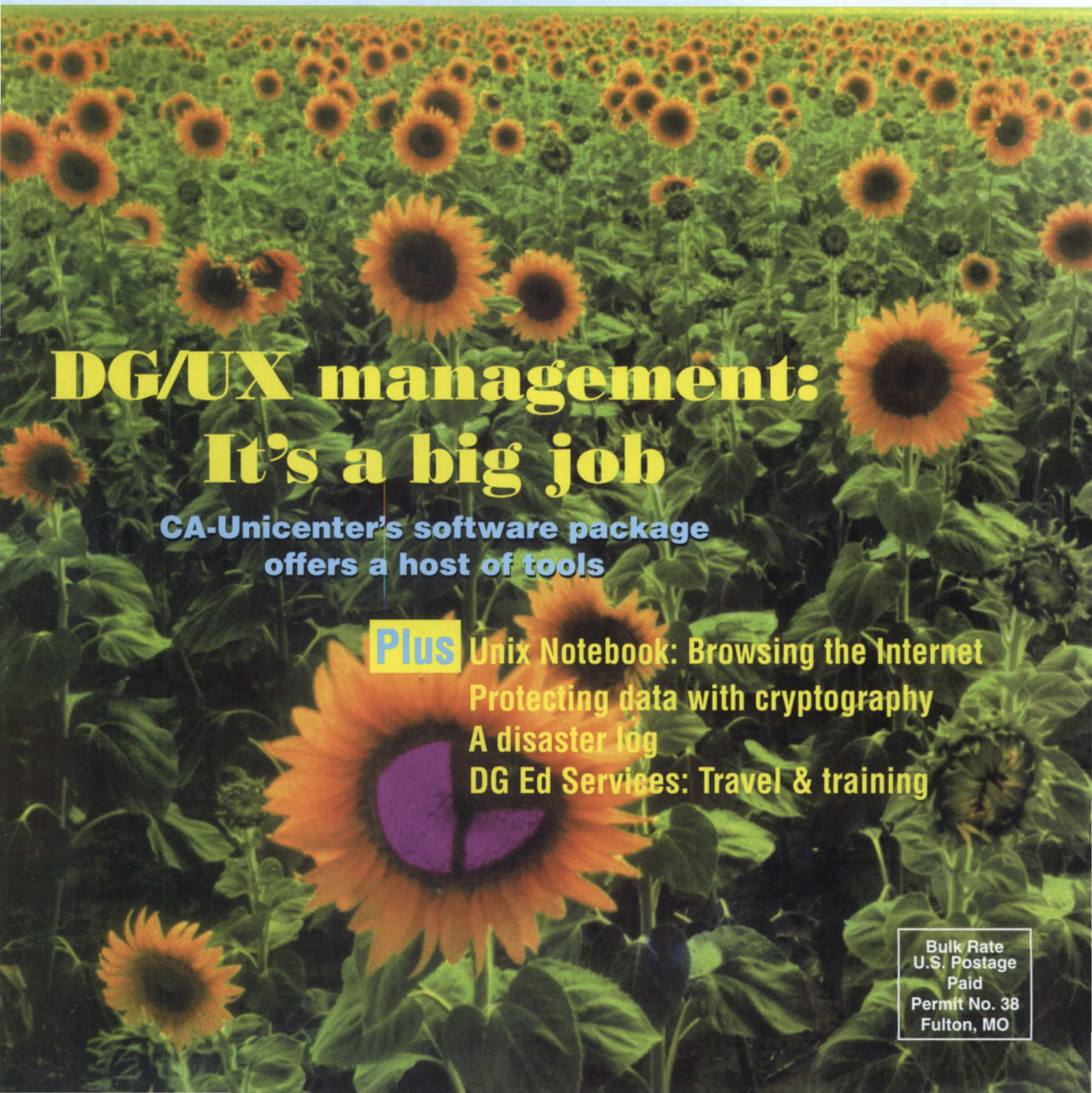
May 1994

FOCUS

The Magazine of the North American Data General Users Group



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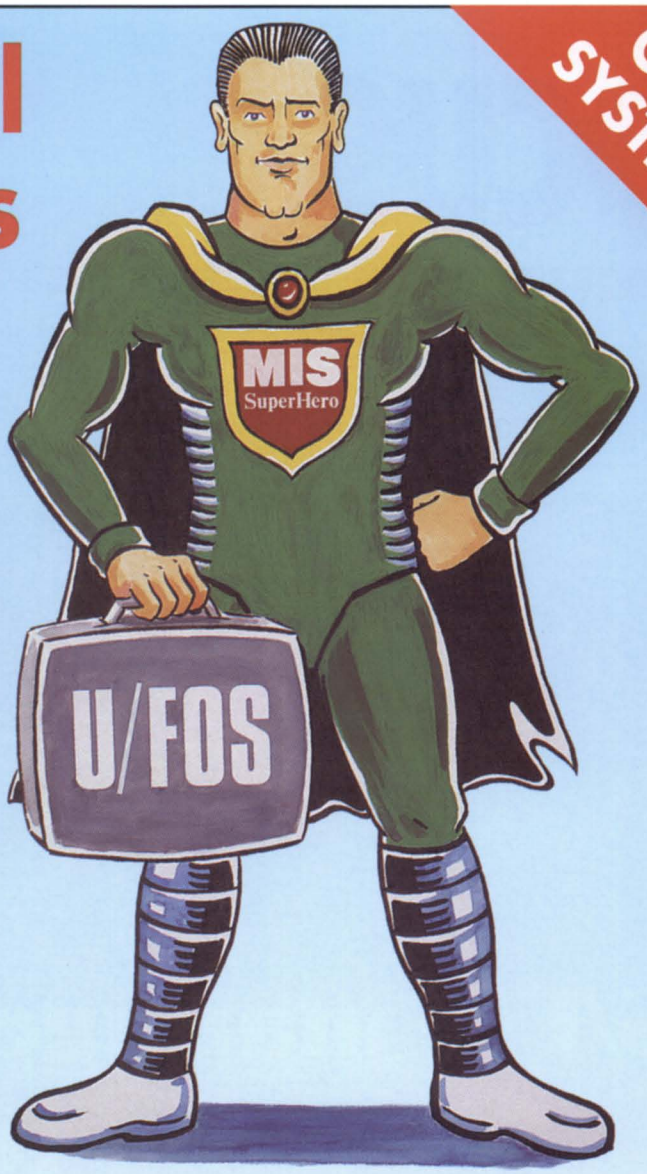

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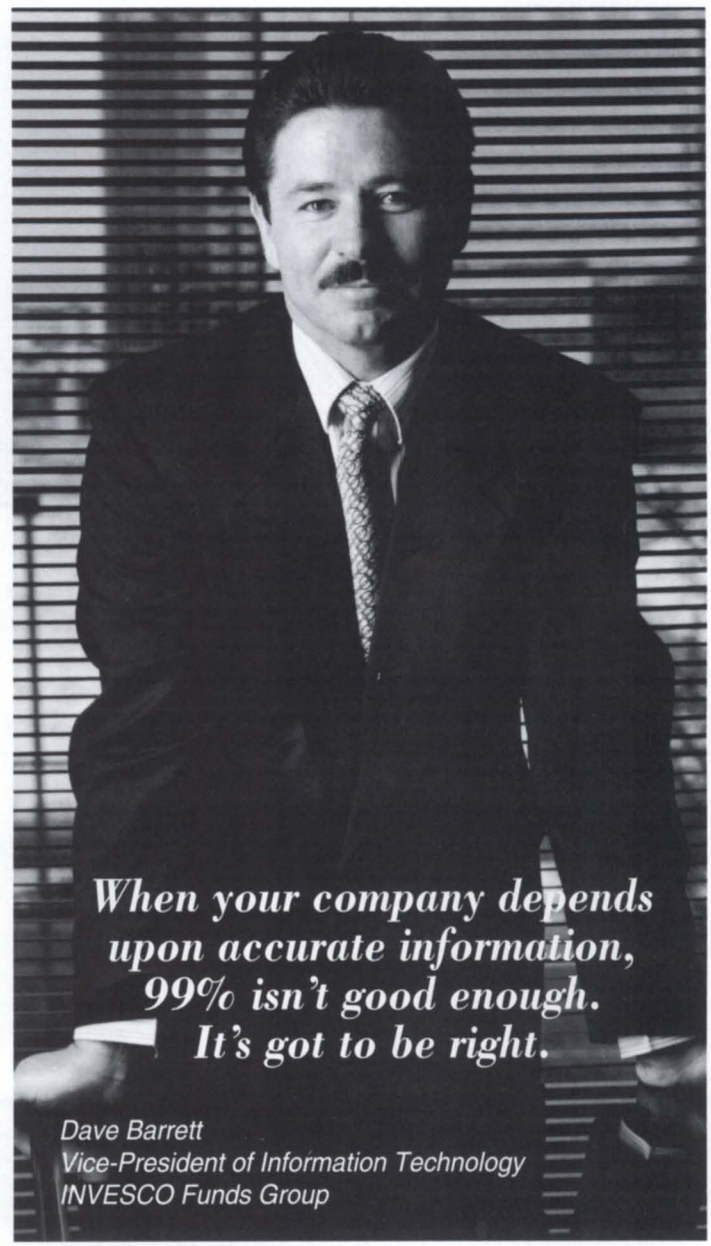

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SYSTEM MANAGEMENT SOFTWARE

Managing Unix: CA-Unicenter and DG's Aviion join forces

It may be new to Data General Aviion users, but CA-Unicenter's track record is well-known in the mainframe and Unix worlds

by Katherine Jones, Ph.D. **10**

SYSTEM MANAGEMENT SOFTWARE

Stepping up to the platform: A user's guide to CA-Unicenter

Data General's software alliance with Computer Associates brings CA-Unicenter to DG/UX and a host of software tools for system administration

by Joe Cannata **17**

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by Doug Johnson **4**

PRODUCTS AND SERVICES

The latest products for Data General systems **6**

IN GENERAL

News and notes from the greater Data General community **8**

UNIX NOTEBOOK

Browsing the Internet

The rapidly expanding Internet will, quite simply, change the world, encouraging and facilitating the free flow of information everywhere. But if you want to tap into this great repository of everything you can possibly imagine (and then some), get acquainted with the seeking and searching tools that make it possible

by David Novy **22**

DATA SECURITY

Protecting data with cryptography

Today we live in a global, electronic village. Unix and the Internet are connecting everyone to everyone else. Unless you take special measures your computer is wide open to any visitor

by Michael E. Marotta **27**

DISASTER RECOVERY

A disaster log

Wondering how you would get your computer system back up and running after a disaster? Well, declare a disaster and find out

by Ed Lindberg **29**

DG ED SERVICES

Travel and training

Data General Educational Services' goal in 1994 is to make getting to training easier by extending class offerings out across the country. In turn, you can use your training time as a way to see parts of the country you might not otherwise visit

by Joe Cannata **32**

BULLETIN BOARDS

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About the cover: *Original photo courtesy of the Texas Department of Highways & Public Transportation in Austin. Cover design by Ann Soto*

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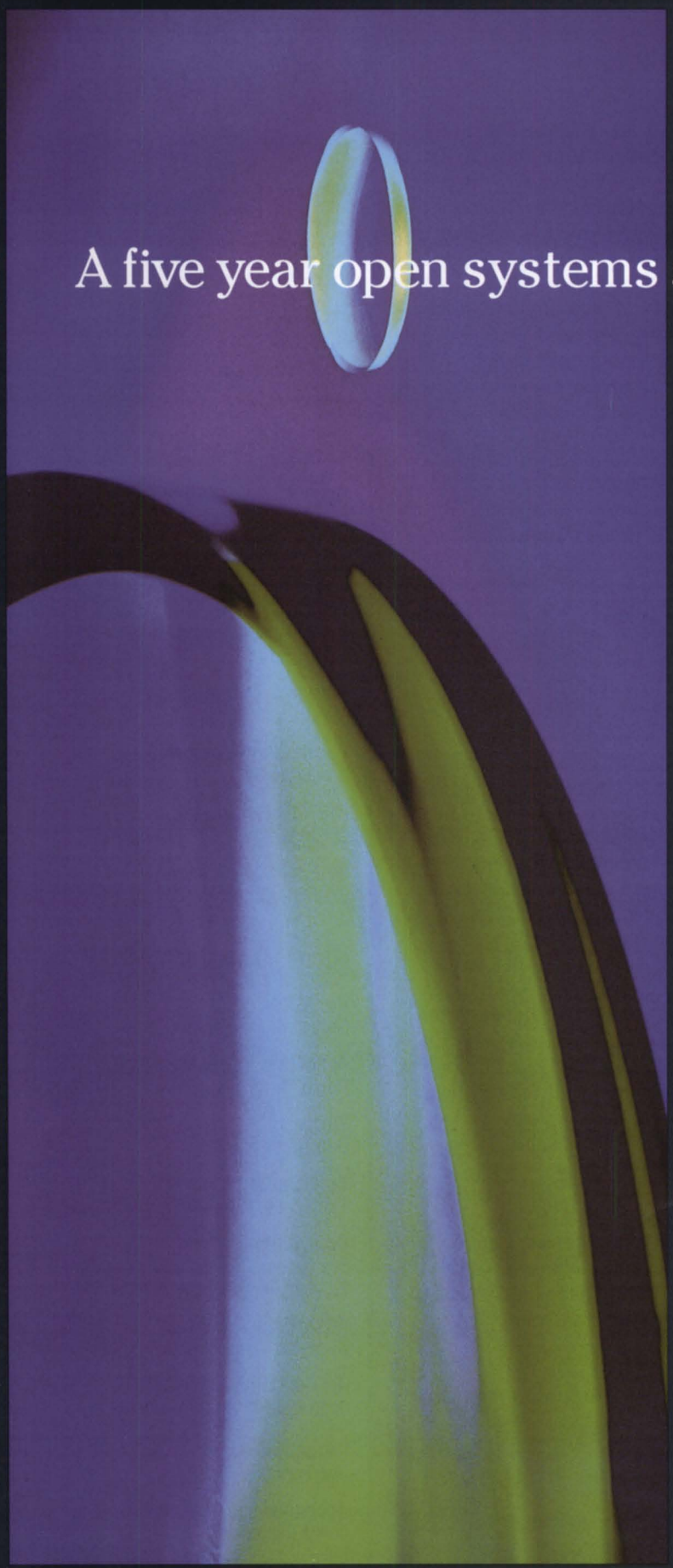

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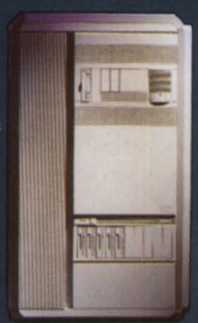

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1. "The CW Guide to Servers," Computerworld, March 22, 1993 and "The CW Guide to Servers and Superservers," Computerworld, January 31, 1994.
2. International Data Corporation, "Data General's Ascent in the UNIX Market," October, 1993
3. "Clash of the Drive Arrays," PC Week, October 11, 1993

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Circle 2 on reader service card.

"Thanks to the Interstate Highway System, it is now possible to travel across the country from coast to coast without seeing anything."
—Charles Kuralt

The Information Super Weed

by Doug Johnson
Focus Editor

I drive a modest 23 miles to work each day in Austin, Texas, a city of half a million not known for its crushing traffic. But if the coming Information Superhighway is even anything like it is here, I hate it already.

Actually, around here we make fun of the superhighway traffic in Houston, so when I think of an **Information** Superhighway, my reaction is, "Oh, great. Maybe it'll be like Houston's Loop 610, any time of the day, bumper-to-bumper to the horizon." Ugh.

I don't remember when I first ran across the phrase, "Information Superhighway," but it would have been somewhere in the news during the last two or three years. It came from somewhere; *some*body had to have coined it—perhaps a would-be visionary writer or columnist. I hope whoever did has since met with appropriate punishment.

Overuse has a way of ruining a buzzphrase. Maybe **INFORMATION SUPERHIGHWAY** sounded good at first (say it as though you're using a megaphone turned all the way up). But it was inadequate from the beginning and soon it became inane. And of course the mainstream media picked it up and it spread like kudzu, contaminating otherwise worthy news and features about the future of computing technology.

Now there's no other way to describe universally networked computing. Unless we strive to break the evil spell, we're stuck forever with this tired, rush-hour metaphor.

How has it come to this? Blame it on herd mentality—and journalists. Most reporters and editors are two-finger-typist technophobes (hey, they can't even do math) who don't have Clue 1 about much more than asking irrelevant questions, writing superficially, and spelling badly—this writer included, except that I spell great. You see, we chroniclers of happenings and trends are trained to look for labels and images. Applying bumper-sticker slogans to a topic is far easier than doing any deep thinking about it. Hence, **INFORMATION SUPERHIGHWAY** and more superficial stories about "on-ramps" and "off-ramps" and "potholes," and on and on. Blecch.

Instead of repeating, "Information Superhighway, yeah, way cool," like robots, we should be reflecting rationally, critically, and asking, "Is this going to be as wonderful as Houston's Loop 610?" I don't want it to be a highway. I want it to be like my telephone: I pick up the handset, punch in a number, and I'm connected. Simple. It's less like a long, arduous journey and more like instantaneous teleportation. Or like my fax machine: I insert the paper, punch the number, wait a moment, bang on the machine a few times, and it sends my document. Simple.

The only way a vehicular superhighway works smoothly is for most drivers to stay home. The **INFORMATION SUPERHIGHWAY** will have to handle zillions and jillions of data flecks all zooming along like digital neutrinos on their way to everywhere. Zooming? No way. If it's constructed to be a superhighway, it will be:

a) way late in getting built; **b)** way over-budget when completed, if ever; **c)** under constant and infuriating repair, sometimes just to keep the road crews busy; and **d)** of too small a carrying capacity.

Because we're stuck with the highway metaphor, we're trapped into thinking it has to be "constructed" in the first place, as though there must be a Federal Information Superhighway Department of Transportation (FISDT) in Washington, DC, complete with a huge bureaucratic staff, planning inter-

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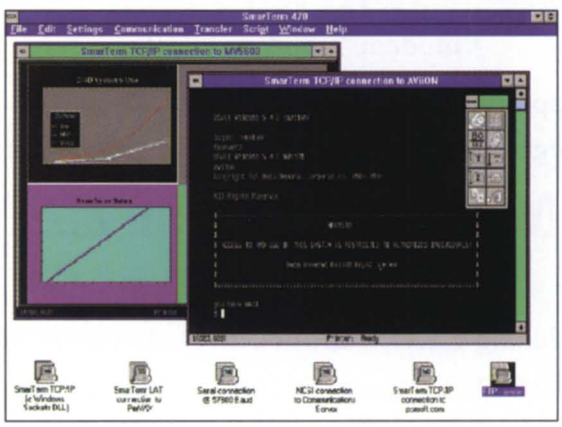

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The latest products for Data General systems

Enterprise data access

Westboro, MA—Data General announced that The ASK Group's ASK OpenIngres/Replicator product is available on the Aviion family of Unix-based servers. In addition, the latest version of ASK Group's data base, ASK Ingress Intelligent Data base Release 6.4/04, is also available to Aviion customers.

The ASK OpenIngres/Replicator product allows customers to replicate automatically between separate servers or on the same server in real time. This allows companies to provide remote users with access to up-to-date local data no matter where they are on the network. By using this technique to duplicate data, users have easy access to enterprise data and do not experience delayed response times typical with traditional methods for gaining access to centralized data.

Data General Corporation, *4400 Computer Drive, Westboro, MA 01580; 508/366-8911.*

Unix print spooling

Dallas, TX—EasySpooler, a division of Seay Systems, Inc., has announced general availability of EasySpooler release 3.0 for Unix platforms. EasySpooler is a print manager and spooler that brings mainframe print scheduling functionality to Unix. The new release incorporates network addressing features, support for unlimited numbers of printers and users, and the ability for non-technical users to customize and manage print jobs to thousands of printers throughout an enterprise. Support for Unix platforms includes Data General's Aviion family.

EasySpooler 3.0 provides spooling features for companies that are rightsizing from minicomputer and mainframe environments to Unix servers. These features enable easier forms control, simpler start and restart procedures, and menu-driven "trash can" recovery. The system's network addressing allows printers to be accessed from anywhere on the network.

Release 3.0 includes a timer that determines how long the spooler will continue trying for a connection to the network port before detaching the printer. In addition, two new printer statuses have been added that report the printer's condition: "network printer busy" and "not ready."

EasySpoolers are sold in packets, sized by the number of printers served. Prices are $1,200 for a 6-pack; $1,800 for a 12-

Continued on page 34

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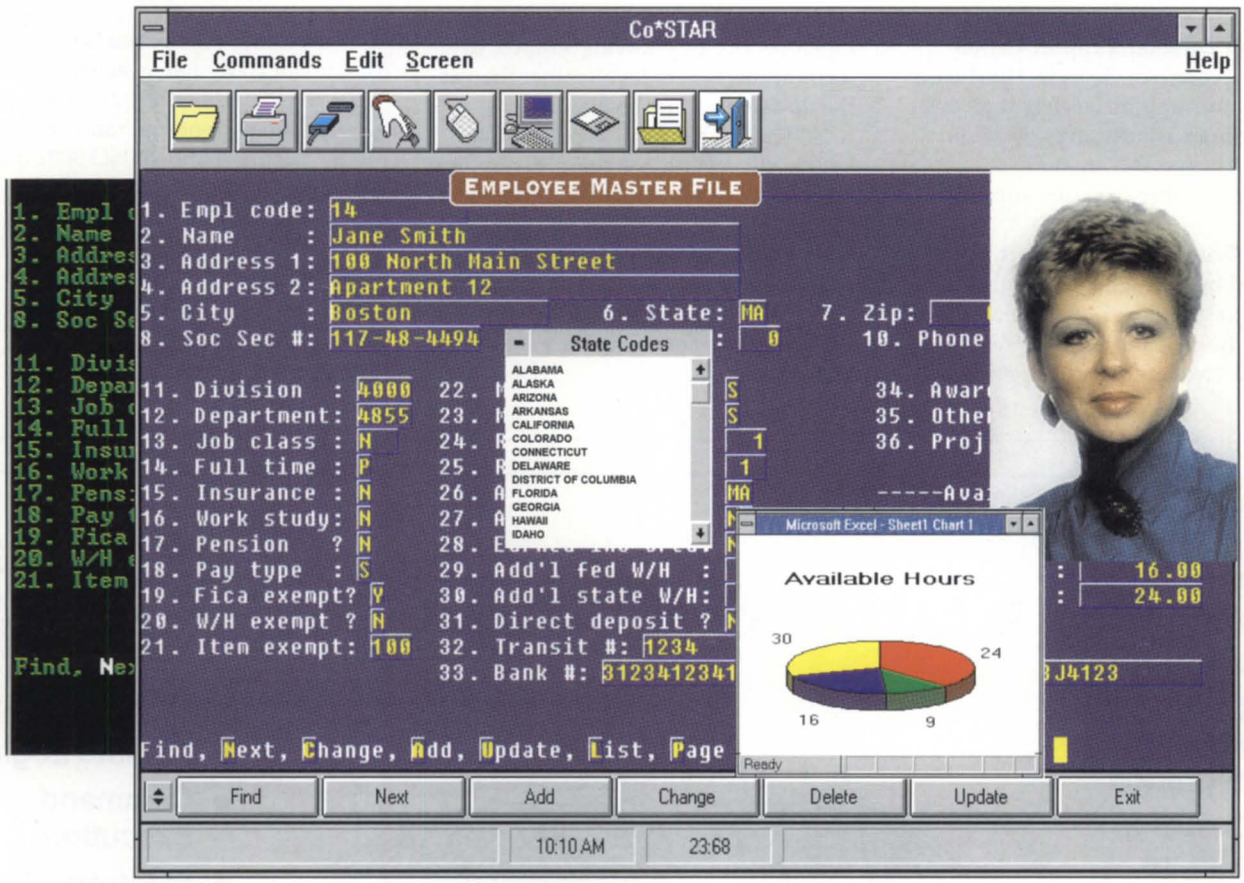

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News and notes from the greater Data General community

Customer Support Center reorg reflects DG business units

Data General announced a reorganization of its **Customer Support Center** located in Norcross, Georgia. Hardware and software support services for DG's three distinct business units—Aviion, Eclipse/MV, and PC, are now combined into three focused support units.

The Aviion Support Department will be led by **Bryan Scoggins,** the MV/Eclipse Support Department will be led by **Ron Gilmore,** and directing the PC/Network Support Department will be **Tim Rice.** All three managers report to **Tom Rizk,** vice president of customer support, who directs the activities of the Customer Support Center.

According to Data General's press release, the changes will enhance customer service by allowing support to focus at the system level, rather than at the device/product level.

"This higher focus is required to address the ever more complex support questions quickly and efficiently. The traditionally clear hardware/software line has blurred," the press release stated.

The goals of the reorganized Customer Support Center are as follows:

- To provide timely and quality remote support to customers and field personnel.
- To optimize resource utilization to enhance service delivery.
- To maintain a work environment that fosters employee empowerment and provides ample opportunity for personnel and organizational success, growth, and development.

In related news, Data General is the first major computer systems manufacturer to have its entire U.S. customer service and support operation certified under the international ISO 9001 quality standard.

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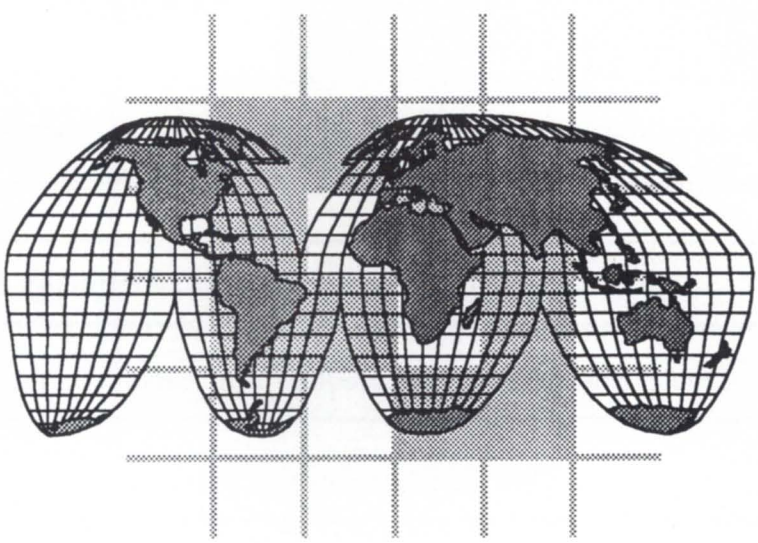

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General Corporation and **Mountaingate Data Systems, Inc.,** of Reno, Nevada (a Lockheed company), entered into an original equipment manufacturer (OEM) agreement.

Under the terms of the partnership, Mountaingate will integrate Clariion RAID-based disk arrays as high-capacity, removable mass storage devices, and market them primarily for use on the Apple Macintosh platform in applications such as desktop publishing, advertising, pre-press, image management, multimedia, high-performance graphics, and video editing.

Mountaingate also reserves the option to offer the repackaged Clariion removable arrays on other platforms it already supports, such as Sun, Digital Equipment, Silicon Graphics, and standard PC platforms.

"With Mountaingate we gain entry into a new market and establish a presence in the Macintosh market to complement our primary position as a server-to-enterprise, high-availability storage solution," said **Larry Hemmerich**, vice president and general manager of the Clariion Business Unit.

Wolfgang Zinck, Mountaingate's vice president of business development, called the Clariion "the ideal high-capacity complement to our Datashuttle, Incremeg, and Passport XL removable hard drives."

The Clariion Business Unit announced this spring the first implementation of mainframe-class, mirrored caching in an open systems disk array.

This advance provides users with increased transaction rates of up to 3,200 I/O requests per second.

The Clariion Business Unit also announced in March at CeBIT in Hannover, Germany, that DG's Series 4000 Model 4300 tape array delivers twice the capacity of the company's prior model through the use of DDS-2 data-compression technology.

Make your reservation

Unique Vacations, exclusive marketing and reservations agent for **Sandals Resorts International,** revamped its reservations system to use Gold One software on Data General's Aviion AV 8500 and AV 9500 computers. The Oracle 7/CDE-based software will run in a client-server configuration over an ethernet network using PC clients.

"We will now be able to provide new and improved levels of service to our guests, travel partners and indeed within our own company," said **Robert Stewart,** CIO of Sandals Resorts. The central reservation system is expected to be online by the second quarter of this year. Δ

*In General is compiled by **Robin Perry.** Editorial contributions may be sent to: Focus magazine, P.O. Box 200549, Austin, TX 78720; 512/335-2886 phone or 512/335-3083 fax.*

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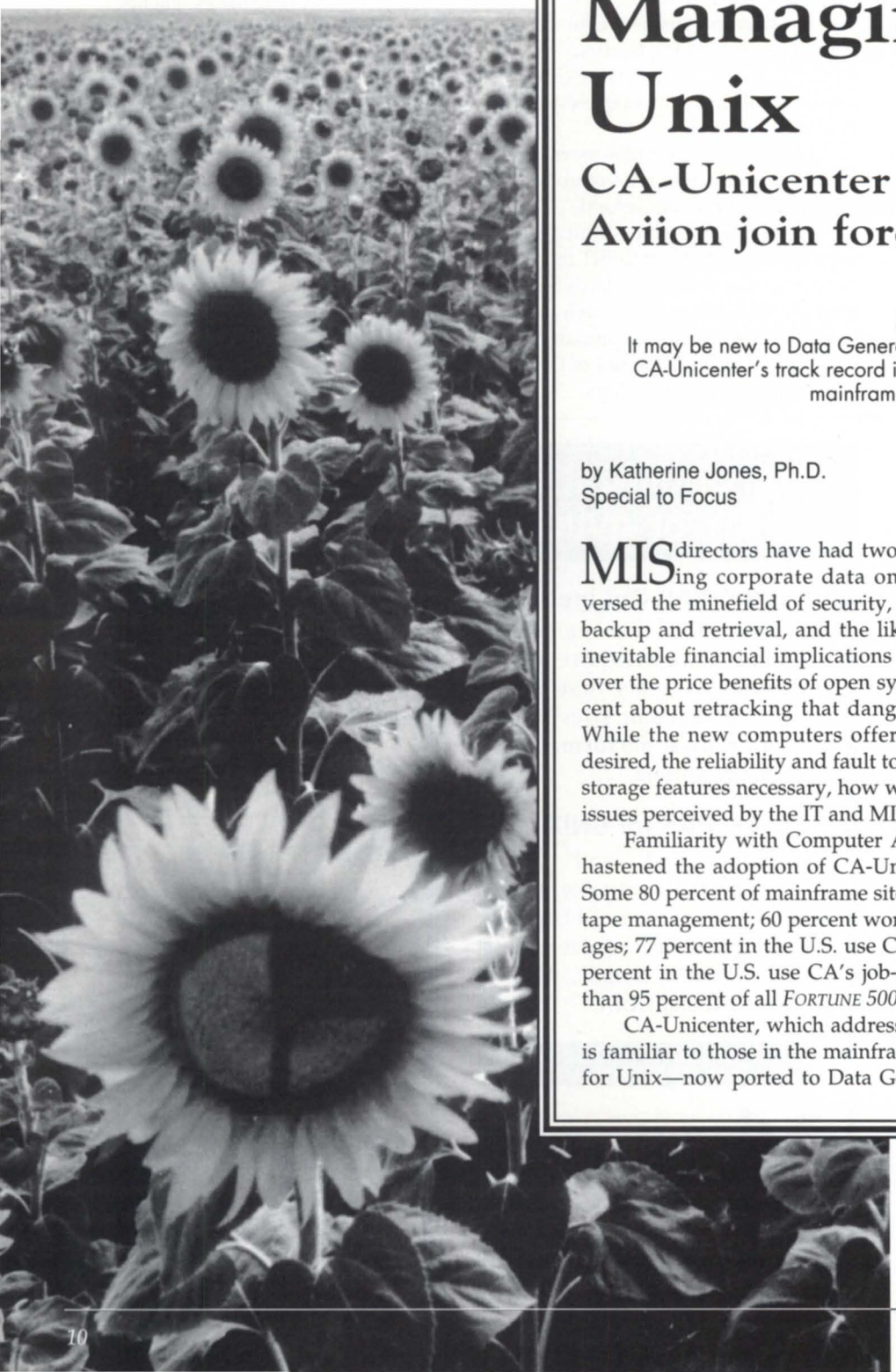

Managing Unix

CA-Unicenter and DG's Aviion join forces

SYNOPSIS
It may be new to Data General Aviion users, but CA-Unicenter's track record is well-known in the mainframe and Unix worlds.

by Katherine Jones, Ph.D.
Special to Focus

MIS directors have had two decades of experience managing corporate data on mainframes. They have traversed the minefield of security, access, tape management, user backup and retrieval, and the like. And now—while facing the inevitable financial implications of maintaining the mainframe over the price benefits of open systems—they are justifiably reticent about retracking that dangerous field on new hardware. While the new computers offer the price-performance ratios desired, the reliability and fault tolerance required, and the mass-storage features necessary, how will these computers address the issues perceived by the IT and MIS directors in the data centers?

Familiarity with Computer Associates and its products has hastened the adoption of CA-Unicenter in Unix environments. Some 80 percent of mainframe sites in the United States use CA's tape management; 60 percent worldwide use CA's security packages; 77 percent in the U.S. use CA's job-accounting software; 70 percent in the U.S. use CA's job-scheduling software, and more than 95 percent of all *FORTUNE 500* companies use CA products.

CA-Unicenter, which addresses the concerns of IT directors, is familiar to those in the mainframe environment. CA-Unicenter for Unix—now ported to Data General's Aviion—addressed the

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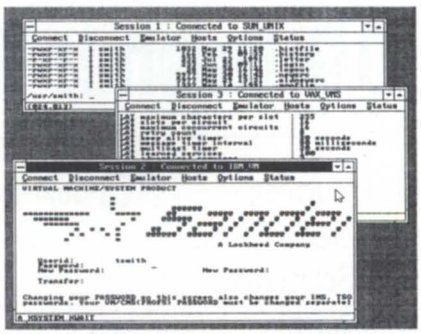

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same needs in the less-than-easy-to-manage world of Unix. CA-Unicenter brings mainframe-quality system management to Unix systems, including security, console management, report distribution, and problem tracking. It also allows management of workload, spoolers, storage, and performance monitoring and resource accounting, as well as general system administration.

CA-Unicenter secures the computing environment and provides integrity and reliability of critical computing resources, especially the information stored on disks and tapes. It automates repetitive and calendar-based processing, monitors the use of computing resources to provide an accurate assessment of current and future computing needs, and enables equitable chargeback of computing costs to end users. CA-Unicenter records, assesses, tracks, and resolves problems related to the systems and end-user requirements.

A unique aspect of CA-Unicenter is the level of integration between the product's components and functions. Some general examples of the benefits of an integrated total solution include:

- A single graphical user interface (GUI) that enables all functions to be accessed in a common manner, and which radically reduces training time.
- A common reporting system that integrates data from all the sources provided by CA-Unicenter functions, and makes management information more accessible.
- A single method for maintaining and customizing all CA-Unicenter functions.

The benefits to the CA-Unicenter user are many. The system administrator can completely secure the computing environment while providing the flexibility to avoid disrupting valuable work time. The system provides integrity and reliability of critical computing resources, especially the information stored on tapes and disks.

Automated monitoring

By automating repetitive and calendar-based processing, CA-Unicenter reduces the risk of human errors. The product monitors the usage of computing resources to provide an accurate

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assessment of current and future computing needs, and enables equitable chargeback of computing costs to end users. The Data Center Administration component effectively records, assesses, tracks, and resolves problems related to the system and end user requirements.

For example, consider a common function that occurs in any commercial environment—the processing of a job. In a fully integrated environment, this task becomes both simple and much more reliable.

A staff member creates a job on the *workload management* system. The workload management system knows the authority of this user from the *security* component and allows this process to continue. When this job is created, it can then be scheduled for processing, utilizing not only time and date policies, but also predecessors . . . maybe another job has to complete successfully, or a file needs to be created. The date and time policies are defined in a centralized *calendar* facility that is also shared by other components of the product. Once the job runs, the reports are retrieved automatically by the *report distribution* component that will dynamically separate the report and print or send the desired pieces of that report to the appropriate people.

What happens if the job did not run successfully? When the job fails, you can: intercept the message on the console and have the program automatically logged in the problem management component. The person responsible for this application can be sent an e-mail message or even be paged. The workload management component can automatically submit the proper jobs to recover from the error, automatically perform restores, and resubmit the original job if necessary. If during any of this process files begin to fill, the High-Performance Rollout component will automatically archive the least-used files on the disk to make more room. This automatic storage management system will then track the archived file

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in its catalogue and, if that file is ever used again, will perform a dynamic restore. Once all the day's work is done, you can account for all the activity and, if desired, produce chargeback information to inform end users of the resources they have consumed.

In CA-Unicenter, the level of integration between these functional areas provides substantial benefits beyond the functionality of each area alone, making the complete system much more powerful than a collection of discrete, standalone products.

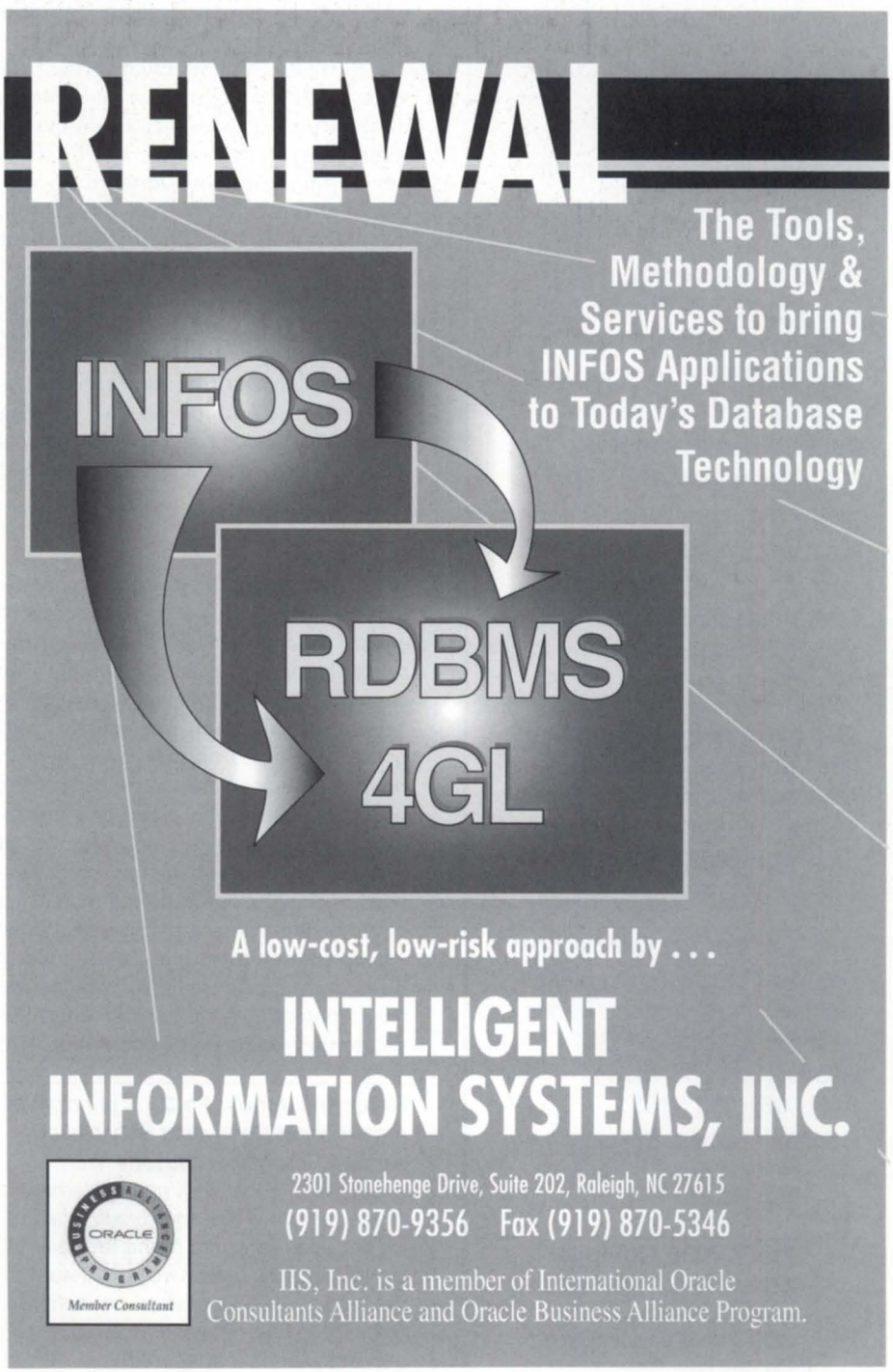
While all the components of CA-Unicenter should interest Data General Aviion users, one of the features of great relevance to data center administrators is the security management component. Security management addresses system entry validation, resource and facility access control, user registration, user and resource auditability, and system integrity. The security system provides a single point of sign-on, which is tightly coupled with the security system native to each Aviion system. It enables the enforcement of system entry policies, asset access control, periodic user password change, account suspension, and security for all system management functions.

Even the superuser can't bypass this security, providing complete protection of the Aviion system. The systems administration functions within CA-Unicenter for Aviion systems provide common Unix administration tools integrated with the security functions for a single-point facility to administer user accounts and file access controls.

Minimizing costs

Because mainframe-level management is available, Unix is becoming increasingly more widely used in mission-critical production environments, which produces substantial savings through minimizing upgrades to the mainframe. And the better-managed system saves operational costs to the corporation. Alan Paller, director of open systems at Computer Associates International, Inc., cites the example of Avis, which reduced its 800-number service reservation time per call by 20 percent through the faster data access on open systems servers, which enabled the company's operators to handle more calls, more efficiently than ever before.

Costs of open systems and network management are minimized by the ability to allocate appropriately skilled personnel where they're needed. No longer must technical experts be duplicated and geographically proximate to every complex system they must manage. Procedures can be located at appropriate sites based on enterprise business factors, not on technical limitations or the local availability of the highly skilled personnel capable of implementing them. The beauty of CA-Unicenter for MIS directors is that it offers familiar functionality in familiar terms—hiding, as it were, the relative rawness of the Unix operating system. This relieves



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Systems: Systems Engineering provides technical planning and implementation. Professional Services include system design, application development, on-site consulting, systems performance, systems integration, networking, and facilities management services.

CA-Unicenter education: Coursework from Data General includes using, implementing, and administering a system or network of hosts running CA-Unicenter for Aviion systems. Training is available at customer sites as well as at Data General training centers around the world.

Summary

Data General's enterprise management strategy allows organizations to ensure the high availability of their important open enterprise systems in a cost-effective fashion via system management personnel, procedures, and products. Organizational investment in people, policies, and products has the potential to be protected and maximized as a corporate asset. The rate of increase in the cost of managing systems no longer outstrips the increasing value of the systems themselves. Open enterprise computing is finally able to offer organizations its full, unencumbered potential for profitable contribution to the enterprise's bottom line. Δ

***Katherine Jones, Ph.D.,** is principle of Independent Consulting Services of Shrewsbury, Massachusetts. Her expertise is in network and systems management in the enterprise. She is on the editorial board of the* INTERNATIONAL JOURNAL OF NETWORK MANAGEMENT *and widely published on matters relevant to internetworking and client-server systems management.*

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Stepping up to the platform

A user's guide to CA-Unicenter

by Joe Cannata
Special to Focus

SYNOPSIS

Data General's software alliance with Computer Associates brings CA-Unicenter to DG/UX and a host of software tools for system administration.

A year ago in January, Data General and Computer Associates announced a strategic relationship to offer CA-Unicenter, CA's revolutionary system-management tool, for Data General's Aviion servers under DG/UX. Now the relationship has been fulfilled. Data General is the latest Unix platform on which CA-Unicenter runs. Qualifying DG customers running DG/UX will have the opportunity for a 30-day free trial with CA-Unicenter.

The product offers the DG/UX customer a full suite of tools to increase the ease by which a Unix system and a data center can be managed. CA-Unicenter brings five major extensions to system administration. They are:

APC: Automated Production Control
DCA: Data Center Administration
ASM: Automated Storage Management
PMA: Performance Management and Accounting
SCA: Security, Control and Audit.

All this is accomplished using a slick GUI under OSF/Motif on an xterm connected to a server or from a workstation. Figure 1 shows an example of the main window. Command-line entry into CA-Unicenter can be performed from a dumb terminal, using the ***cautil*** command options. The product uses its own relational data base, CA-DB/Unix, to store information as well as using several different sorts of files for tracking and logging. CA-Unicenter can be invoked by any username permitted, or automatically brought up at one of the run levels.

Job scheduling, console monitoring, and enhanced spool management are each a part of APC's four components. The workload-management component provides for the ability to define job dependencies, so one job will not start before its predecessor ends. This is an extension of ***cron,*** but prevents jobs from just taking off at a fixed time. Start times and dates can be specified, as well as mixing the criteria of dependencies and start times. You can also dictate conditions (called job triggers) to initiate any processing sequence. Further scheduling can be done based on the availability of resources, such as tape drives. Job status and tracking information can be viewed from any terminal. Job restart and automatic recovery information can be included.

Defining and scheduling jobs are set using profiles. A job could be something simple like a shell command, or a more complex series of programs. All of them can be tied to a calendar that specifies when processing is to begin. You can group several jobs into jobsets, which also can have their own profiles. Jobs and jobsets are tied to stations, places where the jobs execute. Calendar profiles are established to define only the days a job will run. "Start", "muststart", "mustcomplete", "earlystart", and "end times" are each part of the job profile. Figure 2 (pg. 18) shows an example of a job detail entry screen, and the kinds of widgets used in the GUI.

Enhancements into the way printing is managed helped one university justify its CA-Unicenter investment. In

Figure 1: Main Window

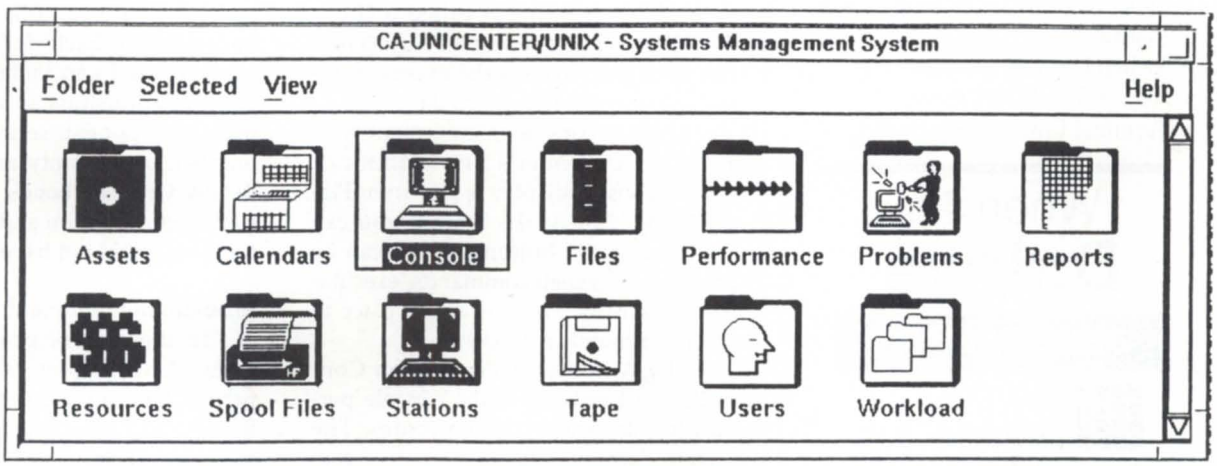

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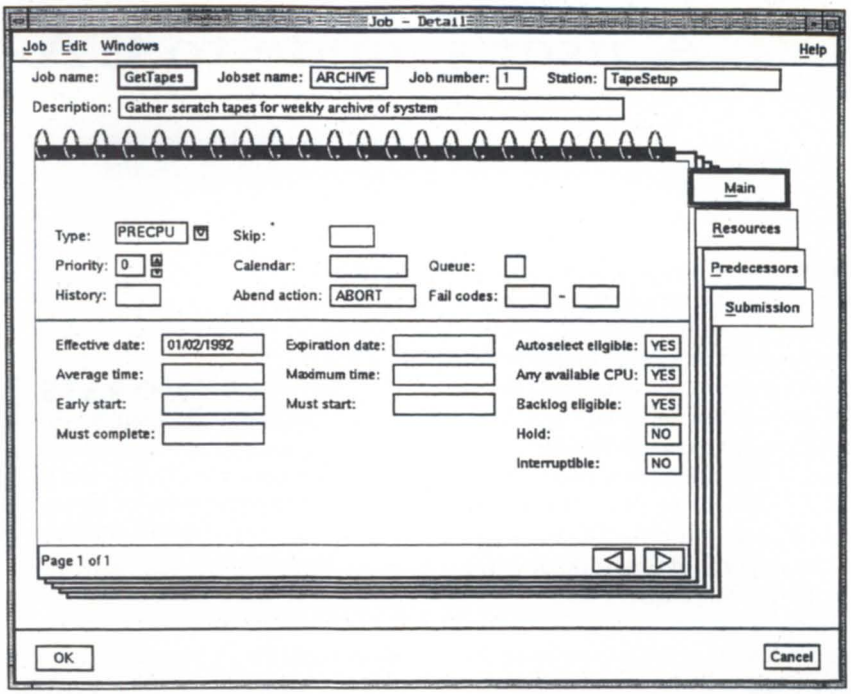
Figure 2: A job detail entry screen



addition to the interface to the basic *lp* command, you can manage and control the spooler, queue, and devices through CA-Unicenter functions.

For instance, your site may produce a 200-page report containing sales information for five territories. But the individual territory managers want to see only their own territories. Traditional Unix would require five copies of the full report to be distributed accordingly. CA-Unicenter will let you do *grep*-like searches on columns or strings so you could segregate the report by territory and have the output for each territory mailed only to the corresponding manager, as well as print a hardcopy of the full report. The product term to denote such a printing is called a "bundle". This is just one way CA-Unicenter can help you save on the excess printing you may be doing each day.

There is console management with all of CA-Unicenter's five facilities. A sample console display is shown in Figure 3 (pg. 20). At the bottom you can see there are 16 buttons, which can be predefined as shell commands, executables, or scripts. There is also a place to enter commands manually.

The Automated Production Control's contributions to the console pertain to jobs and spooling issues. The system administrator can create a custom view of the console message log, and cause certain messages to appear in a different color, highlighted, or blinking. Automatic response commands or scripts can be set to act upon predefined error conditions. Therefore, not only is your level of error reporting enhanced, but your problem resolution is as well. There is also an interface with a problem-management facility, which can generate problem incident tickets automatically.

The Data Center Administration function provides the system administrator with information necessary to manage system issues daily. One of the tools is *component definition*. You are required to define all software and hardware components that make your system. Each definition must be separate, and can include any parent-child relationships as well as a list of users/component, serial or fixed asset number, or warranty and maintenance details. One side bonus is some centralized documentation and an asset inventory you might not have had before.

Problem management

In the area of problem management, CA-Unicenter uses a phased approach. Up front is a problem-definition facility. You list a problem's origin and history, and assign it a priority. There is

the flexibility to create problem categories, status codes, and responsibility lists. There are three types of problems:

Active: a current problem
Resolved: a finished problem
Complete: a problem that has been closed out.

A problem-tracking facility lets you track a problem manually. There is full maintenance capability on the problem records, so bumping a priority or changing responsibility is easy to do. There are also fields to capture when the problem occurred; when and if a vendor call was needed; what time the field personnel arrived; and when the problem was solved. At any time a list of problems outstanding can be displayed in full, or by some selection criteria.

Problem escalation

CA-Unicenter offers a built-in, problem-escalation facility to specify special handling of problems as time passes. An escalation table is created, including the problem and base priority, and the new priority and person responsible if it has not been rectified in your desired timeframe. Flexibility allows there to be several different escalation tables for each problem, or the same table can be used for multiple problems. The escalation table name is part of the problem definition.

Problem definitions can be opened automatically by the Machine-Generated Problem Tracking (MGPT) facility. MGPT can be invoked by a message action from the console or from your applications. A table can be set to indicate what kind of definition to create upon the occurrence of a console message.

The "charter" of the Automated Storage Management discipline is to provide you with the means to protect and manage your files and tapes. ASM will let you do the typical *mv*, *cp*, and *rm* functions. It goes beyond DG/UX in that you can store the location, state, and history of every file—whether it's on disk or has been archived. You can edit and track files, all from the GUI. Backup and restore facilities give you one other sweet feature: archiving.

The archiver comes in two flavors: *scheduled* and *threshold*. Scheduled archiving works from a predetermined occurrence date, or by using the calendar function to specify when archiving is to be fired up. You have the ability to specify the archive criteria. Threshold archiving will happen when you start to run low on disk space. You set the trigger point, usually a number like 85 to 90 percent full in a file system. As soon as the threshold is reached, archiving starts. A facility called High Performance Rollout is used to enhance threshold archiving. If a file that is to be archived already has a current backup, it is not rolled out to tape again. It is just removed, and the file catalog is updated accordingly. This can save time and media.

The backup facility gives you the

AOS/VS to NETWARE INTEGRATION

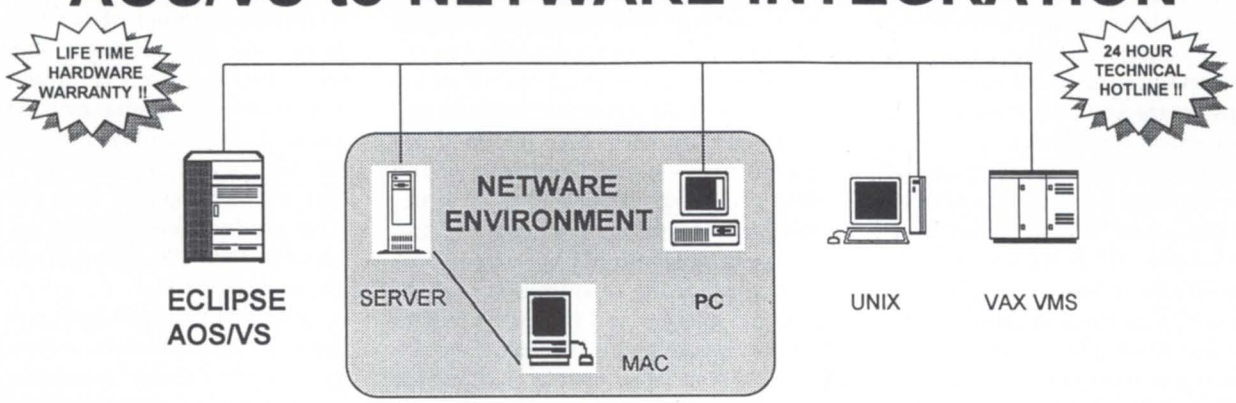


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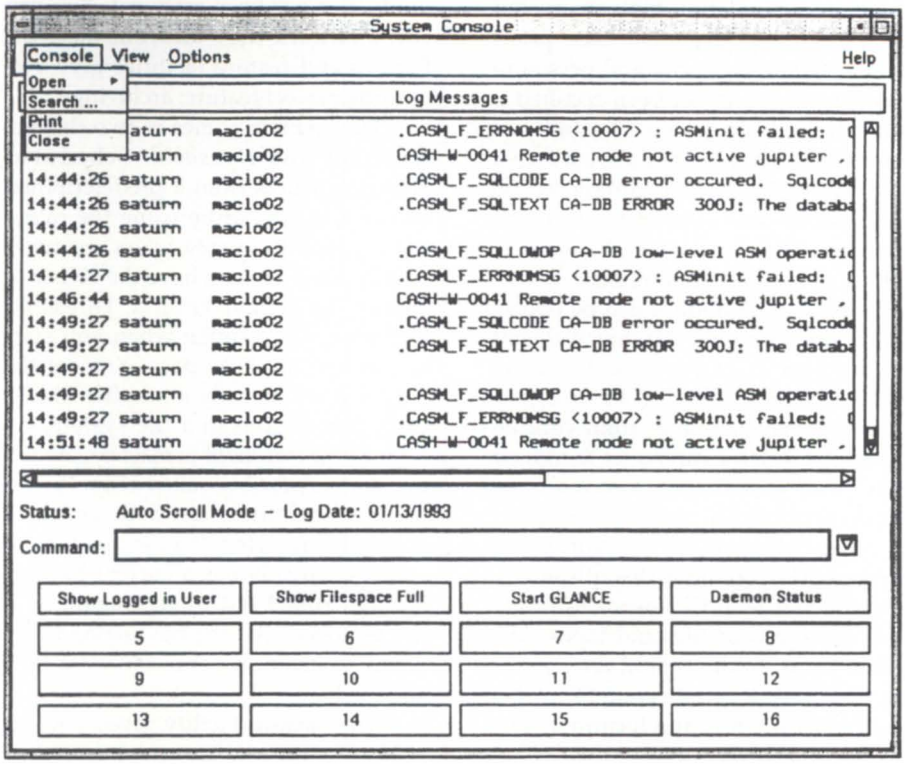
Figure 3: A sample console display



ability to back up files to tape or other media. Certain backup criteria can be set, such as date, version, modification times, or combinations of each. Versioned backups of a file are possible. All backups are tracked by a catalog within CA-Unicenter. Restoration of backups or archived files can be performed easily. If a file that has been archived is needed by a job, the Intelligent Transparent Restore (IXR) facility will seek out the file and restore it. If the required tape is not available, a console message will be sent making the restore request.

The tape-management component is there to track and protect tapes, by inserting an internal volume label along with the volume serial number. This information is stored also in the catalog. Tapes with expired files can be reused.

The purpose of the Performance Management and Accounting discipline is to offer the facilities necessary to collect and manipulate accounting data and to monitor resource utilization. The two main components of PMA include a system performance monitor, and a resource accounting and chargeback facility. The system performance monitor lets you track processes, identify who is running and when they started, typical information from the *ps* command.

The resource accounting facility identifies how resources are being used. This can help with capacity planning. Accounting profiles are needed to set this in motion. The profiles contain the organizational structure, such as department and user. Also included are accounting sources, locations of the data retrieved for each level of structure, and accounting periods for billing back computer time. Chargeback profiles contain the resources for which you can charge, and the cost unit/resource. Special qualifiers can dictate different billing rates, such as charging for prime vs. non-prime usage. Split charges and adjustments are possible, as well as a budget tool to report consumption against the declared budget. Periodic administrative tasks like closings and reconciliations are required.

Policy-based security

The final discipline in CA-Unicenter addresses security of a system's resources and users. The security is policy-based, so attributes are specified on a systemwide scale, rather than on individual users. There is a profile for each user that contains name, login name, login criteria, login date/time restrictions, enforcement actions, and password controls. A user group profile exists and identifies the members of the group and the default permissions. There is a third profile, for assets and asset groups, which contains the ways they are to be protected. The scheme includes access modes such as read, write, and delete, as well as access types like permit, deny, or log. Asset access can be tied to a calendar.

The issue of superuser access control—a key security issue in Unix—is addressed by CA-Unicenter. Superusers can be given access to certain facilities. They are all-powerful within their permitted facilities, but are like regular unprivileged users when outside those facilities. This reduces some security concerns.

Password control is another area addressed. You can exclude certain passwords from being used, mask out certain passwords, use randomly generated passwords, and establish password histories. The ability for users to change passwords and required intervals can be configured. Tolerances can be set for password violations.

Login access can be limited by date and time, number of concurrent sessions, and port. Audits of login access and other functions can track activity and violations. Online or hardcopy reports of all this auditing can be generated. No one can log in to DG/UX without a CA-Unicenter user definition. This product does not replace the controls in DG/UX, it merely enhances them.

As you have just read, CA-Unicenter is a comprehensive software package with the ability to enhance the administrative controls in DG/UX. Its main disciplines address key areas of administration, and facilitate the management of a data center. Data General offers CA-certified training on Unicenter through OST and Educational Services. Implementation services are also available. Δ

***Joe Cannata** is a systems training specialist, Educational Services, with Data General Corporation. He may be reached at the Atlanta Education Center, 4170 Ashford Dunwoody Rd., Suite 300, Atlanta, GA 30319; 404/705-2562.*

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David Novy

Browsing the Internet

SYNOPSIS

The rapidly expanding Internet will, quite simply, change the world, encouraging and facilitating the free flow of information everywhere. But if you want to tap into this great repository of everything you can possibly imagine (and then some), get acquainted with the seeking and searching tools that make it possible.

This month concludes my series on the Internet, but much has happened in the two months since I began. The Internet has been receiving more and more news media coverage. The widely anticipated merger of Bell Atlantic and Telecommunications, Inc., has collapsed. The failure of this merger means that the task of bringing the Internet to the masses will probably be a process of evolution, not revolution.

This month I will get to some of the Internet's more exotic features:

- Network news
- Finding software ***(archie)***
- Finding someone ***(white pages)***
- Internet browsing ***(gopher)***
- Searching indexed data bases ***(WAIS)***
- Hypertext spanning the Internet ***(World-Wide-Web,*** or ***WWW)***

Network news

Network news is the Internet equivalent of a bulletin board system (BBS), such as what you might encounter on commercial online services like Prodigy or Compuserve. To the user, network news appears as a set of topic headings called "new groups". A news reader program allows you to access the news groups in an orderly manner.

As to what information is available to you, it will depend on which computer your news reader uses for its news server. The server collects news from a number of sources: USENET, local news access, mail reflectors, and Clarinet. The largest news source is USENET. It is not a network or a piece of software. You don't need Internet access to use it. Instead, USENET is a *methodology* for passing and maintaining news groups. At present, it consists of more than 2,200 news groups.

As with most Unix applications, there are a number of news-reading programs available from which to chose, the most common programs being ***rn*** and ***nn***. Another popular reader program is ***tin***. The most important feature in a network news server is whether a particular reader supports "threads," which allow you to read news items in order within a topic—***nn*** and ***tin*** support threads, for example; ***rn*** does not.

I have been reading USENET news articles for several months. It is mind-boggling how much information is available. Unfortunately, much of it consists of mail messages from people who insult each other's beliefs and use foul language. But there *is* a lot of valuable information as well, if you're willing to take the time to look. If you have enough courage, you can take part in existing discussions or start an entirely new one.

If you want to study this subject in more depth, I suggest you obtain a copy of *THE WHOLE INTERNET, USER'S GUIDE AND CATALOG*, written by Ed Krol and published by O'Reilly & Associates, Inc.

Finding software *(archie)*

Historically, one of the biggest problems facing an Internet user is finding that which you already know to exist. Anonymous ***ftp*** servers were developed early in the Internet's history, providing users the ability to fetch files from the ***ftp*** servers. But the ability to know about the existence of such files stemmed mainly from interpersonal networking at various user conferences.

Now, interpersonal networking at conferences is fun for system administrators, but it's not very efficient. This led to the development of ***archie***, a computer system that allows searching of indexes of what files are available on public servers on the Internet. It's the place to start if you're searching for programs, data, or text files. Currently it indexes more than 1,200 servers and 2.1 million files.

You ask it to find filenames containing a certain search string, or you suggest files whose descriptions contain a certain word. The program then returns the actual filenames that meet your search criteria, and the names of the servers containing those files. Once you decide which files are most likely

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to meet your needs, you can move them easily to your computer using ***anonymous ftp.***

There are three ways to access ***archie:*** with telnet, with an ***archie*** client on your own computer, or with an e-mail query. An ***archie*** client is the quickest method of access, but it exerts the highest overhead on your local computer. An e-mail query can take longer, but it allows you to submit a query and then check the reply at a later, more convenient time. Telnet access is the most common way to access ***archie.*** Its convenience level is somewhere between that of the other two methods.

Finding someone *(white pages)*

Finding someone's address on the Internet is not a trivial task. There is no single, unified Internet user's directory, for three reasons:

- The ease by which users change locations
- Lack of standards for directories
- Worries about security and privacy

There are several Internet user directories available. These directories are called "white pages" in deference to the phone company's White Pages. I do not expect ever to see a unified Internet directory. The reason is not technological, but rather one of privacy. If a directory were available, someone would try to use it for commercial purposes. I don't want to have my Internet directory flooded with advertising and other junk information. My company feels the same way. For security purposes, my company does not allow my Internet address to be printed on my business card.

Internet browsing *(gopher)*

The ***gopher*** Internet service is a lookup tool that helps you browse the Internet by selecting resources from menus. If you want to use one of the resources that ***gopher*** presents, it helps you access it. It's similar to being able to browse the card catalog of a remote library, and having the library automatically send you the materials you want.

The power of ***gopher*** is that it allows you to search for resources via menus. When you find something you want, you can read or access it without having to worry about domain names, IP addresses, or changing programs. When you want it, ***gopher*** will "go fer" it and bring it back to you automatically.

Gopher does not allow you access to information that you can get from other Internet programs. However, it does improve the ease by which you can access it.

Here's a bit of party trivia information: ***gopher*** was developed at the University of Minnesota, the home of the "Golden Gophers." It was originally designed as a campus information service. It didn't take long to recognize that if ***gopher*** could work for a set of university computers, it could work for servers all over the world. All that was needed was for the Internet to link the international ***gopher*** servers together. In the space of 18 months, ***gopher*** went from one site to more than 100.

Searching indexed data bases *(WAIS)*

WAIS (pronounced "wayz") allows you to search Internet

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archives looking for articles containing groups of words.

WAIS is a distributed text-searching system based on a draft standard (called Z39.50), which describes a way for one computer to ask another to do searches for it. To make a document available for a WAIS search, someone must create an index for the WAIS server to use in the search. When you request a search from a WAIS client, it contacts the servers that handle the libraries you suggested. It asks each server in turn to search its index for a set of words. The server then sends you a list of documents that may be appropriate, and a "score" indicating how appropriate it considers each listing.

The scores are normalized. The document the system gives the best match for your search criteria is given a score of 1,000; the others get proportionally less.

WAIS is not perfect. Searching data bases today is closely dependent on the skill of the person making the search, and WAIS lacks "contextual sensitivity." It can search for the words you want, but it has no idea of the context, how the words fit together. WAIS is a developing technology that will get better as search algorithms are refined and people learn how best to utilize them.

Hypertext spanning the Internet *(World-Wide-Web, or WWW)*

The newest information service on the Internet is the World-Wide Web of WWW. It is based on a technology called "hypertext." Most of its development has taken place at CERN, the European Particle Physics Laboratory. Hypertext is a method of presenting information. Selected words in the text can be highlighted and "expanded" at any time to provide information about the word. That is, these words are "links" or cross-references to other documents that may be text files, pictures, sound files, or any other type of computer information. Anyone who has used a CD-ROM encyclopedia has seen a demonstration of the power of hypertext. WWW is still being developed, but it offers great potential for helping people obtain and present information quickly.

This concludes my series on the Internet. I hope it has sparked or increased your curiosity about the subject. The Internet will change the world. The railroads opened up frontiers by allowing people and goods to travel quickly to what previously had been inaccessible areas. Railroads dictated much of the development of American society from 1850 to 1950, when the interstate highway system took over that sphere of influence. The Internet will allow information to flow freely, anywhere. Its effects on the United States and the world will be profound. Δ

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

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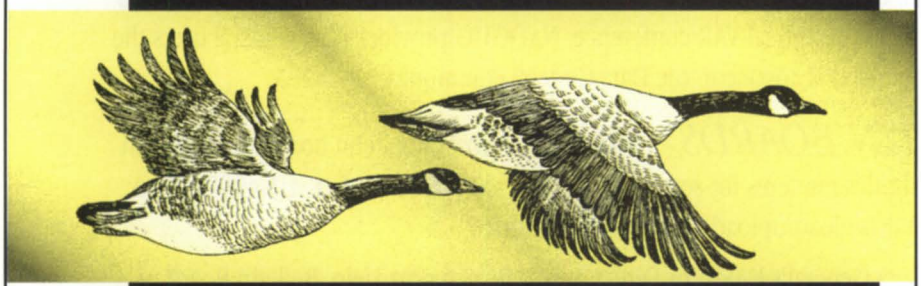

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Protecting data with cryptography

SYNOPSIS

Today we live in a global, electronic village. Unix and the Internet are connecting everyone to everyone else. Unless you take special measures your computer is wide open to any visitor.

by Michael E. Marotta
Special to Focus

In 1979, Ronald Rivest, Adi Shamir, and Leonard Adleman published "A Method for Obtaining Digital Signatures and Public Key Cryptosystems," in the COMMUNICATIONS of the ACM. The RSA cryptosystem was awarded a patent (#4,405,829), which was issued to MIT. In 1982, Rivest, Shamir and Adleman formed Public Key Partners, which licensed the patent from MIT.

In the 15 years since its announcement, the RSA cipher system has become the *de facto* standard in secure communication. It is built into products from Lotus, Wordperfect, Microsoft, and Apple. In all, there are at least 1 million and probably 3 million users of the RSA cryptosystem. According to Jim Bidzos, president of RSA Cryptosystems, there are, "1 million-plus products in use today in the U.S. alone that have RSA in them. More than 280,000 copies of Lotus Notes, more than 300,000 secure voice, data, and fax products, etc., etc. Starting in 1993 the Mac OS has RSA as a standard feature. Netware 4.0 also has RSA."

The global village

The American architect, Frank Lloyd Wright, built homes with their backs to the street. The judicious use of height allowed the owners of the houses to enjoy open views without being open to the world. Wright considered privacy to be the hallmark of civilization. Savages in a village, he said, have no privacy.

Today we live in a global, electronic village. Unix and the Internet are connecting everyone to everyone else. Unless you take special measures your computer is wide open to any visitor. The file transfer protocol (*ftp*) was designed specifically to allow a user at one site to access or leave files at another site. Basically, *ftp* is just a more flexible kind of e-mail. The latest twist is called a "gopher," a menu-driven automatic search of any system from any other system. Therefore, unless you put an electronic "envelope" around your e-mail, each message you send is an electronic "postcard" open to any and all. The RSA cryptosystem is just such an electronic envelope.

You might think of so-called "hackers" when you consider the threats to your privacy. However, the federal government has also come to be identified as a major snoop, a fussy old gossip and an untiring busybody.

The Clinton agenda

The government has never been happy with RSA. Jim Bidzos said, "The change in administration hasn't resulted in a change in policy. Starting from 1977 or 1978 there was resistance on the part of the federal government to RSA. They fought the publication of research papers in this field." According to a White House press release issued April 16, 1993:

> "Sophisticated encryption technology has been used for years to protect electronic funds transfer. It is now being used to protect electronic mail and computer files. While encryption technology can help Americans protect business secrets and the unauthorized release of personal information, it also can be used by terrorists, drug dealers, and other criminals.
>
> "A state-of-the-art micro circuit called the 'Clipper Chip' has been developed by government engineers . . . It scrambles telephone communications using an encryption algorithm that is more powerful than many in commercial use today . . . At the same time, this technology preserves the ability of federal, state, and local law enforcement agencies to intercept lawfully the phone conversations of criminals."

Actually, the government suggested the Data Security System (DSS) in 1992, the Clipper Chip in 1993, and now Tessera in 1994. The idea is the same in all cases. The federal government will create an encryption system that will be installed in all "secure" electronic communication devices: telephones, modems, faxes, etc., and the government will hold the keys to enable the enforcement of laws.

The federal government also prevents the export of encryption technology. Codes and ciphers are classified as military weapons. Therefore RSA (and any other encryptor) cannot be sold overseas without a permit. In fact, it's against the law to take a copy of Lotus Notes or Mac OS outside the country. These restrictions put a damper on international marketing by computer companies.

Consumer crypto

If you spend any time on the Internet, you will see messages that are "PGP Signed." PGP stands for Pretty Good Privacy. It was developed by Phil Zimmerman as a public key cryptosystem. (See "Protecting data with cryptog-

raphy," part 1, April 1994 *Focus*). PGP has become the *de facto* standard for use by "cypherpunks" and others who don't trust the government. It is used not only in the United States but worldwide, especially by the newly free peoples who were once controlled by Moscow.

PGP is available via ***ftp*** from many sites. However, its use is controversial because RSA maintains that PGP infringes on its patents. The issue hinges on whether a mathematical formula can be patented. RSA's Jim Bidzos electronically distributes a "lawyer letter" warning of stiff civil and criminal penalties for using PGP, but PGP continues to gain new users.

On the other hand there are RSA-licensed products, such as RIPEM (Riordan's Internet Privacy Enhanced Mailer), which is available via ***ftp*** from many sites. The author, Mark Riordan, can be reached via "mrr@scss3.cl.msu.edu". RIPEM enciphers and deciphers messages using a public key encryption system, and formats them for embedding in electronic mail messages. It also generates RSA public keys. RIPEM itself is in the public domain. However, it requires the RSAREF toolkit from RSA Data Security, Inc. RSAREF is distributed freely for personal use within the USA, but is not in the public domain.

The secret sharers

Another wrinkle in secure e-mail come from "anonymous remailers." When you send a message, your username and site are given at the top. Additionally, any other computer that passes the message is identified. Unix hackers have developed e-mail utilities that strip these headers from messages. This allows people to send anonymous messages. Now, some computer managers install new utilities to identify and then delete these nameless missives.

Some businesses and government agencies have specific policies against private communication. Everything you do at work is "company business." Engineers and others often sign contracts that define who owns their work, even if it's created at home. Recent turf wars between Novell and Borland have seen e-mail messages become court records.

One of the best sources of evidence against the Iran-Contra conspirators came from backups of the e-mail files. Some people believe that because they "have nothing to hide" that electronic envelopes are not for them. Others believe privacy is a basic right of being a person, and that other rights derive from it. These issues will only be intensified once the Internet moves from a public utility to a private service. Δ

Michael E. Marotta *is the author of* THE CODE BOOK: ALL ABOUT UNBREAKABLE CODES AND HOW TO USE THEM. *He can be reached via mercury@well.sf.ca.us on the Internet.*

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A disaster log

by Ed Lindberg
Special to Focus

SYNOPSIS
Wondering how you would get your computer system back up and running after a disaster? Well, declare a disaster and find out.

Monday, January 10

7:45 a.m.: I called 1-800-DGHELPS and declared a "disaster" consistent with the contract terms between Western New England College and Data General Business Interruption Recovery Service agreement. I spoke with Dian, who indicated that she "had never done this before." I replied that neither had we, and that we would learn together. Our hardware includes a non-Data General 5 GB 8 mm tape drive, which was not covered under the terms of this agreement.

8:15 a.m.: I called Technical and Logistical Consultants (TLC) and talked with the president, Pat Duclos, and explained that we needed a replacement tape drive and controller.

8:30 a.m.: Our Data General Field Engineer (who was on his way to our site for some minor repairs) called using his car telephone to find out what disaster had occurred at WNEC this time. I replied that we had in fact declared a "disaster" under the terms of the Business Interruption Recovery Service agreement. This fact had not been made clear to him during the initial call from Atlanta.

8:45 a.m.: Pat Duclos (TLC) called back indicating that he had located a tape drive and a controller, which would be shipped to us overnight. Our Data General Field Engineer, Mike Zoufaly, arrived about this time and spent the rest of the morning on the telephone confirming the terms of our agreement and the quantity and type of equipment to be shipped. We clarified the address of the building to which it should be shipped and confirmed that this location did not have a loading ramp, and that we needed the equipment delivered to the door. The Field Engineer and I visited the site and determined that adequate power and cables were available. We had installed this power late in 1993.

I was concerned about receiving the equipment in the middle of the night, and the possibility of having to pay overtime to our maintenance staff (this was just a test), so I identified several members of my staff who would respond and assist with the moving of the equipment into the alternate site. Late on Monday, I was informed that the equipment would arrive on Tuesday. It would consist of 13 cartons with a total weight of 2,000 pounds.

Tuesday, January 11

7:45 a.m.: I met with the Director of Facilities Management and we discussed the progress to date and possible complications. As a result of this discussion, I would later attempt to determine the size and weight of the heavier pieces. He concluded that due to snow removal requirements and the workload of the maintenance staff, he would contact a local mover and determine his availability on short notice. I never did receive any specific data on the individual pieces other than the speculation that there would be two or three heavier pieces. The local mover would come (for a fee), on short notice, but only because we were good customers who used his services on a regular basis. We

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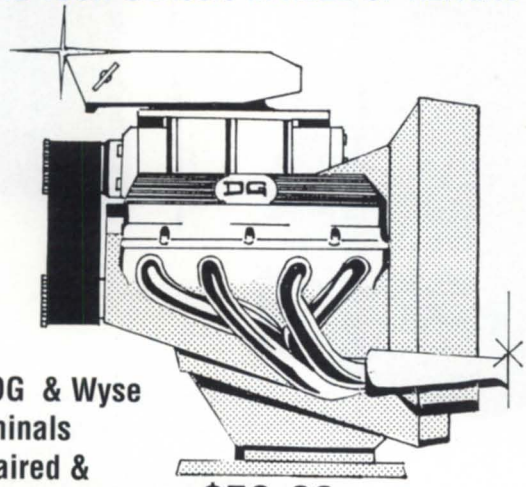

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concluded that we would probably not use his services.

Noon: The 8 mm tape drive arrived without the controller. I contacted Pat (TLC) and determined that the controller had been shipped to his company. We concluded that we would probably get together on another matter Wednesday morning and that he would bring the controller with him to the meeting.

Early afternoon: I talked with my Field Engineer and determined that the equipment was being airfreighted to Bradley Field (Hartford Springfield) and then carried by truck to the college. The Field Engineer corrected a small addressing problem (we had somehow become a hospital) and again confirmed that the delivery would be to the door.

2:15 p.m.: My meeting was interrupted by a phone call to report that the equipment was on a truck at our loading dock (a different address), the truck did not have a power lift, and could not unload at the proper location.

2:45 p.m.: After several different telephone calls, we directed that the equipment be unloaded at our dock. We called in the local mover to transport the equipment to the recovery site and bring the equipment into the building. We also paged the Field Engineer to inform him of our status.

3:45 p.m.: The equipment was unloaded and brought into the recovery site. Only 12 cartons were listed on the shipping paperwork and only 12 cartons arrived.

4:50 p.m.: The equipment was unpacked and positioned. We tested the power, seated all the boards, and powered up the CPU. This resulted in a rather large cloud being discharged out the front of the CPU driven by the fans. We do not know if the cloud was dust, frost, or some other substance. It didn't seem to cause any harm.

5:30 p.m.: We could not seem to get the MVADEX tape to load on the tape drive. After working on this problem for a while, we concluded that the interlock of the tape drive door was functioning. This implied that careful preparation and attention to detail had been given to this equipment before shipping.

6 p.m.: The Field Engineer called for the FE password to start the diagnostics. At this point, we were using a pay telephone down the hall for communication. I had planned to install special telephones after declaring a "disaster" and had failed to put that plan in motion.

8 p.m.: After some delay while determining the devices and types of units on a strange machine, we were successfully running diagnostics. We did not feel that it would be wise to power up the disk drives, since they were very cold due to the air freight and the general January cold. As a result, we concluded activities for the evening.

10:30 p.m.: I talked with Pat (TLC) and we concluded that we would not meet on Wednesday, but would arrange for the transport of the controller in the morning.

Wednesday, January 12

8:30 a.m.: We identified a location halfway between WNEC and TLC to meet and pick up the controller.

9 a.m.: The Field Engineer started powering up the disk drives and explained that we had not received the 1600/6250 tape drive (the 13th package);. We concluded that was not necessary for our activities, and we could install the 8 mm

controller in that slot. He started diagnostics on three of the four disk drives. One was DOA. At this time, we started to question how we would use the Term Servers that we had received with the equipment. We concluded (TLC) that we either needed some software (we did not have a tape) or a PC to act as a Term Manager. We hoped that the software was on one of the disks. It was not.

11 a.m.: The controller arrived, but almost at the same time we received a telephone call that "one of the cables had slipped behind the seat" and was missing. I then arranged to pick up the repair parts for the DOA disk drive.

Noon: We started working with the system tape from our safe. Almost immediately we ran into difficulty. The system tape did not understand device code 22 and the MTB tape drive. We were not storing the starter tape in the safe, so we did not have a "bootable" system. At this point we recognized that if the 1600/6250 were available as scheduled, we would have booted from that unit.

12:45 p.m.: We attempted to change the device code of MTB to 62, but didn't have much success with this approach. After thinking further about the problem, we concluded that we could use the system tape from our other machine (also stored in the safe), since it understood device code 22 as MTC. This would add a step, but at least we could get started.

2 p.m.: Two telephones with unlimited access were installed. The pay telephone we had been using could not receive incoming calls. The internal telephone we were using rang on all three floors of the building. This caused some inconvenience for the staff of the facility. In addition, we realized that if we could install two twisted pairs from the disaster site to the administration building, we could use these pairs to connect all the terminals and PCs in that building.

3 p.m.: The DOA disk drive was repaired. We also completed the installation of the 8 mm tape drive. This installation took a bit longer than expected, with several calls back and forth to discuss proper installation options. This was due mainly to a lack of familiarity with this particular piece of hardware.

4: p.m.: A system understanding the particular hardware available on the replacement system was installed and the SYSUP macro was changed so that we could start loading special utilities, such as INFOS_II. We also had some difficulties with links left over from our original system installation. At this point in time, we could log on using the three IAC 16s provided with the system. We concluded that to go to the expense necessary for the installation of the Term Servers was not necessary for this test.

5:15 p.m.: The largest data base (128 MB) was loaded from the 8 mm tape to the replacement system. We called it a day.

Thursday

8 a.m.: Approximately 72 hours after the original call, we caucused and concluded that to continue further testing would not produce any additional information.

Conclusions

Data General performed admirably. The equipment was delivered in a timely fashion and in good physical condition. Next time, I would determine the flight number delivering the equipment and make sure it was loaded onto a truck we could manage. I think the Data General Field Engineer would want to be available at the airport and for the unloading at the disaster site. To plan on the use of Term Servers without additional software and specific planning for their use is not reasonable. We were not storing quite enough information in the fireproof safe, both from a media and documentation point of view. However, we were able to connect the administration building up with existing spare communication equipment. In general, the results were very educational and valuable.

11 a.m.: The 13th carton containing the 1600/6250 tape drive arrived. Δ

Ed Lindberg, *chairman of NADGUG's RIG/SIG Committee, may be reached at Western New England College, 1215 Wilbraham Road, Springfield, MA 01119; 413/782-3111.*

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Travel and training

SYNOPSIS

Data General Educational Services' goal in 1994 is to make getting to training easier by extending class offerings out across the country. In turn, you can use your training time as a way to see parts of the country you might not otherwise visit.

by Joe Cannata
Special to Focus

Did the long winter get the best of you? Are you only now recovered from pushing snow and wiping salt off the car in the cold climates? Would a getaway or a change of scenery sound good? The answer may reside with Data General, and the number is 800/343-8842, option #4. That's central registration for DG Educational Services, which offers a variety of classes at new remote training centers conveniently located in some of North America's most interesting cities.

You get immediate benefits from classes. What you learn will be directly applicable when you return to work. There are hands-on opportunities with DG/UX and Aviion, as well as AOS/VS (II) and Eclipse. See the sidebar for descriptions of some popular classes to be scheduled.

Additional training sites

Data General has made getting to the training centers easier; now there are more of them. The goal is to bring the training closer to the customer, to save on travel and expenses. Besides the five permanent U.S. education centers (Atlanta, Boston, Chicago, Los Angeles, and Washington DC) and the permanent Canadian site in Toronto, there are new sites with offerings of the most-requested DG/UX and AOS/VS (II) sessions. These locations are also popular travel destinations. You can take classes in Orlando, Las Vegas, Dallas, Seattle, New Orleans, San Francisco, Denver, Phoenix, Santa Fe, Baltimore, Research Triangle Park (Raleigh-Durham, North Carolina), New York, and Branson (Missouri). Besides Toronto, training in Canada is offered in Montreal, Ottawa, and Vancouver. Call Data General's Corporate Travel Center at 800/343-1284 for travel assistance, discounts, and reservations.

Airfares vary almost daily, as experienced air travelers will tell you. Usually, a Saturday stay greatly reduces the fare, as do ticket purchases at least 21 days in advance. Many discount airlines (Mark Air, Private Jet, Kiwi, and others) are appearing at major hubs.

The Orlando-area location is in Altamonte Springs, Florida, with classes conducted at the Marriott Residence Inn. The hotel offers suites with full kitchens, a large breakfast buffet, and 5 p.m. hot-and-cold-snacks, all included in the price. Several restaurants are within walking distance. Altamonte Springs is on the north side of Orlando, about 25 minutes from the tourist "distractions" area. The hotel is just off Interstate 4, so an easy trip south if you're headed to Disney World, Uni-

- **UNIX USER** (S288) is designed to teach the features of Unix from a user's point of view. You will learn to execute basic shell commands, learn to use the ***vi*** editor, perform text manipulation, use the mail system, write basic scripts, identify the directory structure, and create complex command streams using pipes. After this class you'll be ready for any additional Unix training.
- **DG/UX SYSTEM ADMINISTRATION** (S288) teaches the proper techniques for effective administration of a DG/UX operating system using release 5.4R3.00. You will do an install of DG/UX from a release tape, load and customize a TCP/IP network, add and modify users, printers, remote tapes, and file systems, work with the ***sysadm*** menus, perform backups, control and use the accounting system, and create virtual disks.
- **ADVANCED DG/UX SYSTEM ADMINISTRATION** (S388) helps students expand their expertise in learning to customize user login services, integrate third-party terminals by creating ***terminfo*** entries, configure ***syslogd*** to log errors, create a ***sysadm*** install tape, and work with modems and UUCP.
- AOS/VS (II) classes, such as **AOS/VS II USER** (S209)and **AOS/VS II SYSTEM MANAGER** (S217), will be offered at some locations. The user class teaches basic working knowledge of the CLI and AOS/VS (II) filing systems, a look at the process structure, user-manageable printing features, and use of the text editor, SED. System management classes show how to install and generate a custom AOS/VS (II) operating system, perform backups, manage EXEC and processes, create logical disks, and to monitor system performance.

versal Studios, or Sea World.

Since flights into Orlando tend to be very booked, an alternative is to use Daytona Beach Airport about one hour north. Fares into Daytona can be cheaper. Car availability and shorter waits for baggage make Daytona a viable option. The Tampa airport is about two hours south of Altamonte Springs, and can be used as an alternative as well, if you wish to include Florida's Gulf Coast in their visit.

The "Big Easy" is a new and exciting Ed Services location. Classes in the New Orleans area are at the Airport Hilton in Kenner, Louisiana, a few miles west of downtown. The airport is about six miles west of downtown, so it's a short car or cab ride.

In the West, Data General has four locations besides its center in Manhattan Beach, California. The first is Las Vegas, which has transformed itself into a family place. Training is conducted at the Golden Nugget. All major airlines go into McCarran Airport just south of the city, and many offer travel packages. It's a sure bet that taking a class in Las Vegas will be educational *and* fun.

For those wishing to be near the water, why not San Francisco? Training is held at the Ana Hotel, right downtown, while San Francisco International Airport is just south of the city. Take 101 north from the airport right to downtown, or get the hotel shuttle for easy access. It's about a 30-minute ride from the airport to downtown.

How about Santa Fe for a different kind of western trip? Get a feel for the Southwest, its fine food and skilled artisans. And another popular western destination is Denver. Whether you like skiing or golf, Denver can offer both almost year-round. The city's new gem, Denver International Airport, is scheduled for opening May 1994. Classes also will be offered in Phoenix. (Specific information was not available on Santa Fe, Denver, or Phoenix at press time.)

In the East, Data General has spread out its offerings. Training is conducted in the plush Chase Center at the Federal Reserve Plaza in lower Manhattan. New York City's financial district is accessible by Amtrak or one of the three major airports: Newark (NJ), La Guardia, or JFK. Stewart Airport in Newburgh or Westchester Airport in White Plains might be good alternatives if you don't mind a drive.

For a different scene, attend a class in Baltimore at the DG office in Linthicum, located near Baltimore-Washington International Airport. Baltimore is 45 minutes from Washington DC without traffic, and Dulles and National airports in the Washington area are viable alternatives to BWI.

Farther south is Research Triangle Park, NC, home of Data General's Unix development. The research park is located between Raleigh, Durham, and Chapel Hill, an area called the Triangle. Classes are held at the DG facility, and there are several hotels with a variety of prices in the immediate area. Raleigh-Durham Airport is a hub with service from everywhere.

A popular favorite is DG's Dallas location. The classes are held at the Dallas Sales Office on the north side, right off of I-635 (LBJ) and the Tollway, near the Galleria. The nearest hotel is the Doubletree, while Dallas and the Dallas-Fort Worth "metroplex" have a wide variety of things to do. Dallas-Fort Worth Airport (DFW) is located about halfway between the two cities, about a 25-minute ride to the sales office. DFW is the hub to two major airlines. Competition helps keep fares lower than they have been in a few years. And Love Field, nearer to downtown Dallas, is a possible alternative.

Branson, Missouri, on the surface might seem a remote Ed Services location, but Branson has been called the "New Nashville." Major country entertainers perform in the numerous theatres there and several new hotels are being built. There's a small airport with regional service. Nearby Springfield is more of a major airport. Three hours away is Little Rock, Arkansas.

Check the latest training catalog, get out your flight schedule, then call 800/343-8842, option #4, and enroll before the classes fill. Δ

***Joe Cannata** is a systems training specialist, Educational Services, with Data General Corporation. He may be reached at the Atlanta Education Center, 4170 Ashford Dunwoody Rd., Suite 300, Atlanta, GA 30319; 404/705-2562.*

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Continued from page 6

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EasySpooler, a division of Seay Systems, Inc., *5327 N. Central Expressway, Dallas, TX 75205; 214/522-2324.*

X apps access

North Andover, MA—FTP Software, Inc., announced Entran X/32, a high-performance, 32-bit X server product that enables users running Windows to access networked X applications. The release of Entran X/32 represents the first in a series of X products to be developed from FTP Software since a recent relationship formed with AGE Logic, Inc.

Entran X/32 features an interface that is easy to install, configure, and use, while offering productivity boosts as well as saving time and administrative costs. The new product maximizes the 386/486 PC's full 32-bit bus architecture, which processes a greater amount of data more quickly. Entran X/32 also supports "cut and paste" of text and graphics, allowing for a smooth transfer of information among Windows applications. Pricing is $275 through a special introductory offer.

FTP Software, Inc., *2 High Street, North Andover, MA 01845-2620; 508/685-4000.*

On-demand networking

Sunnyvale, CA—Combinet, Inc., introduced simpler plug-and-play efficiency for high-speed remote network access over ISDN. The new Everyware 160 ISDN bridge incorporates NT1 functionality into a compact, economical, and convenient unit. The Everyware 160 eliminates the need for users, such as telecommuters, small business owners and workers at branch offices to purchase and install relatively expensive standalone NT1 equipment.

The Everyware 160 bridge works with all leading network operating systems including TCP/IP, Netware, Sun, LAN Manager, and Vines, and is compatible with any ethernet-based LAN. It is application-transparent and provides a simpler way to create a dial-up LAN over high-speed telephone lines at 128 kilobits per second (2-4 times faster with compression).

The Everyware 160 is compatible with all ISDN telephone switches that support the 2B1Q interface standard, including Northern Telecom and AT&T. It also allows the addition of other ISDN equipment, such as telephones and G4 facsimile machines, to share a single ISDN line with the LAN bridge. Pricing is $1,190; volume discounts are offered. In addition, the Everyware 160 is available through Combinet's NODE (networking on-demand for education) program for $595 to students, faculty, and administrators at participating educational institutions.

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EDITOR'S NOTE

Continued from page 4

changes and overpasses—probably right on top of your house.

Information Superhighway. Is this term irritating you yet? Wait a minute. I *have* thought of a way to describe the future of globally networked computing, and without mentioning highways. Just say "Internet," and add politely: "Hands off. It'll grow like a weed, like kudzu (although the dictionary says that's a vine, but you get my point).

Yeah, the Information Super Weed. It doesn't have to be built at all, merely pruned here and there. It's growing quite vigorously all on it's own. It's alive, you know. Maybe it'll even bloom. Δ

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DASH Items...

Category: DG/UX

Clariion failover software

Author: CLYDE ALLEN

MIF (Machine Initiated Failover) does not appear to work. The ***failovermon_pulse_script*** is either not read or not executed, thus the disks from the secondary system are not picked up. When the "admfailoverdisk" command is executed manually through ***sysadm,*** the disks are picked up. Has anyone experienced this? Is there a workaround or solution?

Reply by: EARLE MACHARDY

Here is some advice from someone familiar with failover:

It could be either. If the script does not start with an interpreter line of the form ***#!/bin/sh*** or ***#!/bin/ksh*** then the script will not execute. This would be pilot error.

If the script has ***#!/bin/sh*** as its interpreter line, and they are using the sample commands in the script, there is a known problem with the ***sh*** where the exit status to the ***admpdisk*** command is always 0. The workaround is to change the interpreter to ***#!/bin/ksh.***

Tape drive, DG/UX 5.4.2.01

Author: DAVID WOO

I'm trying to install a reel-to-reel SCSI tape drive (DG Model 6586) onto an Aviion 4125 running DG/UX 5.4R2.01. DG field service installed it, ran diagnostics (it passed), and is on the system.

I do not know how to make the system identify the drive. I used the ***sysadm*** command to (C)onfigure and (A)dd a device: ***st(insc(),6,0).*** That worked fine—it created some files in the ***/dev/rmt*** subdirectory that look like:

```
st(insc(FFFAxxxx),6,0)
st(insc(FFFAxxxx),6,0)
```

In this /dev/rmt directory are the files/devices for the existing QIC 150 tape: ***st(insc(),4,0)*** etc., *AND* there are also 2 file "0" and "On" that are linked to those files. How do I create some files "1" and "1n" so that they are linked to the "long file names" ***st(insc(FFFAxxx,6,0)***?

Or how do I address the tape drive or get the system to recognize it? By editing ***/var/BUILD/dgux.aviion*** and relinking?

Reply by: EARLE MACHARDY

When you go from init level ***s*** to any other init level, a script called ***chk.devlink*** is run that updates the directory to have shorter names. It also adds these names into a file called ***/etc/devlinktab.***

I think you can probably just run the script as superuser and it will create the nodes for you.

If you want the kernel to come up and configure the "sd(insc(),6)" drive automatically, you have to rebuild the kernel; but you should not have to do so to create the new short names.

Device full

Author: C.A. BROKSCHMIDT

I have a user on my net running an Aviion 400-series workstation with DG/UX 5.4R201. He has encountered an interesting problem. When trying to copy files into a file system that I set up for him awhile back, he gets a "device full" message. The file system is 715000 blocks and according to ***sysadm,*** it is 70 percent used.

The inodes are only 5 percent used. The error occurs only when copying files into one particular subdirectory on the file system. I am able to create another subdirectory on the same level as the questionable one and copy files in with no problem.

What might be causing this?

Reply by: TOM BARRON

One thing that might cause this is if that subdirectory is the mount point for a device that really is full.

Do a ***df*** to see what's mounted where. Another possibility is that the "subdirectory" is really a symbolic link to a directory on a device that's full. In this second case, the problematic subdirectory won't show up in the output of ***df,*** but you should be able to tell if it's a symbolic link by doing ***ls -l*** on it.

Reply by: EARLE MACHARDY

Try running ***dumpfs*** on the ***/dev/rdsk/*** node for the file system that is mounted. You can run out of blocks of a particular size and have lots of little blocks the file system can't use for files. Then do a ***cpd*** on the mount point of the file system.

If you grew the file system, the ***cpd*** limits might not have been increased. You can use the ***cpd -b*** option to increase this on the fly. Can the root do the copy? It could be the directory itself is a ***cpd,*** and that is out of space. Try using the ***cpd*** command on that directory.

There is one more thing to check. A DG/UX directory can be only about 1 MB in size, because it can have only one level of indexing. Check the size of the directory to make sure it's not too big. You can also run ***fsck -n*** on the mounted file system (and ignore most of the messages) and look for the mention of the inode number for that directory to see if anything is wrong with it. Δ

DASH runs on an Aviion 5200 server located at the Customer Support Center in Norcross, GA. The bulletin board is available 24 hours per day, 7 days per week, free of charge. DASH is accessible via Internet address 128.222.159.141, or by calling 800-DASH-CSC (800/327-4272) for the modem rotary.

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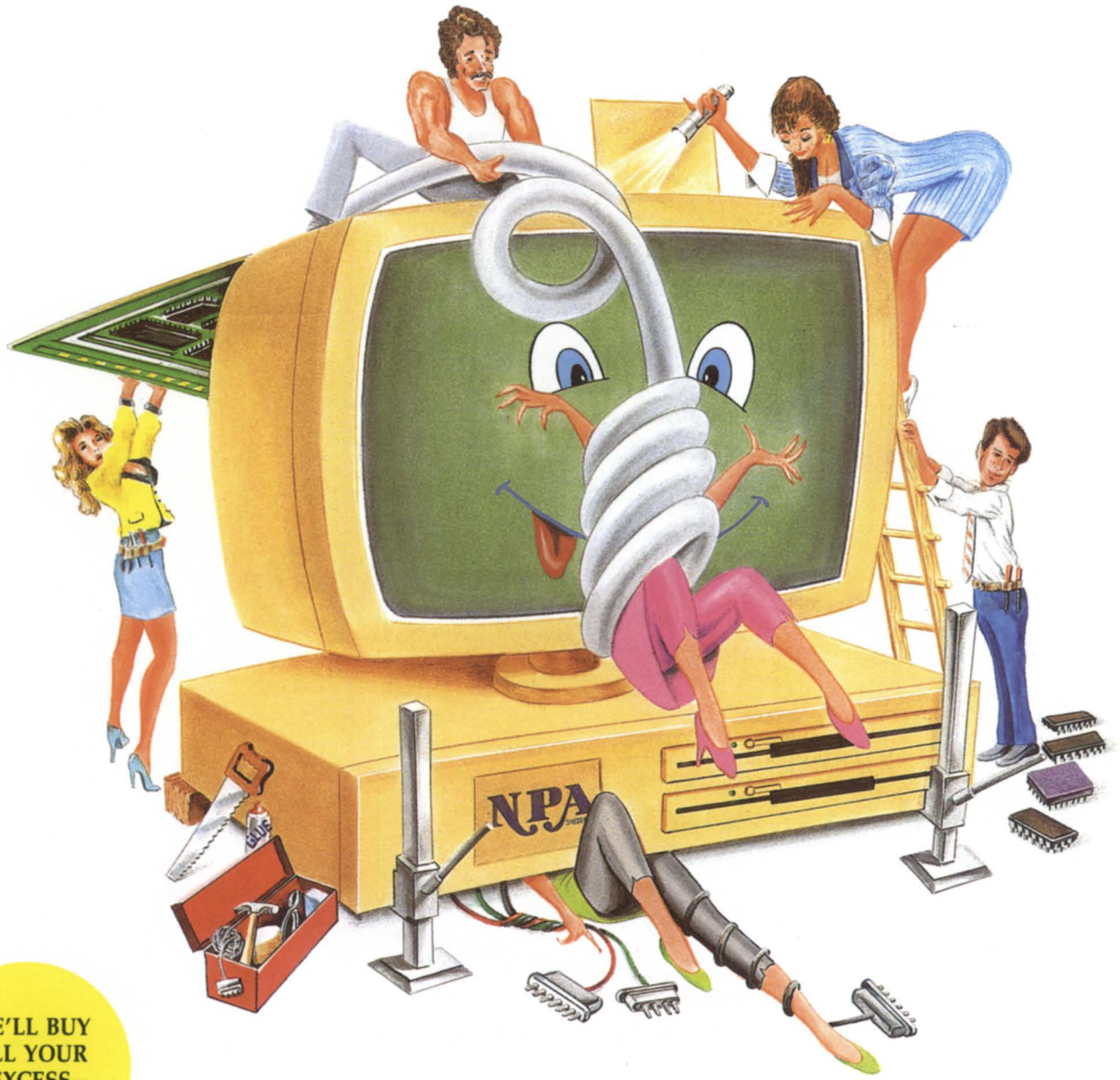

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