

January 1993

FOCUS

The Magazine of the North American Data General Users Group



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In Focus

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Quick fixes

Plus

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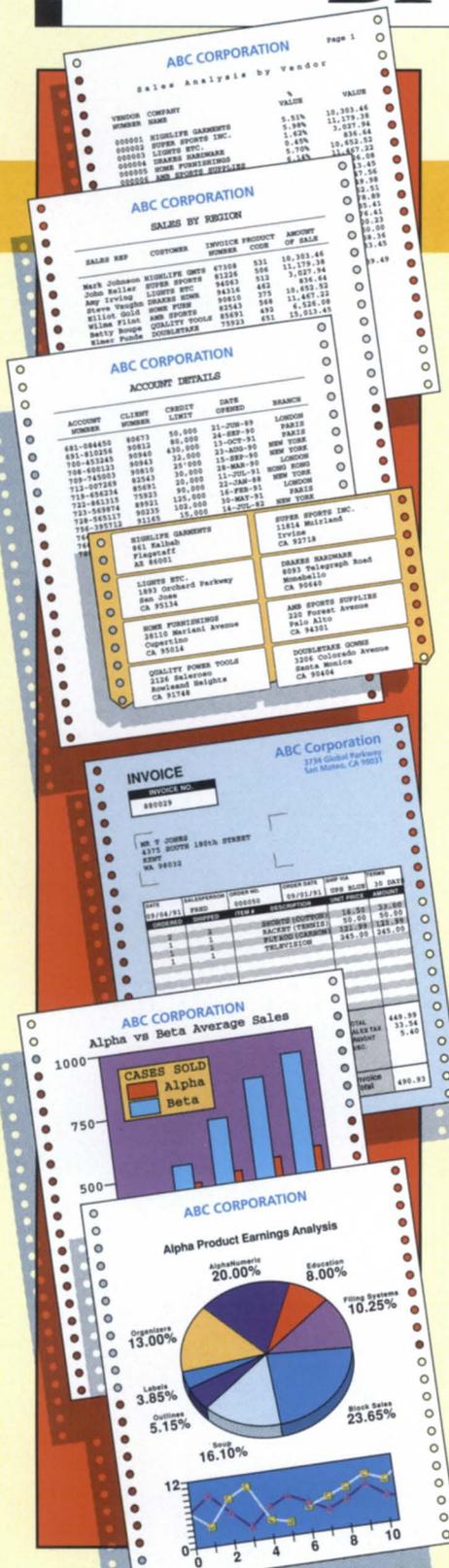
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NORTH AMERICAN
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Jan Grossman

Changing times

Bob Dylan wrote many years ago, "The times they are a changin'," and that particular song still fits today as witnessed by the many companies switching from proprietary systems to open systems. And if companies have not made those changes, they are certainly considering the change for the future.

It's a bit like the political campaign slogan, "The people demand a change."

Never has it been so important to our profession to keep up with changes in technology, and never has it been more important to network with your peers in NADGUG.

NADGUG is changing, too. At the Kansas City NADGUG 92 conference last October, much discussion centered around the regional interest groups (RIGs), their programs, their member interests, and in some cases their possible demise. The role or demand for regional interest groups is changing and/or decreasing. The role of special interest groups (SIGs) is growing and signifying the change in the needs of the membership—the technical needs. NADGUG officers and committee chairs are now rethinking NADGUG's role.

What do *you* think it should be? The role of international groups is changing. The idea of a single united group is heard and discussed throughout the world. This may be a possibility in the future. Remember, we are fast becoming a global society in business, competition, and technology.

NADGUG is taking steps to address the changing needs of its members and changes in technology through its membership benefits, conference programs, and *Focus* articles. In addition, NADGUG officers meet with Data General executives to discuss future technology directions so we can better prepare our program offerings and workshops.

We want to hear from you. What are your needs? How can we help? We are intent on building the strengths of NADGUG and its members. NADGUG members provide a wealth of knowledge, with many experienced members in MV systems and the Aviiion/Unix world, along with networking systems and PCs. Perhaps we can put you in touch with a member who has experienced those changes already or steer you toward someone within Data General who can help. Use the NADGUG Rational Data Systems bulletin boards and Data General's Direct Access to Support Help (DASH).

This year, Data General will be celebrating 25 years of business. The company has proven that it's here to stay. DG's people continue to develop exciting systems and products to address technology requirements of the future. They are dealing with change every day.

This year we are also celebrating 20 years of NADGUG's partnership with Data General. In the months to come you will be hearing about those NADGUG pioneers who had worked so hard to advance the user group. Some of the early pioneers are no longer Data General users; they have experienced changes, too.

And because the times are a changin', NADGUG members as never before are today's pioneers for tomorrow's technology users. What an exciting time!



Happy Holidays!

As I write this message it is still November, so we have not had the traditional Thanksgiving feasts, holiday sweets, or Christmas festivities, parties, and gifts, but I have the Holiday Spirit, and I wish you all Happy Holidays from the NADGUG officers, committee chairs, and staff. △

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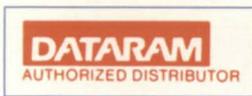
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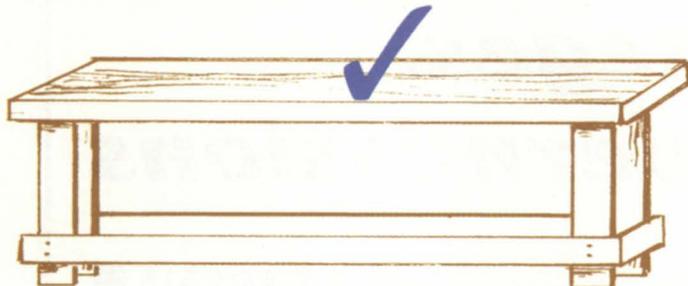


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Users, privileges, and permissions

SYNOPSIS

In the switch from AOS/V5 to UNIX, system managers must get familiar with differences and terminology. The author takes a look at the mechanisms used by DG/UX to restrict access to files, devices, and other resources.

by Brad Clements
Special to Focus

Each user on a Unix system is assigned a user ID number (UID) in addition to a login name. Whenever the system records user-related information such as the owner of a file, it records the UID instead of the username. This takes less space and allows access checking to be performed using fast numerical comparisons instead of slower string comparisons. The login names are really just a convenience for the humans who run the machine. They can appear in the output of or be used as input for some utilities and commands, but unlike AOS/V5 usernames, they are never used internally by the operating system.

Unix also allows you to define user groups. Like users, user groups have both a name and a numerical ID number called the group ID (GID). You can define any number of user groups, and each group can include any number of users. A user can be a member of more than one group, but one of those groups is designated as his primary group.

The file */etc/passwd* lists all the users on the system. Each line of this file contains information for one user including the login name, encrypted password, user ID, group ID, full name, and startup program. This file is maintained as a plain, ASCII text file so you can read it with the *cat* or *more* commands.

It is possible to create more than one entry in the */etc/passwd* file with the same UID. You usually want to avoid this because it can lead to a lot of confusion, but it is sometimes quite useful. Two users with the same UID will have identical access to files and other system resources since all access checking is done via the UID rather than the login name. Anywhere the username is extracted from the UID, such as in file listings or process listings, you will only see the name of the first entry in */etc/passwd* with a matching UID.

Each process on a Unix system has a real and an effective user ID. The real user ID of a login process is set to the user ID of the user logging in, and child processes inherit the real user ID from the login process. The real user ID can be changed with the *setuid()* system call; this can only be done by a process with a real user ID of 0.

The effective user ID of a process normally matches the real user ID. It can be changed with the *setuid()* system call. It can also be changed by running a program that has a special bit set in its permission word. This is discussed in more detail later in this article.

Each process also has a real and effective group ID. These are handled similarly to the real and effective user IDs.

Privileges

The simple entries in the */etc/passwd* file contain much less information than the UPD files used to define a user under AOS/VS. In particular, there is no information corresponding to the AOS/VS superuser, superprocess, and system manager privileges. This is because these privileges cannot be granted to normal users under DG/UX. The only users that can perform actions like terminating an unrelated process, changing the permissions on a file owned by someone else, or setting the system clock are those with a UID of 0. And any process with a UID of 0 has all of these privileges; you can't segregate them the way you can under AOS/VS. This is one cause of security problems in Unix. It is an issue that Unix International has promised to address in future versions of the operating system.

In Unix terminology, any user with a UID of 0 is called "root" or "the superuser"; the privileges themselves are usually referred to as "root privileges". As mentioned above, there may be several login names with this UID, but they are all considered the same user by the operating system, hence the term "the superuser" rather than "a superuser".

Most of the other privileges that can be granted to or denied individual users under AOS/VS are granted to all users under DG/UX. Examples of these other privileges are the abilities to use network resources, to log in from remote machines, and to use the operating system's IPC facilities.

File permissions

AOS/VS provides a flexible and easy-to-use method for restricting access to files, devices, and other resources on the system. You just list which users can access the files and

what types of access they should have. Usernames can include wild cards, and the access types can be any combination of owner, write, append, read, and execute. These lists of users and access modes are called access control lists (ACLs). There is no limit to the number of users included in a particular ACL, but the overall length of the ACL data is limited to 255 characters.

The Unix file access control method is easier to work with from a programmer's point of view, but it is much less flexible than the ACL mechanism. Instead of being able to create an arbitrary list of users that have access to a file, you can only specify access at three levels. And there are only three types of access: read, write, and execute. The permissions are stored as a 9-element bit map with one for each type of access at each access level.

The first level of access is for the owner of the file. The file owner is initially set to the effective UID of the process that creates the file, but it can be changed to any other UID using the *chown* utility or the *chown()* system call. The second level of access is for the file's group. This is initially set to the effective GID of the process, but it too can be changed. The group level of file access applies to all members of the group except for the file owner. The third level of access is called "other" and applies to all users besides the owner and the members of the file's group.

The 9 basic file permission bits are usually expressed in the form of a 3-digit octal number where the first digit refers to the owner access, the second bit is the group access, and the third bit represents the "other" access. The values for each digit are any combination of 4 for read access, 2 for write access, and 1 for execute access. For example, the permission value 751 would indicate that the owner had read, write, and execute access, the group had read and execute access, and others had execute access only.

One implication of this file access mechanism is that, unlike AOS/VS, a file always has exactly one owner. This owner is the only one besides the superuser who can change the file's permissions.

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FOCUS ON: AOS/VIS-TO-UNIX

Unix file permissions is that they don't allow you to specify an arbitrary list of users that can access a file. To give a particular set of users access to a file, you must create a user group that includes that set of users. If you have assigned that group to several files and you need to allow access by one more user to just one of the files, you have to create another group to accomplish this. Even on a system with a fairly small number of users, the number of groups needed to precisely control access could easily become unmanageable. For this reason many system managers give up and create only a few broad groups. This can lead to security problems because access is not specified precisely enough, and some people end up with access to things they shouldn't have access to.

The most bothersome aspect of Unix file permissions is that they don't allow you to specify an arbitrary list of users that can access a file

In addition to the primary nine access bits described above, there are a couple of other access bits in the permissions word that affect file access. One is called the *setuid* bit. If this bit is set on a program file, then the effective UID of a process that runs that program becomes the UID of the file owner. The other special bit, the *setgid* bit, works similarly but alters the effective GID of the process rather than the UID.

The *setuid* bit is a useful way to allow users to perform actions normally reserved to the superuser without turning them loose with root's password. For example, consider the */etc/passwd* file. This file's owner is UID 0, and its permissions are set to deny write access to the group and others. If the other users could write to the file, then they could change their UIDs to 0 and gain full access to the system.

But users occasionally have to be able to write to this file so they can change their passwords. This is accom-

plished by having a system utility called *passwd* that is owned by the superuser and has the *setuid* bit set. When a user runs this program to change his password, his process temporarily gets an effective UID of 0 so it can write the new password (in encrypted form) to the */etc/passwd* file.

Umask

Under AOS/VIS, each process carries a default ACL, which is assigned to any new files created by that process, unless another ACL is explicitly specified at the time of file creation. In contrast, Unix processes carry a *umask*, which is a set of permissions not to grant to files created by the process.

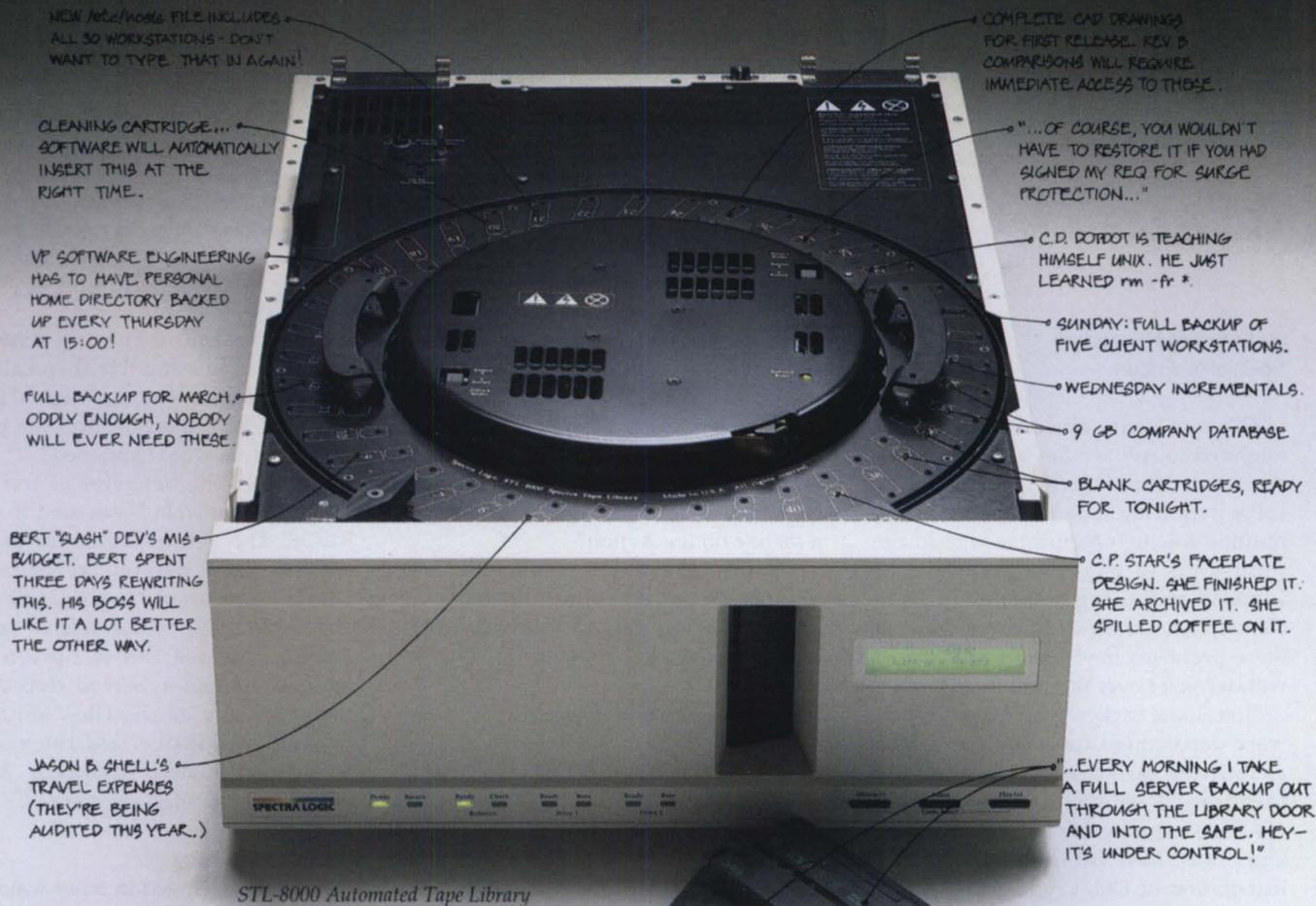
For example, suppose you had set your *umask* to 022, which indicates write access for group and others. Next, suppose you ran a program that created a file and specified the permissions 664, which corresponds to read/write access for owner and group, and read access for others. The *umask* permissions would be logically (not numerically) subtracted from the permissions specified for the new file, and the resulting permissions that would actually get assigned to the file would be 644, which would allow read/write access to the owner but just read access to the group and others.

The *umask()* system call is used to set a process' *umask*. In practice, this is rarely done by application programs. Instead, the *umask* is set explicitly by a *umask* command in each user's *.login* script, and is inherited by child processes of the login process. Δ

Editor's note: *Designs on DG/UX* is a practical guide to porting software from AOS/VIS to Unix and provides guidance in all stages of the project, including planning the port and selecting programming tools. It can be ordered directly from Brad Clements, phone 801/226-6000, fax 801/224-0920, or by CompuServe mail at 71510,3566.

Brad Clements is director of technology with Soft Solutions Technology Corporation. He can be reached at 625 South State Street, Parkview Plaza, Orem, UT 84058; 801/226-6000.

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Quick fixes

SYNOPSIS

Have you used *reorg* lately? Does the idea of setting up a modem give you chills? Don't sweat it out alone! For those who are learning to use DG/UX ICobol, someone who's been through the experience (and survived) shares his solutions to problems you may encounter.

by Ephraim Nussbaum
Special to Focus

The two years since my company migrated to Aviiions have been quite an education. Problems were difficult to solve, requiring lots of trial and error, hunting for the obscure passage in the thousands of pages of manuals, or sometimes finding someone at Data General who knew the answer. Most of these problems now seem trivial, and I wonder that I ever thought them hard.

First, some background. I am the software department for a company with an office on each coast. We have nearly identical DP setups in each office: an AV 5200 running ICobol applications. Ours must have been the first serious installation of DG/UX ICobol. I know that because when we first got it, ICobol still had some major bugs, which had somehow slipped through beta testing. Nobody could have operated a real business system with them.

We use *uucp* to transfer files and inter-office messages. As of this writing, we are still on DG/UX 4.32, but I will probably install 5.4.1 within a few days. Some of the information in this article therefore may be different as of 5.4.1. Our previous machine was an S/280 running RDOS, so it was a real change. I knew nothing about Unix, and nearly nothing about modems or communications.

How to talk directly to your modem

Problem: For a "communicaphobic" (that's me, though slightly recovered), getting a modem set up and working can be one big headache. One thing you may have to do is enter parameters to the modem's non-volatile memory. Of course, you can disconnect the modem, temporarily attach it to a PC or terminal, enter your parameters, and bring it

back to the Aviiion. If you need to experiment with different combinations of settings, doing it this way can guarantee your one big headache becoming one big migraine. So, the question becomes: How do you enter the settings to your modem while it is connected to a *tty* line on the Aviiion?

Solution: Use the *cu* command. You first need to set up a direct line in your */etc/uucp/Devices* file. Add the following line to the file:

```
Direct tty04,M - 9600 direct
```

Replace the 9600 with the speed your modem likes. Replace *tty04* with the line number of the modem. You can now configure your modem with the command:

```
cu -l $ttynn$ 
```

where *nn* or *nnn* is the line number of the modem.

Now *cu* will pass anything you type to the modem line, and pass anything from the modem back to you. If, for example, you have a Hayes-compatible modem, try entering the AT command. The modem responds: OK. Now enter the commands to configure the modem. You could even place a call, though ordinarily, if you wanted to call, you would have started *cu* differently.

Enter whatever commands to the modem you like. When you are done, you exit the *cu* command by entering a Newline followed by the two-character sequence, period tilde (".~").

The disappearing *isam* record

Problem: As part of a monthly procedure, I send an *isam* file from our New York office to California. The manager there downloads the file, and then uses *reorg* to merge a file of his into it. One

month, he found that an expected record was missing. He then called in by modem to look at the original file on the New York machine and the record was there. So what happened?

Solution: The behavior of *reorg* has changed from what I was used to under RDOS. The default behavior of *reorg* was to skip deleted records. My DG/UX version of *reorg* (I don't know about AOS/V5) copies deleted records unless you use the *-d* option. The merged file had a deleted record with the same key as the file I sent. The deleted record overlaid the existing record and made it disappear. Moral: When merging files, use *reorg -d*.

More about *reorg*

Reorg has changed in other ways over the years, and lost a few tricks. When using the recover function, you were able to specify a sequential file as output. This is no longer true; you can only recover to an *isam* file. You could also use a global switch (Unix people read: command-line option) to not skip deleted records. Since there is no such thing as a deleted record in a sequential file, when recovering to a sequential file, you effectively undeleted every deleted record. You could then *reorg* back to an *isam* file. This was a very handy trick to recover from a programmer or user error. At present, there is no way to find deleted records unless you know their exact keys. It would be nice if they would give us back a switch to copy an *isam* file to a sequential, without skipping deleted records.

How to bypass the LP system and talk directly to a printer

Problem: You're just learning Unix, and you decide to experiment with the *cat* command and redirection. You enter, "*cat foo >/dev/ttynn*", expect-

ing to see *foo* print on the printer that you have on that line. Instead, the printer gives a few spasmodic jerks and prints some garbage. Why? You find out that Unix always defaults to 300 baud on asynch lines. The printer is set up for 9600. "Use the *lp* system," you are told. "That's what it's for." Great. But inconvenient. There could be many times when you want to send data directly to a printer, either from the shell or from an ICobol program. Can you?

Solution: I don't know whether to laugh or cry over this one. The problem is so absurd and the answer is so absurd! It's not DG's fault, though. It's standard phew-nix. Hail to open systems, where nobody can fix an ancient inanity, because they would then be nonstandard. It took me several months to come up with this silly shell script:

```
#####
# catdev cat to device.
#####
stty 9600 tabs opost onlcr -onlret \
    clocal ixon ffo cr0 nl0 0<&1
cat
#####
```

Now to send data directly to an asynch line, I just use *catdev* as the end of a pipe (e.g., *cat foo | catdev >dev/ttynn*). From an ICobol program assign the printer to *|>catdev >/dev/ttynn*. Make sure the device isn't in use by the *lp* system. You can change the *stty* modes to suit.

The 9600 is hard coded, because all my *tty* lines are 9600. If you have various baud rates, use a variable, i.e., "stty baud \$1" and use the command:

```
cat foo | catdev baudrate >/dev/ttynn
```

Of late, DG has been suggesting to work around this problem by starting a sleeping background process to hold the line open at a given rate.

How to fit a long Unix pipe into a short ICobol field

Problem: Say you have a printer whose system name is PRT4. To print to it from an ICobol program, you're sup-

posed to assign your printer to "*|> lp -dPRT4 -s 2>/dev/null*". Yes, but you have programs that ask you to input the printer name, and the field isn't large enough. You either don't want to modify the source, or don't have it. What do you do?

Solution: This one is easy enough. I probably wouldn't have included it except it gives me an opportunity to sound off on something.

One way to do it is to create an environment variable:

```
PRT4="|> lp -dPRT4 -s 2>/dev/null "
```

When you run the program, assign the printer to \$PRT4, which is only five characters. When *icx* recognizes an environment variable in a filename, it substitutes its value, regardless of length.

More on environment variables as filenames

When *icx* sees a dollar sign at the beginning of an external filename, it checks to see if the first word of the field is an environmental variable. If it finds such a variable, it substitutes its value, and truncates the rest of the field. Why did they do this? It would be so much more powerful if it didn't truncate.

Maybe they had a programming difficulty. If so, I wish they would find a way around it. It would also be good if it would recognize any word in the field as a variable, not just the first (e.g., ASSIGN TO PRINTER "*|> prog \$VAR \$PRAM*"). I won't ask for it to recognize dollar signs in the *middle* of a word (e.g., "FILE\$NAME"), because of possible compatibility problems.

I don't know how much time DG (and Envyr) are willing to expend on DG/UX specific enhancements, but I suspect there would be a lot more DG/UX ICobol users if ICobol were given some more oomph in general, and if its interaction with Unix were beefed up. Δ

Ephraim Nussbaum is Systems Manager with Nature's Plus, a division of Natural Organics, Inc. He may be reached at 10 Daniel Street, Farmingdale, NY 11735.

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Brian Johnson

WASHIng machines

SYNOPSIS

BJ explains some inside history of the celebrated WASHI chip and offers a solution to one performance quirk.

I've put off writing about the performance quirks of WASHI-based MVs ever since the first WASHI-based MV was announced, but the time has now arrived.

For those of you who don't know exactly what's the big deal about the WASHI chip, a little explanation is in order. As it happens, WASHI is the Japanese word for "Eagle" (Nippon DG was involved in the design), and Eagle was one of the original internal DG code names for the first MV processor design ("Elusive Bird" was another). The WASHI chip is a complete implementation of the MV instruction set, and forms the basis for a wide range of recent MV processors, from the smallest MVs all the way up to the recently announced MV/35000. That's quite a feat considering that the MV is an MBCISC machine (Mind-Bogglingly Complex Instruction Set Computer).

Way back when the WASHI chip set was being designed, to DG's credit, they sampled the opinions of quite a few people both inside and outside the company about the relative speed of integer versus floating point instructions in the WASHI chip set. I was one of the outsiders. Because of the relationship between speed and real estate (faster means more space on the silicon), a tradeoff had to be made between integer and floating point instruction speeds. I voted in favor of integer speed, as apparently did most of the other people who were asked.

The logic is pretty simple. What does a typical MV running AOS/VS spend a large amount of its time executing? Unless your application involves running a model of the upper atmospheric of the North Pacific Ocean or computing pi to a million digits, chances are that you spend the bulk of your time executing the integer instructions. This is especially true when you consider that the entire operating system contains only a handful of floating point instructions. And if your system is like

Figure 1. :SYSMGR Benchmark Results

	INT	CIS
Non-WASHI:	—	—
MV/4000 w/FPP	1.00	1.00
MV/15-8	1.42	1.74
MV/8000II	1.78	1.89
MV/15-10	2.47	2.00
MV/10 w/FPP	3.28	5.53
MV/20	3.56	2.24
MV/20 w/FPP	3.56	6.95
MV/15-20	3.78	2.34
MV/40000	9.96	14.44
WASHI-based:		
MV/5500	3.59	1.25
MV/9300	3.71	1.44
MV/30000	4.02	1.82
MV/9500	4.73	1.87
MV/35000	5.43	2.48
MV/9600	6.32	2.45

most, it spends considerable time executing system code. And anyway, number-crunching freaks are more likely to be plying their trade on cheap, fast workstations than MVs these days.

Unfortunately, there's a third class of instructions on MVs that traditionally have been handled by the floating point logic, even though they technically aren't floating point, and they weren't included in the designer survey. This third class is the commercial instruction set (CIS). CIS encompasses floating point, unpacked decimal (ASCII), packed decimal (Binary Coded Decimal or BCD), and twos-complement binary arithmetic and conversions. Historically, the CIS instructions have been associated with the floating point instruction set in terms of hardware design because floating point is a subset, albeit a significant one, of CIS.

Several MVs have Floating Point Processor (FPP) boards available as an option, and this has led to some confusion. A question I'm asked a lot is, "How is floating point handled when there's no FPP board?" Simple, the instruction set is implemented in microcode, just like the integer instructions (although they're clearly a lot more difficult to implement). It requires lots more space in the microstore, and runs much slower than the integer instructions due to its complexity. If an FPP board is installed later, a different version of microcode is required. The FPP version of the microcode knows to simply engage the FPP board when a floating point instruction is encountered, rather than perform the instruction in microcode. The performance gain is considerable.

So, even before the first WASHI chip was sliced from the first wafer, we knew the floating point instruction set was going to be slower relative to the speed of the integer instruction set than was the case on earlier MVs implemented using more traditional designs, with or without the optional FPP boards.

Early results from the :SYSMGR Benchmark Suite bore this out. The :SYSMGR Benchmark Suite reports speeds relative to an MV/4000 with an optional FPP board (because that's what we have here at :SYSMGR). Figure 1 contains some results for integer and floating point speeds for both tradition-

al and WASHI-based MVs. The floating point test in the Benchmark Suite is actually modeled on the code generated by the Cobol compiler for a MOVE instruction, so the results are a bit pessimistic if your actual application is a Fortran-style number cruncher. Be that as it may, note the relatively poor performance of the WASHI floating point tests compared to the integer tests.

So, how bad is this news? Well, not very. Remember, most commercial applications spend only a relatively small fraction of their time executing floating point or commercial instructions. Let me give you an example. A client of ours who uses MV/4000s and is a heavy Cobol user asked us what the effect of adding an FPP board would be on the speed of his applications.

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According to the published specs, the FPP speeds up CIS operations by a factor of two. I advised him to expect only about a 5 percent increase in speed. He actually got 4 percent. The reason for the disparity is that unless a Cobol program spends the bulk of its time doing MOVES that involve differing data types, the CIS (and therefore the FPP) is not involved.

Then something funny happened. We started to get reports from users of the early WASHI-based systems that some of their Cobol batch jobs were running two or three times slower than expected. I didn't pay much attention until a user showed up who had upgraded (?) from an MV/10000 SX to an MV/9500. He should have seen a slight improvement in Cobol batch job times, even tak-

ing the slower floating point performance into account. Instead, some jobs were taking twice as long.

A bunch of investigation, including an analysis of the benchmark code by some WASHI gurus at DG, turned up the following bizarre explanation. It seems that late in the design, after the survey, somebody noticed they were running out of space on the chip for the microcode needed to implement some of the more complex commercial instructions. The solution they decided on was to select a couple of instructions they thought were infrequently used, and instead of implementing them in precious microcode, they would go "off-chip" into a reserved page of main memory where a set of subroutines had been conveniently loaded, and execute the instructions there. Well, sports fans, the problem with this implementation is that main memory, and the relatively slow instructions you are constrained to executing there, is one whole helluva lot slower than a microcode implementation. About a hundred times, in fact. A little test program I wrote showed instruction times of around a millisecond versus about 10 microseconds for a non-WASHI system.

So what's the problem? These guys were smart enough to pick instructions to execute off-chip that were rarely used, right? Gee, I wish. They picked WLDIX and WSTIX instructions. Too bad they didn't take a little stroll down the hall and ask around about how often the WLDIX and WSTIX instructions are used. Had they inquired at Cobol HQ, they would have found out that the instructions they picked are the very ones frequently used by the Cobol compiler to do MOVES between differing data types. Mega-Oops.

One thing about silicon—it's real expensive to change once the design has been set, so there's no chance of fixing the problem at the hardware level. How about a software solution? Well, maybe. The Cobol group made a few changes to the compiler and libraries to avoid using the slow instructions whenever possible, and that helped a lot. I'm not exactly sure about the compiler revision, but I think most of the changes were incorporated by 3.30. However, even in the most current rev, 3.71, there are still a few WLDIX/WSTIX instruc-



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tions. Any other possible solutions? A few.

One solution would be to speed up the WASHI chip and, in fact, this has already been done. The early WASHI-based machines ran at a relatively slow clock speed compared to what the chip was originally designed to be capable of. As improved manufacturing techniques increased the yield of chips that could operate at higher clock speeds, DG announced follow-on models (e.g., the MV/9600 is the faster clock speed version of the MV/9500). This helps a bit, but the disadvantage of executing WLDIX and WSTIX off-chip is still formidable.

A second solution would be to identify those places in the program where operations are causing WLDIX and WSTIX instructions to be generated, and change the source code in such a way as to avoid them. Not easy, since it means changing the shape of the data items involved, and that's not always possible. In addition, there are still a couple of library routines that have WLDIX and WSTIX instructions hard-coded into them. The library routine called to implement the Cobol syntax "IF item IS NUMERIC . . ." is a case in point.

A third solution is to identify cases where the WLDIX and WSTIX instructions are generated unnecessarily, in spite of the best efforts of the Cobol compiler group, and can be replaced by WLDI and WSTI instructions that are similar, but executed on-chip. The only way to do this is with a program that reads the Cobol application .PR file looking for WLDIX and WSTIX instructions, including those in the Cobol library routines, and determines if they can be safely changed. It wasn't easy but I wrote just such a program, and in several cases it has improved the performance of a couple of batch programs by factors of two to four, especially programs compiled with early revs of the Cobol compiler. In other cases, the improvement has been only slight. It appears there's no way to predict the amount of improvement in advance, except in cases where the program is clearly running much more slowly than expected.

So far, I've only written the program for Cobol .PR files, but in theory it

should also be possible to write a version for PL/I .PR files. As far as other languages are concerned, most don't seem to use the WLDIX and WSTIX instructions. For example, a check of the ICobol and B32 .PR files turned up zero occurrences.

So, if you have a Cobol program that runs much slower on your WASHI-based MV than you expected it to—

especially if it was compiled with an early rev of the COBOL compiler—then give me a call and we'll arrange a test to see if my utility program has some promise for your application.

For those interested in obtaining the full set of results from the :SYSMGR Benchmark Suite, you'll need to submit results for your own system by downloading a copy of the Benchmark Suite

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:CACHES:DISK_DATA

A few months back I said that the DG documentation for the optional AOS/VS II Data Cache (DC) advised that the break-even point occurred at about 30 percent overall cache efficiency. That brought a fast phone call from the person at DG who was most responsible for analyzing the effectiveness of the DC option. He requested a correction and faxed me the section of the DG Performance Monitor (MONITOR) manual, which covers the DC option, plus some of his unpublished notes on DC performance.

The section of the MONITOR manual that he sent me was from change file 093-364-02 and advises a break-even cache efficiency of 20 percent for cache entry sizes of 32 or fewer blocks.

I tried to locate the 30 percent number I remembered seeing, but I couldn't find it. As near as I can remember, I thought I remembered seeing it in the pre-release version of the DC documentation that was handed out at a NADGUG session lo those many years ago when the DC option was first announced (AOS/VS II rev 1.20). Unfortunately, I apparently didn't save a copy.

So until better data are available, I guess we should just go with DG's published break-even percentage of 20 percent.

:HNY

Yep, that stands for Happy New Year. Δ

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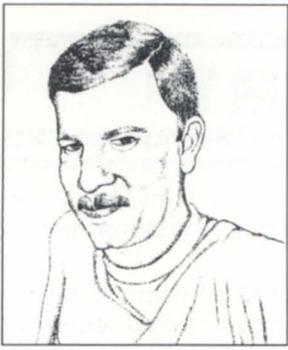
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Tim Boyer

Onward with ICobol 2

SYNOPSIS

These are exciting times if you're using ICobol. NADGUG 92's ICobol roundtable produced a wealth of information about ICobol 2, the new product from the recent ICobol/ICHOST agreement.

For the first time in years I made it back from a NADGUG conference without a cold, flu, or other major ailment. Somehow, it's much more pleasant to attend sessions when you can breathe.

I always look forward to the ICobol roundtable and SIG meeting. This past October in Kansas City we saw an especially large turnout due to the recently announced ICobol/ICHOST agreement. Roundtable panelists were Ralph Jordan and Ed Egan from Egan Systems; Rick Strom, ICobol marketing product manager; and Betty Balch, in charge of languages and third-party products at Data General's Research Triangle Park facility.

ICobol 2, the new product, will be released contractually by July 1993. The same revision will appear on all platforms simultaneously. All platforms will share the same switch structure. The code will be ANSI '85 intermediate

compliant.

The product will support ICHOST's Program Library, allowing you to merge multiple programs' object code into a single library file, loaded at runtime. Although this is very important under Unix—it greatly reduces the number of handles required—those trying to find an acceptable hash frame size for a directory with 2,000 entries under AOS/V5 will appreciate it, too. Not only will it save search and loading time, but programs put into the library are compressed. They'll take up less disk space.

There will also be a new revision of Minisam. Rev 7 will allow up to 16 alternate keys and allow you to forbid duplicate alternates. Here's something the ICobol community has been requesting for a couple of decades. Better still, this version of Minisam will read all versions of the file structures with no conversion necessary. Your 1.40 and 1.50 files can coexist peacefully with the new file structure.

Planned enhancements will start to bring the language into the 21st century. All utilities will now take templates, so a command like ICVERIFY +.CO will work. ICobol 2.0 will include hot key support, windowing, and networking—with itself as a minimum, and across operating systems when possible. Some steps are also being taken to improve performance.

Under MS-DOS there will finally be a full ICobol development environment available, with the compiler and debugger working on all processors, 8088 and up. You'll be able to have up to 129 (!) MS-DOS users, depending on your hardware.

Figure 1: Segmented key structure

```

SELECT INVOICE-FILE
  ASSIGN DISK, "INVOICE_FILE"
  RECORD KEY IS INVOICE-KEY
  ALTERNATE KEY IS INVOICE-CUSTOMER-NUMBER, INVOICE-DATE
  ALTERNATE KEY IS INVOICE-ITEM-NUMBER, INVOICE-DATE.
FDINVOICE-FILE.
  01 INVOICE-RECORD.
    03 INVOICE-KEY.
      05 INVOICE-NUMBER          PIC 9(6).
      05 INVOICE-DATE.
        07 INVOICE-YEAR          PIC 9(2).
        07 INVOICE-MONTH        PIC 9(2).
        07 INVOICE-DAY          PIC 9(2).
    03 INVOICE-CUSTOMER-NUMBER  PIC X(6).
    03 INVOICE-ITEM-NUMBER      PIC X(12).
  
```

An old friend will be back. The Printer Access Scheduling System (PASS, has been resurrected. (RDOS lives!) This will be nice for VS users, and especially useful on Unix systems.

But what would ICobol be without its much-vaunted compatibility? All versions of ICobol, from ICOS 4.4 to ICobol 1.70, will run unmodified. All file systems are supported. ICHOST's MAKECX utility, which combines and optimizes the .PD and .DD file into a single .CX file, will run on all your existing programs.

Finally, all your utility *functions* will be supported. Interfaces will be standardized. Some names may be changed, but you'll have compatibility macros supplied for AOS/VS and Unix.

Whew. That was the first 15 minutes of the roundtable, and my pencil was smoking by the time Ralph Jordan got through talking. Betty Balch and Rick Strom then spoke about Data General's end of the deal. DG will continue to support its existing ICobol products.

DG's people are working with Egan, and will have technical staff on site.

One of their main concerns and responsibilities is ensuring upward compatibility on all new products. A major selling point for me back in the ICOS days is that software I wrote on that CS-40 under DOS could be moved to one of those M600 machines under AOS without changing a line of code. It's still a big selling point (but I believe DG has come out with some new processors since then), and Data General wants to make sure it stays that way. RTP is holding regular meetings with Egan to review design specs and implementation, to manage the beta testing, and do its own extensive testing prior to release. It's readily apparent that this was a well-thought-out process, rather than just dumping the code on Egan's doorstep.

Until the changeover, RTP is working hard to reduce the number of open STRs so that the code going to Egan will be as clean as possible. The current STR

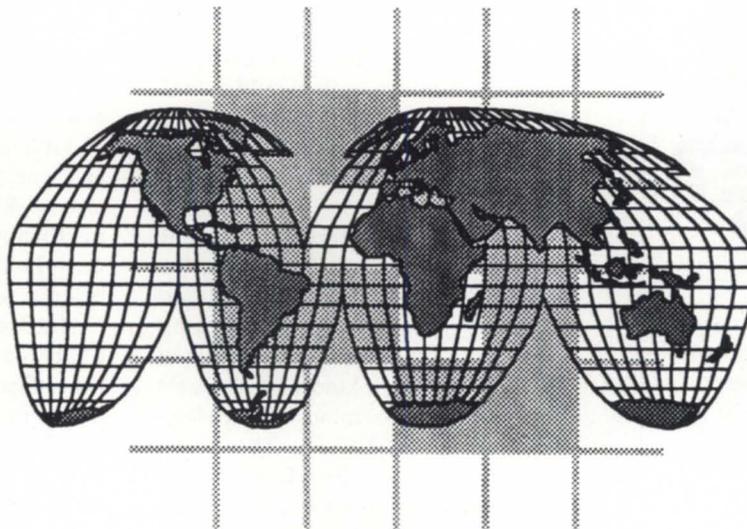
count is under a dozen.

The floor was thrown open for questions, and one of the first was, naturally—how much? Rick Strom said that if you bought Egan's ICHOST for DOS from DG now, there would be a free upgrade to ICobol 2 when it came out, because there is no current DG compiler on DOS. He declined to be pinned down on an exact price for other platforms and situations, but said DG wanted to make the upgrade as painless and inexpensive as possible. AOS/VS pricing will be CPU-based, and Unix and MS-DOS user-based.

And yes, there will be a dongle—a hardware protection device. In most cases, this is an unobtrusive, painless method of software protection, and I much prefer it to schemes that give you files that can't be moved or dumped. I say most cases only because my PC is starting to look T-shaped with this dongle tail coming out of it. Maybe someone needs to invent the 90-degree dongle. Then I can wrap the suckers in a

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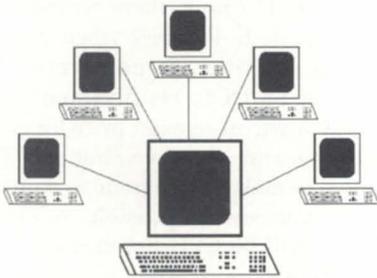
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spiral around my CPU . . . but I digress.

At that point in the meeting I took the podium to discuss the RFE process and to pass along some requests. Those who have paid attention know that the ICobol SIG is now responsible for determining the priorities of all the ICobol requests for enhancement. I brought up some of the new requests, and they were discussed among the attendees. Here are just a few you'll be seeing in the next revision or so.

More runtime units

Currently, there can be one main program and 15 subprograms open at one time. This limit will go to 32. Some people have requested more—one even asking for a top limit of 255. God help you if you use 255 active called programs. However, as Randy Berndt wrote, this should be the choice of the programmer. If we need the resource, and are willing to pay the price, let us.

Normally, I'd protest on behalf of those of us who weren't willing to pay the price—this memory must be pre-allocated. But Ralph Jordan suggested a section in the ICobol 2 configuration file that will let the user specify the maximum number of run units to make available. Now *that* makes sense. In RDOS, you made the choice between number of users, size of programs, number of open files, and so on. This would be similar. Those of us specifying four maximum run units would actually save memory. This will make more run units nearly painless—but there will always be a performance/memory price to pay.

Here's a case where I need some user group input. Are 32 run units enough? Are they too many, considering that there's some performance hit involved? Are 64 enough? How about 128? Give me some kind of reasonable number, keeping in mind Robert Heinlein's motto: TANSTAAFL—There Ain't No Such Thing As A Free Lunch. If the group decides to go with 255, *everyone* will pay *some* kind of performance penalty.

.VM files in memory

It was pointed out that a CALL to a subprogram that just reads a record now causes a read of the .VM file, a read of the file, and a write of the .VM

file—way too much overhead. This made sense in the RDOS days, but memory is just a bit cheaper now. A switch will be added to the runtime unit that says, "I've got enough memory—let's do this *all* in memory, rather than writing to disk." Likewise the linkage section, and anything else that could be swapped to disk.

Variable-length ISAM files

These will be real variable-length files, and will be out in ICobol 2.1.

Segmented keys

If you have two alternate keys in the invoice file and you'd like them sorted by date when you access them, the date must be specified three times. This isn't an ICobol mistake—it's ANSI standard. With a segmented key, you could have a structure like that shown in Figure 1. A READ NEXT of any of the keys would bring up the records in date order.

The advantage is obvious. It's rather like Infos without the overhead. The price to be paid is that the total number of keys—alternates plus segments—can't exceed 16. That is, if you have eight alternate keys, and one of the keys has six parts to it and one has two, you're at the max. I think this is sufficient.

A change in utilities

Wait, don't panic. You'll still be able to do everything you used to do, and it'll be easier than ever before. You just won't type the same names. Let's face it—REORG is a nice program that performs many functions, most of them in a mediocre fashion. It's trying to be a report writer, file converter, ISAM fixer, and, until recently, a tape utility, and it succeeds well at none of them. Egan wants to put out a series of different programs that perform the same functions. In the process Egan will try to improve them and make them a bit more automated.

Let's take a typical corrupt file. You get an access error, so you run an ICVERIFY on it. Whoops—header's corrupt. Run ANALYZE so you know where the keys are. Delete the .NX, rename the .XD something else, do a REORG/D—careful, you specify those alternates right or the whole thing will

blow up on you!—get a file. Run ICVERIFY on it to be sure, delete whatever you renamed the .XD to, and you're ready to go.

Simple, right? If this was as good as Peter Norton came up with, he'd be selling clones down at the local K-Mart. There's no reason we should have to put up with this. Certainly, the assumption is made that we're a little more sophisticated and knowledgeable than your average PC user. So why not a utility that does all this, with prompts along the way?

"File XXX has an invalid header. Would you like me to save a backup copy (Y/N)? Would you like me to attempt to repair this file (Y/N)?" That's what Egan is working toward, a repair utility that repairs files, and a convert utility that converts files. And ones with, we hope, a little more sophistication—REORG was great in the 1970s, under RDOS.

I've about run out of room telling you what's going to be done, and I

haven't had a chance to tell what's *not* going to be done. Egan and Data General will make an effort to include the enhancements desired by the user group that are technically feasible and financially reasonable. What you probably won't get in ICobol in the future are enhancements that benefit a single operating system.

One of the requests was to allow assignment of element sizes on nonindexed files. If, for instance, you knew you were going to create a humongous print file, you could specify a large element size and save some time.

Number one, it's just as easy to do a CALL "CLI" USING and put CREA/ELEM=xxx filename. Number two, of what possible use would this be to someone running Unix or MS-DOS? So this is one enhancement that almost certainly won't appear. On the other hand, the enhancements scheduled above will benefit every operating system.

These are exciting times if you're

using ICobol. Submit your requests for enhancements. They'll get to the ICobol SIG, be ranked, and passed on to Egan and DG, and be acted on. Continue reading this magazine; we'll keep you up to date on changes, and we'll print the responses to some of the RFEs we're getting.

And above all, attend the annual conferences. If you're looking for answers from the ICobol developers, wondering what your peers are doing with the language, or are interested in getting one of your favorite enhancements adopted, this is the place to get things done. I'll see you in Atlanta. Δ

Tim Boyer is EDP Manager at Denman Tire Corporation. He may be reached at 400 Diehl South Road, Leavittsburg, OH 44430; phone 216/898-2711, fax 216/898-5256, or on the NADGUG bulletin board at 415/924-3652, or on the CSC bulletin board at 800/DASH-CSC.

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David Novy

Monster machines

SYNOPSIS

There may be many potential Data General customers out there who could make great use of Aviion file servers for doing enterprise-wide information and document management, if the proper software were available.

The 1992 NADGUG conference from which I returned recently confirmed Data General's claim to being the industry leader in Unix file server technology. But what's unfortunate is that it appears DG now has Unix file servers that far outstrip the needs of the company's present customer base.

If Data General wants to continue expanding, it needs to modify its present customer base. One of the best ways to do that might be to develop products and services that meet the information control needs of *Fortune 500* companies. I will explain.

When I looked at the name badges of people I saw at NADGUG 92, I noticed few attendees from large companies. If representatives from such companies were present, they generally were not part of their companies' information handling function.

Most of the attendees represented hospitals, law firms, insurance companies, small companies, U.S. government agencies, and medium-sized cities. These people are very loyal to Data General, and DG has been very responsive to their needs.

However, few of these companies or agencies will ever need machines the size of an 8-way Aviion, let alone the monster machines that DG plans to bring to market in the next year. Monster machines need monster information loads in order to justify their existence. There are few DG customers today that can generate such information streams.

On the other hand, I also recently

attended a Sherpa users' group meeting. Sherpa is currently the market leader for commercial software for configuration management and document handling. The customer base represented at this meeting was quite different from that of a NADGUG conference. Attending were representatives from General Motors, Schlumberger, McDonnell Douglas, Hughes Aircraft, Rockwell International, Micropolis, Sikorsky Aircraft, Pitney Bowes, Intel, Jet Propulsion Laboratory, and Westinghouse, to name a few.

These large companies are on the verge of spending billions of dollars to install computer systems for controlling documents within their companies. These people are spending big money for the following reasons: to comply with ISO 9001 specifications; to comply with government regulations; to get quality products to market in 50 percent less time; and to remain competitive.

Data General now has machines that can meet the information-handling needs of the huge *Fortune 500* companies. Unfortunately, Data General currently has no document-management software to complement the machines.

Data General is not totally ignoring this market. DG is currently evaluating an image-management software package. I saw the product demonstrated at NADGUG 92, and it looks very powerful. However, there is a big difference between an image-management software package and an *enterprise-wide* document-management package. For some companies, an image-manage-

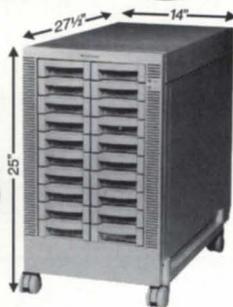
ment software package may be adequate, but most large companies soon learn that image management alone is not enough. These companies need software for native file control of engineering documents, government regulation compliance documents, standards documents, and product information packages, in addition to images.

It appears that Data General's marketing people do not believe that they need a product like Sherpa running on DG equipment. It is somewhat interesting that they should feel this way, if they do, since the marketing departments at Digital, Hewlett-Packard, IBM, and Sun appear interested enough in Sherpa to pay the money required for porting Sherpa to their various platforms. The company I work for believes that information management is important enough to prepare for spending millions of dollars during the next three years installing an enterprise-wide document and information management system.

In conclusion, it appears Data General is on the verge of a revolutionary breakthrough in Unix file server performance. It would be interesting to know what DG plans for prospective customers to process on these powerful machines to justify their purchase. I know I could make great use of Aviions as file servers for doing information and document management on an enterprise-wide basis—if the proper software were available.

I believe there are many other potential customers who could use

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Blazing, Streaming, TCP/IP

Congratulations are in order for the DG/UX development team that found a way to modify DG/UX TCP/IP so that it could be STREAMS-based, and yet capable of running at full ethernet speed with minimum system overhead. It must have been a labor of love.

First, there would have been many doubters, because as "everyone knows," STREAMS-based applications are inherently slow.

Second, there must have been many internal doubts along the way because the work was extremely tedious, and because they had to invent hardware and test procedures to achieve experimental resolution fine enough for measuring performance changes. Third, the problem they were trying to solve possessed both a hardware and a software component.

The solution developed by the design team consisted of improved code and a new ethernet controller. The

new controller is the VLCi. When combined with the new DG/UX revision 5.4.2 TCP/IP, it gives the Avion ethernet throughput equal to any other machine on the market, and with the lowest system overhead on the market today, in a manager that is fully Unix STREAMS-compliant. DG/UX revision 5.4.2 is currently shipping, and the VLCi controller is available from your DG sales rep. List price of the VLCi controller is about \$3,000.

For those of you who prefer numbers to mere adjectives like "blazing" when describing system performance increases, system overhead on an AV 5225 and the old VLC ethernet controller went from 58 percent under DG/UX 5.4 to 41 percent under DG/UX 5.4.2. Switching to the VLCi controller further reduced overhead from 41 percent to 19 percent under DG/UX 5.4.2.

Congratulations on a job well done.

Unix workshop

The first NADGUG DG/UX work-

shop was held in conjunction with the NADGUG 92 conference last October in Kansas City. It was attended by more than 30 people. Thank you to all the presenters: Sue Dintelman of DMS Systems; Gary Beck of Zetaco; John Claflin of Claflin & Clayton; and Mike Brazao of Storage Computer, Inc.

The workshop was well received, but some attendees asked that more emphasis be given next time to DG/UX system management fundamentals and "war" stories, in addition to upcoming trends in the Unix marketplace. The requests have been noted. Be assured that the next workshop will offer a more day-to-day operations format. Δ

David Novy is a technical computer specialist at 3M in St. Paul, Minnesota. He is past chairman of the AOS/VS special interest group, and current chairman of NADGUG's SIG/UX.

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Archiving without palpitations

SYNOPSIS

Data security and delaying the need for more disk space are among the many benefits to consider when choosing an archiving system.

by Gordon Campbell
Special to Focus

If you are one of the many Data General sites out there running CEO, you probably get heart palpitations just *thinking* about archiving. After more than three years with 100 users churning out CEOwrite documents on our MV/2000-1, it was time for us to, as they say, pay the piper. We agonized over whether to use the CEO archiver, or to just buy another disk and hold off on archiving for a couple of years.

Enter Ed and Ed—Rosen and Levin—of Data Bank Associates of Germantown, Maryland. Ed Levin had called me to follow up on a visit to their booth at the NADGUG Conference last year. During our conversation, Ed mentioned that the company was working on an archiving product for CEO called "AIM," and would we be interested in it?

The product was the creation of Ed Rosen, who proceeded to tell me they were writing for CEO something to archive CEO documents to the same location on the disk as that of the original documents. The clinch: documents would be compressed, using only about 40 percent of their original disk space.

We were asked to be a beta site, and I replied, "Sign me up."

Judging criteria

When I look at a product, I judge it on three criteria: 1) how well the product does its job; 2) the quality of the user interface in order to make it func-

tion; 3) support from the people who wrote it.

In the case of AIM, I would give numbers 1 and 2 an "A," and number 3 an "A++."

The product can be used in two ways. First, the user can interactively flag documents for archiving, or restore documents immediately on demand. Second, the system manager can perform blanket archives for groups of users based

Figure 1: Archive interface module

Action (Archive/Restore):

Drawer =
Folder =
Document =

Execute (Y/N)?

on how recently documents were last accessed or modified. The date that the document was last accessed or modified are the dates that are tracked by CEO, *not* the VS filing system.

AIM is set up as a public application. Users will find it easiest to access if they set up a command function key. Both functions take only a minute or two to perform, and are well-documented in manuals provided. Another tip: we had our users change their filing surveys to show the "archived" status field, and changed the title of the status field to "C" or "COM" to indicate a compressed file. We thought this a better indication of file status, rather than "archived," which implies it has been stored off the system and isn't readily accessible.

AIM displays a simple, friendly screen (see Figure 1), prompting the user to choose either "Archive" or "Restore" activities. The user chooses drawers, folders, and documents to be processed. Each level has a separate field in which to enter the choice. If unsure of the correct name, the user may call up an index screen like CEO using shift F2. The index also allows selection of multiple drawers or folders or documents. When satisfied with selections, the user presses F1 (execute). If "Restore" is chosen, selected documents are immediately decompressed (restored).

If the "Archive" is selected, then documents will be marked for archiving, and will appear and will be treated as "archived" by CEO. Documents are only flagged to be archived at this point. Actual "archiving" or compression happens when the system manager runs the "AIM_UPDATE" macro. This update macro is usually run overnight in batch mode, or when the system is

Figure 2: AIM survey report

Date:	6-NOV-91				
Time:	1:29				
Age based on Date Last Accessed					
AGE LIMIT (IN WEEKS)	DOCUMENT COUNT	DATA BYTES USED	FILE BYTES USED	ESTIMATED AIM SAVINGS	
More than 0	61,144	444,154,724	534,237,184	378,783,031	
More than 1	58,945	423,062,961	508,782,592	360,710,556	
More than 2	57,801	405,754,429	498,130,944	353,107,247	
More than 3	56,704	399,426,597	487,632,896	345,618,846	
More than 4	56,001	399,426,597	480,206,848	340,407,539	
" "	" "	" "	" "	" "	
" "	" "	" "	" "	" "	
More than 207	8,825	47,454,922	56,078,336	39,469,113	
More than 208+	8,665	46,279,963	54,736,896	38,538,909	

less busy.

The second method, called Automatic Archiving, selects all documents not accessed or modified for a specified number of days. The key to this process begins with a tool called the AIM Survey. The survey gives you the first real information that you need to manage a

CEO environment. It will give you the age of all documents (by CEO date last accessed and date last modified) as an overall set of figures, as well as by individual user.

To start the process, you make a list of users you want included in the reports. You can do this with a supplied

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macro, and then modify it with any text editor in order to remove users you want exempted. But you may want to include everyone initially in order to obtain information on the overall status of the CEO system. This list becomes the input to the AIM Survey Program, which is run to create a statistical data base of users, documents, and access dates. Once the data base is created, several reports can be produced based on date last accessed or date last modified, over a selected number of weeks (1 to 208). These reports give you an accurate estimate of space the documents are currently using, and how much space would be saved if they were archived under AIM.

Two types of reports can be produced. The first gives a historical summary report (Figure 2, page 29). This aging report shows totals, by the number of weeks old, for the entire system based on date last accessed, and date last modified. It also shows the total number of bytes used, the number of file bytes (includes remaining overhead from the file element size), and anticipated space savings if the files were placed into an AIM Archive Library.

The second report is the same as the first, but on individual users. This report is run for a specific aging period—for example, all documents not accessed in 52 weeks or more. This report can be run many times in order to see the savings if the AIM automatic archiving was used with different criteria.

Automatic archiving

Armed with this information you can run the automatic archiver, supplying it with the desired age data. This process marks the documents in the CEO data base for AIM archiving, and as well creating an AIM data base entry. Documents are compressed during the next run of the AIM update procedure.

We have seen that all programs work very well and are easy to use. Any problems we have encountered have been nondestructive, and were resolved on a timely basis. From a user's perspective, it's terrific not having to request an operator to load a tape for restoring a document. Now the user can restore a document, immediately, whenever needed. System managers

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will find the product easy to use, with all macro procedures supplied for each function and ready to go.

All of the programs seem quite robust, and yet not system intensive. We have run all the processes described during working hours, and they have not heavily affected system response times. Having said this, I would still recommend the AIM update macro be run at night in batch mode, to enable logging of output to a list file or printer.

For system managers handy with the Infos "INQUIRE" utility, the AIM archive and restore details are kept in an Infos data base. This allows you to access the user, drawer, folder, document, pathname, date, and time details for all entries. Use the information to produce your own daily or weekly reports. For those who shudder at the thought of using INQUIRE, most of the information is also written to a text trail file. System backups will not need alterations in order to back up new compressed files, as they reside in a file

under the same directory as the original documents.

Another great feature of AIM is that it is available in French and Hebrew as well as English (with appropriate PROM chip), and soon to follow in Swedish, Spanish, Italian, and German.

**From a user's perspective,
it's terrific not having
to request an operator
to load a tape for
restoring a document.**

Another switch that can be used on execution is "/W", enabling the "+" wildcard option used for selecting at the drawer and folder levels when archiving or restoring. I strongly recommend *not* using this switch because of the danger of typing ahead, resulting in all drawers or folders being archived or restored by accident.

The default for the product is no wildcards allowed on drawers and folders, as DBA felt it otherwise too dangerous—I agree! But you can still use the wildcard to select all documents in a folder, or use the index to select or mark all folders or drawers.

We tested AIM software in November 1991, and purchased the product in the following month. The cost of the product is based on CPU size and multiple site licenses are available.

Support from the DBA people has been exceptional. They are always willing to discuss how the product works and how it interacts with other related products you may be using. AIM has allowed us not only to have a superb archiving system, but also to put off indefinitely the purchase of more disk storage. Δ

Gordon Campbell is MIS manager for the Canadian Banker's Association in Toronto, Ontario. He can be reached at 416/362-6092.

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SYNOPSIS

What will it mean for Data General to turn over future BBASIC development to an outside company?

by George Henne
Special to Focus

I just returned from the NADGUG Conference in Kansas City, where a meeting of the Business BASIC Special Interest Group (BBSIG) was held. It was a good meeting, with a bombshell from Data General tossed in.

The big news is that Data General has transferred support for Business BASIC to Patni Computer Systems of Bombay, India. A number of other Data General products were transferred there early in 1992; Business BASIC was quietly added to the list around May.

The attraction to Data General is clear: DG wants to focus on being a hardware company, so it makes sense to contract out the work to a competent, low-cost development shop. Patni has been the Data General distributor in India for many years, and has a long and good relationship.

Patni's people have already spent time in Research Triangle Park, getting all the technical details, and have already started handling bug fixes. First-line support is still handled out of Atlanta. Users should notice little difference in how STRs are addressed. By the way, Data General has reached an impressive milestone on BBASIC STRs:

as of the date of the NADGUG 92 conference last October, there was only one Business BASIC problem outstanding.

What will the move mean for future development of BBASIC by Data General? Patni works under contract to Data General, and will implement changes as directed by DG. Two changes are planned for the coming year: Release 5.30 will contain a STEP statement for debugging (allowing line-by-line execution) and a modification to the ENTER statement to trap bad files.

By any standard, this is an unimpressive list. The work that Data General has done in the past two years to improve Business BASIC, especially under Unix, was extremely encouraging. New features were added and performance dramatically increased. The team that did the work has been disbanded and dispersed, mostly within DG. The new people at Patni, talented as they may be, will need time to reach a similar level of competence.

Perhaps, once Patni is fully up to speed on Business BASIC, Data General will fund new development to add some of the features already in Transoft's UBB. It would be a shame for the whole Business BASIC community if Data General's product fell irretrievably behind Transoft's product.

In the discussions about the activities of the BBSIG for the coming year, a number of ideas were discussed. There was strong support for ways to improve communication between members of the group and a couple of proposals were made.

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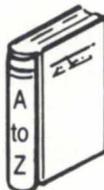
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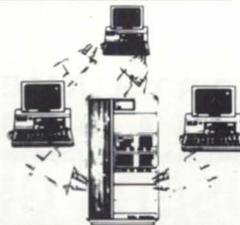
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ing up and distributing a membership directory. This will be sent, free of charge, to all registered members of the BBSIG. If you haven't joined yet, now would be a great time to mail your \$10 (U.S.) to:

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Enclose some details of your installation, and Calvin promises you'll get a copy of the directory "real soon now."

Second, we want to get a bulletin board into active operation. It seems, from our discussion, that there are already a couple of informal boards in operation around the country. We'll be looking at the participation in those, pick a good one, and encourage everyone to call in on it. It'll be great to have a forum for the exchange of ideas on Business BASIC.

I'll give the number and sign-on information in an upcoming *Focus* issue. In the meantime, if you'd like to provide some input into the process, please give me a call.

Membership in the BBSIG is open to all users of Data General Business BASIC and the variations thereof: B32, Bluebird, UBB, TAC, and MarcAlan. All operating systems are included: RDOS, AOS, AOS/VS, DOS, Super DOS, Unix, Xenix, AIX, DG/UX, HP/UX, etc. Finally, there is no requirement that you actually use Data General hardware, just that you use a language based on DG Business BASIC.

I'd like to get this column back to its technical roots. If you've got an interesting technique or problem in Business BASIC, give me a call and I'll write it up for you. I promise you full credit or complete anonymity, whichever you request. △

George Henne is the President (once again) of the BBSIG. You may reach him at The Eastwood Group, 77 Hill Cr., Toronto, Ontario, Canada M1M 1J3. Tel 416/264-5777, fax 416/264-5888. The Eastwood Group specializes in assisting Data General users in conversions to Unix.



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DASH items

SYNOPSIS

Notices and queries posted on the Direct
Access to Support Help bulletin board.

Category: DG/UX

Author: Michael Greer

Subject: *vi tmp files*

I have occasion to use *vi* to edit files that are 2 MB in size. Since *vi* puts its *tmp* files in */tmp*, which on my system is part of the root file system, I run out of space. This was easy for me to work around, but upon investigation I discovered that the *tmp* file *vi* was trying to create was more than 5.5 MB when I was editing a 2 MB file. Can someone tell me why *vi* would create such a huge *tmp* file, or is this a bug?

Reply by: William Krog

vi always creates a work file larger than the regular text file being edited, since it stores a great deal more information in the work file than just the text characters. This is built into the *vi* code, so it's not a bug. I don't know if there is a work-around. You can, however, tell *vi* to use a different directory for its temporary files, using the *:set* command. Syntax would be *":set directory=/whatever"*. That would at least enable you to control where *vi* generates these files.

Author: Wendell Dingus

Subject: 5.4.2

I skimmed through the software release notice but admittedly didn't look very close. Therefore, I thought I'd ask this question here and maybe get a quick and easy answer. Here it is: I just got in the 5.4.2 upgrade, which will be for our in-house development system and some of our customers. The tape does not say if it comes with X-Windows on it, so what I'd like to know is, does it? Our development system (AV 300 with 19-inch monitor) has been giving me a few problems lately, and I wanted to back up all the user files and totally reinstall. I would prefer to know if X is not on the tape beforehand,

though, to avoid having to get it back via some difficult method.

Also, one other quickie: Can 5.4.2 be installed on a fresh system by itself, or does 5.4.0 have to be installed first, and the 5.4.2 tape be used to "upgrade"? That's what I was told had to be done with 5.4.1, but it looked like the 5.4.1 install script just redid the same things the 5.4.0 script had done, only using newer versions.

Reply by: Wiley N. Johnson

5.4.2 is a complete system tape. It is *not* required or allowed. If the model number of your distribution tape is Q001, then X is not included (that is the server tape). If the tape model number is P001, then that is the workstation tape, and *does* include X. X from 5.4.0 should not be used with 5.4.2, I don't believe. I think a new release of X11 is included with 5.4.2.

Author: Rodney Wright

Subject: DG/UX 5.4.2

We have two OS release tapes. One is labeled "Q001APY1CA", and the other is labeled "Q001ASY61A". We wonder what the differences are between these two tapes. Can anyone give us a clue?

Reply by: Wiley N. Johnson

Q001 - DG/UX server package
A - version
P - user count - P=1-16,
S=Unlimited
Y - CPU class; all 5000, 6000,
7000, 8000 servers
1C - License and service offering;
license, media, and doc
61 - License and service offering;
Support Plus
A - media type; QIC cartridge

They should be the same.

Author: Bernie Gaider

Subject: **Raw partitions**

On our DG Aviiion 4600 with rev

5.4.1 of the OS, we have multiple raw hard disk partitions. Is there any way you can back these up to just one tape, either through using *dd* or some other backup program? I suspect *dd* may be able to do it, but due to a lack of documentation, I have been unsuccessful in making it work.

Reply by: John Ross

You should be able to use *dd* by using the *norewind* device, ex:

```
dd if=/dev/rdisk/XX of=/dev/rmt/On
```

Do this for every raw disk partition you wish to back up, and that your tape has room for, but make sure you keep track of which tape file has which raw disk partition. If you need to restore one, you'll need to know which tape file it is. You can use the *mt* command to manipulate the tape.

Author: David Lawver

Subject: **Setting time in DG/UX while multiuser**

We have a bunch of Aviiion 4xxx's running 4.3 or 5.4 DG/UX. The man page for *date* states:

"Should you need to change the date while the system is running multiuser, use the *date-time* command of *sysadm* (1M)."

Does anyone know why? What we want to do is use some of the scripts we have seen around for synching all the machines with NIST time, but they all involve changing time while multiuser.

Reply by: DASH Development

I strongly suspect it's to forestall unexpected (and probably undesired) side-effects of discontinuities in the clock. Time-share accounting springs to mind. As do *make* and *cron*. This is also the probable cause for the "adjust the clock slowly" feature of the *date* command.

Reply by: David Lawver

So, if we use the "adjust the clock slowly" feature, would it be safe to adjust time with date command while multiuser?

Reply by: DASH Development

The "Managing the DG/UX System" manual (pg. 4-26) says that you should not set the clock back unless you are in single-user mode, to prevent system daemons and clock clients from operating erratically. It also states that you can set the clock forward at any run level "without disrupting" things. So, I'd suggest going to single-user mode to set the clock back, and using the -a option on the date command to set the clock forward.

Category: Utilities

Author: Home Beneficial
Subject: **Librarian**

Our company is interested in some type of source code librarian-type prod-

uct. We need something that will allow many users to look at or copy programs, but only one person to update them. We also need some type of archiving feature to recover prior versions of a program. We would like something similar to the product we have on our mainframe, CA-Librarian. We would appreciate any information you could give us.

Category: AOS/VS

Author: Mark Sims
Subject: **AOS/VS II rev 2.10 DDUMP & DUMP_II**

A user on an MV/40000 HA Mod 2, under AOS/VS II, rev. 2.10, patch level 100, experiences a problem using an 8 mm tape drive with DDUMP & DUMP_II. If the switch /SEQUENTIAL is used, the system immediately gets a hard error from the tape drive. Has this problem been reported, or is there a patch that is available?

Reply by: DG Customer Support

The /SEQ switch is used only with labeled tapes. The 8 mm drive does not support labeled tapes, so you should not be using the /SEQ switch. Several other problems with the 8 mm drive and DLOAD are corrected with an optional patch:

2.10_AGENT.PR_GIGATAPE_OPAT.

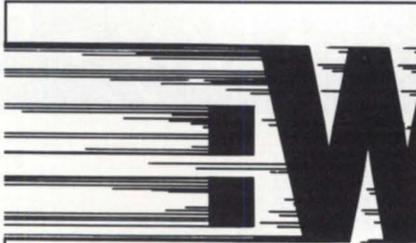
This patch comes on the 2.10 tape. The usual symptoms seen before installing this patch are device timeouts when attempting to DLOAD a large data base from the 8 mm tape. Δ

DASH runs on an Aviiion 5200 server located at the Customer Support Center in Norcross, GA. The bulletin board is available 24 hours per day, 7 days per week, free of charge. Call 800/DASH-CSC (1-800-327-4272) for the modem rotary.

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Circle 18 on reader service card.

The latest products for DG systems

Unix backup, archiving, and library management



Boulder, CO—Spectra Logic, a division of Western Automation, released a comprehensive Unix software package designed to manage data on automated media changers. The product is being distributed exclusively to Data General Aviiion users by Eagle Software, Inc.

The Alexandria Backup and Archive Librarian supports workstations and servers, either stand-alone or on heterogeneous networks. It super-

vises every facet of backup and archival storage, from automatically starting scheduled store operations to managing data, media, storage devices, and even device maintenance across an entire network. Alexandria's scheduler can supervise an unlimited number of full backups, incremental backups, and restores. Files can be included or excluded by pattern, user, group, or date; repeats can be specified by hour, day, date, day of week, month, or year.

The package manages media in libraries as well as media stored in a vault, or off-site. Users can specify the

duration of both library storage and vault storage, after which time the media can be reused by Alexandria. The system tracks media usage and requests replacement when the media's user-defined life is reached. Alexandria can also automatically insert a cleaning cartridge in systems using either 4 mm DAT or 8 mm tapes.

Alexandria includes two user interfaces. The X-11/Motif interface provides pull-down menus and graphical access to all users. The command-line interface provides scripting capabilities as well as access from text-only termi-

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MV15000 Model 8 to Model 20 upgrade	SAVE \$
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MV9500 CPU w/32MB	25,000
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4463-ZT USAM-4	\$275
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4370 IAC-16 RS232, 20MA, W TCB	600
4623 IAC-24 w/TCB-24	3,300
4367 IAC-8 RS232, 20MA Modem Cnt	400
4532-A ILC	.....	2,350
4560 LAC-12	.....	450
4608 10 Port term. serv	.....	2,800

Disk Storage Units:

6161 147MB Disk subsystem	\$400
6236 354MB Disk subsystem	600
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6329 120MB MV2000/MV1400	600
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6554 662MB for MV2500 or CSS	1,700
6581 500MB R.A.M.S. Disk	Call
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6166-X D410 Monitor with keyboard	120
6169-X D211 Monitor with keyboard	125
6391-X D214 Monitor with keyboard	.....	140
6392-X D216 Monitor with keyboard	.....	150
6393-X D411 Monitor with keyboard	.....	160
6394-X D461 Monitor with keyboard	.....	195
6500 D216 Monitor with keyboard	.....	210
6682 D217 Monitor with keyboard	.....	275
6567 D412 + Monitor with keyboard	275
6568 D462 + Monitor with keyboard	500

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Circle 24 on reader service card.

nals, allowing the experienced Unix user to access system-level commands. Prices for server versions of Alexandria range from \$1,550 to \$12,000 depending on type of system and functionality; client versions range from \$200 to \$750 for workstations depending on quantity purchased.

Spectra Logic, 1700 North 55th Street, Boulder, CO 80301; 303/449-7759. Eagle Software, Inc., 123 Indiana Avenue, P.O. Box 16, Salina, KS 67402-0016; 913/823-7257.

Circle 54 on reader service card.

Conversion services



Toronto, Canada—Users of Wordperfect's Mathplan and Planperfect for Data General can now take advantage of conversion services offered by the Eastwood Group, which specializes in assisting Data General users in converting to Unix systems.

Planperfect on Data General has no spreadsheet export facilities, making it impossible to import Planperfect spreadsheets into any other spreadsheet program.

The Eastwood Group's conversion service allows batches of spreadsheets to be moved from Planperfect and used by other spreadsheet programs, such as Lotus 1-2-3 and Computer Associates 20/20. All data and nearly all functions and formatting are preserved.

Users benefit from greatly improved performance, more features, a more standard user interface, and much larger allowable spreadsheet size. Conversions can be done for spreadsheets running on RDOS, AOS, and AOS/VS systems. Costs depend on the number of spreadsheets to be converted. In most cases, conversions can be done from even the earliest releases of Mathplan, when Wordperfect was still named Satellite Software International.

The Eastwood Group, 77 Hill Cr, Toronto, ON, Canada M1M 1J3; 416/264-5888.

Circle 57 on reader service card.

Extending disk life



North Springfield, VT—To extend the life of 14-, 10-, and 8-inch SMD and SMDE-type disk drives used and sold on virtually every computer system manufactured between 1966 and 1986, Vermont Research Corporation (VRC) announced The Answer, a series of plug-and-play disk drive replacements.

VRC's The Answer replaces drives used on a wide variety of computer systems, including Data General (Kismet 6214 and Vulcan 6122). Typically these drives supported 80 MB, 160 MB, 315 MB, 320 MB, 330 MB, and 680 MB in a dual-ported or daisy-chained configuration. The Answer is rated in excess of 150,000 hours MTBF, is guaranteed for five years of continuous operation, and offers capacities ranging from 80 MB to 740 MB.

Prices range from \$7,280 to \$13,340 depending on the size and quantity of disks replaced.

Vermont Research Corporation, Precision Park, North Springfield, VT 05150-0027; 802/885-2256.

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Circle 27 on reader service card.

RAID 7



Nashua, NH—At Technetron '92 in Boston, Storage Computer Corp. (Storcomp) announced its new RAID (redundant arrays of inexpensive disks) storage system, the Storcomp RAID 7.

Available in desktop, integrated rackmount, and modular (console) configurations, Storcomp RAID 7 platforms are designed to provide 1 to 141 GB of protected storage capacity on network file servers, including Data General's MV family and the Aviion 6225. RAID 7 breaks host I/O barriers that previously have kept a large percentage of host MIPS (million instructions per second) from being utilized. It provides virtual solid-state disk performance with data fault tolerance at commodity disk prices.

Storcomp's RAID 7 platforms feature a patented asynchronous hardware design with a real-time embedded operating system to control access to the

disk drives and data flow to the host.

Pricing for the Storcomp RAID 7 platforms vary according to packaging and configuration. Desktop units start at \$15,900, and can be expanded to support 12 disks and 2 host interfaces. Integrated rackmounted units start at \$19,500, and are upgradable to as many as 18 drives and 4 host interfaces. Console systems are separate modular rackmountable units that can be stacked to support 48 drives and up to 12 host interfaces.

Storage Computer Corp., 11 Riverside Street, Nashua, NH 03062; 603/889-7232.

Circle 55 on reader service card.

DBR for open systems



Salt Lake City, UT—DMS Systems, Inc., announced that its Disk Backup & Recovery System (DBR) utility for AOS/VS has been extended into the open systems market for AOS/VS-to-

Unix migration.

DBR solves the migration problem by allowing tapes created on AOS/VS to be read on Unix, and Unix tapes to be read on MVs. DBR on the Unix side will automatically sense that a tape was created using a VS dump utility and load the data in the Unix file system. On the Unix side, DBR loads tapes made with the AOS/VS II, AOS/VS, AOS, or RDOS operating systems. In addition, DBR for Unix will dump data to a tape in a format that standard AOS/VS utilities can load. DBR options also allow for system differences such as Unix hard links.

Hardware resources can be shared by Unix and AOS/VS II machines on a TCP/IP network. Using special software on the AOS/VS II system (the DBR MV server), DBR can dump directly from a Unix file system to a tape drive that is on the VS II system.

The tape can be created using the standard VS format, *tar*, *cpio*, or Unix DBR format.

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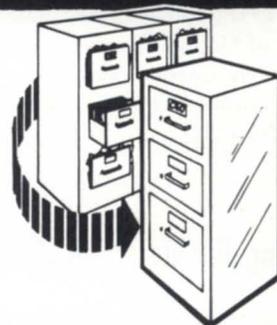
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Circle 10 on reader service card.

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

Circle 50 on reader service card.

Automated shutdown



Birmingham, England—IDC Systems Limited introduced EMAS 1288, which ensures an automated shutdown of your Data General operating system in the event of an environmental fault detected within the computer room. An automatic shutdown will also occur when there is a prolonged power failure greater than the battery support time of an attached uninterruptible power supply (UPS).

Available for both AOS/VS and DG/UX, the software package allows the user flexible control when problem conditions exist. Typical examples include message broadcasting, applica-

tion and batch queue control, operation of remote audible and visual alarms, and overall system environment monitoring.

EMAS 1288 also offers an optional Telephone Alert Unit, allowing remote paging via a telephone line when a fault condition exists. AOS/VS users of the product who subsequently migrate to DG/UX are offered a software upgrade at a nominal cost.

IDC Systems Limited, 11 Rovex Business Park, Hay Hall Road, Tyseley, Birmingham B11 2AF, England.

Circle 52 on reader service card.

Optical data storage



Kansas City, MO—During NADGUG 92 International Software Systems, Inc., announced Fiche Net, an optical data storage and retrieval system for businesses seeking to replace microfiche,

tape, or paper storage. Print files are compressed and indexed, then archived on optical disks for viewing, searching, and printing.

Fiche Net utilizes WORM (write once read many) technology for permanent document storage. If permanent storage is not necessary, documents can be stored on rewriteable optical media.

Fiche Net can be integrated to a mainframe, Unix-based system, or a PC LAN, although a LAN is not necessary. The newest release of Fiche Net runs in the MS-DOS environment.

The system offers up to 10 indexes, user-defined parameters, up to 99 security levels, speedy retrieval time, and adaptability a variety of industry applications.

International Software Systems, Inc., 8101 College Blvd., Suite 290, Overland Park, KS 66210-1844; 800/235-1285.

Circle 53 on reader service card.

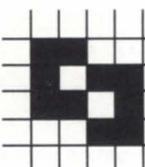
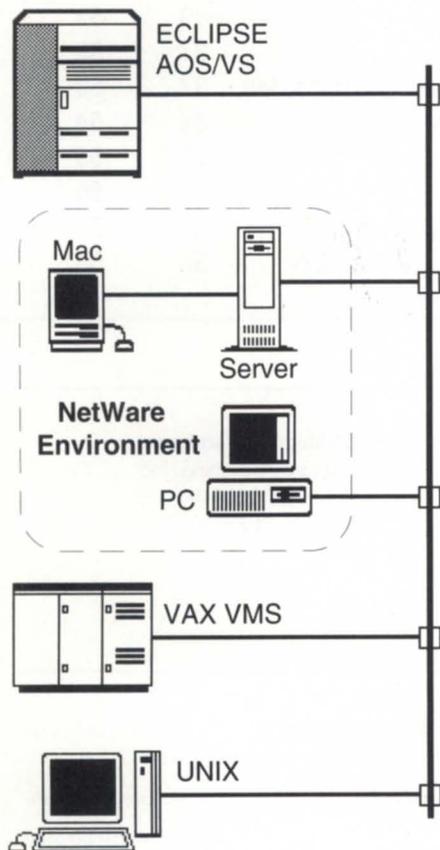
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Novell brings NetWare into Open Systems networking with support for industry standard NFS (Network File System) and TCP/IP networking protocols. Your NetWare servers already have the foundation for an enterprise-wide Open Systems integration strategy.

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This Open Systems networking architecture also provides integration from AOS/VS to other systems such as DEC, UNIX, HP, IBM, and many others.



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Editorial comments, article suggestions Doug Johnson
(please send product announcements to the address listed above)

Information about advertising Greg Farman

FOCUS back issues Turnkey Publishing staff

Data Specific

DMS and Transoft

DMS Systems, Inc., of Salt Lake City, Utah, announced that **Transoft Ltd.** of Slough, England, has joined its family of distributors of the Disk Backup & Recovery System (DBR) for Unix machines.

"There is considerable synergy between DMS and Transoft, and we are delighted to incorporate DBR into our product line," says Transoft Chairman **Mike Edwards**. DBR features media error handling, speed improvements over built-in Unix utilities, multi-volume backups, and multiple backups per volume. Transoft will have non-exclusive rights to market DBR worldwide, as well as exclusive rights to sell DBR to its installed customer base.

DG and Persoft

Data General Corporation has selected **Persoft, Inc.**, of Madison, Wisconsin, to develop high-end terminal emulation for integration into its CEO Connection/PC software. Under the terms of the agreement, Persoft will provide DG with customized Smarterm 470 and Smarterm 320 terminal emulation software, enabling CEO Connection/PC users to access both Eclipse MV and Avion servers.

"This agreement culminates a 10-year relationship between DG and Persoft," said **Susan Hughes**, Persoft executive vice president of sales and marketing. "DG is drawing on Persoft's expertise and experience in terminal emulation to develop an improved, more flexible product that meets the evolving needs of its users."

In a related agreement, Persoft has granted Data General priority reseller rights to its Smarterm line of terminal

emulation software. In the future, this agreement will enable DG to sell these programs directly to its customers.

"Data General is pleased to formalize its relationship with Persoft," said **Bruce Evans**, DG senior product manager of the Eclipse Business Unit. "Our users will benefit greatly from Persoft's experience in providing high-end connectivity solutions."

Persoft develops and publishes products that provide microcomputer users access to information and applications on local or remote systems. Other Persoft products include Intersect local and remote bridges for connecting ethernet or remote token ring LANs, the Intersect Concentrator for wireless-to-wired LAN connections, and Passage token ring-to-ethernet connectivity software. The company's European headquarters is located at the World Trade Center in Rotterdam, The Netherlands. Sales and marketing offices are also located in the United Kingdom and Germany.

Fault-tolerant disks

Soft Switch, Inc., of Wayne, Pennsylvania, announced that mid-range and large models of EMX, the company's Enterprise Mail Exchange, will be equipped with high-availability disk array (HADA) systems as standard equipment, and with no increase in end user list price.

Soft Switch's EMX product, first announced in June 1992, is an electronic mail multi-protocol backbone switch based on the 1988 CCITT X.400 standard, which also provides for interoperability with existing electronic mail networks via access units for SMTP, SNADS, MHS, and numerous LAN e-mail protocols. It is a fully integrated hardware/software solution that incorporates a complete directory system based on an Oracle RDBMS and the SQL standard, and a graphical management system based on the X-Windows standard.

"We have completed a very successful six-month beta test program of EMS, which began in April," said

Michael D. Zisman, Soft Switch president. "This test period has allowed us to significantly increase the reliability of our software. At the same time, there have been advances in RAID disk technology and pricing, culminating in Data General's announcement of the Clariion disk systems."

The EMX models 4000 and 6000 were originally announced with two CPUs and two 525 MB disk drives. These models will now be equipped with two CPUs and one 2.5 GB HADA disk subsystem. The model 8000, originally announced with four CPUs and 2 GB of standard disk, will now have four CPUs and one 4 GB HADA disk subsystem.

"We're delighted that our leadership position in RAID technology has allowed Soft Switch to dramatically increase the reliability of its Data General Avion-based EMX switches," said **Ronald L. Skates**, Data General president and CEO.

EMX switches range in price from \$30,000 to \$300,000 depending on configuration.

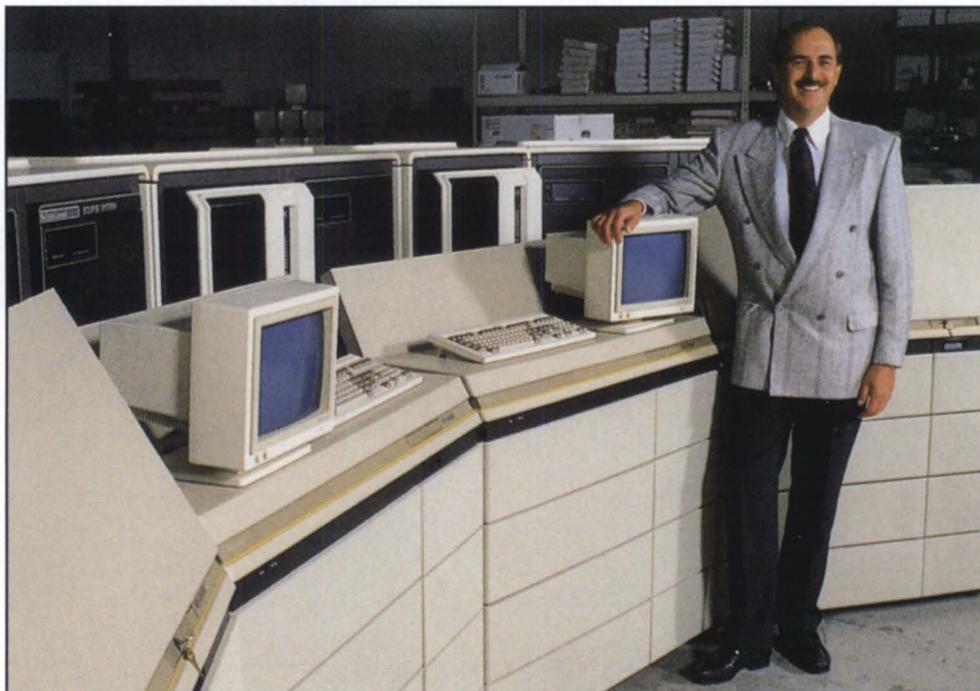
Brasseal joins NPA West

NPA West of Fairfield, California, has named **Jamie Brasseal** regional director of sales and service for the Southwest region. Brasseal will be responsible for sales, operations, and service for Southern California and Arizona, and will report to both **Alan Rees**, president, and **Jose Rivera**, executive vice president.

Brasseal joins NPA West from Data General Corporation, where he worked for 12 years in various capacities including field engineer, regional operations specialist, branch manager, and sales representative for the Los Angeles district.

NPA West, formerly NPA Systems of California, Inc., was founded in 1985 and provides disaster recovery services, third-party maintenance, and sales of new and previously owned equipment. Δ

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