY83, we have hosted 95! The breakdown (in terms of international market areas) is as follows:

	<u>Q1</u>	<u>Q2</u>	<u>Total</u>
United States	30	41	71
Europe	6	5	11
GIA	9	4	13
Total	<u>45</u>	<u>50</u>	<u>95</u>

The Large Computer Group encourages you to bring your customers and your qualified prospects to Marlboro. Your first step is to call me - or - contact the appropriate marketing specialist for your account (refer to the Navigation List, page 45.) Our entire LCG organization looks forward to working with you!



modeling tools (to enable forecasting, simulation, risk analysis).



Four Basic Components of Full-Scale Decision Support System

This figure gives a reasonable approximation of the data and tools flow which result in information for management decision-making.

Who Needs DSS?

Management and staff who must make strategic long and short term decisions, need DSS. A recent study shows that in major companies, an average 2-1/2 year backlog exists for major types of applications requested of in-house DP departments.

Another study shows that DP resource allocation allows about \$30 B in order to support \$450 B of managerial activity, while \$50 B goes for support of \$150 B of clerical activities. That's a 15:1 ratio for management, vs a 3:1 ratio for non-management. DSS enables management and staff to manipulate data, and to derive useful, timely information interactively, without utilizing large amounts of DP resources.

One LCG DSS user, a marketing vice president for a firm in a highly competitive consumer industry, bought a DECSYSTEM-20 in order to do DSS, because "by the time he received sales information from his DP department, it was already out of date; he needed ad hoc query capabilities."

Where Do I Get DSS?

DECsystem-10s and -20s that are used for interactive time sharing frequently support DSS. LCG hardware, designed for interactive time sharing, coupled with the TOPS-10 and -20 Operating Systems,

provides an excellent base for the many application packages available to implement a DSS, and provides the user interface that one customer refers to as "aggressively friendly".

We in LCG Market Development are currently conducting a study of our most successful internal time sharing DSS installations. One aspect of the study is to determine what third party software is being used in combination. As soon as we have more information we will publish detailed articles for your information, and for customers.

The LCG Software Referral Catalog lists descriptions of a large number of DSS application packages: EMPIRE, System 1022, DPL, CUFFS, EPL, CONTROL-10/20, TELL-A-GRAF, SPSS are among the packages that we see our customers using. Numerous other packages exist, some with more highly specialized applications (statistics, for example).

Access to networks and to the more than 1,000 public on-line data bases (such as CompuServe and Dow Jones) greatly enhances a user's ability to make decisions. CompuServe, for example, does public on-line data base gateway access consulting and implementation.

How Do I Sell DSS?

The best way to sell DSS on DECsystem-10s and -20s is to reference sell! The successful DSS installations that we have been interviewing all mention that seeing an LCG reference account was key in helping them to decide to purchase LCG hardware and in helping them to put together the application packages that formed their DSS.

LCG Operations Management and staff are the best sources of information for current reference accounts in all industries. An important point is that DSS installations are industry independent - that is, they are found in large corporations and in service organizations of all kinds: for example, banking, research, and manufacturing.

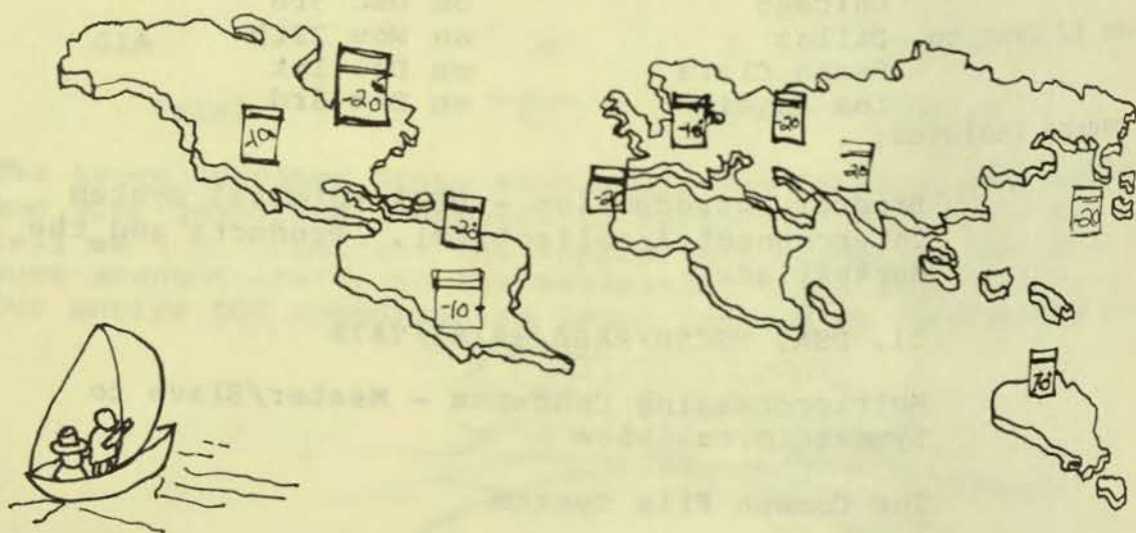
The January 10, 1983 "Fortune", ranking 200 of the largest U.S. corporations, included a survey of eight "attributes of reputation: quality of management; quality of products or services; innovativeness; long-term investment value; financial soundness; ability to attract and develop key talented people; community and environmental responsibility; and use of corporate assets.

Some of the instructors (Bruce Adams, Peter Wysocan, and myself) were then invited by European Sales Training (Roger Smith & Dolf Tuk) to execute a special version for their theatre of operations.

In Europe, two customized seminars were created under the direction and participation of Nita Smith and Bob Taylor. Bill Fulton from Valbonne, France gave a special session on the European support center. Technically, two seminars occurred during a day and a half, with the first seminar targeted to the LCG specialist and the second (DSI concepts) for account and marketing managers.

These seminars were run in two locations, the first administered by Robin Howard in Ferney-Voltaire, France, on December 8th and 9th (16 attended), the second in Ascot, England administered by Gus MacDonald on December 14th and 15th (26 attended).

Now that the DSIA seminars have been completed, we turn to the running of a two-week LCG specialty course in mid-January 1983. Soon to follow will be the running of the Q4 SUCCESS TRAIN on DDP/NETWORKS, in which LCG will participate in a new training format.



DECsystem-10s and -20s in DECISION SUPPORT SYSTEMS

Marilyn Davison
 LCG Marketing
 MRO2-2/8D2

In a recent "ComputerWorld" article*, Carl Wolf, President of Chase Econometrics/IDC (Interactive Data Corp.) predicted that every Fortune 100 company will have a Decision Support System by the 1990s. Wolf used the terms "unpenetrated" and "unsaturated" to describe the current DSS market.

"What is DSS? Who needs it? Where do I get it? And how do I sell it?" are some important questions for those of us in sales and marketing to consider.

What is DSS?

One definition states that "Decision Support" is a theory based on the fact that decisions are made on judgment and on information. The word information is key. Large corporations frequently find themselves swamped with data, but not with the desired information necessary for decision-making.

Simple spread-sheet calculators, such as NCP Calc, are examples of DSS. Plugging in data (tax liabilities, for example) as variables can help produce information of the "what-if?" variety (i.e. "what if I pay an estimated state tax in December so that I can deduct it from my Federal tax in April, rather than invest that money at 5%, and pay a tax penalty for not filing an estimated tax?").

Major corporations deal with hundreds of variables in planning both long term decisions ("should we expand plant capacity in the Far East?") and short term decisions ("will lowering the price by \$10,000 make our product price competitive enough to take market share based on its appeal to a new group of prospects?").

Full-scale DSSs traditionally have five characteristics:

- * multiple source data base;
- * ability to deliver ad hoc analysis;
- * modeling;
- * rapid cross-functional communications;
- * user-friendliness.

To implement these characteristics, a DSS must have data-gathering utilities and data management tools; powerful ad hoc display and graphics capabilities; statistical tools; and

* "Every Fortune 100 Firm Seen Owning DSS by '90s", Jim Bartimo, CW staff, "ComputerWorld", December 13, 1982.



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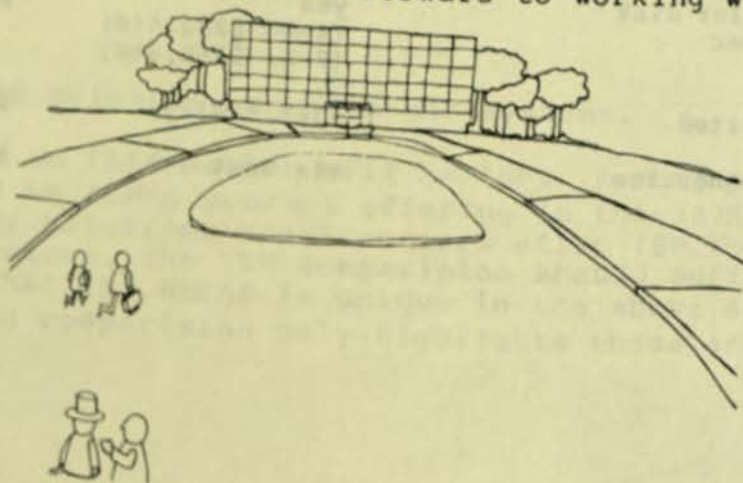
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LCG DSIA TRAINING - LOOSELY COUPLED SYSTEMS

John Loether
Sales Training
MRO2-2/C2

The past two months have been consumed in a great burst of training activity, across the U.S. and Europe, concerning the products we announced at U.S. Fall DECUS. Of special interest were: Multi-Processing with TOPS-20; new software, CFS-20; as well as a raft of new hardware. We had great fun meeting old friends and gaining new ones.

The two training teams were: Team #1: Celeste Moore (Communications), Peter Wysocan (Technical Support & Competition), and myself. Team #2: Bruce Adams (Course Developer, Sales Training), Doug Ruby (LCG Technical Support), Ira Machefsky (LCG Marketing), and Ron Brown (HSC50 Product Manager - Colorado).

Initially the seminar was presented in Boylston, Mass. on 11/19/82; afterwards,

Team #1 went to	New Brunswick, N.J.	on Nov 29th
	Washington, D.C.	on Dec 1st
	Chicago	on Dec 3rd
Team #2 went to	Dallas	on Nov 29th
	Santa Clara	on Dec 1st
	Los Angeles	on Dec 3rd

The course included:

Product Introduction - DSIA (Digital System Interconnect Architecture), Products and the Marketplace

CI, DSA, HSC50/RA60/80/81/TA78

Multiprocessing Concepts - Master/Slave to Symmetric to Loose

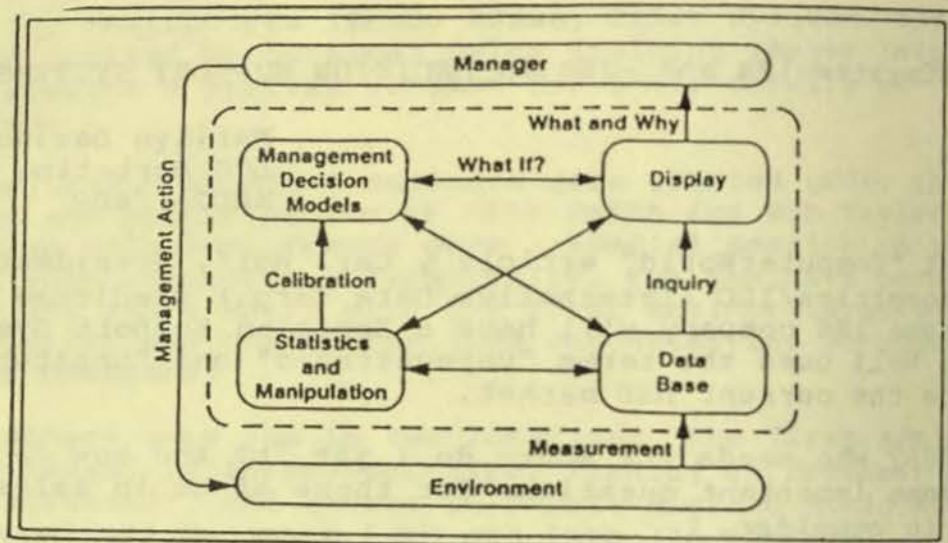
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TOPS-20 Communications

TOPS-10 and TOPS-20 Monitor releases

Technical Support

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The best way to sell DSS on DECsystem-10s and -20s is to reference sell! The successful DSS installations that we have been interviewing all mention that seeing an LCG reference account was key in helping them to decide to purchase LCG hardware and in helping them to put together the application packages that formed their DSS.

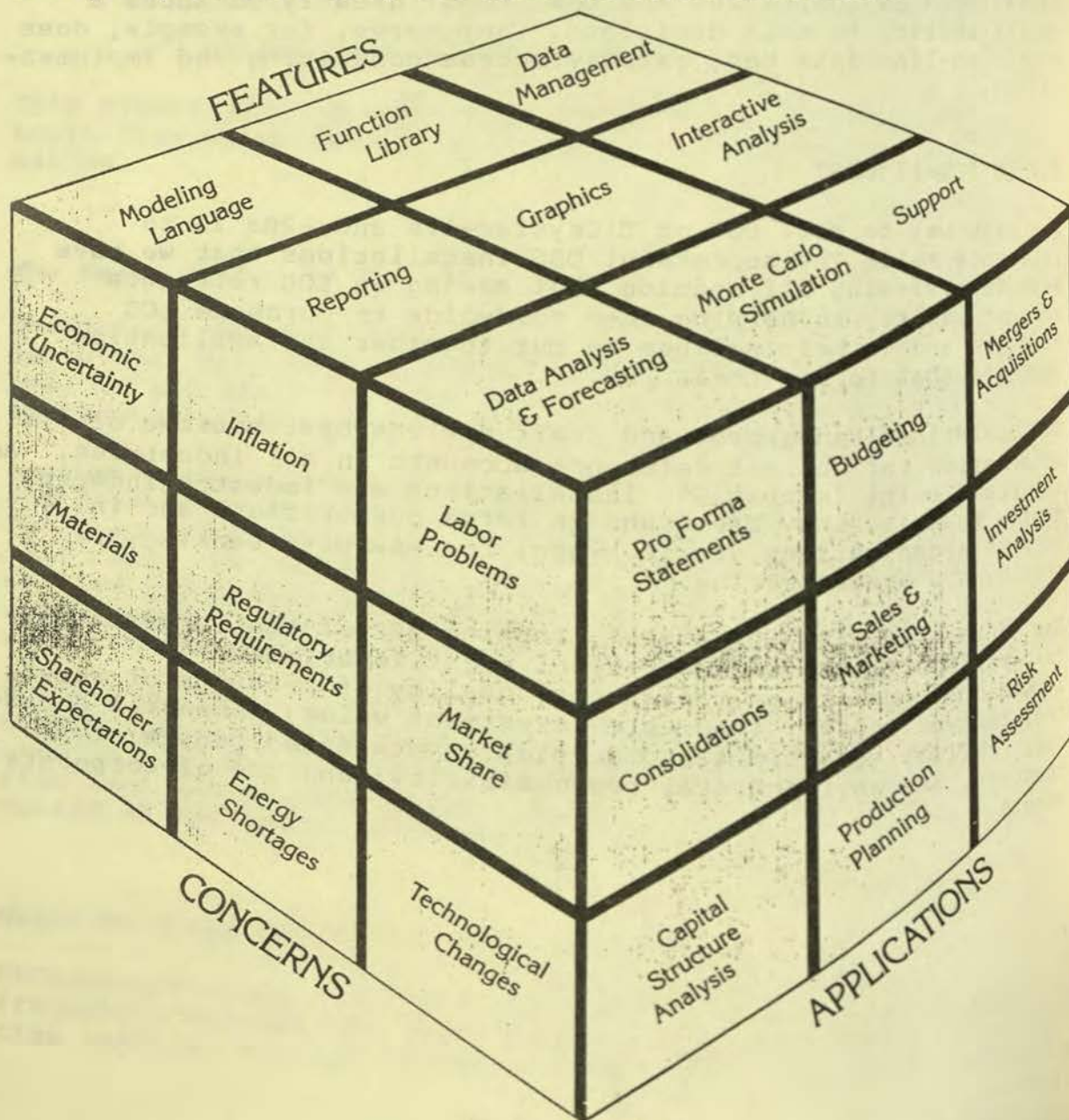
LCG Operations Management and staff are the best sources of information for current reference accounts in all industries. An important point is that DSS installations are industry independent - that is, they are found in large corporations and in service organizations of all kinds: for example, banking, research, and manufacturing.

The January 10, 1983 "Fortune", ranking 200 of the largest U.S. corporations, included a survey of eight "attributes of reputation: quality of management; quality of products or services; innovativeness; long-term investment value; financial soundness; ability to attract and develop key talented people; community and environmental responsibility; and use of corporate assets.

All these attributes require exceptional management decision making. Of the top three ranked corporations for each of the eight attributes, corporations using DECsystem-10s and -20s for DSS ranked 1, 2, or 3 in six of the eight categories, and in the "use of corporate assets" category, the first and third ranking are users of DSS DECsystem-10s and -20s.

Of the selected industry rankings, in banking: 6 of the top 10 use DECsystems for DSS; in pharmaceuticals: 3 of the top 10; in precision instruments: 4 of the top 10.

DECsystem-10 and -20 DSS installations may use different application software to handle data management, statistics, graphics, modeling, and ad hoc queuing tasks. The kinds of data varies by industry, and the degree of complexity of data manipulation varies, but the basic installations have the same components, and serve the same purpose: providing information to managers, so that they can make informed decisions.



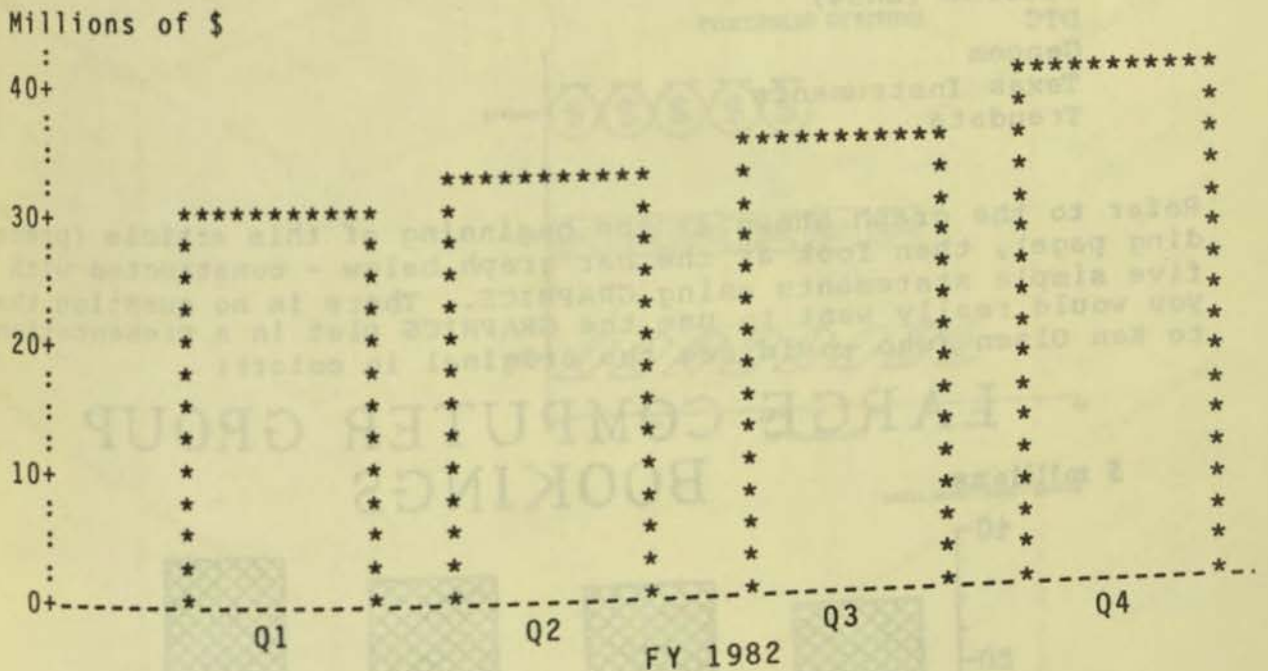
BRIGHTEN UP YOUR OFFICE AUTOMATION WITH
A LITTLE COLOR GRAPHICS



Richard Smith
LCG Prin. Mktg. Spec.
MRO2-2/8D2

If the bar graph below is your idea of graphics, then you really ought to take a look at Rapidata's software package, GRAPHICS:

LARGE COMPUTER GROUP BOOKINGS



Rapidata, an LCG customer of long standing, is a Data Services company that supplies applications and access to financial/economic data to serve the decision support needs of business professionals. Rapidata has offered GRAPHICS on DECsystem-10 as a part of their service since 1980, and began selling software licenses for the package in 1981.

With GRAPHICS, the user doesn't need to be a graphic artist to produce attractive color graphs and charts for business or scientific applications. Using simple keyword commands in an interactive format, a user can create point plots, line plots, spline interpolation curves, straight line regressions, staircase curves, spike graphs, bar graphs, histograms, pie charts, ring charts, and pictographs.

GRAPHICS offers many of the same features as TELL-A-GRAF, yet at a substantially lower price. GRAPHICS runs on both DECsystem-10 and DECSYSTEM-20, and supports a wide selection of graphic displays and plotters, including the VT125, and GIGI.

GRAPHICS supports:

Video Displays from:

DIGITAL (VT125 and GIGI)
Hewlett Packard
Tektronix

Plotters from:

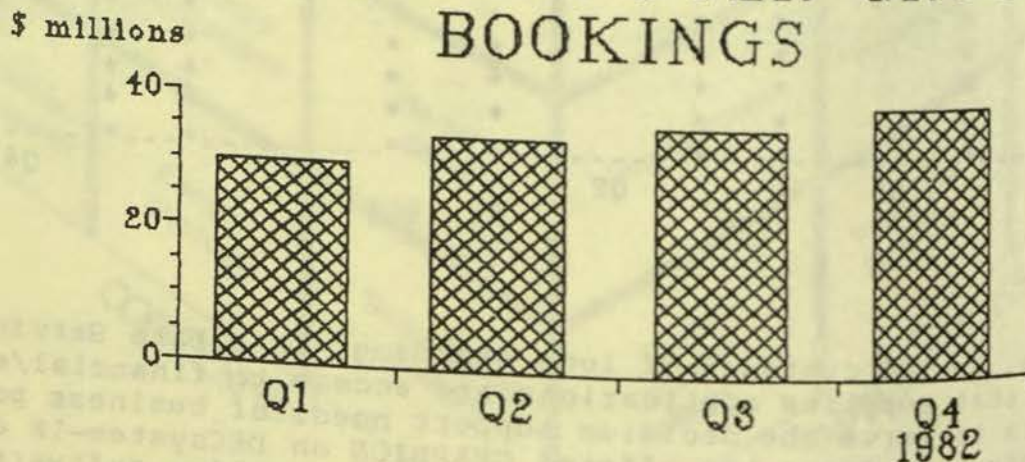
Calcomp
Hewlett Packard
Houston Instrument
Soltec
Zeta

Dot Matrix Printers from:

Anderson Jacobson
Diablo
DIGITAL (LA34)
DTC
Gencom
Texas Instruments
Trendata

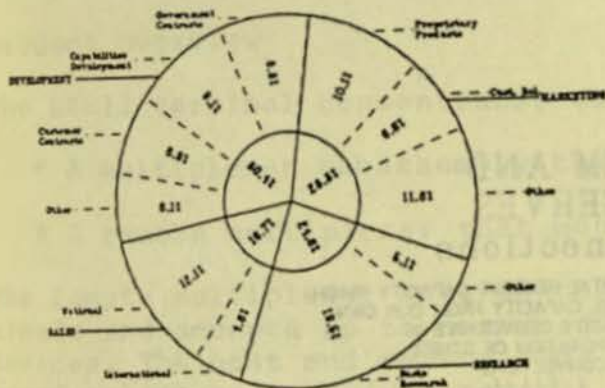
Refer to the graph shown at the beginning of this article (preceding page), then look at the bar graph below - constructed with five simple statements using GRAPHICS. There is no question that you would really want to use the GRAPHICS plot in a presentation to Ken Olsen (who would see the original in color):

LARGE COMPUTER GROUP BOOKINGS

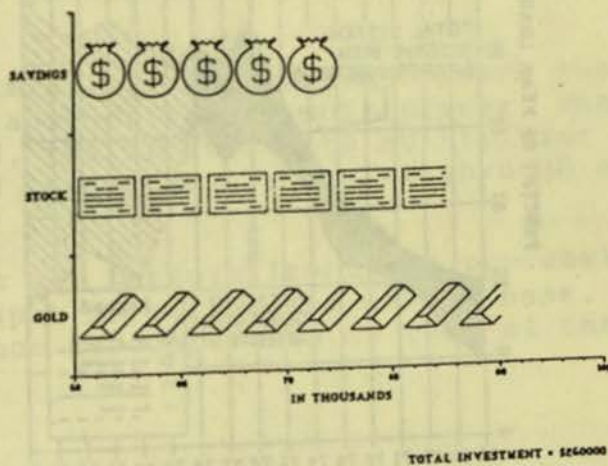


With a little more practice, a GRAPHICS user can quickly create graphs as impressive as these:

PROJECTED BUDGET
February, 1980



PORTFOLIO DIVISION

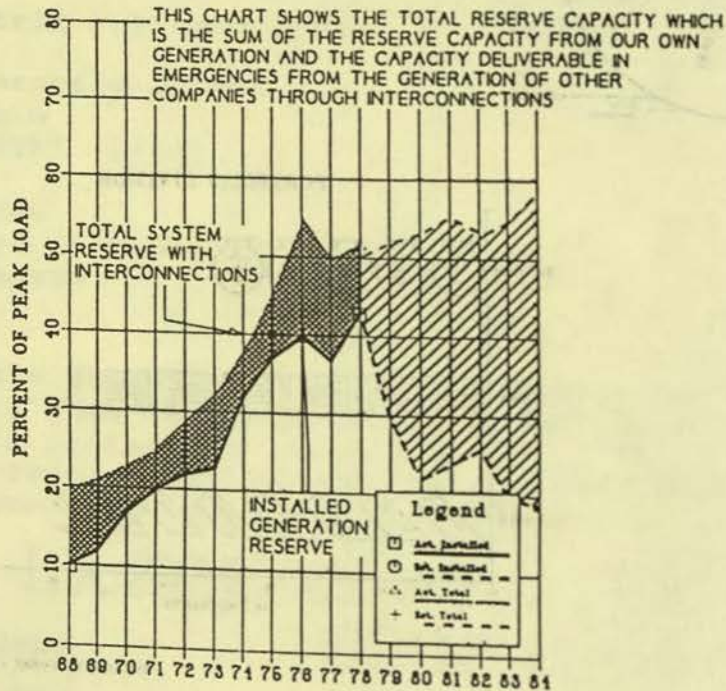


Rapidata would be delighted to show your customers more of what GRAPHICS can do, and will provide a demo for serious shoppers.

Contact:

Dorothy C. Monopoli
 Product Manager, GRAPHICS
 Rapidata Division
 National Data Corporation
 20 New Dutch Lane
 Fairfield, New Jersey 07006
 Phone: 201-227-0035

INSTALLED SYSTEM AND GENERATION RESERVES including interconnections



DZS11 STATISTICAL MULTIPLEXER on DECSYSTEM-2020
and on DECsystem-1090s and -1091s

Jack Lucier
LCG Technical Support
MRO2-2/D13

The DZS11 is a terminal concentrator that can connect up to eight terminals, using a single connection, to a DECSYSTEM-2020, a DECsystem-1090, or a -1091 (-1091 is through a DN20).

Product Overview

The DZS11 terminal concentrator consists of two basic elements:

- * A multiplexer subassembly that interfaces to the CPU, and
- * A remote multiplexer that mounts into a VT100 chassis.

The remote multiplexer acts as the controller for the remote terminals and accepts up to seven additional user terminals as input devices. The host and remote ends are connected by a single high-speed telephone line (via modems) that can handle transfer rates up to 19.2 K bits per second. Alternatively, an RS422 "long line" cable may be used for local connections up to 1 kilometer (3300 feet) without modems.

A total of eight remote terminals may be divided among two locations with the addition of another remote multiplexer. When this second multiplexer is added, the first remote multiplexer services its own terminals and transparently routes through all messages for the second.

NOTE: The DZS11 does not perform front end processing of terminal input or offloading of the host. Host performance is comparable to that of the DZ11.

Product Highlights/Benefits

- * Reduces Users' Frustration and Improves Productivity
- * Major Savings in Modem and in Line Costs
- * Local Terminals up to 1 KM from Host with No Modems
- * Route-Through Adds Second Cluster for Greater Savings

Target Markets / Sample Applications

- * Service bureaus with multiple terminals at a single customer site;
- * Large companies with terminal clusters in branch offices;
- * Sites with clusters of terminals some distance from the host, i.e., "terminal rooms" in college/university computer centers;
- * Large multiple installation customers, OEMs, or end users;
- * Banks, insurance companies, timesharing utilities that have multiple locations are all potential DZS11 customers.

Highlights/Benefits

- * Reduces Users' Frustration and Improves Productivity

Formerly, the DZ11 users on remote (300 Baud dial-up) terminals frequently had to wait as much as a minute to display a full (1920 characters) screen of data. The DZS11 makes it economically feasible for remote terminals to operate at the same 4800 or 9600 Baud rates as local terminals. The minutes of wasted time - and the impatience that goes with it - are eliminated.

- * Major Savings in Modem and in Line Costs

With a conventional asynchronous terminal multiplexer, such as the DZ11, each remote terminal requires its own communications line and a pair of modems. The DZS11 allows up to eight terminals to share a single high-speed line and a pair of modems. Diagram 1 and Diagram 2 illustrate the cost effectiveness of the DZS11 over conventional multiplexer methods.

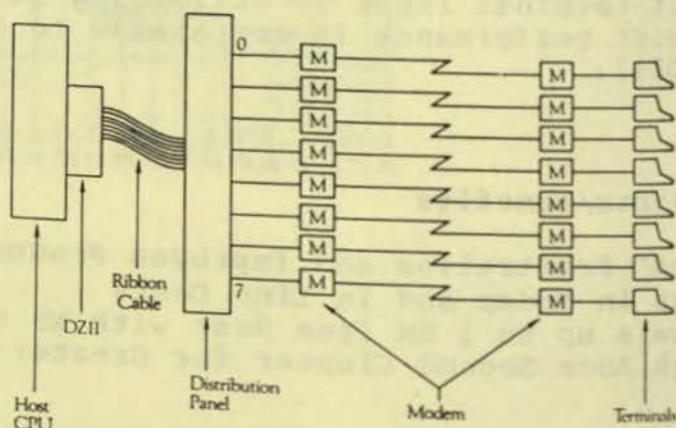


Diagram 1 - DZ11 Conventional Method

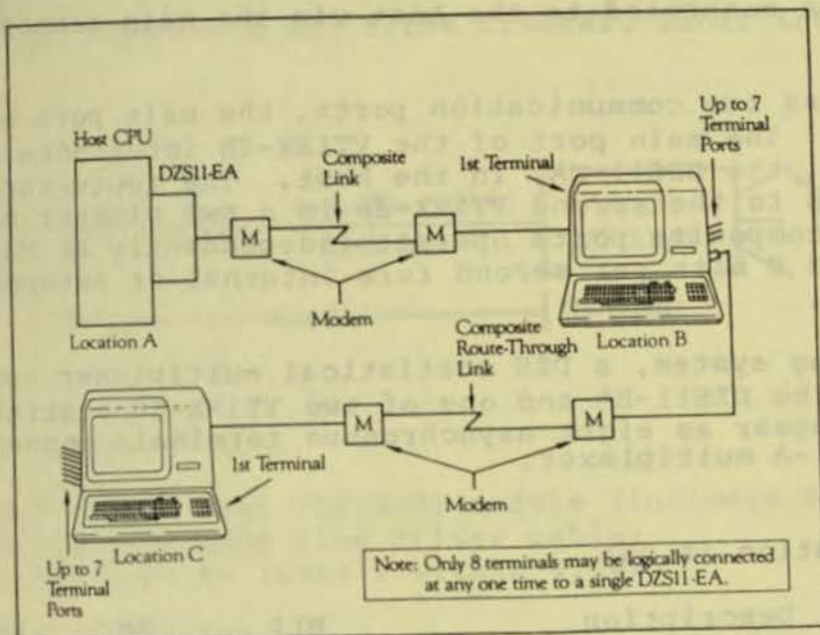


Diagram 2 - DZS11 Method

* Local Terminals Can Be up to 1 KM (3300 feet) From Host With No Modems

In network configurations where direct connections are required, the RS422 long line driver can be used to locate a total of eight terminals up to 1 KM (3300 feet) from either the host or between two remote locations. See Configurations 2 and 4.

* Route-Through Adds Second Cluster for Greater Savings

Optionally, the eight terminals served by a single DZS11 can be divided among two clusters, to support a mixture of local and remote terminals. This can result in long distance line cost saving when both clusters are in other cities; the second line goes only from first cluster to second cluster, not from host to second cluster. See Configurations 3 and 4.

Product Description

Two components comprise the DZS statistical multiplexer network:

1. The DZS11-EA UNIBUS interface, containing the DZ11-A asynchronous multiplexer emulator and the statistical multiplexer; and
2. The VT1XX-EB 8-channel statistical multiplexer for mounting within a standard VT100 chassis.

The DZS11-EA host (or local) multiplexer is a single hex module that mounts in a standard small peripheral controller (SPC) slot on any UNIBUS system. It is program compatible to the DZ11-A, and therefore interfaces to the operating system via standard device drivers.

The VT1XX-EB is an 8-channel statistical multiplexer which, when installed within a VT100, allows the VT100 and seven asynchronous

terminals to be connected to the host via the main composite link.

The VT1XX-EB has two communication ports, the main port and the route-through. The main port of the VT1XX-EB interfaces to the primary device, the DZS11-EA, in the host. The route-through port interfaces to the second VT1XX-EB in a two cluster configuration. Both composite ports operate independently at Baud rates of 1200 to 19.2 K bits per second from internal or external timing sources.

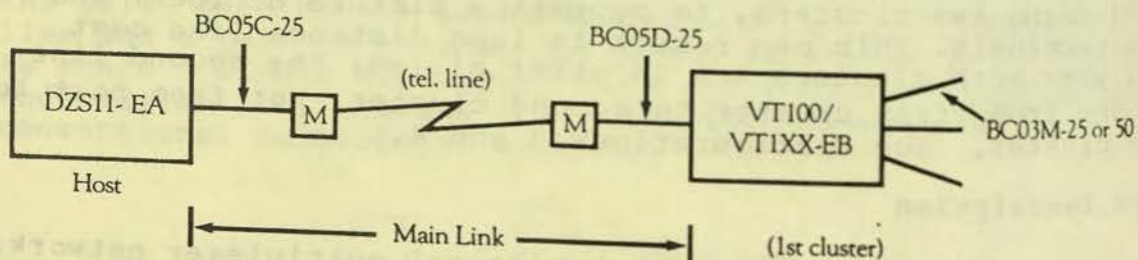
To the operating system, a DZS statistical multiplexer network consisting of the DZS11-EA and one of two VT1XX-EB statistical multiplexers appear as eight asynchronous terminals connected via a standard DZ11-A multiplexer.

Pricing Information (\$ US)

Model	Description	MLP	BMC	Add-On
DZS11-EA	8-chan. host stat. mux.	\$ 4050	\$ 38	\$ 284
VT1XX-EB	8-chan. rem. stat. mux.	\$ 4050	\$ 28	\$ 273

The following diagrams give you the ordering information for each configuration:

Configuration 1 : First Cluster, Remote to Host



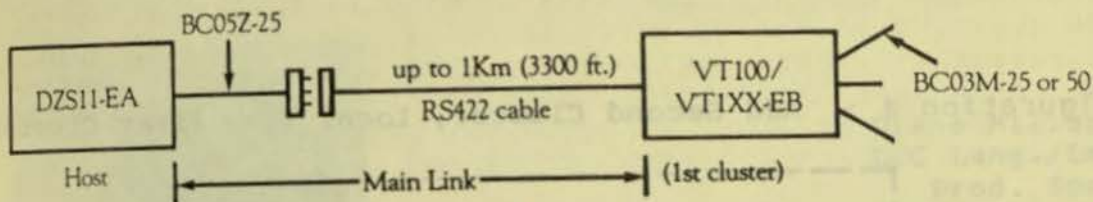
You must order:

- * One DZS11-EA host (UNIBUS) module (includes a BC05C-25 cable to connect to the modem); and
- * One VT1XX-EB to install within a VT100.

Customer must provide:

- * Both modems;
- * BC05D-25 to connect remote modem to VT100/VT1XX-EB;
- * A VT100-AA or VT100-AB into which the VT1XX-EB is installed;
- * BC03M-25 or BC03M-50 cables to connect VT1XX-EB to other terminals in the cluster.

Configuration 2 : First Cluster, Local from Host



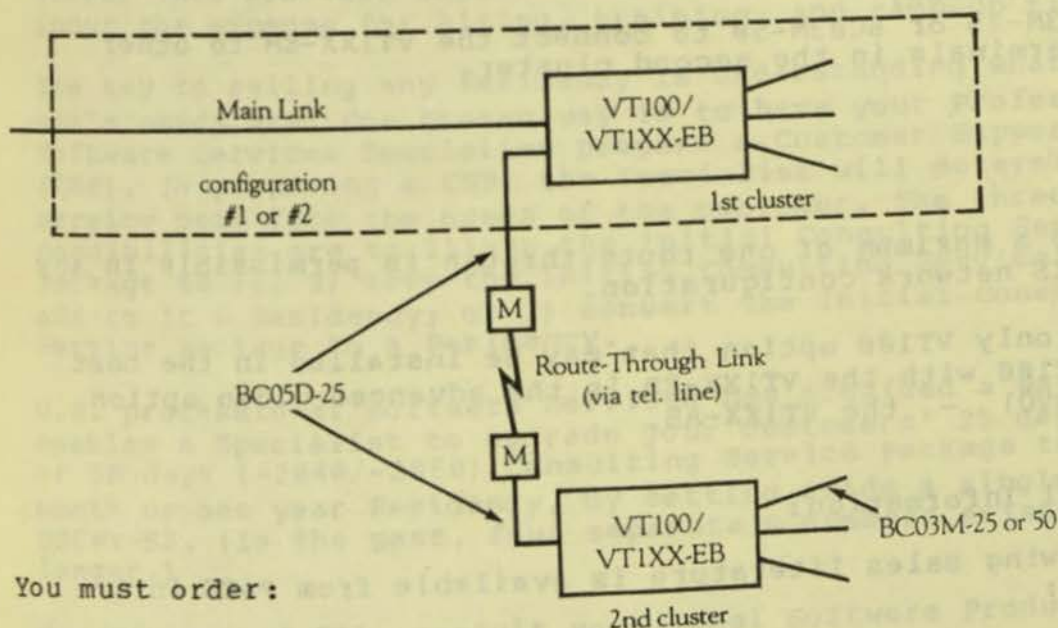
You must order:

- * One DZS11-EA host (UNIBUS) module (includes BC05C-25 cable);
- * One BC05Z-25 long line driver cable;
- * One VT1XX-EB to install within VT100.

Customer must provide:

- * RS422 cable and connector to connect BC05Z-25 cable to VT1XX-EB (we provide pin assignments);
- * A VT100-AA or VT100-AB into which the VT1XX-EB is installed;
- * BC03M-25 or BC03M-50 cables to connect VT1XX-EB to other terminals in the cluster.

Configuration 3 : Add Second Cluster, Remote from First Cluster



You must order:

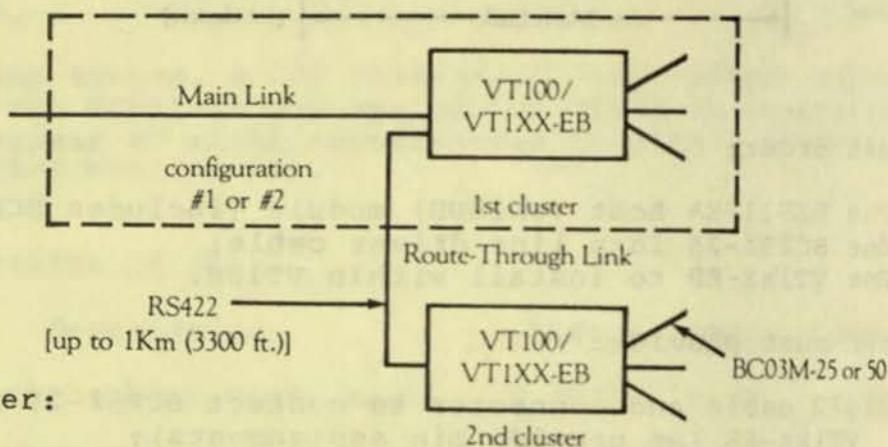
- * One VT1XX-EB

Customer must provide:

- * Two BC05D-25 cables to connect the two modems to the VT1XX-EB;
- * Two modems (synchronous);

- * One VT100-AA or VT100-AB into which the VT1XX-EB is installed;
- * BC03M-25 or BC03M-50 cables to connect the VT1XX-EB to other terminals in the cluster.

Configuration 4 : Add Second Cluster, Local from First Cluster



You must order:

- * One VT1XX-EB

Customer must provide:

- * RS422 cable to connect the two VT1XX (we provide pin assignments between the two VT1XX-EBs);
- * A VT100-AA or VT100-AB into which the VT1XX-EB is installed;
- * BC03M-25 or BC03M-50 to connect the VT1XX-EM to other terminals in the second cluster.

Notes:

- * Only a maximum of one route-through is permissible in any DZS network configuration.
- * The only VT100 option that may be installed in the host VT100 with the VT1XX-EB is the advanced video option (AVO) - the VT1XX-AB.

Additional Information:

The following sales literature is available from P&CS in Northboro:

DZS11 Statistical Multiplexer Product Bulletin
Order number: YM-AA88A-00.

For any additional information or questions, contact your CSS Marketing Representative.

RESIDENCY UPGRADES FOR NEW BASIC SYSTEM PACKAGE PURCHASES



Diana Miller
LCG Lang./Layered
Prod. Specialist
MRO2-2/8D2

A Residency can be a very powerful tool in helping you to make a system sale. It can fill a customer's need, by providing the temporary staffing necessary to transfer and convert data files and programs, can fill-in for the system managers until the in-house personnel are up to speed, and can help the customer ramp up by passing on knowledgeable tips about the operating system, languages, and file handlers.

A Residency can also provide temporary staffing of another form: assisting in new software development, through the role of project manager, project leader, and/or part of the project staff. This provides expertise to the customer without having to incur the expense for hiring, training, and ramp-up time.

The key to selling any Residency is understanding what the customer's needs are. One proven way is to have your Professional Software Services Specialist prepare a Customer Support Plan (CSP). In preparing a CSP, the Specialist will determine which service best fits the needs of the customer. The three possibilities are to 1) keep the initial Consulting Service Package as is; 2) keep the initial Consulting Service Package and add to it a Residency; or 3) convert the initial Consulting Service Package to a Residency.

U.S. professional Software Services has provided a way that enables a Specialist to upgrade your customers' 25 days (-2020) or 50 days (-2040/-2060) Consulting Service Package to a six month or one year Residency, by setting aside a single Q number: OSCNV-SZ. (In the past, four separate Q numbers existed, but no longer.)

For Europe and GIA, consult your local Software Product Services Manager for further information.

The price associated with QSCNV-SZ is determined by the type of upgrade and type of system which is being purchased. For quotes on the Residency Upgrade option, see your local Software Unit Manager or District Consulting Coordinator. Below, I have listed the estimated pricing for the upgrades, based upon the current Professional Software Services' rates and residency equations:

25 day Upgrade to 6 month Resident:

Level II	approx.	\$45 K
Level III	approx.	\$52 K

25 day Upgrade to 12 month Resident:

Level II	approx.	\$96 K
Level III	approx.	\$110 K

50 day Upgrade to 6 month Resident:

Level II	approx.	\$31 K
Level III	approx.	\$39 K

50 day Upgrade to 12 month Resident:

Level II	approx.	\$82 K
Level III	approx.	\$97 K

These prices are based on Professional Software Services' current rates and residency equation. Before quoting a Residency Upgrade option to your customer, be sure that your local Software Unit Manager or District Consulting Coordinator is involved.

Remember: the Residency Upgrade option is ONLY available at the time of system sale. Please contact me for any further information you may need.

LCG SALES TRAINING/PRESENTATION MATERIALS*

John Loether
LCG Training
MRO2-2/C2

Several modules of 35mm slides were produced in support of the November 29-December 3 LCG Sales Training Seminars. These slides will be useful for in-field training or customer presentations.

Ordering Information

Name: Large Systems Training Slide Presentation 12/82

Module No.	Module Title	Slide Qty.	Cost
1	Product Introduction - DSIA The Products & the Marketplace	69	\$ 95
2	CI/DSA/HSC50 TA78, RA81, RA60 STAR Coupler	95	115
3	Multiprocessing Concepts Symmetric Multiprocessing Tri-SMP Loosely Coupled Processing	28	40
4	Common File System	61	75
5	TOPS-20 Communication Ethernet Program DECnet Phase IV X.25 Linkabit & the IDX-3000	69	95
6	TOPS-10 and TOPS-20 TOPS-20 V6.0 TOPS-10 V7.02 FORTRAN 77	63	95
7	Technical Support	19	30

Place your orders (in writing) with Media Services in Bedford, Mass., attention Kathie Stanton, BUO/E17; RCS code: BDFD. When ordering, please provide the complete presentation name (the title appears above); the module number(s); and one-line title(s) as above; your cost center; badge number; and complete Corporate location/mailstop. The requesting cost center will be cross-charged the amount listed above for each module which you order. These slides have been available as of January 1, 1983.

* Reprinted from "Sales Update", p. 66, December 20, 1982.

TOPS-10 LITERATURE KITS

Peggy Sullivan
LCG Marketing Comm.
MR02-2/8D2

In an effort to make it easier for you to find and distribute promotional literature on TOPS-10 and related LCG products, we have created a literature kit which can be ordered from Northboro P&CS. One order number, EZ-82160-07, will obtain for you:

- DECnet-10 Press Kit
- TOPS-10 V7.02 Data Sheet
- DECnet-10 Phase III Data Sheet
- Symmetric Multi-Processing Flyer
- FORTTRAN-10/20 V7 Data Sheet
- IBM RJE E/T (TOPS-10/20) Data Sheet

This kit makes an attractive package for you to give to prospects and customers.

If you like the convenience of this kit, we will gladly create additional kits for TOPS-20 and other subjects of interest. Just let us know your preference.

NEW LCG LITERATURE

Bankers Trust: DECSYSTEM-20 and BTShare - Partners in Success
order number: EA 23155 116

Introducing TOPS-20 Multiprocessing: New Products to
Simplify Expansion
order number: EC 24046 61

Attention! The LCG Literature List does not appear in this issue. Please refer to the January 1983 BUY-LINE, or wait until the March issue.



LCG NAVIGATION LIST

DTN:

Rose Ann Giordano	231-4049	LCG Product Group Mgr.
Per Hjerppe	231-7444	LCG Group Marketing Mgr.
Carl Cargill	231-6127	Strategic Planning Mgr.
Ray Ochester	231-4117	Product Marketing Mgr.
Paul Feresten	231-4371	Mktg. Mgr. DECsystem-10/20
Diana Miller	231-4537	Language/Layered Product Spec.
Ira Machefsky	231-6863	Future Systems Spec.
Peter Wysocan	231-7360	Competitive Analysis
Peter Gray	231-5829	European Support Mgr.
Larry Vifquain	231-4439	Market Development Mgr.
Rebecca Alexander	231-6469	Govt. & A.I. Mktg. Spec.
Marilyn Davison	231-5815	Commercial Mktg. Spec.
Richard Smith	231-7493	Eng./Office Automa. Mktg. Spec.
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Connie Davis	231-4291	Installed Base Mktg. Spec.
Beryl Sachs	231-6691	LCG Projects Co-ordinator
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Richard Colarusso	231-7424	Sr. Technical Supp. Spec.-H/W
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Ammie Herring	231-5963	Shift Supervisor
Wayne Garber	231-6107	Computer Operator
Carol Orton	231-6107	Computer Operator
Jim Rehill	231-5562	Senior Software Spec.
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Laura Gawronski	231-6480	Technical Supp. Spec.
Celeste Moore	231-4510	Technical Supp. Spec.
Reed Powell	231-4261	Technical Supp. Spec.
Debra Rio	231-5612	Technical Supp. Spec.
Rita Tillson	231-6615	Technical Supp. Spec.
Jim Miller	231-4265	GIA Operations Mgr.
Joe Viula	231-4372	GIA Mktg. Mgr.
Sergio Kogan	231-7409	Latin America Prin. Mktg. Spec.
Allan Titcomb	231-4849	Applications Mktg. Mgr.
Bernie Eiben	231-4431	Applications Supp. Spec.
Mitch Perlitch	231-5975	Applications Supp. Spec.
Dee Ramee	231-6431	SOFTWARE REF. CATALOG Editor
Don Mallinson	231-4285	Mktg. Communications Mgr.
Barbara Holtz	231-4996	BUY-LINE Editor (Salesforce)
Don Waite	231-5256	LARGE SYSTEMS NEWS Editor (Customer)
Peggy Sullivan	231-6878	LCG Literature Co-ordinator

For Internal Use Only

LCG Operations (cont'd)

DTN:

Rich Whitman	231-7498	US Area Operations Mgr.
Beverly S. Mansfield	231-6584	Mktg. Supp. Spec. (Cust. Visits)
Michael Flitterman	231-6971	Govt. & Industry Rsch. Mktg. Mgr.
Tom Fleming	231-7115	Govt. & Industry Rsch. Mktg. Spec.
Kathleen Healy	231-6312	Govt. & Industry Rsch. Mktg. Spec.
Ralph Marriott	231-7638	Govt. & Industry Rsch. Mktg. Spec.
Ted Grenham	231-5893	Comm'l/Engin. Mktg. Mgr.
Susan Marie	231-7626	Comm'l/Eng. Mktg. Spec.
Dave Morosas	231-5036	Comm'l/Eng. Mktg. Spec.
Bob O'Brien	231-5455	Comm'l/Eng. Mktg. Spec.
Bob Todisco	231-4201	Educational Mktg. Mgr.
Jim George	231-6610	Educational Mktg. Spec.
Rick Grady	231-4436	Principal Mktg. Supp. Spec.
Don Turner	231-7508	Data Services Mktg. Mgr.
John Montesion	231-4918	Data Services Mktg. Spec.
Art Zina	231-4700	Data Services Mktg. Spec.
Ed Govoni	231-6616	Office of Sales Programs Mgr.
John Loether	231-4961	LCG Sales Training Consultant
Howard Berloff	231-6456	Contracts (Law Dept)
Annette Albright	231-7455	LCG Personnel Mgr.
Bill Gervais	231-6866	LCG Finance & Administration Mgr.
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Dave Slauenwhite	231-5571	Programmer/Analyst
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Earl Devanny	231-7625	Financial Consultant
Tara Howard	231-7342	Financial Analyst
Judie Hunter	231-6456	Financial Consultant
Joe Faro	231-4424	Credit Mgr.
Vicki Morrison	231-7678	Reg. Cr. Anal. Mid-Atl, So, NJ-NY, Reg.
Ann Ruth	231-5782	Reg. Cred. Anal. W & NE Reg.
Sibby St. Cyr	231-4420	Sales Service Mgr.
Nancy Citro	231-4322	Sales Serv. Rep.
Brian Kane	231-5774	Sales Serv. Rep.
Ken Kilburn	231-6881	Manufacturing Finance Manager
Steve Woodhouse	288-6665	Customer Finance

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Nita Smith	933311	LCG Europ. Area Mktg. Mgr., Geneva
Ross Mullins	933311	LCG European Financial Analyst

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Cyril Malm	7300200	SUM, Solna, Sweden
Jamie Muir	160290	Sales Mgr., Oslo, Norway
Roland Matthys	2427270	Brussels, Belgium
Norio Murakami	9897125	SUM, Tokyo, Japan
Bruce Weames	6752580	Toronto, Canada
Erwin Weiss	95910	Sales Exec., Munich, Germany

U.S. LCG COORDINATORS
(UPDATE 1/13/83)

DISTRICT	NAME	LOCATION	TELEPHONE NO.
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Metro Boston	Jim Roche	Boston (BXO)	224-2319
New England	Dave White	Bedford, NH (MHO)	263-2140
Conn.	Bob Nolin	Bridgeport (SCO)	254-2265
Upstate	Pete Lilley	Rochester (RCO)	252-2322
CENTRAL			
Chicago	Helen Godfrey	Rolling Meadows (RLO)	421-5660
Mid America	Nari Bawa	St. Louis (STO)	314-991-6400
Great Lakes	Scott Benson	Detroit (FHO)	313-348-8900
No. Central	Frank Delmont	Minneapolis (MPO)	612-853-9605
SOUTHERN			
Southeast	Ed Janusz	Orlando (ORO)	305-660-2100
Mid South	Bill Martin	Knoxville (KXO)	615-690-1521
Charlotte	Cliff Spatz	Chapel Hill (NCO)	919-493-2531
Houston	Larry Brown	Dallas (DLO)	214-620-2051
WESTERN			
Santa Clara	Toby Arnold	Santa Clara (WRO)	521-2484
San Francisco	Vatche Sogomonian	San Francisco (SZO)	415-397-8670
Rocky Mtn.	Bill Krause	Denver (DVO)	553-2214
Northwest	Ron Quarles	Seattle (SEO)	206-453-5500
NY/NJ			
NY Comm.	Alan Vitolo	One Penn Plaza (NYO)	333-3913
NY Tech.	Ned Barber	Westchester (WHO)	333-3940
New Jersey	Chet Sherer	Piscataway, NJ (KYO)	323-2383
NJ Comm.	Pete Buttacavoli	Piscataway, NJ (KYO)	323-2465
SOUTHWEST			
So. Cal.	Ivan Strashoon	Costa Mesa (CWO)	714-979-2460
Los Angeles	Frank Calderon	Culver City (LAO)	213-417-4351
Albuquerque	Bob Hughes	Albuquerque (AQO)	552-3021
MID ATLANTIC			
*Washington	Clyde Blassengale	Washington D.C. (DCO)	341-2248
*Maryland	CLYDE COVERS BOTH WASHINGTON & MARYLAND DISTRICTS.		
Philadelphia	Lou Goglia	Blue Bell, PA (PHO)	337-2520
Ohio Valley	Jim Fate	Columbus (CSO)	614-868-1900

*Washington & Maryland now have one coordinator for both areas.

OFFERINGS FROM ED. SERVICES SEMINARS

Susan Scown
Ed. Svs. Mktg.
BUO/E58

The following seminars are among several offered by Educational Services early in the Spring of 1983. For more information, call the Seminar Registrar at DTN: 249-4949.

Networking: Design and Implementation of Computer Communications Networks

This three-day technical seminar is a state-of-the-art presentation of fundamental concepts, technology, and practical implementation of computer networks. It includes network architectures, components, and structures, focusing on complete network design.

April 4-6 Chicago, Illinois

Increasing Business Productivity with Personal Computing

This two-day seminar explains the fundamental computer terms and concepts, and looks at PC applications and potential benefits. It examines business applications from financial modeling and word processing to computerized accounting systems.

March 14-15 New York, New York

Local Area Networks: A Practical Approach

This three-day seminar provides a practical, technical discussion of the key design issues involved in the selection and/or implementation of a LAN (Local Area Network). Attendees study topologies, media, access control techniques, and higher level protocols useful in integrating LAN technology into distributed processing systems.

March 15-17 Los Angeles, California

Office Automation: Strategies and Implementation

This two-day advanced course focuses on increasing managerial effectiveness and gaining competitive advantages. It also examines cost justification and administrative analysis techniques from both corporate and departmental perspectives.

March 7-8 Houston, Texas
March 15-16 Cherry Hill, New Jersey
March 28-29 Troy, Michigan

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BUY-LINE February 1983

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Barbara Holtz
LCG Mktg. Comm.
MR02-2/8D2

DIGITAL's policy concerning Company Confidential publications (now changed to "For Internal Use Only") protects our technical information and any names or strategic information concerning our installations and customer base.

We realize that many of you wish to tear out pages of various articles - either for your own notebooks or files, or - to give to customers, if those pages contain a write-up of their installations.

The policy now in effect for BUY-LINE is that the magazine remains a document For "Internal Use Only". We will designate these words at the top of those pages which are considered to be of strategic importance and which should not under any circumstances get into the hands of non-DIGITAL personnel. Please be considerate of customers who have released their stories for internal use only; THEY DO NOT ALWAYS AUTHORIZE PUBLIC USE OF THEIR APPLICATIONS!

All those pages which are not of a confidential nature will not state For Internal Use Only on the top of the page.

We hope that you will make good use of this procedure - and that you will respect it, as well.

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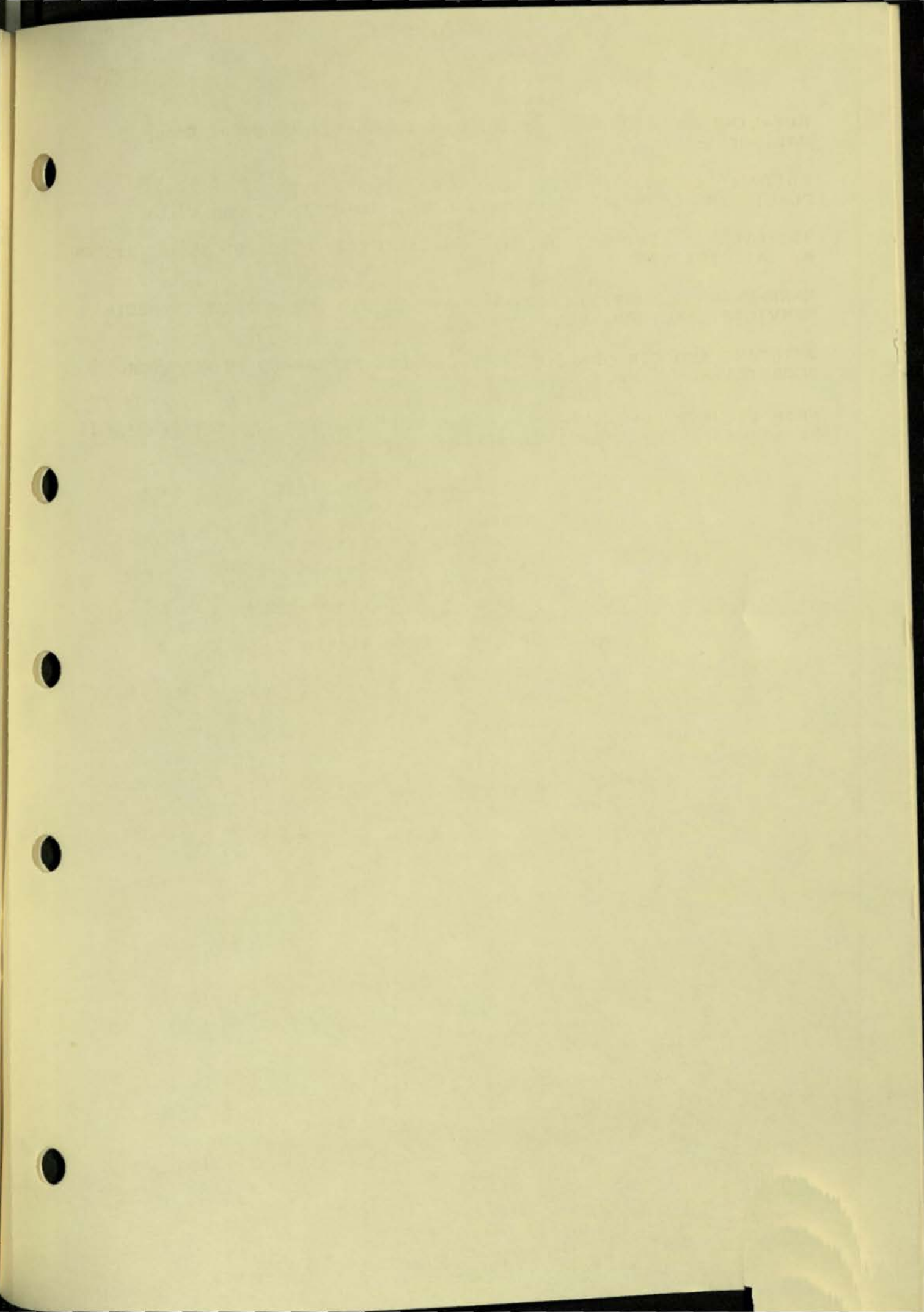
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Upon request (see mailer card in this issue), the following will
be added to the BUY-LINE mailing list:

- Field Service Managers
- Sales Managers
- Marketing Managers
- Sales Representatives
- Operations Committee Members
- Service Group Managers
- Software Support Managers
- Product Managers
- Software Specialists



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group*

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DIGITAL EQUIPMENT CORPORATION
MARLBOROUGH, MASSACHUSETTS 01752

Large Computer Group

BUY-LINE

March 1983

Special In This Issue

Announcing PASCAL-10/20

LCG Presentation: Sales Symposium

DSIA Concept Photo



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digital

ATTENTION READERS !!!

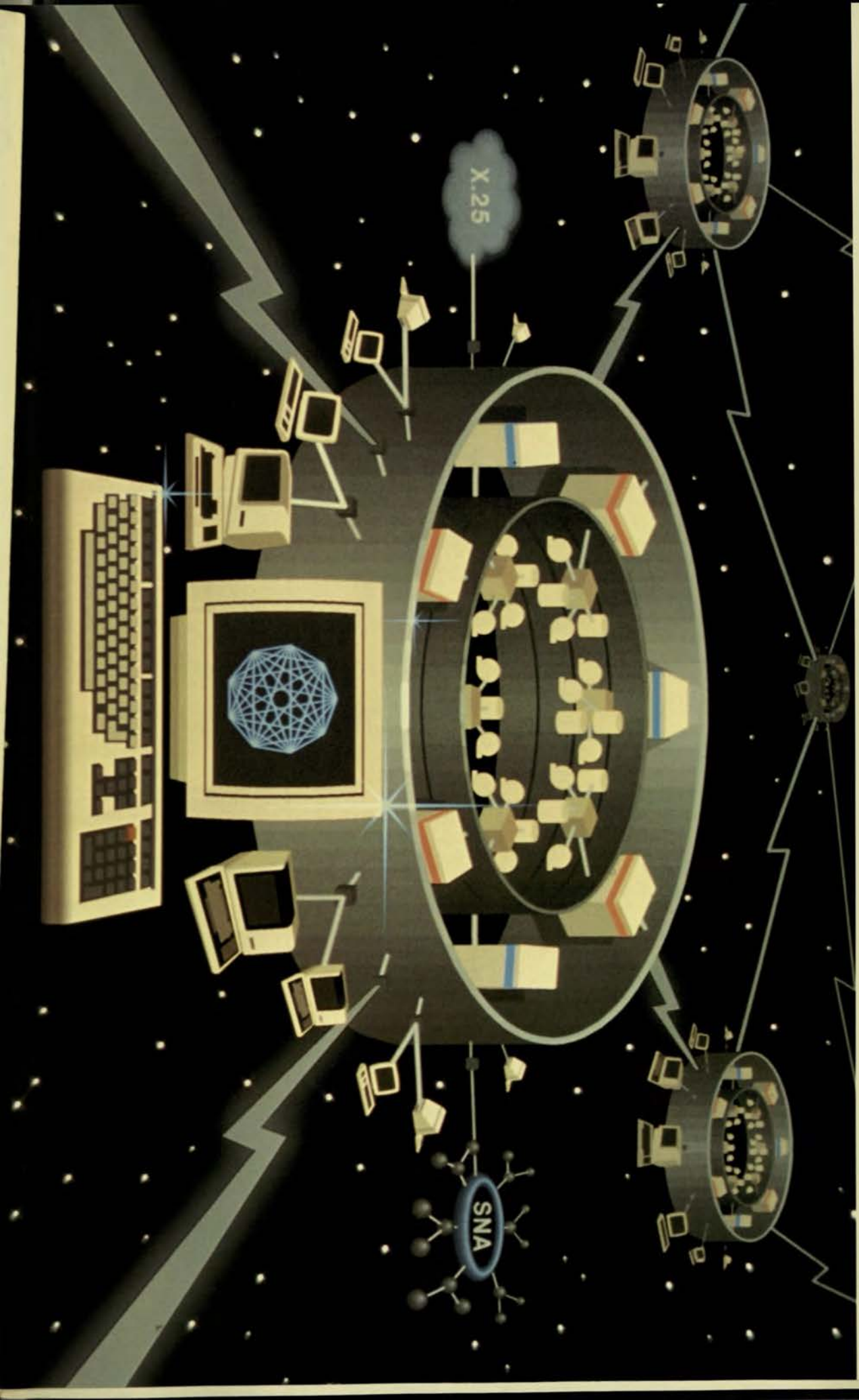
PULL PASCAL-10/20

To Our BUY-LINE Readers:

In our haste to get the very latest information in BUY-LINE, we out did ourselves this time. The article in this issue entitled "Announcing PASCAL-10/20" is premature. While the content is accurate the product is not ready for announcement at this time. So do not mention PASCAL-10/20 to your customers yet.

We learned this after going to press and rather than reformat and reprint the issue and delay your reception of the other news, we decided to issue this special announcement.

PASCAL-10/20 will be ready in the near future.



The illustration represents a conceptual as well as a schematic view of the potential of this new interconnect architecture when fully implemented. The Digital System Interconnect Architecture consists of compute and mass storage servers, future communications servers, high-speed buses to connect the servers, and protocols for inter-server communication.

The outer ring on the illustration represents the ETHERNET. It will connect terminals, communication servers, and compute servers to the Local Area Network (LAN). Through gateways the LAN will connect to other remote LANs and non-Digital networks. The inner rings represent the Computer Interconnects (CIs), connecting multiple homogenous compute servers together into Loosely Coupled System configurations and to mass storage servers in the center.

Close examination of the illustration will reveal the following benefits:

- You, the user, have access to a huge multi-system resource.
- "The system is the network and the network is the system."
- All files can be globally accessed by any user.
- Uptime is high due to multiple component redundancy.
- There is no single point of failure.
- Loads may be distributed throughout the environment.
- Growth is modular and flexible.
- Resource sharing reduces the number of peripherals required.
- Interconnectability will exist between Digital and non-Digital systems and peripherals.

LETTER from the EDITOR



Barbara Holtz
LCG Mktg. Comm.
MRO2-2/8D2

We are pleased to bring to our readers The New BUY-LINE. As you can see, this new look begins with our cover, which visually incorporates LCG's technology strategy, embracing our new high-end disk technology. The products which you see represent the first stage of the implementation of DSIA, Digital System Interconnect Architecture.

Moreover, BUY-LINE's new binding and absence of drilled holes lend a magazine image, more in keeping with the timely, informative, and (yes!) provocative contents which we intend to bring you, each month.

Remember, your comments, article inputs, and critical feedback are always invited; BUY-LINE succeeds when it is "by you" as well as "for you".

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ANNOUNCING PASCAL-10/20 VERSION*1:
PASCAL IN THE LCG MARKETPLACE



Diana L. Miller
LCG Marketing
MR02-2/8D2

LCG is pleased to announce the addition of PASCAL to the DECsystem-10 and DECSYSTEM-20 language offering. PASCAL-10/20 Version 1's major benefits are in the development environment, access to common FORTRAN and PASCAL math routines, and use of RMS.

History And Positioning

The language, PASCAL, was developed by Niklaus Wirth back in the late 1970's. Wirth's PASCAL was influenced by the programming languages ALGOL-60 and ALGOL-W. The principal aims behind the creation of PASCAL were to create a language for teaching programming as a systematic discipline, and to develop a language which could be implemented efficiently and reliably.

Today, PASCAL is a sparse, simple language which facilitates learning ease and translation efficiency. For the first-time programmer, PASCAL is very obvious and straightforward; yet the simple, powerful statements make PASCAL a good language for doing system programming and software implementation. As one software engineer commented, "PASCAL makes system code easy to understand without the language interfering."

PASCAL is a general purpose language, but not all-purpose. PASCAL's major strength is its propensity toward structured programming. PASCAL discourages poor programming practices by offering a variety of data structures and control statements, which facilitate the development of structured programs.

These constraints of PASCAL in turn provide a major benefit: maintenance ease. Structured programming enables a programmer to pick up a program and with minimal effort, understand what the program is attempting to do.

PASCAL-10/20 Version 1 is primarily targeted at the Educational Market, where PASCAL is extremely popular and widely taught. In the areas of Engineering, Scientific Research, and Industrial Research, PASCAL-10/20 provides our customers with an alternative to FORTRAN.

* Portions excerpted from "Sales Update", March 14, 1983.

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Competition

PASCAL is one of the many languages offered by all major equipment vendors, including DIGITAL. There is one product offering in the DECsystem space that competes with PASCAL-10/20. It is called PASCAL-PLUS, offered by NIS (National Information Systems Inc. PASCAL-PLUS is described by NIS as a production-oriented compiler, targeted for industry use. The features PASCAL-PLUS stresses are an optimized, multi-pass compiler, with extended facilities for character manipulation.

PASCAL-10/20 is targeted at the Education market primarily, but it is also targeted for industry use. The features PASCAL-10/20 stresses are: common FORTRAN and PASCAL math routines; use of RMS; and VAX compatibility.

<u>PASCAL-10/20 V1.0</u>	<u>PASCAL-PLUS from NIS.</u>
Entry level PASCAL for Education and Industry	Production type PASCAL for Industry
Non-Optimized	Optimized
Single-Pass compiler	Multiple-Pass compiler
Use common FORTRAN and PASCAL math routines	No FORTRAN compiler available
Uses RMS for all I/O	No RMS support
Standard facilities for character manipulation	Extended facilities for character manipulation
VAX compatible (Subset)	Compatible with their VAX product

A PASCAL-PLUS license is listed at \$25,000, and the annual maintenance cost is 15% of the current license fee. For PASCAL-10/20 pricing and maintenance cost, please refer to the article entitled "ORDERING AND PRICING INFORMATION FOR PASCAL-10/20" in the March 14 "Sales Update".

There is another PASCAL compiler offered on the DECsystem's by a DECsystem user, Rutgers University. This product is offered for approximately \$100 (to cover administrative and shipping costs) and it is unsupported. Rutgers PASCAL is for Education and Industry.

Benefits of PASCAL-10/20 Version 1

PASCAL-10/20's major selling points are its extensions to the ISO standard. The key extensions are:

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development environment,
access to common FORTRAN
and PASCAL math routines, and
use of RMS.

The development environment includes the on-line, interactive features of TOPS-10/20 in the PASCAL language, and provides an interactive symbolic debugger and superior compile-time and run-time diagnostics. These features simplify the programmer's job and increase the programmer's productivity.

PASCAL-10/20 uses the same math routines as does FORTRAN. This now provides FORTRAN and PASCAL users with the most accurate single and double precision arithmetic available from DIGITAL. This is significant if one of our customers' major concerns is precision and standard results.

For more detailed information on these features and others, please refer to the article "ANNOUNCING PASCAL VERSION 1 FOR TOPS-10/TOPS-20" in the referenced "Sales Update" issue, as well as to the LCG data sheet now available on PASCAL-10/20 Version 1.

Description of PASCAL-10/20

The PASCAL-10/20 compiler is a one-pass compiler that executes in native mode. It produces object files which are input to LINK and optionally produces listing files. The listing files contain source code listings, information about compilation errors, and optional items, such as cross reference and machine code listings

A program written in the PASCAL-10/20 language is organized into blocks of code called procedures. Procedures may be internally nested, or externally invoked. Procedures may be recursive; that is, they may call themselves. Block structuring provides for programs that are easier to understand and less error-prone.

Highlights of PASCAL-10/20 include:

- * Standard PASCAL features (including REPEAT and WHILE loops, IF-THEN-ELSE, BEGIN-END, and GOTO statements). Thus, PASCAL-10/20 is easy to learn and is comparable to other ISO standard complying processors.
- * Extensions to standard PASCAL, such as additional predefined types, functions, and procedures. These allow more flexibility in program design.
- * Separate module compilation, which provides for creation of user libraries and fast program development.
- * PASCAL-10/20 Symbolic Debugger for faster and easier program development.

GREAT PRODUCTS BRING IN GOOD BUSINESS:

LCG's PRESENTATION at the 1983 SALES & MARKETING SYMPOSIUM

LCG Operat'ns & Marketing
Staff (Vifquain, David-
son, Whitman, Holtz)

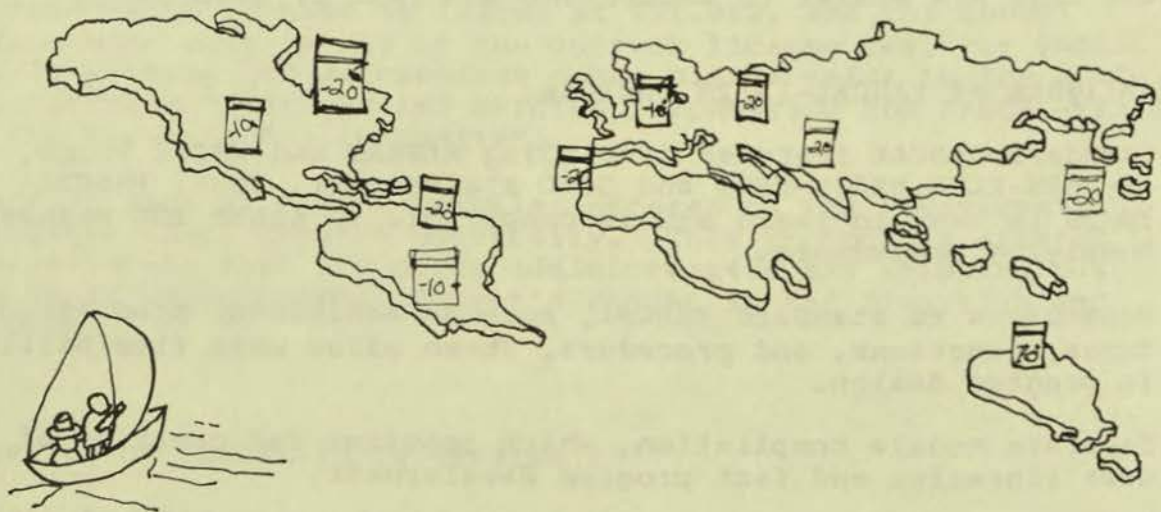
The week of January 17-20 1983 at the Hotel Sheraton Boston was a banner opportunity for LCG to present goals, strategies, and historic achievements to over 1000 national and international members of DIGITAL's field force.

The occasion? The 1983 DIGITAL Sales & Marketing Symposium. LCG's main messages? Our proven success ... Solid proof that LCG products yield profitable business for the field ... Unquestionable Corporate commitment to follow-on systems (product offerings) having a firm high-end market niche ... Development of a host of new applications products enabling LCG to be increasingly successful at solution selling.

The following pages provide a "capsule" version of LCG's major messages given in slide presentations, all week long, by Rose Ann Giordano, Ward Davidson, Rich Whitman, and Larry Vifquain.

Current LCG Products

LCG is still the best in the large-scale multi-user interactive market. From a business point of view, selling LCG products makes sense; we've had consistent annual growth (15%?) in terms of profits and revenue. Our strategy is to focus on the traditional areas of strength - for example using DECSYSTEM-20s for decision support in a highly interactive timesharing environment.



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Our new name accounts span all of our market places, and represent the participation of practically all the US Districts. In addition, we've experienced some remarkable successes in the European and GIA market areas, where tremendous competition exists. In making gains vs. our competition, we stressed applications which are unmistakably better suited to interactive computing.

In the USA, accounts with LCG product installations have proven to be among the Corporation's largest revenue producers - 33 of DIGITAL's top 50 accounts have DECsystem-10s and -20s; of the top 20, 16 accounts are heavily LCG-installed. LCG means good, profitable business for you - and for us!

How/Why We are Successful

From an organizational and a product perspective, LCG's success is based upon a high level of expertise in marketing, operations, technical support, sales training, and interaction with the field. Noted for their responsiveness as well as expertise, our staff and specialists bring added value to your sales endeavors, through programs and tools including our Customer Satisfaction Committee, and Customer Visits to Marlboro - 53.3% of which resulted in firm business in FY83.

Whether in software, hardware, communications products, languages or utilities, our products are up-to-date, sellable, and evolving. Resources were allocated, and gaps were closed. We found that the major reasons our customers buy LCG are: user productivity, ease of use, and quick return on investment. With respect to our KL follow-on, we are examining multiple ways in which we can bring product to market. The products which were announced at US Fall DECUS - generically entitled Digital System Interconnect Architecture - are actually the first stage of this follow-on product implementation; in fact, they comprise the largest announcement thus far in LCG history.

Marketing Programs

LCG application software sold through a number of cooperative agreements represents solution selling in new markets. Prominent firms or institutions around the USA contribute to the use of large computers in microprocessor development, artificial intelligence, custodial accounting packages, and spread-sheet calculators.

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LCG has produced over 80 pieces of high-quality literature, during the past year; our PR and advertising activities, as well as our LCG coordinators have all combined to tell our story internally, as well as to our customers. For the remainder of this fiscal year, and into FY84, a number of exciting programs activities, and strategies are planned, focusing upon our traditional market areas in order to help you make lots of sales, and to enable your customers to get what they need.

LCG in the Office Environment

In addition to providing an industry marketing focus, LCG has invested in cross-industry application markets. There are marketing programs built around Office Automation, Personal Computers, Decision Support, Artificial Intelligence, and Videotex/Graphics. A supporting program for marketing third party software within these application markets is in place.

LCG's investment in Office Automation over the last 18 months can pay off in FY84 for the sales organization. A complete set of proven products exists, along with a marketing plan to support the efforts in the field. OPUS, the DECSYSTEM-20 Integrated Office Environment, is currently working in seven customer test sites, and is scheduled for submission to the EAS Library.

LCG systems will host Personal Computers in our customer sites. We are actively working to assure that the necessary communication tools are available in order to support this. The Rainbow and the DECmate II can be supported with virtual terminal and file transfer. Plans are in place to provide solutions for file transfer and tool-kit for the Professional series.

UNIQUE SALES TOOL!
DSIA CONCEPTUALIZED IN FULL COLOR PHOTO!

Beryl Sachs
LCG Program Co-ord.
MRO2-2/C2

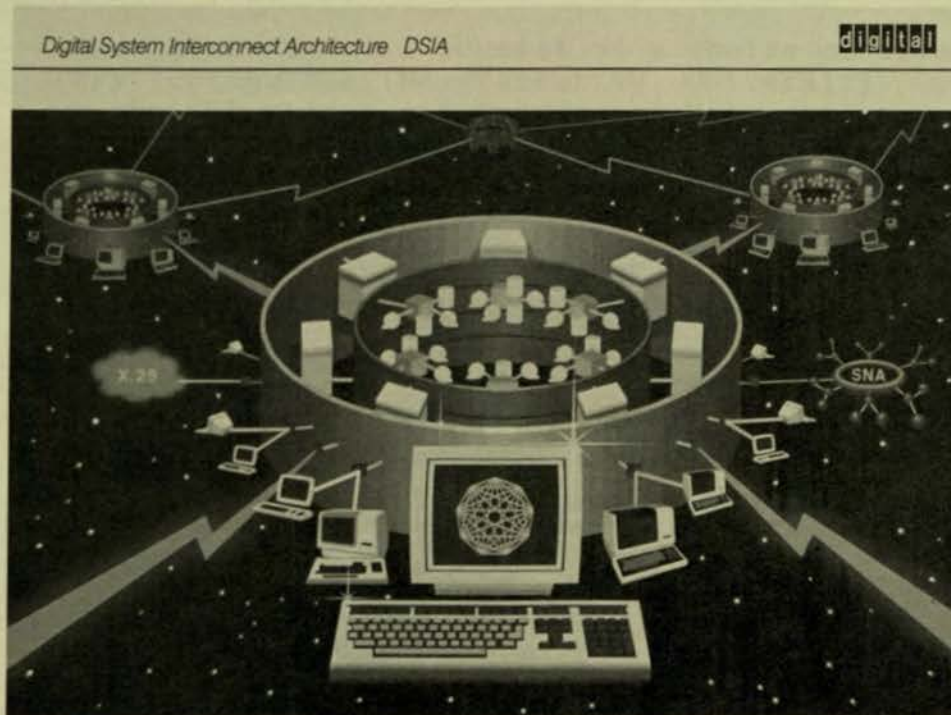
Have you ever tried to explain to a customer - or to a prospect - the magnitude of DIGITAL's system interconnect direction?

Have you found yourself going down the "bits and bytes" road, while not conveying the global concept?

If you have, you're not alone!

The magnitude of DIGITAL's system interconnect architecture has been difficult to describe. We typically present it as the sum of the following entities:

- multiprocessing power
- common file access
- the system is the network.. and the network is the system
- maximum uptime through redundancy
- ability to distribute loads
- modular growth
- interconnectability
- etc.
- etc.



LCG has now developed a sales tool to help you to convey those "thousand words" into a picture.

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Mailed along with this copy of BUY-LINE is a new four-color three-dimensional DSIA picture (reproduced in black and white on the previous page). On the back of the picture we have listed the key sales benefits which our customers can realize through this new architecture.

Look carefully at the details, and you will begin to "see the magnitude" of the DSIA concept and the excitement of our new direction.

Need an extra photo? Or need it in the form of a slide? Contact Barbara Holtz at DTN: 231-4996.

A parting word: Remember, DIGITAL offers solutions from PCs to mainframes. Now you can "picture" that concept!

U.S. LCG SALES TRAINING - THE Q4 SUCCESS TRAIN

John Loether
LCG Sales Training
MRO2-2/C2

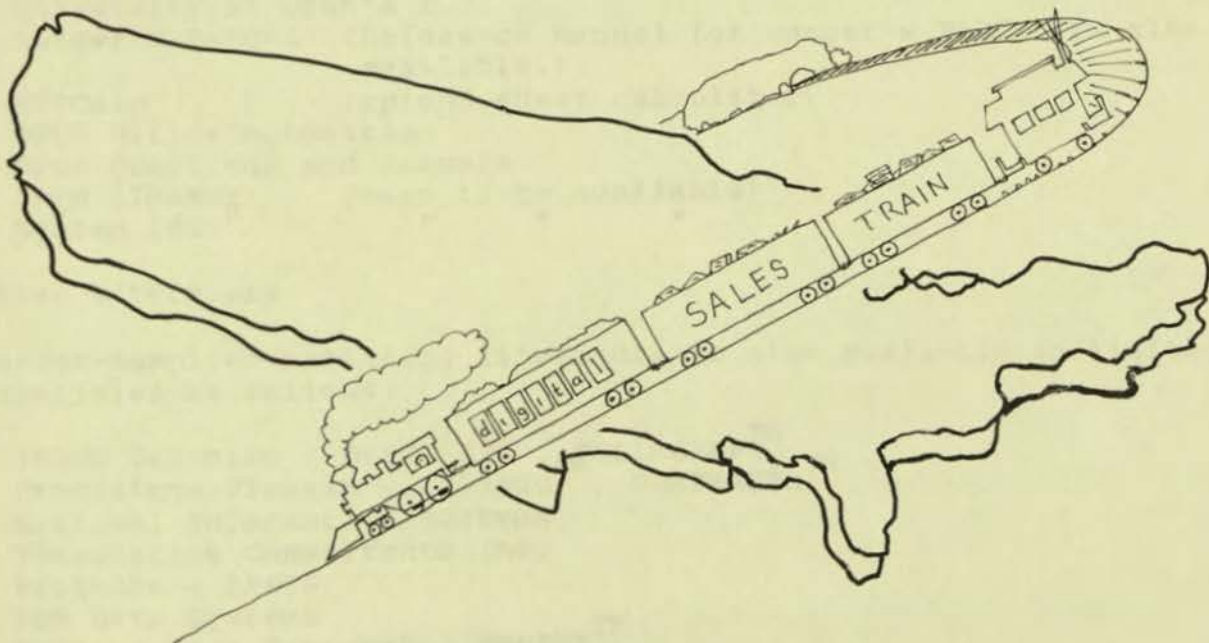
I hope that you all have read the January 31 1983 "Sales Update" article on the Q4 success train. This TRAIN will cover the next level of concepts and products for the NI. Many of you attended the special LCG training on the DSIA last November/December and will recall that LCG is fully utilizing the CI component and program announced as the NI.

Be sure to come and learn more about the NI side of the DSIA. Registration information and hotels was listed in the Feb. 28 "Sales Update". Be sure to register!

To Review the Success Train:

The overall theme of the three day Success Train is Networks and Communications.

- o The first two days will consist primarily of Networks (Distributed Systems) training.
- o The third day will consist of a choice of five "industry" categories (Manufacturing, University, Government, Technical Volume and Commercial Volume).



New Information:

Due to the success of the recent Sales Symposium in Boston, it has been decided to incorporate a mini trade show/symposium as part of the Success Train.

The planned "Trade Show" (or demo) is scheduled from 6:30 to 9:30 on the first evening of each of the Train "stops". The Trade Show schedule would therefore be:

Atlanta	April 5th
Dallas	April 11th
Washington DC	April 13th
New York	April 18th
Chicago	April 20th
Los Angeles	April 25th
San Francisco	April 27th
Boston	May 3rd

The Product Groups which have been invited to participate are:

- o Large Computer Group
- o Communications Industry Group
- o Installed Base Marketing Group
- o Office Automation
- o PDP-11
- o PCs
- o Terminals
- o VAX Systems

So come to the training on NETWORKS, and if you did not get information on the DSIA, or if you have other reps in your office whom you would like to have informed about LCG and about Loosely Coupled KL/CI/HSC50 systems, have them drop by the LCG segment of the "Trade Show".

LCG APPLICATIONS MARKETING SERVICES



Dee Ramee
LCG Applica.Mktg.
MR02-2/8D2

A new issue of the LCG Applications Update (Volume 2, No. 2) has been printed, and BUY-LINE readers should have received a copy with last month's issue. Inside the "Update" are articles about LISP, PCL, OPUS Office Automation, and the SEAL security system.

If you didn't receive a copy, or need additional copies, they may be ordered from Northboro. The order number is: EZ-82160-08.

System-1022 is the most widely used data base management system for the DECsystem-10 and DECSYSTEM-20. Soon, copies of Software House's customer newsletter, "The Data Base", and a new System-1022 software bulletin will be sent out to all LCG District Coordinators.

Software Bulletins

In addition to the above mentioned System-1022 bulletin, one- to three-page bulletins giving more detailed information than that published in the LCG Software Referral Catalog are available for the following software packages:

- KERMIT (KERMIT User's Guide and Specification is also available.)
- University of Utah's X.25
- Rutger's PASCAL (Reference Manual for Rutger's PASCAL is also available.)
- NCPCalc (spread sheet calculator)
- OPUS Office Automation
- OPUS Questions and Answers
- CP/M LIBRARY (soon to be available)
- System 1022 " " "

Other Literature

Vendor-supplied marketing literature is also available in limited quantities as follows:

- ISSCO Graphics - DISSPLATM, TELLAGRAFTM
- Precisions Visuals - DI-3000TM, GRAFMAKERTM
- National Information Systems
- Timesharing Consultants Inc.
- Battelle - BASIS
- RVR Data Systems
- Applied Data Research - EMPIRETM
- Software House - System 1022

Third Party Software Database

An on-line System 1022 database of information about third party software packages listed in the LCG Software Referral Catalog is available for use by DIGITAL sales reps and marketing staff. The database includes information on package pricing, competitive hardware, source languages, documentation available, vendor contact information, and more.

Demo Accounts On Market System

Demo accounts are available for customers or DIGITAL people who want to try various third party software running on the DECSYSTEM-20. Accounts are available for the following software:

<u>Package Name</u>	<u>Available From</u>
SYSTEM 1022	Software House
ACCENT-R	National Information Systems, Inc.
BASCOM	Datability Inc.
CONTROL-1020	Datability Inc.
DPL	National Info. Systems Inc.
FORAID	National Info. Systems Inc.
MAXBASIC	National Info. Systems Inc.
NCP Calc	National Computer Performance Co.
OPUS	Digital Software Services
VUE	National Info. Systems Inc.
MUSE	MARC Software or National Info. Systems Inc.
INFO	Henco
EMPIRE	Applied Data Research Inc.

To obtain bulletins or other literature please contact:

MaryAnn Pannell
MR02-2/8D2
DTN: 231-7636

For information about accessing the software database or demo accounts contact:

Dee Ramee
MR02-2/8D2
DTN: 231-6431

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EXCELLENT RESULTS ON KI TO KL BENCHMARK



Doug Ruby
LCG Tech Supp.-S/W
MR02-2/D13

Do you have some existing customers with KI-10s? Have you been trying to help them "understand" why they should upgrade to newer technology KLS? Are they interested in TOPS-20?

LCG recently assisted in a GIA benchmark for an existing KI customer who is looking to upgrade. The customer had prepared a benchmark suite consisting of compute-intensive FORTRAN programs and terminal oriented FORTRAN scripts that were somewhat I/O intensive.

The purpose was to measure the "performance" (standalone CPU power) as well as "throughput" (simultaneous user throughput including I/O) of the replacement system being bid. Run in Marlboro, this benchmark produced some excellent results.

A DECSYSTEM-2060 was used as the benchmark system. The -2060 configuration consisted of: 1.5 MW of memory; two RP07s; one RP06; and our PDP-11/44-based Remote Terminal Emulator (RTE). We used the latest FORTRAN release, FORTRAN-77 (Version 7).

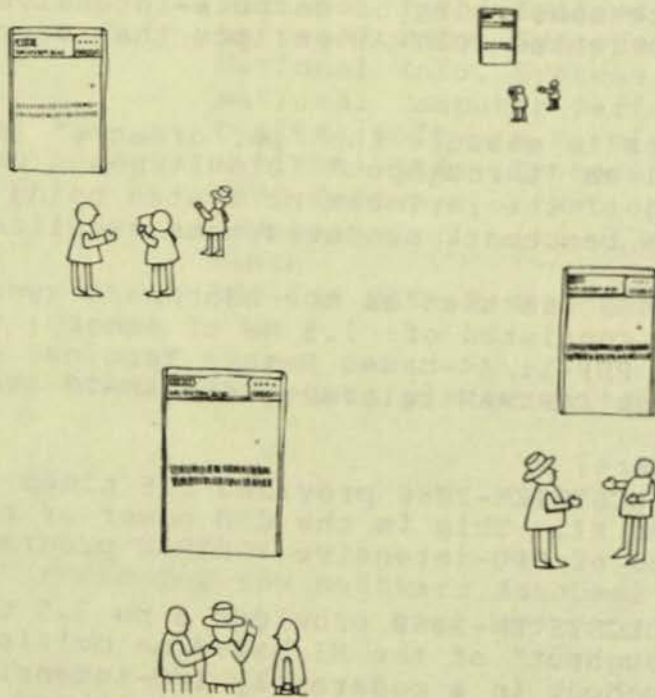
The results were:

1. The DECSYSTEM-2060 provided 2.5 times the "performance" of the KI. This is the CPU power of the KL based on a number of CPU-intensive FORTRAN programs.
2. The DECSYSTEM-2060 provided 3 to 3.5 times the "throughput" of the KI based on multiple terminal script throughput in a moderately I/O-intensive job mix. Much of this improvement can be attributed to the KL's substantially better I/O bandwidth than the KI's. Also, TOPS-20 does a good job of handling many copies of large programs, which this benchmark required.
3. The KI/FORTRAN source upgraded to FORTRAN-77 with no

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changes whatsoever to the sources. This will NOT always be the case, but was very encouraging in this particular instance. Also, FORTRAN-77 worked like a charm, with no bugs being demonstrated, even though we were running pre-Release software.

For you and your customer, this says that upgrading a KI to a KL10-E can be a cost-effective solution to getting substantially more performance and capacity. While this benchmark was run under TOPS-20, substantially similar results would be expected under TOPS-10 on DECsystem-1091.



LARGE SYSTEMS ENGINEERING ANNOUNCES LINK 5.1

Jack Pierce & Hirak Sengupta
IEG Mktg.Comm. & Ly.Prd.Mgr.
VR03-3/W1 & MRO1-2/E78

Large Systems Engineering announces LINK Version 5.1, a new version of LINK software for the TOPS-10 and TOPS-20 operating systems. LINK V 5.1 provides significant new functionality to support language features.

LINK Version 5.1 is a part of DIGITAL's commitment to make continuous enhancements in linking capabilities. It provides specific functionality to support FORTRAN-10/20 Version 7.0. Some of the significant features are:

- o Argument checking
- o Character to Hollerith conversion
- o Character data

MAXNODE Switch, CPU switch changes, DEBUG Switch, SET Switch, LIMIT Switch, MESSAGE Switch, LINKMN Message, SUPPRESS Switch and Writable Overlays, which permit support for the FORTRAN-77 SAVE statement are part of the new functionality which is included in the LINK for the TOPS-10 operating system.

These TOPS-10 features are already included in LINK Version 5.0 for TOPS-20 V5.0 on KL model B processors.

LINK Version 5.1 will support all the DIGITAL-supported layered products that operate on KS or KL processors under the following operating systems:

- o TOPS-20 Version 4.1
- o TOPS-20 Version 5.1
- o TOPS-10 Version 7.01A
- o TOPS-10 Version 7.02

LINK is packaged with the above operating systems and therefore enjoys the full range of DIGITAL services. LINK is included in the pricing of the operating system.

First Customer Ship (FCS) is scheduled for Q4, FY'83.

FOR TIMESHARING CONCERNS, THE DECsystem-10s AND -20s
ARE THE COMPUTERS OF CHOICE

When your customers purchase a new computer for a data systems firm, they are making a decision which directly involves profitability and the whole direction of their firm for the next several years. There are many points to consider:

- o Ease of Use - for programmers and for clients;
- o Responsiveness - each user should feel that the entire system is at his or her disposal;
- o Cost Effectiveness - both capital and operating costs;
- o Flexibility - different applications, availability of languages, ability to fine-tune the system;
- o Growth - how to add more power, mass storage, etc., to meet future needs;
- o Reliability and Support - down-time means loss of income; therefore, the system must be reliable, and service must be easily obtained.

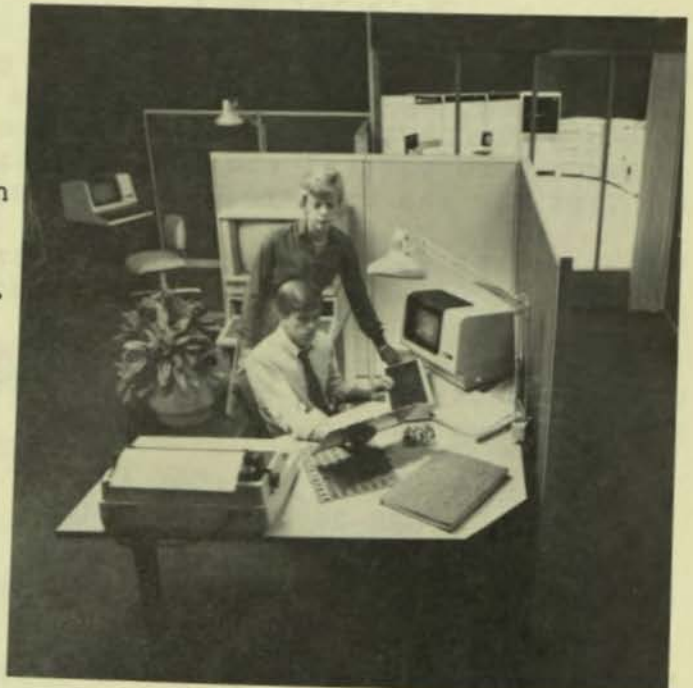
Ease of Use

An operating system which is easy for programmers and for customers means more work can be done with less "people time." Less "people time" increasingly means less cost.

The TOPS operating systems offer unparalleled ease of use. TOPS-20 is extremely user friendly with numerous features designed specifically to make the system simple for both experienced and inexperienced users.

Features such as an extensive help facility, dynamic memory allocation, an easily learned command language, and automatically submitted batch jobs have earned TOPS-20 its enviable reputation as the most user-friendly system available.

Such ease of use makes it more practical for data services clients to expand their timesharing use with other applications. Their computer novices can rapidly learn how to interact with the data services firm's system. This expands the firm's potential customer base, and allows the firm to serve customers more fully.



Responsiveness

Data services customers want fast answers. Many want to use decision support systems and need the fast response times characteristic of DIGITAL's Interactive Mainframes. They want to feel that the system is dedicated to their job, while the data services firm wants to be able to run large numbers of users and a multiplicity of jobs simultaneously. DIGITAL's interactive mainframes, the DECsystem-10s and -20s, fill both of these seemingly contradictory needs.

Cost Effectiveness

People costs are increasing. For a computer to be truly cost effective it must have low staffing requirements and ease of programming. DECsystem-10s and -20s require fewer operators than most other mainframes, and productivity tools in the operating system make programming faster and easier.

In fact, timesharing services based on the DECSYSTEM-20 were rated among the most cost-effective in CPU charges by a Real Decisions Corporation 1982 study, reported in "Computerworld".

Flexibility



Data services customers have a wide variety of applications and diverse needs for languages and programs. DECsystem-10s and -20s give firms the flexibility to meet all of their customer's requirements.

These firms can choose applications packages and a wide variety of languages from numerous sources for the DECsystem-10s and -20s. Select the tools from third-party sources as well as from DIGITAL-supplied software, DECUS programs, and their own programming staff's efforts to best meet their customers' needs in a cost-effective manner.

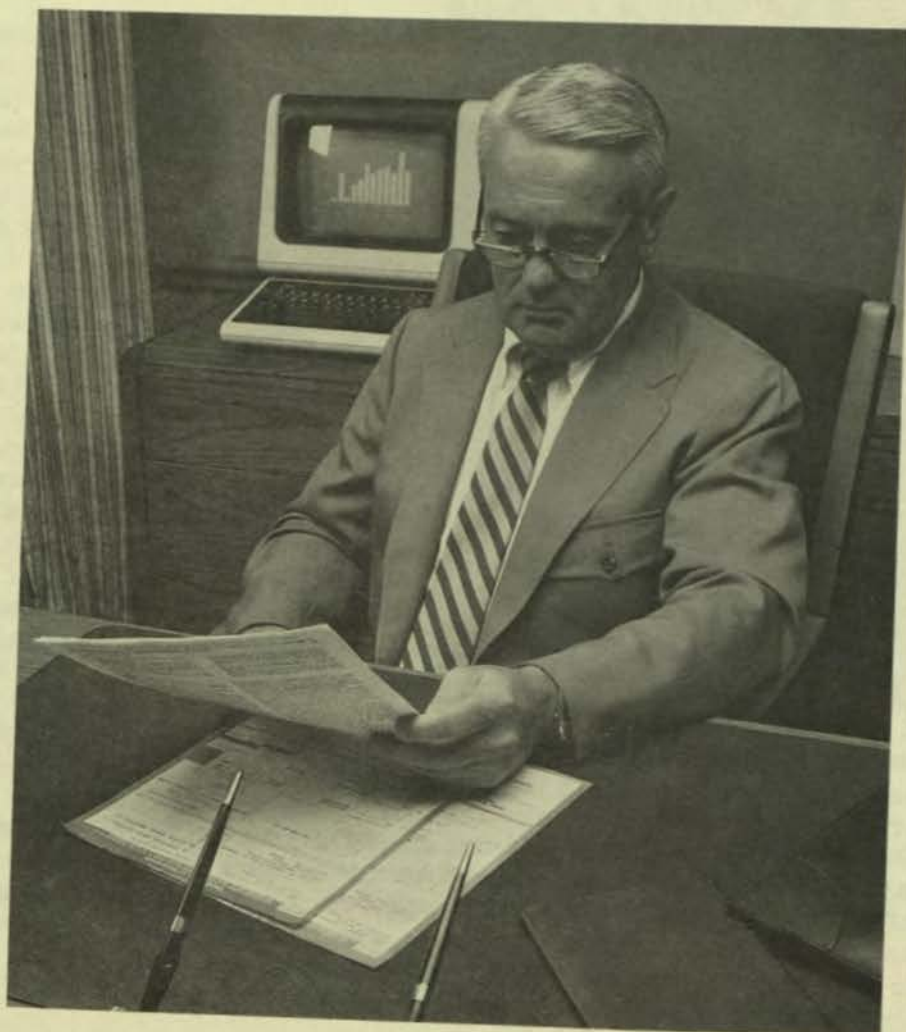
The firm's customer needs may also vary in the degree of responsiveness required for different customers. To meet a particular mix of customer needs, the operating systems allow fine-tuning. Various ways of accomplishing this are available, including the ability to prioritize by class of customer. There is the flexibility to adjust the system to user needs rather than fitting user needs to the system.

For added flexibility, DIGITAL offers a wide range of computer systems from personal computers up through the DECsystem-10s and -20s. This range of products and DIGITAL's DECnet networking software make it easier for data services firms to interface with customers who have small computers in offices or laboratories and need timesharing services for larger applications or to maintain a large data base.

Growth

DECsystem-10s and -20s are families of hardware and software that allow customers to grow computer systems as their needs grow. The recent introduction of the CI20 Port Adaptor allows them to connect two to four DECSYSTEM-20s through the Computer Interconnect (CI). With the CI20 and the Common File System (CFS-20), a loosely coupled multiprocessing system exists with global access to files. Thus they can lower costs by sharing mass storage peripherals, and they can reassign users from one host to another without duplicating files. Users on any TOPS-20 system on the CI access all files as if they were on the user's CPU.

TOPS-10 users also have a modular growth path through Symmetric Multi-Processing (SMP). With SMP, up to three DECsystem-1090s or -1091s can be connected in a tightly coupled multi-processing configuration.



LCG COMPETITIVE INFO: HONEYWELL DPS 88 ANNOUNCEMENT



Peter Wysocan
LCG Marketing
MRO2-2/8D2

On October 14, 1982 Honeywell introduced a new family of mainframe systems, the DPS 88. The following information will help interested LCG field force to properly position this family in the high end mainframe market.

The DPS 88/81 is a single processor system, and the DPS 88/82 a dual processor configuration. The new systems follow the price-performance trend of other recent announcements in the mainframe market, an almost 100% improvement over Honeywell's largest systems available today, the DPS 8/70.

The DPS 88 series is positioned directly against IBM 308X, and UNIVAC 1100/90 systems, in both price and performance.

Technology

The DPS 88 utilizes Current Mode Logic, a technology Honeywell has pursued for years; just now Honeywell has been able to bring it to market in a large system.

The use of this technology permits much greater logic density because of much lower heat dissipation. The micro-package developed for the DPS 88 utilizes a 3.2 by 3.2 inch multilayer substrate, on which 60 to 110 chips are mounted. The logic density in the micro-package is about 30 times greater than on DIP/PCB boards. Even with CML, this requires liquid cooling, and a novel approach was developed for this purpose.

Heat is removed from the micro-package by the SLIC (Silent Liquid Integral Cooler), which makes dry contact with the micro-package. The SLIC also serves as the clamp which presses the micro-package into both the logic connector and power connector. Modules may be replaced without turning off or draining the cooling system.

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Architecture

All processing is performed by the CPU, with the central interface unit (CIU) directing information transfers between main memory (MMU), input/output transfer unit (IOX), and CPU. Diagnostic and protection features are implemented in the system support facility, a free-standing maintenance processor.

The DPS 88 utilizes a 32 KB cache for instructions, and a separate 32 KB cache for operands. In addition, five-stage pipelines and parallel operation of the execution units permit up to 16 instructions to be in various stages of execution, simultaneously.

Main memory utilizes 64 K-bit MOS. A single main memory unit consists of 16 Mega-bytes, expandable by 16 MB increments to 64 MB. Memory is four-way interleaved, and access time is 8 words every 225 nanoseconds.

The input/output transfer unit is designed to off-load I/O from the CPU, and can achieve a peak transfer rate of 48 MB per second. Channel adapter units attached to the IOX can support a 20 MB/second throughput.

Performance/Positioning

Honeywell claims a 3.5 to 4.5 performance improvement over DPS 8/70 for the single processor DPS 88, and 6 to 8 times for the DPS 88/82. This translates to approximately 7.5 MIPS and 13 MIPS, respectively.

This performance positions the DPS 88 against IBM 308X and UNIVAC 1100/9X systems.

Software

The DPS 88 announcement indicated initial support for GCOS 8 only. Honeywell's other operating systems, MULTICS and CP-6 might become available in the future, but no time schedule was announced.

Price and Availability

A DPS 88/81 central system, including CPU, CIU, 16 MB MMU, IOX, Channel adapter unit with 31 channel slots, SSF, console and cooling system has a purchase price of \$2,850,000. On a four year lease, monthly charges are \$ 91,200.

Availability is scheduled for fourth quarter of 1983.

OFFICE AUTOMATION TAKES ROOT IN THE US NORTHWEST DISTRICT



Richard Smith
LCG Marketing
MRO2-2/8D2

Len Winkler of DIGITAL's Portland Oregon sales office knows both the Office Automation market and LCG products. Before taking on the responsibility for managing the Office Automation Sales Unit for the Northwest District, Len ran a Sales Unit that included important LCG customers such as: Nike, Tektronix, and Intel.

Len believes that a major sales opportunity exists for his office unit in LCG accounts in the Northwest, so he invited LCG to present our strategy for Office Automation and Personal Computers to the DECsystem-10/20 Local Users' Group (LUG) on February 11, 1983.

Approximately 30 customers attended the LUG meeting at Bonneville Power Administration in Vancouver, Washington, across the Columbia River from Portland. DIGITAL personnel included: Len Winkler and Mike Jewett from the Portland office; Dick Kessler from the Denver office; and Mark Diltz from the Seattle office.

The presentation on Office Automation stressed LCG's integral role in the overall Corporate office products strategy. LCG equipment occupies the top of the pyramid in DIGITAL's three level hierarchy of interconnected Office Systems, from personal workstations through departmental systems to DECsystem-10/20 based Corporate timesharing and database management services.

A thorough description of OPUS (Office Productivity User Software), the new, integrated office environment for DECSYSTEM-20, received uninterrupted attention from the audience. As an approachable, menu-driven interface that can be tailored for the needs of either novice or sophisticated user, OPUS will both attract large numbers of new users to existing sites, and will provide a key competitive edge in closing new accounts.

The New York Commercial Software Services District developed OPUS, and currently offers the package as a fixed price project. The District plans to submit the package to the EAS Library by March 1, for evaluation. Once validated, the software will be included in the DEC Standard Price List, with support supplied by the NY District. EAS Approval should come before the end of FY84.

OPUS delivers excellent facilities for word processing, filing, calculation (desk-top and spread-sheet), and graphics to the DECSYSTEM-20 user. Furthermore, with the communication capabilities of DECmail/MS, DX, and KERMIT integrated into the OPUS environment, DECSYSTEM-20 users fit easily into the complete network of DIGITAL's Office Systems.

Electronic mail can be exchanged* with users of CMI (that is, Customizable Mail Interface) mail in ALL-IN-1 office systems on VAX; documents can be moved to and from DECmates I or II using DX; KERMIT, a public domain software package, offers file transfer linkage to personal computers such as the Rainbow, that run the CP/M Operating System.

At present, the Professional-325/350 personal computers tie into DECSYSTEM-10/20 with ASCII file transfer capability available from DIGITAL. Full binary file transfer with error checking will be available soon.

After the presentation, an OPUS demonstration drew favorable comments from the attendees. The choice of menu mode for new or casual users, and command mode for the more experienced user received an extremely positive endorsement.

Attendees also liked the graphics capabilities of the ReGIS Graphics Editor software, and appreciated the helpful features of the word processing editor, such as spelling correction.

The meeting went exceptionally well, and more Office Automation sites on DECSYSTEM-10s/20s will undoubtedly begin to sprout in the fertile (and moist) environment of the Pacific Northwest.

* Mail interchange is a custom facility available through a Software Services consulting contract.

LCG AND VIDEOTEX



Marilyn Davison
LCG Marketing
MRO2-2/8D2

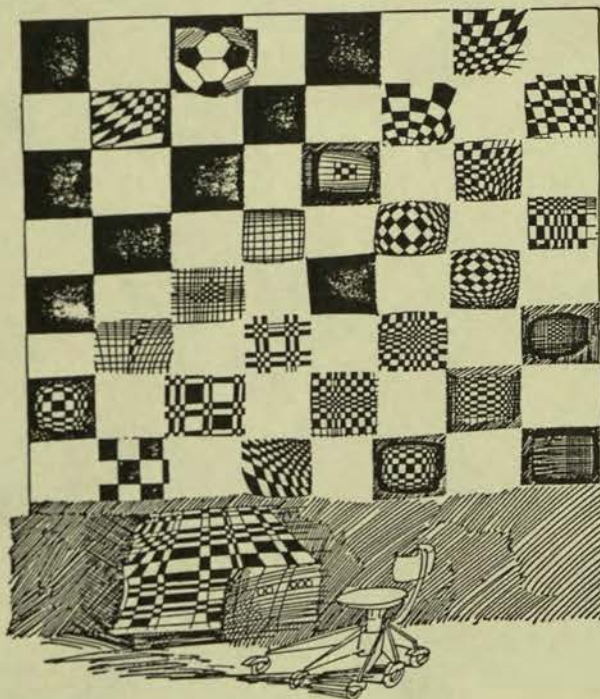
The largest worldwide Videotex system operator is an LCG account, CompuServe, in Columbus, Ohio. 40,000 subscribers use CompuServe's large range of offerings, including: home banking, games, access to stock quotations, and the Official Airline Guide.

Other LCG accounts utilizing Videotex technology to bring easy-to-reference information to home and business users include: CBC (the Canadian Broadcasting Corp.), Citibank, Rabobank, Philips, McLeod, Young Wier and Co., and ICI.

What is Videotex?

Currently receiving a great deal of media attention, Videotex is a technology that makes it easier to get information to relatively unsophisticated computer users - such as high-level managers, or semi-professional workers. Usually color and graphics are part of Videotex transmission, which is always menu driven and very easy to use.

The Videotex software acts as a utility, layered on a data base. The information is derived from the data base, formatted into page structure, and delivered via broadcast, cable, or telephone line to: television sets with decoders, ASCII terminals, or special blockmode terminals. The user requests information with a keyboard, or with just a keypad. As timesharing systems,



For Internal Use Only

designed to handle many simultaneous users, DECsystem-10s and -20s are ideal systems for Videotex.

Currently, DIGITAL does not have a complete "off the shelf" Videotex hardware/software package. A Corporate Videotex task force exists, with members from all of the product and market groups involved with Videotex.

We work with third parties to provide the software, hardware, and consulting services to help a current customer or prospect add Videotex to their system offerings.

We in LCG are currently working on cooperative marketing agreements with software houses, to make selling Videotex capabilities easier. In the meantime, if you have a customer or a prospect who is interested in Videotex, give me a call, and I'll provide the market and technical information that we have.

DATABILITY: THE ENTREPRENEURIAL DECSYSTEM-20s

Don Waite
LCG Marketing. Comm.
MRO2-2/8D2

The entrepreneurial spirit abounds in the New York offices of Datability Software Systems, Inc. Datability employs twenty people, providing timesharing, consulting, and software development services across the USA. Not satisfied with being one of the few companies coupling timesharing and software development within the same company, Datability is always looking for ways to further utilize their DECSYSTEM-2060 mainframe, considered to be their "best investment".

Datability got its start five years ago. Ron Howard, Datability's President and founder, was then a systems programmer at a leading engineering college in central Massachusetts. There he created the computer language BASCOM, a BASIC Language Compiler. Foreseeing BASCOM's commercial potential, Ron seized the opportunity to begin marketing BASCOM by starting Datability. "The environment was right, and I was excited about BASCOM, and now, after five years, our user base is still expanding." explained Ron.

To supplement revenues from BASCOM, Ron did consulting work on a DECSYSTEM-2060 for one of the larger banks in New York City. Datability had an unusual working arrangement with the bank. Ron traded consulting services for machine time on either the DECSYSTEM-20, or one of the two DECSYSTEM-10s located in the bank. The consulting services proved to be a worthwhile endeavor, and soon the demand for Datability's consulting services had expanded to the point of requiring more help.

Ron Howard
Datability
President



Richard Rupp, Vice President, Research and Development, joined Datability in 1979 as a partner; as Datability grew, they took on more and more consulting work. But the two entrepreneurs had the spirit to do more than consulting work and the marketing of BASCOM. They wanted to do more software development beyond BASCOM.

The two realized that all the consulting work they did for the bank could not pay for the amount of timesharing they were doing. Datability had to get more machine time and after many cost comparisons, decided to purchase their own CPU.

The Best Timesharing Machine in the Business

The CPU purchase decision was easy. After evaluating other vendors a DECSYSTEM-2020 was purchased. Ron Howard said, "We were well acquainted with DIGITAL's Large Systems. Our college had a DECSYSTEM-10 and now it has a DECSYSTEM-2060. We bought a DECSYSTEM-2020 because DIGITAL offers the best timesharing machines in the business."

The DECSYSTEM-2020 was an ideal machine for them. It could support all internal usage for their software development, plus they could offer outside timesharing services. Datability was now in the position to sell timesharing, just as the bank had sold Datability time several months before.

Datability, however, sells timesharing in an unconventional manner. They offer clients timesharing on the DECSYSTEM-20, as well as software development and consulting services. Datability has responsibility for the total package, software and hardware, and users don't have to have consulting or software development done by one vendor, then purchase time on another vendors machine.

Timesharing and development are done for the customer by one company, which also gives the customer the ability to control costs. "This eliminates so many problems inherent to software development. We work closely with our customers, not just selling them time," says Ron Howard. "What's more," he states, "our customers don't have to leave our system after the software is developed."

A Bittersweet Situation

Consulting had grown dramatically in the two years after the DECSYSTEM-2020 was installed, but it was a bittersweet situation. Due to the increase in the timesharing and consulting business, software development had been curtailed because the -2020 no longer had the capacity for timesharing and development.

It became apparent that they would have to get a new machine to manage the consulting, software development, and timesharing. Datability's customer base and user space had grown to such an extent that they were almost forced to buy a new machine.

A DECSYSTEM-2060 was purchased, and installed in new, expanded office space - without a hitch - during which time the -2020 was still running in the old office. "The DECSYSTEM-2060 was up and

running in ten days, and the transition from the -2020 to the -2060 went very smoothly. DIGITAL's support was superb!" exclaimed Ron Howard.

"The DECSYSTEM-2060 was simply amazing!", says Richard Rupp. "There is nothing that we can't do with it. We feel that the DECSYSTEM-2060 is the best investment we have made thus far. Timesharing has doubled in the past 4-5 months, and revenues have doubled from a year ago."

CONTROL-10/20

As Datability did more and more consulting work on the DECSYSTEM-2060, they saw certain similarities develop between different customers they were doing work for. Datability reflected upon these similarities and said, "Why reimplement the wheel every time?" Instead, they created a basic information management system called CONTROL-10/20 which allows users to create information management systems in minutes.

"CONTROL-10/20 is used in over 150 sites across the USA and it epitomizes the ease of use and interactivity of the DECSYSTEM-20s. It can support 60 different types of video terminals, and implementation of management programs is very easy. Non-programmers can actually create information management systems in minutes that would have previously taken weeks for a programmer to implement.

CONTROL-10/20 allows users to interactively define screen formats and particular field details. CONTROL-10/20 then creates a program for the user that provides all the functionality previously mentioned and lots more!

BASCOM

BASCOM, the BASIC language compiler that brought out the entrepreneur in Ron Howard, has many unique and diverse applications. One customer has a national budget forecasting system which is tied into some 200 offices around the country. The program, developed using BASCOM and CONTROL-10/20, allows each office to call up and enter data. Each office can then request reports that compare actuals to budgets, as well as forecasting information. The New York office can get a company-wide consolidation of information within minutes, where before it was very time consuming, and nearly impossible. In addition, BASCOM can interface with data base products available for DECSYSTEM-10s or -20s.

Datability on MICROS

Datability is becoming more involved with microcomputers and their connectability to DECSYSTEMS. They are in the process of designing system packages for microcomputers, and then coupling them to the DECSYSTEM-2060 for the maximum utilization of each system's resources. In this manner, the user can interact between the microcomputer and the DECSYSTEM-2060 whenever necessary. "This will allow us to keep the costs of timesharing low while providing users with the advantages of a centralized mainframe,"

states Datability.

Datability's Future

Ron Howard stated that there seems to be a reverse trend happening with timesharing and consulting. "Where previously the two services were taken as separate specialties, now the reverse seems to be true. Timesharing and consulting are commingled. Datability has been concentrating on just this approach since we bought our DECSYSTEM-2020."

Datability has another edge on the market. They do not have to charge traditional market rates for timesharing. They made their CPU investments based on the needs of their R/D and consulting operations and, therefore, are able to charge less for timesharing usage. Also, Datability's customers have a certain security of knowing that they have open lines to the system all THE TIME, rather than timesharing on an ad hoc basis.

DECSYSTEMS For Entrepreneurs

The entrepreneur in Ron is always looking for the optimum use of the DECSYSTEM-2060. "At night, the 2060 is for the most part, idle. We are experimenting with ideas - ways to adequately utilize the system for non-traditional business ventures."

The DECSYSTEM-2060 allows Datability to experiment with ideas. Normally, companies that want to test their ideas either have to purchase a system or purchase time on somebody else's system. Either way it is an expensive route. "Since we have already made our investment, why not take advantage of it?" questions Ron Howard.

We have a big computer. We have already made our investment in the DECSYSTEM-2060. An investment that is paying for itself very well. Now we can experiment. For a few thousand dollars, we can test and implement a new venture where other companies must invest in a million dollar computer as an up front expense. Datability has no major expenditure and it costs little to try new ideas - ideas that could pay off handsomely!"

UNIVERSITY OF WASHINGTON & DIGITAL: TIMESHARING & NETWORKING*

At the University of Washington in Seattle, DIGITAL has made a modest investment, not in its own immediate future, but in the future of the computer field as a whole.

By providing \$120,000 in equipment credits as well as informal personnel support for an important computer research project, DIGITAL accomplishes at least two feats

at once: helping slow the migration of qualified personnel out of university-based research, and helping develop a unique and powerful new kind of computing environment.

The University's Eden Project is being funded by a \$4 million, five-year grant from NSF (the USA's National Science Foundation). Currently, a DECSYSTEM-2060 linked to a VAX-11/780 operate in the University's general computational facility, with plans to add more machines which will be connected by Ethernet.

The Eden Project

The unprecedented size of the NSF grant is important, says Jerre Noe, professor of Computer Science and director of the Eden Project. "The demand for qualified people to work in government, industry, and business has increased so much that students are being diverted away from graduate school; even faculty members are being pulled away from campuses," he observes. "There's a real fear that the quality of university research is going to deteriorate, and that eventually the whole field will suffer the consequences."

The NSF, seeking to counteract that trend, established the Coordinated Experimental Research Program, which gives substantial long-term grants to support computer science research and experimentation, and to provide the equipment required to do that kind of research. This makes university research more attractive. In 1980, Eden became the first project to receive a grant under the NSF program.



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The purpose of the project is to design and build a powerful new kind of computing environment that combines the best of two worlds: time sharing and networking. In conventional shared-memory systems, each user is connected to one central computer. Users have access to formidable computing power, and can interact with each other, but system performance degrades quickly as the number of simultaneous users increases.

In networks and data links, on the other hand, users can share resources such as printers and central files, and their work stations function with speed and flexibility that don't degrade rapidly as new systems are added. The trade-off is that networks (lacking shared memory) make it more difficult for users to share their data and processor power.

Eden, a happy marriage of time sharing and networking, will consist of 20 or 30 "nodes" physically distributed within one building and linked by a local network. These nodes will exhibit the customary flexibility and speed of personal computers, but unlike those in existing networks, they will also give each user access to unutilized computational power available in other nodes within the network.

VAX systems are being used to develop, test, and refine the software packages that will govern the functioning of Eden. "We're expecting another VAX to arrive soon," says Jerry Noe. And that's in addition to the -11/780 linked to the -2060 in our computational facility.

The University of Washington's Computer Science Department has become one of the most reputable in the nation. The Eden alliance between DIGITAL and the University is bound to be fruitful for many years to come.

Dennis Rood, DIGITAL's former Account Manager for the University explains, "The knowledge emerging from a project such as Eden will benefit DIGITAL, because we'll learn more about how our machines function, and how they can best be used. More important, this kind of research opens new doors for the entire computer science community. Everyone benefits from a breakthrough and that's why Eden is important."

* Excerpted from the Jan/Feb 1983 issue of "US Area News", DIGITAL's US Field newsletter.

PRESIDENT REAGAN VISITS DIGITAL'S BOSTON PLANT*

As the Marine One helicopter landed outside, DIGITAL's Boston Plant employees line the windows and cheered. On January 26, 1983, President Ronald Reagan came to highlight his interest in high technology, and to tour the plant, which is considered a model for inner city manufacturing ventures.

The White House Press Corp reporters from the major television stations, news magazines and newspapers, recorded the event, bringing DIGITAL's name into the homes of millions of persons throughout the United States.

"January 26 is a day of honor for the Corporation and for the Boston Plant. All employees should share in the pride which we feel," said Boston Plant manager Ralph Gillespie. "The Presidential visit comes at a time when the plant has proven itself in performance. Ending November, we've had 29 consecutive weeks of 100 per cent delivery at a 96 per cent or better quality."

Gillespie, Ken Olsen, DIGITAL President, and Jack Smith, Vice President, Manufacturing, escorted President Reagan through manufacturing lines for the new personal computer keyboards.



Ken Olsen demonstrates the graphics features of DIGITAL's new personal computers for President Reagan during his visit to the Boston plant.

* Reprinted from "Sales Update", February 7, 1983.

Along the way, the President stopped and greeted employees. At one point, he was invited to operate a heat staking machine, used to seal the keyboards. Carl Mayer, who helped design the machine, showed the President how to operate it.



Carl Mayer (L) displays the keyboard which the President sealed using a heat-staking machine. Plant manager Ralph Gillespie (C) escorted the President through the plant.

After the tour, President Reagan addressed questions from employees and praised the Boston plant as an outstanding manufacturing facility.

Ken Olsen said that the keyboard which President Reagan sealed would be used in a DECmate II, which would be sent to the White House for the personal use of Press Secretary James Brady, who was seriously wounded during the assassination attempt on President Reagan in 1981.



FIELD SERVICE SITE PLANNING KIT FOR DECsystem-10/20 ENVIRONMENT

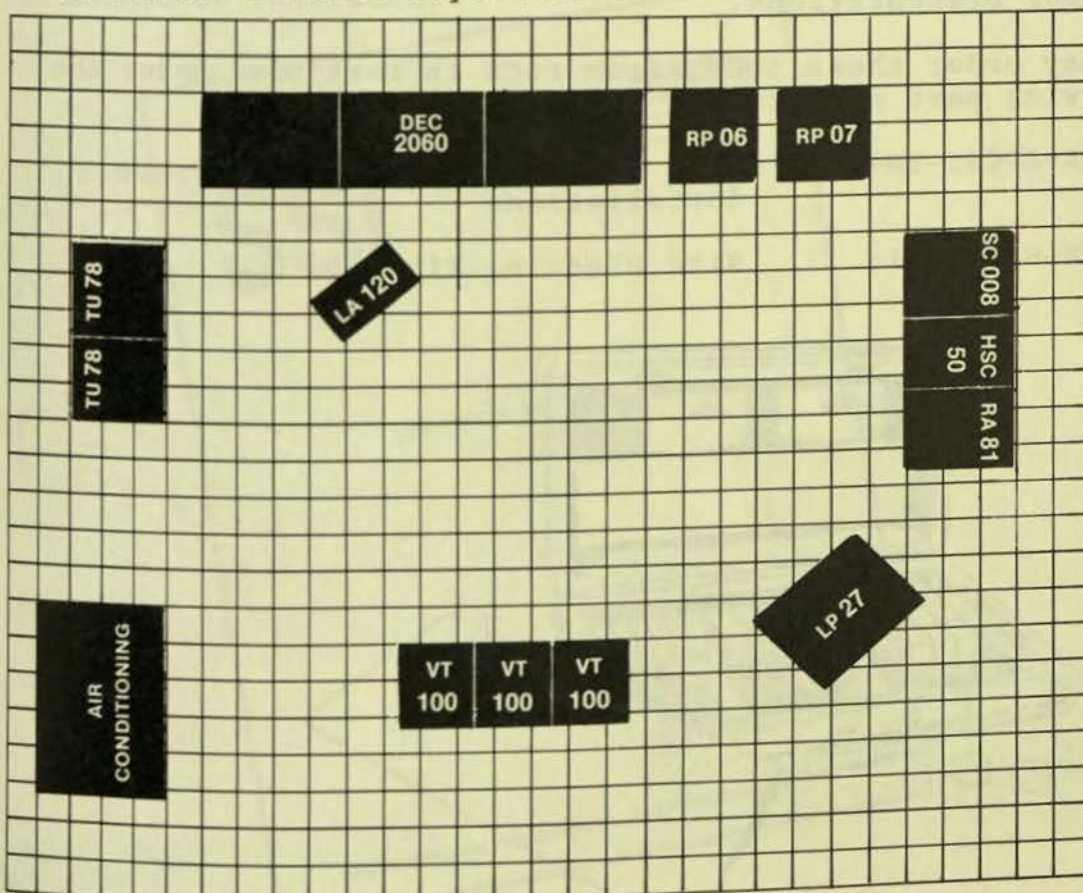
Jim Neill
 Field Srv. Opns.
 OGO1-1/F17

Field Service has recently introduced a generic Site Planning Kit containing visual and informational tools to assist in site preparation. Available to DIGITAL sales and field services offices worldwide, the Kit supports your efforts to produce layout alternatives for all existing products, including the DECsystem-10 and -20, as well as for future products, such as the FCC-compliant KL.

The Kit provides flexibility in site layout formats and comprehensive checklists for environmental considerations. It also offers a standardized delivery technique for site planning of all DIGITAL products.

Site Planning Kit Contents

- * Template Set, including templates for cabinets, mass storage devices, terminals, and common office furniture;
- * "Peel & stick" vinyl stick-down models which are reusable. These are useful for planner/customer participation in considering a variety of different floor plans;
- * Three dimensional models, which enable customers to visualize the site layout as it will look when completed.



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All of the above-mentioned layout tools are scaled at 3/8 inch = 1 foot (on a metric scale, this is roughly equivalent to 1 sq. centimeter), allowing a facility with dimensions of 9.6 m x 19.8 m (31 feet x 48 feet) to be illustrated. By simply adding grid sheets, the plan can take on any dimension.

Checklists and Documentation

Checklists and supporting documentation are included, to ensure that environmental considerations, service clearances, fire protection, media storage, and traffic flow are adequately planned.

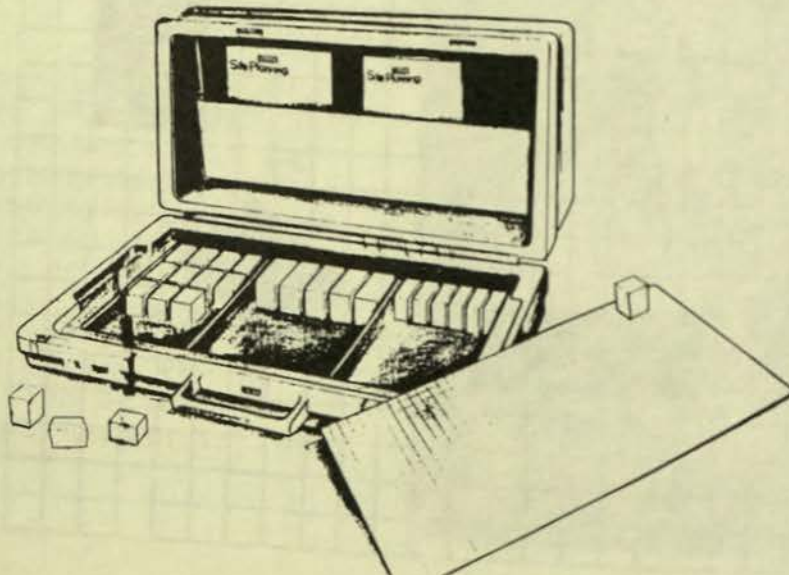
- * Checklists are written in a question and answer format, with space for note-taking. This allows the site planner and customer to tailor the information to the site and system requirements.
- * Supporting documentation is provided to help illustrate isolated ground techniques, plug and receptacle requirements, and other necessary information in a simple, consistent manner.

The Site Planning Kit is available only to Field Service personnel. However, the "Site Planning for Computer System Installations" brochure is available to all sales personnel to assist in customer presentations.

You may order these items from P&CS in Northboro under the following part numbers:

EK-SPCSI-IN-001: Site Planning for Computer System Installations

EK-SPKIT-01: Site Planning Kit



LATEST SYSTEM SOFTWARE INFORMATION MANUAL AVAILABLE

Gladys Pannel
MLO12-3/A62

The latest version of the System Software Information (SSI) Manual has been released; it is current through autumn 1982, and contains DIGITAL software product information gathered from SPDS (Software Product Descriptions); BOMS (Bills of Material); and from software developers and maintainers. The SSI Manual appears in a concise format which aids easy reference.

The SSI Manual provides the following:

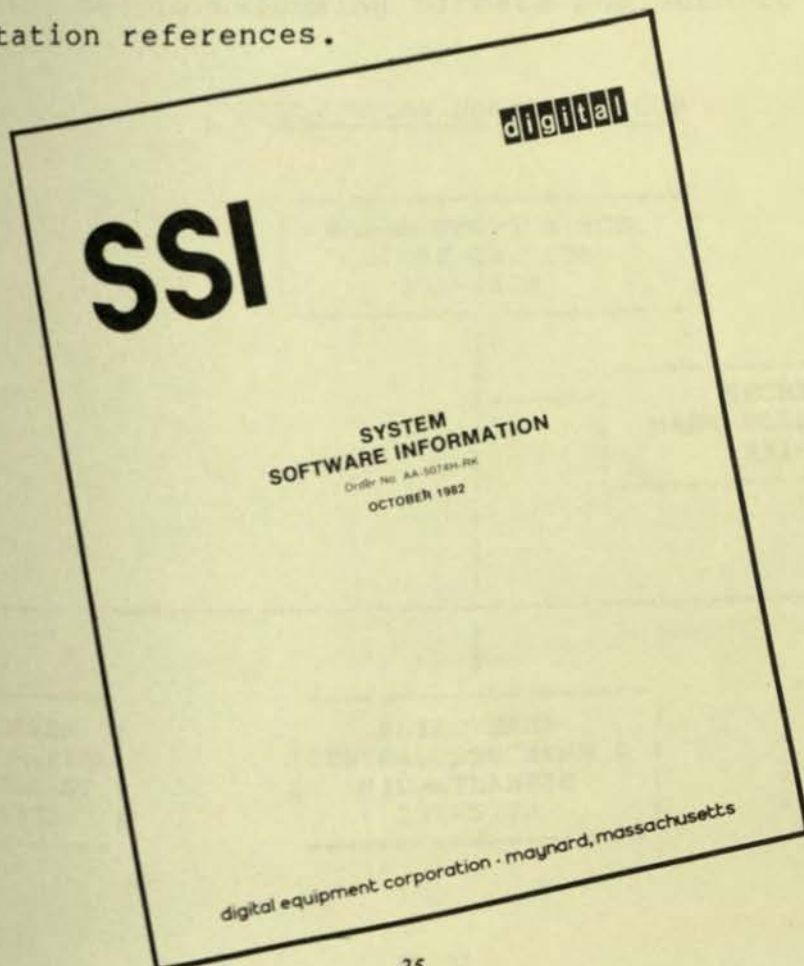
a catalog of the operating systems on DIGITAL's various CPUs (including TOPS-10 and -20);

software products related to these operating systems, and the software manuals related to these products;

software support of hardware, with easily referenced comparison among operating systems;

DECnet, Emulator and Packetnet options;

documentation references.



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Information concerning support for DECsystem-10s and -20s is contained in sections 4 and 5 of the SSI Manual, comprising about 40 pages. A separate manual entitled Language Fundamentals covers language features, formerly published in the above-mentioned SSI Manual.

Ordering Information

The SSI Manual's order number is AA-5074H-RK. The Language Fundamentals order number is AA-M460A-RK. You may subscribe to either or to both by contacting me at the above-mentioned address, or by phoning me at DTN: 223-5860.

Caution!

These manuals are for DIGITAL Internal Use Only and are NOT to be given to customers unless a Non-disclosure Agreement has been signed. To protect confidentiality, they will be mailed only to DIGITAL offices at the request of DIGITAL personnel.

NEW LCG SALES SERVICE ORGANIZATION

Sibby St. Cyr
 LCG Sales Serv. Mgr.
 MRO2-2/8D2

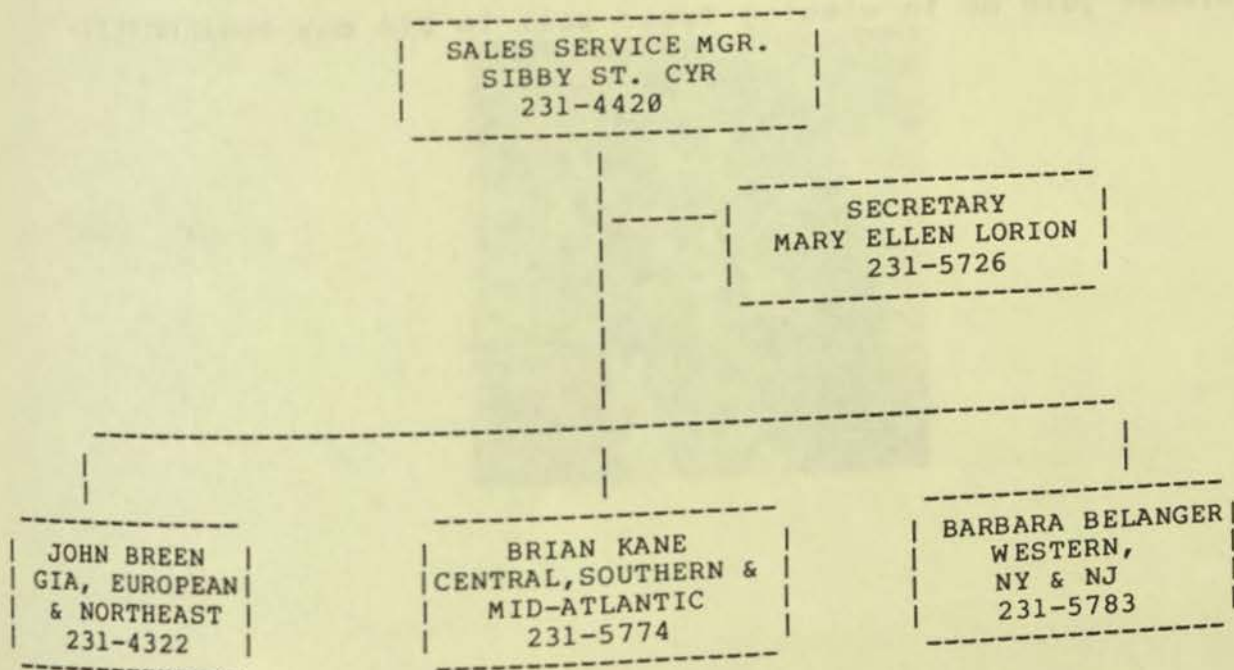
Below, you will find the new organization chart for LCG Sales Service, effective February 21, 1983.

Barbara Belanger replaces Mark Benoit, who now works in DIGITAL's Pittsburgh office as a Customer Assistance Specialist. Barbara has been with DIGITAL for over 5 years. Prior to LCG, she worked in ASM, Refurbished Equipment, and Production Control, in Manufacturing. Before that, she was a Sales Service Representative for TOEM.

John Breen replaces Nancy Citro, who has transferred to the Boston Sales Office as a Sales Unit Administrator. John joins us from TPL, where he has been a Sales Service Rep for two years.

Please join me in wishing Nancy and Mark good luck in their new assignments, and in welcoming Barbara and John to our LCG team!

LCG SALES SERVICE GROUP



PETER WYSOCAN NOW SPECIALIST IN INDUSTRY ANALYSIS

Ray Ochester
LCG Prod. Marketing
MRO2-2/8D2

We welcome Peter Wysocan as the newest member of our Product Marketing Group. Peter has been with DIGITAL for three years, and has most recently been a Senior Marketing Support Specialist with LCG's Technical Support Group.

Peter's new role will be to establish an interactive data base/model of the Large Systems market. The information in this data base will be used to help product introductions, and to establish or analyze historical trends.

Peter's prior responsibilities included competitive analysis for large systems. He will continue that activity, and will be the LCG interface with the rest of DIGITAL's Competitive Analysts. These activities will ensure that, where appropriate, a large systems perspective is included in the analysis. As a new responsibility, Peter will create a new competitive configuration data base which will be used to provide competitive information for the field organizations.

Peter's experience in LCG's Technical Support Group, as well as his knowledge of the large systems marketplace, make him well suited to handle his new responsibilities.

Please join me in wishing Peter well in his new assignment!

LCG F&A WELCOMES JUDIE HUNTER



Bill Gervais
LCG Fin. & Admin. Mgr.
MRO2-2/C2

Please join me in welcoming Judie Hunter to LCG's Finance and Administration Group, where she will support the marketing effort as Financial Consultant.

Judie has been with DIGITAL for three years in Treasury's Real Estate and Construction (RECO) Department. For the past two years, she functioned as the Real Estate Acquisition / Corporate Design Finance and Administration Manager.

We wish Judie well in her new assignment.

Judie Hunter



U.S. LCG COORDINATORS
(UPDATE 1/13/83)

DISTRICT	NAME	LOCATION	TELEPHONE NO.
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NJ Comm.	Pete Buttacavoli	Piscataway, NJ (KYO)	323-2465
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*Maryland	CLYDE COVERS BOTH WASHINGTON & MARYLAND DISTRICTS.		
Philadelphia	Lou Goglia	Blue Bell, PA (PHO)	337-2520
Ohio Valley	Jim Fate	Columbus (CSO)	614-868-1900

*Washington & Maryland now have one coordinator for both areas.



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Ray Ochester	231-4117	Product Marketing Mgr.
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Diana Miller	231-4537	Language/Layered Product Spec.
Ira Machefsky	231-6863	Future Systems Spec.
Peter Wysocan	231-7360	Competitive Analysis
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Larry Vifquain	231-4439	Market Development Mgr.
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Jack Lucier	231-4080	Technical Supp. Spec. -HW
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Carol Orton	231-6107	Computer Operator
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Barbara Holtz	231-4996	BUY-LINE Editor (Salesforce)
Don Waite	231-5256	LARGE SYSTEMS NEWS Editor (Customer)
Peggy Sullivan	231-6878	LCG Literature Co-ordinator

For Internal Use Only

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Kathleen Healy	231-6312	Govt. & Industry Rsch. Mktg. Spec.
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EDUCATIONAL SERVICES SEMINARS

Susan Scown
Ed Services Marketing
BUO/E58

The following seminars may be of interest to LCG sales and field force, or to customers. For registration information, please call DTN 249-4949 or (617) 276-4949.

Local Area Networks: A Practical Approach

This three-day seminar provides a practical, technical discussion of the key design issues involved in the selection and/or implementation of a Local Area Network (LAN). Attendees will be able to make informed decisions regarding topologies, media, access control techniques, and higher level protocols that will be useful in integrating LAN technology into distributed processing systems.

April 18-20 Washington D.C.

Office Automation: Implementation

Course topics include an explanation of fundamental concepts and a look at the most current office techniques. Planning and implementation are examined in depth from the initial survey and needs analysis, to vendor and system selection techniques.

The seminar is led by John Walsh, an internationally recognized author and authority.

April 25	Rosemont IL
April 26	Houston TX
May 2	Philadelphia PA
May 6	Dearborn MI

Data Base Technology: The Key to Software Productivity

This seminar provides an overview of the basic concepts of data models and the physical organization of data bases. An important part of the seminar compares/contrasts relational, CODASYL, and hierarchical data base models. DBMS selection and evaluation will also be discussed.

April 13-15	Denver CO
May 4-6	Dallax TX

SELLING DECsystem-10s/-20s "IMAGINATIVELY"

Barbara Holtz
LCG Mktg. Comm.
MR02-2/8D2

The following paragraphs were excerpted from a recent article under the "Computers" heading in the February 5 issue of "Science News" (p.90).

Prime time for idle computers

In the few hundredths of a second between a user's key-strokes, a computer shared by several users has a lot of time on its chips, enough time to zip to another program, perform a couple of calculations and scurry back without the user being any wiser. Paul A. Pritchard, a computer scientist at Cornell University, is exploiting a computer's idle time by running a "background" program that seeks long arithmetic progressions of prime numbers. These progressions are made up of numbers that are divisible only by 1 and themselves and that have the same difference between successive numbers. So far, Pritchard has discovered one sequence of 18 prime numbers in an arithmetic progression, breaking the record of 17.

Pritchard's sequence starts with the prime number 107,928,278,317. Adding 9,922,782,870 repeatedly produces 17 more prime numbers. The nineteenth number is not a prime, so the arithmetic progression ends with the eighteenth number: 276,615,587,107. A VAX-11/780 computer whiled away 250 hours of scrounged time to find this record-breaking sequence. With two computers, Pritchard has now completed 20 percent of his search, using almost 3,000 hours of computer time. "I was very surprised how much time was available on what seemed to be heavily used machines," Pritchard says.

Pritchard's spare-time project arose out of earlier work in developing a new method for listing all the prime numbers in order. His current program incorporates several ideas for making the search faster. "My method is probably an order of magnitude faster than the previous method that got the record of 17," says Pritchard. However, there's still "an awful lot of searching."

Which leads me to wonder: perhaps some of you readers know about a rather unusual application (or anecdote) concerning a DECsystem-10 or -20 "out there" around the world.

Such unusual stories can be marketed! Properly positioned, they may even assist in your next sale. At the very least, these "tall tales" maintain the fame and notoriety of our Corporation and of our LCG product offerings.

Please feel free to phone, write, or telex (EMS) me with your stories and ideas - even ideas which you consider are "long-shots". Who knows? They may ignite the spark that lights the flame that sets off your explosive next sale.

If we feel that the story is newsworthy on a national scale, we will make sure that editors of national/international publications take note.

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CUT

BARBARA HOLTZ
MR02-2/8D2

CUT



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