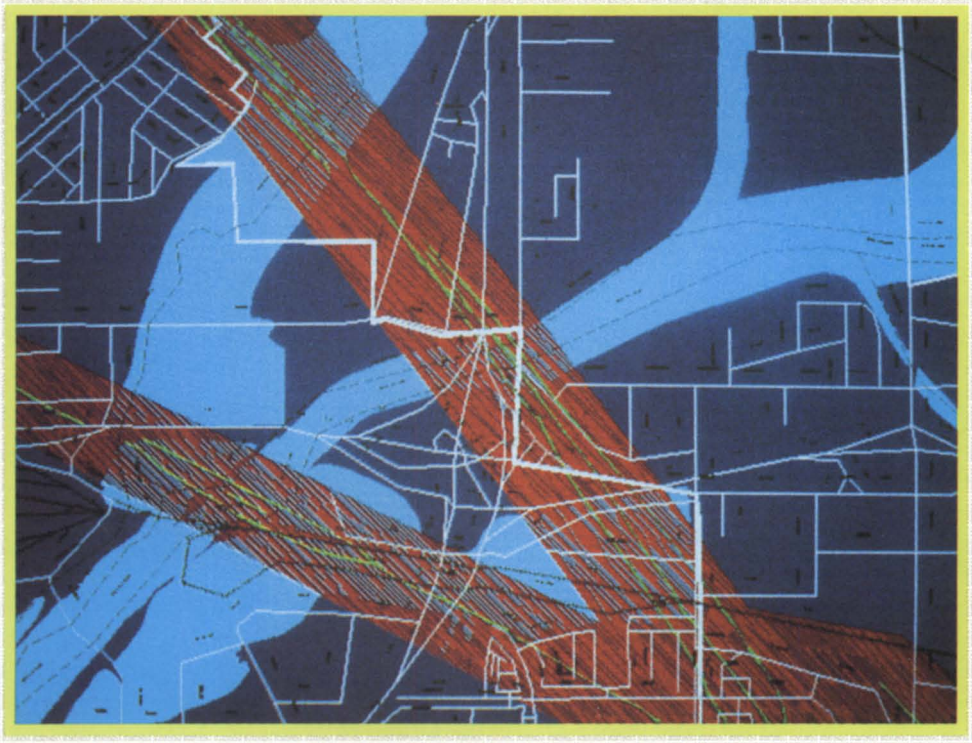
May 1990

FOCUS

The Magazine of the North American Data General Users Group



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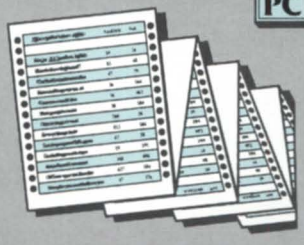

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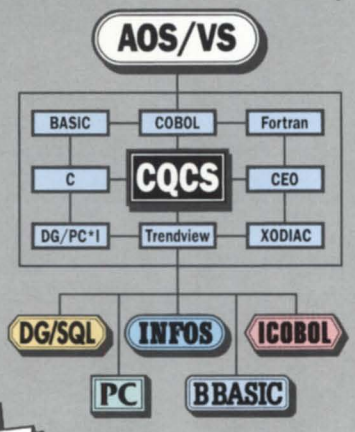

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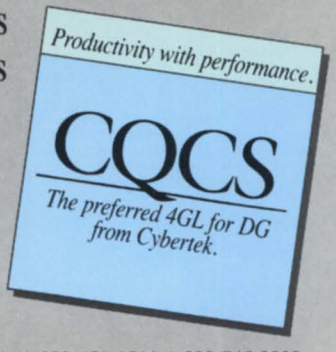

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Business BASIC is on the move...

No 1

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Pictured with an AViiON running their software on the DG stand at NY UNIX EXPO in November '89, are, left to right, Mike Edwards, managing director of Transoft; Richard Music, president, and David Wertz, director of Software development, of Logical Solutions Inc; and John Welser, president of Madison Data Systems Inc. Following this successful demonstration of AViiON DG/UX UBB versions of Logical's CLAIM-WARE Health Insurance Administration system and Madison's REMAP Real Estate and construction Management software, both Logical and Madison placed orders with Transoft for AViiON UBB – the first ever for any AViiON version of BBASIC.

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About the cover:
Streaking red lines show the presence of earthquake faults in the San Bernadino area of southern California and their relationship to flood hazard zones (blue) and the street network. This slide was produced using San Bernadino County's GIMS system. See article on page 14, part of our feature on scientific applications using Data General equipment.

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.

Postmaster: Send address changes to Subscription Department, Turnkey Publishing, Inc., Stillhouse Canyon Office Park, 4807 Spicewood Springs Road, Suite 3150, Austin, Texas 78759.

Focus Magazine is distributed to members of the North American Data General Users Group. Membership fees are $40 per person. A one-year subscription to *Focus* (12 issues) 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.

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Seattle scouting report

The spring board meeting of NADGUG leaders serves a two-fold purpose. There's the usual board meeting material: committee reports, budgets, and other NADGUG business. As much as I appreciate enforcing Robert's famous rules, there's another important aspect of the spring board meeting that I enjoy just as much—previewing the city and facilities of our annual conference.

To say that Seattle is an outstanding place to hold a conference is an understatement. I believe it is the most beautiful site ever chosen for a NADGUG conference. The well-appointed convention center has lush foliage draping the walls. The adjacent Freeway Park (built right over the freeway) is a place to enjoy the natural beauty of Seattle, and observe the work of local artists. There's a statue featuring a spinning profile of George Washington that you must see to appreciate.

The Seattle Sheraton and Towers, a short stroll away, is easily up to NADGUG standards. Not only is it a first-class hotel, but the personnel genuinely attempt to help guests enjoy their stay and the facility. The amenities included make you feel special. There are several nice hotels of various price ranges within walking distance of the convention center.

If you're thinking that as NADGUG president, my opinions may be less than objective, just read what other NADGUG board members had to say.

Chuck Goes, Eastern Vice Chair, RIG /SIG Committee: "I was very impressed with Seattle. It is obvious that much has been done to revitalize and improve the City Center area."

Steve Pounds, North Carolina Charlotte Area Users Group: "Seattle is one of the cleanest and most beautiful cities I've ever been to. There's so much to do in your spare time."

Bill Pearce, LA EDGE: "Seattle is a beautiful city—great food, wonderful people."

Calvin Durden, Audit Committee Chair: "Great facilities! People are friendly and the shops and pier are within walking distance. I'm looking forward to going back and being able to spend more time."

Frank Perry, NADGUG Vice President: "One of the most scenic cities I've been in."

Anonymous: "Rumor has it that the Seattle Sheraton has a perfect NADGUG volleyball tournament pool."

Steve Kern, Publications Committee Chair: "The Underground Tour is a stroll into a different time and place. You'll learn a lot about Seattle's colorful and shady past."

Jan Grossman, Conference Committee Chair: "Not only were the people helpful at the Seattle Sheraton, even the Seattle airport has friendly people willing to help a confused traveler. By the way, if you plan your trip in advance, you can get great fares to Seattle."

Space limits me from telling you more about the wonderful things in Seattle (I didn't even mention the great seafood!), but we will bring you more information in *Focus* as the time for the conference nears. Most important, we hope you visit Seattle and see for yourself at our annual conference, October 22-25. Δ

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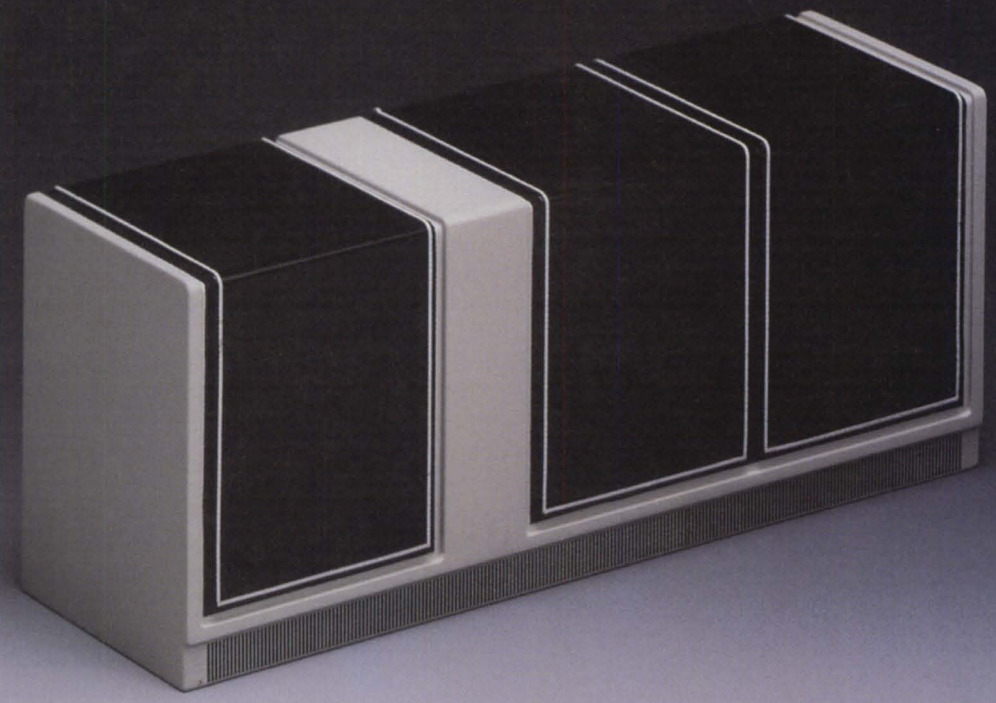

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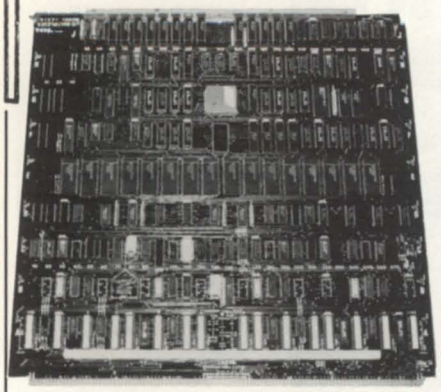

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To your health

Thank you for featuring Data General's healthcare success in your February issue. Your article appropriately noted the significant contributions that Meditech, Professional Healthcare Systems (PHS), and Health Data Sciences (HDS) have made to Data General's healthcare industry success. I would like to also note that HBO & Company, Compucare, and 3M Health Information Systems (Code 3 and Medlab), among others, have been and continue to be major factors in DG's healthcare marketing efforts.

As your article correctly points out, the availability of relational data base and fourth generation language products for Aviion systems substantially compresses application conversion timeframes, which results in drastic reductions in porting costs. These factors make Aviion the driving force in new application solutions recruitment. In addition, a number of our current software vendors are capitalizing on Aviion systems benefits.

At the same time, the continued competitiveness of DG's MV Family systems is critical to our healthcare success. The vast majority of our installed healthcare provider customers use MV systems. In addition, most of our current leading software suppliers provide quality MV-based solutions which effectively meet healthcare providers' information systems needs.

We place a very high value on our business relationships with these healthcare providers as well as with our MV-based VARs and ISVs. Healthcare Industry Marketing will continue to work with them and with DGC Eclipse Systems Marketing to ensure that their MV systems requirements are met.

Del Richmond
Healthcare Industry Manager
Data General Corp.

Blasted

DG provides a connectivity package called CEO Connect which incorporates a protocol known as Blast. We have become concerned by the number of U.K. users who have been calling us, as the U.K. distributors of Blast, after experiencing difficulties with CEO Connect.

We are always happy to try to sort out any problems, but would like to point out that although CEO Connect uses the Blast protocol, it in fact differs substantially from the standard shrink-wrapped product.

Our understanding of CEO Connect is that it is an internal DG mail package (like All-In-One) which allows users on a DG MV to send each other memos and schedule events. If two offices wish to connect their MVs by modem, then at the heart of the operation they will use a portion of the Blast file transfer protocol. However, this protocol is based upon an older revision of Blast than now available and does not include standard Blast handshaking and file I/O capability. The engineers of Communications Research Group, the U.S. manufacturer, were not involved in the adjustment of the Blast protocol to CEO Connect.

Standard Blast for DG machines now has many new features including data compression, Lotus-type interface, and enhanced scripting facilities. PC Blast includes full D200 and D410 terminal emulation as well as many others. Blast is compatible with *all* DG platforms.

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Seattle workshop yields software and support

The **RIG/SIG workshop**, held in Seattle, provided a useful forum for exchange of ideas between interest group leaders. Among the topics addressed were membership, recruitment and retention, RIG/SIG newsletters, membership software, and program planning. The structure of the RIG/SIG committee was also reviewed, along with benefits offered to RIGs and SIGs. What follows is a brief update of RIG/SIG benefits, and the results of the Seattle workshop.

The benefits: To assist your gatherings, NADGUG vice chairs are available to travel. Additional support is offered through the Round Up column. A list of new NADGUG members is distributed to RIGs and SIGs on a quarterly basis. The speakers' bureau is updated regularly. Meeting announcement cards are now available from NADGUG headquarters.

Steve Kern, chair of the NADGUG Publications Committee, spoke on membership recruitment and retention. He encouraged groups to take advantage of the speakers bureau, and to promote the one free conference registration available to each interest group. Contacting VARs and your local DG office for a list of users was another suggestion for expanding RIG membership. A membership drive conducted by telephone solicitation from such lists has proved invaluable in the past with other groups. Follow up is essential.

Retention efforts focused on development of stable leadership. Motivation is a key factor in the success of your group. Users must have a reason for attending. We were reminded that as a RIG or SIG, we retain not only a particular user, but the representation of his or her company, as well. It is important that each member views the assembly as one that truly responds to him or her. Seek to involve your members at each meeting. The extent of an individual's participation can determine his or her satisfaction with the group.

Steve suggested that interest groups actively seek out "hot" topics for discussion. It is helpful to survey the members for meeting topics, dates, places, etc. DG may be contacted for video taped presentations. And of course, the annual conference should be mentioned often, to encourage greater attendance.

Chuck Goes, NADGUG vice chair for the Eastern region, presented new membership software that is still "under construction." Upon completion, the membership software will be distributed to interested groups at no charge.

Greg Farman, publisher of *Focus*, provided numerous "leads" for producing a successful newsletter. A RIG/SIG newsletter can be the most visible vehicle for your organization. Round Up articles can feature activities of the interest groups, but a newsletter can target more of your membership, since affiliation with NADGUG is not required. One section might feature a "spotlight" on members.

Your local DG office can provide product announcements and information, or you can get the information from articles published in *DG News and Review*. The continuity of your newsletter is vital. Establish a title and a consistent look, and consider your editorial tone carefully. Implement a peer review process if possible, and send the final cut of each contribution back to originator for verification, prior to press.

Often a good idea will make a good story, but most important, stay on schedule. Missed deadlines are hard to make up. You could check into Pagemaker software or Wordperfect fonts to make your newsletter more attractive. Encourage participation or sponsorship by a local VAR and give them credit for their contribution. A suggested length is four pages.

Placing a member application in your RIG or SIG newsletter can increase your chances of signing up prospective members. Making copies available to your local DG office for new sales can also be an active selling technique for your group.

The suggestion of a **newsletter contest** was well received by meeting attendees. With details still to be worked out, recommended prizes include free conference registration, a modem, free NADGUG membership and/or professional help with developing a logo. If you have other ideas for a prize, let me know.

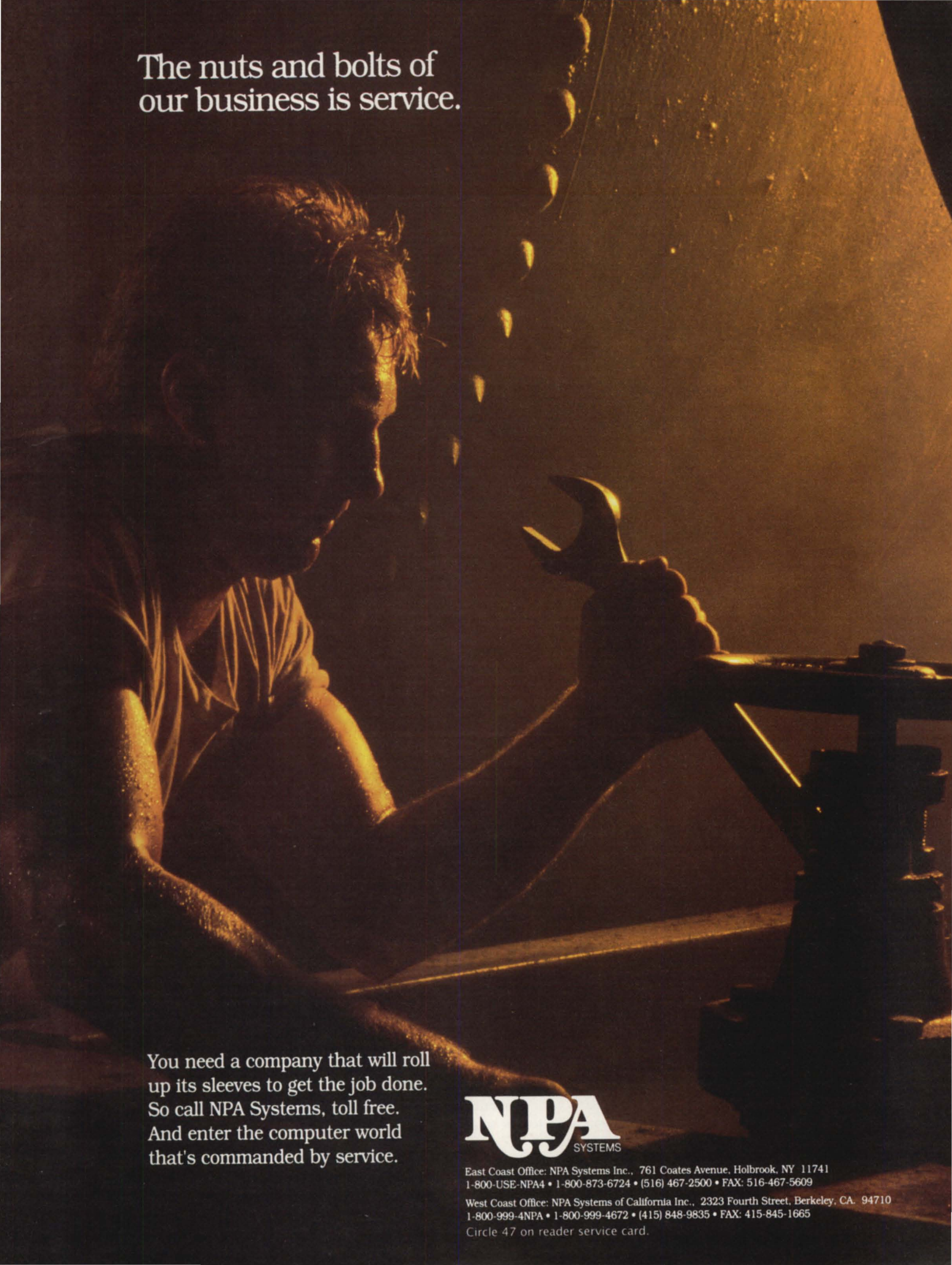
Meanwhile, NADGUG T-shirts are being offered to the interest groups as promotional material (while supplies last). If your group would like to receive a supply of shirts, please have an officer of your organization contact me.

Charlene Kirian, RIG/SIG committee chair, was unable to attend the Seattle workshop for personal reasons, but joins me in expressing sincere appreciation to **OASIS** President **Denise Sikorski,** and Chuck Goes, whose guidance assured a successful workshop. Thanks also to our other presenters, Steve Kern and Greg Farman, and to all those in attendance.

■

Members of the **Heart of Texas Data General Users Group** (HOTDUG) are gearing up for a meeting scheduled for May 24. All Central Texas users are encouraged to attend. **Jim Huggans** will give a presentation on CLI. Watch your mail for more information or contact Jim Huggans at 512/483-0130, or myself at the NADGUG office. 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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The heat's on

SYNOPSIS

Researchers race to establish scientific standards, while solar radiation exceeds known scales.

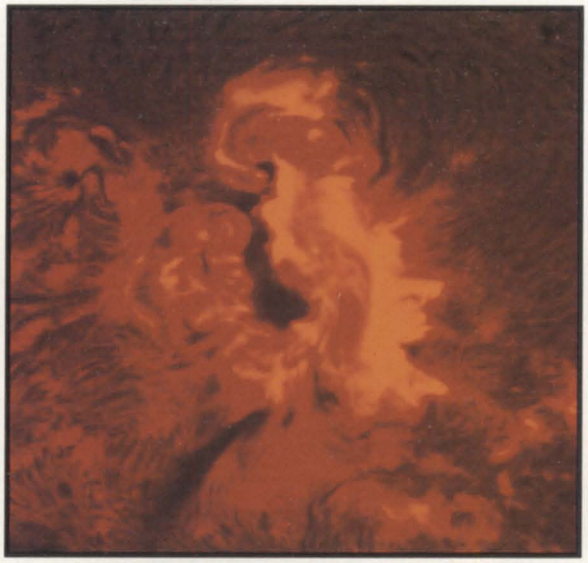

Photo courtesy SESC

by Seemee Ali
Focus staff

Last summer in California, automated garage doors opened and closed seemingly at will, while homeowners watched in amazement.

The poltergeist turned out to be the U.S. Navy, whose ship-to-shore communications had been disrupted by solar flares. In its search for working frequencies, the Navy hit upon the frequencies of garage door opener systems.

The solar flares that intruded on the Navy's radio system are less easily explained than the excitable garage doors. The flares originate from spots on the sun's surface that spew out ultraviolet and X-ray radiation at speeds of up to 2 million miles per hour.

On March 10, 1989, *Time* magazine reports, one particularly turbulent flare sent high energy protons speeding from the sun to the earth's atmosphere within an hour, piercing the earth's geomagnetic field and exposing high flying planes and orbiting satellites to alarming rates of radiation.

The Space Environment Services Center (SESC) in Boulder, Colorado, monitors these sorts of solar activities using a DG MV/10000 SX and Infocen 4GL relational data base software to compile information from varied sources—including satellites, ground base sensors, and tracking stations around the globe.

Operated jointly by the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Air Force, the SESC is attempting to create a new science. They blame increasing numbers of geomagnetic disturbances on a historic peak in the 11-year solar cycle, but the mechanisms responsible for the solar cycle itself are still a mystery.

"There are so few observations to go from," notes Jacob Dean Schroeder III, the system manager at SESC. Though scientists have known about the existence of sunspots since Galileo invented the telescope in the seventeenth century, the specifics about the spots are still relatively unknown. The SESC was created in the mid sixties to watch conditions outside the earth's atmosphere for the benefit of NASA's Apollo astronauts. At that time, scientists were aware that the sun affected conditions on earth, but didn't know the extent of these effects.

"People thought that all they needed to do was set up some solar telescopes and observe a solar flare, and then they'd say 'Oh, you're going to have this effect on earth'" recalled Gary Heckman, the chief of NOAA's Environmental Services Division. "In fact, quite a few of the things we observe in the sun don't materialize at the earth. And on the other hand, we see things at the earth that we don't see in the sun in advance."

Sunspots are still counted in the same way they were counted 300 years ago, Schroeder says: "You project an image of the sun onto a piece of paper, and count the spots." Digital telescopes can do it automatically now, he adds, but the premise is the same.

Heckman estimates that solar forecasting is about 10 years away from being an exact science. "What we need is a model, like the weather models or other models that are used in the environmental sciences now—where you can write all the equations in the physics, and put in conditions now, and let time vary. Then it tells you what's going to happen in five or ten years, or in one or two days."

The SESC now operates with a real-time data system, in which no information is more than 32 days old. Heckman longs for a system on a grander scale, a

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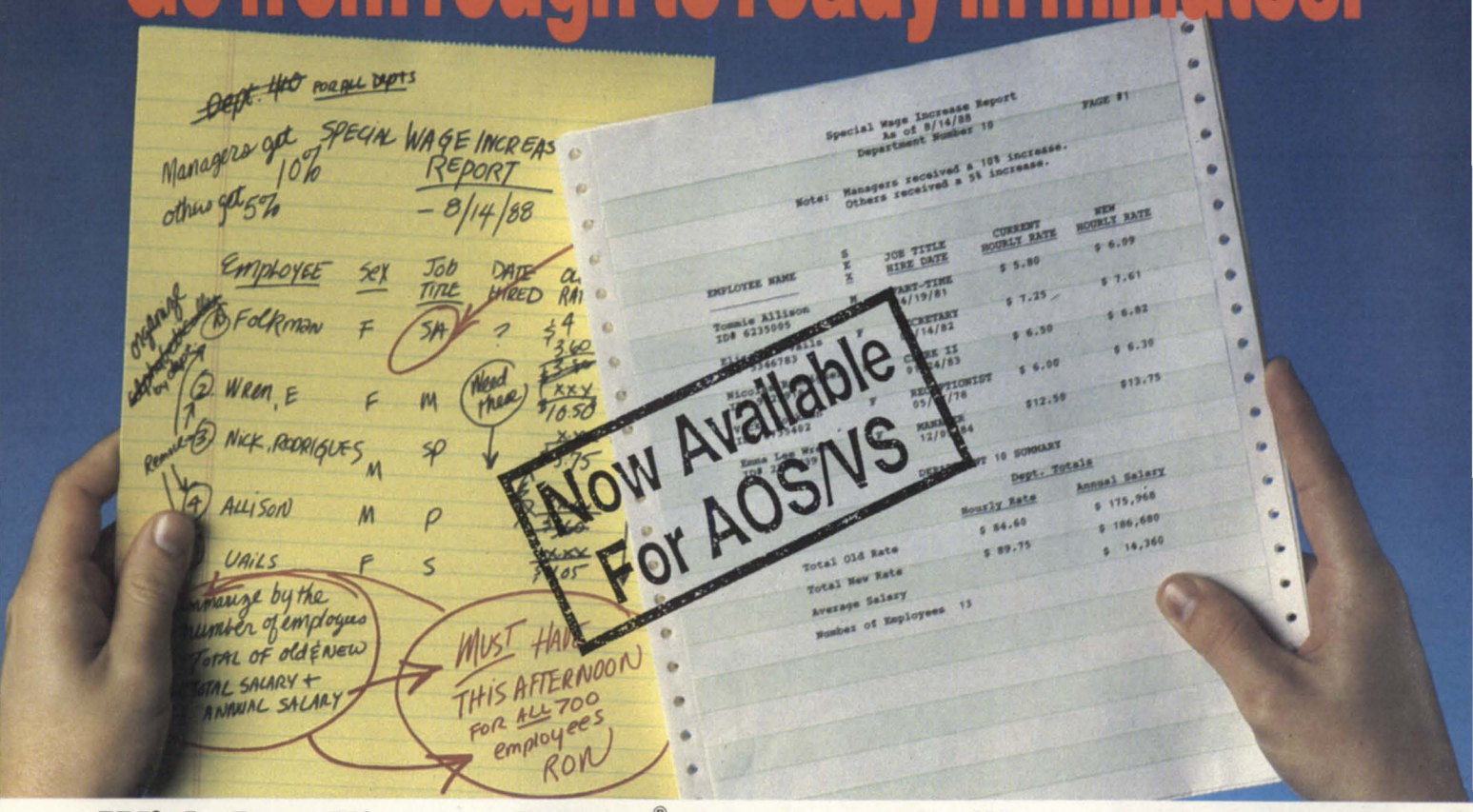

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system that can answer "what if" questions and recall previous conditions under a given set of circumstances. "What we're talking about constructing in our laboratory," he says, "is a long term data base, going back a whole solar cycle [11 years], at least."

The massive amounts of information collected by the SESC create other needs, as well, Heckman says. One avenue of technology he's looking into is large-scale parallel processing systems to help the center in its comparison of data. "Given this data base problem," he explains, "I suspect that we're going to be really looking around at what are the more intelligent or complicated ways you can pose questions for a data base."

For the moment, Heckman and Schroeder have their hands full monitoring the solar peak, and sending "geo-alerts" to client agencies such as the FAA, with the data at hand. The sun's activity during this solar cycle has exceeded any previous cycle in the SESC's experience.

The high levels of radiation coming from the sun are particularly worrisome to NASA, one of the center's largest clients. The last intense period of solar activity took place in the late 1950s, Heckman says, when "the space age was just beginning." Solar data was collected, but not to the extent required by modern calculations. Later solar cycles were less turbulent, so that "our whole space age experience has been in a relatively benign period."

Radiation received by spacecraft and satellites last year, however, was larger than any period before. "If that trend continues," Heckman says, "we're going to exceed the design base lines that have been used for radiation." Accurate forecasts of solar activity and its resultant radiation are becoming increasingly essential in planning NASA's future missions. The scheduled launch of a space telescope last month, for instance, was contingent on the SESC's prediction of few geo-magnetic disturbances.

To meet the information demands of the space age, researchers are busily inventing new formulae and methodologies with which to study the sun. One of these is called helioseismology, and involves listening to the solar gases (mostly hydrogen and helium) as they burble. "It's not far enough along to be used for prediction purposes or warning purposes yet," contends Heckman, so the SESC, which functions primarily as a forecasting center, cannot yet use the fruit of this helioseisomologic research.

For the moment, however, the center's "number one problem," is benign in comparison to those presented by NASA's long-term needs and the elusive nature of solar research. Heckman says his biggest challenge is corporate memory—or the lack thereof—among his clientele, which includes many private companies as well as federal agencies. The 11-year span between solar "peaks" means that many professionals who might be affected by the sun's activity have forgotten about its effects. "When a new cycle becomes active, and the disturbances occur," he says, "people don't really know where they come from." Δ

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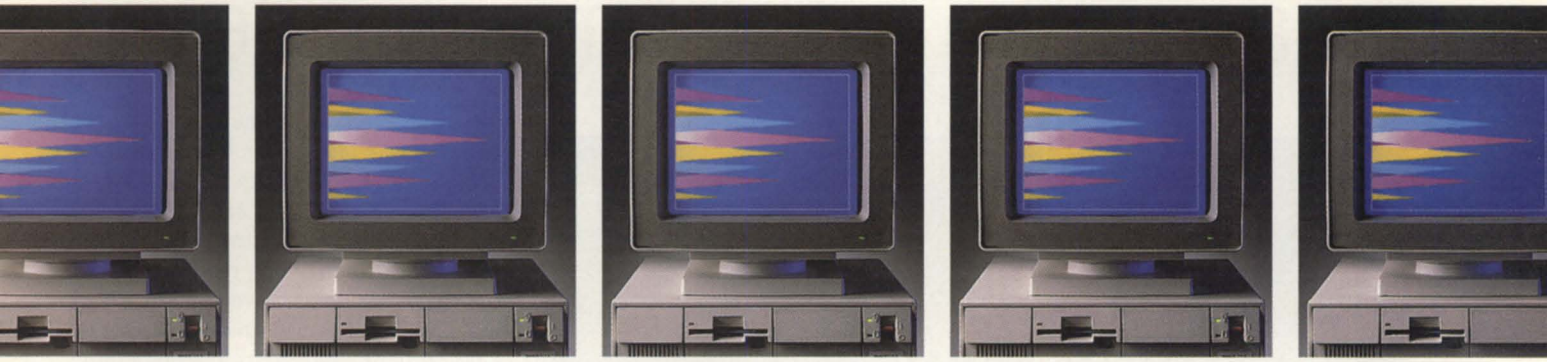
TODAY'S TOP NETWORK NEWS.



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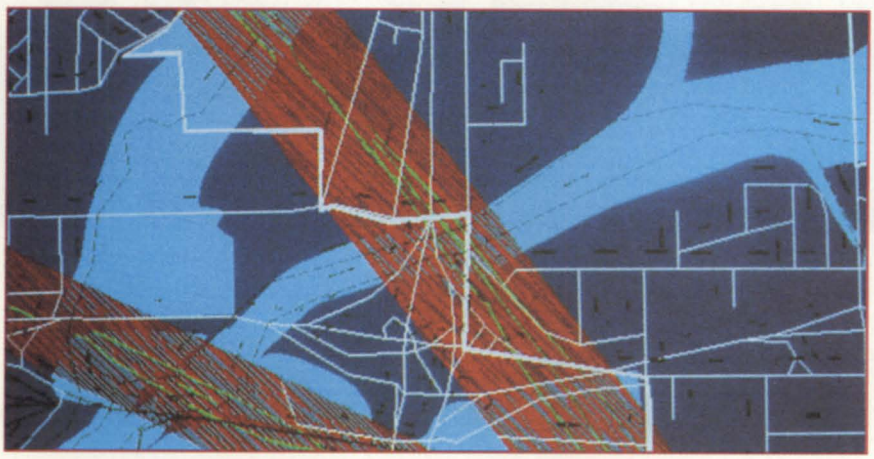
Data capture in the American desert



On-screen representation of San Bernadino County

SYNOPSIS

With automated data in a specialized geographic information system (GIS), San Bernadino County collects, analyzes, and maps information on land usage, crime statistics, and traffic patterns.

by Dan Lewis
Special to Focus

San Bernadino County is the largest county in the contiguous United States. Because of its size, and because its expansive desert region is susceptible to sudden and violent rainstorms that can turn arid land into pools of water, transportation and flood control are among the county's chief concerns. To manage these concerns, the southern California county depends on a geographic information system (GIS) called ARC/INFO from Environmental Systems Research Institute (ESRI).

GIS allows users to combine various types of information into one graphic display. For instance, a land planner working with a GIS can simultaneously view topographic data, traffic patterns, zoning, population densities, and many other diverse types of information.

San Bernadino County's geographic information management system, or GIMS, has evolved over the years in response to rapid growth. GIMS Project Manager Craig Gooch says that rather than following a pre-defined design, "our work was driven by the requirements of the particular projects we were involved in." Gradually, San Bernadino County's GIMS program moved from a single-purpose GIS to a multi-user environment, and from GIS software developed in-house to a turnkey system using ARC/INFO and its various modules.

The county began with its own proprietary GIS on a DG Eclipse minicomputer with four terminals in 1984. In 1986, the system was upgraded to DG's 32-bit, AOS/VS-based MV/20000 running ARC/INFO. Today, the configuration includes the MV/20000, three DS 7540 engineering workstations, two Calcomp pen plotters, monochrome and color electrostatic plotters, and Tektronix 4107, 4111, 4207, and 4208 terminals, which are used for data input and display, as well as a number of workstations to help distribute the computers and data base management within many of the county's departments.

An MV/10000 computer, DS 7420 engineering workstation, and another pen plotter also are connected to the network and used for engineering design and office automation functions. The Data General network is interconnected to the county IBM mainframe, providing access to tabular data bases and applications that include the county assessor's property information management system.

Initially, the data to support the county's GIS needs consisted of parcels, single line street networks, street names, transportation circulation information, environmental hazards, noise hazard areas, and zoning. By 1983, this set of data comprised roughly 30 percent coverage for the county. As the system developed, and new data sets and applications were generated, other areas of the San Ber-

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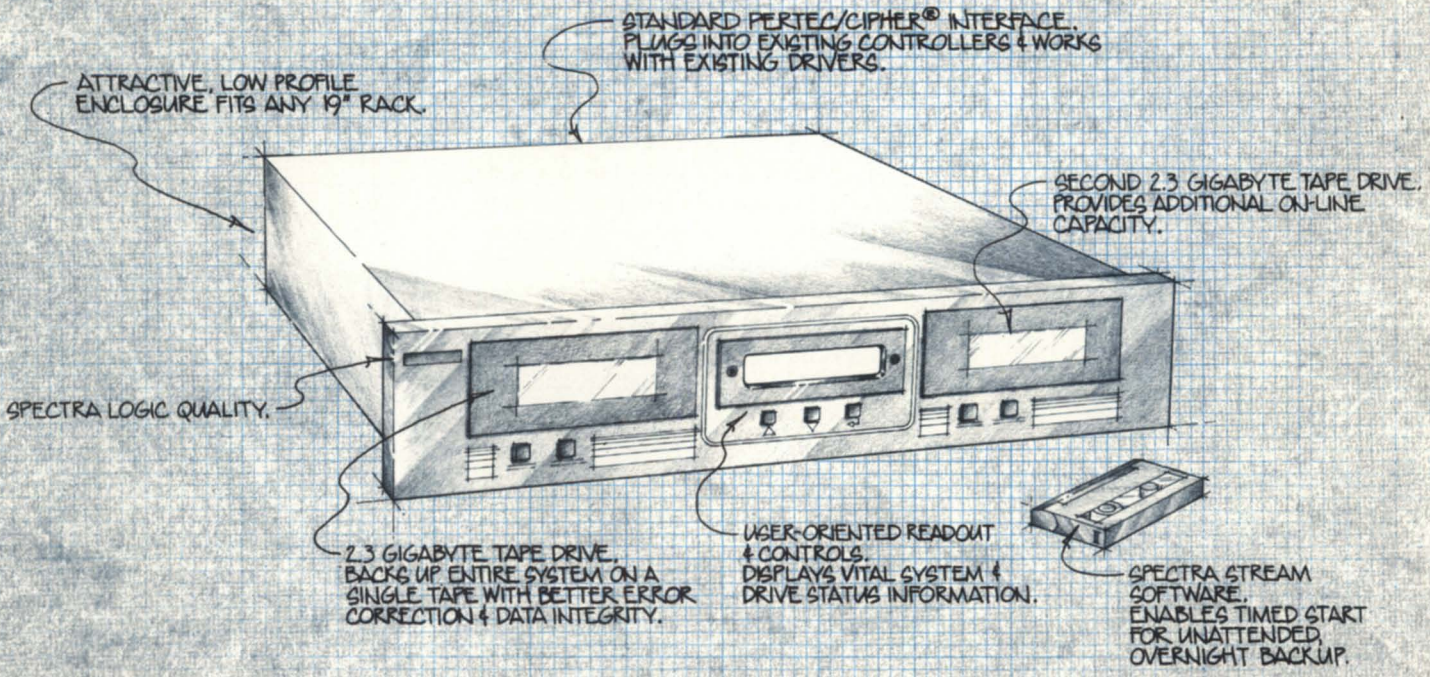

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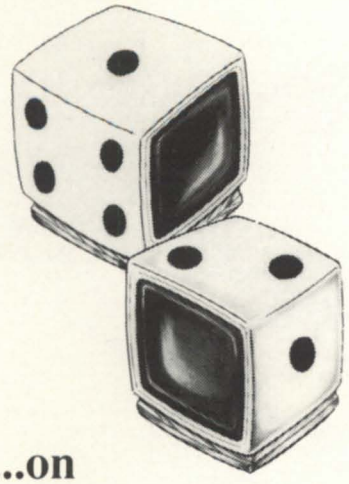

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nadino County government began to sit up and take notice.

The county's GIMS now centers on the concept of a centralized automated geographic data base consisting of cartographic features explicitly related to descriptive attributes or tabular data. This central data base is accessible to a wide variety of people within different county departments, as well as incorporated cities, utility companies, and the private sector for diverse geographic processing activities. With automated data, San Bernadino County's various departments can use the GIS to collect, analyze, and map out information about everything from land use and land parcel ownership to crime statistics and hazardous waste generators.

Specialized GIS applications

The two main components of the county's GIS data base are the parcel and the street centerline network base map components, with the County Assessor's Office responsible for the maintenance of the parcel layer, once the information has been input.

The street centerline network represents the physical alignment of existing roads in the county. Data base attributes associated with the roads—such as addresses, street names, cities, and zip codes—are used by the sheriff to trigger computer-aided dispatch systems, mapping, and address matching.

"In one case we had the Environmental Health Department provide us with the addresses of hazardous waste generators within the county," explained Brent Rolf, a geoprocessing technician on the GIMS team at the county's Environmental Public Works Agency. "We matched those addresses to our street network file and the GIS produced a map showing the locations of hazardous waste generators in the area. Once this information is geocoded, an overlay analysis can be performed, showing which cities and analysis districts they fall into."

Other users of the centralized GIS technology include the county assessor's office, regional parks, the county school district, the council of governments, environmental health services, water districts, and the fire warden. Underground well water data are also compiled using the GIMS data base. These data are used to identify and analyze the relationships between reports of tainted water and possible chemical spills and aquifer impacts.

Cooperative data capture efforts

Wallace Raynor, a GIS team leader in the systems development division of the county's Office of Management Services, says that San Bernadino County (population 1.3 million) is no small mass to reckon with. The assessor's office, for example, is responsible for maintaining records of about 655,000 parcels residing on 20,000 square miles of land.

To utilize the full capabilities of the GIS, 2,500 square miles of spatial data needs to be input to satisfy 90 percent of the county's requirements—an enormous data capture effort.

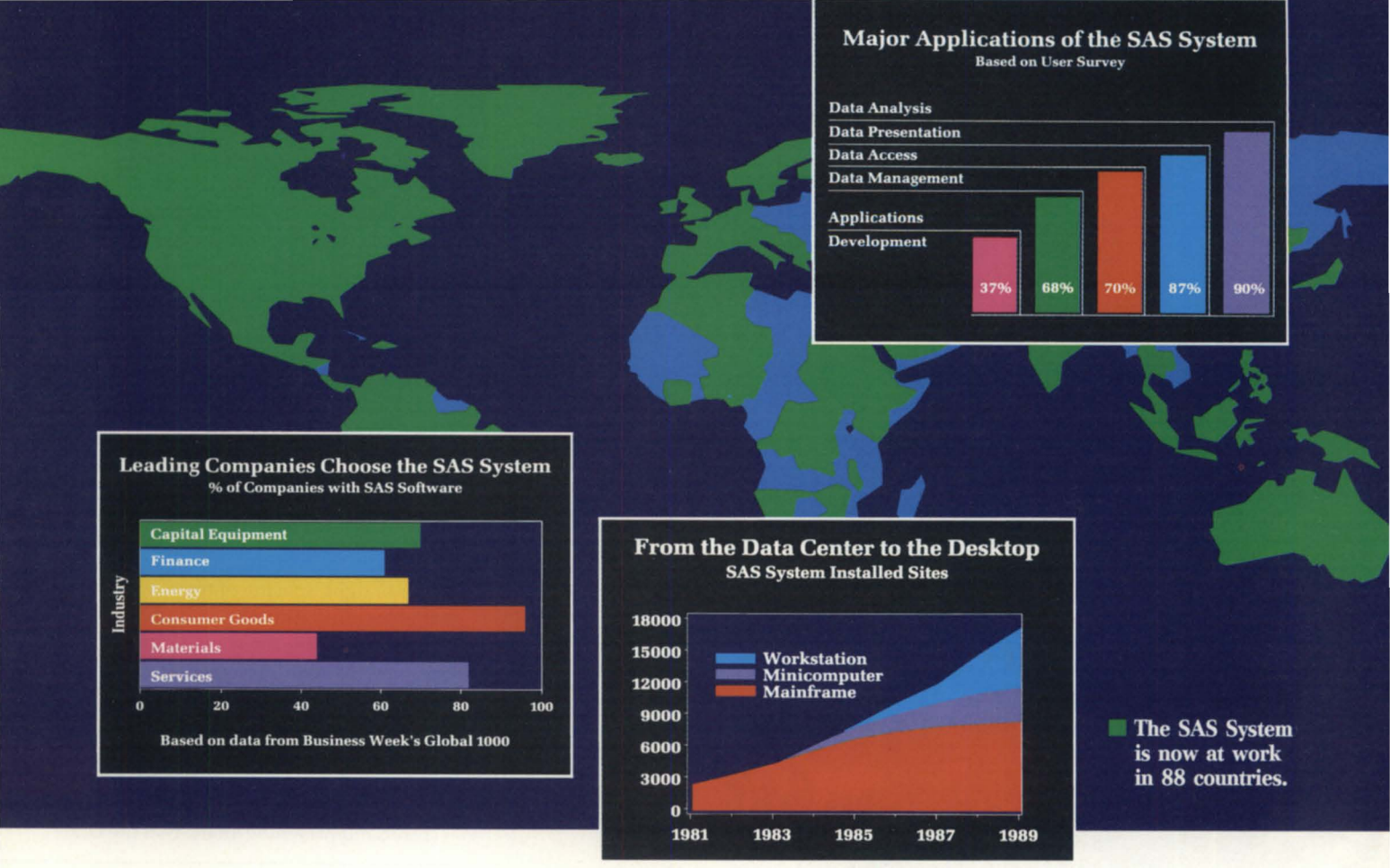
According to Raynor, 13 San Bernadino County departments are currently collaborating on the project. "Data capture is the hardest part because it needs to be done correctly," he says. Positional accuracy requirements are most stringent for the county assessor's office at a strict +/- two feet.

Neighboring Riverside, Los Angeles, and Orange Counties also use ARC/INFO, so information and resources have the potential of being shared among the counties.

"We're making a cooperative effort so we can pass the data back and forth between the different governmental entities. This is a big job, and what I see developing through cooperative efforts is a regional geographic information system," Raynor notes.

The GIMS development plan includes the development of additional applications and data. The cadastral base will be extended to include data for the entire county. Parcel data content and structure are also being enhanced, to update the original parcel data developed from 1977-83. Topological structuring will be added to the graphic information, and a number of new elements are planned, including street names, tax rate areas, lot lines, centerlines, subdivision references, right of way, easements, and dimensions for lines and right of ways. Δ

Dan Lewis is a writer and editor for Environmental Systems Research Institute, Inc., a DG value-added reseller. He may be reached at 380 New York St., Redlands, CA 92373; 714/793-2853.



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Building a better tree

by Lucy Saunders
Special to Focus

SYNOPSIS

The US Forest Service uses a statistical package from Systat to analyze the variables that affect tree growth.

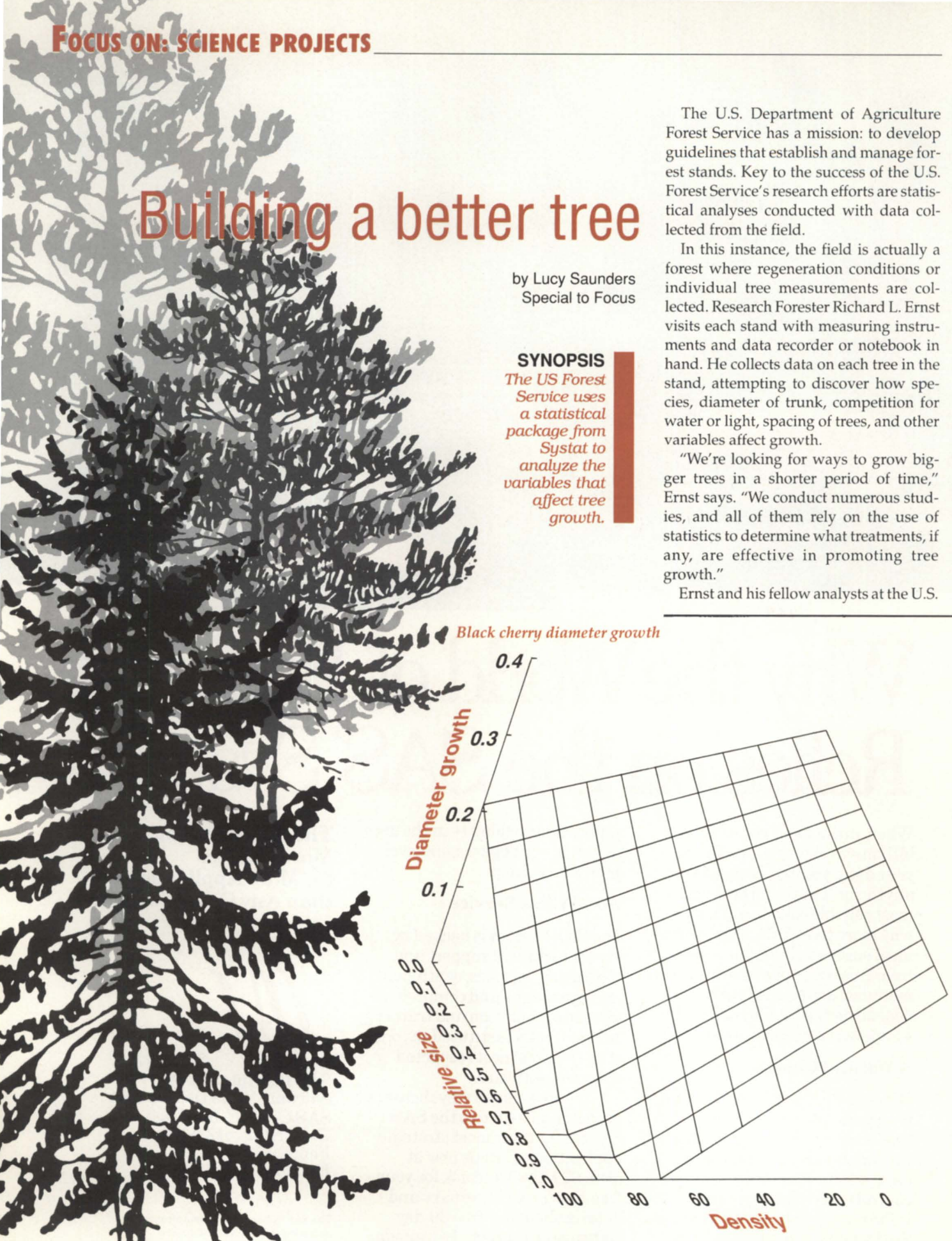
The U.S. Department of Agriculture Forest Service has a mission: to develop guidelines that establish and manage forest stands. Key to the success of the U.S. Forest Service's research efforts are statistical analyses conducted with data collected from the field.

In this instance, the field is actually a forest where regeneration conditions or individual tree measurements are collected. Research Forester Richard L. Ernst visits each stand with measuring instruments and data recorder or notebook in hand. He collects data on each tree in the stand, attempting to discover how species, diameter of trunk, competition for water or light, spacing of trees, and other variables affect growth.

"We're looking for ways to grow bigger trees in a shorter period of time," Ernst says. "We conduct numerous studies, and all of them rely on the use of statistics to determine what treatments, if any, are effective in promoting tree growth."

Ernst and his fellow analysts at the U.S.

Black cherry diameter growth



Forest Service's Northeastern Forest Experimentation Station have collected data over more than 20 years. A long-term user of Data General systems, the Forest Service has more than 900 Data General CPUs throughout the country networked together from the Burlington, Vermont Experiment Station.

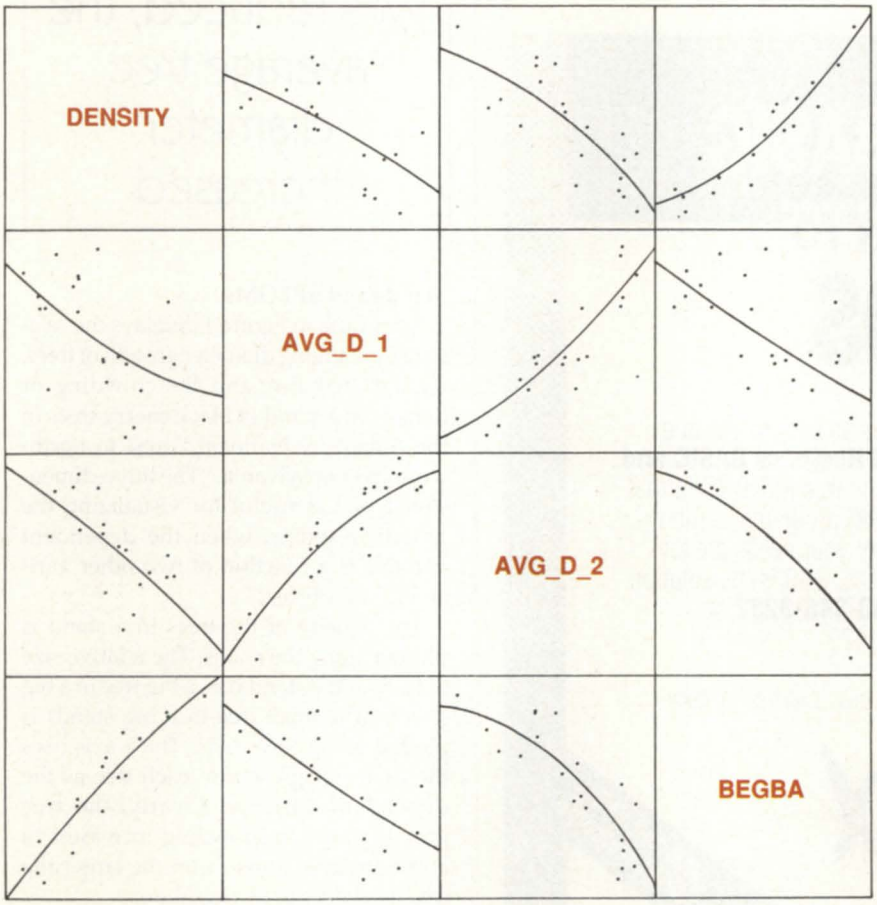
The Data General Eclipse series was chosen for its computational and data handling speed. With large data sets to analyze, the Forest Service needs statistical analysis and graphics software that runs on Data General systems, and is powerful enough to handle many variables. Ernst chose Systat, a comprehensive statistical analysis software package, and its companion Sygraph, to look at relationships among variables such as tree spacing and trunk diameter.

Systat is available on Macintosh and IBM PC-compatible personal computers. Both versions have been rated highly by the computer trade press, so many researchers were familiar with the software. Thus, it took little training to enable Forest Service researchers to use it on the Data General.

The Data General version of Systat is identical to the PC version. The program runs in the interactive mode with the user keying in commands as the analysis proceeds. Like the PC version, the Data General version allows command file execution. However, Systat on the Data General also permits batch submission of analyses. Several command lines can be prepared and submitted to run concurrently in batch mode. The program takes advantage of the multi-tasking virtual operating system of the DG. This enables the user to prepare additional command files, or move on to other projects while Systat is performing its statistical analyses.

Graphics on the Data General are handled with standard GKS drivers. These are automatically loaded and available for use without any programming by the user. Graphics output can be sent to the screen, laser printers, plotters, or written as metafiles. The metafiles can be

Stand variable correlations



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imported into DG's CEO drawing board for editing. Alternately, they can be exported to an IBM-compatible personal computer and then imported into many different PC drawing and desktop publishing software packages that support metafiles.

The Forest Service is committed to a corporate data structure that supports information sharing. It is extremely important that multiple users have access to research data. "Having Systat available on our networked DG system integrates powerful statistical analysis and graphics in the process," says Ernst. "The whole job of taking raw data from raw numbers to publication-quality graphics can be done entirely on the DG."

> One side effect of the treatment was evident: as the density was reduced, the average tree diameter increased

Stands and SPLOMs

The graph in Figure 1 displays the relationships among diameter growth of trees, relative tree size, and the crowding or density of a stand of black cherry trees in the Allegheny National Forest in northwestern Pennsylvania. "The three-dimensional plot is useful for visualizing the growth response when the dependent variable is a function of two other variables," says Ernst.

The density of the trees in a stand is plotted along the x-axis. The relative size of trees in the stand (i.e., a big tree in a big stand, or a small tree in a big stand) is plotted along the y-axis. The z-axis uses the diameter growth of each tree as the dependent variable. Clearly, the tree growth slows as crowding increases; in addition, trees grow faster the larger the tree is relative to its neighbors.

Figure 2 is a SPLOM, or scatterplot matrix in which Sygraph plots every pair of a number of variables in a single display. SPLOMS are useful for studying the relationships among a handful of variables at once. They could be considered as a visual correlation matrix. When looking at a SPLOM, read the column label to interpret the x-axis and the row label to interpret the y-axis. The rows and columns of plots account for the patchwork quilt look of a large SPLOM.

Many of the stand level variables are correlated; the scatterplot matrix makes it easy to see these correlations. The first variable, density, refers to the crowding in the stand. The second variable, AVG_D_1, represents the average diameter of trees in the stand at the start of the measurement study (i.e., the average size). AVG_D_2 is the variable name for the average diameter that is weighted by the size of the trees in the stand. The fourth variable, BEGBA, represents the sum of the cross-sectional areas of all the trees (total basal area) in the stand.

Ernst found that there is a high positive correlation between the two measures of crowding, density and BEGBA. Likewise, there is a high positive correlation between the two average stand diameters; the relationship is also quadratic. The treatment in the stand was to reduce the density. One side effect of the treatment was evident: as the density was reduced, the average tree diameter increased. The plot matrix enables users to see interrelationships between the variables.

"What's important for me is to be able to plot variables using exploratory data analysis techniques," Ernst says. "Sygraph provides the EDA procedures I need to explore the relationships among different variables."

The study cited above is just one of many studies conducted by the U.S. Forest Service Experiment Stations. As Ernst points out, "All of our studies rely on the use of statistics to determine which treatments, if any, are effective in promoting tree establishment and growth. So, for the analysis phase, a statistical software package is indispensable." Δ

Lucy Saunders is a writer for Systat, Inc., 1800 Sherman Av., Evanston, IL 60201; 708 /864-5670.

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Credit where (and when) it's due

SYNOPSIS

Responding to customer criticism, Data General revamped its invoicing system. Timely, understandable, correct, and useful bills are the goals of this recent overhaul.

by Robin Perry
Focus staff

A few issues ago, *Focus* asked readers to tell us how they rated the quality of Data General products and services. Not surprisingly, the results of our survey showed that Data General customers think highly of the company's hardware and software products. The service side, unfortunately, is not as evenly praised. In particular, Data General's invoicing systems consistently drew criticism.

While we'd like to credit the power of the press for bringing about change, most likely it was the dual pressures of customer complaints and an economic squeeze that forced Data General to take better care of its current customer base. Whatever the cause, during the first part of 1990, Data General made several changes to its maintenance contract invoicing system (for software, hardware, and extended warranties), all designed to make bills easier to understand, timely, and accurate. In the following interview, Craig Miller, DG's manager of U.S. contracts and collections, describes the ongoing changes, and their effects on your bills.

FOCUS: I'm going to list the major complaints made by our readers, and ask you to tell us how the new invoicing system addresses them:

Bills are hard to understand. They are not itemized and no explanations are given. It is difficult to track billing.

Miller: That is one of the changes that we made with the new application. We went to a transaction-oriented invoice, effective in January. Previous to that, there was lots of irrelevant information that showed up on the invoice. This change allowed us to eliminate all of that irrelevant information and just put in information that was specific to the transaction.

Also included in that change was something called automatic credit, which had also been a source of complaints and frustration previously, in that customers did not realize their credits on time. We had basically a 30-60 day delay for them to recognize a credit. With this change, credits are now reflected on invoices as soon as we process them.

FOCUS: Will you also include more information on the invoices, like the equipment serial numbers?

Miller: We have the capability of including as much detail as the customer wants. There are basically six invoice options that are available, including all the way down to every model and every serial [number].

FOCUS: It is difficult to get a change or correction made to a bill. Users don't know who to call to report billing errors. What about the suggestion to assign a specific representative to each account?

Miller: That's a surprise because we have a 1-800 number right on the invoice. We have a group of six telephone agents that are in place to handle those questions that come in over that 1-800 line. We have one (line) for Massachusetts and one for outside of Massachusetts.

FOCUS: Are these six agents responsible for all the accounts?

Miller: These six agents are a front-end telephone group. They try to answer a customer's question, and if they cannot, due to the complexity of the question, they pass them on to an administrator who does the daily monitoring of that specific customer, and then that person will get back to them. We get 500 to 600 phone calls a month. So we do have a fair amount of activity.

FOCUS: But every time a person calls, they might get a different person on the end of the line. I think that the comment was, "could we have a specific representative to handle my account, so when I have a problem, I can call and get someone who is already familiar with my account?"

Miller: Let me give you my comment on that: one of the reasons that we put the front-end telephone process in place was because the administrators, of which we have 20, were so interrupted that they could not get their jobs done. It's a high-volume processing kind of job and there's a lot of work that they have to do in a day, and in a week, and in a month.

What we found was that their phones were ringing so much, that the fact that they were taking the time to answer them was taking away from the work they had to do. We put this front-end telephone process in place to try to reduce the amount of interruptions that these people were experiencing, and that process has worked very well for us.

But there certainly can be situations where we can provide an administrator's name to a customer, should they have specific requirements. We just don't want to do it on a regular basis, because it sort of takes away from their job. Basically, 25,000 contracts are split between 20 people, so the volumes are pretty high.

FOCUS: Communication between departments at Data General is a perceived problem. Users have trouble getting bills consolidated. They get multiple invoices from different departments.

Miller: We are trying to consolidate the order entry system as much as possible within the corporation, and I think that might help address that issue. We began a synergy project in August of 1989 to integrate the sales administration group and the contracts administration group. We put collections in there as well. So, effective in August 1989, we consolidated almost all of the order entry administrative functions in the corporation into one group. We're going through a process right now of combining people's jobs so

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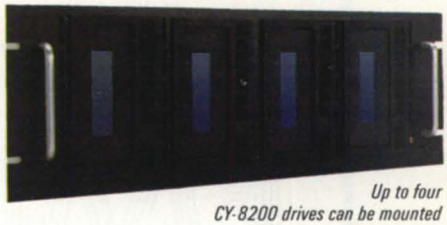

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that there is only one contact for the customer, and we're also going through the process of combining order entry systems, so we look like we're issuing invoices from one department. That's really in the beginning stages right now. We're working our way through that issue.

FOCUS: How long do you think it will take to get this system established?

Miller: That's a tough one. I know that basically there are three major ordering points right now. That would be the service side, the equipment side, and the DG Direct side, which is separate. The DG Direct side and the equipment side have consolidated. The service side is in the process of doing that, but I would say that is probably a good 12 months away. That's a large process that's not really very far along. But we definitely have it in our plans.

FOCUS: Billing timeliness and accuracy are the other issues that were mentioned.

Miller: We have been working very hard over the last year to improve the accuracy and timeliness of the invoices. We think we've done some very good things as far as that's concerned. The timeliness of the invoices should be a lot better than what customers have experienced over the last couple of years. Also, the accuracy of the invoices should be a lot better as a result of the on-going changes in the last 12 to 18 months.

FOCUS: What kind of internal changes did you make to bring that about this improvement?

Miller: We made software changes to some of the reporting systems that were causing delays as far as the timeliness issue was concerned, and also causing delays as far as accuracy. The name of that project was "Focus on: billing." We implemented that over a stretch of roughly 12 months (late '88 and early '89). We achieved some significant results. Right now we have an average [turnaround] time of about 60 days on the contract side. We have an average time of around 18 days on the time and materials side, which is pretty good compared to what we had before, which was around 120 days or so.

The accuracy piece has been substantially focused on using the software changes, and a number of field inventory programs to try to get customers' inventory better in sync with what our data base has. That's been on-going for the last year as well.

FOCUS: What other changes has Data General made to its billing system?

Miller: I think that really covers them. The questions that you asked are really the issues that I've heard for quite a long time. Unfortunately, I think there's a lot of negativism in the customers' minds for problems that have historically been there. It's tough to change that, but I think that the changes we talked about will be the initial step to get us over that hump. Δ

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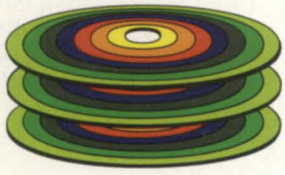

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Don't Panic!

by Tom Gutnick
Special to Focus

SYNOPSIS

With dynamic bad block remapping, AOS/VS II's high availability provisions take AOS/VS disk-mirroring capabilities a step further.

Overshadowed in the hoopla over the AOS/VS II new file system were some seemingly insignificant features that actually turn out to be of great importance. Despite enormous strides over the years in increasing the reliability of disk drives, occasional disk errors still occur. What happens when an error occurs is always a concern.

As part of the high availability strategy underlying AOS/VS II, dynamic bad block remapping strengthens the recovery capabilities in case of a disk error, and even eliminates some potential system failures.

Being electromechanical devices, disk drives are more likely to encounter occasional failures than nearly any other component of a computer system. Disk errors can be caused by problems with the disk drive itself, the controller, or the I/O channel (IOC), but the end result from a software standpoint is the same. The basic issue is what the system does if it tries to read data but can't.

Two classes of disk errors can occur. Whenever AOS/VS, or AOS/VS II, detects an unsuccessful I/O operation, it retries the operation. If the operation succeeds, the error is designated "soft," that is, recoverable, and is reported to the system console and to the Error_Log. Soft errors are transparent to application programs.

The system will normally retry the operation up to 15 times before giving up. If the system is unable to get a successful completion, even after retries, the error is designated "hard" (unrecoverable), and logged accordingly to the master console and the Error_Log. If an I/O operation is unsuccessful, the application will take the error return from the I/O request. What happens next depends on how the application was coded, but the most frequent outcome is that the program bombs out with a message of "Physical Unit Failure." If the disk request was made by AOS/VS itself, it's

See Panic, page 28

Performance comparison pitfalls

SYNOPSIS

To make valid comparisons between AOS/VS Classic and AOS/VS II, you must look not only at the data that is displayed, but also at the way it is gathered. In other words, what do you do with a used tick?

by John R. Gilgis
Special to Focus

There lately have been some invalid performance comparisons of AOS/VS and AOS/VS II. On the surface, comparisons between VS Classic and VS II appear to be valid, but because of internal differences between the two operating systems, they are not. This article discusses the technical reasons why portions of the commonly used comparisons are invalid, specifically, "system call times in ticks," and "percent system time."

System call times in ticks

In both VS Classic and VS II, the total programmable interval timer (PIT) ticks

See Ticks, page 30

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Panic, continued from page 26

the operating system that will bomb out, probably with a panic code in the range of 2001 to 2006.

(When device errors are logged, along with status information, the log record includes the address of the block. This information can be used by the system manager or the field engineer to remove that block from use. Because disks are always expected to have some bad sectors, the disk is formatted with a number of spare sectors. Remapping is the process of redirecting the system from a bad spot on the disk to a spare sector.)

Handling of soft errors is identical under AOS/VS and AOS/VS II. Since soft errors are transparent already, no difference is warranted. It is in the area of hard errors that AOS/VS II provides greater recoverability.

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How it works under AOS/VS

Under AOS/VS, a hard error causes the I/O request to take the error return (except when doing disk mirroring). In most cases, the application program will stop running with the message "Physical Unit Failure." If the I/O request was made by the operating system rather than an application, the system will panic.

When a hard error occurs on a write request, there is also a good chance that the file was corrupted. (The program tried to write out something, and it never got written. The file now has an empty spot or a spot with incorrect data.) It is up to the application or the user to ascertain what corruption may have occurred and how best to recover.

One extra little wrinkle occurs if hardware disk mirroring is in use. When a write request fails, the mirror will be broken, and the disk that was successfully written to will be the preferred image. The error is reported to the master console (and Error_Log), but is transparent to the application. However, before the disks can be resynchronized to resume mirroring, it is up to the system manager to run the partial format option of the disk formatter (DFMTR) against both images to update the bad block table. Obviously, this requires releasing the LDU first, which may be disruptive to operations.

If an error occurs while reading from a mirrored disk, as long as the system is able to read successfully from the other image, the read request is successful, the mirror is maintained, and the user is unaware that anything happened. The system manager should still take action, when convenient, to remap the bad block.

In anticipation of soft errors turning hard, you can use the partial format option of DFMTR to manually update the bad block table, and DFMTR will remap those blocks. (This is why it behooves the system manager to check the error log on a regular basis—at least weekly, and preferably daily.) If DFMTR is unsuccessful in remapping a bad block (whether through manual updating of the bad block or through read-only surface analysis), your file may again be corrupt, and you will need to run FIXUP. (Depending on your application, you may also need to run IVERIFY or an-

other recovery utility as well.)

How it works under AOS/VS II

Under AOS/VS II, soft errors are handled in exactly the same way—completely transparent to the application. The big difference is that AOS/VS II can remap bad blocks on the fly if hard errors occur.

If a hard error occurs on a write request, the bad block will be remapped automatically (assuming that the disk's bad block remap area isn't already used up—but I've never seen that happen), and the data written out to the remapped location. Thus, no data loss occurs, and the error is transparent to the application.

On a mirrored write, the bad block will also be automatically remapped. (If it's hardware mirroring, the same block will be remapped on both drives.) This is transparent to the application. On a mirrored read, as long as the system can read from the other image (or from either of the other images, in the case of a three-way mirror), the read will be successful. The bad block will be remapped automatically, using the data read from the good copy. Again, if it's hardware mirroring, remap the same block on both disks.

Bad blocks will not cause the mirror to be broken. The only time the mirror will be broken is if the system is unable to communicate with a drive—usually because of a head crash, controller failure, etc.

On a read request to an unmirrored disk, the hard error will be returned to the user, as with AOS/VS, and the program will probably abort. (Again, if it's a system request, the system can panic.) But the system will remember that the block was bad (by marking it on the disk), and if it ever does a subsequent successful read of the block, it will remap the block. If a write is attempted to the block before it remaps the block, it can—and does—remap it without attempting to write to the bad block.

However, the system cannot remap bad blocks discovered on a read until it has the data for them. This means that subsequent read requests for that block, whether from the same user or other users, will also fail, unless the problem was transient—not very likely. The system manager should use the Disk Jockey (DJ) utility to remove the block from service, and restore the file from backup.

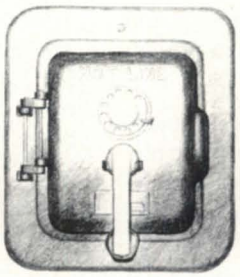
You can use DJ to add a block to the bad block table, but no copying of data is done. Since this could cause file corruption, it may be better to wait for a hard error to cause dynamic remapping.

Notwithstanding the fact that the dynamic remapping capabilities of AOS/VS II provide greatly strengthened data integrity, it is still imperative that proper file back-up procedures be followed on any system. Although AOS/VS II should allow a system manager to sleep better at nights, there is still no substitute for paranoia where your information assets are concerned!

Hardware note

The R.A.M.S. disks ("Shadow" 500 MB and "Excalibur" 1200 MB) remap soft errors without disrupting either the system or the application. Any disk error (header check or ECC) will be remapped automatically by the controller on the

IN CASE OF EMERGENCY



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second occurrence. The remap will succeed if data can be recovered (i.e., a soft error). If the data cannot be read, then no remap will take place. This should cause sectors that are going bad to be remapped before a hard error occurs.

This remapping is superior to remapping done by the operating system. Because the sector is relocated on the same cylinder, no performance penalty is paid when the sector is read again. In addition, hardware remapping is totally transparent to the operating system. This feature is available on both Eclipse-bus and MRC versions of the R.A.M.S. controller.

Summary

Using hardware disk mirroring under AOS/VS is a good first step in implementing a high availability strategy. AOS/VS II adds dynamic bad block remapping to reduce the dangers of file corruption and system failures. The result is even greater reliability and data integrity. And AOS/VS II, used in conjunction with hardware or software disk mirroring and R.A.M.S. disk drives, provides the highest availability of data. Δ

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Ticks, continued from page 26

for each system call since the system was booted can be accumulated. This is done by setting the 16-bit variable, SCTIM, to non-zero in the AOS/VS system file. The accumulation for each system call can then be viewed using the AOS/VS Monitor program.

My main point is that the PIT ticks accumulated by any system call that uses the file system cannot be compared between the two operating systems, since the internal tick allocation schemes changed. Affected system calls could be as obvious as a ?RDB or as obscure as a ?ISEND when the message is spooled to the disk. There is no change in the *method* of accumulating the ticks. Although the total number will probably change between the two revisions, the difference is that they are deposited into different "buckets."

For system calls that use the file system, the ticks used are accumulated in three sections—system call, file system, and disk driver processing. For our discussion, only the first two are meaningful.

In VS Classic, only the "system call processing" is counted in the respective system call ticks bucket. The "file system processing" ticks are accumulated by a system task called the "Disk Manager." The total of these ticks is visible using MP_DISPLAY, but cannot be sub-divided on a call-by-call, or process-by-process basis. For many file system related calls, the "Disk Manager" accumulates the vast majority of the PIT ticks.

In VS II, because of design differences, the file system code executes on the original system call control block. This causes the "system call" and "file system" processing ticks to be combined in their respective system call ticks bucket.

If MP_DISPLAY is executed on a VS II system, the total "Disk Manager" ticks will always show as zero. This is simply because the system task does not exist any longer. Its functions are replaced by the code that executes on the system call control block.

Because of this difference, comparing the PIT ticks on system calls that use the file system between VS Classic and VS II is like comparing apples and oranges. VS II will always have a higher number of ticks for these calls, since a larger amount of code is now being counted in the respective system call "bucket."

CPU time usage

The CPU time usage breakdown that is kept by both operating systems is accumulated in three groupings—user, system, and idle—using one of two methods:

Statistical method. This method uses the histogram feature to separate the real time clock (RTC) ticks into the three buckets. Both CPUTIME and the AOS/VS Monitor use this approach to determine the CPU time usage.

Accumulation method. This method uses the PIT to record the number of PIT ticks used in each one of the three areas. MP_DISPLAY uses this approach to determine the CPU time usage.

The counts maintained by either method are usually displayed as percentages rather than as raw numbers.

When using either of these methods, there are two important consistency issues that need to be understood:

- When comparing data gathered under VS Classic to VS II, how consistent are each of the methods with respect to their statistics gathering?
- When comparing data gathered on only one of the operating systems, how consistent are the two methods when compared to each other?

The remainder of this article will first discuss the consistency of each of these methods, then compare them to each other.

Before discussing the two methods, we also need to examine "system" time for a moment. In either method, the "system" time (which affects the "idle" time) is accumulated for two main areas. The first area is that the system is doing work on behalf of the user, such as system calls, page faults, etc. This is the generally understood idea.

The second area includes some overhead functions, such as scheduling. It is this scheduling component that needs further discussion. When the system is idle, VS executes the scheduler code looking for a job to run. If it doesn't find any job to run, it then executes the idle loop code. When the idle loop code is completed, the scheduler code is again executed. This sequence of execution of scheduler and idle code occurs over and over again while the system is idle.

Using the histogram method

When comparing VS Classic to VS II using results generated by the histogram method with either CPUTIME or the AOS/VS Monitor, the following must be remembered:

- The percent user time *can* be compared between the two operating systems using either utility.
- The percent system and percent idle time *cannot* be compared.

(The reason that system and idle times cannot be compared is that there is an inconsistency between the two operating systems.)

- In VS Classic, while the system is idle, the scheduler code is counted in the system time bucket. Because of this, even

when a system is totally idle, system time is still being accumulated.

• In VS II, this has been changed so that the scheduler code, while the system is idle, is not counted in the system time bucket.

Since the percent system time will differ, the percent idle time will also be affected.

This percent system time difference is most noticeable when comparing VS Classic on a slower CPU to VS II on a faster CPU. In this case, two variables have changed—the CPU type and the revision of VS. The user time may scale as expected, since it is usually only affected by the CPU speed difference. The system time will probably not scale as expected because of all of the following factors:

• The idle time algorithm was changed in VS II

• The system calls may take different amounts of time

• The speed difference between the two CPUs.

The faster CPU, under VS II, will probably have more idle time under identical loads, but this could vary depending on the contribution of each of the above factors to the overall percent system time.

Currently, there is no known method to adjust for this difference in percent system and percent idle between the two operating systems. It will vary significantly with load and application.

Using the accumulation method

When comparing VS Classic to VS II using results generated by the accumulation method, the results should be comparable with a utility such as MP_DISPLAY. Unfortunately, MP_DISPLAY can display incorrect results because of problems in:

• Microcode (fixed on the Eclipse MV /40000 (all types) in instruction micro code rev 1.20). The revision level can be checked by typing the revision command at SCP-CLI prompt.

• VS software (fixed in rev 1.12 patch #98)

These problems cause a multiple of 65K ticks to be intermittently, and erroneously, added to either the current system or idle values. MP_DISPLAY uses these erroneous values when displaying its statistics. Naturally, when this occurs, the percentage calculations are wrong.

Comparing the two methods

Under VS Classic, there are differences between the two methods since neither method is all-inclusive. For example, the statistical method does not include the time spent at interrupt level. This, however, is included in the accumulation method. But in the accumulation method, the time spent in the disk driver code is not included, though it is in the statistical method.

There are two points to be made concerning VS Classic. First, expect small differences between the two methods. Second, don't worry about small differences that may occur.

Under VS II, there can be large differences between the two methods. The primary reason is because of the scheduler time accumulation change. While the histogram method does not include the scheduler time when the system is idle in its counters, the accumulation method does.

To give an example of this difference under VS II, I executed CPUTIME and MP_DISPLAY on two terminals side by side on a production Eclipse MV/20000 running VS II 1.00. The system usually has quite a bit of idle time. The idle time varied from 45 percent to 98 percent while I was monitoring it. The difference in the percent system time displayed varied from 11 to 35 units, i.e.: 15 percent versus 50 percent, one percent versus 31 percent, etc., with CPUTIME always having the lower number. The lower number is more correct since, while the system is idle, the scheduler overhead is not included.

Summary

Monitoring VS to understand how it is performing is a good thing to do. The caveat is that to draw the correct conclusions, you must understand not only the data being displayed but also how that data is being gathered. When gathered data does not either agree or make sense, both the data and the collection method need to be examined to determine where the problem lies. Δ

John R. Gilgis is a member of DG's senior technical staff, in the performance analysis group (PAG).

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SYNOPSIS

AOS/VS rev 7.67 optional patches render a lot of unofficial patches obsolete.

:AOS_VS:7.67

Wouldn't you know it, the AOS/VS 7.67 beta tapes arrived the day before this column was due at *Focus*. Luckily, my editor agreed to extend my deadline by a week to give me a chance to install 7.67 and put it through its paces.

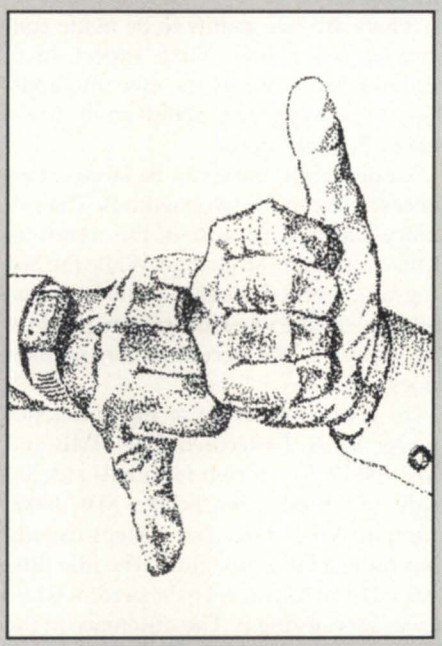
For those of you who weren't at last year's national conference and who haven't read this rag since then, there were a lot of promises made at the conference about some nifty new things that would be done in rev 7.67. DG surprised (and delighted) everybody by responding "Sure, why not" to every reasonable enhancement request, many of which had been the subject of STRs for years.

Here's the list of the major promises pretty much the way I remember it:

- The ability to select/exclude record types for SYSLOG
- Charging of PIDs for time spent doing system calls so that CPU time charges more accurately reflect actual CPU usage
- Improved immunity to the problem of a PID doing excessive system calls and causing massive disruption to other interactive processes (e.g., Blast)
- Longer searchlists
- The ability to specify file data element sizes that are not a multiple of four (AOS /VS II has this)
- The ability to have a root directory ACL of +,RE instead of +,E
- A facility for "pruning" the system software to get rid of rarely used files (e.g., MKABS.PR, STACKER.PR).

Well kids, here's the good news: They took a whack at everything except the last item. The bad news is that they didn't have the courage to sink the changes in concrete; most of them are in the form of "optional patches" supplied as part of the :UPDATE:7.67 directory. That's OK, I love the idea of trashing all those "unofficial" patches that Phil Horvitz and I have distributed over the years.

A special thanks goes out to the hundreds of you who had the courage to run those unofficial patches. The fact that they produced palpable benefits and that no problems were encountered with them was instrumental in getting DG to place their imprimatur on them.



:SISKEL_AND_EBERT

To summarize, here's the patch situation for 7.67:

Thumbs		
Siskel	Ebert	Patch
Up	Up	7.67_FILE_ELEMENT_SIZE
Up	Up	7.67_LRU_BUFFERS_PAT
Down	Up	7.67_ROOT_ACL_PAT
Up	Down	7.67_SEA_BUFFERS_PAT and 7.67_SEA_ENTRIES_PAT
Up	Up	7.67_SYSCALL_CHARGE_PAT
Up	Up	7.67_TUNPBLK_PAT
Up	Up	7.67_BJS_EXEC.PR_PAT
Down	Up	7.67_BJS_LPMGR.PR_PAT
Up	Up	7.67_BJS_XLPT.PR_PAT

Up/Up means I heartily recommend it. Up/Down or Down/Up means install it if you want, but there are either performance or security implications.

:CLI32

The 7.67 tapes contain both CLI16.PR and CLI32.PR. We were already a beta for CLI32 so this didn't present much of a problem for us; the technical staff generally use CLI32 and the clerical staff and OP use CLI16. If the real 7.67 release includes both CLIs, then you may have to go through the minor 16 vs. 32 differences that we went through some time ago. As far as I'm concerned, CLI32 is innocuous except for a) the extra memory it consumes, and b) being forced to use DUMP_II/LOAD_II instead of built-in DUMP/LOAD commands. Luckily, a lot of the glaring bugs in DUMP_II/LOAD_II seem to have been cleaned up in 7.67, although I still dislike the user interface. Oh, well. The price of progress, I guess.

:7.67:INSTALLATION

To load 7.67 I did something really strange; I simply followed the instructions in the release notice. (We were running 7.65 prior to the upgrade.)

One quirk in the upgrade was that AOS/VS 7.67 now comes on two 1200-foot tape reels. Apparently, the files are too big to fit on a single 1200-foot tape, and they can't use 2400-foot tapes because they won't fit on the 6125 series side-by-side tape units. Both tapes are in system tape format, but one contains only the root files and SYSGEN on file 7; the other contains UTIL, HELP, and UPDATE on file 7.

The only real difference between upgrading from 7.65 to 7.67 compared to upgrading from 7.64 to 7.65 was patching the system .PR file.

:7.67_FILE_ELEMENT_SIZE_PAT

This patch is functionally equivalent to the CREATE.P patch that I first described in my Jan. '89 column. It allows you to specify any file data element size, instead of always rounding up to the next multiple of four. This essentially matches the way that AOS/VS II treats file element sizes.

The wonderful aspect of this patch is that now all those pesky little hundred-byte .CLI macro files on your system can be changed to an element size of one, two, or three blocks per macro.

DG has already covered the problem of creating new files with small element sizes; many utilities like SED.PR have been modified to create new files with an element size of one, for the benefit of AOS/VS II users. The only problem is, how do you change all the existing files to take advantage of this? I thought you'd never ask. There are at least two ways.

The first way is to DUMP or DUMP_II all the files between 1 and 511 bytes to a temporary file and then LOAD_II /DELETE/ELEMENT=1 the temporary file. Then repeat the steps for files with 512 to 1,023 bytes, 1,024 to 1,535 bytes, etc.

:PERFMGR users have an easier way. :HAZEL will rocket through a directory tree and change all the element sizes for you while you sit back and drink a Coke. I did just that to the 7.67 root, :UTIL, :HELP, :SYSGEN, and :UPDATE directories and I freed up 20 percent of the space (8,737 blocks, or about 4.5 MB) in a shade over 15 minutes. And with no significant performance penalty as a result.

:7.67_LRU_BUFFERS_PAT

This patch is functionally equivalent to the RELF vs. RELM patch that I first described in my Oct. '87 column. It dramatically improves the speed of any disk write that involves allocating a new file data element (e.g., COPY, MOVE, LOAD, LOAD_II, etc.) by avoiding a forced flush of the random index block each time it is updated with a new element pointer.

Theoretically, installing this patch makes it less likely that running FIXUP after a system failure that occurs without benefit of ESD (e.g., a power failure with no BBU) will be able to preserve the most recent data elements in any open output files. Practically speaking, however, the downside risk of installing this patch is zero. Prove it, you say? OK.

Suppose the system crashed while you were writing an output file and you couldn't run ESD before running FIXUP. What's the first thing you'd do after rebooting? Simple. You'd rerun the program or procedure that was writing the file. If it was a print file, you'd rerun the program that produces it. If it was a MOVE, you'd delete the partially moved stuff and MOVE it again, or repeat the MOVE using /RECENT (there's a related anecdote about this in the sidebar on page

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36). If that's the case, what do you care if FIXUP wasn't able to preserve the last few elements allocated for the file that was being written at the time of the failure? You don't.

There is one exception to this rule; transaction log files. COMLOG handles the possibility of ESD-less failure in two ways. For tape log files, COMLOG does "safe writes." When you specify "safe writes" for a tape, the operating system always writes two file marks immediately after each record written to tape. When the next tape record is written, the system backspaces over the two file marks written the previous time, writes the record, and writes another two file marks. That guarantees that the tape will be readable right up to the last record in the case of an ESD-less FIXUP.

For disk log files, COMLOG pre-allocates the file data elements and writes them with zeros, guaranteeing that they will be readable regardless of how messy the failure is. COMLOG also uses time stamps as a second level of validation.

What about transaction log files written by your application software? Well, they might be a problem. But remember, they are already a problem. You can't depend on every system failure having the ability to run ESD, so you're gonna lose some of your log file records occasionally, anyway.

Given this, I can't see any reason for not installing the LRU patch.

:7.67_ROOT_ACL_PAT

This patch changes the root directory ACL from +,E to +,RE (or even +,OWARE with a bit of judicious patch editing).

Personally, I'm not a fan of letting users peruse the root directory, so I didn't install this patch. Not installing the patch also reduces the temptation to put unnecessary stuff in the root—something I try to avoid, given that the hash frame size is fixed at seven.

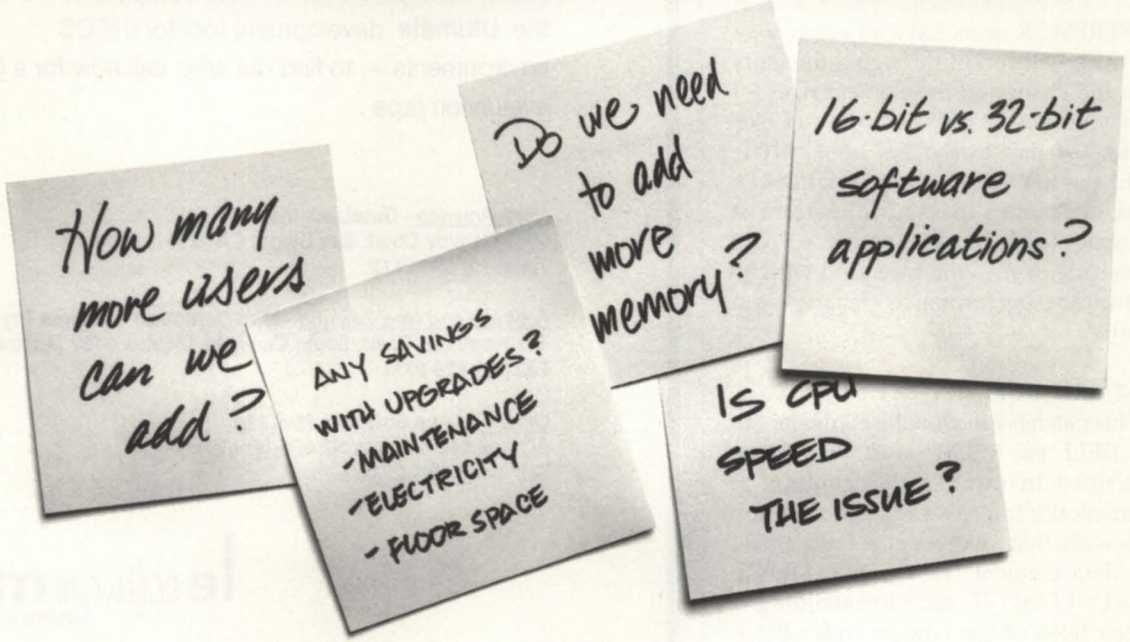
:7.67_SEA_BUFFERS_PAT
:7.67_SEA_ENTRIES_PAT

These two patches raise the limit on searchlist directories to 16 from 8, and expand the maximum searchlist string size from 512 bytes to 1,024 bytes.

I consider limited searchlists both a bane and a blessing, so I didn't install this patch. It's too easy for users to treat AOS/VS searchlists like the MS-DOS PATH command; they put every directory they might ever need into it, even if it's only used once a day. I rate third-party MS-DOS software that requires that its own little directory be specified in the PATH command very low on my list.

In our shop, certain directories are added to your searchlist temporarily when you use certain macros. For example, our global macros directory contains macros for SORT and all the compilers that add the product directory to the searchlist, do the sort or compile, and then restore the previous directory. The global macros directory has an appropriate hash frame size, so locating the macro and adding the searchlist temporarily is far cheaper than the extra I/O caused by carrying the sort and compiler directories around in the

IN THE DARK v



searchlist all the time. We even use the same scheme on MS-DOS, thanks to a little shareware program we found that allows PATH PUSHing and POPing similar to the way that AOS/VS works.

Finally, there is another risk associated with this patch. You might get an application failure if the application does ?SLIST or ?GLIST commands and only has a 512 byte buffer. Not very likely, but possible.

If you want to see the effect of long searchlists on your system, try this. Type XEQ BJ (or some other file that doesn't exist) with your normal searchlist and then try it again after a SEARCHLIST/K command. XEQing a non-existent file forces the system to look through each directory in the searchlist before reporting a failure. You should see quite a difference between XEQing BJ with a full searchlist and an empty one.

:7.67_SYSCALL_CHARGE_PAT

When I saw this patch, I thought my dream had come true. Then I installed it.

This patch purports to "add system time spent by a SYSTEM CALL on behalf of a user" to the CPU time charged to the user's PID. Unfortunately, some testing showed that whatever's being charged is an improvement over previously when nothing was charged, but it still falls far short of charging an accurate amount.

Here's the little program I used to test the patch on the MV/4:

```
        .TITLE    MEM
        .ENT      MEM
        .NREL     7
MEM:    ?MEM
        WBR       MEM
        WBR       MEM
        .END      MEM
```

Assemble, link, and execute the program using these commands:

```
XEQ MASM MEM
XEQ LINK MEM
XEQ MEM
```

To monitor the disparity between charged time and actual time, simply run PED using XEQ PED/PID/USER/PROCESS /PROGRAM/CPUS on some other terminal. We know the program is absolutely CPU bound, so we should expect to see the PID consuming 100 percent of the CPU. On 7.65 I got 29 percent and on 7.67 with this patch I got 43 percent. What you get will probably depend on your processor model.

Oh well. Install it anyway; every little bit helps. And for those of you who use SYSLOG data to charge your users for computer time, there's an added benefit; the revenue for CPU charges is going to get closer to reality. Keep your mouth shut about the anticipated surplus and use it to buy more hardware.

:7.67_TUNPBLK_PAT

I started distributing this patch to some of my clients in 1987, and first published it in my Apr. '89, column. Phil Horvitz later re-discovered the patch, but suggested a different value, in one of his columns last year. The default value is

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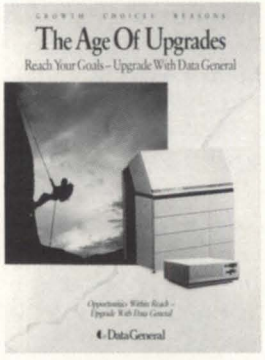

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040000. The new value suggested in the official DG patch is 074000 and is aimed specifically at discriminating against PMGR I/O. My suggested value is 077000 and is aimed at both PMGR I/O and at Blast's annoying tendency to do excessive ?WDELAY calls. Phil Horvitz' value is philosophically different from mine and DG's, and is aimed at undoing the PMGR discrimination in favor of speeding up Wordperfect's low byte count screen I/O.

DG recommends this patch if you have software that is doing lots of low byte count I/O to screens and your goal is to eliminate the disruptive effect on other users. It has little downside risk, so I'd go ahead and install it with the value recommended by DG (i.e., as is). Then you can experiment with other values, depending on your circumstances (like also setting bit 6 to blunt the effect of Blast's excessive ?WDELAYs). The patch documents quite clearly what each bit in the TUNPBLK word does.

:UNOFFICIAL_PATCHES

Any of you who've visited the :SYSMGR BBS know that I keep a collection of unofficial AOS/VS patches on the BBS. Given the 7.67 patches I've just described, a lot of my unofficial patches are now obsolete. But there are still a few left. Here they are.

:7.67_BJS_EXEC.PR_PAT

This patch speeds up EXEC I/O during logon. It has the unfortunate side effect of eliminating the DG copyright message from the logon sequence. I know, it's a tough decision, but we went for improved performance at the expense of the copyright message. Instead, we posted the text of the copyright message in :HELP:CLI.TPC.FREE_SEX where everybody is sure to see it sooner or later.

:7.67_BJS_LPMGR.PR_PAT

This patch allows you to do CHAR/DEF and CLEARDEV commands from any console instead of just from the master console. Very handy for those of us who perform the bulk of our system management duties and trouble shooting duties over dial up IAC ports.

If you plan on using CLI32, then you don't need to install this patch; the new PRIVILEGE command allows you to turn SYSTEM MANAGER privilege on (similar to SUPERUSER and SUPERPROCESS) and the last few revs of AOS/VS allow any process with SYSTEM MANAGER privilege turned on to do CHAR/DEF and CLEARDEV commands. CLI16 has no command to turn SYSTEM MANAGER privilege on, although several patches are floating around that implement the capability as a kludge.

:7.67_BJS_XLPT.PR_PAT

XLPT still doesn't know the difference between logical CPL and physical CPL, so this patch still has to be applied when using serial printers that don't /WRaP the way that DG thinks they should.

:7.67:SYSLOG

An enhanced version of the ?SYSLOG system call in 7.67 allows specifying a bitmap to include/exclude each possible log record type. Unfortunately, the documentation on it wasn't included as an 093 change file with the beta version of 7.67, so I couldn't try it out. Also, there doesn't appear to be CLI support for it (16 or 32). However, I suspect a bunch of handy little user contributed utilities for turning selective logging on with a bitmap will surface shortly. I'll let you know as soon as one is available, or you can check the various DG bulletin boards at the time you receive your official 7.67 update.

One word of warning: selective logging can eliminate a lot of the horrendous disk space consumption of SYSLOG/DETAIL=FULL, but the release notice warns that a lot of the CPU overhead will still be there, so take heed.

:7.67:+NEW+

There are quite a few other changes to 7.67 that I don't have the space to discuss, but they're all spelled out in the 80-plus page release notice. A lot of them involve cleaning up some long-standing small annoyances. However, there's one enhancement that is so wonderful I need to mention it explicitly: Unique Working Set Sizes.

One of the frustrating aspects of recent revs of AOS/VS has been

A Tale of Two CLIs

An obscure but pleasant aspect of the 16 bit CLI's handling of the /RECENT switch is that a file is judged to be more recent if a) its DCR/TCR is more recent than the target, or b) its DCR/TCR is the same as the target, but its length is longer than the target. This means that a MOVE or LOAD command can be aborted using ^C^A and then restarted using MOVE /RECENT or LOAD/RECENT.

This is a wonderful feature, but there is a caveat: File and directory ACLs for newly created files and directories are not set until the file or directory being loaded is closed. Until they close, the current user's default ACL is used. The reason for this is simple; you'd never be able to load a file or directory without SUPERUSER unless its ACL allowed you heavy duty access.

Unfortunately, this means a bit of extra cache activity. It's too bad that LOAD, MOVE, and LOAD_II don't check to see if SUPERUSER is turned on and then just set the ACL's once at create time using the actual ACL. I'd wager that the majority of MOVEs and LOAD[_II]s are done with SUPERUSER on.

CLI32 duplicates the action of CLI16 for the case of MOVE/RECENT, but CLI32 has no built-in LOAD/DUMP commands. Instead, CLI32 is blissfully unaware of reserved words for LOAD and DUMP and instead "sees" macros called LOAD.CLI and DUMP.CLI in the UTIL directory. The macros invoke LOAD_II and DUMP_II. Unfortunately, LOAD_II judges more recent only by the DCR/TCR; it does not examine the length. As a result, an aborted LOAD_II (including a LOAD done with CLI32) should be restarted using LOAD_II/DELETE instead of LOAD_II/RECENT.

Caveat: MOVE, LOAD, and LOAD_II all have the unfortunate side effect that aborting an operation will usually leave the ACLs of any directories that were created set to the current DEFACL. You can either repair the ACLs manually (the quick but error-prone solution) or you can delete all the partially loaded stuff and start over again (slow and tedious, but fool proof). Δ

that they record something call Unique Working Set Size in an inaccessible part of the process table for each PID. A page is considered "unique" to a process if no other process is sharing the page. DG's SEPAC Group in Atlanta distributes a patch to make this information accessible for the purpose of auditing a system.

A few weeks ago, the Chicago Area DG Users Group was kind enough to invite me to be on a panel discussion at their meeting. A member of SEPAC was also there and in one of our "why doesn't Software Development . . ." conversations (off the microphone) we both lamented the fact that this patch was still necessary. Well, not any more. Under 7.67, the ?XPSTAT system call comes in two flavors; rev 0 and rev 1. The rev 1 flavor includes the unique WSS information and the per ring WSS information!

The 7.67 PED doesn't support the new ?XPSTAT call, so I immediately wrote a short assembly program to display the new information (available on our BBS as PERFMGR:PERFWSA) for CLI16 and CLI32. To test the two CLIs I did this:

```
) XEQ :CLI16
) F/AS/S :UTIL:#:FOO
) PERFWSA/L=TEST.LS [!PID]
) XEQ :CLI32
) F/AS/S :UTIL:#:FOO
) PERFWSA/L=TEST.LS [!PID]
```

The tests showed the following sizes in pages:

	CLI16	CLI32
Gross WSS:	121	240
Unique WSS:	14	73

This means that the actual memory cost difference between the 16 and 32 bit CLIs is 59 pages (128 KB), or half the cost indicated by the 119 pages (238 KB) gross WSS. This is wonderful data to finally have available.

In an upcoming column, I'll discuss the new selective SYSLOG facility and supply a program on the BBS that can be used to take advantage of it. The program will probably show up on the BBS before the column does, so keep an eye out for it.

:7.67:SUMMARY

It's pretty clear that the goal for this rev was to clear up as many outstanding STRs as possible in lieu of adding new features and bugs. The standard system patch file, 7.67_AOSVS_PAT, is empty, so they appear to have achieved their goal.

I smell a classic Classic coming. 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, CHAR/605X/CHARLEN=8/PARITY=NONE/AUTOBAUD) or 415/550-1454 (voice).

Time well spent.

Typically, every time I go to a NADGUG meeting, I find something new that pays for the trip. The biggest value I get from the conference is seeing all the vendors in one place. That was where we first saw the demo of the 4GL that we use internally. We didn't buy it then, but it gave us a chance to evaluate all the 4GLs at one time and one place. It knocked down the evaluation phase from several months to a couple of days.

— Ray A. Walther
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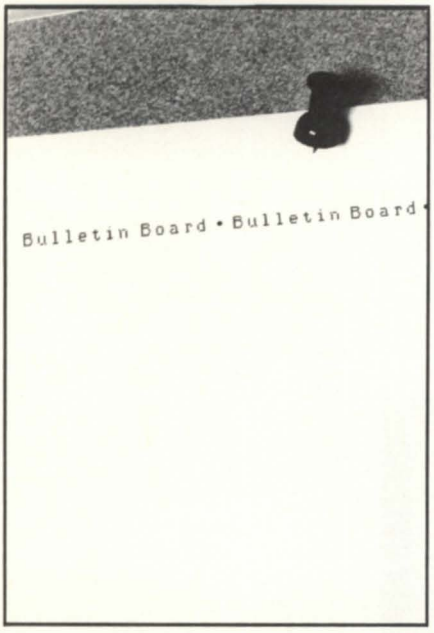

Overdue: shared libraries in AOS/VS C
From: Doug Rady

Yo C users! If you've been waiting for AOS/VS C to support shared libraries, then wait no more. They are not scheduled, which means you can go right on waiting.

As it stands now, there are the following three options:

1. Forget about shared library support by AOS/VS C.
2. One or more people/companies *fund* the development by DG for shared library support themselves.
3. Someone break down and implement the shared library support themselves.

Of these three options, I find number one very, very lousy. Number two would require several companies to get together and make a very forceful RFE and offer to back up the RFE with enough money to pay for a developer. I am considering number three.

Why should DG bother? A number of Unix systems support shared libraries, and also VMS. This is a selling point for those systems. Besides, they have become sort of a "job shop" with respect to AOS/VS development, so why not take this on as just another job?

Fix-a-flat?
From: Jim Bageant

Is there any way to do relative I/O on a flat sequential file in ICobol (a flat AOS/VS file, without .nx and .xd)? I would like to be able to pick a certain record number out of the file and do a read on it without having to read down sequentially from the start of the file. This can be done in VS Cobol on non-Infos files, but can it be done in ICobol?

Also, what kind of performance can I expect on high terminal counts (75-100) and large MVs (MV/20000 mod 1 and 2)? I'm moving a combination assembly/VS Cobol system to ICobol and know I'm going to take a performance hit. I just wonder how bad? Response time is now under one second and there is no echo delay. I mean none. I'm now using block mode terminals, and don't really have a way to benchmark until the system is complete. More hardware is not a problem, if that's the fix.

From: Tim Boyer

There's no way that I know of to do the flat file trick. Depending on how big your file is, though, it may not matter. I benchmarked 10,000 100-byte sequential reads in 29 seconds on an MV 8. As far as the performance issue goes, if you're using Infos now, I don't think you're going to take *any* performance hit. You may even speed up! I know of a guy in Florida who's *voluntarily* switching from VS Cobol to ICobol in order to get a speed increase.

On speed
From: John Teekell

I've tried to convince one of our sites to upgrade to an S/280 from an S/140, but they were not even remotely interested. Argus has never worked very well on their S/140. An operator told me that it takes about five days to REORG their largest files!

From: Larry Mayberry

The performance that you see is radically affected by the application that is running. One of the reasons that VS performance is not as affected by the Argus Controller/Drive combination is that it is the nature of VS (in its multi-user environment) to do a lot of seeks.

Most RDOS applications have been "tuned" to run well in a Zebra environment (i.e., files located close together on the disk, use of contiguous files, etc.). This environment works against the Argus performance, which does better in a world of many seeks. There is a point, running RDOS, for some applications where the performance of an Argus is better than the performance of a Zebra. It really depends on the way your application uses the disks.

The advantages of the Zebra controller/disks are low controller overhead, and low rotational latency. The disadvantages of Zebra are slower seek times, lower transfer rate, lower capacity, and higher CPU overhead. It turns out that the higher controller overhead and the higher rotational latency of the Argus controller/disk pair are the significant culprits in Argus performance. If you really need disk speed, the Argus is not the answer.

The merits of micros
From: John Teekell

I have seen the ICHOST benchmark comparisons, and they are so mind-boggling that some of my users don't believe them. An AT-clone will blow away *any* DG 16-bit mini. However, some of my users are going to want to stay with DG for various reasons, and for them, I try to advise that they go with a DG PC (386/25 or 386/SX). If they won't go for that, then I try to get them into a small MV. What will make the difference in the long run, I think, is when those users who resist the PCs or who can't make up their minds talk to the users who have made the switch to PCs and ICHOST. It just takes time to change people's attitudes.

From: Tim Boyer

There's also what I call a "mini mindset." A "real" DP manager doesn't manage micros.

From: Larry Mayberry

I know what you mean. Someone sees 16 terminals hooked up to something the size of a shoebox and they don't believe it will work. What you need to do is take your 386 and put it in an old freezer (or something of equal size) and paint it blue or "earthtone" and run the wires out the

back. Then you'll get some respect.

From: Kevin Danzig

I don't doubt that a 286/386 platform is the best for many shops, but you can't forget that MS-DOS is not even on par with Unix, which is pretty crude compared to VMS, which is pretty crude compared to AOS/VS, etc . . . .

The bottom line is how big a PC platform you need and what kind of I/O you're going to do. I haven't yet seen a PC that can handle a couple of bandprinters, plus tape, plus whatever and not choke. The other side is that I just saw a new Compaq tower machine, and its price (with disk and memory equal to what the average MV/2000 would have) was more than the little MV, and you have MS-DOS/Windows to work with. Unless we grow a lot, our next machine will be a 386 running Xenix, and either compiled Cobol or ICHOST or Choice.

From: John Teekell

My feelings about Compaq are the same as my feelings about BMWs. Nice, but over-priced. Some of the PC mail-order houses sell excellent clones (Northgate, Zeos, Gateway), and they provide on-site maintenance. I can't see putting a very large site with hundreds of users and many devices on a PC, but for small to medium sites, a 386 will give a much better price/performance ratio. ICHOST won't handle over 65 users, anyway.

As far as benchmarks go, it's all Martian to my users. The only benchmarks they understand are "It used to take us two days to compute taxes on the S/20; now it takes less than two hours on the MV/1400." Move them up to AOS/VS, and it will take even less time.

From: Jeff Campbell

I guess it really depends on the application and exactly what aspect of performance you are looking at. I have an MV/20 mod 2 in Miami with about 270 people on it. It has its moments but runs pretty well most of the time. It's like saying that the 40 or 50 MIPS Unix workstations can process the same amount of data that an MV/40 can process.

By simply looking at the clock speeds of the CPUs, you can say that a workstation may run faster than a big MV or DEC, or an IBM. But the throughput of the data is probably a bigger consideration. I think a good analogy is maximum transfer rates of disk drives, e.g. "This drive will do zillions of MBs per second." It just takes 30 seconds for the heads to get over the proper cylinder. The actual execution may be faster, but the trip up and the trip down are much slower than expected.

In the long run, I think we will all be speaking Unix anyway. I'm just getting exposed to it. You would think they could have written it in English, instead of some dead script language. It's going to take some getting used to. Δ

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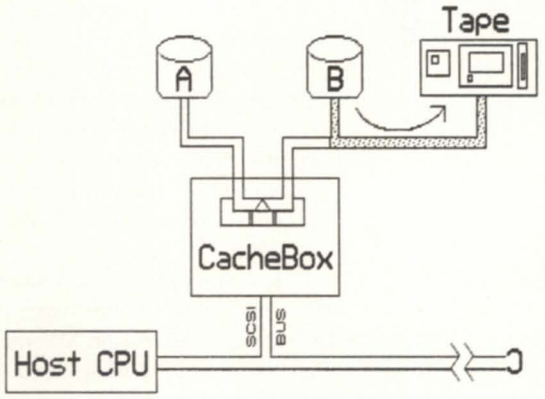

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Reconstructing a CLI macro

by John Huddleston
Special to Focus

SYNOPSIS

A guide to macro-making for recent Unix converts.

CLI vs. UX intelligent processing

I once presented nine points on how CLI macros could be used to process arguments intelligently. The basis for the presentation was a 220 CLI macro menu system that allows over 2,000 user accesses per month to application programs and utilities running on an MV/8000 II.

In this article, I will demonstrate how some of the features of CLI macro processing can be constructed in the UX environment, and compare the CLI macro logic to similar UX commands. Figure 1 is a generic example of how the CLI macros operate.

Data General supports Unix on a variety of operating and hardware platforms. DG/UX is available on MV machines as well as Aviion workstations. MV/UX, operating under AOS/VS, is available on MV machines only. In both cases, either the System V Bourne shell or the Berkeley C shell are available to the user. Due to this variety, I will refer to Data General's implementations of Unix simply as UX environments. In all cases, though, my UX source will work within System V.

Command line parsing

By passing the %2-% arguments as each subsequent macro is called, users can pass all the commands necessary to respond to the various menus on one line. This will put them at the destination macro or program and return them to the calling macro after execution terminates. The equivalent UX process could be handled within the shell script by first performing a "shift" command. This command drops the first argument, makes the second the first argument, the third the second argument, and so on, to the last argument. After the "shift" command, the shell can then pass the entire set of arguments by using $* or $@. $* is equal to "$1 $2 $3 . . . $n" whereas $@ is equal to "$1" "$2" "$3" . . . "$n" for n arguments.

Each new shell is a new environment

CLI environmental parameters can be changed without losing the initial environmental values by use of the "PUSH;PROMPT POP" commands. Thus, each macro can modify the user's environment (such as changing the directory or a user's SEARCHLIST), execute a program, and return to the previous level with a "POP." When a new CLI macro is called, the process and process id remain the same.

A shell script can be executed by putting the "sh" command before it, if the script is not executable (as in "sh script_name"). If it is executable by itself (i.e. displaying the 'x' flag when shown in a "ls -l" listing), a new shell can be invoked by simply typing the script_name. If you use variables defined in the log-in shell or other previous shells, you must "export" them *before* calling the shell_script. For example, to assign the terminal type and allow other shell scripts to have access to it, the UX command would be:

```
"TERM=vt100;export TERM"
```

A UX user may directly operate in the present environment in two ways. The shell script may be executed by the "." or dot command. For example, ". shell_script" causes the shell to read and execute the commands listed in the file "shell_script". Whatever environment parameters are changed will hold true in the current shell.

The second way to operate directly upon the environment is with the use of a function. A function is executed directly by the log-in shell, rather than a new shell. Like CLI macros and the "." command, any environment parameters that are changed will remain changed after the function is complete. An example function to change directories and modify the prompt would be:

```
chd ()
{
cd $1
PS1='pwd'
}
```

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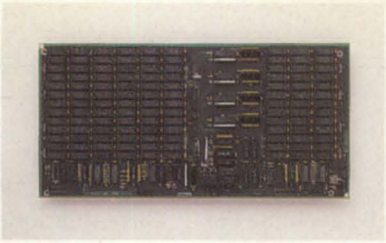

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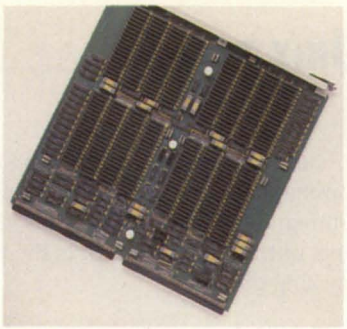

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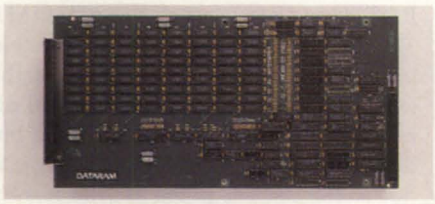

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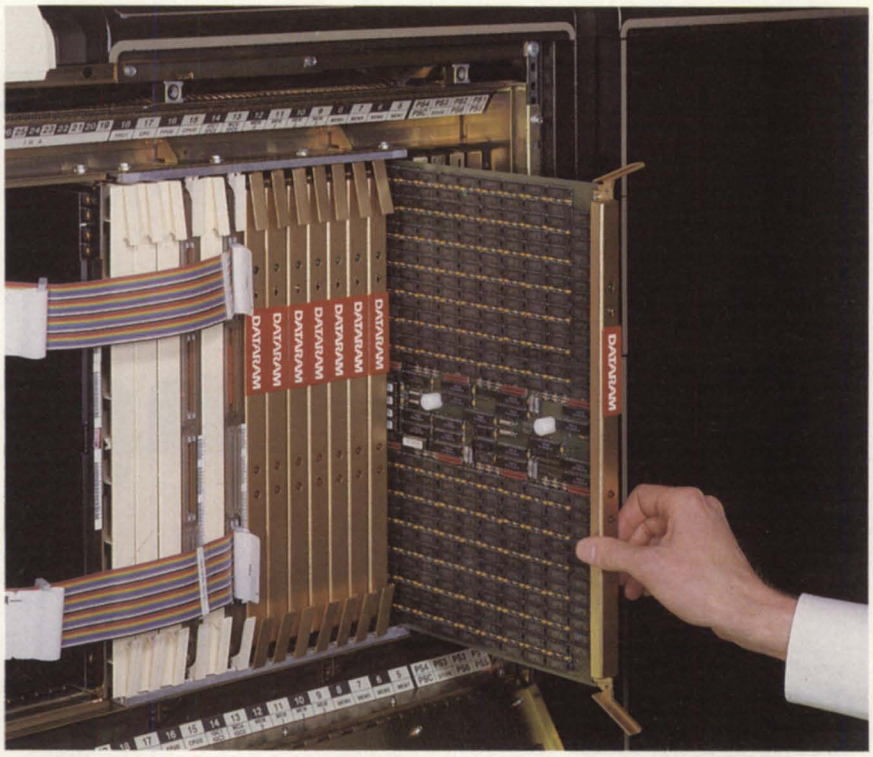

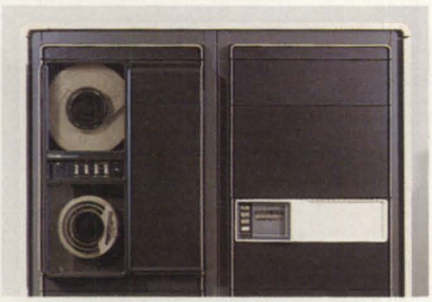

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The backquotes around the "pwd" command are useful since they force commands to be executed. Thus, the contents of the user's prompt is the present working directory.

Searching for the right path

One way to make CLI searchlist assignments faster is to provide explicit directory pathnames. Directories are not added to the list as "SEA [!SEA] :UNIX:BIN" but rather as "SEA :UTIL :MACROS :UNIX:BIN". By avoiding the [!SEARCHLIST] pseudomacro, you reduce the amount of time in the PATH command. The current directory is always searched first.

If you are concerned that you will lose the user's original SEARCHLIST, you can do a "PUSH;PROMPT POP" at the start and a "POP" at the end to return the original SEARCHLIST. By specifying three directories, you can minimize the amount of time the system spends searching through all the directories. The PATH command in CLI gives the full pathname of a file found in one of the SEARCHLIST directories.

The UX environment has a PATH variable that is defined and exported at logon time. For example, the assignment PATH=.:/bin:/usr/bin:$HOME/bin;export PATH would tell the system to search the current (.) directory first, the (/bin) directory next, the (/usr/bin) directory third, and the user's home bin directory last. If the (.) directory was specified as the last one in the list, the current directory would be the last one searched for any shell scripts or programs not found in previous directories in the $PATH.

Unlike the TYPE command in AOS/VS or MS-DOS, which displays the contents of a file, the "type" command in UX gives the full pathname of a file found in one of the $PATH directories. (Remember: Putting a "$" in front of a UX vari-

Figure 1: Generic CLI macro

```
[!EQ,%1%,]

TYPE :USR:MENU:%0%_MENU
 STRING [!READ Enter the menu option of
      your choice ]
[!NEQ,([!STR]),()]%0% [!STRING][!END]

[!ELSE]

[!NEQ,[!PATH :MACROS:%0%.%1%.CLI],]
  %0%%1% %2-%
[!ELSE]
[!NEQ,[!PATH :USR:BIN:%0%.%1%.PR],]
   X :USR:BIN:%0%.%1% %2-%
[!ELSE]
[!EQ,%1%,HELP]
   TYPE :USR:HELP:%0%_HELP
[!ELSE]
   WRITE You may have entered the wrong
      option
   WRITE Press the RETURN key to EXIT
   %0%
[!END]
[!END]
[!END]

[!END]
```


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able allows its contents to be available to the shell script.)

Display the menu or parse the arguments?

The CLI menu system we have designed calls each macro twice if the user elects to go from menu to menu, entering one response each time. The macro is called once from the originating macro without an argument being passed. Since there is no argument, a menu is printed and the user is prompted for a response. The response is read into a string that checks for existence with the [!NEQUAL] pseudomacro of the form "[!NEQ,([!STRING]),()]". If any input exists, the macro calls itself and passes the string as an argument. If no string exists, control passes from the macro and returns to the originating macro. The use of the parentheses protects against pseudomacro failure in case the user enters more than one argument.

If the user passes multiple commands into an input string, each subsequent macro is called without printing the menu—it fails the "[!EQ,%1%,]" test, since %1% does exist. In the next (intelligent processing) section of the macro, the [!ELSE] section checks for the existence of a CLI macro with the %1% argument as part of its name. It does this because some programs may need additional environmental conditions set, or because there may be another CLI menu to be called.

If it fails this check, the macro next looks for the existence of a program with the %1% argument as part of its full pathname. Using the full pathname speeds the search and eliminates execution of any other program with the same name in the SEARCHLIST. If the %1% has failed this test, then explicit keywords are tested, such as HELP or EXIT. If all the above tests fail, the user is prompted to reenter the command and returned to the calling CLI macro.

The UX environment checks for the existence of arguments in several different ways. The "$#" variable yields the number of arguments. The "$1" variable is the first argument. An example of the test for existence of arguments using the number of argument check would be:

```
if [ $# -gt 0 ]
then
 echo "$1 arg passed"
else
 echo "no arg passed"
fi
```

Another test for the existence of arguments can be made directly on the arguments themselves. For instance, the test for zero length uses the -z switch as follows:

```
 if [ -z "$1"]
then
 echo "no arg passed"
else
 echo "$1 passed"
fi
```

Other types of switches can be used to test for various types of files. The "-f" or the "-r" switches can be used to determine, respectively, whether a file exists

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and whether a file is readable. Remember to use double quotes around the variable to be checked. If the string is of zero length and the double quotes are not used, the shell will produce the diagnostic "test: argument expected."

Setting the correct terminal type

At log-on time in our environment, a modem macro sets the environmental variable VAR9 according to the terminal type. This number identifies a file in :UTIL that contains the appropriate escape sequence to put the cursor in the HOME position and then clear the screen. The test for the setting is a number between one and nine. A test for Tektronix graphics terminals would be "[!UEQ, [!VAR9],9]." We use a generic home_page macro that sends the :UTIL:CLRSCN [!VAR9] file to the user's screen with the TYPE command.

In the Bourne shell, the assignment of a terminal as shown above must be made with the TERM variable. The "tput" command can then perform various niceties on the screen. A "tput clear" command will perform a home page operation, for example. Other useful options on the "tput" command are "tput smso" and "tput rmso," which apply standout and reset standout control sequences to the user's screen. This can highlight text or certain words within a paragraph with inverse video.

Menu security

An inherent menu security is built into our CLI system because username formats are designed to contain a group prefix and an id suffix. For example, the user ids contain their group name, a period, and the state code. The [!ENAME] pseudomacro is used to separate the user group from the user id and the [!EEXT] pseudomacro can be used to search selectively for their state. In this way, the menu can limit specific items for particular groups or states. For example, the [!EQ,[!ENAME,[!USER]],WSFS] pseudomacro conditional statement checks for a user group named WSFS.

In the UX environment, there are three levels of authority over the filing system: the owner, the group, and others. Using the "sysadm" command, the system administrator can create the user and at the same time assign some user group as the default for the user. The "sysadm" command can also be used to create user groups. Thus, certain files have read authority for all other files, and both read and write authority for a specific user group and the owner. The "chown," "chgrp," and "chmod" commands can be used to set various permission levels for files.

Till next time

In the next article, I will demonstrate various ways to reprogram Figure 1 using UX commands. In the meantime, if you have any questions, drop me a line. I want to hear from you. Δ

John Huddleston is the vice president of NADGUG's SIGUX. He may be reached at P.O. Box 4611, Portland, OR 97208.

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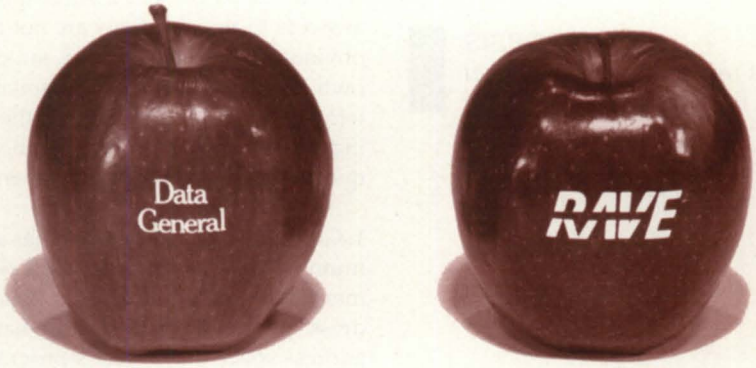

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Circle 52 on reader service card.

How well do you know AOS/VS?

SYNOPSIS

A test for people who said they were systems engineers.

Blast from the past

Will all those who enjoyed last month's fiction please stand up and be counted? For those who are still not sure, yes, it was indeed a purely fictional machine, invented solely as an April Fool's joke.

Test time

As a change of pace, and to help get back to the routine of a normal column, I would like to present a short quiz. The answers to the questions are not always obvious, and in fact, I even supply my own version of them. A reasonable attempt was made to ensure that the wording clearly expressed the meaning of the question. However, nothing is perfect.

1. Given the fact that AOS/VS has a maximum address space of 512 MB per segment, what is the maximum logical address space of a process, and what is the address space that a user's program can access? Explain how you derived the answer.

2. How many segments are there?

3. How many rings?

4. True or false: A "page fault" is usually the result of incorrect memory parity.

5. How big is a page? (Choose one: 1.024, 8.5 x 11, 512, 1,024, 2,048, 4,096, or 16,384)

6. A program running in a segment can change the contents of a segment that is [equal to, less than, greater than, less than or equal to, greater than or equal to, none of the above] its own?

7. In which segments is AOS/VS?

8. What is the lowest possible PID number of a local server? Why?

9. In which ring do users' programs run?

10. In which ring do local (inner ring) servers run?

11. How are overlays managed for 32-bit processes?

12. Which has more bits? Four floating point accumulators or four integer accumulators?

13. Name the mechanisms that restrict
a) a subroutine call to an inner ring
b) accessing data in an outer ring
c) subroutine calls to an outer ring.

14. What is the LINK switch that allows a user process to start execution in a segment that is not the default when the process is initially loaded?

15. How does a program demand that a page be added into its working set?

16. Describe the difference between logical and physical page faults.

17. How many processes can access an unshared memory page?

18. How many pages (minimum) are loaded into memory by default when a process starts? Which one(s)?

19. Which utility is run to allow prepaging?

20. Do all IPC filenames start with "@"?

21. What are the minimum and maximum sizes of a shared page?

22. Is it possible to load all of a program's unshared address space into memory during the initial load?

23. How often should the LRU on an MV/15000 be cleaned and calibrated by your field engineer?

24. What is the condition that causes memory contention?

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Bonus question:

If you can successfully answer the following, you will be the lucky winner of a free bonus macro:

List the bit pattern that defines AOS/VS.

Answers

1. 4,096 MB and 2,048 MB. (Eight and four user segments times 512 MB/segment). (12 points.)

2. There are eight segments. (8 points.)

3. There are eight rings. (8 points.)

4. False. A page fault is a reference to a logical memory location that is not currently in physical memory. (2 points.)

5. Pages are 8.5 by 11 inches, 512 double words, 1,024 words, 2,048 bytes, 4,096 nibbles, 16,384 bits, or 1.024 pictures (if a picture is worth a thousand words). (6 points.)

6. Greater than or equal to. (5 points.)

7. Segments 0-3. (7 points.)

8. Three. Assuming that you are running AOS/VS, and that PIDs 1 and 2 exist, the lowest possible PID would be PID 3. EXEC is not always PID 3. (9 points.)

9. Seven. (6 points.)

10. The possible rings for inner ring programs or local servers is four to six. (7 points.)

11. Overlays are not supported for 32-bit programs. (14 points.)

12. Floating point accumulators are 64 bits wide each, while the integer accumulators are 32 bits wide on MVs and 16 on Novas and other Eclipse processors. (5 points.)

13. a. Gate arrays. (12 points.)

b. None. There is no restriction (as long as it is in your address space, and not someone else's). (10 points.)

c. The call is prohibited, because you would not be able to return from the call as you would then be going inward. (8 points.)

• Add 5 points if you get 13a, b, and c correct.

14. There is none. You cannot do it. There

is, however, a link switch that allows you to link a program for another ring, but you cannot execute that program—it must be ringloaded by a program already running in ring 7. (13 points.)

15. By accessing it. (6 points.)

16. *Lengthy* explanation goes here. (18 points.)

17. Only the process that *owns* the page. The answer is one. If it were more, it would be a *shared* page, wouldn't it? (4 points.)

18. Page zero and the page that contains the location at which the program starts. (7 points.)

19. SPRED and VSGEN must both be used. (5 points.)

20. No. (3 points.)

21. 1,024 words and 1,024 words, respectively. (I'll leave it up to you to compute the average size of a shared page.) (5 points.)

22. Yes. The procedure is: enable the initial program load option using VSGEN (max number of pages); and run SPRED on the program to specify the address range that will be loaded. (4 points.)

23. The LRU is the in-memory chain of Least Recently Used pages—it is not hardware. (2 points.)

24. When the total working set memory pages of all currently active processes exceeds physical memory. (Or, when your processing requirements have exceeded your wallet.) (7 points.)

Time Marches on

Back in the March issue, I presented the MOVE_II macro. I would like to thank the readers who responded with their feedback on it, and, in particular, a few details that you should be aware of.

The first is that some difficulty is encountered when the MOVE_II macro is run in batch. The solution is to change the PROC/DEF to PROC/DEF/INPUT =@NULL/OUTPUT=@NULL. This modification is required to specify the input and output channels.

The second problem area is when running with the 32 bit CLI. It seems that DUMP_II and/or LOAD_II issues a set delimiter table system call. Because the CLI32 has CHAR/SHR set, this causes the CLI32's delimiter table to get changed. When you get back to the CLI32 after running MOVE_II, the up-arrow and down-arrow keys are no longer recognized as commands to scroll through the command history. This, of course, isn't a problem with the 16 bit CLI, since it never used the up-arrow or down-arrow keys. A quick work-around for CLI32 (until the problem is fixed) is to run MOVE_II under the 16-bit CLI by creating a macro that PROCs with the /BLOCK switch a 16-bit CLI with a modified MOVE_II

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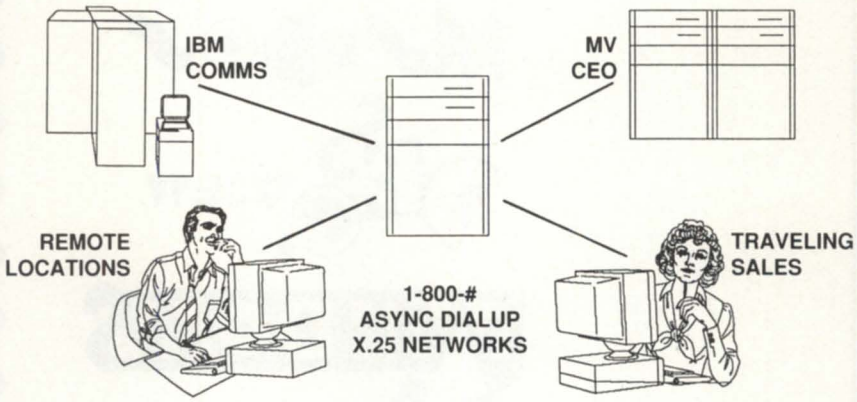

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macro that contains a BYE at the end and uses the arguments required by MOVE_II as arguments to the CLI.

(Thanks to R.T.G. and L.R. for reporting the first issue, and to J.B.S. of the AOS/VS II development organization for reporting the CLI32 problem, with additional commendations for involving D.B. (CLI) and M.T. (PMGR). Thanks M.T. for the "PROC a CLI" solution.)

Answer to the bonus question (3600 points)

Never mind. If you learned anything from my January column, remember, calm down. It's only ones and zeros.

Free bonus macro TAKE.cli

By the way, here is the free bonus macro, called TAKE.cli. It moves files into the current directory from another directory.

```
COMMENT TAKE.CLI
PUSH
DIR %1%
MOVE/V [!DIR/P] %2-%
POP
```

An example would be "TAKE :UTIL:C +.H +.CLI," which would "TAKE" a copy of all the files that match the templates "+.H" and "+.CLI" from the :UTIL:C directory, and place them into the current directory.

The scores

For all of the bean counters of the world, here's a scoring system to rate yourself, and your peers:

0 to 20 points—Try reading the "other" DG magazine for a while, then come back to *Focus* when you think you're ready.

21-50 points—Congratulations. Keep up the good work. Yes, these questions are hard.

51-75 points—Good job. You've done some reading of the System Concepts manual and know some things about AOS/VS.

76-99 points—Watch out! You're almost ready for the big time. You know enough to start being dangerous to my career. (What stopped you from breaking the 100 point barrier?)

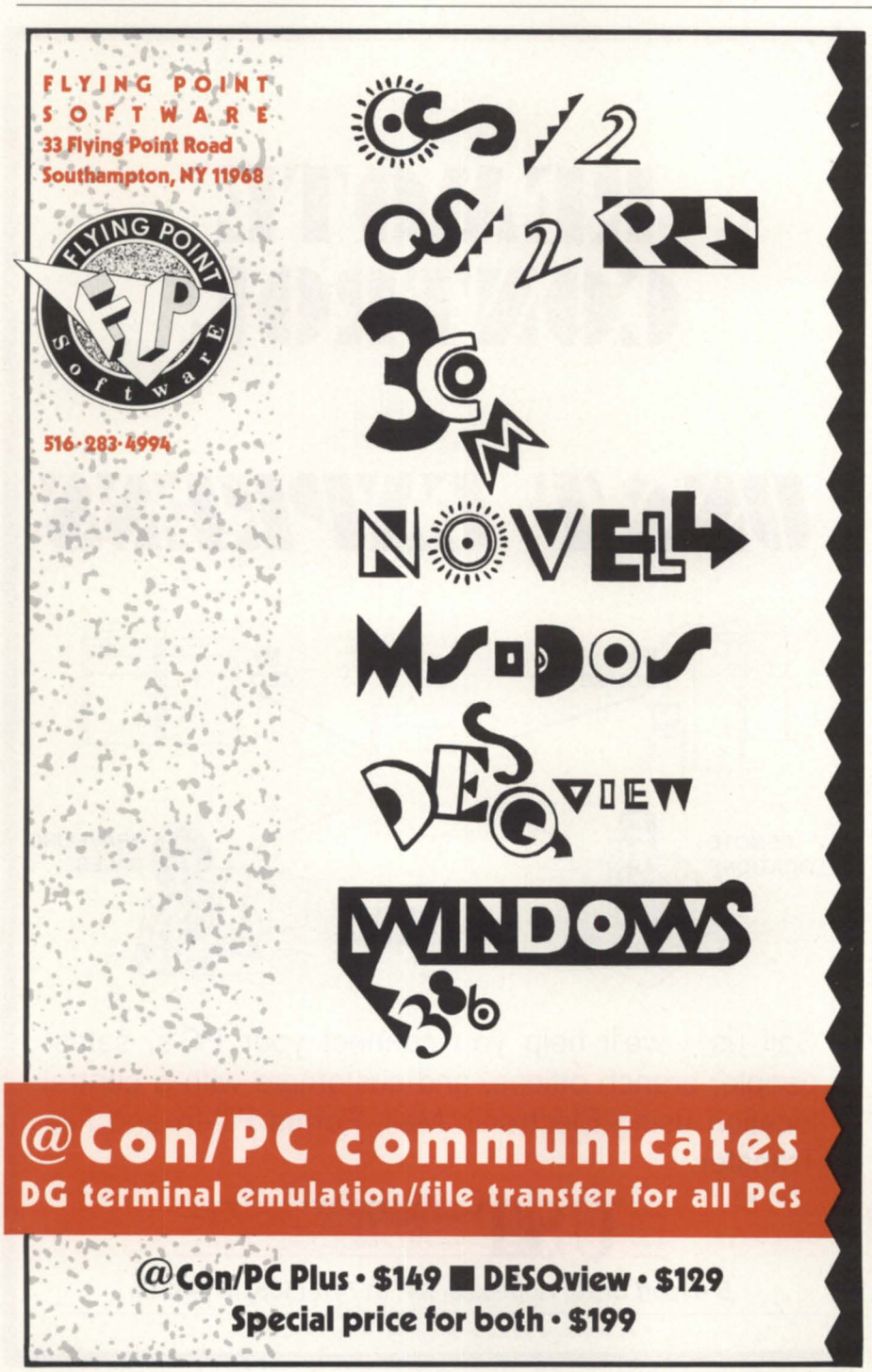
100-149 points—Fantastic. When did you first know you were this good?

150-174 points—Sorry. It looks like I got you on a couple of the trick questions, didn't I? (You probably thought my column last month was serious, too.)

175-199 points—Wrong! This is supposed to be a closed book exam.

200 or above—You either cheated, or know it all. In either case, you should obviously be writing a column of your own. 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.



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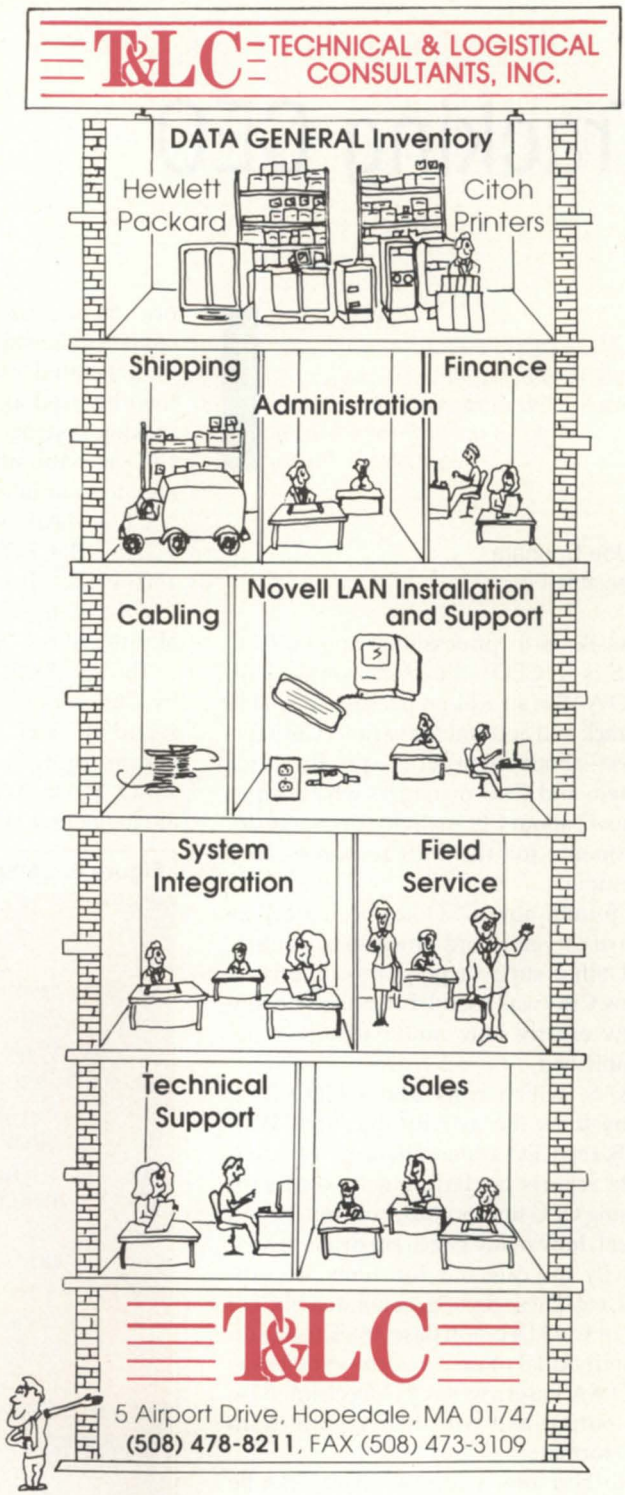

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Tracking CEO

SYNOPSIS

New CEO accounting software (AAS) allows system managers to track CEO activity and generate reports on an individual or system-wide basis.

by Joe Cannata
Special to Focus

As Bo is to professional sports, CEO AAS is to CEO—they both know a lot. CEO AAS is an add-on package available to track and account for various CEO services—about 160 in all. The product is for system and CEO managers who need to "know" about CEO activity, or charge departments for the MIS resources they consume.

Up until now, CEO has been a collection of servers, word processors, utilities, and other support programs. Everyone knew CEO was useful, but nobody really knew exactly how much activity it accomplished.

AAS, which runs under CEO 3.12, demystifies the activity question. With AAS, the CEO system manager can generate reports on how much word processing CPU time is used, how much mail is sent, how many pages are printed, how heavily the calendar functions are utilized, etc. These reports, generated in CEO WP or CEO Decision Base, track usage on an individual or on a system-wide basis. CEO AAS users with CEO Decision Base can output and edit their reports from SPD format.

Furthermore, a specific charge can be assigned to each service (for purposes of illustration, say one-fifth of a cent for one printed page or 20 cents for each new document created). The reports can thus contain financial information. Reports can be generated as spreadsheets that may then be used as input to other decision making systems. AAS is closely linked to CEO, so naturally, AAS reports are delivered to your inbox through CEO mail.

CEO AAS is loaded into :UTIL-:CEO_DIR:CEO_AAS, and uses about 1800 blocks. It interfaces with CEO_OP, CEOGEN, the CEO servers, and optionally, the AOS/VS [II] SYSLOG facility.

The key AAS functionality is provided by CEO servers. Each user's activity directed at a CEO server is logged by that server in the current AAS log file :CEO_MAIL:AAS_SFILE. Transactions are logged on an additive basis. If a user mails a message, the POA simply adds one to the count of the user's mailed messages, instead of appending a new transaction record to the end of a log file. This additive scheme of logging CEO transactions keeps the AAS log file quite small and virtually the same size over long periods of operation.

CEO_OP support allows the CEO manager to create checkpoint AAS log files. These files can then provide information on CEO activity for a specific time interval. The command

```
)CEO.OP NEWAASLOG
```

will close the current AAS log file, append a yy-mm-dd date stamp to its file

Figure 1: Sample log items

Charges Information

No.	Item	Charge	Active
2	Calendar inserts	$0.0010	Y
25	Drawers created	$0.5000	Y
37	Documents deleted	$0.0000	Y
67	Personal lists created	$0.7500	Y
105	LOCAL short messages delivered	$0.2500	Y
106	LOCAL documents delivered	$0.4500	Y
127	Documents spell checked	$1.0500	Y
137	CEO Word Processor CPU time (sec)	$0.0350	Y
140	CEO Spreadsheets CPU time (sec)	$0.0650	Y
149	CEO CP CPU time (sec)	$0.0100	Y
152	Document Conversion CPU time (sec)	$0.0200	Y
156	CEO programs block I/O (1000)	$0.0050	Y

Pick one: (1. Flip Active indicator, 2. Change charge value) 1
Item number(s):

To return to the previous menu, press the CANCEL/EXIT key.

The dollar figures used here are for example only.

name, and open a new AAS log file. By issuing the above command every month, for example, a system manager can compile monthly CEO utilization reports.

CEOGEN allows the system manager to specify which servers should run with AAS logging enabled. You do not have to log CSA activity, for example, if your organization is not a major calendar user.

If you turn on SYSLOG logging on your system, AAS can be used to read the SYSLOG files, extract CPU and pages printed information, and incorporate that information into AAS reports.

Experimentation

Once you have AAS installed and running, you can experiment with features like AASGEN. This CEO-like program allows you to tailor the content and appearance of your AAS reports. The general information section allows you to choose the default report type, WRD or SPD, the number of digits and decimal places in the charge field, the currency character, decimal symbols, and thousands separator. You can also specify an optional mailing address for all AAS reports on your system. A company with a lot of CEO systems might wish to mail all reports to a central processing center.

The Charges Information File is where you specify the dollar amount for each log item, with capability that extends to four decimal places. If you do not want to charge for a certain item, but still want it to appear in your reports, simply assign it a charge of $0.00. If your installation does not care to know how many FSA drawer search requests are performed, the log item's Active Indicator can be set to "N" to prevent it from appearing in the reports.

Setting a log item to "N" will not stop logging of that activity. It simply means that item will not appear in reports. Figure 1 represents a random selection of some of the log items available; the actual menu displays all of the items in numerical order. The log item number is preserved in the example. There are 159 different log items tracked. It is wise to look at the list and determine, beforehand, which ones you want and what dollar amounts should be assigned.

The next step is to let AAS accumulate statistics for a day or two. The first report you might want to run is the CEO_AAS_COMPACT.PR program. The purpose of this program is to roll one or more of the AAS log files and AOS/VS [II] SYSLOG files into one file. This megafile will then be used as input to the report generator.

Initiating the compacting phase can be done with the CEO.AAS.COMPACT.CLI macro, which is found in :UTIL:CEO_DIR :CEO_AAS. A typical command line to compact a log file called AAS_SFILE with the SYSLOG would be:

```
) CEO.AAS.COMPACT/OUTPUT=BIGLOG
  /ALLUSERS :CEO_MAIL:AAS_SFILE :SYSLOG
```

where BIGLOG will be the result of compacting :SYSLOG and the current log file, AAS_SFILE. The /ALLUSERS switch tells the compact program to extract additional information from :SYSLOG for users

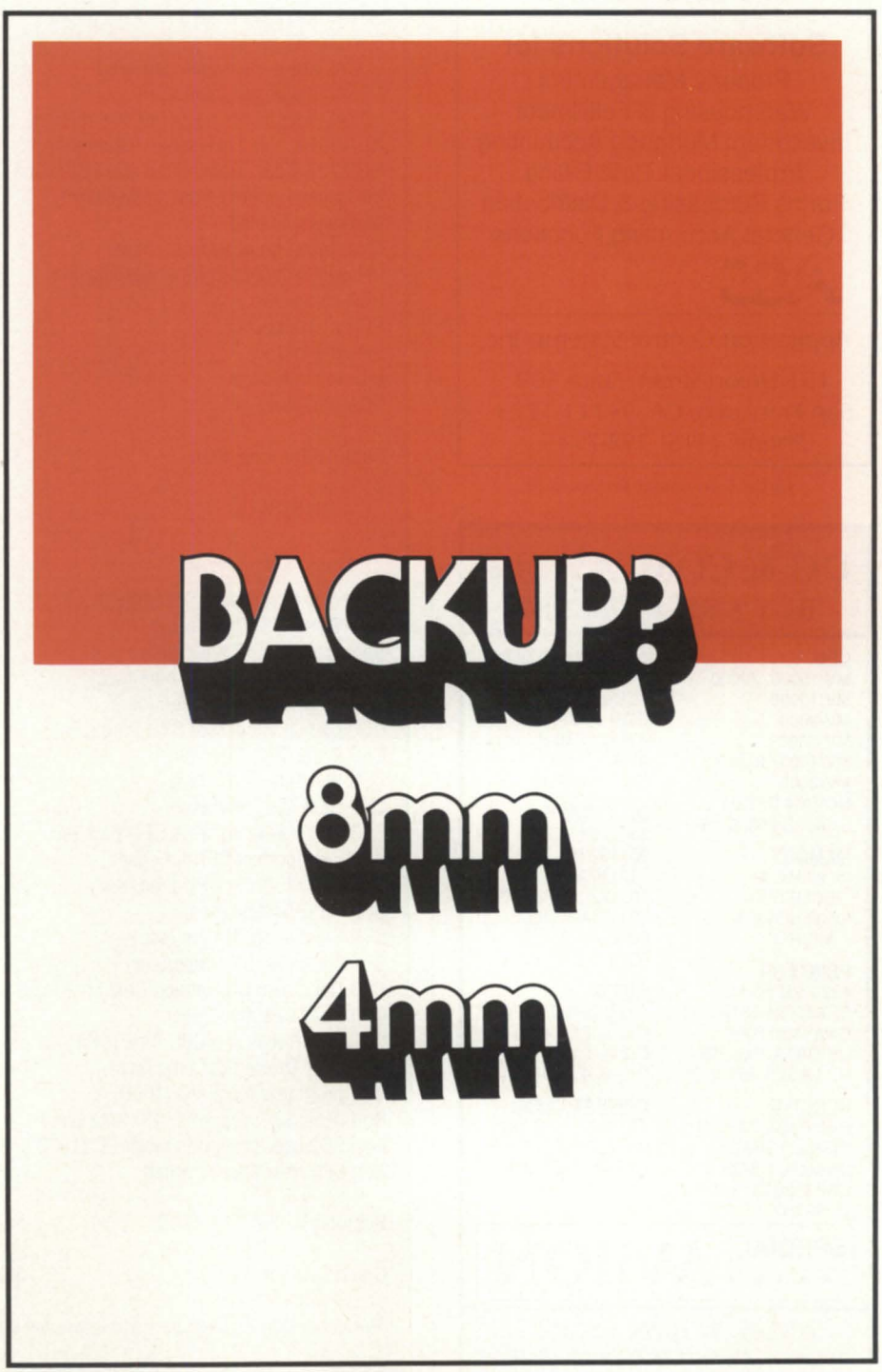

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Figure 2: Sample detailed report

CEO Activity Report

From:	12-FEB-1990
To:	13-FEB-1990
Created:	13-FEB-1990

User Report For: FRED

POA

Item	Quantity	Charge	Total
Short messages posted	257	$0.0000	$0.00
Documents posted	37	$0.0000	$0.00
LOCAL short messages delivered	237	$0.0000	$0.00
LOCAL documents delivered	33	$0.0000	$0.00
LOCAL documents delivered size (blocks)	1,308	$1.000	$1,308.00
NETWORK short messages transmitted	181	$0.0000	$0.00
NETWORK doc. transmitted size (blocks)	40	$0.0000	$0.00
Messages restored from wastebasket	13,842	$1.0000	$13,842.00
Messages deleted	25	$0.0000	$0.00
Messages shredded from inbox	863	$0.0000	$0.00
Messages shredded from wastebasket	21	$0.0000	$0.00
POA connects	127	$0.0000	$0.00
POA disconnects	252	$0.0000	$0.00
Inboxes locked	2	$0.0000	$0.00
Inboxes unlocked	0	$0.0000	$0.00
POA obituaries	0	$0.0000	$0.00
Subtotal for Fred, POA	$15,149.71		

SYSLOG

Item	Quantity	Charge	Total
CEO Word Processor CPU time (sec)	188	$0.0565	$10.53
CEO Write CPU time (sec)	789	$0.0565	$44.57
CEO Present CPU time (sec)	0	$0.0565	$0.00
CEO Spreadsheets CPU time (sec)	5	$0.5650	$2.63
CEO Data tables CPU time (sec)	9	$0.0890	$0.83
CEO Format Processor CPU time (sec)	0	$0.0135	$0.00
CEO Draw CPU time (sec)	0	$0.0767	$0.00
CEO WordView CPU time	0	$0.0129	$0.00
CEO GKM CPU time (sec)	0	$0.6560	$0.00
CEO 20/20 Spreadsheets CPU time (sec)	0	$0.5660	$0.00
CEO Wordperfect CPU time (sec)	0	$0.0656	$0.00
CEO Report Writer CPU time (sec)	0	$0.5600	$0.00
CEO CP CPU time (sec)	1,807	$0.6560	$1,185.61
CEO Closures CPU time (sec)	2	$0.6666	$1.61
CEO Formatter CPU time (sec)	326	$0.0767	$25.04
CEO Document Conversion CPU time (sec)	0	$0.0234	$0.00
CEO Spell CPU time (sec)	0	$0.4660	$0.00
CEO List Processing CPU time (sec)	0	$0.0645	$0.00
CEO User Delete CPU time (sec)	0	$0.6650	$0.00
CEO programs block I/O (1000)	770	$0.0570	$43.90
Non CEO user programs CPU time (sec)	14,720	$0.0754	$1,109.86
Non CEO user programs block I/O (1000)	10,024	$0.5750	$5,763.84
Non CEO user pages printed	1,285	$0.0000	$0.00
Subtotal for Fred, SYSLOG	$8,188.51		
Grand total for Fred	$23,338.22		

The dollar figures used here are examples only.

whose activity was not recorded in AAS_SFILE for some reason or other. (They didn't use CEO for that period, or they do not use a CEO profile at all.) All CEO counts for such users will be zero. However, the CPU and pages printed counts for these users will be non-zero.

CEO does not have to stop for either of the compacting or report generation phases. Also, if there is a single AAS log file, that file can be used as direct input to the report generator without having to put it through the compact program.

Curb inflation

The culmination of your efforts will be reports from the compacted log files. The CEO_AAS_REPORT.PR program invoked from CEO.AAS.REPORT.CLI has several options. You can selectively exclude server data by specifying /NOCSA or /NONSA. You can report on any number of explicitly named users. If you have 200 CEO users, for example, the reports could be quite lengthy. This feature allows you to target certain individuals, rather than all 200 users. Running the report with /POA/USER=name allows you to track just mail activity for the named user.

Other switches allow you to obtain a report of totals for each user, or subtotals by server for each user. Options exist for detailed or for summary information. There is even a /NOZERO switch that allows exclusion of log items with zero counts, again providing a system manager with great flexibility. A switch exists to allow you to specify the recipient of the report. If no switch is specified, the report is mailed to your inbox.

A sample command line looks like this:

```
) CEO.AAS.REPORT/USERS=BOB+JANE
  /DETAILED/SYSLOG/POA/FSA BIGLOG
```

This generates an exclusive report on employees named Bob and Jane and their mailing/filing activity, along with SYSLOG information. Figure 2 shows a sample detailed report. The dollar amounts are examples only.

CEO AAS is very flexible. It tells a system manager how CEO is used on a user-by-user basis. Server statistics can be gathered and rolled together using spreadsheet output from the report program. SYSLOG data can be interpreted for performance monitoring. Dollar amounts can be assigned to various events, so that an MIS group can charge user departments for services provided.

You can do your part to curb inflation by not raising the rates too often. Should you have a windfall, the savings could be passed back to the users with reduced rates. However you use AAS, you will find more information at your disposal, and in an easily obtainable and readable format.

Special thanks to Mark Frishman of the CEO Development group in Westboro for help with this article. Δ

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.

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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
Runs DG DMTRELI	YES	Not Available	Not Available	Not Available
Runs all Revs AOS/VS & VSII	YES	Not Available	Not Available	Not Available

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E-mail for the masses

SYNOPSIS

While X.400 protocols loom in the distance, related MHS technology is being rapidly embraced by e-mail vendors in the PC market place. Why? MHS is easily configurable. Its hubs communicate with one another via simple dial-up lines to route e-mail messages.

Many people still consider PCs to be the offspring of "real" computers. I guess in some ways that's true—PCs are, after all, smaller than mainframes, and like descendants in general, there are a lot more of them around. Continuing the analogy, PCs can do some things that their parents cannot. In some cases, they can do exactly the same thing as a larger system, but without all the overhead and complexity.

We've all heard of X.400 and its spin-off protocols such as X.401, X.402, X.500, etc., but to most of us, these pie-in-the-sky solutions won't mean much for another five years. While the X.400 family will eventually be a robust and complete specification, getting in at this early stage in the game can be a frustrating experience.

MHS

This month, we'll take a look at X.400's little brother: the Message Handling Service (MHS) designed by Action Technologies, Inc., in Emeryville, California, a product that's being rapidly embraced by electronic mail vendors in the exploding PC e-mail marketplace.

I started this article three times, trying to explain what MHS is. On one hand, it is a set of protocols. But that's not completely right. It's a software product.

Let's start with a picture. Figure 1 shows a typical PC LAN. Electronic mail software runs in each workstation. Typically, there is no server-based software; the server is simply a "post office" containing each user's mailbox. To send mail, user A's application simply writes a file to user B's inbox directory. No X.400 or MHS so far. If we connect multiple LANs in a single office or campus (see Figure 2) the LANs are "bridged" via a common file server, therefore we still don't need any fancy routers.

What happens when we separate our LANs by a distance too great to bridge economically, and what happens when we want to connect networks of PC users in one organization with users in another? The primary intentions of both X.400 and

Figure 1

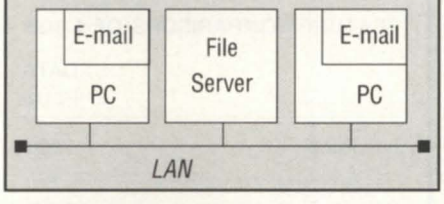


Figure 2

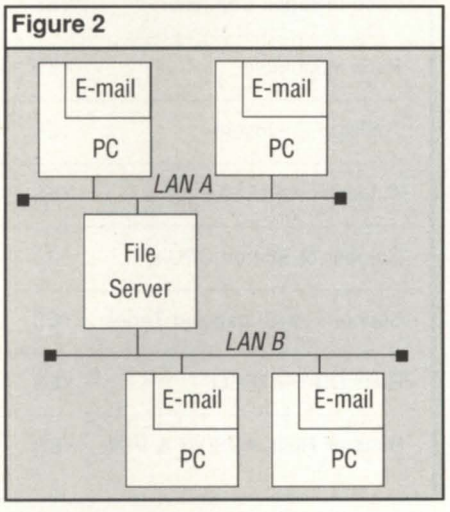
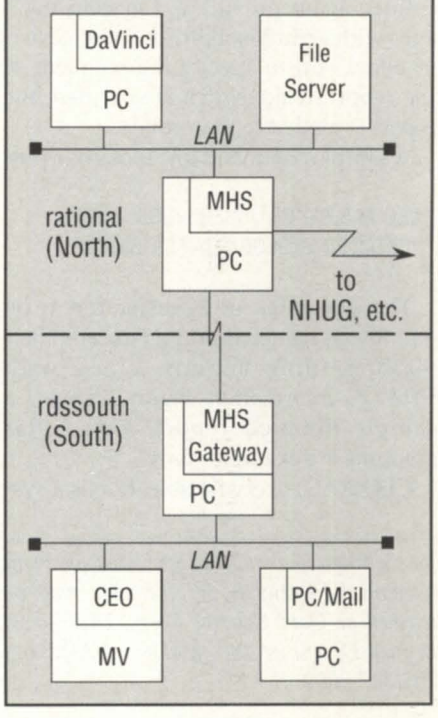


Figure 3



MHS are to allow the routing of messages well beyond a single organization, and this is the real challenge. Not only are these organizations separated by great distances; they also have a wide variety of seemingly incompatible e-mail systems.

The RDS in-house network

Let's look at the e-mail system here at Rational Data Systems. We have two offices: Sales and support are handled by our southern California office (South in Figure 3), while bookkeeping, research, and development are located near San Francisco (North).

In the southern office everyone uses our PC/Mail product, which runs on the workstation and communicates over the LAN to the CEO Post Office Agent on the MV. All messages that originate there are in CEO format.

Up north, where we are always doing kinky things with AOS/VS, we cannot afford to base our e-mail on CEO. Instead, we installed a popular PC LAN-based e-mail package. We chose Da Vinci's package for no particular reason except that it is easy to use and is MHS compatible. All messages originating in the northern office are in MHS format.

Inter-office mail

In each office, we've installed a dedicated PC running MHS. In the northern office, the installation is quite simple: messages heading down south are sent by the Da Vinci software to MHS for forwarding. Likewise, incoming messages are dispatched by MHS to the appropriate user.

In the southern office things are a bit more complex. When a message arrives from the north, there are two problems. First, the message is in MHS format while the users are all running PC/Mail (i.e., CEO). Second, as the local users are not running Da Vinci's e-mail, MHS cannot deliver the messages directly.

To solve these problems, we developed an MHS "gateway," and this is where MHS really shines. The gateway is simply a program that is invoked on an as-needed basis by MHS on the dedicated MHS PC. The gateway solves both of the above problems by reformatting messages from one standard to another, and by physically transmitting the message from system to system.

In our case, the gateway converts messages between MHS and CEO formats, and via PC/VS exchanges messages between the MHS box and CEO's Post Office Agent (POA). Once the POA receives a message from MHS, the POA dispatches the message to the appropriate CEO (PC/Mail) user.

Addressing

How complex is the addressing? Well, that depends on when you ask the question. The CEO/MHS gateway is still in development, and as of this writing, it's a bit rough around the edges. A simple MHS address is of the form:

<name>@<host>

For example, my address in the northern office is

doug@rational

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When I send e-mail to someone in my own office, I just use their name. The "@rational" is assumed. To reach my partner in the southern office, I address messages to

pete@rdssouth

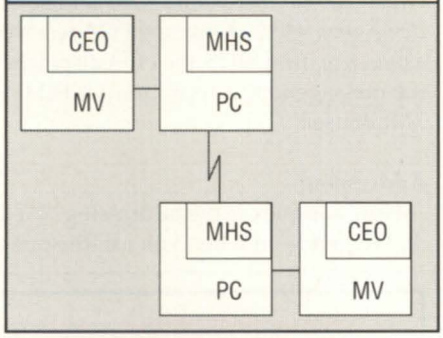
There's a shortcut available, however. Since I have told my local MHS server that messages for "pete" should default to "rdssouth," I can simply address them to "pete."

When Pete sends mail to me, the obvious CEO addressing scheme would be

doug:rational

In fact, this involves interfacing to the CEO Message Transfer Agent (MTA) and the Name Service Agent (NSA), but neither of these tasks has yet been completed. In the meantime, we require that Pete send his messages to a global CEO "pseudo-user," MHS, and embed the actual MHS address in the body of his message. For example:

Figure 4



To: MHS
Message:
To: doug@rational

It's kludgy, and we're always forgetting to embed the address (especially in reply messages), but it does work, and if we do make a mistake, the gateway will reject our messages and let us know they did not reach their destination. In the next few months, we hope to complete the MTA and NSA interfaces.

Intercompany e-mail

You may have noticed that only one office is called "rational." That is because the northern office's MHS server is also our corporate-wide gateway to the rest of the world. For example, our "rational" server communicates with NHUB in Provo, Utah, and from there to any employees of Novell, worldwide. Furthermore, since many other Novell-related companies also link to NHUB, we can likewise exchange e-mail with any of them.

This all sounds great for high tech companies with lots of money. I mean, only international conglomerates like Rational Data Systems can afford the leased lines and satellite links required to put this together, right? Right.

An unconditioned 9600 baud line between our offices would run us over $7,000 per year without the modems and other necessary hardware. At that price, it's cheaper to send floppy disks via Federal Express both directions twice every day. And what about our link to Utah?

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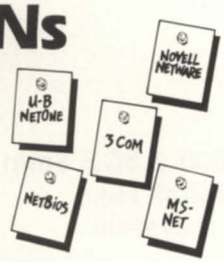

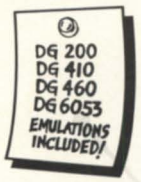

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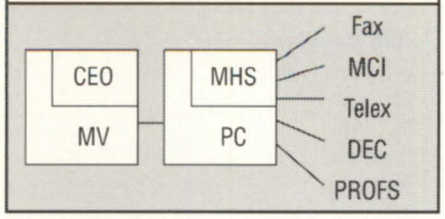
For the few messages per day that traverse that link, we could probably fly them back and forth via corporate jet and save money compared to a leased line.

Configurability

What *is* the link then? I've saved the best for last. MHS hubs communicate with one another via simple dial-up lines at rates up to 9600 baud. (We use 2400.) It is beautiful in its simplicity. The main MHS program runs in a big loop, and you can control how often this loop executes. It first runs any gateways to collect incoming messages from non-MHS systems (PC/Mail-CEO, for example).

It then sorts the outgoing messages to see if any are destined for (or must be routed through) any remote MHS hosts. If so, the remote hosts are automatically dialed, the messages are forwarded, any incoming messages are received, and the two MHS hosts disconnect. Now the local MHS host sorts any mail that has arrived and delivers it to local users. If the incoming mail is not for local users, MHS fires up the needed gateway program or calls yet another MHS host, as appropriate.

Figure 5



The system is easily configurable to handle a variety of communications needs. You may not want one MHS host calling another every few minutes. You may, instead, want a call to be placed only when there are a certain number of messages to be sent, or perhaps whenever there is a message to be sent, or some period of time has passed, whichever occurs first. You may also want to restrict the hours of the day during which two hosts exchange messages.

Again, this is all configurable on a host-by-host basis. Our particular inter-office links are set up to send any messages within five minutes. In this way, we never have to poll the other office for messages (i.e., no wasted calls), and at the same time, we know that multiple messages have a good chance of being sent on the same call if composed within a few minutes of one another.

Alpha test results

We've run MHS in one configuration or another for about four months now, and it appears to be very reliable. While our prototype gateway managed to lose messages during our debugging, MHS *itself* has never lost or damaged a message or file. The protocol appears to have excellent error handling, reasonable performance, and the whole system handles busy lines, out-of-service modems, and other typical problems with ease.

RDS employees now communicate office-to-office as easily as they do locally, and at a fraction of the cost we would incur in linking two CEO systems to-

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gether. Our MHS link is at least as convenient as the more expensive Xodiac equivalent, and as under Xodiac, we can and do send text files, word processing documents, spreadsheets and even MS-DOS and AOS/VS programs via our simple dial-up lines. Our involvement with the operation is minimal. We just hear the modem dialing in the other room every once in a while, and know that things are chugging away.

The future of MHS

There are many interesting applications of MHS. Have you ever wanted to link two CEO systems but couldn't afford the dedicated line for the small volume of messages? Plop up a cheap PC or XT next to each MV, hook up a dial-up modem to each, load MHS and the gateway software, and it's done! (See Figure 4, page 60.)

Want an inexpensive way to link CEO to outside mail services? There are MHS gateways for that, too. (See Figure 5, page 61.) Figure 6 includes a list of some of the MHS gateways and e-mail products available today, and more are coming.

Figure 6

MHS gateways:
Compuserve Infoplex
Fax
MCI Mail
Telex
Banyan
DEC's All-in-One
IBM's PROFS, SNADS, DISOSS, CICS, and TSO INDISY

PC e-mail products supporting MHS:
Coordinator II (Action Technology)
Email (DaVinci)
Daynamail for Macintosh (Dayna Communications)
Framework III (Ashton-Tate)
cc:Mail (cc:Mail)
Total Office Manager (Network Technology)
PC Complete (Transend Corp.)
Para-Mail (Paradox)
Netweaver (Boston Software Systems)
LAN-Mail (OCP Software)
Gallery (Daystrom Data Products)
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Space does not permit me to delve into the subtleties of MHS, but suffice it to say we're very excited about this technology. Not just for our in-house use, for that problem has already been soived, but rather as a communications tool to solve a variety of more complex application-to-application needs for our customers in the years to come.

At this time, we have not decided whether to release our CEO/MHS gateway as an official product, but if the idea appeals to you, give us a holler. If you happen to have an MHS system yourself, here's my MHS access info:
doug@rational (host "rational" at 415/499-8617, 2400 baud) Δ

Doug Kaye is CEO of Rational Data Systems and can be reached at 415/499-3354. For a free copy of the "RDS Report on PC Integration," contact RDS at 140 South Los Robles Av., Pasadena, CA 91101; 818/568-9991.
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Circle 56 on reader service card.

The other woman

SYNOPSIS

She takes the sparseness out of your disk. She does CHORES. She makes her presence known.

by Kevin Danzig
Special to Focus

At first, it seemed to be an unusual occurrence for what had transpired both between myself and my wife also happened between myself and my MV. About a year ago, my wife started dropping hints, first infrequently, but now quite regularly about *her*. Lest any real intrigue build, the other woman was not for me nor for my wife, but for our house.

I hope that your attention is still here—what my wife wants is someone to come in and tidy up on a regular basis. While that is an important part of my home life, it is the *other* other woman that you should get to know. Many of you have heard of her. Some of you have access to her right now and probably don't even know it.

In my last article, I reviewed :WFFCA from :SYSMGR. One of the nicest parts of the package was a module called WFWSC. This module is a white space compressor. It removes wasted space in a file. This module works only for text files. In our shop it has done wonders for the accounting data that we keep on line. It has the added security that it leaves the file in a totally readable fashion without decompression (assuming normal tab stops).

Now that you understand white space, (trailing blanks and spaces that could be tabs) we have an area that we shall call sparseness. What is sparseness? Who is the woman? Stay tuned!

Software by committee

Unfortunately, my favorite operating system doesn't exist, primarily because I haven't had the time to write it. I imagine that every programmer around today who 1) started working with computers writing in assembly language, 2) didn't start with computers to fill some electives in college, and 3) is at least as egocentric as I am about their skills, has similar feelings.

Reality dictates that the world can't wait for every programmer savant to generate an operating system. What has happened instead is that many of the aforementioned (you may substitute a different word for use with savant) were put together to write operating systems, AOS/VS [II] included. Is this bad?

Enough with the questions. Good or bad (it is both) is not the point. Working with and around the operating system is what counts. I suppose that even in GIZNAD/VS (my unwritten system) there would be defaults, but for every default there would be an option to get around it. Many of the objectional defaults in AOS/VS have corrections; some are easier than others. The other woman can handle two of the work arounds quite nicely. The first is sparseness.

If your job was to fetch water, a bucket at a time, in order to meet everyone's thirst, you would probably choose a bucket that kept you from making unnecessary trips but would not be too heavy to carry. Optimal file element size has this problem. Using a bucket that is too big will make a file sparse. The minimum bucket size for AOS/VS (unpatched) is an element size of four. That means that files are added to in blocks of 2,048 bytes. If you don't believe me, try this simple test. In your own directory (a CPD), create a simple text file with less than 100 bytes. Do the following:

```
)space
)delete text.file
)space
```

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The difference between the space commands will be 4 blocks (2,048 bytes).

How is this possible? Simple. When AOS/VS was written, it was assumed that there would be less system impact if data was brought at a larger bucket size. One system call and disk access for 2,048 bytes is a lot better than four calls for 512. However, if you regularly only want 512 bytes (or less) each time, there is no point in requesting 2048 bytes. These are minimums.

There are other more extreme examples. Most .PR files have an element size of 32 (32 times 512 = 16,384 bytes) and as a result are quite sparse. What this means is that while

```
)f/as *.pr
```

will show you the size of the file, it will not give you an accurate perspective of the unused "hidden" disk space tied to the program.

```
)dump_ii/stat myprogram.dmp myprogram.pr
```

will give you a better example. In the statistics there will be a listing of zero bytes compressed. That is roughly how much of the disk was held captive to the element size of the program. You will also notice a decrease in size of the dump file when compared to the program. While there are simple rules to follow when creating files to determine optimum element size, she can do it for you.

Why haven't I mentioned her name? While :SYSMGR has turned out quality software, creativity in naming it is absent, and may be lacking. When I was a kid there was this TV show that I thought was inane. The central character was a maid who worked for the Baxter family (as in "Coming, Mr. B."). Her name was Hazel. She spent most of her time being a social worker/psychologist, but the house was always clean and the meals cooked, so who am I to complain? Our Hazel has some other similar traits that I will explain later.

Hash is not just for corned beef

In my basement there lurk many old books. Three of them are from a set of what was to be eight on computer programming. Only three were ever written, because the author was sidetracked by

other pursuits. The third volume dealt with sorting and searching. Hashing is explained quite well and should you wish to gather greater understanding, you should pick up the set of three books. The set is named *The Art of Computer Programming*, by Donald Knuth (Addison Wesley). I don't know if it is still in print.

Simply put, hashing is a technique for storing data for optimal retrieval. Each entry is compared against some data item (or hashed) and stored based upon the result. For every list there is an optimum hash scheme. We might increase or decrease this scheme based upon the number of entries, etc.

Directories are groups of files that require an accurate list kept of entries. Again, there is a system default of hash frame size which may or may not be best for your directories. Hazel will calculate what it feels to be an optimal hash frame size.

Running the beast

Running Hazel is quite simple. There are two choices. One may either

```
)dir :hazel
)hazel my.directory
```

which leaves Hazel's log file in its own (starting) directory, or

```
) dir my.directory
) sea [!sea] :hazel
) hazel my.directory
```

Hazel requires the server from perfmonitor to be up, but that is a given. One similarity to the other Hazel is that she makes her presence quite known. Hazel is a powerful user of system resources. Do not run it during active times when system response is important.

The first time I ran Hazel, it did some things that I liked and a few that I didn't. We have some 300 compiled Cobol programs on our system. All were linked with shared code, so they are not overly large. Each .pr is between 60 KB and 110 KB, (before shared code they were all more than double). The first time we ran Hazel, it reduced the disk space storage requirements for these programs by an average of 35 percent. That was like someone tacking on a 10 MB extension to the disk from just that one directory. Other directories yielded good results, but the general rule is that program (.pr) files will give the most back.

Ideally, Hazel should run on an idle system so it can change hash frame size if necessary. It must delete the old directory, and can't if it is shared. How often should you run it? Once a month is more than enough in my estimation; you should judge for yourself.

I must say that watching it run the first time was fantastic. It took clippers to so many files I thought I was looking at my significant other rooting through last year's clothes looking for things that were still "classics" (pun intended). Unfortunately, subsequent runs are not as dramatic and are almost anticlimactic.

There are a number of options, for example, a CHORES list that you may want

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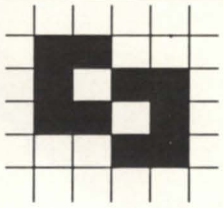

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Hazel to attend to. Minimum file element size is first, adjusting hash frame size another, and changing directories type=DIR to control point directories type=CPD. Frankly, I haven't seen the point in changing every directory to a CPD with the limit being unlimited, but that is Hazel's default.

I mentioned before that four is the minimum element size for an unpatched AOS/VS system. We applied :SYSMGR's patch to decrease the minimum element size to one and haven't seen any problem. Hazel (rev 0.50) will take this into consideration when running. Almost every CLI macro we had went from an element size of four to one.

Those who are leery of applying a non DG-supplied patch to your system now have two choices. The latest version of AOS/VS (rev 7.67) and AOS/VS II both allow an element size of one.

Hazel didn't do everything without fail. It didn't care for our :NET directory and made three backups of it. :SYSMGR told me just to delete the extras and that they were aware of the problem. The problems were quite outweighed by the gains though.

Where's the beef?

At this point, I must state that Hazel is not a panacea for disk problems. Some things it will do are decrease storage requirements for your present data, and reduce problems related to hash frame overflow. The first item is substantial. The second borders on what may be what is called in the trade, *vaporware*. Optimum hash frame helps in an environment where there are a lot of users doing CLI commands such as:

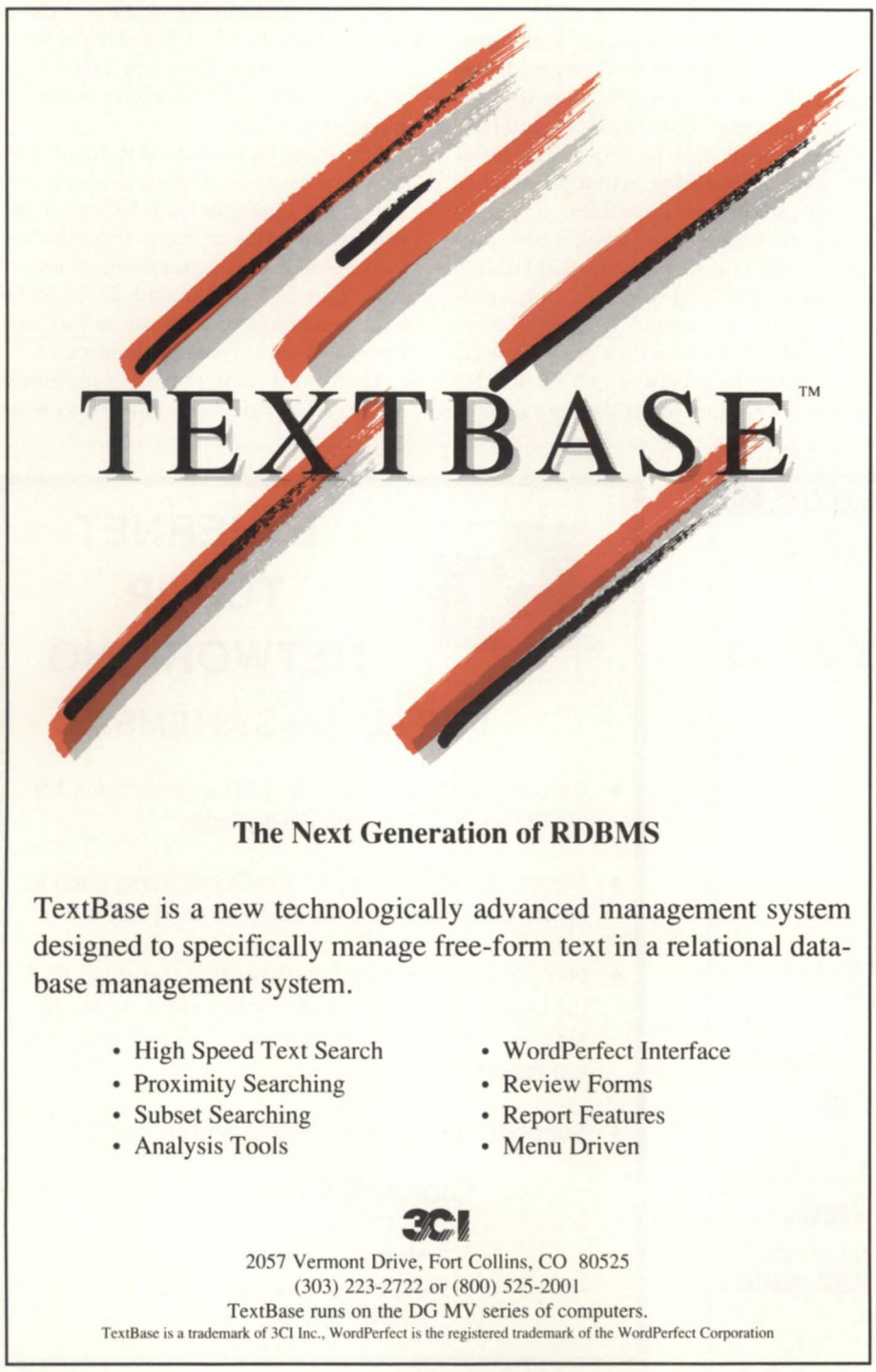
```
)f/as/so
```

on a regular and continual basis. Personally, I think that you should buy people like this a Nintendo game, as it requires far less in system resources. We also found from Disco that as a result of freeing up disk space, average seek and service time on our system were improved. Is it noticeable? I don't think so. If I felt that it was, we would be running a disk optimizer on a regular basis. We are not. Our system load breaks down as follows: 75 percent—operators running Cobol with INFOS_II, 20 percent people playing with Wordperfect, 5 percent stressed out system managers debugging, writing, etc., while pretending to be something else in the company.

With our small requirements, things would have to be pretty bad (disks at 95 percent) before we might notice an adverse system environment.

The bottom line is if you have PERFMGR and don't run Hazel, you should try it. If you don't have PERFMGR, request a demo copy. If you would like a 20 or 30 MB extension to your present disks and think that it's worth $499 for Hazel (I do), you'll buy it. Hazel is packaged with PERFMGR as well for $799. Δ

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



Circle 64 on reader service card.

Connectivity 101

SYNOPSIS

Using smart cards and Crystal Point's modem server and PC-Term emulation software, a Boston real estate company solves its connectivity problems.

by Craig Ellison
Special to Focus

Cabot, Cabot, and Forbes, a medium sized Boston-based real estate development company, had a connectivity problem to solve.

Our project managers needed two things: access to the cost-estimating programs and data bases that reside on our DG minicomputers (an MV/10000 and an MV/15000 Model 20), as well as the PC functionality of Lotus 1-2-3 and Microsoft Word.

An evolutionary process

Solving our connectivity problem was not an overnight process. Rather, it has been an evolutionary process spanning the last three and a half years. Our current connectivity solution utilizes Crystal Point's PC-Term, and has only been in place for the last eight months. The road we took before installing it was a real learning experience.

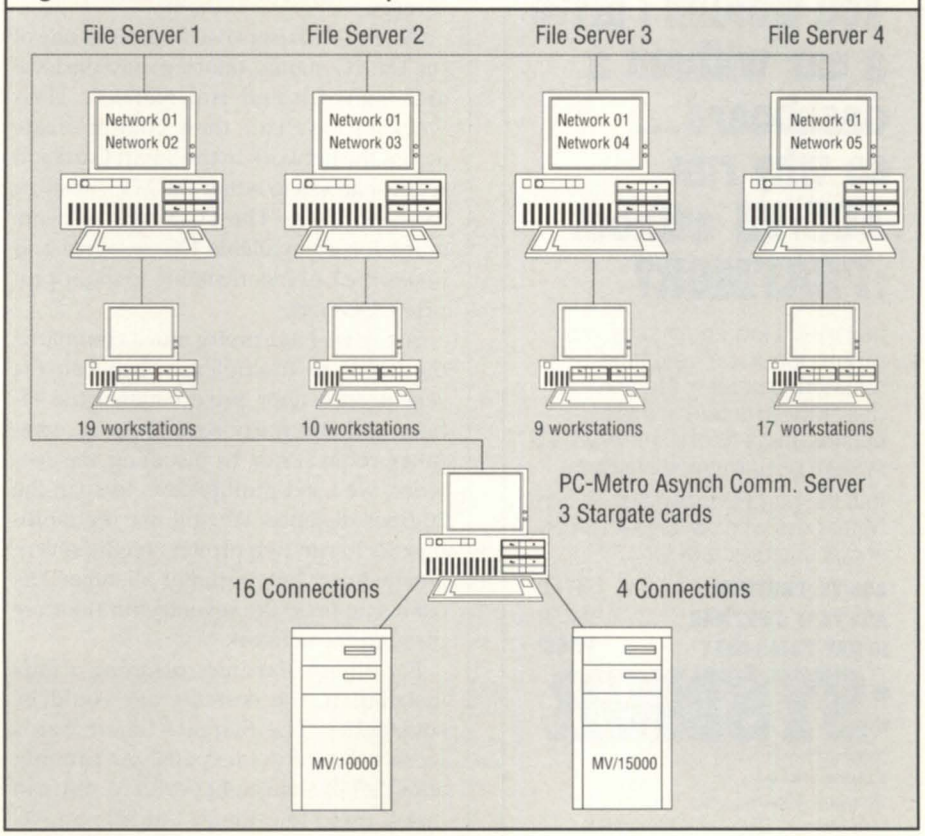
The first step came in mid-1986 with the installation of a Virtual Microsystems bridge board. This board, initially installed in our MV/10000, created essentially four 8086 processes. Performance considerations soon forced us to look for other PC-based solutions. Additionally, with the graphics limitations of our DG400 and DG410 terminals, users could not fully utilize the graphics capabilities of the PC-based software. At a 9600 baud data rate, the screen refreshes were slower than even the slowest PC.

Step two: standalone PCs

The next step in the evolution was the addition of standalone PCs. We installed PC-based applications on the PC, and provided connection to the DG minicomputers via the PC's serial port using terminal emulation software. This achieved our goal of offloading CPU time from the MV/10000, and provided users with the speed and graphics capability of a standalone PC for PC-based software.

This was not the best solution, either. We were adding more PCs and many of these users had only occasional needs for connections to the DG minis. We were running out of IAC ports, and couldn't afford to dedicate a DG port to each PC. We needed to find a way to share our DG ports among our occasional users. We looked at several solutions, and ultimately

Figure 1: Local area network map



chose PC-Term from Crystal Point to achieve our goals.

Modem sharing capabilities

In addition to Data General 410/460 emulation, Crystal Point's PC-Term provides modem sharing capabilities. This feature enabled us to achieve our goal of sharing our Data General resources among multiple PC LAN users.

Crystal Point's technical team suggested we try a PC Smart Card from Stargate Technologies. This card provides eight intelligent RS-232 ports. After we installed the Smart Card on a dedicated PC, we had to install the software, configure the ports, and connect the ports from the Smart Card to the IAC ports on the Data Generals.

The PC-Metro software that Crystal Point included with its PC-Term package was a key tool to communicate across the LAN. PC-Metro is a gateway program that defines and controls the Stargate serial ports, and provides access to defined minicomputer ports. Currently, we have installed three Stargate cards for a potential 24 connections to the Data General machines. Twenty DG ports are connected to provide access to virtually any Novell LAN workstation on any of our four file servers.

When LAN users need access to one of the Data Generals, they log onto the local area network and run Netbios. Their workstations can then communicate across the network to the Smart Card and request access to either the MV/10000 or the MV/15000. The PC-Metro software scans for an available DG resource and hooks the LAN workstation to the appropriate DG port.

So far, we have pretty much eliminated the need for multiplexors between the seventeenth floor project managers' offices and the thirty-seventh floor computer room. Prior to installing the network, we used multiplexors to span the 20-floor distance. We still use the multiplexors to run two printers on the seventeenth floor, but virtually all other DG connections on the seventeenth floor are through the network.

For other companies planning a mux installation, the cost savings could be substantial. The Stargate Smart Cards were relatively inexpensive, running about $700 for an eight port card. You can install up to four Smart Cards in an AT-class machine at a cost of about $1,000.

Months and months

The decision to go with Crystal Point's PC-Term was not a hasty one. We wanted to make sure that PC-Term was fine-tuned to meet our specific applications. I insist on testing a new product in the MIS department for two to three months to examine its functionality and limitations.

Before we released it to our users, the MIS department evaluated PC-Term for about three or four months. There were some minor problems in the beginning, but our MIS department and Crystal Point eventually refined the DG460 emulation to meet our needs.

For example, when we first received PC-Term, it did not emulate the F11 and F12 function keys. Users could emulate F11 and F12 by pressing Alt F1 or F2 keys, but they were used to hitting F11 and F12 on their DG terminals. These are small, day-to-day conveniences that users want. As another example, in the DG world, the "Enter" key to the right of the numeric keypad is interpreted differently than in the IBM world. Instead of being a "carriage return," it functions as "new line." Crystal Point solved both of these problems for us.

Communication via YAK

We found Crystal Point's support during the debugging phase to be very effective. Their technicians set up a "YAK" bulletin board system. When they solved a problem, we dialed into their bulletin board, downloaded a new emulation, and evaluated it immediately in our live environment. This refinement process was much faster than waiting for disks to be mailed back and forth. Turnaround time became a matter hours rather than days.

With PC-Term now in use on a production basis, we have continued to improve our DG/PC connectivity. We are currently running the terminal emulation at 19.2 KB, and have recently integrated PC-Term with Data Bank Associates' file transfer program, Turbotran. Using programs developed in house, our PC LAN users can now extract information from DG data bases and transfer them directly to the local area network. Δ

Craig Ellison, manager of PC systems at Cabot, Cabot, and Forbes, has more than 10 years experience in microcomputer integration.

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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.

CRTEDIT • 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, Userspace, Scan, Glossary, Laminate, and Qhelp. 4,325 blocks.

Kermit • A file-transfer protocol developed at Columbia University. Uses 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.

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:
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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.

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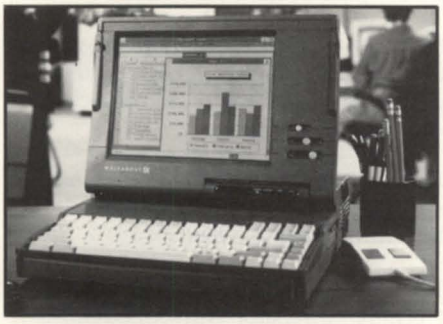
Walkabout gets SX appeal



The Walkabout SX portable laptop

Westboro—DG introduced an SX version of its 386 laptop Walkabout. The battery powered system, priced at $4,995, is based on Intel's 16 MHz 80386 microprocessor. The 386 SX configuration allows users access to software such as MS Windows/386 written specifically for the 32 bit Intel chip.

The laptop features a tiltable, black-on-white, backlit screen that displays 32 levels of gray, and supports color application software. Its display screen measures 10.5 inches diagonally, and offers 640 x 480 VGA resolution, with full compatibility for EGA, CGA, and MDA modes.

Memory runs from one to eight MB on the Walkabout SX system board, and can be expanded in one or two MB increments with 100-ns single in-line memory modules (SIMMs). One 1.44 MB, 3.5 inch floppy disk drive and a 40 MB, 25 ms hard disk are standard. Optional features include an asynchronous 2400/1200 bps direct-connect internal modem with Hayes "Smartmodem" compatibility.

Five ports are built into the new laptop. Two are serial ports, one is a selectable parallel printer or floppy drive port, one is a VGA monitor port, and one is an external keypad port. The Walkabout SX is user-expandable through three dedicated expansion areas—a modem slot, a general purpose 16-bit slot, and the SIMM memory expansion area. If a modem is not used, the modem slot can serve as a second general-purpose expansion slot. The 86-key Walkabout SX keyboard is fully compatible with the IBM 101-key keyboard. Δ

Data General Corp., 3400 Computer Dr., Westboro, MA 01580; 508/898-4074.

Circle 79 on reader service card.

And now, MacAviion

Westboro—uSHARE software from Information Presentation Technologies (IPT), Inc., makes possible Macintosh /Aviion integration. The software package gives users of Apple Macintosh and MS-DOS based PCs access to Aviion's Unix environment.

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MV4000DC 2MB, 120MB, floppy	2,250
MV2000 Enhanced 4MB 160 MB disk	5,200
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uSHARE is fully compatible with Appleshare and AFP (Apple filing protocol), allowing users to see the same interface and access the same applications and services as they would if they were connected to a dedicated Macintosh server. The software includes an electronic mail system based upon the simple mail transfer protocol (SMTP), and sharing of printers and print spooling between Aviion, Macintosh, and MS-DOS computers.

uSHARE is available directly from IPT. Licenses range from $1,195 to $10,000.

Data General Corp., 3400 Computer Dr., Westboro, MA 01580; 508/898-4072. IPT, 5000 North Parkway Calabasas, #304, Calabasas, CA 91302; 818/347-7791. Δ

Circle 80,82 on reader service card

Smarterm 470 goes multi-user

Madison, WI—Persoft, Inc., introduced a multi-user version and an update (version 1.1) of its DG terminal emulation product, Smarterm 470. The new multi-user version, Smarterm 470 for file servers, enables users to share software residing on a network file server and access information simultaneously. Smarterm's version 1.1 includes a 50K memory reduction and faster performance.

The multi-user Smarterm can be configured for a network or customized for individuals. Independent user configurations may be made for specific hardware, soft keys, and setup.

Smarterm 470's single user version requires an IBM PC or compatible that runs DOS version 2.1 or higher, and is priced at $345 for an individual package. The DOS version for the multi-user product depends on the network operating system requirements, and runs $1,495 for five concurrent users and unlimited nodes. Site licenses are also available directly from Persoft.

Persoft, Inc., UW Research Park, 465 Science Drive, Madison WI 53711; 608/273-6000. Δ

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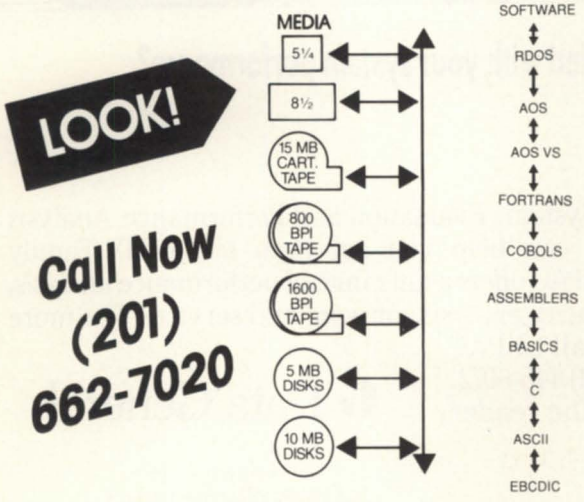

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Circle 74 on reader service card.

of uninterruptable power supplies (UPS), on-line peripherals that "clean" the electrical power flowing to a computer system and provide from 8 to 100 minutes of reserve power when normal utility power is lost.

The new UPS systems are available in power ratings from 350 VA to 1000 VA, and support both Aviion and Eclipse MV systems. U.S. list prices begin at $735 for the 350 VA unit to $1,550 for the 1000 VA unit.

Data General Corp., 4400 Computer Drive, Westboro, MA 01580; 508/870-1452. Δ

Circle 81 on reader service card.

Data General gets AMOS

Omaha—Automated Medical Office System (AMOS) software on Data General computers is now available. AMOS manages patient billing, appointment scheduling, insurance processing, and marketing information for medical practices of one to 150 providers at a single site.

AMOS is immediately available on the Dasher line of personal computers, and will be available on the Aviion family of Unix systems in the second quarter of this year. Δ

Medical Computer Management, 11128 John Galt Blvd., Suite 450, Omaha, NE 68137.

Circle 83 on reader service card.

Aviion under Control

Rockville Center, NY—Hospital materials management software from AMS is now available on DG's Aviion workstations. Called AMS Control, the product is the only materials management system created specifically for hospitals. Control offers bar coding, vendor performance analysis, multi-location purchasing, and reorder management capabilities.

Control is already compatible with IBM and DEC platforms, but increasing hospital demand for RISC technology swayed AMS to port to DG's Aviion, according to the company's vice president of marketing, Matthew Ehrlich. Δ

AMS, 55 Maple Av., Rockville Centre, NY 11570; 516/764-5953.

Circle 78 on reader service card.

ZIM for Unix

Ottawa and Dallas—Zanthe Systems' ZIM, an entity-relationship (ER) based fourth generation language relational data base management system is now available on the Aviion platform.

ZIM is used mostly in the development of application solutions. Its family of products includes a runtime and query runtime system. Prices for the Aviion begin at $3,525.

Zanthe Systems Division, 38 Antares Dr., Suite 1200, Ottawa, Ontario K26-7V2, Canada; 613/727-1397. Δ

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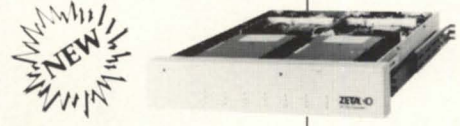

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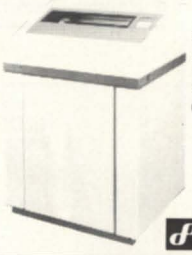

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ON-LINE HELP

Who to call for answers about NADGUG *and* FOCUS

NADGUG

Membership, address changes
Jennifer Foye **800/877-4787**
(Outside the U.S.) **512/345-5316**

Information on RIGs or SIGs
Greg D. Goss **800/877-4787**
(Outside the U.S.) **512/345-5316**

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Editorial comments, article suggestions.....Robin Perry
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- SIG/UX (Unix)
- SMBASIC

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.

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As promised, **Data General** revealed a new plan for managing its international affairs by placing DG Executive Vice President **Herbert J. Richman** in charge of international sales and service. The international market has become increasingly important to Data General, with revenue in that area nearly doubling in the past five years. In fiscal 1989, international revenues reached $672 million, for the first time surpassing domestic revenues.

Richman will be responsible for sales and service activities in Europe, Australia, New Zealand, and Asia. **Angelo Guadagno**, vice president of U.S. sales and service, has expanded responsibilities, including Canada and Latin America. **Anthony Nicoletti**, vice president of sales support and planning, was named vice chairman of the board of directors of **Nippon-Data General**, the company's Japanese subsidiary, and vice president responsible for Japan.

New to DG's global front is **Lindsay Yelland**, who was appointed vice president and general manager of Asia Pacific Sales and Services. He held a similar position at **Apollo Computer, Inc.**

Richman and Guadagno report to **Ron Skates**, DG CEO and president. Nicoletti, based in Tokyo, and Yelland, in Singapore, report to Richman.

■

Did you know that Data General is one of the few U.S. computer companies that design, develop, and manufacture computers in Japan for the Japanese market?

■

Russian officials of **Perekat** recently held their first board meeting in the United States and toured DG's Apex manufacturing plant in North Carolina. Perekat is a joint venture between a Soviet software organization, **NPO Parma**, an Austrian industrial automation firm, **Voest Alpine Industrienlagenbau**, and Data General. The anticipated outcomes of the venture are modernization of Soviet manufacturing plants, and marketing of jointly developed computer and industrial technology to businesses in Russia.

NPO Parma's Nikolay Artimov and Valery Borduger

■

By the way, the name Perekat is a derivative of a Russian word meaning "the point in a river where water flows most rapidly." An appropriate title, explained **Nikolay Artimov**, director general of NPO Parma, because "we hope to get our products into use quickly."

■

Adding to its list of healthcare solutions, Data General signed a value-added reseller agreement with **Tingley Systems, Inc.**, of Florida. Tingley offers Unix-based applications, and has provided turnkey solutions to the managed healthcare industry since 1977.

■

NPA Systems of California, Inc., has named **William H. Evans** director of technical services. Evans is a former senior engineering technician group leader for Data General. He is responsible for supervising, directing, and implementing NPA's data disaster recovery services for Data General systems.

■

Recognition for the Aviion . . . Data General signed a reseller agreement with **Recognition Equipment, Inc.** of Dallas to market document processing imaging applications on Data General Aviion systems and Dasher workstations. Recognition's System 100 is aimed at banking, insurance, government, and transportation markets. The products and services to be purchased by Recognition have a projected value of up to $30 million.

■

The new AOS/VS and AOS/VS II Training Services Catalogue from **Data General Educational Services** is now available. The catalogue offers DG customers the opportunity to send away for an additional "skill checker" brochure, which will enable them to effectively analyze their strengths and weaknesses with AOS/VS and AOS/VS II. For more information, contact Data General Corporation's Educational Services Department at 617/366-8911.

■

Water under the bridge . . . Data General may have to rebid its winning proposal to outfit the **U.S. Department of Interior Water Resources Division** with 6,000 Aviion computers. The other two contenders in the final running filed protests with the **General Services Administration** over the awarding of the contract, which would automate the Water Resources Division over a seven-year period at a cost of approximately $127 million.

SMS Data Products' contention that Department of Interior contracting officials improperly disqualified SMS on procedural grounds was upheld by the GSA administrative appeals board. The GSA ruled that the Department of Interior must provide the opportunity for Data General, SMS, and **Lockheed** to resubmit their bids.

Data General said that it believes the administrative board's decision is erroneous, and it will vigorously pursue reconsideration, and other actions, as appropriate. The GSA appeals board rejected a protest from Lockheed, which contended that DG was not technically compliant with the bid. Δ

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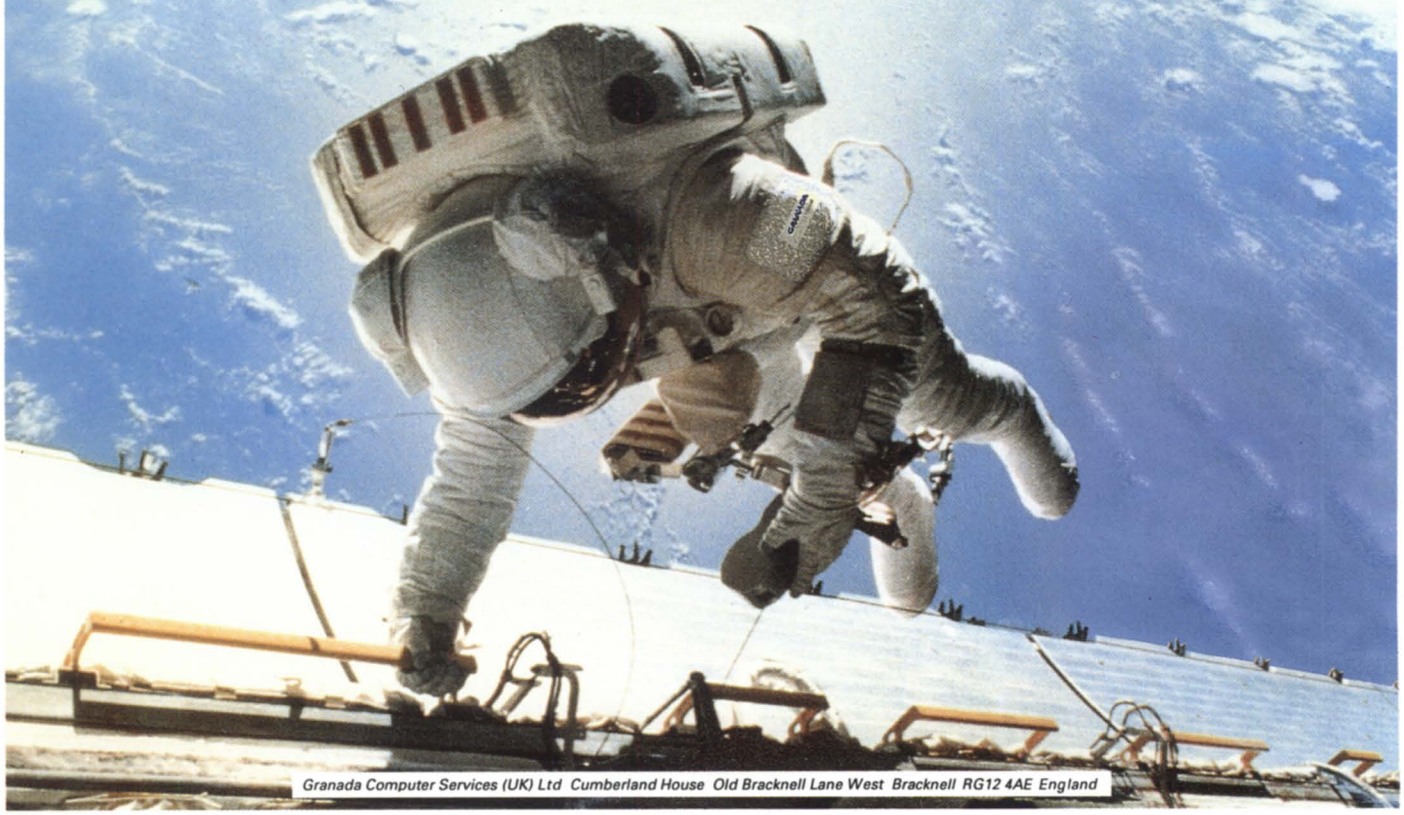

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