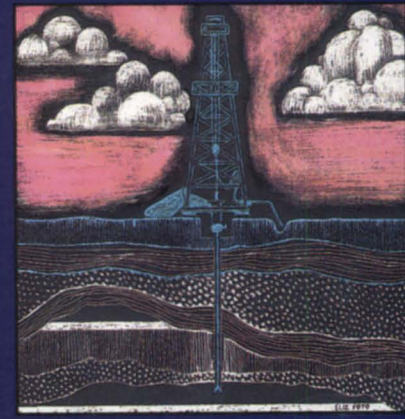
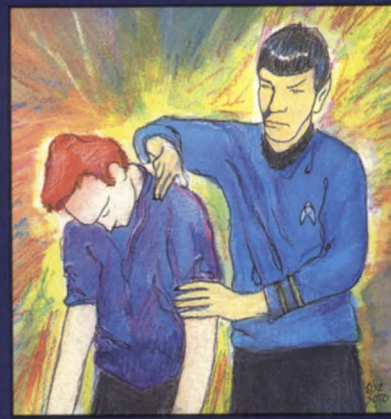
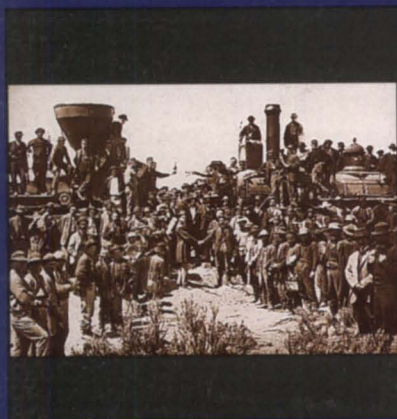
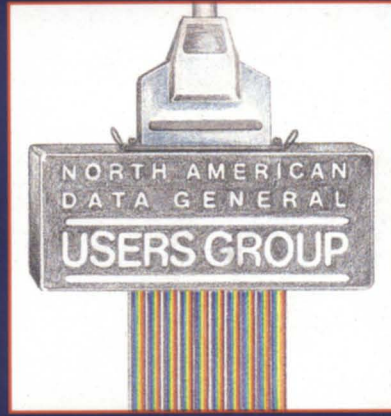


November 1990

FOCUS

The Magazine of the North American Data General Users Group



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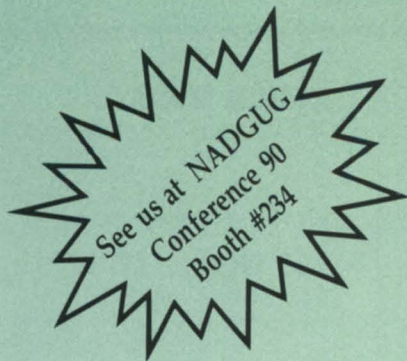
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FOCUS, the Magazine of the North American Data General Users Group (ISSN 0883-8194) is the official monthly publication of the North American Data General Users Group (NADGUG) in cooperation with Turnkey Publishing, Inc. NADGUG offices are located at Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759, phone 512/345-5316.

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 \$40, of which \$36 is allocated to a subscription for FOCUS, the Magazine of the North American Data General Users Group. A one-year subscription (12 issues) to FOCUS, the Magazine of the North American Data General Users Group, costs \$36. For all memberships and subscriptions outside North America, add \$50 to defray costs of mailing. For information on NADGUG membership, call 1-800/877-4787. Address all other correspondence to FOCUS, the Magazine of the North American Data General Users Group, c/o Turnkey Publishing, Inc., Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759.

Application to mail at Second Class Postage Rates is Pending at Austin, Texas and additional mailing offices. POSTMASTER: Send address changes to: FOCUS, the Magazine of the North American Data General Users Group, Subscription Department, c/o Turnkey Publishing, Inc., Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759.

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.

NADGUG is an independent association of computer users; it is not affiliated with Data General Corporation, nor does it represent the policies or opinions of Data General Corporation. The views expressed herein are the opinions of the authors, and do not necessarily represent the policies or opinions of NADGUG or of Turnkey Publishing, Inc.

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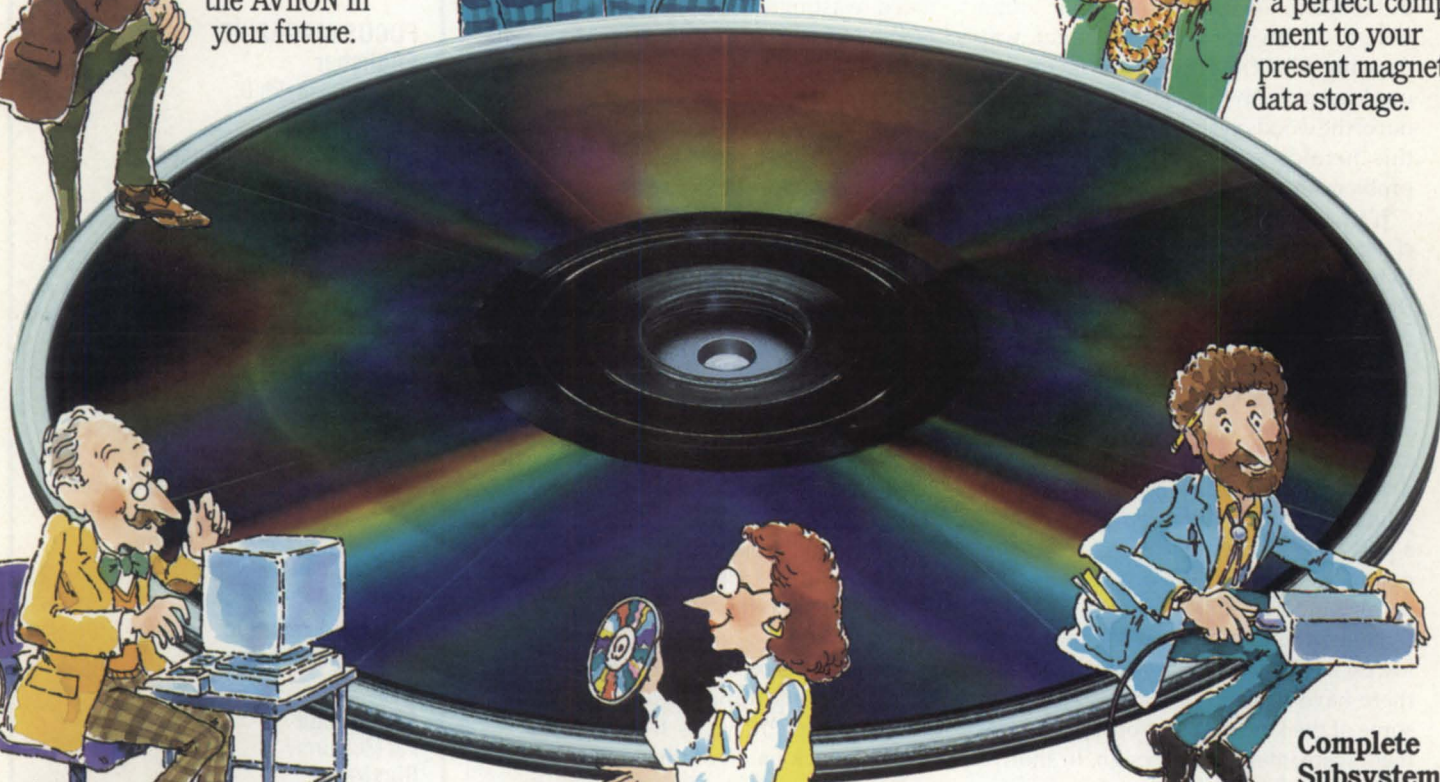
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For better, for worse



What a year this has been! In case you haven't noticed, this is my last month as NADGUG's president. That means it's also the last time the *Focus* editor is going to bug me about writing a column for the president's page. In the normal course of things, I'd probably spend this space talking about the major issues that came up during my term in office, and why I think I did such a good job of dealing with them. Unfortunately, these aren't normal times. Instead, I want to talk about what I think is ahead for NADGUG.

I don't want to sound like an alarmist, but it looks like times could be tough. And believe me, since I live and run a business in Houston, Texas, I know about tough times. As my term as president was drawing to a close, we were facing the unpleasant truth that Data General is not out of the woods yet financially. Obviously, this heralds some potentially serious problems for NADGUG.

It's hard to understand why the financial tide hasn't turned, because DG seems to have been doing just about everything they could to reverse the bad financial results of the last few years. They have completely revamped their product line on both the proprietary side and the Unix-standards side. They have sold off their excess factory capacity and trimmed costs dramatically through a series of very painful reductions in force. I can't think of a part of the company that hasn't undergone close scrutiny to identify cost savings or revenue possibilities. Yet the red ink remains, and the company's stock is at its lowest level ever. To make matters worse, there have been rumors circulating that some of the key members of top management were intending to resign. In short, a crisis of confidence has been building for DG's future.

I just came back from Westboro, where NADGUG's officers spent two days meeting with DG management, including CEO Ron Skates and Marketing Chief Steve Baxter. Officially, we were there to discuss the results of the annual survey of our membership. Unofficially, we wanted to ask some questions about the company's

fortunes, and about its commitment to its users.

Ron Skates is at his best in meetings like this. There were just a handful of us sitting around the table, and we were asking questions he probably didn't want to hear, questions like, "Is DG going to be around next year?" His answers were precise and persuasive. Their thrust was that everything that's been done up till now was absolutely essential, because the industry will no longer support the kind of monolithic companies that grew up during the seventies and eighties.

In some ways, DG is ahead of the competition, because companies like DEC have been resisting the reassessments and adjustments DG has already undertaken, precisely because they were so unpleasant. But DG didn't go through all this just to go away; rather they expect to be around to fight again tomorrow. Indeed, there will be a need for proprietary systems for many years to come, and DG will be there to provide them.

That doesn't mean the battle is won. It just means that DG is in it for the long haul. And I'd say the same has to be true for NADGUG. DG's problems point to some belt tightening for the user group, coupled with some aggressive marketing of the benefits we offer users. During the next year, we should review our entire program, with no sacred cows, and decide which activities should get our money and attention. In the process, I'm sure we'll uncover other activities that we can safely scuttle.

None of this is easy. The only consolation is that tough times are often interesting times. I hope 10 years from now to be looking back on all of this with a kind of detached fondness, and reflecting, "You know, I'm sure glad we didn't give up on it when things didn't look so good."

So, on that note, I invite you to welcome our new president, Frank Perry. He is well aware of the transition that must take place in NADGUG, and is eager to hear your suggestions. I thank you all for your support this past year, and wish you good luck in the future. Δ

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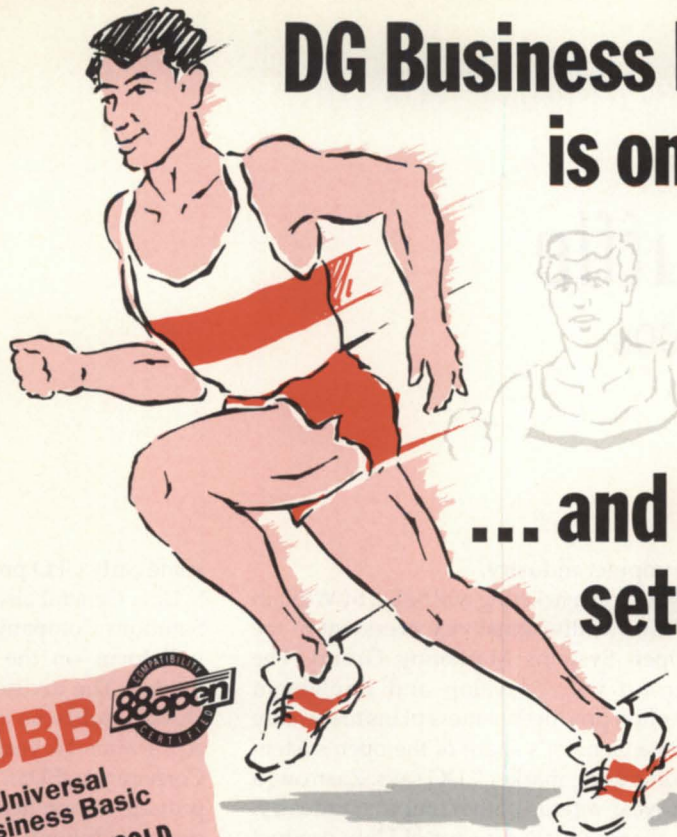
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Software Portability & Productivity

Executive shuffle

DG maps strategy for the 90s

by Robin Perry
Focus staff

On October 9, Data General revealed the strategy it will follow as it attempts to regain a foothold in the computer industry. The announcement of upper management changes and a companywide reorganization ended months of speculation in the DG community.

The company was reorganized to reflect the divergent Unix and proprietary products it manufactures, and a new division was created to pursue the systems integration market. The upper management team was bolstered with the addition of three new vice presidents. Tom West will head a newly created development group that will evaluate technology for future products.

The new vice presidents are Allan Jennings, vice president, Aviion Development Group; William Zastrow, division vice president, Open Systems Marketing Group; Peter Gyenes, vice president and general manager, International.

"Allan Jennings and Bill Zastrow are recognized industry leaders in the Unix markets and Peter Gyenes brings broad international expertise. Their addition will strengthen our core group of executives, providing the company with a team that we believe will carry out a winning strategy," said President and Chief Executive Officer Ron L. Skates.

Jennings, former vice president and general manager of the Unix Systems Division at Unisys, will head the Aviion Development Group. The group is responsible for all Aviion product line hardware and software development programs. Jennings, who reports to Skates, has more than 16 years experience in the

computer industry.

Aviion marketing will be led by William Zastrow, divisional vice president of the Open Systems Marketing Group. The group will "develop and implement Aviion product business plans to increase Data General's share of the open system computing market," DG says. Zastrow, a 20-year veteran of the computer industry, was previously director of Unix product marketing for Dell Computer Corporation. Zastrow reports to Stephen P. Baxter, vice president of Corporate Marketing.

Both marketing and development for DG's proprietary Eclipse MV line will fall under Vice President and General Manager Joel Schwartz. Schwartz joined Data General in 1989 as vice president of the Software Business Unit. He oversaw DG's efforts to recruit software solutions to the Aviion line. In little over a year, 400 vendors have agreed to port over 1,000 applications to Aviion computers, DG says.

International operations will now fall under Gyenes, a former senior vice president of marketing and sales for Encore Computer. Gyenes, reporting to Skates, will later assume overall international responsibility. Herb Richman, vice chairman of DG's board of directors, is currently responsible for Asia/Pacific/Japan areas.

In the past few weeks, four Data General vice presidents resigned. They were Tom Palka, vice president of U.S. Sales; Bob Tway, division vice president Eastern Operations; Fred Cochrane, vice president Central Technical Services; and John Kavazanjian, vice president of the PC Business Unit. Tway was known to NADGUG members as a good contact within DG, and helped the OASIS (Office Automation Special Interest Group) with

some early CEO problems.

Data General also announced the Data Solutions Company, a new division that will focus on the systems integration market. The division will be headed by David Jacob, who joined Data General in April after 18 years at Electronic Data Corporation (EDS). The new division will provide comprehensive information processing solutions, DG says, including professional services and systems integration of software, communication, and hardware technologies. The division will begin by focusing on manufacturing environments, said Jim Dunlap, corporate spokesperson, and will suggest the most appropriate solution for an environment, not necessarily the Data General solution.

West, developer of the first 32-bit Eclipse system and former leader of Aviion and Eclipse development, will "lead a group of developers who will determine and evaluate technologies for implementation in future generations of Data General products," DG says. He will still work closely with the Aviion and Eclipse product groups as a consultant.

"We said back in August that we had to be successful in the 90s. We added strength where we felt we needed it. We are now very well positioned for the 90s," Dunlap said.

The position was not achieved without a price, however. In August, Data General announced the layoff of 2,000 members of its worldwide workforce. In October of last year, a 2,500-person reduction in workforce and closings of four manufacturing plants were announced. Data General has consistently lost money for the past several quarters, although some market analysts say that 1991 could be the year that Data General turns around. Δ

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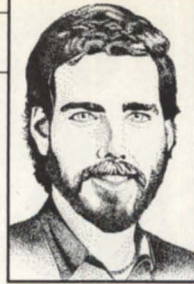
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Highlights

RIG/SIG planning meeting addresses needs of special and regional interest groups

In mid-September, **RIG/SIG Committee** members met in beautiful Asheville, North Carolina, where we held a planning meeting at the facilities of Wilcox Travel Agency, Inc. I left Asheville with many thoughts, but mostly I was impressed by the committee members' professionalism, and by their commitment to the success of NADGUG interest groups.

Committee members present were RIG/SIG Chairperson **Charlene Kirian** of Computer Training Associates, Eastern Vice Chair **Chuck Goes** of Datamark Corporation, Western Vice Chair **Bernie Abrams** of Librascope Corporation, AOS & AOS/VS Special Interest Group Chair **Edward E. Lindberg** of the Western New England College, OASIS Chair **Denise Sikorski** of the Chicago Board of Trade, and myself.

The topics discussed included membership software, local DG office support, current issues facing DG, feedback on RSVP cards, and a review of services provided to interest groups. We also selected the winner of our annual newsletter contest. The following is a brief highlight our of discussions.

We received generous response concerning the RSVP card made available to interest groups in March of this year. To date, the only enhancement request has been to modify the pre-printed area to accommodate 6 lines per inch. The modification has been made and new cards are in production. The membership software will also accommodate these cards.

Interest group chairs failing to submit the required reports for the fall board meeting by the suggested deadline can expect to receive a reminder call from a committee member. Areas for follow up

were divided among the vice chairs.

One issue of vital importance to both NADGUG and interest groups is the exchange of membership rosters. These rosters furnish both NADGUG and interest groups with valuable data for recruiting new members. Currently, the national office provides a roster to interest groups twice a year, as new memberships are secured. So far, the Wisconsin, Central New York, SEARIG, and Chicago area interest groups have responded to our appeal for lists of interest group members. Further discussion on the matter resulted in a recommendation that membership rosters accompany group reports.

The recipient of the \$150 cash prize in the newsletter contest was the **Colorado Data General Users Group**. The prize money and a certificate will be awarded in Seattle. Others in the running were the AOS/VS & SIG/UX Notes, Central New York DG Users Group, Data General Users of Indiana, OASIS—Word for Word, SEARIG News, and Los Angeles End Users of Data General Equipment. Committee members were impressed with each newsletter. Judging was based on consistency, content, format, and the number of authors. Congratulations to the Colorado users group!

If your group has a newsletter, consider placing the NADGUG office on your mailing list. You'll be eligible to enter next year's newsletter contest. And if you will provide us with at least 65 copies, we'll make sure your news is a part of the newsletter exchange.

The aforementioned membership software and its documentation is expected to be ready by Conference 90. The software will generate labels and reports. It was

designed with the needs of a membership organization in mind. A report writer may be purchased to operate in conjunction with the software for more complex report needs. Enhancements are possible to tailor the software to your group's individual needs.

While future directions for the committee were deliberated, we re-emphasized the need for committee members to participate in local chapter activities and to provide direction for new interest groups. We mapped the areas currently represented by interest groups, and drafted a plan to target several new areas.

Interest groups that would like to plan a workshop are encouraged to contact the committee for additional support. The suggestion of a "job bank" for members merits further investigation, as well as a corporate travel service.

Representatives of the committee will visit each of the special interest group meetings in Seattle. RIG/SIG Committee members are very interested in hearing about your group's activities, concerns, and successes. If you have questions or comments about any RIG/SIG activities, please let us know.

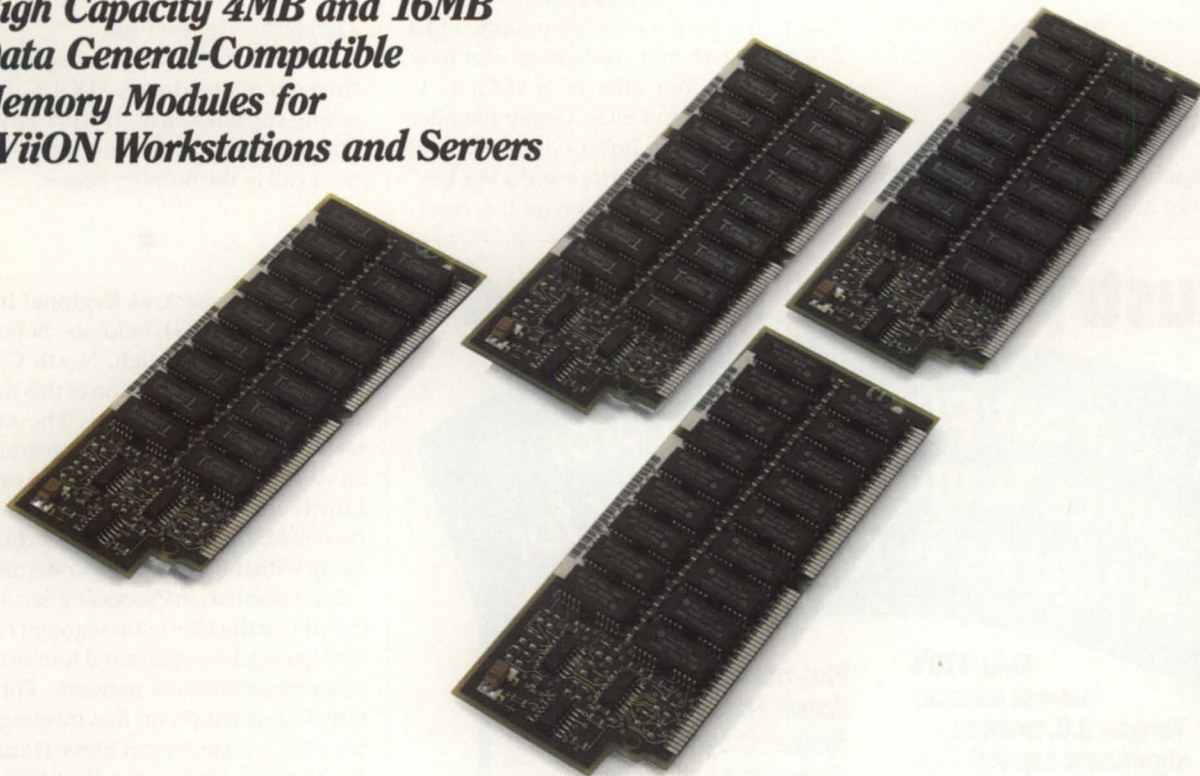


In preparation for the Fall board meeting, RIG/SIG report forms were mailed to all interest group leaders. This report affords NADGUG a summary of your group's activities since last account, the size of your membership, future activities, changes in group officials, and suggestions of how NADGUG can further assist interest groups.

Although at press time, limited responses constituted a somewhat inconclusive account, some of the suggestions for NADGUG included: assistance in recruitment of new members; continuation of distribution of user group meeting topics; updating the speakers bureau; and more frequent rosters of new NADGUG members for each area.

I'm happy to say that several of these concerns are already being met, and oth-

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ers will be reviewed by the RIG/SIG committee. Thanks to those of you who responded early.

And now, news from our regional interest groups.



The Metropolitan New York Regional Interest Group held its September meet-

ing at the Data General facilities in Saddle Brook, New Jersey.

"PC to Data General Connectivity" was the program topic with discussions and a live demonstration. The group also took advantage of our offer of NADGUG T-shirts for RIGs and SIGs. Group member Lee Fisher of The Bobst Group Inc., reported that "the T-shirts were a big hit." For additional information on this meet-

ing or on the Metropolitan interest group, please contact Gary Gittleson or Lee Fisher with the Bobst Group, Inc. at 201/226-8000 extension 302.

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The Southeast Area Regional Interest Group (SEARIG) held its September meeting in the Raleigh, North Carolina area. The morning portion of this meeting was held at SAS Institute. The meeting featured a SAS product demonstration on an Aviiion and a tour of the SAS campus. Lunch followed with a discussion on current high performance disk technology, along with the SEARIG business meeting.

NC Information Processing Service was the site for the afternoon segment concentrating on a description and tour of the NC telecommunications network. For additional information on this meeting or on SEARIG, please contact Steve Handlos of Productivity Systems at Post Office Box 1931, Summerville, South Carolina 29484-1931.



The Data General Users of Indiana held its September meeting at the Quality Inn East in Indianapolis. Guest speaker for the evening was Jane Volta of the Naval Avionics Center. Jane's topic was "Planning for a Hardware Upgrade."

The final DGUI meeting of 1990 is scheduled for November 14 at the Wood Mizer in Indianapolis. As this is a breakfast meeting, the designated theme will be "Sunrise with DG."

An inside view of Data General's new CEO Object Office will be the feature presentation. For additional information on this meeting or the activities of DGUI, please contact Nancy Miller of CIC Enterprises at 317/253-1711.



The Smokey Mountain Users of Data General Equipment (SMUDGE) held its August meeting at the Wilcox Travel Agency, Inc. in Asheville, North Carolina. SMUDGE President Daniel Shook gave a

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tour of the facilities.

During the meeting, **Joe Carroll** of Design Data Systems in Rockville, Maryland was welcomed as a new member. A drawing was held for the free registration to NADGUG's Conference 90 in Seattle. **Lynn Mills** was the lucky recipient. Member participation is unquestionably encouraged as Joe was enlisted to introduce guest speaker **John Fahlstrom** of Zetaco, Inc.

John's conversation focused on what makes Zetaco drives so fast.

The October program was held in Gatlinburg, Tennessee and featured **Bill Rhodes** of Interact Computer systems. Demonstrating its new 911 telephone monitoring/tracking system on the Aviion, members were able to see the technology brought to various counties using Data General equipment. For addi-

tional information on these meetings or on SMUDGE, please contact Daniel Shook at 704/254-0746.

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The **Colorado Data General Users Group** held its September meeting at the U.S. Forest Service. Data General's **Carol Keller** and **Jay Bachman** gave a presentation on AOS/VS II and CLI 32. In November, the Colorado group plans to host its first annual DG Night, also at U.S. Forest Service offices. There will be demonstrations of DG products, hors d'oeuvres, and a brief business meeting.

As always, the group plans to have a display table available for vendors to distribute materials. Members seeking a job change or employment may bring resumes. Employers may post positions available.

For additional information on these meetings or on Colorado group activities, please contact **Bruce Cary** of The Association of Operating Room Nurses at 303/755-6300.

The **Los Angeles End Users of Data General Equipment (LA EDGE)** will hold its next meeting on November 8. The theme for the meeting will be "Data General Night." This annual event gives DG representatives the entire evening to inform members of what the company is doing, and how it can continue to serve the needs of the DG community.

Members will not want to miss the December 4 meeting as the society once again hosts "Casino L'EDGE". As all proceeds from this event will go to local charities, membership is not required for participation in what has been billed as the "social event of the year!"

For further information on these meetings or on LA EDGE, please contact **Mark Speer** of Zero Halliburton at 818/897-7777 or **Marida Slobko** of Information Resources at 818/351-0481. Δ

Greg D. Goss is the RIG/SIG coordinator for NADGUG. He may be reached at Focus magazine, 4807 Spicewood Springs Rd., Suite 3150, Austin, TX 78759; 1-512/345-5316 or 1-800/USR-GRUP.

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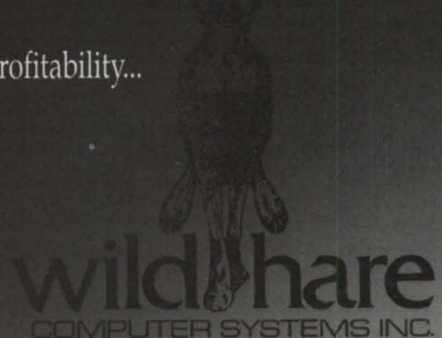
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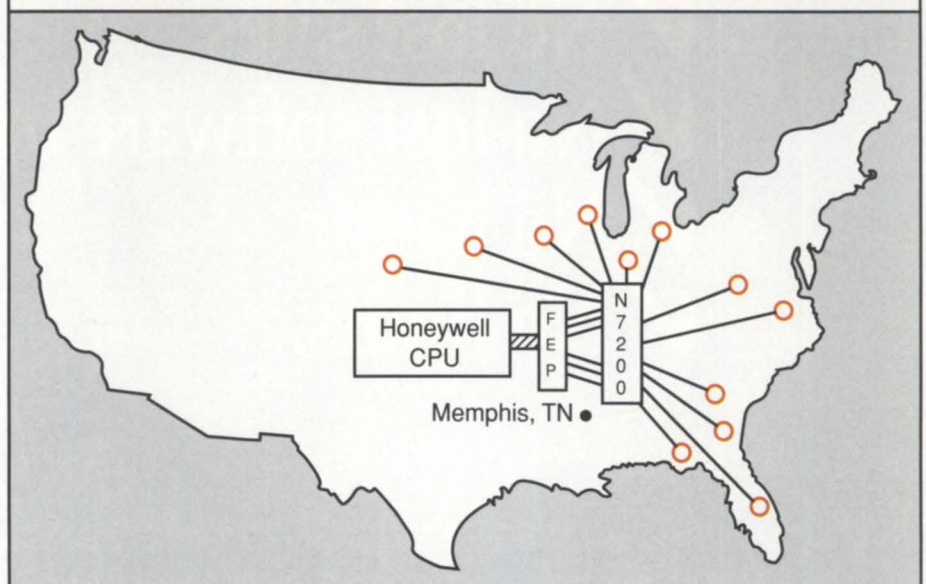


The road to efficiency

SYNOPSIS

Automark avoids traffic jams by linking 400 Parts Plus stores with an X.25 network. Efficient movement of parts, cost savings, and growth potential are the results.

Figure 1: Automark mapped a distributed network for Parts Plus stores.



by Etta McCarthy
Special to Focus

Automark System Corporation of Memphis, Tennessee is a subsidiary of Parts Industries, one of the largest automotive parts wholesalers in the United States. As a computer systems house, Automark supports and operates the main data center, the minicomputers at 36 warehouse locations, and the personal computers at over 400 Parts Plus store locations.

With warehouses located north to Michigan, south to Florida and Louisiana, east to Washington, DC, and west to Colorado and the Oklahoma border, Automark's network plays a significant role in its day-to-day business. Order en-

try, inventory control, and shipping information is continuously exchanged between remote warehouses and the main office's data base.

With the recent purchase of five additional warehouses and plans for future growth, Automark recognized the imminent fact that it was outgrowing its existing network. The processing power of the mainframe would soon reach its limitation. Warehouse production and the ability to move parts efficiently would become more critical as the company continued to grow.

In order to best utilize their existing Honeywell and Data General equipment while considering a strategy for future growth, Automark chose to replace their traditional central processing system with a distributed network (Figure 1).



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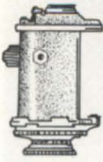
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Network design

Automark began by upgrading its DG S20 16-bit machines to MV/2500s (or larger) to handle the local processing for order entry and shipping functions. Each warehouse has an independent data base and all data base changes are sent to the mainframe master data base at the end of each business day. In



turn, a companywide updated master data base requires transmission to each warehouse before the start of the next business day.

To accommodate these file transfers, all lines were changed from multipoint to point-to-point. With the completion of this change, Automark recognized a file transfer rate increase from 15 blocks per minute to 20 blocks per minute on the VIP point-

to-point.

The installation of the industry standard X.25 protocol, supported by Honeywell and DG, and used by the concentrator, followed. X.25 was better suited for file transfers and allowed for flexibility in the communications transmission from DG to Honeywell equipment. DG's Xodiac Transport Service to support X.25 on the DG MV/2500s was also installed. To avoid the high cost of expanding FEP ports, Automark concentrated the 20 low-speed lines into six high-speed lines on the Honeywell FEP using an Amnet (Data General value-added reseller) Nucleus 7200 X.25 Concentrator. Automark now recognized a file transfer rate with X.25 point-to-point communications as 65 blocks per minute.

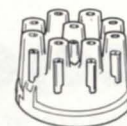
The two Nucleus 7200 X.25 Concentrators in the network are the common elements that interconnect the 20 DG MVs at the warehouse sites and the six Honeywell FEP ports. The concentrators, implemented on the industry-standard PC/AT, provide extensive network management capabilities, including statistics and alarm reporting. In addition, the on-line reconfiguration feature of the concentrators enables Automark to make addressing or port changes with greater ease than previously experienced with the Honeywell FEP.

Each N7200 concentrator is tied to the Honeywell FEP via three X.25, 56K bps links. The concentrator is in fact a tandem arrangement with two concentrators interconnected via a high-speed X.25 link. The tandem switches each support 10 of the warehouses at 9600 bps. Automark has realized an increase of four times the data throughput and one-half the cost of the alternative of expanding the Honeywell FEP ports.

Cost savings

Before the divestiture of AT&T, it was prudent to order multipoint lines for a network like Automark's. There were cost savings to be had with reasonably good service. The multipoint circuits were more complicated and hence more difficult to repair than point-to-point, but the cost of

point-to-points were prohibitive. Multipoint lines also save on costly FEP ports. Point-to-point lines require a FEP port for each site.



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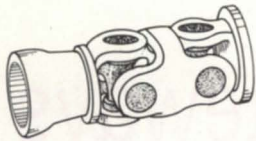
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Automark took advantage of AT&T's ACCUNET Spectrum of Digital Services (ASDS). The point-to-point telephone circuits under this new service turned out to be marginally less money than the previous multipoint service. The circuits are inherently more reliable and less complicated than multipoint circuits. In the event of a phone line failure, only one location is affected. Overall, the warehouses are more productive by being less susceptible to network outages. Under ASDS, Automark also has the option to upgrade to a higher speed service at a later date without significant cost increases.



Automark's cost savings were also realized in the purchasing of the N7200 concentrators by reducing the costly number of FEP ports needed, while outperforming the Honeywell FEP's speed and throughput. The PC-based technology of the N7200 concentrator supports line speeds up to 256K bps and can be expanded up to 32 ports. Thus, as the network grows and traffic increases, the current system has the capacity to meet those needs without changes in hardware and costly upgrades.

Tangible benefits

On a day-to-day basis, Automark's move to an industry standard X.25 network resulted in the following tangible business benefits:

- Each warehouse is able to directly query any other warehouse's data base, enabling them to move parts more efficiently. Direct communication with the mainframe in Memphis is no longer required.



- The business day now ends at 8 p.m., rather than

3 to 4 p.m. Inventory files can be updated instantly, instead of waiting for the central office.

- The data throughput has increased four times, far exceeding expectations.

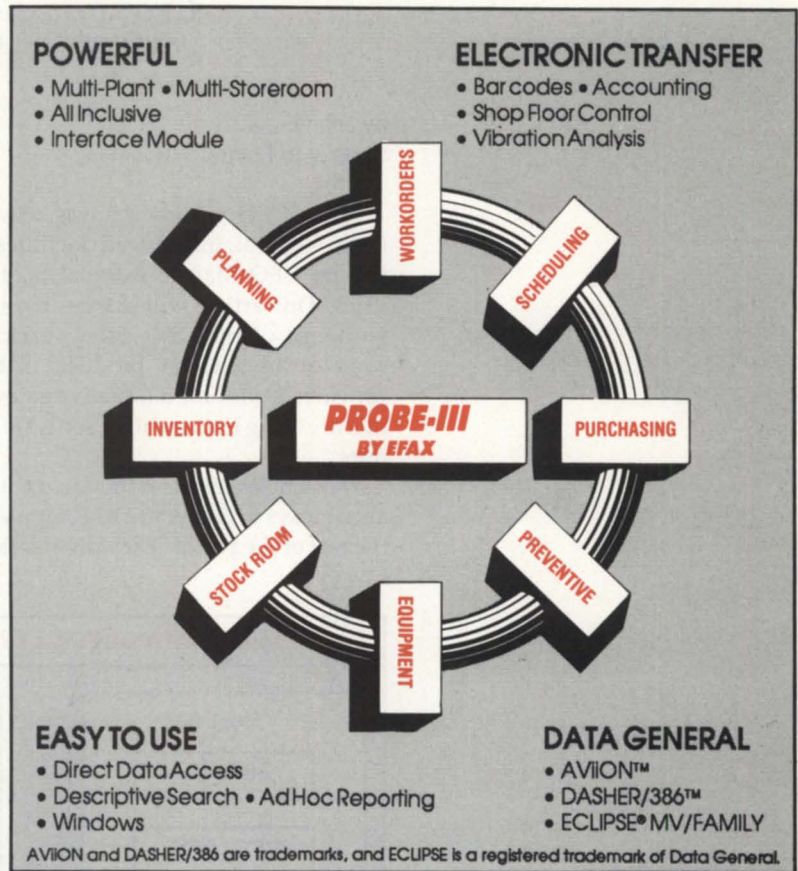
The potential for the network's future benefits is more secure. The X.25 protocol protects their investment. New applica-

tions such as payroll, accounting, or fax services can be added to the existing network. When the need arises, the upgrade to a backbone packet switch network can be easily achieved. Automark's network exceeds the changing needs of today while laying the foundation for future expansion. △



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Etta McCarthy is manager of marketing communications for Amnet, a Data General value-added reseller (VAR). The above article was produced with technical assistance from Andrew Langin, senior applications engineer for Amnet, and Ed Charbonnet, director of Distributed Processing at Automark.

Circle 27 on reader service card.

CEO gateways

SYNOPSIS

CEO 3.0 provides the tools to link your e-mail network to the world.

by Stan Gula
Special to Focus

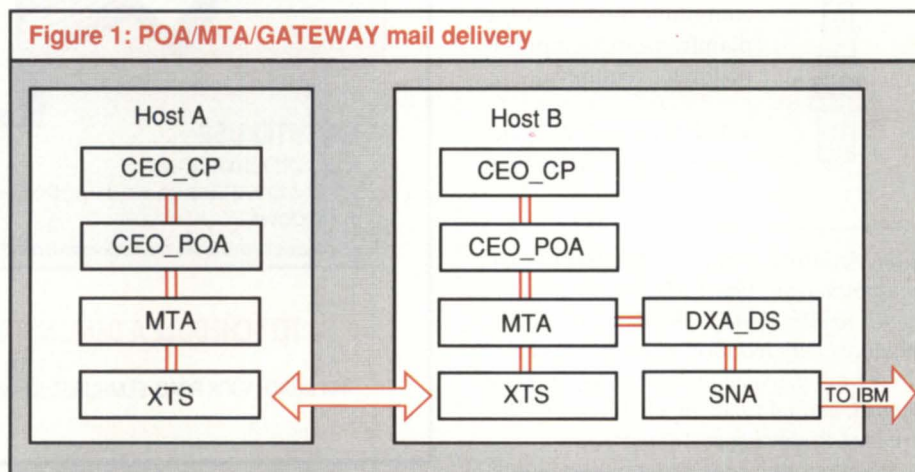
When CEO version 3.0 was released, Data General introduced facilities for linking CEO Mail to external mail services. This article will discuss the inner workings of the CEO gateway facility, some of the gateway products that DG provides, and some alternative gateways that are being built by other software vendors.

The articles in this issue are primarily about ways to link your DG computers to the rest of the world. They discuss things

like file transfer and access, cabling, and program-to-program communications over local and wide area networks. I'm sure you've seen the acronyms XTS, OSI, TCP/IP, PC*I, etc., and various "protocol stack" diagrams.

That's all fine. There are certainly real world applications where you need to have those services available. Terminal emulation and file transfers are good things. But for making connections between multiple companies, a more useful and secure connection is an e-mail connection.

E-mail allows file transfers between





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users on diverse systems, without requiring the remote user to have a valid logon ID on your system. And with tools like the CEO AUI (agent user interface) library, e-mail can be a "store and forward" application-to-application file transfer platform.

DG's CEO mail platform is a high level communications service. And with the gateway facilities in rev 3.0 and later, you have the tools to link your e-mail network

to the world. DG supplies gateway products for the four major mail standards. CEO DXA is a gateway to IBM's DISOSS and Office Vision systems. DXA supports mail exchange as well as DISOSS library access. CEO PXA is a gateway to PROFS, IBM's VM-based office software. DG /X.400 is the OSI-based X.400 gateway. And for all you Unix hackers, CEO MAILI is a gateway to Unix SMTP (simple mail

transport service).

Great, another pile of acronyms. Don't worry about what they mean. You don't need to know anything about these other mail services except that you can link to them. DG has done such a good job implementing gateways that you can continue to use existing CEO mail services as you always have, without regard for the fact that some of your mail is being transferred through these gateways.

X.400

Potentially the most important of these is X.400. I'm sure by now you have read too many articles about X.400 and its related directory services, X.500. I know I have. Again, you don't need to know about X.400, other than the fact that you will want to use it.

Another acronym that's being used a lot these days is EDI (electronic data interchange). And with X.400, EDI means e-mail. It's very likely that in a few years X.400 messaging will be a standard for EDI. It's important to remember that EDI means more than file transfers. There will be another layer on top of the message transfers defining transaction types and formats. So, you will be doing business with many of your vendors and customers by transferring orders, invoices, etc. inside X.400 envelopes.

Why is this likely? Because the U.S. government has declared that all federal and military networking procurements conform to the GOSIP (Government Open Systems Interconnection Profile) standards. GOSIP says OSI, and OSI messaging means X.400. So when government agencies begin adopting EDI, what message transfer service will be used? Good guess.

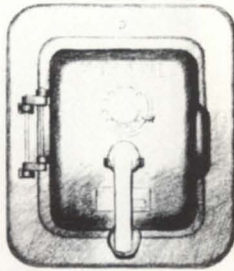
So, now that you're convinced that trading messages with the rest of the world is a "good thing," let's look at how gateway services have been grafted onto CEO.

MTA

The basis of the gateway service is the program MTA, which is a part of the XTS software package. I still have not figured out why MTA is sold bundled with XTS. If you're implementing an SNA-based gateway, like CEO DXA, you don't need XTS transport; you need SNA. But you don't have a choice if you need a mail gateway—you need to buy XTS to get MTA.

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mail that is not going to a local user is handed over to MTA for final delivery. This scheme lets MTA handle the "normal" CEO network traffic. In addition, it allows the grafting on of other mail networks. The truly amazing thing about this whole scheme is that the CEO POA (CEO post office agent) only sees MTA. All non-local messaging uses exactly the same format, as far as POA is concerned. And, for a CEO user, message addressing for a non-local CEO user is the same as addressing for a gateway user. That is, the network address familiar to CEO users, USERNAME:HOSTNAME, is the same format as the gateway address.

MTA uses a three-part address for mail delivery: username, hostname, mail-process-name. The hostname is the XTS hostname and the mail-process-name is an MTA customer process name. Don't confuse this with AOS/VS process names. Each customer of MTA declares its name when it connects to MTA. That name is the process name used in addressing mail.

For CEO-to-CEO use, the mail-process-name is always "CEO_POA". For a gateway, the mail process name is customizable. For example, the default mail_process name for DXA_DS (the mail piece of the DXA product), is DXA_DS. However, you can define multiple DXA servers on a single MV, so the DXA product allows you to generate multiple servers on a single MV. All you have to do is define them to CEO using the correct names.

Defining gateways

You define a gateway to CEO in two ways. First, you need to add a gateway entry into the name server data base by using the "gateway management" option in NSAGEN. When you create the NSA entry for the gateway, you specify the "usable" name of the gateway, the hostname of the system where the gateway process will be running, and the MTA mail-process-name of the gateway server. In CEO Light, this is done with the CEO.GATEWAYS program because Light does not use the name server. The usable name is an alias. It's what users see when they address mail. The name server maps that name into the hostname/processname that MTA needs for addressing.

Secondly, you need to make sure that your mail-process-name is in POA's VALID_MTA_CUSTS table. Otherwise,


POA will not accept mail from that mail process. For all DG-supplied products (except in cases where you are running multiple servers of one kind on a single system), you should not have to modify this table. The names in the VALID_MTA_CUSTS tables have changed from revision to revision. In CEO rev 3.12, the table contains CEO_POA, X400, SMTP, DXA_DS, and PXA. This

table is imbedded within the CEO_POA.PR file and the only way to modify is via a program patch. Currently, the table has room for 11 gateway names. Since the table is in the program file, there's no way to expand that number.

Delivery

Once you have a gateway defined, POA and MTA work together to deliver your

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FOCUS ON: GREAT CONNECTIONS

message. When POA receives the message (either from the CEO_CP program or from an AUI toolkit program), it resolves all addresses using the name server. POA will expand mailing lists and resolve remote aliases to generate a list of completely specified addresses. That is, for other than simple local mail addresses, POA will have the username, hostname, and mail-process-name. For the local users, POA delivers the messages directly. For all others, POA submits requests to MTA, one for each host/process combination. As soon as MTA accepts the message(s), POA forgets it.

When MTA receives a request from POA (or any other mail process, for that matter), it checks the destination hostname on the message. If it's the local hostname, MTA tries to deliver the message to the named mail process. Otherwise, MTA connects to the MTA on the remote host and the remote MTA delivers it to the mail process. See Figure 1 for a picture of this whole process.

In the diagram in Figure 1, Host A is running CEO, MTA, and XTS. Host B has the same, plus the DISOSS gateway product DXA_DS. So for example, the DXA gateway is defined in the name server as name=IBM, hostname=Host B, and process=DXA_DS. A user on Host A could send a message to a DISOSS user named FRED by addressing it to FRED:IBM.

In the DISOSS case, the DXS_DS server does more than reformat messages. It also has to take care of translating text from ASCII to EBCDIC, reformatting attached documents from CEO WRD or CWT format to IBM's RFT, FFT, or NOTES formats, and transferring the resulting message over the SNA network to a remote SNADS service. And DXA also has to handle the mapping of valid IBM addresses to CEO format because SNADS mail names are limited to 8 characters and CEO names can be 16 characters. For example, D.Krayenbrink may be known as KRAYEND1 on the IBM network, and DXA has to map that to a valid CEO name before giving the message to MTA.

Alternatives

What do you do if you have a mail system that does not support X.400 or one of the other DG supported gateways? For example, if you are running ADR/Mail on an IBM system, or a home brew mail system on your Prime system? Unfortunately,

DG has not released a toolkit to help build custom gateways. Even with the difficulty of writing an MTA customer program, there are a few such programs coming to the market soon. Look for a Novell MHS gateway to be announced at the NADGUG meeting. There is also a gateway to MCI mail under development. And I'm sure that DG has internally developed custom gateways for some large users.

Suppose you have two MVs running CEO connected by a leased line running XTS? This is probably cost-effective if the MVs are fairly close and the traffic is sufficient to warrant the cost of the leased line. If the two systems are thousands of miles apart, say one in New York and the other in Australia, then it would be hard to justify the line charges. Even connecting to a packet network might be too expensive.

As an experiment, we built an MTA customer process that takes messages from MTA, places a dial up call to the remote system, transfers the message, and hangs up. The remote agent judiciously edits some fields in the message (to make it look like a local message) and delivers it to the remote MTA. So basically, we have duped the two MTAs into using a cheaper transport mechanism.

In our own company, we maintain two offices about 50 miles apart. The cost of a leased line is cheap, on the order of \$100 a month. We use our MTA gateway to dial up on demand, instead of using XTS. We pay about \$25 a month for the phone calls between the two systems. Your mileage may vary. The resulting connection looks just like a normal network CEO connection. I send messages to PAT:TLC and Pat sends messages to STAN:UST. Everything works. Even attachments, rejects, and replies work as expected.

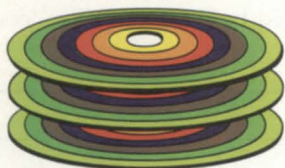
DG has done a very good job of opening up CEO mail services by developing gateway products for all the major standards. And they have opened the interface enough for independent developers to expand this support to other systems. If you are committed to CEO, you will eventually be using a gateway process. Δ

Stan Gula is president of US&T Inc. He may be reached at 5 Airport Drive, Hopedale, MA 01747; 508/478-8211.

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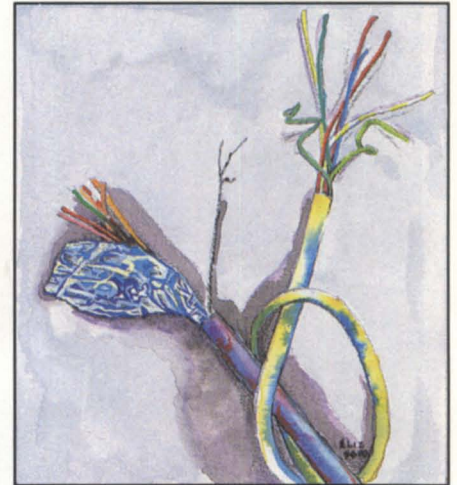
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- **EXTENDER** adds a volume and **MANAGER** enables space management for an INFOS index or data base.
- **PARAMEDIC** recovers data records from corrupted INFOS files.

Wiring 101

SYNOPSIS

Are you a closet cable mangler? Here's an experienced manager's guide to wiring terminals and other devices using the EIA RS-232-C async protocol.



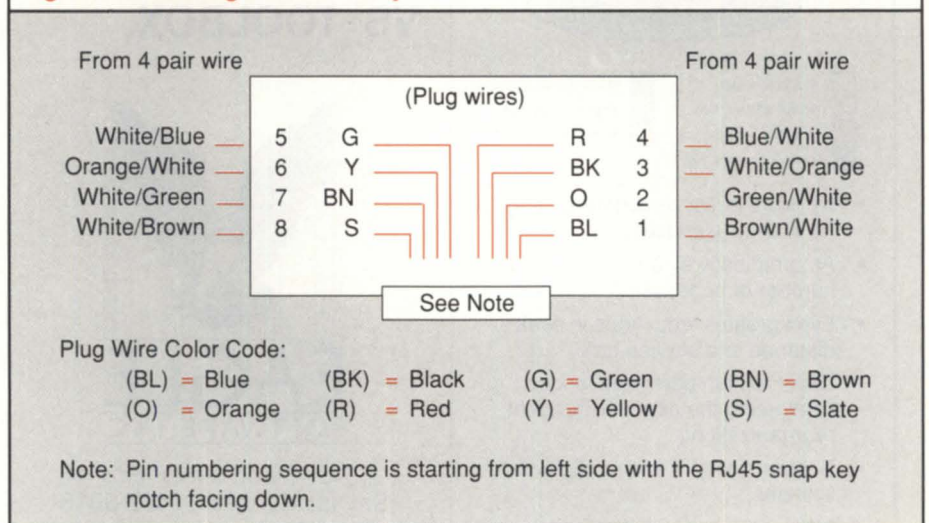
by Steve Kern
Special to Focus

This article is a practical guide for wiring terminals and other serial devices using the EIA RS-232-C async protocol. It is the culmination of eight years of sweating, swearing, and of course some effective research (blind luck). We will discuss three areas: cable types, EIA RS-232-C protocol, and wiring the connectors.

Please note that it is not my intention to define a blueprint on how to cable and wire up any serial device. The examples I use are based on a Data General terminal (D460) connected to an IAC-16.

The cable you select will have a direct impact on the distance, speed, and reliability of your terminal. The two most commonly used types of cable are stranded twisted pair and solid twisted pair. The stranded twisted pair offers less resistance

Figure 1: Wire diagram for RJ45 jack



of the data signal, and therefore can be run longer distances. In addition, the solid twisted pair is more prone to breakage when bent at sharp angles.

Either of the above cables are made by taking two insulated individual wires and twisting them together. (As opposed to a type of cable that places four wires next to each other. This type of cable is used primarily for telephones and should not be used for data communications.) For connecting a terminal or printer, you will need a minimum of two pair, or a total of four wires.

Twisted pair cable also comes as shielded or unshielded. Shielded cable consists of a metallic foil that is wrapped around the two pair and an uninsulated wire. The shield, when properly grounded at one end, can isolate the two pair from extraneous electrical disturbances and offer even greater distances before a loss of signal.

Finally, you must decide on the wire gauge (thickness). For distance and ease of connecting, 24 gauge wire appears to be optimal. Remember, the thicker the wire, the lower the gauge number. As a suggestion, purchase your cable with different colors for each wire and, if your budget will permit, buy four pair. The additional two pair of wires will help if a pair breaks on installation or if you need an additional device in the same location. The different colors help immensely when wiring up the connector.

The maximum length of an individual terminal connection is dependent on many factors such as wire gauge, terminal speed, and electrical interference. Data General recommends a maximum distance of 50 feet between an IAC and a terminal, but we commonly run 500 feet using 24 gauge, unshielded twisted pair. We run our terminals and printers at 9600 bps and have not encountered any problems.

RS-232 signals

RS-232 is one of the most widely used protocols for hooking up terminals and output devices. Once you understand some basic terminology, you can hook up practically any device.

First, the RS-232 protocol is based on 25 different signals/pins, of which only five are actually used by most vendors and two of the five are used only if your IAC has modem control. All the other signals are used to "fake out" the device into

thinking it has hardware flow control signals. The following three signals are always required:

- Ground (GND),
- Transmitted (TXD),
- Received (RCD).

All the other signals are used for modem or hardware flow control:

- Data Terminal Ready (DTR),
- Data Set Ready (DSR),
- Request To Send (RTS),
- Clear To Send (CTS),
- Data Carrier Detect (DCD).

If we put aside all these anachronisms and take a logical look at the signals needed to communicate between a device and a host computer, we find that for a direct

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connection to an IAC, all we really need is a wire to transmit and receive, and a wire that allows the terminal and computer to orient to each other (synchronization). The rest of the signals are used to tell the terminal and the computer that there is a connection between them.

Get physical

Now, on to making the physical con-

nection between the device and your host computer. Because of the vast array of different connectors required by each new device that someone within your organization now can not live without, and because there are subtle differences in wiring each type of connector, my company decided to cable the entire building using a universal wiring plan.

Every workstation and IAC port is wired

to a central location within the building using four pair, 24 gauge, unshielded solid twisted pair cable. The workstation/port end is terminated using a RJ45 jack receptacle and the other end is terminated to a RJ45 patch panel. RJ45 jacks look like a large version of a telephone jack (RJ11) and allow for eight wires instead of the telephone's four wires. (See Figure 1, page 24.)

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Figure 2: Connector cables

Dasher Terminal	
To terminal	To RJ45
25-pin (male)	8-pin (male)
GND 7 _____	6
TXD 2 _____	5
RCD 3 _____	4
DCD 8 _____	3
DTR 20 ___	
DSR 6 ___	
RTS 4 _____	
CTS 5 ___	
IAC-16	
To IAC-16	To RJ45
25-pin (female)	8-pin (male)
TXD 2 _____	4
RCD 3 _____	5
GND 7 _____	6
CTS 5 _____	3 DCD
DSR 6 _____	
DCD 8 ___	
RTS 4 ___	

As a result of using the RJ45 jacks and the universal wiring plan, we need only maintain unique connector cables that travel with each specific device. (See Figure 2.)

By modularizing our cabling system, we are able to deal quickly with adding or moving devices without resorting to wire cutters, pin crimpers, or the dreaded soldering iron. When we need to support several independent systems, we add a data switch (port contention unit) without touching the existing cables. Δ

Steve Kern is the chair of the NADGUG Publications Committee and MIS Manager for Werner and Pfleiderer Corp.

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Standard connections

SYNOPSIS
DG announces new connectivity products for MV and Aviiion systems. OSI product suite is aimed at the government procurement market.

by Lori Rhea DiSorbo
Focus staff

Open. What does it mean to you? If you define it as the ability to communicate between diverse kinds of computers, then Data General has maintained "open" systems for quite a while. MVs have been communicating for a long time with ISO (International Standards Organization) products, and with TCP/IP to work with multiple vendors.

DG has historically supported industry standards, says Daniel Williams, DG senior marketing communications consultant. In 1979, Williams says, DG was the first vendor to adopt the ISO/CCITT standard X.25 packet switching protocol. In 1987, DG was one of the first to support the X.400 message and mail exchange protocol.

DG Aviiion systems, initially produced in February 1989, use the Motorola 88000 RISC microprocessor and DG's commercial-grade version of Unix, DG/UX. This past February, DG introduced X.25 for Aviiion systems to provide wide-area communication capabilities over public and private packet data networks.

This month, Data General announced its latest entry in the open systems field. The GOSIP-compliant suite of products described below is aimed at the federal market, said Katherine Jones, senior

product marketing manager. GOSIP—the government's OSI (open systems interconnection) profile—is developed from ISO standards.

According to Williams, the new OSI products broaden Data General's existing OSI product line that includes a complete seven-layer implementation of OSI on AOS/VS II. The seven layers of interconnection span from a systems physical connector (wire or cable), on up to the application that people actually see on their computer. "They [ISO] thought of everything, from how data talks to a wire, to how my computer knows how to find your computer," Jones asserts.

In an effort to further expand connectivity capabilities, Data General has produced new products and enhancements for both the Aviiion and the Eclipse MV family. These new products make the most of OSI technology, Williams said, and pave the way for better computer connectivity.

New OSI products

DG has produced three new OSI products for Aviiion systems running DG/UX. This GOSIP-conformant OSI communication product suite is designed for the large Unix-based government procurement market. Jones reveals that, "DG's reasons . . . for GOSIP compliance extend beyond its interest in supporting just *our* federal government." It provides DG with

a mechanism for selling to the international market, she says, and it ensures customers who might be going into international business in the future that their communication package uses a recognized standard.

Jones cites the United Kingdom as an example. Once the government accepted the standard, GOSIP "spread like wild fire. It is now the primary mechanism throughout not just the UK, but all of Europe for commercial and industrial communication," she said.

The following products were announced in October.

- FTAM for Aviiion systems: a package that provides file transfer and management capabilities in heterogenous environments. Compliant with GOSIP specifications, the product implements ISO standard file transfer, access, and management protocols over both local and wide-area networks.
- Virtual Terminal Protocol for Aviiion systems: a software package that provides remote log-on capabilities for Aviiion users in multivendor environments over local and wide-area networks.
- OSI/Platform for Aviiion systems: a complete communications platform composed of OSI layers two through seven that provides routing and end system transport services over local and wide-area networks. The package contains a programmatic interface allowing users to develop custom applications that access OSI stack services.

Connections for Eclipse MV family

Data General has developed new management products, and major revisions of existing products to enhance connections in the Eclipse MV family.

- DG/SQL Connection Server 1.00: lets MV family-based application programs access remote DG/SQL data bases trans-

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parent to application programs. This product supports all languages currently supported in DG/SQL, including 3GLs, report writers (e.g. Present), and 4GLs (e.g. DG/Ingres, Powerhouse, CQCS). DG/SQL Connection Server 1.00 supports AOS/VS II and XTS II. It provides increased performance in MRC and LAN environments over that of DG/SQL Remote Agent (RQA) because of its Ring 0

implementation. Connection Server and RQA cannot interoperate, although they can exist on the same system. An upgrade license from RQA to DG/SQL Connection Server is available.

- DG/Ingres Net 6.21: lets Ingres-based application programs (on any Ingres platform, including PC and Aviiion) access remote DG/SQL data bases on an MV

family system. It also lets DG/Ingres data bases on other vendors' systems. DG/IngresNet supports AOS/VSII and TCP/IP. The remote system requires Ingres/Net with TCP/IP protocol support, and Ingres RDBMS (on server systems), or Ingres tools/applications (on client systems).

- Infos Connection Server: lets Aviiion-based application programs access remote Infos II files on an MV family system. It supports C, Cobol 85, Fortran 77, PL/1, and the DG/UX TCP/IP protocol. It requires Infos Connection Server 1.10, and full Infos 6.00 on the MV family server system.

- Infos Connection Server 1.10: adds TCP/IP and XTS II WAN support to the Infos Connection Server product.

- DG/SQL 5.00: offers twice the performance of DG/SQL 4.1 measured in TPS using the ET1 benchmark. New features include ANSI Level 2 support, higher availability and DSA support using DG/SQL Connection Server, higher user counts and improved concurrency control.

- Infos II 6.00: checkpoint performance improved. Other enhancements include improved scalability, a user tunable environment, a new common programming interface, and an updated Inquire utility.

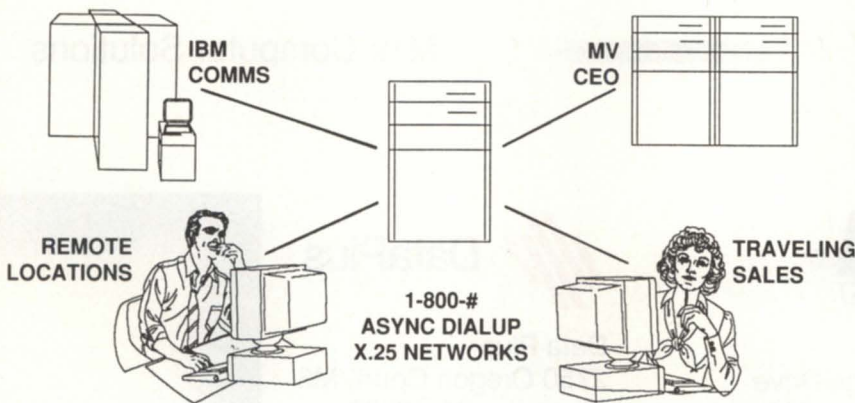
Your chance to see

Data General will display these new products at upcoming conferences, including the 1990 NADGUG conference. You may have seen some of them at Interopt '90, October 8-12. At Interopt '90, DG was scheduled to demonstrate OSI interoperability on and between Aviiion and Eclipse MV family products. DG also displayed XWindow applications running on Aviiion RISC-based systems over the Interopt FDDI network, and planned to show how the Aviiion Simple Network Management Protocol (SNMP) agent allows other SNMP managers to control any Aviiion workstation or server.

If you are attending NADGUG 90, take advantage of an opportunity to preview the above products. Excluding the FDDI demonstration, all of the mentioned products and presentations will be at the show. △

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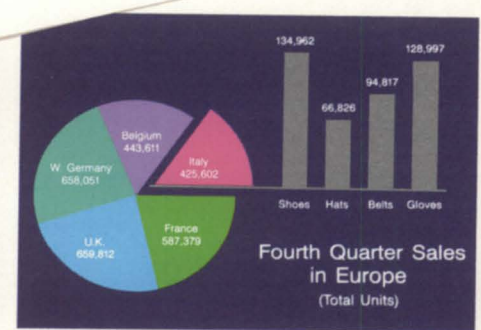
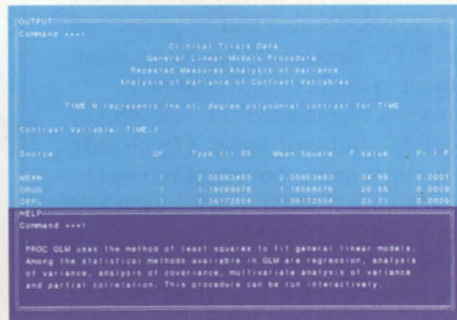
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Will the real NSAP please stand up?

SYNOPSIS

The author defines Network Service Access Points (sort of) and explains how to use them to navigate OSI layers and get to the right computer. Part 1 of 2.

by Mark Wlodarczyk
Special to Focus

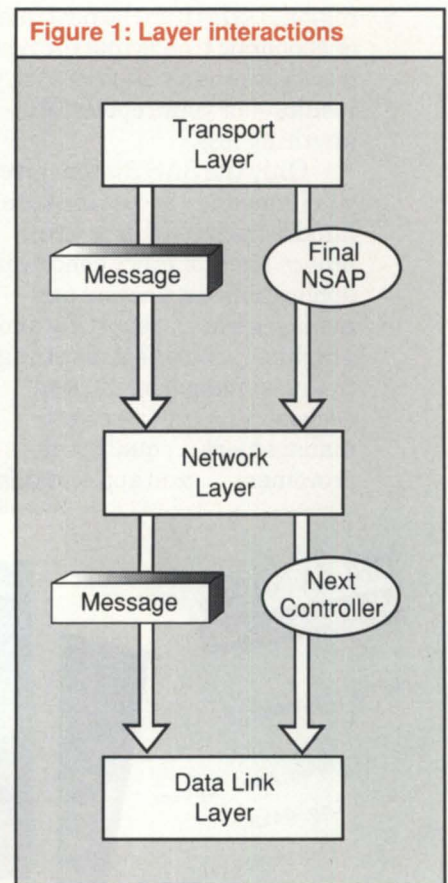
What's an NSAP—yesterday's answer

An NSAP is the name of a computer on an ISO network. (This is a model, i.e., a useful lie. Full truth later.)

Every network has many machines to connect. Each CPU must have a unique name to use in addressing messages to the network. The International Standards Organization (ISO) uses Network Service Access Points (NSAPs) to identify the target computer.

DG/PC*I was the first Data General product that used ISO's networking rules (protocols). With the release of DG/PC*I, the NETGEN program started asking system managers to specify an NSAP for each MV. NSAPs also had to be defined for each PC through PCGEN, or as an argument to the ENABLE command.

Managers were forced to create NSAPs for each PC, but traditional XTS already had a unique name that could be used to build a default NSAP for MVs. Each MV has its own HOST NAME that NETGEN could convert into an NSAP. Of course, the manager created the HOST NAME just a few screens before being asked about

Figure 1: Layer interactions


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*University of Maryland,
Ph.D., Physics, June 1990

*United States Naval Academy
M.S., Chemistry, May 1985

*Brigham Young University
Electrical Engineering, M.S.

Experience

*Hydrospace Challenger Co.

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Manager, Engineering Support (1980-1985)
Contractor efforts with Naval Sea Systems Command. Led engineering development for future submarines. Manages a staff of 800 engineers.

*United States Navy 1965-1980

Pentagon, Director Naval Submarine Engineering
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the NSAP! So, in both cases a manager has to make up a unique name for each computer on an ISO network. (A psychoanalysis of CPU names would reveal a lot about manager's personalities, but that's beyond the scope of this paper and the nerve of the author.)

Thinking up unique names is hard work, so we encourage you to use each name in a number of ways. This leads to confusion if you want to sort out exactly what software uses what identifier, but it saves wear and tear on your name-generating brain cells. The HOST NAME was introduced in X.25 XTS to save users/programmers from the chore of remembering the DTE address of every computer they wanted to call. As a (non-standard) convenience, XTS converts HOST NAMES (like ZETA, PLATO) into numbers (similar to telephone numbers) needed by the X.25 protocol. These names become ASCII filenames for HST type files in the :NET directory.

Luckily, one of the many forms of NSAPs allowed by ISO is ASCII (type 50).

NETGEN takes your HOST NAME and glues a hex "50" on the front end to construct a default NSAP. As long as this HOST NAME is unique on your network and the network is using type 50 NSAPs, you should accept the default.

The same basic guidelines should be used for the NSAP of a PC. If you are using type 50 NSAPs, simply make up a unique ASCII name. The macros that DataGeneral supplies suggest that you reuse the ASCII part of the NSAP as the application name for the MS-NET redirector program. MS-NET runs as an ordinary application on top of NETBIOS and, as such, it must declare an application name to act as its port to the net.

DG supplies an install utility with WTS (PC side DG/PC*I) that loads files and creates "DGNETUP.BAT". This batch file requires an argument that it will use as both an NSAP in an ENABLE command and as the "workstation name" in the NET USE command that starts up MS-NET. This is another example of thinking up one unique name and using it for two

separate functions.

Overriding defaults?

When should you override the defaults? I do it all the time in my classes to illustrate how different layers of software each need their own collection of unique names (e.g., the redirector name must be unique among all the NETBIOS "application names," and NSAP must be unique among NSAPs). But, there are reasons for normal people to change the defaults too.

The major motivation is for coexistence with other ISO software that uses some other form of NSAP. Coexistence is not interoperability! Interoperability means understanding and interacting with the form and contents of each other's messages. Coexistence means recognizing the other's form and ignoring its messages.

What's an NSAP—today's answer

An NSAP identifies a particular network layer (layer 3) in an OSI-conformant protocol stack. (Not the absolute truth, but we're getting closer.) The International

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Number of Shared CPU's	3	Not Available	Not Available	Not Available
Supports ANSI Labeled Tapes	YES	Not Available	Not Available	Not Available
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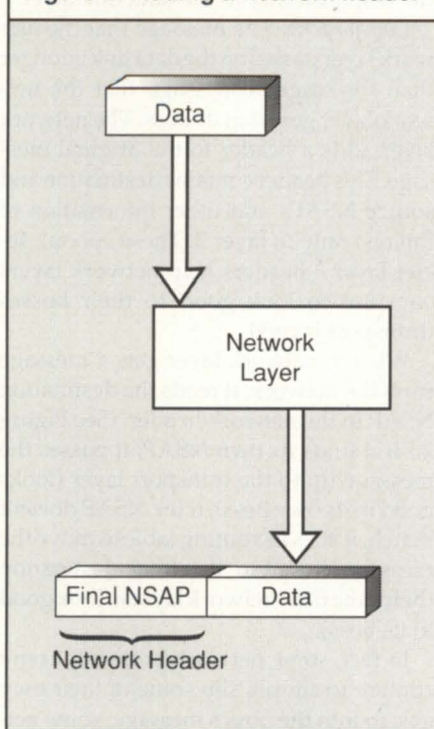
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Standards Organization tries to make the world a better place to live in by creating and publishing International Standards. ISO is involved in many areas outside networks; its international standards let you buy the right size bolt to replace the one that fell off your car on your foreign vacation, even if you're not sure how much it really costs.

In an effort to encourage the creation of networking standards, ISO subdivided the complexities of networks into seven layers. Each standards committee only had to create rules for part of a network, not the whole thing. This partitioning of network services is called the Basic Reference Model (remember, model = useful lie) for Open Systems Interconnection (OSI).

In OSI, it is the duty of the "network layer" to forward messages through the right wires (or microwave links or optical fibers...) to get one step closer to the final destination. Through the combined efforts of a series of network layers, the message finally gets to the right computer. The NSAP identifies the final destination.

Figure 2: Adding a network header



Layered standards and the products that use them (sounds like a talk-show topic) have some special tendencies: blissful ignorance, peer-to-peer conspiracies, and mix-and-match stacks.

Ignorance: network layers must be told what the destination NSAP is. They are totally ignorant of the bookkeeping and the processing that other layers do before they feed the destination NSAP to the network layer. The "transport layer" (the network layer's boss) must pass the message and the destination NSAP to the network layer.

All that the network layer has to do is look up the controller address of the machine that is one step closer to the final computer. (See Figure 1.)

OSI layer 3 products must all "map" a destination NSAP onto the next data link layer (controller) address. This mapping is usually done using a table containing controller addresses indexed by destination NSAPs. This is called a routing table. The network layer takes the final NSAP it is given, looks up the next controller ad-

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FOCUS ON: GREAT CONNECTIONS

dress, and then passes the message and the responsibility to the data link layer.

Conspiracies: The message that the network layer passes on the data link is longer than the original message that the network layer got from its boss. The network layer adds a header to the original message. This header contains destination and source NSAPs and other information of interest only to layer 3. These special, secret layer 3 headers help network layers conspire to look good to their bosses (transport layers).

When a network layer gets a message from the network, it reads the destination NSAP in the network header. (See Figure 2.) If it finds its own NSAP, it passes the message up to the transport layer (looks good to its own boss); if the NSAP doesn't match, it sues its routing table to move the message closer to the final destination (helps the final network layer to look good to its boss).

In fact, some network protocols aren't content to simply slip some of their own gossip into the boss's message; some network layers create messages of their own intended to go no higher than the receiving network layer. Such "messageless headers" are one method to construct routing tables. This approach makes sense if all the network layers are directly connected to the same medium. Such a "dynamic routing" protocol looks like this:

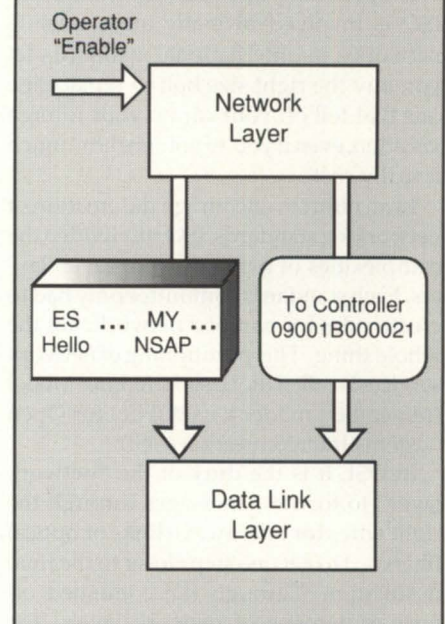
1) One computer configures its network layer to be the central bookkeeper; it tells its controller to monitor a special network administration address (09001B000021 for DG/PC*I) in addition to the hardwired controller address.

2) Every network layer on every CPU that is added to the network constructs a network layer message and sends this message to the central bookkeeper's special address. The message contains the new CPU's NSAP and controller address—just what the central bookkeeper needs to put into a routing table.

3) Any time a network layer's boss wants a message delivered and the network doesn't recognize the destination NSAP, the local network layer appeals to the central bookkeeper for routing table information.

As you may have guessed, this is exactly how DG/PC*I network layers conspire to forward messages. The central routing table bookkeeper is the MV with the role of BOTH or GATEWAY. (Such an MV

Figure 3: End system hello



should be called a ROUTER, but that's another story.) Configuration titles aside, the actual bits in DG/PC*I's network headers conform to an ISO standard for layer 3. A computer sends out its NSAP in messages called "End System Hellos".

ISO calls the central bookkeeper the "Intermediate System" (it still should be called a ROUTER, but that's still another story.) Although the standard is very explicit about the form and the meaning of these messages, ISO says that use of them is optional. In other words, a vendor could create a product that didn't include this ES-IS dialog and still be conformant to this network layer standard!

Mix-and-match: A layered approach allows a vendor to create new network products by rearranging or adding a few new layers to existing stacks. DG/PC*I support of Token Ring added a new physical and data link layer to an established and mature set of upper layers. The ISO network layer didn't have to change because its interfaces and basic environment remained the same. Δ

Next month: Tomorrow's answer to NSAPs.

Mark Wlodarczyk has been telling useful lies for 11 years for Data General Educational Services.

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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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When the lights go down

by Mark R. Taylor
Special to Focus

SYNOPSIS

Are voice grade lines and dial-up modems adequate for your data processing contingency plan? Active testing eliminates surprises.

When developing a disaster recovery plan for critical data processing operations, the strategy for connecting critical devices to an alternate processing site is vital.

Without the ability to support on-line users and critical electronic interfaces in an acceptable time frame, the value of an alternate processing site is questionable. For Data General users with critical applications, a workable contingency plan must include not only an alternate processing site, but also the appropriate communications/connectivity strategy to utilize the remote site.

To ensure the effectiveness of the communications link in a data processing contingency plan, you must perform active testing. Merely loading your systems onto another DG computer adequately tests this portion of the contingency plan. However, many people become complacent after running this test, and they overlook the fact that accessing the backup system is equally, if not more, important.

The right strategy for communications and connectivity in a contingency plan

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depends on a number of factors.

Alternate processing facilities

The foundation of a recovery plan is an alternate site with compatible DG computers and peripherals that can be immediately accessed in an emergency. In the past, when applications were batch-oriented, reciprocal arrangements between similar system users were common. With

increasing dependence on interactive on-line systems, reciprocal arrangements are less effective.

Built-in redundancy in a corporation's data processing system and network is an expensive solution justified only for extremely critical or time-sensitive applications. Commercial hot sites, with adequate communications infrastructures, are a cost-effective option for users with critical

applications who can not afford to build redundant systems and/or facilities.

Whatever alternate processing facilities you choose, remember that the ability to support on-line terminals and other devices, as well as critical electronic interfaces from the alternate site is essential.

Recovery "windows"

The data processing contingency plan is shaped by recovery time frames considered acceptable for critical systems, or "windows". Some applications are so time-sensitive that redundant systems, which can be utilized in seconds or minutes, are the only option. For the majority of Data General users, a 24-hour window for reconstituting critical systems is acceptable. In general, the cost goes up exponentially as the window shrinks.

Physical environment

The methods used to connect devices in a normal environment influence the contingency plan's connectivity strategy. In many DG shops, devices are connected directly to an IAC, and the alternate site will duplicate the normal connection with a communications link. With a local area network (LAN), the best strategy may be to bypass the network and revert to a direct connect approach, again, with a communications link. In some cases, it may be desirable to support a LAN from the alternate site. The technology for this support is available, but it may be expensive due to the greater bandwidth requirements.

Communications paths and equipment

The ability to communicate with an alternate site depends on the availability of telephone circuits and interface equipment that establish remote links. For the vast majority of DG users in a disaster recovery mode, simple voice grade lines are appropriate, and can be used with dial-up modems. This approach is usually the least expensive.

Using statistical multiplexors and V.32 modems (9600 bps), a single voice grade circuit can be used to support from 8 to 24 devices, and more in some cases. The optimum number of users per circuit depends on the nature of the applications and the throughput requirements. Our experience shows that a ratio of 8 to 1 (eight devices running at 9600 bps over one modem link, also running at 9600 bps) is appropriate

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for most DG users. On-line users can also be clustered in groups to limit the amount of additional cabling. Sites with large numbers of critical devices can use higher capacity multiplexors, such as 58 channels, over multiple links to gain adequate throughput.

For sites supporting remote devices over dedicated circuits, dial-up links directly to the alternate location over pre-installed voice grade circuits (which do not go through a telephone key system) are adequate for disaster recovery in most cases.

Some DG sites need the speed and bandwidth offered by digital networks. Network providers offer many packaged services on an as-needed basis to meet this requirement. These services, such as reserved T-1 and switched 56, lend themselves to contingency planning. The cost of having a digital network available for disaster recovery can be much higher than voice grade circuits, but it can be justified in certain instances. If a LAN must be supported from an alternate site, a digital link is usually required.

Electronic interfaces to other sites, third parties, or other hardware platforms can usually be supported by dial-up circuits using synchronous interfaces and modems. In some cases, dedicated circuits to third parties may be required, often times for security reasons.

Security on dial-up lines can be enhanced by using dual dial restore modems (which require two phone circuits) and encryption devices. Some examples of critical third-party interfaces include electronic funds transfer for financial institutions, transmissions of pricing/trading information for financial services firms, and electronic data interchange for invoicing and accounts receivable data between manufacturing and distribution firms.

Levels of outage

The connectivity approach can vary depending on the level of outage or severity of the problem. We encourage subscribers to plan for three levels: short-term equipment outage, localized problem in the data center, and total loss of the facility. In the first two levels, critical devices outside of the data center are intact, and the best approach for connecting local devices to the alternate facility is to intercept existing cabling or networks at the most convenient point. In a level 3 sce-

nario, an alternate operating location must be employed. The connectivity strategy will depend on the physical environment at the operating location.

Different types of recovery

The following case studies illustrate how two DG users developed communications strategies to meet their recovery objectives.

An on-line service bureau with over 150 remote sites and over 1,000 devices supported daily over dedicated phone circuits needed recovery. One of their key objectives was to make it as easy and automatic as possible for the remote users to switch to the hot site. Many remote sites had a dual dial restore modem and two dial-up telephone circuits in addition to the leased line. Compatible modems and

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multiplexors were installed at the hot site. If the service center needs the hot site, the remote locations merely switch to dial mode, and the modems automatically dial a pre-programmed number to connect to the hot site.

Other remote locations have multiple devices, which are multiplexed over the dial-up lines just as they are over the leased lines. Other remote locations have a single device that is supported using a digital packet switched network. Their modems automatically dial a local access number for the network, and their data is sent over the network through a dedicated 56 KB link to the hot site. An 80 port PAD (Packet Assembler/Disassembler) controls the incoming traffic at the hot site.

The other case study is an asset management firm with approximately 50 critical users on its DG system, all located in the same building. Their plan included the ability to receive and transmit financial data over dial-up circuits to third parties, as well as supporting critical users and a 1000 lpm printer over dial-up links.

In a live test from the hot site, they used a single 58 channel multiplexor with four telephone circuits, each with a 9600 bps modem to handle all terminals and the printer. A single phone circuit with a 4800 bps modem and intelligent synchronous controller (ISC/2) handled their CPU transmissions to and from third-party computers. The live test verified that the on-line users could be supported with little impact on response time, even though the computer was over 1,000 miles away, and the critical electronic interfaces could be supported within 12 hours of a declared emergency.

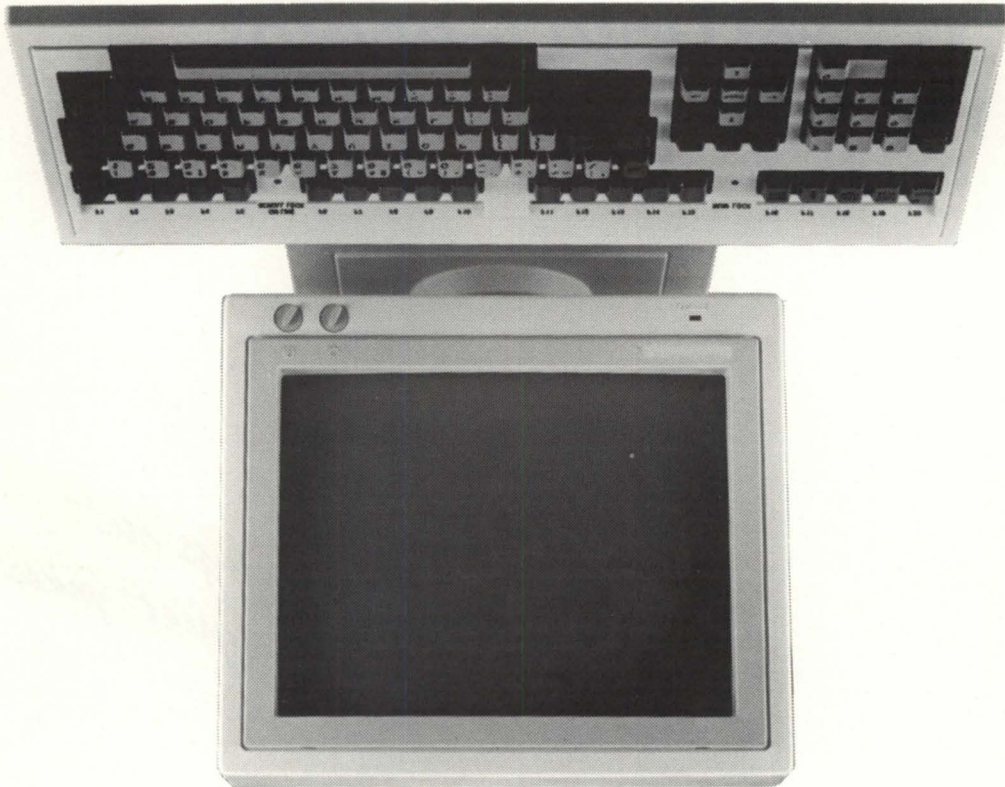
Practice makes perfect

We urge DG users not to overlook the importance of testing the communications portion of their data processing contingency plan. If the connectivity strategy is right, the test will validate it. If it needs to be revised, or simply won't work, you are better off finding out during a test than in a real emergency, when it may be too late.

△

Mark R. Taylor is vice president of sales for Data Assurance Corporation, 6551 S. Revere Parkway, Suite 130, Englewood, CO 80111; 303/792-5544 or 800/654-1689.

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FONTastic changes to CEO 3.20

SYNOPSIS

Data General presents an improved CEO package. Rev 3.20 boasts of easier font manipulation, support of three new terminals, an envelope feeder, and much more.

by Joe Cannata
Special to Focus

CEO rev 3.20 promises to make life for CEO system managers less complex. Changes in the way printers and fonts are handled, some cosmetic differences, and many bug fixes will make 3.20 a revision of desire. This article is a summary of some of the changes you can expect.

There have been several changes in the way CEO supports fonts in printing documents. These changes affect the areas of printer definition, font selection at print time, and printing of CEOwrite documents that contain multiple fonts.

Printer definition

A long-standing problem has been the confusing way in which printers utilizing multiple fonts had to be defined. With the availability of sophisticated printers with numerous fonts, it became a cumbersome task for CEO managers to create separate printer definitions for each font used on a particular printer. This also was cumbersome to users, forcing them to scroll through numerous screens to find the

printer definition with the desired font, orientation, and pitch.

The single printer definition for each font concept has been replaced with a two-tiered approach to font management, all based on accessibility. The CEO manager defines which cartridges are available for a printer. Accessibility is specified in the Printer Definitions menu.

Note that the two types of accessibility (font cartridge, available fonts) are independent from each other in that a cartridge may be specified as accessible. Those fonts that are declared as accessible, on an inaccessible cartridge are not usable and are invisible to the user.

The reason for this separate accessibility is to enable a CEO manager to change the accessibility of a cartridge without changing the accessibility of its fonts. Separate accessibility is valuable when cartridges are frequently removed from printers. CEO system managers can preserve existing font definitions for a specific cartridge. When that cartridge is available again, the system manager makes it accessible, and the fonts do not have to be re-defined.

From a user's perspective, the fonts are not available and are not listed among the survey of available fonts for printers obtained by pressing the Index key. When the cartridge is available again and the CEO manager makes it accessible, all previously defined fonts are available to the user. The "internal" category is also printer-dependent.

From the user's viewpoint, these changes mean that any time a print request is made, whether from the Main Menu, the Inbox, or within CEOwrite or CEO Word Processing, the user will be prompted for the printer name, number of copies, and now, the font.

This will also be the case when a print layout is defined. Users requesting an INDEX on the font name will be able to see only the available fonts (as defined by CEO system manager) for that printer. Users will need to recognize the particular font name they must use to obtain the desired printing format.

For example, instead of a printer named LANDSCAPE, the user could print to one called LASER, but would have to know that the font must be COURIER10_L to achieve a landscape result. "COURIER" is the type style, "10" is the pitch, and the "L" means landscape. A description field is available that describes the font. This information may be accessed through Survey Management and will ease the transition for users. There are other description fields that the CEO system manager may add as well. The new print menu will look like Figure 1.

Other changing utilities

The Control Program has received its share of enhancements. CEO now fully supports D216+, D412+, and D462+ terminal types. Also added is the functionality to enable you to create a user profile having the same UserID and Username, as long as you follow these restrictions

Figure 1: New print menu

PRINT DOCUMENT

Document name: Report

- 1. Print using current specifications
2. Print after changing specifications

Enter choice: 1

Print document summary: (Y/N) N

Printer name: LASER

Font name: COURIER10_L

How many copies: 1

Execute? (Y/N)

carefully: 1) Neither the UserID nor the Username can be global, 2) the UserID cannot be listed in the directory at any time.

The Language Profile has been extended to support military time format. In this format, for instance, 8 a.m. will appear as 0800 hrs, and 2:27 p.m. will show as 1427 hrs. Be aware that Decision Base, Drawing Board, Wordview, and Present will not support this format.

Message printouts will look different on the top line. The page will include a heading on message printouts "Message Display for User" when a short message is printed. Special symbols will now be supported in drawer, folder, and document names. The list of characters includes: # <> " * : +.

As of CEO 3.20, any long search requests such as those in a GO TO or FIND, can now be interrupted by pressing the BREAK/ESC key. There will be no more penalties for incorrectly typed information generating a top-to-bottom search, with no way to stop it. This will work even on an inbox or document survey containing hundreds of entries. (But no one ever has hundreds of messages, right?)

The User Directory will now sort on the language specified in the profile of the person creating the directory, and the language name will appear. Should you be running multiple language versions, be careful with the directories. Anyone entering CEO with the CEO.CLI macro should note the presence of a new switch, /NOREMIND. This allows entry into CEO with a damaged reminder file, therefore bypassing the validation.

For those with an HP LaserJet IID printer, the envelope feeder is now supported. Three different envelope sizes are supported: Commercial 10 (4-1/8 x 9-1/2 inches), Monarch (3-7/8 x 7-1/2 inches), and DL (110 x 220 mm). The bins will be 4, 5, and 6 respectively. The sizes are predefined for the bins.


The word processor (CEO_WP) will allow you to read in a document type that can be converted into WRD. CEO_DOC_CONVERT will run for you

automatically, changing the document chosen to be read in to type WRD. Then CEO_WP will allow it to be read in.

The organization of files on disk will be somewhat different in 3.20. The font table (.FT) and font name (.FN) files that existed in :UTIL:FONTS for each particular font, and the language files (.LANG) in :UTIL:CEO_DIR:PRINTER_TABLES_REV3 have all been merged into one file for each

font. This file will have a .FDT extension and can be found in :UTIL:FONTS. This will take some noticeable time during the installation of the revision.

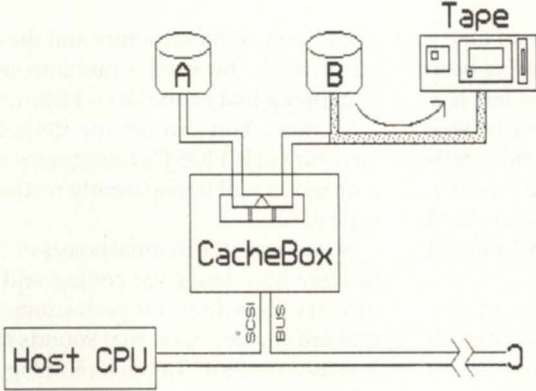
The new font management capabilities contained in revision 3.20, along with the other enhancements and list of bug fixes indicated in the release notice, should help facilitate your management of CEO and provide enhanced utility to users. Δ




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Joe Cannata is a training specialist for Data General Educational Services. He may be reached at Data General Corp., 7927 Jones Branch Dr., Suite 200, McLean, VA 22102; 703/827-9690.



The host with the most

SYNOPSIS

What? Trade in your mini after all these years? With an add-in board for speedy processing, a full set of utilities, and an excellent compiler, the ICHOST system from Envyr will test your loyalties.

I've always wanted a chance to take a look at the ICHOST system. They've been doing a lot of boasting over the last few years, and—not that I wouldn't believe every word that a computer vendor tells me—I wanted to see for myself. So when Gerry Manning and Associates was kind enough to offer me a trial system, I jumped at the chance.

ICHOST from Envyr Corp. is an MS-DOS/Unix alternative to ICobol. The MS-DOS version can run with up to 65 users, which means that it can replace a good-sized MV. The secret to running quantities of terminals without a horrible degradation in speed is the add-in ICHOST board. Each board contains an 8 to 12 MHz 80186 CPU with 256 to 1024 KB memory, which is dedicated to handling character I/O and computation for four or eight terminals.

Using this method, the host CPU handles only disk I/O, record locking, and resource management. When you need to add more terminals, you add another powerful processor instead of putting more work on the host CPU. The newest version, 2.50, can also handle any MS-DOS network, such as Novell or Lantastic. This new feature gives ICHOST a maximum terminal count of 255, bringing it well into the larger MVs' territory.

ICHOST will handle ICobol 1.50 syntax, including the WRITE/REWRITE IMMEDIATE and ACCEPT... FROM ENVIRONMENT constructs. In addition, it will

allow the 1.50 file structure and the older structure to be used simultaneously—something that I hope DG is kicking itself over now. You can set the default file structure in ICHOST's configuration, but a program will transparently read either type of file.

So anyway, the manual boasts of "careful assembly language coding and proprietary algorithms for performing decimal arithmetic." Gee, that sounds fancy. Just how fast is it? Take a look at Figure 1.

What we have here is a truly awesome system, one that is not only faster than

anything I've tested on a 386 (and I've stopped embarrassing myself by including MV/8 benchmarks here), but is up to twice as fast as the Aviion in certain functions. I can't wait to get to the conference this year and find out how they made floating point *divide* routines faster than the *multiply* routines. Careful assembly language coding, indeed!

ICHOST comes with its own full set of utilities. Some of these are familiar, if re-named: CHKISAM is the same as IVERIFY, PACKISAM is very similar to ICOMPACT, and so on. Others are unique to ICHOST.

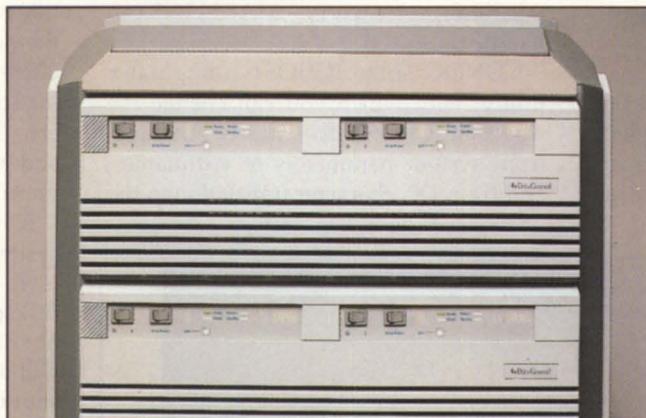
MAKELIB combines specified program names into a library file, ICHOST.LB. This file is opened when the runtime system is started, and looked at first for CALLs and CALL PROGRAMs. If your program is in the library, this can greatly improve program load speeds. In addition, it helps cut down on disk clutter by letting one file take the place of hundreds or possibly thousands of .PD and .DD files.

MAKELINK allows alternate filenames to be used without changing any programs. A file name such as CHEMICALFL,

Figure 1: Benchmarks

	RM85 4.0 25M 386	Unix ICobol 25M 386	Aviion 300	ICHOST 2.46 25M 386
Random write (10K)	72	190	55	35
Random Read (10K)	24	38	24	15
Sequential Write (10K)	34	22	13	10
Sequential Read (10K)	16	13	8	6
Random Read/Rewrite (10K)	48	70	45	34
Sequential Read/Rewrite (10K)	120	21	14	16
Open Read Close Loop (100)	21	4	3	4
Div S9(10) COMP by S9(5) COMP giving S9(5) COMP (100K)	46	70	43	20
Mult S9(5) COMP by S9(5) COMP giving S9(10) COMP (100K)	28	38	22	25
Add S9(5) COMP to S9(10) COMP (100K)	15	31	23	17
Move S9(5) to S9(5) COMP (100K)	12	10	3	4
Move X(50) to X(50) (100K)	6	4	2	2
Display at line 24 (500)	20	7	6	17
Null Paragraph (300K)	16	4	2	1

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perfectly valid in RDOS or AOS, will be truncated in DOS. MAKELINK allows you to redirect this by building a text file with the form

old filename new filename

and then running MAKELINK on the file. This creates a file, ICHOST.LNK, which will be loaded when ICHOST comes up. This way, you don't have to go through all

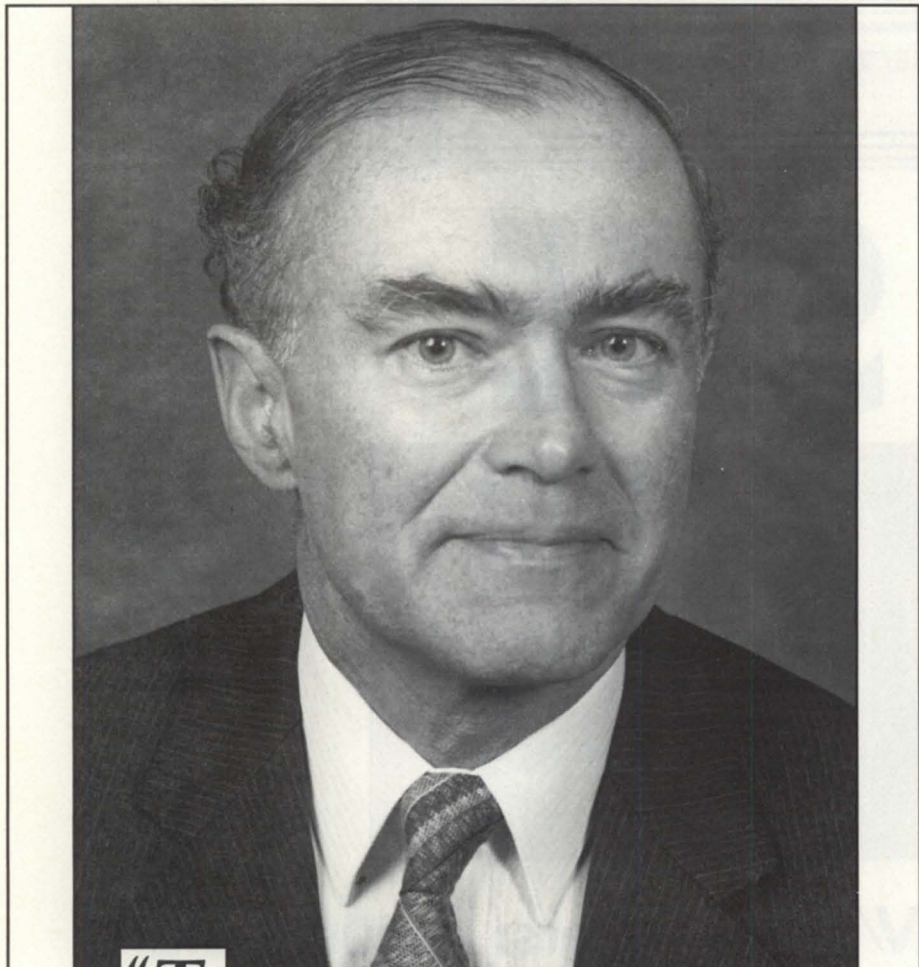
of your programs and change your 10-character filenames to eight characters. If you've committed the cardinal sin of hard-coding pathnames (e.g., DP0F: FILES:MYFILE), not to worry—MAKELINK can handle these, too.

CONFIG is the ICHOST configurator utility, with which you can change the way that ICHOST does nearly anything, from system parameters to pathnames, and from DG character translation to the

system messages. Figure 2 shows one of the menus, the system parameter menu.

The system configuration makes a *large* impact on performance. When I started this review, I had the parameters set for the default. The 100K record write took 202 seconds instead of 35, and I was thinking some nasty things about the developers. Gradually, by reading the manual and a little trial and error, performance improved to its current level.

ICHOST includes many of the RDOS system calls, and adds quite a few of its own. The ##D call gets total and free disk space, ##F will get the full pathname of a file or do a DIR on a template, and ##U will do an unconditional runtime system shutdown, to name just a few. The #P call, for the Printer Access Scheduling SYSTEM (PASS) is back, and better than ever. It allows four active print queues and up to 255 files, and can be accessed from any terminal.



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Figure 2: System parameter menu

Number of ISAM files:	16
Number of sequential files:	16
Number of ISAM record locks:	32
Size of buffers:	4096 bytes
Maximum memory for buffers:	400K bytes
LIM Expanded memory enabled:	Y
Size of program area:	24K bytes
Size of program data area:	0K bytes
Number of programs per run unit:	16
Number of file OPENS:	100
File update time:	30
Printer Control enabled:	N
Number of Printer Control entries:	48
Overlapped Disk I/O enabled:	Y
Automatic MAKECD enabled:	Y
System Services menu enabled:	Always
ISAM Version to create:	6
Console range:	Lowest 0 Highest 64

The only utility missing that I would call a necessity is a debugger. I *need* a debugger in order to make my code work. I know that I'm an aberration, because most of the people I talk to never use a debugger. But it's my column, and I want one. What we need is for someone out there to write a decent MS/DOS ICobol debugger that everyone—Wild Hare, Envyr, and Data General can license.

But wait, there's more!

In addition to the runtime system, I received revision 3.04 of Envyr's

compiler, DGCobol. Compatibility of the product was excellent; the compiled object code ran just fine on the MV/8. While DGCobol compiled slower than either Wild Hare's Axis or ICobol, at 12,000 lines per minute I still didn't spend a lot of time pining away at my terminal.

DGCobol will not only compile an ICobol program, it will tell you when it is doing things right that the ICobol compiler is doing wrong. For instance, ICobol will allow the JUSTIFIED clause to appear darn near anywhere, in spite of what the documentation states or the ANSI standard dictates. DGCobol flags this as an error. ICobol allows the RECORDING MODE IS FIXED clause, while DGCobol warns you that this is only valid with a sequential file. ICobol will automatically set the counter to zero when doing an INSPECT . . . TALLYING. DGCobol will too—but it informs you that this is not ANSI standard.

Figure 3: Listing key

* Definition
[] Usage occurs in dead (eliminated) code
() Usage is implied by an operation
a Screen referenced in an ACCEPT statement
b Procedure referenced as beginning of PERFORM range
c File referenced in a CLOSE statement
d Screen referenced in a DISPLAY statement
e Procedure referenced as end of PERFORM range
g Procedure referenced in GO TO
i File referenced in an I/O statement
m Data item is modified
o File referenced in an OPEN statement
r Data item is referenced
u Item is used in another item's definition
x File referenced in a DELETE FILE statement

True, heeding these messages now may cause some rewriting of your programs, but I look at it as an insurance policy. Some day, someone new at DG will notice that the JUSTIFIED clause isn't working right, and will "fix" it for a new revision—at which point you'll be getting compile errors all over the place. Or, you'll want to convert your programs from ICobol to some other Cobol, forget about initializing the TALLY variable, and have the program fail miserably.

I'd rather put in a little effort now, and have my programs ready for the future. After all, how much work does it take to

put a MOVE ZERO TO TALLY line in the program?

The compiler has some features not found in ICobol. DGCobol does some automatic optimization by eliminating unreachable code. It allows BOLD, DIM, REVERSED, and UNDERLINED screen attributes. I got all excited when I read about the STRING and UNSTRING verbs, and multi-character arguments in the IN-

SPECT statement. Unfortunately, these are currently available only under Unix. Hopefully, this version will be ported to the DOS version soon.

DGCobol's cross-reference is vastly superior to ICobol's. The listing appears in Figure 3. After studying Figure 3, you should know *exactly* what each procedure and data item are doing—or not doing. A typical entry is shown in Figure 4.

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Both the compiler and runtime system are copy protected, but with a hardware device that plugs into the printer port. This is the first program I've encountered that uses this method, and I kind of liked it. I could load a copy on my system at home and just carry the modules back and forth with me. I just hope this method doesn't become *too* popular—I can see my PC sitting a foot away from the wall, with this long line of protection modules plugged into it.

Figure 4: Typical entry

```
SCREEN NAME  data name,
alphanumeric lev 77, len 16, loc 698
97 * 304u 368u 381u 464m (466r)
488m (490r) 511m (513r) 536m (538r)
549m (550r) 869m (871r) 892m (894r)
905m (906r) 955m (957r) 980m (982r)
1005m (1007r) 1031m (1033r) 1041m
(1042r) 1067m (1069r) 1077m (1078r)
1104m (1106r) 1128m (1130r) 1151m
(1153r) 1176m (1178r) 1200m (1202r)
```

I've spent some time wondering what my next processor is going to be. Although I've used a mini all of my career, and still feel that AOS/VSI is vastly superior to MS-DOS, ICHOST is obviously going to have to be a consideration the next time I look at upgrading. The DGCobol compiler is well written and solid, failing only in the documentation, of which there is precious little. ENVYR's current project is a 500-plus page compiler manual that will free them of their DG documentation dependency. Together, this is a cost-effective pair that runs at lightening speed, and just may make me give up my mini.

DGCobol and ICHOST are available from:

Gerry Manning and Associates
3351 Candelaria Road N.E., Suite E
Albuquerque, NM 87107

DGCobol costs \$595 for the DOS version, and \$1,295 for the Unix. The ICHOST software runs from \$395 to \$3,995, depending on number of users. Δ

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

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SYNOPSIS

The addition of full-detail logging to AOS/VS provides enhanced auditing abilities and meets C2 security requirements. However, it can overtax your system. SYSLOG filtering relieves this problem.

by Tom Gutnick
Special to Focus

Figure 1: Events recorded with SYSLOG/DETAIL=MINIMAL (default)

- Console connect sessions.
- Unit (i.e., tape) mount sessions.
- Process terminations (with resource utilization).
- Pages printed.
- Privileged user log-ons.

Figure 2: Events recorded with SYSLOG/DETAIL=FULL

- Unsuccessful log-on attempts.
- Process created (including change of username), terminated, blocked, chained, ringloaded, type changed.
- Customer/server connections, disconnects.
- Invocations of Superuser, Superprocess, System Manager, Access Devices privileges.
- Files created, deleted, renamed, ACL changed.
- Files opened and closed (including unsuccessful open attempts).
- User profiles maintained.
- IPC (interprocess communication) messages sent.
- Logical Disk Units initialized, released.
- Disk mirroring.
- Job Processors initialized, released.
- Class scheduling enabled, changed, disabled.
- System clock/calendar changed.

"You Asked For It!" If you're a baby boomer or older, you may recognize the name of a popular TV program in the 1950s. Viewers wrote in, describing what they wanted to see on the show. (The only episode I remember was when they showed a guy changing the lightbulbs at the top of the TV tower on top of the Empire State Building—maybe that's why I'm afraid of heights!) In any case, SYSLOG filtering is something that you (or at least many Data General users) requested at recent NADGUG conferences, and now we can say "You Got It!"

Let's back up and discuss some history. Roughly five years ago, with the introduction of AOS/VS rev 6, Data General provided a major enhancement to the functionality of the System Log facility (SYSLOG). Previously (and going back to AOS days), the SYSLOG recorded information that was suitable for resource utilization charge-backs and for capacity planning, but was of only limited value to a system manager looking for security breaches; this capability is now referred to as minimal-detail logging. The enhancement in rev 6, full-detail logging, provided an exhaustive audit trail of potential security related events.

See Figure 1 for a list of the main types of events recorded under minimal-detail logging, and Figure 2 for additional events recorded under full-detail logging. For more complete lists, refer to the documentation (especially :UTIL:PARU.32.SR) if you need to know more. As should be obvious from looking at Figure 2, full-detail logging has the potential to tell you more than you ever wanted to know about activities on your system.

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Full-detail logging was added to AOS/VS in order to meet the audit requirements for C2 security, as defined by the National Computer Security Center. Although some of the information logged may seem like overkill, it can be extremely useful to a security administrator; but it comes at a cost.

Depending on the level of system activity, some performance degradation (in

both CPU processing and disk I/O requests) may result. More importantly, the log file may use up large amounts of disk space (on the order of megabytes per day would not be surprising), and aggressive system management would be called for. And finally, it can result in a voluminous audit trail that, because of its sheer size, is difficult to use.

Consequently, many users have re-

quested the ability to get a more selective version of full-detail logging. This ability is now available, as part of AOS/VS rev 7.67 and AOS/VSII rev 2.00, both of which were released recently.

What it does

SYSLOG filtering provides total control over what gets logged. I remember the first time the subject came up at a NADGUG conference (and it wasn't that long ago), and it was suggested that AOS/VS provide different subsets of events for which logging could be enabled. (For example, resource utilization events, file system events, events related to logging on, etc.) However, rather than trying to second-guess a very heterogeneous customer base by defining and implementing subsets (along with incurring lots of additional overhead in figuring out what to log), our developers took a better approach.

It is now possible to specify individually for every possible event type whether or not to log it; this capability applies equally to events defined by DG and to events defined by users. Filtering is done with an exclusion bitmap, where every possible SYSLOG event code (of which there are 4,096) is represented by a bit indicating whether or not to inhibit logging of that type of event.

Note that you must first enable the appropriate level of detail in the SYSLOG. For example, if you wanted to record only events indicating failed log-on attempts, you would first need to turn on the SYSLOG at full detail (because failed log-on attempts are not recorded at minimal detail), and then set an exclusion bitmap to inhibit recording of all other events.

Note also that the C2 evaluation criteria do not allow any granularity in what gets logged. If you exclude logging of any events through SYSLOG filtering, your system is not running in compliance with the C2 criteria. But that's not a real issue for most of us.

How to use it

Unfortunately, you can't enable SYSLOG filtering through a CLI command. (It would have meant adding 4,096 new switches to the SYSLOG command—not an attractive option!) Thus, to enable filtering requires writing a program that uses the ?SYLOG system call to provide the exclusion bitmap—but see the next



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section below before you panic! (This situation is somewhat analogous to class scheduling: A number of system calls were added in AOS/VS rev 7.50 to support class scheduling, but no equivalent CLI commands. Users can write their own programs to issue the appropriate calls, or they can license the Class Assignment and Scheduling Package (CLASP), which provides a program for that purpose.)

Full documentation of the enhanced ?SYLOG system call is provided in *AOS/VS, AOS/VS II, and AOS/RT32 System Call Dictionary, ?N Through ?Z* (93-543-1), which shipped with the new operating system releases.

A simple solution

A few months ago, I wrote a "quick and dirty" program to enable SYSLOG filtering, and I am donating this program, SYSLOG_FILTER.PR, to the NADGUG Software Library. I'll personally make an effort to fix any problems that are reported to me, but otherwise the program is not supported by Data General in any way.

What goes in must come out

It doesn't do much good to collect lots of data unless there's some way of generating reports from it. A good starting point is the REPORT utility (found in :UTIL on all AOS/VS and AOS/VS II releases). This program has been around since AOS days, but has been enhanced to deal with the new features. XEQ REPORT /FAILED_LOGONS will show a detail item for each time an invalid username /password combination was entered. XEQ REPORT /TRACE=<username> will give you a very detailed report: one line item for each auditable event by that user. (You may learn some surprising things about some of your applications when you read through one of these traces!) And XEQ REPORT /FILE=<pathname> will allow

Tom Gutnick has been playing with DG systems for over a dozen years. He is currently a systems engineering consultant in Data General's Technical Services Group for Eastern Operations, specializing in AOS/VS and AOS/VS II issues, including performance and security. He can be reached at Data General Corporation, 7927 Jones Branch Rd., Suite 200, McLean, VA 22102; 703/827-9600.

you to see every time a file has been opened (or an open attempt failed because of file access denied).

If you want to customize your own reports, it may be time to resurrect those rusty programming skills—but it's not difficult. You'll find all the documentation you need in Appendix A of *AOS/VS System Concepts* (manual 93-355-1), but I suggest that you start with my article "Be-

yond REPORT: Getting more out of your SYSLOG" in the July 1988 issue of *Focus*.

Conclusion

SYSLOG filtering meets a need expressed repeatedly by our users. It has minimal performance impact on a system, and allows valuable audit trails to be maintained. And best of all, "You Asked For It!" Δ

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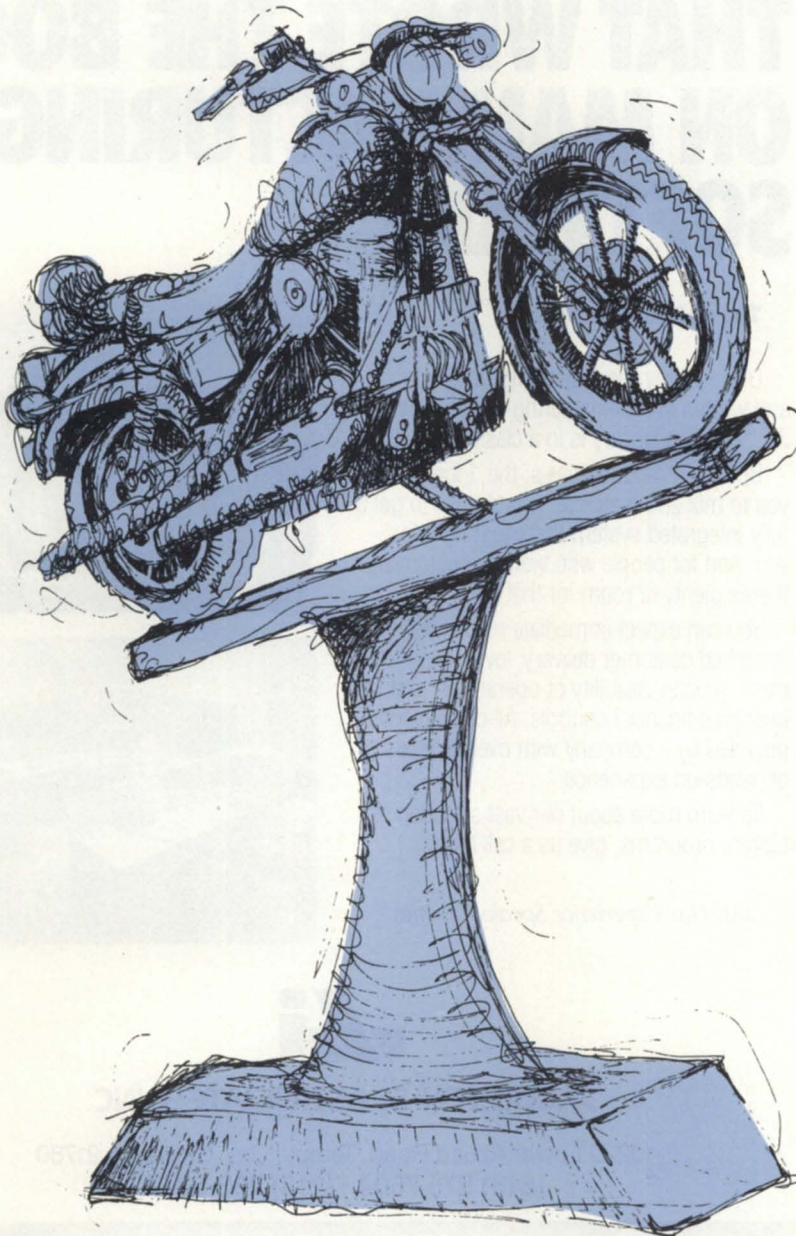
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Logjam

SYNOPSIS

Tracking a leak in system performance can be a tedious task. Here are some tips for diagnosing excessive system call activity using CLI's ?LOGCALLS.



:CONFERENCE_90

For those of you reading this in Seattle, there are several events you need to be aware of that don't appear in the Conference Program.

First, a limited number of original BJ Inc. business cards will be given away at the :SYSMGR booth on a first-come, first-served basis. Anyone who asks, except for anyone connected with a certain competitor who submitted our logo to the Coca Cola Company's legal department, will be eligible to receive one.

Second, the 1st Annual Jesse Helms Memorial Sleaze Tour will depart from the Hilton Hotel lobby at around 10 p.m. on Tuesday night. Bring cab fare, rental cars, and lots of chumming cash.

Third, the 2nd Annual UPDATE.CLI Memorial Trophy will be awarded to the DG development group whose product showed the most significant performance improvement during the last year. Last year's winner was the Infos II group for Infos II 5.00. They received a well-worn Harley speedometer mounted on a classy wooden base with an engraved plaque. The trophy will be on display at the :SYSMGR booth in the exhibit area prior to being handed over to a representative of the winning group.

:SYSTEM_CALLS

Over the past few years, I've referred several times to the use of the AOS[/VS [III]] system call logging facility as part of an effort to track down processes that are doing excessive system calls.

This month, I will go into more detail on

how to use the system call monitoring and logging facilities. This will be of benefit if you're experiencing poor performance due to excessive system calls, or if you're trying to optimize your application software.

Due to space considerations (I've had it with trilogies), I'm going to limit this month's discussion to AOS/VS [II] and 32-bit programs. It's also possible to do similar analyses on AOS, and on 16-bit programs under AOS/VS. If you're dying to do that, give me a call and I'll try to point you in the right direction.

I'd like to be able to tell you that after this column you'll be able to hunt down every system call problem and bludgeon it out of existence; but I'm afraid this whole subject is a lot less cookbook-ish than it should be.

:SYMPTOMS

The most noticeable symptom resulting from a program doing excessive system calls is its impact on other interactive users. That is, response time gets dramatically worse when a particular program or group

of programs is run. However, it's still possible to have a situation where there are excessive system calls being done without a major effect on response time. In this latter case, the only symptom will be that an abnormally high percentage of the CPU consumption will be in the kernel and/or the AGENT in Ring 3.

Whether or not excessive system calls impact overall response time significantly depends on the specific system calls that are being abused (see my May '86, *Focus* column) and whether or not you have been playing with the TUNPBLK patch (see my April '89 and May '90, *Focus* columns).

:DIAGNOSIS:INDIRECT

An indirect method of detecting excessive system call activity is to monitor overall CPU consumption. The easiest way is to use a performance monitor that displays idle, system, and user CPU percentages. Ideally, the monitor should also break down user CPU percentages per user Ring (3 through 7). In fairness, there is also a


way to obtain the CPU usage per Ring, albeit clumsily, without an extra cost monitor by using the HISTO.PR utility like this:

```
) XEQ HISTO 0 60 0 1777777777 2000000000
FOO
) XEQ HISTOREPORT/I=FOO/O=@LPT
```

The first command tells HISTO to run a CPU histogram on PID 0 (all users) for 60 seconds. It specifies the address range of interest as the entire address space, with a granularity of 512 MB (one Ring). The second command produces a report of the CPU consumption, by Ring, for the 60 second period during which HISTO ran.

To get a history of CPU consumption over the course of an entire day, with statistics available for each one minute interval, would require rerunning HISTO every 60 seconds and producing a total of 480 output files for later analysis. A bit of a pain, but doable.

The main problem with using system CPU consumption to infer when exces-



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sive system calls are being done is that there's no way to attribute the consumption to a particular PID or group of PIDs. But you've probably already got some suspects on your list, right?

:DIAGNOSIS:DIRECT

System calls can be directly monitored in three different ways. The first two require special software monitoring packages, and the third requires either a source code change to the problem program, or a somewhat tricky patch to it if you don't have the source.

The first method for monitoring system calls is to make use of a counter of the total number of system calls that is maintained within the kernel. Most performance monitoring packages, including DG's MONITOR and our :PERFMGR, allow displaying and logging the rate at which calls are being done based on this counter. Unfortunately, this counter only records a subset of all possible system calls. It does not record a small class of high speed calls like ?WTSIG, and it does not record a larger class of calls that are handled entirely within the AGENT in Ring 3.

The second method for monitoring system calls is to make use of the optional system call counting logic within the kernel. To turn this option on, all you need to do is apply a one word patch to the system, reboot, and have a software package available that can display the call counters (MONITOR or :PERFMGR). System call counting has a slight advantage over the total system call rate method mentioned above; it includes most of the high speed calls that do not show up in the total count, but it still misses the AGENT-only calls.

Both of the above methods for monitoring system call rates share a common problem with the indirect method; lack of attribution. There is no way to trace the calls back to a particular PID or group of PIDs.

The third means of monitoring system calls gets around the attribution problem, but it's the most difficult of the three to do, and it requires that you know which process is the bad guy. The technique involves using the system call logging facility via the ?LOGCALLS system call.

System call logging can be turned on in one of two ways; by modifying the source for the program to turn it on, or by patching the .PR file. The latter method is the

only choice if you don't have source code, or if the program language doesn't allow system calls (e.g., PRESENT).

:ALARM_LIMITS

So what's the threshold of pain for system CPU consumption? 25 percent? 50 percent? 90 percent? It's impossible to say with certainty; it depends to a great extent on what your application is.

See if this little thought experiment helps. Two systems, designated A and B, are running the World's Best Operating System, WBOS.

System A is running a multi-terminal

on-line inquiry/update system that uses elaborate screen layouts and multiple huge data bases scattered over several large local and wide area networks. The operating system includes the data base system within the kernel to maximize its performance. On a system like this, the application software works somewhat like a symphony conductor merely directing the activities of the operating system in accomplishing the work to be done. Ninety-nine percent system CPU and 1 percent application CPU consumption would not be unexpected.

System B is running a handful of terminals and several batch streams. The terminals are doing statistical analyses of weather data and the batch streams are running a simulation model of the upper atmosphere over the North Pacific. One percent system CPU and 99 percent application CPU consumption would not be unexpected.

So, as you can see there is no easy way to specify targets for system CPU consumption without taking the application into account.

Well, theory is nice, but we have systems to run, so back to reality. Most performance experts recommend that Ring 0 (system) CPU consumption for typical interactive applications should not exceed one quarter to one third of total CPU consumption, rising to one third to one half if Ring 3 is counted along with Ring 0. I agree. But the real goal is simply to drive the system and Ring 3 consumption as low as possible, preferably without a corresponding rise in Ring 7 consumption. How to do that will have to wait for a future column; we're just interested in the process of diagnosing and isolating the problem this month.

What about the system call rates? Are there any targets for those? A similar problem exists; it depends on the application. The general rule is simply the fewer system calls you do, the less system CPU is consumed, and the more CPU that's available for your application code. In addition, spending less time in the kernel means there is more time for the scheduler to apportion among the competing user programs, so response time will generally be better.

You can't avoid doing some system calls. The goal is to get the maximum use out of the calls that are unavoidable, and when possible, to avoid calls altogether.

**Figure 1:
Turning on system call logging
(examples)**

```

/* C ?LOGCALLS example code fragment */
#include <stdio.h>
#include <sys_calls.h>
main() {
    if (sys_logcalls(+1,"LC.LOG")
        exit(lasterror());
}

* COBOL ?LOGCALLS example code
* fragment
* Compile with /OCTAL.
IDENTIFICATION DIVISION.
PROGRAM-ID. EXAMPLE.
ENVIRONMENT DIVISION.
DATA DIVISION.
WORKING-STORAGE SECTION.
COPY "COBSYSID.IN".
77 LFN PIC X(7) VALUE "LC.LOG<0>".
77 AC0 PIC 9(9) COMP VALUE -1.
77 AC1 PIC 9(9) COMP VALUE +1.
77 AC2 PIC 9(9) COMP.
77 IER PIC 9(9) COMP.
PROCEDURE DIVISION.
CALL "?CBBADDR" USING LFN, AC2.
CALL "?CBSYS" USING COB-LOGCALLS,
    AC0, AC1, AC2, IER.
IF IER NOT = ZERO DISPLAY IER,
    STOP RUN.

C FORTRAN 77 ?LOGCALLS example code
C fragment
%INCLUDE "QSYM.F77.IN"
INTEGER IER,AC0,AC1,AC2
AC0 = 1
AC1 = 1
AC2 = BYTEADDR("LC.LOG")
IER =
    
```

:ISOLATION

Once the symptoms of excessive system calls are observed, the trick is to work backwards and figure out which program or programs are doing the excessive system calls and whether or not they are unnecessary. On most systems, you probably already have some suspicions.

The indispensable tool for analyzing the system calls done by a particular program is the system call logging facility provided by AOS/V5 in the form of the ?LOGCALLS system call. The LOGCALLS.PR program reads the log files produced by ?LOGCALLS and produces a detailed report.

If you have the source code for the program you want to analyze, then it's simply a matter of modifying the program to include a ?LOGCALLS system call at the beginning of the program and then recompiling and relinking it.

Better yet is a technique we use around here. Every program begins with a call to a standard subroutine that checks for the existence of an undocumented global

switch, like /LOGCALLS, and turns on system call logging if it's present on the command line. That way we can easily go back and recheck a production program when it's run on real data instead of just when it's run on relatively tiny test data bases. Some source code examples for turning on system call logging for C, Cobol, and Fortran 77 are shown in Figure 1.

What if you're running an interpreter that doesn't allow direct access to system calls, like ICobol? You're out of luck, unless the interpreter allows assembly language subroutines (ICobol now does), and you can write a subroutine to turn on system call logging. But even if you succeed, it is often difficult to reduce the number of system calls because they might be the result of a poor interpreter design, not a result of what your application code is doing.

But what if you don't have the source code, as is commonly the case with misbehaving third-party software packages? Well, you can still make use of ?LOGCALLS, but it gets a little tricky.

The trick is to patch a private copy of the .PR file to turn on logging. Patching a private copy of the .PR file allows you to do the logging without disturbing other real users of the program. A patch for doing this is shown in Figure 2 (page 62).

Let's pick a program to test this scheme out, and then you can follow along on your own system to get your feet wet.

Needless to say, it should be a really sleazy one, and it should be one that you all have access to. REPORT.PR springs immediately to mind. An examination of REPORT.PR running against a 1.5 MB SYSLOG file using :PERFMGR shows the following:

System calls:	9/sec
Idle CPU:	6%
Sys CPU:	8%
Ring 3 CPU:	52%
Ring 7 CPU:	33%

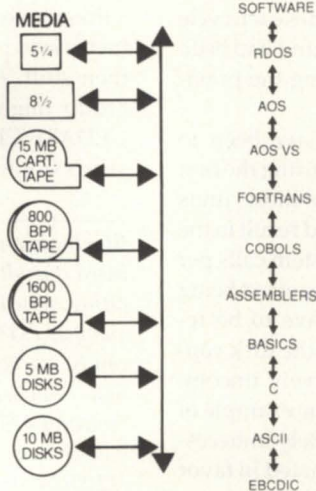
The system call rate and system CPU percentages are downright reasonable, but the Ring 3 CPU consumption is incredible.

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SYSTEM MANAGER'S LOG

After applying the patch shown in Figure 2, rerunning REPORT.PR on the same file using DEB with the commands shown in the patch, and using LOGCALLS.PR to analyze the log file, I found the following:

Total calls: 48,080
?READ calls: 47,967 (99%)

Dividing the size of the SYSLOG file by the number of ?READ calls gives an average read length of 32 bytes. That means that the program is making no attempt to do any buffering of the SYSLOG input file. This makes for easy programming, but it means that the program executes several thousand instructions to go into and out of the AGENT to retrieve each 32 bytes.

The speed of the program would be dramatically improved, and the CPU consumption significantly reduced, if the program read 2 KB or more of the input file at a time and then picked each record out of the buffer by itself. This is a good example of a program that doesn't make the most out of every system call.

Repeating the test on a patched private copy of DISCO for four update cycles gave the following results:

Total calls: 1199
?DVSTT calls: 1023 (85%)
?DVSTT rate: 14/sec (from :PERFMGR)

The ?DVSTT call is the one that returns the device statistics for a particular IOC number, device code, and unit number. Apparently, the DISCO designer felt it necessary to re-examine all possible 252 non-zero IOC number/device codes each cycle on the off-chance that a disk unit had been INIT'ed or RELEASEd during the previous cycle.

A better design would have been to locate all the INIT'ed disks during the first cycle, and then check only those units from there on out. That would result in the elimination of over 1,000 system calls per minute with the only negative effect being that the program would have to be restarted to notice changes in the disk configuration (which are relatively uncommon anyway). This is a classic example of system calls that are completely unnecessary and can be safely eliminated in favor of documenting a minor limitation.

:THIRD_PARTY_SOFTWARE

You may be asking yourself "What good

Figure 2: ?LOGCALLS patches

```

;A patch to enable system call
;logging in 32 bit .PR files.
;
;Command sequence ($=ESC key):
;
; ) DEB program name<NL>
; 6\\.$B
; $R
; $D
; 360$R
;
%PROGRAM
360 000000 [WPSH 0,3]
^+1 000000 [WADC 0,0]
^+1 000000 [WNEG 0,1]
^+1 000000 [XLEFB 2,+.11*2]
^+1 000000 []
^+1 000000 [XJSR @6]
^+1 000000 []
^+1 000000 000412
^+1 000000 [NOP]
^+1 000000 [WPOP 3,0]
^+1 000000 [XJMP @6]
^+1 000000 []
; "LG.LOG<0>"
^+1 000000 046103
^+1 000000 027114
^+1 000000 047507
^+1 000000 000000
;End of patch

```

does it do to analyze third-party software if I can't do anything about it?" Simple, you can get on the case of the supplier to fix the problem. They'll have plenty of motivation because they'll get to send out a Press Release announcing the dramatic increase in performance of the next rev of their stuff. And if it's a DG product, the group might end up with the coveted UPDATE.CLI Memorial Trophy at next year's Conference. Δ

BJ is the President of B.J. Inc., a San Francisco based consultancy specializing in system auditing, system management, and performance analysis. :SYSMGR is a division of B.J. Inc. BJ can be reached at 109 Minna St., Suite 215, San Francisco, CA 94105, 415/550-1444 (voice) or 415/550-1072 (fax). The :SYSMGR bulletin board number is 415/391-6531 (300 /1200/2400 with optional MNP class 4, C H A R / 6 0 5 X / C H A R L E N = 8 /PARITY=NONE/AUTOBAUD) or 415 /550-1454 (voice).

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The changing face of software design

by George H. Marschalk IV
Special to Focus

SYNOPSIS

The time-consuming and error-prone aspects of manually extracting requirements for design usage are reduced by using an automated design processor.

Over the past 25 years, the software development world has revolutionized. The introduction of structured programming changed the way we create software. Structured Analysis methods such as computer aided software engineering (CASE) vastly improved the process.

But in such a rapidly changing industry, there is always room for improvement. We found a gap in the development process that once remedied, freed us from time constraints and gave our designers more opportunity to be creative.

Structured analysis tools

Structured analysis (SA) and real-time structured analysis (RTSA) tools help to create models of proposed systems. The model includes diagrams of how the process transforms data and control input flows into output flows, and a data dictionary that describes all of the flows.

Up until now, designers manually transferred information from the model to the design, a drawback to using SA tools that caused delay and some error. Software Systems Design has developed a way to automatically transfer

information from model to design.

From analysis to design

The data dictionary provides a starting point for the designer. Using information

Figure 1: Data dictionary conversion

Sample dictionary entries:

```
traffic_light_color = "red" | "yellow" | "green"
```

```
traffic_light = location + current_status
```

These become the following type structures (in Ada):

```
type traffic_light_color_type is (red, yellow, green);
```

```
type traffic_light_type is
  record
    location : location_type;
    current_status : current_status_type;
  end record;
```

or (in C):

```
typedef int traffic_light_color_type;
#define red 10
#define yellow 11
#define green 12

typedef struct traffic_light_type {
  LOCATION_TYPE location;
  CURRENT_STATUS_TYPE current_status;
} TRAFFIC_LIGHT_TYPE;
```

| indicates an "or" function
+ indicates a combination function

from the model, the designer creates the system's data structures. The more complete the dictionary is, the better the designer can specify required data types. The designer also examines the upper-

most DFD (context diagram) for a definition of system boundaries. The interfaces and their associated flows define the routines needed to transfer information to the system.

Each diagram is analyzed to determine the best design representation for the data and control processing required. What results is a top-level, or architectural, design of the system. This approach to top-

Figure 2: Mapping of RTSA entities into Ada and C program units

<p>State Transition diagrams:</p> <p>Each STD → Ada task → C function (control/executive routine)</p> <p>Processes on Data Flow diagrams:</p> <p>If enabled on a STD → Ada task</p> <p>If triggered on a STD → procedure/function</p> <p>If not referenced on a STD → procedure/function</p> <p>If no STD exists on the DFD If process has a STD on its child diagram → Ada task Else → procedure/function</p>	<p>All processes → C functions</p> <p>Data Dictionary Entries:</p> <p>Composite entries → Ada record type → C typedef struct</p> <p>Enumerated entries → Ada enumeration type → C integer typedef with a define for each enumeration value</p> <p>Predefined entries → Ada predefined type → C predefined type</p> <p>Undefined entries → Ada enumeration type with "TBD" enumeration → C integer typedef with "TBD type undefined" comment</p>
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level design can be time-consuming and tedious, especially for large models. Automating the transfer of data from model to design results in a tremendous time savings. Designers no longer reenter information from the model, and a computer prepares the top-level design.

Improving the transition

Our approach to improving the transition from requirements to design involved three steps: defining a conversion algorithm, interfacing to SA tools, and generating the design.

Our first step was specifying the conversion methodology. We mimicked what an expert designer does with a given model. Complete details of our methodology are beyond the scope of this article, but the following summary highlights the major points. Our top-level design is based on an Ada representation using packages, tasks, procedures, and functions.

As mentioned, data types are created from the data dictionary entries. Figure 1 (page 64) illustrates how entries are con-

verted. (Note that the vertical bars indicate an "or" function, and the plus signs indicate a combination function.) These entries are easily mapped to the design structures shown. The first entry, traffic_light_color, may be represented as an enumeration type. The second, traffic_light, logically becomes a record structure. Each data type is stored in its own package.

Figure 2 maps the typical entities present in a RTSA model into Ada and C design components. Diagrams are analyzed in a top-down manner. Each process is examined to determine its relationships with other processes and state transition diagrams (STDs), so that it is classified properly. Data type packages produced from the dictionary exist, and are referenced by the packages created from the diagrams.

After the algorithm was defined, we interfaced to SA tools. Teamwork, Software through Pictures, and Excelerator simplified the task by allowing internal data bases. Calls to available library routines allowed the re-creation of the model

for analysis. The extracted data was stored in our own internal requirements structure to facilitate SA tool independence.

The final step was outputting the design generated by the conversion process. The internal Ada-based design can be processed by different language-specific output programs. Ada and C versions currently exist. Each design package is written into a file. Since references to needed data type packages are made during the conversion process, they may be used to create Ada "with" or C "include" statements.

The output files are compatible with any editor or compiler and contain comment-compatible descriptions extracted from the dictionary and process specifications. These descriptions are designed to be interpreted by commercially available PDL processors.

Automation

Inherent problems exist in any effort to replace humans with machines. Potential problems with automating the design

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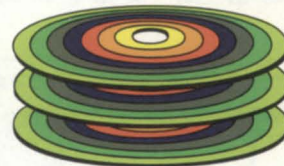
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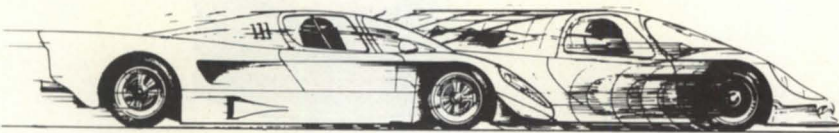
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process include communication among the resulting program units, rationale behind design decisions, and explanation of how to complete the design. The designers must finish the design and resolve communication issues. This is necessary since the automated conversion is limited by the information that can be extracted from the RTSA data base. Communication issues stem from how data is transferred between two routines—sent by one routine to another or, requested when needed.

Our implementation of the conversion process tool addresses the above problems. We provide dual-access mechanisms for data communication, and include hints of why packages exist to explain resulting designs to designers. Meaningful PDL constructs also help explain processes.

Our automated conversion features other benefits. Since each diagram and dictionary entry is examined, every aspect of the requirement specification is addressed. Errors in the SA tool data base can be detected and reported to the user. Missing information is indicated by To Be Determined (TBD) marks, providing the user with starting points for design completion.

Try it, you'll like it

We successfully produced a top-level Ada design from a RTSA model that contained over 1,500 data dictionary definitions and 350 processes. The resulting design contains more than 1,700 package specifications and bodies, and in excess of 200,000 lines of data structure declarations and design information. Using our automated process, the entire conversion took only 90 minutes.

We developed a formal methodology for the conversion of requirements information into top-level design. The tedious and error-prone aspects of manually extracting requirements for design usage are reduced by using an automated design processor. This automated approach provides significant time savings, thus freeing the designers to refine the design, revisit the requirements, or pursue rapid prototyping of portions of the system. Δ

George H. Marschalk IV is a senior software engineer and may be reached at Software Systems Design, 3627 Padua Avenue, Claremont, CA 91711; 714/625-6147.



Netware for AOS/VS

SYNOPSIS

*Independent or tightly integrated? PC/VS, PC*I, and Netware offer you three choices in PC integration.*

Those of you who made it to the NADGUG conference this year are finally able to see at least some part of Netware for AOS/VS. I'm writing this way back in August, so I'm not quite sure how much is operational by the time of the conference in Seattle.

In the next few issues I'll be describing various aspects of this exciting new product that is being released as a joint effort of Data General and Rational Data Systems. But before diving into the details of Netware, let's consider the question we've been asked more often than any other during the past years since this product was first announced: "How is Netware different from PC/VS and PC*I?"

AOS/VS independence

The three PC integration products (PC*I, PC/VS, and Netware) vary in how independent they are of AOS/VS. A dependent product is one that is tightly integrated into the AOS/VS environment in terms of system management. In this sense, independence is neither inherently good nor bad. Some applications and users will prefer independence, others will prefer dependence. What is right for one user or application may not be the best for another.

PC/VS: The most tightly integrated

For each user logged into PC/VS there is a surrogate process running under that user's AOS/VS username. PC/VS uses

the AOS/VS password to control access to the system and the normal ACL mechanisms are used to control access by PC users. When PC/VS's file redirector is used, AOS/VS files appear to the user as though they are MS-DOS files. The same is true for the other products, but in the case of PC/VS, AOS/VS is providing security and accounting functionality using its normal mechanisms. This is one reason for PC/VS' simplicity and efficiency.

When a distributed application is developed, the code for the application is typically linked directly into the PC/VS surrogate process. This further extends the ability of AOS/VS to associate work performed with the particular user.

PC*I: An intermediate approach

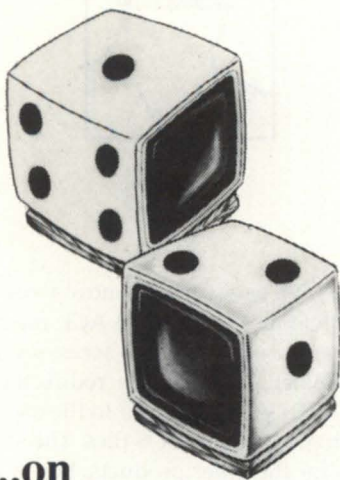
When PC*I users log in, they still use an AOS/VS username and password, but there is no surrogate process created. Instead, there is a global MVNET process that handles all file redirector requests from all PC*I users. Since this process has but a single AOS/VS username, all requests appear to AOS/VS as coming from this single anonymous user. It is up to MVNET, therefore, to re-implement the ACL mechanisms, increasing the overhead of MVNET field operations. Furthermore, system accounting views the CPU and I/O use by MVNET as coming from a single user, and cannot distinguish the actual users of the system.

A distributed PC*I application uses the Netbios interface and may or may not create a process for each user. (Most do not.)

Netware for AOS/VS: Independence from AOS/VS

Users log into Netware with a Novell username and password which, by the way, will not typically be mappable into the AOS/VS username/password system. This is necessary in order to support the variety of remote (PC-based) utilities for Netware system management such as SYSCON, FILER, etc. Surrogate processes

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will be created, but they will not support users on a one-to-one basis. The current model is configurable and may support, say, five or ten users per surrogate process. This has the same effect as MVNET, which is that AOS/VS cannot provide security or charge for resources on a user-by-user basis.

Netware has the further restriction that since an AOS/VS username is never used, it is not possible for Netware to re-enforce ACL checking as PC*I now does. For example, a user's Netware username might be "BOB", but AOS/VS will see all Netware users as having a single anonymous username, something like "\$NETWARE".

The advantage of this approach is that Netware for AOS/VS will look to a Netware supervisor exactly like any other Netware server. The disadvantage is that from the perspective of AOS/VS, the entire collection of Netware users will appear as a single individual. As far as AOS/VS is concerned, all Netware users must be granted a global set of privileges. In fact, these privileges will be those available to the Netware Supervisor (like a superuser). The Supervisor may, in turn, further restrict the privileges of Netware users on a group or individual basis according to their Netware usernames or group associations.

File locks

Like PC*I (MVNET), Netware must provide the ability for multiple users to lock records, files, and other objects. (Note: PC/VS does not support file or record locking.) As this does not map into an existing AOS/VS facility, Netware for AOS/VS will include a lock manager of its own. The disadvantage of this scheme is that although a Netware user can lock out another Netware user, a native AOS/VS application will not typically be aware of the lock and may disturb the supposedly locked object.

A weak solution to this problem exists in the form of library routines for AOS/VS applications that communicate with the Netware lock manager. The weakness is that this scheme only protects locked objects from cooperating with AOS/VS applications. Those that are not Netware-aware may still cause trouble.

For these reasons, we envision that many Netware for AOS/VS users will not attempt to use Netware by itself as a

mechanism for a truly distributed file architecture. Netware files and those used by AOS/VS-based applications will continue to be separate in many environments.

Print spooling

Printing is also very different between these three products. Again at one extreme, PC/VS makes use of the AOS/VS spoolers directly. Files for printing are enqueued by the surrogate process running with the PC-user's AOS/VS username. Access control, header pages, and resource accounting are trivially simple.

Because of its use of centralized rather than surrogate processes, PC*I has a more difficult time of this, for all print jobs appear to AOS/VS to be submitted by a single AOS/VS user without regard to the actual PC user. However, there is still only a single queuing mechanism, that of AOS/VS.

Portable Netware has its own queue and spooler management. In order to offer 100 percent compatibility with other Netware servers, Netware for AOS/VS will implement these mechanisms. The question then arises, what happens to print jobs as they leave the Netware spoolers? Are they sent directly to hardware devices? If so, these devices may not be shared by the AOS/VS spoolers.

Alternatively, the Netware spooler output may be fed to the AOS/VS spoolers. While this permits the sharing of output devices, it means that Netware users and operators will not typically be able to see what jobs are in the print queue; they will zip right through the Netware spoolers and appear to have been printed, while in fact they are sitting in an AOS/VS queue, invisible to Netware.

That's a quick once-over of the stylistic differences you can expect between the existing PC integration products and Netware for AOS/VS. In the months to come, we'll examine other aspects of this important platform product in greater detail. Δ

Copyright (c) 1990 Rational Data Systems, Inc. Doug Kaye is president of Rational Data Systems, Inc. and can be reached at 1050 Northgate Drive, San Rafael, CA 94903; 415/499-3354. This article is excerpted from the 1991 Report on PC Integration, a free copy of which can be obtained from RDS.

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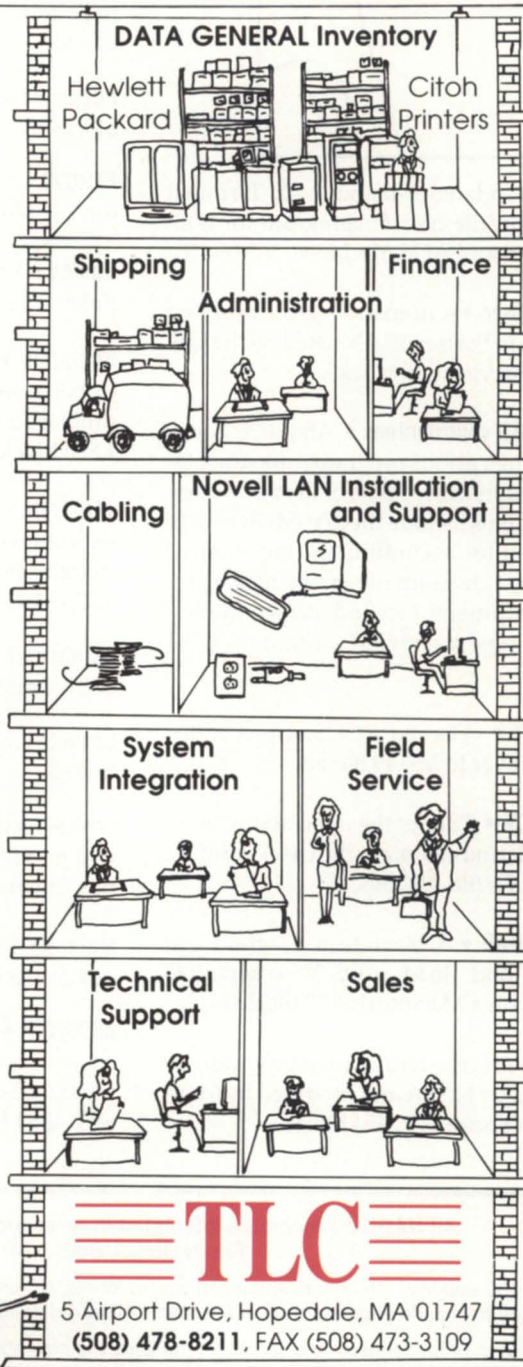
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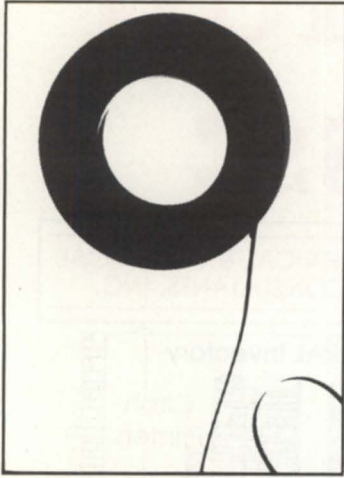
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A complete listing of the NADGUG software library

ACK • Updated version 1.70. Terminal emulator/file transfer program for both AOS/VS and AOS machines. 365 blocks.

Big Brother • Automatic log-off program written in Fortran 77. Donated by the U.S. Forest Service. 169 blocks.

B.J.'s BBS contributions • About 20 items, including various programs, documentation, and macros. Some of the more interesting items include the :SYSMGR benchmark suite, a continuous incremental backup, a clean-up file maintenance program, a program to find strings in files, and a type-backward program. 6,761 blocks.

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

DBCHECK • Checks the open status of an Infos file and examines the checkpointing status of a file. 187 blocks.

DUMpload • A Macintosh program to dump and load AOS/VS-compatible dumps on a Macintosh. 137 blocks.

ERP • A process-termination program developed by NASA and modified by Manville. In Fortran 77. 454 blocks.

FILEMNGR • With this new version, you can move, copy, delete, view, and perform several other options faster. This is distributed as shareware. If you try it and continue to use it, you are requested to pay a registration fee. From Kim Geiger. 654 blocks.

Focus • *Focus* magazine articles. 1774 blocks.

FTNCVT • A Fortran 5 to Fortran 77 translator. 232 blocks.

Games • A collection from various places. Enjoy. 19,216 blocks.

IMSLUTIL • A collection of CLI macros, Cobol routines, and assembly routines callable from Cobol. By IMSL of Houston. 4,893 blocks.

JAG_UTIL • JAG_UTIL by John Grant consists of several programs: Filecount, User-space, Scan, Glossary, Laminate, and Qhelp. 4,325 blocks.

Kermit • A file-transfer protocol developed at Columbia University. 9,697 blocks.

Logout • Another auto log-out system. 178 blocks.

Look • Used to view text files, Look allows you to move forward and backward in a file. Donated by Data General. 202 blocks.

Macros • A collection of macros from various sources. 441 blocks.

MENUDIR • An initial user menu that can chain to other applications and features a password-control system. From the Fed SIG. 486 blocks.

Misc Kerm • An expanded version of AOS Kerm, this now includes other versions of Kermit including DG/One Kermit. 6,709 blocks.

MS-DOS • A VS program that lets you read and write MS-DOS diskettes on an MV system with a 5.25-inch floppy disk drive. 984 blocks.

Notify and Prior • Two contributions from Concept Automation. Notify tells you when a process has terminated. Prior lists the priorities of processes. 162 blocks.

RDOS Kermit • Now available. You must request the Kermit tape (rather than the library tape) to get RDOS Kermit.

Softrans • A file-transfer protocol written in Fortran 77 used to communicate with proprietary PC communications packages. 462 blocks.

Spell • Checks the spelling of a word or spell-checks documents. Submitted by Richard Kouzes. 5,108 blocks.

TEX • Version 2.26a is now available. TEX (Terminal Emulator with Xmodem) is a terminal-emulation program written by David Down. He has revised the TEX software to include a command language. TEX is distributed as shareware. At the end of 30 days, either remove it from your system or send the author a \$45 fee. 463 blocks.

VT100KER • VT100 emulator from John Grant. 1,043 blocks.

Xfer • A tape-conversion utility. 607 blocks. Δ

All NADGUG members interested in receiving the NADGUG software collection should send a 1,200-foot tape to:

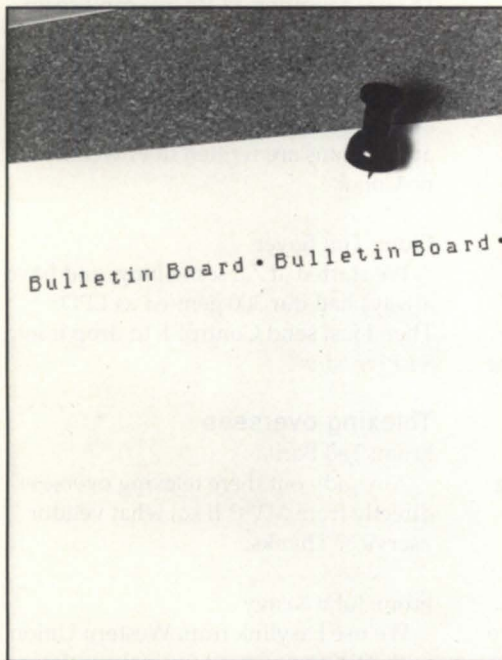
Randy Berndt, Building 4, Suite 321, 5300 North Braeswood, Houston, Texas 77096

MV/2000 and MV/1400 users should send one formatted, error-free tape cartridge. Software contributions should be sent to the same address. Be sure to include your membership number. Allow 4-6 weeks for delivery.

Thanks to Brian Johnson and :WFFCA, the library is now able to provide 1200 ft. copies to AOS/VS rev 6 users. Thanks to Kevin Danzig for duplicating MV/2000 tapes. To leave a question regarding non-standard library distribution call 713/988-5342.

Please include a self-addressed envelope with sufficient return postage. In compliance with postal regulations, do not date the postage. Either disable the date printing completely, or set the date to "--" or zeros. Tapes cannot be returned UPS collect.

Bits and bytes from the bulletin board



CEO integrated processes

From: Kevin Light

Help! Can anyone tell me whether running applications as integrated processes under CEO results in excessively long log-on times?

We are running Wordperfect and a Powerhouse application as integrated processes. Users at log-on come up in CEO (to protect them from the unknown!). We are experiencing delays of 20-plus seconds. Our hardware is an MV/2500 with 8 MB. Current users number 14, however delays of this type occur with only one user on the system. Is this an endemic feature of CEO when running integrated processes? Can I expect the situation to worsen as more applications are added?

From: Jerrold Rappard

One thing that will cause longer times

before the CEO main menu comes up is if the users have a lot in their CEO inboxes. CEO tries to sort this before painting the first screen. Have the users delete and shred excessive messages. This should help.

From: Kevin Light

That is one thing DG hasn't suggested. They have suggested extra disk, more memory, and performance tuning. Thanks, I'll try that today.

From: Doug Rady

Have you SPRED the various .PR files involved? How are they started? Is CEO_CP the initial log-on IPC?

From: Tom Moore

It could be a lot of reasons. I would check a) the element size of the CEO_CP.PR file, b) buffers (I/O) on the IAC, and c) the number of buffers set at start up.

RJE-80

From: Wendell Putney

I have a client who would like to run RJE-80 unattended in the middle of the night through a dial-up modem. Any suggestions as to how to establish the connection and release it, since RJE-80 has no dialing capability?

From: Jim Krause

There is an unattended version of RJE-80 that does have the dial command. We currently use the unattended version but do not use the dial portion, so I have no idea if it works. We currently are only being called. According to the manual, you will need an autodialer connected to a con number, and it will even retry from 0 to 10,000 times.

UserID

From: Mark Hutchins

I would like to find out a way to retrieve the "Last login date" that is supposedly stored in the UPD file of each user ID. Using the f/dlm is not accurate, and seems to reflect my last backup date. F/dla gives me a similar result. Can anyone give me a clue on

how to retrieve the data?

From: Stan Gula

I upload a file called PROF.DMP to the AOS/VS area. It contains a file called PROF_IPC.PR, which will list time/date last logged on, initial process, and initial IPC for a list of users passed on the command line. Default output goes to the generic output device. You can redirect it using a proc statement like: `proc/in=null/out=proc.op/def prof_ipc [!ef [!f :upd:+]]`.

7.67 patches

From: Steven Bonici

I just up rev'd to 7.67 and tried to install some patches from SYSMGR BBS. Each patch I tried, it told me "Patch not installed." I did see something like, "symbol not found." I don't know if this has anything to do with it. I did everything from the :UPDATE directory: `XEQ PATCHIT=SYSGEN: AOSVS_7.67.PR/P=7.67_BJS_name-of-patch_PAT`. Am I doing something wrong, or is there anything else I have to do?

From: Tom Moore

Either your SEA did not accommodate your attempt, or there were no .ST files available.

From: Steven Bonici

My searchlist was set to :UTIL, :, :PER, :MACROS, and I was in the :UPDATE directory. Which .ST files is it looking for? If it's the system-name, it's in the :SYSGEN directory. Should I have had this also on my searchlist? Thanks.

From: Kevin Danzig

It would even be better to install them while you were in :SYSGEN but your problem is that the patch can't find the .ST. Try putting it on your searchlist.

From: Brian Johnson

Please get the latest copy of the 7.67 patches from our BBS and try again. Nobody else has reported any problems with them.

Microcom modems

From: David Potter

Does anyone have any experience with the Microcom MNP/5 v.32 or MNP/7 v.22 modems sold by DG? I

seem to have a serious problem with terminal emulation. When ever I do a TYPE of a moderately sized text file I get line over runs, loss of data, and garbage. However, when I transfer using Blast, the integrity of the file sent or received is excellent. Yes, I am using Blast as my comm software on both ends. The remote PCs are anything from a true IBM model 50, DG dasher 286, IBM XT, to a no-name clone. Does anyone have any ideas?

P.S. Whenever I do a ? that has say 50 PIDs active, I can never get to the end of the list without getting line over runs (garbage)!

From: Brian Johnson

We are using these modems with great success. My October *Focus* column describes the setup for the AX series modems in detail. The modem columns came about as a direct result of over a years' worth of effort attempting to get DG Direct to provide recommended configurations for the modems they were selling. They promised many times to come up with it and never did.

Zmodem comms package

From: Andries Holtzhausen

Anybody out there with a comms package based on Zmodem protocols that runs on DG equipment?

From: Stan Gula

I have one coming out real soon now. We ported Zmodem to the MV two years ago as part of the Express Mail program. We're unbundling the CEO Mail pieces of that. The MV-to-MV auto-transfer section is in Beta now, and a PC-to-MV auto transfer piece is almost done. We've been toying with the idea of just implementing the RZ/SZ utilities as implemented in the original code, but we're not sure about that yet. We stripped out all the old X/Y modem support, and just do Zmodem because that's all we're really interested in. Especially since all the PC comms packages do Zmodem now. (I recommend Telex if you haven't seen it—very nice shareware package.)

DG/UX 4.30

From: John O'Keefe

How is 4.30 DG/UX? Has anyone loaded it or run benchmarks on some

real applications? All DG literature says it now screams. True or false?

From: Doug Rady

True! Also, some nasty network bugs are fixed. Life with 4.30 has been much easier than with 4.2<,1,2> Every once in a while, closing a window and moving the mouse before the window is fully destroyed will cause X to go red and hang. It will either terminate or you can kill it off. Not a big thing—just a little annoying at times.

From: Ephraim Nussbaum

I've been running 4.30 for a week now, doing ICobol applications. I haven't noticed any real differences except that now the print scheduler doesn't get hung. Some users have reported slight hesitation on the screen occasionally, but this is subjective and may not be real.

Changing TLM

From: Rick Marnell

Does anyone know how to change the TLM on a file without actually modifying it? I wrote a "touch" utility and am currently using a kludge method of performing ?GTRUNC on the file using the same file size. Anyone know of an easier way?

From: Brian Johnson

Your current solution is both effective and efficient. What are you trying to improve on?

From: Rick Marnell

I'm not certain that disk I/O is being avoided using ?GTRUNC; otherwise, I suppose it is just fine.

Data products VFU

From: Robert Kirby

Does anyone know the commands to load a format into the electronic VFU of DG 4215 or 4218 printers (300 and 600 LPM drum printers)? I am using these printers on a Unix system and need to be able to set them for various forms.

From: Brian Johnson

The DAVFU command format is documented in several places. I got my info on it from the DG "Peripherals" manual (014-632-01, pg III-48ff). It can also be found in the Programmers

Reference for the particular printer. DAVFU format was defined by Data Products and is a quasi-standard.

XLPT/Printronic

From: Bill Hanway

We are trying to upgrade from AOS /VS 6.04 (that's old, I know) to AOS/VS II 2.00. I have everything working (Wordperfect, Office, Powerhouse, etc), except XLPT. Our shop has always genned printers as LPB, but we've needed back-door patches from DG to get the Printronix running. Now that DG has rewritten XLPT, we can't seem to get any help from them with the problem. Can I gen the printers as LPD or LPE? We use multiple form lengths, and both 6 and 8 LPI formats. All of our applications are written in Powerhouse, no Cobol.

From: Tim Boyer

We started at 7.2 something, and have always had our 300 genned as LPD. Then I just send Control-F to drop it into 8 LPI mode.

Telexing overseas

From: Ted Barila

Anybody out there telexing overseas directly from MVs? If so, what vendor /service? Thanks.

From: John Keavy

We use Easylink from Western Union with TEX shareware terminal emulator on our MV.

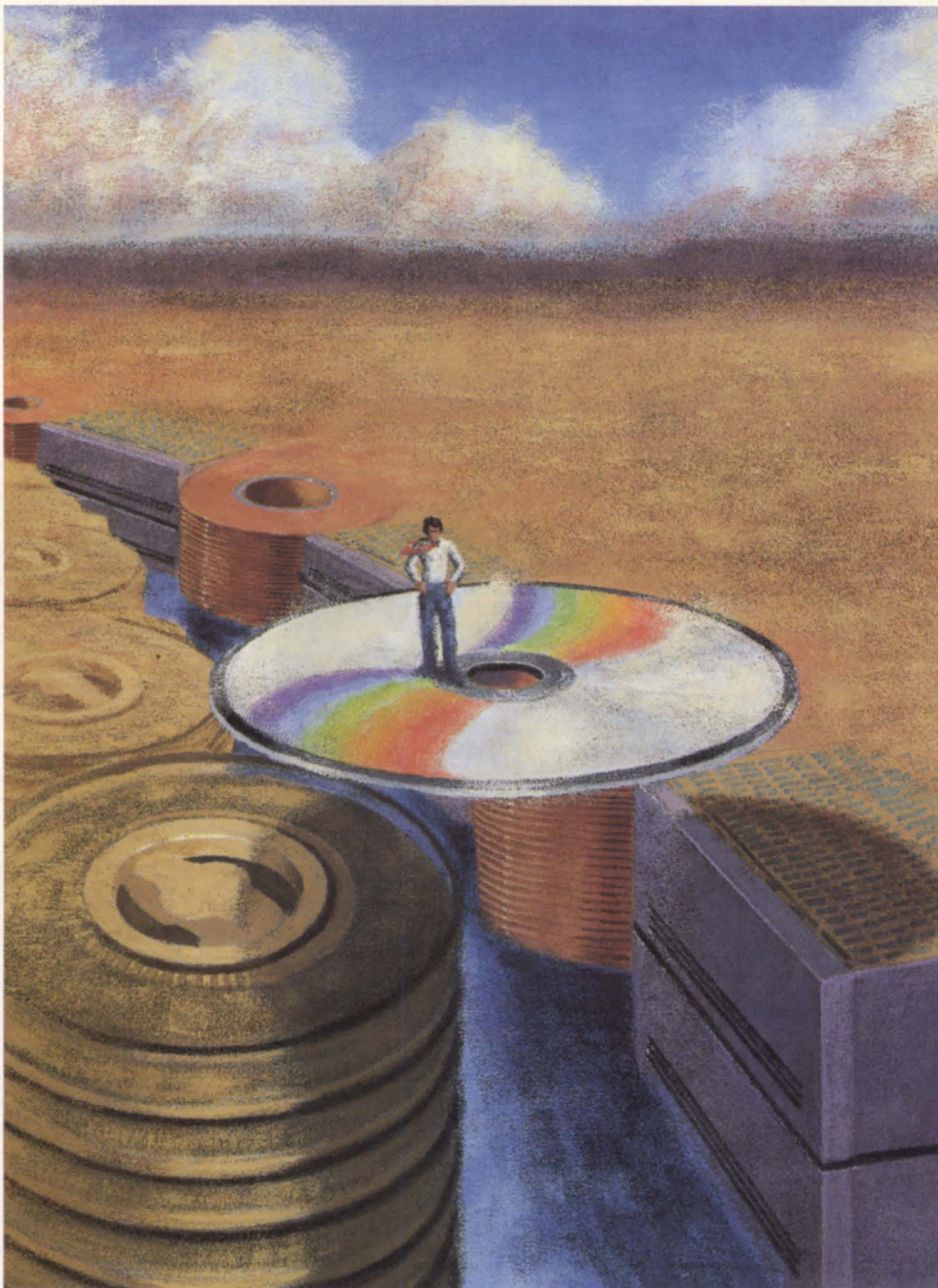
From: Michael Travis

We use the CEO X.400 gateway to Telemail (I think it wants to be called "Sprintmail" now). Telemail has in turn gateways to Telex and fax. So we can send a Telex or fax from CEO. It's been very useful.

From: Andries Holtzhausen

We use CEO_DOCUMENT EXCHANGE II with a locally manufactured box of tricks. Works well when the PO lines are up. 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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Connectivity on the next frontier

SYNOPSIS

Don't discredit your programmers for sneaking into their library of video games. They may be preparing for the ultimate in connectivity—integration between humans and computers.

by Michael E. Marotta
Special to Focus

Just less than 100 years ago, following the 1890 census (tabulated with punch cards), the government announced the closing of the frontier. The process of winning the West included extending the modes of transportation and communication.

In the 21st century, computers will carry the freight of an information-driven world. Fiber optics and satellite transmissions are the new telegraphs. One important difference is that the railroad and telegraph operated within the physical geography of the real world. However, communications among computers is creating a new frontier, a virtual geography of paths, nodes, and storage devices where reality depends on your choice of symbols.

Virtual reality

PC users often speak of data being organized according to a directory "tree". (Data General's designers worked with a model of concentric rings.) According to virtual reality (VR) researchers, there is no reason why you could not see a tree, reach out and touch a leaf, and in so doing, open a file in a subdirectory. You could take the leaf and shake it open to make it a sheet of paper. Inserting the paper into the image of a typewriter would bring up the word processor; inserting the paper into the image of an abacus would enable the spreadsheet.

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This technology is already being used today. The bottom line of virtual reality is the video game. And today's video games do not rely on clunky joysticks, but on "Power Gloves" and "U force fields." Meanwhile, at the University of North Carolina at Chapel Hill, VR is being used to model medicines. Researchers call up three-dimensional models of molecules and explore their interactions. If you attempt to move two incompatible molecules together, you feel resistance in a special I/O glove.

In fact, Sitterson Hall at UNC was designed using VR techniques that allowed an architect to walk through the building before construction began. Wearing a helmet while walking a treadmill allowed the designer to experience his creation.

Private Eye is another VR output device. Three inches (7 cm) long and an inch high and wide (2.25 cm x 2.25 cm), the device weighs 2.25 ounces (68 gr). You wear it on a headset and it projects the equivalent of a nine-inch image that hangs in space in front of you. About a dozen different companies have licensed the technology, including Hughes Aircraft. Produced by Reflection Technology of Waltham, Massachusetts, Private Eye not only allows the creation of virtual reality, it makes VR as portable as a walkman.

Most I/O devices that support VR are quite larger than Private Eye. Autodesk, well-known to automotive and aircraft designers for their computer aided design (CAD) systems, manufactures a Cyberspace system that includes a glove and a heads-up display the size of a welder's mask. A headmounted display is also part of an Air Force project to give pilots a "god's-eye-view" of combat. NASA's Ames Research Laboratory has produced a Virtual Interface Environment Workstation (VIEW) that is somewhat bulkier than a scuba mask. Thus, the promise of Private Eye is the ability to take your reality with you.

The Autodesk and NASA systems also incorporate gloves. In addition, NASA's VIEW responds to voice and body motion. The overall trend is to create a set of I/O devices that are natural and comfortable. This will make computing natural and comfortable. Whether you are writing a memo or correlating the econometric parameters of petroleum production, the goal is to add power to your actions without increasing the burden of

distraction from the computer's command set.

There is a challenge here. Today, we work in a world where you need special protocols to get data from an IBM S/36 to an Aviiion workstation and this is just to see the *text*. SNA, ISDN, and OSI barely

In the aching black of nothing, there may be a three-dimensional gridwork punctuated by cubes, spheres, pyramids, and other shapes that represent corporate and government databanks

address the issues that we will face in the next decade. (One VR researcher quipped that ISDN stands for "It Still Does Nothing.")

Cyberspace

Cyberspace is the sum total of all computer-to-computer connections. Most people, even those who work in telecomputing, are unaware of the astronomically large number of connections that exist. Internet, Bitnet, Usenet, Fidonet, Arpanet, the list goes on. Connections exist over the entire globe.

Two connectivity tools are firmly in place: ASCII and Bell 212A. The American Standards Committee for Information Interchange defined a 7-bit code for data. Bell 212A was devised by AT&T to transmit digital data as analog tones along the phone lines. Today, it is possible to use any Dasher-compatible desktop computer as terminal to any Nova, Eclipse, or MV computer. In fact, there is an entire culture of programmers who spend much of their time exploring the network topology of cyberspace.

While ARPA (Advanced Research Project Agency) is clearly an arm of the United States Government, the other networks were built on an ad hoc basis by the hackers who use them. Usenet and Bitnet are Unix-based. (The "bit" in Bitnet means

"Because It's There".) Fidonet connects MS-DOS computers running as bulletin boards (BBSes).

You might say that all lesser networks are subsets of Internet. Internet is a quasi-official means for connecting colleges and other research sites. Depending on the priorities of the sysop, a BBS may be on more than one network. Thus, Fidonet connects to Bitnet, something not initially envisioned by the creators of either network. These ad hoc solutions come from people with little or no official standing. Their work will come to fruition when the tools of virtual reality are used to display cyberspace.

Theory and practice

In the aching black of nothing, there may be a three-dimensional gridwork punctuated by cubes, spheres, pyramids and other shapes that represent corporate and government databanks. This image of Cyberspace was created by science fiction writers like Vernor Vinge and William Gibson. In their worlds, life goes on for most people as it always has: using a computer is something you get paid to do. It is not clear that all this connectivity will improve life for everyone on Earth.

Dr. Timothy Leary, long a proponent of virtual reality, makes very positive claims for connectivity.

"To me VR is a more richly complicated telephone. Variable Realities gear, as inexpensive as Nintendo, will allow the ghetto kid to create mutual realities with other *individuals* . . . It will break down the walls of language, country, geography. It will lead to the global village which McLuhan so brilliantly predicted."

Howard Rheingold, however, isn't so sure. He expects that when connectivity technology is mature enough to attract really big players, then the big players will control connectivity. Improving the lives of people "isn't completely a technological issue," he says.

Jerry J. Vaske and Charles E. Grantham wrote "Socializing the human-computer interface," because they wanted "to begin the process that recognizes the interdisciplinary nature of the interactions that occur between people and machine. Theories found in social psychology, sociology, and anthropology are used to illus-

trate how these disciplines can facilitate our human-computer interactions . . . ”.

Vaske and Grantham seek to help people work together using sophisticated connectivity tools. One of their first applications is to map and display the *real* lines of communication in a corporation.

The marketplace

One laboratory experimenting with Virtual Reality has been visited by phone companies, banks, real estate developers, automotive manufacturers, advocates for the disabled, and various public officials. Obviously, there is a demand. But what about the supply?

Informix is a fourth-generation language for Unix-based microcomputers. Informix-Online is designed to include tools for uniting binary images, sound, and text files. Their marketing department has a video that illustrates the concept, but there is no price tag for the product.

There are products for sale, again, from the ad hoc sector of the economy. Because CompuServe clients log in with a wide range of personal computers including IBM-compatibles, Amiga, Atari, and Apple, Cshow was written. Cshow (the CompuServe graphics system) is a shareware program (\$15 registration) that allows users of all kinds of personal computers to share pictures. This includes the RLE format used by radar weather maps.

Internet supports "Anonymous File Transfers." Site administrators allow or encourage the storage of MS-DOS, Unix, or Macintosh data and programs. Anyone can use a common program, (NET or KAQ9, for instance) to connect to Internet and move from one computer to the next. You can visit Apple Computer or White Sands Missile Range and if the site administrator supports networking, you will find some files there. You log in as "anonymous" and give your own last name as the password.

Thus we have shareware connectivity and a poor man's cyberspace but as widespread as these are, they are not yet profit-makers. Δ

Michael E. Marotta is a technical writer with a decade of experience on Data General and other equipment. He works in manufacturing and business environments.

Sources for this article include the following.

"A Case Study of High Technology Impacts on Organizational Design," Charles Grantham, PhD, North Bay Consultancy

"Across the Electronic Frontier," Mitch Kapor and John Barlow, Electronic Frontier Foundation

"Concerning Hackers Who Break Into Computer Systems," Dorothy Denning, 13th National Computer Security Conference

Document from Bob Berry, Canyon State Systems and Software

Document from John E. Perry Jr, UUCP

"Living in a Virtual World," Scott S. Fischer and Jane Morrill Tazelaar, BYTE

Private communication with Dr. Timothy Leary via WELL (Whole Earth 'Lectronic Link).

"Thinking in Organizational Analysis," Charles Grantham, PhD, North Bay Consultancy

"Travels in Virtual Reality," Howard Rheingold, *Whole Earth Review*

"Virtual Display comes off the drawing board and into use," Michael Alexander, *Computerworld*

For more information on virtual reality, read the following.

The Art of Human Computer Interface Design, Brenda Laurel ed

Envisioning Information, Edward R. Tufte

"Issues in Multimedia Interface Design: Interface Agents and Media Integration," Abbe Don

Proceedings of the Special Interest Group on Computer Human Interaction 1990, Association for Computing Machines

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Let the North American Data General Users Group (NADGUG) connect you with other Data General users who have a similar special interest and who want to share information, ideas, problems, and solutions. No matter what the special interest is behind the group — equipment, systems or application software, major language, operating system, industry type — the reason is the same: to work together to exchange ideas on how to get the best performance out of your DG system.

Listed above are NADGUG's current special interest groups. If you are interested in making the connection with one of these groups, or if you have an interest that needs a group, please contact NADGUG's RIG/SIG coordinator, Greg D. Goss, at 1-800-USR-GRUP (512/345-5316 outside U.S.) for further information.



Intro to OOP

SYNOPSIS

Hype and glitter aside, C++ is a valid technology. In object oriented programming, the data defines the method.

What with a short vacation, fishing on the weekends, arranging and recording synthesized music, and other events on my social calendar, I haven't researched further the EXEC Cooperative processes I wrote about in September.

Fortunately, there is another subject that comes to mind that I can write about—my learning about Object Oriented Programming (OOP). This topic will make good conference reading, and to show you how insightful I am, I will anticipate your questions (look for them in brackets {}), and answer them here so you don't have to wait. If you have questions that I missed, write me a note or give me a call.

A bit of history

Since this column is based upon my personal opinions and thoughts, I have the liberty of giving you a minor resume of my programming experience.

While in college, I learned Nova assembler, and Fortran for both a main-frame (WATFOR & WATFIV) and Data General (Fortran IV). I picked up Basic after hours on an unknown Wang processor. Given this set, I could work on time-sensitive or hardware I/O specific

problems with MASM, compute-bound stuff with Fortran, or just fun things with Basic.

So far, this was the typical set of languages known by an electronics student. Hewlett-Packard's SPL (another high-level assembler) and RPG-II came later, along with IBM's EDL (Event Driven Language) for real-time programming on a Series/1. PL/1, Forth, and C came later.

[What!, no Cobol?] Cobol followed also, but I much prefer C, MASM, or PL/1, besides, I prefer to write programs that are shorter than the collected works of Leo Tolstoy.

C can be used like an assembler that lets me twiddle bits, has the high-level features of the other languages, is not verbose, and I can use it on all of the hardware platforms that I work on. For years, now, I have owned various revisions of Borland International's Turbo C for the PC. Well, I recently purchased their C++ compiler.

["C Plus Plus" I suppose is a marketing hype to say that it is better than C?] It won me over.

Technology vs. hype, glimmer, gimmick, et al.

Hype uses the term "object oriented".

Glimmer says "new & improved," and people will buy it.

Gimmick uses C syntax, the increment operator "++", to indicate that it is above C.

Technology states the truth, based upon techniques and what it really can do for the consumer (i.e. programmer).

Object Oriented Programming, like C++, is very different from the normal style of programming found in regular C. In traditional programming, code manipulates the data that is used by the program. In OOP, the data defines how it can be manipulated, and the program code calls upon the data to use these methods to make the changes upon the data.

[I've heard of self-modifying code, but self-modifying data is absurd.] It is not

self-modifying, but the data defines the methods by which it can be operated on.

Another distinction in C++ is that you can define your own classes of data, and they can be treated just like all of the internal data types.

As an example, we could define a class of data to handle NADGUG conference attendees. Within the definition of this class, there would be, as we would expect, areas to store specifics related to the person, like name, address, telephone numbers, etc., just like any normal structure. With OOP, what we would also find within the class definition are the methods or functions to manipulate the data. Examples of these follow.

- Retrieval of various elements of the name
- Retrieval of portions of the address
- A method to allocate and initialize another attendee
- A method to de-allocate an attendee
- Methods to compare attendees

and any other ways of operating upon an

attendee that we could think of, such as if we were using some fancy terminal that could display video. We could even have a method to show the attendee's picture on the screen.

What is really different in the use of a class versus a typical structure, is that the program might be prohibited from directly accessing the internal information that is stored within the class.

[Why have the data if I can't get to it?] You use only the methods that the class defines. That way, you could not corrupt the internal data. The advantage is that the internal form of the data could change, and only the implementation of the methods of the class would change. Any references or operations within the program would still work, because they are using the methods, and not the raw data.

As an example, suppose the attendee's age was changed from an integer to a floating point number. In a traditional program, many things would "break," from the printing of address labels, to the storing of the record on disk. Things would

be broken, until all of the references to the attendee's data structure were changed. Using OOP, only the few methods that deal with the person's age would be changed. (Many of the methods deal with names and addresses, and do not touch the age, and therefore would not have to be touched.) Given this scenario, with OOP, we would have perhaps a dozen things to change, versus the potentially hundreds of changes that would be required in traditional programming.

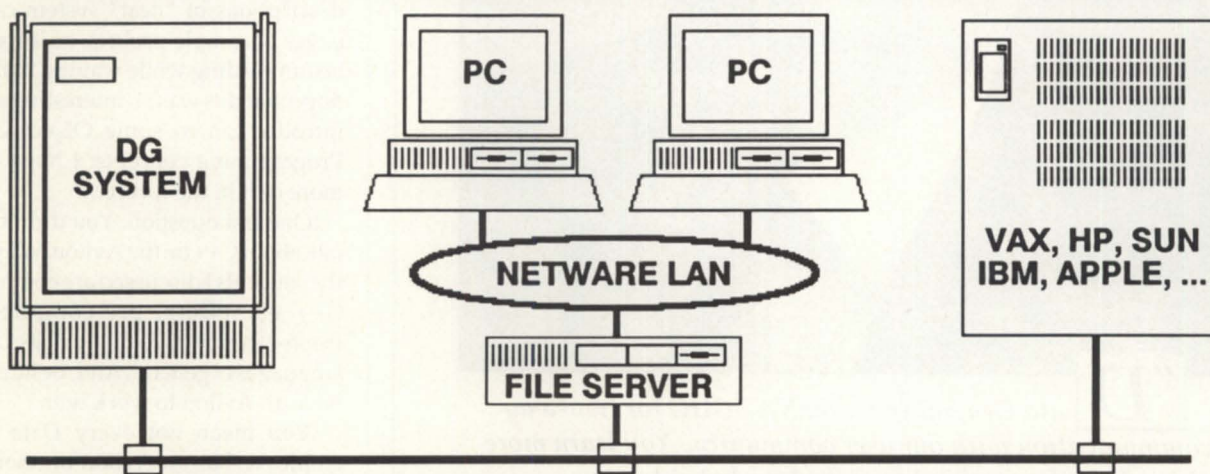
Polymorphism and inheritance

Polymorphism. [Definition: A Greek disease (ism) whose major symptom is the sudden presence of many (poly) morphs.] Definition: characteristic of being able to change into many shapes.

Inheritance. [Definition: Something that's coming to me when someone else gets what's coming to him.] Definition: to obtain from one's parents and preceding generations traits or characteristics.

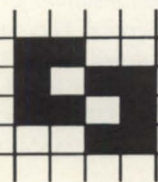
Within an OOP like C++, a class of objects may be derived from other, pre-

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viously defined classes. The new class will usually have some fundamental characteristic that relates to the parent class.

Since we are talking about inheritance, many examples of inheritance come from the field of biology. In biology, plants and animals are classified in a hierarchy, and it can easily be seen that related animals and plants do share various characteristics and traits that are not shared by members of

other classes. An example is that most plants absorb sunlight, and produce chlorophyll. Just as in real life, the exceptions to the base rule can be handled in OOP.

The primary advantage within OOP is that if a class is derived from another class, the new class inherits the methods of its parent class, which reduces the amount of code that you have to write for the new

class. In the case of our example, printing the conference attendee's name would be inherited from another (probably a string) class, since all of the work involved in manipulating strings has already been done.

{Have you forgotten about that other word, what was it? PolySMURFism?} Polymorphism. Now, suppose we had a class, and it had methods that were particular to that class. We also had another class that was different from that first class, but it had a method by the same name as the first class. Polymorphism is the term to show that a method can be called, and the operations that are to be performed on the object are those that correspond to that particular type of object.

If we were to add another class of data, i.e., breakouts, to describe each of the sessions during the conference, then our program could at some point retrieve either an attendee, or a breakout session, and the particular method that would be used, would be based upon the type of the parameter that would be passed to the retrieve function.

More to come

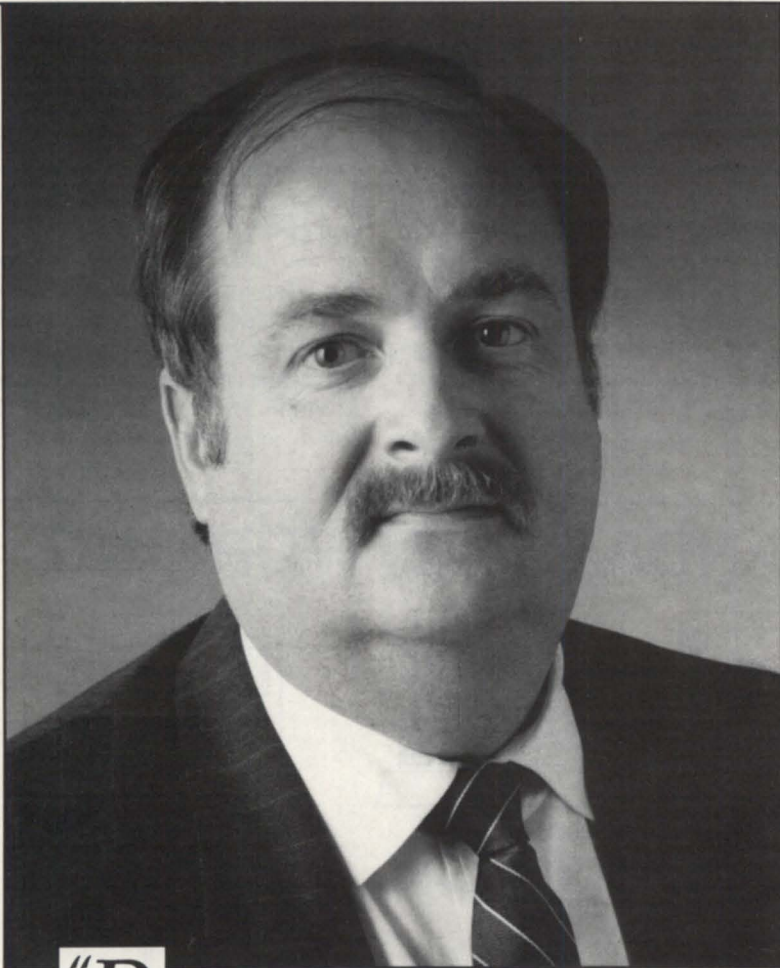
There is lots more to be covered. I did not want to fill the conference issue with descriptions of "neat" system calls, and pages of sample packets, as it would not be fun reading while waiting in line. So, I hope that this was an interesting and brief introduction to some Object Oriented Programming concepts. I hope to cover more of it in the future.

{One last question. You didn't seem to talk about C++ on the Aviiion. Why?} Note, the concepts I discussed are common to all C++ compilers, pre-compilers, and fronts—common to many object oriented languages in general. And, besides, I don't have an Aviiion to work with.

{You mean not every Data General employee has an Aviiion on their desk?} No comment (yet).

Till next time, and start sending those cards and letters (and donations). Δ

Michael Dupras is senior consultant for the Software Products and Services Division of DG Canada. He may be reached at Data General, 490 boul. St-Joseph, Suite 104, Hull, Quebec, Canada J8Y 3Y7; 819/778-2171; CEO address MICHAEL DUPRAS :CANADA.



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Vector processing on Aviion

Westboro—Data General announces that Aviion workstations and servers now have vector processing capability, resulting in increased performance of complex applications.

The Model 5069 vector processor targets systems integrators, labs, contractors, instrument manufacturers, and exploration firms for power demanded by signal, image, seismic, and other real-time processing uses.

The vector processor is a 32-bit single-precision, single-board option, and performs at up to 66 MFLOPS (million floating-point operations per second). A maximum of eight can be interconnected for a performance of 528 MFLOPS in a single chassis. With an industry-standard VME data bus, the vector processor can be connected to a wide range of devices.

The vector processor models are priced at \$8,995 with 2 MB of memory, or \$12,195 with 8 MB of memory.

Data General also announced three VMEbus interfaces for connecting Aviion systems to external devices.

The Model 5089/5099 VMEbus/DR11-W interface emulates the Digital Equipment Corporation DR11-W interface and supports most DR11-W drives and applications.

The Model 5517 VMEbus/IEEE-488 bus interfaces with the General Purpose Interface Bus (GPIB) defined by IEEE-488 for electronic measurement devices, instruments, and computers.

Model 5400 VME General Purpose VMEbus interfaces high-speed parallel

block transfers between Aviions and external devices.

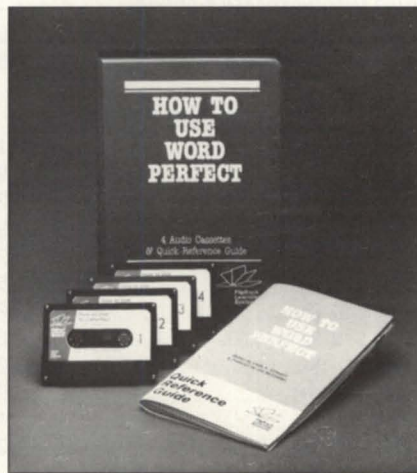
Models 5089/5099 are priced at \$1,895 and \$2,995 respectively, and are available 60 days after receipt of order. Model 5517 is priced at \$2,400 and is available 30 days after receipt of order. Model 5400 is priced at \$4,495 and is available 60 days after receipt of order.

Data General Corporation, 3400 Computer Drive, Westboro, MA 01580; 508/898-4051.

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Beginner's guide to Wordperfect

Glen Ellyn, IL—Fliptrack Learning Systems announces its self-paced Wordperfect audio course for Data General equipment users, *How to Use Wordperfect, Data General Version 4.2*. The training course takes users through manipulation of documents, and introduces special features such as columns, footnotes, etc.



The course format allows users to interact with DG hardware and Wordperfect software. The four audiocassette lessons are approximately two hours each. Ten copies of a comprehensive Quick Reference Guide accompany each course.

How to Use Wordperfect, Data General Version 4.2 is available from the publisher for \$495.

Fliptrack Learning Systems, 999 Main, Suite 200, Glen Ellyn, IL 60137; 800/222-3547

Circle 77 on reader service card

New RAS version 3.10

Salt Lake City, UT—DMS Systems, Inc. announces version 3.10 of the Resource Accounting System (RAS), running on the MV family of computers. RAS provides an interface for recording specific transactions, and printing out the reports.

Several basic reports are provided that may be used as is, or customized using the report writer feature of RAS. One basic report, showing which files are accessed by which users, may be run for an entire system, for specific files or users, or just for access violations. Other reports provided show all ACL changes (who made them, the file affected, and the new ACL), and profile modifications (who made the change, whose profile was changed).

An additional new feature of revision 3.10 allows reporting on multiple levels of groups. Resource utilization may be totaled by department, and within department by area. RAS version 3.10 is available immediately.

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

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Micro Focus Cobol/2 utilities for DG

Palo Alto, CA—Micro Focus announces that its Cobol/2 compiler has now been ported to DG's Aviion and Dasher products.

With Template Native Code Generator (TNCG) technology, Micro Focus enhances the performance of target applications. The comprehensive Micro Focus Cobol/2 compiler is compatible with DG ICobol.

Micro Focus has also developed Micro Focus Cobol/2 Toolbox for Unix. These utilities are designed to help application developers working with the Cobol/2 development system.

The Toolbox provides sophisticated tools for designing, creating, debugging, and testing applications. Components include: a Cobol editor, an interactive screen painting utility, an enhanced version of the Animator debugger, and a session

recorder. The Micro Focus Cobol /2 Toolbox for a single user workstation is priced at \$1,500.

Micro Focus, 2465 E. Bayshore Road, Suite 400, Palo Alto, CA 94303; 415/856-4161.

Circle 79 on reader service card.

HBO hosts inhouse tracking for MVs

Atlanta, GA—HBO & Company announces the addition of Hosts (Hospital Support Tracking System) to its minicomputer product line, including the MV family.

Hosts tracks support issues from the time of initial call, to completion, for all vendors. Management and statistical reports track response time, evaluate staffing needs, determine documentation needs, and isolate call trends.

Hosts is available to existing HBO & Company customers with any of the following Star systems: Clinstar-patient care, Clinstar-pharmacy, Clinstar-radiology, Clinstar-laboratory, or Star financials.

HBO & Company, 301 Perimeter Center North, Atlanta, GA 30346; 404/393-6066.

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Unix security

Reston, VA—Unitech Software, Inc. announces Upass, a Unix password management and control product. With password control and automatic reporting transparent to end users, Upass provides system administrators greater security for their Unix systems.

Upass allows system administrators to make existing logins secure enough to meet U.S. Department of Defense (DoD) guidelines for classified or sensitive material.

Upass is a component of Unitech Software's Usecure software. Upass and Usecure range in price from \$1,000 to \$4,000, depending on CPU classifications. The software will be available to run on Aviiions at the end of October.

Unitech Software, Inc., 1800 Alexander Bell Drive, Suite 101, Reston, VA 22091; 703/264-3301. Δ

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NADGUG staff and Focus Magazine address:

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FOCUS Magazine

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

Information about advertising.....Michelle Sentenne

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Canada's **EMJ Data Systems**, a wholesale distributor of high performance personal computers and peripherals, agreed to sell Aviion systems nationally through its VARs (value-added resellers). EMJ has an extensive marketing program, including direct marketing to 6,500 dealers and VARs, telemarketing, joint trade shows, and cooperative advertising. "The partnership of two high-profile names in the Canadian computing industry is a significant event nationally," says **Jim Casey**, acting general manager of Data General Canada.

Computers & Solutions signed an agreement to sell \$1 million worth of Aviion workstations and Dasher personal computers. The computers will run Business System software designed for the distribution industry. Computers & Solutions, based in Norcross, Georgia, has installed its Business System in over 100 locations throughout the U.S.

System Dynamics, maker of manufacturing and distribution software, will sell its product on the Aviion family. Its Dynamic Manufacturing and Dynamic Distribution applications are geared toward customers in the pharmaceutical, food, chemical, beverage, and bottling industries. The package uses the DG/UX operating system and Oracle relational database software. System Dynamics is located in Ontario, Canada.

Hager Telecommunications signed a VAR agreement to sell its voice products on the Dasher/386-25 and Aviion sys-

tems. Hager, located in Hopkinton, Massachusetts, distributes products that provide voice mail, transaction processing, and interactive voice response systems.

There is a free on-line bulletin board (BBS) for users of Progress 4GL/RDBMS to exchange ideas and information. The BBS is called **PROMP FORum** and may be accessed by dialing 215/446-4035 (2400/1200 N81).

Disgruntled **Data General** shareholders filed suit against the computer manufacturer in **U.S. District Court** in Boston. The shareholder suit charges that Data General made misleading statements about its business earlier this year. Data General said the suit is "without merit."

DG also reported that two five-year-old shareholder suits were settled in September, with DG agreeing to pay a total of \$6 million. In **Malanka vs. Data General** and **Lewis vs. de Castro**, DG executives were charged with selling stock before announcing negative news about the company. Neither DG nor the executives admitted any liability. A portion of the settlement will be covered by insurance, DG said.

Data Assurance Corporation (DAC), provider of disaster recovery services, announced that **Christopher J. Quirarte** is the new Western Regional Manager. Quirarte has eight years experience as a marketing professional in the computer industry. He was formerly employed with Data General as a customer service account executive in the Southern Califor-

nia region. DAC has headquarters in Englewood, Colorado. Quirarte will work out of DAC's office in Long Beach, California; 213/988-2022.

Dataram appointed two new vice presidents. **Carl B. Anderson**, formerly director of sales, is now vice president of sales. **Jeffrey H. Duncan** will move up to vice president of engineering from director of engineering. Dataram provides memory products and service for mini-computers and workstations, including Data General products.

Did you recognize all the **Great Connections** on the cover of *Focus* this month?

Clockwise, beginning in the top left, are a KC-135 tanker refueling a SR-71 reconnaissance jet, the uniting of East and West Germany, suckling piglets, Babe Ruth whacking a baseball, a well tapping an underground oil field, Spock's arresting shoulder squeeze, the laying of the Golden Spike that connected North America's first trans-continental railroad, and a detail from Michelangelo's painting of the Sistine chapel. And in the center square is NADGUG, your Great Connection to the Data General community.

If you did not have the opportunity to attend this year's NADGUG conference in Seattle, take heart. We'll have full coverage in the next issue of *Focus*. If you'd like to attend a NADGUG conference, start planning now to meet us next October in Denver, Colorado. That is the site of NADGUG 91! △

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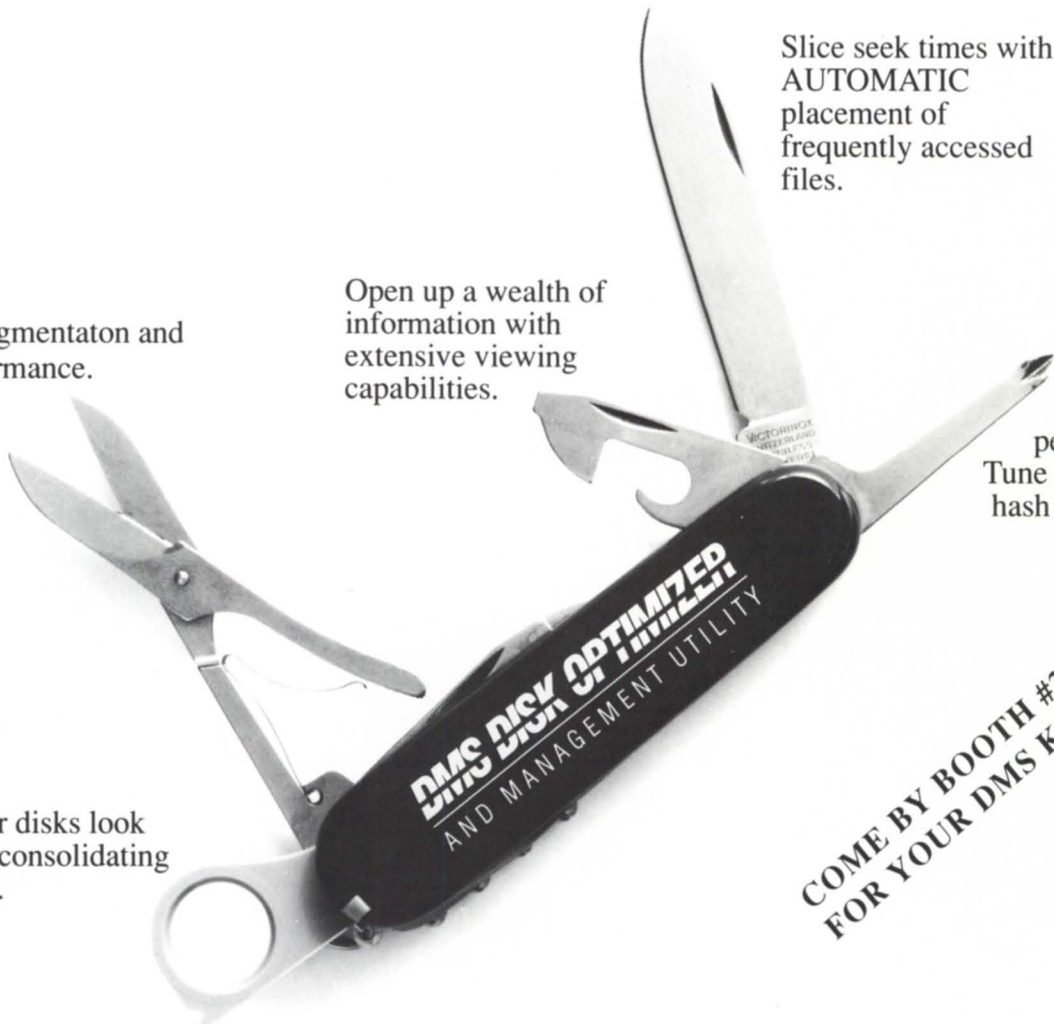
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