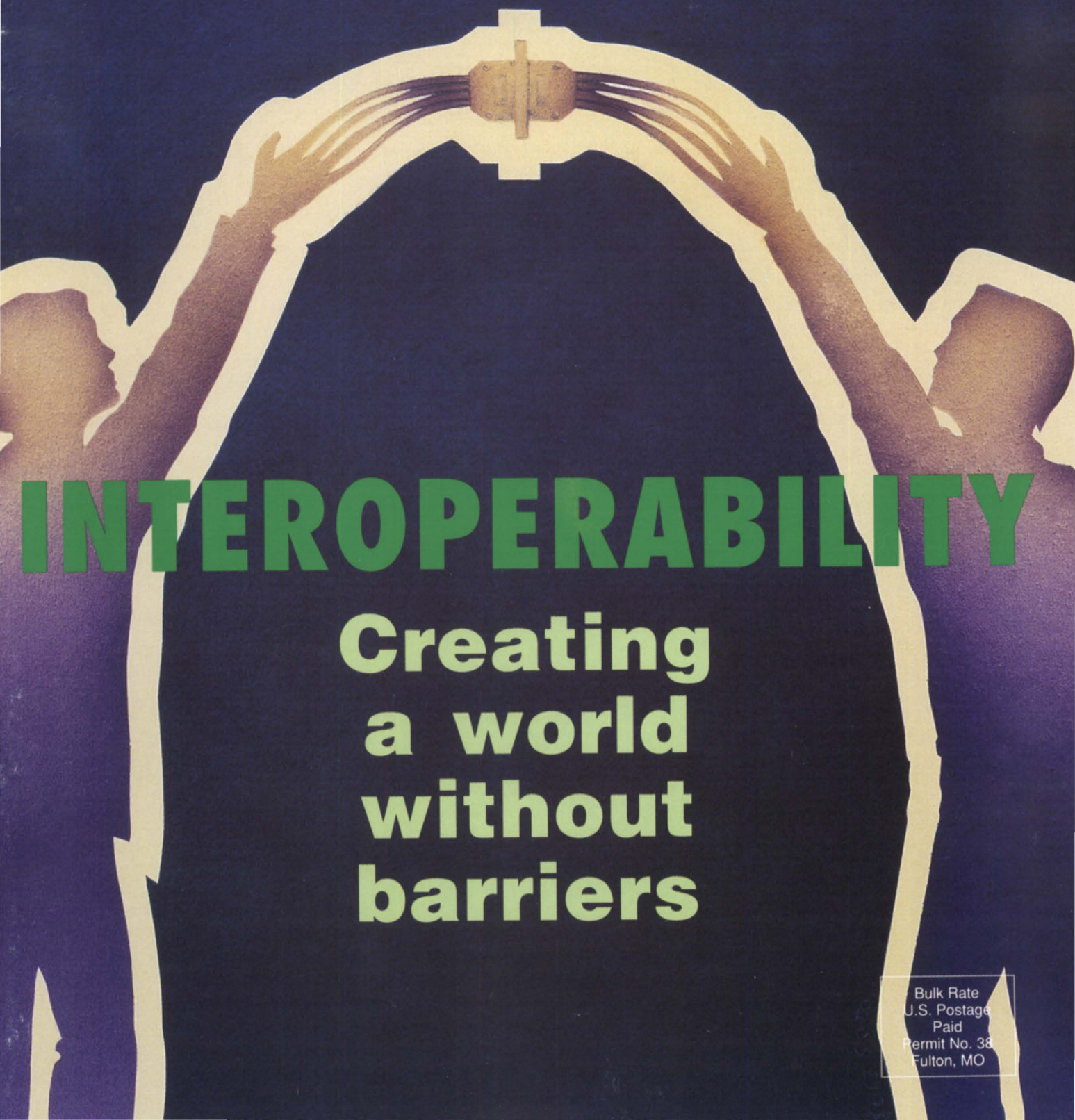
March 1990

FOCUS

The Magazine of the North American Data General Users Group



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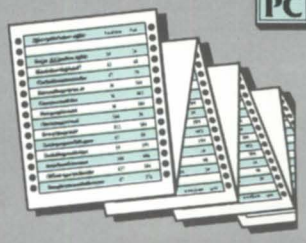

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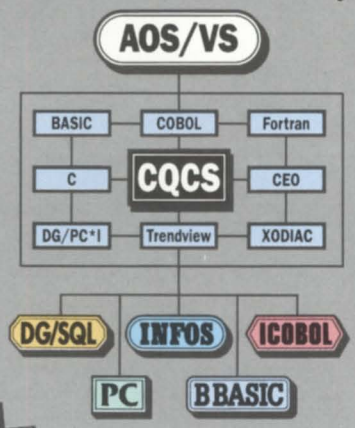

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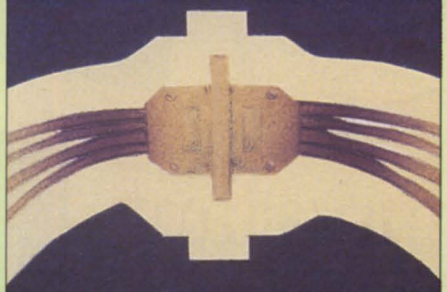

FOCUS ON: INTEROPERABILITY

Focus, the Magazine of the North American Data General Users Group (ISSN 0883-8194) is the official monthly publication of the North American Data General Users Group (NADGUG) in cooperation with Turnkey Publishing, Inc.

NADGUG offices are located at Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759, phone 512/345-5316.

Postmaster: Send address changes to Subscription Department, Turnkey Publishing, Inc., Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759.

Focus Magazine is distributed to members of the North American Data General Users Group. Membership fees are $40 per person. A one-year subscription to *Focus* (12 issues) costs $36. For all memberships and subscriptions outside North America, add $50 to defray costs of mailing. For information on NADGUG membership, call 1-800/877-4787.

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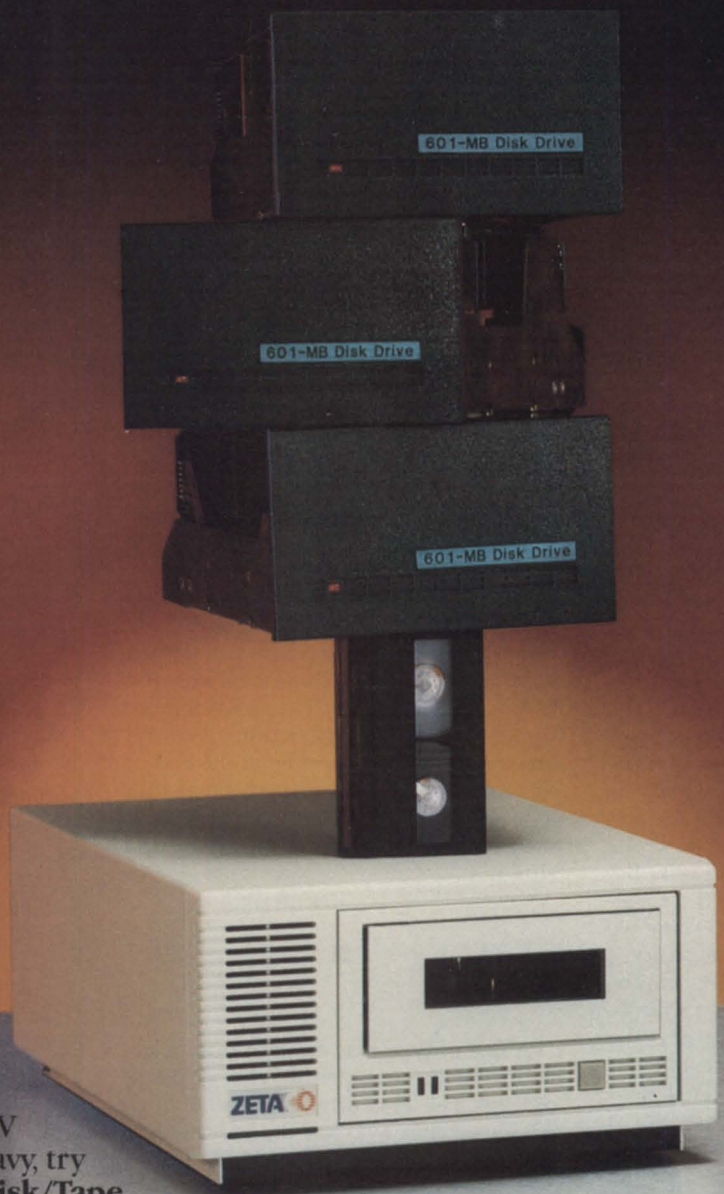
NORTH AMERICAN DATA GENERAL USERS GROUP

Back-Up Support For 2 GB



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*In lab tests on an MV/7800, SKM tape sustained streaming performance at 246 *KB/sec* data transfer rate, backing up a 100-MB sequential file from SKM high-performance disks in just 7.5 minutes.

ZETACO

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Corvairs, curling, and member directories

It was a quiet December afternoon, the 29th, that Friday before New Year's when everyone is somewhere else, and business offices are as still as a classroom the day after graduation, when we received an urgent-looking envelope from Apartado, Guatemala, marked "Entrega Immediate, Special Delivery."

It reminded me of a true story that I've always wanted to publish, and this seems like the opportune circumstance. In October 1984, my husband and I were traveling from Fairbanks, Alaska, to Texas in a 1964 Corvair van. Near the border of the Yukon Territory and British Columbia the van stopped and refused to move another inch toward the Lower 48. Have you ever been to the border of British Columbia and the Yukon Territory? It is magnificent, wild, and four hours from the nearest town.

My husband diagnosed the problem as a hardened valve seat in the cylinder head. Our choices were to catch a bus and abandon the van at the only establishment within towing distance—the Liard Lodge, or repair the van and drive home. I guess I should mention that my husband built the engine and had the tools and know-how to repair it, he just needed the right part.

Our answer was in a small book. Before leaving Texas, we attended a meeting of the Dallas Corvair Club. There we were given a copy of the organization's national member directory. Six months later, we were at the Liard Lodge, thumbing through the book and calling the nearest member, a man on Vancouver Island a thousand miles away. That kind man, who knew nothing of us, put a Corvair cylinder head in a paint bucket and placed it on a bus to Fort Nelson. My husband rode for four hours in the back of a cold camper to Fort Nelson, where a machine shop took almost all of his money to grind the head so it could be installed in the van engine. He was left with enough Canadian money to buy poster board and a marker, so he made a big sign and stood by the side of the road. The sign said:

"Wife and car stranded, 496 mile Alaska Highway. Help."

In less than five minutes, he was picked up by a truck driver and taken all the way to the Liard River, where I was waiting in the crippled van. Being held captive audience to a four-hour discourse on the sport of curling was the only price for the ride. The next day, we were on the road.

Once in the United States, we sent the man on Vancouver Island a check for the cylinder head. I have never met that man, yet he will always have a special place in my memory. That's one reason why I'm a firm believer in organizations like ours—groups of people sharing common interests, who, no matter where or how they live, can touch someone's life in an unexpected way.

Back to our friend from Guatemala. Inside the envelope was a reply card to the 1990 NADGUG Member Directory update. Fellow DG user Eduardo Barrientos Mejia went to considerable expense to make sure that his card arrived at NADGUG offices in time to be included in the 1990 directory. The new member directories are in production now and are scheduled for shipping at the end of this month. Mr. Mejia is listed, along with a few thousand other members who may be able to help you in an unusual situation.

■

A line of type was omitted from a letter by Bob Primmer in the February issue of *Focus*. The letter originally stated "Any advanced sites who had the pre-released 3.11 version should apply patch 3.11_CEO_CP_PATCH_40 to the CEO_CP.PR program and patch 3.11_CEO_FSA_PATCH_43 to the CEO_FSA.PR program." Our apologies to Mr. Primmer and to any reader who may have been confused by the omission.

Regarding the article about the 1990 NADGUG conference in Seattle, Data General has not agreed, at this time, to sponsor a reception Monday evening for NADGUG members, DG resellers, and salespeople. Δ

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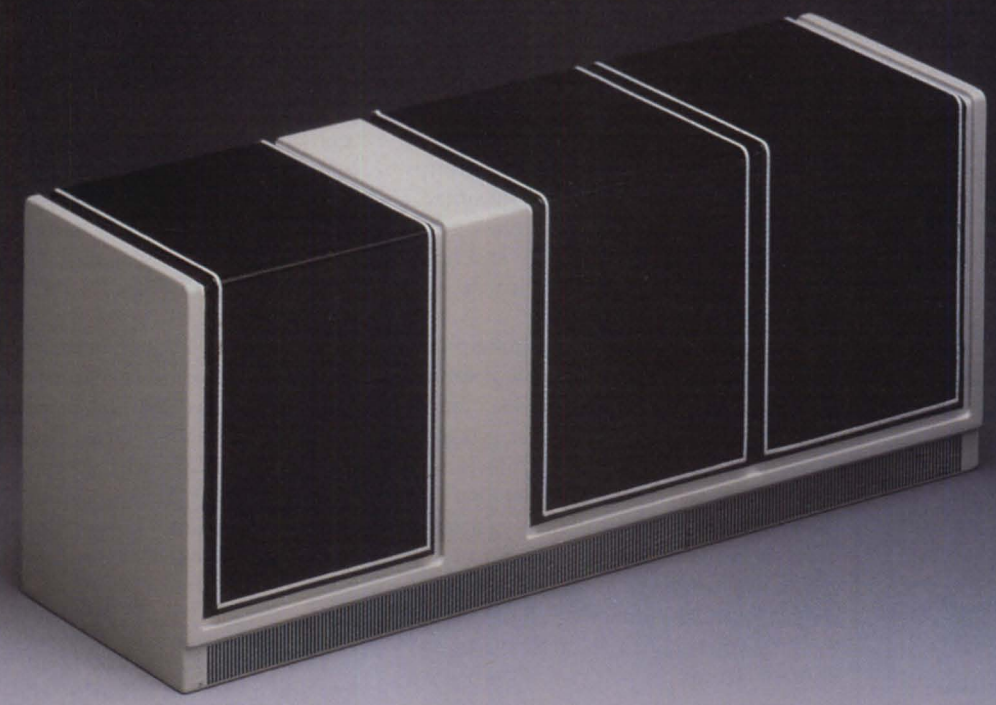
AOS/VS & ORACLE



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CA	Bakersfield	Mar 15*f*
	Costa Mesa	Mar 27*f* Apr 19*f*
	La Jolla	Apr 17*cf*
	Los Angeles	Mar 29*fpu* Apr 24*fl*
	Ontario	Apr 5*f*
	Sacramento	Mar 7*f*
	San Diego	Mar 20
	San Francisco	Mar 22*lp* Apr 27*cf*
	Santa Clara	Mar 28*c*
CO	Denver	Mar 12*f* Apr 3/* Apr 17*l*
CT	New Haven	Mar 6*f*
	Stamford	Mar 15*f*
DC	Washington	Mar 13*u** Apr 10*
FL	Jacksonville	Mar 21*f*
	Melborne	Mar 14*c*
	Miami	Apr 18*c*
	Orlando	Apr 12*f*
	West Palm Beach	Mar 28*f*
GA	Atlanta	Mar 8*c* Apr 5*l*
HI	Honolulu	Mar 15*fp*
IA	Boise	Apr 4*f*
	Des Moines	Mar 20*p* Apr 17*f*
IL	Chicago	Mar 7/# Mar 14*l*
		Apr 12/# Apr 19*u*
IN	Fort Wayne	Apr 25*f*
	Indianapolis	Mar 8*f* Apr 17*f*
KY	Louisville	Apr 25
LA	Baton Rouge	Apr 19*f*
	New Orleans	Mar 25*c*
MA	Boston	Apr 12*f*
	Burlington	Mar 8*f*
	Springfield	Apr 17*f*
MD	Baltimore	Mar 29/#
ME	Portland	Apr 10
MI	Dearborn	Apr 10*c*
MN	Minneapolis	Mar 6*fp* Apr 3*c*
MO	Kansas City	Mar 21*c* Apr 27*l*
	St. Louis	Mar 13*f* Apr 5* Apr 11*c*
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	Res Tri Park	Mar 15
NE	Omaha	Mar 13*f*
NH	Bedford	Mar 13*f*
NJ	Cherry Hill	Apr 11*l*
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NY	Binghamton	Mar 27
	Buffalo	Mar 15*c*
	Melville	Mar 21*f* Apr 18*f*
	New York	Mar 7*f* Mar 28*c*
		Apr 4*f* Apr 25*p*
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OK	Oklahoma City	Apr 17*cf*
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SC	Columbia	Mar 20*c*
	Greenville	Apr 4*c*
TN	Knoxville	Mar 27*
	Memphis	Apr 5*f*
TX	Austin	Mar 9*c* Apr 20*fp*
	Dallas	Mar 6*cfl* Apr 19*cf*
	Houston	Mar 8*cf* Apr 12*f*
	San Antonio	Mar 13*c*
UT	Salt Lake City	Mar 7*l* Apr 24*f*
VA	Newport	Mar 13/#
	Richmond	Mar 22/#
WA	Seattle	Mar 27*f* Apr 17*cf*
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Please note::

- * These seminars are held for the Federal Government only.
- # Only the specified afternoon seminar is held on that date.

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TRBA

RIG/SIG resources

Since I am new to this position, I thought I'd review just exactly what a RIG/SIG coordinator does.

My primary responsibility is to act as a liaison between interest groups and NADGUG to increase membership in and strengthen Data General users groups. Over the next few months, I will contact a representative from each interest group to find out what its needs are and how I might meet them. I will also provide start-up support for new groups.

There are several ways I can help your group plan its activities. My resources include a speaker's bureau, a list of meeting topics, a roster of interest groups, a newsletter exchange, and contacts with NADGUG leadership. You can also publicize the activities of your organization in this column. For more information, please call me at the number listed below. I look forward to meeting all of you and helping you organize the activities of your interest group.

■

VAR Night launched the nineties for the **Los Angeles End Users of Data General Equipment (LA EDGE)** during their first meeting of the year on February 6. After cocktails and dinner, **DG's Brian Conway** gave the group a rundown of what value added resellers offer, and how they fit into Data General's "Strategy for the Nineties."

Several LA area VARs also spoke—**Bert Pitters**, the president of Restaurant Industry Systems, related his experiences as a VAR in the restaurant business and his migration to Unix; **Farid Malek**, president of **CIP Systems, Inc.**, discussed software options in the legal field; **John Quinn**, vice president for technical support at **Professional Healthcare Systems**, spoke on software development for the healthcare industry; and **Brian Silvia**, senior marketing representative at **Compusource**, spoke about manufacturing solutions.

■

Southeastern New England Data General Users Group hosted **Tom Gutnick**, system engineering consultant with **Data General's Technical Services Group**, at their first meeting of the year on February 6. Gutnick shared his expertise in system security and performance enhancement matters with a presentation entitled "Coping with Current Trends in Computer Hacking." Data General also took the opportunity to demonstrate its 17 MIPS Aviion workstation at the meeting, along with some of its newer PC products.

To find out about Southeastern New England's next users group meeting, contact **Richard Wind**, of **South Shore Packing**, at 508/587-6900, extension 265; **Stephanie Hayes**, at the **Rhode Island Department of Transportation**, 401/277-2558; or **Suzanne Dunbar** of DG's sales office, 617/964-4881.

■

FEDSIG is alive and well, says its president **Vincent DiCarlo**, who recently moved to Maryland from Nevada. For news about the group's activities, call Vincent at 301/427-7436, or write him at P.O. Box 884, Washington Grove, Maryland 20880.

■

Attention RIG/SIG chairpersons! **NADGUG's executive board meeting** takes place in Seattle on March 8 and 9. All chairpersons or RIG/SIG NADGUG representatives are invited to attend. Written reports should be sent to me by Monday, March 5, at the address below if you are not planning to attend the meeting. Attendees may present their reports in Seattle.

Additionally, a **RIG/SIG workshop** is scheduled for Saturday, March 10 from 9 a.m. to 1 p.m. Call RIG/SIG Committee Chairperson **Charlene Kirian**, 704/251-9551, for more information. Δ

Greg D. Goss is the RIG/SIG Coordinator for NADGUG. He may be reached at ***Focus*** *magazine, 4807 Spicewood Springs Rd., Suite 3150, Austin, TX 78759; 1-512/345-5316 or 1-800/USR-GRUP.*

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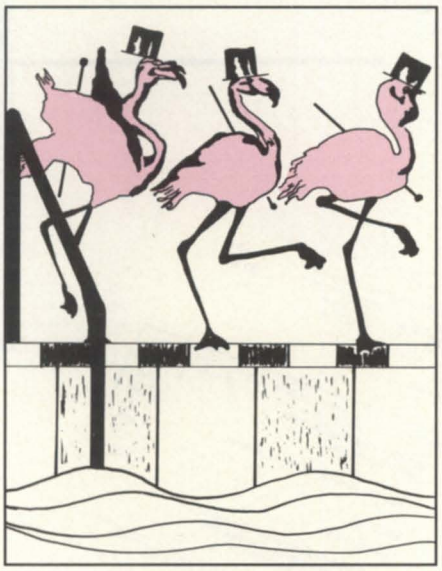
Poolside manners

The future of MVs and AOS/VS laid forth in Miami



by Greg Farman
Focus staff

Until two weeks before it began, there were still serious doubts whether this year's AOS/VS seminar would really happen. The AOS and AOS/VS Special Interest Group's leaders knew from the beginning that the planned two-day event was a risky experiment for their treasury. Similar meetings hosted by OASIS, the Office Automation SIG, usually turn out well, but if attendance fell short of projections this one could lose money.

With the preregistration deadline closing in and only a few registrations confirmed, it was doubtful whether there would be enough interest to make the seminar worthwhile. Ed Lindberg, the AOS and AOS/VS SIG's president, talked it over with Charlene Kirian, the seminar organizer, and they decided to proceed as planned; with luck they thought they might be able to break even.

At the close of the January 11-12 seminar, the attendees' evaluations confirmed that Ed and Charlene had made the right decision. Attendance at the Miami Beach event was disappointing, but the quality of the discussions was excellent. Most participants said they hoped to do it again next year.

A success story

The first item on the agenda was a presentation by Chuck Goes, who recently came through a successful conversion to AOS/VS II. Although the new version of the operating system has been available for some time, many in the audience were still not sure how it differs from the "classic" version. Chuck told about the differences that had led his shop to undertake the conversion. They knew they would pay a penalty in memory and CPU usage, but this was outweighed by the advantages of the new version, especially in the area of support for communications.

Their increasing user count was spreading their work across more machines, and they were adding PC*I while looking into other network products as well. Since AOS/VS II brings the network into the operating system kernel, they expected to get improved performance. They also anticipated adding an MRC in the future, which would require AOS/VS II. In addition, Chuck's clients demanded maximum availability; the fact that AOS/VS II doesn't require Fixup after an abnormal shutdown was an attractive benefit.

This brought a number of questions from the audience. One user said he speeds Fixup by running it from several terminals at once for different drives. Someone else asked whether AOS/VS II would still require ISAMVERIFY or IVERIFY for ICobol or Infos data bases (the answer is yes). The interaction at this point in Chuck's presentation set the tone for the rest of the seminar: The discussion could quickly change direction whenever anybody had a question or something to add.

Once Chuck's group had decided to move to AOS/VS II, they went into great detail planning for the conversion. He pointed out that the :UTIL:NEWFS_MIGRATION directory in AOS/VS 7.6x and higher is a good source of information. As an experiment, they converted their MV/4000 first, then tested all their applications and file transfer procedures with it before converting their MV/10000. His conclusion was that the move can be done smoothly and fairly simply, but he advised others to take the time to plan every step of the conversion, and to make it a team effort by the entire DP staff.

There are no rules

Bill Means, a senior member of DG's Atlanta support center staff, next took the floor to discuss performance issues. His first point was that users' performance concerns have changed rapidly as memory costs have gone down. It's now fairly common to see systems with 32 or 64 MB of memory, so memory contention is less of a concern now than it was a few years ago; CPU contention or I/O is more likely to be the culprit.

Bill said that diagnosing the cause is a good first step toward solving the problem. If the cause is an I/O bottleneck, then increasing the element size may help. If CPU contention is the problem, then it may be helpful to reset the priorities of jobs and users. He shared his rules of thumb for setting priorities:

1. Never put anything higher than PMGR and EXEC.

2. Servers like Infos should either be set higher than their users (to always make them handle requests promptly) or at the same level (which would avoid degrading performance of users while the server responds).

At this point an audience member said he sets the servers at a *lower* priority, because users at his site insist on getting an immediate response to keyboard input, but are less sensitive about getting a response from the server processes. Bill said this was a perfect illustration of his first rule of performance: There are no

hard and fast rules. Acceptable performance is highly subjective, and what you do to deliver it depends to a large extent on what users expect.

Debate and discussion

The only scheduled debate of the seminar was the panel presentation comparing the features and operation of CEO and Wordperfect Office. A show of hands identified only a few sites currently using Office, with the remainder using CEO. However, many of the current CEO sites are examining alternatives, primarily due to portability considerations. The debate quickly turned into a free-wheeling discussion about the differences between the products.

A general view emerged that the integration and simplicity of Office, along with its availability on many vendor's platforms, makes it attractive. However, Office lacks some of the polish and structure of CEO. DG's product may be more attractive to companies that require an enforced filing system, or that have large numbers of users on networked systems.

Debate and discussion continued through the rest of the seminar. Brian Scoggins of Data General explained what the Atlanta support center has been doing to improve its services to users. Gary Davis told, in considerable detail, how Data General expects its new Aviion products to add capability and flexibility for existing MV customers, by allowing the two platforms to share resources, share networks, exchange information, and provide for remote data base access. *(Editor's note: For more information, see Davis' article starting on page 10.)*

Wearing a lapel button that said, "MVs are forever," Gary promised that 1990 will be a very big year for new MV offerings. Pressed for details, he said he couldn't provide specifics, but that MV customers could expect new processors, especially in the mid-range, that will provide considerable price/performance improvements.

The seminar formally concluded on Friday at noon, but about half a dozen attendees retired to the poolside to continue the discussions for the remainder of the afternoon. As they drifted off to make airplane connections, the general farewell was, "Let's do this again next year." Δ

Eclipse-Aviion interoperability

SYNOPSIS

DG offers solutions (some new) like AOS/VS II TCP/IP, virtual terminal connections, media interchange, Telnet, and NFS that build bridges between MVs and Aviions.

by Richard Benyo
Special to Focus

and

Gary Davis
Special to Focus

At some point in time, every organization has been or will use or will become a "systems integrator," one of the hottest buzz words in computing today. Systems integrators weave together pieces of a technological puzzle to give an organization the best solution to do the job. The goal is to place computing at the convenience of the user, with applications and data distributed optimally throughout the network. This kind of interoperability is the heart and soul of Data General's Distributed Applications Architecture (DAA).

Simply defined, interoperability is the ability of all system elements to exchange information between equipment from the same vendor or a collection of vendors. This article explores Data General's products and strategies for interoperability between Eclipse MV family (AOS/VS) and Aviion (Unix) systems.

Bridging environments

The goals for AOS/VS and Unix interoperability are

- to enhance customers' investments in MV family hardware and applications
- to offer customers the best of both Eclipse systems and the industry-standard Aviion and Intel-based systems
- to maximize configuration flexibility.

Providing users the freedom to choose from both solutions while allowing them to expand the power and versatility of each, is a key goal of DG's strategy. This will allow users to adopt and integrate new technology at their own pace. It is not the company's strategy or intention to force existing Eclipse MV customers to port their applications to Unix systems. Data General has a major commitment to the enhancement of the Eclipse MV product line and layered software well into the future.

Adherence to industry and de-facto standards is an important component of our AOS/VS and Unix interoperability strategy. The strategy is to implement Unix standards on AOS/VS II, as opposed to porting AOS/VS products to DG/UX for Aviion. While Data General could have followed a strategy of porting AOS/VS products such as Xodiac, DG/SQL, or Infos to DG/UX for Aviion, it felt that this would not provide the maximum benefits to users in an open systems environment.

MV as server

Many MV users are evaluating Aviion workstations as the platform of choice in client/server environments. These users are committed to AOS/VS and want to add Unix systems to their existing MV family network. An important part of the strategy is to create a server environment on the MV system for Unix clients. This allows new Unix applications to access data, printers, tape drives, etc. residing on the Eclipse MV system and maximize the customer's configuration flexibility while preserving the advantages of and investment in their MV hardware and software.

AOS/VS II is key

While some level of interoperability is possible with AOS/VS, most new products and enhancements will require AOS/VS II. As most readers of *Focus* are aware, AOS/VS II has important enhancements over AOS/VS in its file system and kernel based communications services. This makes AOS/VS II the right platform for new interoperability related products like TCP/IP, ONC/NFS, and OSI, which by their very nature are communications-intensive.

Interoperability products

Data General has embarked on a long-range strategy for providing interoperability between its Eclipse and Aviion product lines. Some users simply need the ability to exchange files between systems, while others want to develop sophisticated client/server based systems where client applications do not know or care whether services are being provided by Eclipse or Aviion systems. DG expects that many users will begin using relatively simple file transfer-oriented methods and evolve toward higher levels of resource sharing and development of distributed applications. The plan is to provide functionality that fully encompasses this wide range of user requirements.

The following sections provide an overview of the interoperability functionality that is either available now or intended for availability this spring.

Media interchange. At the most basic level, it is important to be able to exchange magnetic tape between MV and Aviion

systems so that files can be easily transferred between systems without the requirement for a network connection. With AOS/VS II rev 2.00 and AOS/VS rev 7.67, Data General will provide a utility that will dump or load files in either of the Unix standard TAR or CPIO formats with support for both standard 9-track and QIC-150 tapes. Since these formats are Unix standards, they make it possible to interchange tapes with many other Unix systems—not just Aviion. Note that the CPIO format on QIC-150 tape cartridge is the 88open standard for media interchange.

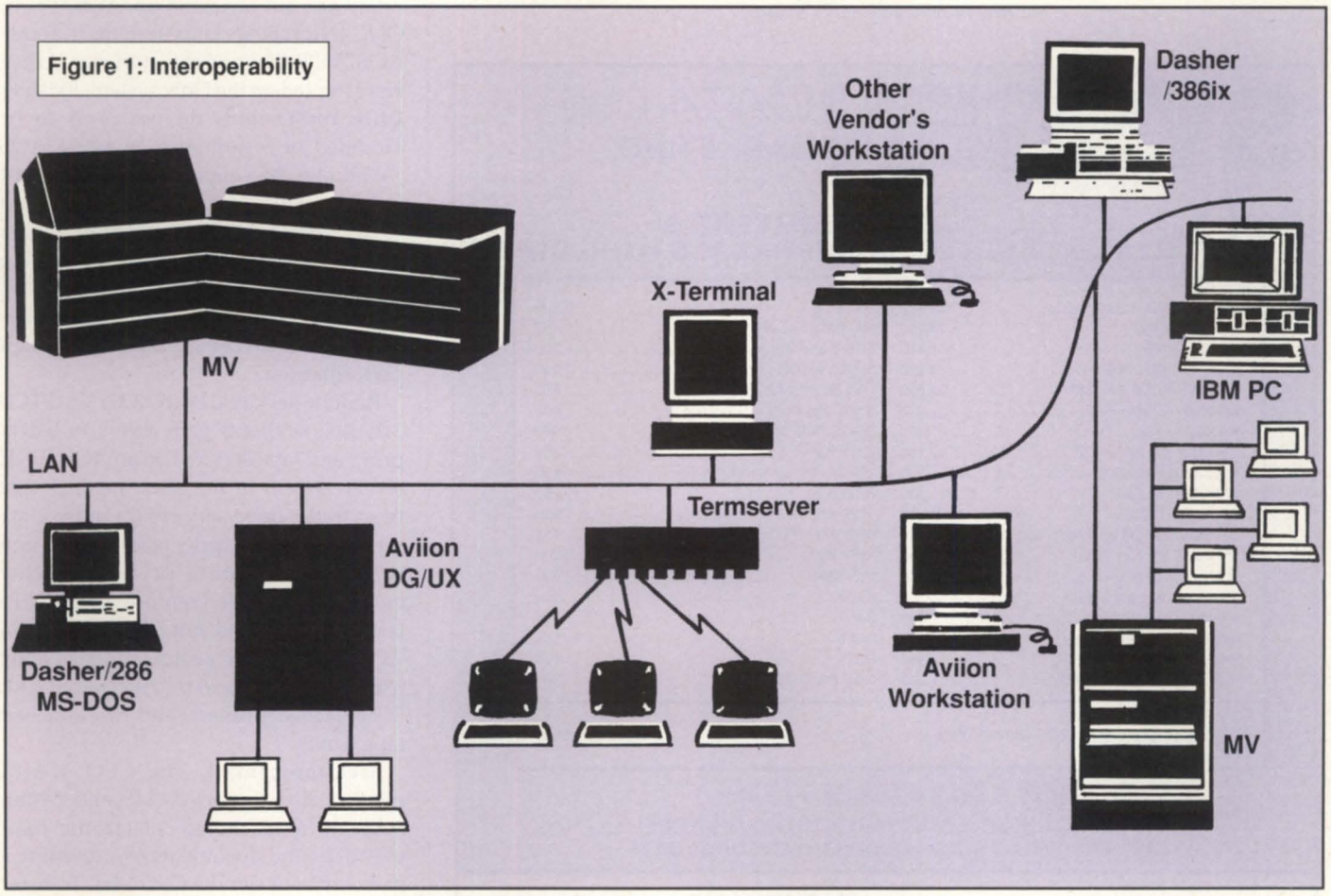
Network connectivity. When transporting tapes between systems using the "sneaker net" is not sufficient, a network connection is required. The most common network environment for Unix systems today is an ethernet LAN running TCP/IP protocols. The TCP/IP standard protocol set includes not only basic communication transport services, but also services for file transfer (FTP), virtual terminal (Telnet), and simple mail (SMTP). Data General supports TCP/IP on both AOS/VS and AOS/VS II.

AOS/VS II TCP/IP, a completely new implementation, provides up to three to five times improved performance (using FTP) over AOS/VS TCP/IP. This is accomplished by integrating the TCP/IP protocol into the AOS/VS II kernel. This new version of TCP/IP is also fully integrated with XTS II, enabling it to share a single LAN controller with XTS-based protocols. In addition, the industry standard "sockets" interface is now supported, allowing easier migration of networking applications from Unix to AOS/VS II. AOS/VS II TCP/IP provides the platform on which most of DG's current and future interoperability related products will be built.

Terminal connectivity. A major issue in the area of interoperability is terminal connectivity. While graphics-based PCs and workstations are clearly the wave of the future, most business applications still assume the user has a character-based, dumb terminal (for AOS/VS applications, a D2xx; for Unix applications, a VT100/220). Data General's goal is to support a wide range of options for terminal emulation and connectivity, so that no matter what type of workstation a user has, they will be able to easily access existing Eclipse and Aviion applications. (Complete coverage of the wide range of options for terminal connectivity is beyond the scope of this article, so we will focus on some of the new functionality in virtual terminal connections and terminal servers.)

Virtual terminal connections. AOS/VS II TCP/IP provides a new, kernel-based implementation of Telnet, which provides both high performance and full-screen functionality. This enables, for example, a user on an Aviion system running TCP/IP to remotely log on to an AOS/VS II server system and run a screen-based application such as CEO office automation. This can be accomplished regardless of whether the Aviion is using a Dasher terminal, a VT100/220 terminal, an Aviion workstation, or an X-terminal.

Terminal servers. When large communities of terminal users require high volume access to both MV and



Aviion applications, a terminal server solution offers significant advantages over either direct connections (IAC/LAC) or virtual terminal connections. In the near future, Data General will support the TCP/IP Telnet protocol on its terminal server and terminal controller (ITC/LTC) product lines. By running the Telnet protocol on the terminal servers and MV-resident terminal controllers, any terminal user may easily "switch sessions" between applications on the MV and Aviion systems without losing the context of the application. Thus, there is no need to log off one system and then back on to the other system. This solution to the terminal connectivity problem provides high availability (if either system fails, the user can still access the other) and does not put a processing load on the "gateway" system as a virtual terminal connection does.

File sharing. For the remote sharing of files between an MV server and Unix client systems, Data General has implemented Sun Microsystems' ONC /NFS (open network computing /network file system) on AOS/VS II. ONC/NFS allows Unix systems to access AOS/VS II files and directories as if they were located on the Unix system. Existing Unix applications do not need to be modified or re-compiled to access AOS /VS II files. By supporting the sharing of files among systems, new applications can be written to take advantage of Aviion systems while sharing data with existing AOS/VS II applications. Like AOS/VS II TCP/IP, ONC/NFS has been implemented in the AOS/VS II kernel for high performance.

Remote services. With AOS/VS II TCP /IP, Aviion clients gain access to batch, print, and tape services on an AOS/VS II server system in the same manner that they access these services on other Unix servers. This is made possible through the implementation of the Berkeley r-commands rsh (remote shell), rlp (remote print), and rmt (remote tape) on AOS/VS II. These commands give Unix users direct access to the AOS/VS II CLI, MV-attached printers, and MV-attached tape drives.

Electronic mail. The CEO MAILI product allows users on MV and Aviion systems to exchange electronic mail messages and documents by providing a gateway between the CEO Mail Transfer

Agent and the TCP/IP SMTP protocol. This facility gives Unix users access to the entire range of electronic mail connections available from CEO software on MV systems.

Remote data base access. Information exchange at the data base level is often an excellent way of providing interoperability between MV servers and Aviion or other Unix client systems. Dividing the application between a data base server and a client application is not a new technology; Data General has long offered the ability to remotely access MV-resident data bases using the Remote Infos Agent (RIA), Remote DG/SQL Agent (RQA), and more recently, the Infos Connection Server.

Since remote data base access products redirect data base calls to a common data base server, they allow multiple client applications to dynamically share a data base on a server system. This approach is most appropriate when many users are accessing small numbers of records within a shared data base, for example, as in transaction processing applications.

In contrast, if a user requires exclusive access to an entire file, such as in a word processing application, ONC/NFS, which provides file-system level redirection, would be the preferred approach.

In the future, Data General plans to provide the ability to access data bases (such as Infos) residing on an MV server from an Aviion system. These products will require AOS /VS II and AOS/VS II TCP/IP on the MV server and TCP/IP protocol support on the Aviion system.

Summary

Interoperability between the MV, Aviion, and Intel-based Unix systems is an essential element of Data General's Distributed Applications Architecture. The focus for product development will be on building both homogeneous and heterogeneous networks of interoperating MV and Unix systems (both Aviion and Intel-based). Δ

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A watershed decision for the Aviion

by Robin Perry
Focus staff

SYNOPSIS

Open systems make a winning strategy for government contracts.

Less than one year after the announcement of Data General's RISC-based Aviion line of computer systems, DG won a government contract to place 6,000 Aviions in Water Department offices throughout the country. The upstart Aviion beat out such established vendors as IBM, which made news last fall when it dropped out from the bidding to leave opportunity in the hands of three final competitors.

Shortly after the Unix machine's unveiling in March 1989, the DG sales force saw a potentially good fit and went after the Department of Interior contract, according to Stan Dolberg, DG's marketing manager for the Open Systems Product Line. Ease of software porting, reliance on standards, performance, and competitive pricing were all factors in Data General's successful bid.

"The standard architecture of the Aviion product line, from the hardware and software, including the Binary Standard that DG helped develop with the 88open Consortium, is really a key part to why we were successful in entering the bid, working our way through the live demos, and ultimately winning the award," Dolberg said.

The $127 million seven-year contract calls for Data General to provide approximately 5,700 Aviion workstations and 300 Aviion servers to all Department of Interior Water Resources Division regional and branch offices—a total of 200 sites. The installation will be built around a Distributed Information System II (DIS-II) network that will connect Aviion workstations and servers in local offices and to a central IBM data base located in Reston, Virginia.

Replacing a Prime-based minicomputer system, the Aviion installation will put more power in the fingertips of end-users by connecting them to other offices of the Water Division. "The individual agent or employee of the water resources division would have a high-performance Aviion workstation on the desk, be able to connect on a TCP/IP network locally to a server that has local data about water resources, and be able to network off of that local server using X.25 protocols to specific gateway Aviion servers elsewhere in the network that run SNA to the IBM," said Dolberg.

The Water Resources Division classifies and gauges the water resources of the United States. The typical branch office will have an Aviion server and about five workstations. All peripherals, service, and training will be provided by Data General. Products from Ingres Corporation, a manufacturer of data base management software, Frame Technology Corporation, an electronic publishing vendor, and Prior Data Sciences, a graphics library systems vendor, will be integrated into the network.

"The open architecture of Aviion aligns so well in terms of standards that software developers have adopted that we were able to assemble a very complex set of software very quickly and not only demonstrate that it worked functionally, but that it worked with good performance," said Dolberg. "It's one thing to get software working and it's another thing to get it working fast."

The freshman Unix computer system

passed a number of strict examinations, according to Ronne Rogin, Department of Interior contracting officer for the Water Resources Division. "It was a fully competitive procurement," she said. Technical evaluations were done on a pass/fail basis, with each bidder gaining points for passing portions of the test. A failed portion did not result in deduction of points. In addition to the live tests, the competitors were put through "a rigorous benchmark," Rogin said. Data General's tests were conducted at DG's advanced software development facility in Research Triangle Park, North Carolina.

With every silver cloud, however, there is a dark lining. The two other finalists in the competition, systems integrators SMS Data with a Hewlett Packard solution, and Lockheed with a Sun-based package, filed protests with the Department of the Interior over the awarding of the contract. Rogin, miffed over the protests, maintains that "Data General offered the Water Resources Division the most cost effective and technically compliant solutions to its needs."

She said the government will fight the protests in a hearing before the Government Service Board of Contract Appeals scheduled in February. A decision on the case should be handed down in March. *(Editor's note: Watch future issues of* ***Focus*** *for an update.)*

Regardless of the outcome of the protest, Data General officials believe the DIS-II bid bodes well for DG's push into the open systems market. "It reaffirms everything that we've been talking about," said Lisa Gillson, public relations manager for Marketing Communications. DG officials especially savored the fact that the Department of Interior is a new customer for Data General.

Dolberg says the DIS-II bid illustrates how the government's push toward open systems and Unix increases the competitiveness of government bids. "In order to let out a bid that could really be responded to, closed, and awarded for immediate installation, they constructed a bid that included all the leading demonstrated software that had to run on hardware that could be demonstrated in the live demo environment. By being so specific as to what exactly the software had to be, and by definition what the hardware had to be (because the hardware had to run the software), the DIS-II bid is a prototypical example of how the government can act quickly to meet needs and get very large systems at relatively low costs."

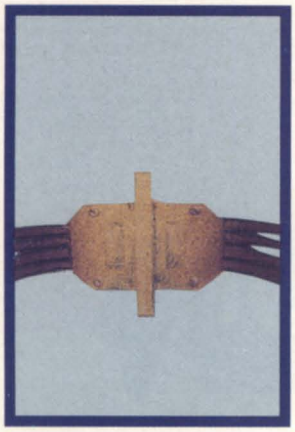
Data General is currently a bidding partner with Hughes Aircraft Company and Electronic Data Systems on a contract to modernize the offices of the U.S. Bureau of Land Management by installing over 1,000 Aviion workstations—a prize potentially worth $210 million.

"I suspect that since the government is driving the move to Unix, the regulations to spend less and yet to continue to automate are going to effect positively the buying of client/server configurations such as DG is supplying the Department of Interior," Dolberg said. This theory will be tested as Data General pursues government contracts. Δ

Combining alien worlds

SYNOPSIS

Interactive Systems' 386/ix lets PC users operate in a Unix environment.



by Don Dewar
Special to Focus

A Unix implementation by Interactive Systems combines the alien worlds of Unix and MS-DOS, and channels the force of a workstation into the PC.

In addition to the operating system, 386/ix supports a host of systems software, such as NFS (network filing system), TCP/IP, and a software development system. The product can also run MS-DOS applications, transfer files between MS-DOS and Unix, and capture the "look and feel" of MS-DOS. 386/ix is marketed by Data General for its line of 386-based microcomputers.

386/ix and Unix

386/ix has most of the usual standard Unix tools: Unix pipes, redirection, and both the Bourne and the C shells, two of the most popular Unix user interfaces. In addition, it has a system administration interface that reduces the complexity of managing the Unix system by at least tenfold.

The essence of the Unix operating system is very simple, containing only the basic commands needed to manipulate the operating system. The plethora of tools provided with the system give Unix its real power, and allow users to tailor the environment to their individual needs or tastes. Pipes and redirection make the tools more convenient and easier to use. (A friend of mine often says, "Unix gives you the tools to build the system you thought you bought.")

Some of the most popular and powerful Unix tools included in 386/ix are "awk," "grep," and "find." Awk is traditionally described as a pattern scanning and processing language, but I think of it as more of a report writing language. Grep is used to search files for patterns. Find locates files in the Unix filing system. In contrast to DOS, whose users purchase different programs that do essentially the same things, these tools are standard on any decent Unix system so that every Unix user is familiar with a similar set of tools.

Systems software

386/ix is packaged as a set of separate products. Beyond core Unix software, TCP/IP, NFS, and a software development system can be purchased separately, with a few other optional odds and ends.

TCP/IP provides some basic network facilities usually found in a Unix environment. It is a network protocol that allows Unix systems to communicate with each other and with other operating systems that use TCP/IP. The MS-DOS equivalent to TCP/IP is Netbios.

NFS, the network filing system, is a useful addition to TCP/IP. (This is the juicy stuff.) It allows almost seamless access to filing systems on other machines that also run NFS by "mounting" the filing system of the other machine, though this other filing system must have first been "exported". From here, the same commands can be used on the mounted filing system as on your own directories, including the restrictions.

This is by far the easiest way to transfer data between machines under Unix. Once NFS is running, the system can be set up

to automatically mount filing systems.

NFS in action

Here's an example of how a developer can use NFS: Let's say that he or she is running 386/ix and NFS while working on a software project that involves 12 other people. (This could consist of thousands of lines of code.) Let's also assume that the developer has a minicomputer with lots of disk space and is running DG/UX, Data General's Unix operating system.

The first problem the project runs into is that the developers, each working on their own PC, keep duplicating each others' efforts by making different changes to the same source files. Unix comes to the rescue with SCCS, a standard source code control system found on most Unix systems.

The next problem that the developer realizes is the lack of disk space on the 386 PC for all the sources. NFS lets the project store all its data on the minicomputer. SCCS has no problem handling this because it doesn't care (or know) that the filing systems are on different machines.

This means you can talk to other PCs and minicomputers—in fact, you can access data on any machine running a decently implemented Unix and NFS. (I must admit, however, that I have only done this with other 386/ix systems and DG/UX.)

386/ix also has a software development system that can be licensed. It isn't really systems software, but development tools are so important to Unix that I put it in this category. This toolkit has SCCS, a C compiler with all the trimmings, and many of the standard Unix libraries to link into your programs.

For the diehard MS-DOS user

Unix is unlike MS-DOS in that you can't just turn off your PC and turn it back on to bring it back up—that would be like turning off your Eclipse MV system and expecting it to come back up nicely. It takes a few minutes for Unix to boot, and a few more minutes to come down. You could boot MS-DOS on your PC and run your MS-DOS applications, but this is too slow to be practical.

VP/ix on 386/ix makes this process easier and more convenient. VP/ix allows MS-DOS applications to execute while the 386/ix is running on the PC. Unfortunately, there are a number of applications, such as "Fastback," that do not run under VP/ix. The release notice lists a number of the more notable ones.

Once you have 386/ix running and have added some users to the system, you can configure VP/ix for some of those users. When they execute the vpix command, an MS-DOS shell executes over Unix. Now, any MS-DOS command can be executed to either list the files on your Unix system, or list the files on your MS-DOS disks, or run applications.

Additionally, certain portions of the hard disk can be allocated to be either Unix or MS-DOS compatible when using 386/ix utilities and the hardware available on the 386 PCs. Thus, when you go into VP/ix, MS-DOS applications can be

executed from the MS-DOS portions of the disk drive. Unix commands can also be used, but they don't always give you the results you expect, since they are still executing in the original Unix environment. For example, if you change directories and enter a Unix "ls" command, you'll get a list of files from the directory you were in just before you entered VP/ix.

On the other hand, when you are in the Unix environment, you can still use MS-DOS commands, such as "dir," to execute in the Unix environment. While 386/ix has software that emulates MS-DOS from Unix, it does not have software that emulates Unix from MS-DOS. Hence, the disparity.

Using 386/ix and VP/ix, I can run MS-DOS applications on my machine from other machines. (Unix allows you to remotely log-in to another Unix machine using the "rlogin" command.) I logged onto my PC from a co-worker's PC in another office, and then brought up VP/ix on my machine from the other machine to run an MS-DOS application.

With features like VP/ix, 386/ix lets MS-DOS users slowly migrate to Unix. The ability to run MS-DOS applications is obviously useful, considering the large number of applications available, and the amount of data that relies on them.

Some tips

I wouldn't want to send starry-eyed readers into the world of 386/ix without a little help, so here are a few tips:

Familiarize yourself with both shells available on 386/ix. Most people who have a choice opt for the C-shell because it has command history and other useful features beyond the Bourne-shell. The Bourne-shell, on the other hand, is the more standard shell, and can be found on almost every Unix system. In revision 1.06 of 386/ix, we found that if a mounted file was added to the C-shell path, the shell was logged off. We ended up using the Bourne-shell for source control.

Don't make mistakes installing your system software. System managers of less fortunate Unix installations can tell you of their harrowing experiences managing their systems. The most common mistake we made was installing our software in the wrong order. The sysadm program simplifies installation of the system software provided by Interactive Systems Corporation, which brings me to the next tip.

Familiarize yourself with sysadm. This program can help you with almost any system administration that you need, and more. Among other things, it allows users to be added, back-ups to be scheduled, and devices to be managed.

A tip on how to get great, free software: There is a very un-secret society known as FSF (Free Software Foundation). It is working on project GNU (GNU is not Unix), a total software development environment that works in Unix. FSF produces high-quality software free of charge and sells reasonably priced documentation. I have its version of EMACS, a text editor with hundreds of features, running on my 386. EMACS is far superior to the Unix standard text editor "vi." Not only can you map keys, but you can define your own EMACS functions using Lisp. Some version of EMACS can be found running on most Unix machines, so your knowledge is portable. The one drawback to the GNU EMACS is that it takes up about 2.5 MB of disk.

Another great GNU software offering is gdb, the GNU debugger. Sdb is the standard debugger that comes with 386/ix; dbx is another standard Unix debugger that can be purchased separately. I haven't used dbx, but gdb is far superior to sdb and has served my needs adequately. Gdb has on-line help, and, best of all, it's free.

Interactive Systems provides another tool called Ten Plus for users to get around the Unix system. Ten Plus is an "easy to use" user interface for the Unix filing system that provides a means to move about the filing system and manage Unix files. It has a built-in editor to edit files. For users who can't tolerate the Unix shell interface, Ten Plus is worth investigating.

Why 386/ix over MS-DOS?

Some of you are probably shaking your heads, still wondering why 386/ix should be used over MS-DOS. For those who are satisfied with the limited world of MS-DOS, there is probably no need to change. You may have already had to face a similar decision when Xenix was introduced. (Did you know that 386/ix 2.0.1 is Xenix compatible?)

For people who want an operating system that puts the user fully in touch with the power of their 386, however,

386/ix is the way to go for three reasons:
- 386/ix has more advanced networking capabilities
- 386/ix has multiprocessing
- 386/ix has a virtual memory scheme.

I have already mentioned some of the advanced networking capabilities available with NFS. Data can be shared in the MS-DOS environment by shipping files back and forth over LANs, but NFS provides even more power and flexibility. Using NFS, you can execute a program from the mounted file system of another PC, a feature that's not readily available in MS-DOS. In addition, 386/ix has ftp, a file transfer protocol to ship data back and forth; uucp, Unix-to-Unix copy; and an rcp command that copies over the network almost as if the other machine's filing system was local.

386/ix also provides multi-processing, a feature poorly emulated by TSRs in MS-DOS. Using multi-processing, 386/ix allows seven virtual terminals to run concurrently. Virtual terminals are similar to other user sessions that can be easily accessed through function keys; they let you log onto other Unix hosts and switch between the two machines with the flick of a few function keys. Multiple Unix shells and shell scripts can run in the background. Furthermore, multiple users can use your PC concurrently by logging on from another Unix system, or by directly attaching another terminal to your machine.

Finally, developers should be happy to know that 386/ix, like many current Unix implementations, has virtual memory. Because the operating system brings into memory portions of the program that are executing, programs can be large. By comparison, MS-DOS programmers usually have to get around this problem by splitting their program up into a set of small programs that are executed when that functionality is needed. This is cumbersome for the programmer and often causes performance problems while waiting for the program to initialize.

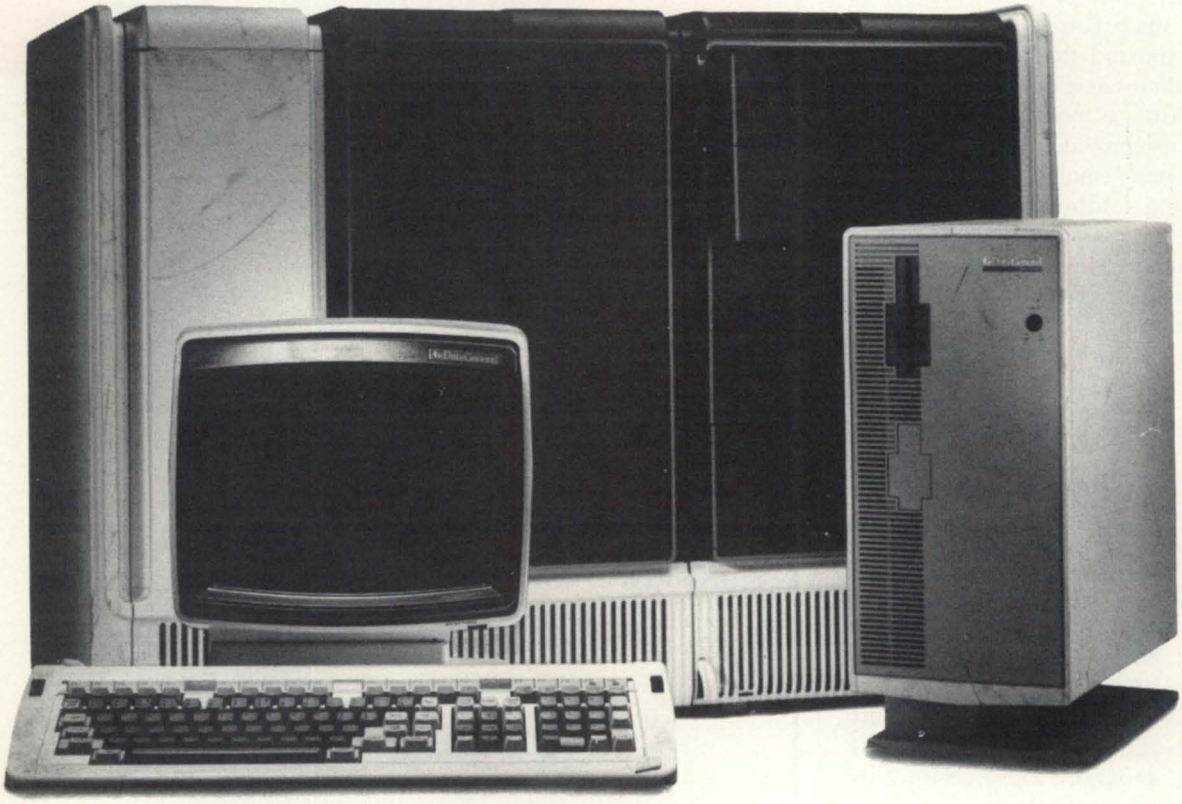
Almost a workstation

The lines between the different types of computers, from mainframe to PC, have blurred over the last few years. The difference between a workstation and a personal computer once centered on the workstation's greater power and superior features; now, the power of personal computers based on 80386 and even more powerful 80486 chips matches that of low-end workstations. 386/ix exploits the extra power, providing features that were once exclusive to workstations.

Workstations still have some "niceties," such as a larger tube, a windows interface to the operating system, and greater graphics capabilities, but 386/ix creates an alternative for people who need the power of Unix without the extra features that come with a workstation. Current owners of 386s who feel cramped by MS-DOS can now stretch out into the Unix world relatively inexpensively. Δ

Don Dewar is a software engineer at Data General Corporation.

USED vs.



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SPACE
the final frontier

SYNOPSIS

:WFFCA allows users to view, test, extract, and add to compressed groups of files. Is there anything it can't do?

by Kevin Danzig
Special to Focus

As I look back over almost two decades of minicomputer-inspired headaches, space management is an area that surfaces again and again.

While there is probably a multi-user computer that has more memory than it will ever use and even more disk space, neither you nor I have access to it. Generally, we all work on systems that suffer from some memory contention and relatively full disk units. Memory, including buffer space, cache space, etc., is a problem addressed today by good system tuning and performance evaluation products. This is what I call space management.

Disk space management is a multifaceted arena, addressed by many products. I am not here to discuss the optimization of disk space. That can cause a great deal of excitement and this article already has slated for it one area of great disagreement (stay tuned, sports fans).

Personally, I would love to see a true disk randomizer that ensures consistent and uniform access times. First, one must do the obvious and rid the system of all needless files, (yes, it is nice to keep all 30 MB of VS release notices since rev 5 on line, but magnetic tape could do as well). Should the obvious not provide the desired goal—i.e., storing as much as possible in any given disk space—further steps must be taken.

The idea of packing data has always been around in various fashions. The first machines I worked on provided pseudo-operatives in the assembler to pack text strings in three different schemes to be unpacked at execution. (It wasn't a Data General machine, but Mr. De Castro did work there.) That form of packing was needed in its time, but today different tools are needed.

Again, the best way to free up disk space is to not clutter it with dead files in the first place. If you need more, there is a utility package to which you should be introduced.

:WFFCA

:WFFCA (World's Fastest File Compressor & Archiver), from :SYSMGR, Inc., is a collection of packing, compression, and management routines. The two distinct sides to :WFFCA are compression and management. Let's look first at the compression side.

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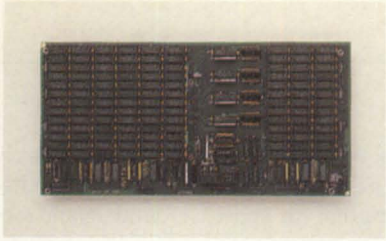

New memory boards use the full potential of the MV/7800X. Dataram DR-7800X boards in 4, 8, or 10MB capacities let the CPUs support more users and applications, improve terminal response time. DR-7800X memory upgrades can be user installed in minutes, require no hardware or software changes, and have no affect on your DG warranty or service agreement. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

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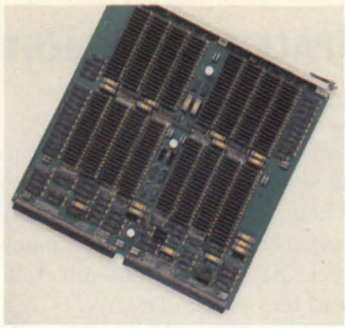
Memory Boards for MV/15000, MV/18000, MV/20000 Computers



Dataram DR-1520 memory comes in 8, 16 or 32MB board capacities. The add-in memory uses 1Mb RAM technology to upgrade processor performance, and does not affect DG service arrangements. Boards are user installable, have Enable/Disable switch and LED indicators. **Dataram Corp. Phone 1-800-822-0071 (NJ 609-799-0071).**

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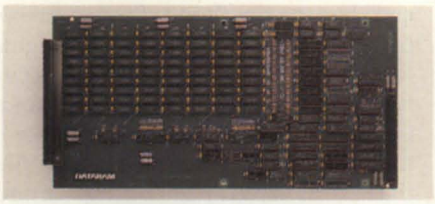

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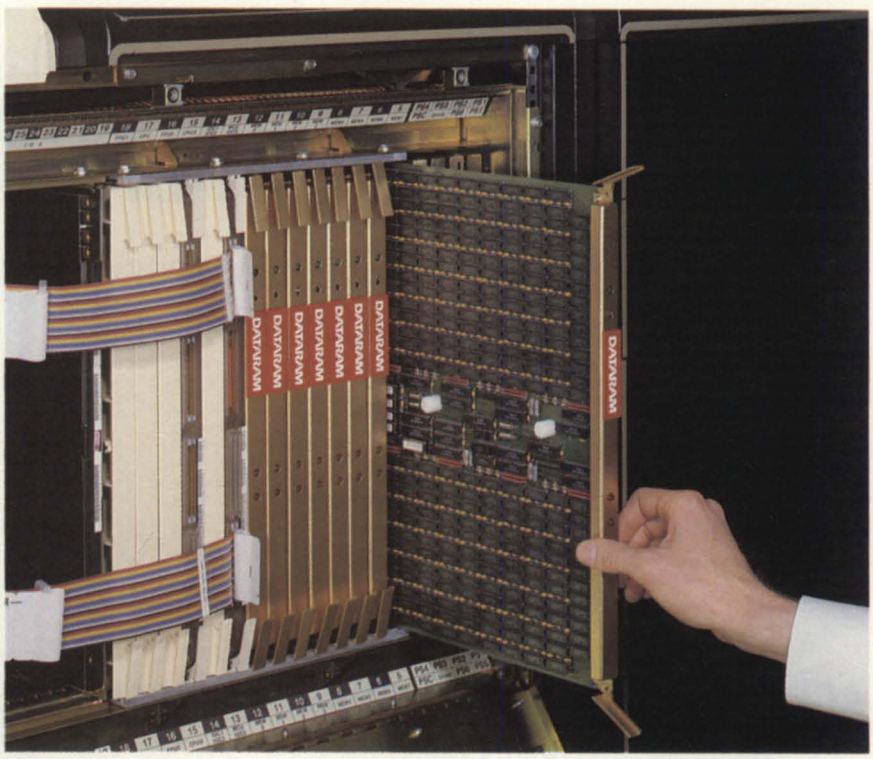

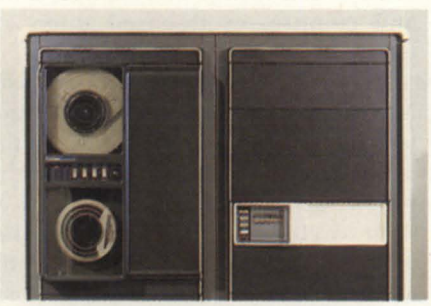

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store many Cobol-generated reports. Sometimes we keep them only for a matter of hours, but generally we need them for weeks or months. Unfortunately, after weeks have elapsed, months follow and dead files accumulate. :WFFCA's "white space compressor" aids quite well in these situations. It is the only compression package that leaves its resultant file readable and printable.

On Cobol printer files, the savings can be large. Some files we generate require only 20 percent of the original file space. :WFFCA removes unnecessary characters, and at the same time leaves data unaltered. A module that can "decompress" the output is also included. This is not a true decompression program and will not restore the original to its exact form. What it will do is create a file with all tabs changed to spaces so the file may be handled by a device that doesn't understand tabs. If you must keep records and/or reports online or in a tape library, and do not feel comfortable compressing them into a non-readable form, :WFFCA can yield excellent savings.

On your mark

The next module in :WFFCA is a run length encoder/decoder. Run length encoding is a simple but effective method of data compression. It scans the original file for duplicate consecutive occurrences, and replaces them with a marker indicating the character and number of times it appears. There are some files that run length encoding cannot compress—the SED.DICTIONARY file, for instance, which leads us to what has become the prevalent standard in data compression.

LZW

No, these aren't the initials of a new vehicle for yuppies on a budget. Lempel Ziv Welch (LZW) has become the mainstay in data compression in the AOS/VS market and still ranks high in the PC world. LZW is a complex file compression scheme that analyzes a file and compresses it based upon an established dictionary or data table.

Readers who have received the NADGUG library or the AOS/VS Kermit tape have access to COMPRESS.PR, the public domain version of LZW. For many people, COMPRESS is a strong part of their archiving and data transfer processes. LZW routines exist presently for many other machines as well, so that transfer times for export and import often enjoy these savings. The question now becomes, "If I can get COMPRESS for free, why should I buy :WFFCA?" There are two simple answers.

The first is speed and system impact. My tests consistently show a 250 to 350 percent increase in speed for decompression, and a 200 to 300 percent increase in speed during compression. These tests were done over several nights in batch jobs on the same idle systems. I have not included my resultant data because I wish to avoid system-to-system comparisons that have no real function in a multi-user environment. What is important is the increase in speed. If you really want my benchmarks, you may

request them from me at the address given below.

In terms of impact, our users first appeared to feel a greater system demand during my on-line use of :WFFCA. Upon evaluation, it was revealed that the greater use of the product was because of its speed. There was a decrease in impact on a file-by-file basis.

The second answer to the question deals with the more important side of :WFFCA, what I call management.

Packages

The above routines and modules are fringe benefits, in my view, of :WFFCA. Presently, any user of COMPRESS.PR has two alternatives when dealing with more than one file. They can individually compress all files and dump them into a dump file or tape. This gives flexibility when retrieving a specific file, but does not achieve optimum data compression. The second, more common path is to first dump files to a disk file, a .DMP type, and then run the compressor yielding a .DMP or .DMZ file type. In this case, compression is excellent. We have had many .DMZ files on and off of our system and they have been a tremendous help.

There are strings attached, however, and they are substantial. First, there is no way to view the contents of a compressed dump file. Second, there is no quick or easy way to selectively retrieve files. The whole .DMZ must be decompressed in order to be treated like an ordinary dump file. The dump file may then be scanned for individual files. Adding to a .DMZ presents the same problems. In order to add files, the whole thing must be decompressed, loaded, added to, dumped, and compressed.

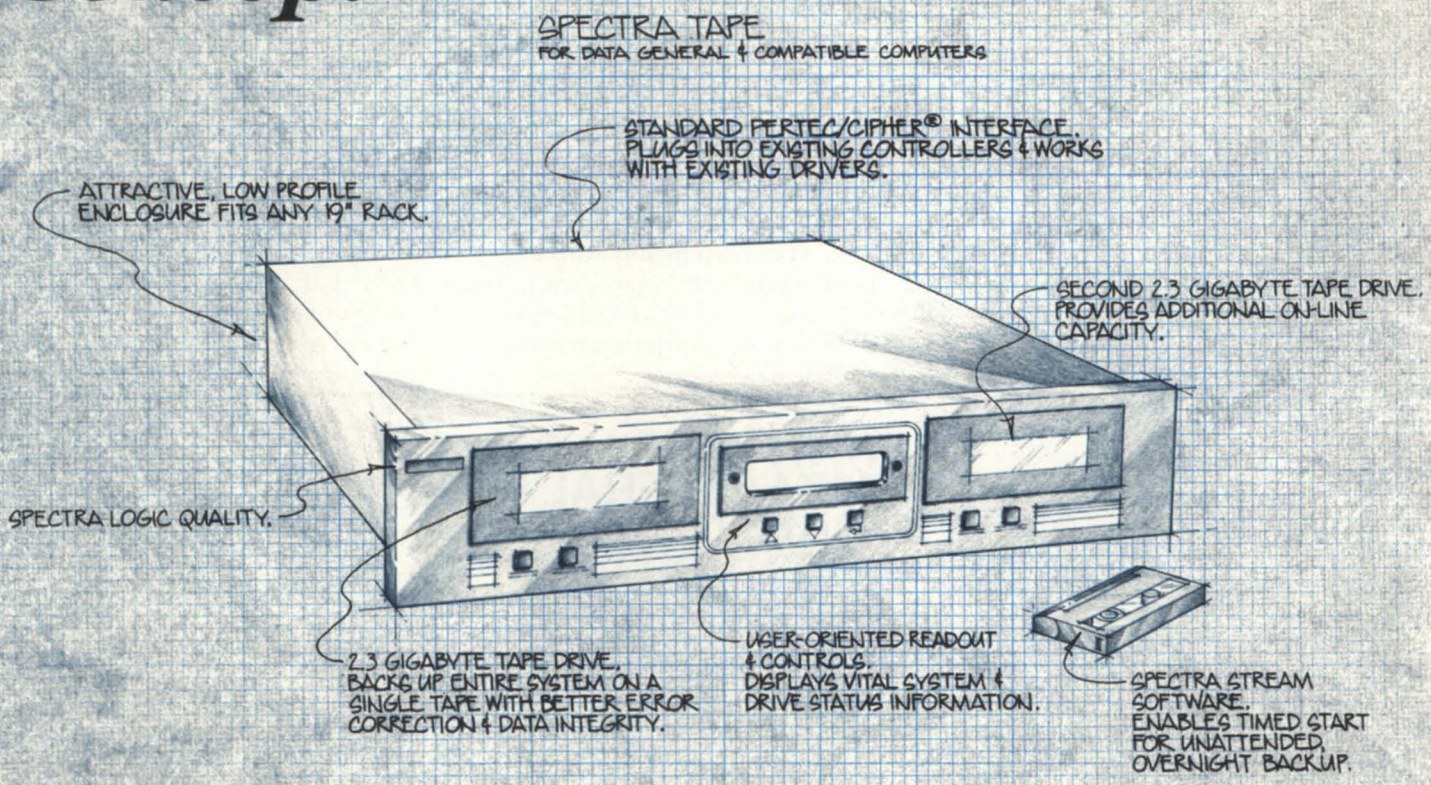
Out of the mouths of . . .

I suppose my prejudice against PCs may show itself too often. In this case, however, the PC environment pioneered the way to compress and group files. There are at present a dozen good file compression and management packages available on the PC market. They generally use LZW or another equally efficient compression method and have the ability to selectively extract from or add to the grouping.

:WFFCA follows this path allowing the user to view, test, extract, and add to groups of compressed files. In managing packages, WFPKG retains all AOS/VS information. Packages are the default for this module. Surprisingly, there is no expense in doing this over the old route. In every example, the resultant .PKG files were slightly smaller than the equivalent .DMZ file. When it comes to extraction, the speed is excellent. In most cases, it was difficult to discern which took longer: extraction (with built-in decompression), or a straight load from a dump file on disk.

If you have used any PC-based program, you will be quite at home with :WFFCA. The extremely simple modules run easily. A short help file from CLI is available to remind you of command syntax, but the operation is so straightforward, you will learn the command set in minutes. Another

Concept



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excellent feature of :WFFCA is its support of templates. It is not necessary to supply complete names or use ([!filenames, +whatever+]) structures.

On the above merits alone, I suggest that :WFFCA is a very good buy. There is an additional side to :WFFCA that adds substantially to its value. While some compression routines run on AOS/VS systems and foreign systems, such as PCs, only one compression/grouping package available can run on both. As PC integration becomes a larger part of the AOS/VS world, it is a definite advantage to have the ability to transfer files—both compressed and bundled.

ARC from System Enhancement Associates was the first, and is now the most widely used format for compressed and bundled PC files (ARC). :WFFCA presently handles ARC files created by ARC rev. 5.20 and 5.32. :WFFCA was tested using ARC files downloaded from several PC sources, and in all cases it was able to handle ARC files generated by rev. 5.20 and 5.32. Originally, there was trouble unARCing some files, but these proved to be from older revisions of ARC.

When the ARC format is used instead of the PKG format, filenames are converted according to PC filename requirements. Execution time for creating .ARC files was quick. Lastly, .ARC files created by :WFFCA are compatible with ARC.

Into the arena

While I was writing this article, some concern arose in the DG user community about ARC. System Enhancement Associates (SEA) has entered into an agreement with another software supplier to provide ARC to the AOS/VS and VAX/VMS world. Prior to completion of this review, I spoke to the people at SEA. They reinforced the following policy statement regarding ARC file format:

"We hereby grant to the entire world and all sentient creatures in the universe who do not already have an agreement with us to the contrary a perpetual, unlimited, galaxy wide license to read, extract, create, or otherwise manipulate ARC format archives." Δ

Kevin Danzig is the general manager of DFM Corp. He may be reached at P.O. Box 157, Northvale, New Jersey 07647; 201/767-8000.

Let your server do the walking

SYNOPSIS

Yellow Pages public domain software controls groups of Unix workstations from a single master server.

by David Novy
Special to Focus

The downward spiral of Unix workstation costs allows most companies to purchase several Unix workstations for the same price that they purchased a supermini five years ago. However, every Unix system manager soon learns that, contrary to the glossy sales brochures, workstations do not manage themselves. Unless a system manager plans carefully, he or she soon finds that managing a single Unix workstation can be more challenging than managing an MV machine; an improperly designed network of Unix workstations has been called a system manager's hell.

Fortunately, there are several tools available that allow a Unix system manager to work and still have a reasonable social life. One of them is Yellow Pages, a public domain software package developed by Sun Microsystems that allows Unix system managers to control a group of Unix workstations from a single master server. The workstations controlled by this master server are referred to as a domain.

Defining Yellow Pages is simple, but the software itself remains an enigma to most Unix system managers. At this time, most Unix networks are not managed by Yellow Pages, partly because most beginning and intermediate texts concerning Unix systems management give it little coverage. Furthermore, an improperly managed Yellow Pages domain creates more work than if one did not use Yellow Pages at all.

Used with NFS, Yellow Pages can help control file access. Consistency of the /etc/passwd and the /etc/group files is critical, however, because user and group access to a given NFS file is controlled by user id and group id. User name and group name access to NFS files on a system not controlled by Yellow Pages is determined by cross referencing the /etc /passwd and /etc/group files. Inconsistent /etc/passwd and /etc/group files on NFS servers and clients will void file access security.

The main features of Yellow Pages are

- Single point control of network user password files, group password files, and network host tables
- Data consistency across a Yellow Pages domain
- Creation of slave servers. (This helps avoid problems when the master server has to be shut down, or if critical network links go down.)
- Local modification of the master Yellow Pages files (maps)
- Works with both Unix and non-Unix operating systems.

The limitations of Yellow Pages are:

- File maintenance is not a trivial task
- Slower logons, since clients need to refer to servers to validate logon requests
- Changes to the Yellow Pages master maps must be made on the master server
- If the master server is down, the master maps cannot be changed
- Clients that depend on servers can become very hostile when they cannot find a Yellow Pages server.

In one instance an ethernet router went down, causing the crash of another machine over 1,000 miles away. Apparently, someone had tried to boot a Yellow Pages client and because the router link between this client and its servers was down, it could not find a Yellow Pages server to establish its network name and internet address. Instead of patiently waiting for the network link to be reestablished, the client (not a DG machine) decided to unilaterally determine its internet address. Unfortunately, it chose an internet address already in use by a machine 1,000 miles away on the same TCP/IP network.

A TCP/IP network with two computers at the same TCP/IP internet address is very unstable. The above situation could have been avoided if Yellow Pages slave servers had been installed on both sides of the network router.

When properly managed, however, Yellow Pages can significantly reduce the time required to manage key user and network accounts for systems that use NFS or have a large number of workstations.

The key to effectively using Yellow Pages is not in its installation, but in its maintenance. I would recommend a training class to anyone seriously considering the use of Yellow Pages. This will allow you to practice installing Yellow Pages on a test network, and also let you meet people who use Yellow Pages. These people can become invaluable sources of information in the future regarding the use of Yellow Pages.

To learn more about Yellow Pages, refer to "Managing NFS and Its Facilities on the DG/UX System," (093701049-00). To obtain an understanding of how to install Yellow Pages, refer to "ONC/NFS System Release Notice 4.10," August 1989—DG Part Number 085-600133-00.

In the proper environment, Yellow Pages can be a priceless system management tool. Installation is extremely simple. Its use will expand as the use of Unix workstations and NFS grows.

Δ

David Novy is a technical computing specialist at 3M Corp. He is chairman of the SIG.UX and editor of the ***AOS/VS and SIG.UX Notes*** *newsletter. He can be reached at 3M Center, Building 235-1D-19, St. Paul, MN 55144; 612/733-3320.*

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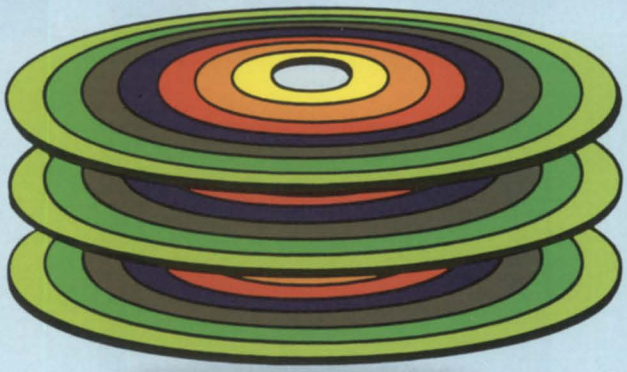

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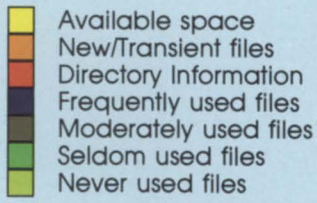

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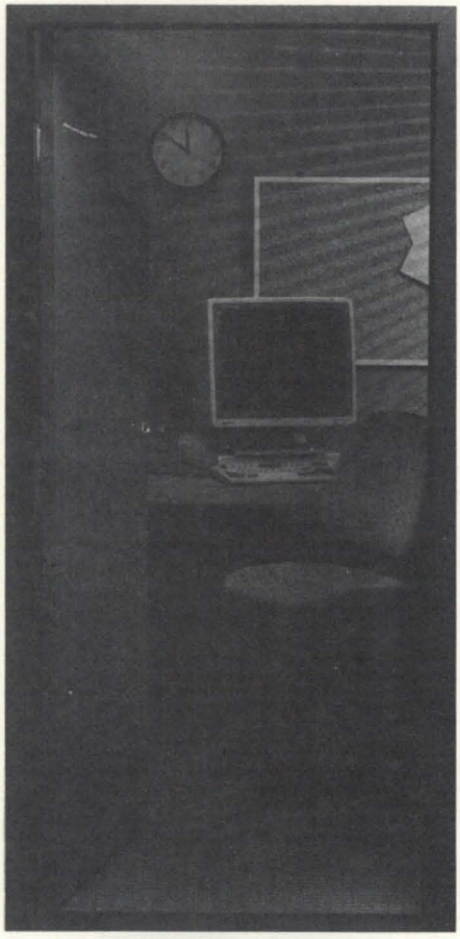

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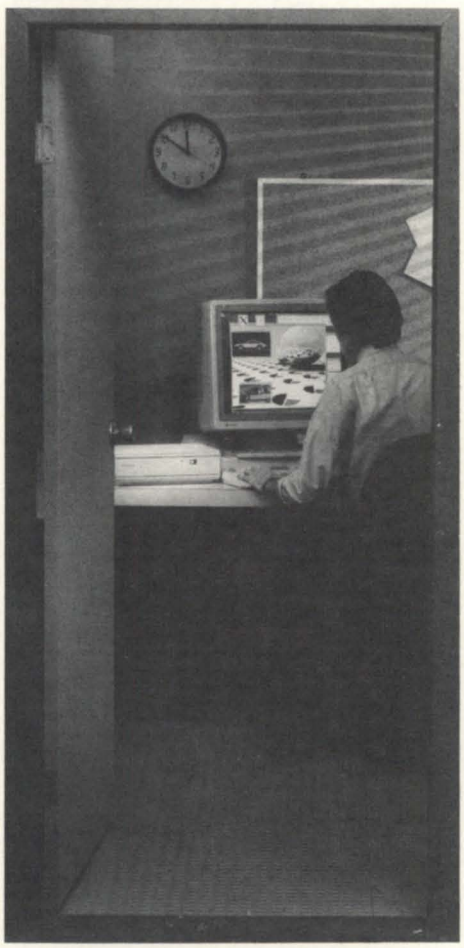

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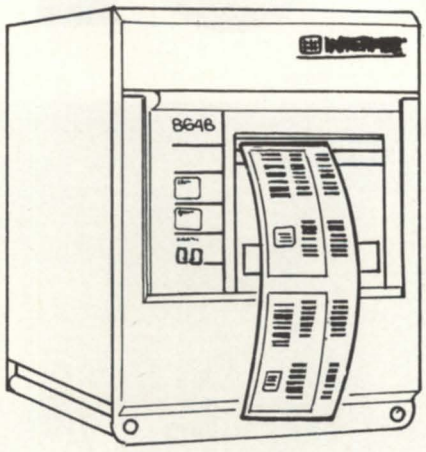
Bar code strategies



by Mike Leathers
Special to Focus

SYNOPSIS

The finer points of bar code implementation—from choosing a printer to justifying costs—are covered in the second installment of a two-part series on bar codes.

Choosing a bar code printer

For some reason, manufacturers of bar code printers ignore standards when designing their printer interfaces, especially in the way they communicate with the host computer. Printer selection can mean the difference between a shoe-in job or a true hair-pulling experience. When choosing a printer, you can't afford to let your intuition guide your checkbook, nor should you believe a salesperson's assurances that "this will do."

Bar code printers are not devices that you can easily run down to your local printer repair shop. Your choices when your printer breaks are either to invest in a backup printer, or to pay the manufacturer a monthly maintenance fee. A maintenance fee provides for an overnight replacement from the manufacturer, and in most cases that should be sufficient. If you buy a backup printer, choose one that's exactly like the primary printer. This can be expensive, but two printers give you the benefit of continuous throughput.

The software to drive bar code printers ranges from simple to complex. Again, this depends upon the printer you choose. Many printers have a computer and non-volatile memory built into them. These features allow you to connect to a dumb terminal and converse with the on-board computer as you set up label formats.

Label formats tell the printer where the components of the label are to be printed. The components describe the coordinates of the bar code, as well as any human-readable information that is to be printed. Usually, each component is assigned a field number. The host application program sends information in order of the field numbers, and the printer merges it into the format and prints the label.

Your application programmer will find this task relatively easy until you start sending lots of label information to the printer. This is where the fun starts, since many of the hand-shaking techniques for flow control that are present on text printers do not exist in bar code printers.

Error messages

Some bar code printers don't send error detection codes back to the host computer, while others inundate you with status codes. At Snowbird, we found one printer that only sends a status code when it has trouble printing the label. The problem with this is that ICobol programs must do a read when checking status, but if everything is OK, the program has nothing to read. (Oh, why doesn't Data General give us a timeout on a READ statement?)

Putting a variable delay in our printer interface programs for flow control works about as well as anything else. You can't always drive the printer at maximum speed, but you get the job done. (Did someone say something about hardware flow control? Good luck at getting that to work, too.)

Bar coding by PC

Most bar code printers work very well when attached to a PC, especially if the vendor has designed an interface between the user and the printer. A vendor named Form Maker has created a way for the host to send label information directly through the program, rather than relying on manual entry. Form Maker's Bar Maker program accepts label information from either the communication port or a disk file on the PC's hard drive. This frees you from error-checking and hand-shaking worries, and your application

program can concentrate solely on sending information to the printer.

Bar Maker has no flow control, however. If the host communicates directly with Bar Maker through the communication port, you'll need to add delays to keep from overrunning the PC. If possible, you should use a PC integration product to get the label information into Bar Maker as a disk file. We have had some success with the MS-DOS copy command, but we haven't really tested it day-in-day-out.

A big advantage of a program like Bar Maker is that it interfaces with printers that can also be used as text printers. We have used a C.ITOH model C-400, Epson FX and compatibles, IBM Proprinter and compatibles, and HP Laser Jet. You may want to consider the pros and cons of these configurations before spending money on a dedicated bar code printer.

Labels, and their quality of life

Bar code printers and label media determine the quality of the labels they create. Thermal labels, for example, generally print quickly, but tend to fade in the light, whether it's artificial or direct sun light. A thermal transfer works a little better. Dot matrix printers provide an inexpensive solution, though quality is somewhat poor.

Label quality is usually measured by "the first read rate," or the ease of reading the label with one scan. This is typically expressed as the percentage of successful reads. On one application, a dot matrix printer yielded a very high first read rate because the ribbon was changed often.

The term "density" refers to the width of a bar on a label and the amount of information the label can hold. The thinner the bar, the higher the density of the label. In an application with only four digits of data to print, we used a medium-density label. Teaming the label with a medium-density wand, we achieved first read rates close to 90 percent.

The media on which the bar codes are printed must be carefully considered. The further you are from the end user in the distribution channel, the higher the quality of media you need. There are some applications where it is desirable for a label to be readable many years into the future. Serial numbers (virtually impossible to modify in a bar code stamped in metal), for example, are sometimes used to determine product warranty. On the other hand, if your products have a high turnover rate, the label doesn't necessarily have to last as long.

Implementation considerations

One of the best strategies for implementing bar code systems is simplicity. Without question, your first project should be a small one. Choose a process that is working well in its current design—this allows you to spend time working out the bugs within the bar code equipment itself, rather than redesigning a complete system.

Even if you are well versed in computer programming, it would be money well spent to include a systems integrator on the first project. The systems integrator

can act as a consultant or as a turnkey vendor, but regardless of his or her role, be sure that the integrator is part of a team working on the project. The ideal team consists of at least one person from upper management (to monitor costs), one person from data processing (to help explain current software design and to program if necessary), and one person from operations who currently uses the system, and who will be using the modified system in the future. Your bar coding system should not be designed in a vacuum.

Be sure the team knows exactly what the current system does. Write out a brief description of the system, and chart the flow of information from input to output, being certain that both data processing and operations agree on it. Several times, I have seen data processors design a system only to find it doesn't meet the needs of the operators. Don't forget to include the time consumed by each step of the current process.

Evaluate the cost of your current process, and consider that bar coding saves labor costs by increasing accuracy as well as the speed of data collection. Think of what happens when things don't go smoothly, and look at your information flow beyond the area of the system you are bar coding. Evaluate the impact of errors. Though it may seem that bar coding takes too long or creates more work, sometimes the real cost savings are down the line—where data accuracy is crucial.

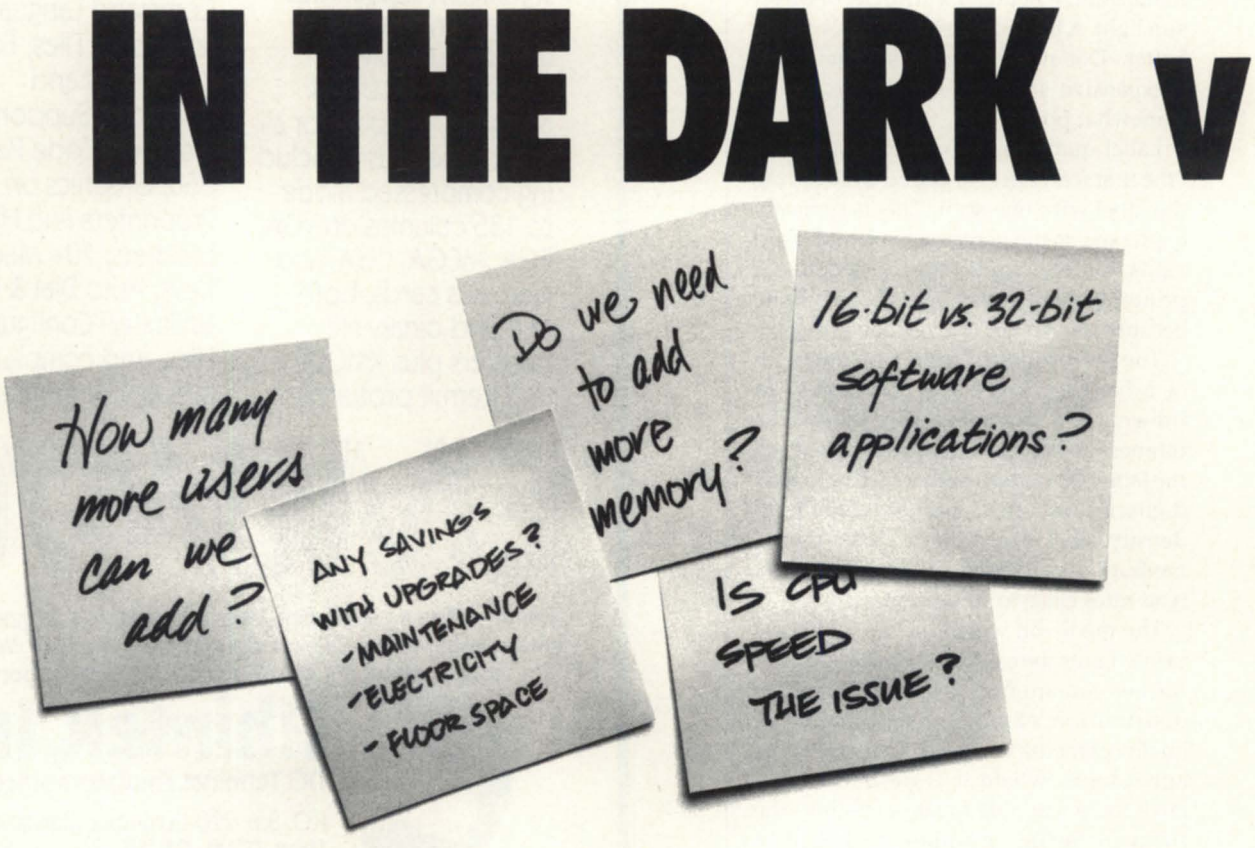
With a good understanding of your current system, you can identify where bar coding can best be implemented. Determine your needs realistically and define them first without considering the cost of equipment. You should care more about how much the system makes (or saves) than about how much it costs.

Role of the systems integrator

Systems integration requires careful study of the problem, knowledge of solutions, and experience in implementation. In studying your current system, the integrator can raise important questions about costs, and help determine your equipment needs by knowing the considerations important to performing the bar coding task. During equipment selection the integrator will know which devices to look at and which to avoid, and during implementation he or she can use manufacturer contacts to get answers to problems as they arise.

A turnkey systems integrator can take full responsibility for the project, including equipment procurement and maintenance. Usually, the integrator has established credibility with vendors and distributors of bar code equipment, allowing him or her to borrow expensive items for evaluation purposes. The integrator may be able to work on a quoted fixed fee after definition of the project, but because of the wide variation of time required on any project, most systems integrators prefer to work on a time and materials basis.

Almost any manager experienced in bar code implementation will advise you



to use a systems integrator on the first project. If you have your own technical people, they should be able to implement future projects with only directional guidance from the systems integrator.

Designing the system

Design the system with the type of equipment you think you need but without letting specific brands cloud your thinking. For example, if you want to bar code a counter invoicing procedure, determine whether the scanner is to be a wand or a laser, and whether the decoder will be attached as a keyboard or a serial wedge—don't specify the use of a Symbol LS-2000 handheld laser scanner with a Model 340 decoder.

Modify the written description from the previous step, where you analyzed your current system, and adjust the information flow chart to incorporate your bar coded design. Making these diagrams available to vendors of bar code equipment will make many people's jobs easier, and having it all in writing makes it easier to reconcile problems that might occur later.

Training

Expect to pay for some education on your first project. Ask vendors to demonstrate equipment that you are considering, and have it connected to your computer for the demonstration. Remember that you want to end up with a successful implementation. This is not the time to take the lowest bid. If vendors seem reluctant, offer to reimburse them the cost of an on-site visit (if it fits in your budget), and ask for an equivalent discount on the equipment if you do finally purchase from them.

When planning the installation, include a realistic implementation schedule with plenty of time set aside for training. Training should take place on multiple levels, starting with management. The cross-section of departments represented on your project team should prevent any big surprises during training.

Monitor and evaluate the results periodically. Upper management will want reliable figures to calculate payback characteristics. Again, these should be realistically stated and should encompass the different areas affected by the results of bar coding. Remember that increased accuracy is the biggest benefit, and the results will surface in other areas of the information flow.

Application examples

A basic asset tracking application can be used to track library books, tools, file folders, office equipment, etc. This sort of application involves assigning and bar coding unique numbers for each asset and each user of the asset. When checking the asset out, the asset bar code and user bar code are both scanned, along with a bar code indicating "out" status. Each code is scanned again when the tool or book is returned, so that the program processing the information can keep track of who has assets and how long each person had them.

Receiving can be automated by using a

hand-held portable reader to collect data that is ultimately uploaded to the host computer for processing. If a receipt is from a vendor whose purchase order is on file, purchase order data can be downloaded to the portable reader so part numbers and quantities can be verified. Receiving applications can also collect serial numbers for selected products.

Through bar coding, a shipping department can scan product codes to compile a shipping manifest. Data can be collected using portable devices, or fixed-mount lasers attached to conveyors, or an RF terminal mounted on a forklift that takes products from the warehouse onto the truck. If the reader has intelligence, it can be downloaded with the picking information and in some cases, particularly with RFs, the picker can be directed to the location of the product.

In the first part of this article, published in last month's *Focus*, I mentioned collecting labor and inspection data from the job shop or manufacturing floor. To this end, a time clock can be implemented for payroll purposes by issuing bar coded identification cards to all employees.

Radio frequency tags

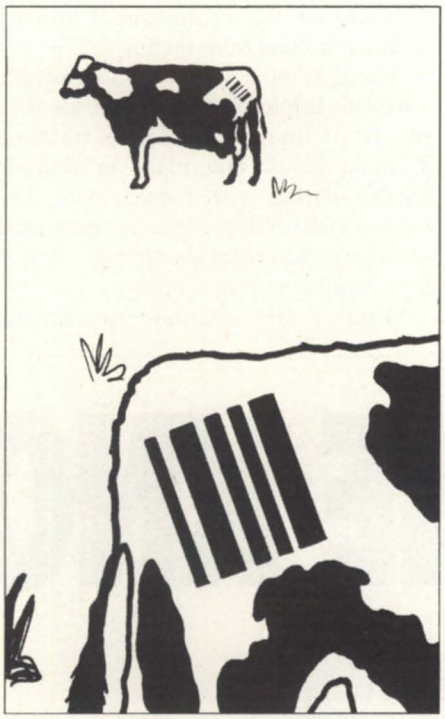
Radio frequency tags can be picked up with a loop antenna in a fairly wide geographic area, and then integrated with bar codes. For example, you might have RF tags mounted on large buckets of a conveyor system. As the bucket passes a supply conveyer of a certain product, the computer triggers a solenoid that dispenses one of the products into the bucket. The bucket collects items for a customer order in an automatic picking application.

Vehicle identification tags using radio frequency technology can be used in parking garages and even toll road applications for automatic billing purposes. Wouldn't it be nice to drive into your favorite gas station, fill your tank, drive away, and receive a monthly statement of your purchases later? Even if the gas station owner required a deposit for the privilege, I think it would be worth it, and in this scenario, labor costs are practically non-existent.

Radio frequency tags can also be used to identify animals. The transmission range of the tags is only a about a foot, so you would have to consider this in the design of your application. Dairy farms, for example, use the RF tag method to dispense food to cows. I've even heard there are fish swimming in the streams of Colorado with RF tags imbedded in their scales for a study of migration habits.

Equipment costs

Costs vary considerably for bar code equipment. Readers range from as little as $300 for a simple keyboard wedge with a wand scanner, to $2,000 for a hand-held moving beam laser scanner with a serial wedge. Portable bar code readers start at $1,000 and go up to $4,000, depending upon memory and scanner requirements. Radio frequency systems start at $8,000 and go and go and go. Bar code printers range from under $1,000 to well over $25,000 for printers with automatic applicators. Label media is usually priced per thousand labels, and can range from $6 to more than $25.



Hardware costs appear to be going down at the rate of 10 percent per year, with improved features. Computer programming and reprogramming costs are hard to estimate, particularly on the first project, since it's common to run into problems that take a lot of time to work through.

Cost justification considerations

The key to cost justification is realistic evaluation of the current system cost, and a broad estimate of the cost of your system after bar coding. In your analysis of current system cost, be sure to include the cost of error reconciliation, taking into special consideration its impact down the line.

Current statistics show a data entry error is made an average of once every 300 keystrokes; bar code reading results in an error rate of less than one in a million characters. Have you ever stood at a sales counter and watched the salesperson key in a product code, and then say "It shows we have one, but let me check?" With bar coding properly installed, there is usually no reason for doubt. Consider these situations and the resulting inefficiency as you evaluate the impact of an error-free identification system.

Your first project will probably have some budget overruns, but don't feel badly about it. The educational costs incurred can be retrieved over future projects.

Sources of information

Getting Started with Bar Codes: A Systematic Guide by Richard Bushnell is available from Cutter Information Corporation, 1100 Massachusetts Avenue, Arlington, MA 02174

The Bar Code Book is an excellent overview of bar coding by Roger Palmer. It is available from Helmers Publishing, Inc., 174 Concord Street, Peterborough, NH 03458.

A free subscription to a monthly newspaper is available by writing the reader service department of *Automatic I.D. News*, P.O. Box 6170, Duluth, MI 55806-9870.

Two annual conventions called ID Expo and Scan Tech are advertised in *Automatic I.D. News;* ID Expo is usually in the spring and Scan Tech in the fall.

Your industry trade association may have standards for bar codes. Many proceedings and publications are available by writing to Automatic ID Manufacturers, Inc. (AIM), 1326 Freeport Road, Pittsburgh, PA 15238. Δ

Mike Leathers is president of Snowbird Systems, a DG VAR specializing in system integration for inventory control. He may be reached at 12015 Park 35 Circle, Suite 117, Austin, TX 78753; 512/835-0143.

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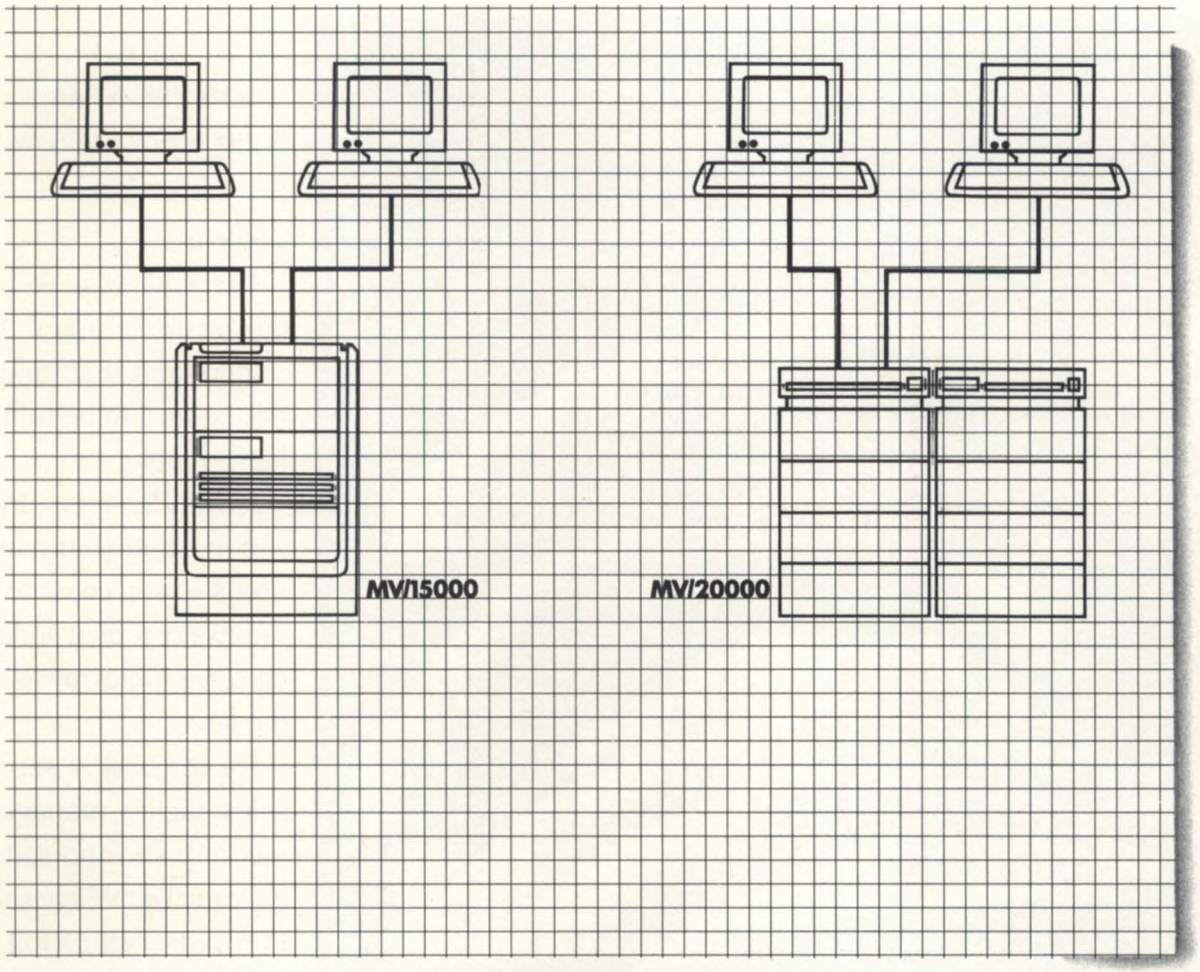

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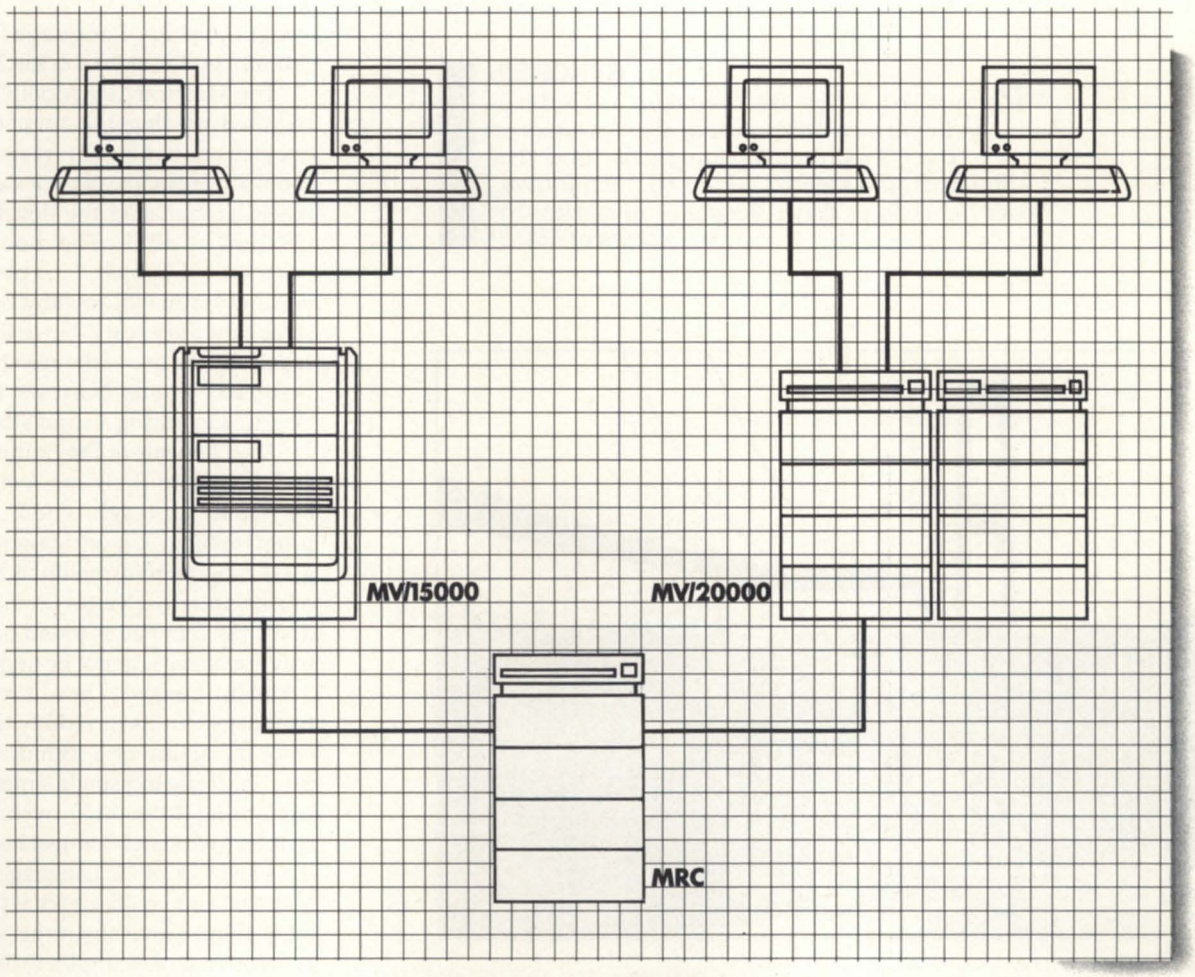

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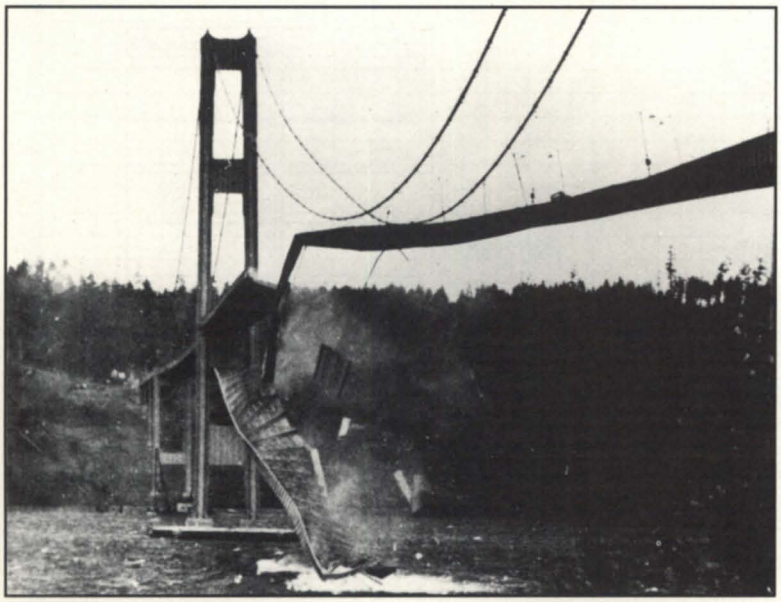
A user's guide to FIXUP

SYNOPSIS

Recently back from the Continent, BJ dabbles in literary criticism, rating such classics as "The C Programming Language" and "The Mythical Man Month." Aided by mind-altering over-the-counter drugs, he also enumerates the intricacies of FIXUP.



The aerodynamically designed Tacoma Narrows Bridge.

:CHOO_CHOO

I just got back from spending two weeks in Europe indulging my other passion: riding trains. As a change of pace, I decided to leave my DG/One and any work related stuff at home and just bring along some books to (re)read. A few of the books were the usual *New York Times* Top Ten Trash, but a couple of others were computer classics.

For years, I've had this habit of taking along either a DG manual I haven't read in a while, or a classic, when I get on a long plane flight. I recommend the practice highly. You'd be surprised how much you discover re-reading a DG manual you haven't read in eons. For example, I recently re-read the CLI manual cover-to-cover and found two new command syntax options I wasn't aware of. I won't tell you what they were because I'm embarrassed that they had slipped my notice until now. See, even old dogs can learn new tricks.

Anyway, people are always asking me what my favorite computer books are. Well, I'll tell you which four classics I brought along on this most recent trip: "The Mythical Man Month" by Brooks, "The Elements of Programming Style" by Kernighan & Plauger, "Software Tools" by Kernighan & Plauger, and "The C Programming Language" (Second Edition) by Kernighan & Ritchie.

"The Mythical Man Month" should be required reading for anyone who has project management responsibility. Brooks details some of the lessons learned when he managed the development of OS/360 at IBM. The book is very humorous (Example: " . . . plan to throw one away; you will anyhow."), and at the same time very scary. I love the pictures, especially the one of the aerodynamically designed Tacoma Narrows Bridge self destructing during a wind storm.

"The Elements of Programming Style" and "Software Tools" are both attempts by K&R to teach good defensive programming. Unfortunately, I suspect good programming ability is like art and music; either you've got the talent, or you don't. As Tom Peters found out the hard way, excellence cannot be taught.

Finally, I enjoy "The C Programming Language" for its incredibly terse style. I envy the ability of a technical writer to precisely state in a single simple sentence something that other writers take a chapter to discuss. Contrast his book with the size of DG's "C Language Reference Manual" and you'll see what I mean. The other thing I love about this book is the generous use of examples to illustrate the points being made; hardly a paragraph goes by without a code scrap to lend reality to the verbiage. Granted, this book is specifically targeted to a computer professional and not someone who is just learning programming. But maybe this precise targeting, and the brevity it allows the writer, is exactly what appeals to me so much.

:NGBROI

This month's column is a bit shorter than usual. I somehow managed to bring back a duty free copy of the dreaded English flu. Only some serious mind-altering drugs (legal ones like Nyquil) allowed me to pound out as much of this as I did in the midst of a 102.8 degree

fever. And yes, I do admit to owning a digital thermometer.

:REMINDER:FIXUP

We recently had some intermittent CPU bus problems that resulted in a couple of system panics due to file system discrepancies. In one case, the panic was caused by AOS/VS detecting an invalid directory data element while accessing a directory, and in the other case AOS/VS detected an illegal block number while accessing a random index block.

Because these two panics were related to the file system, AOS/VS refused to perform emergency shut down. While attempting to FIXUP the disks after the panics, I was reminded of a crucial, but undocumented rule regarding FIXUP. The rule is:

If FIXUP reports any potential file system damage, then you should rerun FIXUP until you get an uneventful run.

OK, that sounds simple enough. But what constitutes "potential file system damage" and what is "an uneventful run"?

I'd love to be able to tell you to simply consult the FIXUP documentation for a list of messages that indicate file system damage, but no such luck. Conversely, if this was all documented then I'd have to think up a different topic for this column.

To get around the problem, I used XEQ DISPLAY/TEXT on :FIXUP, extracted the error message texts, sorted them, and then grouped them according to whether they are uneventful (Figure 2) or indicative of file system damage (Figure 1). Rip out these figures (pages 42-43) and keep a copy near your master console.

Note: The "#" characters that occur in the messages are replaced with the file or directory name or numeric value at runtime.

You're probably wondering how I figured out which messages are innocuous and which are serious? If you can figure that out, then you should become a consultant, too.

:FIXUP:BLOW_BY_BLOW

To illustrate how to use this list, let's take a look at what happened after one of my system panics.

The first panic was a code 6027. A check of AOSVS.PANICS.SR showed "INVALID DIRECTORY ELEMENT TYPE." This panic indicates that the internal structure of a directory had somehow gotten mangled. Because the particular panic code indicated that the current information and buffers in memory might be wrong, AOS/VS refused to do an emergency shutdown, so FIXUP had to be run on all the disks.

:FIXUP:PASS_1

The first run of FIXUP produced the usual mess of "File is open (file # closed)," "Transient file deleted," "Directory bitmap replaced," "New eof = # bytes, old eof = # bytes," and "Empty directory block found to deallocate" messages (all innocuous), but it also produced these serious messages:

```
FNB pointer in FIB, file was being deleted
Inconsistent backward link found
```

DDB block # found not on a chain
Repair in dir :
new number inferior dirs = 69., old number inferior dirs = 67.

Clearly a second pass was indicated, according to the rule. One bright spot in all of this was that the only directories involved were :PAGE, :SWAP, :PER, and :SL_TEMPS, so at this point it didn't seem that I would have to resort to reloading any damaged directories from the backups.

:FIXUP:PASS_2

The second run of FIXUP produced a few more "Empty directory block found to deallocate" and "New eof = # bytes, old eof = # bytes" messages, but it also produced these serious messages:

Could not read in block # while walking chain #
The FIB chain will be rebuilt for this directory
DDB block # found not on a chain

Figure 1: Serious FIXUP messages

ACL deleted (file #)
Block found on multiple chains
Block found on wrong FNB chain
Cannot read directory bitmap block
Cannot read in anchor block #
Could not read in block # while walking chain #
DDB block # found not on a chain
Directory block too high to be addressed
Directory with element size not = 1 (file # deleted)
Disk error reading directory block
Disk error reading index block
FIB chain anchor # missing, the FIB chain can't be rebuilt
FNB chain anchor # missing, block # must be deleted
FNB found on FIB chain, FNB deleted (file #)
FUI found on FIB chain, FUI deleted
File element size is zero, size reset to one (file #)
File element too high to be addressed
File rebuilt (file #)
File(s) may be missing
Inconsistent backward link found
Incorrect backward link in chain anchor block
Incorrect format for directory block
Incorrect length for FIB (file # deleted)
Invalid FAC pointer in FIB, FAC deleted (file #)
Invalid FIB pointer for FAC, FAC deleted
Invalid FIB pointer for FLB, FLB deleted
Invalid FIB pointer for FNB, FNB deleted (file #)
Invalid FIB pointer for FUD, FUD deleted
Invalid FIB pointer for FUI, FUI deleted
Invalid FLB pointer in FIB (file # deleted)
Invalid FNB pointer in FIB, file deleted
Invalid FNB pointer in FIB, no room to rebuild FNB, file deleted
Invalid FUD pointer in FIB, FUD deleted (file #)
Invalid FUI pointer in FIB, FUI deleted (file #)
Invalid file name deleted (file #)
Invalid first logical address, file emptied
Invalid index depth specified in FIB (file # deleted)
Invalid pointer in index block
Multiply-allocated file element
Multiply-allocated index block
New number inferior dirs = #, old number inferior dirs = #
No NB pointer in FIB, file was being deleted
No directory bitmap block
No room to rebuild file, check for a file missing
Non-contiguous file with double precision element size (file # deleted)
Part of file may be missing
Probable loop in chain with anchor block #
Renamed to # (file #)
The FIB chain will be rebuilt for this directory
The FNB chains will be rebuilt for this directory
This directory is at the maximum nesting level of 8, it will be emptied
Unique ID deleted (file #)
User data area deleted (file #)
Wrong type DDE found on FNB chain, DDE deleted

Figure 2: Innocuous FIXUP messages

```
Directory bitmap replaced
Empty directory block found to deallocate
File closed (file #)
File deleted (file #)
File is open (file # closed)
New eof = # bytes, old eof = # bytes
New ldu maxsize = # blocks, old ldu maxsize
= # blocks
New number index levels = #, old number
index levels = #
New size = # blocks, # blocks recovered
New size = # blocks, old size = # blocks
Transient file (file # deleted)
```

In this case, luck was with us again; the only directories involved were :SL_TEMPS and :PER.

Because serious messages occurred, another run was indicated.

:FIXUP:PASS_3

The only messages from the second pass were "Empty Directory block found to deallocate," "Directory bitmap replaced," "New size = # block, old size = # blocks," and "New size = # blocks, # blocks recovered," all of which are innocuous. As a result, a fourth pass was not called for, but I ran one anyway just as a test.

:FIXUP:PASS_4

The only output from this pass was "Done!"

:FIXUP:SYNOPSIS

What's the worst that could happen if you don't rerun FIXUP until no serious messages occur? Well, any damage to the directory structure could potentially propagate and eventually cause even more files to be lost. On the other hand, you might get lucky and have nothing happen. But why take a chance?

:DJ:NOTES

For those of you on AOS/VS II who read this and smirked about how the New File System makes FIXUP unnecessary, dream on. If NFS detects file system damage, it signals an error and continues processing as best as it can without panicking the system. But only a fool would continue to run a system that has file structure damage. Obviously, the best strategy would be to get everybody logged off ASAP and then run DJ on the offending disk(s) to correct the problem and restore any damaged/lost files. Unfortunately for you, a single pass of DJ can easily take longer than the entire four passes of FIXUP that I had to run; I know because I just timed a DJ run on a similar disk.

Whether or not you have to rerun DJ after serious errors occur is open to question at this point. Maybe somebody from DG can shed some light on this. I haven't had time to call and ask. Δ

BJ is the President of B.J. Inc., a San Francisco based consultancy specializing in system auditing, system management, and performance analysis. :SYSMGR is a division of B.J. Inc. BJ can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105, 415/550-1444. The :SYSMGR bulletin board number is 415/391-6531 (300/1200/2400 with optional MNP class 4, CHAR/605X /CHARLEN=8/PARITY=NONE /AUTOBAUD) or 415/550-1454 (voice).

A complete listing of the NADGUG software library

ACK • Updated version 1.70. Terminal emulator/file transfer program for both AOS/VS and AOS machines. 365 blocks.

Big Brother • Automatic log-off program written in Fortran 77. Donated by the U.S. Forest Service. 169 blocks.

B.J.'s BBS contributions • About 20 items, including various programs, documentation, and macros. Some of the more interesting items include the :SYSMGR benchmark suite, a continuous incremental backup, a clean-up file maintenance program, a program to find strings in files, and a type-backward program. 6,761 blocks.

CRTEDIT • The old RDOS screen editor ported over to VS. 49 blocks.

DBCHECK • Checks the open status of an Infos file and examines the checkpointing status of a file. 187 blocks.

DUMPLOAD • A Macintosh program to dump and load AOS/VS-compatible dumps on a Macintosh. 137 blocks.

ERP • A process-termination program developed by NASA and modified by Manville. In Fortran 77. 454 blocks.

FILEMNGR • With this new version, you can move, copy, delete, view, and perform several other options faster. This is distributed as shareware. If you try it and continue to use it, you are requested to pay a registration fee. From Kim Geiger. 654 blocks.

Focus • *Focus* magazine articles. 1774 blocks.

FTNCVT • A Fortran 5 to Fortran 77 translator. 232 blocks.

Games • A collection from various places. Enjoy. 19,216 blocks.

IMSLUTIL • A collection of CLI macros, Cobol routines, and assembly routines callable from Cobol. By IMSL of Houston. 4,893 blocks.

JAG_UTIL • JAG_UTIL by John Grant, consists of several programs: Filecount, Userspace, Scan, Laminate, Glossary, and Qhelp. 4,325 blocks.

Kermit • A file-transfer protocol developed at Columbia University. Uses 9,697 blocks.

Logout • Another auto log-out system. 178 blocks.

Look • Used to view text files, Look allows you to move forward and backward in a file. Donated by Data General. 202 blocks.

Macros • A collection of macros from various sources. 441 blocks.

MENUDIR • An initial user menu that can chain to other applications and features a password-control system. From the Fed SIG. 486 blocks.

Misc Kerm • An expanded version of AOS Kerm, this now includes other versions of Kermit including DG/One Kermit. 6,709 blocks.

Notify and Prior • Two contributions from Concept Automation. Notify tells you when a process has terminated. Prior lists the priorities of processes. 162 blocks.

RDOS Kermit • Now available. You must request the Kermit tape (rather than the library tape) to get RDOS Kermit.

Softrans • A file-transfer protocol written in Fortran 77 used to communicate with proprietary PC communications packages. 462 blocks.

Spell • Checks the spelling of a word or spell-checks documents. Submitted by Richard Kouzes. 5,108 blocks.

TEX • Version 2.26a is now available. TEX (Terminal Emulator with Xmodem) is a terminal-emulation program written by David Down. He has revised the TEX software to include a command language. TEX is distributed as shareware. At the end of 30 days, either remove it from your system or send the author a $45 fee. 463 blocks.

VT100KER • VT100 emulator from John Grant. 1,043 blocks.

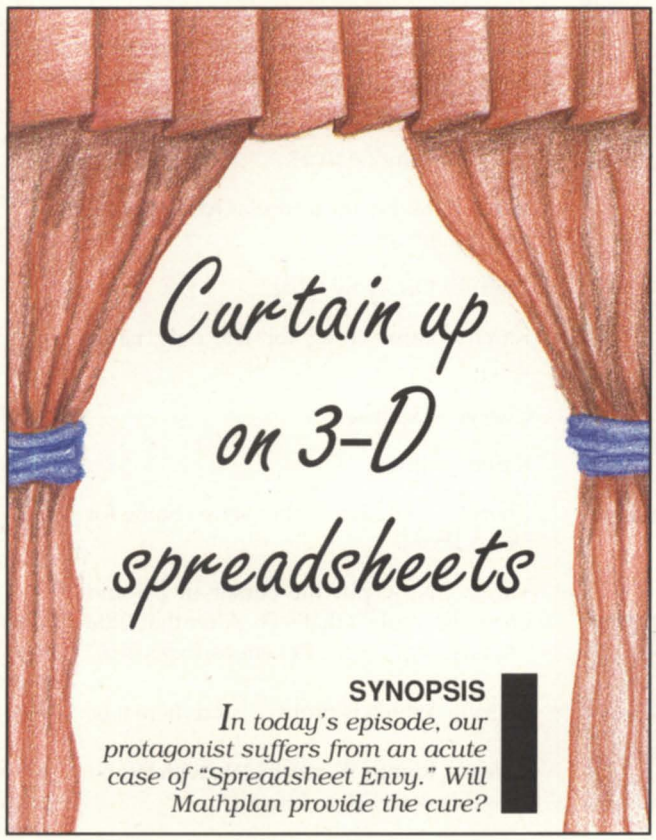
Xfer • A tape-conversion utility. 607 blocks. Δ

All NADGUG members interested in receiving the NADGUG software collection should send a 1,200-foot tape to:
Randy Berndt, Building 4, Suite 321, 5300 North Braeswood, Houston, Texas 77096

MV/2000 and MV/1400 users should send one formatted, error-free tape cartridge. Software contributions should be sent to the same address. Be sure to include your membership number. Allow 4-6 weeks for delivery.

Thanks to Brian Johnson and :WFFCA, the library is now able to provide 1200 ft. copies to AOS/VS rev 6 users. To leave a question regarding non-standard library distribution, call the following number: 713/988-5342.

Please include a self-addressed envelope with sufficient return postage. In compliance with postal regulations, do not date the postage. Either disable the date printing completely, or set the date to "--" or zeros.



Curtain up on 3-D spreadsheets

by Kent Finkle
Special to Focus

Scene One: The water cooler. Cheryl, the director of marketing, puts her hands on her hips and shakes her head. Her colleague Karen, returning from a meeting, stops to chat.

Cheryl: That does it.

Karen: What's the matter?

Cheryl: I have "Spreadsheet Envy."

Karen: Girl, what are you talking about?

Cheryl: I was just down the hall talking to the guys in International Division, and they said they just got a new 486 PC.

Karen: Yeah, I see them playing Flight Simulator on it all the time. Great graphics.

Cheryl: Not only that. They also have Lotus 1-2-3.

Karen: So what?

Cheryl: Karen, it's brand new, version 2.2. They said they were going to make these "3-D" spreadsheets. They're going to consolidate all their financial data from all these different spreadsheets into one spreadsheet. No macros, no re-entering data, all automatic.

Karen: That's nice.

Cheryl: Nice? Karen, it's a very advanced, sophisticated technique. It's going to be the marvel of the 1990s, apparently. What a bunch of rocket scientists they have down there. I asked them to show me how to do it, but they said it was too hard for me. They said only power users need apply, or something like that. By the way, what's a power user?

Karen: Somebody whose computer needs a lot of electricity. Good for them.

Cheryl: Bad for me, you mean. Why am I always the last to get the latest thing?

Karen: The last? You were probably one of the first.

Cheryl: I don't get it. I don't have Lotus 2.2. I don't even have a PC.

Karen: Who needs one? You have a terminal. And you have Mathplan.

Cheryl: That Wordperfect spreadsheet? I never use it. Besides, who knows how long it will be before they come out with a 3-D version of that. Probably never.

Karen: Cheryl, Lotus is just now getting around to doing 3-D; Mathplan has had that feature for a while.

Cheryl: It has?

Karen: Let me show you.

Scene Two: Cheryl's office. Cheryl sits at her DG terminal. Karen stands next to her, arms folded.

Cheryl: You don't have to do this . . .

Karen: It's no trouble.

Cheryl: Do you want to sit down?

Karen: This won't take that long.

Cheryl: It won't? But we're going to make a 3-D spreadsheet!

Karen: When we build a rocket, I'll sit. For this, I'll stand. Now log on and type MP to get into Mathplan.

Cheryl: OK.

Karen: Here's your blank spreadsheet. For now, we'll just do a sample. After you catch on, you can make them as big as you like. Type "Retail" in A1, "Revenues" in B3, "Expenses" in B4, "Profit" in B6, and put nine dashes in C5 for an underline.

Cheryl: Hey, slow down!

Karen: So much for the labels. Now for the numbers. Put your revenue from the Retail Department in D4 and your Expenses from the Retail Department in D5. For this first pass, enter them in thousands.

Cheryl: That's 315 and 261.

Karen: Let's name D3 "Revenues," D4 "Expenses," and D6 "Profit."

Cheryl: How do I do that?

Karen: Put the cursor on D4. Press NAME, which is Control F6. Pick "1" to name a cell, and when it says "New Name:" type "Revenues" and press newline.

Cheryl: Why do that?

Karen: Makes the formulas easier to read and remember.

Cheryl: OK. Now what?

Karen: Same thing for D5, only name it . . .

Cheryl: Expenses?

Karen: Bingo.

Cheryl: Well, that makes sense. Same for D6, as Profit.

Karen: Now put the cursor in D6 and press "Formula"; that's F6. After that little "equals" sign, type "Revenues-Expenses."

Cheryl: Which is profit . . . and there it is.

Karen: Right. OK, recalculate with F9 and save this with F10 as "Retail."

Cheryl: Now I suppose we have to do it all over again for wholesale and mail order.

Karen: Wrong. We'll use this one over, mostly. Go back up to A1 and put "Wholesale" in there. Then put your wholesale numbers in for sales and revenue. Then recalculate and save it under.

Cheryl: But that will ruin the . . .

Karen: Trust me. Save it under "wholesale." Now you have two templates. Do that again for mail order. "Mail Order" goes in the upper left corner, mail order numbers go in for sales and revenues, and recalculate and save it under MailOrder.

Cheryl: Now I have three.

Karen: One to go. Press Exit but say no to "Exit MP?" to get a blank sheet.

Cheryl: Exit but don't exit. Whatever you say.

Karen: Put "Totals" in A1, "Retail" in B3, "Wholesale" in B4, "Mail Order" in B4, "Total" in B7, and put those dashes in D6 for an underline.

Cheryl: Will you please slow down? I only have two hands.

Karen: Now to link all these spreadsheets together.

Cheryl: What's a link? And when do we get to the . . .

Karen: Hang on one minute. OK, here goes. With the cursor on D3, press Link. That's Control-Shift-F1.

Cheryl: Yeah?

Karen: Hit 1 for Create. Where it says Source sheet: type "Retail" and newline. For source block, type "Profit." For Destination block, just hit newline.

Cheryl: Hey, that's my profit figure from my Retail spreadsheet. Where did that come from? I don't get it. What are we doing?

Karen: We told Mathplan to put the profit number from your Retail spreadsheet into your Totals spreadsheet in D3. It's just a formula like a regular spreadsheet formula. It's just that this formula is pulling a number from a cell in different spreadsheet instead of from a cell in the same one.

Cheryl: Mathplan goes and gets the number from that other spreadsheet and brings it in to this one?

Karen: Right.

Cheryl: That's not so bad then. Each time I change the Retail sheet, I'll just do the link over and . . .

Karen: No, no, no, you've got it wrong. It's all automatic. They're linked now. When you change that Retail sheet, Mathplan updates this Totals sheet.

Cheryl: No way!

Karen: Let's finish up, because I gotta get to a meeting. Go to each of the cells in that column and link. Put the cursor in D4 and link in the wholesale number.

Cheryl: Same as before?

Karen: Yeah, except that when it asks

you for the "Source sheet," you say "Wholesale" instead of "Retail," so you get the total from the right sheet. Then do it again. Put the cursor in D5 and link in the number from MailOrder.

Cheryl: Source sheet . . . OK, got it. But what about that really advanced stuff where you . . .

Karen: Now let's add 'em up. Put the cursor on D7. Press F6 for Formula, and after the equal sign, type D3+D4+D5 and newline.

Cheryl: Don't we want to name them though?

Karen: What?

Cheryl: Don't we want to name the cells we're adding up like we did before, I mean, so the formula makes more sense when you look at it?

Karen: You learn fast. Sure, you can do that. Put the cursor on D3 and type . . .

Cheryl: Control-F6, right, I'll name it RetailProfit, and then D4 will be WholesaleProfit, and D5 will be MailOrderProfit.

Karen: Now, when you make the formula . . .

Cheryl: It's F6 to get an equals sign, and then just type in Retail Profit+WholesaleProfit + MailOrderProfit and press newline.

Karen: And that's your grand total from all three spreadsheets.

Cheryl: And if I add more stuff to the other spreadsheets, it will link into here.

Karen: Right, this one will be the big picture. Plus, if you want to make more links, you can. You can make links from any spreadsheet file into any other file. And so on. As many levels as you want, up and down.

And I have to go. Don't forget to save, kiddo.

Cheryl: Karen, Karen, wait. We never got to the part about the . . .

Scene Three: Back at the water cooler, later that day.

Cheryl: Karen, thanks a lot for showing me that spreadsheet thing this morning. Simple tricks, but they'll help.

Karen: No problem.

Cheryl: How does your schedule look for the rest of the month?

Karen: Why? Do you want to do something else with it?

Cheryl: Well, yeah.

Karen: What did you want to do?

Cheryl: Well, I'm still kind of hoping that sometime you'd show me that sophisticated, advanced 3D spreadsheet stuff that they're doing down in International Division.

Karen: What are you talking about?

Cheryl: If you think I wouldn't get it, maybe I could buy a book, or take a class . . .

Karen: No, no. That was it.

Cheryl: What?

Karen: What we did today. The rocket scientist, power users only, 3D marvel of the nineties. That was it.

Cheryl: But that's no big deal!

Karen: I know. It isn't very hard is it?

Cheryl: That's it?

Karen: Yeah.

Cheryl: Oh well, I just didn't know.

Karen: What didn't you know?

Cheryl: I didn't know that little linking thing we did was all there was to a 3D spreadsheet. I just ordered a 486 PC and a copy of Lotus 1-2-3 version 2.2.

Karen: Don't feel *too* bad, Cheryl.

Cheryl: Why not? That just cost me $10,000 bucks!

Karen: Can you play Flight Simulator?

Δ

Kent Finkle is the computer system manager for the Town of North Andover, Massachusetts.

The DUMP/LOAD shuffle

SYNOPSIS

Streamline DUMP/LOAD operations with pipe files and the MOVE_II macro.

The Software Products and Services Division (SPSD) of Data General Canada recently moved into new premises. Changing computer systems, network addresses, and a host of other details gave me occasion to shuffle the files I had on two systems in Ottawa to two systems in Hull. A colleague suggested that I use the MOVE_II macro. If this macro is old hat to some readers, please do what you will, but if the macro is new to you (as it was to me), you might want to use it yourself.

Before we go too far, I suggest a detailed look at Figure 1, which contains the listing for MOVE_II.CLI. Line 5 of this macro takes the current process id (PID) and builds into the string a filename that has a chance of being unique. Line 6 creates a file in :PER by this unique name. It is important to note here that the file type is specified as a pipe file. The seventh line of the file determines whether the macro is being run on-line or in a batch stream.

The macro executes one of two paths as a result of this decision—either lines 8-12, or lines 14 and 15. The only difference between the two paths is that if the macro runs from a console, the PROC lines should specify that both programs share the console terminal as the input and output channel. In batch, there is no terminal to share, so the console CHARacteristics in line 8 do not have to be set. (The shared terminal characteristic is reset in line 12.)

So far, everything in the macro should be quite clear. Looking at the PROC statements, we see that one is for DUMP_II, and the second is for LOAD_II.

DUMP_II is told to dump the file templates specified in arguments 2 through the end. Peculiarly, the file that is the target of the dump is the pipe file created in Line 6. Note that the DUMP process is PROCed concurrently with our CLI process (/BLK is not specified on the PROC command line).

LOAD_II is directed to work in the directory specified by argument 1. The dump file from which it loads is the same pipe file into which DUMP_II writes. The PROC command line for the LOAD_II program now specifies that our CLI should be blocked until the LOAD_II program is finished.

The merits of piping

Pipe files are a clever approach, and their merits are easily understood.

Looking at the macro globally, we learn that it starts two programs running simultaneously. We already know that the dumpfile created by the DUMP_II program is understood by LOAD_II. After reading January's column, we know that it does not take too much extra processing to know if a pipe file is full or empty, and that pipe files can be used for output by one process, with the result being used as input for another process.

The LOAD_II process takes in the dump file as the dump file is written by the DUMP_II process. This has several very interesting repercussions. What has been achieved is the Unix and DOS style of piping data between two processes at the

Figure 1: MOVE_II.CLI

```
1  WRITE Move-II Fast Move Utility — Revision 1.01
2  write
3  write Moving files from [!dir] to %1%.
4  write
5  string @?[!pid].move_ii.tmp
6  create/elem=128/ty=pip [!string]
7  [!Equal [!logon],Console]
8    char/shr
9    proc/def/ioc=@console/calls=32 dump_ii/mem=max[!string]%2-%
10   proc/def/ioc=@console/bl/calls=32/dir=%1% &
11   load_ii/mem=max%0/% [!string]
12   char/off/shr
13 [!else]
14   proc/def/calls=32 dump_ii/mem=max [!string] %2-%
15   proc/bl/ioc/calls=32/dir=%1% load_ii/mem=max%0/% [!string]
16 [!end]
```

Line numbers in the left columns added for reference.

command level.

The total disk space used by the dump is only the size of the pipe file, not the full size of a dump to a disk file. The elapsed time for this procedure is *not* the sum of the DUMP and LOAD processes, as the two processes are directly feeding each other. Any additional delays experienced by the DUMP process would be because the LOAD process has been too busy writing to the disk before getting around to reading more information from the dump file. The LOAD process would experience delays only if it has completely caught up with the data that has been buffered in the pipe file, and is waiting for the DUMP process to write more data into the pipe.

Either or both of these situations could occur, based upon system load, process scheduling, extreme loads on either of the source or target disks, etc. Otherwise, the two processes act in tandem, copying the files from the source to the target directory. Even with the PROCess creation overhead, there are situations where this would be faster than using the MOVE command, and definitely faster than a dump followed by a load.

All in all, I found this macro to be an excellent vehicle for demonstrating the use of pipes. (And something that I could write about in the time I had available. My apologies to those who expected this month's article to be on shared memory.)

I would like to hear from you. If you have a topic of interest that you think I should cover in this column, please drop me a line. Δ

Michael Dupras is senior consultant for the Software Products and Services Division of DG Canada. He may be reached at Data General, 1827 Woodward Dr., Ottawa, Ontario, Canada K2C 0P9.

Terminal schemes

Old column topics never die, they just come back to haunt you year after year. When I described DG's ITC and LTC controllers in the May and June 1989 issues of *Focus*, little did I realize how many questions were left unanswered.

This month begins a two-part explanation of Data General's terminal interconnection schemes, starting with techniques used for either normal terminals or workstations running emulation. Next month, we'll look at the options available to PCs.

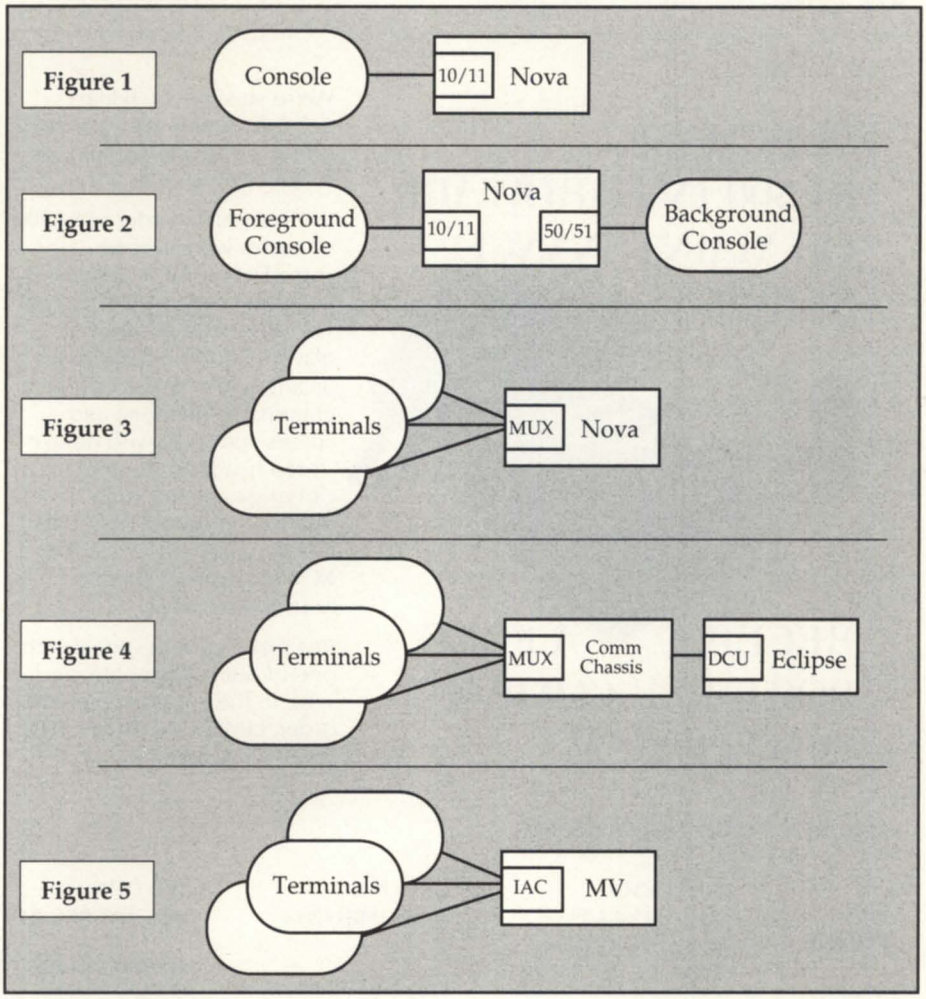
SYNOPSIS

DG's choice to provide the ultimate in interactive "feel" extracts a price from CPU performance. This brief history of DG's attempts at interconnectivity explains why.

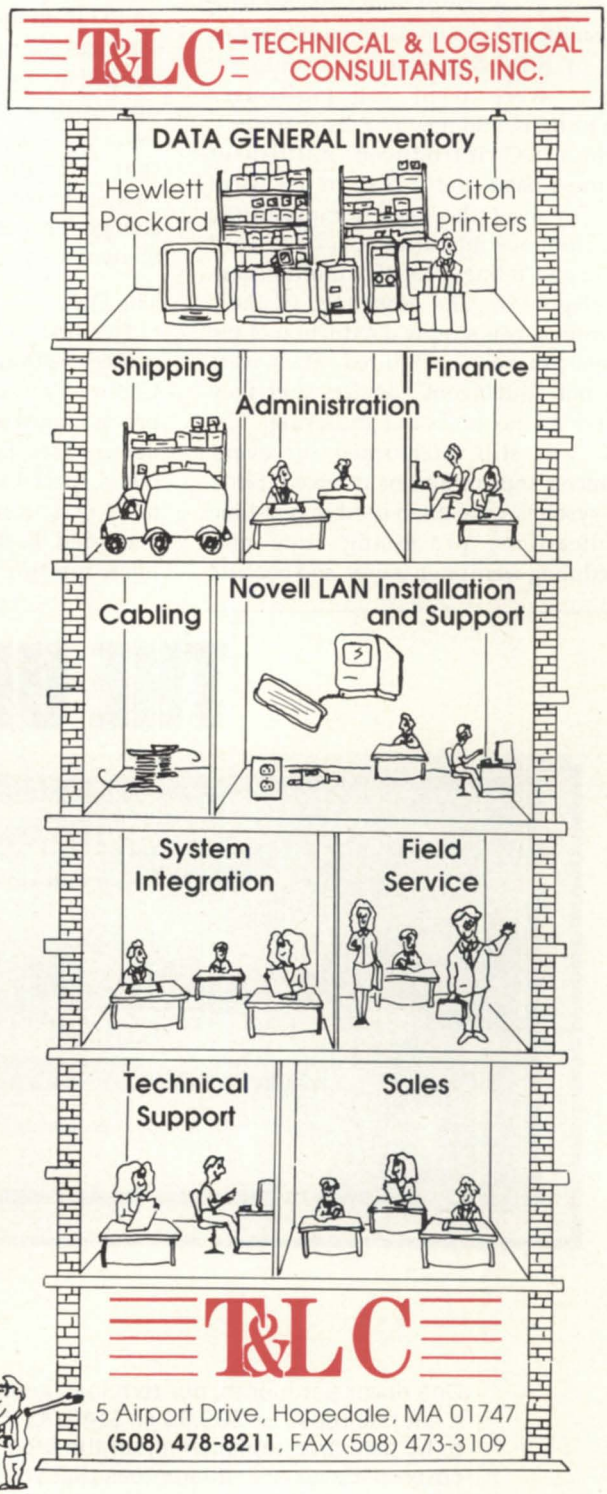
Roots

To understand the current DG terminal interconnection schemes, one has to go back to the beginning to see how this architecture developed. It began with the Nova, of course, where the typical console device was the teletype. There was only one console at first, and it was connected using device codes 10 and 11 (see Figure 1). This is still how all master consoles are connected.

RDOS (the Nova's primary operating system) supported a foreground



Your Equation for Success:



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/background operation, so a background console was added as a device 50/51 (see Figure 2). Both consoles were connected by simple serial interfaces, and like today's PCs, they had no multiplexing capabilities. The central processor received an interrupt for every character transmitted or received. While at first this was of little consequence, eventually Novas were used for multi-user applications, and new problems arose.

Then DG introduced multi-user Business Basic and ICobol to the Nova line. To meet the need for multi-line asynchronous interfaces, DG developed 4-line and 8-line character multiplexors (see Figure 3). The advantage of these controllers was simply a reduction of the number of boards required. They were still not "intelligent" devices and they contained no on-board buffering. The CPU was still interrupted for every character transmitted or received. Since DG systems were often used in real-time applications, processing time and scheduling were often issues, and because these multiplexors had no on-board buffering, it was not uncommon for data to be lost.

AOS

With the release of 16-bit AOS, the problem was compounded, since AOS was touted from the beginning as a multi-user interactive system. The designers of AOS wanted to improve the performance of the operating system's support of asynchronous terminals, and they realized that interrupting the CPU for every character cost them dearly. They felt that changes in both hardware and software were needed.

The DCU

The first attempt to off-load terminal processing from the host CPU was the Data Control Unit (DCU), a separate Nova-like processor just to handle character-oriented devices (see Figure 4). DG clients could buy a special version of the multiplexors to sit in a "comm chassis," and the DCU provided buffering and processed all interrupts from the muxes.

Screenedit I/O

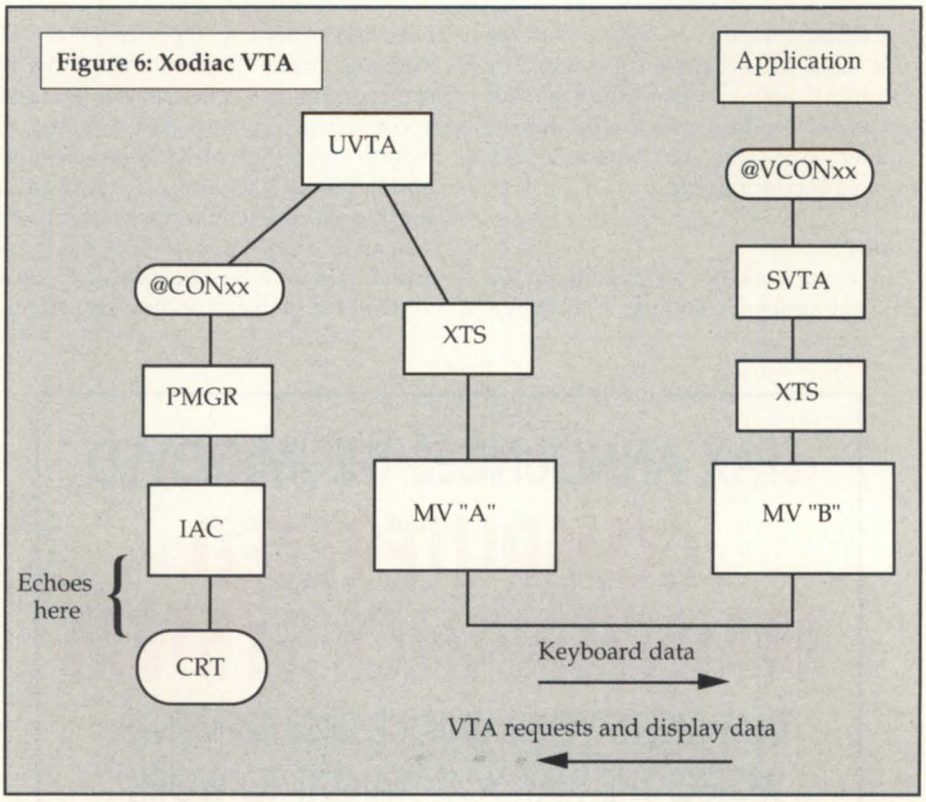
The biggest change, however, was in the software used to handle terminals. The AOS designers looked at the IBM mainframe architecture where terminals operate in block mode, meaning an entire screen can be sent from the CRT to a dedicated I/O processor, then moved in one pop into the main processor. Mainframes can handle a large number of devices because their CPU does not handle interrupts on a per-character basis. In an attempt to build faster minis, DG decided to go halfway towards block terminal support, and adopted the concept of line buffering. Screenedit I/O, as it was called, was first used by the AOS CLI and LINEDIT (predecessor of SED) utilities, and has become one of Data General's most controversial decisions.

Instead of using buffered terminals (as mainframes do), DG put all the buffering on an intelligent asynchronous controller, the now-ubiquitous IAC, the mainstay of asynchronous terminal support under AOS/VS (see Figure 5).

Most DG users are familiar with line editing features of screenedit I/O such as ^E to toggle edit mode, cursor left and right moves, A to extend the line, etc. All the while, data flows back and forth between your terminal and the IAC, but the MV is not involved. It is not until you press <newline> that the contents of that line buffer are transferred to the host processor and an interrupt occurs. One of the major benefits of this design is that all echoing of typed characters is performed in the IAC rather than by the host CPU. This can substantially reduce host processing overhead.

The DG architecture is now totally dependent upon "editreads," a superset of screenedit reads developed to support CEO, and for that reason, DG has optimized performance in this architecture. There are some unfortunate side effects to this decision, however; typically, the performance of those applications that must read single characters. For these applications, notably word processors and some of the better

Figure 6: Xodiac VTA



text editors, there is an interrupt of the host CPU for every key pressed. The echoing of input is done by the host. This is required in order to provide the ultimate in interactive "feel," but extracts a price from CPU performance.

Xodiac

In a networking environment, the editread strategy provided a challenge. Let's take a look at the architecture of Xodiac's Virtual Terminal Agent (VTA) shown in Figure 6. Assume your terminal is connected to a local host A, and you want to log on through Xodiac to a remote host B. You need to think of it backwards: starting with the remote application on B. When the application on B is ready to accept data from your keyboard, it issues a ?READ system call on its own system. Since a virtual console (VCON) is in use rather than a real console, the operating system diverts this request to Xodiac's SVTA (Server VTA) process. SVTA then sends a VTA "read" request to machine A. Xodiac on A passes this request for characters to UVTA (User VTA) on machine A, which is the actual application you are running. All of the parameters of the ?READ such as cursor positioning, delimiters, etc., are passed on from one machine to the other via Xodiac's VTA.

UVTA is the actual application running at your terminal, and UVTA issues a ?READ call to AOS/VS with the same parameters as those used by the remote application, except this time the call addresses your @CONxx port rather than @VCONxx on host B. This ?READ call is processed by the PMGR and sent to your local async controller (IAC). Just as though this ?READ were originating from a local process, your IAC performs all communications with your CRT, including echoing and line editing, until you press <newline>, at which time an entire line of data is sent from your IAC to your local PMGR, to UVTA, over Xodiac to the remote SVTA, and from there to the waiting remote application. (Whew!)

So long as the data consists of reasonably long lines of text, it works pretty well. VTA is weak in the processing of short fields and (heaven forbid) single character I/O. Imagine, for example, what occurs when the remote application is performing the echoing as in the case of running some word processors over Xodiac. The entire sequence of events is done twice for each keystroke, once for the character and again for the echo.

Intermission

Our history lesson has taken us to the early 1980s. Next month, we'll finish the past decade by introducing PCs, terminal emulation, and LANs. Better start studying for the quiz on VTA. Δ

Doug Kaye is the CEO of Rational Data Systems, Inc. He can be reached at 1050 Northgate Drive, San Rafael, CA 94903; 415/499-3354. For a free copy of the "Rational Data Systems Report on PC Integration," contact RDS at 150 South Los Robles Ave., Pasadena, CA 91101; 818/568-9991.

WordPerfect Office™ Now Available for Data General

WordPerfect Corporation has released WordPerfect Office 2.0 for the Data General AOS/VS operating system. Comparable to the recently released Office product for IBM PC networks, WordPerfect Office provides several products to automate the office environment.

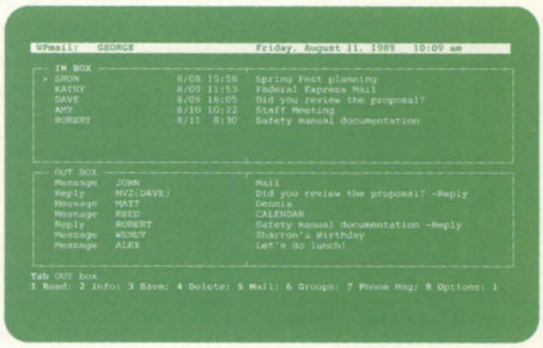
The flexible Shell menu can be used to organize all the programs available to a particular user. Single key access to any program on the Shell menu, and easy interrupt from one program to another, gives a user power to suspend temporarily one process while entering another. Any AOS/VS program can execute from the Shell menu, and submenus allow the user access to as many programs as they like.

In addition to the Shell menu, WordPerfect Office has enhanced the electronic mail feature to support sending messages, document, and files all at the same time in one envelope. A user can now send carbon copies and blind copies, along with his regular mail. Screens have been improved to make the sending and receiving of mail flow more smoothly.

The improved Calendar screen now displays up to eight weeks at a time. The user can set appointment memos, and to-do's for each day and view them all simultaneously. A new auto-date feature has been added to schedule repeating appointments. The alarm feature is available to notify the user of important appointments. Best of all, the to-do feature prioritizes the to-do items and will roll them to the next day if they are not completed.

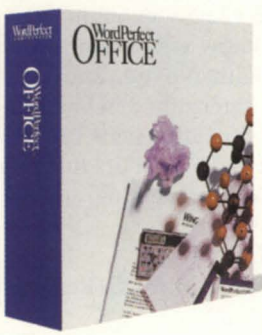
A simple, easily defined database, Notebook provides a convenient way to organize information. All Notebook files are saved in WordPerfect merge format so they are ready to use with WordPerfect documents.

In addition to doing basic math operations, Calculator lets the user perform advanced scientific, financial, statistical, and programming functions. Calculator entries are recorded in an on-screen tape display which can be transferred to other programs via the Shell Clipboard.



Three programs have been added to the Office software. File Manager is a list files-type feature accessible directly from the Shell. P-Edit is a full-screen program editor, and M-Edit lets a user customize macros without having to rewrite them.

Evaluation copies of WordPerfect Office are available by calling (801) 222-4100, or contacting your Reseller.



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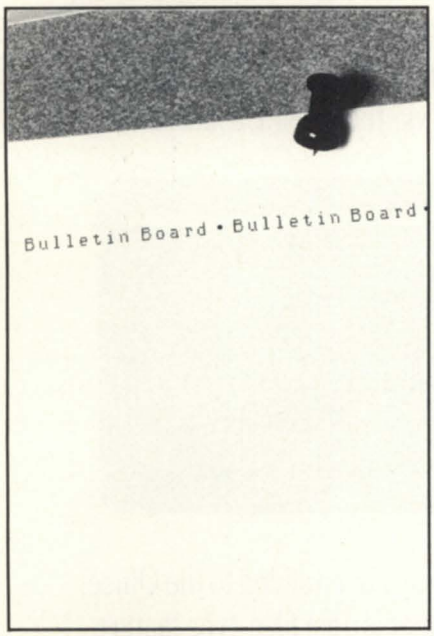
Bits and bytes from the bulletin board



Schools of thought

From: Steven Hubbell

I know this is a long shot, but here goes: I currently have an MV/4000 doing absolutely nothing, since everything has been switched over to PCs on a Novell network. I miss using the DG as much as we used to. I would like to hook the MV up to the rest of the world via UUCP and let it act as a netnews and net-mail receiver/sender.

We currently run only AOS/VS 6.02. A lack of memory has kept us from upgrading. We are also very limited on funds (this is a public school) and really can't afford much. My questions are 1) is this even a feasible thing to do? 2) what do I need to do it? 3) How much $$ are we talking about?

Any suggestions would be appreciated.

From: Bruce Johnson

Depending on your situation, something ought to be do-able. Rational Data Systems, operators of this BBS, have a package called PC Remote that purports to do some of what you want both asynchronously and over some kind of network. My employer, Tisoft, Inc., of Fairfax, Virginia, has put together a server/e-mail system based on TCP/IP and Wordperfect Office, which uses MV/2500s and other mini-beasts as servers.

I don't know enough about networking to know whether or not this would work with Novell, and I haven't yet really determined what our system's memory requirements are. We're using VS 7.62 and VS II, but I think it might run under VS 6-something.

From: Doug Kaye

Yes, we do offer PC/Remote for asynch PC-to-MV stuff, but I'm afraid we can't help you much with UUCP. It is supposedly supported by MV/UX (for which we have a license here), but I'm not sure if anyone ever got it working.

From: Steven Hubbell

Thanks for the information. Right now though, it looks like my main problem is getting the DG itself hooked up to the rest of the world. I've heard horror stories about DG/UX and don't even want to *think* about using that for a UUCP connection. I am wondering if anyone has ever taken the code (or format) for UUCP and designed it to run under AOS/VS *without* DG/UX?

I had originally thought of using UUCP because of the simplicity and ease of getting connected with other systems. But now I am beginning to think about TCP/IP. What would it take to get my 4000 onto the net?

From: Doug Rady

Yo! Are you referring to MV/UX "under" AOS/VS? Please don't confuse MV/UX with DG/UX. MV/UX is a hosted Unix environment. DG/UX is a native Unix environment. It is generally known that MV/UX stinks. It is also generally well known that DG/UX is one of the better products to come out of DG (i.e., rev. 4.0 and up).

I've heard of some people hacking the UUCP, news, and mail sources to run on AOS/VS without MV/UX, but such a task is not easy.

Are you referring to Usenet? Or are you referring to Internet? I'm planning to port some variant of UUCP, news and mail at some future time, but they aren't high on my list of porting objectives since I have them available on other hardware.

DG/1

From: Mark Pagano

I have recently attempted to sign on to our MV/10000 (AOS/VS 7.65) with a DG/1 using its terminal emulation menu. The problem is that the CR/LFs are all screwed up and the text keeps running off the right side of the screen. Any ideas?

We are using U.S. Robotics modems on the MV side and an internal modem on the PC side. Thanks.

From: Kevin Danzig

I don't know about the emulation, but

in any case, check the characteristics of the port on the MV. If NAS is on, turn it off; if it is off, turn it on. (CHAR/<on-off>/NAS).

Modem limbo
From: Jeff Campbell

My Microcom modem answers just fine. While I'm in the CLI everything works great. When I go into CEO, however, all my keyboard input is ignored or put into some buffer somewhere. The time on the CEO menu is updated, but I can't do anything. I use a back door out of my comm program so I can Xodiac over to the system. Once there, I term my CEO_cp.pr. When I return, I have my prompt back, but it still won't respond to the keyboard.

From: Stan Gula

Interesting. I just found out my system is doing that to me too! Probably the modem is trying to handle an xoff that is really part of a cursor positioning command, even though the modem has its "ignore flow control" switch set. I'm lost.

I was in my office today where we have the modems set up, and I never played with it. All my work up till this week was just line-oriented stuff like CLI commands, sorts, etc.

From: Jeff Campbell

After playing around with it for awhile, I found that by setting switch 2 (on the rear bank of switches) to the down position, everything worked. I don't have the Microcom manual handy, but I think that switch enables xon/xoff flow control between the modem port and the modem. So far it's working great!

From: Tom Scheiderich

I ran into a similar problem with the xon/xoff characters. Even though you set flow control off, you still have to pass xon/xoff characters through (AT/X1, AT/QO, and AT/GO). You would think if there is no flow control, the modem would be smart enough to pass the characters through. I am trying to get the modems to work like my dumb Hayes 1200 baud modems and just pass the data through, but I can't make it work yet. I spent four hours on the phone with Microcom trying to make it work and still can't. I am going to give it a couple more days (and try a Telbit Trailblazer modem at the same time).

More modem activity
From: Michael Drucker

How can I determine if a modem line has no activity and term the PID running on the modems CON? I need this for night background processing.

From: Kevin Danzig

The easiest way is to use an idle PID monitor/terminator program (in the NADGUG library there are a few, but we use ERP. It's free and it works). Δ

The NADGUG/RDS electronic bulletin board is available to all NADGUG members. The phone number is 415/499-7628. There are no fees for use other than the telephone charges.

Models of efficiency

SYNOPSIS

A poorly written report program wastes system resources. You can bypass pitfalls with efficient programming.

Lessons on efficient program design and coding techniques could easily fill enough pages to dwarf the Encyclopedia Britannica. There are a number of reasons for this, the main one being that for many tasks in data processing there is really no "right" technique.

I will start tackling the subject of efficient programming with the class of programs that have the biggest impact on a system's throughput: report programs. Report programs behave like batch programs though they frequently run interactively on terminals. If written poorly, they can waste system resources and adversely affect system throughput. One of the worst cases I've seen ran somewhere between 2.5 to 3 hours on an empty system. After rewriting the program efficiently, runtime shrank to one hour and 20 minutes on a partially loaded system (i.e., with several terminals involved in data entry but no other reports running).

The main loop

Let's start by considering what happens during the main loop of a typical report program. The main loop reads the records of the detail file sequentially, processing them one at a time. The detail records come from what I call the primary file. Any other records that are involved come from secondary files. (We will assume there is no merge operation of records going on at the detail level.)

Processing a detail record can involve one or more of the following steps: validation and selection, retrieving secondary file data, internal computation, and data formatting and output. We'll come back to the other three areas some time in the future.

What is secondary file I/O? For this discussion, it means all I/O statements that are executed for any record other than your primary record. If you use Infos, it is possible that all of your records are in one Infos file. In this case, only the primary records (sequentially accessed records) would be accessed using the file pointer; secondary records would normally be random reads with the RETAIN POSITION option set so as not to disturb the file pointer setting for the primary record. Using MINISAM (ISAM in ICobol), this would mean retrieving records from other files.

Coding routines

The purpose of this discussion is to explore the different techniques of coding routines for secondary I/O, and how and when to apply them. Experienced Infos programmers will note that all of the coding techniques presented here are for ISAM files.

For multi-record Infos data bases, the techniques are identical, but they must be coded somewhat differently. First, principles of good programming demand that your records be moved into working storage after retrieval. Second, the keys are normally built in an area separate from the record.

The simplest way to retrieve a secondary record is just to build the key and read it. For example, if the detail record is an open invoice in A/R and the secondary record is the salesperson number, the minimum code needed might look something like this:

```
READ ARO-AR-OPEN-INVOICE-FILE NEXT RECORD.
MOVE ARO-SALESREP TO SLM-KEY.
READ SLM-SALESREP-FILE.
```

This type of retrieval is ideal when you have a secondary record that needs to be read only once, or if read more than once, will never happen twice in a row. In the above example, there may be several invoices in a row with the same salesperson number. Why read the same salesperson record from disk each time? Doesn't it make more sense to see if we have it loaded first? Sure it does!

Let's fix up our simple routine with the absolute minimum required to make it more efficient. It now looks like this:

```
READ ARO-AR-OPEN-INVOICE-FILE NEXT  RECORD.
IF ARO-SALESREP NOT = SLM-KEY
    MOVE ARO-SALESREP TO SLM-KEY
    READ SLM-SALESREP-FILE.
```

If the salesperson on an invoice record is not the same as the previous record, we perform the code needed to retrieve the new salesperson record. However, if two or more records in a row have the same salesperson, you will only go to disk once for the first record. The remainder of the detail records detect the correct secondary record in memory and use it.

Consistently biased reporting

I am rather biased about my I/O. I like to put it all in one section of the program. To show the code needed to detect the end of the file and also to loop back, the main processing loop of my report has a skeleton that looks something like this:

```
PROCESS-DETAIL-NEXT.
    PERFORM READ-NEXT-DETAIL.
    IF ARO-DETAIL-STATUS NOT = I-O-OK
        GO TO PROCESS-DETAIL-FINAL-TOTAL.
    PERFORM LOOKUP-SALESREP.
    . . . <rest of detail processing> . . .
    GO TO PROCESS-DETAIL-NEXT.
PROCESS-DETAIL-FINAL-TOTAL.
```

In the body of the program, I have all of the I/O statements for all of the files. Due to the global error handling routines used in DECLARATIVES, they look something like this:

```
READ-NEXT-DETAIL.
```

```
        MOVE "NEXT ARO" TO FILE-ERROR-TYPE.
        READ ARO-AR-OPEN-INVOICE-DETAIL NEXT  RECORD.
        IF ARO-DETAIL-STATUS = RECORD-LOCKED
                GO TO READ-NEXT-DETAIL.

LOOKUP-SALESREP.
        IF ARO-SALESREP NOT = SLM-KEY
            MOVE ARO-SALESREP TO SLM-KEY
            PERFORM READ-SALESREP-FILE.

READ-SALESREP-FILE.
        MOVE "READ SLM" TO FILE-ERROR-TYPE.
        MOVE RECORD-NOT-FOUND TO VALID-ERROR-1.
        READ SALESREP-FILE.
        IF SLM-FILE-STATUS = RECORD-LOCKED
            GO TO READ-SALESREP-FILE.
```

This is perhaps the most efficient technique available to do secondary lookups under certain conditions. It saves on file I/O when the records of a secondary file are needed for more than one detail record in a row but the order in which they are needed is somewhat random.

I was careful to pick the salesperson record as a secondary example in this case for several reasons. Many companies have a limited number of salespeople in relation to the number of invoices issued. This means that the salesperson will be represented on a significant number of invoices scattered throughout the file.

However, most companies keep their open invoice file in customer account number sequence. In this case, all of the invoices for a given customer may list the same salesperson. This could amount to dozens or even hundreds of records per customer.

The reduction in file I/O depends on the average number of records. An average of a mere 10 records per customer yields a reduction of 90 percent. An average of 25 records each increases that to 96 percent! Even if the average is only 2 records each, we still see a 50 percent reduction in file I/O.

Shhh...

Okay, I can hear it now. Someone has spotted the fallacy. AOS/VS uses the LRU chain and free memory to cache disk pages. Likewise, Infos and MINISAM have routines to keep the most recently used pages in memory. It's true. My initial experiences date back to ICOS and AOS 16-bit Cobol. Those systems were less efficient at caching disk than AOS/VS, but there is still a significant gain to be realized. Your application can now detect an existing record in just a few machine instructions, and eliminate extraneous calls to the filing system.

Since you still have to traverse the index structure for the random access read and all of the disk blocks have to be searched, the only thing that you might save by letting the system do the disk caching is the physical disk reads. If your system is running under memory contention conditions, efficiencies from

system disk caching will not be realized. However, you will still see a significant reduction in overhead by having your program perform one quick check before retrieving a secondary record.

Logical constraints

The last record check is not necessarily the most efficient code under some conditions. Logic tells us that there are two conditions under which our improved secondary lookup routine might not be most efficient. One condition is if it is doing too much, (i.e., more than is needed), and the other might be if it is not efficient enough.

Let's examine the first of these two. Are there situations where you would not want to bother checking with the last record retrieved? The answer is yes.

Back to our open invoice records—let's assume that they are stored in customer sequence. If you needed to get the customer record, it would make sense to do so for the first record of a customer, in other words, during the pre-break processing for a customer. Since you will not return to the same customer, it becomes a waste of time to check whether the customer record has been loaded. Let's look at the code needed in the main processing loop for such a condition:

```
PROCESS-DETAIL-NEXT.
    PERFORM READ-NEXT-DETAIL.
    IF ARO-DETAIL-STATUS NOT = I-O-OK
        GO TO PROCESS-DETAIL-FINAL-TOTAL.

    IF FIRST-RECORD-FLAG = "Y"
        MOVE "N" TO FIRST-RECORD-FLAG
        GO TO PROCESS-CUSTOMER-PRE-BREAK.

    IF ARO-CUSTOMER NOT = CUS-CUSTOMER
        PERFORM CUSTOMER-TOTALS
        GO TO PROCESS-CUSTOMER-PRE-BREAK.

    GO TO PROCESS-DETAIL-NO-BREAK.

PROCESS-CUSTOMER-PRE-BREAK.
    MOVE ARO-CUSTOMER TO CUS-CUSTOMER.
    PERFORM READ-CUSTOMER-FILE.
    MOVE ZEROES TO WS-CUSTOMER-TOTALS.

PROCESS-DETAIL-NO-BREAK.
    . . . <rest of detail processing> . . .
    GO TO PROCESS-DETAIL-NEXT.

PROCESS-DETAIL-FINAL-TOTAL.
```

The READ-CUSTOMER-FILE paragraph is almost identical to the one for the salesrep file shown earlier. There are advantages

to consistent paragraph names. A paragraph that is called "READ-XXX-FILE" will perform a random read to the file named "XXX". A paragraph called "LOOKUP-XXX" will be more involved, perhaps checking the last record loaded or building a complex key before calling the simple-minded READ paragraph.

Note that the customer file read is performed in the pre-break paragraph before the body of the detail processing paragraph. Only two conditions allow you to read that paragraph. Either you have just read the first record of the file (detected by "FIRST-RECORD-FLAG"), or you have reached a new customer (detected by comparing the detail customer to the secondary record customer).

You may also note that I did not put the LOOKUP-SALESREP routine in the last example. Why? Its placement depends on how your company does business with its customers. There are many different ways of assigning salespeople to clients. If your company assigns one salesperson to a client and that salesperson gets full credit for anything that comes in, then the most efficient way to handle the salesperson lookup is to perform it right after the customer lookup in the pre-break processing. You would still keep the previous record detection code since different customers might have the same salesperson.

On the other hand, if your sales force specializes in product areas, multiple salespeople may be assigned to the same customer. If your customer has multiple locations with purchasing done locally, but payables centralized at the corporate office, you might also have multiple salespeople for client offices in different sales territories. In this case, you would need to perform the salesperson lookup routine for every detail record, thus the correct place for the perform would be in the detail processing.

This is another reason why I like to put all of my secondary lookup intelligence into a single routine. It allows me to make a change in the application by simply relocating the routine.

Not good enough

Now let's examine the second condition in which the improved lookup routine may not be efficient: it just isn't good enough. If there is a possibility that the secondary record does not exist, and none of our previous routines handled a case in which no record was found, this could be the major hole in the routine.

Two other causes of inefficiency are secondary records that are arranged so sporadically that there is virtually no chance of reusing a secondary record, or the number of secondary records is very limited.

In all of these cases, we can improve the routine to achieve a better throughput, which will be the topic of this column next month. Δ

Jim Siegman is a contributing editor to **Focus** *and treasurer of the Chicago Area Data General Users Group. Send comments or questions to him c/o Datamark Corp., 3700 W. Devon, Suite E, Lincolnwood, IL 60659; 312/673-1700.*

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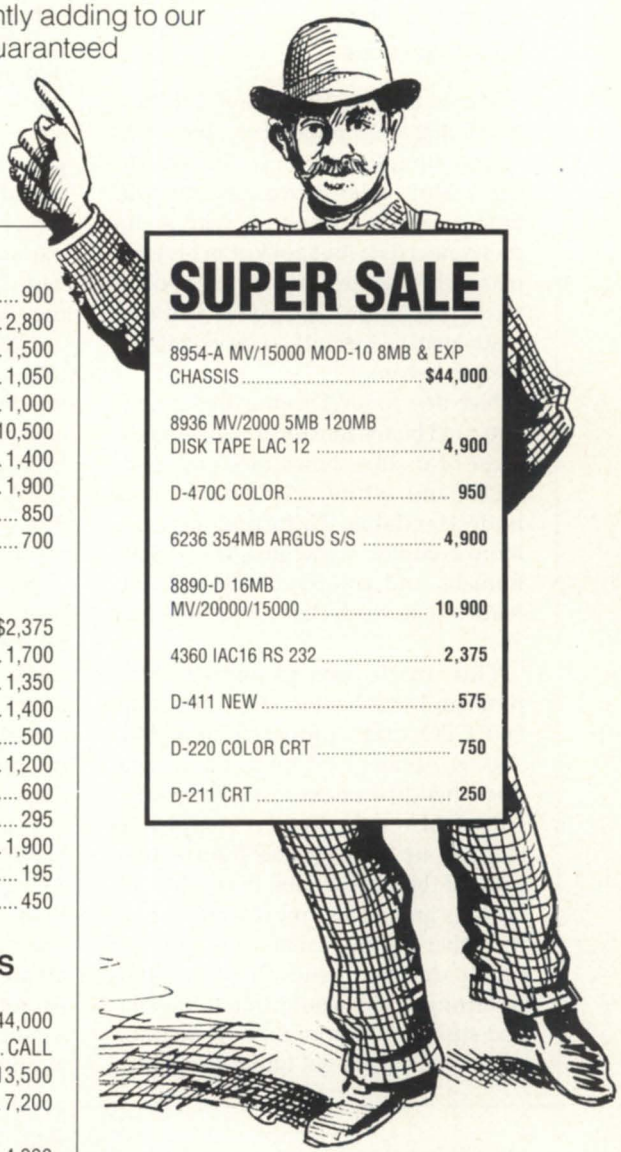

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SYNOPSIS

DG's Atlanta service center calls its own customer service priorities into question when it dogmatically insists that users' problems lie in faulty system priorities.

Goodbye, Dr. Hull

by Andy Weighart
Special to Focus

Those of you who have studied psychology may remember a professor of the stimulus-response school, Dr. Clark Hull, who drove rats batty in little mazes. He came up with some pretty neat data, but got lost in his own maze when he attempted to extrapolate those conclusions and prove that one mathematical formula could explain all human behavior.

Needless to say, Dr. Hull died trying. You can't blame him too much, though. Most of us like things nice and neat, black and white, explainable and understandable. Unfortunately, the more complex something is, as with humans and computer systems, the harder it is to declare "one rule fits all."

This article was prompted by a problem I was having after migrating 160 CEO users onto our new MV /40000. Although printing had worked fine when 20 users were on the system, CEO QMA now seemed completely clogged up. The Queue Information showed three active jobs, but QMA had no sons and wasn't processing any of the other requests that were quickly filling up the queue. Stopping and restarting QMA would free things up and stuff would print for a while until things eventually got hung up again.

I called Atlanta Software Support and got second level help quickly. After dialing onto our system, they uttered the dreaded words: "Your priorities are set wrong." I countered with, "our priorities are set per the recommendations of SEPAC (DG's performance group)." That didn't get me far. "Things have changed since you had the VSPAC performance course," they said.

"OK," I replied, trying desperately to be nice, "how would you like me to set them?" We changed all the CEO and Xodiac servers, and even PMGR, EXEC, Infos, and DBMS, and lastly the QMA formatters. Nothing changed. But, we would have to restart QMA for the formatter priorities to come into effect, right? Yes, and that magically freed up QMA! Due to changing the priorities? Maybe. I was suspicious and asked if we could keep the call open—no problem.

Sure enough, QMA hung up 20 minutes later. I called back and Atlanta had a good idea—look in the Queue Information of the users whose jobs had been active while QMA was hung. And there it was: Error 13255: "Invalid Remote Username Password Pair." After a day of screaming users and a mystery with no clues, here was something solid to track down! Atlanta's reply: "Your priorities are set wrong on your other systems."

My jaw dropped in disbelief. Didn't they want to investigate the error? "No!" So I investigated. In no time, I saw that the CEO_MGR profile had a different password than our 10 other systems. No problem if you're running CEO rev 3+, but you can't do that with pre-rev 3 CEO. And every user who had been hanging up QMA had this same error in their Queue Information. They had all been trying to remote print, namely to the pre-rev 3 systems.

Who's the dummy? Me. I *had* originally told Atlanta that we had the same passwords for CEO_MGR. So I moved our CEO_MGR profile around to all of our systems, and sure enough, we could print to pre-rev 3 systems without a problem. Yet after I told Atlanta that the problem had been resolved, they still insisted that the problem was that our priorities were wrong.

Just to be sure, I set my priorities on all systems the way Atlanta wanted them, restarted the QMA, changed our password to CEO_MGR, and the QMA hang reappeared. Even though I'm the dummy who made the mistake, it's a bug in CEO 3.12 that QMA doesn't return the error to the user, but leaves the job hanging until QMA is restarted. It's STR'd with STR# NASC-4057 in case you want to follow it.

Believe me, I don't care if it ever gets fixed—you should follow the

instructions in the CEO manual/release notice about the CEO_MGR profile, and the problem will be gone when we're able to get everyone on CEO rev 3. And believe me, this article is in no way meant to knock Atlanta Software Support. They have helped me innumerable times, even when I've done dumb things and given them misinformation. I really think they've gotten 300 percent better in the last five years.

My real beef is about the battle we've had with DG about priorities ever since I saw my first Eclipse. And it's not really our battle with DG—it's DG's battle with itself! How many times have we been told: "Take them out of the heuristic scheduler!" "Put them in the heuristic scheduler!" "Put half of them in and half of them out!" All from DG performance "experts." And it seems each division (Educational Services, Atlanta Support, SEPAC) boast that theirs is the right way. Am I asking DG to get all the divisions together and agree on one set of priorities? No. That's the very thing I don't want, and the reason I'm writing this article!

Are DG computers so simplistic that only one set of priorities will work? Aren't there at least two or three priority schemes that could be good, and not cause my system or servers to hang? Can't I tailor my priorities (using sound computer science principles) to the configuration of my particular system and to the type of performance I would like to have? Is CEO so sensitive that it will only work correctly in one priority scheme? If I had 10 Ph.D.s from MIT study DG/CEO performance for a year, would they all come up with identical priority recommendations?

I hope that the answers to these questions are self-evident. I'm not a performance expert, but I don't have to be—the "experts" disagree with each other. And don't get me wrong. I'm not saying that DG computers are so complex that any priority scheme will do. Nor am I saying, as one DG employee once said, "priorities are a black art." There are definite rights and wrongs or better and worse. All I'm asking is:

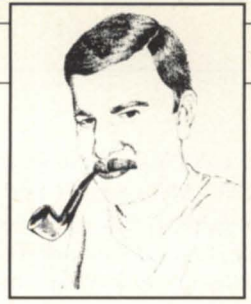
1. Could the different divisions of DG stop being so dogmatic about this issue and recommend/defend reasonable priority settings based on system configuration and user preference?

2. Could DG be slower to blame software problems on system priorities?

3. Could DG software support personnel be slower to jump on the bandwagon of one performance "expert," mimicking everything they say, or on the latest performance buzzword (e.g., "IAC contention") when they haven't done the research themselves?

Dr. Hull believed he could reduce all human behavior down to one mathematical formula. He also felt rats were better subjects than humans. Why? They act so much more uniformly—rigidly. Let's not think like them . . . or like Dr. Hull. Δ

Andy Weighart is a senior systems programmer for Beneficial Corp. in Peapack, New Jersey.



Easy access

SYNOPSIS

PC/VS software accesses files on the MV at disk-like speeds.

A few months ago, I wrote about PC/Remote, Rational Data System's network running on the asynchronous line. This month I'm going to take a look at PC/VS, also from Rational Data. For those of you who have memorized the previous article, I apologize, because I will be repeating some of the things said about PC/Remote. Luckily, I can't sue myself for plagiarism.

PC/VS is the big brother of PC/Remote, operating on a 10MB/second ethernet cable. PC/Remote is a good printer sharing program, but because it runs on asynch lines, it falters slightly when it comes to sharing disk. PC/VS gives you access to files on the MV at disk-like speeds. Where PCR imported my test file at 540 bytes/second, PC/VS transfers the same file at over 20,000 bps—a 37 fold increase. What's more, it seems to use *less* of the MV's resources than PC/Remote. I imported LOAD_II.PR, and used BJ's WHERE utility to see how much CPU it was using. The clone process went from 2.3 percent to 2.8 percent of the CPU.

The system that RDS sent me consists of an Interlan ethernet board on the MV side, a 3Com 3C501 board in the PC, and a length of coax cable. Hookup was fairly simple—I had a small cabling problem, which was quickly fixed. Doug Kaye, the president of RDS, recommends having an expert on hand when setting up this type of LAN. On your asynch lines, if there's a problem, you just get out your $90 breakout box and fix it, right? Well, with ethernet, some of the diagnostic equipment can run up to $20,000!

Just looking at the "Ethernet Cabling Overview" section of the PC/VS System Manager's Guide told me that I was in over my head. I've worked with RS-232 for long enough that I sometimes mumble pin outs in my sleep. This section is filled with minimum and maximum runs, transceivers at every 2.5 meters, and strange formulas for mixing RG-58 and ethernet cable. I'll leave this installation to the experts.

Sharing files

Being a novice at LANs, I think of them first as a method of sharing disk files. With PC/VS, there are three ways of sharing files: the file redirector, virtual disks, and file importing/exporting.

The file director is the easiest to use. Type PCVSFILE, and you suddenly have two new drives on your PC, M and N. Typing M: gets you into (in my case) M:\UDD\TIM. You now have access to the MV, exactly as if it were an additional drive on your PC. You can COPY a file from your PC to M:\UDD\TIM, at which point it is on the MV, and may be manipulated from there. Typing CD\DISK2\ICOBOL\PROGRAMS gets me into my program directory (:DISK2:ICOBOL:PROGRAMS on the MV), and I can edit programs on the MV using my favorite PC editor.

While file redirection is the simplest form of file service to use, there are some disadvantages. First, you can't run a PC program sitting on the MV—you have to copy it back to the PC. Virtual disks (see below) don't have this restriction.

Secondly, you now have all of these MS-DOS files sitting alongside your VS files, and it is *very* easy to confuse which is which. Or to forget where you are—when I see a directory named "\UDD\TIM," I just naturally type "F/AS/S" to find out what's in it. I've spent the last month getting nasty DOS error messages.

Thirdly, some files and directories will be just plain inaccessible. The redirector uses DOS services, so a directory like SCREEN_DEMON or a file like PARU.32.SR will not appear on a directory listing. There are ways around this like linking a valid MS-DOS filename to the AOS/VS filename, but it may be a lot of trouble to go through when you can import a 1 MB file in less than 50 seconds.

And the last drawback—which will be corrected in PC/VS 4.00, and doesn't affect a lot of people—is that file redirection will not work with DOS 4.0+.

Virtual disks, on the other hand, are faster than the file redirector, at about 12,000 bps, but more limited—your file can't be accessed from the MV. If this isn't a need for you (and it isn't for us), this may be the best way to go. Virtual disks are like having up to four removable 32 MB drives on your PC. The command VS MOUNT WORDSTAR F:, for instance, will enable access from the PC to my virtual drive on the MV. On the MV side, a virtual disk looks like any other disk file—in this case, WORDSTAR.VDISK—but on the PC side, it looks like a disk drive. I can get to drive F:, do a DIR, TYPE a file, even execute a program—in other words, anything that can be done on a normal disk, except for FORMAT or FDISK. If the disk is mounted using the /READONLY switch, other users can also have access to the files. To access another virtual disk, I can either mount it on the next drive—G: in this case—or dismount WORDSTAR and mount the new disk as F: again.

(It's too bad that DOS won't let you name a disk, because my current system is getting too confusing. I've got a 5.25-inch on A:, a 3.5-inch on B:, hard drives C: and D:, RAM drive E:, device drives F: and G: for a 360 KB and 720 KB floppy, PC/VS drives H:, I:, J:, and K:, and PCVSFILE drives M: and N:. I'm making notes on a yellow pad for this article to figure out where I am.)

Schemes unlimited

There's no need, though, to limit yourself to one or the other scheme—you can share files using the redirector and a directory of, say, \WPFILES, and impose some naming conventions, while other files and programs can be on a virtual disk. I don't have the software to test it here, but I'd love to try running MSIcobol on the PC, running programs on a read

only virtual disk while accessing redirected MINISAM files on the MV. Now *that* would be distributed processing—but I suspect that MLS wouldn't allow it.

Using these two file services, you have nearly limitless storage available to your PC. Backups can be made using your normal MV routines, which eliminates the necessity of backing up the PC files. And we all know how often users back up their files, don't we? Combine this with one of the new 8mm backup units, such as Megatape's, and you now have practically painless backup of both your MV and PCs.

Importing and exporting of files is something that we've all done. PC/VS just makes it more convenient and faster. The command is simply VS IMPORT (or EXPORT) <source file> <destination file>, which means no more PROCing up some kind of Xmodem program on the MV and then quickly switching to the PC. But instead of running at 500 or 600 bytes/second, PC/VS transfers at about 20,000 bps. This makes the transfer of large files not only possible, but downright enjoyable.

By the way, some of you are probably wondering why, if it's a 10 MBPS system, it will only transfer files at 20,000 BPS. I wondered. Mr. Kaye explained to me that the MV and the PC aren't capable of keeping the line that busy. The other fact to remember is that the 10 MBPS is a limit for all users—in other words, if you have 100 users accessing simultaneously, they won't *each* be going at 10 MBPS, the *sum* of their speed will be 10 MBPS, max. Put the maximum of 1,024 users on one machine simultaneously, and they'll be running at 9700 BPS—and you'll be running for a new job!

It was stated at the NADGUG conference that it's sometimes quicker to import a file to the PC through PC/VS, manipulate it, and send it back, than to do the work on the MV. I'm sure I was one of those people who cocked an eyebrow at that rather rash statement. The eyebrow has since become uncocked. I just got a copy of Wild Hare's Axis compiler, which will be reviewed next month. It takes 34 seconds for the MV/8000 to compile SBTEST. It takes 16 seconds to import the file, compile it with Axis, and export the .DD and .PDs. Wanna cut your compile times in half?

In addition to accessing files on the MV from the PC, it's possible to do it the other way around—access files on your PC from the MV. RDS includes a program called the Remote Executive, or REX. While REX is running, nothing else can be done on your PC—but your PC can be accessed by the MV.

To start REX, type PCVSREX on the PC. This creates an IPC file on the MV, which can be used to send commands to the PC. From the MV, you can then issue commands such as REX EXPORT *.WP, which will copy all of those files from the PC to the MV. This could be useful in making sure backups are done every night. It would be even more useful if you were able to initiate or terminate REX from the VS end. For now, you have to type CTRL BREAK to get out of REX.

Peripheral sharing

The other major function that I think of in connection with a LAN is peripheral sharing. As it does for disk sharing, PC/VS makes this user transparent. The command VS RPRINT @LPT LPT1 redirects all of the PCs output to LPT1 to the MV's @LPT printer. Once this is typed, any command to the DOS printer will automatically go to the MV. You can have up to three redirected printers—for instance, LPT1 going to the main printer, LPT2 going to a @CON port, and LPT3 logging to a disk file. (I'm writing this in Wordstar, and just issued a print command. A few seconds later, this article prints out at 800 LPM on the main printer. If you're buying printers for each PC you have in the office, this could save a bundle.)

Unlike PC/Remote, PC/VS has no script language—mainly because it doesn't need one. PCR used the scripts to automate logging in and out of the MV. They tended to be complicated because they were busy setting baud rate and parity, waiting for a reply from the CLI, etc. PC/VS doesn't need to worry about baud rates, and PROCs up a process called PCVSCLONE instead of the CLI, so logging in and out is handled by the program itself, instead of a script. The PC/VS commands themselves are identical to those in PCR—but instead of typing PCR <command>, you type VS <command>. In order to change the batch files I wrote for PCR to use on PC/VS, I changed all occurrences of PCR to VS, and they ran perfectly. Now *that's* upward compatibility!

The menu system is also identical to that of PC/Remote. The menu can be either resident or brought up each time, and contains all of the commands necessary to run PC/VS—from LOGIN to IMPORT/EXPORT to running AOS and MS-DOS commands.

Included with PC/VS is a small TSR called the Notifier. The Notifier alerts you when you receive mail from CEO, Wordperfect Office, or another PC user. The syntax is SEND <username> <message>, and a message window pops up on your screen. An optional package, PC/Mail, allows you access to CEO's electronic mail facilities.

On my wish list for the next release is that some of these TSRs be able to reside in extended/expanded memory. Once I load up Sidekick, the file redirector, PCVSMENU, and the Notifier, I didn't have enough memory to bring up Wordstar.

Unlike PC/Remote, PC/VS doesn't come with Popterm bundled in. I don't think this is cheapness on RDS's part. If you own a PC that's hooked up to your MV, you probably already have a terminal emulator. Since PC/Remote shares the asynch line, however, using someone else's emulator would entail unloading PCR each time you wanted to get into the mainframe—a definite pain. PC/VS, on the other hand, doesn't have anything to do with the asynch line, so it will coexist with any emulator quite nicely (although I'm sure RDS would encourage you to use Popterm!). Of course, there's a LAN version of Popterm available, PTLAN,

which would mean that you could get rid of that RS-232 cable and run Popterm off ethernet.

I've been a bit parochial throughout this article with the term ethernet. PC/VS runs on ethernet here because that's the controller RDS sent me. It will run equally as well under Starlan, Arcnet, Token Ring, and Lattisnet, so you are not confined to one cabling scheme or one vendor.

As I said in my last article—and I feel no need to apologize for using a bad pun again—RDS has come up with what seems to me to be a very rational method of pricing their products. They charge per user. PC/VS runs from $2,500 for one user, to $12,000 for 32, up to $36,000 for 1,024. So at the 32 user level, it's $375 per user—and you can start buying those dirt cheap 20 MB disk drives again. PTLAN, the LAN version of Popterm, runs $2,250 for 32 users when bought with PC/VS, or $70 per user.

PC/Remote is a nice introduction to LANs, with much of the functionality if not the speed. PC/VS is a *real* LAN, with as much speed as I could ask for, while keeping the command structure of PC/Remote. In both cases, Rational Data has supplied us with the utilities and commands necessary to make a LAN manager's life easy.

Odds and ends department

PC/VS, like many programs today, requires a key code to get it running. For those of you unfamiliar with this, before the programs can be run you must enter a program (in this case, UNLOCK.PR), get the key code, call the company, and enter the code read back to you. The program then creates a key file and unlocks.

Sounds simple and unobtrusive, right? What am I complaining about? Well, the key file can't be moved. Or deleted, and reloaded from tape. Or anything. If your disk crashed at an inconvenient time (has anyone ever had a disk crash at a convenient time?) and you can't contact the company, you can't run the software. Period. Even if you have the programs and key files backed up.

As I become dependent upon this type of software, I get worried about such an occurrence. There must be a better way to protect the software from piracy. Bob Head from Threshold has suggested some kind of centralized clearinghouse. Data Bank Associates has gone with the key code, but their file can be moved or reloaded. I like DBA's solution, and I'd urge other companies to consider it.

Clarification

The SBTEST benchmarks that I mentioned in my January article were run on a Dell 12.5 Mhz 286, something that was never said in the column. Sorry about that. From now on, I will state clearly and concisely what PC I'm using—this month, a Northgate 386/20Mhz. The MV/8000 stays until further notice. Δ

Tim Boyer is EDP Manager at Denman Tire Corporation. He may be reached at P.O. Box 951, Warren, OH 44482, 216/898-2711 or on the NADGUG bulletin board at 415/924-3652.

DG introduces new Aviion series

Westboro—Three new series of Aviion systems have been announced by Data General. The ten new products in the series fall under a 2-D/3-D graphics workstation group (the AV 400 series), an entry-level server or multi-user system category (AV 4000 series), and a high-end server (AV 5200/6200) series.

AV 400 workstations come in four models—AV 400, AV 402, AV 410, and AV 412—with prices starting at $9,500. Each machine in the series features a two-slot, industry-standard VME chassis, and user-installable 8-bit, 24-bit, or 24-bit Z-buffer graphics processors for applications such as imaging and 3D modeling. (The 24-bit Z-buffer processor can be used with both the 8-bit and 24-bit processors.) Each system comes with 8 MB of memory and an integrated ethernet controller to accommodate low-cost LAN connection.

The AV 400 incorporates a 16.7 MHz 88000 chip that performs at 17 Dhrystone MIPS, Data General says. AV 402 uses two of the 16.7 MHz 88K chips for a Dhrystone rating of 34 MIPS. AV 410 incorporates a 20 MHz Motorola chip and performs at 20 Dhrystone MIPS. AV 412 uses two of the 20 MHz chips for 40 Dhrystone MIPS performance. A 70 Hz, high-resolution, 1280 x 1024 flicker-free color monitor is also available with the AV 400 series.

The AV 4000 systems have similar base system specifications—8MB of memory, two-slot VME chassis, and integrated ethernet controller—with 16 MHz 88K chips. The 4000 uses one 16 MHz chip and performs at 17 Dhrystone MIPS. The 4020 uses two 16 MHz chips, for 34 MIPS performance. Prices start at $17,000. User installable add-on 4 MB memory modules are also available and allow up to 32 MB to be tailored for application requirements. The new systems also support up

to 2.5 GB of mass storage as well as cartridge and reel-to-reel options.

Both AV 400s and 4000s are available in deskside packages based on a single board, and come in either single or dual-processor configurations.

The high-end 5200/6200 series starts at $55,000 (a 25 percent price/performance improvement over previously available Aviion systems, DG says), and uses the 25 MHz 88K chip for 25 Dhrystone MIPS performance in models 5200 and 6200. AV 5220 and 6220 use two 25 MHz chips each, and perform at 50 MIPS. The AV 5200 and 5220 models come in deskside packages, while the AV 6200 and 6220s are 14-inch high, NEMA standard rackmount models.

All 5200/6200 models include a 10-slot industry-standard VME chassis, with a maximum of 208 MB of error-correcting code memory and cartridge and reel-to-reel tape options. The deskside version supports over 5 GB of mass storage, and the rackmount supports up to 26 GB. Δ

Data General Corp., 3400 Computer Drive, Westboro, MA 01580; 508/898-4072.

Circle 70 on reader service card

More Aviion storage

Westboro—DG announced its Model 6588 reel-to-reel magnetic tape subsystem for the Aviion, touting it as the industry's lowest priced high performance subsystem for Motorola 88K based systems. Four times the data currently available on the Aviion can be stored and accessed 25 percent faster using the new tape drive, DG reports.

The drive includes a 512 KB memory buffer, ANSI-standard dual-density settings of 6250 or 1600 bits per inch (bpi), and up to 140 MB of storage capacity. Data General says Model 6588's memory buffer enables the subsystem to continually read and write to the drive at 125 inches per second (ips).

The 6588 is configurable in a cabinet and requires only 8 3/4 inches of vertical space. Another model, the 6589, comes in a free-standing tabletop enclosure. Optional tri-density versions of both models, with 800 bpi, are also available. Prices start at $21,950 (for the dual density Model 6588-A) and range up to $25,550 (for triple density Model 6589-TA).

Data General Corp., 3400 Computer Drive, Westboro, MA 01580; 508/898-4060. Δ

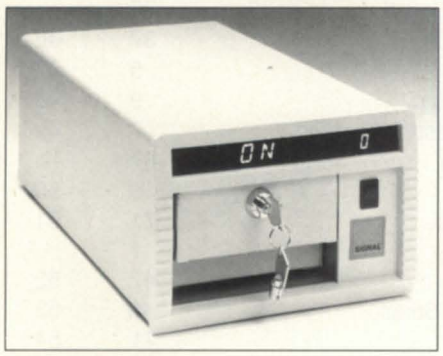
Circle 71 on reader service card.

Secure, portable disk storage on Aviion

Acton, MA—Removable disk storage is available for Aviion users in Signal Computer Products' new subsystem model RS/250. The 250 MB product is designed for applications which, for security reasons, require transportable data.

A compact desktop unit with a removable shock-isolated drive canister, RS/250 houses a high performance 3.5 inch disk drive. The smaller size of the drive canister lets users carry large amounts of data

between systems and secure areas with relative ease, and a security lock on the canister slides into the enclosure to prevent unauthorized data removal. A front panel status display, drive activity indicators, and an optional solenoid interlock prevent drive removal while the disk drive is spinning down. RS/250 is both hardware and software compatible with the Aviion and DG/UX. It lists for $6,895, and is immediately available from Signal.



Signal Computer Products' RS/250 provides moveable storage

Signal Computer Products, Inc., 411 Massachusetts Ave., Acton, MA 01720; 508/263-6125. Δ

Circle 73 on reader service card.

Genisys for Infos

Salt Lake City—Genisys, an information management system available on Data General hardware, makes its debut on Infos files in its latest revision (rev 1.10).

Genisys reports contain a maximum of 16 levels of nested breaks with optional detail lines. Breaks can be set on fields of any data type, pieces of fields, or combinations of fields, in one file or in combinations of linked files. The software calculates sums, averages, percentages, cumulative and running totals at each level, and can also perform other mathematical functions such as variance, standard deviation, and correlation.

According to DMS Systems, the makers of Genisys, the software runs reports faster than Infos or Cobol reports over the same data—especially when all or most of an Infos file is involved. Queries, DMS adds, will also be faster, for both indexed and non-indexed fields. "Infos must always use an index, so if the field being searched on isn't indexed, Infos has to read an irrelevant index sequentially," explains DMS senior programmer Ben Spigle. In Genisys, Infos users overdefine Infos files, then use Genisys menus and its report builder to see the Infos data in a format of their choosing. The first implementation of the Genisys/Infos interface overdefines "nearly any" ISAM file or DRAM file, DMS says.

Rev 1.10 has been shipped to all Genisys customers with current software subscriptions. DMS's next enhancement will allow overdefinition of Infos files where the key value is not stored in the record.

DMS Systems, Inc., 1111 Brickyard Rd., Salt Lake City, UT 84106; 801/484-3333. Δ

Circle 72 on reader service card.

Circle 38 on reader service card.

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***Who to call for answers about* NADGUG *and* FOCUS**

NADGUG

Membership, address changes
Jennifer Foye **800/877-4787**
(Outside the U.S.) **512/345-5316**

Information on RIGs or SIGs
Greg D. Goss **800/877-4787**
(Outside the U.S.) **512/345-5316**

Electronic bulletin board
(300 or 1200 baud modem)
Rational Data Systems **415/499-7628**

NADGUG staff and Focus Magazine address:
c/o Turnkey Publishing, Inc.
Stillhouse Canyon Office Park
4807 Spicewood Springs Road
Suite 3150
Austin, TX 78759

FOCUS Magazine

512/345-5316

Editorial comments, article suggestions.....Robin Perry
(please send product announcements to the address listed above)

Information about advertising.....Michelle Sentenne

FOCUS back issues .....Turnkey Publishing staff

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- CQCS
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- Law Enforcement
- Lions Gate
- OASIS (Office Automation)
- :PERFSIG (performance and capacity planning)
- SIG/UX (Unix)
- SMBASIC

Let the North American Data General Users Group (NADGUG) connect you with other Data General users who have a similar special interest and who want to share information, ideas, problems, and solutions. No matter what the special interest is behind the group — equipment, systems or application software, major language, operating system, industry type — the reason is the same: to work together to exchange ideas on how to get the best performance out of your DG system.

Listed above are NADGUG's current special interest groups. If you are interested in making the connection with one of these groups, or if you have an interest that needs a group, please contact NADGUG's RIG/SIG coordinator, Greg D. Goss, at 1-800-USR-GRUP (512/345-5316 outside U.S.) for further information.

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Laser Printer & MV/10000.
Cat.#: 4425—DGC Laser Document Printer; Cat.#: E8780-B—MV/10000; Cat.#: E8749—MV/10000 BBU.

Virtual Imaging—Ref. #C628.
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The public communications operator of the Netherlands, **PTT Telecom**, will install a Communications Server system from Data General in the first half of this year. The server will connect to PTT Telecom's 400NET messaging network, allowing participating companies to exchange messages and documents with users of fax and telex services. The 400NET is PTT Telecom's X.400-based public distribution network.

Development of the Communications Server backbone messaging service was an international effort. Core development was done at DG's **European Development Laboratory** in Cambridge, at the **Asian Development Laboratory** in Singapore, and at corporate headquarters in Westboro.

■

After digesting the news that Data General is marketing computers to the Soviet Union, one might begin to wonder how the Soviets are going to handle some of the more basic aspects of doing business—like paying bills. In a recent issue of *Data General News*, **Bill Burck**, a DG attorney, explains there are three ways: with hard currency accessed through the central government for a specific project; with hard currency a Soviet company earns through normal operations; or through barter and trade of commodities, like oil.

The exchange rate between roubles and dollars is 1.6 roubles to $1, however Burck says the rouble is so inflated that it has almost become a false currency.

■

Ethan Allen Jr. was named vice president of Data General's U.S. Services. The former director of customer service for the **Open Software Foundation (OSF)**, Allen will be responsible for customer service, including U.S. field engineering and headquarters systems engineering. Allen has 17 years experience in computer systems customer service and products, including stints at **Prime** and **Honeywell Information Systems**. Marking a shift in management strategy, Allen will report to **Angelo Guadagno**, vice president of the U.S. Sales and Services Division. Formerly the officeholder reported to **Michael Schneider**, VP of Customer Services.

Mr. Allen's departure from the OSF marked the fifth resignation of a top OSF official in as many months.

■

Two more television stations have chosen the **Computer Engineering Associates (CEA)** Newsroom System to computerize their newsrooms—**WDRB-TV**, a Fox affiliate in Louisville, and **KJAC**, an NBC-TV affiliate in Beaumont/Port Arthur, Texas. Running on Data General minicomputers, the CEA Newsroom System computerizes newsroom functions including wire capture, assignments and scheduling, script editing, and electronic prompting.

■

Data Assurance Corporation (DAC) increased subscriptions over 54 percent in six months, to 150 subscribers of disaster recovery hot site services. DAC officials credit much of the increase to new guidelines that require financial institutions that use electronic data processing systems extensively to have a tested, documented disaster recovery plan. DAC is headquartered in Englewood, Colorado and has recovery facilities in New York City and Philadelphia.

■

A developer of software for client/server LAN-based computers, **Fourth Shift Corporation,** is porting its manufacturing software series to the Aviion product line. It is the first port to a RISC-based Unix platform for the software company.

■

A live one! **Michael Edwards** of **Transoft** reports that his company received orders for its Aviion version of UBB (Universal Business Basic) product from **Logical Solutions, Inc.,** of Long Island, and **Madison Data Systems, Inc.,** of Hawthorne, New York, following the successful conversion of Logical's Claimware health insurance administration software and Madison's Remap real estate and construction management software. "As you know, there has been considerable criticism of the DG Aviion (and 88open) software catalog that little of it actually exists. UBB and U/SQL (Transoft's data base reporting facility) are noteworthy exceptions," quips Edwards.

■

If you've been looking for **John Bonacci** or **Craig Hadley**, formerly of **McIntyre's Minicomputer Sales Group**, you can find them at **Computer Engineering International, Inc. (CEII)** in Troy, Michigan. CEII is a new company that buys, sells, and trades Data General and compatible hardware. It is an authorized Dataram dealer and has a full-time staff of technicians for repair of DG equipment.

■

The **Object Management Group (OMG),** headed by former DG manager **Chris M. Stone**, announced a working relationship with **X/Open Company, Ltd.**, the international open systems consortium. Under the agreement, X/Open will adopt OMG-approved standards where applicable to the X/Open Common Applications Environment and incorporate OMG specifications into future versions of the X/Open Portability Guide. Δ

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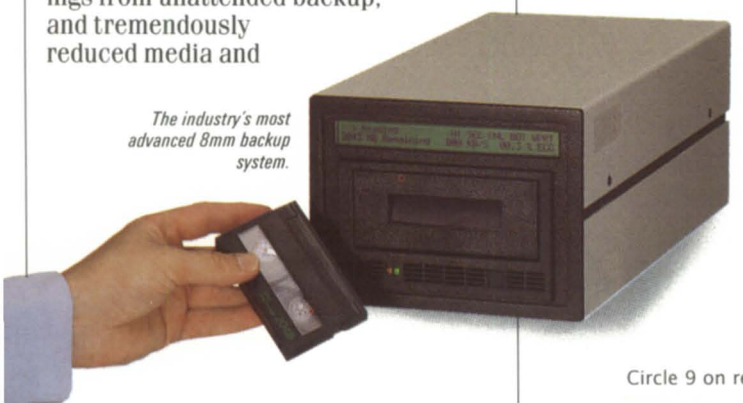

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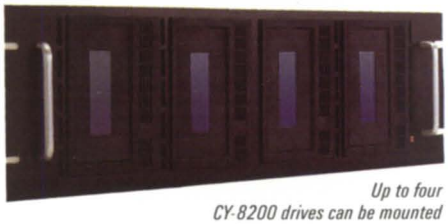

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