November 1991

FOCUS

The Magazine of the North American Data General Users Group

MVP

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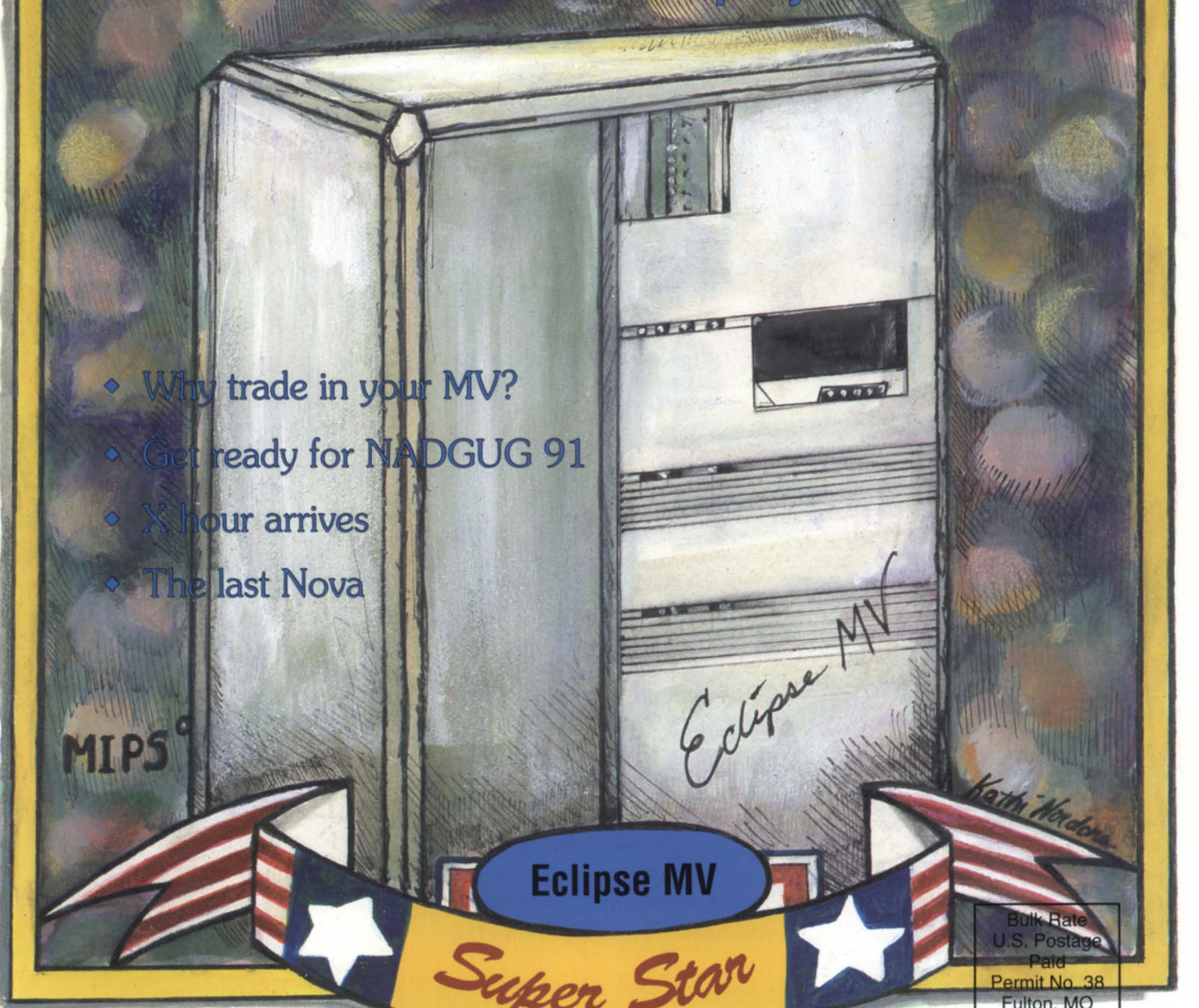

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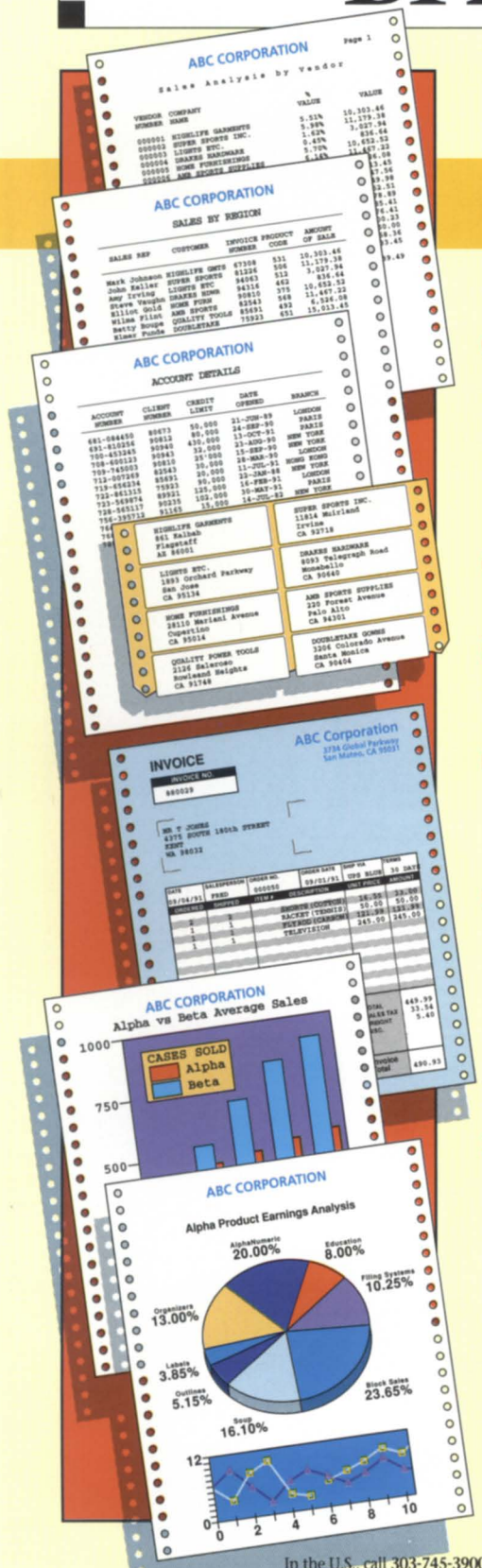

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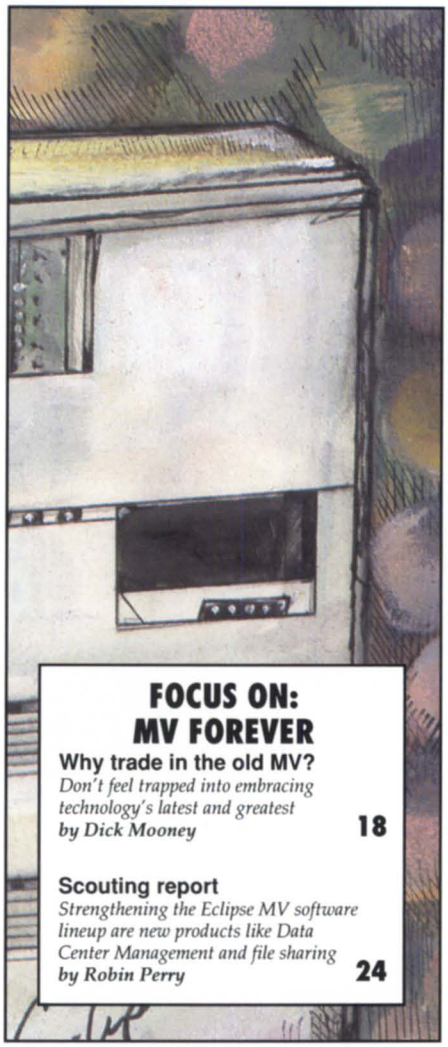

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Cover illustration by Kathi Nordone

FOCUS, the Magazine of the North American Data General Users Group (ISSN 0883-8194) is the official publication of the North American Data General Users Group (NADGUG) in cooperation with Turnkey Publishing. Editorial and business offices are located at Livingston Building, Suite 250, 3420 Executive Center Dr., Austin, TX 78731, phone 512/345-5316. NADGUG headquarters are located at NADGUG, c/o Danieli & O'Keefe Associates, Inc., Chiswick Park, 490 Boston Post Rd., Sudbury, MA 01776, phone 508/443-3330.

Postmaster: Send address changes to Subscription Department, Turnkey Publishing, Livingston Building, Suite 250, 3420 Executive Center Dr., Austin, TX 78731.

FOCUS, the Magazine of the North American Data General Users Group is distributed to members of the North American Data General Users Group. Membership fees are $60 per person. A one-year (12 issues) subscription to *FOCUS, the Magazine of the North American Data General Users Group*, costs $48. For memberships and subscriptions outside the U.S., add $50 to defray the cost of mailing.

The cost of single copies is $4. Requests to replace missing issues free of charge are honored only up to six months after date of issue. Send request to *FOCUS, the Magazine of the North American Data General Users Group*, c/o Turnkey Publishing.

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Volume 7, Issue 11.

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Robin Perry

All good things

Nothing is forever, especially in the computer industry. So when the folks at Data General declare "MVs are forever," you know they don't mean it. What they really mean is that, for the foreseeable future, Data General will continue to manufacture Eclipse MVs. And when it decides to stop making MVs, you will get five years' advance notice. Users can live with that.

As the saying goes, "all good things must end." Though it's not a pleasant thought, someday Data General *will* stop making MV computers. I don't know when this will happen. I hope it won't happen for a long time, but it is inevitable. Here at *Focus*, we wondered about that eventuality. What will happen to the MVs and the programs written on them? What will become of MV programmers and system managers? Will there be a minicomputer museum? With children starting to use Macintoshes in kindergarten, will all the knowledge to program minicomputers be lost?

In trying to understand the future of MVs, we decided to track down current users of Data General's first successful computer, the Nova. This is not *Focus*' first attempt to find Nova users.

Reports Doug Johnson, staff writer and designated Nova sleuth, "In its January 1986 issue, a *Focus* article about the McDonald Observatory in West Texas deploying Data General computers to track the path of Halley's Comet noted that the reliable machines in question included some venerable DG Novas. An editorial note in the following issue mused upon how many of those old standbys were still in service, and what kind of work they were doing."

Focus sponsored an informal contest, asking Nova users to write in and describe what they were doing with the Nova. Prizes would be awarded for the oldest machine still in use, the most creative application, and the most unusual installation. The winners would receive "vintage recordings from the year in which the Nova in question was manufactured." There were no responses.

This time around, we tried a more scientific approach to locating Nova users—we looked in the NADGUG member directory for people who listed Nova among their computer equipment. While most of the people contacted said that they no longer use the Nova, we did locate several proud Nova owners who still use and enjoy their machines.

The biggest surprise was a call from Al Hill, president of Hill Computer Consultants, Inc. of Washhington, D.C. This past summer, Hill rescued a Nova from the junk pile—serial number 262, manufactured in 1968. Hill refurbished the Nova to showroom condition, and generated a program to run on it. We finally have a winner to our 1986 contest. (Al—which do you like better, Bob Dylan or Jimi Hendrix?)

What can be concluded about today's MVs from this exercise? Barring unforseen circumstances, Data General will continue to manufacture MVs. The MVs will become more sophisticated, so that current models will look simple by comparison. You can already see the difference between an MV/4000 and one of the new WASHI-based MVs. A whole lot of MVs have been sold, and many of them will still be in use 20 years from now. If long-time MV users are like long-time Nova users, the MV will have some die-hard fans. And if *Focus* ever sponsors a contest to find vintage MV users, we'll give away CDs instead of records. Δ

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Frank Perry

Make tracks for Denver

My desk looks like the aftermath of Hurricane Bob, I have a report due tomorrow that I haven't started, and the editor of *Focus* just called and wants me to write a column. This is retirement?

It's been a few months since you've seen me in these pages, but it's not because I haven't been busy. This has been a year of dramatic change for NADGUG. Over the next two months I will fill you in on what's been happening behind the scenes. Our first priority has been working hard to make the 1991 conference in Denver, November 18-21, our biggest and best ever.

There are many productive activities at the conference: sessions, workshops, exhibits, etc. In this column, I'd like to tell you about some of NADGUG's special events that you may not be aware of.

For instance, did you know that at the NADGUG conference you can arrange a private meeting with Data General's senior executives? This tradition began at the New Orleans conference with Corporate Marketing Vice President Stephen Baxter. While at the conference, you can make appointments to meet with a broad selection of DG's senior management. Last year many people met with DG President and Chief Executive Officer Ronald L. Skates. Only at the NADGUG conference do you have an opportunity to talk one-on-one with DG senior management about your concerns or ideas!

The first day of the conference, Monday, November 18, we'll have a combined session to which all three Data General groups are invited. That is, NADGUG attendees, DG value-added resellers, and Data General sales and systems people who are all meeting in Denver in November. Keynote speakers from Data General will be Skates, Baxter, J. Thomas West, senior vice president of Advanced Systems Development, and Joel Schwartz, vice president and general manager of the Eclipse Business Unit. Alan J. Parisse, one of the country's foremost business speakers, will deliver the keynote, "Prospering through the Cycles." Following the general session, there will be a reception in the exhibit hall for all three groups.

Prior to last year's conference, only registration took place on Monday, and the conference began on Tuesday. In our efforts to expand the conference, we've added functions to Monday, so get there early and don't miss a chance to meet people from all the Data General groups.

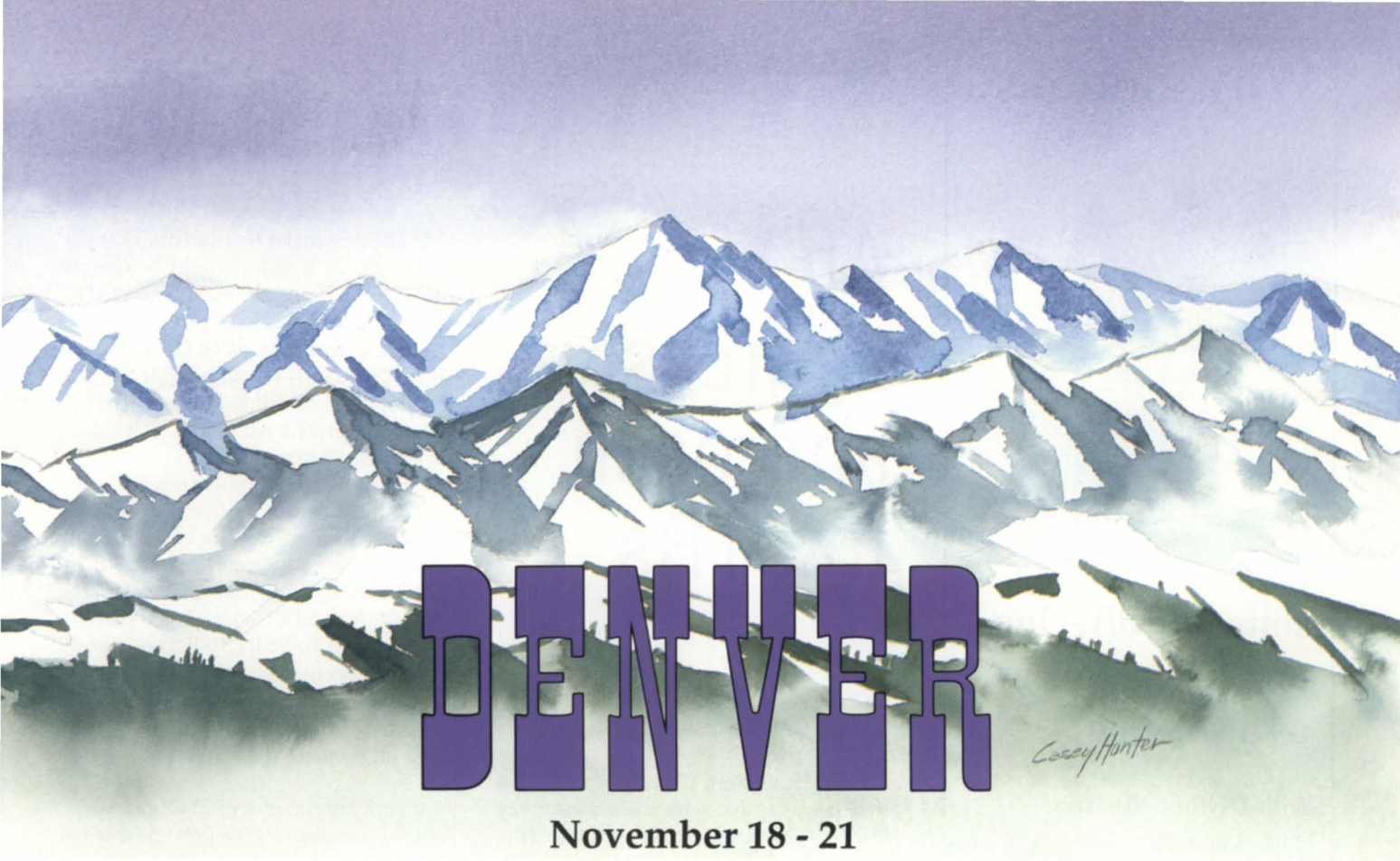
Don't forget the special interest group (SIG) meetings on Tuesday and Wednesday evenings. We've set aside special times and meeting locations so that SIGs can meet without conflict with other sessions. This will also be an opportunity for new groups to form. At Wednesday's NADGUG business meeting you can hear first-hand about the changes at NADGUG. In our sessions and exhibits, look for expanded offerings in the areas of Open Systems and Aviion.

One of the most important forums provided by NADGUG is the operating systems roundtable which takes place Thursday afternoon. The two-part session will cover AOS/[VS] II, Unix, and system management. The open-mike forum allows users to ask questions directly of Data General experts. Over the years, attendees have found this event to be one of the most effective for resolving issues.

Finally, include time on your conference trip to enjoy our host city. Denver is a fascinating place—a blend of the Old West ruggedness and modern culture, set against the backdrop of the spectacular Rocky Mountains. On Thursday evening, we've planned a Central City Gold Rush Jamboree. This post-conference tour takes you into the mountains to the site of the Great Gold Discovery of 1859. You'll see picturesque shops and saloons, enjoy a sumptuous Rocky Mountain dinner, and delightful entertainment. If you're a skier, Denver is within easy driving distance of some of the best slopes in the country.

I believe NADGUG 91 will be an exceptional conference, and I urge anyone interested in Data General computers to attend. There is absolutely no other place to find so much information regarding Data General equipment—or to meet people with similar interests—than the NADGUG conference. Don't miss this opportunity. See you in Denver in November! Δ

Frank Perry is the president of NADGUG and an independent consultant. He "retired" in 1990 after 30 years at the Rhode Island Department of Transportation. For NADGUG 91 registration information, call 800/932-6663 (or 508/443-3330 outside the U.S.).



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Cool off and network!
The "Mile High City" offers much to do and see, so come and enjoy yourself and gain valuable information in the process. Take advantage of the second year the NADGUG conference will be held concurrently with DG's reseller conference (SOURCE 91) and DG's annual sales and systems meeting. Browse through the exhibit hall which offers products and services from over 75 vendors. Network with other DG users and be part of the largest DG conference in the world!

On track for the future!
NADGUG 91 will put you on track for the future. Be there and find out for yourself the rich resource this conference is to the Data General community. If you are a NADGUG member a registration kit will automatically be sent to you. If you are not a member, call our Hotline at 800/932-6663 or 508/443-3330 to request a kit. See you in Denver!

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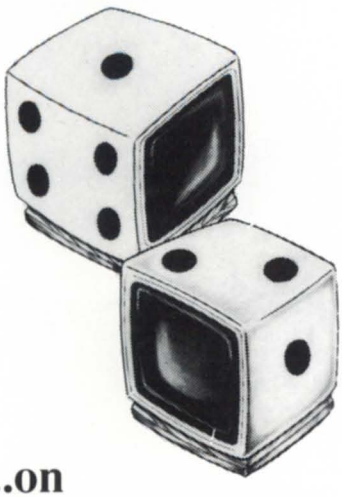

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An aggressive approach to STRs

by Dennis Doyle
NADGUG Vice President

Five days before Christmas in 1990, a meeting was held with a number of key DG developers and vice presidents, at the request of NADGUG and others, regarding the mounting number of Software Trouble Reports (STRs). I'm pleased to report a great deal of progress since that first meeting.

In early August this year, a follow-up session reviewed the gains made on this important element of products that are key for many NADGUG members. The August meeting underscored again DG's renewed commitment to resolving customer problems.

During the August session Allan Scura, division vice president for software development, stated that because of NADGUG a new, "aggressive" approach to cleaning up existing STRs had been put in place.

According to Scura's written report:

"Early in 1991 based on STR data available to Data General Software Development on current STR trends, plus input from major customers and the NADGUG Executive Board, it became apparent that an STR Reduction Plan needed to be implemented for the Data General flagship products CEO and AOS/VS II."

The plan, formulated in the Software Development operation of the Eclipse Business Unit, was presented to Data General executives in March and approved as presented. Following are its major elements:

1) The next major revision of CEO (3.3) and AOS/VS II (2.10) would be moved back three months, the extra time used to reduce the STR backlog.

2) New revisions of CEO (3.21) and AOS/VS II (2.03) would be added to the development schedule. These revisions would target STR reductions only, with no changes of functionality.

3) Software Development targeted specific reductions in STRs. One goal for CEO was to reduce the backlog of priority 10 and 20 STRs by 50 percent or more by CEO 3.21. For AOS/VS II, one goal was to reduce the total STR backlog by 50 percent or more by AOS/VS II 2.10. For both products, the objective was to avoid backlog by keeping up with incoming STRs.

As for progress in the interim:

1) Both interim revs of CEO and AOS/VS II (scheduled for June 1991) *did* ship on schedule. These revs *did* address STR reduction, rather than functionality.

2) Both CEO and AOS/VS II achieved a 50 percent reduction in priority 10 and 20 STRS prior to the June releases.

3) Total open STRs in CEO with the shipment of CEO 3.21 were reduced by 33 percent. Total open STRs in AOS/VS II with the shipment of AOS/VS II 2.03 were reduced by 39 percent.

Scura concludes: "I think you'll agree that we've made a good start and I'll be happy to provide an update when we've completed the plan. We also realize that CEO and AOS[/VS II] are not our only products, and we are looking at plans to involve our other key products as well."

NADGUG appreciates greatly the development team's efforts to date, and is confident that the plan will remain in place to keep the number of STRs at a manageable level. Here is your user group at work on a real issue for you—and with positive, concrete results! Please stay active and help the membership base grow. Δ

Dennis Doyle is the vice president of NADGUG. He may be reached at Dennis Doyle & Associates, 8355 S.W. Sexton Mtn. Ct., Beaverton, OR 97005; 503/641-8772.

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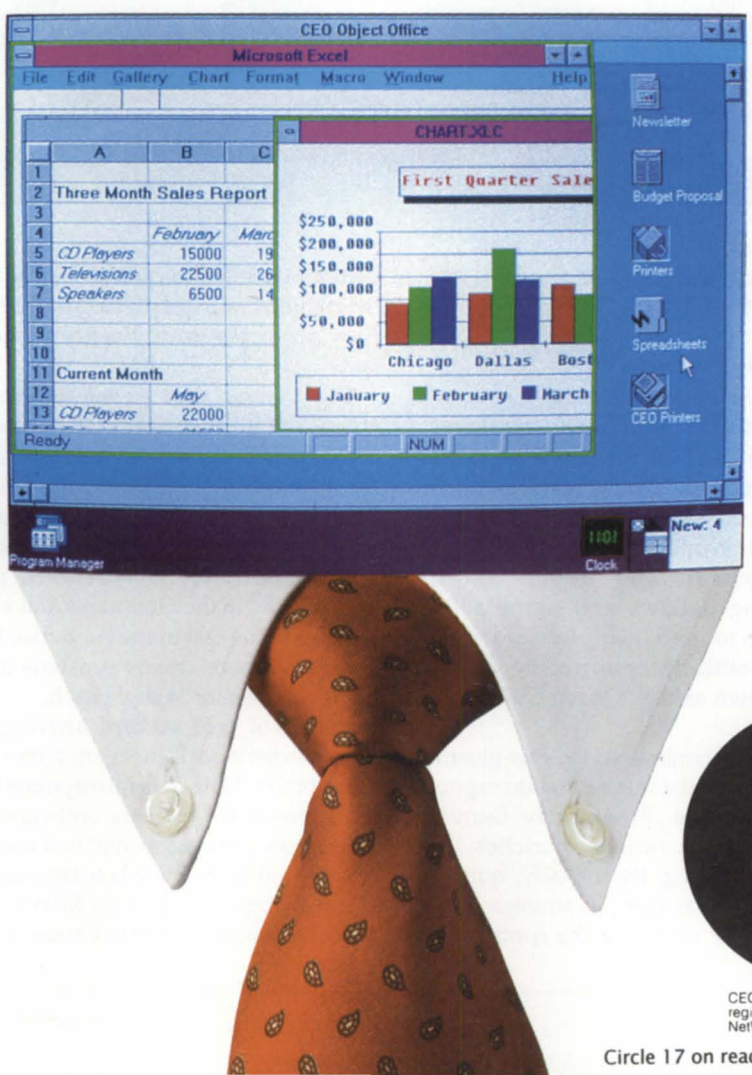

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Discover Denver

SYNOPSIS

Sunshine and skiing, Rocky Mountains and majestic vistas, frontier history and modern technology . . . there's plenty to like about Denver, the convention site for NADGUG 91.

by Doug Johnson
Focus staff

Welcome to Denver!

Gold fever in the nearby Rocky Mountains gave this rough-hewn boomtown its start. Situated at the western edge of the Great Plains, 19th-century Denver with its smoke-filled saloons and wild gambling halls lured prospectors and adventurers, hardy pioneers and wagon trains, gunslinging outlaws and desperados. They came to grab their piece of the incredible wealth. By the turn of the century it was known as the "Queen City of the Plains."

That past is symbolized today in gleaming gold leaf that adorns the state capitol building's dome. Present-day Denver boasts a wider variety of riches: its people—including, by the way, quite a few Data General users; its strategic location, near the center of the continental United States; and, as will always be true, the rugged beauty of the nearby Rockies. People come here to experience the mountains.

The Denver that serves as site for NADGUG 91 this month offers modern accommodations and convention facilities in an urban population area of nearly 2 million. The Mile-High City boasts a mix of skyscrapers and frontier history. Set on a characteristically sun-drenched plain (not actually in the mountains, but about 15 miles to the east of the Foothills), Denver enjoys more annual sunshine hours than San Diego or Miami Beach.

Instead of gold seekers, arriving this time to experience Denver are some other hardy breeds: Data General corporate leaders, value-added resellers, software vendors, system managers, and end users.

There are several hotels within reasonable walking distance of the $126 million new Colorado Convention Center, where

NADGUG 91 activities will take place Monday through Thursday, November 18-21. Also within walking distance downtown are such well-known sites as the U.S. Mint, the State Capitol, the Denver Art Museum, and a mile-long pedestrian promenade called the 16th Street Mall.

A local perspective

NADGUG 91 in its own backyard represents a rare self-promotion opportunity for the Colorado Data General Users Group (CODGUG). To help local users get involved, CODGUG has scheduled its regular meeting for November within the program of the overall NADGUG conference. "We will have somebody at the NADGUG registration booth for the whole conference, to welcome Colorado users and also as a membership-type thing, to get users to join the local group—people we didn't even know were here, if you will," said CODGUG member Bruce Cary.

Cary is the computer operations manager for the Association of Operating Room Nurses, and a Denver-area resident for 22 years. With all those years comes experience with local weather conditions in all seasons.

"I like the weather," says Cary. "And then, of course, you have the Rocky Mountains as a backdrop for sunsets. And when the weather is just right, oh, the sunsets are *beautiful*."

Sunrises aren't bad, either. "Early in the morning when you look at the mountains, when the sun is first coming up, you know where the words 'purple mountains' majesty' come from. The mountains *are* purple."

As for what you can expect in mid-November, "It can be very nice," Cary says. "It can be short-sleeved shirt weather during the day when the sun is out. Most of the time we do have some beautiful weather. However, you are *always* prepared for snow." Visitors should pack their stuff accordingly. That means a few additional warm items such as sweaters and jackets that may be put on or taken off in several layers. A chilly morning may turn rapidly into a balmy afternoon.

"We could have six inches of snow on the ground one day, and the next day it could be all burned off by noon," Cary says. And even if it does happen to snow, such weather shouldn't cause problems for the conference proceedings because of the proximity of the major hotels to the downtown convention center.

Cary describes the Colorado Convention Center itself as spacious, modern, and attractive. NADGUG officials toured the facility last February. Of other conventions held there since its opening not quite two years ago, Cary says, "The items that I have seen in the business section of the *Rocky Mountain News* have said that the people who have come in have really enjoyed it."

Denver really is a mile high

It isn't called the Mile-High City for nothing. Altitude is 5,280 feet above sea level. The air is a bit thinner, and chances are your lungs will notice it somewhat.

"Let's see," says Cary, "I'm trying to think of how to say it so that people don't get a negative feeling about it, but be prepared to feel tired." Don't be surprised if you feel slightly out of breath at times.

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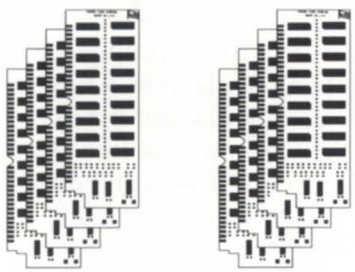

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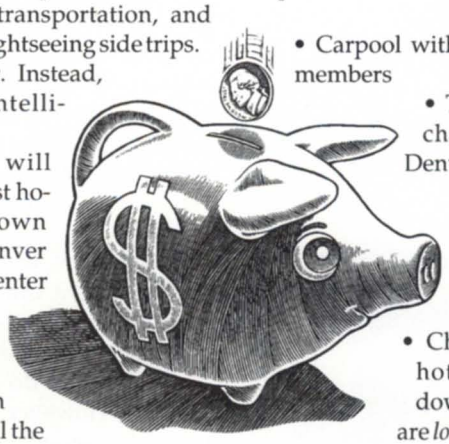
Thrifty travel tips

You want to attend the NADGUG 91 Conference in Denver, but you're worried about expenses: airfare, lodging, local transportation, and those exciting sightseeing side trips. Do not despair. Instead, economize intelligently.



NADGUG will sponsor two host hotels in downtown Denver. The Denver Marriott City Center is located just three blocks from the Colorado Convention Center, where all the Conference meetings and activities will take place. The Comfort Inn Downtown is just five blocks away from the convention center. Following are room rates at the host hotels:

Marriott—$108/single, $125/double
Comfort Inn—$55/single, $55/double, $85/suites.

These are special NADGUG rates available November 15-24.

NADGUG also provides special air travel discounts through United Airlines of up to 45 percent. Be sure to reference the NADGUG meeting ID number to qualify for these discounts.

In getting to Denver and once you're there, consider these thrifty tips:

- Carpool with other NADGUG members
- Take advantage of charter services to Denver
- Room with other NADGUG members and save up to half on your hotel costs
- Check out rates for hotels outside the downtown area (there are *lots* of choices). Then commute in to attend conference activities (and remember that tip about carpooling).

For alternative lodging information, contact Sonya Stanton of the Denver Metro Convention & Visitors Bureau at 225 West Colfax, Denver, CO 80202; 303/892-1112. You can get a free 88-page *Official Visitors Guide to Denver*. Plan ahead to make your NADGUG 91 experience educational, entertaining, *and* cost effective. Δ

"Let's say that you went for a one-mile walk every morning at lower altitude. Here, if you went for half a mile you'd probably feel the same way you did if you went for a mile at lower altitude. You could feel a little like you're huffing and puffing a little bit more than normal."

Plenty to do and see

Denver's list of "Things to Do and See" is as long as you wish to make it. There are art museums, historical museums, numerous parks, botanical gardens, and a zoo.

Just a short trip to the north is picturesque Fort Collins, home of one of the U.S. Department of Agriculture's three national computer centers. To the south is Colorado Springs, site of the U.S. Air Force Academy, Pike's Peak, and the U.S. Olympic training center. Be sure to check out the guest programs and tours in your NADGUG 91 registration packet.

"There really is something for everybody, and of course, those who want to go skiing can have a ball," says Cary. "We're not that far from the mountains. Come in on the weekend before the conference, spend the weekend up in Vail or Aspen, Steamboat Springs, make a skiing weekend out of it. Or if you don't ski, just go up and get a room and sit around the fireplace and watch everybody else ski."

Be sure to drop by the NADGUG booth and visit wth a CODGUG member for more local perspectives on what to do during your Denver stay. Δ

.8

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NADGUG Conference 91— Preliminary Agenda

NADGUG 91 features a full slate of seminars, activities, and events. Sessions this year address five major categories: Applications/Case Studies; Application Development; Business & MIS Management; Communications & Networked Systems; and System Management & Performance. For further details, consult your NADGUG 91 registration kit or call 800/932-6663 (or 508/443-3330 outside the U.S.).

MONDAY, November 18

7:30 a.m.-8:00 a.m.	• *Educational Services Seminars & Office Automation Workshop; Registration only*
8:00 a.m.-8:00 p.m.	• *Registration*
8:00 a.m.-10:45 a.m.	• *Educational Services Morning Seminars*
8:00a.m.-11:45 a.m.	• *Office Automation Workshop (Part 1)*
11:45 a.m.-2:30 p.m.	• *Educational Services Afternoon Seminars*
12:45 p.m.-2:30 p.m.	• *Office Automation Workshop (continued)*
2:30 p.m.-4:30 p.m.	• *Special General Session*
4:30 p.m.-8:00 p.m.	• *Welcome Reception* • *Exhibits open*

TUESDAY, November 19

7:30 a.m.-6:00 p.m.	• *Registration*
8:30 a.m.-9:30 a.m.	• *Data General's Implementation of the Motorola 88000 Chip Technology* • *Taking Advantage of Aviion's High Availability Features* • *Overview of Aviion's Data Communication & Networking Products* • *Network Management: Criteria for Product Selection in TCP/IP & OSI Networks* • *Recent Developments in AOS/VS II Architecture*
9:30 a.m.-4:30 p.m.	• *Exhibits & Cafe open*
9:30 a.m.-10:30 a.m.	• *Complimentary Coffee Break*
10:30 a.m.-11:30 a.m.	• *Using a Secure Unix System-Based Operating System in a Commercial Environment* • *Open Systems Directions* • *Advances in Interoperability* • *AOS/VS II rev 2.10 Terminal Services: Connecting Your Future* • *Concurrency in DG/UX STREAMS*
11:30 a.m.-1:00 p.m.	• *Lunch Break*
1:00 p.m.-2:00 p.m.	• *EDI Implementation: The Business Issues* • *An Overview of GIS* • *Data General's Office Information Systems Strategy for Aviion Systems* • *Multi-Protocol Environments on MV family Systems* • *The DG/UX Fast Recovery File System*
2:00 p.m.-2:15 p.m	• *Short Break*
2:15 p.m.-3:15 p.m.	• *Implementation of the Distributed Information System II of the U.S. Geological Survey*

	• *EDI Implementation: The Technical Issues*
	• *The CEO Product Family, Now More Than Ever*
	• *Connecting Data General's AOS/VS over SNA Networks using Logical Unit 6.2*
	• *Disk Array Technology*
	• *DG/UX 5.4 Performance Report*
3:15 p.m.-4:00 p.m.	• *Complimentary Coffee Break*
4:00 p.m.-5:00 p.m.	• *Cost-Effective Solutions in Communications: Microwaves & Data-Switches*
	• *Increasing Productivity Through Windowing on MV family Products*
	• *ICobol Roundtable & SIG Meeting*
	• *Office Automation Roundtable*
	• *Picking Proper Program Parameters*
5:00 p.m.-5:15 p.m.	• *Short Break*

SPECIAL INTEREST GROUP MEETINGS

5:15 p.m.-5:45 p.m.	• *ICobol, Office Automation, BBasic*
5:15 p.m.-6:15 p.m.	• *PERF, U.S. Forest Service*
5:45 p.m.-6:15 p.m.	• *Federal, Educators, Lions Gate*

WEDNESDAY, November 20

8:00 a.m.-6:00 p.m.	• *Registration*
8:30 a.m.-9:30 a.m.	• *Writing Portable International Applications on DG/UX*
	• *Graphical User Interfaces: A Primer*
	• *Document Management*
	• *Applying Client-Server Technologies to Sharing MV family Resources*

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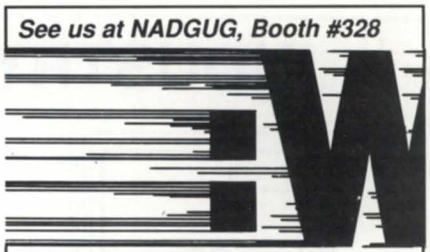

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	• *Who Did What to Whom? Better Security Auditing with the SYSLOG*
9:30 a.m.-9:45 a.m.	• *Short Break*
9:45 a.m.-10:45 a.m.	• *NADGUG Business Meeting*
10:45 a.m.-11:00 a.m.	• *Short Break*
11:00 a.m.- Noon	• *Selling Senior Management on the Need for a Corporate Recovery Plan & Hot Site Disaster Recovery Services*

	• *Maintaining Productivity in a Downsized Environment*
	• *Network Programming Using Remote Procedures Calls*
	• *Introduction to Open Network Computing*
	• *System Security in Heterogeneous Networks*
Noon-6:00 p.m	• *Exhibits & Cafe open*
Noon - 2:00 p.m.	• *Lunch Break*
2:00 p.m.-3:00 p.m.	• *Using INDEXCALC for Design Decisions*
	• *Pitfalls in Moving to a 4GL*
	• *Interfacing C++ & X-Windows*
	• *Cost Reduction Opportunities for Computer Recovery Plans*
	• *Building Distributed RDBMs Applications*
3:00 p.m.-3:45 p.m.	• *Complimentary Coffee Break*
3:45 p.m.-4:45 p.m.	• *Case Studies in Live Disaster Recovery Hot Site Utilization*
	• *Cobol is Not Dead*
	• *Utilizing CASE Tools With 4GL Software Development*
	• *ICobol in the Open Systems World*
	• *Networked Systems Panel*

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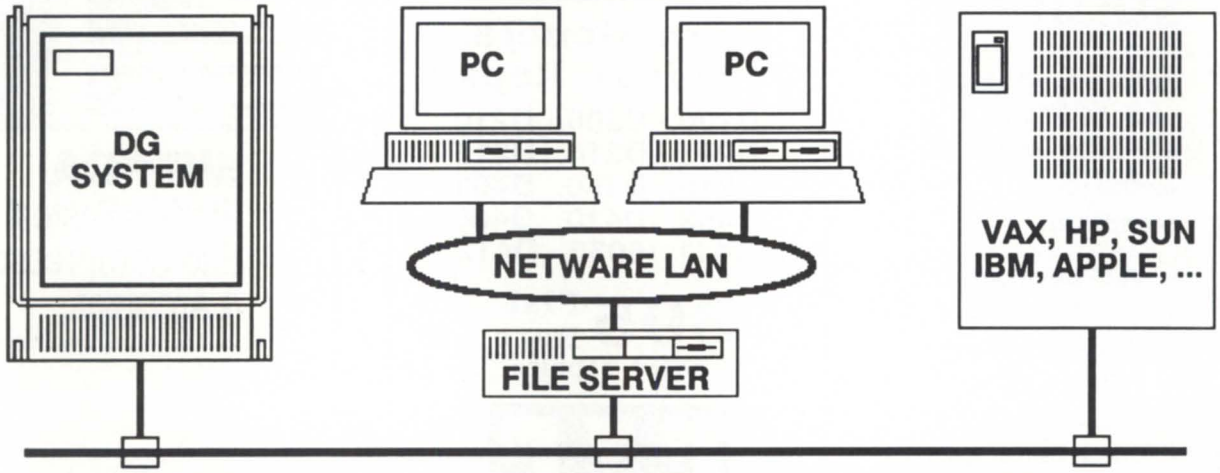

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4:45 p.m.-5:00 p.m.	• *Short Break*

SPECIAL INTEREST GROUP MEETINGS

5:00 p.m.-5:30 p.m.	• *AOS/VS, DG/UX, Health*
5:00 p.m.-6:00 p.m.	• *CQCS*
5:30 p.m.-6:00 p.m.	• *Infos II, Oracle, MRC, Guardian*
7:15 p.m.	• *Cocktail Reception & Banquet*

THURSDAY, November 21

8:00 a.m.-3:00 p.m.	• *Registration*
8:30 a.m.-9:30 a.m.	• *Moving Character-Based Applications to the X-Windows Environment*
	• *System V Release 4 Function in DG/UX*
	• *New Directions in Business Basic*
	• *The Application of Optical Disks for Computer Output Data Storage & Retrieval*
	• *Data Management Roundtable*
9:00 a.m.-1:30 p.m.	• *Exhibits & Cafe open*
9:30 a.m.-10:30 a.m.	• *Complimentary Coffee Break*
10:30 a.m.-11:30 a.m.	• *Focusing on Optical Solutions*
	• *A Simple Network: Then & Now*
	• *Data General's Data Base Management Products for the Aviion*
	• *Business Basic Workshop*
	• *Introduction to Bridges, Routers, Brouters, & Gateways*
11:30 a.m.-1:30 p.m.	• *Closing Ceremonies of Exhibit Hall; Pizza Party & Prize Drawings*
1:30 p.m. -3:00 p.m.	• *Operating Systems Roundtable* Δ

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Why retire the old MV?

SYNOPSIS

Your system is slowing down, but you simply can't afford the newest gleaming machines. Don't feel trapped into embracing technology's latest and greatest. Instead, think carefully about upgrades. You need a plan. Consider what you'd like, but buy what you need.

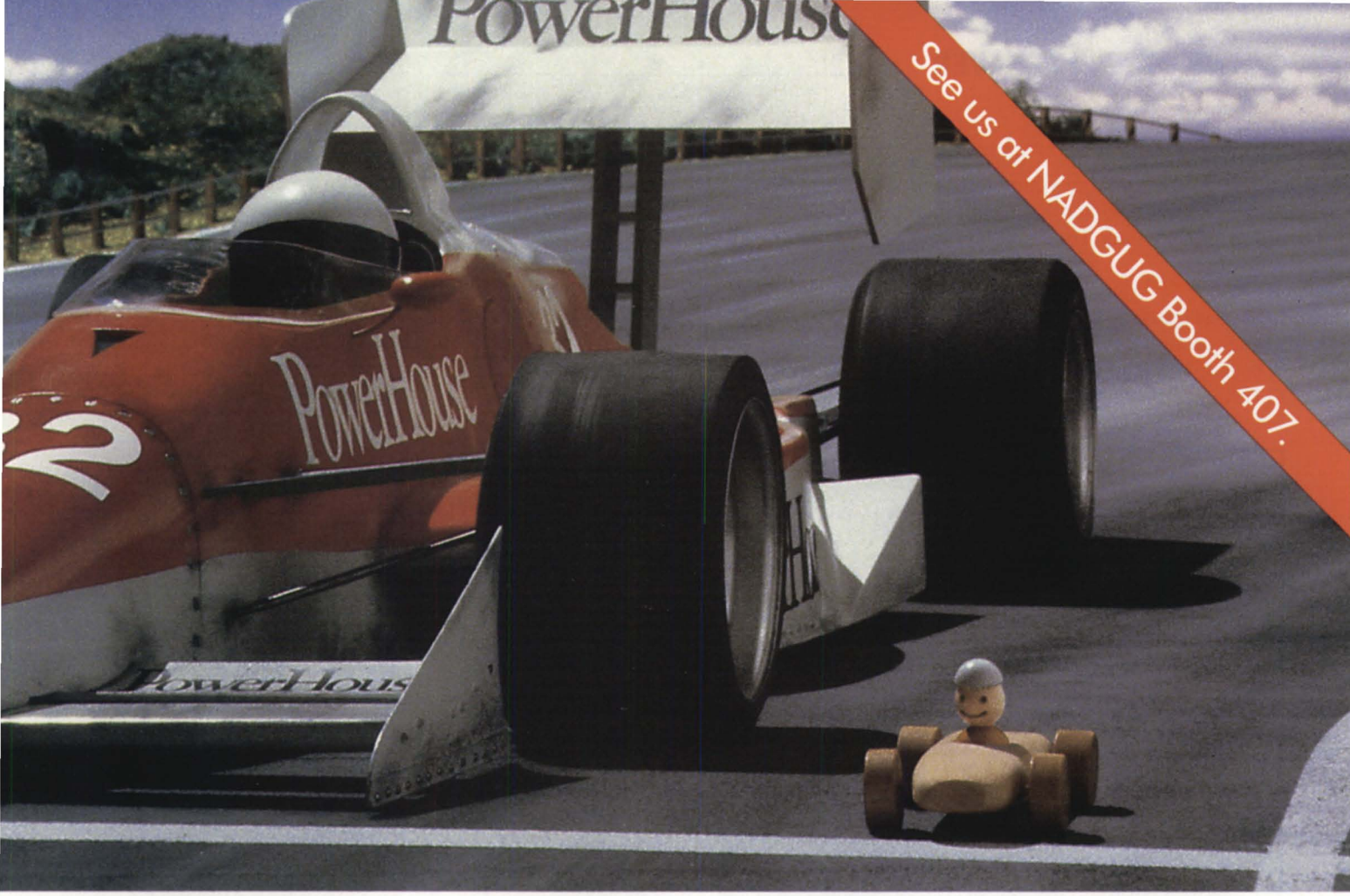
by Dick Mooney
Special to Focus

There have been many articles in *Focus* explaining the wonders of new Data General systems and their associated technologies. Quite often, the theme of the article is why you should buy this wonderful new stuff. I agree that there are good reasons to migrate away from the "old," obsolete MV (or older) systems. There are, however, many cases where the most cost-effective solution is to keep the old MV and just give it the proverbial shot in the arm. This article will address those cases.

So, why keep the old MV? Because you know the bear in the old cave. The new cave is unknown. You are familiar with your operating system. Your applications work, basically. You know your hardware, its limits, and its "personality." And before you asked it to do more than it was capable of doing, it did the job. Although your DG sales rep will disagree, the answer could very well be to upgrade to more applicable "old" MV hardware.

For more than 20 years, Data General has been known for building some of the best hardware in the business. As a result, the used DG industry has grown to multi-million-dollar proportions. And this growth has occurred in spite of numerous attempts by DG to make it go away. But after 20 years it is probably safe to say it's here to stay. Those of us who stayed in this business have done so because we believe that DG bends some of the best iron in the industry. Why else would we have dealt with the infamous DG attitude toward third-party vendors?

What you have then is a system that is probably a great machine with some performance problems, and a huge industry that survives by addressing those problems. It would be impossible in 1,500 to 2,000 words to address all the performance problems you may be experiencing, so I will attempt to provide a rather broad overview of common problems and resolutions we encounter fairly regularly. I certainly don't mean to imply that keeping the old MV is always the answer. It's not. But not everyone has the luxury of being able to jump on the technology bandwagon. This article is intended for that audience.



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In the last few years, I have seen a pattern to the kinds of complaints and problems that customers have with their MV family systems. These fall into four categories:

1) Storage space exhausted
2) User connection limits
3) Backup requirements
4) Throughput slowdown.

The most common issue we have come across is a need for more and faster disk storage. The basic architecture of Data General systems is such that disk upgrades generally are relatively simple. As mass storage technology has advanced, the speed of disk subsystems has increased drastically, the physical size has diminished, and the per-megabyte cost has come down noticeably.

The cost associated with upgrading disks varies dramatically. As an example, if you currently have a pair of DG 6236 Argus drives, you have three basic options:

1) Add more 6236 drives
2) Switch to larger capacity/higher performing DG drives
3) Switch to "emulating" drives.

The cheapest way out, if space instead of performance is the issue, is to add another pair of 6236 Argus drives. On the used market this will cost you somewhere around $800 to $1,200 each. Switching to 6239 592 MB Argus drives will run around $2,700 to $3,800 each.

For a little more money, you could go to the CSS-style disk subsystems. Because these are harder to find they cost more, but will give you better performance and more storage in less physical space. The cost of a CSS with a pair of 662 MB SCSI drives will be in the area of $11,000 to $16,000.

The most expensive, although highest-performing solution, is to go to the emulating products. These products use a controller that "emulates" the Data General DPJ device driver, and uses industry standard disks and chassis. These products cost more but will give you extremely high performance.

The options available to you for disk upgrades are many and varied. Since price increases as dramatically as performance, you should give serious thought to where your mass storage really needs to be improved, and how much it needs improving.

The second most common upgrade we have seen has been to add user connections to the MV. As a rule, if you just need more ports, the upgrade is simple and painless. Plug in another IAC or ATI, regen the system, and you're done. An IAC-16 should cost in the vicinity of $900. However, this may be the time to consider a network. In doing so, you will be able to connect your PC, DEC, etc., hardware to each other and truly share resources. This type of upgrade can be complex and expensive due to the interaction between hardware and software, but quite often it is an excellent choice. The key is to have a long-range plan.

As data bases have increased, and you have done your disk upgrades, you may

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find that your backups (daily, I hope) are taking a long time. Is unattended backup the solution? There are numerous products available today from Data General and many others. Sometimes adding 8 MM, 2 GB tape can be a part of the disk upgrade, if you go to CSS-style drives, or some of the emulating disks. However, you can add this technology to just about any MV in a variety of ways. You should plan on spending about $5,500 to $13,000 depending on your specific hardware configuration. When you consider the cost of labor to perform 12 to 15 reel backups every day, the price really is not all that high.

The most difficult issue to resolve is slow throughput. Since the system software interacts with so much of the hardware in so many different ways, determining the root cause can be difficult. The best way to approach throughput problems is to keep a log of what happens when it is at its worst. Some of the things to consider are:

- What applications are running?
- How many users are logged in?
- Is there a noticeable increase in disk activity?
- Does it show up more often when printing?
- Did it become more noticeable after adding a new application?

Once you have some background information, make some phone calls. There are numerous third-party companies who have tech support people with years of DG experience. Talk it over with them, and get some ideas of what to try and/or watch.

Resolving this type of problem could be as simple as adding a memory, or as complex as upgrading to a more powerful CPU. I have rarely seen a situation where one simple upgrade resolved all the issues. Here is a typical situation:

The customer in question was running AOS/VS on an MV/4000, with 8 MB of memory, a pair of 6236 Argus drives, 2 IAC-16s, and a 6300 tape drive. When he went over 27 users, the system slowed down drastically, and the disk activity increased substantially. He needed to add another 8 users, his disk space was 75 percent used, and he was spending about 2 to 2.5 hours a day backing up.

After monitoring what was happening, he found it was at its worst when he had high CEO use. One recommendation he received was to buy an Aviion and convert to Unix, or upgrade to an MV/9500. Both of these options were far beyond his budget.

The solution was to convert to an MV/10000, enabling him to use his existing memory, and add an additional 16 MB. We also added another IAC, and converted his disks to 6239 592 MB Argus drives. We added an 8 MM tape drive running with a Pertec interfaced controller. The final result was a substantial increase in throughput, partially due to the increased memory and partially to the increased "crunching" power of the system. He doubled his disk space and solved both the user connection and backup problems. Our field service division took care

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of the hardware installation, and the entire upgrade was done in a day. Total cost, including shipping and installation, was about $25,000.

While the customer did not end up with state-of-the-art technology, he did resolve his existing performance problems. He was one of those users who sometimes finds himself in limbo—DG wants him to move to the latest and greatest (and so does he), but the budget won't allow it.

Slow throughput problem resolution usually falls into the category of a major upgrade. As a result, there are many factors to consider. When faced with switching to a new CPU type, you should consider the many benefits of state-of-the-art technology. A large number of DG upgrade offerings include AOS/VS II licenses. This may be beneficial to you. Converting to open systems platforms like Aviion also may offer real benefits. The ultimate decision should be based on what you need as opposed to what you would like. Keep in mind that staying with "old" MV technology can be an interim step. For example, if you are contemplating a disk upgrade, and think you may end up with Aviion in the future, consider CSS disks. They are supported on the Aviion.

Overall, the MV is an exceptional product. Giving it up just because it is not state of the art seems a little absurd. If you think you need an upgrade, I suggest the following steps:

1) Determine the cause of your particular problem
2) Establish a long-range plan
3) Find a solution to the problem that fits into that plan.

A couple of years ago, Data General salespeople were seen with buttons that read "MVs are forever." Forever is a long time, but MVs should be with us for quite a while. There may be no need to get rid of the old MV. After all, we have the technology. We can make it better. Δ

Dick Mooney has 20 years experience working with Data General hardware, was a designer of the original Zebra disk drive, and is currently the engineering and new products manager at Hanson Data Systems, Inc., in Marlboro, Massachusetts. He may be reached at 508/481-3901.

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Scouting report

SYNOPSIS

Strengthening the Eclipse MV software lineup are new products like Data Center Management and file sharing, Infos enhancements, and new revisions of AOS/VS Classic and AOS/VS II.

by Robin Perry
Focus staff

Data General has loaded the bases with new software products for the Eclipse MV line. Literally. This summer the Eclipse Business Unit toured the country with its new hardware and software products. The show featured a mock baseball field, with each position displaying a different set of products. Joe Mettee, product marketing manager for the Eclipse Business Unit, reports that the show earned Data General favorable publicity among the trade and business press—including a picture of Data General President and CEO Ronald L. Skates and Divisional Vice President Marketing for the Eclipse Business Unit Dave Ellenberger on the cover of *Electronic News*.

The Eclipse Business Unit will continue adding to its software and hardware lineups. A new rev of AOS/VS II will be announced this month. The next AOS/VS Classic revision is scheduled for early 1992. In the following interview, Mettee offers a glimpse at new software products that will soon be available for the Eclipse MV. Some of the products will be announced at the NADGUG 91 conference in Denver. Mettee invites anyone attending the conference to stop by the Data General booth to obtain more information, or to see a product demonstration.

FOCUS: What new products were on display at the All Star Road Show?

Mettee: We had CEO Object Office and the new Apple Connectivity products, in the "right field" we had PC connectivity and object-oriented stuff, [in] "center field" we had Data Center Management, and [in] "left field" we had new Ingres tools and development products. Data Center Management was always swamped. Center field was a very popular place to be.

FOCUS: Will you have the same setup at the Data General booth during the NADGUG conference?

Mettee: No, it will be a different setup entirely.

FOCUS: Can you tell me more about the products in center field: Data Center Management and file sharing?

Mettee: Yes. The two main products were the Data Center Management, which is coming with VS rev 2.10, which we will

probably announce out at the NADGUG show, and the file sharing— the ability to share files between multiple MVs, which will also be part of VS II rev 2.10.

Data Center Management is software that we've written that runs on an Aviion workstation and allows you to manage multiple computer systems. I can say that instead of multiple MVs, you can manage practically anything on it. It hooks between the Aviion, then you connect the Termserver to it, then you can connect up to 10 MVs on the Termserver. If you wanted to connect more, you put another Termserver box on it. Then it allows you to manage each system in its own window. So you can have a central operator and keep tabs on everything that's going on on multiple systems from a single location.

File sharing is the ability to have multiple MVs access the same files or files on a single MV. Similar to the way the MRC allows multiple systems to access files, you will now be able to do that in a LAN environment.

FOCUS: What other new software products are coming out for the MV?

Mettee: We recently completed an Infos survey, and one of the most often asked for areas were better backup restore and recoverability. That is what we are focusing on for the next revision of Infos. Improvements to the Iverify area will be down the road. Generally, making sure that your data base maintains the proper level of integrity.

We're certainly working to enhance our PC connectivity products. We just announced the Apple connectivity products at the All-Star Road Show. We'll be adding more Apple products—the Apple Data Access language will be coming soon. We'll be adding Netware services to Novell—just generally keeping up with the standards at whatever level in PC connectivity, which is a large part of our overall strategy.

We have updates to languages coming in. We will bring VS/Cobol and ICobol up to the 85 standard, and we're bringing C up to the ANSI standard.

Sybase is in the process of porting to the MV. Oracle will be doing Version 7, Cognos is bringing in the latest version of Powerhouse, so those are all new. In general, we are continuing to work closely with the partners we have in third-party software like Wordperfect, Oracle, Cognos, and Ingres.

FOCUS: The EBU has a policy that high-end product cycles are three years or less, and mid-range product cycles are two years or less. How does this affect the time on testing and research that you need to assure a product is ready to bring to market?

Mettee: Our announced product goals are two years on the mid-range and three years on the high end. We try to drive to more aggressive schedules internally, but we publicly announce two and three years.

To answer your question, you have to break it down into two areas and look at the mid-range, or the two-year product cycle, and realize that those products are all based on the WASHI chip. One of the

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things we told customers when we brought out the WASHI chip was that it would mean shortened development times, improved reliability for lower cost of ownership, and quicker time to market for new products. Since they all are based on the WASHI chip, the thing that you don't have to do is start over every time you develop a new MV.

We have laid a foundation with a single-chip MV. We're constantly working with Hitachi, the chip vendor, refining the process. In a sense, everything is done before in testing your new products, so you can have a new design cycle. You don't have to test out that new CPU, you have to test out that new system design. In that area, it really hasn't reduced our time at all. We still have to go through a full, complete set of system testing diagnostics, a full set of regression testing. It's just that you're finding less problems because you didn't redesign the CPU.

At the high end, you've got a different condition. You have to start with a clean sheet of paper for that CPU, and what you think is the best technology in the timeframe you have to deliver. What has changed is that the development tools that are available today are far superior to ones that were available only a few years ago.

That means we can do more simulation because the time to write the program design is shorter, and you can simulate more areas of the system. The systems today have more simulation time going into them than any system we had in the past. And that makes for a reliable design and a shorter debug phase.

FOCUS: With a 20 percent price/performance improvement each year, why buy an MV now?

Mettee: That's always true in the computer industry. If you wait for the latest and greatest, you'll never buy anything. That's been true since the early days.

Why buy now? How about the case where you're a new customer? You don't have an MV. Last year, 50 percent of our VARs' business was to new first-time users, so obviously, they needed a computer to run those applications.

And what about the guy who already has an MV; why buy now instead of waiting? Again, you can always wait. The faster the CPUs get, the better the price/performance, but in the meantime, there could be a great savings for you. The cost of ownership of the new WASHI products is substantially less than things like MV/10000s and MV/4000s. You can replace a 2.5 MIPS MV/10000 with a 7 MIPS MV/9600 and dramatically lower your monthly maintenance costs.

Another thing a lot of customers have done is consolidate a lot of systems—taking an MV/4 and MV/10 and replacing them both with an MV/96 or an MV/30000. So your operational costs go down, your cost to run that in terms of electricity and cooling go down, and your monthly maintenance goes down. So there are savings there. And there are other people who have run out of cycles. They need more computing power. Δ

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Why SNMP?

SYNOPSIS

Distributed, large, or multi-vendor TCP/IP networks can all benefit from centralized network management. The growing movement toward SNMP is supported by a slew of software and systems vendors.

by Dr. Katherine Jones
Special to Focus

(Note: Last month (Focus, Oct. 91, pg. 20) the author began a discussion of SNMP (simple network management protocol) including a technical overview of what SNMP is and what it does. This month's article delves into the "how" and "why" questions regarding SNMP.)

SNMP is a "stateless" transaction-oriented protocol. This means there is no particular state or sequence of events the protocol must go through to operate. This allows for direct querying of the entities across the network even if that entity goes down.

SNMP network management operations are modeled as request/response transactions between the network manager and the agent across the network. Activity relating to network management is usually initiated by the manager (the software product, not the human administrator). However, when a significant event affecting that agent takes place—such as a link or router going down, or a computer reboot—the agent initiates a "trap" and notifies the network manager.

The decision to keep the number of traps generated by an agent to a minimum allows the network administrator to control the amount of traffic on the network. In addition, however, vendors can define traps for other network events important to their product or that they perceive as vital to the network in general.

Because SNMP uses the user datagram protocol (UDP), part of the TCP/IP protocol suite, SNMP has low network overhead when making queries. Hence, it is an inexpensive way of gathering data across the network.

Managing your TCP/IP network

Data General distributes an SNMP-based network manager that runs on an Aviion workstation. Called "EYE*NODE," this sophisticated product developed by Digital Analysis Corporation gives the network manager the capability to monitor, test, diagnose, and correct network activity on a local or wide area TCP/IP network, in which attached devices implement the SNMP protocol. Such devices include other Aviions, Eclipse MVs, and any PC, terminal server, bridge, router, or brouter that has a standards-based SNMP.

EYE*NODE also provides the ability to manage the network from a central location or at multiple sites. Traps (SNMP alarms and alerts) from the managed nodes and devices on the network can be sent to one or more management stations.

The EYE*NODE product line, all available from Data General, consists of two versions of an SNMP-based network manager: EYE*NODE (which includes an embedded Ingres data base), and EYE*NODE/RT (which does not offer data base support); SNMP agents for Aviion systems running DG/UX 4.3X, available individually and through site licenses (an "agent" has to reside in each system to be managed); a Novell LANtern MAC-layer monitor for protocol statistics; and Management Information Base (MIB) extensions to allow other vendors' SNMP devices (e.g., 'cisco routers) with proprietary MIBs to be managed by EYE*NODE.

Data General will provide SNMP agents as part of the TCP/IP product suite in revision 5.40 of DG/UX and in revision 1.10 of AOS/VS II TCP/IP. EYE*NODE works with both these Aviion and MV agents over ethernet (IEEE 802.3) and token ring (IEEE 802.5) for local area network management, and X.25 for managing across wide area networks.

EYE*NODE allows the network manager to monitor and control a TCP/IP network and all SNMP-based devices on it from any Aviion 300 or 400 series workstation. When used on a LAN with a LANtern LAN analyzer (available from Data General), EYE*NODE can alert the administrator to such events as broadcast storms, excessive traffic and collisions, malfunctioning transceivers, and improperly installed cables.

Vendor-supplied MIBs

The good news for system and network managers is that vendors are usually most willing to supply both SNMP-compliant and readable text versions of their MIB extensions. EYE*NODE has a compiler

through which these proprietary MIBs can be integrated with those already supported. MIBs available today from Data General are capable of managing products by Synoptics, 'cisco, Proteon, and the Novell LANtern sub-Mac layer monitor.

Who needs SNMP management?

Anyone with a network using TCP/IP can benefit from SNMP. Some of the clearest needs are described here:

Large TCP/IP networks: those businesses with either a large number of workstations, or several MV or Aviion servers, can benefit from centralized network management. The actual number of systems, either workstations or servers, is not so much the issue as the ability of the network or system administrator to manage the number of systems. Whenever centralized management would make that job easier, an SNMP manager is a good candidate.

Distributed TCP/IP networks: Whenever networks, regardless of size, are distributed over a wide geographical area, from a college campus to another hemisphere, a product that can monitor and control the remote systems is desirable. In this instance, one may have as few as two MVs running AOS/VS II TCP/IP—but have a need to know the status of the remote one and the ability to control it.

TCP/IP multi-vendor networks: Because of the standard protocol SNMP, many managers can monitor and control any SNMP device—both hosts made by other vendors and those network devices like bridges and routers that have SNMP. Thus, an SNMP manager is a solution for those environments where multi-vendor computers that contain SNMP agents communicate over TCP/IP on ethernet or token ring local area networks, or X.25 wide area networks.

Vendors with SNMP today

The growing movement toward SNMP management can be seen in the numbers of vendors participating in the Interop SNMP interoperability demonstrations. In its first year (1988), the SNMP demo had 14 participants; in its second year, there were 25 vendors, including the majority of major systems vendors. In 1990, about 50 vendors participated in the SNMP inter-manageability demonstration at the San Jose Interop '90 show.

The initial wave of SNMP vendors were small to medium-sized companies specializing in TCP/IP networking. Several key players, such as Sun Microsystems and Hewlett-Packard, participated in the Interop '89 demonstration, which served to raise consumer awareness and interest in SNMP. Major vendors, including IBM, DEC, Data General, Hewlett-Packard, NCR, and Unisys, are now investing in SNMP management. Other vendors with products announced or in process include Prime, Proteon, Wellfleet, Cabletron, Vitalink, 'cisco, Synoptics, 3Com, TRW, Experdata, Chipcom, Cheyenne Software, and many more. Δ

Dr. Jones is the senior product manager responsible for network management and TCP/IP product lines at Data General.

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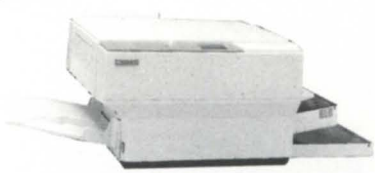

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The last Nova

by Doug Johnson
Focus staff

SYNOPSIS

Data General's once-numerous Nova is fading away like an endangered species. Is there any such thing as a classic in the Computer Kingdom, something that will stand the test of time? Perhaps not.

An opening scene in Tracy Kidder's prize-winning book, *The Soul of a New Machine*, describes how upstart Data General Corporation in the earlier days memorialized its first successful computer. On display in the lobby of the company's Westboro headquarters sat "The First Nova," its screen blinking and glowing with the spectacular sales figures and profit margins of burgeoning financial prosperity.

Introduced in 1968 and thereafter appearing in a number of model variations, the Nova, in author Kidder's words, "had a simple elegance about it that computer engineers I've talked to consider admirable, for its time."

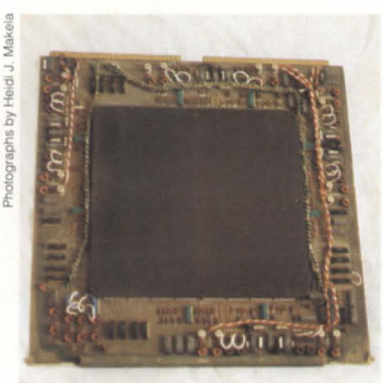
For its time is the operative phrase here. In the computer business what you produce today not only expands upon what you did yesterday and the day before, but

Quiz

Configuration:
- Original Nova
- 7-slot chassis
- Basic I/O w/RTC w/EIA option
- 4KW core board

Original Nova, #262, still running with 4KW core memory

Photographs by Heidi J. Makela



4K core board

1) What instruction is being displayed?

2) What address does the instruction reference?

3) At what address is the instruction stored?

4) What address is indicated by the switches?

(Answers on page 35)

Recalled to life

by Doug Johnson
Focus staff

The old computer was a sad, dilapidated specter of its former self; a forgotten machine, light bulbs burned out, switches broken. Rats had built nests inside a chassis damaged over the years by water, dust, mud, and neglect.

To the casual observer this was a worthless wreck, an outmoded relic from an equally obsolete era, but to former Data General Corporation employee Al Hill, it was an authentic treasure. This was a DG Nova, a first-year original from 1968, serial number 262. And after 23 years, Hill was determined that it would live again.

Hill is president of Hill Computer Consultants, Inc., in Washington, DC, but he may be rapidly developing as well into a dedicated computer collector.

it tends to shove those earlier efforts into obsolescence.

Achieving classic status

Drive a classic automobile and you can enjoy tooling around town in style. And you can savor basking in the envious stares of your peers. A 1965 Ford Mustang is a recognized beauty, a machine masterpiece you could still take out for a breezy jaunt down the highway. It still runs on gas. Certainly it uses today's roads, and it'll serve you just fine in its primary function—getting you where you want to go. You may even congratulate yourself on the timelessly splendid piece of hardware you have preserved from the junkyard.

A car 10 or 20 or 30 years old may still be a perfectly suitable way to travel, but can you say the same about a computer? Can a computer stand the test of time? Are computers even *meant* to? Anyway, the years just don't pass the same way. This different species of machine lives faster, dies younger, and is wheeled out the door sooner, *much* sooner.

"The First Nova" is still there at DG headquarters, but not too many years from now that first Nova may also qualify as the last—like Martha the passenger pigeon, stuffed and displayed at the Smithsonian.

Going . . . going . . .

Data General's marketing department estimates that approximately 1,500 variously installed Nova machines are still out there. Of that total Data General still maintains about 500. Perhaps 500 or so receive third-party maintenance. The remaining 500 get no service at all.

"It's dead," says Charles Masoomian of Data Investors Corporation. His company in Hackensack, New Jersey, carries Nova systems and parts, but the old computer accounts for only a tiny percentage of the business. Some power companies up in Canada are still using Nova 3s as moni-

Classic, continued on page 34

"In the last six months I've been accumulating DG equipment," he says. Hill wanted to locate an old Supernova, the model that appeared just after the original Nova, but treasure quests don't always turn out as expected.

He ran across the Nova at a "junk dealer"—a DG used parts vendor—in Meriden, Connecticut. "He had two original Novas, and I had an old Desktop 10 that I didn't want," Hill says. "So we traded."

The battered machine arrived at Hill's northern Virginia home last July 30. There it was—7 inches tall, 19 inches wide, 22 inches deep, 7 slots, weighing 65 pounds. It was the first in a line that would include such models as the Nova 800, Nova 1200, Nova 2, Nova 3, Nova 4, and quite a number of variously configured versions in between.

Restoring a vision

Hill's fixup procedure took about 40 hours all told—not all that much time, he thought—and cost him perhaps $25 or $30. But it was a labor of love.

"I usually stay up a lot at night," he says. That time was spent "replacing bulbs, using Q-tips with alcohol to wipe off the dirt and stuff on the inside, just general-purpose cleanup."

Broken switches needed replacing, as well as some specially shaped lock nuts (rounded, and beveled on one side) to hold them in place. "It took me about four weeks to find a company that made those nuts," Hill says. He ran into the same problem with the light bulbs. Apparently only two companies in the United States still make them.

"I took off the front panel and scraped off all the old lettering and lines that were on there to divide up all the lights and everything," says Hill, "and replaced them with all new lettering and new lines." He used a 20-percent muriatic acid solution to clean the chassis of collected grease, dirt, and rust. Inside the machine, he used a horsehair brush to clean out dust, and

Recalled, continued on page 33

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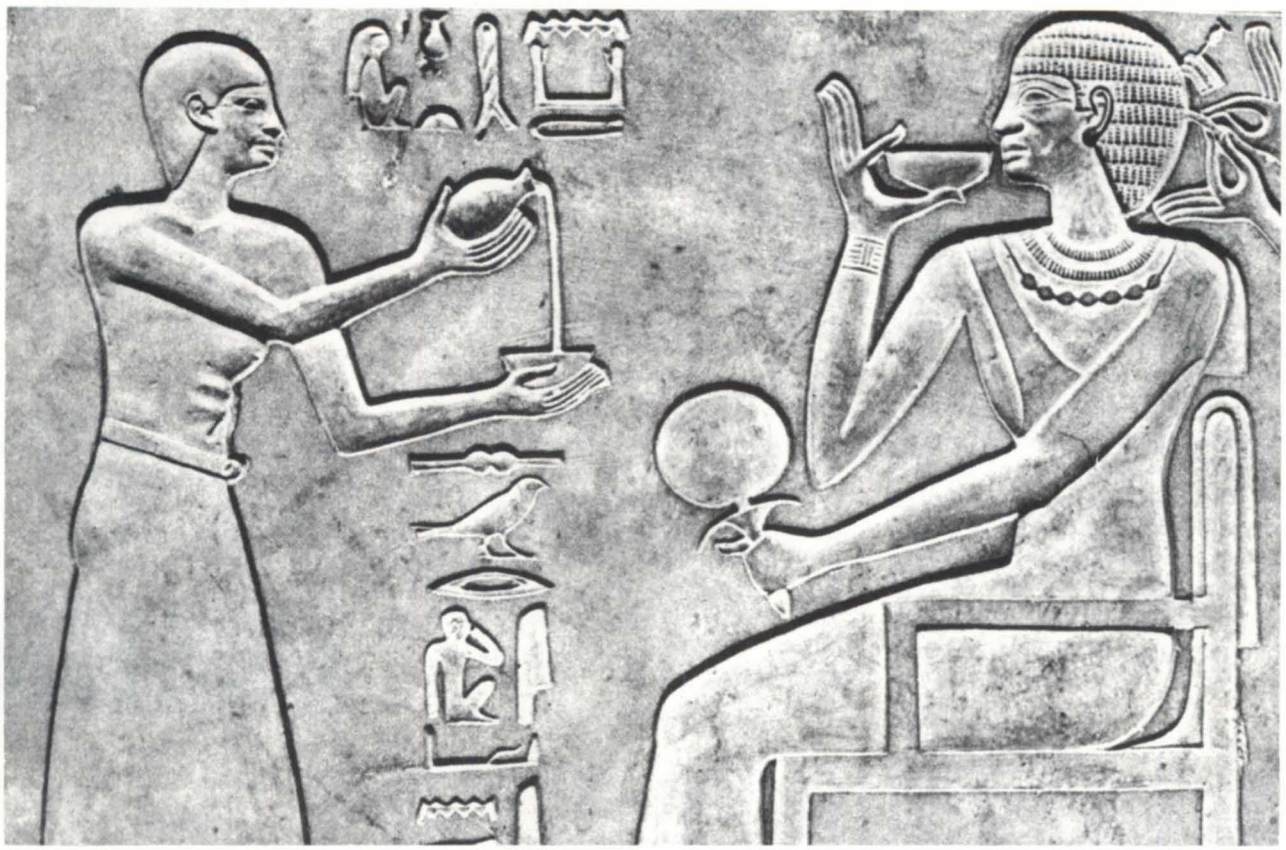

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Recalled, continued from page 31

sprayed components with a deoxidizing compound.

An earlier era

What emerged from the cleanup was a vision out of time. "It looks like it just came off the showroom floor," Hill says. "I have one of the oldest operating DG machines."

The new/old Nova also represents a fascinating earlier era in electronic computing. "You can't find a machine today that will illustrate the basic concepts of computer programming like this one did, being 23 years old," Hill says. "This is the way we used to have to do it."

Hill called Data General's public relations department to find out how much the Nova sold for in 1968. It was the first system of its kind that was priced at under $10,000.

The original Nova CPU was actually on two boards. A third board was the basic I/O board. The fourth board was 4 K words in core memory. "It has no disk drives and no tape drives, nothing like that," Hill says. There's no RDOS operating system, either. "Everything that I can load into the Nova comes either off my PC or off of my MV machine, downloaded over the serial port," Hill says. "And to download it, I have to key in a loader program that's about 16 words, which will read data and place it in specific locations in memory."

Hill tested the Nova with a program to generate prime numbers (the Sieve of Erastosthenes), written first for an MV/4000 with subroutines to emulate bit instructions (AOS/VS on the MV will accept bit instructions; the Nova won't). The MV ran the program in 30 seconds. After downloading the program via the serial port, the Nova ran it in 228 seconds.

"So if you look at the MV/4000 as being a 0.7 MIPS machine, and you look at the Nova as being a 0.1 MIPS machine," Hill says, "that's about the difference between running in 30 seconds and running in 228 seconds, a factor of seven."

Hill marvels at the simplicity of the Nova's boards. "If you look at a CPU board now in an MV machine or on a PC, that board is very highly populated, very densely packed," he says. "But these old boards, you can repair these boards by hand. You can *make* them by hand. The boards are very sparsely populated, and the chips that they used were almost all bought off the shelf. Nothing was custom-made."

As for the core memory board, "it's like looking back in time," Hill says, "because *nobody* makes boards like this today."

Collector's items

Can it be said that the computer industry has been around long enough now that it's possible to have something that you can call an antique? Maybe and maybe not, but the simple fact is that machines like the original Nova won't be around much longer for anyone to wonder about it.

"They are going to be gone, if they're not gone already," Hill says. "I was very fortunate, I thought, to get hold of this one. And the fact that it still runs, to me, is amazing. And it runs well." Δ

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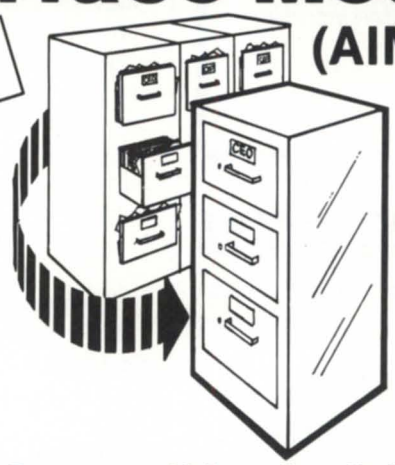

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Classic, continued from page 31

tors, he recalls. Various others crop up in government. The Novas are around here and there, but not conspicuously.

"Once in a blue moon someone calls up to get a part," Masoomian says. "If they're buying a Nova [an entire system], it's as a spare."

There is the occasional offbeat request. One customer "asked me to put a Nova system together so they can take files off a 10 MB disk that they've had in storage for about 10 years," Masoomian says.

Randy Welch, sales manager for Ames Sciences, Inc., of Trappe, Maryland, also notes the rare Nova purchase for a spare. "Primarily, I'd say they [Nova customers] are companies that started with the Nova when it first came out. It had unique software and everything's up and running, and it's working fine for them."

Vince O'Connell of Security Computer Sales, Inc., in St. Paul, Minnesota, says "few and far between" describes Nova users rather well. "Anybody that's done any growth at all," he says, "or has decided that they really want to upgrade their system, just wouldn't be using a Nova anymore. I mean, for crying out loud, just about any PC can do what a Nova does nowadays."

Still using Nova

The NADGUG membership directory for 1991 lists only a handful of DG users who recorded "Nova" in the CPU category. Most of those when called say, "Oh, we don't use the Nova anymore."

But Robert Hiett of Terry Robinson & Co., Inc., in San Francisco answered, "Yes, absolutely," to the "Still using Nova?" question and proceeded to explain why in terms paying tribute to efficiency, economy, and just plain common sense.

The company for which he works as managing partner typesets scholarly books and journals. "It's mostly text-intensive material, and if there are illustrations, windows are left for the illustrations, or photographs, or whatever is stripped in later," says Hiett.

Shouldering the work burden are a Nova 4X and 4C for an office of less than 10 people. The system was purchased in 1983. "And we have two 147 MB drives, what are called Kismets. And four terminals. And a dual-density mag tape drive." The whole outfit is hooked up to two Linotron typesetters.

Hiett likes the Nova because of its RDOS operating system and because of the economical efficiency of the software he's using, sold by Penta Systems International of Baltimore, Maryland. Hiett used to work for Penta, hence his familiarity with that software and with how it runs on different systems. Other choices could be DG's MV series with AOS/VS, or PCs on a network, or in the near future the Aviion.

"The speed is roughly the same, believe it or not," he says, comparing the Nova to the MV or a PC network. And RDOS allows for a significant reduction of scale. "The operating system . . . well, RDOS takes up about 30 K of disk space. AOS/VS II takes up 50 MB." Hiett laughs.

"From my point of view, it's [RDOS] a much more elegant system. It's a lot easier to maintain in terms of terminals and stuff. I know people who have networks hooked up to MVs, and whenever they go down it takes 20 to 30 minutes to get those things back up again. I mean, here, one terminal may pull the software down, but it takes about 10 seconds to restart all of it."

What about maintenance costs? Hiett laughs again. "We don't have any maintenance costs." The used parts market provides spares. "We have a backup for every board, everything we've got, and we bought it for pennies on the dollar."

With Penta migrating soon to the Aviion, Hiett says he would consider upgrading to a server situation. But such a change brings up the prospect of large capital outlays that the company has avoided up to now.

"I think Data General was kind of shortsighted in dropping RDOS development," Hiett says. "If they stuck with something as tight and compact as RDOS and just expanded a little bit and put it on a tighter chip, they could be selling something for 10 grand, some plug-and-play minisystem for 10 grand that would be relatively comparable to the thing that IBM introduced recently, the AS 400."

As for the old Nova, "Yeah, I am very happy with it," Hiett says, adding that he rejects the notion of going out "every three years and spending $200,000 or $300,000 to have the latest toy."

Just a machine

The Nova computer line certainly helped define Data General's early success, but perhaps it isn't correct to compare old computers to classic cars.

"It's surprising how long some com-

puters stay in operation," says Gordon Haff, DG's product manager for Midrange Eclipse Systems. He works on occasion with people who choose to upgrade from their old Novas.

"You appreciate the history," he adds, but Haff points out that venerated automobiles take on additional aspects—such as image and sentimentality—that computer users don't necessarily feel when they're considering the replacement of their old machine. A computer is, after all, a tool that you use to get a job done, and the decision is one of economics. "You don't get sentimental about a power drill when it gets old," Haff says. "You replace it when it becomes necessary to do so."

RDOS forever

At Datanet Co. of Reseda, California, a Nova 4 serves an even smaller office: electromagnetic consultant Robert Hansen and his secretary. Hansen, who has worked in the computer business since 1950 on ILLIAC I, "where I was writing machine language," has so far declined to switch to PCs. In his view and based on the computer publications he reads, PCs are not the right machine for the number-crunching he requires. Although PCs are rated faster than the Nova 4, extended memory problems negate much of the advantage.

"In order to address extended memory, you have to go through these Mickey Mouse code adaptions, which slow everything down, and so, the speed advantage of a 486 is partly lost," he says.

Hansen considers his Nova 4 "a very reliable system." Maintenance costs through a third-party vendor are about $500 per year.

As for the future, Hansen concedes the Nova computer's demise through obsolescence. "A lot of the people will have migrated to something that's faster," he says. "I suppose there will be some people who won't change because there's no advantage to changing, but there won't be many."

Hansen's own decision for his next computer system is unclear. "I don't really have a need for a proprietary operating system," he says. "I'm not networked. The MV is especially good for networks, where there are a bunch of terminals, but that's not what we do."

The Nova 4 has an advantage over the new workstations, in Hansen's view, in that "most of the workstations are Unix, and Unix is a dumb language compared to RDOS."

"I think for users such as myself," Hansen continues, "I find RDOS very, very good. Unix in comparison looks as if it was written by a bunch of cute graduate students." In RDOS, by contrast, "it's difficult to get in trouble."

Hansen's dreams turn to simplicity. "I wish there were RDOS-type operating systems available for more powerful computers, but I don't see them anywhere."Δ

Answers to the quiz on page 30

1) SUBZL 1,1
2) None. It's a trick question.
3) Location 456_8
4) 445_8

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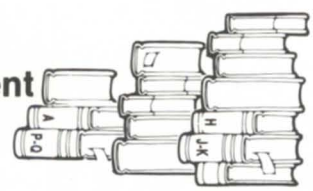

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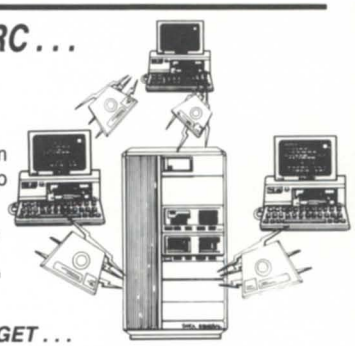

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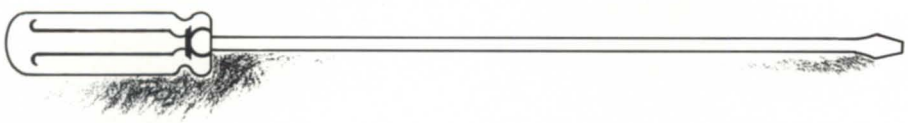


by Bob McGowan
Special to Focus

SYNOPSIS

Peripherals are more reliable than ever. And even when you do need replacement parts, you can get them overnight. So who needs peripheral maintenance service? Self-maintenance is an idea whose time has come.

When is a disk drive not a disk drive? When it's *down*, of course. That could apply to just about any part of your computer. But this article will focus on peripherals and how peripheral maintenance as we know it—through the evolution of hardware engineering and manufacturing processes—may be a thing of the past.

About the time the MV-class computer arrived on the scene in the early 1980s, peripherals and disk subsystems began playing a very different role from the grunt jobs to which they were accustomed. Someone had the brilliant idea of offloading the CPU, delegating workload to peripheral controllers on the I/O bus.

Ala-ka-zaam! . . . the Argus was born, and disk technology has never been the same on Data General computers. (Please do not mistake the magic for DG's years of effort to deliver the Argus.)

The Argus brought intelligence to the disk subsystem, a major breakthrough in improving CPU performance. Disk subsystems became self-reliant for their own performance. And when compared to Zebras, Vulcans, and Kismets, transfer rates of 1.8 MB/second and 22ms average seek times were pretty outstanding. Maintenance costs were reduced dramatically (50 percent less than Zebras, for example). Improved performance, reduced power consumption, lower maintenance, and faster CPU all from a disk drive—now *that's* technology.

At the same time that Data General was delivering thousands of Argus drives to the market, Zetaco (at the time, the only real alternative to DG disks) was offering all of the above features—improved performance, reduced power consumption, lower maintenance and faster CPU, as well as overlap seeking, and other enhancements. Zetaco, however, was comparing its products to the Argus, while Data General was comparing the Argus to the Zebra. At the time, Zetaco subsystems cost about 50 percent less than the Argus.

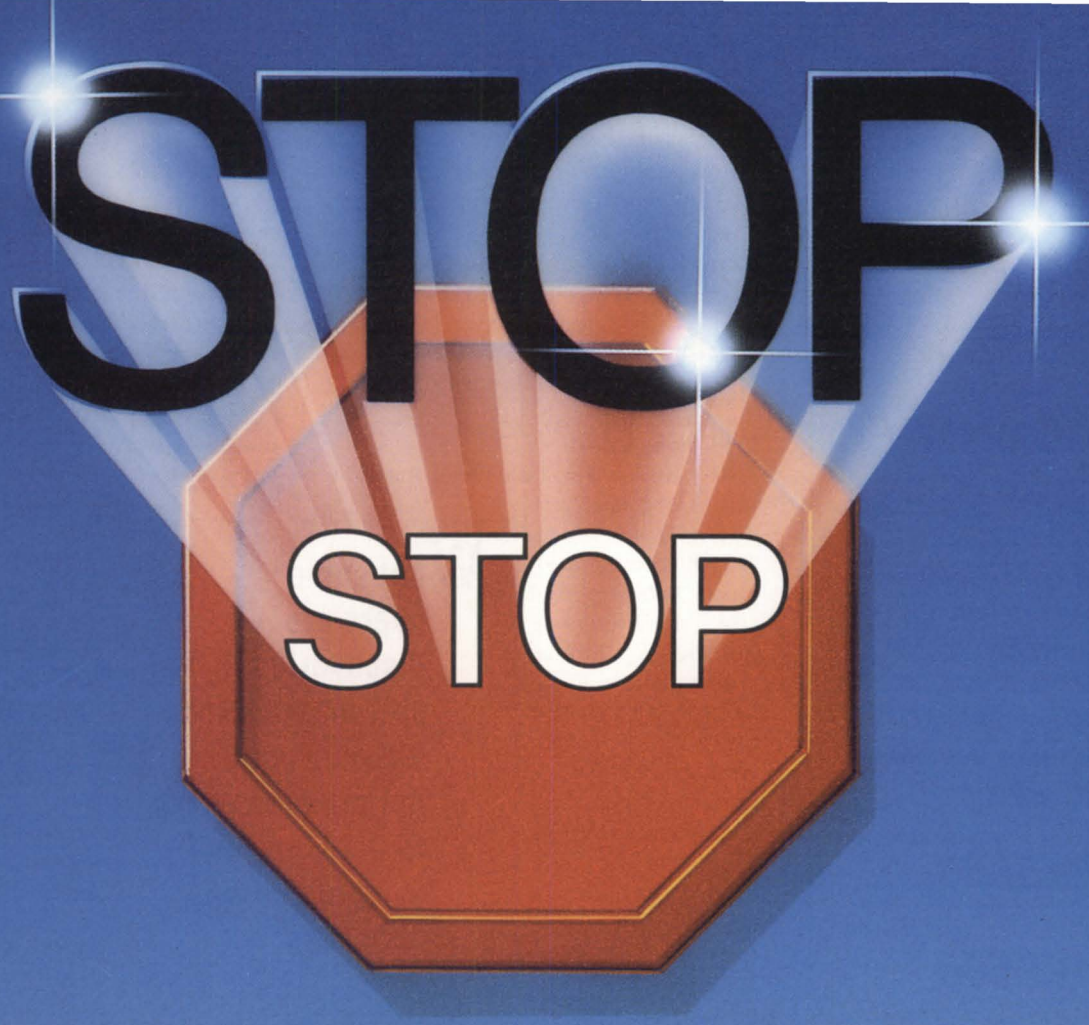
RAMS and RAID

Let's move the clock ahead to 1990. The past few years have seen Data General offering more and more non-Data General manufactured disk drives, mostly on the smaller "L-Bus" machines. We've also seen new heights reached in performance with the RAMS (rapid access magnetic storage) disks. Transfer rates now are almost three times faster than the original Argus 354 MB disks. Seek times are a full 25 percent faster than the Argus.

Because the RAMS used the DPJ device driver under AOS/VS, the CPU still had a lot of help from the disk controller. Maintenance prices came down a little more. Power consumption continued to drop and cooling requirements . . . well, the RAMS needed to be kept cool because of the speed of disk revolutions and the heat generated to spin at 4,600 rpm. It was another major step in the right direction, although it was still a proprietary interface, which meant it would run only on your MV.

Today, Data General no longer manufactures any of the disk drives offered for sale. DG works very closely with several major disk manufacturers such as Maxtor and Micropolis, and continues to bring to market impressive peripheral subsystems. The costs of Data General disk subsystems are beginning to reflect the savings realized by buying out-of-house the lower-cost peripherals (and margins *do* take a hit for DG and anyone else buying outside). The new RAID technologies (redundant arrays of inexpensive disks) offer whole new dimensions in trading downtime for dollars.

This is 1991, and the technology has changed dramatically. Disk-drive manu-



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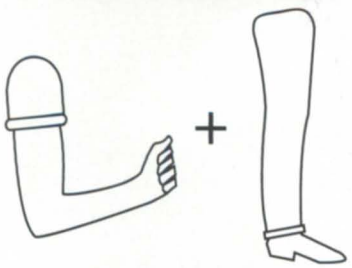

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facturers such as Seagate and Hewlett-Packard offer warranties of up to five years. The cost of replacement drives has dropped so much that the question of "self-maintenance" has sparked serious conversation in many boardrooms. Can you really think about not having maintenance on your disk drives, or even other peripherals?

Let's make a deal!

At a time when some major manufacturers are backing down from those "startling announcements" extending on-site maintenance from 90 days to one year, and are now offering the 90-day warranty again, guess what? Four-year warranties are available, if you're interested in being creative. Disk drives used today on the MV are the same 5.25-inch disk technology being used in the PCs in your offices. And changing drives in a disk enclosure—with proper training—is no more difficult physically than changing a drive in the PC.

What some users are discovering is that self-maintenance not only cuts maintenance costs to the bone, but system uptime improves

We are all looking for ways to cut expenses. In hardware maintenance, the biggest fear is extended outages—the "D" word (downtime). Well, what some users are discovering is that self-maintenance not only cuts maintenance costs to the bone, but system uptime improves. That's right, there is no response time for service engineers, so system repair and restore time is typically less than 30 minutes. And that's only in cases of failures. Today's disk drives are more than 10 times more reliable than that old Argus (faithful friend that it's been).

This sounds too good to be true, you say? This is too risky, you say? This could never work for us, you say? Perhaps. There is no absolute solution for everyone. But when disk drives are sold with 150,000 hours MTBF (mean time between failures), which is roughly equivalent to 17 years when running 24 hours per day; when disk drives come with a four-year warranty (also for controllers, enclosures, cables, etc.); when you can get spares kits for a fraction of the cost of the subsystem; and when replacement parts are available overnight—maybe some users can see that this is the wave of the future. They just may want to catch it.

For users doing their own maintenance, there are networks in most major cities throughout the United States offering both telephone and on-site technical support—or specific hardware training on a remedial basis, or AOS/VS operating system support, or advanced troubleshooting via memory dumps and other sophisticated methods. All of these services should be made available from your hardware supplier to ensure your comfort and satisfaction in considering self-maintenance.

Lastly, "self-maintenance" is not a new concept to the Data General community. When major compatible memory manufacturers (SCIP and Dataram) began offering lifetime warranties with guaranteed overnight replacement of failed boards, many DG users who replaced their DG memory with these compatible boards did so to reduce monthly maintenance costs. These users have been performing self-maintenance for years. They have already overcome the unnecessary fear that they would not survive without either full DG or third-party service.

Hardware today is proven to be much more reliable than ever before. Investing in spares pays for itself with the savings in maintenance. Maintenance savings accumulate over the term of an extended warranty. Replacement parts are readily available overnight to keep spares kits stocked. Self-maintenance is an idea whose time has come. Δ

Bob McGowan is president of the Peripherals Division of BL Associates. He has been in the high technology industry since 1971. Having specialized in data communications and network control systems through 1980, he has since become a leading authority on Data General compatible equipment and services. He may be reached at BL Associates, 145 Webster Street, Suite 2C, Hanover, MA 02339; 617/982-9664.

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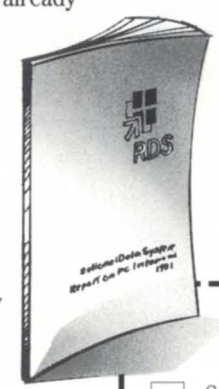

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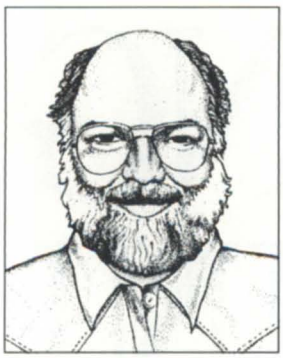

Brian Johnson

Designing your complex server

SYNOPSIS

Roll up your sleeves and prepare to get busy. In this second installment of a series devoted to global and local servers, BJ begins an exploration of complex server design.

:SERVERS:PART_II

Last month I started an epic series on the design of simple and complex global servers by documenting how to design a simple server. This month I'm going to begin the examination of the issues related to complex server design.

I'm assuming that you're implementing your server using a 32 bit process, and you're running under AOS/VS 6.00, or later, or AOS/VS II. If this isn't true in your case, give me a call and I'll outline the changes you need to make. Note, however, that the implementation shown here will work with either 16 or 32 bit customers.

I'm using DG C as the language for demonstrating the logic of the skeleton servers, but you should be able to easily translate the C code into the language of your choice, as long as the language meets the minimum requirements necessary for implementing servers: direct access to system calls, bit manipulation, and, in the case of complex servers, the ability to use multitasking. That lets out straightforward Cobol and most interpretive languages (e.g., ICobol and Basic) for implementing complex servers.

In the C code, I've tried to avoid taking advantage of any features that are peculiar to DG C. For example, instead of using C's built-in function to execute a son process, I've explicitly coded the ?PROC system call.

Finally, please don't call or write to suggest improvements in my C coding style. The code fragments here have been severely edited to fit the constraints of publication: terse comments, short lines, and minimal indentation. I really do write nicer-looking C code when not constrained. (See Figure 1, pages 42-44)

:SIMPLE_OR_COMPLEX?

A simple server is one that has no customer/server relationship with the PIDs that interact with it; each transaction between a PID and the server is a complete transaction. A simple server has no need for more than a single task within the process, so programming simple servers is easy.

A complex server is one that has an ongoing relationship with other processes and that needs to know when those other processes terminate. Complex servers require use of the AOS[/VS] Connection Management Facility (CMF) and a minimum of two tasks, so they are inherently more difficult to program.

When you talk to EXEC using CONTROL@EXEC (or CX.CLI), EXEC behaves as a simple server. It acts on whatever command you give it and returns a response. There is no ongoing relationship between you and EXEC once the command is processed.

On the other hand, EXEC has on ongoing relationship with its cooperative processes (e.g., XLPT), and needs to know when they terminate. Technically speaking, EXEC doesn't need to use CMF to be notified of co-op terminations because all of its co-ops are sons; it can simply listen for their obituary messages. However, during the debugging process at DG it's handy to be able to fire up XLPT with the

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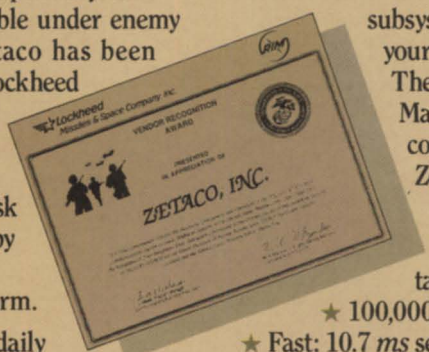

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John Kelly

Circle 69 on reader service card.

Figure 1: SERVER.C

```
/* SERVER.C: Skeleton complex server.
**
** To compile:          CC SERVER
** To link:             CCL/STACK=8192 SERVER
** To start:            SERVER_UP
**
** SERVER_UP.CLI:
** CREATE/2=IGNORE/DATASENSITIVE/TYPE=TXT SERVER.OUT
** PROCESS/DEFAULT/DIRECTORY=@/OUTPUT=SERVER.OUT SERVER
*/

#include <stdio.h>
#include <ctype.h>              /* toupper() */
#include <string.h>             /* strxxx() */
#include <stdarg.h>             /* <- available on :SYSMGR BBS */
#include <dglib.h>              /* lasterror(), zero() */
#include <multitask.h>          /* mtask() */
#include <paru.h>               /* ERCDE,... */
#include <sys_calls.h>          /* sys_xxx()... */
#include <packets:ipc.h>        /* P_IREC */
#include <packets:create.h>     /* P_CREATE_IPC */

#define     MY_LPORT 1          /* Local IPC port */
#define     MAXSONS 32          /* Maximum son processes */

/* Global stuff. */
int  dads_pid;                  /* My Daddy's PID */
int  ignore;                    /* Bit bucket */
char my_pname[$MXPN];           /* My full process name */
char my_uname[$MXUN];           /* My username */
short dad_pids[MAXSONS];        /* Dad PIDs */
short son_pids[MAXSONS];        /* Son PIDs */
int  sons;                      /* No. of sons currently */
char *spnptr;                   /* Ptr to simple process name */

/* Fatal error handler. */
void fatal(void) {
 exit(lasterror());
}

/* Send a message to a PID or Daddy. */
/* N.B.: max message is 255 bytes! */
void send(int pid, char *fmtp,...) {
 va_list ap;
 int         sec,min,hour,day,month,year;
 char        msg[256];

 /* Who gets it? */
 if (pid == -1) pid = dads_pid;

 /* Build the message and send it. */
 if (sys_gday(&day,&month,&year)) fatal();
 if (sys_gtod(&sec,&min,&hour)) fatal();
 sprintf(msg,"(%s) on %d/%d/%d at %02d:%02d:%02d: ",
  spnptr,month,day,year,hour,min,sec);
 va_start(ap,fmtp);
 vsprintf(&msg[strlen(msg)],fmtp,ap);
 sys_send(pid,msg,strlen(msg));
 va_end(ap);
}

/* Tidy up after a disconnected customer. */
void tidy_up(int pid) {
 /* Later... */
}

/* Notify the son's sponsor of its death. */
void notify(int pid, char *strp) {
 int         i;

 for (i = 0; i < sons; i++) {
  if (son_pids[i] == pid) break;
 }
 if (i >= sons) {
  fprintf(stderr,"Spnsor of PID %d?\n",pid);
  exit(EXIT_FAILURE);
 }
 send(dad_pid[i],"PID %d terminated %snormally\n",pid,strp);

 /* Delete the table entries by sliding the rest down. */
 while (i < sons-1) {
  dad_pids[i] = dad_pids[i+1];
  son_pids[i] = son_pids[i+1];
  i++;
 }
 sons--;
}

/* Disconnect handler task. */
void dcon_task(void) {
 int         ier,pid,code;
 P_IREC irec_pkt;
 short       tmess[$TDFL+126];
 P_TMESS *tmess_pktp = (P_TMESS *) tmess;

 for (;;) {

  /* Wait for a CMF event or obituary. */
  zero((char*)&irec_pkt,sizeof(irec_pkt));
  irec_pkt.ioph = $SPTM;
  irec_pkt.ilth = sizeof(tmess) / sizeof(short);
  irec_pkt.iptr = (short *) tmess;
  if (sys_irec(&irec_pkt)) fatal();

  /* Extract the termination code. */
  code = irec_pkt.iufl & $TMSK;
  pid = (int) irec_pkt.iptr & 0XFFFF;
  if (code == $TEXT) {
   code = tmess_pktp->tmxtc;
   pid = tmess_pktp->tmpid;
  }

  /* Decide what to do. */
  switch (code) {
  /* The following codes are CMF events. */
  case $TCCX:
   send(-1,"PID %d chained\n",pid);
   break;
  case $TBCX:
   send(-1,"PID %d disconnected\n",pid);
   if (ier = sys_dcon(pid))
    send(-1,"Error %o on ?DCON\n",ier);
   tidy_up(pid);
   break;
  /* The following codes are son obituaries. */
  case $TSELF:
  case $T32T:
   notify(pid,"");
   break;    /* Son died peacefully */
  case $TRAP:
  case $TCIN:
  case $TSUP:
  case $TAOS:
  case $TABR:
  case $TR32:
   notify(pid,"ab");
```

```
  break;
 default:
  send(-1,"Unexpected IPC code %d\n",code);
  break;
 }
}

/* Process STOP commands. Sender must be OP, */
/* have the same username, or be a SUPERUSER. */
void stop(int gport) {
 int          authorized,pid,superuser;
 char         his_uname[$MXUN];

 if (sys_isplit(gport,&ignore,&pid,&ignore)) fatal();
 if (sys_gunm(pid,0,his_uname,&superuser,&ignore)) fatal();
 authorized = (strcmp(his_uname,"OP") == 0);
 authorized |= (strcmp(his_uname,my_uname) == 0);
 authorized |= superuser;
 if (authorized) {
  send(pid,"Stopping\n");
  exit(EXIT_SUCCESS);
 }
}

/* Process CHECKPOINT commands. */
void do_cmd(int gport,char *msgp) {
 P_ISEND iipc_pkt;
 P_PROC proc_pkt;
 char         iipc[$DFLL];
 int          pid,son_pid;

 if (sys_isplit(gport,&ignore,&pid,&ignore)) fatal();
 if (sons < MAXSONS) {
  send(pid,"To many sons - try later\n");
  return;
 }

 /* PROCESS/DEFAULT/INPUT=@NULL/OUTPUT=@NULL CLI,message */
 memset((char*)&proc_pkt,-1,sizeof(proc_pkt));
 proc_pkt.pflg   = 0;                /* No flags */
 proc_pkt.psnm   = ":CLI";           /* Program pathname */
 proc_pkt.pdir   = 0;                /* Same directory as me */
 proc_pkt.proc_res = 0;              /* Reserved */
 proc_pkt.pxspi  = 0;                /* Subpacket indicator */
 proc_pkt.pipc   = &iipc_pkt;        /* Initial IPC packet */
 proc_pkt.pifp   = "@NULL";          /* @INPUT */
 proc_pkt.pofp   = "@OKI";           /* @OUTPUT */
 proc_pkt.plfp   = 0;                /* @LIST */
 proc_pkt.pdfp   = 0;                /* @DATA */
 strcpy(iipc,"CLI,");
 strcat(iipc,msgp);
 zero((char*)&iipc_pkt,sizeof(iipc_pkt));
 iipc_pkt.ilth = (strlen(iipc) + 1) / sizeof(short);
 iipc_pkt.iptr = (short *) iipc;
 if (sys_proc(&proc_pkt,&son_pid)) fatal();

 dad_pids[sons]  = pid;
 son_pids[sons++] = son_pid;
 send(pid,"PID %d is executing %s\n",son_pid,msgp);
}

/* IPC handler task. */
void ipc_task(void) {
 P_CREATE_IPC create_pkt;
 P_IREC irec_pkt;
 int          i,ier;
 char         msg[$DFLL];
```


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1	MVME337F-6	EVSB I/O ENGINE
1	NDS-M16-2	16" WORKSTATION
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Figure 1 Server.C (continued)

```
/* Create my IPC file. */
zero((char*)&create_pkt,sizeof(create_pkt));
create_pkt.cftyp_entry = $FIPC;
create_pkt.cpor   = MY_LPORT;
create_pkt.ctim   = -1;
create_pkt.cacp   = -1;
if (sys_create(spnptr,&create_pkt)) fatal();

/* Loop processing IPC messages. */
for (;;) {
 zero((char*)&irec_pkt,sizeof(irec_pkt));
 irec_pkt.idpn = MY_LPORT;
 irec_pkt.ilth = (sizeof(msg) + 1) / sizeof(short);
 irec_pkt.iptr = (short *) msg;
 if (ier = sys_irec(&irec_pkt)) {
  if (ier != ERNEF) fatal();
  fprintf(stderr,"IPC message too long\n");
  continue;
 }

 /* Convert to upper case. */
 i = 0;
 while (msg[i] = toupper(msg[i])) i++;

 /* Check for known commands. */
 if (strcmp(msg,"STOP") == 0)
  stop(irec_pkt.ioph);
 else if (memcmp(msg,"DO,",3) == 0)
  do_cmd(irec_pkt.ioph,&msg[3]);
 else
  send(-1,"Unknown command: %s\n",msg);
}
}

/* Server task. */
void server_task(void) {
 /* Later... Just sleep for now. */
 send(-1,"Ready\n");
 sys_wdelay(-1);
}

/* Skeleton complex server. */
main(int argc, char *argv[]) {

 /* Get my simple process name. */
 if (sys_pname(my_pname,-1,&ignore)) fatal();
 spnptr = strchr(my_pname,':') + 1;

 /* Get my Dad's PID. */
 if (sys_dadid(-1,&dads_pid)) fatal();

 /* Get my username. */
 if (sys_gunm(-1,0,my_uname,&ignore,&ignore)) fatal();

 /* Hang an OPEN sign in the window. */
 if (sys_serve()) fatal();

 /* Spawn a CFM event handler task. */
 if (mtask(dcon_task,8192,2,1)) fatal();

 /* Spawn an IPC handler task. */
 if (mtask(ipc_task,8192,3,1,spnptr)) fatal();

 /* Do whatever it is that I do. */
 server_task();
}
```

debugger under the programmer's CLI and still have EXEC be able to deal with it, so EXEC declares itself a server and XLPT establishes a customer relationship with it.

If you want to see which processes on your system have declared themselves as servers, there's an easy way to do it. CLI provides both CONNECT and DISCONNECT commands. You always wondered what those commands were good for, right? Well, here's your chance to use them. If you enter CONNECT OP:EXEC, then CLI should reply "Server's PID is 3" (or whatever PID your EXEC is). If the process is not a server, CLI will tell you so. Then you can undo the CONNECT to EXEC by entering DISCONNECT 3. Your CLI was just a customer of EXEC for a short time. That and 50 cents will get you a Coca-Cola, but it's a handy way to debug a skeleton complex server before you've gotten around to writing the skeleton customer.

Deciding if your server needs to be simple or complex is straightforward. If you need to be aware of customer terminations so that you can update your internal data bases or clean up any mess the customer might have left behind, then you need a complex server. Otherwise, a simple server is the way to go. The most common types of servers, lock arbitration servers like MLS, are invariably complex servers.

:CONNECTION_MGMT

Simply stated, the CMF allows processes to declare themselves as official servers, thereby making themselves eligible to be notified when any of their customer processes terminate, and it allows processes to declare themselves as customers of one or more servers, optionally receiving an obituary message if the server terminates. In addition, CMF provides a system call to verify that a particular PID is currently a customer (i.e., that it has issued a ?CON system call aimed at your server).

All of these various notifications take the form of connection event messages generated by AOS[/VS] and sent to the servers and customers on special IPC ports, so a thorough knowledge of how IPC messages are used by CMF is critical to implementing complex global servers. As a result, we need to spend a little time covering IPCs.

System Manager's Log, continued on page 68

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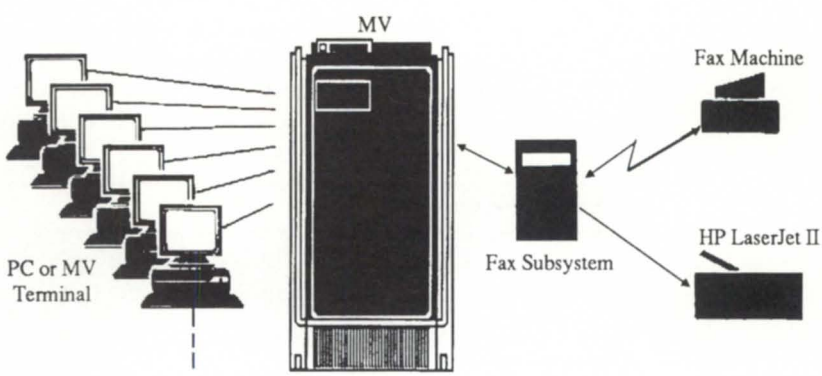

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BBASIC is back

SYNOPSIS

With proven swiftness and a host of new features, Business Basic sheds its dowdy image to reveal itself as a powerful language (no matter who you buy it from). The author presents a side-by-side comparison of products from B32, Data General, and Transoft.

by George Henne
Special to Focus

In my last column, we looked at the performance of B32, Data General Business Basic, and Transoft's UBB on Unix systems. While there were differences in performance, it was clear from the overall numbers that all three were so much faster than their AOS/VS ancestor that any of them would deliver more than enough performance for most users.

Since those tests, each of the vendors has implemented further performance improvements. If the tests were held again today, the results would be much closer to each other.

Figure 1: Resource limits

	B32 3.00	DG 1.10	Transoft 3.00
Maximum program size (K)	512	512	65536
Maximum data area size (K)	512	512	2097152
Maximum line number	65534	99999	65000
Maximum channels open per user	150	150	255
Maximum statement length	255	256	256
Variable name length	255	32	255
GOSUB nesting levels	22	32	20
FOR/NEXT levels	20	32	8
Maximum index file size (MB)	128	128	128
Maximum data file size (MB)	OS limit	OS limit	2097
Maximum string size (KB)	512	522	2097152

It's probably more important, therefore, to consider the different features of the products. After the benchmarks were completed, we asked each of the vendors to give us information on the resource limits of their products on the Aviion and for a list of significant extensions to them. The results do more than just compare the products: they show how BBASIC is changing for the future.

First, let's look at the resource limits (see Figure 1). Much of how BBASIC programs look today is a result of the severe limitations that were imposed for so many years. RDOS could be set up to run programs larger than 20K, but with performance penalties. AOS/VS, in 16-bit mode, increased this to 26K or 28K, still limiting the size of each module. As a result, REM statements were terse and, in large programs where they were most needed, often removed. Unnecessary SWAPs and CHAINs broke large programs into smaller pieces.

It is hard to conceive of a program that would ever come near the current limit of 512K or more that the current products have under Unix.

Another limitation was the number of open channels. In the earliest days of Business Basic, the limit was just 8 files. To get around this, the cumbersome C1 array, PARAM file, and logical file methodology was invented. Long ago, this was expanded to 16 files, and now to 150 or more. Once again, needing more than 150 files open seems unlikely.

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It is now possible to write programs that don't use logical files at all, but have each file in its own physical file. This simplifies program development and system maintenance considerably.

Virtually every other limit that previously existed has been increased by vendors. While the other changes may not affect programming style as dramatically as the ones mentioned, they make it clear that there are few jobs that cannot be done with BBASIC.

Features

One point needs to be remembered in looking at the results in Figure 2. Vendors, especially Data General, are reluctant to announce features before they are ready to ship. There is good reason for this policy. On a chart like the one shown, however, it can put them at a disadvantage. A feature may not be available now, but could be available soon.

Keep in mind that vendors sometimes have different ideas on how to implement the same feature. Both Transoft and B32 have screen save features, for example, but they work differently, each having its own advantages. One vendor's definition of cut and paste may be different from another's as well.

Here are comments on some of the features:

• Windowing, hot keys, screen save, cut and paste, and mouse

Figure 2: Features

	B32 3.00	DG 1.10	Transoft 3.00
Windowing	Oct. '91	NA	yes
On-line manual	yes	limited	yes
Hot keys	yes	NA	yes
Screen save	yes	NA	yes
Third-party DBMS	yes	NA	yes
Statements without line numbers	yes	NA	Dec.'91
Full-screen program editor	yes	NA	Dec. '91
AOS/VS support	yes	yes	NA
DOS and DOS network support	yes	NA	yes
Shared programs/subroutines	Oct. '91	NA	yes
SAVE file compatibility across platforms	Feb. '92	limited	yes
Imbedded SQL reporting	Oct. '91	NA	Sep. '91
Cut and paste between hot keyed programs	limited	limited	yes
Mouse driver support	Nov. '91	NA	Nov. '91
Active data dictionary	NA	NA	Sep. '91
Bluebird compatibility	yes	NA	yes
Multiple statements per line	yes	NA	NA
C subroutines	yes	yes	yes
Quad precision arithmetic	yes	yes	yes

Note: NA means not announced at this time

driver support are significant new features. They allow BBASIC software to adopt the look and feel of PC-based software.

Face it, most of the BBASIC programs written over the years look pretty dull when compared to almost any PC package. Very little BBASIC software does as good a job at being user friendly by providing features such as on-line help and lookup windows.

By using a hot key (a function key programmed to work globally in any application), these features can be added. Screen save and windowing allow you to display new data while preserving the current contents of the screen. With some clever programming, your old applications may be made to look as slick as the current crop of software.

• Statements without line numbers, full-screen editing, and multiple statements per line all work together. The reason for statement numbers is to label statements such as GOTO or GOSUB. Statements in between are executed in order. However, because the current program editor is strongly line number oriented, a new program editor is needed. By making it a full-screen editor with cursor positioning, you can improve programmer productivity.

• Third-party DBMS (data base management systems), embedded SQL reporting, and active data dictionaries point to another trend in Business Basic: it can be used as a powerful tool in accessing data bases.

B32 currently has an Ingres interface and is planning others. Transoft has Oracle and db_Vista, as well as Ingres. Business Basic is just as convenient a programming language to use when using these file systems. Meanwhile, the advantages of using a full DBMS can be realized.

In SQL support, B32 and Transoft reflect very different strategies. Transoft wrote its own (in UBB), allowing a tight integration of SQL to existing software. As it is a code generator, the results can be tweaked to provide almost any function the user might need. B32 chose instead to ally itself with Cyberscience, a successful vendor of fourth-generation products. Cyberscience's Cyberquery product provides good performance on Business Basic files: reports and queries often are created much faster than a Business Basic program could execute.

The active data dictionary is a new concept. It allows programmers to use variables to refer to fields in files without having to know the exact byte positions. That information is maintained by a data dictionary that the interpreter refers to. This offers the potential of making code much more error-free, as well as allowing tremendous flexibility in redefining records when fields need expansion.

These new features combine to make Business Basic a powerful language. With no line numbers, full block structure (IF THEN ELSE, DO_WHILE) and 4GL/DBMS support, it is hardly recognizable as the same old Basic. On the other hand, with its interactive debugging and execution, as well as its stunning performance, it is possibly the ultimate language for the 1990s. Δ

George Henne is president of the Eastwood Group, specializing in assisting Data General users in converting to Unix. He is also president of the BBSIG, which can be joined by sending $10 U.S. to Calvin Durdin, Tractor & Equipment Co., Inc, 5336 Airport Highway, Birmingham, AL 35212. George Henne may be contacted at 416/694-5777.

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Kim Medlin

More about RAD

SYNOPSIS

Four-GLs may do amazing things for software development—but don't expect your workday to get shorter. And while you may not save quite as much development time as you thought you would (or as much as you were told you would), you will see a significant increase in productivity.

In my first article, we got our feet wet with the concepts of Rapid Application Development (RAD). In this installment, let's move a few steps toward the deep end of the pool and further discuss several isolated aspects of rapid development.

Just how rapid is rapid?

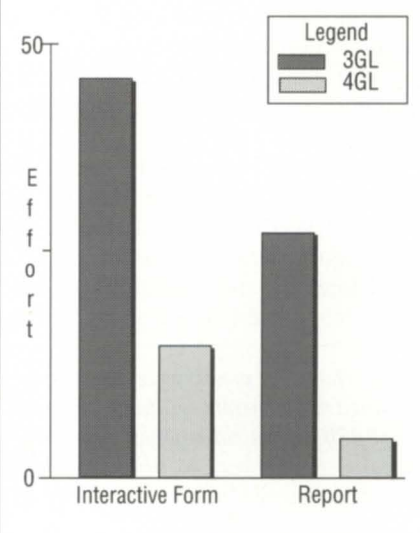
The number one question regarding RAD concerns the seemingly outlandish industry claims of development savings. And it's not just the vendors. Author James Martin claims that any fourth-generation language (4GL) worth its salt should provide a 10-to-1 savings ratio. How realistic can these claims possibly be?

Here at Data General's Solution Services, we've been providing custom software development for about 15 years now. I've been on board for more than 11 years, and have concentrated on commercial development. To determine the actual development savings afforded by 4GLs, I examined development statistics of past 3GL and 4GL projects.

Disclaimer

Before I share these comparisons with you, please keep several things in mind. First of all, development procedures vary greatly between software development facilities. Our shop adheres to established standards in all phases of development: analysis, design, programming, etc. For example, we check the outcome of virtually every data base I/O performed within application functions. This makes programs larger and more tedious to write, but the long-term benefit is easier software support. Also, our lead programmers or project leaders review source code before it is shipped, and applications undergo a four-level quality assurance procedure for each function written.

Figure 1: Comparison of functions



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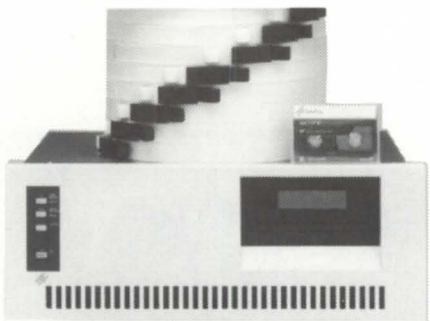

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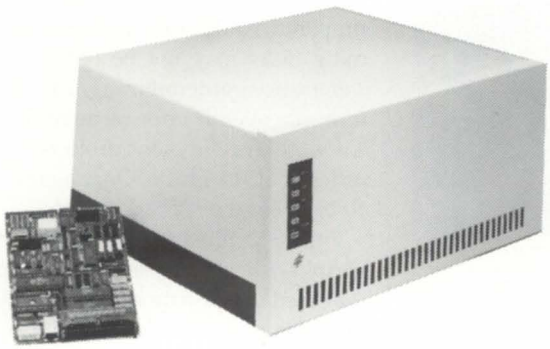

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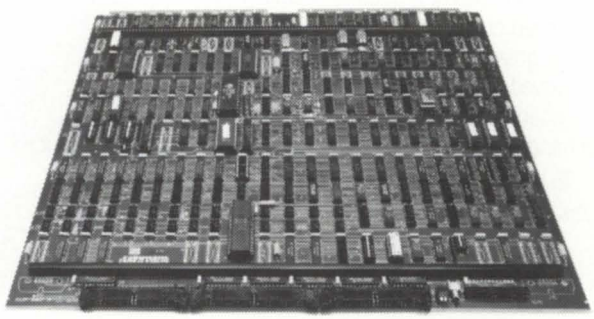

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The point of saying all this is to clarify that our shop may do things differently from yours, yet neither of our approaches is necessarily wrong. Also remember that RAD is a *very new* technology. The whole world is just now really beginning to wade into the RAD swimming pool. As a technology, it hasn't had time to prove itself for decades like Cobol has.

The intent of the above paragraphs is to point out that just because our statistics indicate certain trends, the same trends may not be true for you. Like the auto industry says, "your mileage may vary." And the statistics will undoubtedly change with each additional RAD project that is completed.

Comparing apples to apples

Let's start with a 3GL-to-4GL comparison of two fundamental and common application functions: the interactive form and the management report. An interactive form is a function in which an end user interacts with the computer via a formatted computer screen, keyboard, and/or mouse. Such forms include data entry, maintenance, and inquiry functions. Management reports present selected information contained in the data base in every combination and permutation that management deems useful.

The results

To put it simply, the results are impressive (as you can see in Figure 1, page 50), but not as amazing as rumors might lead you to believe. Our development savings for interactive forms is about a 4-to-1 ratio. Some of the simpler forms have tremendous savings, but 4-to-1 is the average. That's not 10-to-1, but look at it this way: what used to take almost a week is now finished in a day. That's significant!

And what about reports? I've found them to provide a 7-to-1 savings ratio. Think about it. This is the stuff that heroes are made of!

And now the rub

Is it safe to assume that entire applications can be written between four and seven times faster when using a 4GL? Unfortunately, no.

That's because there are more components to successful software development than just programming (even though many people don't seem to realize it). Specifications still need to be written. This includes both analysis and design. Projects still have to be managed. Technical and end-user documentation still has to be prepared. And so on. These non programming tasks may not be reduced in the same ratio as programming, if at all. Therefore, the overall improvement for entire software development projects is on the order of a 3-to-1 ratio. Once again, it ain't 10-to-1, but it ain't bad, either.

Figure 2 illustrates how the project shrinks when you use a 4GL. A project that used to take a month now needs little more than a week. Not too shabby.

The truth about technology

So now you know my opinion of how rapid rapid really is. I think you'll agree that the RAD environment increases development productivity dramatically over

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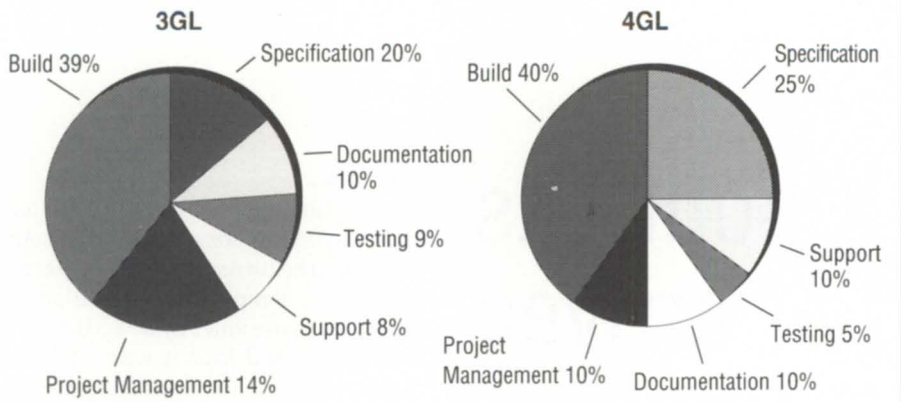
Figure 2: Comparison of components



3GLs. Then the application backlog we've been hearing about for the last few decades will soon disappear, right? Well, as one of our presidents from the 1970s used to say, "Let me say this about that."

Labor saving devices, such as 4GLs, enhance productivity. Even though technology has changed the way we work, we still work eight hours a day. However, we work smarter. We are able to tackle responsibilities that we never would have even dreamed of before. On top of that, the quality of our work is even better than that which we were able to achieve with the older technology.

The application backlog won't go away because of 4GLs. We'll simply find more applications for computers to solve. And from one programmer to another, doesn't that make you feel really comfortable?

What's next?

There are many more RAD concepts for us to explore. In my next article, I'll introduce a sample application and then show you the development process step-by-step, using RAD techniques and tools.

After the application is introduced, we'll tackle analysis and design. For that task, we'll use a CASE tool and accompanying methodology. Subsequent articles will focus on the remaining development phases. Δ

Kim Medlin is a Software Development Section manager with Data General's Solution Services group in Atlanta, Georgia. Solution Services specializes in custom software design, development, implementation, and consulting. Kim's address is 3617 Parkway Lane, Norcross, GA 30092. He can be reached at 404/448-6072, extension 2007.

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David Novy

X hour has arrived

SYNOPSIS

Mixing X Terminals with Unix workstation server environments can supply users with greater computer power at a reduced cost. Learn how to make sure your system fails the newspaper test.

There is another computer revolution on the horizon. This revolution has been brought about by the rapid increases in performance of Unix workstations and X Terminals. A month ago I did not have a high regard for X Terminals. The price of a 19-inch monitor, color X Terminal was $12,000. The price of a 25 MIPS, 19-inch monitor, color Unix workstation was about $20,000. The cost of a monochrome X Terminal was about that of a PC. So why would you want to purchase a terminal when you could get a full computer for about the same amount of money?

You can now purchase a 25 MIPS, 19-inch monitor, color Unix workstation for about $15,000 or a 19-inch monitor color X Terminal for about $5,000. You can also buy a 75 MIPS, 19-inch color Unix workstation for about $40,000. But it's when you put the 75 MIPS workstation and the X Terminal together that amazing things begin to happen.

Two weeks ago, I received an HP 700/RX workstation and connected it to a 55 MIPS workstation. When I ran benchmarks on the X Terminal, I discovered that it was as fast or faster than the workstation itself, and significantly faster than any other workstation I had available. (The other workstations tested had rated less than 30 MIPS.)

The reason it ran as fast or faster than the workstation itself is that the application I was benchmarking was an X Windows application, and the HP 700/RX workstation is tuned for the X protocol. If I brought in the application from disk, X Terminal and workstation performance were equal. If I preloaded the application into memory, it ran 2.5 times faster on the X Terminal.

Now you might say that $40,000 is a lot of money to pay for a workstation. And you would be correct. But look at the total system cost compared to overall performance. Suppose you buy a 75 MIPS Unix workstation and load it with 64 MB of memory and extra disk so that it can function as an X Terminal server. Such a system would cost about $55,000. Now let's add six $5,000 X Terminals to our system. The total system cost is now $85,000. The cost of seven 25 MIPS workstations with 16 MB of memory is about $105,000. Now you will say I have put myself in a corner. The X Terminal system costs less, but the workstations have a combined MIPS value of 175 MIPS while the X Terminal system has only 76 MIPS. Why would I be enthusiastic about such a system?

The workstation system does have a rating of 175 MIPS, but those are theoretical MIPS. In actuality, most of the time users are using only a fraction of the available MIPS. The MIPS are wasted when users are not working. When a user has high demand, the most he or she can access is 25 MIPS. Fewer total MIPS are available using the X Terminal system, but fewer MIPS are wasted because the MIPS resource is pooled among seven users. When a user does have a high demand for performance, he or she has access to 76 MIPS.

There are other advantages to the X Terminal system that are not readily apparent from specification sheets:

1) The proposed server for the X Terminal has 64 MB of memory. If most users are running the same applications, these applications tend to be memory resident and therefore run significantly faster.
2) An X terminal connected to a very fast workstation server can have significantly faster network speed than a 25 MIPS workstation. The ftp transfer speed of the X Terminal server I used for the benchmark was 300 KB per second. The ftp transfer speed of a 25 MIPS workstation is about 30 KB per second.

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3) The X Terminal connected to a 75 MIPS Unix workstation server fails the newspaper test. The primary application run at my site is very CPU-intensive. It is so demanding that on 25 MIPS workstations users have time to read the newspaper while waiting for the computer to respond. Users do not have time to read a newspaper when using an X Terminal connected to a 50 MIPS workstation. This is an excellent result.

4) You can buy X Terminals for less than $5,000. They are considered terminals, not computers. Costing less than $5,000 means that many middle managers have the signing authority to purchase them without having to answer a lot of questions. Many companies require new computer purchases to be approved by a vice president or president. Terminal purchases, however, are left to the discretion of middle management. This allows you to acquire computer equipment with fewer hassles.

I hope you can understand now why I am excited about X Terminals. I believe they can be a powerful tool in reducing costs, while giving the user access to greater computer power. Even though X Terminals show tremendous potential, the decision to purchase and use them properly requires careful planning for the following reasons:

1) They increase network loading. You may need to segment your ethernet network and even purchase additional network equipment. (Keep network loading below 30 percent or collisions will occur.)
2) The server for an X Terminal network will require a significant amount of memory. (You will want to have enough to avoid paging; otherwise, significant performance degradation will occur.) Conduct tests to determine how much memory is required, or you'll end up spending a lot of money on memory without necessarily increasing performance.
3) The server will also require additional disk space for swapping purposes. You could need between 50 and 100 MB of additional disk space for each X terminal.
4) As the cost of memory falls, X Terminals will become even more attractive.
5) Data General currently does not emphasize color X Terminals in its product line. The company is recommending the NCD X Terminals if you need a color X Terminal. I have seen the NCD color X Terminals, and they are excellent. They use the Motorola 88000 CPU, the same used in the DG Aviion workstation line. If you wish to comparison shop, the HP 700/RX and the Tektronix are also powerful color X Terminals.

X Terminals/Unix workstation server environments can be very effective in supplying users with greater computer power at a reduced cost, compared to pure Unix workstation environments. But careful planning is required for using X Terminals effectively. 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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Tim Boyer

Hooked again

SYNOPSIS

If you work with the CLI, there's always much more to learn than what you thought you knew already. What you need is an authoritative reference source that goes beyond the manuals. Well, rejoice and get ready to turn pages, because Greg Shalless' newly updated manual is a CLI tour de force.

I haven't written a book review since ninth grade. In fact, this may be the first I've written without the benefit of Cliff's Notes. But here goes—I've spent the last few months looking over Greg Shalless' tome, *?!#(Hook-Bang-Crunch, Programming the CLI)*, newly revised and updated for CLI32. This is one great book, and I'll try to give you the flavor of the book without giving away too much of Shalless' code.

I migrated from RDOS to AOS/VS a few years back, without benefit of training (other than the fact that I'd kept all of my back issues of *Focus*—I *knew* I was going to need them sooner or later). Looking back at it, I did OK. I'm no AOS/VS guru, but on the other hand I can generally get my batch streams up and running. It wasn't the most pleasant period of my life, however. I tended to keep the CLI manual with me at all times, and spent more than a few hours on the RDS/NADGUG bulletin board asking questions that look stupid to me now. In other words I survived—but I didn't enjoy it.

With this book I probably would have enjoyed it.

Greg Shalless started as a training instructor with Data General Australia, and subsequently founded his own consulting firm, Shalless Software. The purpose of his manual isn't to replace the CLI manual, but to enhance it. Let's face it—when it comes to understandable examples, the CLI manual is somewhat lacking. *?!#* attempts to remedy this.

As a writer, Shalless has an enjoyable, terse style that's very readable, especially in a technical manual. Were he to write this column, it would only be half as long. *?!#* consists of 30 chapters and 6 appendices, with each of the chapters around 5 to 15 pages long. Thus, the book is set up like a well-ordered disk—plenty of small, logically complete subdirectories.

The book starts off with an overview of the CLI, which includes help files, macro arguments and switches, and conditional logic. The macros given in the book (and supplied on the tape if you were smart enough to get it when you bought the book) such as $ARGTEST, which tests arguments passed, and $SWTEST, which tests switches, allow you to play around with passing values to the macros and viewing the results. Sounds like pretty tame stuff, but if you're a beginner you'll be amazed at the possible options. Even if you're an experienced macro programmer, I think you'll be surprised at how much you've forgotten since last you read the CLI manual. I fall somewhere in between, and have begun using these macros to test my own macros.

Next, Shalless delves into using the CLI as a programming language—loops, recursion, and so on. I'd never quite thought about it, but he points out that CLI is a structured language—no labels or GOTOs. The CLI as a programming language seems to be a recurring theme throughout the book. Later chapters explore complex logic (AND and exclusive and inclusive OR), documentation, error handling, and debugging—in other words, everything a good programming book would teach you.

The book then covers pseudomacros—for instance, [!DATE] and [!TIME]. Although there aren't many surprises in this chapter, it sets the stage for a latter chapter, user-written pseudomacros (UPMs). Not only haven't I written a UPM before, I didn't know such a thing was possible. The author states that you "will probably find this Chapter alone will make your purchase of this Manual worthwhile." He's right. A UPM, like a normal pseudomacro, contains no commands at all. Instead, it simply returns information. The simplest example is one that we've all used, $$BELL.CLI, which consists of [!ASCII 207]&. Note the ampersand at the end—it's so your macro doesn't see the New Line as a command terminator. If you leave it out, a command using the pseudomacro, like

```
WRITE [$$BELL]Hello There
```

will, instead of the expected output, terminate the command and return

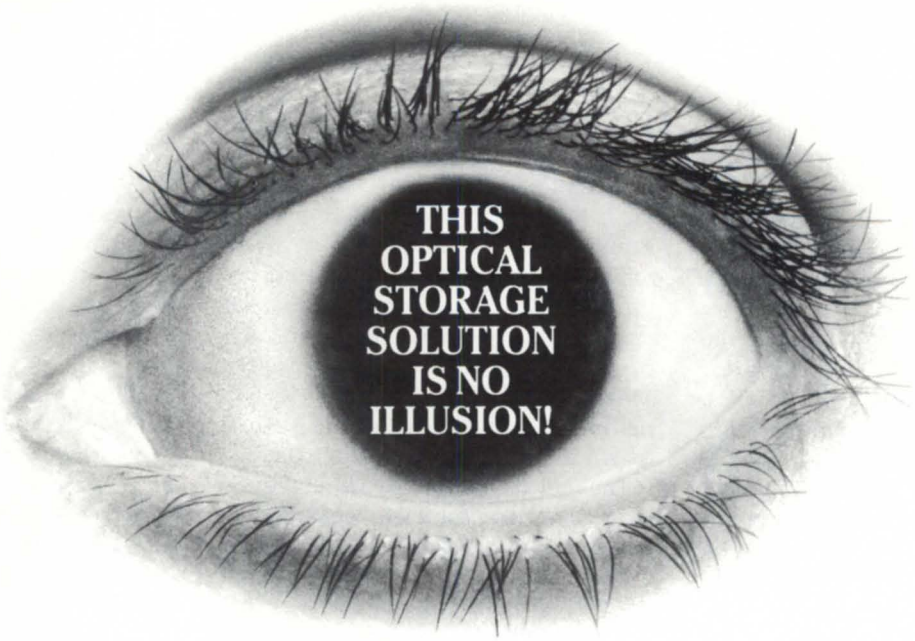
```
Error: Not a command, macro, or program,
HELLO
HELLO,THERE
```

I found the chapter on brackets and templates to be one of the more useful. AOS/VS doesn't process brackets ('(', '[', and '<') in the same way RDOS did, and rather than mess up badly I've elected to avoid them (especially with command line editing). No more—this chapter explained exactly what to expect with a particular combination of brackets. It also gave the first understandable explanation of why brackets don't work well with backslashes in the DELETE command, and why the following command:

```
DELETE +\<PROG1,2><,.PR>
```

which I would expect to delete the directory except for the files PROG1, PROG2, PROG1.PR, and PROG2.PR instead will delete the entire directory. Good information to have.

?!# then covers input and output. With the !READ pseudomacro, along with



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methods for evaluating responses, Shalless gives a minitutorial on the ways to get from a !READ prompt to the CLI. Shalless describes what he calls "the only failsafe method of accepting user input to a CLI macro," and I haven't been able to break the method yet.

On the output side, *?!#* has given me the only method I've found yet of putting text in my file, yet allowing me to put commas, tabs, and even unmatched brackets into my macro. Typing CREATE/M @OUTPUT will echo to your screen *exactly* what you type underneath, until the closed bracket beginning a line is found. It's a great trick, and I've started using it extensively.

To close out the main portion of the book, *?!#* includes a couple of examples—a good general menu processor, and a day-of-the-week macro that CLI32 has, unfortunately, made unnecessary.

But wait, there's more

Although the subtitle of *?!#* is "Programming the CLI," Shalless doesn't limit himself to macros. Not only does the manual cover the CLI, but it delves into generic files, ACLs and LINKs, PUSH and POP, SPEED, SORT/MERGE, and the PROC command. Appendix A covers SPEED commands, including a truly impressive SPEED macro that edits macros to indent the conditional commands. Appendix B is an extremely useful SORT/MERGE primer, containing items such as tips on managing Infos files and a macro for sorting filenames on creation date.

The tour de force of the manual is the index. It's very complete, spanning 18 pages. Now, you're reading this article and wondering what's the big deal about an 18-page index. The big deal is that Appendix X shows how the whole thing was created using a combination of CLI, SPEED, and SORT/MERGE.

What truly impressed me was the lack of typographical errors. I have yet to find a single macro from the tape that didn't work as advertised. That's an amazing feat, and yet it pales in comparison with the fact that I have yet to find a macro in the *manual* that didn't work. Admittedly, I haven't typed them all in. But as one who has written a few articles containing code, I can testify that it is rare that a line slips through *without* being mangled. The fact that an entire manual full of odd characters is correct speaks of painstaking proofreading, and is indicative of the quality of *?!#*.

With the addition of CLI32, *?!#* is now completely up to date. The manual features a discussion of the common features in each chapter, and then includes any differences due to CLI32 at the back of the chapter. A new appendix demonstrates the writing of a number of the featured SPEED macros in CLI32, uses of the new LOGOFFMACRO and PRIVILEGE commands, and a CLI32-only macro to resolve links.

Gripes? The only thing I'd like to see in this manual is more of the same. The section on SPEED could easily be expanded to a manual by itself. There is only one specific case where I might complain, and it's so convoluted that you can tell I'm

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A Programmer Calls His Dog.

WITH COBOL

```
IDENTIFICATION DIVISION.
PROGRAM-ID. CALLDOG.
ENVIRONMENT DIVISION.
SELECT ANIMALS
   ORGANIZATION IS INDEXED
   ACCESS IS DYNAMIC
   KEY IS ANIMAL-TYPE
   ASSIGN TO BEASTS.
DATA DIVISION.
FD ANIMALS
   RECORD CONTAINS 16
   CHARACTERS
   DATA RECORD IS ANIMAL-REC.
01 ANIMAL-REC.
   03 ANIMAL-TYPE PIC X[8].
   03 ANIMAL-NAME PIC X[8].
PROCEDURE DIVISION
START.
   OPEN INPUT ANIMALS.
   MOVE 'DOG' TO ANIMAL-TYPE.
   READ ANIMALS INVALID KEY
   DISPLAY 'BAD ANIMAL'
      LINE 10 POS 1.
CALL-SPOT.
   DISPLAY 'HERE' LINE 10 POS 1.
   DISPLAY ANIMAL-NAME HIGH
      LINE 10 POS 16.
   CLOSE ANIMALS.
   STOP RUN.
```

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reaching for criticism. But here goes: *if* I only bought the manual and not the tape, and *if* I was running CLI32, and *if* I typed in macros without reading the whole chapter, I might get a little ticked off when I got to the CLI32 section at the back of each chapter and found that what I had so painstakingly typed has "been made redundant by the new Pseudo Macros provided in CLI32." My solution? For the small difference, don't bother buying the manual without the tape.

Oh, and one major annoyance. If Shalless is going to give us a manual printed on A4-size paper, he needs to include an A4-size notebook with it. This thing hangs over everything I've got by a quarter-inch on each side. Charge $5 more and send a notebook with each shipment!

If you work with the CLI, you need this manual. It has earned a permanent spot on my desk. It ought to be shipped with every MV.

Odds and ends department

Speaking of typographical errors—in my September review of Multiview Windows, there was an error in the phone number listed for Digital Dynamics, Inc. The correct number is 313/995-2400.

I've been running VS7.69 for a couple of weeks, and it seems to be as stable as BJ said it would be. I mention this only because it makes one of the user pseudomacros in *?!#* obsolete. The macro to see which version of CLI is running looks like this:

```
CLI[!EQUAL,A,A\\CLI32_will_ignore_this&
]32[!ELSE]16[!END]&
```

CLI rev 7.69 has the new !CLI Pseudomacro, which returns the same result.

Just bought a new toy . . . oops, I mean a vital piece of equipment for my home system. I finally got a CD-ROM player. It has 660 MB on one disk—I'm going to be a couple of months just going through the one bulletin board disk I bought. It looks like hardware prices are finally dropping to the affordable zone ($400, give or take). If all of you will also buy one, it'll help drive the price of disks down.

An unexpected bonus is that it also plays audio CDs. So, here I am, listening to "Layla" and finishing my article. This is the only way to write! Δ

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Bits and bytes from the bulletin board

Restoring a systape

From: Steven Bonici

Recently we replaced our boot disk and had problems initializing our system disk from a systape. I created a systape the day before, and also had two others from when we upgraded to 7.67. Every time we got to the point of Initial Load, we received an AOS/VS Fatal Error 12300. This happened with all three copies of the systape. We then went back to DG's AOS/VS release tape and did it the hard way. Does anyone have any ideas on why any of the systapes would generate this error message?

From: Joseph Edens

What all was on the tape (files 0, 1, 2, etc.)? Maybe something was on there that was corrupt, or maybe something was missing that AOS/VS was looking for. At one point (on 7.67) we lost everything in root due to bad (obviously) logic in a macro that restarts our SYSLOG. The only thing we had left was stuff that was perm'd. We reloaded from a systape with no problems. Are you using DG's provided systape macro or something else?

From: Steven Bonici

I'm using DG's systape macro, which I modified to exclude certain directories. I called DG, and guess what? They told me there is a bug in the macro when used on certain systems. The AOS/VS panic was caused by some +IAC+ files that weren't on the tape. It didn't recognize the IAC8. I changed the macro to dump all the +IAC+ and ANSI+ files. We went back to the original release tape (DG's), and everything worked fine! They say that this bug was fixed with 7.68.

RDOS file xfer

From: Hank Brandenburg

I am in desperate need of reliable async xfer protocol to migrate code from MV platforms (NANOS) to PC networks, so I (hopefully) can free up MV hardware for file server use. Can anyone help?

From: Tim Boyer

By code, do you mean source? If so, you don't need a protocol. Just send it as ASCII to whatever you're running on the PC (or even use the ol' "type and capture"). If you need a real protocol, we've got RDOS Kermit on the release tape—just check the NADGUG software library.

From: Ephraim Nussbaum

The RDOS version of Kermit as supplied is an unfinished program. It is distributed in the hope that someone will finish it. I would love to use it to move data from my sleeping S/280 to my Aviion. If anyone knows how to do this, please let me know.

From: Kevin Danzig

If I remember correctly, you need a RATFOR or a Fortran 5 compiler. You would be better off playing with the free assembly code for a checksum Xmodem that is in the TEX dump file to get it to run under RDOS.

From: Ephraim Nussbaum

Pardon my ignorance, but: What TEX dumpfile? How do I get it onto my S/280? Where do I get Xmodem for my Aviion? etc. I'm really not familiar with any of this. Although we've been using the Aviion for over a year, I still have to power up my S/280 or S/140 occasionally to print a report from data we have on Zebra packs. We would like to move all of this to the Aviion and then to tapes.

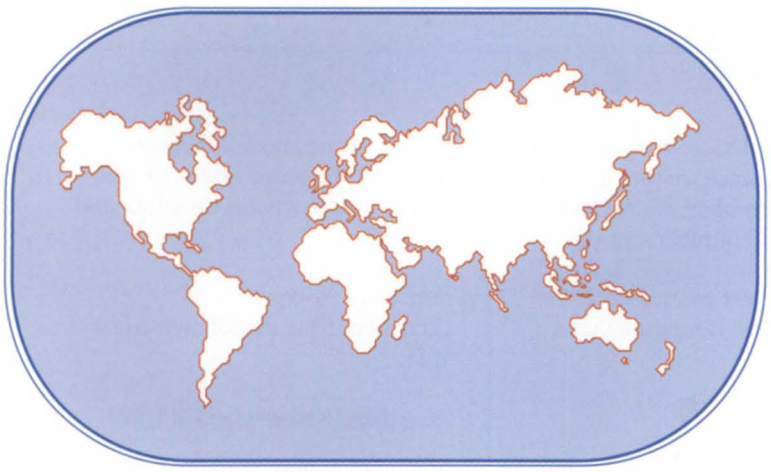
From: Kevin Danzig

There is an AOS/VS dump file that has a VS X/Ymodem package called TEX. In it there is source for MASM Xmodem. If you know RDOS well, it shouldn't be a big deal to redo the system calls. X/YModem should be share- or freeware for the Aviion. Omen Technology (the author of Zmodem), should have Unix source. If you can get X/Y/Zmodem running on the Aviion, there are a few commercial Xmodem packages that run under RDOS.

DUMP to tape fails under AOS/VS 7.69

From: Jeff Berntsen

Just upgraded my MV/2000 from 7.60 to 7.69, and I've been having a nasty problem ever since. When I use the SMI to back up (DUMP_II to multiple tapes), I get one of two different errors. The first is at the end of a tape (different



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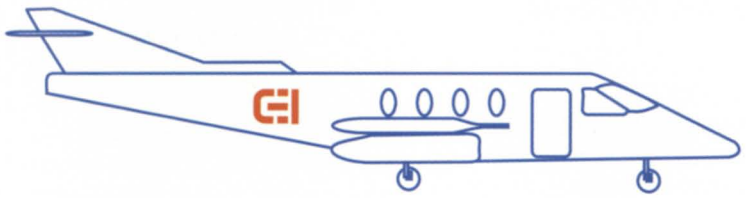

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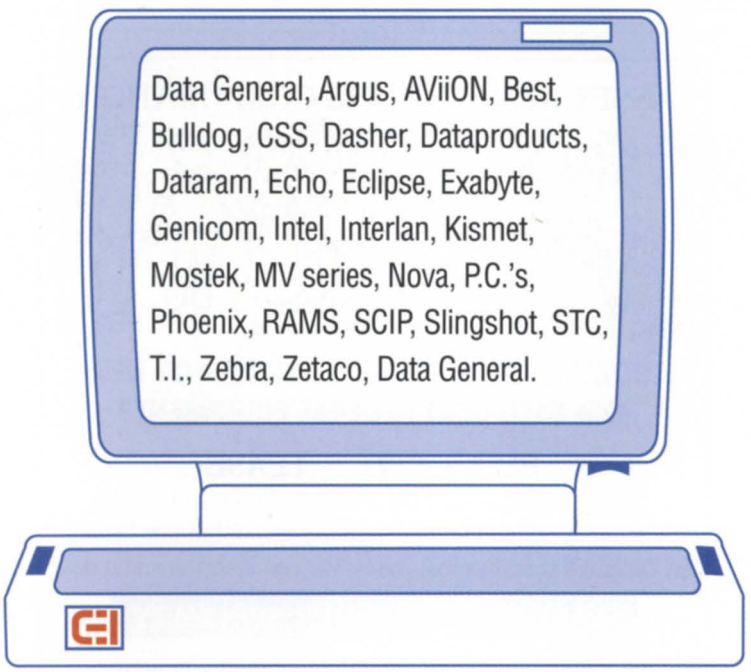

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ones at random). I get the following error messages repeated in a loop:

Warning: File space exhausted, file @MTJ0
Hard tape error in label, tape file: 2, block: 02

The other also happens at the ends of different tapes at random. I get the same file space exhausted error message as before, then get the following messages in a loop:

Hard tape error, block: 01276
Warning: Invalid system call parameter, file @MTJ0

with the block number incrementing until around block 1290, after which I get a stack dump. The SMI then gives me the message ERROR 71173, Dump Failed. Can anyone help me with this problem?

From: Bill Ingram
We had the same problem, but under AOS/VS II rev 2.03, which is contemporary with rev 7.69. DG field engineering handled the STR, since we thought it was a hardware problem at the time. I don't have the STR number, but the reference number was Q333775. We got a tape in the mail last week with a replacement DUMP_II module that fixed the problem.

Local time

From: Rick Marnell
Does anyone know if it is possible to determine what the local time is under AOS/VS? I need to get the number of hours difference between local time and Greenwich Time. Is there a system call that does this?

From: Bob Butler
Check the ?NTIME/?GTIME calls. They will report the GMT offset as defined in VSGEN and/or system boot.

Status line clock command

From: Walter Mosscrop
Does anyone know if there is a way to set the status line clock from a program? If so, what is the command to do so?

From: Gary Stoynoff
Try submitting the following text string:

<036><106><162><status>0000HH:MM

Status is 2 for 12-hour am/pm mode, 3 for 24-hour mode. HH & MM are in decimal separated by a colon (:).

From: Walter Mosscrop
That did the trick. Thanks for the help! Δ

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

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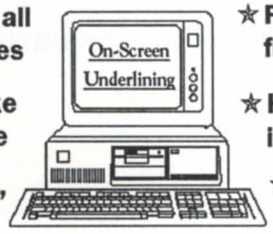

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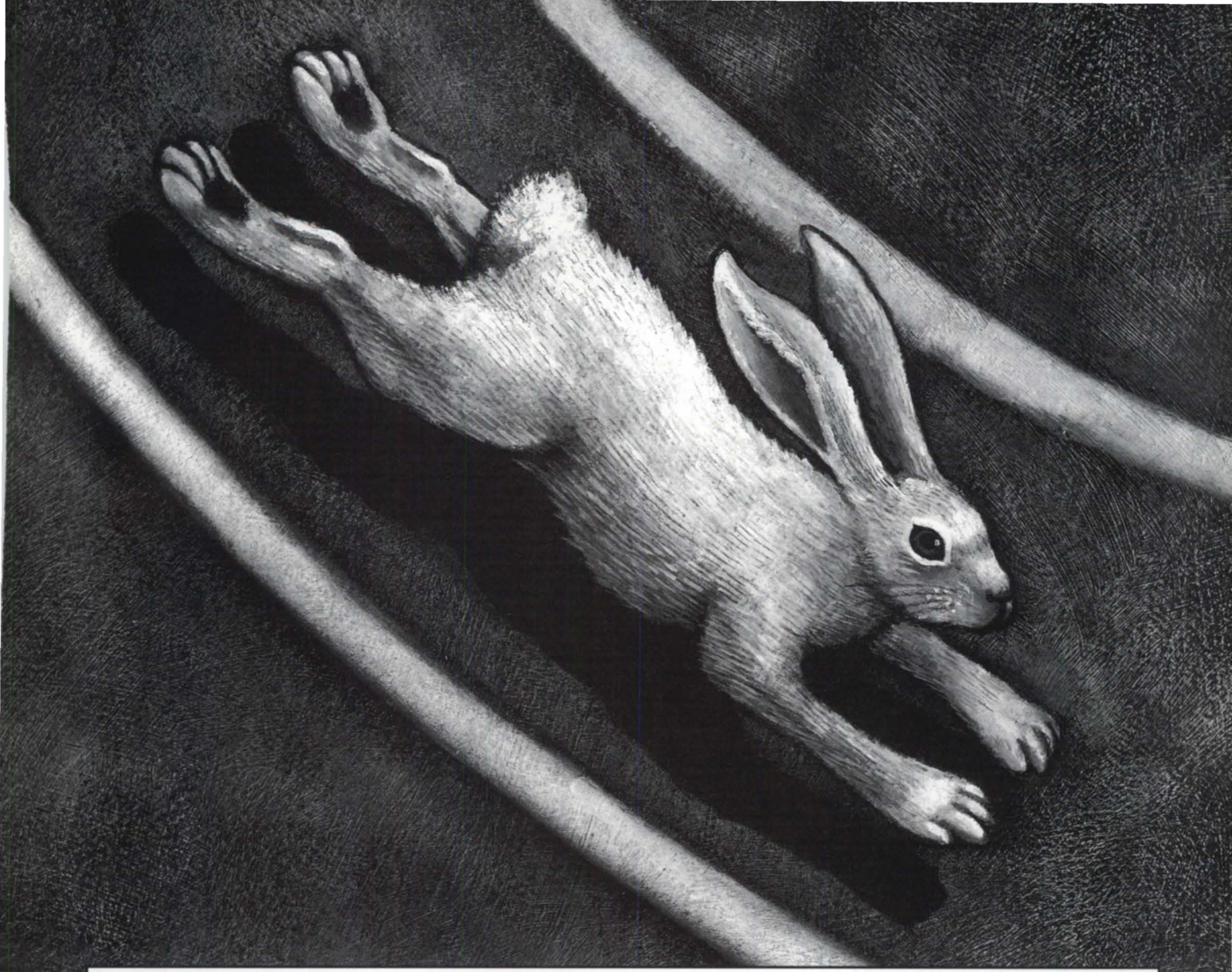

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SYSTEM MANAGER'S LOG

Continued from page 45

:IPC_HANDLING

IPCs were designed originally to allow cooperating processes to communicate with each other via IPC ports associated with IPC files created by one or both of the processes. But the operating system also uses the IPC facility to send notifications of various events to processes using global IPC ports that are not associated with an IPC file. These special global ports are defined in the various system parameter files (e.g., PARU.32.SR). Here's a list:

?SPTM Obituary messages from sons and CMF events.
?SPRM Runtime messages from son processes.
?SIGP The port to read your command line from.
?SPPT Messages from ?ASSOC'ed processes (obsolete).
?SRIM System/REMA interface messages.

In our case, we're interested only in messages from global port ?SPTM. As luck would have it, this is the port used for just the two kinds of messages that we're interested in. To receive these messages you just need to issue a receive (?IREC) on global origin port ?SPTM and local destination port 0. Because CMF notifications take the form of zero-length IPC messages, an IPC message buffer is not strictly required unless you are also expecting son termination messages in addition to CMF event notifications. Because that's a distinct possibility and relatively easy to handle, I've included a standard termination message packet in the skeleton server and a command to test it.

When a CMF event occurs, the format of the IPC packet depends on the PID-size attributes of the server .PR files. In general, it's always a good idea for the server to be HYBRID or ANYPID, not SMALLPID, because SMALLPID .PRs can't have ANYPID customers. As a result, I'm going to ignore the format for SMALLPID servers and just describe the format for HYBRID and ANYPID servers.

When a CMF event IPC is received, packet offset ?ISFL usually contains 000707. The meaning of this value is a mystery; the manual doesn't mention anything about it. Packet offset ?IUFL will contain either ?TCBX or ?TCCX in bits 4-7, indicating that the customer either broke the connection (?DCON) or chained (?CHAIN), and a bitmap of which rings were involved in bits 8-15. The customer's PID is returned in packet offset ?IPTR, overwriting the pointer to the termination message packet. What action you take depends on whether the customer disconnected or chained.

Chains are typically ignored; the customer relationship remains intact across the chain, so no action is required.

The first order of business when a customer disconnects is to issue a ?DCON against the PID. Failure to do this can result in "lost PIDs." This requirement is spelled out clearly on page 9-5 of the AOS/VS System Concept manual (093-335-01, as amended by :UTIL:093_000335_01), a fact missed by the designers of many third-party servers. The next order of business is to reset the entry for the PID in your table of known customers and do any required cleanup processing.

Figure 1 shows the C code for a skeleton complex server that includes everything I've described so far, plus a simple IPC handler task (described last month) that recognizes only two commands: STOP and DO. The DO command tests the obituary IPC message logic, and reminds you that when PROC'ing up sons from servers, it's always best to use the requestor's username so that [s]he gets charged for it.

Also, the skeleton server includes two stubs that will get filled in later: server_task() and tidy_up(). You can easily test the skeleton server like this:

```
) SERVER_UP
PID 23
) CONNECT/S SERVER
Server's PID: 23
) CHAIN :CLI
From PID 23: (SERVER) PID 34 chained
) DISCONNECT 23
From PID 23: (SERVER) PID 34 disconnected
) CONTROL SERVER DO XYZZY
From PID 23: (SERVER) PID 37 is executing XYZZY
From PID 23: (SERVER) PID 37 terminated normally
) CONTROL SERVER STOP
From PID 23: (SERVER) Stopped
)
```

I've omitted the date and time stamps to conserve space.

:IPC_CURIOS

If you rewrite the skeleton server in a

language that doesn't automatically preprocess the command line, as C does, be sure to issue at least one ?GTMES call during initialization in order to retrieve your command line from the IPC spool file. I don't know if it's still true, but in the old days any unreceived (i.e., spooled) IPC message for a process caused all subsequent IPCs to that PID to have to be written to the receiver PID's IPC spool file (:PROC:IPSnnnnn), even if the receiver was ready to receive the current message. Having to write the message to the IPC spool file and then retrieve it moments later for delivery involved a lot more overhead than simple memory-to-memory delivery, so it was always advisable to keep the number of waiting IPC messages at zero. The only waiting messages a process might not have received are its initial IPC (its command line) and obituary messages from deceased sons. This means that if your server PROC's up sons to do things for it, it should dutifully read and process or discard the son's obituaries. Because the obituaries arrive on the same system IPC port as CMF event messages, the skeleton server I've shown is already set up to deal with them, albeit by simply discarding them.

One of the privileges in user profiles is the "Use IPC" privilege. The reason this is a privilege is that giving a user the ability to send and receive IPCs is potentially dangerous. A user could theoretically send malicious commands directly to PMGR to manipulate PMGR devices directly. Rather than enlighten the hackers, I'll forego describing the possibilities in gory detail. But what about the customers of our server? Well, it turns out that AOS/VS skips checking the Use IPC privilege in several cases, one of them being IPCs sent between servers and their customers, and a second being the receiving obituaries. This means that neither the server nor the customer needs to have the Use IPC privilege.

:WRAP_UP

OK, we've got a working skeleton of a complex server, but it doesn't do anything useful yet. We'll tackle that part next month. In the meantime, I'd encourage you to pick up a copy of the skeleton server source code from the :SYSMGR BBS (item SMLOGS:SML9111X) and get it running on your system using either C or the language of your choice. Having a skeleton server laying around that needs only a couple of stubs filled in to become a real server will be a helpful addition to your tool bag.

:APOLOGY

A couple of months ago I gave a pretty strong recommendation to AOS/VS 7.69 based on our use of the beta version. Yesterday the official release tapes arrived and I plugged them in. We lasted less than an hour before discovering that EXEC was badly broken; implicit labeled tape didn't work at all. We are now back on the beta rev while awaiting patches to fix the problem. Apparently, a few last-minute changes were made and subjected to zero testing. Makes ya wonder about DG's current beta and release rules, doesn't it?

Anyway, I immediately dialed into OIS to check for 7.69 patches and found zip. In fact, as far as the Patches section of OIS is concerned the most recent rev of AOS/VS is 7.64. I did find two Software Bulletins for 7.69 that mentioned the patches, but no indication of how to obtain them. Presumably, you get them through Atlanta but, like a lot of you, we're not SPSA subscribers. I wonder what criteria are used for which patches get put onto OIS and which don't. I realize that DG would prefer that we all be on SPSA, but as long as they continue to offer SSS *à la carte*, then there should also be a way to obtain the latest patches via OIS or the official NADGUG BBS. Oh well . . . .

The next day I found an AOS/VS II 2.03 EXEC patch that appeared to match the labeled tape problem (and fixes for QSNA and QPRINT), so I edited the patch file to change the rev numbers and PATCH claimed all went well. We're now back up on 7.69 and so far so good . . . (knock on plastic). Δ

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Electronic bulletin board
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Rational Data Systems **415/499-7628**

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

Information about advertising.....Michelle Sentenne

FOCUS back issues .....Turnkey Publishing staff

The latest products for DG systems

Netware for AOS/VS

San Rafael, CA—Rational Data Systems, Inc., announces availability of Netware for AOS/VS, a Novell-certified implementation of Portable Netware for Data General MV family minicomputers.

Netware for AOS/VS allows an MV family computer to appear just like any other Netware server to MS-DOS, OS/2, and Macintosh clients on a local area network (LAN).

Netware's development for AOS/VS required nearly two years and involved four different companies. Novell provided the basic code, written for Unix in C. Mentat (Santa Monica, California) supplied AT&T-compatible Streams, a standard environment for communications protocols. Data General supplied the device drivers for the various MV family LAN controllers, as well as a PC*I-compatible Netbios interface module. Rational Data Systems ported the Novell source code, provided other AOS/VS-specific components, and put everything together (including the documentation) to create the final product.

Netware for AOS/VS comes in two halves:

- *Netware Transports* include the AOS/VS LAN device drivers and standard Netware protocols, including IPX, SPX, Netbios, and the application program interfaces (APIs) for these protocols. The license fees for Netware Transports are based on MV family CPU type.
- *Netware Services* include the standard Netware features such as file and printer sharing, multi-user record locking, bindery, etc. Netware Services licensing is based on the number of simultaneously logged-in users.

Configurations for Netware Transports and Services together range in price from less than $3,000 to as much as $29,000. Deliveries are 15 days ARO.

Rational Data Systems, 1050 Northgate Drive, San Rafael, CA 94903; 800/743-3054 or 415/499-3354.

Circle 82 on reader service card.

Larger, faster disk subsystems

Minneapolis, MN—A new disk subsystem in Zetaco's SKM series offers larger capacity and higher performance for Data General MV computers, featuring individual drive capacities of 1370 MB and an average seek time of 11.5 milliseconds.

The Zetaco controller supplied with SKM subsystems supports up to seven drives. DG users may configure up to 9.59 GB in one subsystem, using about the same rack space needed for a Data General 592 Argus. SKM subsystems are housed in rack-mountable enclosures that hold four drives each.

SKM subsystems with the new 1370 MB drive, offered in both disk-only and disk/tape configurations, are priced at $12 to $14 per megabyte, depending on configuration. SKM subsystems are fully DG compatible and emulating, and are supported by Data General maintenance.

Zetaco, 11400 Rupp Drive, Burnsville, MN 55337; 612/890-5135.

Circle 83 on reader service card.

Rev 3.0 for B32

Blue Ash, OH—Now your software can look and feel like PC software with such features as windows, pop-up menus, Lotus-style menus, on-line help, hot keys, pull-down menus, and color support with Business Basic rev 3.0 from B32 Software, Inc.

B32 Business Basic runs on all major Unix platforms, as well as DOS/Novell and AOS/VS.

Advanced programming features include full-screen editing, optional line numbers, shared subroutines with argument checking, multiple statements per line, and extensive debugging aids.

With embedded SQL reporting, new statements like SQL_CONNECT, SQL_EXECUTE, SQL_FETCH, and SQL_DISCONNECT give direct access to relational data bases such as Ingres (soon to be extended to Oracle and Informix).

B32 Software, Inc., 4412 Carver Woods Road, Blue Ash, OH 45242; 513/791-6172.

Circle 75 on reader service card.

No limits on input files with new Arc version

Germantown, MD—Version 2 of Arc from Data Bank Associates features functional enhancements as well as a performance improvement on Arctape. Arc can now process an unlimited number of input files, automatically convert PC file line endings, support incompatible PC filenames, and process to magnetic tape at speeds up to six times faster.

In its standard "add" mode of operation, Arc can now handle 4,000 to 5,000 input files in a single pass. The previous version was limited to approximately 500 files in a single input pass. There are no limits when presorted indirect files are used.

Arc will now automatically "store" (no compression) previously Arced files. Because previously compressed files will not compress any further, there is a performance improvement for both Arc and Arctape.

Arctape provides users with the capability to perform their backups to magnetic tape by building an Arc library on the tape. The new release can now process Arc libraries to tape up to six times faster than the previous version. Arctape can now recover files 10 to 20 times faster than Load II. The product includes a user-

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friendly interface that operates in either interactive or batch mode.

Using the /PC switch, Arc can now automatically convert text files to either the PC line ending, carriage return, line feed (CRLF), or the Data General line feed (LF) format. Additional enhancements include the ability to process "odd" PC filename characters like "-", "(", and "&". Arc for the Data General is fully compatible with the PC version. Users may transfer and manipulate Arc libraries on either system without any type of conversion.

The Arc program for Data General computers lists for $995 per system, regardless of size, and includes Arc, Arctape, Arcmerg, and one PC version of Arc. Initial licenses include one year of software subscription and hot line support. Corporate licenses and discounts are available as well as reseller pricing.

Data Bank Associates, Inc., 20010 Century Blvd., Suite 104, Germantown, MD 20874; 301/540-5562.

Circle 77 on reader service card.

Turbotran 1.50 offers better flow control

Germantown, MD—Version 1.50 of Turbotran and The Smart Connection for Data General systems, both from Data Bank Associates, Inc., provide enhancements for file transfer and flow control error handling. The Smart Connection and a number of other utilities are bundled with Turbotran.

Compatible with DG's AOS, AOS/VS, and AOS/VS II operating systems, Turbotran provides the Xmodem/Ymodem capability to transfer files error-free to and from any personal computer using almost any terminal emulation software. Turbotran supports transfer speeds up to 38,400 baud.

Turbotran can now automatically remove the "pad" characters associated with Xmodem and Ymodem communications. Files may be received on the Data General with the exact file length as the original.

Version 1.50 provides improvement in the handling of flow control problems. Although the Xmodem protocol does not use flow control, many of the "intelligent" modems and other devices have this capability built in. Turbotran now handles most flow control problems while remaining fully compliant with the Xmodem protocol.

The Smart Connection provides Persoft Smarterm products with an easy-to-use file transfer package. This additional software may either be used within CEO or in a standalone mode. Within CEO, the package operates as a public application and permits operation with a single keystroke for either file import or export. Release 1.50 of The Smart Connection now automatically transfers files without any "pad" characters.

Turbotran includes The Smart Connection, additional utilities, and one year of software and telephone support. Turbotran costs $495 per Data General system, regardless of the model or size CPU. Corporate licenses and discounts are available as well as reseller or dealer pricing. Current clients under yearly software support will automatically receive their product upgrade.

Data Bank Associates, Inc., 20010 Century Blvd., Suite 104, Germantown, MD 20874; 301/540-5562.

Circle 78 on reader service card.

Rush adds new fax products

Sterling, VA—Concept Automation, Inc., announces two new additions to its line of automated facsimile for the Data General MV series of computers: Rush Lite and Rush Multi-Line.

Rush Lite offers straightforward automated faxing from the DG MV computer for users who don't require Postscript or multiple outgoing lines. Document length limitation is 15 pages.

Rush Lite comes with the Faxcom 500, and operates using the same firmware as the bigger Faxcom systems, but operates directly from the 1.44 MB floppy drive.

Rush Lite is available for any size MV system for $4,995 including hardware, software, cables, cover sheet logo, 90-day warranty, and one year of software support.

At the other end of the spectrum, CAI introduces Rush Multi-Line. Designed for high-volume faxing for manufacturers, service companies and other larger users, the high-end Rush system can deliver up to 16 faxes simultaneously using the Faxcom 4000.

Faxcom 4000 may be configured from 4 to 16 lines depending on your volume. Configure lines for outgoing as well as incoming faxes to gain a plain-printer fax receiving station. CAI offers a Postscript upgrade that will allow sending of Postscript documents over the company's fax broadcast network. The Faxcom 4000 also offers a TCP/IP ethernet communications option for added speed, as well as linking of multiple platforms into one fax server.

List price for a four-line Rush Multi-Line system complete with hardware, software, cables, software support, hardware maintenance, and one coversheet logo, ranges from $17,950 to $19,550 depending on the size of your DG system.

Concept Automation, Inc., 1319 Moran Road, Sterling, VA 22170; 703/450-6000.

Circle 76 on reader service card.

Structured documents with Architext

Goleta, CA—Architext, a language-driven document constructor from Interactive Software Engineering, Inc., allows manipulation and viewing of structured documents such as programs, specifications, and technical or administrative reports.

Featuring a graphical user interface (GUI), a single mouse click, for example, selects a structural block of a document. Commands such as "cut," "copy," and "paste," instead of acting merely on streams of characters, as in textual editors, apply instead to entire structures. Structures may be built both from system-generated templates or by typing partial or complete phrases that are then parsed and completed by Architext's built-in parser.

Architext, which runs on a variety of Unix platforms, including Data General's Aviion family, offers adaptation to any context-free language. To build an Architext editor for a specific language (programming language, design language, or even the description of the structure of standardized technical documents), the user describes the language's grammar in a simple notation called LDL (language description language). Architext includes basic LDL grammars for Eiffel, Ada, For-

tran, and C. Users have access to these grammars and may adapt them to support their specific needs, even developing their own.

Also provided are semantic facilities for executing programs, even not completely refined ones, for software prototyping and program testing.

Interactive Software Engineering, Inc., 270 Storke Road, Suite 7, Goleta, CA 93117; 805/685-1006.

Circle 79 on reader service card.

Faxing in the multi-user environment

Galveston Island, TX—Users may fax information directly from their computer systems to any fax machine around the world using Fax-Link, a turnkey hardware/software system for the multi-user computer system environment, now offered by Intuitive Technology, Inc.

Fax-Link's features include: fax broadcasting, reporting, ID codes, security receipts, graphic merging (including letterheads and signatures), and forms overlay. Graphics capability allows even text-based computer systems to fax complicated forms and letters. Fax-Link can support multiple fax channels connected to the host computer system. New optional features include integrated voice response (IVR) and Faxback technology. Price begins at $1,495 and up depending on the number of fax ports.

Intuitive Technology, Inc., 30 Colony Park Circle, Galveston, TX 77551; 409/762 8456.

Circle 80 on reader service card.

Address correction with Postware

La Crosse, WI—Postware Address Correction and Encoding (ACE) from Postalsoft, Inc., is now available for several multi-user, multi-tasking computers, including Data General's Aviion family.

ACE helps commercial mailers reduce postage costs and speed mail delivery by assigning up-to-date postal codes such as ZIP codes, ZIP+4 codes, and carrier route numbers, and corrects and standardizes all address data, including street, city, and state names.

ACE is certified by the U.S. Postal Services Coding Accuracy Support System (CASS). Initiated in 1988, CASS is a testing program designed to improve the accuracy of postal codes on mail pieces. According to recent CASS tests, ACE (Version 3.0) achieved the following scores: 99.94 percent for ZIP code matching, 99.9 percent for ZIP+4 matching, and 99.94 percent for carrier route matching.

Postalsoft, Inc., 4439 Mormon Coulee Road, La Crosse, WI 54601-8231; 608/788-8700. Δ

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—D.G. Review, April 1991
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Data Specific

Apex certified to European standards

Data General's manufacturing plant in Apex, North Carolina, has a competitive advantage over others seeking European business. The plant is the first in the United States to receive the **Underwriters Laboratory's** ISO 9002 certification, a guideline for doing business in Europe after 1992.

The designation came after an "exhaustive audit and certification process" of 18 different functions, DG says. ISO 9002 certification verifies that a plant's production and process programs meet European quality standards, and is already beginning to appear in customer bids from Europe.

Service for medical customers

Data General agreed to purchase the field service operation of long-time value-added reseller **HBO & Company.** HBO & Company is one of the largest suppliers of computerized medical systems to hospitals. The service arm of HBO & Company, **Computer Service Management Group,** has annual revenues of approximately $25 million, and employs 160 people.

Win one for the NSA

A three-year contract worth over $40 million to provide Aviion computer systems to the **National Security Agency (NSA)** was awarded to Data General. In addition to supplying Aviion servers, DG will be responsible for software support and initial maintenance.

DG settles with GSA

Data General paid approximately $1 million to the federal government in August to settle a dispute with the **General Services Administration.** The GSA alleged that Data General failed to disclose discounts on computer parts to commercial customers that weren't given to federal customers.

Federal contracts by law are required to disclose such discounts to the U.S. Data General said it believes the government was in error in making the charges, but settled because it would have been more expensive to litigate.

Alliances

Sweet deal

DMS Systems, Inc. will join with **Nectar Advanced Software Ltd.** to jointly market Mosaics, an application design, development, and runtime system that runs on Data General Eclipse MV computers under the AOS/VS operating system, and Aviion computers under the DG/UX operating system.

Mosaics is a flexible and progressive, object-oriented design tool. Nectar has been developing software tools for Data General equipment since 1979, and Mosaics already has a wide client base outside the United States.

All dressed up

Unix System Laboratories signed a licensing agreement with Data General to offer the Tuxedo System Transaction Manager, release 4.2, on the Aviion product line. The Tuxedo system Transaction Manager, known as System/T, is a software product that provides a framework for building on-line transaction processing applications on Unix System V operating systems.

RIG/SIG gigs

NOVEMBER/DECEMBER

November 17
SEARIG (Southeast Area Regional Interest Group)
Time: 1 p.m.
Location: Medeco Security Locks
Roanoke, Virginia
Contact: Betsy Koehler, 703/380-5000

November 18-21
NADGUG 91
Location: Denver Marriott City Center and Colorado Convention Center
Contact: NADGUG; 800/932-6663 or 508/443-3330 outside the U.S.
Description: The annual conference of the North American Data General Users Group is the largest gathering of DG users in the world! There will be sessions, workshops, educational seminars, exhibits, roundtables, special interest group meetings, and activities to suit every flavor of DG user. See pages 10-17 of this magazine for complete information.

November 18, 1991*
Office Automation workshop
Location: Colorado Convention Center
Description: Sponsored by NADGUG's Office Automation Special Interest Group, topics include CEO migration, conversion and training users from CEO word processing to Wordperfect, minicomputers vs. local area networks, chargeback, and applications analysis/development.
Cost: $75

November 19, 1991*
The following SIG meetings are scheduled during the NADGUG 91 conference: ICobol, Office Automation, BBASIC, Performance, U.S. Forest Service, Federal, Educators, Lions Gate.

November 20, 1991*
The following SIG meetings are scheduled during the NADGUG 91 conference: AOS/VS, DG/UX, Health, CQCS, Infos II, Oracle, MRC, Guardian.

* For all meetings taking place at the NADGUG 91 conference, please check your registration packet for more information.

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

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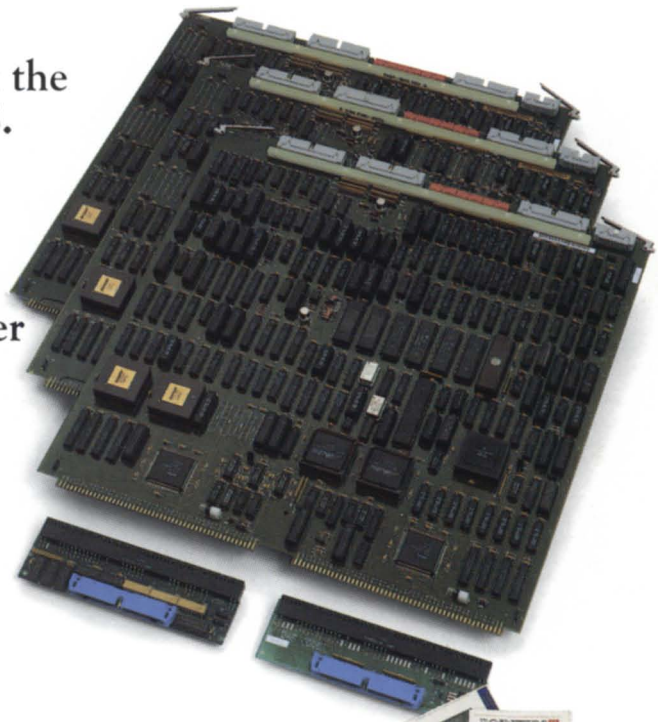

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