Patricia Seybold's

UNIX IN THE OFFICE

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PRODUCTS • TRENDS • ISSUES • ANALYSIS

AFCAC 251

Defining the Future Unix Office

By Judith S. Hurwitz

IF THE CINDERELLA story were being written in 1987 by a computer industry storyteller, it might be based on the U.S. Air Force Computer Acquisition Center (AFCAC) Project 251. For those who haven't yet heard the tale, AFCAC 251 is the largest government request for proposal (RFP) ever for 22,000 Unix-based office systems over a 96-month period. At its basic level, the bid is thought to be worth at least $3 billion. The potential follow-on business from civilian government agencies could swell the total to $8 billion. Therefore, it is not surprising that all the fair maidens in the land are hoping that the glass slipper (the conditions of the RFP) will fit what they have to offer.

The entire computer industry is *(continued on page 3)*

• E D I T O R I A L •

Apple Throws down the Gauntlet

Will the Unix World Accept the Challenge?

By Patricia B. Seybold

APPLE HAS SET an industry standard once again with the new HyperCard software program for the Macintosh. HyperCard does for end-user programming what the Mac user interface did for personal computing. It ups the ante by demonstrating clear leadership in usability and accessibility.

HyperCard is a multimedia application development environment designed for end users by Bill Atkinson. It uses the principles of hypertext/hypermedia. Professor Andy van Dam of Brown University, a hypermedia practitioner, offers the best definition of these concepts: "*Hypertext*, a term coined by Ted Nelson, describes both an author's tool and a reader's medium. A hypertext document system allows authors or groups of authors to link information together, create paths through a corpus of related material, annotate existing texts, and create notes that point readers to either bibliographic data or to the body of referenced text. By extension, the word *hypermedia* denotes the functionality of hypertext but with additional components such as two- and three-dimensional structured graphics, paint graphics, spreadsheets, video, sound, and animation. With hypermedia, an author can create links to complex diagrams, texts, photographs, video disks, audio recording, and the like."

Apple's HyperCard is a tool based on the hypermedia concept that will enable users who have never written a line of code in their lives to create useful and exciting applications. It supports bit-mapped graphics, text, sound, and video. Objects in HyperCard have underlying HyperTalk scripts. Users use HyperTalk, a programming language, to write scripts, create objects, use the library of objects that comes with HyperCard, or use other users' HyperCard objects. HyperCard, as yet, is neither a multiuser tool nor a tool that facilitates group activities.

THE CHALLENGE. Apple has set the standard in user interface design. Now Apple has upped the ante in end-user applications development by introducing a tool that is essentially free (it comes with every new Mac and costs $49 as an upgrade), that encourages the design of multimedia applications, and that is easy for and alluring to most computer users. Will HyperCard be implemented for Unix boxes? Probably. But, since HyperCard as defined by Apple is essentially a single-user tool, it is likely that a Unix port may miss the mark.

What we'd like to see is a true multiuser, hypermedia application development environment for end users (programmers could use it, too) in the Unix environment. It would, of course, be highly graphic in nature and adhere to the burgeoning user interface standards: XWindow, Apollo's new Open Dialogue (see page 18), or Adobe's PostScript (the basis of Sun Microsystems' NEWS interface). But it would go beyond the notion of supporting individual productivity to encompass the Unix/research community's heritage of collaborative work. The Unix tradition supports group computing and multiuser applications. The Unix tradition espouses shared objects, user-generated scripts, and distributed computing. The Unix tradition does not, however, excel in the end-user accessibility of its development tools nor its applications.

We are grateful to Apple for upping the ante. Will any Unix supplier step up to the challenge? ◐

Patricia Seybold's Office Computing Group

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•AFCAC•

(continued from page 1) watching this bid with great anticipation. We have heard that more than one job is on the line if a potential bidder loses out. But, beyond the dollar value, the bid has important implications for both the future of Unix and the shape of office systems for years to come.

Unix: At the Heart of 251

The Air Force decision to require Unix as the operating system is no surprise. For years, the federal government has been anxious to require standards in every area, from languages to microcomputers. It is interesting to remember that Cobol and Fortran—two of the most popular computer languages ever written—were developed because of governmental standards requirements. Likewise, Ada, a derivative of Pascal, was developed because of U.S. Navy requirements for a standard language for computer, command, and control applications.

The competition is so fierce that some software vendors are porting software at no cost to become part of a bid.

Standards in computer hardware and software have long been a goal of the government. For its large installed base of systems, minimizing the need for training, programming, and development makes sense. Unix is attractive because it provides a single operating system to which applications can be ported with relative ease. The use of one type of multiuser system with a single operating system by everyone in the Air Force will enhance the ease of communications between systems and reduce training and maintenance time. These factors, added to the growing popularity of Unix, were another impetus for the government to embrace Unix.

Setting Standards

The effects of this set of requirements will filter down to the rest of the industry by default. For example, the Air Force has required AT&T's System V and intends to migrate to the emerging Posix standards once that standard has matured. Posix is an international standards organization that aims to take the supervision of the standardization of Unix away from AT&T's direct control. In effect, this requirement mandates System V as an interim industry standard and adds credibility to the Posix standard. It also marks Berkeley as an also ran. And mandating AT&T's testing suite, SVID, validates AT&T's role as the Unix standards policeman.

Naturally, the adoption of AT&T's System V by the Air Force has generated controversy. DEC, for example, has issued a protest, contending that the requirement of AT&T's version of Unix biases the bid towards AT&T and away from DEC's own version of Unix, a Berkeley derivative called Ultrix. This will cause the bid to be delayed for a yet undetermined length of time. It is interesting to note that DEC has announced plans to modify Ultrix to make it compatible with AT&T's System V. In January 1987, DEC announced Ultrix 2.0, which was System V (SVID compliant) with support for BSD 4.2 and 4.3. At the time, DEC also promised to migrate to the Posix standard. DEC may actually try to stall the bid until it can bring Ultrix 2.0 to the market.

The Scope of AFCAC 251

To appreciate the ramifications of the RFP for AFCAC 251, it is important to review the various areas where the Air Force has specified requirements. These areas range from the architecture to the paper-handling (see box "The Requirements," page 10). Needless to say, it's a tall order to fill.

Because the requirements are so broad that no one vendor could possibly be expected to meet them all, vendors are making alliances in order to bid. The competition is so fierce that, we've heard, some software vendors are porting software at no cost to become part of a bid. Hardware vendors have developed new hardware specifically intended to meet the bid requirements. As a result, you may have noticed a few Unix hot boxes announced over the last few months that are multiuser systems accommodating from 8 to 64 concurrent users and including DOS running over Unix, a host of software products, office automation software, and the like. You may also have noticed that more vendors are including the popular Unix-based relational databases as part of their product lines.

Putting the Pieces Together

While it is interesting to speculate on which vendor (or group of vendors) may eventually win AFCAC 251, the more important issue is what such a bid will mean to users. We believe that the net effect will be positive for end users and vendors alike. In the following section, we will discuss the details of the RFP and their ramifications for the future of Unix office systems.

Architecture

The AFCAC 251 RFP calls for a multiuser system that can support from 8 to 64 concurrent users—without requiring a charge-out of peripherals. In addition, each CPU must be a 32-bit processor with a minimum of a 32-bit data path. This can be achieved either with a single processor or multiple processors; the RFP does not rule out a network of small processors. The I/O bus must be at least 32 bits wide. A floating-point arithmetic processor that handles both 32- and 16-bit floating-point arithmetic is required.

Because of this requirement, we expect that vendors will bid either the Motorola 68020 or the Intel 80386. Naturally, the DEC VAX architecture or Hewlett-Packard's (HP's) RISC machines would also meet these requirements.

Data Communications

Given the fact that AFCAC will place these systems around the world (including locations in Japan, Korea, Guam, the Phillipines, Puerto Rico, Europe, Turkey, Iceland, Panama, and the Azores—to name a few), communications is a key component of the bid. Modems must be switchable from speeds as low as 9600 to 19.2K. Data communications ports must meet CCITT standards. All hardware, software, and cables will be attached to an IEEE 802.3 10 Mbps baseband LAN interface unit. Terminal interface includes industry standard RS-232C as well as MIL-STD 188-114 communication lines. These lines should be two-wire and four-wire twisted pair voice grade or coaxial for long-distance communications. For applications requiring direct connection at high speeds for extended distance, the RS-422A interface will be required. Transfer rates will be a minimum of 9600 bps up to a distance of 1,000 feet. All local networks will have to connect to the standard multiuser small computer systems via the Defense Data Network (DDN). DDN is a Transmission Control Protocol/Internet Protocol (TCP/IP)-based network that will migrate to the full International Standards Organization (ISO) standard when it becomes available. The interface to DDN will enable data files, programs, and electronic mail to be exchanged with heterogeneous DDN-standard X.25 host computer systems. International networking will be achieved via an X.25 network.

A critical component of the proposal is that all the 130,000 microcomputers already procured by the Air Force (a bid won by Zenith) must be able to serve as workstations on these systems.

A critical component of the proposal is that all the 130,000 microcomputers already procured by the Air Force (a bid won by Zenith) must be able to serve as workstations on these systems. These include Zenith Z-120 and Z-248 micros. The protocol to achieve this interconnection is IBM's Network Basic Input/Output Systems (NETBIOS) standard. Communications between the CPUs and nonintelligent terminals will be via asynchronous communications, not IBM's Systems Network Architecture (SNA), which is a long-term requirement. At the same time, the RFP demands that, in addition to running Unix, the micros that will be workstations must be able to run DOS. Therefore, DOS over Unix will be required. This is certain to be a boon to companies like Locus Computer and Phoenix Technologies, which both offer such products.

Although the communications requirements within AFCAC 251 are not startling, they do exemplify the desire of the Air Force to meet standards. X.25, RS-232, and 422A are standard interfaces, and NETBIOS is rapidly gaining acceptance as a standard. This highly publicized RFP can only help cement these standards. The inclusion of a DOS and Unix overlay further confirms links between these two standard operating systems.

Software

Perhaps the most significant and most interesting aspect of the AFCAC 251 RFP is its software requirements. It is interesting for what it specifies directly and what it leaves vague. The requirements for future enhancements are also revealing.

We will discuss the software requirements at several levels. First, we will look in general at what AFCAC calls office automation requirements, the database management system (DBMS). Next, we will examine the requirements for functional integration. Finally, we will look at the component parts of that integration including electronic filing, spreadsheet, word processing, electronic mail, calendar, business and composition graphics, statistical analysis, and project management.

OFFICE AUTOMATION REQUIREMENTS. There was a time when office automation (OA) meant simply document handling. Now, it encompasses a great deal more. We were impressed by the Air Force's awareness that the emphasis in office computing is on the database. We noted that the section of the RFP on OA software begins with the statement "Databases produced by the office automation system should be in an integrated common format such that all specified office automation software can access, utilize, and integrate all data and graphics."

Database Management System. The database is a key component in the RFP. Specifically, AFCAC 251 requires a relational database (RDBMS), a wise and predictable move. Equally predictable is the requirement of SQL as a query language (patterned to conform to ANSI Standard X.3.135-1986). The implementation of the database must be either in C, Cobol, or Ada. The database itself must consist of tables.

The requirement that the database store ASCII files and be compatible with the proposed office automation system could have important implications. Unlike other requirements, this functionality is not spelled out, but is left vague. One vendor might interpret "compatibility" simply as the user's ability to move a database report into the word processor. Another vendor might interpret it as an opportunity to create tight integration between the database and various office functions. We hope that vendors would develop sophisticated, highly integrated solutions.

Some other requirements include:

- The ability to define synonyms for elements in the data dictionary that can be stored for future use
- Formatted screens and prompting for online input into the data dictionary
- The ability to search for rows or columns using special alphanumeric characters or wild cards
- Online help at any level

The users should also be able to extend the RDBMS functions without changing or recompiling existing applications processes. This means that the user should be able to add functions without affecting the user interface. The changes would also have to be transparent to any routine written in SQL. Recovery is a key requirement; utilities must be available to recover the database if it should crash. Also, there should be a transaction journal of data modifications and database restoration, including records of all data modifications and restoration to include roll-forward of data.

We could find no references to Compound Document Architecture. This RFP would have been an ideal opportunity for the Air Force to push this important emerging standard.

Fourth-Generation Language. Included as part of the database is the requirement for a fourth-generation language (4GL). Like most software requirements of AFCAC 251, the 4GL is supposed to be easy to learn and use. Specific features include a database query and updating facility, a mechanism to generate reports or to interface with the interactive report writer that will be part of the proposal. The 4GL will access data from the database dictionary and will provide menu and screen generation.

In general, the characteristics of the 4GL are vague. Therefore, most vendors will probably propose existing products, and we will not see any leading edge languages developed.

Interactive Report Writer. The specifications for the 4GL are comparable to many existing interactive report writers. We are told that the report writer must format, edit, calculate, perform logic operations, and write to any specified output device. The report writer must support up to nine control breaks and a minimum of 15 columnar totals as well as summation lines.

Report writers are notoriously unfriendly and hard to use. Therefore, we were intrigued that ease of use and learning are not mentioned here. This would have been another opportunity for some state-of-the-art development in user interfaces.

FUNCTIONAL INTEGRATION. The Air Force definitely wants integration of functions within the office automation software, but what is meant by integration is left vague. The RFP reads, "At a minimum, the level of integration of the various office automation tools described below shall allow the user to easily move data and graphics from one tool to another without retreating to a higher command level."

This can be interpreted in at least two different ways. It might mean that a user should be able to access word processing while in the database by selecting a word processing function key. In this case, the user might leave the database function completely. On the other hand, it could be interpreted to mean that the user could have a multiwindowed environment where a word processing document could be created in one window while a database file is open in another. The RFP requires that function keys be consistent from application to application. For example, if the PF 2 key is an insert key in the database application, it should perform an insert function in the word processing software. Vendors will also be required to provide interrupt capabilities so that a user can interrupt one function, say a database query, start a word processing function, and be able to return to the same spot in the database. Though menus are not required, bypass for experienced users is.

We would hope that software vendors preparing to bid would take the high road and provide as complete an integration as possible. Windowing may be the best way to ensure that users are able to access several functions easily. And indeed, although vendors are not required to use a windowing environment, at least two windows are required within word processing. It is interesting (and somewhat distressing) to note that the bid does not require windowing software at all levels.

In another section of the RFP, the factors determining acceptance are stated as: "The extent to which integrated documents, data, text, and graphics can be integrated and moved between the various office automation functions...". In addition, acceptance is based on the ability of the various software functions to allow users to shift between functions and return immediately without "labor intensive intermediate handling or reformatting."

We could find no references to Compound Document Architecture. This RFP would have been an ideal opportunity for the Air Force to push this important emerging standard. A compound document architecture would provide a framework to enable parts of different applications to be easily integrated. Many vendors, including IBM, DEC, and Wang, are developing such architectures for their future systems. The Office Document Architecture (ODA) is being developed as a standard for Compound Document Architecture.

Indeed, for a vendor hoping to be chosen (will the glass slipper fit?), these "factors" must seem subjective and hard to

fathom. If the industry were able to agree on the ideal definition of system integration, all systems would be integrated in the same way. Therefore, it is not surprising that vendors are madly dashing about trying to achieve perfection against an elusive standard.

We would hope that some vendors will take these challenges to heart and create some impressive solutions that will surpass what we have seen thus far so that the standard for acceptable integration of office systems will find a new high point.

Electronic Filing. With the amount of paper work generated by the government, it is not surprising that the Air Force would be very concerned with the storage and retrieval of documents. The RFP not only requires that all "relevant" materials be stored electronically, but also that there be indexed database retrieval methods to get access to information. The RFP requires scanners and OCR devices so that paper-based information can be stored electronically.

The word processing package that will be generated by the RFP will be sufficient for most needs, but it is not at the leading edge of technology.

Typically, records management systems are separate entities from office automation systems. With the exception of traditional minicomputer-based and server-based LANs running strictly word processing software, most vendors do not yet combine OA systems with records management software that cuts across functions ranging from word processing documents to database searches to scanned images. For example, the system, "upon inquiry, must provide the number of records on each file in the central file, the average length of each record, total current file size, file size by time frame, type of record by disposition code, and historical/prior-years' information by the same parameters." Keyword indexing is required. Also, users must be able to search by any field in the index, including keyword search patterns. Although this extensive capability is technically feasible, it will present a challenge to most traditional Unix office software vendors.

Spreadsheet. The list of the characteristics for spreadsheets reads like the specifications for a traditional PC spreadsheet package. Requirements include such common functions as linking spreadsheets, storing variable-length text strings in cells, online help, left and right justification, centering of numbers and text at the option of the user, sorting columns containing numbers and text in ascending and descending order, and protecting and unprotecting selected cells. Integration of the spreadsheet at any level with other office software is not indicated.

Word Processing. Most of the requirements for word processing are the straightforward capabilities of most standard products available on the market today. These features include saving multiple page formats (such as margins and tabs), line centering, indentation, underlining, left and right justification, boldface, single and double spacing, page breaks during editing, and automatic adjustment of page breaks when text is added. Other characteristics include move, copy, search/replace including global search/replace, and automatic page numbering. A not-so-common requirement is for logical or physically concatenating multiple files. Interestingly, the RFP initially called for screen-oriented text, which means that characters such as subscripts and superscripts as well as graphics will have to be displayed, or WYSWIG (What You See Is What You Get). However, vendors requested that the Air Force reduce this requirement because of its technical difficulty (see Dialog box page 8 for an explanation of the bidding process). Graphical characters will be indicated with a special character representing, for example, a subscript or superscript. On the other hand, business graphics must be displayed within word processing. Other requirements are automatic hyphenation and automatic decimal-aligned columns. Another interesting feature is forms fill-in capability, with the ability to tab to the next entry block. For example, vendors will have to allow users to create forms and mask preprinted blank forms. The user must be able to index forward and backward from field to field, type over previously entered data, and automatically reformat and enter data into blank fields. Footnoting with a direct tie-in to text is required. The windowing requirement is quite clear in the word processing section. Users must be able to have at least two windows and be able to edit material from either.

Conversion is another important requirement within word processing. The RFP requires Word Star Version 3.3, Multimate Version 3.3, Peach Text 5000, ASCII, Enable, and Convergent Technology word processor Version 10.2 to convert all unique formatting codes from the original word processor to that of the offered word processor and from those of the offered word processor to the code of each of these products. The U.S. Navy Document Interchange Format (DIF) must also be supported. This will require vendors to do some extra homework.

The required spell checker contains at least 80,000 words in the primary dictionary and allows for a minimum of 20,000 words in a supplemental dictionary. A user will be able to choose from a list of possible correct spellings and will have the option of global or selective correction.

The word processing package that will be generated by the RFP will be sufficient for most needs, but it is not at the leading edge of technology. We would have liked to see more emphasis on procedural automation features. For example, a user should be able to set up a series of processes in advance and recall them with a single keystroke (such as the ability to create complex macros within WP). Advanced word processing functions such as outlining and math functions are not mentioned in the RFP.

We think these functions should be added.

Electronic Mail. Electronic mail capabilities are fairly common to most systems available in typical minicomputer and mainframe systems. Typical functions required include the abilities to send messages to users on other systems including those interfaced to DDN; to send messages to distribution lists; to create new distribution lists; to notify users when they receive messages; to allow users to reroute messages; to insert text files as parts of messages; to automatically identify message originator, date, time, and subject; and to allow users to delete, store, forward, answer, or queue mail for future delivery. The system needs to have a "registered mail" capability. An interesting feature includes the ability to notify a user if a registered mail item hasn't been read within a specified period of time. One challenge for vendors will be a requirement to provide a conversion utility to and from Convergent Technology's CT-Mail.

The Air Force realizes that if such a mammoth group of systems and software is to be installed without tremendous chaos and agony, learning has to be fast and relatively painless.

Calendar. Many of the specifics about how the calendar operates seem to be left to the discretion of the individual bidder. The Air Force's main concerns seem to be with the look of the display (80 characters for the daily calendar, 40 for the weekly, and 20 for the monthly). The other critical area appears to be meeting scheduling. The system will be able to search specified user calendars to find the best date and time for a meeting. Perhaps because we are dealing with the military, the calendaring function will allow an individual to actually reserve space on someone else's calendar (this isn't something we usually like to see happen). The system also requires a full listing of all users on the electronic mail system.

Business Graphics. Graphical display and output is an important requirement within AFCAC 251. Vendors are expected to provide a wide array of capabilities, including generating (at a minimum) pie, horizontal, and vertical bar graphs; line- and scatter-plot diagrams; charts; and text-only graphics. Interestingly, the Air Force wants graphics to be interactive with all subsystems within the system. Users should be able to add text to graphics, to shrink and enlarge graphs, and to edit for size, type style, color/pattern/shade, and location. The vendor will have to provide at least four font types and sizes and at least eight distinct colors and line patterns. Other requirements include multiple line-type segments, multiple types of shading and filling, and definable color vectors. In addition, the ability to add labels for graphics interactively and in color must be available. No free-form graphics (a la Mac) are required.

Composition Graphics. Sophisticated software is required for creating illustrations interactively with a digitizer tablet in combination with the keyboard and a command menu. This requirement is specifically for storing diagrams and maps used by the Air Force. An image must be immediately viewable on the monitor as it is being created, and the user must be able to create and place text within a picture and be able to scale and rotate text.

Statistical Analysis. Characteristics of the statistical package are standard in many common products on the market. Requirements include descriptive analysis, variance analysis, correlation analysis, regression analysis, time series analysis, nonparametric tests, distribution functions, and trend analysis. The system must have the ability to print and plot the results of these analyses. One hitch in an otherwise straightforward request is the need to provide a utility to convert statistical data created on the Z-248 using Microstat.

Project Management. Including project management as a capability within an office package makes perfect sense. We hope that this may start a trend so that more vendors will make project management a necessary OA component. Some requirements of the RFP are the abilities to chart a minimum of 100 tasks/projects, output to GANTT and PERT chart formats, and the capability to automatically combine two projects into one. The Air Force wants to see software address critical path management by calculating the starting and ending dates for tasks, and even to indicate which tasks must start on time and which can wait. It would also like to be able to play "what if" games with project management to determine what would happen, for example, if one part of the project were three days late. And, just when it looked manageable, the Air Force wants another conversion utility: this time, to convert data from a project management package called Timeline to the proposed software.

Training Requirements

TRAINING COURSES. The Air Force realizes that if such a mammoth group of systems and software is to be installed without tremendous chaos and agony, learning has to be fast and relatively painless. This is obviously why the phrase "ease of use" is sprinkled throughout the RFP. The task is awesome. Training will be needed at just about every level throughout the government. Training requirements will range from teaching users how to log on to teaching programmers how to use a required language. The RFP says, "Training will be provided at the following levels: systems orientation (non-ADP experienced user personnel), systems administrator/operator, maintenance, systems programmer, systems utilities, bar code equipment operation, relational database management system and interactive report writer, communication software, Ada programmer, Pascal programmer, C programmer, 4th Generation Language,

The Dialogue

Usually when a vendor is preparing a proposal for a potential customer, the sales rep can call the customer and ask questions about the contents of the Request for Proposal (RFP). Because of the size of this RFP and the number of vendors, all questions must be submitted in writing. Needless to say, these make for some interesting reading. We thought you'd find some of the questions and anwers interesting, too. Here are a few samples:

Question: Who has the responsibility to make the connection to the CT-B25 (Convergent Technology) PC work?

Answer: The Government.

Question: Are the following LAN components required to be provided in this RFP?

a. LAN controllers for GOE Workstations
b. Comm servers for the LAN
c. NETBIOS for GOE Workstations
d. IEEE 802.3 transceivers and transceiver cables

Answer:
a. No
b. No
c. No
d. No

(Reference: Section C, C10.a(1) and C10.h(2), pp. C-9 and C-10)

Question: Are these paragraphs in conflict?

Answer: No. The vendor is required to provide a port for connection to a GOE media access device such as a broadband radio frequency modem.

Question: Can the contractor require the government to load and use new software releases?

Answer: No. The government reserves the right to load or not to load software releases.

Question: In the RFP, it states the government "reserves the right" to verify the functional conformance with SVID by using SVVS. If the government exercises this option to verify the SVID, will it supply the SVVS program?

Answer: The government test team will verify the conformance with SVID by utilizing the government SVVS program tape carried to the test site(s) by the team. The offerors, if they desire to "pre-test" their SVID conformance, should obtain the SVVS program tape on their own.

Question: The government's requirement for vendors to demonstrate CAI modules for third-party proprietary software is unreasonable. Will the government allow vendors to substitute representative, already developed CAI packages to avoid incurring the expense of creating these packages for proprietary third-party software?

Answer: The offerors must demonstrate the CAI packages as stated in LTD Manual paragraph 7.5.11 and further defined in Section C, paragraph C30.

Question: Does the Government truly expect and require that, over a 96-month contract life for software, both maintenance releases (correction of errors, improvements, etc.) and major development releases (major expansion/addition of capabili-

and user software familiarization courses." Other courses will be in areas such as electronic filing, spreadsheet, word processing/spelling corrector, electronic mail, project management, graphics, and statistical analysis.

To solve its enormous training problem, the Air Force is putting the onus on the vendors. Online contextual help is required for just about every piece of every component. And the Air Force wants to make sure that it will be easy to read. While most vendors have some online help, no vendor has the extensive help facility the Air Force wants.

COMPUTER AIDED INSTRUCTION. Computer Aided Instruction (CAI) is another critical component of the training requirements within AFCAC 251. In fact, vendors are required to provided CAI for every function for which a course will be offered. In addition, certain functions, such as backup, file transfer, and tape dump handling, will only be taught via CAI.

Although CAI is such a critical component of the proposal, the Air Force is not specific about how the instructional material should look. In fact, the only guidelines vendors have is, "Both [host-based and PC-based applications] must be interactive and user friendly...Students taking these training courses will be functional users with little or no computer expertise."

Therefore, very little information is given about how the instructional material might look. More specific requirements might have resulted in upgrading the efforts of vendors to create state-of-the-art training packages. Because the Air Force is allowing vendors to decide exactly how training packages will look, the end result could go in two possible directions. On one hand, the product will be less interactive and easy to use than we

ties, features, functions, etc.) be provided *without additional charge* to the government?

If the answer is yes, will the Government disallow pricing for said maintenance and major development releases being "factored in" over the 96-month software contract life in the initial pricing proposal from Section B?

Answer: Section B, Table B-6 allows pricing for software maintenance. Latent defects must be corrected at no additional charges to those already provided for in Table B-6. The government's intent is to receive corrections of defects without having those corrections lumped into new "development releases" that the government may not need or desire.

Question: The government expresses a requirement for applications portability between all systems that meet the SVID requirements. Would the government confirm it requires only source code portability?

Answer: Source code portability is the requirement.

Question: Will the government provide the proprietary codes and formats for CT-Mail, Multiplan, WordStar Version 3.3, MultiMate Version 3.3, Peachtext 5000, Enable, CT Word Processor Version 3.0, the Request Database Managment System, and Timeline?

Answer: No. Locating the proprietary codes and format of the above software packages is the responsibility of the vendor.

Question: Is the identification of a graphics area within a word processor file satisfactory?

Answer: No. The graph must be displayed.

Question: Are nondisplayable super/subscripts, nondisplayable headers/footers, and nondisplayable broken underlines allowable if the word processor prints this information correctly?

Answer: No. Everything must be displayed. However, special characters may be used to indicate presence on the screen in lieu of actual characters.

Question: Does the government really want a user-updatable primary dictionary?

Answer: No. C24.d(1) will (be) changed in Amendment 0003 to read: "must have at least an 80,000 word primary dictionary."

Question: How will the government normalize bid costs/prices for vendors required to pay royalties to AT&T for Unix licenses, given that AT&T will have an unfair competitive advantage in a procurement specifying SVID compliance/functional conformance?

Answer: Though vendors are not prevented from offering a licensed Unix operating system, it is not a minimum mandatory requirement; therefore, the evaluation will not normalize bid costs/prices based on royalty payments.

Question: Please provide evaluation criteria for secure database performance.

Answer: No

would like to see. On the other hand, if well-designed, the CAI requirement may set a new standard of training among Unix vendors that will have a positive impact on the user community. In either case, an abundance of training can only help users.

The Human Factor

We were impressed overall with the emphasis in the RFP on three factors: ease of use, ease of training, and ease of integration. As an example, "...all software requiring user interaction must be designed for minimum training requirements and ease of use (user friendliness)." Considering the depth of software requirements, this should set a good precedent for vendors—especially vendors in the Unix marketplace.

The Future Look of AFCAC

Part of the RFP calls for vendors to be prepared to add functions when technology is available. These requests reflect of the technology directions that many users are also waiting for. For example, the Air Force is very interested in voice recognition technology. It would like to have its users speak commands into computer systems. Also, it would like to use expert systems as an aid for decision support.

Like many end-user organizations, the Air Force is looking for an increased use of graphics as a means to integrate and present complex ideas and relationships. Also, the Air Force would like vendors to add new storage devices and technology such as CD-ROM (although not specifically named). Other ca-

pabilities on the wish list include:

- Improvements in communications technology, including advances in modem technology
- Advancements in processor technology that will increase throughput
- Advancement in memory technology and capacity

Summary: The Implications of AFCAC 251

It would be foolhardy to believe that such an enormous RFP could be without controversy. Vendors are deeply embroiled in the battle. Employees' jobs are said to be on the line if their employer does not win this decade's glass slipper award. Some vendors are challenging the validity of the RFP. Others have decided that the requirements are so broad and so costly that they will not bid at all. Others are sitting back and waiting to see what will happen. Still other vendors have decided to pour massive resources into winning the prince's affections. At the end of the story, when the maiden becomes the princess, what will AFCAC 251 mean? What effect will it have on the Unix and office systems market?

We believe the major implications will be in the areas of ease of use, Computer-Aided Instruction (CAI), and functional integration. The Air Force, in reality, is no different than any other user of office systems, though on a grander scale. Any end user faced with implementing a new system for a corporation must be concerned with the same issues that the Air Force is grappling with. Because of the vast numbers of users that will have to be trained in a short time, the Air Force has taken the only viable approach. It is requiring that systems be as easy as possible to use.

However, unlike most end-user organizations, which are forced to deal with whatever technology the vendors are able to pull off the shelf, the Air Force can make demands. As a result of this RFP, end users should be able to gain access to much more training material in the form of easy- (or at least easier)-to-use computer-aided instruction. The system improvements that will result from AFCAC 251 should make office software at least a little bit easier to use, too.

Functional integration should also be improved as a result of AFCAC. It is unclear just how tightly vendors will tie functions together. As we noted already, the RFP is vague, leaving vendors free to do as much or a little as possible. We predict that most vendors will not spend time and energy on creating tightly integrated systems that we would put our seal of approval on. However, functions will be more integrated than those we have seen thus far in most office systems (perhaps with the exception of Applix's Alis). For example, we expect to see more use of graphics within word processing. We would hope that some vendors would have the foresight to include compound document architecture. We expect that databases will be more functionally tied to other office functions.

Perhaps most important from an industry perspective will

The Requirements

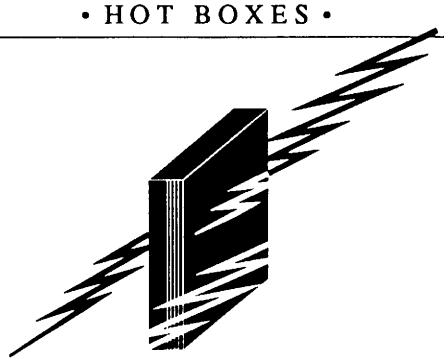
The list of the system characteristics required to meet AFCAC 251 begins to read like *War and Peace*—long and detailed. The Air Force expects vendors to work together to meet its shopping list of components and software. Here is a list of the basic system requirements. In many instances, the Air Force is requiring that the vendor integrate many of these functions. (We've left out some of the details such as cables, paper-handling equipment, and other peripheral technologies.)

- Data communications and networking, including wide area and local area networks
- Printers, including dot matrix, to impact character and laser printers
- Imaging technology, including digitizers, OCR technology, and bar code readers
- Voice recognition technology (as a future add-on)
- Spreadsheets
- Graphics (both charts and composition graphics, such as scanned in maps and mechanical drawings)
- Word processing
- Electronic mail, messaging, and calendar
- Relational database management system (which will include a fourth-generation language and report writer)
- Project management software
- Language processors (Cobol, Fortran, Ada, C)
- Configuration management software
- Training (everything from train the trainer to computer-aided instruction)
- Storage technology (ranging from floppies to high density optical storage, when it becomes available)

be the ramifications for Unix as a platform for applications software. While Unix has become appreciated for its portability, it has not been thought of as the platform where great applications software has been born. The office software that has come out of the Unix arena has been serviceable, but not leading edge. With the promise of billions of dollars as an incentive, applications should surpass the quality of existing Unix-based office applications. Once a vendor is selected (whenever that may be), other vendors will emulate the standards set by the Air Force. This is especially important because every vendor will want to do work for the federal government. Many vendors will bid software like the final AFCAC choice for future RFPs for other government agencies.

It may well be that, as a result of AFCAC 251, we are embarking on a new direction both in office computing and Unix applications. We are entering a phase where these two arenas will be mentioned in the same breath—without fear and dread. It may come to pass that, as the applications environment within Unix grows stronger because of a $3 billion transfusion, vendors will begin to believe that Unix is a strong platform for the office. Stranger fairy tales have come true.

• HOT BOXES •



Computer Consoles: One Year Later

By Ronni T. Marshak

We took our last look at Computer Consoles Incorporated (CCI) at a transitional point in the company's development. John Cunningham, former president of Wang, had taken over the reins as CCI chairman and chief executive officer, bringing with him an assortment of long-time Wang employees ready to turn around a company with superior technology and poor marketing. He instituted a marketing strategy focusing on the value-added reseller (VAR) market and on hardware sales of the company's line of Unix-based minicomputers. Specific niche markets, including law and government, were targeted as likely candidates for low-end CCI hardware bundled with its OfficePower integrated office software.

Financial Picture

CCI's current figures are much more promising than last year's. The company has had four consecutive profitable quarters, and the six-month figures for 1987 (as of June 30) show a profit of $885,000 compared with a June 30, 1986, loss of more than $6.5 million. But the numbers don't quite measure up to Cunningham's optimistic expectation of a break-even 1986; the company showed a loss of $2,983,000. Oh well. Onward and upward.

Marketing Picture

VAR STRATEGY. Cunningham's strategic marketing plan called for a heavy reliance on VAR agreements, limiting the CCI direct sales force to communications (telephony) products such as directory assistance products sold to Regional Bell Operating Companies (RBOCs), law firms, the federal government, and selected industries, such as aerospace. In our in-depth look at this marketing strategy (Vol. 1, No. 4), he clearly laid out the objectives for signing up independent sales organization (ISOs). The proposed number of combined factory OEMs, national VARs, office equipment resellers (OERs), and international VARs was (conservatively) 350. While Cunningham was talking about a several-year plan, the fact that, to date, only 84 ISOs have been signed does not signal an auspicious beginning. Cunningham himself admits his disappointment, stating in the CCI second quarter report, "...we remain concerned that the level of new business from our domestic OEM channel has been less than anticipated and that our efforts to recruit the highest quality VARs have taken longer than expected."

STRATEGIC ALLIANCES. This summer has brought a number of strategic alliances to CCI.

Interleaf Cooperative Sales. CCI and Interleaf Incorporated of Cambridge, Massachusetts, have signed a cooperative sales program to interface OfficePower with Interleaf's electronic publishing systems and software. CCI's ISOs and Interleaf will offer turnkey solutions for combined office automation and electronic publishing. CCI OfficePower documents will go through a document conversion utility to Interleaf format.

Opus Joint Marketing Agreement. Opus Systems of Cupertino, California, has signed an agreement with CCI whereby Opus will sell its Series 100 Personal Mainframe product to CCI resellers. The Opus product, a Unix board for IBM XTs, ATs, and compatibles, will allow those platforms to run the full OfficePower software.

The fact that, to date, only 84 ISOs have been signed does not signal an auspicious beginning. Cunningham himself admits his disappointment.

Compac Microelectronics Agreement. Compac Microelectronics of Fremont, California, has entered a marketing agreement with CCI that allows Compac to sell a desktop publishing system made up of Ventura Publisher and the Xerox 4045 laser printer to CCI resellers.

Product Line

HARDWARE. The CCI line of minicomputers features the low-end Power5 system and the Power6/32 family.

Power5. The Power5 system is sold bundled with the OfficePower integrated office system to end users in specified niche markets through both direct sales and the OER channel. The Power5 runs at 1.2 MIPS and can support up to 14 users. The Power5 currently supports Unix version 4.2 BSD, but CCI is in the process of bringing out a System V version.

Power6/32. The Power6/32 line is CCI's main product family. The line runs the CCI System V operating system, which is derived from and is compatible with AT&T Unix System V. These minis are available to VARs with or without the OfficePower software. The Power6/32 systems come in a number of models:

We have found application development in UDAP as well as the OfficePower interface to be flexible and addictive.

- The Power6/32S 5 MIPS mini is field upgradeable to the Power6/32SX 8 MIPS system. The maximum number of recommended users for the 6/32S is 50, for the 6/32SX is 80. The prices of the two systems are $89,950 and $109,950 respectively without OfficePower software.

- The Power6/32EX also runs at 5 MIPS and can support a recommended maximum of 50 users. A floating point processor is standard with the system. It is field upgradeable to the Power6/32X. The Power6/32EX sells for $145,000.

- The Power6/32X operates at 8 MIPS and supports a recommended maximum of 80 users. It also featured a second floating-point processor. The system sells for $173,000.

- The Power6/32MP is a 15 MIPS system in a multiprocessor design, using two CPUs in an asymmetric master-slave configuration. The recommended maximum is 100 users; it is priced at $257,000.

Software

OFFICEPOWER. All CCI minis run OfficePower, an integrated office computing package that includes word processing, calendar, electronic mail, online rolodex, and a user-definable, single-file database application (UDAP).

UDAP is actually the underpinning of the OfficePower product. Most of the applications were built under UDAP, which features an "open/close" paradigm: Basic information is displayed about a record, such as a name in the rolodex listing, which can be opened to display more information. We, and others, have found application development in UDAP as well as the OfficePower interface to be flexible and addictive.

OfficePower does not offer its own spreadsheet or relational database management system (RDBMS), but it does support Access Technologies' Supercomp-Twenty and 20/20 spreadsheets and the Unify RDBMS.

PCPOWER. IBM PCs and compatibles may be linked to the Power6/32 line via PCPower, a program which allows the PC to function as a PowerTerminal (CCI's standard terminal) including softkey support. An attached PC can toggle between the DOS and OfficePower environments.

New Announcements

The past few months have also seen several new software announcements from CCI.

TARGETING WANG. Over the past year, everyone has taken pot shots at Wang (although we are optimistic about the turnaround that Fred Wang's leadership seems to be indicating—see *The Office Computing Report*, Vol. 10, No. 8). CCI has obviously decided to capitalize on the well-publicized Wang customer dissatisfaction by targeting a new software product for the Wang 2200 market.

The Basic-K compiler—developed and marketed in the United Kingdom by Kerridge Computer Company, Ltd.—allows Wang 2200 applications to be moved onto CCI processors that can support more users and, thereby, offer an upward migration path. CCI's compact Power6/32S, for example, supports over 80 users compared to the Wang 2200's maximum of 16 users. CCI holds exclusive distribution rights worldwide except in the United Kingdom.

Basic-K under Unix offers language extensions and operating system enhancements that are not available under Basic-2 on the Wang system. Among these are Unix utilities to perform previously programmed functions, open file systems with nonrestrictive sizing, and expanded memory capabilities. The Basic-K compiler runs on all of CCI's Power5 and Power6 systems. Prices range from $1,500 to $4,500, depending on the hardware configuration.

CCI hopes to attract new VARs and to offer additional opportunities to existing resellers with this product. An estimated 50,000 end users and 2,000 software developers and VARs of the Wang 2200 could now have access to CCI's Unix-based systems. CCI resellers can combine Basic-K-based applications with OfficePower.

OFFICEPOWER 4.0. We have always been impressed with the level of integration, interface consistency, and database underpinnings of OfficePower. Release 4.0 of the software brings both innovative new functions and plugs some holes in the product.

The new enhancements are predominantly in the areas of word processing, networking, and graphics.

Word Processing. Word processing improvements include the following:

- Table of authorities (TOA). The table of authorities (TOA) is designed for the legal market, one of CCI's prime market niches. TOA sorts citations from legal briefs alphabetically within specific classifications into a table of authorities with the page number(s) listed beside each citation. Citations may be sorted by classifications such as case, statute, regulation, or publication. All citation page references are automatically updated after repagination.

- Proportionally spaced fonts. The screen correctly displays line breaks and page breaks taking into account the variable spacing of the characters.

- Automatic font conversion. Proportionally spaced documents can automatically be reformatted to fixed pitch fonts and vice versa. The system knows what fonts are available on the printer selected and uses heuristics to choose the font which most closely resembles the font specified for the document. If there is no close match, the document is automatically reformatted for any available font.

- Support for italic fonts and NEC Multilingual A and WP Fineline thimbles.

- Automatic conversion between OfficePower 3.04 and 4.0. The two releases are upward and downward compatible.

- Stored font information with the document. Font information can be stored with the default setting for each document in the Document Attributes Form, which also stores printer defaults, formatting settings, and notes about the document.

- Nonbreaking return. Nonbreaking return will hold titles together with accompanying text or keep lines in a table together on one page. CCI is late in offering this standard feature.

- Document width of up to 256 columns. Up to 132 columns may be displayed on a VT-100-compatible terminal. A soft key toggles between the 80- and 132-column mode.

- Word preview. The word preview feature provides a view of the print image of a formatted document including headers, footers, and footnotes. This view is not editable.

- Conversion to and from ASCII format. Documents are transferred from any IBM PC or compatible in print image format and are enhanced to include OfficePower attributes such as boldface and underlining. Documents are fully revisable. It's about time this standard ASCII transfer was available. It opens up a lot of doors (potential customers with file transfer requirements) that were closed to CCI before.

- Support for the Navy Document Interchange Format (DIF) standard.

Networking. Networking enhancements include the following:

- Asynchronous Connect Facility (ACF). Based on the Kermit Connection Program from Columbia University, ACF provides connections via ASCII asynchronous communications. An OfficePower interface to Kermit allows the storage of access parameters to each external service. In addition, a word processing transcript of the session is stored. Not overwhelming, but a step in the right direction.

- Network status and administrative tools. Tools are available to system administrations to help identify potential communications problems within the network.

- Mail record utility. The mail record utility feature deletes mail records from standard and log mailboxes based on a defined retention period.

Graphics. New improvements in graphics support include:

- Optional integration with 20/20. Access Technology's spreadsheet, including business graphics, can be integrated into OfficePower. A conversion utility is provided to convert Supercomp Twenty spreadsheets into the 20/20 format.

- 20/20 graphics generator. The graphics generator provides the interface for generating business graphics directly from 20/20. These graphics can be integrated by OfficePower as graphics objects in word processing documents and manipulated by any of the functions in the graphics category. A graphics object is inserted in a "closed mode" one-line format that describes the object and indicates how much space it occupies. When the document is displayed, the user can "open" the object and get a more complete description of the graph. Displaying the actual object requires an IBM PC or compatible with CCI's PCPower Graphics program. When a PC user opens the inserted object, the screen will clear itself of text and display the actual graphic.

Release 4.0 of the software brings both innovative new functions and plugs some holes in the product.

- Word chart generator. The word chart generator, which is actually part of the word processor, offers six text styles, nine bullet types, eight colors (or shades of gray), and multiple point sizes.

Other Enhancements. In addition to these enhancements, Release 4.0 also offers the following:

- Softkey interface for VT-100 users. Softkey interface was previously only available to users of the CCI Power-Terminal.

- Increased printer support. Support of the Dataproducts 2630 laser printer, a 26-page-per-minute text printer, and the Imagen 2308 Desktop Laser has been added. Support for the PostScript standard is coming later this autumn.

- Custom printer interface. The interface and documentation is available for resellers and customers who need to write new printer drivers.

- Redundant File System (RFS). The Redundant File System provides relatively quick access (5 to 10 minutes) to files in the event of a nonrecoverable system crash or during routine system maintenance.

Training. Two training courses are being offered on Release 4.0: OfficePower 4.0 User Training—2 students per company, 2-day course, $375; OfficePower 4.0 System Administrator Training—1-day course, $175 per student. Completion of User Training is a prerequisite for attending the second training course.

Conclusion

CCI is still holding a firm line on bundling its office software only with its hardware with a few exceptions. The Opus agreement, obviously, belies this policy. And a CCI representative has indicated that large potential customers, who use different hardware platforms, may contact the company directly to negotiate a porting of the OfficePower software. But we'd still like to see OfficePower available on Xenix, opening up this well-designed software to a new audience. And new opportunities could develop by porting OfficePower to other Unix platforms, thus making it available to the OEM market. After all, CCI stands tall in its conviction that the Power6 minicomputer line is the best bang for the buck. Why, then, are the marketing folks hesitant to offer their software on other systems? The combined offering should, according to them, win first-time automation customers by its superiority. OfficePower running on, say, an NCR Tower would introduce CCI products into environments which have already chosen that different Unix platform. ◐

We'd still like to see OfficePower available on Xenix, opening up this well-designed software to a new audience.

Stop the Presses!

AS WE WERE going to press, CCI announced a major layoff in its computer products division workforce. About 20 percent, or about 100 employees, will be laid off as part of a restructuring. The layoffs are intended to reduce expenses by about $7 million. John Cunningham has stated that the division would concentrate on the development and marketing of high-performance superminicomputers and reduce development of lower-performance minis. Cunningham sees it as "...a real shifting of resources away from the commodity side of the business to the high-performance end."

Even though the division's sales grew almost 50 percent last year, it has continually piled up losses. This year, a divisional loss of $12 to $13 million is anticipated. But, despite this, Cunningham expects a profitable quarter for the company as a whole. He is also confident that CCI will report its first profitable year since 1984. But he has cut in half his earlier prediction that the company would earn $8 million this year.

The 1987 Seybold Executive Forum:
Visionary Management and Technology Directions in the Real World

The Program: The 1987 Seybold Executive Forum provides a context in which both business and information systems management can come together and build a common frame of reference about future directions in technology and strategic, corporate-wide implementations of information systems. The unqualified success of the Seybold Executive Forum format is due to three factors: Speaker are handpicked and their presentations carefully screened to avoid marketing hype. Presentations are limited to 20 minutes and are followed by an interactive dialogue between the speakers and Patricia Seybold. The audience joins a lively question-and-answer session following each presentation.

November 9th

Global & Organizational Issues

Patricia B. Seybold
President
Office Computing Group
"Leading Indicators in the Evolution of Information Technology"

Kenneth H. Olsen
President
Digital Equipment Corporation
"Building the Communications Infrastructure"

John Young
President
Hewlett-Packard
"Technology and People: America's Competitive Advantage"

Allen Krowe
Senior Vice President
IBM Corporation
"Adapting to Changing Technology"

Government Leader
"Aligning High Technology and Government"

Vittorio Cassoni
Senior Vice President
AT&T/Olivetti
"Partners in Progress"

Al Ramacciotti
President
American Airlines/Capture

Chris Demos
Senior Business Advisor
Federal Express Corp.

Mitsuo Tada
Executive Vice President
Fujitsu America Inc.
"The Global Information Economy"

Karen Vangorder
VP of Sales, Services and Distribution
Steelecase

Prominent Economist
"Meeting the Technology Challenge"

November 10th

Visionaries & Technology

Patricia B. Seybold
"Visionaries & Their Uses of Technology"

Bill Gates
Chairman & CEO
Microsoft Corporation
"Mission Critical Software"

Steve Keese
Consultant/ Systems Strategies
John Hancock Corporation
"Sowing the Seeds of Innovation"

Dr. Harry Tennant
Texas Instruments Fellow
Texas Instruments
"Strategic Implications of AI"

Liz Menten
Manager
Information Systems
Pepsico Company
"Supporting End-User Computing"

Jean-Louis Gassée
VP of Product Development
Apple Computer
"Harnessing Renegade Computing"

Signe Weber
VP Planning & Technology
Shearson & Lehman Bros.
"Organizing for Change"

John Greenup
Senior Member of Technical Staff
General Electric

Carl Hodges
Director
Environmental Research Lab
"The Ultimate Beta Test: Biosphere II"

Dr. Joseph P. Allen
Executive Vice President
Space Industries, Inc.
"Expanding our Uses of Technology in Outer Space"

Richard Fox
Director of R & D
Walt Disney Imagineering
"Technology: Disney's Backstage Star"

November 11th

Technology & Teamwork

Patricia B. Seybold
"Creating & Maintaining High Performance Teams"

Fred Wang
President
Wang Laboratories
"Technology & Teamwork in the Office"

Marilyn Mantei
Senior Research Engineer
Center for Machine Intelligence
EDS

Jim Manzi
President & CEO
Lotus Corporation
"Enhancing Workgroup Productivity"

Martin Petraitis
Director of Automation
National Semiconductor
"People, Process, and Technology"

Ron Skeleton
Manager of Scheduling and Integration
Aerojet Strategic Propulsion

David Allen
Vice President
Insight Consulting
"Managing Accelerated Performance"

Joe Henson
President & CEO
Prime Computer
"Supporting High Performance in Manufacturing"

The Forum is priced at $1095. For more information or to reserve your space call Debbie Hay at 617-742-5200

NEWS ANALYSIS

PRODUCTS • TRENDS • ISSUES • ANALYSIS

• INSIDE •

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The XWindow standard resurfaces. **Page 18**

Xenix for the 386...at last! **Page 19**

Tolerant exports to Korea. **Page 19**

• APOLLO •

More Standards on More Fronts

No matter how powerful a high-end workstation vendors offer, users still require the services of larger minis and superminis. In an effort to provide alternatives to DEC, the traditional host for Apollo Computer's workstations, the company has entered into an alliance with Ridge Computer. As part of the joint marketing agreement, Ridge will sell Apollo's workstation line, while Apollo will sell Ridge's Reduced Instruction Set Computers (RISC)-based superminicomputers to interface with its workstations. The two companies will work together to distribute third-party applications across networks including both Ridge superminis and Apollo workstations, as well as other specialized and general purpose computing resources.

Ridge's 3200 family of superminis ranges in price from $55,000 to $100,000 and operates at I/O of 14 MBps with 128MB of real memory. Ridge compares its systems to the VAX 8600 family. It claims its processors operate from 2.3 up to 5 VAX MIPS. The Ridge family runs RX/V, a Unix operating system based on System V.2. Primary applications for these high end processors include computational-intensive tasks such as electrical and mechanical computer-aided design (MCAD), education, video animation, and physical science research.

The marketing agreement is also part of Apollo's strategy of opening its Network Computing System (NCS). In fact, Ridge is the second company to adopt NCS. The first company to endorse NCS was Multiflow Computer, in Branford, Connecticut, a startup that makes a supercomputer aimed at the MCAD market. Thus far, more than 60 companies have joined Apollo's Network Computing Forum, which intends to build momentum for Apollo's new brand of networking.

USER INTERFACE TOOLKIT. Apollo seems to have caught on to the power of standards and has opened up another proprietary product, hoping to create a de facto standard in the user interface arena. According to the company, the new product, called "Open Dialogue," enables application developers to quickly and easily design customized easy-to-use interfaces for a broad range of platforms. Thus, developers can design a common user interface across applications and for different Unix hardware platforms. Apollo claims that Open Dialogue is the first commercially available product built on the XWindow system.

With Open Dialogue, developers can create graphical user interfaces that are consistent across various vendors' computer systems. Source code will be licensed to other vendors. Open Dialogue is available on Apollo, DEC, Sun, and IBM workstations starting at $2,000 per copy. It will initially be available to solution suppliers in October 1987 with a general release next January. A version for DEC's GPX workstation will be available in February 1988. Versions for the IBM RT and Sun workstations will be available in March 1988. Apollo promises to provide source code licenses to colleges and universities.

LEARNING LESSONS. It must have been a tough lesson for Apollo to learn as it watched Sun successfully promote its technology as a de facto industry standard. Apollo lost ground and time. Sun's marketing gamble paid off. Initially, Apollo balked at any notion of opening its proprietary technology to the outside. But the pressure of standards won out. Apollo's networking scheme is much more sophisticated than any open networking software on the market today. While Sun's Network File System (NFS) requires the user to physically open a volume to access a file, NCS allows much of this to happen transparently. In other words, the user

simply requests a file, and the system will access it regardless of where it resides. It is not necessary for users (as long as they have access rights) to open anything. More critically, NCS allows users to distribute parts of databases or programs across a network—a move toward true distributed processing. We believe the industry would be wise to pay close attention to the capabilities of NCS as a distributed networking standard.

With its latest move, Apollo gains a running head start by opening its user interface development engine to other Unix vendors. This is a smart move and could have important implications. The Unix operating system has never been cherished for its ease of use. Nor have Unix software vendors been known to write the most advanced user interfaces.

However, as Unix now moves to center stage with such forces as AFCAC 251 (see page 1), vendors will need to find more sophisticated software solutions. A tool that will help develop a standard user interface across platforms is to be applauded and encouraged. Open Dialogue should provide Unix vendors with some interesting options. —*JSH*

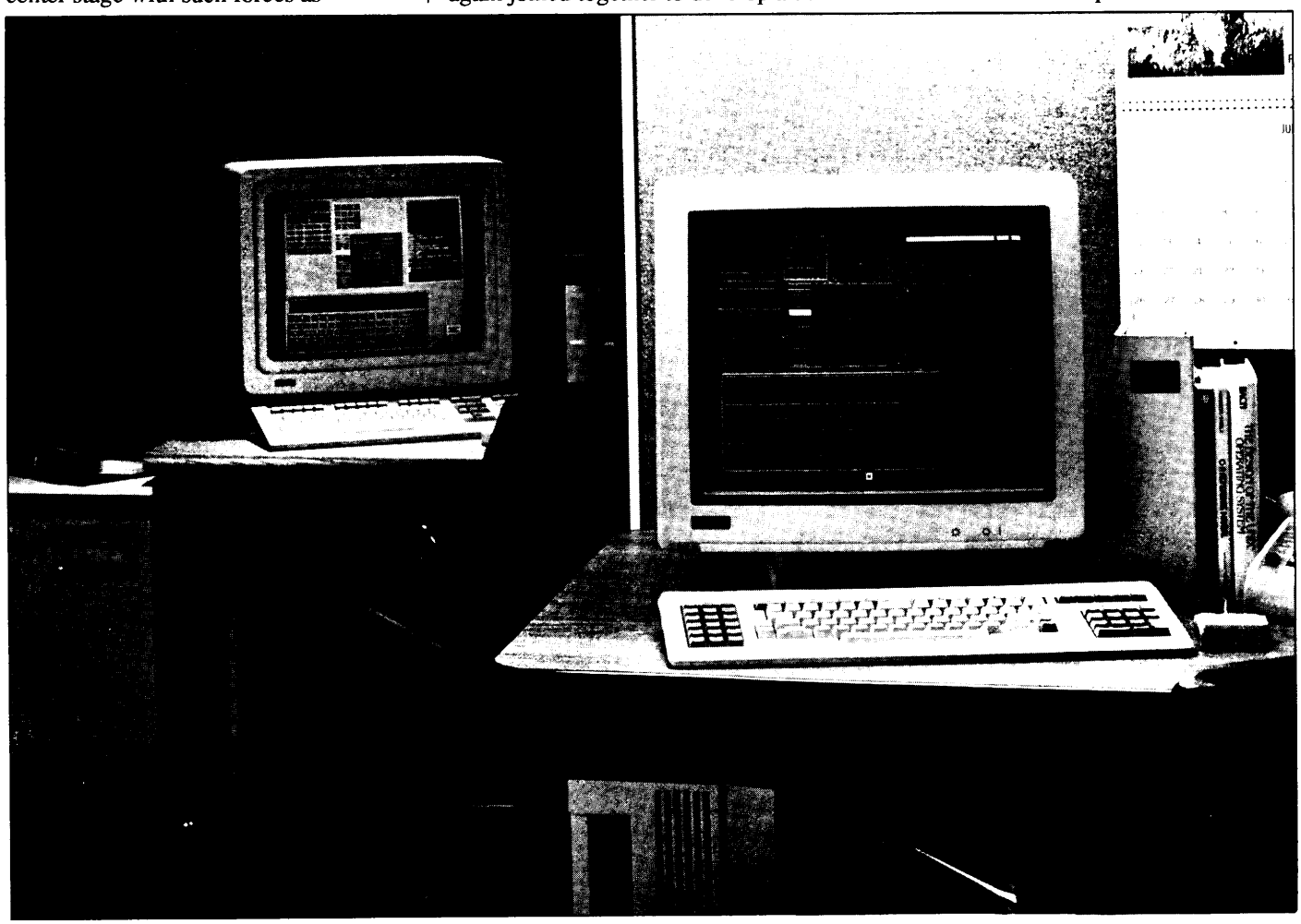
•USER INTERFACE•

Spotlight on XWindow

After its initial appearance in the spotlight earlier this year, XWindow seemed to disappear from view. Suddenly, this MIT-developed windowing standard for Unix is reappearing. The same group of vendors that initially pledged support for XWindow has again joined together to develop a definition of a public, three-dimensional (3-D) graphics extension to X Version 11 (X.11).

Two of the chief proponents of XWindow, DEC and Sun Microsystems, offered a joint 3-D proposal at a special-interest group meeting at MIT in June. The proposed 3-D extension to X.11 will support graphics standards such as Programmers Hierarchical Interactive Graphics System (PHIGS). PHIGS is a draft ANSI graphics interface standard that provides a set of functions for the definition, display, and manipulation of 3-D graphical data. A variation of PHIGS called PHIGS+ adds support for enhancements such as lighting, shading, curves, and surfaces.

The first implementation of the 3-D graphics extension will be developed at MIT for release to the public. Apollo, DEC, and Sun have committed resources to its development. How will



Apollo's Open Dialogue will be used to create a standard user interface across different hardware platforms.

this mesh with Sun's News windowing standard? Because News is a superset of XWindow, the 3-D graphics extensions can easily fit into Sun's environment. For example, a workstation running News could have an X-Window-compliant application running in one window taking advantage of the proposed 3-D graphics standard. —*JSH*

• MICROSOFT •

Unleashing Xenix

Microsoft has released its long-awaited System V/386 version of Xenix. The new operating system is intended to take advantage of the 80386's 32-bit architecture. For example, it includes such features as:

- Demand paging, which allows users to extend memory by using disk storage as though it were part of memory.
- Up to 4GB of virtual addressing space, which allows large applications to run in RAM.
- The ability to emulate the 80387 coprocessor, which allows for fast floating-point math. This is an alternative to implementing a separate coprocessor.
- A minimum system RAM requirment of only 1MB. This compares to other Unix implementations of at least 2MB.

Microsoft claims that program execution time is two to three times faster than on a 80286-based system. The new operating system maintains full backward binary compatibility with Xenix System V/286. Therefore, applications developed under earlier versions can run in the new release without recompilation. System V/386 is a complete implementation of AT&T's Unix System V and complies with AT&T's System V Interface Definition (SVID).

Microsoft still intends to carry out its promise of a follow-on product that will merge its Xenix with AT&T's Unix System V/386 Release 3 sometime in mid-1988. However, because Microsoft promises to build backward-applications compatibility into the merged product, the attitude now espoused is, "Why wait?"

In a related announcement, Microsoft announced Phoenix Technologies/ Interactive Systems's VP/ix as an add-on product under Xenix. VP/ix creates a virtual PC environment in which MS-DOS can be run as a task under Xenix.

As an aside, Microsoft is quick to point out that clear differences exist between its two operating systems, Xenix and OS/2. "Xenix 386 is the logical operating system for users who have standardized on Xenix/Unix technology. It emphasizes portability across different processor architectures and is driven by the federal government requirements and international standards organizations," states Steve Ballmer, Microsoft vice president of systems. In contrast, he points to OS/2 as "the logical upgrade path for users who have standardized on MS-DOS. It is highly optimized for Intel architectures and is driven by IBM's Systems Applications Architecture (SAA), which provides a consistent application interface across different IBM systems." Some interesting food for thought —*JSH*

• TOLERANT SYSTEMS •

Tolerant Inks Major Korean Deal

Now, here's a switch. Because of advanced Asian technology, there has always been a deluge of computer products shipped to the United States from third-world countries. So we were impressed when Tolerant Systems Incorporated, a California-based manufacturer, signed an $11 million, five-year purchase, manufacturing, and technology licensing agreement with the Korean government.

Data Communications Corporation of Korea (DACOM), a firm jointly owned by the Korean government and several Korean electronics and high-technology companies, will implement Tolerant products as part of its National Administration Information System (NAIS) project. The goal of the NAIS project is to improve the Korean information industry by helping Korean industry to introduce new technology into the government and private sectors.

The force behind the $176 million NAIS project is Tolerant's Eternity Series. According to DACOM president Dr. Yong-Teh Lee, the Eternity Series' powerful data management capabilites gave Tolerant the edge.

During the first phase of the $176 million NAIS project, DACOM will use Eternity—a fault-tolerant, Unix-based system—to automate all administrative functions of the South Korean government. This will include the installation of approximately 90 Eternity central processing units (CPUs) physically located at five different computer centers, each center being linked by a wide area network. DACOM's DACOM-NET public, packet-switching data network will connect the 10,000 workstations within the computer centers and will manage all connections among these sites and the workstations.

In the second phase, beginning early 1988, DACOM will begin to actually implement the NAIS project. To that end, DACOM companies will start manufacturing segments of Eternity hardware and licensing Tolerant's TX operating system on a royalty basis. (The Korean Ministry of Commerce and Industry still has to give its final approval before the technology transfer.)

DACOM's goal for year-end 1988 is for the Korean government to have seven administrative subsystems on line: residence, real estate, employment, retirement pensions, customs clearance, vehicle registration, and economic statistics. NAIS intends to add five more subsystems by 1991, and 31 more by the year 2000.

Tolerant will also be a subcontractor for the the U.S. government. Under

a $3 million, three-year value-added reseller (VAR) contract with Control Data Corporation, 18 of Tolerant's computer systems will be used in a new communications networking and integration system at Wright-Patterson Air Force Base, Ohio.

Again, Tolerant's Eternity Series is a central factor. Control Data plans to design and implement a Central Datacomm System (CDS) that links end-user organizations with the Aeronautical Systems Division's Information Systems and Technology Center (ISTC). During the project's first phase, CDS will allow access to more than 500 simultaneous users, providing them with transparent access to computer systems that are already installed at ISTC. During the second phase, CDS plans to extend access to more than 1,500 users. The Eternity Series comes into play as a transparently distributed, fault-tolerant, front-end host for Control Data's Ascent software for networking, integration, electronic mail, and database access. ◐ —*L. Brown*