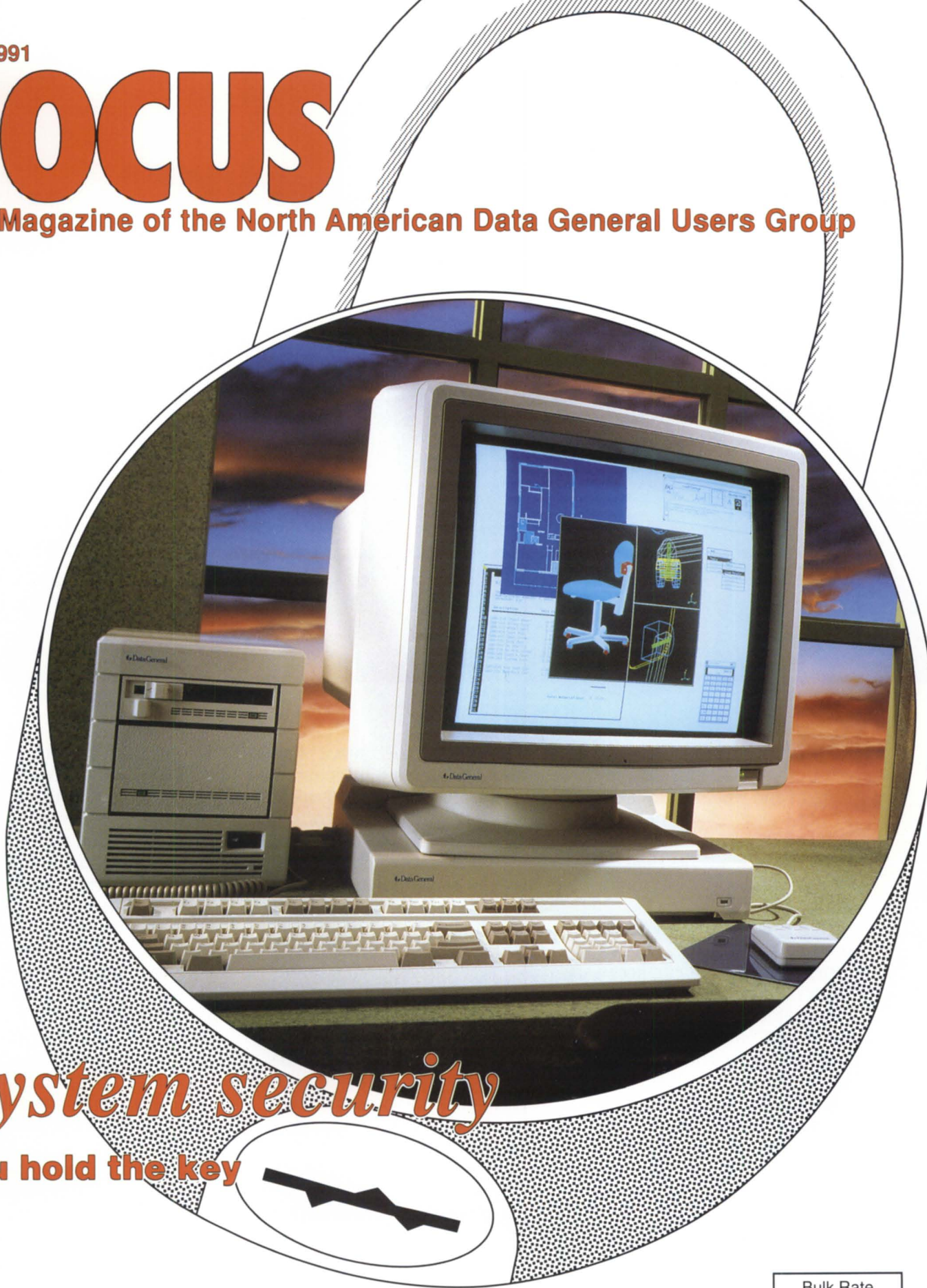


May 1991

FOCUS

The Magazine of the North American Data General Users Group

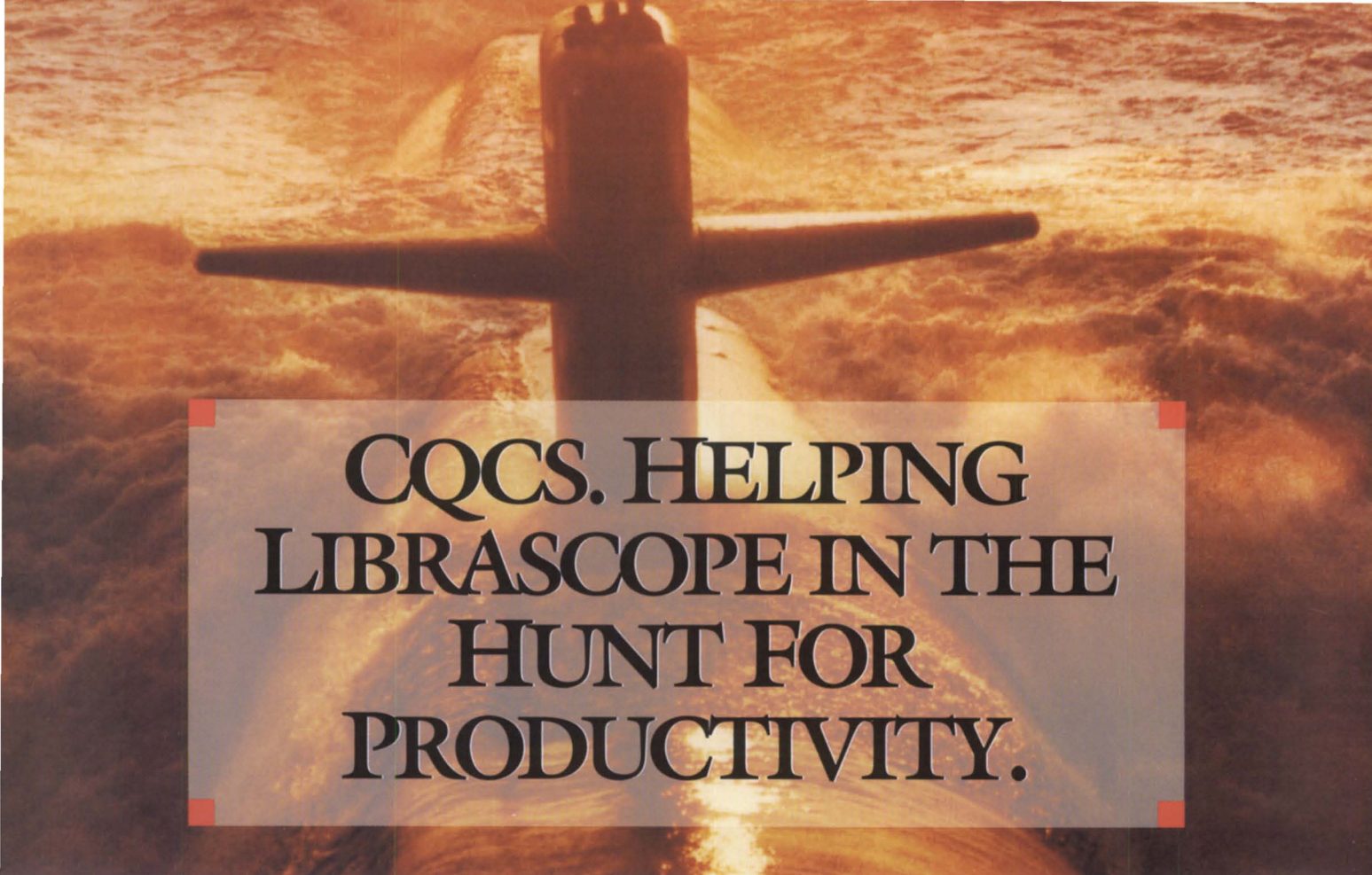


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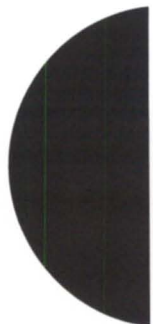
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Reality squeeze

"The board is essentially the soul of a new machine, highly reminiscent of Tracy Kidder's Pulitzer prize-winning book of the same name, published a decade ago about an earlier-generation Data General computer, which also featured Tom West."

The quote above was taken from a press release announcing Data General's new 117-MIPS Aviion servers, the ones with the powerful circuit boards that you can tote in a pizza box.

Throughout Data General's promotional material for its new servers, the quad-processor board is referred to as the "soul" or the "heart" of the new machine. It's an effort to recapture the feeling of Data General's glory days of the early 1980s. Trade publications are picking up on the new mood, based in part on a profitable first quarter. They no longer refer to Data General as the "troubled minicomputer manufacturer." Now Data General is in the midst of a "turnaround effort." The change is subtle, but not insignificant.

Recapturing an earlier era is not a bad idea. Wouldn't it be nice to start over at the beginning of the 80s and skip all that bad stuff that happened in between then and now?

I have a theory that a part of Data General lost touch with reality sometime during the 80s. After the success of the "new machine," the Eclipse MV that we know so well today, Data General leaders embarked on an ambitious expansion plan, building manufacturing plants and investing in property all over the world. And while DG raced along its path, it seemed to be wearing blinders while the PC revolution passed it by. We all know what happened. DG lost

a whole lot of money. It closed manufacturing plants, sold property, and laid off a few thousand individuals.

That's the reality squeeze. The icons of the 80s—inflated salaries, gourmet lifestyles, growth at any cost—were a dream. Now, frugal is in. Waste is not tolerated. And so, wiser but thinner, and maybe a bit humbler, Data General faces the 90s.

The new generation of managers must learn from the experiences of the past. They must significantly increase Aviion sales this year. I'm only an observer, a spectator in this race, but it looks like Data General's new Aviion products (the 117 MIPS servers, disk array subsystems, and DG/UX 5.4), are winners. Yet as it plunges forward on the open systems path, Data General leadership must proceed with caution in two areas. It must keep always vigilant so that it is not left in the dust by the next wave of technology, and it must earn the trust of those users who care the most.

Data General wants to be a major player in the open systems market. It reminds me of a saying: Be careful what you wish for, because you may get it. Vendor loyalty is fleeting in an open systems world. Data General leadership must never neglect its established base of users. They are the glue that holds the company together during times good and bad. Δ

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A trio of announcements for Aviion fans



J. Tom West, senior vice president Advanced Systems Development, talks to the press. He holds a sample of the quad-processor board that fits in a pizza box.

Photo courtesy Data General

by Robin Perry
Focus staff

During an international videoconference staged at the glitzy Helmsley Palace Hotel in New York City on March 13, Data General Corporation unveiled the newest and fastest members of its RISC-based series of Aviion computers—AV/7000 and AV/8000 servers that deliver 117 million instructions per second (MIPS).

The machines are fueled by a quad-processor circuit board with four 25 MHz Motorola 88100 RISC (reduced instruction set computing) processors, supported by eight of Motorola's new 88204 cache/memory management chips totaling 512,000 characters of cache memory. The AV/8000 system can support up to 8 local

area networks and 1,275 terminals.

The systems range in price from \$96,000 for an AV/7000 desktop server with 16 MB of memory, 662 MB hard disk, and 525 MB QIC storage tape, up to \$249,520 for the high-end rack-mount AV/8000 with 128 MB of memory and 5 GB of disk storage. DG spent less than one year in development of the board, which can also be used to upgrade existing AV/5000 and AV/6000 servers, said Stephen P. Baxter, vice president of marketing.

The pricing allows businesses "to run software applications that have required mainframe performance on microprocessor-based open systems at costs that are orders of magnitude lower," said Ron Skates, president and chief executive officer.

Baxter identified seven vertical markets in which DG will concentrate sales of the high-end servers. These markets are discrete manufacturing, federal government, non point-of-sale retail distribution, state and local government, utilities/telephone companies, medical, and GIS (graphic information systems).

Since its announcement in spring of 1989, more than 1,500 software solutions have been ported to the Aviion. All the solutions run on the high end servers announced in March. "One of the key points is that it is 100 percent compatible with the systems we have [previously] delivered," said Baxter. "That means those solutions run not only on the lowest priced RISC workstation on the face of the earth, but they also run on the most affordable high-performance RISC system on the face of the earth."

The scene-stealer at the press conference was DG's new HADA (high availability disk array) subsystem, which was announced in conjunction with the high-end

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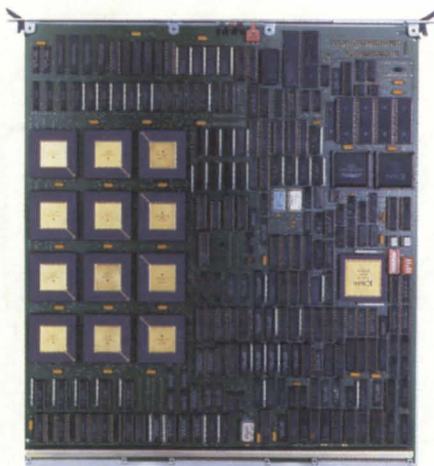


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Aviiions. The subsystem allows users to simultaneously manage drives individually or as mirrored pairs, in which data is written to one disk and mirrored to a second disk. In a live demonstration broadcasted simultaneously in San Francisco, Brussels, and Toronto, a customer from the New York Power Authority removed a random running disk from a random running system with the fault-tolerant disk array. With the system running continuously, another disk was put into the empty slot and all the data from the removed disk was restored.

According to William Zastrow, division vice president of Open Systems Marketing, accessing data on a HADA system is as much as four times faster than a standard SCSI system. Using low-cost 5.5-inch disk drives, the subsystem can perform up to 400 I/O operations per second, with an average rate of 170 I/O per second. The HADA subsystem can house up to 24 GB of redundant storage capacity, or two subsystems can be used simultaneously on the AV/6000 and AV/8000 for up to 48



The board behind the new AV/7000 and AV/8000 systems has four 25 MHz 88100 RISC processors.

GB of redundant storage capacity.

The subsystem, available in June, will cost \$269,000. A lower-cost alternative, the Combined Storage Subsystem 2 disk array, will be priced from \$48,000 to \$128,000. The Combined Storage System Subsystem 2 has a storage capacity ranging from 4 to 12 GB, and performs up to

250 I/O per second.

Data General also announced the newest version of the Unix operating system for Aviiion computers: DG/UX 5.4, a Unix System V.4-compliant operating system that supports symmetric multi-processing, optional C2 and B1 security, and commercial extensions for high availability.

"It looks good," said Judith Hurwitz, of the Seybold Office Computing Group, who previewed the product. "The most impressive achievement that DG has accomplished with this release is that they really are the first vendor to achieve full symmetric multi-processing under Unix that really works. I think the fact that they're adhering so closely to industry standards is quite important because it makes porting to their operating system very easy for ISVs [independent software vendors]. They've really done a good job of sticking to industry standards."

Hurwitz said that DG's claim to be one year ahead of the competition in terms of compliance and performance "is pretty close." △

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Education

*University of Maryland,
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*Brigham Young Univer.
Electrical Engineering, M.

Experience

*Hydrospace Challenger C

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No excuses

The job of convincing the boss to provide system access security often falls to system managers. Yet, protecting your system from intruders is, quite frequently, an exercise in not overlooking the obvious.

SYNOPSIS

by Peter Walsall
Special to Focus

Computer security is a topic that gets little respect from most users and company management. The people in between, the system managers, often feel like Cassandra—we are either ignored or not heard. Until it is too late, of course. Then we have the unfortunate job of picking up the pieces, assuming that we are not blamed for causing the problem.

Having spent many years managing Data General machines, and more recently developing and selling access control software for DG systems, I have seen and heard many examples of security lapses. The sad part about it all is how simple it usually is to avoid trouble.

When I gave a talk on security at the 1989 NADGUG conference, some attendees complained that most of the time was spent covering the obvious. This was rather ironic, as it is the simple and obvious things that make the difference between an installation that is open for problems, and one that is considered secure.

Why so few companies have a good security plan is not hard to understand. It requires careful planning ("That other project, which is now six months late, needs to be finished first"). It requires a few additional procedures and discipline on the part of the users ("It's inconvenient and wastes my valuable time"). It requires a little money ("We really need to trim our budget this year; maybe next year"). How many of these excuses have you heard?

So how do you convince management that there is a problem, and that it must be addressed immediately? I have often found it useful to tell my clients some of the horror stories I have encountered over the years. It is surprising how quickly I can get their undivided attention if they are shown how their system has the same potential for disaster. In case you do not have an appropriate supply of such stories, let me offer you a few of mine. You are welcome to use them.

Uninvited guests

A classic example of uncontrolled access was told to me recently: A law enforcement agency had an unexpected "visit" to its system from an employee who had left the agency some 12 months before. They were lucky that no significant damage occurred, but they were embarrassed that it could happen at all.

How many managers make sure they are always advised when a user leaves the company, or moves to another division where they do not need access privileges? Whenever this happens, the user's profile should be disabled immediately.

Whether or not you receive such information, it is not difficult to monitor the profiles on the system and look for those remaining unused for some time. If you find a profile unused for longer than you would expect, disable it. It is better to take a few minutes to re-enable it when the user wants it, than to suffer the same fate as described above.

Demon dialers

Another routine task, just as important as checking profile use, is looking for user profiles possessing privileges they should not have. One of our customers found this out the hard way. When installing a new software product, it was discovered that some users could no longer access the system. After some searching, it was found that all of their consoles had been given the /MOD characteristic—that is, they were assumed to be modem lines, even

Uses and types of security		
	Threat	Countermeasures
① Modem	<ul style="list-style-type: none"> • Theft of data • Importation of illicit code • Hacker access 	<ul style="list-style-type: none"> • Prohibit; use central modem pools
② Removable Disks	<ul style="list-style-type: none"> • Easy theft of data • Compromise operating system 	<ul style="list-style-type: none"> • Prohibit or control & lock up
③ Diskettes	<ul style="list-style-type: none"> • Easy theft of data • Compromise operating system • Introduction of illicit code 	<ul style="list-style-type: none"> • Prohibit or strictly control
④ Non-Removable Disks	<ul style="list-style-type: none"> • Conspicuous theft 	<ul style="list-style-type: none"> • Use except where physical theft of entire workstation is feasible
⑤ File Server	<ul style="list-style-type: none"> • Physical theft/destruction 	<ul style="list-style-type: none"> • Backup; lockup
⑥ Ethernet/Token Ring Tap	<ul style="list-style-type: none"> • Unauthorized connection; monitoring of data/passwords 	<ul style="list-style-type: none"> • Encryption; dynamic passwords
⑦ Workstation	<ul style="list-style-type: none"> • Unprotected storage of passwords for other nodes; monitoring of Ethernet 	<ul style="list-style-type: none"> • Dynamic passwords; encryption
⑧ Operating Systems	<ul style="list-style-type: none"> • Unauthorized access 	<ul style="list-style-type: none"> • C2/B1 * operating system; implement C2/B1 features; change default user IDs & passwords; password management; configuration management
⑨ Dial-in; Dial-out	<ul style="list-style-type: none"> • Hacker 	<ul style="list-style-type: none"> • Discourage, but if necessary use call-back system and/or dynamic password system

Information provided by Grumman Data Systems. *C2/B1 refers to a level of security defined by the U.S. Department of Defense.

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though most of them were not. When creating new test profiles for the users, the new software automatically set the "Use modem" privilege to "N", so they were not allowed to log in to any of these lines! As their previous profiles would allow access from real modem lines, it made any determined hacker's task that much easier.

While the problem of hackers and demon dialers most often comes to mind when talking about security, it is still true that most security breaches are caused by

people inside a company. One system manager who was working particularly late one night discovered the truth of this, much to his chagrin. One of his more adventurous programmers was active on the system, even though there was no obvious reason why that should have been the case. Why was the user on the system?

If you wanted to poke around in places where you were not allowed, would you do it while there were others around who might accidentally see what you were up

to? The solution to this problem was fairly simple: just find a way of restricting profile use to normal working hours. Access at any other time would be found and terminated. There are at least two products on the market that will solve this problem.

Memorable passwords

I read recently of a seminar in which the speaker asked how many of the audience listeners had ever accidentally learned a

Did I lock the office before I left?

SYNOPSIS

Human error remains the greatest danger to even the most sophisticated computer security safeguards.

by David Hiechel
Special to Focus

Did you ever have one of those days when you knew there was something you had forgotten, but could not remember what it was? After a long day at the office, I headed home to relax and watch some Big Eight basketball on television. As I sat there in front of the TV, I started to wonder if I had remembered to lock up before leaving. I rushed back to the office to find out that I had left the office open. Fortunately, nothing was disturbed. I gave a big sigh, thankful I was off the hook this time and swearing it would never happen again.

In my little story all the security systems were in place, but by forgetting to lock the door none of them took effect. Human error not only caused me to miss a great basketball game, but could have also caused some real trouble at work.

Your computer system is no different from an office. You keep the heart of the company on your system and depend on it for day-to-day functions. Your goal and responsibility as a system manager is to make sure that no unwanted visitors get into the system.

The first step in preventing unwanted access to your system is to make sure all the doors have locks. By this I mean check the security measures provided by the operating system and make sure they are in place. The AOS/VS operating system has many protection schemes that work very well in preventing unwanted intruders. Some of these precautions include ACLs (access control lists), username/password combinations, and a set of privileges defined for each user.

Once users log onto the system, they exist in their own little environment that you have set up for them. Limiting the access of users means, if a user has a bad day and does a DELETE #, they will only be able to delete files in their environment. The different operating system protection

schemes allow you to build the boundaries for each user. The job of the system manager is to make sure these boundaries allow the user to do a job without intruding on other users.

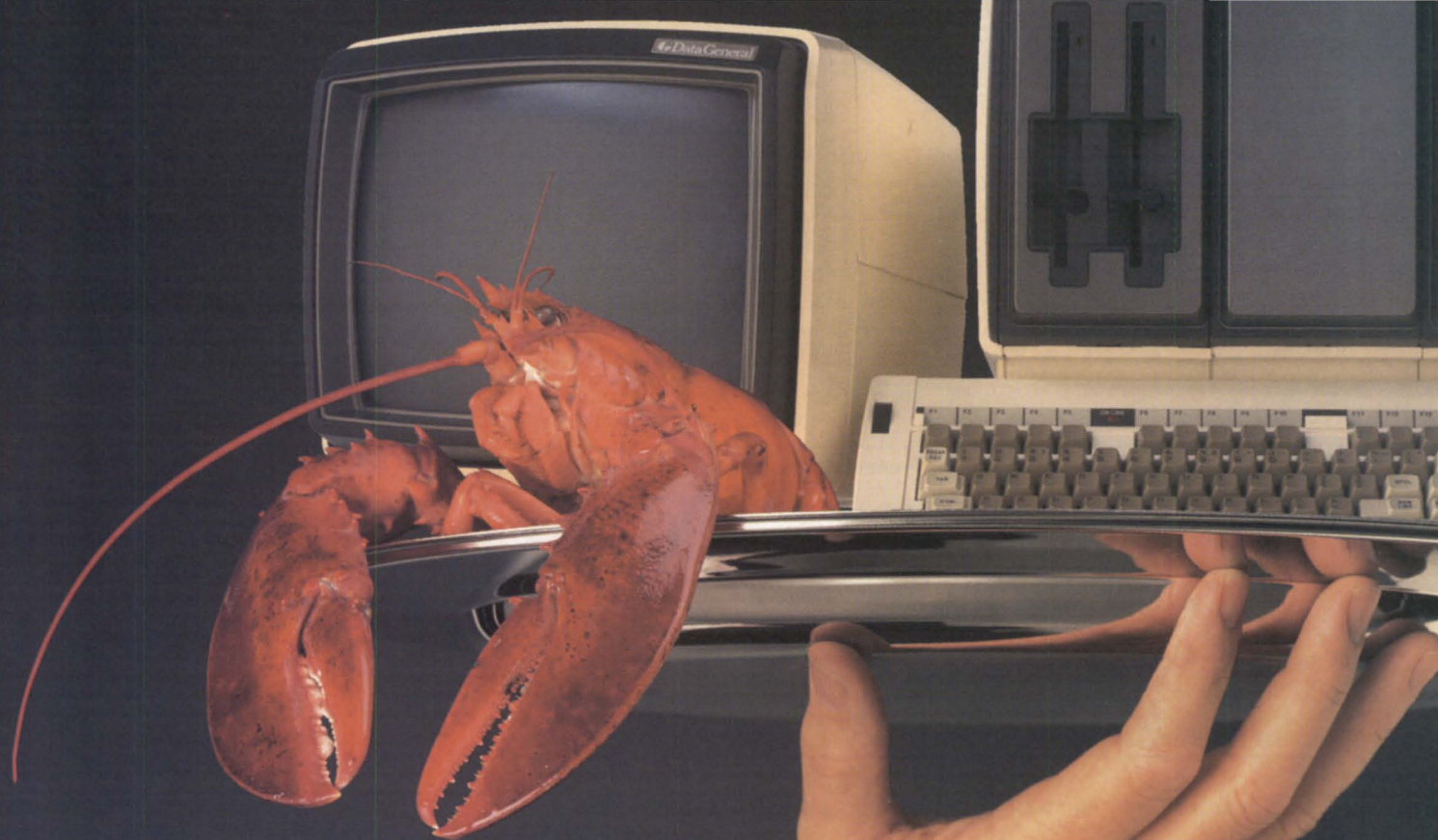
Okay, you have made sure and are confident that all precautions provided by AOS/VS have been taken—your problems are solved, right? Wrong answer! You still must deal with the human element of system security. This includes the user running out of the office at 4:59 p.m. to watch basketball and forgetting to log off the system before leaving. You have taken great time and effort in giving your users a secure environment and then how do they repay you? They leave the front door unlocked!

Although you have taken the time to restrict user access, any intruder would still have limited access to your system. If the user has access to important files, which I would think would be the case more times than not, this limited access could still cause a great deal of damage. The problem is compounded if the user who left himself logged on has SUPERUSER privileges that could allow intruders to set up secret accounts or peek at other users' passwords.

So now what? You have spent hours changing ACLs, updating user accounts with Predator, and forcing everyone to change passwords every hour. The whole problem starts when people leave themselves logged on when they are no longer using the computer. The solution is still a simple one. AOS/VS gives you the ability to check and see if a process is active or inactive (RUN pid#). Once you see the user is no longer active you can use the CLI TERMINATE command to log the user off the system. This works, but you still have a human in the loop of security. There are programs available for the MV that search for and terminate inactive users. Use one of these programs or write your own application to do the job. The important thing is getting those users off the system as soon as they are finished using it, and preventing anyone else from walking in.

The problem of security is a large one. Too bad it still all comes down to the fact that if you leave the front door unlocked, you will get unwanted visitors. Δ

David Hiechel is a programmer/analyst for Eagle Software. He may be reached at 169 East Cloud, Salina, Kansas 67402-0016; 913/823-7257.



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co-worker's system password. All but one person raised their hands. This illustrates graphically the problem of making the average user choose a sensible password, change it frequently, and avoid reusing old passwords.

As most users will pick a word that is easy to remember, it is equally easy for someone else who knows the user to make an educated guess with a reasonable ex-

pectation of success. The only safe way is in not allowing the user to choose the password, or if that is not possible, in having a dictionary of words that are not permitted. (How many of you know of systems in which there is at least one profile with a *Star Trek*-related password, "NCC-1701"; or something obvious, like "OPERATOR"?)

This raises a question: what types of

passwords should be used on a system? The debate over this has been going on for a long time, and will probably continue forever. While there is a good argument for generating cryptic passwords (the fact being that it is almost impossible to guess them), the negatives are equally troublesome. I know of one defense contractor who found users writing passwords on pieces of paper and sticking them to their terminals! All the cryptic passwords in the world will not solve that one!

I have a strong preference for using combinations of 5- to 7-letter English words. Given a dictionary of 1,000 common words, that provides over 1 million combinations, which makes guessing a password essentially impossible. We have found that most users have little difficulty remembering their passwords, and in many cases they find them quite memorable. (The rumor that one slightly flaky user received the password "SPACE CADET" is [probably] not true!)

Solutions

As I mentioned earlier, most of the problems are obvious. The solutions are simple and inexpensive, particularly when compared to the cost of fixing the system after it has been invaded. So look at your system and imagine that you are going to break into it. Then try to envision how it could be done. Be paranoid, but realistic. Develop a security plan to address the issues you find. Implement the plan and *stick to it*, but don't become complacent. There may be someone out there searching for the security hole you forgot about.

Having said all this, there is one other issue that is just as important, and frequently a lot more difficult—and that is gaining the confidence and support of management. All the procedures you can think of will be compromised if company management believes security is unimportant, or it is perceived as conflicting with the efficient running of the company. The best way to handle this is to sell them on the plan first. Then have them send a memo to all users indicating the importance of following procedures. This will go a long way toward making any security plan a success. Δ

Peter Walsall is president of Datalynx Inc. He may be reached at 619/560-8112; 6659 Convoy Court, San Diego, CA 92111.

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Who are the real software pirates?

Crime via computer is real, and the culprits are getting away with it. Courts hand down light sentences to those who intrude electronically to steal and destroy. The software industry seems unconcerned over billions in sales lost to illegal copying. And the federal government? Heaven help us if Uncle Sam stepped in to insure our data.

SYNOPSIS

by Al Hill
Special to Focus

On November 2, 1988, Robert Morris Jr. launched the Internet virus that invaded thousands of systems across the country. On January 23, 1990, Morris was convicted of a felony. His sentence was three years of probation, 400 hours of community service, and a \$10,000 fine. It was a meager ending to a crime that caused more than \$98 million in direct and indirect costs for a single virus incident. Robert Morris Jr. exploited a hole in the Unix Sendmail function. The hole had existed for years and was known to others, including possibly Robert Morris Sr., a chief scientist at the National Security Agency.

On February 15, 1990, Markus Hess (the Hannover Hacker), et al., were found guilty of espionage and received one- to two-year sentences. They are now released on probation. Hess writes networking software for a company in Hannover, Germany. There is no dollar estimate for the damage done by Hess and his associates from the time they began their crime in the fall of 1986.

In Texas, a scorned employee left a logic bomb in his company's software that, when activated, destroyed payroll records. He is serving time.

The term "virus" spreads fear among the uneducated to the point that now fear itself is a virus. Whenever something happens to a computer that cannot be easily explained, the user (subconsciously) thinks virus. Without a computer virus, there would be no market for antiviral programs.

The term hacker formerly indicated a person who had an intense relationship with computer hardware and software, and was able to utilize both environments fully to solve complex problems. The term has evolved to define those who are immature, irresponsible, and criminal with their knowledge of computer systems.

The modern hacker is a legitimate threat to your system. Whether the hacker is a thrill-seeking child prodigy, an intelligent thief, or a disgruntled employee attempting deliberate destruction of company records, action must be taken.

There is no doubt that crime via computer is real—most notable is the Morris case where millions of dollars were lost. But how many people have considered the billions of dollars lost to software piracy? We are told not to leave our keys in our cars. Lock our doors. Don't leave our wallets on our desks at work. To do so invites theft and destruction. Yet computer systems manufacturers and software developers have all but ignored attempts to stop software piracy, and they continue to complain about the number of pilfered copies of software passed around freely from one user to the next.

I contacted the Software Publishers Association in Washington, DC, to determine the costs associated with software piracy. I was not surprised to see a \$2 billion price tag attached to lost software sales per year. I was surprised, however, to see that efforts to curtail piracy are mostly dedicated to litigation, legislation, education, and public relations campaigns.

To date, litigation has not proven to be

a deterrent to computer crime, as seen from the outcomes of the Morris and Hess cases. In my opinion, it does nothing more than provide the country with full court dockets and satisfied attorneys. Failure to pass harsher sentences negates the efforts expended by law enforcement agencies in the pursuit of these criminals.

As for legislation . . . well, can you imagine trying to get more than 500 senators and representatives to enact legislation to curtail computer crime? The budget will be balanced before this happens. Worse yet, the government could create the Federal Computer Insurance Corporation, to insure your company's data. That way, all taxpayers can share in your misery when your data and system are destroyed.

Education and public relations also seem ineffective. Many companies I have visited issue statements condemning the use of illegally obtained software or "unsafe" diskettes, yet they are inwardly blind to the practice.

Terms like "Trojan Horse" and "Failsafe" stimulate interesting and exciting stories in the minds of users and programmers. Even Hollywood likes this kind of material. But is it difficult for computer system manufacturers and software product developers to create secure environments? Absolutely not. The reason they do not, in my opinion, is because it is inconvenient. A pain. A detail. They want their products to be simple to use, easily portable, and readily available. This is what they have achieved. The cost is an environment that invites crime.

The government is also responsible. ARPANET, the Advanced Research Projects Agency Network, created the open network that allowed Morris to launch his virus. Should the government be prepared to take some of the blame? Until recently, state and local governments could not be prosecuted for the use of illegally obtained software in their own offices. I suppose the government is best at taking care of itself.

What prohibits manufacturers and developers from implementing safeguards? Most developers seem content with \$2 billion in annual lost revenue, although some have tried to develop copy protection schemes. The developers compete to make their software as user friendly as possible. If it were not, users might shop elsewhere. So the \$2 billion lost annually

is passed to the user who procures legitimate copies of software at inflated prices.

There seems to be no combined effort among the various manufacturers and developers to make their environments secure or, at a minimum, difficult to violate. Instead, we rely on the criminal justice system. This is the aspirin that stops the pain but does not cure the cause.

The industry that is capable of creating machines that execute millions of instructions per second, store billions of bytes of data on disk, and transfer data at the speed of light seems unwilling, if not incapable, of creating a secure environment in which legitimate users can share and access information without worry.

The next time you hear a story about a surreptitious virus infiltrating someone's bank records, ask yourself if your computer system is safe. Then ask yourself if the software developers and manufacturers should share some of the blame for any damage. The government requires levels of certification for secure hardware and software. Why doesn't private industry? Take a look at the software and hardware disclaimers that absolve the developer and manufacturer from any damages.

If you buy a car and the door locks don't work, you can take it back. Why can't we have the same assurance with our software investment? Δ

Al Hill is president of Hill Computer Consultant's, Inc., a Washington, DC based consulting firm. He may be reached at 703/471-4104.

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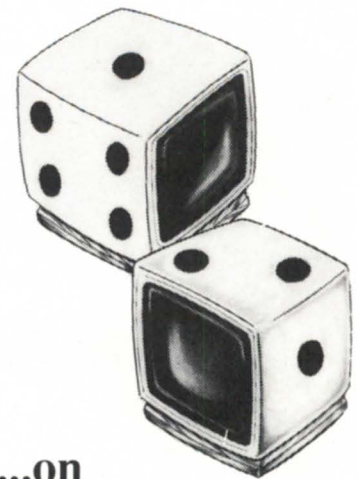
If you would like more information concerning computer security, please read the following:

"Computer Viruses, Worms, Data Diddlers, Killer Programs, and Other Threats to Your System" by John McAfee and Colin Haynes.

"The Cuckoo's Egg" by Cliff Stoll (see review on page 18).

Or you may call the Software Publisher's Association, in Washington, DC at 202/452-1600. Δ

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by Tom Gutnick
Special to Focus

"The Cuckoo's Egg: Tracking a Spy Through the Maze of Computer Espionage"; Author, Clifford Stoll; Published in New York by Doubleday, 1989; \$19.95 (Hot flash: Now available in paperback!).

"What Do You Feed a Trojan Horse?" That's the presentation by Cliff Stoll, which I attended a few months ago. Having previously met Donn Parker, Gene Spafford, and Fred Cohen (luminaries in the computer security business), I was expecting to see another middle-aged university professor type—corduroy sports coat with suede elbow patches, smoking a pipe... Instead, I thought I was caught in a time-warp as this seeming refugee from the 60s (electric hair but minus the love beads—except that he was probably just a toddler back then) started bouncing up and down, telling us excitedly about his recent experiences. Actually, once I looked past his appearance and hyperactive demeanor, I found that he possessed insights important to any system manager, and I knew that I simply had to read the book.

It all started with a 75-cent accounting discrepancy . . .

Clifford Stoll was an astronomer whose grant had run out. To tide things over, he had been recycled into a position on the support staff at the Lawrence Berkeley Laboratory computer center. Fortunately, he fit right in, wearing "the standard Berkeley corporate uniform: grubby shirt,

faded jeans, long hair, and cheap sneakers." His second day on the job, he was asked to find out why the previous month's computer billings were off by 75 cents, out of a total of \$2,387.

By now, few in the computer industry haven't heard at least part of this story, but in 1986 Stoll had not an inkling of the odyssey upon which he was embarking. Within a few days, he figured out that somebody had surreptitiously obtained an account on the computer. The center director viewed this as electronic terrorism, and told Stoll to use whatever resources he needed to catch the hacker—even if it took three weeks! Not knowing much about computers, and finding that there were no guidebooks (or even any experts to consult) for tracking hackers, he approached the problem as he would any other scientific research project, proceeding methodically and taking copious notes every step of the way. Over the next several months, Stoll found that a hacker had not only penetrated the Lab's computer systems but, through skillful network weaving, was attempting (with enough success to be scary) to penetrate systems at U.S. military facilities and defense contractors.

Before long, Stoll had gotten the FBI involved, along with CIA and Air Force intelligence—he was a citizen in good standing of the People's Republic of Berkeley working with those he would have previously viewed as "warmongering puppets of the Wall Street capitalists." Eventually, it turned out that the hacker, operating out of Hannover, Germany, had been working for the East German and Soviet secret police. Along the way, Stoll developed a very strong sense of the importance of trust in the computing community—and no longer laughed off hacking incidents as he once did. (In other words, he figures that he finally grew up!)

I found Stoll to be an eminently entertaining author, and this book is written in the same spirit as Tracy Kidder's *The Soul of a New Machine*. You don't have to be a

SYNOPSIS

An astronomer turns detective, successfully tracks and trees a computer-hacking spy, and writes a book about his exploits with entertaining style and penetrating insight. You don't have to be a "techno-geek" to enjoy The Cuckoo's Egg, just a mystery fan.

techno-geek to understand and enjoy *The Cuckoo's Egg*. Stoll shares with us some of his philosophy on computer hacking:

"Old style software wizards are proud to be called hackers, and resent the scofflaws who have appropriated the word. On the networks, wizards refer to these hoodlums of our electronic age as 'crackers' or 'cyberpunks.' In the Netherlands, there's the term 'computervrederebreuk'—literally, computer peace disturbance. Me? The idea of a vandal breaking into my computer makes me think of words like 'varmint,' 'reprobate,' and 'swine.'"

The book isn't just about computers, but is more about tracking down the mystery. Stoll gives us quite a bit about how the search affected his personal life: flak from his girlfriend about the nights he slept under his desk in the computer room, while waiting for the hacker to access the system; intimate moments interrupted by the hacker's log-ons; sanity maintained by cooking or sewing (one footnote gives Stoll's recipe for chocolate-chip cookies—it looks to me to be a minor variation on the venerable Tollhouse recipe); the unfortunate results of attempting to dry out soggy sneakers in their brand-new microwave oven.

The Cuckoo's Egg isn't a textbook on computer security. Stoll first wrote a "dry, academic" dissertation on the incident, entitled "Stalking the Wily Hacker," which appeared in the May 1988 issue of *Communications of the ACM*. If you want all the nitty-gritty technical details, be sure to read it. And just a few months ago, the PBS television series "Nova" featured Stoll's story in an episode entitled "The KGB, The Computer, and Me." It was entertaining, but not nearly as satisfying as the book—so by all means, watch for the re-run. But instead of buying the video (if there is one), buy the book. Δ

Tom Gutnick writes (preaches?) frequently about computer security and other system issues. Having worked with Data General systems for more than 12 years, he is currently a systems engineering consultant in Data General's Eastern Technical Services and can be reached at Data General Corporation, 7927 Jones Branch Drive, Suite 200, McLean, Virginia 22102; 703/827-9600.

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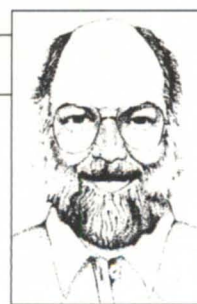
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Infos pitfalls

SYNOPSIS

There are many fine-tuning issues involved in building and managing your data base with Infos. This versatile system has, if anything, too few restrictions. There's a strong temptation to overindex. And be careful about duplicate keys.
Part 1 of 2.

:INFOS:AGAIN

The subject of Infos seems to be a persistent one lately. Last month, I demonstrated how to minimize the overhead associated with periodic checkpointing of Infos data bases. This month, I'm going to cover some basic Infos file design guidelines.

After seeing a few thousand Infos data base designs, including a large number of extremely bad ones, some clear trends start to emerge. This month I'm going to list some of the most common mistakes. Perhaps you can learn something that will save your bacon when it comes time to design your next Infos data base. It may even be enough to cause you to do some re-design of your existing data bases to gain a significant performance improvement.

Before we get started on this, I'd like to say a few words about Infos itself.

Infos is often criticized as inefficient. My personal opinion is that, 15 years ago, Infos was the most highly optimized hierarchical File Management System (as opposed to DBMS) available from any computer manufacturer. Since that time, Infos has suffered a bit at the hands of maintainers and porters, and it has enjoyed an occasional recovery from the damage done (e.g., Infos II rev 5.00). The Infos we use today is no match for its assembly language granddaddy in terms of speed, but it compares favorably with the FMSs offered by other manufacturers. And it runs circles around any DBMS that I know of, especially relational ones. Now, that's an unfair comparison because a DBMS is clearly in a different league than an FMS, but there are an awful lot of applications that don't need a DBMS. In those situations, Infos is the ideal solution.

Before all of you ICobol fans fill my mailbox with anecdotes about how ICobol's Minisam files outperform Infos, let me surrender gracefully. Yep, Minisam files are faster for the trivial case of single

key ISAM or multiple alternate key ISAM (a la ANSI Cobol). But this comparison is just as unfair as touting the speed advantage Infos has over a DBMS. Each time you add a feature, such as partial records, variable-length keys and records, compressed keys and records, space management, logical local/global deletes, and checkpointing, you can't avoid taking a speed hit.

In fact, if Infos has any problem, it's not that it has too many features; it's that it has too few restrictions.

:INFOS_BASICS

OK, now that I've defended Infos more than necessary, let's take a look at some basic design principles that will result in an efficient (i.e., fast) and practical data base design.

Infos is like a crate of Soviet AK-47 assault weapons mixed in with the contents of a Sears professional toolbox

There are a lot of fine-tuning issues associated with Infos, such as volume element sizes, customized root node page sizes, when to use multiple-index and data base volumes, and such. I'm going to ignore all that stuff here because if your underlying index and data base design is stinko, then all the fine-tuning in the world isn't going to solve your problems.

It's also true that the speed of various Infos operations is a function of the index size. For example, random writes start out very fast when the index is nearly empty, and then eventually become a linear, low-slope function of the index size as the index grows. That's all well and good, but

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what we're more interested in here are simple ballpark values, so I'm going to ignore size considerations.

I'm also going to deal mostly with the CPU cost of each operation. That's because CPU is often the limiting factor in most Infos operations, especially night-time batch runs when most of the index is sitting in the shared page cache. Actual elapsed times will be somewhat longer,

depending on the amount of physical disk I/O that occurs.

:WHAT'S_IN_A_RECORD?

As I alluded to above, it's the lack of restrictions that get most Infos data base designers into trouble. In many ways, Infos is like a crate of Soviet AK-47 assault weapons mixed in with the contents of a Sears professional toolbox.



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The one "feature" that has caused more problems than any other is: Infos does not require that the key be contained in the data record. ICobol's Minisam is just the opposite; it requires that the key be in the record, and at a fixed offset into the record. That means recovering a Minisam data base with a corrupted index file is a piece of cake. There's even a standard utility provided to do it for you: REBUILD. No such standard utility is even possible for Infos.

But all is not lost. If you follow the lead of Minisam and make it a design criteria in your shop that all records contain enough information to re-create the index structure for the record, then it's possible to create a relatively simple and efficient procedure for re-creating the index when the existing index becomes corrupt.

Having an index that is a large percentage of the data base size, or even exceeds it, is sort of like the Library of Congress being filled to the rafters with card catalogs, and having the books stored in a small shed out back

Unlike Minisam, which requires that all records be the same size, Infos allows variable-length records. That means that in addition to storing the index information in the record, you've also got to either store a record type indicator in the record, or have unique record lengths for all record types so you can infer the record type from the record length. I prefer the former method, and I use a single alpha character in the first position of the record to indicate the record type. This allows me to implement a defensive programming strategy to detect when records have been written with an incorrect record length.

:TO_INDEX_OR_NOT_TO_INDEX :THAT_IS_THE_QUESTION

The second most common mistake made when designing Infos data bases is the

excessive use of subindices.

Whenever you're tempted to include another subindex in the design, ask yourself some questions:

Is this subindex really required to support the on-line operation, or does it exist just to avoid a select and sort operation during batch runs?

If the subindex is used during on-line operations, what percentage of accesses involve using it? Does it just exist to support rare cases where the operator doesn't know the primary key?

If you answered yes to either of these questions, then the subindex is probably not required. The additional overhead required to maintain subindices is significant enough that they should be added only under duress and when you can demonstrate that they are less expensive in space and CPU time than alternative methods.

The temptation to overindex a data base is quite compelling. Management loves to see flashy demos that can access a record by a multitude of keys, but management isn't around on the weekends when the same data base consumes prodigious amounts of CPU to accomplish batch processing.

A good test to use in detecting whether or not an existing data base has an overdesigned index structure is to compute the ratio of the index size to the data base size. Better yet, express it as a percentage—only bookies and racetrack addicts are comfortable with ratios. Anyway, divide the index volume size(s) by the data base volume size(s) and see what you come up with. If you get more than about 25 percent, chances are good that your index design has an excessive number of indices. If you get more than 50 percent, you are in need of serious help.

Having an index that is a large percentage of the data base size, or even exceeds it, is sort of like the Library of Congress being filled to the rafters with card catalogs, and having the books stored in a small shed out back. In this case, the index cards clearly have way too much information on them.

Another test for an index with excessive subindices is to count or estimate the number of individual subindices. If you're not sure, try running IVERIFY on the data base and check the output to determine the number of index subindices. If the number of subindices is more than a

handful, you've probably got an excessive number of subindices. If it's hundreds or thousands, you've definitely got a problem.

A good example of a trap that's easy to fall into with subindices—especially if you've taken the Infos class given by DG's Ed. Services—is the case of handling things like purchase orders. In one system I saw, purchase orders were handled using a

three-level index: a selector index at level 0, purchase orders indexed by customer number at level 1, and purchase order line-item records indexed by line-item number at level 2. The resulting index had as many subindices as there were purchase orders (clearly more than a handful). And most of these subindices end up with only a handful of keys in their root node, resulting in a lot of unusable space.

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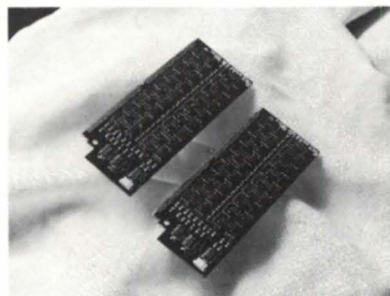
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A better approach is to append the line item number to the purchase order number to produce the key, using a line item number of zero for the purchase order header record. This trick has little effect on the programming effort involved, but results in a dramatic reduction in the size of the index compared to the data base by eliminating as many subindices as there are purchase orders, and the resulting large amount of unusable (wasted) root node space.

Another sure-fire indicator of a poor index design is a subindex that is created as part of a batch run, and then deleted when the run is complete. The correct procedure to use in this case is to write the records involved—or better yet, adjust the fields needed to a flat file, which is then SORTed before final processing. Flat files take a lot less time to delete than entire subindices, and they don't cause a fragmented index volume.

:DUPLICATE_KEYS

One of the best-kept secrets about Infos is how poorly it handles duplicate keys when the average number of duplicates is large. I've got at least a hundred horror stories involving misuse of duplicate keys, but the best one involves a system used to keep track of parking tickets in a certain Middle Eastern country that shall remain nameless. In this particular country, the most common license plate number was "NONE", so ticket records were indexed by both plate number and the vehicle registration number (displayed inside the front windshield). The data base contained several hundred thousand ticket records, and those with a plate number of "NONE" numbered in the tens of thousands.

Occasionally, someone would show up to pay off a ticket. The data entry clerk would then locate the ticket by either the plate number or by the registration number, depending on which one was not "NONE". When the operator went to delete the record, the system would lock up for about 20 minutes; zero idle CPU, disks emulating Maytag washing machines, and all other terminals accessing the data base would go dead, although non-Infos users and other Infos users not using the same data base would be relatively unaffected. Finally, at the end of 20 minutes, everything would return to normal.

What happens is this: Infos stores duplicate keys together and assigns each

new one that's introduced an "occurrence number." When you go to delete a record via the duplicate key, you are required to supply both the key and the occurrence number. The original designer of Infos never envisioned that someone would store hundreds or thousands of duplicates for a single key, so his approach was to position to the first occurrence, lock the entire index, and then read sequentially forward, looking for a matching occurrence number before doing the delete and unlocking.

In retrospect, a better design would have involved carrying the occurrence number along as part of the key, but visible only to Infos. But even that's not the best solution.

The perfect solution is to *not* index the record by the "NONE" key at all! Unlike ICobol's Minisam, only one key is required to write a record with Infos; the rest are optional. In the case of our Middle Eastern friends, the solution was to check for a plate number of "NONE," and in that case just write the record by the VRN number key and skip the inverted write of the plate number key. And vice versa if the VRN was "NONE" and the plate number wasn't. If both were "NONE", then the guy who wrote the ticket needs a day back in traffic cop school.

Think of it this way: each key in the index costs, and therefore it should pay its way (i.e., be of some use occasionally). Thousands of duplicate keys named "NONE" contribute nothing other than symmetry with the VRN index. In fact, they are simply a gigantic waste of index space and get in the way of "real" keys, making the entire index less efficient.

I've run out of room for this month, so next month I'll cover some more Infos topics like feature costs and key efficiency, and give you information to test your own system. Δ

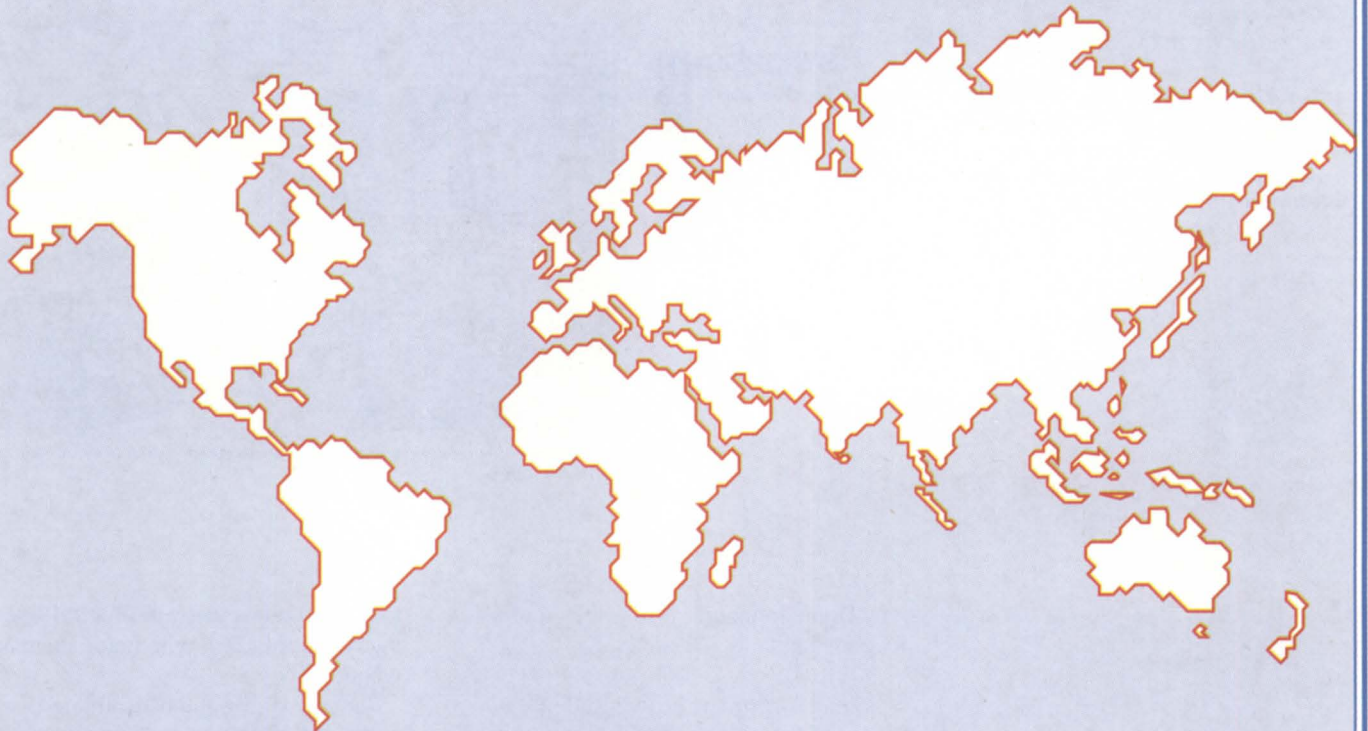
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A better way to run your jail

SYNOPSIS

Video imaging of inmates and computerized record management represent improvements through technology for jails and prison systems. Government and private enterprise in Canada's British Columbia teamed up to market a software that seeks to become tomorrow's correctional institution standard.



Inmate video imaging system at the Fraser Regional Correctional Center, British Columbia.

Photo courtesy of OCS

by Doug Johnson
Focus staff

The new inmate scowls sullenly into a video camera while a computer operator nearby checks the man's real-time face on screen. Seconds later, a keystroke freezes the image and saves this electronic mug shot instantly into the prisoner's permanent record. The record also becomes part of a much larger shared correctional facility information network.

He will never miss a court date. A sophisticated record management system tracks such scheduled events throughout his prison stay. It calculates sentence length and release date, tallies his allowed visits, coordinates cell locations, and oversees ongoing administrative tasks. The computer system maintains an inventory of the inmate's personal possessions, trust accounts, and pertinent medical data. All of the prisoner's records are available in an integrated report—but only to those with proper authorization. Records are immediately updatable, but all changes

footnote themselves automatically, taking down the ID of who made them and when.

Video imaging and consolidated, computerized record management are the future of inmate processing and administration for jails, prisons, and other correctional institutions. It is merely the everyday present, however, in the Canadian province of British Columbia. And it may become the future for jails and prisons elsewhere in Canada, in the United States, and around the rest of the world, through an innovative agreement inked last fall that teams government with private enterprise.

British Columbia owns CARE (Corrections Administration Records Entry), a computer system it saw the need for developing 15 years ago. Olympic Computer Systems of Vancouver is the marketing partner. Under their November 1990 agreement, OCS pays the province for international marketing rights and agrees to return 20 percent of sales revenues to the B.C. government over the

next five years. Also as part of the arrangement, the Corrections Branch of the B.C. Ministry of Solicitor General receives free CARE software enhancements.

Vice President Floyd Sully, of OCS's Government Services Division, calls the agreement a "zero-cost program" for economic development. "Since all costs incurred by the government would have otherwise been incurred to meet their own needs," he says, "there is no additional cost on the part of the government to foster this type of development."

CARE was developed originally for the B.C. government by Syscon Technologies Limited of Richmond. Programmers initially wrote in Cobol on the IBM 8100, using ISAM file management. Three years ago, the system was converted to run on Data General's Eclipse MV series. The Cobol code was ported into the DG environment, with Oracle brought in to be the file management software.

OCS, which became a publicly traded company in July 1990, purchased Syscon in September that year and took over CARE's future. "We are now moving the system to an Oracle and Unix environment," says Sully. The British Columbia correctional system maintains its IBM 8100 equipment, but has begun a systematic changeover to Data General. Replacement is about 50 percent complete, according to Sully, with all 8100 equipment due for phase-out by March 1992.

Starting from scratch

The process that resulted in the CARE system began in response to worsening problems with information management. Records offices possessed thousands of paper files, but access and organization of that system was unequal to the task of administering most aspects of inmate life. Numerous legal and policy related requirements—keeping track of a prisoner's physical location within the correctional system, scheduling court appearances, and standardizing sentence calculation—were not being fulfilled. Inmates could get virtually no information regarding their own status. Prisoner grievances mounted. Reports and financial statements from one department were generally unusable in another.

"Most of the printouts were not information, but data pollution," says Steve Fader, OCS's director of public relations. He was part of the original government

research group that set about finding a solution. "I was employed in the Department of the Attorney General," he says. "At that time there was a crisis in our computer system." As Fader says he regarded it at the time, "We have to design a new computer system from scratch. This one (an earlier system installed in 1972) is junk."

In May 1976, the Justice Information

System Division of the Attorney General's Department, along with the British Columbia Corrections Branch, produced a report entitled, "A Corrections Information System Plan." It launched the designing project ACCESS (Automated Corrections Client System), the prime goal of which was to implement an efficient, operational computer system for the B.C. Corrections Branch. CARE took shape over

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a four-year period, with some 25 programmers working on the project.

CARE and COPS

British Columbia correctional facilities saw their first CARE installation in 1982. Today, there are 44 institutions directly using CARE. The system's main modules govern booking and custodial functions, warrants, sentence administration, case management, and double-entry trust accounting. The major goals are data accuracy and instant information retrieval.

An optional CARE interface links a correctional facility's records to a centralized, supervisory archival case-history file system. The video-imaging system used in booking new inmates is an optional interface called the Corrections Offender Photograph System (COPS), which stores images easily and defers printing of a copy until one is needed.

Gone are the antiquated tools of yesteryear and, in some cases, yesterday: typewriters and correction fluid; Polaroid cameras and not-so-instant film; rejected

shots of inmates with closed eyes; hand-written, ink-splotted prisoner log books. Such tools produced records readily accessible only to those working within reach of the filing cabinet—records corrupted with the inevitable errors and inconsistencies associated with redundant data re-entry.

"For the officer or clerk, the CARE system offers better quality of information with less effort involved," says Sully. "No more running for court lists, visit schedules, and inmate files. No more calling the business office to find the balance in an offender's trust account."

Higher-quality information means fewer errors "and a more secure environment for the officer," says Sully. CARE tracks inmate medical history, for example. "Officers also report that the introduction of CARE has provided them with administrative tools that are more consistent with the environment in the rest of the world. As such, their career mobility is enhanced by use of the CARE system. They have be-

come computer literate."

Security for a security system

According to Sully, CARE's advantage is its comprehensive management structure. "If you have the authority to access the information, then it is there on the screen." That its own strong points are not taken advantage of, it follows that security of the system itself and controlling user access are top priorities.

"Certain of the data is quite sensitive, obviously, within the correctional setting," says Sully, "and one of the major advantages of the system is it has allowed us to secure information better from incidental abuse, [such as] where papers are left lying out and someone sees something about an inmate incidentally." Information about an inmate's financial status is closely guarded, says Sully, "for fear that other inmates, if they find out that he's got a significant bank account, would put pressure on him."

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ers granted varying levels of security clearance. Even prisoners use the system. "One thing that would probably be surprising to a lot of people," Sully says, "is that we're so confident of the system's security that we actually have terminals in the [inmates'] living units." A nearby corrections officer controls the area around the computer desk, but "those terminals are permitted only for the most cursory of information, so that even if an inmate did get control of a terminal, he's not going to see anything that we wouldn't mind him otherwise seeing anyway."

Audit trail tracking looks for unauthorized record changes. "We have the usual procedures for date stamping and recording the user ID of the officer who changed [something]," Sully says. "So if someone wants to let his buddy out of jail, by going in and changing a release date, we know his user ID was used to update that record the last time."

With COPS at the front end recording faces and even identifying marks such as scars and tattoos (plus imaging valuable personal possessions), and CARE handling administrative duties from beginning to end, jail and prison staff manage a more efficient workflow. "Because that's one of the highest-risk areas of a prison, when you've got a new person coming in off the street and you've got to book him," Sully says. Bookings before COPS and CARE took anywhere from 15 to 45 minutes using typewriters and Polaroid cameras. "With the CARE system, you can sit down and book an offender in five minutes and have him photographed and out of there. That kind of efficiency really helps you to keep the inmate moving, before he's had a chance to figure out what kind of disruption he's going to make in your booking area."

The future: CARE and DG

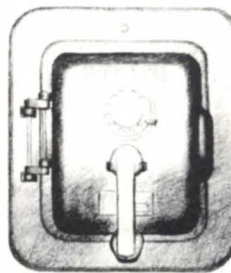
Although OCS's development plans have British Columbia prisons switching over to the Data General MV series, "the DG Aviion family will be the platform of choice for development and implementation of the CARE system in the future," says Sully.

The decision to move toward the Aviion's open system architecture, Sully adds, "is a decision which we have taken after review of what we believe is the future direction for major system development by American governments. The

B.C. government has made it a condition of the agreement of sale of CARE that we undertake this development and complete it by the end of 1991." Then the B.C. government will have for itself the option of acquiring the Unix-based product. "It is our opinion," Sully added, "that the Aviion solution will be a less expensive offering than the MV series of equipment that we are presently utilizing."

Whether or not CARE is the specific system to end up serving as a prison industry standard, something like it will be used everywhere eventually because the system and the ideas behind it simply make sense. OCS is working to become the supplier of choice in a field where, in the past, most jails and prisons simply developed their own computer systems—and lived with the results. △

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In control

by Steve Beste and Guy Sutton
Special to Focus

Rev 6.00 of Infos II introduces many new features and options to a well-established product. The enhancements are rather extraordinary.

The Infos II buffer manager—that part of Infos II that allocates and manages memory—has been redesigned. It allows for significantly faster checkpoint performance as well as improved data sharing among Infos II users. We have also introduced switches for the Infos II startup command line that you set to “configure” your Infos II system.

Previous Infos II revisions depended upon the operating system to read data into memory, manage the data in memory via the system LRU, and finally write the data back to disk. This method imposed memory management and performance limitations upon Infos II itself that could be lifted only by moving this functionality from the operating system to Infos II.

With the new Infos II buffer management, *you* define the limitations you wish to impose on the Infos II system. *You* determine the maximum amount of system memory or “slots” you would like to allocate for Infos II. *You* restrict the amount of Infos II users that can access data at one time. And *you* require that all allocated memory remain resident, to prevent any page swapping during Infos II operation. Each one of these decisions, previously left up to the operating system to manage, is now yours. In this way, you now have the ability not only to assign system resources for Infos II and any dependent

applications, but also to affect directly the performance of Infos II and these dependent applications.

The pool of memory you assign to Infos II is divided into three sections. The External Structure Global Buffer file contains data used by Infos II to manage the user environment. Infos II must keep track of who is using Infos II, which files they have open, what operations they are performing, where they are positioned in the file, and more. The Small Page Global Buffer file contains data for any open data base that has been defined (at creation time) with a page size of 2,048 bytes, while the Large Page Global Buffer file contains data for an open data base that has been defined with page size of 4,096 bytes.

In each case, when Infos II users make requests, the data is held in this common area to be processed. Should your application use one page size but not the other, you may then choose to save system memory when you bring up Infos II by *not* allocating any space for the unused page size slots. On the other hand, if your application should make use of data bases defined with both large and small page sizes, you determine how much memory should be allocated for each global buffer file.

Because small and large page buffer files are common, the data contained in them is available to any Infos II user. A data record one user is about to read may already have been read from disk earlier (and kept in memory in the appropriate buffer file), thus eliminating a disk I/O operation. Prior to Infos II 6.00, each Infos II user had a small shared memory window that was used for accessing Infos II file data.

Here’s an analogy: if you have to pay for the gas, wouldn’t you rather drive the carpool van than give everybody gas money to drive individual cars? The principle is the same in Infos II revision 6.00, because now you have the ability to reduce the amount of disk I/O by configuring the system with switch settings that allocate only as much memory as you

SYNOPSIS

Infos II rev 6.00 has a host of new and improved tools—faster checkpointing, improved buffer management, powerful operator commands and utilities, versatile programming interfaces—that will put you in control of your Infos II system.

think your total Infos II user community will need. The more data shared in the global buffer files, the greater the chances that users will be able to satisfy Infos II requests without incurring disk I/O.

It is clear that controlling the size of these common buffer areas is important. If the demand by user requests for space in the buffer exceeds the size of the buffer, additional I/O operations will be required to fulfill the Infos II requests. On the other hand, if the buffer size far exceeds the demand for space in the buffer, then memory will have been wasted.

Three operators

To this end, revision 6.00 includes three new Infos II operator commands that allow you to analyze and control the Infos II system environment.

The Infos II Monitor operator command allows you to watch the Infos II system at work. Updating the screen in real time, the Infos II Monitor provides information on the three global buffer files, on various lock collisions, and on the Infos II request rate (including the number of current requests, the average number of requests, and the peak number of requests since Monitor was started).

Because the Infos II Monitor displays data per cycle as well as total data accumulated, you can study both the rate and the number of global buffer file read and write requests, as well as view hash chain and LRU statistics for any of the global buffer files. Information for a number of internal locks can also be used to understand better the Infos II environment and its dependent applications.

Included with the Infos II Monitor is a document that not only explains how to interpret the monitor's output, but also gives you helpful hints for setting Infos II switches.

The Infos II Statistics operator command reports accumulated statistics for all Infos II commands. It has been enhanced to include the /PERFORMANCE option. This information can be displayed either as a raw total of Infos II requests (since Infos II was started or since the last STATISTICS command request), or as a snapshot showing how the values passed to Infos II in the INFOS_SWITCHES.CLI file are being utilized.

Finally, the Infos II Buffersize operator command has been added not only to allow you to display the buffer sizes you

have defined for the global buffer files, but also to allow you, under certain circumstances, to resize either the small or large page global buffer file dynamically after Infos II has been started.

Better checkpointing and more

For those users who run Infos II in standard file mode, listen up! For those users who run Infos II in differential file mode,

keep it up! Here's why: checkpoint performance has been greatly strengthened because of changes made in the checkpoint process and changes made in the Infos II buffer manager.

In previous revisions, multiple concurrent checkpoints would stack up one behind another like shoppers in the checkout line, with only one request serviced at a time. Now, in revision, 6.00, there are up

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to 12 checkpoint tasks available to perform multiple concurrent checkpoints in parallel. And with the changes made in the Infos II buffer manager, each checkpoint operation has the potential to move 130 KB with one system call, thus greatly reducing the number of system calls.

The INQUIRE utility, the tried-and-true data base query tool many Infos II customers use, has been given a much-needed facelift. INQUIRE has an expanded command set, including request group and multiple file processing. In addition, users can issue checkpoint requests from within an INQUIRE session. Other features include an ability to pop to the CLI, the removal of 16-bit restrictions, and an easier-to-read format (which includes displaying non-ASCII data symbolically, rather than literally).

New in revision 6.00 is the Common Programming Interface (CPI). This feature allows users to develop applications in C, PL/1, or Fortran, using a common set of routines supporting the entire Infos II command set (including

program-controlled checkpoints, request group processing, and Infos II statistics). Simply add the language-specific include file to a program that utilizes the CPI command set, include the icpi.lib file at link time, and you're set.

There are currently a number of programming interfaces for Infos II. With the CPI, you get the whole package with all of the Infos II features and enhancements you want, under one umbrella. And the CPI provides you with the means to cross-develop applications between MV and Aviion systems.

Released as a separate product and supported in Infos II for the first time with revision 6.00, the Infos Connection Server for Aviion allows applications written for Aviion systems that use the CPI interface to access Infos II data bases on MV systems via a TCP/IP network. Programs written on the MV using the CPI can be moved to an Aviion system, recompiled after making minor changes for a few of the Infos II commands, and executed.

Since revision 6.00 really begins a new

era in the Infos II product, both current and new users should take the opportunity to learn what this revision can do for them.

When you receive revision 6.00, read the release notice. *Please.* We've written this document to help you understand and implement the changes discussed in this article. A new revision of the Infos II System User's Manual, now called Infos II System User's Guide, is also available to answer questions and further your understanding of Infos II.

Finally, remember to customize your Infos II environment by editing the INFOS_SWITCHES.CLI file *before* executing the INFOS_UP.CLI macro. By using these tuning tools with care, you can tailor your environment, leaving you in control of your Infos II system. Δ

Steve Beste and Guy Sutton are both software engineers in the CSSD Infos II Development organization. They can be reached at 919/549-8421.

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Bits and bytes from the bulletin board

7.68 timing problems

From: John O'Keefe

[I have a] problem to report—Exec dying with the dreaded “have all users log off and terminate this exec” message when the CX CONTINUE (1 2 3 4) command is entered and a job is trying to start. It seems to happen when there is a job ready to go in the queue already when Exec first comes up. Maybe it's a timing problem, but pauses didn't do any good. Any ideas?

From: Doug Rady

There are known timing problems with the new multi-process Exec stuff. For most things like this, you need to break the CONTINUEs or whatever into separate requests, with a PAUSE of .5 or 1.0 in between.

Another alternative is to badger your local DG rep into providing you with the latest copy of Exec. For VS II this is rev 02.02.00.04, and includes replacements for Exec, XBAT, XLPT, and XMNT. There should be a counterpart update for VS Classic.

Note that the above-mentioned timing problems also apply to anything that is managed by one of the cooperatives.

6590 cartridge tape drives

From: Gail Heineman

I'm having trouble with a Model 6590 8 GB cartridge tape drive. I'm using an MV/9500 with AOS/VS 7.67. I can use DUMP_II and LOAD_II with it just fine, as well as COPY to and from it relatively small files. But when I try to COPY a large file (say 180 MB), I get a Timeout Error, Device 064 Unit 1, retries 00, Statuses: (varies). The device giving the error varies, too. It is *not* always the

drive I'm copying from. Anybody else have this trouble?

From: Brian Johnson

Your problem is simple: ?WRB uses a 16 bit block number, and when you write the next block after block number 65,535 it gets bumped to (you guessed it) 0. The time it takes the 8 mm to space-reverse to block 0 is nearly infinite, so AOS/VS times out. The solution is to use COPY/OMTR=32768 and check that no more than 65,535 blocks will be written by dividing the file size by the /OMTR= value to make sure. Later revs of AOS/VS I and II now include an option in the ?BLKIO packet (but not ?RDB/?WRB) to use 32 bit tape block numbers, but not much software has been modified to use it yet.

More on 6590 cartridge tape drives

From: Wendell Putney

We received a CSS2 with the 6590 tape and 6720 disk (1.0 GB) a few weeks ago. I called Atlanta to see if we needed to up-rev from VS 7.67, and I was told yes, we needed 7.68. So I followed their instructions and everything works fine! We use DBR dump/load, and it has some specific switches to use with the 8 mm tapes. Our only problem was the hardware documentation: it said the controller would *automatically* use device code 23 for the tape. It doesn't; the FE diagnostics must be used to tell the controller the device code. We back up 800 MB in about an hour and a half, at 3 a.m. while the whole DP staff is peacefully sleeping. I love it! I figure in a year or so, we'll be able to slide in a 5 GB drive for a couple of thou, the way things are going!

From: Tim Boyer

Wendell, have you noticed any difficulties dumping to multiple files (e.g., @MTD0:3) in 7.68? I'm getting timeout errors and runaway tapes that never showed up before.

From Wendell Putney

No, I haven't! In fact, the DBR method for allowing faster searches on the 8 mm cartridge divides up the dump into many files (18, for instance) since the 6590 can find files faster than specific data file names.

TCP/IP

From: Michael Small

We are considering purchasing TCP/IP for an MV running AOS/VS Classic. The product will be used mostly for file transfer to a Sun Sparc. Can anyone tell me how well the product behaves under Classic? Does it consume vast amounts of resources? Anyone having installed TCP/IP could advise on possible pitfalls or concerns.

From: Richard Kouzes

We've used TCP/IP for several years, and recently added a Sun Sparc 2 to our net. File transfer works fine and gives good transfer rates. Telnet service works, but there are severe restrictions on characters transferred, resulting in an inability to use editors like vi. Δ

Do you have an answer, comment, or question? Call the NADGUG/RDS electronic bulletin board, available to all NADGUG members. The phone number is 415/499-7628. There are no fees for use other than the telephone charges.

Taking wing with Pereline 3.0

by Kevin Danzig
Special to Focus

SYNOPSIS

Our reviewer expresses admiration for the soaring capabilities (and down-to-earth price) offered by the newest version of a DG terminal emulator that gets its name from a falcon.

Quite often the expression "out of the mouths of babes . . ." or for my purposes, "simple hints often lead to great ideas," is very true. In this case those who have dialed into BJ's SYSMGR BBS have seen the small recommendation to try a communications package with Data General terminal emulation called Pereline. About a year ago, I purchased a copy of version 2.4. I was and am quite pleased.

Pereline—the name, according to the authors, is derived from that of a peregrine falcon, the fastest bird, or for that matter the fastest animal in creation—is a communications program with a directory of frequently called phone numbers and settings for each entry, file transfer software, a few terminal emulations including Data General D210 and D211-type terminals, and a script language.

The earliest question regarding PCs running a terminal emulator was: why buy a PC for thousands of dollars and add to it the cost of software in the hundreds of dollars to pretend to be something that can be bought for under \$500, namely a Data General terminal? My work habits for the last 12 months and the metamorphosis they have undergone provided a very strong answer. Some of that answer shall be saved for a future time, but much of it is pertinent herein.

Firstly, what are the terms that can quantify and qualify an emulator? While speed may not seem to be an issue (especially to users confined to access over a slow dial-up line), for users working on high-speed direct connections emulation overhead can become apparent. Pereline, working regularly at 19,200 bps doing regular screen refreshes, has never shown signs of strain or overhead.

The next measurement tool is accurate emulation. Again, the screen images have excellent mapping. The third term is that of mapping a dissimilar keyboard, producing different codes to that of the emulated one. In that respect, Pereline 2.4 showed its only weakness to users of such programs as Wordperfect, Planperfect, and Office/Library on the Data General MV series of minicomputers. Pereline's "hot key" had always been the "home" key, moving the actual "home" key elsewhere.

Evaluation of the aforementioned section of a file transfer package, in this author's opinion, should be limited to the ability to support existing standard protocols as cleanly and neatly as possible. In this area, Pereline has always done very well. With a cornucopia of transfer protocols available, an additional proprietary transfer protocol must yield significant gains—something quite hard to accomplish today.

Pereline Data Systems has, in its rewritten release 3.0, not only corrected its small weakness but added significantly to a very complete communications/terminal emulation package. It added Dasher D410 emulation—a truly welcome addition. The keyboard was remapped so that even Wordperfect users will now find a totally transparent emulation. Included are additional standard file transfer packages and the ability to add others as "external protocols." However, this is more applicable to its use with PC BBSs than in the MV world. Lastly, it has added to and restructured its very powerful script language.

Backtracking to an earlier statement regarding a metamorphosis in my work habits, Pereline 3.0 has foreseen an opening that many people should follow. In the past year I find that I am more often offloading work from our MV to PCs. Our philosophy at present is to leave our MV as a data base handler running Infos II and compiled Cobol mixed with F77. Spreadsheets and large mailing merges with heavy text formatting are now done with relatively inexpensive PC resources. The final results are often brought back to the

MV, which acts as a print server.

Those requirements demand a quick, low-overhead emulator that can handle regular heavy file transfer to and from our MV. Pereline 3.0 not only excels at this but offers substantially more. Until now, transfers of data running at high serial speed would take up to two hours sometimes, and demand exclusive use of not only the attached con line but that of the complete PC as well. Pereline 3.0 offers the ability to run file transfers concurrently with either a second communications window, allowing a different connection, or even the ability to shell to DOS and run other outside applications as memory will allow. That is nice. Now, during a 20-minute upload or download I can still be productive without finding a new desk or keyboard. No, I won't be able to load a 2 MB spreadsheet and heavily massage it, but that is more a restriction of MS-DOS than of Pereline 3.0.

What else is there? The improved script language allows for automatic logon, uploads, and downloads with more options than I could probably describe in a manual twice Pereline's size. As in the previous revision, the manual is clear and complete. More importantly, the package is so user friendly that everything from initial configuration to complicated fine-tuning is integrated into pull-down menu after menu of crystal clear instructions, questions, and directions. For the more advanced, these may be bypassed with simple, easily learned keystrokes, many of which are the same as for Pereline 2.4. A small but functional file editor is included, as well as a file manager allowing for Pereline to be a program called upon boot on the PC and functioning as a shell for many users.

The biggest bonus is price. I seldom see anything of value under \$200 unless it is shareware or a utility package serving some small area of system tuning or performance. Pereline 3.0 is available as an upgrade to version 2.4 for \$30, or \$49.95 for first-time purchase. Talk about low overhead!

For more information, contact: Pereline Data Systems, 750 Camden Ave., Suite B, Campbell, CA 95008; 800/359-6612. Δ

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

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Network-based terminal emulation

SYNOPSIS

The array of available options can make the decision of choosing a network terminal emulator a difficult one. And the situation grows more complex each year. Here's some information to get you started in the right direction.

Every year about this time I get requests to explain the various options for PC-based terminal emulation for Data General systems, and every year, sure enough, the situation becomes more and more complex. I'd like to be able to tell you that there are better solutions to the same old problems, but new problems always seem to keep one step ahead.

The easy stuff

If you don't (yet) have a PC LAN (local area network), your choices are temporarily easy. When it comes to asynchronous terminal emulation, your biggest problem is just deciding which of the many emulators suits your fancy. Popterm, EMU, Smarterm, and a dozen others—they're all pretty good, but make sure you first get a demo to check out the peculiarities of the one you like.

When it comes to the networked environment, it's a whole different story. So much so that we'll concentrate on that segment for the rest of this month's column.

Worth a thousand words

Most of what I can tell you about LAN-based emulation options is contained in the table and flowcharts that follow. Let's start with the table (Figure 1). I've identified six basic schemes, numbered at the top.

The first is the virtual terminal emulation scheme used by Data General's DG/PC*I. While performance under AOS/VS II is much improved, it is still recommended only for occasional use. The overhead is high enough that you wouldn't want to use this for serious terminal-based applications. The only emulators that support this architecture are those supplied by Data General.

These same W4xx emulators are supported by the Netware Transports for AOS/VS (scheme 2). Performance under Netware is somewhat better than under PC*I and not as good as PC*I-II, but Netware for AOS/VS has the advantage of being able to share drivers and PC LAN adapters with native PC Netware.

Also offering concurrent Netware support, and the only scheme offering high-performance emulation under AOS/VS, is the use of XNS-based ITC or LTC controllers in your MV, or connecting an XNS Termserver to your IACs (scheme 3). The only emulators supporting this scheme are Popterm/410 and EMU/IPX.

Instead of using XNS software in your ITC, LTC, or Termserver, you could buy the TCP/IP Telnet code (scheme 6). While TCP/IP is about 30 percent slower than XNS, performance is still as good as a directly connected CRT with the same AOS/VS overhead. The only problems with TCP/IP are (a) poor compatibility in a Netware environment, and (b) the requirement for additional, sometimes expensive, TCP/IP and Telnet software on the PC.

Figure 1: LAN-based terminal emulation schemes

	1	2	3	4	5	6
Transport protocols	PC*1 ISO	Netware IPX	IPX or XNS	Netware IPX	TCP/IP	
Session protocols	Netbios WSVTA	Netbios WSVTA	3Com VTP	Netware NVT	Telnet	
Emulator software	Original WSTERM D210-D460	Netware WSTERM D210-D460	Popterm & EMU/IPX D210-D470	Popterm for NVT VT52-VT102	Various 3rd party emulators	
MV software required	DG/PC*1	Netware	none	X	TCP/IP	
MV hardware required	none	none	ITC/LTC or Termserver (XNS)	X	none	ITC/LTC or Termserver (TCP/IP)
MV performance	slow	slow	fast	X	slow	fast
Aviiion software	X	X	X	Netware	TCP/IP	
Aviiion performance	X	X	X	fast	fast	

"X" = incompatible

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THE WORKSTATION

Figure 4: Vendors and products listed in this column

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Netware for AOS/VS
Popterm/410 (IPX/XNS)
Popterm/NVT (Netware)
EMU/IPX

Persoft, Inc.

465 Science Drive
Madison, WI 53711
608/273-6000
Smarterm

Even after buying the transport and session protocols for your PC, you've still got to locate and purchase compatible emulation software.

In addition to the hardware-supported scheme, you can also connect a Telnet-based emulator to an MV using just AOS/VS Telnet software (scheme 5). TCP/IP and Telnet are much better performers under AOS/VS II than under AOS/VS Classic, but this is still a software-only approach that carries with it a great deal of overhead on these operating systems.

Unix

Things are much simpler for users of Aviiion and other Unix systems. Just compare the Unix flowchart in Figure 3 with that for AOS/VS in Figure 2.

Under Unix, there are only two choices. If you're using Netware on your PCs, go for emulators based on the Netware Virtual Terminal (NVT) protocol (scheme 4). The transport and session code for both sides comes with Netware for Aviiion; you just add an NVT-compatible emulator such as Popterm/NVT.

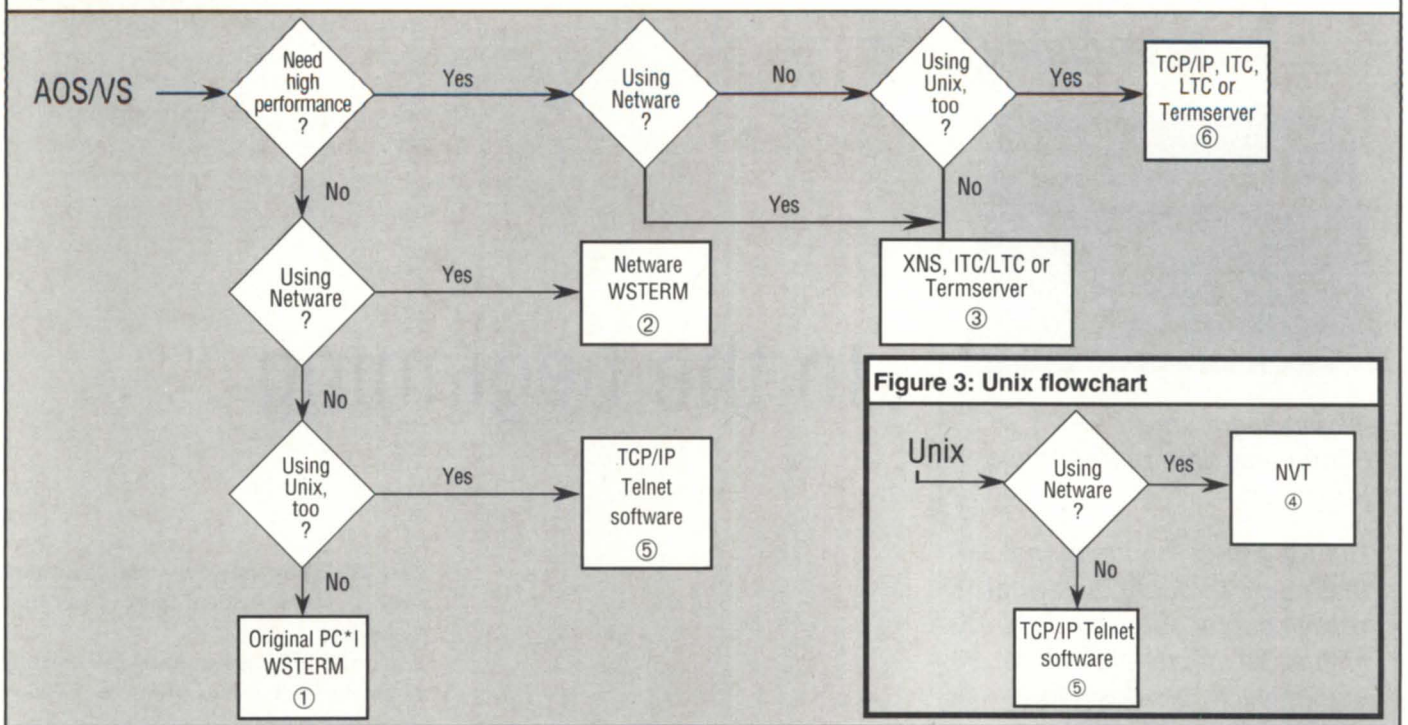
If Netware is not in your PC plans, go for scheme 5 again, the TCP/IP and Telnet path. While there is no hardware assist under Unix, it isn't really required. The substantially lower overhead of interprocess communications under Unix means that Telnet terminals or emulators are nearly as efficient as locally connected CRTs.

Decision flowcharts

There's obviously a lot more to making your emulation decisions than I can cover in this brief column. I've kept the descriptions to a minimum, hoping you'll concentrate on the table and flowcharts. Even then, these are just meant to get you started. Given the way things have been going for the past few years, it's a pretty safe bet you'll see an updated article in *Focus* just about this time next year. Δ

Doug Kaye is president of Rational Data Systems, Inc., and can be reached at 1050 Northgate Dr., San Rafael, CA 94903; 800/743-3054. This article is excerpted from the RDS "Report on PC Integration." For a free copy, contact RDS. Copyright 1991 Rational Data Systems.

Figure 2: AOS/VS flowchart



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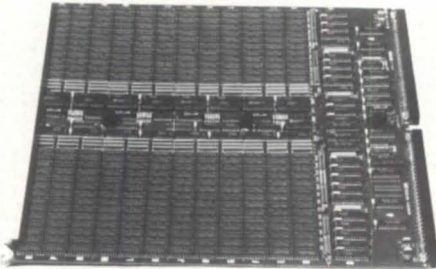
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SCREEN TEST by Tim Boyer



In the beginning . . .

an ICobol shop, however, and the report writing is what I spent most of my time reviewing.

In order to be able to use your existing files with the Genisys program, Genisys comes with a File Description Analyzer that will read record descriptions used by ICobol, Cobol, and PL/1, and automatically define the fields to be used. You simply need to tell Genisys what type of file it is and give the path for the .FD and data (.XD) portions. Genisys can read Infos, Minisam, or straight ASCII files (plus, of course, Genisys files).

Genisys is intelligent enough to read the header portion of the .NX file, and therefore doesn't need to prompt you to enter the key structure. Then, when selecting on fields that are already part of the index, Genisys uses the ISAM structure, and ignores it otherwise.

After the file is imported, you need to design a form that you will use with the file. Genisys could be called a forms-based system. Every action you take, from entry to editing, displays to reports, is based on a form that you design using an on-line screen painter. For my first try, I decided to create a report using my item file, and printing the item number, description, and YTD sales. The first step is to pick which data names to use. Here's where I ran into one of the few gripes. Genisys will display only the first 15 characters of a data item. It terminates items that aren't unique through the first 15 characters with a number. Therefore, most of my data items looked something like INVENTORY-IT101. For those of us trying to be clear and

SYNOPSIS

With its rich set of function key operations, impressive speed, and user-friendly attitude, Genisys is an excellent ICobol report writer—and much more.

I mentioned a few months ago that Denman Tire is a great place to work—if you like spending 50 percent of your time writing ad hoc reports. In search of the perfect data base/report writer, I took a look at Genisys from DMS systems this month.

Calling Genisys a report writer is rather like calling an MV/40000 a word processor—certainly it will *do* that, but just as certainly it's not *limited* to that. Genisys is designed to be a complete, fourth-generation language, with its own file layout, that can be used by anyone to set up data entry and report screens. The fact that it also happens to be able to import other languages, and thus makes an excellent ICobol report writer, is truly incidental to the main purpose of the program. This is

concise in our names, 15 characters just won't hack it.

In an attempt to remedy this situation, Genisys offers an option when importing files that allows you to ignore a prefix. If you have a whole .FD full of standard prefixes—as I do—you can strip them automatically. INVENTORY-ITEM-LAST-YEAR-SALES would become LAST-YEAR-SALES, CUSTOMER-PHONE-NUMBER becomes PHONE-NUMBER, and so on. This helps a lot, but I still have to wonder why we can't just have 30-character names, and avoid all of the manipulation.

Anyway, we were choosing field names. There are two basic methods of choosing names (or Genisys commands, for that matter). The arrow keys are the first method. The second is similar to AOS's minimally unique abbreviations. Given the following command menu, for instance:

ADD COLUMN DETAILED DISPLAY EXPORT
FORMS MODIFY PRINT REPORT SAVE SELECT

SORT USE . . .

typing an initial 'S' changes the display to
SAVE SELECT SORT

From there, pressing an 'E' would display **SELECT** only, and then pressing the space bar executes the command. Field names work the same way—pressing 'P' brings up **PRICE-1** through **PRICE-5** on the screen, and I can arrow key through them until I get to the one I want.

Incidentally, Genisys has a rich set of function key operations, just to make your life a little easier. For instance, the data names in Genisys are displayed in a four-inch by two-inch box at the top of the screen, which made me think that it would take a week to scroll through the 350 data items in my inventory file. Then I discovered the shift-C3 key, which gives you a whole screen at once—80 names at a time. *Much better.*

So you've selected the fields you want. Whether you want to print or display information, you still need to start off by

designing a form. There are two kinds of forms—column and detailed. A detailed form contains one record per screen (or multiple screen, up to 256 per form), and is mostly used for entering or changing data. A column form contains one record per line and is usually used to inquire or print data, which is what we want to do. Genisys's screen painter allows you to move fields simply by moving your cursor to the appropriate field, pressing the **MOVE** function key, and pressing **CR** when you have the field where you want it. Text can be added anywhere on the form, and you can decide how you want the data to display—underlined, bold, reversed, or blinking. You have as much control over the form as you would have if you had written an ICobol program to accomplish the same thing.

When you're ready to print, you can take advantage of some special print formats. You've got your basic edit fields (if you're a Cobol programmer, the field editing will look very familiar), and control
See Screen Test, page 44.



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Continued from page 41.

over the mundane items such as characters per line, lines per page, lines between records, and so on. You also have the ability to print page numbers and dates on the report, and can choose where on the page to put them. If you'd like something a little more permanent or more complicated, Genisys allows you to create and name reports. These give you much more flexibility than a simple printout. In Re-

port mode, you can derive fields and do counts, subtotals, averages, accumulations, and even standard deviation and correlations.

I simply included information in the file for this report, and asked for all of the records. Should I so choose, I have a complete string, mathematical, and financial function library that can be used to manipulate data. These range from substring

manipulation to date arithmetic, and from future value to hyperbolic tangent. I thought I did some strange things with a business language, but I'd love to find out who needed hyperbolic functions, and for what. In addition to deriving fields, you can also select records and fields to display or print using these functions, such as selecting IF TODAY GT DUE_DATE AND AMOUNT_DUE GE 100.

Of course, we all know that a generalized report writer like this is much slower than a 3GL, right? To test Genisys' speed, I ran a report that output the above-mentioned three data items for my entire item file. The program ran a 170-page report, reading more than 6,100 records, in less than a minute—58 seconds, to be precise. This is more than 100 records per second. Next, I tried a sort. Somehow, the sort was even faster, at around 160 records per second (it helps that Genisys is doing a sequential read of the .XD file, instead of using the ISAM structure—sequential reads are much faster than indexed). Don't worry about your system slowing down with *this* package! I've heard that one of the reasons for the speed is that the important parts of Genisys are still handcrafted in assembler.

It's difficult to describe a product this versatile in a brief article. I didn't even have a chance to touch upon searches—very quick, and it accepts wildcards—or linked fields, or the built-in security features. For that, you'll have to get a demo from DMS. Suffice it to say that Genisys is user-friendly, incredibly fast, and very flexible. It might even replace our current report writer—me.

The price for Genisys varies according to CPU and number of users. For more information, contact Sue Dintelman at DMS Systems, Inc., 1111 Brickyard Rd., Salt Lake City, UT 84106; 801/484-3333.

Odds and ends dept.

Well, it looks as if Data General has found a surefire way to make me quit griping about ICobol quality assurance. They made me a beta tester. Naturally, therefore, ICobol 1.60 will be the first bug-free release ever. I'll be taking a look at it in my next column. Δ

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

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Memory upgrades for DG Aviion and MV

Hopkinton, MA—New memory upgrades for Data General Aviion family workstations and MV series minicomputers are available from Clearpoint Research Corporation.

The DGME-A30 add-in upgrade for Aviion workstations and 3200/4000 series servers offers 4 MB and 16 MB densities. A DGME-AV1 memory board for the AV/5000 and AV/6000 series covers a range of densities, from 16 MB to 192 MB.

The DGME-15P and DGME-410 provide densities ranging from 4 MB to 32 MB, supplying the MV/20000, MV/18000, MV/15000, MV/10000, and MV/4000.

Clearpoint's MV series memory products are designed to use 75 percent fewer memory chips than their Data General equivalents, ensuring fewer alpha particle hits, improved reliability, and lower power consumption.

Using 80 ns DRAM technology, Clearpoint's Aviion and MV series memory promises faster cycle times and higher performance.

List price ranges from \$1,690 for the

DGME-410/4 MB to \$5,350 for the DGME-410/32 MB; from \$2,590 for the DGME-15P/4 MB to \$9,010 for the DGME-15P/32 MB; from \$780 for the DGME-A30/4 MB to \$5,000 for the DGME-A30/16 MB; from \$4,280 for the DGME-AV1/16 MB to \$51,310 for the DGME-AV1/192 MB.

Custom, host-level memory diagnostics are available for verification of memory functionality. Clearpoint offers a lifetime warranty on all memory products, along with a toll-free technical support hotline and a 24-hour replacement program.

Clearpoint Research Corporation, 35 Parkwood Drive, Hopkinton, MA 01748; 508/435-2000.

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Expanded memory for DG MV/9500

Boulder, CO—For increased performance and expanded memory on the Data General Eclipse MV/9500 computer sys-

The B52 is an aircraft well used to superlatives. Massively powerful, its versatility and adaptability have extended the B52's lifespan in an age when technology has outpaced most other weapons systems and has left them outdated almost as soon as they enter service.

Designed in the 1940's the B52's role in the inventory of the USAF has been projected to the end of the of the century—few aircraft will have proved so long lived.

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Hughenden House, Main Street
Collingham LS22 A4
United Kingdom
Contact: Tony Deakin
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tem, Western Automation announces the Acumen 9500 memory board.

Providing 8 or 32 MB of memory expansion and priced at \$2,490 and \$9,950, respectively, the Acumen 9500 is hardware and software compatible with the Eclipse MV/9500. The new board features four-layer circuit design and construction for high-speed performance. Technical support is available directly from Western Automation. The Acumen 9500 is covered by a five-year factory warranty with 24-hour turnaround on exchanges.

Western Automation Laboratories, Inc., 1700 North 55th Street, Boulder, CO 80301; 303/449-6400.

Circle 55 on reader service card.

New release of Disk Opt

Salt Lake City, UT—The newest revision of the DMS disk optimizer and man-

agement utility includes several new features designed to increase performance on almost any MV system, whether AOS/VS or AOS/VS II.

The new Disk Opt revision 1.11 for AOS/VS II includes automatic file placement, based on frequency of access, to speed disk performance—a feature previously available only on VS systems.

Disk Opt revision 2.40 for AOS/VS includes new calculations for automatic file placement. The new algorithm takes into account the number of file accesses, with three additional criteria: size of the file, the last time the file was accessed, and the last time the file was modified. The combination of factors creates a bias toward optimum placement for smaller files, and for files that are read more often than modified.

Several customer-requested changes have been incorporated into the new revisions of Disk Opt for both AOS/VS and AOS/VS II. File compression is an option for manual reorganization, and in hardcopy mode, "list files" is now avail-

able. Disk Opt also runs faster on all systems, both for analysis and reorganization.

DMS Systems, Inc., 1111 Brickyard Road, Suite 204, Salt Lake City, UT 84106; 801/484-3333.

Circle 51 on reader service card.

Maid for CEO

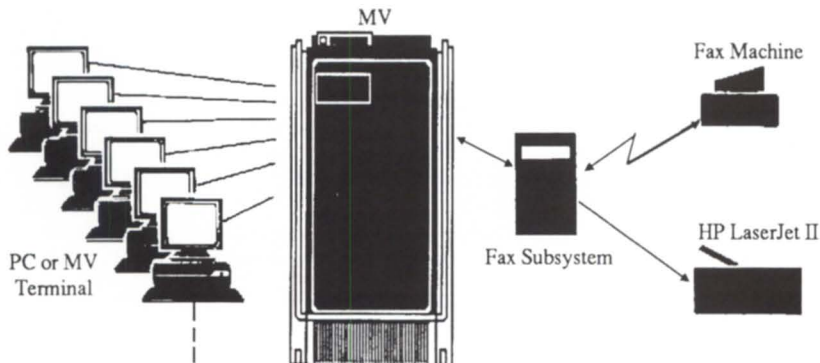
Salina, KS—A comprehensive set of software utilities for Data General's CEO users is available from Eagle Software, Inc. Maid for CEO enables system managers to increase performance, flexibility, and reliability of the CEO system.

Among the new product's features:

- deleting extraneous, orphan, or unnecessary files—in a large CEO system reclaiming as much as 50,000 disk blocks
- rebuilding CEO_INDEX (Infos data base used by CEO filing system) in one step to improve processing speed and reclaim unused disk space

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- moving CEO drawers no longer owned by the user who created them; drawer directories are moved to a current owner so that the correct user is accountable for disk space used by their CEO drawer
 - continued sending of CEO reminders and mail notifications to users' consoles when they are not in the CEO environment
 - finding and deleting CEO documents whose corresponding AOS/VS files do not exist; if the document is not needed, it should be deleted to reclaim the space it uses in the CEO_INDEX
 - reporting user-specified information about CEO documents; this information can be used to shorten the time required to recover documents from backups
 - finding structural faults in CEO_INDEX; problems with CEO_INDEX are located before they generate more corruptions.
- Maid for CEO prices range from \$850 to \$3,450, depending on CPU model.

Eagle Software, Inc., P.O. Box 16, 169 East Cloud, Salina, KS 67402-0016; 913/823-7257.

Circle 52 on reader service card.

Interactive graphics with SAS 6.07

Cary, NC—Release 6.07 of the SAS Applications System, demonstrated recently at the 16th annual SAS Users Group International (SUGI) conference, offers users a new level of interactivity with support for X-Windows-based graphical user interfaces (GUIs) and an interactive graphics editor. In addition, a new product, SAS-Insight software, will be available in this new release. Among other systems, Rev 6.07 supports Data General's DG/UX, running on Aviiion workstations.

The new graphics editor can be used to modify graphics output interactively. The editor enables users to zoom or resize displays, and move objects to foreground or background. Previously created graphs can be read in and linked to other graphs.

SAS/Insight software is an interactive tool for data visualization and exploration, enabling users to explore data through a variety of graphics displays including bar charts, scatter plots, and rotating plots. Observations are linked—changes to one graph show up immediately in all others. SAS/Insight offers

distribution, correlation, regression, and principal component analyses, each with appropriate graphs. The software is fully integrated with other SAS System modules. Output can be viewed from any SAS procedure; any SAS procedure can be used to analyze results from SAS/Insight software.

Additional capabilities of the SAS Applications System include data entry, retrieval and management, report writing, and graphics; statistical and mathematical analysis, business planning, forecasting and decision support; operations research, project management, and quality improvement; and applications development.

The SAS System is licensed on an annual basis, with fees based on the number and classification of workstations. A first-year license for single-user workstations begins at \$825. Renewals are available at lower rates. Discounts are available for degree-granting customers.

SAS Institute, Inc., SAS Campus Drive, Cary, NC 27513; 919/677-8000.

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Erdas rev 7.5 image processing

Atlanta, GA—An integrated image-processing software, Erdas revision 7.5, is scheduled for a mid-1991 release by Erdas, Inc. The new system on a variety of platforms, including Data General's Aviiion family, is an integrated, image-processing software used in urban and regional planning, natural resource management, oil and mineral exploration, the geosciences, and defense.

The new software offers data importation from raster, vector, and statistical packages; statistical filtering; output to color printers, digital film recorders, and electrostatic plotters; ASCII file transferral to and from data bases and spreadsheets; macro writing with Descriptor Script; region-of-interest mathematical operations defined by vector polygons; and a variety of fonts and user-defined line styles. Δ

Erdas, Inc., 2801 Buford Highway, Suite 300, Atlanta, GA 30329; 404/248-9000.

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Data Specific

DeCastro speaks

What do company founders do after they leave the company? Among other activities, **Edson D. de Castro**, Data General founder, and former president and chairman of the board of directors, is touring the U.S. to address a nonprofit organization of chief executive officers. De Castro, who resigned at the end of last year, has a fascinating story to tell. Known as a very private person, it will be interesting to hear how much the maverick entrepreneur reveals of his past experiences, and of his future plans.

De Castro will speak at the May meetings of CEO Club chapters in New York, Chicago, Boston, Washington, D.C., and Pittsburgh, and at the September meetings of chapters in San Francisco, Los Angeles, and Dallas. The cost to attend, including lunch, is \$150. For more information, contact **Joe Mancuso**, president of the CEO Clubs, at 800/247-7642 or 212/633-0060 (in New York).

International news

International sales account for approximately one-half of Data General's annual revenues. Here's a wrap-up of some of Data General recent international deals.

The government of **Argentina** purchased approximately \$900,000 worth of Data General Aviiion, MV, and Dasher computers. The systems will be used to support administrative and community services in a provincial development project, part of the United Nations Development Plan.

The **Borough of Calderdale** in the United Kingdom purchased approximately \$330,000 worth of Aviiion servers for use by the town's social services department. The Aviiions will run Uniplex business software.

Leicestershire Libraries and Information Service will replace its Unisys mainframe computer with an Eclipse MV/20000 dual processor system. Using an ethernet X.25 local area network, the sys-

tem will connect more than 200 terminals at 30 locations. The system was sold through BLCMP Library Services, a DG value-added reseller.

Hitachi Zosen Information Systems (HJZ) in Japan recently placed a \$5 million order for 200 Aviiion workstations and 5 Aviiion servers. HJZ is a VAR specializing in computer-aided design (CAD) applications for use in shipbuilding, machinery design, metal mold design, and solid molding.

One of Japan's largest independent distributors of office automation, **Ootsuka Shoukai**, added Aviiion servers to its line.

Data General scored a major win in South Korea with the purchase of an MV/40000 HA2 with an MRC subsystem worth \$1.5 million by **Dankuk University**. The university chose Data General after a two-year evaluation process that included competition with **Digital Equipment and IBM**. The system was sold by DG's South Korea distributor, **Zungwon Systems**.

First-day orders for DG's new 117-MIPS Aviiion computers included a sale to the **Odessa Shipyard** in Denmark.

User notes

Worth the drive

With the slogan "It's worth the drive," the **Data General Users Group of Indiana (DGUI)** hopes to attract DG users from Illinois, Ohio, and Kentucky, as well as its home state to the organization's first regional conference. Modeled in part after NADGUG's national conference, the meeting will offer a keynote speaker, workshops, lunch, and a closing reception. **Dr. Georgia B. Miller**, dean and director of the undergraduate program of the **Indiana University School of Business**, will give the keynote address.

For more information, see the RIG/SIG gigs calendar on this page, or call **Nancy Miller**, DGUI president, 317/253-1711. Speaking of driving, the Indianapolis 500 takes place in May, Miller says, so attendees may wish to schedule a day at the track after the DGUI conference. Δ

May 14, 1991

LA Edge Hardware and Software Expo
Location: Brookside Country Club
Contact: Mark Speer, 818/897-7777

May 17, 1991

DGUI conference (DG users of Indiana)
Location: Quality Inn East, Indianapolis, IN
Time: 8 a.m.-5:30 p.m.
Description: The theme of the conference is "Maximizing the potential." Speakers include Tyce McIntosh, Compusystems, Inc. ("What did my MIS manager just say?"); Nancy McRae-Case, Analysts International Corp. ("Stabilizing the standards"); and Mark Langner, QIS Enterprises ("Resource management under AOS/VS.")
Cost: \$35 before May 3, \$45 late registration; continental breakfast, lunch, and reception included.
Contact: Nancy Miller, 317/253-1711

RIG/SIG gigs

MAY/JUNE

June 9-12, 1991

LEDGUG workshop (Law enforcement DG users group)
Location: Inn in Aspen, Aspen, CO
Description: With an overall theme of high-tech policing, topics will cover word processing, digital photo imaging, E911 systems, and more.
Cost: \$125 (includes one-year membership to LEDGUG)
Contact: John Myers, 319/291-2557

This calendar is for notices of regional interest groups (RIGs), special interest groups (SIGs), and NADGUG events. If you would like your group's meetings posted here, please send a notice to *Focus* magazine, Livingston Building, Suite 250, 3420 Executive Center Dr., Austin, TX 78731; fax 512/343-7633. We must receive your notice by the 5th of the month, two months prior to the actual event.

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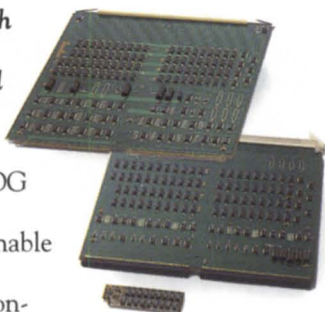
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The Clearpoint Team!

Clearpoint proudly introduces memory for Data General's MV and AViiON families, the first of our commitment to a comprehensive Data General product line. Our DG design team backs each product with over 100 years of Data General engineering design experience.

Our aim is to provide DG users with unparalleled performance at a reasonable cost. Commitment to new technologies and on-going product support have made Clearpoint the leading supplier of add-in memory for DEC, IBM, HP/Apollo, Sun, Compaq, Macintosh, and now Data General systems.



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Clearpoint's DG memory products are supported by • a lifetime warranty • 24-hour repair/replace • round-the-clock technical support • world-wide spares depots

Clearpoint's lifetime warranty is offered with confidence. To insure reliability, rigorous testing is done on each board throughout all stages of production. Clearpoint's Universal Memory Tester (UMT), a microprocessor-based computer, runs an individualized DG bus translator to access bit-specific diagnostic tests.

Call or write to receive information on Clearpoint products for Data General systems.

- Product Specification Sheets
- Clearpoint's 1990-91 Product and Services Catalog
- The Designer's Guide to Add-in Memory*, an 80-page text on issues of technology and reliability
- Commitment to Quality*, Clearpoint's QA procedures.



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