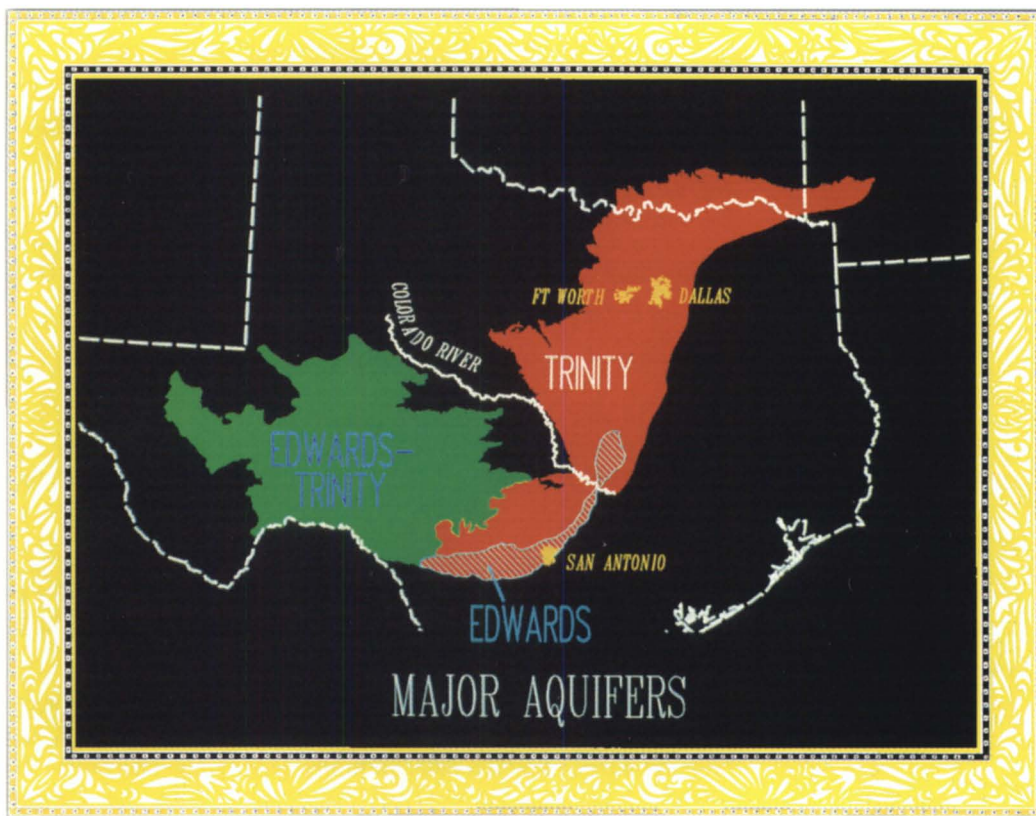


April 1992

FOCUS

The Magazine of the North American Data General Users Group

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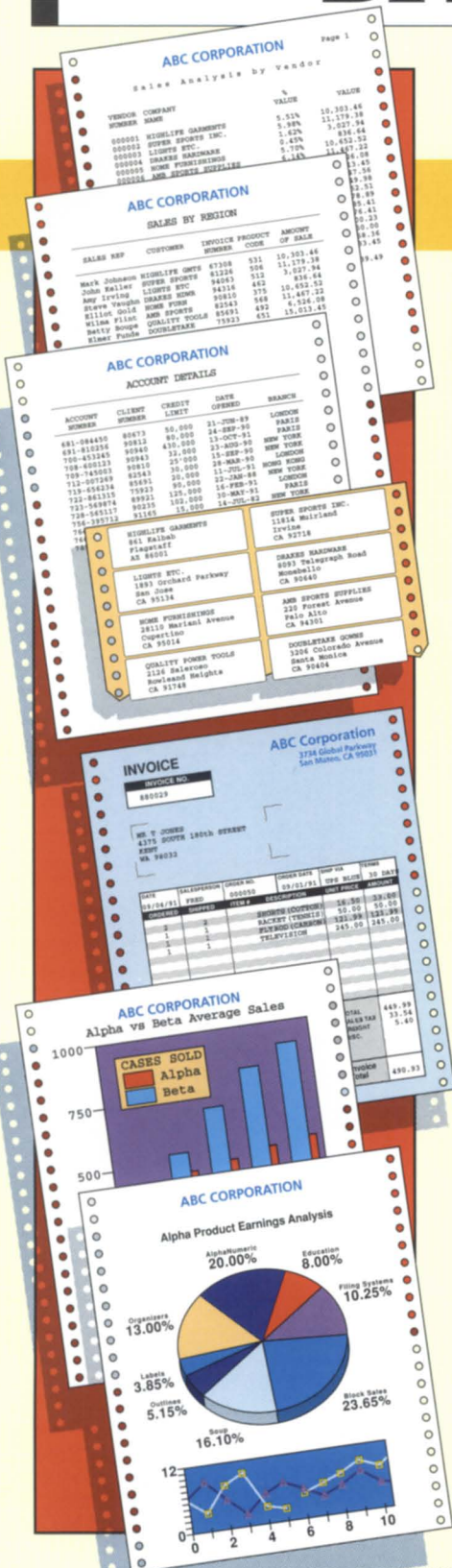
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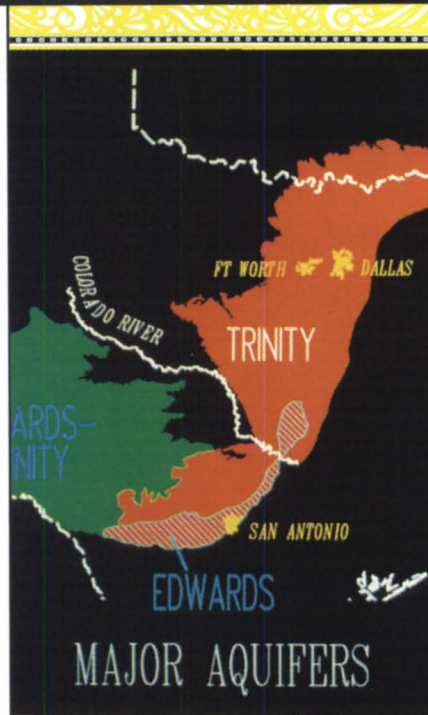
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Uninterruptible power supplies have become a necessity.
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Computer equipment fares rather better than
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It's easy to be green

by Robin Perry • Focus staff

From my second story office window I can see the green fuzz on trees beginning to bud in the neighborhood across the freeway. We've finally gotten a break from all the rain, and today is one of those warm, bright spring days when I yearn to be outside enjoying nature.

For most of my life, I took nature for granted. I assumed that beautiful clear days like this would always come along; that nature would provide more sunny days than unpleasant ones. I tend to have that outlook on life in general. However, in recent years I became aware of how my way of life is harmful to the environment. It doesn't make sense for me to destroy what I love. I realized that nature provides more than personal pleasure; the Earth's natural resources are the very lifeblood of all creations on this planet. Loving nature is not enough; it's time for action.

Today these statements seem obvious, even sappy. But I admit, I used to drink out of styrofoam cups! I used to throw away glass and aluminum! But I was shamed into changing my ways. Only three years ago, here at *Focus*, we did not have a recycling program. We all felt a little guilty, because as publishers we use a lot of paper. The idea often came up at staff meetings, but no one volunteered their time to find out how we could do it. Then a recent college graduate joined our staff. She sized up the situation pretty quickly (a bunch of self-indulgent baby boomers getting too set in our ways).

Yes, dear readers, she shamed us all. She had the smallest office, yet put cardboard boxes in her space, collected and sorted paper: white, colored, and computer. When she became dwarfed by the paper mountains, she would bag them and take our former trash to a local recycling center. She taught us how easy it is to make a difference in the environment. You just have to take that first step.

Now we have recycling bins for aluminum, glass, and four

kinds of paper. A local recycling company picks up the paper. We take turns taking the other recyclables. Instead of paper or styrofoam cups, we use our own coffee cups. My children sort the trash at home. I cringe at the thought of throwing a glass jar in the garbage. (They say reformed sinners make the best fanatics.)

Taking a larger look at our business, we know that the publishing industry is a source of pollution, as well as a major consumer of paper. Our printer keeps us up to date on the possibility of printing this magazine on recycled paper, and/or using water-based inks. (The petroleum-based inks and glossy coatings used in publishing are toxic.) At this time, it is not feasible for *Focus* to use either of these two options for printing the magazine (although we have used recycled paper successfully for inserts and special mailings). Recycled paper is about 10 percent more expensive, and we are not yet satisfied with its quality and availability. The same is true for water-based inks.

Now that we at *Focus* (and you at your home and work, I assume) are on our collective way to becoming cleaner and less wasteful world citizens, we thought it would be timely to look at some of the ways the computer industry is helping our environment. Specifically, we looked at two government agencies (the USGS and the EPA) that use Data General Aviiion systems to gather and interpret data, build models, and monitor the environment (page 6). Then we wondered, how are the products of the computer industry recycled? Many ways, it turns out. Used computers are resold to other users; defunct systems are cannibalized for parts; precious metals are extracted from computer guts (page 10).

It is getting easier to be green.

This is my last editor's note for *Focus*. I am moving on to other projects here at Turnkey Publishing and leaving my editor's pen in the capable hands of Doug Johnson. For over a year now, Doug has served as the assistant editor. He is an accomplished writer and skillful editor, and he is enthusiastic about *Focus*. I know he'll enjoy the job. I have. Thanks to all who make it possible. Δ

EXECUTIVE MESSAGE

How much money? A lot of money

by Steve Pounds • NADGUG Treasurer

NADGUG is financially stable!

Those are four important words that underscore the vibrancy of our group. As you are all aware, any organization, regardless of how great their cause, has to have money in order to survive. Serving in my first year of a two-year term as treasurer, this is all very important.

Most people don't realize how much money it takes to run an organization like ours. The conference, this magazine, and member services (like the membership directory) all cost a lot of money. Thanks to a great deal of work done by many different people, we are successful at maintaining our financial stability.

In addition to all the great people within NADGUG that make it all happen, two other organizations must also be mentioned. One is Data General itself. They have been strong supporters of our users group, both financially and otherwise. I hesitate to

mention names because it's easy to leave some out, but four Data General people come immediately to mind: Ron Skates, President; Steve Baxter, VP Corporate Marketing; Gerri Rebello, Customer Programs Manager; and Debra Bedrosian, DG Coordinator for NADGUG. Another organization that deserves credit for our financial success is Danieli & O'Keefe Associates, Inc., our management firm. They have done a great job in managing our expenses and developing membership.

I know it's still six months until we arrive in Kansas City for Conference '92, but if it is anything like Denver and Conference '91, it will be a great success. We had 39 states represented in Denver, not to mention the District of Columbia, and attendees from 16 other countries.

I hope to see you in KC!

Δ

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Environmental snapshots

SYNOPSIS

From cleaning up toxic dumps to researching groundwater in Texas, Data General Aviiions are in use at government agencies that monitor and protect our environment.

by Robin Perry
Focus staff

The EPA

In the southeastern United States there are 4,400 identified toxic waste or deposit sites. How does the Environmental Protection Agency (EPA), which manages the Superfund for cleaning toxic dumps, determine which site to clean up first? second? or last?

There are a number of variables, according to John Shirey, EPA technical project officer, but the most expedient way is to determine the number of people living near each site. Using the Arc/Info graphic information system, the EPA does population counts in ring buffers—how many people live within one mile, two miles, etc.—around the sites.

That is an example of one of many applications that runs, or will run, on Data General's Aviiion platform. On June 21 of last year, Data General won a \$2.5 million contract to supply the EPA with 16 workstations and 125 servers, a variety of software, and training. Aviiions have been installed in EPA offices in Washington, D.C., and several states.

Ninety percent of the Aviiion workload will be involved in GIS (graphic information systems), says Shirey. The EPA has used GIS since 1983. The Aviiions were acquired to replace Prime minicomputers running Arc/Info. An important part of the bid was that the existing applications be portable to the Aviiion.

Another GIS application described by Shirey is a new EPA program called EMAP (environmental monitoring and assessment program). Its formidable task is to organize the mass of environmen-

tal data collected over the years (at least since the creation of the EPA in 1970) for the study of environmental trends. The goal is to be able to take a "snapshot" of the environment, then in future years compare information to see if the environment has gotten better or worse—in other words, to determine if the EPA's efforts are successful.

GIS will be the data integration tool for this long-term project. "One of the base information layers is land use and land cover. It would be virtually impossible to pull all this data together without putting it in a spatial context. The [Aviiion] workstations are a core information system for our endeavor," Shirey said.

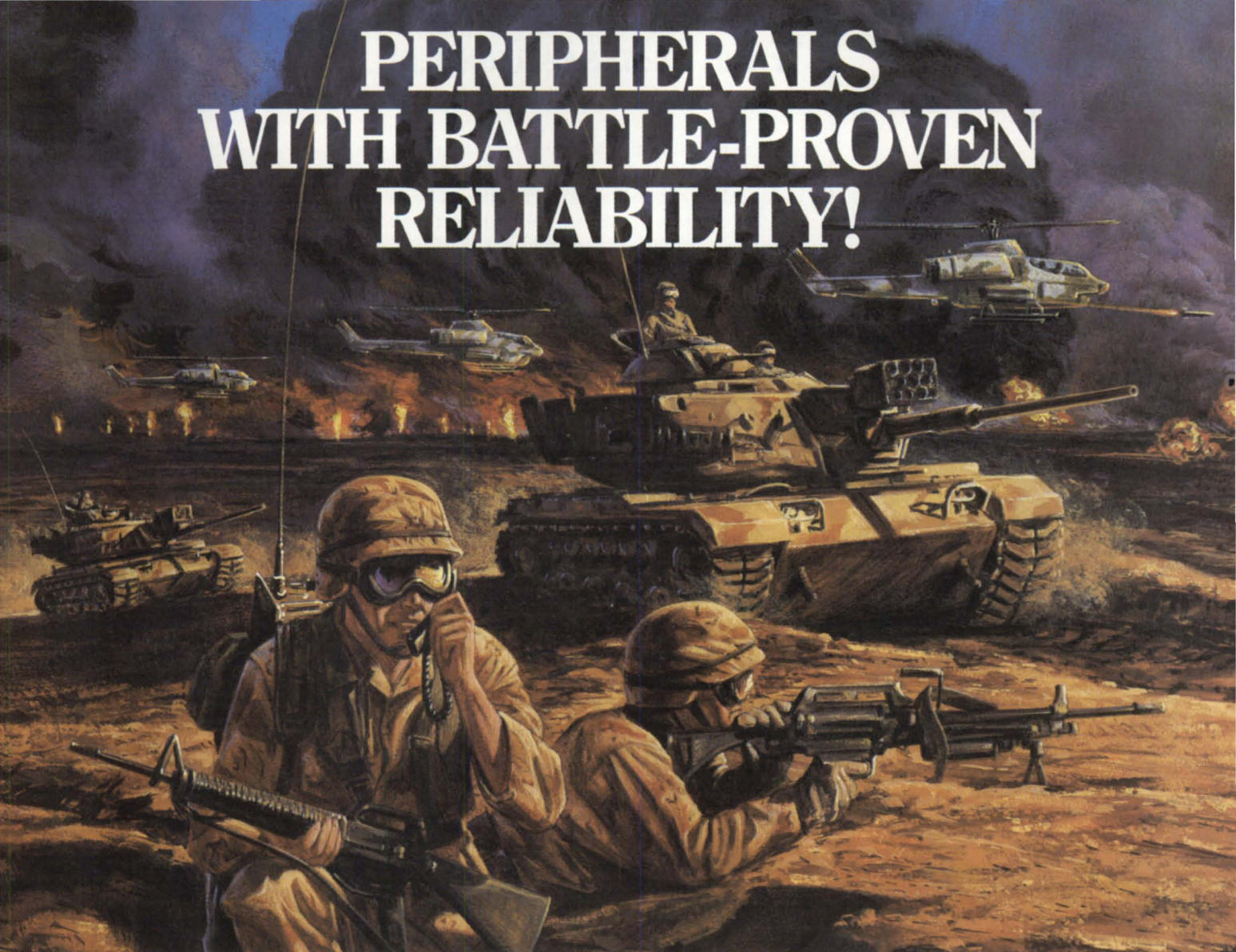
The switch to Aviiion hardware has greatly increased the agency's productivity. "In half of our regions they were running six GIS analysts on a computer that was rated at 1.6 MIPS. Now we're giving each of those analysts their own processor. The architecture represents a 21-fold increase in computing power for a typical five-person GIS work group, compared to the agency's existing GIS computers," Shirey said.

For the future, the EPA would like to expand the use of Aviiion workstations beyond GIS to general scientific purposes. Much of the modeling and statistical work is currently done on VAXes. However, Shirey said, "the workstation environment is the best because of the graphics capability. We expect that to expand over the life of the contract."

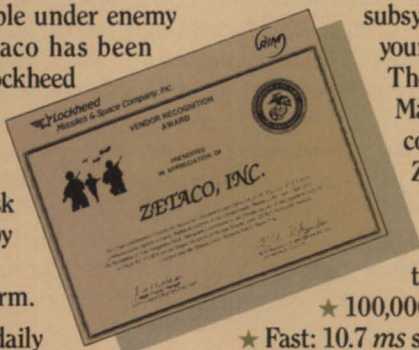
The USGS

The awarding of a \$127 million dollar contract to outfit the U.S. Geological Survey with Aviiion workstations and servers marked a turning point for Data General. It established the then new Aviiion line of RISC-based Unix computers as serious com-

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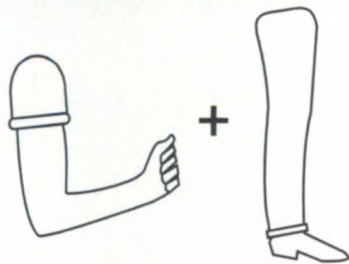
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FOCUS ON: THE ENVIRONMENT

petition for lucrative federal government contracts. As of October 1991, the USGS had ordered 1,240 Aviiion workstations, 116 file servers, various software, and peripherals, expending approximately \$18.5 million of the contract value.

The contract, known as DIS-II, calls for replacing the USGS's current minicomputer distributed information system, or DIS. USGS Chief of Computer and Communications Services Charles Nethaway, reporting at a session held at the 1991 NADGUG conference in Denver, said that "the Aviiion systems are extremely open. The most positive thing is that they could port software easily."

Nethaway reported that most hardware and software installation has gone smoothly. Preloaded "disk-full" workstations with a peripheral disk unit cabled directly to the workstation were easier to bring up than diskless workstations (those with no local disk). Most software was installed using the Unix utility *sysadm*. More challenging aspects of the installation were tuning systems, configuring workstations on the local area network (LAN), and developing a method for sharing registration and access information across the workstations.

A major issue for the USGS is migration of data, Nethaway reported. Word processing applications require considerable experimentation to be exported from DIS to DIS-II. Simulation models based in Fortran require significant development to ensure preservation of functionality and accuracy.

Under the DIS-II contract, according to Nethaway's report, a single family of workstations and servers replaces an "unconsolidated collection of thousands of personal computers, other workstations, and minicomputers which have functioned as a highly heterogenous set of computer resources at each site DIS-II allows applications developers, always in short supply, to consolidate their efforts on one type of user interface, operating system, and networking schema, thus increasing their efficiency."

On-site

Shortly after the contract implementation in November 1990, Data General proclaimed in a national advertisement that the DIS-II contract was "Good News for Planet Earth." It was pretty good news for Data General too. *Focus* recently visited a regional USGS office in Austin, Texas, to find out if Aviiions really are good news for our home planet.

In the center of a cheerfully cluttered office is USGS Hydrologist Eve Kuniansky, punching up colorful displays of groundwater charts on her Aviiion workstation. She is developing a numerical model that will simulate groundwater flow in aquifers, huge underground reservoirs of fresh water.

While many people visualize Texas terrain as one big, dusty cow pasture, water is plentiful in many parts of the state. In fact, droughts and floods are the dominant weather themes. And where it doesn't look like there is any water, you may be standing directly above a vast underground river, like the Edwards aquifer of central and southwest Texas.

From her Austin office, Kuniansky draws information from different sources including a central data base in Reston, Virginia. A number of variables go into the groundwater model. "It gets very complicated," she says. "You have a lot of different types of information you have to process to get it into a state which you can put into a graphic information system. There's a lot more to getting the information together than 'pull it from here and send it to there.' You have to do a lot of work just to get it into a form that's usable."

The end result will be a model for water resource management. For example, consider the Edwards aquifer. Farmers, fish hatcheries, and the entire million-plus population of San Antonio all pump out water. The aquifer is slowly replenished by rainwater soaking through the ground. How much pumping is too much? How much pumping will cause streams and even the aquifer itself to go dry? These questions are unanswerable now, but with information provided by the USGS, the State of Texas will have the knowledge it needs to properly manage its groundwater supply in the future.

(Note: For complete details of the DIS-II installation, you may order a copy of the report, "Implementation of the Distributed Information System II of the U.S. Geological Survey, Open-File Report 91-448," by Charles Nethaway, by writing to Books and Open-Files Reports, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225.) Δ



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Recycling: your computer's next life

SYNOPSIS

Computer equipment fares rather better than humans when it comes to recycling. Your battered castoff can go on to another career as someone else's reconditioned workhorse. Or various parts and particles of it may achieve (relative) immortality as furniture, jewelry, or even your average cola can.

by Doug Johnson
Focus staff

Recycling isn't a new idea at all. We are, all of us, composed of molecules hurled into space from some ancient supernova sun. *Ashes to ashes, dust to dust*, as they say. That's about it for humans. Some parts of us are transplantable, and then there's genetic and cultural heritage across generations. But we individuals aren't reusable or upgradable, and certainly not resellable.

Computer equipment fares better when it comes to recycling. For our electronic friends, perhaps the litany should be *desktop to desktop*. Old computers never die; they just go on to the next guy or gal.

Think way back to when automobiles were new. First, there weren't very many. But as cars proliferated, so grew the market for used vehicles and parts. And so developed practical reasons for recovering materials. With the computer industry still as relatively young as it is, doesn't it make sense that recycling might not seem important at first, but would become important when there's used equipment about?

Consider the Zebra disk drive. It's old enough now for battered castoffs to begin showing up at recycling centers. Each contains about 90 pounds of aluminum—a lot of cola cans. "It's not something you can just throw in the dumpster, and it's not something you'd *want* to throw in the dumpster, really," says Pat McIntyre, account rep for Rave Computer Association, Inc., a second-source supplier in Sterling Heights, Michigan.

Dick Mooney, engineering and new products manager for Hanson Data Systems, Inc., of Marlboro, Massachusetts, worked as a designer

for the original Zebra. Recycling attitudes have changed, he notes. "You used to be able to go down to the town dump and throw it off the back of a truck." Mooney predicts profit will be the driving force in, and the deciding factor for recycling's future success or failure.

"I think you'll find a good portion of sheet metal is recycled," he says. Future computer makers may routinely accept back hardware at the end of its useful life. "And I'm thinking of the quantity of machines that are replaced in a given year," says Mooney, "all of those showing back up at the doorstep of people like IBM and DEC and Data General. What will they do with them?" Manufacturers would have to build in recycling costs at the front end. "That is something that would probably create havoc in the entire industry—again, unless recycling became profitable."

Hanson Data Systems gives old machine cabinets and bad circuit boards to local vocational schools. Cabinets become storage furniture. Old boards help teach students how to solder.

At Rave, McIntyre says the term "recycling" covers a wide range, from converting to cannibalizing. "It might be just breaking off the gold fingers on edge connectors and recovering gold jumpers. Or pulling power supplies for copper."

At NPA West of Fairfield, California, some old equipment goes to a local high school. And a surprising number of companies still use (and need parts for) older Data General equipment. "We have a customer in Mexico that's one or two generations behind," says Alan Rees, NPA president. "They're installing a lot of MV/2000s right now." The MV/2000 is older, but "it's available very inexpensively." Δ

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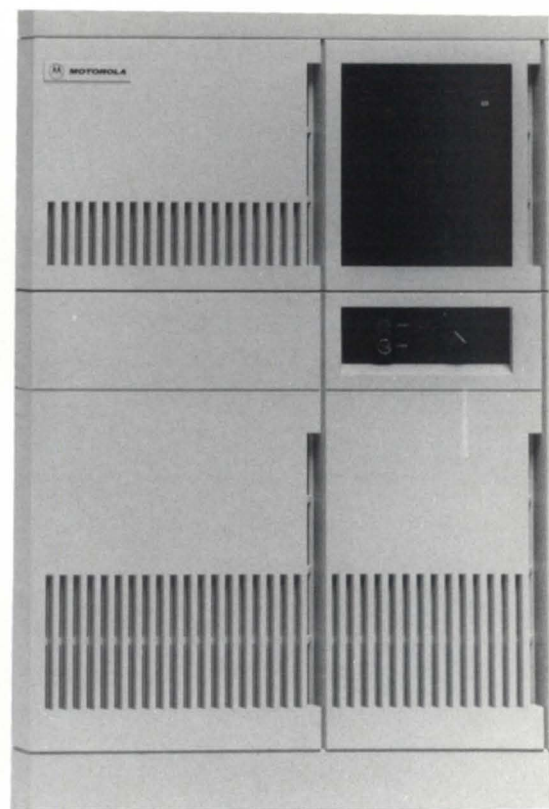
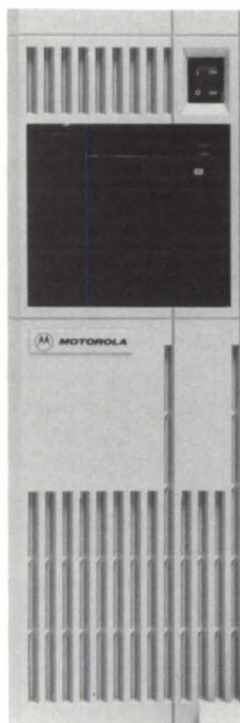


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A really incredible thing

by Rick Havourd
Special to Focus

Caveat: This article deals specifically with software used to display pictures on an X-terminal or workstation.

SYNOPSIS

Do you like pictures? Would you like to set up your own simple image display and conversion lab with off-the-shelf programs and data files? Well, what are you waiting for? Read the article!

While at a customer site the other day I was accosted by a terribly excited young lady. As you can imagine, I suffered a major ego crisis when I discovered that the "really incredible thing" she wanted to show me was on her computer screen, and not a clever ploy to ask me for a date. I plodded into her office and was assaulted by what had to be the most horrendous example of "computer art" ever to grace a video screen. There in the glaring contrast of black and white, was a digitized image of a *Sports Illustrated* swimsuit model strolling along the beach.

I smiled weakly and commented, "That's . . . er . . . ah . . . nice (?)."

"Oh yeah! Well, it gets better. Watch this." She clicked on the mouse and pointed me to the 19-inch monitor alongside her Macintosh. My stomach started to feel queasy as each new scan line was displayed. Just as vertigo set in, the image finished.

"Now what do ya think of them apples?" she beamed.

Oh, this is great. This same individual insists on using Pagemaker and a laser printer for a simple inter-office memo, yet here she is completely enthralled with a fine example of the human body portrayed as an Ansel Adams Leggo mosaic! Wonderful. Here, let me fax you my Hawaiian vacation pictures!

You may be wondering what is the point of this charming story? Well, it got me to thinking about computers, pictures, and what one could do with a few simple

programs. This article is all about setting up your own (simple) image display and conversion lab with off-the-shelf (free) programs and data files.

The more bits the better

Just so nobody feels completely left out, I will restrict the majority of the article to greyscale images only. If you are color-capable, feel free to substitute the word *color* for any occurrence of *grey*, as the following concepts are applicable to either type.

Computers that display multiple shades of grey typically describe this in terms of bit planes. Each plane requires an additional bit per pixel and represents an additional power of two shades. Therefore, a single-bit plane display can display two shades of grey (typically white and black). An 8-bit plane display is capable of 2^8 (256) different shades of grey. Figures 1 through 5 represent the same image with each one providing an additional bit plane of shading (i.e., 2, 4, 8, 16, and 32 shades). Figure 6 represents a full 8-bit greyscale image. Even though 8 bits are available, this particular image uses only 148 unique shades of grey.

For the most part, you want your pictures to have smooth transitions between individual shades. This transition between intensity levels is called *contouring*. Typically, 64 levels provides for smooth transitions within a given picture. Adding more than 64 levels gives the image a "warmer" feeling, whereas reducing the number of levels rapidly diminishes the quality and effect.

Most of the available routines are designed to alter a true color image so that it can be displayed on a restricted color device. The goal is to maintain maximum image quality. With this in mind, a few of

the more popular algorithms are introduced below.

Techniques for enhancing image quality

Gamma Correction: A display that provides 256 shades is a suitable platform for viewing images, but what are the exact intensities to be used? Our eyes are more sensitive to the *ratios* of light intensity rather than their absolute values. To capitalize on this, a technique called gamma correction is employed. A table of all the intensities within the image is created. Then the individual intensities are adjusted along a logarithmic scale that produces level transitions more suitable to the way our eyes work. This process also lets you adjust the entire image's brightness by increasing or decreasing the lowest intensity level.

Halftoning: A monochrome image, by definition, is made up of pixels of only one color (the black part doesn't count). Any shading must be performed using only white or black pixels. Fortunately for us, the human eye is more sensitive to the overall intensity of a particular area, as opposed to the discrete elements composing the area. Figure 7 is a halftone image. To truly appreciate the effect of halftoning, consider Figure 1, which is also a monochrome image, but no halftoning was used. By adjusting the density of white or black pixels over an area, it is possible to trick the eye into believing that there are more shades than there actually are.

Dithering: The halftone technique is appropriate when the resolution of the display device is greater than the resolution of the image. When the image is the same resolution as the display, we switch to using the ordered dither. The method of displaying intensity is the same as a halftone image, but the calculation is different for determining the intensity of the area.

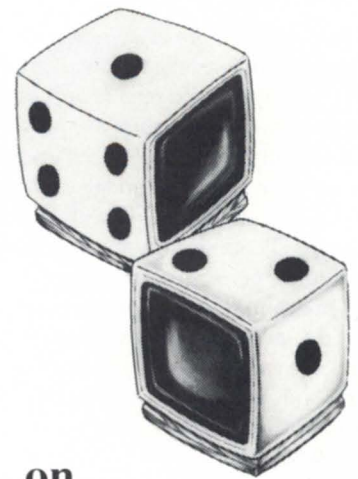
Standard image encoding formats

"For every machine there is standard." For us, this means that just about every manufacturer has at least one encoding format that is considered the "standard" for that architecture. Each format has its own benefits, as well as drawbacks. Taken individually, this does not represent a problem. You just display pictures created on a PC using another PC; pictures on a Mac stay on a Mac. As we usher in the world of "open systems," this philosophy doesn't work.

Figures 1-7



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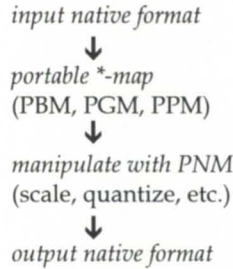
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equipment.

Given the plethora of encoding formats for graphic images, the task of displaying each and every different type becomes monumental. Some display programs automatically convert between encoding formats each time the image is viewed. But what if you want to actually translate from one encoding format to another or, even worse, perform some type of permanent manipulation (scaling, quantizing, etc.) and save the changes? This is where a package called PBM plus comes in. The source code and documentation are available on the Internet, as well as on various bulletin boards.

The *pbm* package uses a series of "discrete filters" to accomplish individual tasks. Within *pbm* there are four primary subsections: Portable BitMaps (PBM) for monochrome images, Portable GreyMaps (PGM) for grey-scale images, Portable PixMaps (PPM) for color images, and Portable aNyMaps (PNM) for filters that process any of the above three formats. A combination of these filter sets are all you need to convert and manipulate between

just about any of approximately 50 formats. In addition to converting between different file formats, a number of utilities are available for performing a wide range of operations on the image itself.

The basic flow of processing is:



Real-life example

We recently picked up a Panasonic JX-100 18-bit color scanner. This is a nifty little device that can scan a 4-inch x 6-inch image in 18-bit or 6-bit color/grey at 50 dpi all the way up to 200 dpi. An interface program was written in C so that we could scan directly into the Aviion (instead of using canned software on a Commodore

Amiga). This allows us to scan an image and produce any of the portable formats.

From the shell, the steps to scan a picture are:

```
$ jx100-color-filetype ppm-density 200/dev/
tty01 sara.ppm
```

Scan the picture at 200 dpi, 18-bit color (262,144 unique colors). The scanner is attached to the serial port *tty01*.

```
$ ppmquant 256 sara.ppm >sara.256
```

Quantize, or limit, the number of colors to 256. This step results in a small reduction in image quality as contouring is introduced.

```
$ pnmgamma 1.1 sara.256 >sara.gamma
```

Perform gamma correction to improve the transition from successive intensity levels.

```
$ ppmscale 1.5 sara.gamma >sara.scaled
```

Enlarge the final picture 1.5 times.

```
$ ppmto gif sara.scaled >sara.gif
```

Write a .GIF file as the final output format.

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The necessities for displaying pictures

Now that you have all the tools needed to scan pictures and translate between various formats, a method of displaying the images on your workstation is needed.

xgif: I started using *xgif* first because there were a number of .GIF files included in the archive, and this made for immediate gratification. By the way, GIF stands for Graphics Interchange Format and is copyrighted, trademarked, or some such nonsense by Compuserve. Regardless, it's a platform-independent scheme for encoding a graphic image. *xgif* is a relatively simple program with the following options: expand the size of an image, strip color bits from the picture, and force the use of as many colors as possible.

xloadimage: (Too much typing, so *xld* for short.) Byte for byte, this program is better than *xgif*. It takes a little longer to complete a display but, considering the features, it's worth it. Images can be displayed in a window or as the root, with automatic dithering and halftoning,

gamma correction, brightening (both increasing and decreasing), clipping, smoothing (multiple passes), dithering, depth-reduction, rotation, and zooming. In addition, you can set up slide shows and display a wide variety of image types.

Just as things start to get interesting

This article has barely scratched the surface of image processing, but my pen is running dry. With *xld* and *xgif* you have the ability to display just about any picture you want. Add to that a scanner with a program like *jx100* and the conversion/processing utilities of PBMplus, and you have quite a foundation for experimenting with pictures on your own workstation.

To receive a copy of the software mentioned in this article (it's all public domain/free and has been tweaked and compiled to run on the Aviiion), send a QIC 150 tape with either prepaid postage or \$5 to me c/o the address listed below.

A number of people have (unwittingly) contributed to this article, so I thought I'd

mention their names quickly because that's the only recognition they are likely to receive.

PBMplus, Jef Poskanzer, et al. Jef appears to be the primary author, but there are a slew of other contributors destined to remain anonymous.

xgif, John Bradley

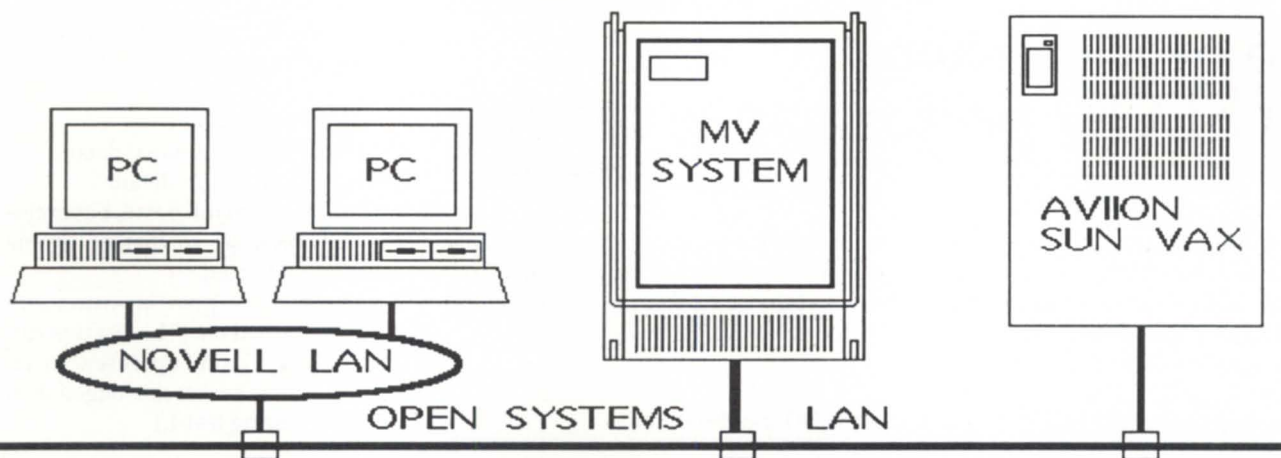
xloadimage, Jim Frost, et al.

jx100, *ppmgamma*, Gerry Duprey (Micro Sage Software).

Reference: *Foundations of Interactive Computer Graphics*, by J.D. Foley and A. Van Dam △

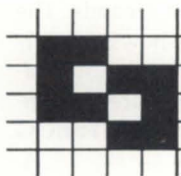
Rick Havourd is a partner with Micro Sage Software Systems and may be contacted at 130 South First Street, Ann Arbor, MI 48104; 313/663-0444.

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Audit without overload: the story continues

by Tom Gutnick
Special to Focus

SYNOPSIS

Determining who did what to whom is of paramount importance for security minded system managers. The SYSLOG facility has always been a help in this endeavor, but it also produced mountains of extraneous data. Now there are convenient filtering features and even Superuser logging. The author presents an update and tutorial.

Is good security auditing possible, or merely an elusive Grail? Security conscious system managers have always been concerned about having proper audit trails to ensure that they can know how a system is being used or abused. The challenge has always been to achieve audit without overload—either in system overhead or in the quantity of data needing analysis. Ongoing software enhancements to AOS/VS and AOS/VSII make the challenge much more manageable.

The AOS/VS System Log facility

No overload here: SYSLOG performance testing

by Tom Gutnick

I ran what I consider to be a worst-case test of SYSLOG overhead: loading the AOS/VSII release tape, which has lots of small files. At full detail logging, there would be four events logged (creating, opening, changing the ACL and closing) for each of these files.

The test environment was an MV/5600DC with 16 MB of memory, running AOS/VS II Rev. 2.10, two 662 MB disk drives (master LDU, on one drive; directory into which files were being loaded on the other), and a 6589 (front-loading 125-

inches-per-second) tape drive. The tape was a copy of the AOS/VS II rev. 2.00 release tape dump file, at 6250 BPI and a buffer size of 32,768 bytes.

Each test was run four times and the results averaged. The tests were:

1. SYSLOG turned off.
2. SYSLOG on, at minimal detail.
3. SYSLOG on, at full detail.
4. SYSLOG on, at full detail, but exclusion bit mask set so that no events actually got logged.
5. Same as test 4, plus Superuser logging also turned on. (The test was run by a non-Superuser, so no more events got logged than during test 4.)

Figure 1: SYSLOG overhead tests

Test	Elapsed	CPU_ time	Increase
1. No logging	318	65	-
2. Minimal detail	317	65	0%
3. Full detail	322	69	6%
4. Full, exclusion	316	68	4%
5. Superuser logging	320	68	4%

The CPU time shown is the total consumed by both the user LOAD_II process and the operating system. Both elapsed and CPU times shown are in seconds. The last column shows the percentage increase in CPU utilization compared to running with the SYSLOG turned off. Δ

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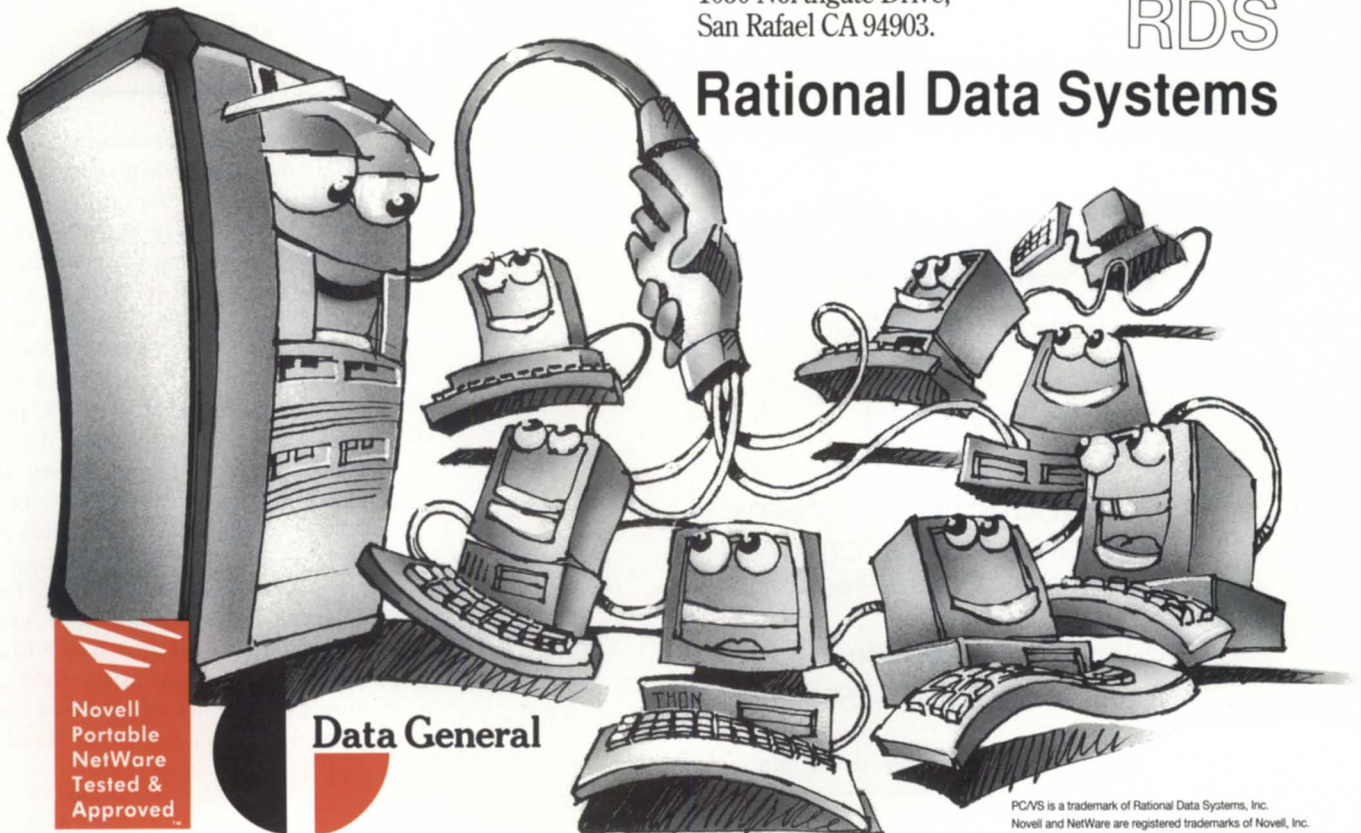
It also works with other Rational Data Systems software, like PC/VS (which adds an extra touch of AOS/VS-specific features for your system managers) and PopTerm/410 (which gives you blindingly fast LAN-based emulation).

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(SYSLOG) has always been an important component in a typical security strategy. A year ago, I wrote an article in this space to describe a new feature, selective logging, to help in this area. Previously, the SYSLOG could run at a minimal-detail level, which provides basic accounting information but only very limited security-related information. Or it could run at full-detail level, with reports of unsuc-

cessful log-on attempts, invocation of "super" privileges, and other security related events—but this exhaustive audit trail also captured every file open, every file close, every IPC message sent, and more.

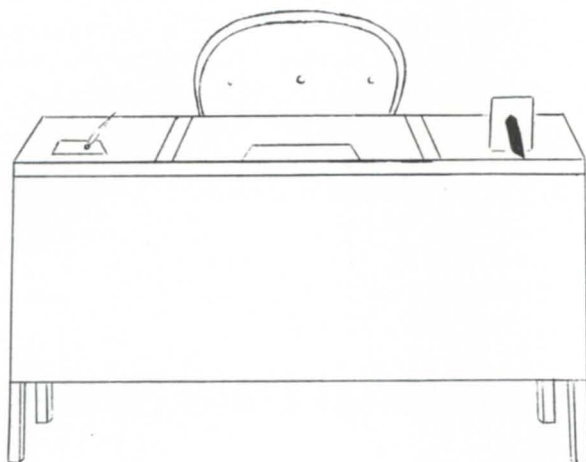
The disk overhead and the effort required to analyze the data were potentially staggering. In AOS/VS rev 7.67 and AOS/VS II rev 2.00, Data General added

the ability to do SYSLOG "filtering." By setting an exclusion bit mask, the system manager can select exactly which event types will be captured.

Now, we have extended this capability even further. In AOS/VS rev 7.69 and AOS/VS II rev 2.10, "Superuser logging" is also provided. Instead of having to log at full detail for all users, you can choose to log just those events caused by a Superuser (i.e., a user who has Superuser privilege actually turned on). In addition, you can set an exclusion bit mask to filter which Superuser events should be logged. Not only that, but you can even specify different bit masks for Superusers and for all other users, providing the ultimate in flexibility.

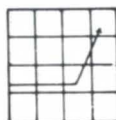
Full information on the use of these features is provided in documentation

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*The challenge has
always been to achieve
audit without overload
— either system
overhead or in
the quantity of data
needing analysis*

accompanying the operating system release, but this article will give enough of a summary to get you started. Note: in order to take advantage of either of the SYSLOG filtering features (standard or Superuser) you need to use a program. The alternative would have been to add 4,096 switches to the CLI's SYSLOG command—not desirable! A year ago, I wrote such a program to enable SYSLOG filtering, and Data General donated it to the NADGUG software library. I have since updated the program to enable selective Superuser logging as well, and this program is now also available through the NADGUG software library. (While I was at it, I cranked out another program, called SYSLOG_STATUS, which will display the current status of the SYSLOG, including a listing of which event codes have been excluded with both Standard

and Superuser exclusion bit masks. This program has also been donated to the NADGUG library.)

Lots of options

There are now several different options for starting the SYSLOG, and they can be used in (nearly) any combination. For example:

`SYSLOG/START` or `SYSLOG/START/DETAIL=MINIMAL` provides the traditional logging of resource utilization, privileged user log-ons, etc. This has the lowest overhead.

`SYSLOG/START/DETAIL=FULL` provides the most exhaustive audit trail. (Note, if you want to change the detail level, you must first issue `SYSLOG/STOP`, followed by the appropriate `START` command.) This obviously incurs the highest overhead. Recent tests have shown that the additional CPU processing overhead is actually not all that bad — but the resulting log files on disk must be managed aggressively.

To enable SYSLOG filtering, most likely you want first to start the SYSLOG at full detail. This isn't a requirement, but as its name suggests, the exclusion bit mask inhibits logging of specified events. To include events, you must be sure that the SYSLOG is running at the appropriate detail level. Filtering out unneeded events will slightly reduce the CPU hit compared to full detail without exclusions — but, more importantly, will usually result in a significant reduction in what gets logged to disk, thereby reducing both the number of I/O requests and the amount of disk storage required.

As noted previously, to set the bit mask requires a program. If you are using my program from the NADGUG software library, simply invoke "XEQ `SYSLOG_FILTER n...`" where "n" is the decimal number for each event you want included. For example, to log failed log-on attempts and invocations of System Manager privilege, you would specify "X `SYSLOG_FILTER 1215 964`". (You can find the list of event codes in `:UTIL:PARU.32.SR` or the SYSLOG appendix in the latest system call dictionary.) This program will automatically include all events defined at minimal detail level, but will include only those full-detail events that you specify on the command line. If the SYSLOG is not currently running, it will be turned on at full detail

level. (If the SYSLOG is currently running at minimal detail, you will need to turn it off before invoking the program.)

To enable Superuser logging, issue `SYSLOG/SUPERUSER/START` after having already started the SYSLOG. (This option is in the newest CLI32, which shipped recently with AOS/VS II rev 2.10 and will ship early this year with AOS/VS rev 7.70. Under AOS/VS rev 7.69, the CLI

doesn't know about this new option, so it's necessary to use a program to turn it on; read on...) In case you don't want to capture all events attributable to Superusers, my `SYSLOG_FILTER` program has now been enhanced to set the exclusion bit mask for Superuser logging (via the /S switch). This program will also handle turning on the option under AOS/VS rev 7.69. As already noted, you can get

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SECURITY UPDATE

a copy of my updated program through the NADGUG software library. Using only Superuser logging will normally result in less CPU overhead (and fewer events logged to disk) than with full-detail logging. (Note that separate invocations of SYSLOG_FILTER are required to set standard and Superuser bit masks.)

By now, you're probably grumbling because I've been talking about more and less CPU overhead, without quantifying. Grumble no more! The sidebar to this article shows the results of some recent testing. I ran what I consider to be a worst-case test, and was pleasantly surprised to find that, despite the conventional wisdom on the subject, the CPU overhead implications of the various logging options are rather minimal. Selecting the right logging option for your site will obviously help you manage the hit on disk storage. And selecting a good (probably means big!) file element size for the SYSLOG will help minimize the number of disk I/O requests which get processed. (To set the element size, include a command like "CREATE/TYPE=LOG/ELEMENT=nn :SYSLOG" in your UP macro, before turning on the SYSLOG.)

What goes in must come out?

Of course, it doesn't do much good to put lots of data into the SYSLOG unless there's also an easy way to get the data out. The other area which has recently been addressed is that of reporting from the SYSLOG. Data General has always supplied a utility called REPORT, which provides general-purpose reporting capabilities (both summary and detail) from the SYSLOG.

Ever since full-detail logging was added a few years ago, REPORT has supported some additional switches: /FILE, /TRACE, and /FAILED_LOGONS. The /FILE switch will generate a report showing all logged events associated with the specified file or files. Similarly, /TRACE will show all logged events associated with the specified usernames. And /FAILED_LOGONS does just what it says—for each unsuccessful log-on try, you'll see what time it occurred, at which console device, and what username had been entered. The latest release adds a new switch, /CHGUSER. Every time a user creates a process under a different username (such as with the ubiquitous "USER", "BE" or "BECOME" macros),

that information (showing both the old and new usernames) will be reported. Using that information, in conjunction with the /TRACE and the /BEFORE and /AFTER switches (to look at a specific time window), makes it easier to figure out what's going on.

Sites needing greater reporting flexibility will be interested in another option. Over the past year, our Solution Services group developed a utility called SNOOPER. SNOOPER is a parameter-driven program that allows extensive control over what gets reported. For example, using command-line switches the following may be specified:

- Aliases: Report only on users who have created a process under a different username.
- Start/Stop: Report only those events occurring during the specified window (by date and time).
- PID: Track one specific process and subordinate processes.
- Super privileges: Report only on processes that have Superuser and/or Superprocess privilege turned on.

In addition, through the use of a parameter file, the following may be specified:

- Events: Indicate which specific event types are to be reported. (Most of the time, you don't really want to see every IPC message!)
- Users: Specify usernames that should be included or excluded.
- Programs: Specify program pathnames that should be included or excluded.
- Files: Specify file pathnames that should be included or excluded.

The combination of the various options for capturing data in the SYSLOG and the SNOOPER utility is very powerful, making it much easier for a system manager to determine who did what to whom. Δ

Tom Gutnick is a Systems Engineering Consultant in Data General's Eastern Technical Services, specializing in issues such as operating system security. He can be reached at Data General Corporation, 7927 Jones Branch Drive, Suite 200, McLean, Virginia 22102; 703/827-9669; Internet: Tom_Gutnick @dgc.ceo.dg.com.



David Novy

Solving power glitches

SYNOPSIS

Brownouts and power surges can really ruin your day. Uninterruptible power supplies have become a necessity. The big question remaining is: how much UPS do you need?

After the heavy-duty content of last month's column, it is probably the appropriate time for less philosophy and more items of a practical nature.

The 1991 NADGUG Conference was a very enjoyable and informative conference. The Data General Unix technical sessions ranged from novice to esoteric. All of them were well prepared, however, and well received. Data General presented an excellent array of Unix hardware, and has developed powerful additions to the Unix operating system to improve system uptime and performance.

I was somewhat disappointed by the lack of Unix software exhibits. As Brian Johnson said in a recent article, there were many Unix attendees, but NADGUG still remains an AOS/VS show — at least in the exhibit area. This is unfortunate because the Unix technical presentations were equal or better than those you would see at Usenix or Uniforum. If anyone has ideas regarding how to get more Unix exhibitors, please contact me. I will see that the appropriate people are contacted.

Power supplies, maintenance contracts

We had a power glitch today. Fortunately, our Unix workstations and ethernet network were unaffected. We use uninterruptible power supplies (UPS) on every workstation and on the ethernet network. The glitch reminded me that you cannot

overemphasize the importance of supplying electrical isolation and battery backup for workstations, file servers, and networks — especially now that systems are small enough that the cost of using UPS systems has fallen dramatically.

Installing a UPS with every workstation at our site was not an inexpensive proposition. However, because we use UPS and have several similar machines, we feel comfortable going on a time-and-materials maintenance contract for any workstation connected to a UPS. The UPS paid for itself in about one year in what we saved on reduced computer maintenance costs and downtime. If you have several workstations, and the maintenance contract for each workstation is more than \$100 per month, hardware maintenance costs can become a large part of a company's computer operations budget.

Using UPS on every workstation does *not* guarantee a fail-free system. Things will still break, and fixing them on time and materials will be expensive, but generally it will be much less costly than a multi-system, same-day-response maintenance contract. Under no circumstances should you forego hardware maintenance support on file servers. If you lose a file server and you're on a time-and-materials contract, you could be down for several days. Time-and-materials contracts have the lowest possible priority. Also, if you have specific workstations running key applications, you should consider a conventional hardware maintenance contract, or perhaps even a premium contract.

If you have several similar machines so you can afford to have knowledge of hardware maintenance — a UPS and a time-and-materials maintenance contract may make sense because of the potential cost savings. If a time-and-materials contract is too risky, then you can evaluate service contracts for guaranteed next-day response or depot repair services. These can result in significant cost savings with very little risk. Other common ways to save money include prepaying maintenance and site volume discounts.

A less common way to save on maintenance is to use X-terminals connected to high-performance workstations, in-

stead of workstations, when you want to expand your workstation network. The average hardware maintenance cost for an X-terminal is less than \$30 per month. This is a significant savings compared to hardware support cost for a workstation.

Read the fine print

Even if you have a normal service contract, you should check the fine print. Most hardware service contracts for workstations guarantee only same-day repair. Several vendors guarantee only next-day repair unless a premium is paid. Premiums beyond the normal contract window can add up quickly. There can be a 16-hour support window premium, a 24-hour support window premium, a weekend coverage premium, and a two-hour response premium. And these premiums tend to be additive. So, if you want 7 x 24 hour coverage and 2-hour response, you can end up paying at least double the standard rate. The operational rule here is: Buy the coverage you need, and make sure to budget for it.

Returning to the subject of UPS. Determining how big a UPS to purchase can be a difficult decision. If you use published measurements, you will tend to feel that you are purchasing too large a UPS. This is because published measurements deal with worst-case conditions, and computer vendors want to err on the side of safety. When it came time for me to decide how big a UPS was needed for a given project, I purchased several of varying sizes and evaluated how well they did under operational conditions. If an "undervoltage" alarm or a "too much current" alarm sounded when I pulled the power cord on the UPS, then I knew I needed a larger size. I then checked my results with an electrician to

If you lose a file server and you're on a time-and-materials contract, you could be down for several days.

ensure that I still met electrical code requirements before additional UPS's were purchased. Fortunately, more scientific methods of determining UPS size have become available. High-quality UPS systems come with computer output capability, allowing you to monitor line conditions. They can also support software that will begin a machine shutdown sequence if battery power sinks too low. A new UPS has come on the market that displays system load levels as a direct readout display on the front panel.

Whether or not to use UPS systems, and what kind of maintenance contract to purchase, are complex decisions that vary with each site. As far as I'm concerned, however, using UPS systems is a necessity. I've seen far too many systems damaged by power surges and brownouts. Δ

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

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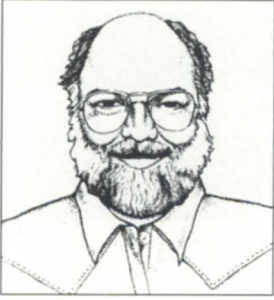


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Brian Johnson

Best of BJ

(Editor's note: *Focus* gives BJ the month off this time around and reprints excerpts of two previous "System Manager's Log" columns. Both are a bit on the lighter side, but timeless, so relax and have a chuckle.)

How to spot a good engineer (July 1989)

SYNOPSIS

And how to keep one once you find one
(Hint: Stock up on Jolt Cola and Cheetos)

Several people have asked me recently to advise them on alternatives for servicing their systems. Generally, my advice goes something like this: the specific engineer involved is more important than the company behind that engineer. Price fades in comparison. It only takes one or two unnecessary afternoons of being down for the lost productivity and salary costs to erase whatever gains you may have realized by going with a low-priced service vendor. Then again, a high-priced service vendor does not necessarily guarantee better service and less downtime.

So the next question usually is, "How can I be sure that the engineer assigned to my account will be a good one?" You can't. But there is something you can do to spot a good engineer when one shows up, and to keep one once you find one. To spot a good engineer just ask yourself the following questions:

Are many of your service calls direct results of problems not completely fixed during a previous visit? Are many of your service calls a direct result of problems introduced during a previous visit? Are any of the panels on your cabinets currently off? Are any of the cable connectors on the back of your processor missing hoods?

Are all the cable connectors (new style DB connectors) on the back of your system screwed in and/or attached to strain relievers (especially cables to the older-style paddleboard connectors)?

When you need to unscrew a cable connector from the panels in the back of your system or from the back of a terminal, do you first have to spend a day at the gym building up your arm muscles? A good engineer knows that the small screws on connector heads and circuit board covers are designed to keep the things they connect from falling apart, not from being pulled apart by kids and other small animals—they don't need to be tightened the same way the head bolts on a pickup truck are tightened.

Do all the circuit boards in your system have the protection covers that they came with, and are they properly installed and screwed on?

Are the covers broken off from their supports on any of your circuit boards, or does the engineer carry a tube of Super Glue and repair any broken covers encountered?

After each visit, does the collection of leftover bits and pieces of hardware grow? (especially circuit board protection covers and the little black screws that held them on).

After each visit, does stuff disappear (e.g., the diagnostic tape, schematics, or service manuals that arrived with your system)? If the engineer says something like, "You don't need this stuff anyway, I'm the only one who needs it," don't fall for it. The stuff is yours, and your next service provider will need access to it. Anyway, chances are that the next time the engineer needs it, it won't be there.

Does the engineer review your error log files as part of every preventive maintenance visit? (And do you have them ready when the engineer arrives?)

At the same time, does the engineer ask to review your operator's log binder to see what crashes or unusual occurrences have happened since the last visit? If you don't keep a log, does the engineer show you how to start and maintain one?

Does the engineer struggle with a problem for hours before escalating it?

Do you have a long-standing intermittent problem that your engineer has told you to just learn to live with?

After a circuit board is removed and repaired, do you ever see it again? A good engineer will return your board and reinstall it during the next preventive maintenance visit. Someday I'll recount the bizarre problems I've encountered that turned out to be quirks caused by under-rev circuit boards introduced to the system as loaners to cover a board out for repair.

Do all the cables entering the back of your system have adequate slack; or could you play the cable like a violin string?

Is the bottom of your cabinet a repository for coils of excessive disk and tape cables? Ask any disk manufacturer about the intermittent problems caused by excessive cables stored coiled up in the radio frequency hurricane present inside most power-supply-infested cabinets.

Does the engineer *always* write-protect *all* of your disk drives before powering the processor down, and especially before running any diagnostics?

Does the engineer always try to read a known good tape (single drive systems) and run a tape interchange test (multi-drive systems) before pronouncing a tape drive healed? I use the latest AOS/VS release tape as my "known good tape." Don't use a tape previously written on your drive. Especially, don't use a diagnostic tape the engineer brought from another system.

Does the engineer take off before you've rebooted and logged back on? Does the engineer fix any of the problems mentioned above, no matter who caused them? Does the engineer try to explain problems and what their causes may have been, or does the engineer just treat you like an ignorant jerk who wouldn't be interested in "all this technical stuff?"

OK, so now you know how to spot a good engineer. What can you do to make sure that engineer is the one permanently assigned to your account? That's easy: become the engineer's favorite account. Find out what the engineer's favorite soda pop and snack food are, and stock up on them. Provide the engineer with a desk and a phone to use while on-site. Invite the engineer to lunch (at a time convenient to the engineer). Put the engineer on your Christmas card list. Send a birthday present. In short, do whatever it takes to make sure that whenever this engineer thinks of you, the memories are fond ones.

I have one client who did exactly these things. Later the engineer quit and went to another service organization. My client immediately switched his maintenance contract to the engineer's new employer. What do you do if the engineer is assigned other accounts and you are assigned somebody new? Easy, if the new one is good, make this engineer a pal, too. If the new one is a Bozo, then call your account manager and threaten to switch vendors unless you get your pal back. If that doesn't work, switch vendors. You have nothing to lose. At worst, you'll get somebody just as bad as the Bozo they tried to force on you. Δ

Feckless (February 1986)

SYNOPSIS

BJ expounds on one of his favorite after-dinner topics: useless (or commonly thought to be useless) AOS(/VS) commands.

(fek' les), adj.

1. ineffective; incompetent; feeble
2. without worth, spirit, or value

:FECKLESS:BIAS

My favorite is the BIAS command. To refresh your memory, the syntax is "BIAS [max [min]]". Its effect is to tell the AOS(/VS) scheduler the maximum and minimum number of noninteractive processes that should be kept in memory. The BIAS can be examined by any user, but can only be changed by PID 2.

So, what's a "noninteractive" process? Well, AOS(/VS) characterizes a process as "interactive" if it frequently relinquishes control of the CPU before its allocated time slice expires. Processes that frequently consume their entire slice (i.e., those that are CPU-bound) are characterized as "noninteractive."

When AOS(/VS) finds itself short of real memory, it swaps (assumably) inactive processes to free up pages for use by active processes. In general, AOS(/VS) is biased toward interactive processes. This means it will swap a noninteractive process

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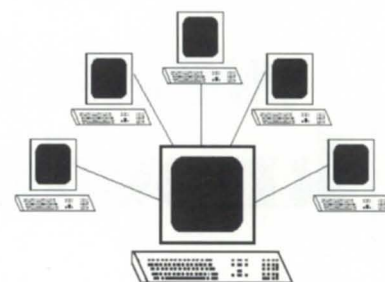
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before it swaps an interactive one.

The BIAS command subverts this logic by forcing AOS(/VS) to keep in memory those processes it normally would swap. Unfortunately, it does this at the expense of interactive processes, which get swapped sooner than they normally would have.

Speaking of biases, I have a few myself. I consider active process swapping to be the pits. As far as I'm concerned, applying exotic algorithms to the swapping logic to make it better is like using acupuncture on the victim of a Claymore mine.

The performance of a time-sharing system degrades so dramatically once swapping starts that your only action should be to eliminate the swapping, not improve how well it is done. This involves either increasing the system memory or decreasing the system load. Given the current cost of a megabyte, the preferred course of action is obvious.

But, I digress.

What kind of system manager would voluntarily opt to make interactive response time even worse so that a few batch jobs could get better service? Only a very sick one.

Footnote: If you're not actively swapping, the BIAS command has no effect.

FECKLESS:XBIAS

In addition to the CLI's BIAS command, there is also an EXEC XBIAS command. Its syntax is "CONTROL @EXEC XBIAS @device {+|-}factor." This command can also be applied to batch streams, but it has no effect unless the /CPU= switch is used when submitting jobs. Few people use this switch, so we'll ignore batch streams for the purpose of this discussion.

EXEC selects the next job to be printed based on two things: the job's QPRIORITY and the time it was submitted. If multiple entries are in the queue, then EXEC picks the one with the highest (i.e., numerically lowest) QPRIORITY. In the usual case, there will be a group of entries at the same priority, and EXEC will pick the oldest job for printing. It decides which job is oldest by taking the time the job was submitted, and adding the estimated pages multiplied by the bias factor. If the bias factor is zero, then estimated pages plays no part.

In the absence of a /PAGES= switch on the QPRINT command, EXEC estimates the pages required for a job by taking the size of the file and dividing it by an assumed number of characters per page.

In the early days of AOS, EXEC defaulted the bias factor to some positive, nonzero number. Well, apparently a few of you old-timers out there submitted enough STRs to cause DG to change EXEC so the bias factor would default to zero, and the change then carried over into AOS/VS.

The most reasonable explanation I can think of is that people who print a group of program listings at a crack often submit the filenames in alphabetical order, and would like them to come out on the printer in the same order. That way, they can throw the printouts into a binder without sorting them.

I like the idea of printing short jobs first; it seems eminently reasonable to me that short print jobs should come out first when several items are in the queue. But I also sympathize with the alphabet freaks.

A simple solution suggests itself: How about adding a /NOXBIAS switch to the QPRINT command that would have the effect of overriding the XBIAS for the specified file(s)? If a user is

worried about having his group of printouts interrupted by a higher priority print job (a danger in any case), he could simply specify /QPRIORITY=0 (or whatever his profile specifies as his highest). As long as no one else submits at the same priority at the same time, his jobs will come out in the proper order, uninterrupted by other jobs.

With every scheme there's always a flaw. In the case of this one, EXEC would have to de-commit support for negative XBIAS factors. A negative bias factor would make a job seem "younger" than it actually is. It is used to favor long jobs over short ones. Does anyone know of a case where someone wants long jobs favored? I've never seen one.

FECKLESS:SYSINFO

On the surface, SYSINFO doesn't seem too useful. However, I know of two cases where it has solved major performance problems.

When AOS is booted, it determines the amount of physical memory present by testing each possible page until it finds one that doesn't respond. Notice I said "doesn't respond," not "doesn't exist."

In the case of AOS/VS, the amount of physical memory is determined during power-up by the SCP. AOS/VS then asks the SCP how much memory is present. How does the SCP figure out how much memory? Take a guess.

An unfortunate side effect of this scheme is that if one of your memory boards is completely dead, the system will only see the memory up to the dead board.

Several times now I've had discussions like this:

Client: My system performance suddenly went in the toilet last Tuesday.

BJ: What happened last Tuesday?

Client: Nuthin'.

BJ: Nuthin'? All of a sudden, performance became stinko?

Client: Well, no, we had a bizarre panic, and after we rebooted it stunk.

BJ: Type SYSINFO and tell me how much memory the system thinks you have.

Client: Wait a sec . . . it says 2 MB, but I know I have 4 MB. What gives?

BJ: Call field service and tell them to bring a new memory.

People who reboot every day should probably put a SYSINFO command in the UP macro and train their operators to check it when booting. That's because their memories usually die during power-up, as opposed to dying in prime time and causing a nonsense panic. △

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Tim Boyer

Not a bad trade at all

SYNOPSIS

As with most things in life, you have to give up something to get something. With Acucobol, conceding some file speed gives you multiple-Cobol compatibility, multi-platform capabilities, windowing, and the rich features of ANSI '85 Cobol.

This month, I got a chance to look at the Acucobol-85 Cobol compiler from Acucobol, Inc. This compiler offers source code compatibility from RM/Cobol, ICobol, and VAX Cobol. Currently, it runs on the MV, VAX, Unix, MS-DOS, and OS/2 platforms, so you have a choice not only of software compatibility modes, but of hardware platforms as well.

I took a look at their compiler for AOS/VS. I've never used a Cobol compiler that runs on the MV, other than ICobol, so this should be an interesting experience. It'll tell me just how parochial I've become.

In many ways, ACUCobol-85 is similar to ICobol. It's a pseudo-interpreted system, which means there are both a compiler and a runtime system. This also makes portability easy.

By the way, more than once I've been asked to recommend a good ICobol book for the beginner. Frankly, I don't know of one. The textbook I learned Cobol from was the Burroughs Medium Systems Cobol manual—not something to be used for light reading. I've hesitated looking at mainstream Cobol manuals, because ICobol always has been a bit . . . well, different. Now that ANSI '85 compliance is scheduled for 1992, I'll make a point of finding a good tutorial. If anyone out there has any suggestions, please drop me a line.

Anyway, my first step was to compile SBTEST, the benchmark I use for looking at compilers. The compile was clean, except that the RECORDING MODE IS FIXED and WRITE...IMMEDIATE lines were flagged as errors.

Initially, I thought there was a problem with the terminal handler. Escape codes weren't escaping, and CR and LF were swapped. Then, in desperation, I read the manual. Lo and behold, the keyboard is completely redefinable, and all I had to do was remove the commenting out of a few DG-specific lines. This eases the transition between different operating systems. What, for instance, do you do with a Next machine if you can't configure the keyboard, since the Next has no function keys?

Not only does this file define the keyboard, it is also used for hot key assignments. To pop up the Calculator over my programs when I hit the F5 key, I just include the line

```
KEYSTROKE HOT-KEY=CALCULATOR k5
```

Better still, I can customize a program from within the program. In the Procedure division, a line like

```
SET ENVIRONMENT "KEYSTROKE" TO "HOT-KEY=NOTEPAD k7"
```

will modify the environment of my current program only and enable the F7 key to pop up the Notepad program from any ACCEPT. This way, I can have some general routines that all programs can access, as well as program-specific code. Nice!

Acucobol comes with its own file system, Vision, but can work with other file systems such as Btrieve, C-ISAM, and ICobol's MINISAM. The release notice states that the system "can be replaced at your option with other file systems." That's good, because Vision's performance is less than optimal.

I've finally found something that an MV8 can beat. Acucobol is faster only in division and addition, and there not by much. The two things my Cobol programs seem to do the most of—moving data around, and reading in more data—ICobol is almost four times as fast. On the chance that this was a fluke due to testing on the MV, I tried the test on my 386. ICHOST was more than three times as fast with file functions, and even faster at MOVES.

Figure 1: Comparison times on various platforms

	Cobol 1.60 MV8	ICHOST 2.46 386/25	ICobol Aviion 300	Acucobol 2.0 MV8
Random write	(10K) 62	35	55	370
Random Read	(10K) 43	15	24	174
Sequential Write	(10K) 39	10	13	60
Sequential Read	(10K) 30	6	8	44
Random Read/Rewrite	(10K) 30	34	45	618
Sequential Read/Rewrite	(10K) 69	16	14	122
Open-Read-Close Loop	19	4	3	46
Call/Recall Program	(1K) 500	31	-	380
Compile OEINVPOST	121	-	-	-
Div S9(10) COMP by S9(5) COMP, giving S9(5) COMP	(100K) 213	20	43	278
Mult S9(5) COMP by S9(5) COMP, giving S9(10) COMP	(100K) 140	25	22	82
Add S9(5) COMP to S9(10) COMP	(100K) 63	17	23	56
Move S9(5) to S9(5) COMP	(100K) 37	4	3	76
Move X(50) to X(50)	(100K) 8	2	2	30
Display at line24	13	17	6	74
Null Paragraph	8	1	2	56

Note: All times in seconds.

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Acucobol goodies

One of the differences in the file systems is that the Acucobol file system has such goodies as 119 possible alternate keys. To get features like these, you've gotta give up something. In this case, it seems to be speed. Those people clamoring for more alternate keys in ICobol, please note. On the other hand, if you're willing to give up speed in exchange for more flexibility, this could be the file system you want.

A great file feature is the split key. This could save me bunches of disk space. It's one of those things that's so obvious—after someone else thought about it. Here's how it works. My daily sales file key currently looks like this:

FD DAILY-ITEM-SALES-FILE
LABEL RECORDS ARE STANDARD.

01 DAILY-ITEM-SALES-RECORD.

03 DAILY-ITEM-SALES-KEY.

05 DAILY-ITEM-ITEM-NUMBER

05 DAILY-ITEM-PRIMARY-DATE.

07 DAILY-ITEM-PRIMARY-YEAR

07 DAILY-ITEM-PRIMARY-MONTH

07 DAILY-ITEM-PRIMARY-DAY

05 DAILY-ITEM-INVOICE-NUMBER

05 DAILY-ITEM-SEQUENCE-NUMBER

PIC X(12).

PIC 9(2).

PIC 9(2).

PIC 9(2).

PIC 9(6) COMP.

PIC 9(4) COMP.

03 DAILY-ITEM-ALTERNATE-KEY-1.

05 DAILY-ITEM-CUSTOMER-NUMBER

05 DAILY-ITEM-ALTERNATE-DATE.

PIC X(6).

07 DAILY-ITEM-ALTERNATE-YEAR
07 DAILY-ITEM-ALTERNATE-MONTH
07 DAILY-ITEM-ALTERNATE-DAY
05 DAILY-ITEM-ALTERNATE-INVOICE
05 DAILY-ITEM-ALTERNATE-NUMBER

PIC 9(2).
PIC 9(2).
PIC 9(2).
PIC 9(6) COMP.
PIC 9(4) COMP.

Note that the date, invoice, and sequence are duplicated in the alternate key. This file is used in inquiries, sometimes by customer number and sometimes by item number. To keep the file in ascending sequence when using the alternate key, I had to duplicate some information. The alternative was two files and the concomitant duplication of a couple hundred bytes of information. This way, I duplicated 11 bytes.

But if I had been running Acucobol, I could have put this into my SELECT statement:

```
ALTERNATE RECORD KEY IS DAILY-ITEM-ALTERNATE-KEY-1 =
DAILY-ITEM-CUSTOMER-NUMBER,
DAILY-ITEM-PRIMARY-DATE,
DAILY-ITEM-INVOICE-NUMBER,
DAILY-ITEM-SEQUENCE-NUMBER.
```

and eliminated all the duplication. The fields don't need to be in sequence or contiguous within the record. An elegant solution.

How compatible is Acucobol? Well, let's see. Put it this way—it's *decently* compatible, but not *extremely* compatible. Some of the differences are minor and documented, such as not having the ACCEPT FROM EXCEPTION clause. Others are major and not,

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such as no WRITE...IMMEDIATE, or no ACCEPT...FROM USER. Apparently, the compatibility has been frozen somewhere around ICobol 1.40, circa 1988. As this is being written, I'm running 1.70 and eagerly awaiting the 1.80 beta version. Compatibility with 1.40 isn't gonna do me a whole heck of a lot of good.

But I'm unusual (I mean, aside from my general appearance). As mentioned before in this column, I tend to put new software on my machine as soon as I get it. If you're a VAR with a couple of RDOS systems, a few desktops, a bunch of MVs, and some Avions, you're probably writing code for the least common denominator. In that case, 1.70 compatibility isn't a worry — your code may conform to ICOS standards!

The inconveniences of the minimal amount of code changes you need to make are greatly overshadowed by the features available to Acucobol users. Most of the features on my ICobol wish list are available in Acucobol — windowing, sort/merge, multi-character INSPECT...REPLACING, SETting items to a variable's address, and so on. In Acucobol, I can do an INSPECT line this:

```
INSPECT A-VALUE REPLACING ALL "ABC" BY "def".
INSPECT A-VALUE TALLYING TALLY-1 FOR ALL "HIJ".
```

which beats the heck out of the character-by-character INSPECTS that I have to do now.

Acucobol also has a rich set of DISPLAY and ACCEPT options,

both in the Screen section and as verbs. You can open and close windows and pop them up in a variety of configurations. For example, the following defines a window:

```
DISPLAY WINDOW
AT LINE 10 COL 10
SIZE 50
LINES 15
REVERSED
COLOR 5
BOXED
TITLE "HELLO THERE" CENTERED TOP
SHADOW.
```

This gives me a filled window at line 10, column 10, 50 positions wide and 15 high, filled in with color #5 (red), with a box around it, a title centered on the top, and drop-shadow effects as described in my configuration file. After I've invoked the WINDOW

Continued on page 39

Vendor Information

Acucobol-85 version 2.0.1. is available from Acucobol, Inc., 7950 Silverton Ave., Suite 201, San Diego, CA 92126; 619/689-7220 (phone); 619/566-3071 (fax). Contact vendor for pricing information.

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Bits and bytes from the bulletin board

Zmodem convolutions



From: Brian Johnson

After months of researching Zmodem's unbelievably convoluted protocol for the purposes of producing an AOS/VS version to talk to my PC running Pereline, I came to the conclusion that Zmodem offers no added performance compared to what I'm currently using (Ymodem-Batch and compressing the files with WFFCA before sending/after receiving). Seeing a few messages on this board for Zmodem, I just thought I'd leave this message to burst your bubbles.

Zmodem achieves high speed in PC-PC transfers through the use of packet windowing and compression. In general, windowing protocols only work reliably when the receiver is a "workstation" (i.e., single-user dedicated system). Timesharing systems just cannot be expected to reliably reschedule a receiver program to keep

the inbound mux buffer from overrunning. As a result, any Zmodem on AOS/VS would begin life by requesting a window size of 1. That effectively makes it a half-duplex protocol like Ymodem. The compression scheme used by Zmodem currently is crude (simple run-length-encoding) and hardly a match for Lempel-Ziv and other dictionary based schemes. As a result, for the special case of PC to AOS/VS, Ymodem wins due to: a) less overhead per packet; b) no escaping of control characters; and c) a known fixed packet size so the receiver can guarantee no overrun (even with default IAC input buffer sizes) as long as the Ymodem receiver program on AOS/VS is written with that in mind (our WFFCA/WFFCA package is, TEX ain't). I've written up a description of the setup for my new 19,200 baud PC->AOS/VS V.32bis/V.42bis, including how file xfers are done, as my March '92 Focus column (available on the :SYSMGR BBS).

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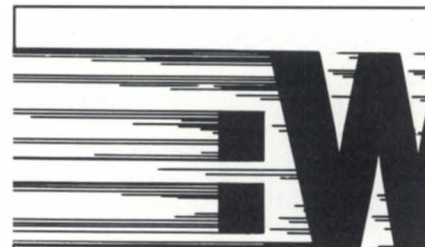
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From: Stan Gula

I disagree on several key points. First, it is quite possible to develop Zmodem send/receive functions for AOS/VS that don't have buffer overflow problems. I ported Zmodem from the public domain Unix sources (the original version before Chuck Forsberg added run length encoding and took it out of the public domain) about three and a half years ago, and we've had very good results from it. Second, the loss of throughput due to escaping a handful of control characters (XON/XOFF plus a couple common packet network gotchas) adds at most 4 percent overhead.

It's not true that AOS/VS can only reliably run with single block frames. In Zmodem the blocksize as well as the frame size are determined by the transmitter and we start out with 1 K blocks and vary the frame size according to line speed. We use bigger frames at higher speeds not because of overrun problems, but to make error recovery faster. This is a *big* advantage over Ymodem (if your transmitters take advantage of the feature), especially over Ymodem-G, which uses the file size as the frame size. Also, Zmodem is smart enough to reduce the packet and frame size if line conditions are bad. After a certain number of bad packets, the packet size is reduced.

I agree that in many instances Ymodem-G is measurably faster — if you have a good phone line with MNP-4 or V.42 modems, or a direct wire, then you should use Ymodem-G (although I hate to restart a 2 MB transfer after getting disconnected 85 percent through). If you are using a packet network or messy phone lines, I think Zmodem wins without question. If anybody wants timing figures, feel free to ask. I haven't timed this stuff for years — I just use it and enjoy. BTWI, we have Zmodem in our TLC Express E-Mail software, which is a very nice PC interface to CEO mail for remote users.

From: Mark Fuller

I have been using Stan's product over packet nets for several years now, and the fact that Zmodem doesn't acknowledge each block saves me thousands of dollars each year. When you go through multiple gateways,

turning the line around to get a response from the other end can take 20 seconds or more. If you do that after each block . . . you can see what happens. Then there is the restart ability. We work in areas where phone service is less than optimal. You can lose a connection at any time, and the next time you connect, it picks up where you left off. It works great.

From AOS to Mac and back



From: Leroy Chen

I'm looking for an AOS <-> Mac file transferring solution. Mainly Mac to AOS. I'm aware of Pacerlink. Is there another solution out there? We have an MV/1000-DC & MV/3500 running AOS/VS II with 16 PCs running DG/MSNet ethernet backbone. The Mac has

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ethernet capability, and ethernet transfer would be nice. But I'll settle for async if it's easier and inexpensive. Speaking of transfers, is there a Zmodem shareware or PD available for the host MV running AOS/VS II?

From: Mark Weber

I used Versaterm Pro for binary and Macbinary file transfer between AOS

and Mac. It was asynch but worked very well, and in addition, Versaterm Pro has a very good Dasher emulator. I used an Xmodem program that I got from this bulletin board. Versaterm will also do Ymodem and Zmodem. Versaterm is available from most of the mail-order Mac houses. Blast has a nice file transfer as well, but I think it's maybe in the same price range as Pacer. Versaterm is

probably the least expensive solution without going to ethernet, although I think Versaterm was working on an ethernet version.

From: Tim Boyer

TEX, which is on this board somewhere, has some Mac-specific switches, and Xmodem/Ymodem transfer capabilities. Although less versatile than some packages, its \$35 price makes up for a lot of sins.

ICobol hair-pulling



From: Joseph Edens

I have simple question, but it's driving me bonkers. I've been using C and Pascal too long, I guess. I need to read in data from a flat text file and the data is in the format "-123.4567", "0.3456", etc. I need to distinguish between positive and negative numbers and do calculations with them appropriately. I have banged my head against the wall with no help from the ICobol programmer's reference. What can I do to set the input and output PICs to get the desired results? Signed: A very frustrated OOP programmer.

From: Tim Boyer

OK, now lemme get this straight. You've got a bunch of comma-delimited data, right? If it was a line sequential, i.e., each of the data separated by an LF, there'd be no problem, right? Likewise, if it's just plain sequential, but each number is of a fixed length, with leading/trailing zeros. Assuming this, here's what you do; dump the thing down to Lotus/Quattro, and do an import. Parse the sucker. You're now in fixed length fields. Print it to a file. Remember to turn off page breaks. Load it back up to the MV. Your input PIC will be -9(whatever).99, and output will be ZZZ . . . Z9.99-. That should do the trick. △

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.



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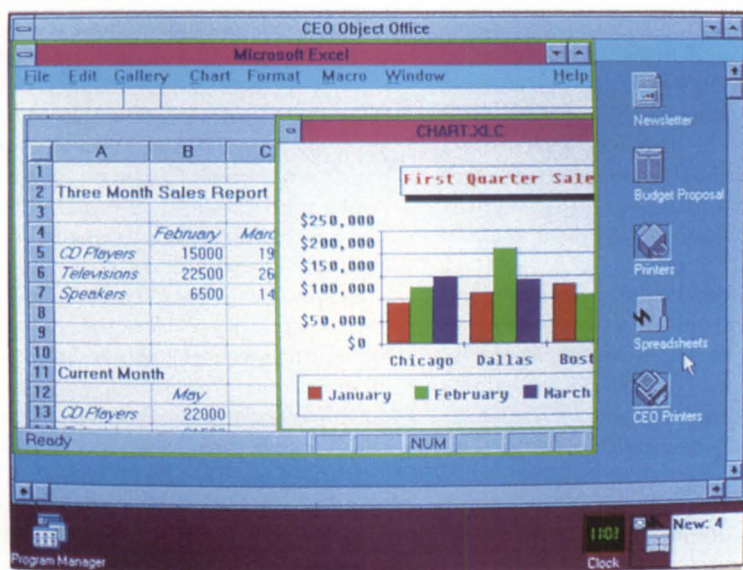
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The making of a software revision

SYNOPSIS

No, they don't drop new operating system release tapes off a building to see if they bounce high enough, but there is a bit of the care and diligence of the cranberry industry in Data General's software qualification process.

by Joe Cannata
(special thanks to Kathleen Callaghan
and Mark Wilding)
Special to Focus

In my travels as an instructor, I often pick up local publications for reading material. On a recent trip to our Education Center in McLean, Virginia, I happened to look at a small rural Virginia magazine, *Novascope*, which contained an interesting article about cranberries. Two million barrels get harvested each year, with Massachusetts contributing the largest share in this \$100 million industry.

After a careful harvesting, the article explained, berries are dechaffed and sent on to the packing house. It is there they are graded; visibly defective berries are removed and discarded. The final test is a rigid competition in which only the hearty and worthy survive. Each berry drops down a chute at the bottom of which is a four-inch barrier. The berry is then expected to be resilient and strong enough to bounce over the four-inch wall in no more than seven tries. Survivors then go on to the manufacturer, to become your favorite cranberry sauce, pie, drink, or chutney. Reading this made me think of the software qualification process here at Data General, in which I participate.

I will start by stating that our development groups have not now, will not, or even ever plan to qualify software by dropping release tapes off the roof at 4400 Computer Drive to see if they bounce before shipment. Software qualification is

a bit more complex than it is for cranberries, and not as physical. A recent revision such as AOS/VS II 2.10 is subjected to stringent testing and retesting before release.

The story of a release starts in development, where components and bug fixes are determined in conjunction with product marketing. Software Development considers feedback from various sources, including software trouble reports (STRs), requests for enhancement (RFEs), and some from NADGUG roundtables. Work on a new software release could begin as far back as two years before it actually ships.

The QA process begins in development. All visible enhancements (way down to the system call level) are reviewed by developers, as well as SSQ (systems software qualification), and documentation employees, to see if the changes are compatible with existing features, and if they are reasonable in nature. All major components undergo design and code reviews. Something as complex as terminal services will go through several weeks of testing before being given to SSQ. Also prior to delivery to SSQ, one week of testing takes place with a QA test suite, under timesharing conditions.

From development, the software is formally turned over to systems software qualification. This group guides the software through the testing and re-qualification processes. The first phase is the standalone test. Here, the operating system is tested, in a standalone format, uti-

lizing automated regression tests running under ATD (automated test driver). Twenty-four tests make up the suite. A sampling of the tests include IPC stress, block I/O, demand paging, process management, EXEC, memory management, file system, and terminal services. Other testing is run manually to investigate the CLI and other aspects. Each internal release of software is called a pass. At this stage, the software is at Pass 1. Its contents are similar to VS II 2.00. In the case of VS II 2.10, development began on August 15, 1990—approximately 16 months before VS II 2.10 was actually signed off and shipped.

The next cut of the software is Pass 2, or the pre-alpha phase. Here, the software is loaded on timeshare machines in SSQ and other groups within Data General, such as documentation, special systems, and some international sites. Here the multi-user testing begins. This phase started a few months later. New features added in this pass were preliminary Ring 0 terminal services, DJ Polisher script capability, and Termserver support. During each pass, feedback is provided to Development through internal STRs called SPRs (software problem reports). These are just like STRs—they could be reports of problems, or requests for a change or enhancement.

Pass 3 begins the alpha phase. In alpha, VS II 2.10 is run on higher-risk systems throughout the company. Alpha participants such as myself volunteer to load and test VS II 2.10 on their machines. I had enough confidence in our software to load

it on our primary administration and CEO system in McLean, and then on a system in Atlanta.

The gain that results in this process is worth the effort. Our site has participated in alpha testing of VS II since its early days, back at rev 1.10. We also test VS, CEO, and Infos II. A total of 24 internal sites participate in the alpha test, spanning the globe. Some features added to Pass 3 include preliminary auto-reboot of IACs, CON0 logging, preliminary EXEC custom logon, and forced release of LDUs. This pass was delivered to SSQ, and the alpha test for internal sites began after SSQ evaluated it.

Pass 4 begins the beta test phase. In beta testing, VS II 2.10 is run under alpha conditions at selected, pre-qualified voluntary customer sites. Five customers participated in the beta test, one as far away as the United Kingdom. Now the total number of test sites outside of SSQ is 29, meaning that there are 29 different ways of beating up VS II 2.10, in addition to the heavy testing still going on in SSQ. This broad spectrum helps to put VS II 2.10 through a variety of real applications testing, which is the way the software will be used by the customer base. Sometimes testing in the lab is too pure. Vigorous exercising of an operating system by the end user helps to prove certain designs, and to stress-test new functionality. This also helps to assure that bugs are really fixed. Pass 4 was delivered to SSQ, and then again later to the field, so the beta test actually began more than a month later. Alpha sites are still involved. Major bug fixing was done in Pass 4 to get it ready for the beta test.

Pass 5, next release to come through the pipe, contained final Polisher script functionality, the BROWSE utility, and ITC reboot capability. During each of these passes, SPRs are written and investigated, quite swiftly I may add. I can speak from personal experience on this. Pass 6 came to SSQ in September. It contained new code for ITC reboot. There were issues discovered in terminal services and the custom EXEC logon.

Pass 7 brought COMLOG, and many CLI32, EXEC, and terminal services fixes.

Joe Cannata is a training specialist for Data General Educational Services in Norcross, Georgia. He may be reached at 404/441-2515.

This was sent to SSQ and released shortly thereafter. This was followed by Pass 8. We are now more than a year beyond Pass 2. This pass required minimal bug fixes. The final pass, Pass 9, was sent to SSQ and signaled the end of the testing and the beginning of software shipment, pending a final review. Minor fixes to DUMP_II and AGENT were included. The software has now

come full cycle, from a thought and a concept to a reality ready to be loaded.

The intent of this piece was to give you some insight to the qualification process that we use at Data General. The same process is used for all software, with the scope depending upon the nature of the product. Diligent effort and copious time is spent debugging and evolving software. Δ

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Screen Test;
Continued from page 31

statements, all further displays are relative to the particular window. In other words, DISPLAY AT LINE 2 COL 4 will be at physical line 11, column 13. The CLOSE WINDOW statement returns your screen to the previous state. Beats the heck out of BLINK BELL, eh?

Acucobol comes with some handy utilities. The debugger can be used as a source-level debugger if the code was compiled as such, or a low-level debugger no matter how the program was compiled. The commands available are approximately equivalent to those available under ICobol 1.60: set breakpoints, watch variables, do a hex dump, and so on. The Acucobol screen display is much nicer, however. The source code appears in the top of the screen, with the debugger commands on the bottom. Thus, the code you're executing is always visible as you step through.

VUTIL is Acucobol's answer to REORG and ICVERIFY. You can test files, rebuild them, extract records, and so on. Unlike REORG, however, you can't rearrange fields and change the keys. I find it easier to write a program to do that anyway, but some people that I know have a Ph.D. in REORG. They wouldn't be happy with VUTIL.

Building an object library

Acucobol also lets you gather object files together and create an object library. This greatly cuts down on the number of files you have lying around your directory, and can improve performance by decreasing disk activity. This is one feature that ICobol needs desperately—I've got a directory with more than 2,000 .DD and .PD files in it.

On the whole, an excellent product. Like so much in life, with Acucobol it looks like you'll have to give up something to get something. In this case, giving up some file speed gives you multiple-Cobol compatibility, multi-platform capabilities, windowing, and the rich features of ANSI '85 Cobol. Not a bad trade at all. Δ

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

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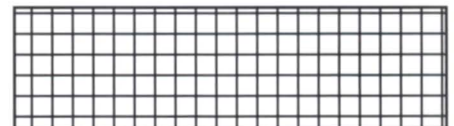
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Westboro — Data General Corporation and Action Technologies, Inc. (ATI), announced the availability of Message Handling Service (MHS) for Aviiion Unix-based systems and servers. Aviiion is the first Unix platform to support MHS, an international standard for local area network (LAN) messaging. The basis for more than 600 electronic mail, data base, fax, voice mail, and imaging products, MHS was previously available only for PCs running MS-DOS.

With MHS, Aviiion systems become true multi-function LAN servers, complementing Novell Native Netware

servers by providing MHS services, Netware services, and commercial Unix application on one platform supporting RDBMSs such as Oracle, Informix, Sybase, Progress, and Ingres.

MHS for Aviiion systems can be the messaging engine for numerous connectivity applications across multiple computing and networking environments. MHS for Aviiion provides electronic mail service for Data General's AV Object Office. Those users will now be able to use MHS messaging services, as well as other data management services.

Data General Corporation, 3400 Computer Drive, Westboro, MA 01580; 508/898-4056.

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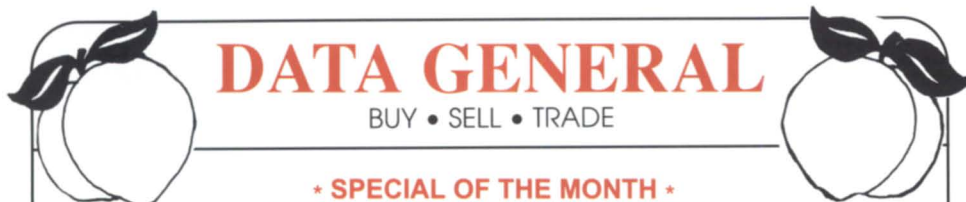
BMC-to-SCSE-2 adapter



Westboro — A new high-performance BMC-to-SCSI intelligent host adapter for Data General's Eclipse MV family is intended to provide improved performance over previously available host adapters.

The new model 6786/6787 host adapter provide MV systems with configuration flexibility and enhanced diagnostics over the earlier models 6433, 6434, and 6435. When configured with SCSI-2 peripherals, the new host adapter performs up to 450 to 500 I/Os per second, and provides transfer rates of up to 10 MB per second — 10 times the performance of previous host adapters.

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simultaneous asynchronous and synchronous SCSI operations, multiple command queuing, seek optimizations, and retry management. It supports both SCSI and SCSI-2 peripherals.

The new controller is configurable as either a single-ended or differential SCSI interface. Users may switch from one to the other as configurations change. When configured as a differential SCSI interface, the new 6786/6787 host adapter supports cable bus lengths of up to 81.2 feet. When configured as a single-ended SCSI interface, it supports cable bus lengths of 19.6 feet. Up to seven SCSI peripherals may be configured on the same adapter, but single-ended and differential SCSI peripherals cannot be mixed on a single controller.

The 6786/6787 can be configured to support both disk and tape devices. As a stand-alone interface, the adapter is list priced at \$8,500.

Data General Corporation, 3400 Computer Drive, Westboro, MA 01580; 508/898-4056.

Circle 49 on reader service card.

Cobol-integrated graphics package



San Francisco, CA — A new graphics package fully integrated with Acucobol-85, Acuvieu, was announced by Acucobol, Inc.

Acuvieu will allow Acucobol-85 developers to draw variation so five categories of business charts, including tables of data and bar, pie, line, and word charts. Developers will choose from a catalog and select from more than 100 standard chart designs, as well as create customized charts. More than 200 attributes will be adjustable, such as character height, text placement, grid lines, axis labels, colors, borders, shading, notes, legends, and data tables.

Graphs created from Acuvieu may be displayed at a terminal, or at a variety of hardcopy output devices, including any Postscript-compatible printer. Acuvieu can also create standard computer graphics metafiles (CGMs) These intermediate files can be used as input to slidemakers and other sophisticated graphing devices.

Acuvieu will be supported by the more than 500 hardware platforms on which Acucobol-85 currently runs, including the Data General Aviiion, MV, and the Dasher 386i.

Acucobol, Inc., 7950 Silverton Avenue, Suite 201, San Diego, CA 92126; 619/689-7220.

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New Winchester



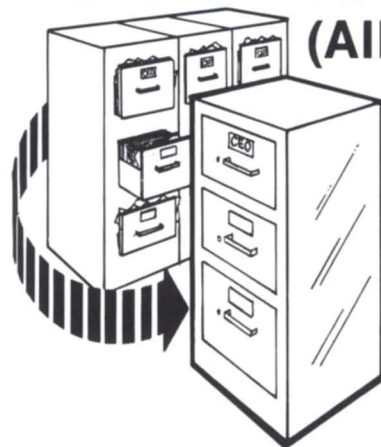
Westboro — The Model #6716/#6718 Winchester disk drive, announced originally as available on Aviiion systems only, is now supported on Data General's Eclipse/MV systems configured with AOS/VS and AOS/VS II. With a

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formatted capacity of 1.4 GB, the 5.25-inch drive boosts the storage capacity of Eclipse/MV systems. Priced at \$11,900, the #6716/#6718 offers improved performance and a lower per-megabyte cost than other Data General 5.25-inch SCSI disk drives.

The #6716/#6718 is a full-height device with 240 KB buffer size, an average rotational latency of 8.33 ms, an

average seek time of 15 ms, and a data-transfer rate of 2.16 MB/second. The drive includes sector-level ECC for ensured data integrity, transparent defect mapping at format time, and built-in diagnostics.

The 1.4 GB disk drive may be configured in the CSS2, CSS2/DC, and PHU peripheral chassis, or mounted internally into the Eclipse system. It's offered

in prepackaged configurations, as well as add-in disk drives. Upgrade options are also available.

Data General Corporation, 3400 Computer Drive, Westboro, MA; 508/898-4246.

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Icon-based authoring



Nashua, NH—Iconauthor, Aim Tech Corporation's multi-platform, high-end multimedia authoring system, will support Data General's Aviion servers and workstations under Motif.

The first Windows-based authoring system for the PC platform, Iconauthor will be the first icon-based authoring system available on Aviion systems under the OSF/Motif user interface. The Motif architecture was designed to create a standard for windowing systems that can be easily transported across various platforms. This new architecture allows Iconauthor developers on the Aviion to transport their applications to any other workstations running Iconauthor.

Iconauthor is intended as a high-end authoring tool for developing advanced, interactive multimedia applications. Combining text, graphics, animation, digital audio, and full-motion video, Iconauthor allows the nonprogrammer to build applications for computer-based training, simulations, performance support systems, self-service terminals, and desktop presentations.

Applications are created by using a "build-structure-and-add-content" technique. To build the structure that visually depicts the application's logic, icons representing functions or tasks are selected from a library and linked into a flowchart. Content, including text, graphics, animation, digital audio and video, is added to the icon structure using dialog boxes. As applications are developed, they can be run, tested, and edited in real time.

Iconauthor on the Aviion family will require OSF/Motif and a mouse, or compatible input device.

Aim Tech Corporation, Nashua, NH; 603/883-0220.

Circle 46 on reader service card.

Multiple processing with enhanced screen recovery



Ann Arbor, MI—Digital Dynamics, Inc., has announced Multiview Windows II, its newest version of Multiview Windows. The recent release combines features of MV Windows, which allows the MV user to have up to eight concurrent processes on a single console line, and Screen Demon from Threshold, Inc.

MV Windows II returns the user to the precise screen the user left. Screen Demon technology enhances MV Windows' performance when switching from one window to another by saving whole screen images, instead of character strings.

Like the original MV Windows, MV Windows II retains the capability to hit key between all eight concurrent applications, send screens to DG queues or files, route one terminal's output to many other terminals, and title windows for easy recognition. MV Windows II also maintains compatibility with DG, as well as third-party software.

MV Windows II is currently available in demo form with full documentation, priced at \$49. A full license for five users is priced at \$1,244. Upgrades are available at \$395 for current MV Windows subscribers.

Digital Dynamics, Inc., 3055 Plymouth Road, Ann Arbor, MI 48105; 313/995-2400.

Circle 51 on reader service card.

10-tape stacker, intelligent access



Newport News, VA—The CY-CHS10i, a data storage system featuring a CY-8200 or CY-8500 8mm tape drive and 10 tapes in a desktop cabinet, is now available from the Contemporary Cybernetics Group.

The CY-CHS10i provides random, or "intelligent," robotic access to cartridges. Capacity ranges from 25 GB to 250 GB, depending on configuration.

The system is intended for applica-

tions such as backup, journaling, archiving, data acquisition, and data distribution—all without manual intervention. Users get faster access to data because tapes may be retrieved in any order.

With a CY-8200 8mm tape drive, the CY-CHS10i can store 25 GB on 10 tapes. With a CY-8500 installed, the CY-CHS10i can store 50 GB on 10 tapes.

Optional data compression increases storage capacity per tape by up to five times, giving the user the potential for storing up to 250 GB.

Contemporary Cybernetics Group, Rock Landing Corporate Center, 11846 Rock Landing, Newport News, VA 23606; 804/873-9000. △

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And Reduce it to this.



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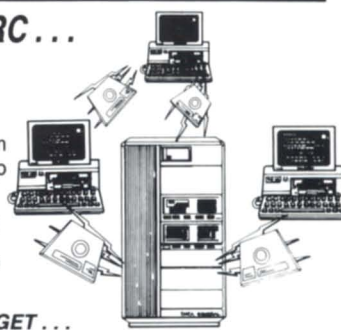
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Circle 10 on reader service card.

Data Specific

DG nets \$4 million for 1Q 1992

Revenues from its Aviion family of open systems continued to grow during the first quarter of fiscal year 1992, led by increases from Aviion servers, as **Data General** reported net income of \$4 million, or 12 cents per share. Overall net income is down from the same period last

year, when the first quarter of fiscal 1991 produced \$12.4 million (41 cents/share).

"We have been able to maintain profitability despite continuing weakness in the worldwide economy and very competitive pricing pressures," said President and CEO **Ronald L. Skates**.

DG's condensed consolidated statements of operations showed \$294.8 million in revenues during the first quarter, compared to revenues of \$311.7 million for the first quarter in 1991. The company said that first-quarter revenues from the Japanese marketplace were down \$16 million from last year's first quarter, a result of the sale last year of its Nippon Data General subsidiary.

Family additions

Since the start of fiscal year 1992, Data General has announced a series of agreements and new products:

- Augmenting the Aviion line through a software products agreement to allow **Dun & Bradstreet** customers to run business software on Aviion server systems in a Unix-based, client/server environment.
- Extending the low end of the Aviion server family with the AV 4300 deskside system (29 MIPS), and the AV 4320 (58 MIPS).
- Unveiling an enhanced Unix operating system certified compliant with POSIX and X-Open Portability Guide 3 standards.
- Introducing a new high availability disk array (HADA) subsystem, based on new RAID technology, for the Aviion family.
- Strengthening its Eclipse/MV family with a new SCSI-2 disk and tape subsystem.
- Adding the Dasher II-386SX-16z, a PC that can stand alone or link up with MV or Aviion servers.

Object management

Hyperdesk Corporation of Westborough, Massachusetts, announced agreements with several independent software vendors that will build and integrate open distributed applications with the Hyperdesk Distributed Object Management System (HD-DOMS).

Planning to incorporate the HD-DOMS into future releases of their software products are **IXI Limited** of Cambridge, England; **Constellation Software, Inc.**, of Framingham, Massachusetts; and **Uniplex Integration Systems, Inc.**, of Irving, Texas. **Hyperdesk** and **Netwise Corporation** of Boulder, Colorado, have also agreed to continue working together to use remote procedure call (RPC) technology in the HD-DOMS to provide optimal communication independence.

Initially announced in January, HD-DOMS is the first product based on the Object Management Group's object request broker (ORB) standard.

IXI Limited plans to incorporate the HD-DOMS into X.desktop, its leading desktop manager. Constellation Software will incorporate the HD-DOMS into its Hyperstar client/server data base access product, which will support Unix and Microsoft Windows. Uniplex is building an object-oriented office automation suite.

May 3-4 at the OASIS

Make plans to attend the day-and-a-half OASIS (Office Automation Special Interest Subcommittee) spring workshop, Sunday and Monday, May 3-4, in Atlanta, Georgia. Sunday will be a full day of interesting and pertinent presentations. Time will also be set aside for interactive discussions among attendees. Scheduled for Monday morning is an informal meeting of the Data General Support Center staff, and a tour is planned of their facilities. See more information below under "RIG/SIG gigs."

RIG/SIG gigs

MAY

May 3-4

OASIS (Office Automation Special Interest Subcommittee) spring workshop.

Location: Atlanta, Georgia.

Description: Includes presentations, interactive discussions, an informal meeting of the Data General Support Center staff, and a tour of their facilities.

Registration: \$75.

Contact: Judy Yordan, OASIS secretary/treasurer, 305/752-1100, ext. 479; or Linda Klatt, OASIS president, 414/299-6053.

	Quarter Ended	
	Dec. 28, 1991	Dec. 29, 1990
Revenues:		
Product	\$185.5	\$199.3
Service	109.3	112.4
Total revenues	294.8	311.7
Costs and expenses:		
Cost of product revenues	99.9	104.8
Cost of service revenues	66.4	65.5
Research & development	27.9	25.0
Selling, general, & admin.	95.7	100.9
Total costs & expenses	289.9	296.2
Income from operations	4.9	15.5
Interest income	3.2	1.4
Interest expense	3.6	3.2
Income before income taxes ...	4.5	13.7
Income tax provision	0.5	1.3
Net income	\$4.0	\$12.4
Primary & fully diluted net income per share	\$0.12	\$0.41
Weighted average shares outstanding	34.5	30.7

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drive that gives you up to 25 GB on a single tape. And with transfer rates of up to 90 MB per minute, backup takes less time, frees resources, and makes frequent backup simple and convenient.

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Command under execution, transfer rate, tape remaining, and ECC are presented in a clear easy-to-read format. By offering such features as data compression – for five times the storage capacity per tape – and data encryption – giving you data access control – the CY-8500 adapts to your company's growing needs. We'll adapt to your site requirements

too, with rack mounting options and cable lengths of up to 80 feet.

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Best of all, the CY-8500 offers peace of mind. 8mm helical scan technology, designed for data recording, gives you demonstrated performance and reliability. Not an adaptation of an audio recording format.

The CY-8500 is part of a complete family of tape backup products that range in capacity from the 150 MB ¼" cartridge streamer to the 2 TB cartridge handling system. All backed up by our in-house technical support group and 12-month warranty. For more information on how you can enjoy the best value in tape backup, call today at 804/873-0900.


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Altos	HP	PC
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Arix	IBM Mainframe	Pertec
AT&T	IBM RISC/6000	Plexus
Basic-4	IBM RT	Prime
Concurrent	IBM S/38	Pyramid
Convergent	Macintosh	Sequent
DataGeneral	McDonnell	Silicon
DEC 3100	Douglas	Graphics
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DEC TU/TA81	PS/2	and more

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