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The Magazine of the North American Data General Users Group

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New AOS/VS features allow more flexibility in handling security

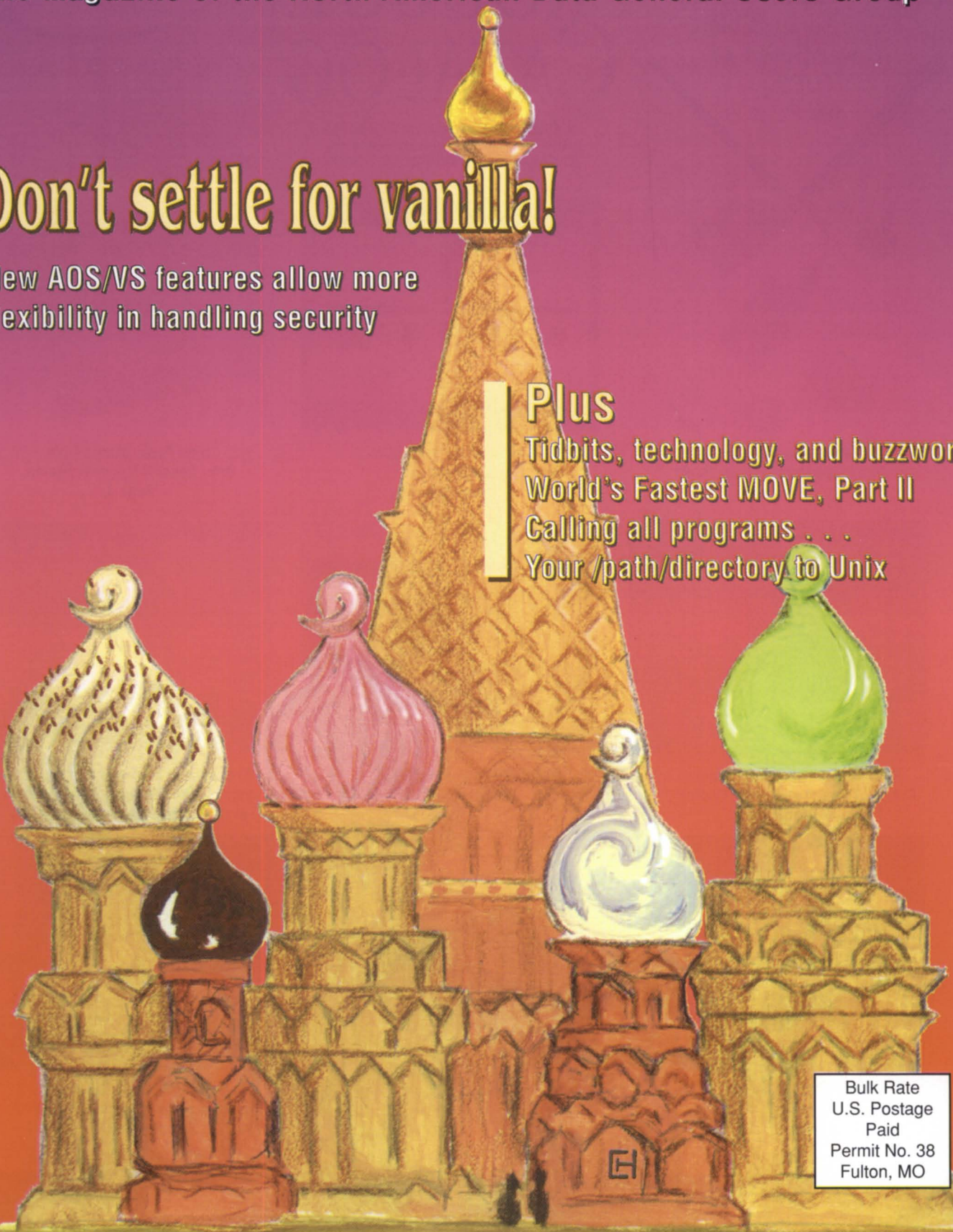
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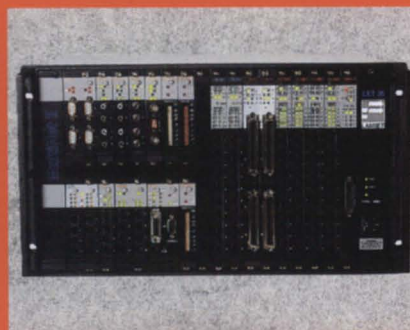
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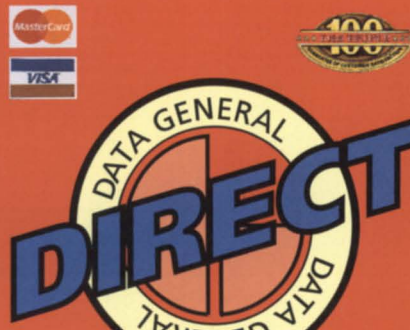
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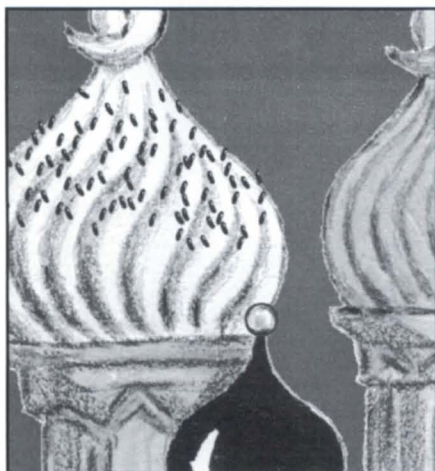
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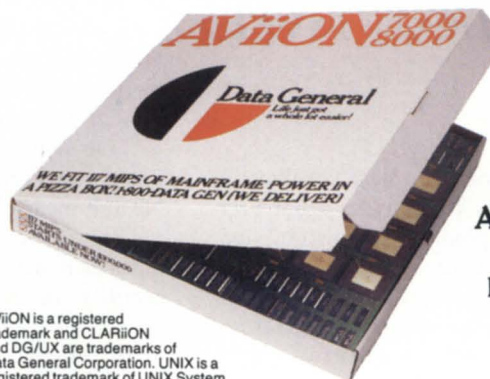
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NADGUG 93: the right investment

by Steve Pounds
NADGUG Treasurer

As you read this, the March "Storm of the Century" will be just a memory. Probably the bombing at the World Trade Center in New York will also be out of the news. These events remind me of something our company has been talking about for a long time but has not acted upon—a disaster recovery plan. So you think this column is going to be about disaster recovery? Not really.

Since we do want to implement a disaster recovery plan, I feel that my involvement in NADGUG is the best way to help us accomplish this goal. I will use NADGUG and a trip to the conference in Atlanta this October to gain insight into the subject. We could hire a consultant to design a detailed recovery plan, but this would be more expensive than the cost of the entire NADGUG conference trip.

While at the conference I will have an opportunity to visit exhibits of companies that offer, for example, disaster recovery "hot site" services. I expect to attend sessions on disaster recovery or related issues. The most important advantage of attending the conference and getting the help I need for a disaster recovery plan is, quite simply, in the networking. It's invaluable what insights you can gain from someone who has already "been down that

road." It's amazing how much you can learn just by mingling with people in the exhibit hall and in sessions. They can tell you what to do, how to do it, and (maybe this is most important) what not to do. And they enjoy sharing their knowledge and experiences with you.

At NADGUG 92 last October in Kansas City, I wanted to learn how to go about submitting a request for proposal (RFP), since we purchase equipment from time to time. I ran into someone who happened to know about the subject. After spending about 30 minutes with this individual, I felt I had learned a lot. Thinking back to my earlier example, I'm sure I will find someone at NADGUG 93 in Atlanta who knows a great deal about disaster recovery and how to implement a plan.

If you have trouble convincing your employers of the importance of attending the conference and being a part of NADGUG, I hope you can take some ideas away from this message. If the bosses tell you they can't afford for you to go, explain to them that they can't afford not to allow you to go. Remember, everything costs money. Your goal should be to assure that you are spending your (or your company's) money wisely. I can assure you that being a member of NADGUG and attending the conference is the right investment.

I hope to see you in Atlanta. Δ

NeXTnext? NOT!

by Doug Johnson
Focus editor

There's bound to be a corollary to Murphy's Law that covers what happened to our planned "Focus on:" feature for this issue. Put simply, and you've no doubt seen news of it elsewhere, Next Computer, Inc., this spring decided to get out of the hardware mar-

ket and become instead just a software company. So there can't be much of an alliance anymore with Data General Corp. for selling Next workstations to go with Aviiion servers.

Oh well. We shouldn't complain. For several hundred people laid off at Next, it means being out of a job. For us, we'll move along quite nicely with Tom Gutnick's article about AOS/VS system security (he didn't mind a bit when he found out he would get the cover story all to himself). Δ

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News and notes from the greater DG community

News briefs

Stephen Gardner, who had been serving as president of the Integris division of **Bull North America**, is the new vice president of Aviion marketing.

In his new position, Mr. Gardner will be responsible for marketing strategy, product positioning, major marketing programs, and operations for the Aviion computer product line. He reports to **Joel Schwartz**, vice president of the Aviion Business Unit.



Stephen Gardner

According to DG, Mr. Gardner helped found and lead the rapid growth of the Integris Division, which focuses on systems integration and downsizing opportunities within the IBM mainframe environment.

Electronic mail network management provider, **Soft Switch, Inc.**, recently upgraded its Customer Support Center services. Customers now have 7-day, 24-hour access to Soft Switch's electronic mail and messaging specialists at the support headquarters in Wayne, Pennsylvania.

Hyperdesk Corporation and **Digital Analysis Corporation** announced an agreement to develop and market tools to manage Hyperdesk's Distributed Object Management System (HD-DOMS). The first product the two companies will develop is Orb View, which will provide a realtime, interactive monitoring and control of HD-DOMS Object Request Brokers (ORBs) on Unix workstations.

Orb View is expected to be available on the Data General platform in the third quarter of this year. Hyperdesk Corporation was spun off from Data General in December 1990 as an independent software company and is operated by a group of former DG employees.

Aviion server users most satisfied

Data General received some excellent publicity—at last—in the March 22 issue of *Computerworld* magazine. (I know it was kind of tacky to add that "at last" phrase, but sometimes it seems like mainstream computer trade publications have forgotten about Data General.) Anyway, here's the good news . . .

In a survey of RISC (reduced instruction set computing) servers, Aviion users were rated as the most satisfied with their servers. Aviion had the highest score of 87. The closest runner-up was Hewlett-Packard's HP 9000 Series 800 (82), followed by DEC's DECsystem 5000 (81), Sun's Sparcserver 10 (79), and IBM's RS/6000 Powerserver (77).

The survey was conducted by an independent market research company. Scores were based on a number of criteria including value for the dollar, compatibility with installed equipment, speed, and reliability. In the

price performance category, rated as number one in importance by the users, the Aviion again ranked highest with a score of 8.9. Aviion server pricing starts at under \$20,000 while high-end multiprocessor models can cost more than \$100,000.

Users were asked if they would buy their server product again. Of 20 Aviion users polled, 19 said they would purchase an Aviion again, and one answered "Don't know." Although it was a small sample, the results clearly looked good compared to the other competitors, who each had a measurable percentage saying they would not purchase the same brand of server in the future. The only negative surveyed users mentioned regarding Aviion machines is "the dearth of third-party applications that run under DG/UX," the article states.

In General is compiled by Robin Perry. If you have an item for In General, please send it to Robin, c/o Focus magazine, P.O. Box 200549, Austin, TX 78720; 512/335-2286; Fax: 512/335-3083.

Top Priority: Price/performance

USERS RATE TOP RISC SERVER LINES IN WHAT THEY SAY IS THE MOST IMPORTANT CATEGORY: VALUE FOR THE DOLLAR

Data General's Aviion		8.9
Hewlett-Packard's HP 9000 Series 800		8.5
DEC's DECsystem 5000		8.1
Sun's SPARCserver 10		7.9
IBM's RISC System/6000 Powerserver		7.6

Ratings based on a 1-to-10 scale, where 10 is best.

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Don't settle for vanilla!

SYNOPSIS

New AOS/VS features allow system managers much more flexibility in handling security.

by Tom Gutnick
Special to Focus

Several years before the Soviet Union crumbled, my wife and I went there on vacation. I quickly learned to read many of the Russian signs, and being an aficionado of certain tasty dairy products, one of the first words I learned was *morozhenoye*—ice cream! I was thrilled when, as we were riding the bus from Tblisi airport to our hotel, I noticed a big sign for

MOROZHENOYE

—an ice cream parlor! That evening after dinner we went trooping up the street to check out this *morozhenoye* parlor. We found it wasn't like choosing from 31 flavors back home. The only choice was whether your single scoop of vanilla ice cream would or would not have chocolate shavings on top. They even weighed out the ice cream as they scooped—in socialist paradise, every customer got exactly his or her fair share. And by the way, the ice cream was quite good.

For a long time the security conscious system manager faced a similar situation with AOS/VS: the basic features provided a good foundation, but there weren't many choices for customizing. Over the past few years, however, a number of new features have been added, allowing the system manager much more flexibility in managing the security of the system. This article will look at some of these new features and how they can be used.

Start with the vanilla

Before describing all the newest goodies, let's review what we

already had. Both AOS/VS and AOS/VS II meet the C2 evaluation criteria, as defined by the National Computer Security Center. This means they provide discretionary access controls that are sufficient to meet the needs of the U.S. Department of Defense. The C2 class is also quite appropriate, by the way, for most commercial DP sites.

Going back to the early days of even 16-bit AOS, we've had good identification, authentication, and authorization (known as I&A or A&A) capabilities. This is a big mouthful, which basically encompasses user profile management (through the PREDITOR utility), and the username/password validation performed by EXEC when users log on to the system.

AOS/VS (and I also mean AOS/VS II throughout this article, except where specifically noted otherwise) has also always had file-access controls. Through the use of access control lists (ACLs) on each file or directory, individual users can control whether and how they share their files with other users. And finally, AOS/VS provides a number of audit trails, including the system log facility (SYSLOG), master console log (CON0 log), EXEC log, and CLI log files.

Extending file access controls

I'm sure you already know about standard file ACLs, in the format <username template>, <privileges>, where <username template> can describe a single user or multiple users, and <privileges> is some combination of OWARE, granting Owner, Write, Append, Read, or Execute access. An ACL can specify multiple username/privilege combinations. A typical file ACL might look like this:

```
TOM,OWARE,JOHN,,+,R
```

In other words, user TOM has full privileges for this file. JOHN has no access. Everybody else on the system has read-only access.

Beginning in AOS/VS II rev 2.00 we've added Group ACLs—a long-requested feature. Groups offer a simple way of managing access to files that are shared by many users, since access privileges are determined by group-name instead of individual usernames.

Group ACLs don't replace standard ACLs, but rather supplement them. The format is:

```
<username template>:<group>,<privileges>
```

and both group and nongroup access can be mixed together. For example, a file might have an ACL of:

```
TOM:OPS,OWARE,+:OPS,WR,+,R
```

This means that user TOM, when belonging to group OPS, has full access privileges to the file. Any other user belonging to group OPS has read and write privileges, and any other user on the system has read-only privileges.

So how does somebody belong to a group? It's really quite easy. Your AOS/VS II system has a directory called :GROUPS. To create a group, simply create a text file (using SPEED, SED, SLATE, or other favorite text editor) whose name is the name of the group you want to set up.

Each line of text in the file contains the username of a member of the group. (For more information, see chapter 2 of the CLI manual.) For a user to actually join the group, issue CLI32's GROUP LIST command. For example, typing GROUPLIST OPS would make me a member of group OPS (assuming that my username is contained in :GROUP:OPS), and my access to the file would be granted or denied accordingly.

Note that joining a group is rather like wearing a hat. You don't wear a hat all the time, and you might wear different hats depending on what you're doing. Similarly with the GROUPLIST command, you can effectively remove hats and put on other hats as needed. And although it may be unwieldy, AOS/VS II will even let you "wear" up to eight hats simultaneously.

What's really nice about the whole idea of Group ACLs is ease of maintenance. As users in your organization come and go, you can change the authorized membership of a group just by editing the file in :GROUPS instead of going back to change the ACLs of individual files. And if you're using groups, your ACLs are likely to be shorter and simpler.

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Figure 1: EXEC custom log-on

- 1) The console is enabled as normal:
CONTROL @EXEC ENABLE
@CON17.
- 2) EXEC displays the log-on banner and waits for New-Line to be pressed.
- 3) EXEC looks for :UTIL:CONSOLE_CUSTOM_LOGON.PR. If it does not exist, then EXEC performs the standard log-on processing you've known for all these years. If it does exist, EXEC will process your log-on code instead, as follows.
- 4) EXEC creates a process named OP:CONx, running the custom-log-on program, which has full privileges.
- 5) The custom log-on program does whatever processing you set it up to do, and assuming successful authentication, passes back to EXEC the information that EXEC needs to put into the user's ?PROCESS packet. This information would include the initial program and initial IPC message, process privileges, and the like.
- 6) EXEC now creates the standard process for the user <username>:CONx, running whatever program was specified.
- 7) At this point, the user is logged on to the system, and EXEC just waits for a log-off from that console.
- 8) On process termination (log-off), if the option had been requested by the initial invocation of the custom log-on program, EXEC will again create a process running the custom log-on program, in order to do any desired post-processing.

Figure 2: Sample macro fragment

```
0.  \ clean-up from previous
    invocation goes here . . .
1.  (logfile acl/k)
:secure:[!username].cli_logfile
2.
password/noprompt/read=:secure:
[!username].passwd
3.  lock rename delete send log-
    file
    ....
```

Figure 3: Modifications to SAMPLE_LOGON.C

SCMP - Rev. 2.20.00.00 Monday, June 1, 1992 12:01:55 PM

Comparing :UTIL:LOGON_TOOLKIT:SAMPLE_LOGON.C to SAMPLE_LOGON.C

Replace lines 713 thru 714 - allow full searchlist

```
v-----v
char  searchlist [32], defacl [32], reexecute_msg [32];
^-----^
```

with the following 2 lines.

```
v-----v
char  searchlist [$MXPL*$MXPSL], defacl [32], reexecute_msg [32];
^-----^
```

Replace lines 895 thru 898 - invoked CLI with /NOCA

```
v-----v
if ( (pipc_fd = open ( iccfn, O_RDONLY ) ) != -1 ) {
    if ( !sys_gtacp ( iccfn, user_name, &ac0 ) )
        if ( ac0 && $FARB )
            length = read ( pipc_fd, pipc_buf, PIPC_SIZE);
    ^-----^
```

with the following 8 lines.

```
v-----v
strcpy (pipc_buf, icrog);
strcat (pipc_buf, "/NOCA, " );
if ( (pipc_fd = open ( iccfn, O_RDONLY ) ) != -1 ) {
    if ( !sys_gtacp ( iccfn, user_name, &ac0 ) )
        if ( ac0 && $FARB ) {
            strcat (pipc_buf, iccfn);
            length = strlen (pipc_buf);
        }
    ^-----^
```

Replace line 904

```
v-----v
    pipc.iufl = 060000; /* $GFEX | | $GFEB */
    ^-----^
```

with the following line.

```
v-----v
    pipc.iufl = $RFCF; /* CLI format message */
    ^-----^
```

Replace line 934 - use EXEC's current searchlist for user

```
v-----v
sprintf ( searchlist, ":UDD:%s", user_name );
^-----^
```

with the following 5 lines.

```
v-----v
/* Use Exec's current searchlist */
ac0 = 0;
acl = searchlist;
ac2 = sizeof (searchlist);
if (sys ($GLIST, &ac0, &acl, &ac2) ) return (ac0);
^-----^
```


Protecting the SYSLOG

The system log facility (SYSLOG) has always provided a good audit trail of system resource usage. And since full-detail logging was added (in AOS/VS rev 6.00), an exhaustive audit trail, covering every file open and close, every IPC message, and many other events, is possible.

(See "Audit without overload" in the November 1990 *Focus*, and "Audit without overload: The story continues" in the April 1992 *Focus*.)

However, some security-conscious managers worry about the possibility of an unauthorized user somehow getting the password for a privileged profile, and then turning off the SYSLOG or even deleting the log file.

And I know some sites that don't even trust their authorized system management staff not to do this! (Like my boss always used to say, "Just because you're paranoid doesn't mean they're not out to get you.")

The answer to this dilemma is coming soon. In AOS/VS II rev 3.00 you will be able to issue a command of SYSLOG/PROTECT. You'll want to be sure to first turn on the SYSLOG at the appropriate level of detail, with any exclusion bit-masks set. Once you protect the SYSLOG, it is virtually tamper-proof. It cannot be turned off. The detail level can't be changed. The exclusion bit-masks can't be changed. The log file itself cannot be deleted or renamed, nor can it be written to.

You can, with appropriate file access, still read the file to run a report against the SYSLOG, but you wouldn't be able to use FED, for example, to modify any log entries. Once the log is protected, the only way to manipulate the current log file is to shut the system down and reboot.

Needless to say, you want to be sure that you won't run out of disk space for the log, as the system will panic. If your site generates huge log files, you may find it appropriate to dedicate a disk drive for that purpose.

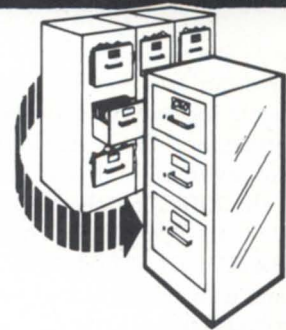
EXEC custom log-on

EXEC custom log-on provides hooks into EXEC so that you can totally customize the process of logging on and authenticating users. It requires AOS/VS rev 7.70 or AOS/VS II rev 2.10

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(or later). The basic process is pretty straightforward (see Figure 1, page 8).

Custom log-on is also available for batch processing. The scenario is similar: whenever a batch stream goes active, the XBAT batch cooperative looks to see whether :UTIL: BATCH_CUSTOM_LOGON.PR exists, and if so, uses it in the same way as described above.

Everything you need to use custom log-on is already on your system. (It's easiest to work with custom log-on with the AOS/VS C compiler. However, you can work in another high-level language or Assembler if you're willing to put in a bit of extra effort to mediate the subroutine calling sequences.) Under :UTIL is a directory called LOGON_TOOLKIT. The files in this directory are:

- LOGON_TOOLKIT.DOC: the documentation file, describing all the toolkit routines and how to use them.

- LOGON_TOOLKIT.H: a C header file, which provides the function prototypes.

- LOGON_TOOLKIT.LB: a library containing object files for all the routines. This library gets included on the command line when linking your custom log-on program.

- SAMPLE_LOGON.C: just what it sounds like—the source code for a sample custom log-on program. Actually, it's even better than that. It duplicates EXEC's standard log-on functionality, so instead of writing a program from scratch, use this one as your starting point and save yourself lots of work.

- BUILD_SAMPLE_LOGON.CLI: a macro to invoke the C compiler and the linker to create the custom log-on programs.

- INSTALL_SAMPLE.CLI: a macro that

creates links in :UTIL to the sample program. As soon as these are in place, EXEC begins using them immediately—it isn't necessary to bounce EXEC.

Locking the CLI

Again, going back to the old AOS days, LOCK_CLI was designed to secure the master console, by disabling a number of commands (such as DELETE, XEQ, TERMINATE) unless unlocked with the correct password. When CLI32 was released, rather than create a separate LOCK_CLI32, we put the locking functionality directly into the standard CLI32, along with some improvements:

- If you lock or unlock without arguments, you will be working with the default command set, which is the same as LOCK_CLI's. But you can provide arguments to lock or unlock specific commands.

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- You can lock specific CONTROL @EXEC commands. (With LOCK_CLI, you couldn't do this, so even a locked master console could still blow away all your users with CX TERMINATE or CX HALT.)
- Whereas LOCK_CLI's password was stored in cleartext within LOCK_CLI.PR (and required running FED to change it), CLI32's password is established for each session, either interactively or from an encrypted file on disk. And the locking ability is available to all users.
- With the latest releases of CLI32, specifying PASSWORD/NOPROMPT means that, although the password must be entered correctly to unlock the CLI, it isn't necessary for locking.

One handy thing that you can do now is disable specific CLI commands from a particular user. Many of us used to patch the command dispatch table within CLI.PR to remove commands, but that was an ugly kluge that is no longer needed.

Figure 2 (page 8) shows an example of a log-on macro that takes advantage of these features to accomplish some nifty things. (To be able to do everything shown in this example requires at least AOS/V5 rev 7.70 or AOS/V5 II rev 2.20).

Line 1 sets a CLI logfile for the user, into a directory that presumably has an ACL such as "+,AE"—thereby allowing users to create files in that directory, but not to tamper with or look at any other users' files. Line 1 then sets a null ACL on the log file. The end result is that every CLI command issued by the user will be logged to that file. But the user will be unable to modify the file, either with a text editor or with FED.

Line 2 establishes a password for the CLI session. The /READ switch indicates that the password is already stored, in encrypted form, in a file on disk. (The user must have read access to this password file, but wouldn't have write or owner access. Presumably the user doesn't know what the password is—the system manager would have

established this.) The /NOPROMPT switch means that the password isn't required to be entered interactively for the next line to work.

Line 3 locks out some commands, so they cannot be invoked by the user. Most importantly, since the LOGFILE command has been locked out, the only way the user could turn off CLI logging (assuming he even knew that it was on) would be to unlock that command. But not knowing the password, he wouldn't be able to!

Protecting CLI's initial IPC

If you're reasonably astute or paranoid, you might have realized that the one potential flaw with the previous example is that a well-timed ^C^A sequence would allow the user to break out of the log-on macro being processed by the CLI, and therefore bypass all the nifty controls you were trying to establish.

Well, we even have an answer for that—an answer that makes it much easier to establish bulletproof log-on procedures within the CLI.

Beginning with AOS/V5 rev 7.70 and AOS/V5 II rev 2.20, you can invoke CLI32/NOCA. The /NOCA switch tells the CLI to ignore any ^C^A keyboard interrupts during processing of the initial IPC message (that is, the log-on macro). The only thing that is a little less than straightforward is the fact that

PREDATOR has no way of specifying switches on the initial program. But you can get around that with the custom log-on feature described earlier in this article.

To save you some work I'll even share with you what I've done on my own system: Figure 3 (page 8) shows the modifications I made to SAMPLE_LOGON.C. It's quick and dirty, since it hard-codes the initial program, but it works.

Banana splits, anybody?

By now, I hope you've come to appreciate all the security features that are available—features that give you more flexibility and especially more control over what your users do. Admittedly, there's some work involved in taking full advantage of them (isn't there always?), but the pay-offs should be worth it. Certainly, there is no longer any reason to settle for vanilla. Δ

Tom Gutnick frequently writes for Focus on issues involving system security and performance. Not so well known is that he has received the Silver Scoop Award from Dreyer's and Edy's Grand Ice Cream. He can be reached at Data General Corporation, 7927 Jones Branch Drive, Suite 200, McLean, VA 22102; 703/827-9669; Internet: tom_gutnick@dgc.ceo.dg.com.

A few possibilities . . .

I hope you're already excited about the prospects of using custom log-on. But if your attitude is "So what?", here are a few possibilities:

- *Bypass password checking for selected usernames.* This is something I ordinarily recommend against, but if you're providing a read-only bulletin board it's handy to be able to log in those users as soon as the username has been entered, and not worry about passwords.
- *Implement pass-phrases or pass-algorithms instead of passwords.*
- *Establish time-of-day or location restrictions.* For example, payroll clerks cannot log on between midnight and 5 a.m., or can only come in through specific console ports. Δ



David Novy

Tidbits, technology, and buzzwords

SYNOPSIS

It's potpourri this month for our Unix columnist: What's next with Next? Running X-terminals over asynchronous modems actually seems to work. And you should check out the pleasant possibilities offered by workgroup software.

This is the kind of month in which nothing specific has come to mind. So I thought I would discuss several smaller issues.

What's NeXT?

The theme of this month's *Focus* was originally scheduled to be about the partnership between Data General and Next Computer, Inc. However, Next recently announced that it would withdraw from the hardware business (Unix-based workstations), and its future efforts would concentrate on bringing its Nextstep software for the Intel platform to market. Since Next would no longer be in the hardware business, there would not be much for the DG sales force to sell. Thus, the working relationship between Data General and Next ended almost as fast as it began.

I never did understand the rationale for a partnership between DG and Next. The Next workstation ran on a Motorola 68030 platform. DG sells no Motorola 68030-based products. There had been some discussion that Next would port to the Motorola 88000 platform. But when Next decided *not* to port to the 88000, then DG and Next had little or nothing in common, except for trying to survive in a competitive marketplace.

Running X-Windows on serial lines

One of the latest hot technologies my company has been testing is running X-terminals over asynchronous modems. The results have been better than expected, although you shouldn't expect fast response when doing X-Windows over a serial line. The advantage to such a system is that it would allow X-Windows users to have the same graphical user interface (GUI) wherever they happen to be. The technology that makes X-Windows over serial lines possible is the new 38.4 KB modems, which are capable of running

the PPP or SLIP data-transfer protocols.

By the way, if you are looking at X-terminal emulators for your PC, one of the best emulators on the market is the Hummingbird Communications HCL "eXceed" package. This emulator has excellent performance, and it also works quite well with PC/NFS. There are several X-terminal emulator packages on the market that offer good performance. However, many are unsatisfactory because of an inability to coexist peacefully with PC/NFS.

Workflow software

I learned some new buzzwords recently—*workflow* and *workgroup management*. These are new words to describe a subject that has been around for years in the engineering community as *configuration management*. I guess "managing workgroups" sounds more interesting than managing configurations. The purpose of these products and configuration management products is to collect, store, and distribute textual and graphical information among members of a workgroup. The information is organized into data bases by means of *forms* and *views*. The software incorporates the benefits of electronic mail, bulletin boards, and conferencing software, while going beyond these systems in functionality. Installations of these systems can connect hundreds of users, some of whom may be separated by thousands of miles. The information handled by these systems is usually mission-critical: product development, client and project tracking, and sales and customer service information. Preferably, the software uses a client-server model.

One of the market leaders in this area is Lotus Corporation, with its Lotus Notes and cc:mail products. I believe that within the next year, these products will gain ever-increasing popularity as companies are forced to optimize how they handle their corporate

information with reduced computer operations budgets and smaller computer support staffs. A good discussion of workflow application tools and Lotus Notes can be found in the February 22 issue of *Info World*.

By now, some readers with long memories are asking how I can talk about Lotus Notes for workflow management when only a few months ago I was praising the use of Sherpa for doing configuration management, and earlier in this article I stated that workflow management and configuration management were similar.

The answer is that a user of Sherpa probably does not need Lotus Notes. The Sherpa product data manager is more robust than that of Lotus Notes. The definition of a product data manager is electronic vault, bill of materials, release procedures, and change procedures. One can have a very good workflow management system, by combining a PC, an X-terminal emulator, an ethernet connection, a good word processor (Microsoft Word, Wordperfect, etc.), a good spreadsheet program (Microsoft Excel, Lotus 1,2,3, etc.), and the Sherpa electronic vault running on a Unix file server. Users start their particular application programs, check the required documents from Sherpa, make the required changes, and check the document back into Sherpa. The Sherpa structure takes care of the relationship among the documents.

So what does all this mean?

1) How to maximize the use of corporate information is one of the critical business issues facing U.S. businesses today. Corporations will be spending billions of dollars in this area over the next 10 years.

2) Both Lotus Notes and Sherpa appear to be very useful products for workflow management or configuration management.

3) Neither of these products cur-

rently runs on a DG computer.

4) Both of these products have been ported to the Unix boxes of DG's major competitors. They have been or are being ported to PCs and Macintoshes.

5) There are no market-leading commercial software packages for workflow or configuration management running on Data General computers.

Another challenge

John Pilat, formerly the director of DG/UX development with Data General, recently accepted a vice president position at Oracle Corporation. Pilat played a major role in helping DG/UX become one of the best versions of Unix on the market today. On behalf of the Data General DG/UX Special Interest Group, I wish him the best of luck. Δ

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Brian Johnson

World's Fastest MOVE, Part II

SYNOPSIS

BJ continues building and explaining an alternative to CLI's MOVE command.

:WFMOVE:CONTINUED

Let's see, where was I? Oh yeah, last month I started building an alternative to CLI's MOVE command just to demonstrate how files can be moved around more efficiently without resorting to cumbersome methods like DUMPing to and LOADING from pipe files. Modestly, I called it WFMOVE, for World's Fastest MOVE.

Last month I got as far as the function hierarchy, global stuff in the WFMOVE.H file, and the main program, WFMOVE.C. Now it's time for some gory details. But before I plunge in, I've got one minor cosmetic change, and one minor addition that occurred after I wrote last month's column.

The cosmetic change involves some confusion with the word "source." In last month's column I used it to refer both to the source code and the source directory, and in retrospect I noticed that the phrase "source file" was ambiguous, so I've changed from using "source directory" and "source file" to "origin directory" and "origin file" in this column and in all the source code. For example, "sdpn" is now "odpn". Sorry for the confusion.

The minor addition was to add a /UPDATE_TLA global switch, a call to a function named "init_stla" in WFMOVE.C, and add a global Boolean variable to WFMOVE.H named "stla". The "init_stla" function checks to see if: a) /UPDATE_TLA is not present; b) SUPERUSER is ON; and c) if the current system is AOS/VS 7.60 or later, or AOS/VS II 1.20 or later. If so, then it sets "stla" (Suppress TLA update) to

YES. Later on when I get to the "copy_data" function, I'll check "stla" to see whether I can suppress TLA updating on source files. It's a handy zero-cost feature that I've often wished CLI's MOVE command supported.

:MOVE_PLUS.C

The source code for this function is shown in Figure 3 on page 16 (I'm continuing the numbering from last month). In simple terms, it opens the current directory, scans all the filenames, decides whether the file is MOVEable, skips if not, or invokes either "move_dir" or "move_file" to move it.

The first order of business is to open the current directory in anticipation of scanning its contents. Any problem will cause me to report the directory name and skip it. The most common problem will be "File access denied" if I don't have read access.

At this point, a couple of simple potential optimizations become apparent. The first one has to do with file- and path-name handling, and the second one involves avoiding pathnames in favor of filenames when accessing files.

A major source of excessive CPU consumption in many programs involves massaging string data when it could have been easily avoided. In the case of WFMOVE, I could spend a lot of time constructing and maintaining origin and destination pathnames for each filename encountered at each directory level, and repeatedly scanning them to determine their lengths. Instead I'm going to use only a single origin and destination pathname, and I'm going to just keep track of how much of the pathname belongs to each level using a pair of pathname length arrays and a depth gauge.

Upon entry to "move_plus", the "opn" string contains the pathname of the current origin directory, and the "dpr" string contains the pathname of the current destination directory. "move_plus" adds a trailing ':', if necessary, to both pathnames and then uses the remainder of the origin pathname as the filename buffer for the ?GNFN system call. In this way the only memory-to-memory move needed is to append the filename to the "dpr" string each time a file is moved, and the only scan for string length occurs prior to entering a subdirectory. In both cases, only a relatively short filename (32 characters max) is moved and/or scanned. Contrast this with DUMP and LOAD that both do massive memory-to-memory moves of both pathnames and the data (!!!) being dumped/loaded.

The second optimization is to avoid using pathnames as much as possible in system calls in favor of using filenames. The reason for this is that it takes the operating system a

whole lot longer to validate a pathname than it does to validate a filename. Unfortunately, a process can't be "in" two directories at once, so at least 50 percent of the time in our case pathnames will be unavoidable. That's part of the reason why DUMP and LOAD using a pipe file works a bit better; the DUMP and the LOAD processes are positioned in different directories so both can just use simple filenames (although I suspect they don't fully exploit that fact). So, in this case I'll move through the origin directory subtree using simple filenames, but I'll be forced to resort to full pathnames for the destination files. In fact, the only reason that I maintain an origin pathname at all is to use it to report errors associated with origin filenames. If I just reported the filename you wouldn't know which directory it was in.

Okay, now I can start scanning filenames using the ?GNFN system call. Once I have a filename I have to get its file status so that I can decide what to do with it. Note that I don't want to resolve links; I might be MOVEing the link itself so I don't want to follow it to its resolution file.

Whether or not a file is MOVEable file type is determined by a small function called "ismft". The rules are pretty simple. DG defines three general classes of file types: system (0..63), DG (64..127), and user (128..255).

System files are just what the name implies: links, directories, devices, IPCs, and network files (e.g., HST, RMA, etc.). The only MOVEable system file types are LNK, DIR, CPD, and

LDU (which I'll have to convert to a CPD).

DG file types are the things that you're used to seeing all the time: UDF, TXT, PRV, STF, etc. All are MOVEable, with one exception: pipe files (PIP, type 104). A pipe is not a real data file, so I won't be MOVEing them.

User file types are rarely used. The most common exception is Wordperfect files: e.g., 150 is a document, 151 is a macro, and 154 is an encrypted document. All are MOVEable.

Earlier, I cleverly told ?GNFN to read the file name directly into the tail end of "opn", but now I have to copy it to the end of "dpr" too. Luckily it's only a filename (32 characters or less) so this is an inexpensive copy operation.

The only decision now is whether this thing is a directory or a file. The "isdir" function returns true if the file type is DIR, CPD, or LDU. Based on the "isdir" I either invoke "copy_dir" or "copy_file" to deal with the messy details.

After exiting from the ?GNFN loop the next order of business is to re-terminate both "dpr" and "opn" to the condition that they were in upon entry. This effectively removes the trailing ':' that was added upon entry, and in the process it removes the last filename that was appended after it by ?GNFN.

A check is then made to make sure that I exited from the ?GNFN loop due to an end-of-file. If not, it's fatal. If I succeeded in opening the directory, then the only possible error from ?GNFN, other than errors related to directory damage, is end-

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Figure 3 - MOVE_PLUS.C

```

/* This really improves the code readability. */
#define Otyp fstat_pkt.styp_type

/* Move all the files in the current directory. */
void move_plus(void) {
    int bitbin,ier;
    Boolean ddda=NO; /* True if ':' appended to dpn */
    char*dfnp; /* Ptr to filename part of dpn */
    Boolean odda=NO; /* True if ':' appended to opn */
    char*ofnp; /* Ptr to filename part of opn */
    P_FSTAT fstat_pkt;
    P_GNFN gnfn_pkt;
    P_GOPEN gopen_pkt;

    /* Open the current directory. */
    memset((void*)&gopen_pkt,0,sizeof(P_GOPEN));
    if (ier = sys_gopen("=", -1,&gopen_pkt,&bitbin)) {
        warn(opn,ier);
        return;
    }

    /* If the last character of the origin pathname */
    /* isn't a dir separator then append ':'. */
    ofnp = &opn[opnl[depth]];
    if (strchr(":=@^",*(ofnp-1)) == 0) {
        *ofnp++ = ':';
        opnl[depth]++;
        odda = YES;
    }

    /* Ditto for the destination pathname. */
    dfnp = &dpn[dpnl[depth]];
    if (strchr(":=@^",*(dfnp-1)) == 0) {
        *dfnp++ = ':';
        dpnl[depth]++;
        ddda = YES;
    }

    /* Setup the ?GNFN packet. */
    memset((void*)&gnfn_pkt,0,sizeof(P_GNFN));
    gnfn_pkt.nfnm = ofnp;
    gnfn_pkt.nftp = DEF;

    /* Process all the files in this directory. */
    for (;;) {
        ier = sys_gnfn(gopen_pkt.opch,&gnfn_pkt);
        if (ier) break;

        /* Get the filestatus by filename instead */
        /* of by pathname: it's a lot faster. */
        /* DON'T RESOLVE LINKS! */
        if (ier = sys_fstat(ofnp,BIT1,&fstat_pkt)) {
            warn(opn,ier);
            continue;
        }

        /* Skip it if it's not a MOVEable file type. */
        if (!ismft(Otyp)) continue;

        /* Append the filename to dpn. */
        strcpy(dfnp,ofnp);

        /* Directory or file? */
        if (isdir(Otyp)) {
            move_dir(ofnp,(P_FSTAT_DIR*)&fstat_pkt);
        }
        else {
            move_file(ofnp,&fstat_pkt);
        }
    }

    /* Restore opn and dpn to same as upon entry. */
    if (ddda) dpnl[depth]--; opn[opnl[depth]] = '\0';
    if (odda) opnl[depth]--; dpn[dpnl[depth]] = '\0';

    /* Exited from the ?GNFN loop gracefully? */
    if (ier != EREOF) error(opn,ier);

    /* Close the directory. */
    ier = sys_gclose(gopen_pkt.opch,&bitbin);
    if (ier) error(opn,ier);
}

```

Figure 4 - MOVE_DIR.C

```

/* Move a directory. */

/* This really improves the code readability. */
#define Otyp fstat_dir_pkt->styp_type
#define Dtyp fstat_pkt.styp_type

void move_dir(char *fnp, P_FSTAT_DIR *fstat_dir_pkt) {
    Boolean newdir; /* True if a dir was created. */
    int fnl,ier;
    characl[$MXACL],*aclp; /* ACL string & ptr */
    P_FSTAT fstat_pkt; /* Used to check that dest */
    /* file that already exists */
    /* is a dir. */

    /* If /FLAT then ignore it. */
    if (flat) return;

    /* If /CONVERT and it's a DIR, make it a CPD. */
    if (convert && Otyp == $FDIR) {
        Otyp = $PCPD;
        fstat_dir_pkt->smsh = DEF; /* Huge */
    }

    /* If it's an LDU and there's no /LDUS, skip it. */
    /* Otherwise, convert it to a CPD and move it. */
    if (Otyp == $FLDU) {
        if (!ldus) return;
        Otyp = $PCPD;
    }

    /* Maybe get the start time. */
    if (times) start_secs = hack();

    /* Make a copy of the directory at the dest. */
    aclp = (early) ? (NULL) : (acl);
    if (ier = clone(dpn,fnp,fstat_dir_pkt,aclp)) {
        /* Unable to create the file/dir. */
        if (ier != ERFAC) {
            warn(dpn,ier);
            return;
        }
        /* Already exists: make sure it's a dir. */
        ier = sys_fstat(dpn,BIT1,&fstat_pkt);
        if (ier) error(dpn,ier);
        if (!isdir(Dtyp)) {
            warn(dpn,ERNAD);
            return;
        }
        /* Already exists and is a dir: proceed. */
        newdir = NO;
    }
    else {
        /* The directory was successfully created */
        newdir = YES;
    }

    /* Always report directory names (same as CL116). */
    verify_move(fnp);

    /* Descend into the directory. */
    if (ier = sys_dir(fnp)) {
        warn(opn,ier);
        return;
    }
    depth++;

    /* Update the path lengths for the new depth. */
    fnl = strlen(fnp);
    dpnl[depth] = dpnl[depth-1] + fnl;
    opnl[depth] = opnl[depth-1] + fnl;

    /* Recursively process the sub-directory. */
    move_plus();

    /* Climb out. */
    if (ier = sys_dir("^")) error(opn,ier);
    depth--;

    /* It's safe to set the new directory */
    /* ACL now if we didn't do it earlier. */
    if (!early && newdir) {
        if (ier = sys_sacl(dpn,acl)) warn(dpn,ier);
    }
}

```


Figure 5 - CLONE.C

```
/* Clone a file. */

/* These really improve the code readability. */
#define Otyp fstat_pkt->styp_type
#define Ofmt fstat_pkt->styp_format

/* If aclp is NULL, set the ACL. Otherwise use */
/* DEFACL and return the real ACL to the caller */
/* who will presumably set it later. */
int clone(char *newpn, char *oldpn,
          P_FSTAT *fstat_pkt, char *aclp) {
    characl_lr[$MXACL]; /* ACL string or */
                        /* link resolution */
    P_CREATE_DIR cre_pkt; /* ?CREATE packet */
    int ier; /* AOS[VS] error code */
    Ushort uda[$LNUD]; /* User Data Area */

    /* MOVE'able file type? This is defensive: */
    /* move_plus() has already checked this, but you */
    /* might want to recycle this function for use */
    /* in some other program. */
    if (!ismft(Otyp)) return ERIFT;

    /* Only links lack an ACL, check for it. */
    if (Otyp == $FLNK) {
        /* Get the link resolution. */
        cre_pkt.cacp = acl_lr;
        if (ier = sys_glink(oldpn,acl_lr)) return ier;
    }
    else {
        /* Get the ACL. */
        if (aclp) {
            /* Caller wants to set ACL later. */
            cre_pkt.cacp = DEF;
        }
        else {
            /* I'm gonna set the ACL: use my buffer. */
            aclp = cre_pkt.cacp = acl_lr;
        }
        if (ier = sys_gacl(oldpn,aclp)) return ier;
    }

    /* Use ?FSTAT packet to build the ?CREATE packet. */
    cre_pkt.cftyp_format = Ofmt; /* Rec fmt */
    cre_pkt.cftyp_entry = Otyp; /* File type */
    cre_pkt.chfs = fstat_pkt->scps; /* Rec len or hfs */
    cre_pkt.ctim = &fstat_pkt->stch; /* CTIME sub-pkt */
    cre_pkt.cmsh = fstat_pkt->sdeh; /* Elem size or */
                        /* max CPD size */
    cre_pkt.cmil = fstat_pkt->smil; /* Max indices */
    cre_pkt.cmrs = 0; /* Reserved */

    /* Create the clone */
    if (ier = sys_create(newpn,&cre_pkt)) return ier;

    /* If we cloned a LNK then we're done */
    if (Otyp == $FLNK) return 0;

    /* Check for a UDA; if it exists then copy it */
    if (fstat_pkt->sssts & $FUDA) {
        if (ier = sys_rduda(oldpn,uda)) return ier;
        if (ier = sys_cruda(newpn )) return ier;
        if (ier = sys_wruda(newpn,uda)) return ier;
    }

    /* Copy the PERMANENCE attribute */
    if (fstat_pkt->sssts & $FPRM) {
        if (ier = sys_satr(newpn,1)) return ier;
    }

    /* That's All Folks! */
    return 0;
}
```

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of-file.

Finally I close the directory and exit. An error on a close can only occur as a result of a hard disk error, or during debugging if I supplied a bogus channel number; any error is fatal.

:MOVE_DIR.C

This function is relatively easy because no data need to be moved: I just need to replicate the subdirectory at the destination, if it doesn't already exist, and then process it recursively. The source code is shown in Figure 4 (on page 16). The error-handling strategy is to just report any problems and return to the caller. This effectively causes the subdirectory and any underlying structure to be bypassed.

The first step is to see if /FLAT was specified. If so, I just skip the directory and return.

If /CONVERT was specified and the directory is a DIR, then I change it to an infinite size CPD and proceed.

If it's an LDU and /LDUS was not specified, I just skip the directory and return.

If cloning a copy of the directory at the destination fails for any reason other than that the directory already exists, I just report the fact and return. If the error was that it already exists, I simply ignore the fact and proceed (as with CLI16's MOVE and LOAD and CLI32's MOVE, but unlike LOAD_II which issues an annoying warning before proceeding) after

verifying that the destination is in fact a directory type file. If it's not, I report the fact and return.

If /VERIFY, I report the name of the directory whether or not I had to create it. The "verify_move" function simply reports the origin filename, indented two spaces for each level on the depth gauge.

Processing the subdirectory is relatively easy: I bump the depth gauge, compute the pathname lengths for the new depth (here's the only use of the "strlen" function), enter the directory, call the "move_plus" function recursively, climb back out, and decrement the depth gauge. Any problem processing the subdirectory causes the error to be reported and the directory skipped.

Now, a subtle point. Why is the default to wait until after processing the subdirectory to set the ACL of the destination directory, if I had to create it? As it happens, this is the same logic used by CLI16's built-in MOVE, LOAD, and DUMP commands, and by CLI32's built-in MOVE command and the LOAD_II.PR utility. That doesn't necessarily mean that it's a good idea, and that's why I've included a /EARLY switch. If you want to see what happens when ACLs are set at the point that the file or directory is created, just use the /EARLY switch.

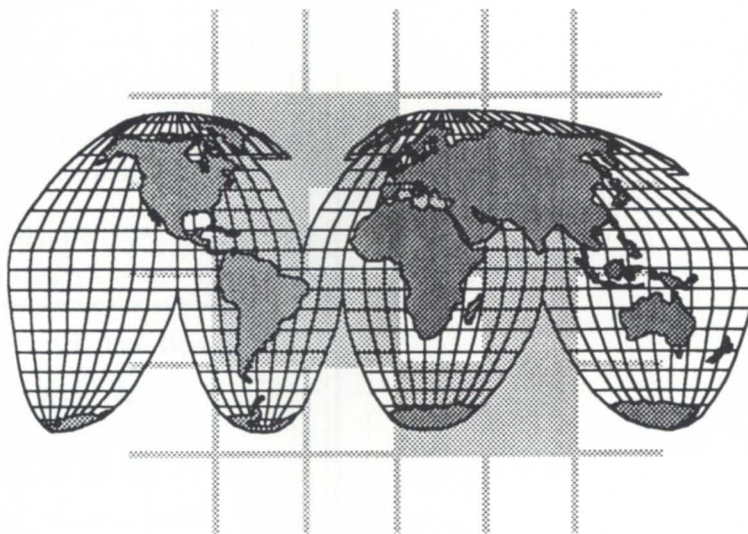
Anyway, here's the problem with the default scheme for setting ACLs: suppose you dump FOO:#, where the ACL of FOO is +,RE. When you go to MOVE or LOAD the files and



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create the new FOO directory, you wouldn't be able to create any files underneath it if you set the ACL to +,RE immediately and weren't a SUPERUSER. The easy solution is to use your own default ACL when creating a new file or directory, and then hold off setting the real ACL until you're done with it. The downside is a quirk you've no doubt encountered a few times: an interrupted MOVE or LOAD leaves the ACLs messed up on all directories that have been created, but not yet climbed out of, and on the file that was being MOVED or LOADED at the time of the interruption.

:CLONE.C

This is a cute and very handy function. It makes a fine addition to any utility programmer's private library. Given a new pathname, an old filename, and an ?FSTAT packet, it creates the new pathname as an exact replica of the old filename, except for TLM and TLA. The procedure is pretty straightforward. The source code is shown in Figure 5.

First it checks to see if the file is a LNK or not. If it's a link it gets the link resolution, otherwise it gets the ACL. If it gets the ACL it either reads it into a caller-supplied ACL buffer so the caller can set it later (remember the curious ACL problem described earlier?), or it reads it into a local buffer so it can set it immediately as part of the ?CREATE system call.

The next step is to use the ?FSTAT packet to fill in the ?CREATE packet and create the file.

If the file was a link then I'm done, otherwise I have to check the status word in the ?FSTAT packet to see if the file has a User Data Area (UDA), and create and copy it if it does. UDAs are typically associated with forms files and Infos index and data base directories and volumes.

Finally, I check the status word in the ?FSTAT packet to see if the origin file is permanent, and if it is then I set the permanence attribute on the new file.

Not that wasn't so bad, was it?

:TO_BE_CONTINUED

Next month I'll cover the final two major functions: "move_file" and "copy_data". Then we can take this thing for a little spin around the disk and see how reliably it performs before installing some ultra-high-performance modifications. Δ

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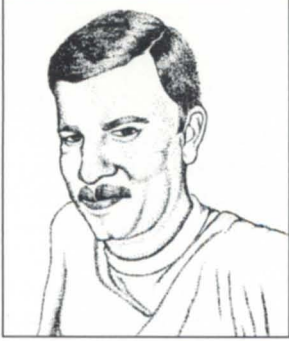
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Tim Boyer

CALLing all programs . . .

SYNOPSIS

How many programs do you have that contain files that are infrequently used? That's how many candidates you have for a CALL.

I just finished using the CALL facility to write a simple note—appending a program for order entry. Naturally, as soon as I finished, I came up with a much more elegant way of accomplishing the same thing using Screen Demon.

But it occurred to me that I've never seen a simple write-up of a CALL, and the Screen Demon solution would make for a good example of what can be done with that product. Therefore, this column.

Our sales department people sometimes need to make notations on the orders they enter that will be read by the billing department when they bill the shipment. We had been using post-it notes, which worked well enough—as long as they didn't get torn off, or accidentally placed on the wrong order.

But as long as we're on the computer, sales said, why can't we just type the note while we're entering the order? Made sense to me.

Then they threw in the kicker—they'd like to be able to enter this note at *any* input field in the program.

Since this note-entering was going to be a relatively infrequent occurrence in a number of programs (order entry, order change, order inquiry, and so on), it seemed to be tailor-made for the CALL routine.

To begin with, I needed to rewrite the programs with a common routine on all inputs to check for the particular function key that's going to call this subprogram. I decided on F4, since all of my programs use F1 for the help key. So instead of this:

```

DISPLAY ITEM-1, ACCEPT ITEM-1.
ACCEPT ESCAPE-CODE FROM ESCAPE KEY.
IF ESCAPE-CODE = ESCAPE-KEY
  GO TO EXIT-DATA-ENTRY
ELSE DISPLAY VALUE-ITEM-1.
  
```


all of my input statements would look something like this:

```

DISPLAY ITEM-1, ACCEPT ITEM-1.
PERFORM COMMON-ESCAPE-
PARA.
IF ESCAPE-CODE = ESCAPE-KEY
  GO TO EXIT-DATA-ENTRY
ELSE DISPLAY VALUE-ITEM-1.
    
```

```

COMMON-ESCAPE-PARA.
ACCEPT ESCAPE-CODE FROM
ESCAPE KEY.
IF ESCAPE-CODE = F4-KEY
  CALL "ORDER_NOTES" USING
  PASSING-ORDER-DATA.
    
```

The only danger in using the CALL statement is if you've become a lazy I Cobol programmer—like me—and you don't initialize your program's variables. All variables will remain as they were when the program last exited. If you're trying to keep track of something like line numbers, as I am in this program, then this particular feature is

The only danger in using the CALL statement is if you've become a lazy I Cobol programmer—like me—and you don't initialize your program's variables.

a blessing rather than a curse.

The data are passed using an 01 or 77-level item in the sending program, and corresponding item in the LINKAGE SECTION in the receiving program. For this program, I'm trying to pass along the order number and program name. The calling program has this in WORKING-STORAGE:

```

01 PASSING-ORDER-DATE.
03 PASSING-ORDER-NUMBER
  PIC 9(6).
03 PASSING-PROGRAM-NAME
  PIC X(28).
    
```

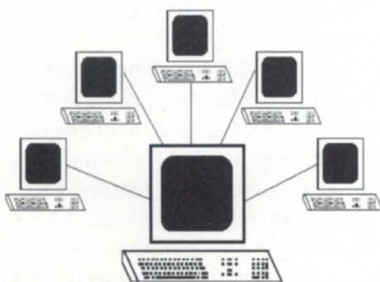
and the receiving:

```

LINKAGE SECTION.
01 PASS-ORDER-DATA.
03 PASS-ORD-NUMBERPIC 9(6).
03 PASS-PROGRAM-NAMEPIC
  X(28).
    
```

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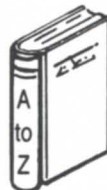
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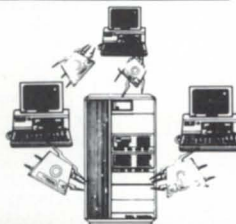
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To make the programs work, I simply MOVE ORDER-NUMBER TO PASSING-ORDER_NUMBER, do an "ACCEPT ENVIRONMENT . . ." to get the program name, and use the CALL described above.

I won't spend too much time describing the ORDER_NOTES program, because there's not a lot to it. The program is basically a large ACCEPT statement that does some additional line positioning when a note is appended to, and writes out a file with the order number as the key.

When the clerk begins to bill the shipment, BILL_OUT_ORDERS does a CALL to ORDER_NOTES. Here's where I use that program name field. If no note exists, and the call is from the billing program, ORDER_NOTES simply falls through and returns without displaying anything.

Otherwise, a window pops up and the note displays. From the other programs, of course, a note is created.

This way, one program will suffice for creating, modifying, and displaying the notes. Since billing may want to look at the note at any time during the process, I also rewrote that program with a common function-key routine.

So you write it, and test it, and it works just fine. You call your boss over, and with a smile you test it again. And it fails with a file access 91, and your boss gives you this look.

Here's what happened, and I had to have Gerry Manning point this out to me at a NADGUG conference. The CALLED program is *not* closing files for you. This is one of the reasons that this process can be so efficient. The first time through, the program opens your order notes file, you write to it, and do the return.

The next time the program is called, it opens your order notes file—oops, that file's already open. File-access error. Funny look from immediate superior.

Luckily, there's an easy fix. Initialize your file status variable like so:

```
77 ORDER-NOTES-STATUS
   PIC X(2) VALUE SPACES.
```

Then, your OPEN statement is:

So you write it, and test it, and it works just fine. You call your boss over, and with a smile you test it again. And it fails with a file access 91, and your boss gives you this look.

```
IF ORDER-NOTES-STATUS =
  SPACES
  OPEN I-O ORDER-NOTES-FILE.
```

The first time through the program, the status will be spaces. The next time—remember, variables keep their value—the status will be “00”, and the OPEN will be skipped.

There's the plain vanilla ICobol solution. After I did all of these changes, while paging through the Screen Demon manual, I discovered a way of doing the CALL from any input *without* having to rewrite the programs to use a common escape routing. This way, by using Screen Demon's hot key feature, all you need to do is add five lines to any program.

Screen Demon allows (demands!) modifications to its SD_ICX_CONFIG.SR file. This file contains the timeout values, screen blanking parameters, key translations, and—most importantly, for our purposes—names of hot key programs.

I've got my version of PASS in there, ready to come up at the press of the CTRL-F9 key. Why couldn't I put ORDER_NOTES on the hot key list, and have it pop up, say, when I press CTRL-N? This would eliminate the need for a common escape routine.

In order to accomplish this, I added the following lines to my SD_ICX_CONFIG.SR file, and reassembled it.

```
; On CTRL-N, call the order notes
program
```

```
HOT_KEY 14
ICOBOL ORDER_NOTES
SAVE_SCREEN
```

This modification took care of the pop-up program. Now, there were only two problems.

One was how to get the order number to a hot keyed program, the other how to avoid having the ORDER_NOTES program pop up over, say, the employee maintenance program, with the ensuing disastrous results.

Since this is a hot key program, it can't contain a LINKAGE section (a Screen Demon restriction). I could write the information to disk in one program and read it in another, but there's a simpler way.

Screen Demon has a call, SD_PUT_VALUE, that allows for inter-program communication without the restrictions of the LINKAGE section. The syntax is:

```
CALL "SD_PUT_VALUE" USING
  item-name, item-value, item-length.
```

where item-name is a PIC X(n) field containing the exact name of the variable, ending with a space, item-value is a PIC X(n) field containing the value of the item, and item-length is a PIC 9(4) COMP field containing the length of the field. The code looks like this

```
77 SD-ORDER-NUMBER-NAME
  PIC X(16) VALUE "SD-PRDER-NUM-
```



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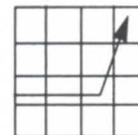
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```
BER ".
77 SD-ORDER-NUMBER-VALUE
PIC X(6).
77 SD-ORDER-NUMBER-LENGTH
PIC S9(4) COMP VALUE 6.
```

```
MOVE ORDER-NUMBER TO
SD-ORDER-NUMBER-VALUE.
CALL "SD_PUT_VALUE" USING
SD-ORDER-NUMBER-NAME,
SD-PRDER-NUMBER-VALUE,
SD-ORDER-NUMBER-LENGTH.
```

I'm assigning order numbers sequentially and automatically, so before my first ACCEPT statement, this appears:

After that, at any ACCEPT, a CTRL-N will send the user into my hot-key program, ORDER_NOTES.

Naturally, where there's a SD_PUT_VALUE call, there's a SD_GET_VALUE call. Trust me, the syntax is comparable.

In ORDER_NOTES, this retrieves my order number, which once again is the file's key.

One more Screen Demon call, and we're ready to go. Let's find out where we're coming from.

The SD_GET_HOT_CALLED_FROM_NAME puts the calling program into a string, and we can then check to be sure it's a valid calling program:

```
CALL"SD_GET_HOT_CALLED_FROM
_NAME" USING HOT-CALLED-
FROM-STRING.
IF HOT-CALLED-FROM-STRING =
"BILL_OUT_ORDERS"
PERFORM DISPLAY-EXISTING-
NOTES,
ELSE IF HOT-CALLED-FROM-STRING
= "ORDER_INQUIRY" OR
"ORDER_ADD"
OR "ORDER_CHANGE"
PERFORM ENTER-OR-ADD-TO-
NOTES,
ELSE PERFORM EXIT-PROGRAM.
```

Since this particular hot-key program is treated by Screen Demon exactly the same as a CALL, those warnings and techniques also apply here—be sure you're not opening files more than once, and also remember to initialize your variables.

So, there are the basics of a CALL. It's easy, it's extremely resource-efficient (and will become even more so, if ICobol II will hold some of these variables in memory instead of writing them to disk), and it's terribly under-used.

How many programs do you have that contain files that are infrequently used?

That's how many candidates you have for a CALL. △

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 or fax 216/898-5256, on the NADGUG bulletin board at 415/924-3652, or on the CSC bulletin board at 800/DASH-CSC.



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by Phil Goodwin
Special to Focus

Your/path/directory to Unix

SYNOPSIS

History has taught that revolutions are usually bloody. At the very least, migrating to Unix involves overcoming obstacles. But by adopting an organized approach, you can protect the financial and personal investment you've already made.

As a boy growing up I dreamed of a career as a professional basketball player in the NBA. As I grew older, there were really only three things that prevented me from attaining this goal: I was too short, too slow, and couldn't shoot.

Recently, I have found an ironic similarity between my youthful imaginings and VS Cobol/Infos shops considering open systems. They hear a lot about the glamour of Unix, and there are also three barriers: time, money, and effort. Fundamentally, no one really disputes the benefits of vendor independence, high price/performance, and lower maintenance costs. Plus, seeing the sizzling performance statistics of an Aviiion will cause just about any DP mouth to drool. But in an ever more competitive economy with finite resources, businesses cannot move to

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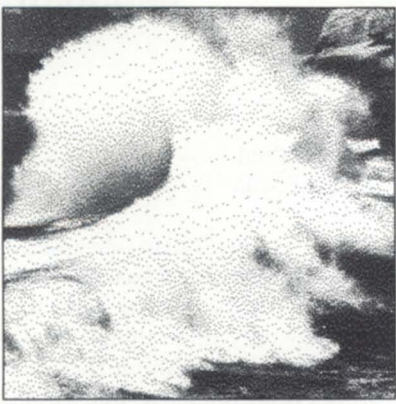
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Unix simply because it's fashionable. In fact, the nature of proprietary software in traditional systems creates a big barrier requiring significant direct cost savings to justify the "brute force" rewrites previously needed to gain the benefits.

When our company began addressing VS Cobol/Infos migrations, we talked to a wide variety of shops. The discussions revealed some common themes. First, the typical shop's investment in applications is enormous. Often tens of thousands of man-hours have been spent creating applications that address the company's unique situation. After years of sweat, the applications finally are tweaked just right. Throwing them out is money down the drain.

This brings up the second commonality. Most companies are satisfied with the state of their applications and don't relish rewriting them. Lower hardware maintenance fees rarely justify the cost of rewrites and license fees—even with the productivity promise of fourth-generation languages (4GLs). Select another flavor of Cobol, and you risk spending more man-years just to arrive at the functionality that you already had achieved.

Third, both programmers and users are comfortable with the system, warts and all. New applications mean retraining everyone, plus implementing new procedures.

And fourth, VS Cobol shops are concerned about the future. Most DP managers concede that the Unix life cycle is on the way up, while AOS/VS has, at best, peaked. They want to avoid being painted into a corner by old technology.

After examining many VS Cobol/Infos systems and migrating some of them to Unix, our developers have learned a lot about the nuances (and idiosyncrasies) of these systems. We've found quite a few pitfalls moving these proprietary DG systems to open systems. If you know where to look and what to do, a move to Unix can be quicker than you imagined, and quite justifiable.

We've found that most of the pitfalls can be grouped into one of three main categories of incompatibility: Infos data files, DG-specific Cobol syntax and code structure, and operating system/program CLI calls.

Non-ANSI "gotchas"

VS Cobol defenders will say that only small portions of the language are non-ANSI compliant. Unfortunately, it's the small things that become "gotchas." In the course of migration, it is desirable to bring the code as close to ANSI specs as possible. Some of the violations, though, are so big that overcoming them would require huge investments in manual reprogramming.

The biggest gotchas are the ones that are only minor syntax differences, but which imply a program design based on subtle Infos capabilities that do not exist anywhere else. The underlying design assumption, if not supported elsewhere, would require a complete rewrite of a program. Such examples include the record-level LOCKing and UNLOCKing Infos supports that open systems do not.

Many small DG incompatibilities also add up to big headaches. For example, VS Cobol doesn't require section names before a paragraph—another of many minor ANSI infractions. These small things can take unexpectedly large amounts of time to physically review or change. Automated tools designed to do the work on a large scale and avoid manual effort can bring such items to ANSI standards quickly. Δ

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Our friend, Infos

As VS Cobol users are doubtless aware, Infos/DBAM files are the single largest perceived obstacle to direct migration. These files are incompatible with everything else in the industry, including the AviiON. The data access techniques of Infos seemed like good ideas back in the mid-1980s, when memory was expensive and CPUs were slower. But the unique tricks played with inverted keys, duplicate primary keys, and other Infos-specific features can also be a migratory downfall. These limitations are overcome by replicating the same file-access functionality while using a portable ISAM format compatible with all open systems.

Of course, as soon as you change the structure, you might have to modify the program logic. Which raises the question: Why not create a complete Infos for Unix? Our company has considered this and opted not to, for several reasons. It's true that such a development could make migration faster. But it

If you know
where to look
and what to do,
a move to Unix
can be quicker than
you imagined, and
quite justifiable

would violate the DP department's goal of positioning the department for the future. The world of third-party software under VS Cobol/Infos is shrinking, and it is certainly *not* the language of choice for new developers. Thus, most shops are willing to pay some reasonable price to get back into the mainstream of software development with access to report writers, 4GLs, and third-party applications. But we've empirically discovered that the majority of systems can be migrated smoothly by using only a small subset of Infos file functionality.

Our solution, then, is combining a portable ISAM format with a specific Infos-emulating technology. ISAM offers the advantages of DG compatibility, wide-ranging portability, and can be read by a number of report writers and 4GLs. And because ISAM is the common standard among Cobol languages, users are not locked into proprietary hardware or software architectures.

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When we embarked on this strategy, we thought solid system design would be enough. But the trickiness of some structures, such as the duplicate primary keys mentioned above, was a real challenge. Initially, we tried to solve the duplicate primary key problem by creating a transparent secondary set of ISAM keys to emulate the primary keys with duplicates. This lasted for several iterations until the hair-tearing experience of redesign-with-every-program became too much. At that point we simply modified our Axis Cobol compiler to emulate the Infos OCCURRENCE and FEEDBACK facilities, allowing VS Cobol program logic intended to work with Infos to function properly under ISAM. Some might call this cheating, but because we control the development of the compiler, if the shoe doesn't fit, we can remake the shoe.

Replicating multi-level DBAM files proved to be another juggernaut. In many cases, people chose Infos just for its ability to provide wide-ranging access, versus ISAM's presumed key limitation. Here again, for the application to be successful, the modified data structure must be transparent to the end user. Fortunately, solid system design is the answer. After analyzing the applications and the data base, we restructure the files by segmenting them and separating the subfiles. Then we can map the files into a standard ISAM structure with identical data access. However, when I say that the problem is solved with solid system design, I'm understating the case. In larger systems, there may be well more than 100 programs accessing the data files. The design must fit each and every program, and the program logic must fit the data.

At this point some programmers probably are hearing warning bells about file overhead, both file open and disk I/O. Our customers have run benchmarks due to this concern, and the results were surprising. On an MV/30000 mod 3, opening 20 files took more than 3 minutes on a performance monitor. On the new Unix system, the open was so fast that it didn't even register on the monitor. Under batch-processing benchmarks, overall processing time has been reduced up

to 80 percent. In some cases, customers were so incredulous they checked reports by line item to verify that the process had not skipped a few steps. The proof is in the pudding, and the explanation is Unix's faster file-handling ability.

CLI calls


Program-level CLI calls' signifi-

cance range from minor to extensive in the systems that we have examined. Obviously, any call to AOS/VS must be changed to the Unix equivalent. In about 80 percent of cases, we've found that our CLI translation facility handles the job automatically. However, there is not a one-for-one correspondence between AOS and Unix. For these cases, a shell script macro is just the ticket.

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This CLI facility also handles different combinations of line feeds and carriage returns.

This gives the programmer the ability to do just about anything with different types of files, including line files, fixed-length files, and files that contain combinations of delimiters. The result is a system that can be run on any flavor of Unix without additional

changes to the system calls. This can eliminate hundreds of hours of manual coding.

Plus, it works

All the theory and planning in the world count only when they work. Our company just completed a project of migrating an MV/30000 mod 3 to Unix. The system had more than 1,100 pro-

grams, 6 million lines of code, and 400 separate Infos data structures. It took just five months from the day we first looked at the code to complete analysis, design, implementation, integrity verification, end-user testing, and live production.

Using the old "brute force" rewrite technique, most people estimate such a conversion would take at least 18 months. With the MV's monthly lease and maintenance costs approaching \$20,000 per month, the company's savings from cutting 13 months off of the conversion time was substantial. Parallel processing revealed identical results, and performance improved by several factors. Plus, the customer is now planning for the implementation of high-productivity development tools to meet its business information needs in the coming years.

Evolution, not revolution

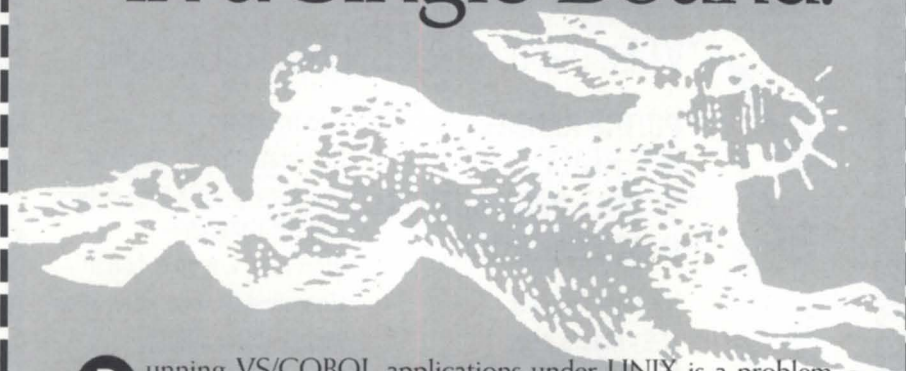
History has taught that revolutions are usually bloody. And how many DP managers or software developers need another unnecessary bloody revolution to contend with? By evolving, we use an organized approach to change what needs to be changed, while preserving the integrity of the system. Our own tools and products evolve at the same time. By controlling the compiler's development, we can respond directly to a situation and do not have to use convoluted work-arounds that may hinder future situations. DP can focus on enhancing the application rather than recreating it, and end users see only the impact of a more responsive system. Management, of course, is pleased to see costs reduced.

By adopting this organized approach, you can protect the financial and personal investment you've made in VS Cobol/Infos. At the same time, you'll be sure to gain the many benefits of future open systems, and not be stuck at the back of the migratory herd. Δ

Phil Goodwin is General Manager of Wild Hare Computer Systems, Inc. He has more than 10 years of data processing experience on a variety of platforms. He may be contacted at 303/530-2221 (phone) or 303/530-9637 (fax).

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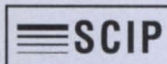
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Eagle Software, Inc., P.O. Box 16, 123 Indiana Avenue, Salina, KS 67402-0016; 913/823-7257.

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Tracking assets

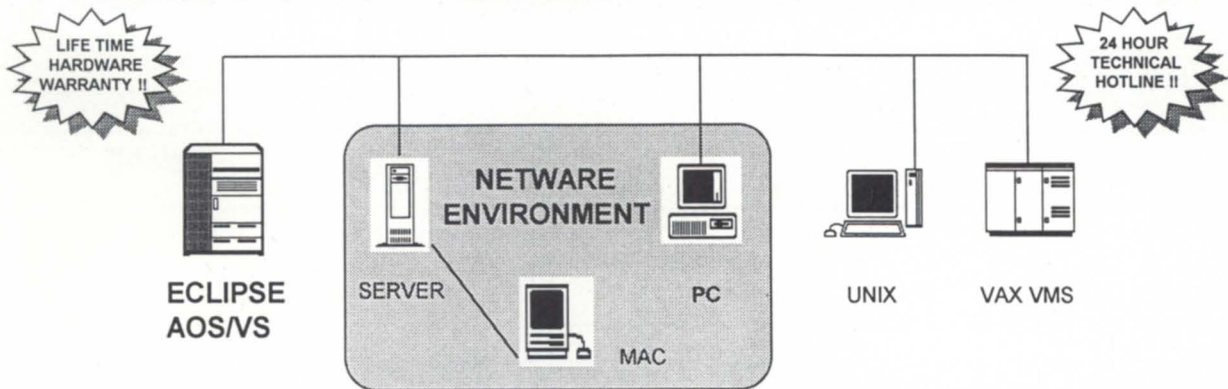
Schaumburg, IL—Concepts Dynamic, Inc., announced the release of CDI Fixed Assets, the newest addition to CDI's Financial Control System. The new module rounds out CDI's suite of mainframe-alternative corporate accounting applications that are written in 100-percent Informix-4GL and are

designed for Unix-based computing environments.

Specific features of the CDI Fixed Assets module include:

- Separate GAAP and tax reporting so that financial and tax book processing can be independent of each other.
- Support for multiple tax books, to allow federal, state, and local reporting for the same asset.
- Depreciation calculation based on a full range of standard methods, plus an unlimited number of user-defined methods to reflect true asset values accurately.
- The ability to calculate depreciation periodically or daily for timely reporting.
- The capability to transfer a por-

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tion or a component of an asset from one asset to another, one custodian to another, or one component to another.

- Simultaneous calculation of projection depreciation schedules for multiple books and periods, for more effective forecasting and analysis.

Concepts Dynamic, Inc., 1821 Walden Office Square, Suite 500, Schaumburg, IL 60173; 708/397-4400.

Circle 51 on reader service card.

Land modeling



Atlanta, GA—Plus III Software, Inc., released Terramodel Version 8.10, which expands the capabilities of the company's popular land-modeling package, and includes a complete rewrite of the Hydro/Plus standalone package as an integrated Hydrology Module in the Terramodel system.

New features and enhancements of Terramodel 8.10 include:

- New point, bearing, distance,

vertical, and angle snapmodes. There are more than 30 new Snap options including midpoint, factor, intersection, offset intersection, station, and offset, all created for engineering/survey design and drafting.

- BLOCKS—allows users to create a single Block definition from multiple objects that can be shared by multiple project files.

- EDIT—allows users to edit a text object without retyping it.

- HATCH—allows users to create a block object using a hatch pattern within selected boundaries.

- New macro language commands and extensions to the macro language.

- The powerful features of Hydro/Plus as a newly integrated module for generating hydrographs and complete stormwater detention/retention studies.

Terramodel Version 8.10 is compatible with previous versions of Terramodel, and is binary compatible

across supported PC and Unix workstation environments. The system runs on a variety of Unix platforms, including Data General's Aviiion. The MS-DOS Solutionpak for PCs ranges in price from \$995 to \$6,995. The Unix Solutionpak pricing ranges from \$1,295 to \$9,995.

Plus III Software, Inc., One Dunwoody Park, Suite 250, Atlanta, GA 30338; 800/235-4972.

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Hydrology module



Atlanta, GA—Plus III Software, Inc., announced release of its new Hydrology Module, a storm water detention application running with the existing Terramodel software system.

The new module allows users to explore and understand how water interacts with existing terrain or a proposed design. By using Hydrology in combination with other Terramodel



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modules, users can determine the changing slopes of a DTM (digital terrain model), drainage areas of a DTM, slope from one point on the ground to another, volumes of a pond, and areas of a design as well as view cross sections of a detention pond.

The Hydrology Module is available with the release of Terramodel 8.1 and is priced at \$1,595 (DOS) and \$1,995 (Unix.)

Plus III Software, Inc., One Dunwoody Park, Suite 250, Atlanta, GA 30338; 800/235-4972.

Circle 55 on reader service card.

Open text editing

San Jose, CA—A new product, nu/TPU Text Editor from a/Soft Development, Inc., has been certified by the 88open Consortium and is available to 88open members and end users.

nu/TPU is a multi-platform, fully programmable text editor that is fully integrated with Motif, MS Windows,

and Openwindows. The system features mouse support and pop-up and pull-down menus. Available on MS-DOS and on more than 50 Unix systems (including Data General's Aviion), nu/TPU allows developers to move from one editing environment to another without having to switch editors.

Three prebuilt interfaces—EVE, EDT, and WPS—come ready to use with nu/TPU, or you may customize the editor to fit your specific editing needs. The system supports unlimited windows and buffers, as well as its own extensible programming language. Users may edit on their 88000 machines and move to a different environment without change; nu/TPU customizations can be moved from one environment to another by simply copying a file.

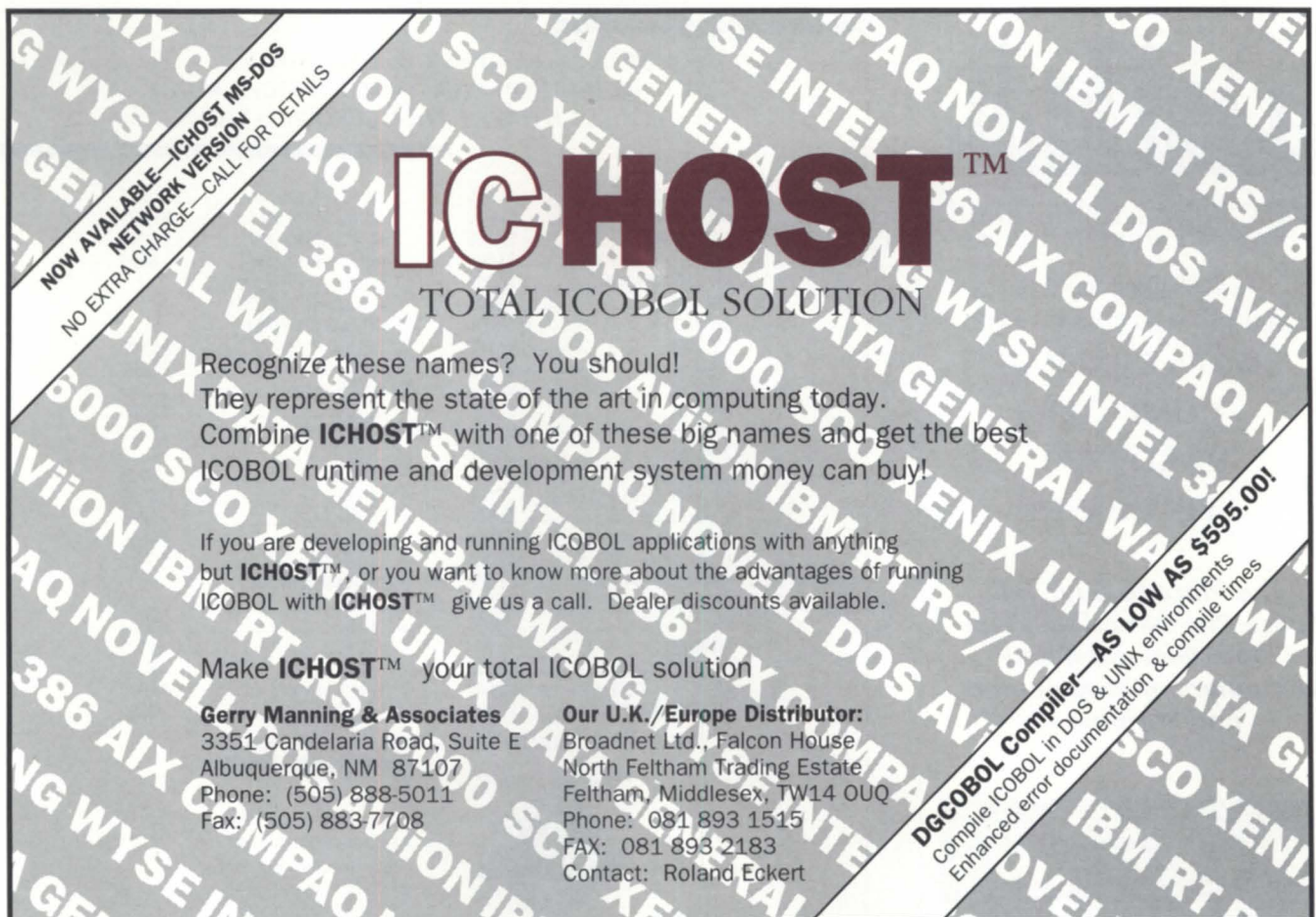
88open Consortium Ltd., 100 Homeland Ct., Suite 800, San Jose, CA 95112; 408/436-6600.

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Backup management

Newport News, VA—The Contemporary Cybernetics Group announced that its 8 mm tape library systems, the CY-CHS10i and the CY-CHS120, are available with backup management software. Designed for multi-vendor Unix networks, the software automates backup and restore operations and gives users direct access to between 25 GB and 3 TB of data—without manual intervention.

The CY-CHS10i features one 8 mm tape drive and 10 tapes in a desktop cabinet; the CY-CHS120 features up to four 8 mm tape drives and 116 tapes. Both libraries utilize a robotic tape handler to load and unload tapes without manual intervention. Unattended backups, either full or incremental, can be scheduled to run automatically at any time or date. Backups can also be performed with users on-line. The software catalogs each backup, creating an audit trail for recordkeeping and security.



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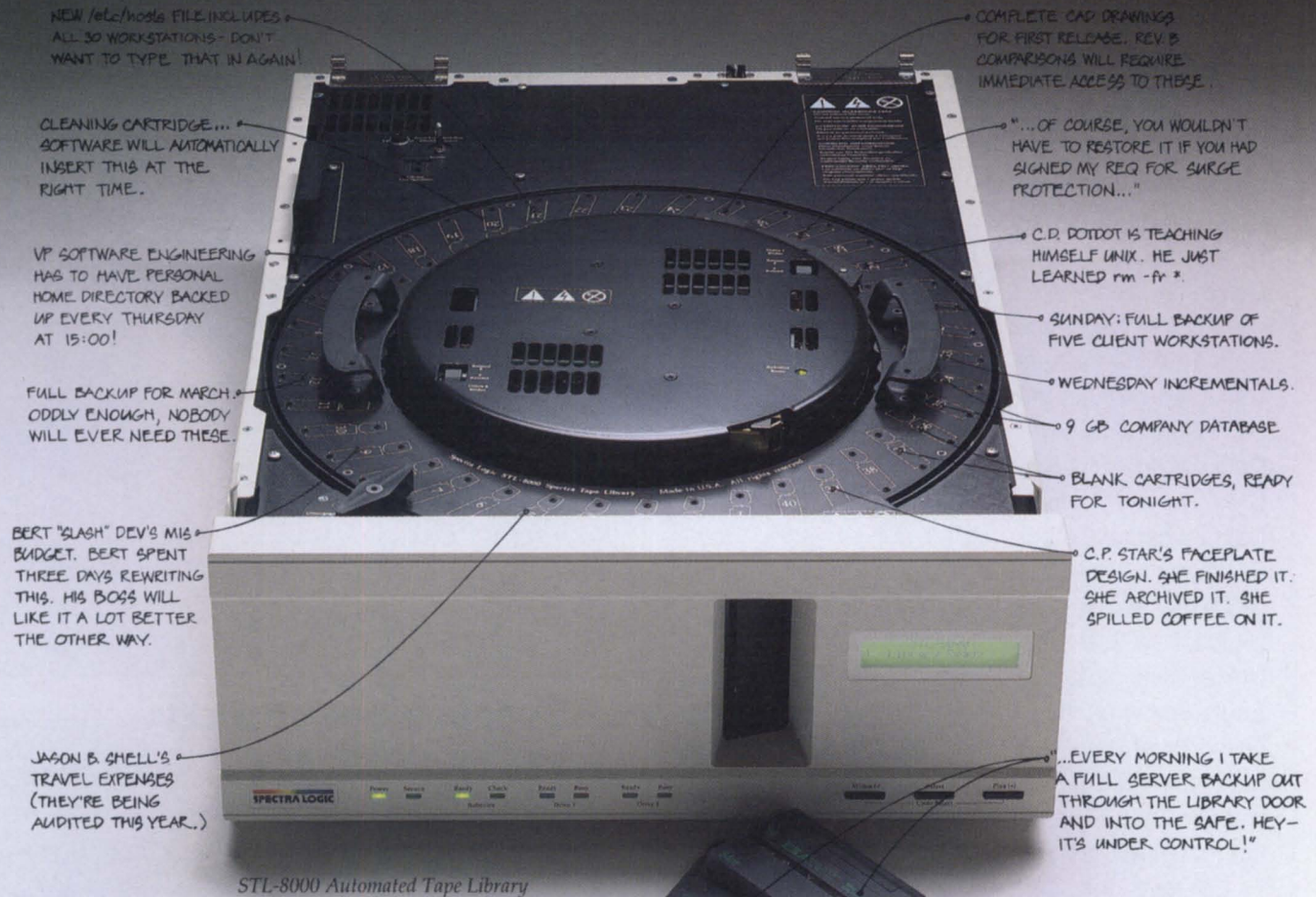
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Alexandria Backup and Archive Librarian

Together, the library and librarian provide complete automation of network backup, archival storage, media management and data control.

With Spectra Logic's Total Archive and Backup Solution, Spectra TABS, anyone on the network (with the appropriate privileges) can search a database by user, group, path or filename and restore a file — just point and click.

THE SOFTWARE

Spectra Logic's Alexandria Backup and Archive Librarian is one of the first UNIX backup and archive software packages designed specifically for use in a library environment.

More than a "backup" package, Alexandria manages media and data over heterogeneous networks, tracking files and media elements in the library or in off-line storage.

Alexandria's power is easily accessed through an intuitive X-11 GUI window environment or directly from the shell.

THE HARDWARE

Spectra Logic's STL-8000 Automated Tape Library provides random access to 200 Gigabytes of uncompressed data on forty 8mm cartridges. Centralize your data in a 7" height, rack-mount or desktop enclosure.

Alexandria also supports Exabyte's 10i and 120CHS tape libraries, optical libraries from Hewlett-Packard and the Spectra Logic STL-6000: a 20 cartridge, 100 GB, 8mm tape library.

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ON-LINE HELP

Who to call for answers about NADGUG and FOCUS

NADGUG address:
c/o Danieli & O'Keefe Associates, Inc.
Chiswick Park, 490 Boston Post Rd.
Sudbury, MA 01776
FAX: 508/443-4715

FOCUS Magazine address:
c/o Turnkey Publishing, Inc.
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Data General Customer Support Center**800/344-3577**

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

Information about advertising.....Susan de Blanc

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Designated users can locate and restore their own files without ever touching a tape.

Contemporary Cybernetics Group, Rock Landing Corporate Center, 1846 Rock Landing, Newport News, VA 23606; 804/873-9000.

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Expediting the mail



Wayne, PA—Soft•Switch, Inc., announced enhancements to EMX: The Enterprise Mail Exchange, bringing major support for building managed X.400 e-mail backbone networks into LAN environments.

The enhancements include support for X.400 over TCP/IP and support for X.400 messages containing international character sets such as ISO6937 and T.61 (Teletex). Also announced were enhancements to the server component of Soft•Switch's client/server API—Soft•Switch Network API (SNAPI) to support TCP/IP transports.

EMX is a Unix-based family of scalable, multi-protocol backbone electronic mail switches based on X.400 with directory services. EMX provides full interoperability with other major electronic mail distribution protocols, including SNADS, SMTP, and MHS.

A related Soft•Switch product, EMM: The Enterprise Mail Manager, is a managed object-based, graphical management system for network configuration, operation, and maintenance. It executes in an X-Windows and Motif environment.

To enable customers to use current networks and routers without requiring OSI support, EMX now implements the Internet community's RFC1006 allowing EMX customers to send X.400 information utilizing TCP/IP transports. RFC1006 specifies the ISO Development Environment (ISODE) to enable OSI applications such as X.400 to operate over TCP/IP LAN environments.

Soft•Switch, Inc., 640 Lee Road, Wayne, PA 19087-5698; 215/640-9600.

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Migration made easier



Boulder, CO—New software tools announced by Wild Hare Computer Systems, Inc., are intended to dramatically simplify migrating VS Cobol/Infos applications to open systems. As a result of enhancements to Wild Hare's Choice! and Axis Cobol products, VS Cobol/Infos users can migrate their applications to Unix, DOS, and many other popular operating systems with minimal effort, even when using proprietary VS Cobol constructs.

New Choice! and Axis enhancements include extended Cobol syntax, Infos-compliant file additions, and dynamic system call translations.

Wild Hare Computer Systems, Inc., P.O. Box 3581, Boulder, CO 80307; 303/530-2221.

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Window management

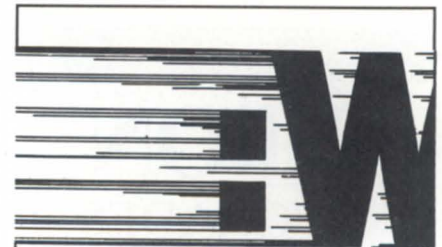


Plano, TX—A joint marketing agreement between LINK Technologies of Fremont, CA, and Structured Software Solutions, Inc., will offer a free evaluation copy of FacetTerm, the session and window manager with any LINK Alphawindow Terminal shipped. The agreement is part of a LINK initiative to offer Alphawindow Appraisal Kits (AWAKS). The AWAKS kits will include either a LINK ST80 or WT6 Alphawindow terminal bundled with a PC-style keyboard, a mechanical mouse, and the FacetTerm window manager evaluation package. The free FacetTerm window manager evaluation package is fully functional and will enable up to 50 terminal users to run multiple sessions and applications when connected to virtually any Unix host.

LINK Technologies will begin offering the AWAKS packages with FacetTerm immediately through a worldwide channel of distributors and resellers. The WT80 and WT6 terminals, coupled with a window manager, provide up to six simultaneous sessions.

Structured Software Solutions, Inc., 4031 W. Plano Parkway, Suite 205, Plano, TX 75093; 214/985-9901. Δ

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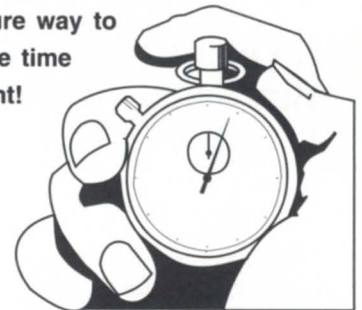
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SOFTWARE LIBRARY

A complete listing of the NADGUG software library

compiled by Tim Boyer

ACK • A terminal emulator Xmodem/Ymodem file transfer program from Benchmark Products. Operates under AOS/VS and AOS. This is an updated version (2.03). 510 blocks.

BIGBRO • An auto-logoff program, written in F77. From the Forest Service. 170 blocks.

BJ_BBS • A directory containing programs from Brian Johnson's :SYSMGR BBS. Some are Brian's, and some have been put on the board by others. 6,762 blocks.

CCOMP • A Benchmark Products C compiler. It is *almost* fully functional; several items have been left out of the demo version. None should interfere with testing the compiler. 864 blocks.

CONCEPT • Two submissions from Concept Automation: NOTIFY lets you know when another process terminates; PRIOS lists the priorities of processes. 162 blocks.

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

DBCHECK • Our first submission from Europe. Lee Dickinson of IBIS Information Services, offers a program to check the open status of an INFOS file; examines check-pointing status of a file, and if enabled, will force checkpointing. 187 blocks.

DUMpload • A Macintosh program to dump and load AOS/VS-compatible dumps on a Mac. To get this program over to your Mac, you will need a communications program that supports MacBinary Xmodem transfers and BINHEX (a Mac utility that converts Mac files into Xmodem-able files). Use TEX (also on this library) to send the three files to your Mac. Don't forget to use the -k switch on TEX. Then run BINHEX on each of the files. DUMpload is the actual program. 137 blocks.

ERP • Another inactive PID terminator. Developed by NASA and modified by Manville. Written in F77. Kevin Danzig found some bugs and corrected them. See "READ.ME.LAST". 454 blocks.

FILEMNGR • Allows manipulation of files through a screen-oriented program. Move, copy, delete, view, and several other

options. This is a shareware program. If you continue using it, you are requested to pay a registration fee. 656 blocks.

FOCUS • A directory of programs related to articles published in *Focus*. 1,908 blocks.

FTNCVT • A Fortran-5 to Fortran-77 translator. It was apparently included in early F77 releases by DG to smooth the transition from F5. 232 blocks.

GAMES • Accumulated from various places. Most can be accessed from the GAMES.CLI macro. But a couple, like MONOPOLY and CB, use disabled console and are not included in the main macro. Create a link in your macros directory GAMES.CLI that points to :GAMES:GAMES.CLI. Put the GAMES.DMZ file in the root (:), and execute the NADGUG macro there. That will load everything into the directory :GAMES. 18,836 blocks.

GUTNICK • Utilities donated by Tom Gutnick of DG. The MIPS_METER and DISKIO_METER require a graphic terminal, and do what their names imply. The SYSLOG_FILTER programs allow choice of which SYSLOG events to record. This feature requires AOS/VS 7.69 or later, or AOV/VS II 2.10 or later. 832 blocks.

IMSLUTIL • A collection of CLI macros, Cobol routines, and Assembly routines callable from Cobol Donated by IMSL, Houston. 4,894 blocks.

JAG_UTIL • MISCUUTIL contains several programs. FILECOUNT lists counts and combined sizes of files, based on various selection criteria. USERSPACE counts the space used by CPDs within :UDD. SCAN searches for strings within multiple files at the same time. LAMINATE allows you to combine two test files in various ways. QHELP generates tree-structured help files (like VMS has). SWITCHES allows you to painlessly add minimally unique switches to any 32-bit compiled program. GLOSSARY builds a file of word usage. 4,325 blocks.

KERMIT • A file-transfer protocol developed at Columbia University. This version was ported by Phil Julian from the Unix C code. Also included is an EMACS editor. There are also several compression programs. KERMIT is public domain. 9,697

blocks.

LOOK • Used to view text files. Move forward and backward in a file. Donated by DG. 203 blocks.

MACROS • Contains miscellaneous submissions: MACBOOK, a macro collection from the Colorado User's Group; VITRO, a macro collection submitted by Ronald Floda of Vitro Services Corporation (Fort Walton Beach, FL); MILWAUKEE, consisting of a GO macro to quickly move to a directory based on only part of the name, and MAIL?, to check Wordperfect Mail (submitted by Dall Noll, Milwaukee County Transit System). 508 blocks.

MENUDIR • From FEDSIG (Federal User's Group), allows you to control (and require) password maintenance by users. 486 blocks.

MISKERM • My official "KERMIT non-categorized storage facility." If it doesn't have anything to do with Phil Julian's version, but it is related to KERMIT, it goes here. Of special interest is the DG/1 KERMIT (the DG/1 uses different comm chip, and can't use regular IBM PC KERMIT). Sources of most of these versions is nebulous at best, so *caveat emptor*. 6,495 blocks.

MSDOS • A program to read MS-DOS 5.25-inch diskettes on AOS/VIS systems. 978 blocks.

SOFTRANS • A file-transfer protocol used by a commercial PC communications package. This F77 version is being distributed with the permission of Softronics, the author (per Mike Bay, 10/13/88). 426 blocks.

SPELL • Checks the spelling of a word; SPELLALL spell-checks a document. Submitted by Richard Kouzes, Princeton University. 5,108 blocks.

TEX • (Terminal Emulator with Xmodem) A terminal emulation program written by David Down. Allows Xmodem and Ymodem transfers with options to simplify transfers between DG MVs and various types of PCs. Now features a command language. Distributed as shareware; use for 30 days, then get rid of your copy or send David Down a registration fee. 463 blocks.

VT100KER • The VT-100 emulator from John Grant, part of a KERMIT implementation that does not have the file-transfer protocols working yet. 1,044 blocks.

XFER • A tape-conversion utility. 607 blocks. △

NADGUG members interested in receiving the software collection should direct requests to: Michelle M. Dube, NADGUG Association Manager, c/o Danieli & O'Keefe Associates, Inc., 490 Boston Post Road, Sudbury, MA 01776.

Include your membership number, a ship-to address, type of media you require, and payment of \$30 to cover cost of the media, shipping, and handling. The library is available on MV/2000-style 20 MB cartridge or 1,200-foot, reel-to-reel tape. Allow 3 to 4 weeks for parcel post delivery. Send software contributions to the above address. For information about non-standard library distribution, call 800/253-3902 (continental U.S. only) or 508/443-3330.

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:SYSMGR BBS specializes in file transfer of RDOS and AOS[VS] DUMP files - no messaging facilities. XMODEM, YMODEM, and KERMIT supported. 415/391-6531(one line), 2400 baud (Microcom AX9624c), 8 data bits, 1 start / stop bit or 415/550-1454 (voice). System is MV/4000, terminal mode is CHAR/605X.

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DASH Items...

Category: DG/UX

Author: Elliott Lavy

Subject: **System dumps**

I saw a reference in one of the weekly bulletins to a "mini-dump" as opposed to a "full dump" of the system. Can anyone tell me what that means?

Reply by: DG Customer Support

As of release 5.4.1 of DG/UX, the kernel dump procedure now defaults to using what is known as a mini-dump. The mini-dump will write all kernel memory out to your tape without writing memory being used by user processes.

This makes for a much smaller dump, i.e., usually 6 MB to 20 MB, instead of the entire contents of physical memory (often a few hundred MBs). Typically, the user data space is not needed in order to determine the problem that caused the system panic. Mini-dumps have the added advantage of getting you up and running more quickly as it only takes a few minutes to dump the required memory as opposed to all of physical memory.

Author: C.A. Brokschmidt

Subject: **ls command hangs in /**

I have encountered a situation where my `ls -al` command hangs when attempting to look at the root directory (`/`) on my 5225. The `l` qualifier seems to be the culprit. I am able to `^C` out of the command. I assume that the command is encountering corruption or some other file information, such as file length, that it can't read. Any ideas how to straighten this out? The `ls -a` command works fine.

Reply by: DG Customer Support

Are you on a network? The `ls -l` causes a stat of the remotely mounted file systems and if one of your remote machines were down, this could cause the hang. If you suspect corruption, you

should run `fsck`. Typically, if you had a file system problem such as this, your LDU would seal which would downgrade it to read only access and instruct you to run `fsck`. I suspect you may have some NFS links or symlinks that are hard-mounted that aren't responding. This would usually cause the message "NFS server XXXX not responding" to be printed to your system console.

Reply by: C.A. Brokschmidt

Thanks for the reply. I checked the system again the other day, and was again able to issue the `ls -al` command in the root dir. It may well have been a network issue, as you described. We have about 25 Aviiions throughout the building and use NFS extensively.

I also have approximately 12 mount points off of the root where we mount rewritable optical disks on an Opstar jukebox. Since this is a very mechanical device, maybe my "hang" was really a pause while optical cartridges were manipulated to return statistics for the `ls -l`. Δ

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

Bits and bytes...

Modem send/receive loop

From: James Spellman

Anyone know what causes send/receive loop (on all the time) on MV/2000 w/ 7.58? Also, [it] seems to hang a lot lately, and needs to bring down the system to "free" the port.

From: Walter Mosscrop

Have you checked:

1) the modem, to make sure it's not echoing data;

2) the cabling, to make sure that it's not shorted and/or too long (I've seen several cases where the data being sent out are "echoed" back to the port by long cables acting as antennas).

Also, have you tried using a different port (assuming that's possible) to eliminate a bad port or modem?

CEO archiving headaches

From: Matt Koch

I would be very much interested to hear from anyone regarding what they do to keep their filing system clean. We've tried CEO archiving, and have found that it has very little effect.

Educating users seems to have little effect. No one has time to look through years of old documents.

From: Jeff Campbell

There are several variables that can be changed to alter the depth of the archive run. One thing to keep in mind is that the AOS/V5 disk file is the only thing deleted.

The record in the CEO_Index is maintained. You can then adjust filing system surveys to not list archived documents.

Another thing to keep in mind is if you delete a lot of data from a disk, you might want to rebuild the data on that disk.

You can do that by dumping, reformatting, and reloading the data back onto the disk. This will reclaim some wasted space. Δ

Call the NADGUG/Rational Data Systems electronic bulletin board, available to all NADGUG members. The phone number is 415/499-7628. There are no fees other than telephone charges.



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