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Computers aren't sold by what version of the operating system they run. Applications and utilities sell computers. Unix vendors need to recognize this if Unix is to compete in the office.

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After the announcement of System V.4, OSF decided to replace part of the AIX kernel in its operating system (OSF/1) with Carnegie Mellon's Mach operating system.

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UNIX IN THE OFFICE

PRODUCTS • TRENDS • ISSUES • ANALYSIS

To Lead or Follow?

Which Route Have Uniplex, Applix, and Quadratron Chosen?

By Ronni T. Marshak

CONTRARY TO THE birthday party theory, people don't like surprises. They don't like change. And, other than Indiana Jones, we can't think of anyone who will jump from here to there without some solid stepping-stones on the way.

The same is true of computer users. While not necessarily a stagnant bunch—though some MIS directors still have to be dragged into the '80s, much less the '90s—users want to take little steps towards the future of computing. They want to be gently guided into the (*continued on page 3*)

SOMEONE asked me which version of Unix was most interesting to end users. When I stopped to figure out an intelligent answer, it occurred to me that he was asking the wrong question. Commercial users don't care about operating systems.

Those users who bought for price considerations were more likely to pick up whichever operating system the hardware vendor happened to offer. And users who have just discovered the joys of openness are perplexed by such a question. Their reaction is analogous to the startled bewilderment of the idol worshiper who, convinced by a missionary to convert to Christianity, is filled with euphoria until he is suddenly asked if he wants to become Mormon, Baptist, or Catholic. He hadn't realized that there were subtle distinctions.

Are users really concerned about whose version of Unix to buy? Vendors concentrating on this issue are making a mistake. What users require are solutions to the hard issues, like on-line transaction processing (OLTP) in a Unix environment. Transaction processing is the meat of the commercial world.

Users must demand that vendors spend less time arguing about versions of operating systems and spend their R&D dollars making the hard core stuff work in Unix. Users need more complex security, better redundancy of data, and leading edge applications for Unix. Is this happening? Yes and no.

Unix has not yet grabbed the innovation agenda. Instead, the innovative applications are still turning up first on the Macintosh. This means that the Apple Macintosh will continue to lead in innovation. At the same time, OS/2 is beginning to slowly build up steam. Developers are feeling better about the prospects for OS/2 because of improvements such as the new OS/2 file system.

These are pivotal times for the Unix marketplace. Vendors have the opportunity to change the industry for the next 10 years. They also have the potential to make key changes in ease of use and applications innovation. Instead, they are spending too much time on operating systems and marketing hype. Com-

• E D I T O R I A L •

Unix Meets the Real World

By Judith S. Hurwitz

The dynamic is out of kilter. We are beginning to see that the pendulum may swing against Unix and towards OS/2. What makes OS/2 attractive all of a sudden? The answer to this question takes us back to the beginning of our tirade. When a user decides that OS/2 is the wave of the future, the vendor does not want to know first which version of OS/2 the user is interested in (yes, there is Extended Edition, but that's a very different tale). The Macintosh offers the same lure to developers...no controversy, no confusion over whose implementation is better.

What's the message? Well, we suspect that the winds of change may be pulling a bit against Unix these days. Just when it appeared that Unix had incredible momentum behind it, it became a political and hotly contested battlefield. Therefore, users have to let vendors know what they care about. New applications? Transaction processing? Ease-of-use utility software that makes Unix commands disappear? Distributed computing and object orientation? When there are so many important issues, vendors should not be asking users which flavor of Unix they want. They should be asking what applications and what utilities they need to get the job done. Until this changes, Unix may well remain a second-tier operating system, just right for the lab but not ready for the office. ☉

We'd love to discuss this topic with you. Either call me at (617) 742-5200 or contact us through MCI Mail: JHurwitz or UUCP address: {sun,apple,uunet}!dcm!sg.das.net!hurwitz. Internet address: hurwitz@dcm!sg.das.net

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• OFFICE SYSTEMS •

(continued from page 1) world of "state-of-the-art." Mammoth leaps are for paratroopers, not for corporate computing customers.

This axiom is proved by the relative market position of two players in the Unix office arena: Uniplex and Alis.

Current Market Position

Uniplex (Irving, Texas), with over 70,000 licenses, may or may not have the largest installed base in the Unix office market. Reports vary, and Quadratron (which claims about 80,000 licenses—see box, page 10) and R Systems often show up with equal or larger shares of the pie than does Uniplex. But Uniplex is considered the market leader. Most competitors agree that it is the one to beat, the one they most often bid against. And OEMs agree. Uniplex is high on every Unix hot-box maker's wish list. Uniplex Business software runs on over 200 Unix platforms as well as DOS.

Alis from Applix (Westborough, Massachusetts) has not done as well. The product currently has just over 12,000 licenses, a large number of which are in the government as the result of several major bids. While the product has generated a lot of interest, and, indeed, most Unix OEMs offer or plan to offer Alis on their platforms, up to now, customers haven't been buying.

(Applix does report an upswing in commercial sales, saying that there are a number of large contracts just about to be signed.)

So why has one been so successful while the other lagged behind? To determine the reasons, we'll look at the following issues:

- Corporate and product philosophy
- Product technology: interface, leading-edge applications, and openness of architecture
- Marketing strategy
- Future directions

What we believe results is a picture of two companies which took very different routes to what is perceived as the same marketplace: one safe and pragmatic, the other full of risks and innovation. And what we'll see is that safe-and-steady has been winning the race.

Philosophically Speaking

UNIPLEX. As Uniplex president Jeffrey Waxman has stated a number of times, Uniplex is "state-of-the-market, not state-of-the-art."

Uniplex's philosophy is to offer what the customer wants as soon as, or very shortly after, the request is made. In line with this commitment, the company has gotten its porting time down to a matter of about a week, rather than a multi-month cycle that some other vendors require (nice, but not as impressive as Quadratron; see box, page 10).

Uniplex is also committed to supporting users on all the different desktop devices. Dumb-terminal users are considered as strategic as engineering-workstation users. The company has recently introduced an X-Window version of its product. But it

has made sure that any enhancements made to the product will always be available on nongraphics terminals. And those former character-display users who migrate to an X-Window device have the option of operating in the familiar character mode or in the Windows mode (more on this below).

But the software is the proof of the pudding, and Uniplex II Plus seems to be a crowd pleaser. The product doesn't offer all the latest bells and whistles available on the market. For example, the compound document capabilities are significantly limited when compared with Alis or DECwrite. What the product does offer is full-featured applications, tight integration of modules, and a consistent interface. For today's general horizontal office market, Uniplex II Plus fills the bill.

APPLIX. In many ways, Applix's Alis was a product ahead of its time. It was the first Unix-based office system to offer compound documents and a graphical windowing environment. And, as such, it faced a lot of hurdles. Educating a market is never easy. It is especially difficult when a small, unknown vendor is doing the education. And this was further compounded by a certain arrogance on the part of the developers. Applix entered the market with leading edge technology, but with less than adequate functionality and no specific marketing strategy. So, while analysts were intrigued, customers did not flock to buy.

Version 2.0 of Alis was a great improvement, bringing the product up to snuff in the office marketplace by significantly improving its basic functionality. And a new focus on marketing should help get Alis into the hands of customers.

But Alis is primarily a workstation product, though it is being positioned as a horizontal office system, perhaps incorrectly. Applix is committed to maintaining state-of-the-art

*Uniplex and Applix took very
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technology in the product. This isn't as difficult as it used to be. State-of-the-art is fast approaching state-of-the-market.

IN COMPARISON. So we have one product (Uniplex) that started out with good functionality and no advanced technology, and another product (Alis) that began with a strong technological base but without many standard functions. The two are coming closer together. Uniplex, with its new X-Window version and its links between the spreadsheet, business charts, and relational database, is demonstrating its slow but steady migration to the newer technologies. Alis has improved its base functionality—the word processor can finally be configured to tab properly (or should we say standardly?), something that it wasn't able to do before—added to its feature list, and improved ease of use. But Uniplex is still ahead in everyday functionality, and Alis still has a strong lead on the technology side.

The Technology Edge: Environment and Interface

UNIPLEX. Until recently, Uniplex was very much behind Applix in the area of user interface. The standard Uniplex interface featured a full-screen main menu combined with context-sensitive soft keys that display at the bottom of the screen. The system also supported Escape key sequences for more streamlined operation. But the Escape sequences weren't indicated anywhere on screen, making them hard to learn; the soft keys could only display a limited number of functions at a time, requiring the user to go through several screenfuls in order to see all options; and there were no windows, much less any type of graphical interface!

X-Window. Let's address the last problem first. Uniplex has taken big steps towards a solution with its recently released native X-Window version of the product, Uniplex Windows, which maintains the character-based interface yet takes advantage of the windowing environment, iconization of files, and mouse usage.

Uniplex Windows currently does not include pull-down menus—you still have the full-screen main menu and soft-key interface. But you can manipulate these soft keys and menus with the mouse. And, surprisingly, the combination of interface styles does not seem incongruous.

By choosing this implementation, Uniplex maintains consistency with terminal users. And the performance doesn't seem to have suffered much. We put the product through its paces and didn't experience any unusual delays or bottlenecks.

Uniplex Windows supports any X-11.3 Windows-based

implementation. At this release, the product uses the Athena Toolkit from MIT to provide the GUI (graphical user interface). The Uniplex design uses a single binary module based on the X Desktop interface technology from IXI Limited (the same interface technology used in SCO's Open Desktop—though the company hasn't officially said so, we expect shrink-wrapped Uniplex for Open Desktop in the not-too-distant future. By the by, Alis has already demonstrated its Open Desktop version). The design can be modified to support specific graphical interfaces, such as Motif.

Uniplex is committed to writing to Motif and expects to deliver the Motif version by early 1990. Other GUIs and desktop managers will come when there is market demand. (Yeah, yeah, we know!) But the company is firm about maintaining the character-based interface for terminal users. Users will always have the option of using either the GUI or the character mode.

We agree with this philosophy, especially for a product like Uniplex, which has many terminal users in its customer base. Too often, the terminal user is forgotten when a product is enhanced under a GUI. By committing to the dual interface offering on graphical workstations, Uniplex is, in effect, committing to enhancing its products equally on all its platforms.

Ring Menus. To address the problem of multiple layers of soft keys, the latest version of the Uniplex Office System, 7.0, released November 1, has incorporated optional ring menus—you can still use the soft-key interface if you choose. The ring menus operate on all platforms and are implemented in the

standard Lotus-like fashion the industry has come to expect. As an added bonus, though, Uniplex provides a "hint" mode. After you execute a command via the ring menu, a prompt will display indicating what the proper Escape key sequence would be, thus subliminally teaching the user the keystroke ac-

celerators. And this helps solve the first problem mentioned. We would still like to see an online menu of escape commands more immediately available for those of us who never seem to take the hint.

The Interface Black Box. To help move to all these new GUIs (when the market demands), Uniplex has designed a logical "black box" for interface development. Basically, the GUI is not incorporated into the office system's source or binary code, but rather sits as a filter in between the source code and the desktop devices (see Illustration 1). This model was designed to allow character devices, X terminals, and workstations to share the same source code. The black box conceptually works like a terminal definition file (termcap) or a terminal emulator. Using the black box concept, Uniplex states that it can more

Uniplex started out with good functionality and no advanced technology, and Alis began with a strong technological base but without many standard functions. The two are coming closer together.

quickly write to different interface specifications because the product itself is not modified.

The significance of the black box is really for third-party ISVs. ISVs can write to the Uniplex source code and translate to new GUIs and desktop managers through the black box filters. Only one port needs to be done.

Basically, the black box works like this: The user ID indicates what type of device is being used. The black box takes that information and figures out which filter to activate. The filter interprets commands from the X environment (such as a certain mouse click), converts them into commands understood by character-based Uniplex (F10 for instance), and then translates them back to the display.

APPLIX. Alis has a definite edge over Uniplex in the interface area. The product was the first Unix-based office system to be developed in a windowing environment with a graphical user interface. In fact, long before the debates between Motif and Open Look, Alis was committed to and running on a graphical environment. A character-based version of Alis is available for terminal users, but the appeal of the product really suffers when denied its visual razzle-dazzle.

The Alis windowing environment is a proprietary implementation based on the X-Window X.11 standard. The interface features pop-up cascading menus. At present, the screen design is somewhat cluttered, making it difficult for the first-time user to navigate through menus, etc., an issue the new release (2.1) addresses. But the interface is very consistent, and, thus, easy to use.

The product, however, is not all that easy to learn. This isn't a fault of the product itself, but rather the problem of offering advanced functionality in areas that are difficult to fully grasp, such as object-oriented compound documents with hierarchically structured styles, not to mention a proprietary graphical user interface. Many users have not moved from a character-oriented mindset...yet.

Meta Macros. Many functions in the Alis environment take a number of steps to accomplish—far too many in some cases. This could be a big problem, but Alis's macro programming language, ELF (Extended Language Facility) helps users streamline common applications. ELF provides a keystroke capture mode (mouse activity is not recorded in a macro) for saving common sequences and phrases. The user has a great deal of flexibility in naming macros and assigning them to specific key combinations.

But ELF is a lot more than just a keystroke capture facility. It is a full programming language with an English-like syntax. Stored keystrokes generate an ELF script. And, while not effectively front-ended for the novice user, it's pretty easy for any moderately advanced user to edit existing ELF scripts. For example, we saved a keystroke macro which gave us a listing of all our spreadsheet files. Looking at the macro script, we quickly understood that changing the word "spreadsheet" to

The Uniplex Black Box Interface File

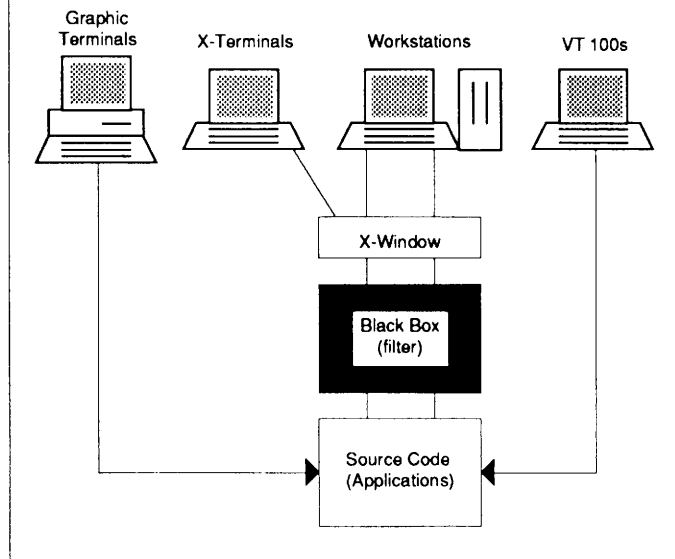


Illustration 1. By positioning an interface development filter between the source code and the user platform, Uniplex eliminates much of the development effort required to move to new interface standards.

"text" would give us a listing of all text files. Changing the word to "data" would list database files, etc. Advanced users, system administrators, and in-house programmers can develop complex applications using ELF. ELF scripts can be mailed across the network and shared by users.

ELF works across applications—both across Alis modules and across any application running on the host. For example, with ELF, a user can capture the keystrokes to open a Unix window, launch another application, manipulate some data within that application, and pull the data into the Alis environment, ultimately linking it to a document.

IN COMPARISON. While Alis provides a more complete windowing and graphical interface, Uniplex offers a better, more consistent environment for organizations with a wide range of desktop devices by providing the same character-based interface for terminals, PCs, and graphical workstations. The Uniplex Windows product is a nice transition from the CUI to a GUI for workstation and, eventually, X terminal users.

But Applix is way ahead in the macro area. ELF is a well-conceived cross-application macro facility that expands the functionality of Alis. The keystroke capture facility is a powerful tool for the user, especially considering its scope—anywhere in the operating system. Uniplex does not offer anything that even approaches this capability. It allows user-defined keystroke sequences, but only within a single module.

The Latest Release

BOTH UNIPLEX AND APPLIX have just announced new releases of their office systems. Here are just a few of the highlights.

UNIPLEX OFFICE SOFTWARE VERSION 7.0. The major enhancements in 7.0 are in the user interface. Ring menus and dialogue boxes have been added. Also, Version 7.0 is needed to run Uniplex Windows. There were several functional fixes and additions, too, including:

- Hidden dot commands. Until this release, Uniplex required manually input dot commands—annoying on-screen commands such as “.pa” to indicate a forced page break. Dot commands are still supported, but the user can now use the menus to enter a formatting command. The command still appears on screen, but now it displays English words—“Manual Page Break”—in inverse video. Still not WYSIWYG, but at least it’s intelligible.
- Multiple mail inboxes. Up to three different views of the inbox can be displayed. For example, messages can be ordered FIFO (first in, first out) or LIFO (last in, first out).
- Three-dimensional graphics. A three-dimensional graphics capability has been added to presentation graphics and to business charting from the spreadsheet or database.
- Scrolling cursor. Uniplex has finally added support for a scrolling cursor. (We have been particularly annoyed by its absence.) This means that when the cursor is positioned on the first character of a line, the left arrow will move it to the last position of the line above and vice versa.

A small handful of other enhancements, such as eliminating the 99 recipient names limit on E-mail messages,

have been added. But 7.0 is really an interface update. Uniplex has also released both its well-conceived X-Window and DOS products within the same time frame, so we can’t complain.

ALIS VERSION 2.1. Alis 2.1 is primarily a functional enhancement. The interface has been pretty much left alone. Applix has, instead, tried to fix minor limitations and add much-needed functionality.

The major changes are in the following areas:

Document processing

- Standard WP behavior. The Tab and Return keys can now behave as they do in most word processors. The Tab key no longer sets up on-screen columns, but rather moves the cursor to a tab position. Similarly, the Return key now enters a hard line break rather than act as a line feed key. Cursor movement is now limited to areas containing data.
- Snaking columns.
- Change bars.
- Quick print. Users can now bypass the Print menu if no settings need to be changed.
- Expanded headers and footers. Alis now supports four-line headers and footers versus the previous two-line limit. New system variables have been added, including the ability to add total page count, date last modified, and entry title of a section. While the longer headers and footers are an improvement, four lines is still an unrealistic limitation.

The Technology Edge: Leading-Edge Applications

UNIPLEX. Uniplex was the first Unix office system provider to integrate a fully relational database management system (RDBMS) into its product. And the product supports live links of data between this relational database and the Uniplex spreadsheet and business charting applications. Recently, Uniplex introduced a forms-based front end to external SQL queries to both the Oracle and the Informix RDBMSs (RTI’s

Ingres will be supported in early 1990). Uniplex also provides a fully linked spreadsheet front end to its own database as well as to Oracle and Informix. Establishing a spreadsheet link requires some knowledge of SQL. The forms front end is menu driven and easy for the novice user.

Other than this valuable value-added, Uniplex does not offer leading-edge functionality. In fact, some of its functionality is not yet state-of-the-art. (This statement is based on the assumption of three categories in the industry: leading edge—those new and exciting technologies that only a few innovative vendors provide; state-of-the-art—customer awareness of

- Thesaurus.

Calendaring

- Multiple access. Users can now designate permission to others to view and edit their calendars.
- Resource scheduling. Separate schedules for resources may be maintained.
- Year-at-a-glance view.
- The ability to query for specific events.

Graphics

- Palette defaults. The current object (tool, fill pattern, etc.) becomes the default on the palette until it is changed.
- Histograms.
- Smoothing.
- Aspect ratio-scaling.
- Repeat last operation.

Electronic Mail

- ASCII messages. Messages are typically in Alis format. In 2.1, you can opt to create an ASCII message.
- Mail ELF scripts to non-Alis users.

these leading-edge technologies and expansion in the market; and state-of-the-market—those technologies demanded by customers in their everyday systems.)

The core applications—word processing, electronic mail, calendaring, and spreadsheet—are state-of-the-market. The optional presentation graphics application (drawing, not painting) is state-of-the-art, rivaling dedicated graphics packages. But there is little integration among these modules—no visual live links. Oh, sure, a graphics file can be referenced within a Uniplex word processing document, but you can't view the graphic except in a preview mode or at output. Seems a waste of the X-Window interface.

- Receive document from non-Alis users.
- Mail delivery via alternate host.

Spreadsheet

- Cell font styles. Bold, italics, underline, double underline, color, and invisible fonts are supported.
- Cell Alignment. Left, center, right, and repeat are supported.
- Sorting.
- Grid lines.
- Multilevel interspreadsheet reference updates.

There are a number of other related enhancements, all at about the same or an even more detailed level. As you can see, there are no major changes to the product itself. Release 2.1 really is designed to beef up Alis, make it easier to use, and bring its functionality more in line with its competition.

IN COMPARISON. Back at the beginning of this article, we noted that Uniplex started out with good functionality but no advanced technology, and Alis began with a strong technological base but mediocre functions. The new releases strongly dramatize the work each company is doing to compensate for its deficiencies. Uniplex is hard at work to support new interface standards and the PC. Applix is focusing on fine-tuning the functionality.

But state-of-the-market is, after all, the state of the market. Uniplex has not had to educate the public. Nothing needs explanation. And Uniplex has done an excellent job of maintaining state-of-the-market. As soon as some new technology is demanded by customers, Uniplex seems to offer it. The company is often riding on the coattails of industry pioneers, but, unlike many pioneers, Uniplex has sold product.

APPLIX. The Alis product demonstrates most of today's "hot" technologies. Under the umbrella office functionality—E-mail, scheduling, filing system, etc.—the core of Alis is a set of application modules that have been implemented as a single

compound document processor. This includes a WYSIWYG word processor with office publishing capabilities, graphics and image editor (draw and paint), spreadsheet, and single-file database management system. The data from each module can be considered a type of "object" which can be included—with live links, of course—in an Alis compound document.

Of the competitors on the market, only Digital, with DECwrite, comes close to the compound document functionality offered by Alis. But Alis has lagged behind in a few basic word processing features. In the latest release, Alis 2.1, the company is catching up by providing functions such as standard tabs and a Return key that acts like an editing Return key. (Tab and Return previously had nonstandard, yet very advanced, functions. Tabs, for example, set up columnar layouts.) This is perhaps representative of Applix's dilemma: When the company focused on advanced functions and technology, the basic tools got lost in the shuffle.

Applix also prides itself on its multivendor connectivity capabilities. Alis can run transparently on a multivendor network, providing virtual filing, etc.

Applix, in many ways, is an industry pioneer. And industry pioneers are often stuck in a Catch-22. By coming up with the most innovative solutions to the thorniest of problems, you are often unable to sell product to an uninformed public. Compound this with the schism between innovative research and marketing. Applix could have written the book on this phenomenon. Ahead of all major competitors with graphical interfaces, windowing environments, and compound documents, Applix lacked the marketing know-how to get the message to the streets. The company has only recently refocused on marketing, moving from a pure R&D mentality that has not served it well to a mindset that recognizes the value of P.R. and salesmanship.

IN COMPARISON. The Alis compound document processor is one of the most advanced on the market. But that didn't make it popular. The market, as a whole, doesn't seem to be ready for this kind of functionality...yet. DECwrite will help educate the market on the value of compound documents. But that will take time. Customers may buy the concept from Digital or from the many similar products now in development—products that have the advantage of recognizing Applix's problem areas and avoiding them. Another disadvantage of being a pioneer.

Though Uniplex's applications are not nearly as innovative or visionary as Alis's, the product does what the customers want today. Though there has been no official word from Uniplex, our hunch is that the company will look to acquire one of those compound document editors in development, and the editor will be added to Uniplex in mid-1990, just around the time users start demanding the functionality.

The Technology Edge: Open Architecture

UNIPLEX. There is a complete booklet dedicated to third-party applications customized to run transparently under Uniplex. Unfortunately, no one was ever told about them—or so it seemed. Similarly, ISVs were never, or rarely, told that there is a Uniplex Toolkit specifically for the purpose of integrating applications into the Uniplex environment!

The catalogue of applications has a heavy British accent (most of the products are from Great Britain), but the new version of the listing promises to have more U.S. representation.

The interface black box fits here also, allowing third parties to write to Uniplex Windows without worrying about mucking up the original port to Uniplex nonwindows.

SQL Front Ends. Uniplex offers a live-linked spreadsheet front end, and a forms-based, easy-to-use front end to its own relational database as well as to Informix and Oracle.

Platforms. Uniplex II Plus is ported to over 60 different Unix systems, including IBM's AIX, Digital's Ultrix, System V.4, SCO (Santa Cruz Operation) Xenix, etc.

(By the by, IBM seems to be positioning Uniplex as the office offering of choice on AIX. This commitment is evidenced in a 12-page glossy brochure that proclaims Uniplex Business Software as an AIX Partnership Solution. The screen shots of Uniplex—and there are many—all sport the on-screen name of IBM/Uniplex AIX Office Automation.)

Uniplex DOS. The company also offers Uniplex DOS 6.1 (\$695), which is more than a terminal emulation product. The Uniplex word processor, spreadsheet, screen builder (customization tool), and card index feature all reside on a 286 or above PC. The PC would typically be connected

via NFS (Network File System) to a Unix host running Uniplex, but this isn't necessary. All these modules work independently of a Unix host, yet the file formats are completely compatible with host files. In most implementations, however, the PC will be hooked up to the host, and PC users will have full access to all Uniplex II Plus modules (E-mail, calendaring, etc.).

The connection to the host is totally transparent to the user. The user simply picks, say, E-mail off the PC menu. The system flashes a subtle message saying that it is accessing the host. The performance is impressive—a matter of a few seconds to access the product on a Sun360.

There is, however, the question of the true-blue PC user. You know, the one who uses Lotus and little else. For this type

Industry pioneers (like Applix) are often stuck in a Catch-22. By coming up with the most innovative solutions to the thorniest of problems, you are often unable to sell product to an uninformed public.

of user, Uniplex DOS offers too much functionality. What he or she really needs are the umbrella office modules—electronic mail, calendaring, and filing system—and to have them integrate transparently with his or her PC applications. Adding Lotus to the menu, while easy to do, results in the user having two spreadsheets on the desktop.

APPLIX. In the past, rumors have gone around that the Alis source code is “Spaghetti” code, meaning that the code is so complex and intertwined it is difficult to modularize and port. Applix assures us that the company is well along in solving this, heading towards a more modular Alis.

Applix provides a toolkit and APIs to third-party application developers. The toolkit is only available to those ISVs also willing to take a training program offered by Applix. With this toolkit, applications can be completely and transparently integrated into the Alis environment using C code. These applications can become objects in the Alis compound document structure.

However, most ISVs do not go this route. Most are happy with the other, less intensive levels of integration. The basic level is via SQL integration, which is accomplished via an ELF script (see below). With just a bit more work, again using ELF, software can be added to Alis menus.

SQL Front Ends. Applix provides a direct menu-based SQL front end to Oracle, Informix, and Interbase. Any other RDBMS can be accessed using an ELF script (which can be edited from an Applix-provided script).

Platforms. Alis runs on a variety of Unix boxes, including Apollo, AT&T 3B2, Digital's Ultrix and RISC-Ultrix, HP9000, IBM RT, NEC, Sun, 386, Xenix, Pyramid, Solbourne, and MIPS. The product also runs under Digital's VMS. A DOS-based product that front-ends a Unix or VMS host completes the Alis picture.

PC-Alis. PC-Alis is a DOS product which provides a graphical front end into host-based Alis. The software is quite reasonably priced at \$495. But the product does not go as far in supporting PC users as we'd like to see. Only the graphical interface is local at the desktop; all applications reside on the host. If connection to the host is lost, PC-Alis doesn't work. And the user must log in and out of Alis before using other DOS applications locally.

Like Uniplex, Applix does not provide a solution for the corporate PC user who wants to be connected to the rest of the organization but who almost exclusively uses Lotus or

WordPerfect. For this type of user, Alis in its entirety is overkill. A product that includes only E-mail, calendaring, and the filing system would be ideal.

IN COMPARISON. At present, Uniplex has a lot more third-party applications in its catalogue than does Alis. But those that are integrated with Alis are truly integrated on an object level.

Uniplex's front-ended SQL queries are very usable by the average user, even if he or she knows very little about SQL. The limitation is that only Informix and Oracle (as well as Uniplex's own RDBMS) are front ended. Alis's implementation is very similar to Uniplex's, but, besides direct links to Oracle and Informix, any other RDBMS can be accessed via ELF.

Uniplex has a more flexible PC solution with Uniplex DOS. But neither Alis nor Uniplex goes far enough in supporting the typical PC user. Again, let us emphasize that all users in an organization do not need the same level of functionality. But everyone does need access to group functionality such as E-mail. We are still waiting to see one of the popular Unix office systems decouple the umbrella office functions from the core applications, thus providing only those functions needed on a by-user basis.

Marketing Strategy

UNIPLEX. Uniplex, as we have repeatedly stated, has sold quite well. The product is targeted at general office requirements in large organizations, particularly where relational database is a strong requirement. The product comes in three variations: Uniplex II Plus—user interface, word processing, spreadsheet, relational database, and business graphics; Advanced Office System—II Plus plus electronic mail, time manager, personal organizer, card index, report writer; and Advanced Graphics System—II Plus or Advanced Office plus presentation graphics and presentation editor. The DOS product discussed above completes the product picture.

Direct Sales. Uniplex only sells direct to selected large corporate customers, relying on OEM, VAR, and distributor agreements for the bulk of sales.

Reseller Channels. Uniplex has pushed reseller channels since the beginning. The product is now on virtually every significant Unix platform out there, but certain alliances are more strategic than others. One of the most recent, and potentially most lucrative, is the AIX Partnership with IBM. As mentioned earlier, IBM seems to be pushing Uniplex as AIX Office, at least for the time being. Our hunch is that Uniplex is a placeholder for a

Neither Alis nor Uniplex supports the PC user well enough. Not all users in an organization need the same level of functionality, but everyone needs access to group functionality such as E-mail.

Quadratron: A New Product Family— A New Lease on Life?

THE EARLY LEADER in Unix Office, Quadratron has lost a lot of ground to Uniplex in the last two years. The company has just announced a new office product, which should help Quadratron maintain some of its large installed base. Cliq 1.0 is a rewrite of Q-Office 1.95, but it features an entirely new user interface and completely new source code.

Establishing a new and clean product line (Q-Office had a reputation for being buggy) is a smart move on Quadratron's part. The company suffered a lot of bad press early in its career. Quadratron was considered unresponsive to customers and careless regarding bugs. But the company has been working hard to overcome past mistakes. A new product could help it start with a clean slate.

USER INTERFACE. Cliq does not yet offer a graphical windowing environment. Estimated time of delivery of a GUI is early to mid-1990. Even without graphics and windows, however, Quadratron has made a major leap forward in the interface area. The Q-Office interface was severely lacking. The product offered a lot of functionality, but it was so difficult to use that we, among others, never bothered seeking out the advanced functions. The new interface features pop-up vertical menus with cascading submenus. Users can bypass menus by typing in the proper keystroke commands. And menus can be set to appear immediately, after a user-specified delay (say, one second), or not at all, so the system can grow along with you. The help feature is based on hypertext technology, and on-screen prompting is much improved.

The Cliq Desk. Quadratron has incorporated a "desk" metaphor. In fact, there is a screen which is the user's desk. Users can put any files they are working on onto their desktops.

few years until IBM can port OfficeVision to AIX. Uniplex is aware of this likelihood, but can still make a bundle and significantly increase its installed base during the tenure of the relationship.

APPLIX. Applix is also positioning Alis as a general office system for large organizations, but this time the focus is on compound documents. And therein lies a problem. Although built in a modular form, Alis is not sold modularized; even in PC-Alis, you get the entire product. And Full Alis is overkill for most users. The market is not yet ready to buy compound

The desktop display shows the class or type of the object or file (i.e., text, spreadsheet, mail message, calendar entry, etc.), the descriptive name (different than filename), and status (either open or the date of last access). All three pieces of information are worth discussing.

- **Object type.** By classifying all different types of files and tools—for example, the calculator is an object that can be placed on the desktop—Quadratron has taken the first step towards object orientation. The real objective nature of the product can be seen in the implementation of the filing system. The system doesn't hide the Unix system, but it allows easy manipulation between directories using the cursor keys and a visual setup. Accessing a file directly from the filing system will open the proper application with the document. And files can be sorted and viewed by object type.
- **Descriptive name.** Files are given names that adhere to Unix filing conventions. But users can also give files nicknames. This is very useful, because different users can give different nicknames to the same file. For example, the file I call "Monthly Report" could be called "Company Status" by another user. The actual filename might be something like "monrept.tag", but the user doesn't have to remember that.
- **Status.** By having the desk point to files rather than physically moving them, Quadratron can allow multiple users to place a file on their desktops simultaneously. When the file is opened by one of the users, the status of his or her desktop changes to "open." If other users attempt to access an open file, they get a message stating the file is open and unavailable for access.

document editors en masse. In addition, Alis requires basically 4MB per desktop. Yes, prices of memory and hardware are coming down, but we are still finding users balking at putting that much memory on every desk, especially those who really need only E-mail, calendaring, and spreadsheet. Alis might do much better in a niche market. The functionality is impressive, offering much more in terms of integration than does Interleaf or Framemaker. Perhaps Applix should reconsider the possibilities of Alis as a point product, at least until market demands catch up with the technology.

The desktop metaphor is easy for most users to understand, and makes Cliq a whole lot friendlier than its predecessor. But there are problems. You must go to the desktop too often. And the object-oriented nature of the filing system is changed to a tool-oriented metaphor in the desk. In fact, you open the word processor, spreadsheet, etc., from a menu called "Tools." The mixed metaphor is actually one of perception rather than structure. A document accessed from the desktop understands that it is a word processing object and opens the appropriate application. The tools metaphor was chosen to accommodate third-party applications that might not fit into an object-oriented structure.

So, while the Cliq interface is a major improvement, Quadratron still has a way to go and some simplification to do, not to mention the move to a GUI.

PLATFORMS. Quadratron is porting Cliq to a large number of Unix platforms, including Sun3 and 386i, Pyramid 98X, Unisys, NEC Astra, NCR Tower, Motorola VME 8000, AIX, 386ix—the list goes on and on. The product also runs on DOS, with or without a Unix host.

Quadratron has made a science of porting its software to new platforms by using state-of-the-art robots to do both the port compiling and the Q&A. What takes many companies months takes Quadratron only 24 to 48 hours.

DOS Cliq. Quadratron goes further than both Alis and Uniplex in providing functionality for the DOS user. The entire Cliq suite of applications, including electronic mail and calendaring, can run on a PC LAN. There is also a standalone version of the DOS product that does not include the group functions. Cliq under DOS requires an AT or

Applix seems to be recognizing some of these issues. A renewed statement of focus stresses office publishing as a target market.

Direct Sales. Applix has recently moved from a strategy of primarily direct sales to a reseller focus. The company's direct sales force is now serving as selling partners and as support teams for the VAR program.

Reseller Channels. The new focus on VARs could be very good for Applix. The company's strengths were never in mar-

keting and sales. Applix is basically an R&D organization which suddenly found that it had to sell product. A new marketing team is in place to expand and support the reseller channels. So far, there seem to be a lot of deals in the making, with some major sales about to be signed. We'll have to wait and see how successful this new focus will be.

Like Uniplex, Alis is also being sold by IBM on its AIX platform, though IBM hasn't given it the same launch as it has Uniplex. Our hunch, though, based on an emphatic commitment to CDA and DDIF, is that Applix may have something in the works with Digital, and that this is more of a focus for Alis.

higher with 1MB of memory. The price starts at \$670 without electronic mail and calendaring.

Accessing the host from DOS is easy, but not completely transparent. You are aware that you are going into terminal emulation.

IN COMPARISON. With so much new going for it, you may wonder why we didn't include Cliq in our head-to-head coverage of Uniplex and Alis. The main reason is that Quadratron is neither an innovator like Applix nor an industry sweetheart like Uniplex. The company is struggling, but not to educate a market or to find the proper niche for its products. Rather, it is trying to maintain an eroding base and is refocusing on marketing.

Quadratron has good functionality—functionality that is on a level with Uniplex (except for the RDBMS arena), and that offers just a bit more in some areas, such as voice annotation. But the company had always considered user interface as a distant second to functionality, making previous versions of the product unappealing. And the company, historically, has not known how to market!

Hopefully, this is all changing. Obviously, Quadratron has recognized the importance of user interface. Otherwise, why create Cliq? And the Cliq introduction at Unix Expo is going to be a big event with a lot of splash. (Unfortunately, this article went to press before the actual announcement, so we are going on Quadratron's word.)

So, while there is still a lot of work to do to bring Cliq up to speed vis-à-vis the competition in some areas, if Quadratron refocuses on marketing, keeps improving its interface and functionality, and works with its customers, the next article of this type could feature Cliq prominently.

IN COMPARISON. Both Uniplex and Applix are concentrating on the VAR and OEM channels. But Uniplex has much more experience in this field. The Uniplex product line is also much more customizable—we have always teased Uniplex because every time we said we didn't like a certain screen, keystroke combination, or menu, the company representative would say, "But it's all customizable!" Alis is not nearly as flexible (though major customization can be done through ELF).

Customizability of interface is becoming less of an issue due to standards in graphical user interfaces. Both Uniplex and Applix are committed to moving to Motif, and each should have a fairly easy job of it—Uniplex with its X-Window version and black box, and Applix because it already features a graphical user interface based on X-Window, and company developers have a lot of experience with graphical environments.

The major differentiations between the potential success of each of the similar marketing strategies are the actual products. The Uniplex Office System is very suitable for today's customer. It runs equally effectively on a dumb terminal as it does on an engineering workstation. And the DOS product can operate in a standalone mode. Alis is more advanced in document processing than most customers need at this point, and the product takes more memory than users want to put on a desktop. Though there is a character version of Alis, the product really loses a lot of its appeal when the graphics aren't available. PC-Alis only works when attached to a Unix host.

These are two very different products, yet they are both aimed at the same type of customer through similar channels. It isn't surprising that one is doing better than the other.

Futures

UNIPLEX. Uniplex, historically, has always been rather closemouthed regarding future directions—a policy which has, in the past, hindered the company more than it has helped. For example, the industry perception is that Uniplex is a totally closed system, with no toolkits or open APIs for third-party development. This isn't and has never been true, but Uniplex never bothered telling anyone. The policy is slowly changing. While President Jeff Waxman wouldn't give many specifics about the future, he did offer a lot of hints. Obviously, the next step for Uniplex is to move the product to Motif and other industry standards. (This was acknowledged and confirmed.) When we asked where the company was going with compound documents, Waxman deftly changed the subject and started talking about Uniplex being "acquisitive." We can assume, therefore, that the company is in

the market for a compound document editor or a company developing such a product. When we questioned him about the PC product's directions—decoupling the core applications from the group functionality in order to support the WordPerfect user—he smiled enigmatically. Experience gives us reason to believe that this was an "It's in the lab" smile.

Uniplex has also just announced support for NCR's new product, Tower NetWare (OEM-ed portable NetWare from Novell). Uniplex will release a version of its DOS product with network hooks into the Novel protocols (IPX, SPX, etc.) to interface with Uniplex host applications. This will be Uniplex's first product to incorporate PC LANs.

One piece still missing from the Uniplex puzzle is a macro programming language. We didn't get any commitment nor any real hints on the direction here, but the company did acknowledge that this was an important missing piece. And, historically, Uniplex has been pretty quick to fill in the gaps.

APPLIX. Jit Saxena, president of Applix, probably wasn't trying to hold his cards close to the chest, but we got very little sense of the future directions for Alis. Work on adhering to standards was all that came out clearly, though we did finally get the word that office publishing, forms processing, and multivendor connectivity are also primary focuses for the immediate future. Perhaps Applix is at a crossroads, waiting to see how the new marketing strategy works before making major commitments for the future.

The industry perception is that Uniplex is a totally closed system, with no toolkits or open APIs for third-party development. This has never been true, but Uniplex never bothered telling anyone.

IN COMPARISON. A year ago, we held a lot less respect for Uniplex. It seemed that the company was concentrating so much on today that it was ignoring tomorrow. Yet we were proven wrong. Uniplex is moving slowly but surely into the future. The company will never be a pio-

neer, but it will, most likely, always be there with what the customers demand. (At least for the next few years. We are loath to predict past then.)

We have always been impressed by Alis's technology, while, at the same time, being dismayed at the lack of market savvy. There are signs of hope with the new marketing thrust, but we are skeptical of Alis's success as a horizontal office product in its current implementation. If the horizontal modules—E-mail, etc.—were decoupled from the product on all platforms, allowing users to put in their own applications and/or, ideally, a subset of the full compound document editor, the product would make a lot more sense as a corporate sell. The product is innovative, but it's just too much—too much functionality, too much memory, too much to learn—for most users.

The Products in Brief

	APPLIX Alis 2.1	UNIPLEX Uniplex 7.0	QUADRATRON Cliq 1.0
Platforms supported	15 or more Unix, VMS, DOS.	200 or more Unix, DOS.	30 or more Unix, DOS (VMS and OS/2 imminent).
Marketing focus	VARs.	VARs and OEMs.	Direct sales.
Interface and environment	X-Window-base proprietary GUI. Committed to Motif. Character-based option for terminals. PC-Alis DOS client/server product with local GUI front end and terminal emulation into host.	X-Window-based proprietary GUI. Committed to Motif. Character-based interface for all platforms with ring menus and soft keys. Uniplex DOS coprocessing program with character-based front end and core applications on DOS and terminal emulation into host for group functions.	Character-based user interface with pop-up menus and dialogue boxes. Uses an intermediary desktop paradigm. Committed to Motif.
Macro language	ELF full programming language with keystroke capture, cross-application (not just within Alis) functionality.	Single-application keystroke capture only. No programming or editing capabilities.	Cross-application keystroke capture within Cliq applications. No programming capabilities. Macro can be edited.
Document processing	WYSIWYG compound document editor including live links to graphics, spreadsheets, and data tables. Support for hierarchical structure of styles within style sheets.	Full-featured word processing with no compound capabilities. Can reference a graphic file, but cannot view it.	Full-featured word processing with hot links to graphics and voice.
File management	Effectively hides Unix, provides document summary information, supports triggers (i.e., opening a file triggers an action, such as sending a mail message).	Iconic filing in X-Window version. Native Unix in character mode.	Native Unix but with direct movement through the Unix hierarchical directory structure using cursor keys. Path name aliasing is supported.
Electronic mail	Full-featured.	Full-featured.	Full-featured.
Calendaring	Personal and scheduler.	Personal and scheduler.	Personal and scheduler.
Database support	Flat-file database in product, forms-based SQL front end to Oracle, Informix, and Interbase. ELF can be used to access any SQL database.	Relational database in product. Also forms-based SQL front end to Oracle and Informix. Live links through SQL to spreadsheet.	Flat-file database in product. On-screen form (not menu-based front end) to SQL queries.
Spreadsheet	Full-featured.	Full-featured. Supports live links to and from databases.	Full-featured, based on third-party package.
Graphics	Full-featured business and presentation graphics, both draw and paint capabilities.	Full-featured business and presentation graphics.	Full-featured business graphics based on third-party package.
Voice technology	None available.	None available.	Voice annotation supported with appropriate hardware.

Who's to Blame?

It's kind of sad watching innovation struggle and pragmatism win out. And we started thinking, maybe we're to blame. The analysts of the industry. We have been challenging vendors to come up with visionary applications, to push the envelope of the leading edge. Yet, companies who do just that often fall by the wayside, opening a market that some more cautious vendor overtakes. Wang did it with image, and Applix might have done it with compound documents.

Yet we won't accept the entire blame. We never advocate throwing users into new environments without a careful migration from the familiar, comfortable automated world in which they live. Vendors must take users along step by step. But these steps can be big ones and can come pretty quickly if there is a real comprehension of the problems faced by customers and the strategic value of the solutions.

Applix has had trouble, but not just because it was selling a leading-edge product that was conceptually difficult to understand. Partly, it was because the company still expects users to pay for 4MB on every desk! And partly because performance,

though much improved, is still somewhat sluggish. Most of all, it was because Alis, as a complete system with a full compound document editor, presentation graphics, etc., is not appropriate for everyone in an organization.

Uniplex, on the other hand, has sold well. But, while we applaud its market understanding, salesmanship, and the yeomanlike performance of its software, we are, frankly, a bit bored with the software. There is little innovation. What is there was adopted from someone else. But Uniplex understands that customers aren't ready to buy all the things that the analysts tout.

So, developers (including Uniplex and Applix), beware! Don't listen only to the voice of the visionaries—the industry gurus. Mix innovation with a healthy dose of current reality. Let users migrate to innovative new technologies bit by bit. Digital is a good example of a company that does just that. Long before it was popular, Digital claimed, “The network is the computer.” But the company still provided solutions that met current customer needs at every step of the way. Meanwhile, it was building the underpinnings of the office of tomorrow. ☉

• OPERATING SYSTEMS •

Why OSF Chose Mach

By Judith S. Hurwitz

In the shadow of the unveiling of Unix System V.4, OSF has been moving in a new direction with its operating system, making a mid-course correction in its strategy based on feedback from its membership. Rather than using IBM's AIX Version 3 in its entirety as initially planned, OSF is swapping out the AIX kernel and picking up Carnegie Mellon's Mach operating system. One key rationale for the change is that members wanted support for multiprocessing. In addition, the membership felt that, rather than continuing to build on a 20-year-old operating system, OSF should take a "giant leap forward" and go for an object-oriented, multithreaded kernel. In addition, to be able to fulfill the promise of the forthcoming RFT (Request for Technology) on distributed computing, OSF will need many of the object-oriented features available in the Mach kernel and not available in AIX.

CHANGES IN OSF/1. The modifications to OSF/1 are as follows:

- Encore Computer's version of the Mach kernel supports parallel and symmetric multiprocessing. This replaces about 50,000 lines of code within the 150,000 lines in the AIX kernel. Most of the commands and libraries from AIX are being maintained. In addition, the threads component of the kernel will be based on the forthcoming Posix committee specification (rather than Encore's own implementation of threads). OSF will also participate in the threads activities of the Posix committee.
- The Vnode is being changed from System V to BSD 4.4 (the newest version of the Berkeley operating system).
- The AIX journal file system is being removed because there are too many AIX-specific dependencies.
- The Realtime features of AIX, specifically the preemptive kernel and the user-controlled scheduler, are being deleted.

- Distributed lookup services are no longer part of the OSF/1 kernel. Instead, this requirement will be handled through the Distributed Computing Environment Request for Technology.
- The menu-driven system administration from AIX has been deleted. System administration will be handled through a forthcoming RFT. In the interim, system administration will be provided by traditional BSD system administration facilities.
- Rather than implementing the C2 security provided in AIX Version 3, OSF/1 will include B1 level security with a migration path to B3 level security.
- OSF/1 will provide object format independence by offering both COFF (the new object format for System V.4) and Mach-O (the object format provided in Mach).
- Mach Interprocess Communication will be added. This object-oriented IPC mechanism is an important component in establishing a transparent distributed computing environment.
- A new portable GCC compiler from the Free Software Foundation will be made available.
- Rather than using Sun's version of NFS, OSF will use the BSD version of NFS and its Vnode file system switch. This will free OSF from licensing fees.
- Members told OSF that Xenix, System V.3.2 compatibility, and ABI compatibility were required. These will be provided via third parties. OSF expects Intel to provide a 386 ABI. Likewise, it expects Motorola to provide ABIs for its 68xxx platforms. This is a radical departure for OSF, which has vigorously objected to ABIs. However, membership pressure has caused OSF to reconsider this decision.

ANALYSIS OF THE CHANGE. OSF has decided that, since OSF/1 was going to be late anyway, it might as well begin providing next-generation technology. This appears to be the only way that

OSF can comfortably compete with the power of System V.4, which provides important unification of the key platforms in use today: Sun OS, System V, and Xenix. Thus, it appears that System V.4 is the answer—the solution users have been waiting for. And, in a sense, it is. It does bring together the key versions of Unix. But System V.4 is as much marketing power as it is technology. Unix International will proclaim System V.4 as the Unified Unix and, therefore, the only standard users need. In a sense, that is true. It is available today and includes some of the key technologies that users need to move ahead.

But there are problems underneath the surface. For example, the UI workgroup on multiprocessing has recommended that AT&T's Unix Software Organization (USO) start working on its next-generation kernel. True multiprocessing and parallel processing will need a new multithreaded kernel. System V is old operating system technology. The System V kernel also is in desperate need of revision. Ironically, USO and UI are looking to Mach and its object-oriented minimal kernel to bring System V into the '90s.

So, OSF is taking a leap now. We expect it will take some heat for its decision. Users and vendors alike will be worried and frustrated about the delays. The operating system will not be delivered until the end of 1990—and even that requires a truly aggressive schedule. There are some who doubt that OSF can deliver that quickly.

OSF is trying to balance aggressively moving to the next-generation operating system while staying competitive with current technology. To accomplish this, OSF is promising conformance with Posix 1003.1, the X/Open XPG3 (third edition of the portability guide), with AT&T's SVID 2 base and with the AES validation suites. The goal is to both provide next-generation technology and, at the same time, provide a migration path for current users.

To OSF's credit, it is not trying to develop much technology itself. It is, instead, taking technology it is offered—mostly software in the public domain; while OSF will be picking up the Mach kernel from Encore, Mach is, in essence, in the public domain. It is owned by CMU, which only requires that companies using Mach provide the University researchers with any changes or fixes made to the operating system. No money is involved. Likewise, OSF is picking up a lot of technology from BSD 4.4. Like the technology from CMU, the Berkeley software does not cost OSF

any license fees. OSF will pick up an NFS-compatible suite from the latest release of BSD. A System V.2 license will still need to be purchased, but OSF has concluded that most companies that will be picking up its technology already have this license. It is also relatively cheap (when compared to the System V.4 license, for example). As a result, OSF will be able to dramatically undercut USO in terms of price.

We suspect that the coming year will be a difficult one for OSF. It will find itself constantly on the defensive. The creation and, more importantly, the delivery of System V.4 will provide USO and UI with market clout. How much pressure OSF can expect depends on how soon and how many applications will be ported to System V.4. If it is a very slow migration, OSF will be in a good strategic position. If software migrates quickly, OSF will have to compete directly with System V.4. This could be difficult.

It is also important to remember that Unix is, in part, in a strategic position because of the early failure of OS/2. Many users had expected to be able to migrate to OS/2 in order to gain new applications and added functionality of a modern operating system. When OS/2 was delayed due to so many problems, users and vendors began to look to Unix to fill that void. Now that a 32-bit version of OS/2 is about to enter the market, it will put additional market pressure on Unix.

THE LONG VIEW. In the long run, we believe that OSF is making the right decision. Especially since it will allow vendors to add modules of OSF/1 to existing operating systems in an evolutionary manner. By selling OSF/1 in this way, OSF could, in the long run, have phenomenal success. Ironically, it could also provide a way for AT&T to pick up the multithreaded technology it needs. The risk, however, is that the task that OSF is undertaking is too grand and complex to be completed in a reasonable time frame. In addition to the operating system work, OSF has promised to have selected a Distributed Computing Environment by April 1990. This in itself is a large amount of work. It could be that OSF will make the mistake of taking on too much too soon. If it cannot deliver on all its promises, it will quickly lose credibility and, thus, disappear. It is, no doubt, a gamble. But, if OSF pulls it off, it will have a profound effect on the Unix industry and on the PC industry as well. ●

NEWS

PRODUCTS • TRENDS • ISSUES • ANALYSIS

ANALYSIS

• SYBASE •

An Open Architecture

Sybase has always stressed its sharp focus on both online applications (not just decision-support applications) and network computing (a client/server approach rather than host-based computing). With its announcement last month, the company now adds a third major component to its strategy: an open architecture. Sybase will license its client and server APIs to provide hardware-, software-, and network-independent client/server communications. Developers and customers will now be able to integrate non-Sybase front ends and servers into the Sybase environment using the Sybase Open Client and Open Server APIs.

The most significant aspect of the new Open Server is the fact that it can interface to any server and is not limited to SQL-based servers. Sybase views this as essential to its OLTP (online transaction processing) customers since online applications are very demanding and "one size does not fit all."

In addition, Sybase has now formally announced Version 4.0 of its SQL Server, with the product already in production and available on Sun

platforms. Other news from Sybase includes new Unix platforms—for both the SQL Toolset and SQL Server—and new partnerships, particularly the investment in Sybase by Lotus.

VERSION 4.0 OF SQL SERVER. Last May, we presented an in-depth review of the Sybase relational DBMS (RDBMS). Version 4.0 includes specific technology that makes the Open Server possible, such as server-to-server communications and the database remote procedure call.

"Second Generation" Programmable Server. The Sybase server has always had intelligence, with the ability to store procedures and triggers (a special type of stored procedure) in the database as objects. Version 4.0 adds nested triggers (up to 16 deep; the previous inability to nest triggers greatly limited their effectiveness), flexible parameter-passing (the ability for a stored procedure to return both values and status information), access to stored procedures from remote servers using server-to-server communications (previously, the stored procedure had to be on the local server), and access to stored procedures from non-Sybase servers (with the Open Server interface).

Server-to-Server Communications. Server-to-server communication is the

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major new feature in Version 4.0, allowing the execution of transactions and business rules that span multiple servers. Thus, the server can be programmed independently of the client application, and servers can communicate with each other without involving the client applications.

Server-to-server communication is implemented through what Sybase calls "database remote procedure calls" (RPCs). Database RPCs are an extension of stored procedures. Previously, stored procedures could only be invoked by client applications, not by another server, and triggers could only affect tables within a single server. The database RPC is similar to a network RPC but has special features tailored for a database, such as complex retrieval of multiple rows of data. It is used to request remote database services, providing a powerful tool for writing distributed applications. The database RPC offers transparent (to the client) access to multiple servers while preserving local autonomy over who may access data. This important concept in implementing distributed databases allows Sybase to now provide a level of location transparency.

Database RPCs extend the benefits of stored procedures to multiple-server environments, enhancing performance, making applications easy to maintain, and enforcing cross-server integrity.

New Data Types. Sybase 4.0 supports text and image data types, accessible with standard SQL or with special utilities to "read text" and "write text." Each text or image field can hold up to 2GB of data. However, Sybase does not support any operations or functions on the content of text or image data.

Browse Mode Locking. This time-stamp-based locking protocol eliminates the overhead associated with page- or row-level locking and prevents locking conflicts between readers and updaters. When a user selects data, Sybase time-stamps the data retrieved by the query. If the user then wants to update any of the data, Sybase notifies him or her whether any of the data has been changed by another user since it was originally selected. The user then must reselect the data in order to update it. This locking scheme preserves integrity while allowing throughput. It is called an "optimistic locking scheme" because it is built on the assumption that the data usually hasn't changed and the user will probably not have to rerun the query.

New Programming Functions. Programmer productivity has been enhanced with additional mathematical and string functions, plus new control and resiliency features. New mathematical functions include trigonometric, logarithmic, and exponential functions. Built-in string functions perform ASCII and character-code conversions, upper- and lowercase conversions, and trim left and right blanks. There are also new data-type conversion and date formats in Version 4.0.

Availability. Version 4.0 of SQL Server is now in production release on all Sun platforms. It is in Beta test on Digital VAX/VMS and will be generally available on all other Sybase platforms by first-quarter 1990. It is available to current customers on maintenance as a free upgrade. Cost of an initial license ranges from \$3,000 to \$192,000, depending on platform.

THE OPEN SERVER. The Sybase C/SIs are designed to provide access and integration, across a network, among heterogeneous facilities that include:

- Servers—non-Sybase data, application services, and gateways in addition to the Sybase SQL Server. Examples could be a mail server, a stock quote server, or a gateway to a non-Sybase DBMS, such as Oracle.
- Applications—the Sybase SQL Toolset, third-party products, or custom applications.
- Tools—spreadsheet, office automation, CASE, Sybase SQL Toolset, and the like.

Open Client, a programmable library interface for client applications, was formerly known as DB-Library and has always been available from Sybase. Sybase is now allowing other vendors to relicense Open Client. The Open Client interface can also be called from within programming languages.

The Open Server is a new offering for use by servers of any type. It can be used to connect a gateway, a DBMS, or another server application to Open Client applications. The developer uses a consistent set of routines to access a wide range of servers and data environments while masking from the user the complexity of the server, the network, and the data. Sybase maintains that it is the first database vendor to open up its server interface in terms of licensing the source code and allowing the interface to be used with any type of server.

Both Open Client and Open Server are a set of APIs that are based on, and extend, the ISO (International Standards Organization) Remote Database Access (RDA) protocol and ANSI SQL. For example, the Sybase Open Server provides the ability to communicate with both SQL database servers and other types of servers. Sybase has submitted its Client/Server Interface (C/SI) specifications to OSF (Open Software Foundation) in response to its

Distributed Computing Environment Request for Technology (RFT). They will also be submitted to the ISO RDA Subcommittee.

C/SI will be the foundation for Sybase's own development of generalized gateways. Sybase maintains that if its C/SI is not adopted by the standards bodies, it will be adapted to whatever standard is adopted. And we do expect to see other offerings in this area. One that has been announced since we went to press is from the newly formed SQL Access Group.

Open Server has two logical components: the Network Interface and the Server-Library.

Network Interface. The Network Interface manages the network connection and accepts requests from client programs running Open Client or remote procedure calls from an SQL Server. It supports multiple connections from multiple clients or SQL Servers, supports multiple logical connections on a single network connection to increase network efficiency, shields the user from knowledge of underlying networking, supports tabular data stream (TDS) protocol (Sybase developed), passes returned data a record at a time in exactly the same format as an SQL Server, and translates data representations (e.g., ASCII to/from EBCDIC).

Server-Library. Utilities here provide the logic to ensure that client requests are passed to the appropriate server, that they are completed properly, and that the returned data is correctly formatted for the client program. Open Server can also pass requests to other servers. The Server-Library manages the task queue, schedules client requests, passes requests and parameters to user handlers, collects returned data and status, and converts the format of returned data.

Third-Party Support. Over 60 ISV tools support Open Client today, and there is currently a lot of interest in Open Server. C/SI remarketers include

Lotus Development, Microsoft, MIPS Computers, NeXT, Novell, and Tandem.

Availability. Open Server and Open Client are licensable technology that will be available in the following formats: source code, object code, and technical specifications. Open Server is now available in object code on Sun and Digital platforms. Object code will be available for other Unix platforms and OS/2 in 1990. The price ranges from \$795 to \$48,000, depending on platform. Customers can also purchase Sun and VAX source code for an additional fee.

The Open Server API does not have to run on the same platform as its server, although the implementation is cleaner if it does. Sybase will be encouraging other vendors to license the source code and port it to non-Sybase platforms. Using Open Server also does not require the presence of a Sybase SQL Server. In fact, a customer or developer could license both Open Client and Open Server, interface to a non-Sybase front and back end, and never use the SQL Toolset or SQL Server. That is the Sybase definition of an "open architecture".

LOTUS PARTNERSHIP. In September, Sybase and Lotus Development released details of a strategic partnership in which Lotus acquired a 15 percent equity position in Sybase with the option to increase it to 25 percent. The two companies view the agreement as an opportunity to merge end-user computing with production applications in a single environment, portraying themselves as very complementary in approach. Frank King, senior vice president of Lotus, expressed a high level of commitment to this partnership. He stated that a client/server architecture is important to Lotus, which sees itself providing front-end tools on the client side. The Sybase connection will allow Lotus to extend this capability beyond spreadsheet/decision-support to include applications development and access to

online applications and an RDBMS.

Lotus plans eventually to connect all of its tools to Sybase servers. While Lotus asserted a respect for openness and an intent to connect to other, non-Sybase servers as well, Sybase will be its "preferred partner." Lotus tools will be more tightly integrated with Sybase than with other back-end products.

Lotus also offered a preview of Lotus 1-2-3/G accessing data on a Sybase SQL Server using the Data Lens driver (both front end and back end were running on OS/2). Lotus would not specify when such a product would be available.

NEW PLATFORMS. Both the SQL Toolset and the SQL Server run on the IBM RT/AIX; HP9000 300 and 800/Unix; and AT&T 3B2 and 6386/Unix.

The Sybase Open Client interface is also available on the Macintosh in two flavors: a HyperCard interface and a Macintosh Workbench (MWB) for C interface. This allows a developer to access a Sybase SQL Server using a HyperCard or MWB-developed application. Thus, the Sybase front-end SQL Toolset doesn't run on the Mac, but a Mac application written in one of these two development environments can provide a front end to a Sybase database. The objective here is not to port the Sybase system to the Mac, but to use native tools already available in the Mac environment to access the functionality of Sybase across a network. This is essentially a developer's product for a serious programmer who wants fast C programs, graphical user interface, ease of use of HyperCard, and access to a remote database.

The Open Client products for the Macintosh are available at a cost of \$195 each. They currently support Level 3.0 of Open Client, and, therefore, cannot access images stored in a 4.0 SQL Server. However, the Mac products will be upgraded by the end of the year.

MARKETING NOTES. In addition to its four traditional markets—financial,

manufacturing, telecommunications, and government (where Sybase has developed a B2-level secure product)—the company sees new penetration in the electronic/software, publishing, medical/pharmaceutical, and transportation industries. Sybase is also aggressively moving into the Japanese market in addition to the U.S. and European.

THE FUTURE. Sybase also previewed its coming attractions for 1990. Developments are underway in the following areas: support for symmetric multiprocessing, generalized gateways (e.g., to IBM's DB2), additional/enhanced application development tools, international language support, an adaptable windowing environment, and several new platforms. —J. Davis

• D N C •

Transarc: A New Contender

Transarc hasn't wasted much time delivering its first product. The six-month-old company announced that its version of the Andrew File System, dubbed Transarc AFS, will be available March 1, 1990. This is the first commercial version of AFS, a distributed file system developed at Carnegie Mellon University (CMU).

We were a little perplexed about the ownership of AFS. Until recently, it had been available from CMU, but we were told that it's now available only from Transarc. Actually, considering IBM's parental role in the development of AFS, the transition makes sense. CMU's Information Technology Center, the lab that gave birth to AFS, has been funded by IBM, and IBM maintained rights to the technology developed there. Obviously, the company wanted to take advantage of AFS, so, when the time came, IBM also invested in Transarc, and now the rights reside with Transarc.

AFS 3.0. AFS fared well in our estimation when we looked at it last April (see Vol. 4, No. 4.). AFS is best known for its disk-caching scheme, which minimizes network congestion. When you retrieve a file from the server, it is cached—in its entirety (unless you have a really huge file, in which case, AFS will read it in chunks)—on your hard disk. Thus, since you have most of your data stored locally, you needn't keep nagging the central file server. The AFS security and administration systems are nothing to sneeze at, either. AFS uses Project Athena's Kerberos authentication system for security. Essentially, the system won't recognize you unless you answer its encrypted code. Systems administrators rely on logical volumes rather than individual files for operations like backup and load-balancing among file servers.

Transarc considered its refinements sufficient for a new release (3.0). However, most of the company's effort merely went into developing additional ports. The new release supports: IBM RT; Sun3 and 4; and DECstation, MicroVAX, and VAXstations (running Ultrix). Transarc also developed a backup system, and an NFS/AFS translator is in the works.

Considering the dominant role of NFS (Network File System) in the industry, the NFS/AFS translator should be a very important development for Transarc. Currently, the AFS cache manager can coexist with an NFS implementation, so workstations have access to both AFS and NFS servers. What Transarc will provide is more along the lines of an intermediate server that will export AFS files using NFS protocols and vice versa.

CONCLUSION. As a university project, the Andrew File System served as a valuable model for distributed computing environments. CMU has been using AFS successfully for several years, and its evolution into a commercial product will bring the benefits of AFS to a broader spectrum of users.

At some point, Transarc should be announcing the availability of a trans-

action processing (TP) system based on CMU's Camelot project—another distributed computing prototype. Of course, the company wouldn't comment on when it would be available, but we hope it's soon. Transaction processing is a crucial enabling technology for distributed computing, and users are anxious for solid TP solutions under Unix. A breakthrough in this area could do a lot for Transarc.

—L. Brown

• INGRES •

A GUI Front End

Seeking to reach the broader audience of low-tech users, Relational Technology announced a graphical front end to Ingres, its relational database product.

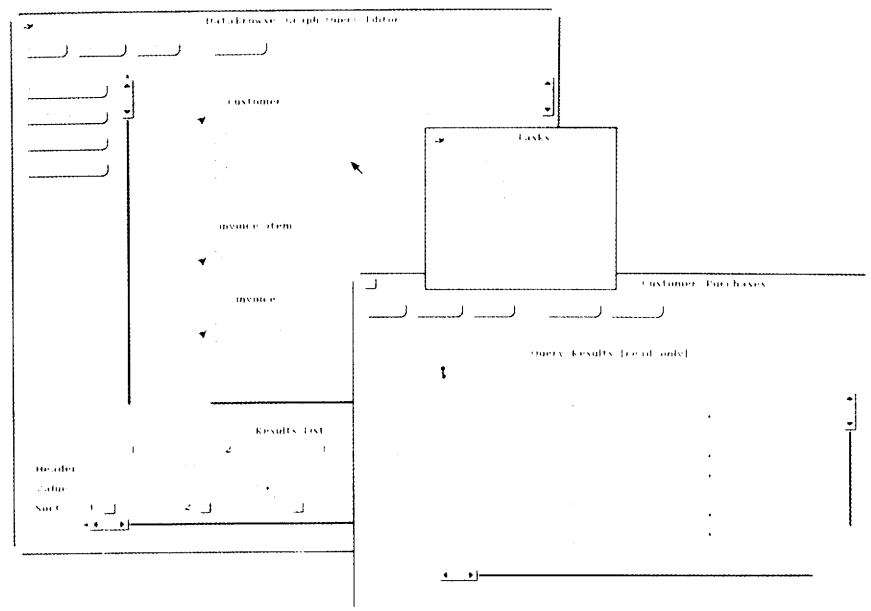
The tool, called Ingres/Simplify, is a query and reporting tool based on OpenLook. At the moment, it only runs on Sun workstations (shipping for the Sun3 is already underway; a Sun4 version will be available by the end of the year). Sun Simplify tools have been around for quite a while. A number of

software vendors have modified their products to run with the Sun Simplify tools, so that, in itself, is not unique. One of the reasons for Sun's success is that the company works very closely with third parties to integrate applications into the Sun environment. Sun and Relational Technology have been collaborating on the front-end tool for two years. The two companies are marketing the product together, although it's only available from Relational Technology.

GRAPHICAL QUERY AND REPORTING. The point of Ingres/Simplify is to relieve SQL-phobic users of complex languages and relieve MIS people of SQL-phobic users. Users have a graphical view of data and a visual query editor. Instead of typing lines of SQL statements, you point and click on the information you need (see Illustration). Relational Technology sees its graphical front end as a first step towards support for object orientation.

The Ingres/Simplify product has four components:

- DataBrowse, a graphical query editor and data display that lets users con-



The DataBrowse component allows you to create database queries by pointing and clicking with a mouse rather than keying in SQL statements.

struct queries and browse their results visually. Visual queries are automatically generated into SQL, but a standard SQL editor is also included.

- ReportWrite, a graphical report-formatting utility. Using the mouse, users can cosmeticize a report layout (i.e., the placement and sizing of components such as text, data fields, and the addition of headers, footers, columns, subtotals, etc.).
- SchemaDesign, a tool that provides a visual representation of the database. In other words, it gives you a view of the data that is available, how it is related, and how to use it. It also allows you to define new data types and create or modify tables and views.
- Utilities, which gives you access to standard Ingres programs and utilities via menus.

OTHER GUI OPTIONS? Since OpenLook is hardly the only player in the Unix GUI game, we wondered about Relational Technology's plans for a Motif or perhaps eventually a NextStep GUI front end for Ingres. Motif seems to have more momentum right now than OpenLook. (Of course, when Relational Technology started developing Ingres/Simplify, there was no Motif.) And actually, Relational Technology seems quite committed to Motif; Ingres is being bundled along with Motif in SCO's Open Desktop. However, considering the popularity of Sun workstations and the few well-designed applications under any graphical user interface at all, we don't expect the choice of OpenLook to put Ingres at a disadvantage.

Yet.

Company representatives stated that their relationship with Sun does not in any way restrict them from developing a graphical front end to other platforms or interfaces. However, they seemed to be completely focused on the current OpenLook product. In the not-

too-distant-future, they'll need to broaden their scope. Perhaps they are.

—L. Brown

• DECNET •

Digital Makes Room for Ultrix

As part of its commitment to provide equivalent functionality and support to its Ultrix systems, Digital Equipment has outlined the way these systems will fit into and communicate over its DECnet networking architecture as it evolves to full OSI compliance. In addition, the company introduced two

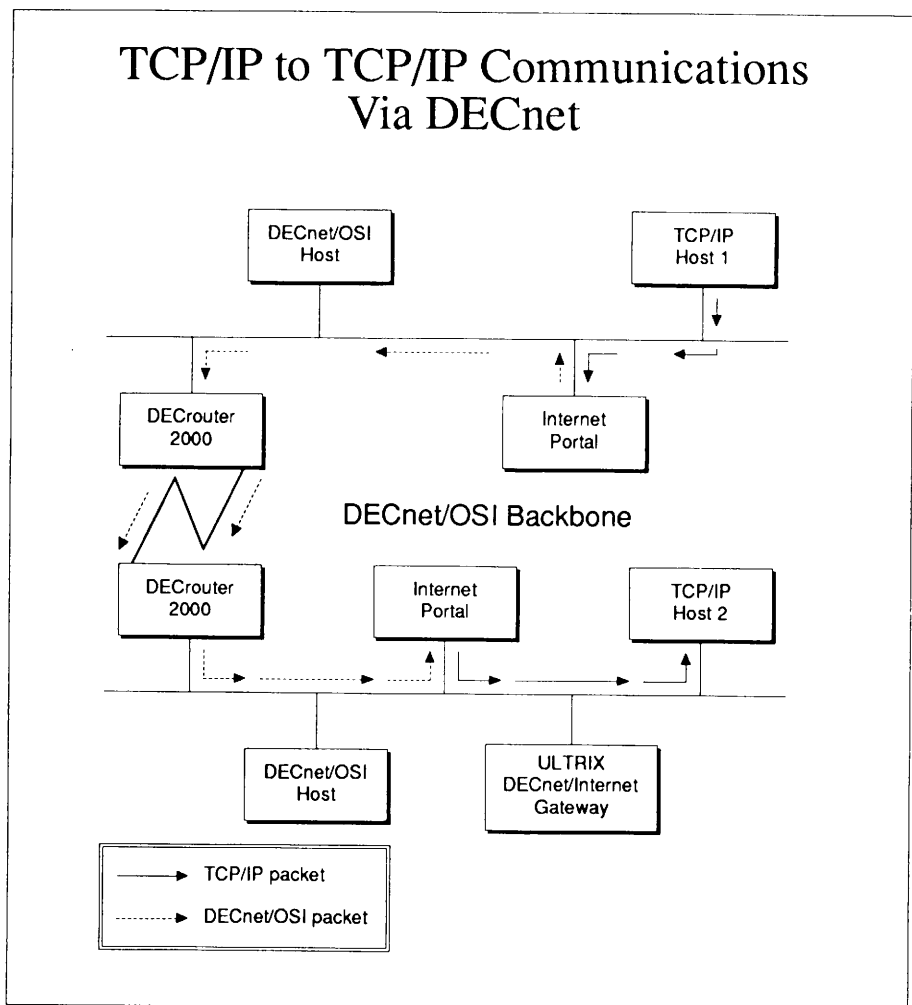
specific products that integrate TCP/IP networks into current DECnet implementations.

The products will be immediately welcomed by companies who currently have TCP/IP networks and a DECnet backbone. Equally important is the assurance to users of mixed networks that they will have access to network functionality for as long as they need.

OSI BACKBONE STRATEGY.

Digital's strategy for including TCP/IP and other "foreign" networks (i.e., X.25, SNA) has two elements: gateways and portals.

TCP/IP gateways, which Digital has provided for quite a while, allow machines on TCP/IP networks to communicate with machines on the DECnet



The movement of a TCP/IP packet from host 1 to host 2, using the Internet Portal and DECrouter 2000.

(and, through additional gateways, to other networks). Gateways do this by translating the lower levels of the protocols from one architecture to the other. Gateways may also translate the applications, such as file, mail, and terminal access. Gateways are the essential component of mixed networking, and they will be with us as long as we have systems that run different networks.

The new concept that Digital has added is the portal. The portal allows a machine on a TCP/IP subnetwork to communicate with another machine on a different TCP/IP subnetwork. The two subnetworks both must be attached to the DECnet backbone (which, with Phase V, will be OSI). The backbone is used simply as a transport for the data, which remains the same at each end point. Thus a Telnet or NFS command travels as a whole from the sender to the recipient.

The way this happens is as follows (see illustration, page 21):

- The portal encapsulates the TCP/IP packet (actually, the IP datagram) within a DECnet packet.
- A router routes the encapsulated packet to another router on the network segment upon which the destination TCP/IP machine or subnet sits.
- A second portal on this network segment disencapsulates the packet and sends it to the recipient.

NEW PORTAL AND ROUTER COMBINATION. Digital has introduced two new products to make this system work: the Internet Portal alone, and the Internet Portal combined with a DECrouter 2000.

The Internet Portal is built on Digital's RISC platform, the DECsystem 3100. The combination hardware/software product costs \$9,500 and is currently available. The DECnet/Internet Router 2000 actually includes the two separate products, though Digital has indicated that they will be combined into a single box at a future date.

The package is currently available at \$15,000, a very aggressive price, particularly when compared to a separate purchase costing \$7,000 more. In addition to the lower price, this combination provides a simple approach for companies choosing to connect TCP/IP networks via a DECnet backbone.

—D. Marshak

• A S / 4 0 0 •

In Search of Openness

IBM continued on its path to increased openness by adding TCP/IP support and a Token-Ring-to-Ethernet Bridge for the AS/400.

The new AS/400 TCP/IP Connectivity Utilities consists of the following:

- TCP (Transmission Control Protocol)
- IP (Internet Protocol)
- UDP (User Datagram Protocol)
- FTP (File Transfer Protocol)
- SMTP (Simple Message Transfer Protocol)

The AS/400 TCP/IP attaches through IBM Token-Ring, Ethernet, and 802.3 networks. The Ethernet/802.3 attachment is via the new 8209 LAN Bridge.

IBM has integrated the TCP/IP applications into the OS/400 environment. Users invoke FTP support through OS/400 command syntax, for example.

The SMTP implementation uses SNADS for mail exchange. Users can send mail to SMTP users via OfficeVision/400, DisplayWriter, PS/PC OS/400 SNDDST, or RCV DST OS/400 commands. Documents transmitted must be in FFT format. The OfficeVision/400 support means that a user can send or receive mail from lo-

cal and remote AS/400 users, PROFS Bridge users, and now SMTP users. Local and remote SMTP users must be enrolled in the AS/400 system directory.

INTENTIONS. The TCP/IP support on this platform, although welcome, is a bit sparse compared both to IBM's TCP support on other platforms and TCP support by other vendors. IBM has stated its intention to bolster the nascent TCP/IP products on the AS/400 by providing:

- Ethernet/802.3 integrated adapters for the AS/400 (eliminating the use of the 8209 Bridge)
- Support for X.25 and Telnet client and server functions

Nevertheless, the TCP/IP support is significant and an indication of more things to come.

8209 LAN BRIDGE. The 8209 LAN Bridge connects an IBM Token-Ring network to an 802.3 or Ethernet LAN. Token-Ring stations view the 8209 as a bridge to another ring. The bridge supports Ethernet and 802.3 networks simultaneously, and it is functionally transparent to the Ethernet stations.

Various configurations of the bridge allow support for multiple protocols (TCP/IP, OSI, SNA, NETBIOS, 802.2) for 802.3 networks.

WHY? You could argue that the support for TCP/IP doesn't mean much for the AS/400, as those boxes tend not to sell into heavy TCP/IP environments. That is true, but IBM is always open for market opportunity. More to the point, however, is IBM's strategic intention of becoming the mechanism for integrating the Enterprise network and thus providing, in effect, a general transport mechanism. Without support for accepted non-IBM standards, IBM would be shut out both from emerging markets and that integrating role. IBM is doing its best to prevent that situation from happening.

—M. Millikin



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the relationships
between all the
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