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# UNIX IN THE OFFICE

PRODUCTS • TRENDS • ISSUES • ANALYSIS

## BBN's Slate System

### *Delivering Compound Documents*

By Laure Brown

**C**OMPOUND DOCUMENT ARCHITECTURE is a hot concept that's taken its own sweet time to emerge. And Unix seems to be the platform it's emerging on. Up to now, most compound document architectures have been rudimentary at best. We know that they are hard to do; we've seen some clumsy attempts. However, two companies that have come up with commercially available products featuring powerful and sophisticated compound document architectures—Applix and BBN Systems and Technologies Corporation (BBN)—use Unix as their foundation. It makes sense. *(continued on page 3)*

WE ARE IN the midst of major changes and upheavals in the Unix environment. Vendors are making and breaking alliances, and creating new standards in a variety of arenas. New consortia, such as the Open Software Foundation (OSF) and 88Open, are forming. When all the dust settles, we will indeed have standards in operating systems, in computer chips, in user interfaces... to name a few. Once this happens, vendors will begin to realize that, to differentiate themselves from the competition, they have to add value to the standards. That value-added will come in terms of technological subtleties, service and support, and, even more important, application software.

**SOFTWARE IS KEY.** Applications software will have to be accessible to users. It will have to simulate the way people work; it should not make their tasks harder. The problem with much of the office and productivity-oriented software available today on both Unix and proprietary operating systems is that it takes too much effort and too many steps to make things happen. Users often start out being excited about office software only to find themselves bogged down. This has been a way of life for Unix applications for many years. Only recently have Unix vendors begun to understand how important clear and intuitive user interfaces are to end users.

**COMMERCIAL VIABILITY.** There is another important reason for this coming push towards applications software. Slowly but surely, Unix will become a commercial operating system.

• E D I T O R I A L •

# The New Generation of Applications

## Unix Developers Need to Start Focusing Beyond the Operating System


By Judith S. Hurwitz

The rules for what is acceptable in end-user corporations differ from what is required for developers. Therefore, Unix developers will have to change their way of thinking about what goes on top of the operating system.

What form will this software take? We expect that vendors will begin to offer software that includes many of the characteristics of BBN's Slate, the topic of this month's feature. Slate is interesting for several reasons. First, it has a graphical user interface. Second, it is object oriented. Third, it allows users to access and combine different types of data into compound documents.

**AN INDICATION OF THE FUTURE.** Whether Slate succeeds as a product does not

matter. What is important is that Slate is an indicator of the type of applications we can expect from Unix vendors over the next two years. Some of these applications will come from third-party software vendors like BBN, Uniplex, Quadratron, and Applix, and perhaps others will come from the proprietary software world. We also expect that major hardware vendors will join in providing software solutions as a way of offering value-added to their customer base. We anticipate that much of this software will be office applications and that these vendors (IBM, Digital, Hewlett-Packard—to name a few) will take a similar approach to BBN in terms of compound document architecture and object orientation. The next few years should bring as much excitement for software as the past several have held for standards. ●

	<b>Publisher</b> PATRICIA B. SEYBOLD	<b>Editor-in-Chief</b> JUDITH S. HURWITZ
	<b>Managing Editor</b> RONNI T. MARSHAK <b>Assistant Editor</b> DAVID S. MARSHAK <b>Staff Writer</b> LAURE BROWN <b>Sales Director</b> RICHARD ALLSBROOK JR. <b>Circulation Manager</b> DEBORAH A. HAY	<b>Senior Editors</b> MICHAEL D. MILLIKIN JUDITH R. DAVIS 33 Summit Road, Lexington, Massachusetts 02173 Telephone: (617) 861-3926  <b>Contributing Editor</b> GARY J. NUTT 3450 22nd Street, Boulder, Colorado 80302 Telephone: (303) 444-0341
148 State Street, Suite 612, Boston, Massachusetts 02109 Telephone: (617) 742-5200 FAX: 1-617-742-1028		

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## • B B N •

(continued from page 1) Unix's multitasking environment easily lends itself to compound documents. Furthermore, when you consider that Unix is generally the platform used for scientific and technical research, it follows that it would be the platform of pioneer technologies.

BBN is in the interesting position of being both developer and forecaster in the evolution of Compound Document Architecture (CDA). The Slate compound document editor is a step ahead of any commercially-available products out today (though rumors abound about exciting CDAs from different sources that will be announced soon).

## Company Background

BBN Systems and Technologies is a subsidiary of Bolt Beranek and Newman, a 40-year-old, \$300 million (fiscal 1988) holding company based in Cambridge, Massachusetts. BBN has four subsidiaries:

- BBN Communications is the company's bread and butter, garnering 50 percent of its business. BBN Communications develops and installs very large networks and is known mainly for its development of the ARPAnet.
- BBN Software Products, a \$30 million operation, develops data and statistics packages for manufacturing and quality control.
- BBN Advanced Computer Incorporated (ACI), the hardware branch of BBN, manufactures a large-scale family of parallel processors called the Butterfly (used mostly for artificial intelligence processing).
- BBN Systems and Technologies is the research and development branch, which serves as a spin-off point for the company. Projects at BBN Laboratories are customer-funded (usually government-funded), but once a project reaches critical mass, it becomes a commercial product and gets its own subsidiary. However, at this point, the company hasn't determined whether Slate will be moving to its own subsidiary or joining another. For the time being, it will be staying at BBN Systems and Technologies.

Because of its success with *Expres*—a university project seeking, among other things, to improve the quality and exchange of electronically submitted documents (See Vol. 2, No. 11)—BBN began marketing *Slate* early this year under the name "Diamond," the name associated with the *Expres* project. (Diamond, we were told, was the project; *Slate* is the product.)

**MARKETING.** At the moment, BBN is riding the marketing of *Slate* on Sun's coattails. The two companies have a joint marketing relationship that will introduce *Slate* via trade shows and open houses. Because Sun is ported to Unix, BBN is well-positioned to expand to other Unix platforms. BBN isn't ready to make use of the VAR or OEM market yet. (Keep in mind that *Slate*'s life as a commercial product is new, and BBN's marketing efforts are not yet in full swing.)

BBN marketers realize that, at this point, their product is based on an emerging technology, and customers in the corporate world are not exactly beating down BBN's doors trying to get it. On the other hand, hardware vendors are excited about *Slate*'s technology. Vendors are coming to BBN looking for opportunities for their products. BBN is targeting Fortune 500 companies and government agencies—operations willing to invest in multiple copies of *Slate* for their businesses. BBN is selling the product at \$2,000 per copy, but after the ninth copy, the price goes down to \$1,000.

But even if customers embrace the concept, BBN's track record with marketing has not been stellar. For example, a statistical modeling package which ran on DEC minis (and sold a reasonable number of copies, though not an earthshaking number) was ported to the PC. BBN tried to sell it, but the product disappeared with barely a whimper. The company's heart and soul is in R&D. Marketing is a relatively new focus.

## The Product

In simplest terms, *Slate* is an integrated document processor that lets you produce and exchange documents electronically with other *Slate* users. But the only simple thing about *Slate* is using it. BBN refers to *Slate* documents as "multimedia documents"—sounds rather lofty, doesn't it?—because they are made up of up to six different media elements: text, graphics, scanned images, speech, spreadsheets, and charts generated by spreadsheets.

**DOCUMENT PROCESSOR ONLY.** BBN stresses the fact that *Slate* is a document processor only. The company has no intentions of turning it into an office system. It would rather have you use the office automation products (calendar, scheduling, database, etc.) you want and let *Slate* coexist with them. BBN's efforts have gone into expanding the definition of a typical document—*Slate* documents even talk to you.

When working on an important business report, you usually go through various stages: gathering information, collaborating ideas with other people, getting the report reviewed and approved, revising it, prettying it up with graphics, etc. In fact, sometimes the work in progress is more important than the hard copy—for instance, a business proposal that you want to send electronically. Thus, BBN views documents as living objects, as

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*Customers are not exactly beating*

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*down BBN's doors trying to get Slate.*

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*On the other hand, hardware vendors are*

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*excited about Slate's technology.*

workstations running Sun OS 3.0 and higher. BBN is currently porting Sun4 workstation and has plans to port to several other machines (see "Futures").

## Compound Document Architecture

Slate's CDA is top-of-the-line. You don't need a spreadsheet source file (although you can import one if need be); you can create one and edit it right in your document. The spreadsheet that appears in your document is the spreadsheet file. It's always live. When you fiddle with a spreadsheet in a Slate document, the corresponding chart reflects your changes. Even when you send a spreadsheet as a message, it's live. (Of course, you can kill it at any time, making it a text element.) But here's the fun part: The frame surrounding your spreadsheet is adjustable. Think of it as a camera shutter that you can expand or narrow to adjust your view, although the entire view is always available just by opening the full frame size. It can show as many or as few cells as necessary, and it does the same thing with graphics and images. It's neat!

**SLATE'S CDE.** Slate's Compound Document Editor (CDE), called the multimedia editor, supports all five of Slate's media elements. Actually, the multimedia editor is the meta-editor; the graphics, image, spreadsheet, and voice modules are complex editors in their own right, and the multimedia

editor allows them to interact in a single document.

Because the interface is seamless, switching among media elements is simple. You don't have to open a separate window to edit an element. Each is displayed and edited on a single display surface and within a single process. You can update a spreadsheet application, then change any corresponding text immediately without leaving the document screen. It's just a matter of moving the mouse. And you don't have to tell Slate which media element you're editing; the pointer position provides it with that information, and Slate automatically gives you the appropriate menus. Obviously, when starting a new document, you have to signify which media element you want to create (the default is text). All this functionality comes at a price,

To: TCrowley  
Subject: The BBN Slate system

1. Introduction

BBN Slate Advanced Office Automation software is a computer-based system for creating, editing, transmitting, printing and managing **multimedia** documents. Like professionally printed documents, a Slate document may contain varying media types, including:

1. Text
2. Geometric graphics
3. Scanned images
4. Voice
5. Electronic spreadsheets and business charts

x	Sin(x)	Cos(x)
0	0	1
0.314159	0.309017	0.951057
0.628319	0.587785	0.809017
0.942478	0.809017	0.587785
1.25664	0.951057	0.309017
1.5708	1	-3.49146e-15
1.88496	0.951057	-0.309017
2.19911	0.809017	-0.587785
2.51327	0.587785	-0.809017
2.82743	0.309017	-0.951057
3.14159	-7.42706e-15	-1

Trig Functions  
Func(X)  
X

Above are found a spreadsheet and a chart generated from the spreadsheet. Below, are a geometric graphics object and a scanned image.

Buffer: Brochure File: Brochure

*A Slate document is made of six different media elements: text, scanned images, speech, spreadsheets, and charts generated by spreadsheets.*

works in progress, and all the features described below were developed with this in mind.

BBN has developed a seamless interface and sophisticated compound document architecture that smoothly integrates Slate's various media elements. The messaging system makes text-only electronic mail seem crude. With Slate, you can send a multimedia document that retains its life: The recipient of a Slate document can edit it, create graphics, scan images, rework the spreadsheets—use every option the author had. The teleconferencing feature lets several coworkers electronically collaborate on a single document at the same time.

**AVAILABILITY.** Slate is currently available on Sun3 and 386i

# Compound Documents: Their Time Has Come

By Ronni T. Marshak

SIX YEARS AGO, at Comdex (you remember, the first really big one that validated the "PC as Business Tool" movement) we saw an interesting product called Jack 2 hidden away in a secondary hall at one of the outlying hotels. Unlike the other "integrated" products being hailed—DesQ, VisiOn, and Windows (though we all know how long it took that product to finally come to market)—Jack 2 was not a windowing environment into which applications were loaded. Rather, it was a compound document editor, though nobody knew that at the time. The product allowed you to move anywhere in a document and specify a section of that document as text, spreadsheet, or data tables. While you were in a specific section of the document, the proper editing tools with which to manipulate the appropriate data type were available to you. No one was impressed. Jack 2 disappeared.

But we were intrigued. Oh, we knew that the product was not commercially viable at the time. Even the impressive and prophetic Xenix Star (ancestor of the Macintosh and model for all current graphical interfaces) couldn't find an audience. But we saw a bit of the future at Comdex, and we waited for its time to come. Now is that time.

**THE ROCKY ROAD TO COMPOUND DOCUMENTS.** People have been talking about compound documents for at least the last decade, but the talk always seemed to be about the future. The path to truly compound architectures has been twisted and rocky.

First, we had the ability to cut and paste data from one file into another. The data was text only, so this ability was of limited use.

The next step was the ability to refer to a second file within a document. At print time, the latest version of the referenced file would be included at the specified position in the document. More useful, yes, but you still weren't sure how much space it would take up nor how the final printout would look.

The third step was a giant one—the ability to view the referenced file within the document. This was a live view. Any changes to the referenced file were updated, usually through a specific command, in the document. This stage is where most products are at this time.

The step that many consider to be the final one is the ability to call the referenced file from within the document in order to edit it. In the more elegant solutions, such as Alis from Applix, a window containing the original file opens.

You can see changes in the document as they are made. We were very excited when Alis appeared on the scene. The combination of compound documents and the sexy Sun platform was almost irresistible. Even though we did resist Alis on grounds of basic functionality and delivery problems, the product upped the ante for compound document architectures and became the ruler against which all others were measured.

We, however, have been waiting for another step—the one we saw all those years ago. This is a document which contains different object types (text, graphics, spreadsheets) all within the document. You do not have to leave the document in order to edit any object, and the proper tools are always available. This is what Slate looks like (though the different objects are actually stored in different files, totally transparent to the user).

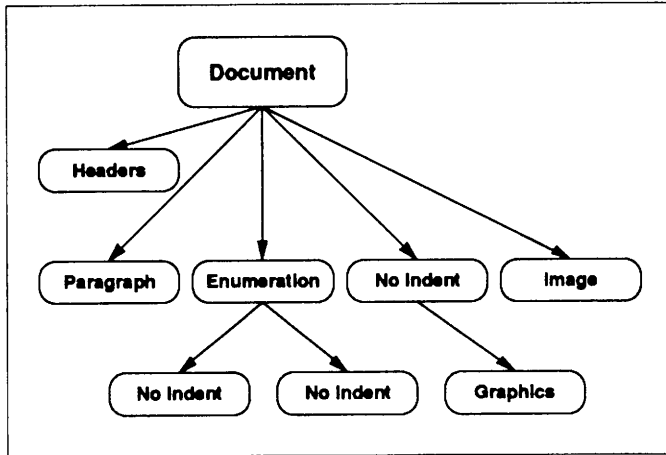
**WHAT TOOK SO LONG.** Why have we waited six years to get where Jack 2 was? Because it's hard! It takes a lot of programming effort, memory, and processing power to support compound document architectures. Until recently, it was simply too expensive to produce a commercially viable compound document editor. But the prices of MIPS and memory have lowered dramatically, eliminating this barrier.

Other, more conceptual, barriers have also been removed. Before graphical windowing interfaces and workstations, it was difficult to visualize a compound document, especially one containing graphics and images. That was one of the appeals of the Alis product—the way it appeared on the Sun workstation.

But a larger obstacle was the way people thought about using their computers. The focus used to be on tools. You had a word processor, so you could type a document. You had a spreadsheet, so you could crunch numbers. The applications dictated their use.

In the past year, the industry has turned its back on an applications approach in favor of a solutions approach typified by object orientation. The focus is now the task at hand, not what tools are available. If, say, the task at hand is creating a quarterly report, the perfect solution is a document which contains various object types: text, graphics, images, spreadsheets, and data tables. Therefore the tool required is a compound document editor. Now that users are more apt to think in these terms, compound documents are better comprehended and are considered desirable.

Tools are only good if they can build what you need. The industry now recognizes this basic truth, and new and exciting technologies, such as compound documents, have begun to flourish.



*A multimedia document is a structured object.*

though. The multimedia editor is large, using over a megabyte to execute on a Sun3.

Some hardware vendors are developing their own CDAs and CDEs. Digital, for one, is working on compound document facilities, and BBN has ported a version of the product to the VAX under both VMS and Ultrix, although it's not yet commercially available. As a third party, BBN plans to keep Slate standard and consistent across different systems. In other words, BBN has worked independently of Digital's Document Interchange Format (DDIF) developments.

## Document Management

Slate's document management system lies on top of Sun's Network File System (NFS) and the Unix file system (see diagram page 7). Documents and folders are stored in Unix directories, which may be distributed across a LAN. A Slate document may contain a number of different media objects which are all included in one or more Unix files. These files are imported as needed into the multimedia editor, which creates and modifies documents.

Each user has an inbox folder, where citations to messages are delivered. (The product comes with an inbox folder; other folders must be created.) All documents are identified with three pieces of information: the author's name, date of creation, and associated file name. Document files are automatically affixed with ".dmd" for identification. Since the inbox holds your messages, it also contains a subject line.

For directory searching, each document contains user-defined fields of summary information. Slate doesn't offer keyword search or full-text search at the directory level, which would be helpful. You can, however, define a field for keywords—Slate will search on portions of fields, so several keywords can be included in one field, and the system will still locate a single keyword search.

Slate has three levels of user access: user, group, and public, but they're not definable by the typical end user. So, if you're a member of a group, your folders are available to the whole group.

(You wouldn't want to store your resume in one of them.) Likewise, if you want to get information to a group of which you are not a member, your only option is to mail the information. A user-created folder maintains the restrictions of that user (which are defined by the systems administrator). At the directory level, Slate lets you read, create, modify, and delete.

**SYSTEM ARCHITECTURE.** Slate operates within a cluster in an internet environment that includes both wide and local area networks. To run effectively as a distributed environment, Slate requires the following elements:

- A high-speed LAN. Slate will only thrive on a speedy LAN—multimegabit-per-second, minimum. Slate currently uses Ethernet LANs.
- Powerful workstations. (Obviously. What good is all that speed without the proper workstations?) At the moment, Slate supports the Sun3 and 386i.
- Shared server hosts. The hosts are Unix-based. They provide data storage and device-controlling services.
- An internet gateway. The gateway supports communication between cluster hosts and hosts external to the cluster.

Because of its multimedia characteristics, Slate also requires specialized equipment such as vocoders (devices that digitize and then play back voice) and image scanners.

The Internet Protocol (IP) supports interactions among Slate's components. In particular, Slate uses Transmission Control Protocol/Internet Protocol (TCP/IP) for its basic mail and teleconferencing mechanisms, making it possible to conference across different networks and hardware platforms.

## Interface

Slate's interface is impressive. Of course, running Slate on Sun workstations makes it especially so. The interface is highly graphical and windowing. And you won't see any shades of Unix; all file management is done through the Slate interface.

Slate is pretty close to WYSIWYG representation—one developer at BBN calls it "quasiwyg" (i.e., some elements, like side-by-side columns or huge spreadsheets, won't be WYSIWYG). When you expand a chart, the rest of the document readjusts itself automatically. You can see changes in fonts and formats right on screen. This fits in with Slate's reverence for "live" documents. Slate's interface is completely consistent from media element to media element and from system to system. Of course, Slate currently runs only on the Sun workstations, but BBN plans to port to a number of systems (see "Futures").

**MENUS.** It's easiest to use a mouse and just point and click through Slate menus, but you don't have to. The program comes

with pop-up forms and dialogue windows where appropriate. It also offers keyboard bypass. BBN implemented standard function keys, but left them customizable. (The folks at BBN are high on letting users tailor Slate to support their preferred style of interaction and usage.) Some keystrokes are pre-assigned, however. Unfortunately, the system doesn't notify you when you're overwriting a keyboard assignment, so you have to make sure you're not clobbering another assignment when you do the customizing. Although Slate doesn't offer intelligent (or contextual) defaults for menu items, it remembers your last choice.

**WINDOWS.** The windowing facility is excellent, especially on Sun's bit-mapped screen. You can have an unlimited number of windows, and you can juggle them around and change their sizes. Slate supports Sun Windows and X-Window Version 11.

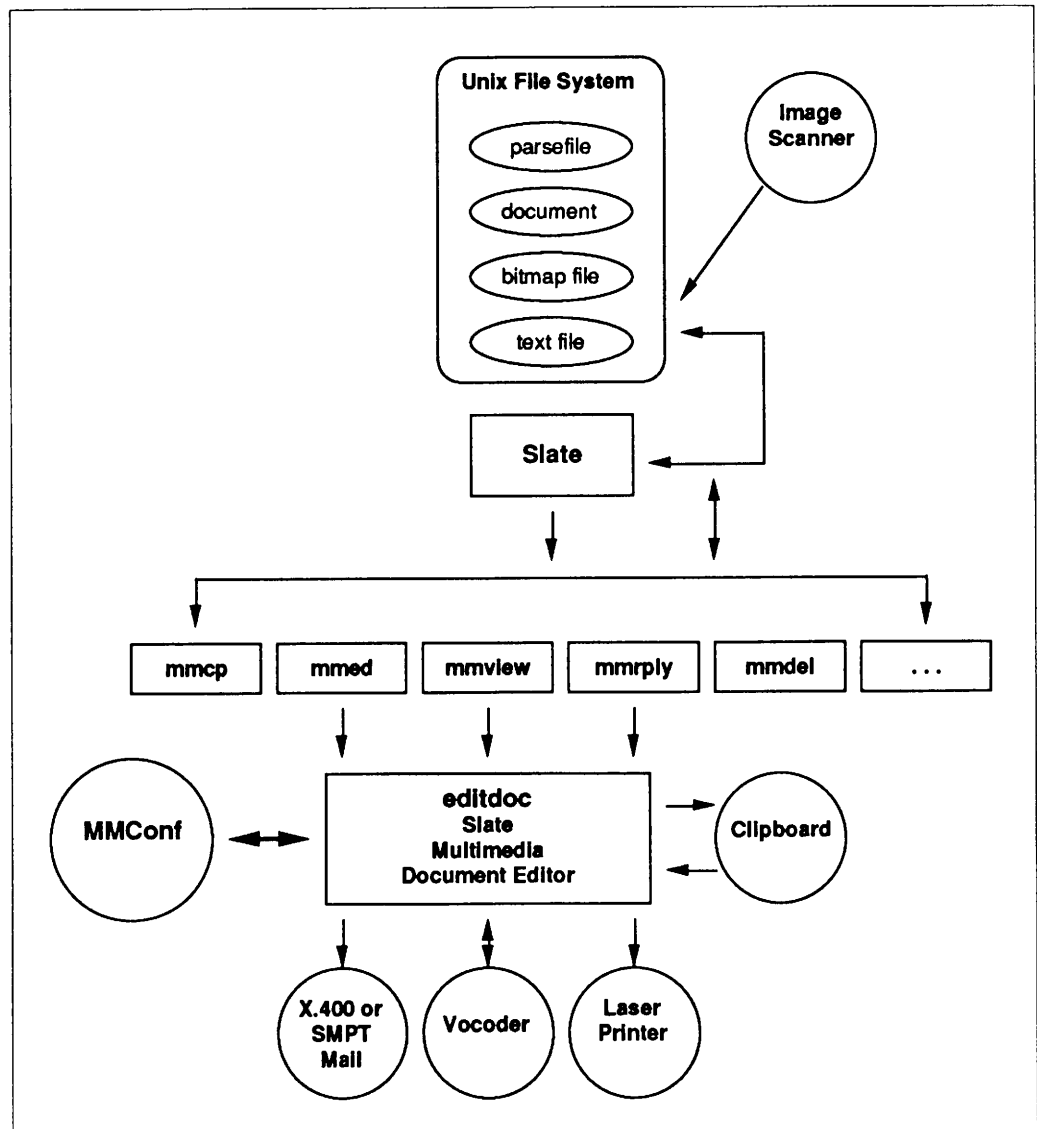
**HELP.** Slate's online Help is very good. Invoking Help is intuitive and context-sensitive. When you invoke a menu item, a click of the middle mouse-button gives you a help file for that function only. But Slate contains no main Help index, so, if you're not sure how to begin a process, you'll have to go rooting around—a hassle.

We were a little disappointed that Slate is not taking advantage of the 386i's Help. The 386i offers extensive support from help files that are accessed in a hypertext-like fashion. BBN decided to go with its own Help facility because the company wants to keep Slate's interface standard across a variety of systems. Still, writing software to the 386i without exploiting its Help seems like such a waste.

**ERROR-HANDLING.** Slate prompts you with an error message when you've done something wrong (although it won't suggest a remedy). To guard against system crashes, it provides a checkpoint facility that saves automatically at a checkpoint specified by the

user. The default is 200 characters. If you're in editing mode, the checkpoint facility won't overwrite your original document; it creates a shadow document of the original and overwrites only when you tell it to. If the system happens to crash in editing mode, Slate will keep both the original and shadow document.

**COMMENTS.** We'd like to see BBN implement a better macro facility for Slate's command feature. Fully-functional macros are a godsend, but right now Slate only offers editable scripted macros (much like Lotus's). We'd like to see something like Alis's offering, where you can invoke a keystroke capture mode that creates macros that you can then edit, or you can write your own scripts. Slate offers a temporary keystroke capture mode;



*Multimedia documents are stored as Unix files and manipulated by the multimedia editor (unless the documents are being manipulated from an ASCII terminal, in which case limited functions—"mm" commands—such as move, copy, delete, print, etc. are available). The multimedia editor communicates with the teleconferencing module, mail transport mechanisms, and print spoolers. Scanners and vocoders are accessed by software drivers within the Slate system.*

it's limited to one sequence in one session. That's simply not enough.

Every once in a while, Slate's terminology confused us. For instance, Slate refers to a new screen as a new "buffer." Not exactly intuitive—it calls to mind printer buffers. Why can't it just refer to it as a new screen (or take advantage of the new name and call it a clean slate)?

## Document Processing

**TEXT.** With Slate's advanced features, we expected an excellent word processor, but evaluating it was difficult. On one hand, it's got some sophisticated components. On the other, functionally, it's nothing to write home about. However, a number of new features are on BBN's agenda for Slate's next release in October.

The best parts of Slate's word processing are its formatting styles and text attributes. Predefined style sheets exist, but you can develop your own. Slate gives you a lot of leeway when designing a document: You can have a section head displayed in a small, italic, times/roman font with hanging indent on the left for all text following. And you see all this on screen as you do it.

It's also very easy to use. When you create a Slate document, the multimedia editor default is text, so you just start typing. Functions are available from menus or keyboard bypass.

**FUNCTIONALITY.** Slate lacks state-of-the-art word processing features. We're beginning to see word processors with powerful macros, CDAs, electronic publishing, true outlining (structured, collapsible headings as opposed to merely numbering paragraphs), and customizable interfaces. Although Slate is ahead of the game with CDA and electronic publishing, its functionality is generic at best. It performs most basic word processing functions: multiple ruler, justification, search and replace (non-case sensitive), on-screen attributes, headers and footers, mark and go to, undo (just one level), multiline spacing, side-by-side columning (though it isn't WYSIWYG), paragraph numbering, multiple fonts, widow and orphan control, cut and paste, copy and move, and spell correction.

But it's missing some basics, too. Slate's columnar work is weak. It creates side-by-side columns that cannot be sorted or moved or viewed in WYSIWYG representation, and it doesn't support snaking or parallel columns. Given Slate's strong formatting capabilities, we expected the column feature to be topnotch. Also lacking in the current version are footnote and index functions. One minor limitation we ran across is that Slate won't let you input text next to a spreadsheet or graphic. The only way to get around it is to create an image section and use text characters within the frame, but you lose your formatting when you do that.

Although BBN plans to increase the functionality of Slate based on customer demand, it doesn't want to compete with single-application products. It would rather coexist with them than reinvent the wheel. BBN plans to integrate major word processing packages so that customers can use the package of their choice and port the documents into Slate, but the product currently only maps to ASCII and WordPerfect.

**GRAPHICS.** Slate's graphics editor lets you create objects containing lines, boxes, geometric figures (polygons, circles, etc.), ellipses, text, arcs, splines, and scanned images. You can draw outlines in a range of brush widths and textures, and you can fill in closed regions with shaded textures and patterns.

Editing aids, such as rulers and grids, are also available. Color graphics will be available in the next version.

Getting into the graphics editor is easy enough; just invoke it from the main menu. From that point, you can choose and manipulate the available objects. Once you are on the display surface,

Slate lets you move, scale, rotate, enlarge, and shrink single objects or groups of objects. And you get to play with the opening and closing frame.

BBN provides filters that will translate output files of MacDraw and MacPaint.

**IMAGES.** The image editor currently supports monochrome bit-mapped images (the size of the bit-map is limited only by the memory available) and video (single-frame video, that is). With a scanner, you can include black-and-white photographs, maps, or drawings in a Slate document, and, from there, they can be cropped, scaled, rotated, reflected, painted on, or marked with graphical annotations. (When you mark an image with a graphical annotation within the image editor, the annotation is merged into the bit-mapped image.)

**SPREADSHEET.** Slate's spreadsheet leans more towards flexibility of on-screen presentation than towards functionality, although it performs most basic functions (statistical, mathematical, special, boolean, financial, date, and what-if). It's modeled more after Excel than Lotus 1-2-3. It reaches to 256 columns and 2,048 rows—not as much space as many full-featured spreadsheets, but sufficient.

The strength of the Slate spreadsheet, like the other media elements, is its menu-driven, consistent interface. You can create a spreadsheet right in the document—no need to invoke a separate window, no need to call up a spreadsheet file. Of course, you can pull in a spreadsheet source file, but, once you do, you have the entire spreadsheet in your document to update and edit as you see fit. The spreadsheet element you invoke remains live and editable throughout the life of the document. And, again, you have the adjustable frame. The frame contracts to give you a

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functionality of Slate, it doesn't want to compete  
with single-application products. It would rather  
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precise view, but the entire spreadsheet is still there. To get a larger view, you simply point and drag with the mouse to the desired size.

The spreadsheet editor will accept data from Lotus, Excel, MultiPlan, and ASCII text files.

Slate's current abilities fall short of what serious spreadsheet users now expect. Its biggest shortcoming is the lack of spreadsheet macros. Again, it has only the system-wide scripted language and temporary keystroke capture. Links to a database would be another step in the right direction.

**CHARTS.** The Slate spreadsheet generates charts that can be manipulated by the graphics editor (see "Graphics" above). When information in the spreadsheet changes, the corresponding charts reflect the changes.

**VOICE.** Users can work with the Slate voice element, which is digitized speech passage, to make comments in the document. A Slate uses vocoding devices to digitize and compress spoken speech at rates from 16 to 32 kbps. For presentation purposes, each voice element is represented graphically by an icon of a loudspeaker as well as an optional text caption. Since a primary function of Slate is sending live, editable documents from user to user, the text caption is a useful device for keeping track of whose comment is whose. BBN might want to consider offering a blind icon to prevent users of a shared document from hearing a voice annotation without losing it altogether.

BBN kept the voice interface simple; it's basically a handheld tape recorder. To create a voice element, you merely invoke it from the menu and speak into the recorder; to hear it, you point to the icon and invoke the "playback" command.

## Slate's Messaging System

Slate's messaging system is a lot more than your average E-mail. You can send even the most complex Slate documents electronically. Slate's CDA is maintained through transmitted documents, even across a WAN. To send a document, you provide the name of the addressee and the subject of the document (both will appear in a status window of the mailed document) and invoke "Send" from the menu.

Documents are electronically exchanged either via Standard Mail Transport (SMT) or the International Standards Organization (ISO) X.400 mail protocols making use of the standard DARPA Internet Transmission Control Protocol (TCP). BBN has developed its own body type definition for its X.400 implementation.

**PROS AND CONS.** Slate documents sent electronically lose none of their characteristics, not even voice—as long as you're a Slate user, that is. Which isn't to say you can't mail Slate documents to non-Slate users. You can, but the document won't be quite the same. As mentioned, BBN has developed filters that translate the document into other document- and media-type formats (see chart to the right to see which ones are available). For instance,

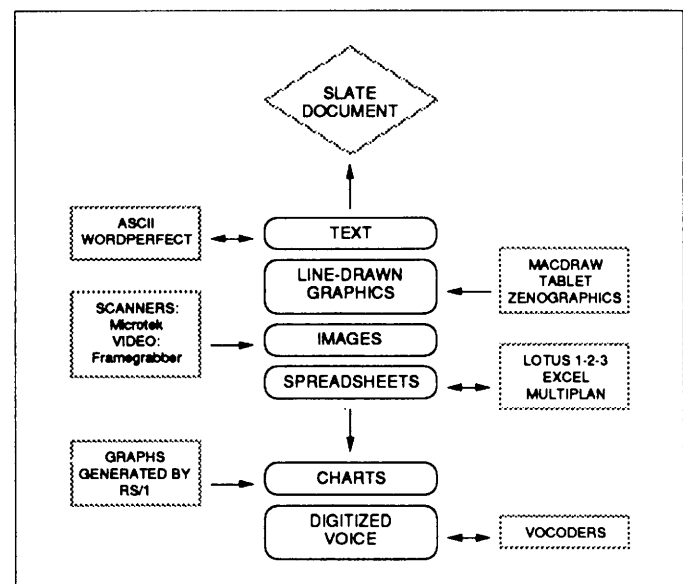
a filter will translate a Slate document into ASCII text. When you send a message to a text-only destination, Slate creates a text-only message that includes text descriptions of the other media elements (e.g., "There was a voice message here.").

Slate does not assume that the recipients of your mail message are Slate users. The system maintains a database of recipients and their system status, so if you send a multimedia document to a non-Slate user, it will automatically be sent stripped of all but text objects. Slate always recognizes other Slate users, even those not on the database. If you're sending a message to a user not included in the database, you have the option whether or not to register the user in the database.

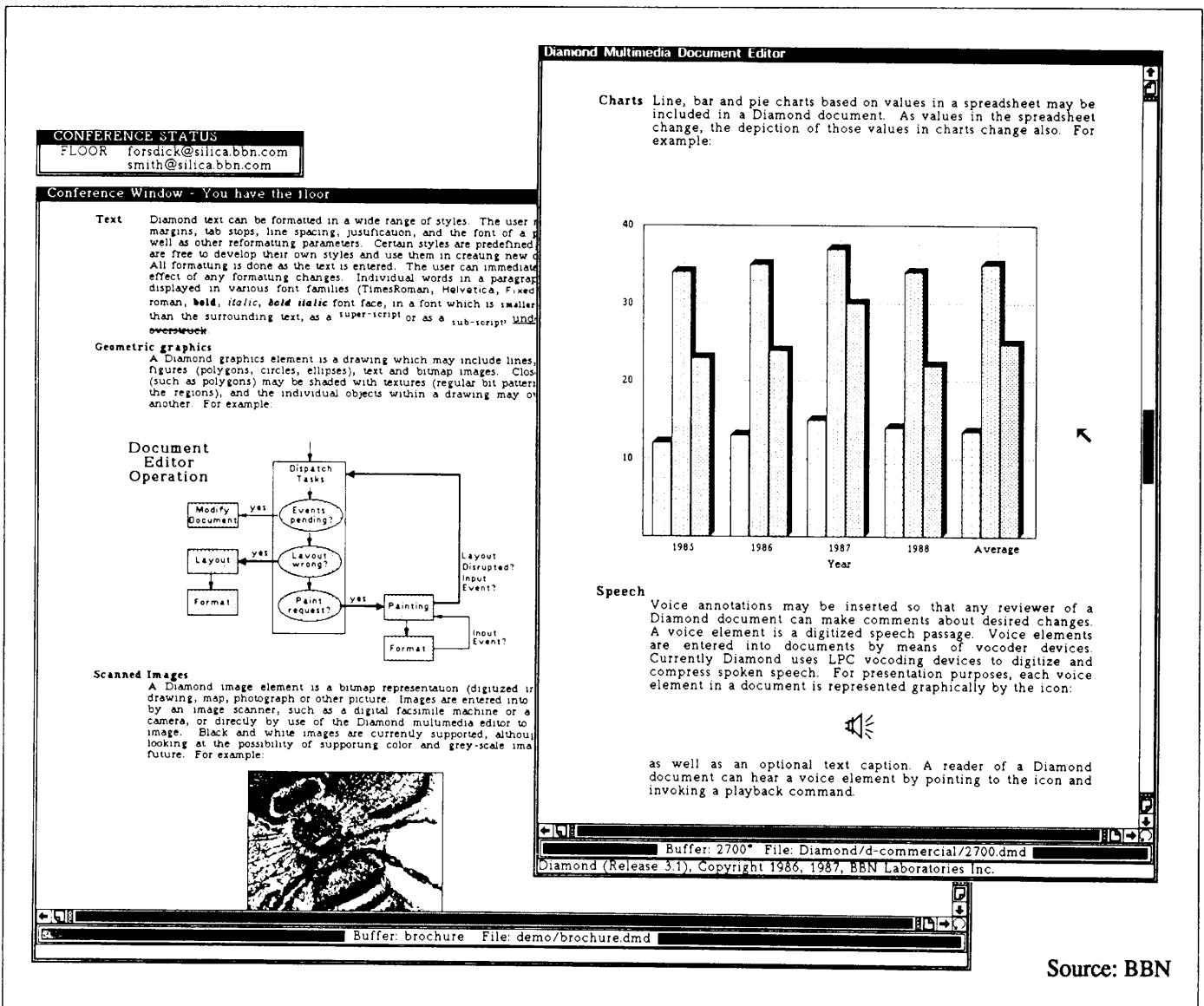
However, once the document is stripped to text, Slate will only recognize it as a text document. For instance, if you're sending a document round trip to a non-Slate user, it won't come back to you with its multimedia elements.

Slate doesn't yet have an attachment facility. In Slate, the document is the message. When you compose a message, Slate gives you header forms where you enter the name of the addressee and the subject. (Slate gives you one subject line, but you can create additional ones.) But we'd like more than subject lines. When you send a document, you usually want to explain what it is and what you want done with it. You always have the voice annotation option—just voice your needs to the person at the other end. But an attachment feature would also be nice, and BBN promises to have one in the next version. Even a stamp pad facility would do. That way, you could flag the document with "FYI," "Read and Return," etc.

You can use Slate as a front end to other E-mail systems; in fact, BBN encourages it. But you might want to keep your mail message files separate from your Slate files. Let's face it, the "Slate Multimedia Electronic Document" is something altogether different from your basic "Hi, Joe, do you want to see a backstage after work?" message.



*Slate's current integration environment.*



Source: BBN

A Slate document as viewed during a conference. The conference status window shows who has the floor. All parties involved see changes on screen in real time.

### Multimedia Conferencing

Sending Slate's multimedia messages has obvious advantages over sending text-only messages, but BBN takes communications a step further with "multimedia conferencing." Basically, multimedia conferencing, which operates via TCP/IP, lets you collaborate electronically in real time. Several users can edit the same document simultaneously with the changes appearing on everybody's screen.

In essence, all the participants in a Slate conference share the same document. The display surface and pointer are controlled by one person at a time. Slate calls this "controlling the floor." A status window on the top right-hand corner of the screen lets you know who has the floor. When the floor-holder modifies a document, the other participants watch the changes

occur in real time. Participants can also be linked to speaker phones, making the conference highly spontaneous and reactive—just like a face-to-face conference.

BBN might want to consider implementing a redlining feature to cap off its conferencing module. That way, co-workers could collaborate over a document without setting up a conference.

**CONFERENCE CHAOS.** The only limitations to Slate's teleconferencing facility are sociological, not technical. Yes, Slate conferences are designed to be interactive, but they may be too much so. Slate gives no guidelines; anything goes. Anyone can take control of the floor at any time, even in the middle of another user's operation. You'll also bump into people who hog the floor. And, if several participants are involved in the conference,

some may never get a chance to jump in. In earlier versions of Slate, the user on the floor could not be interrupted unless he or she voluntarily relinquished control. Slate had set up queues; you had control on a first-come-first-serve basis. But the structure detracted so much from the essential spontaneity of a conference that it was rejected. Of course, the phone link should keep reins on the chaos to some extent, but eventually, some "teleconferencing etiquette" needs to evolve.

## Futures

BBN is considering various options for Slate. It doesn't intend to change the concept of the product; its plans have to do with availability and integration.

**AVAILABILITY.** BBN is working on future ports of Slate to several machine types, including DEC MicroVAX II running both Ultrix as well as VMS (BBN is waiting for Digital to ship DECWindows before it comes out with a DEC version), the Apollo DN3000 workstation, the IBM PC/RT workstations, and the Apple Macintosh II. All of these versions will use the X-Window system for display support. The company's immediate priorities are a Sun4 version and improved versions for the Sun3 and 386i. BBN is considering ports to OS/2, but not in the near future. The company will wait for more commercial acceptance of OS/2 before it's ready to commit to it.

**INTEGRATION.** As we mentioned, BBN doesn't want to compete with single-application products like Lotus 1-2-3 or WordPerfect. Instead, the company is developing more translators that will let Slate interact with other systems, especially other word processors (see "Document Processing").

**STANDARDS.** BBN is committed to standards only as they become necessary in the market. For instance, Slate supports X.400, but only where it's needed. Support for ODA/ODIF is under development; it should be available within the next year. However, since ODA has no support for things like voice and tables, it will be a subset of the full functionality of Slate.

## Conclusion

Slate is very good at what it does. Its power lies in its Compound Document Architecture, which keeps the interface between components seamless and manageable.

We're concerned, though, about Slate's weak functionality. The word processor and spreadsheet are only rudimentary, and we're afraid that users won't buy into that—no matter how much fun Slate is to use and no matter how spiffy its CDA. Although BBN is promising better functionality for future versions, it's banking more on the software filters that will translate media elements from other packages into Slate (e.g., a Lotus spreadsheet or ASCII text). In other words, you can use whatever package you're used to, but not at this point. Slate only filters WordPerfect and ASCII for text, and Lotus, Excel, and MultiPlan for spreadsheets. We'd like to see Slate catch up functionally pretty soon. No one is going to switch to a document processor that doesn't have at least state-of-the-art capabilities. We're looking forward to seeing BBN's developments in the October release.

We also wonder whether users will opt for the integrated Unix office systems (with databases, calendaring, etc.) out there. Systems like Alis and Uniplex offer more functionality than Slate, even if they're not quite as sleek. BBN might at least consider supporting a database.

Lastly, BBN should get out from Sun's shadow and develop a better marketing strategy for Slate (learning everything they can from Sun in the process—Sun is a marketing whizbang). The marketing agreement with Sun might be a good way to introduce Slate, but for the product to really take off, it needs more individual exposure than joining Sun at trade shows and open houses. But, on the other hand, BBN has only really sold successfully into the scientific and university markets. Perhaps after working with Sun marketeers and porting Slate to other systems, more marketing alternatives will become available.

What with its CDA, its teleconferencing facility, and its electronic document exchange, Slate is an exciting product. We'd hate to see such leading-edge technology drown in functionality and marketing holes. ●

## • ISSUES AND OPINIONS •

# Apollo's Troubled Times

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Can the new Workstations and RISC architecture cause a turnaround?

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By Judith S. Hurwitz

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Apollo is struggling hard these days. First, it had the unpleasant task of informing investors just days before the second quarter ended on July 2, 1988, that it would suffer a substantial loss. It attributed this loss both to the poor performance of its German subsidiary (it didn't know that Siemens would not be purchasing its promised volume) and pricing cuts on its 4000 series. To make matters worse, President Roland Pampel suddenly resigned to become president and CEO of Honeywell Bull only days after the bad financial news surfaced. Pampel had probably been in negotiations with Honeywell Bull for some time. However, his move, following so closely on the heels of the disappointing quarterly results, left many with the impression that Pampel left because of the company's financial and management woes.

Indeed, Apollo seems to have a history of management problems. Taking a look at the last three years, you can see a series of mishaps. Back in 1985, Apollo suffered when the company added more manufacturing and office space than it could possibly use. This, combined with the fact that Apollo's product line was out of date, led to a major personnel layoff. And last year, Apollo had a currency trading problem. Oh yes, the company has experienced some very rough times.

## Coming Out from Under

It is easy to look at the second quarter financials and the problems that have plagued Apollo over the past three years and to forecast disaster. But, though we don't wish to minimize Apollo's problems, it is important to look at all this in perspective.

We should not forget just how far Apollo has come since its biggest management crisis back in 1985. At that time, the company had but one prod-

uct (the DN300), depended on a single customer (Mentor Graphics) for as much as 50 percent of its business, and supported only a proprietary operating system (Aegis). In addition, its communications technology was weak. Apollo did not support Transmission Control Protocol/Internet Protocol (TCP/IP) or the increasingly popular Network File System (NFS). Communications to mainframe systems was virtually nonexistent.

Then, Apollo had virtually no competition and had the luxury of selling iron just as fast as it could push it out the door. Marketing was nice but not really necessary. Fiscal control was good, but there was no time to think about it in those heydays. Gradually, competitors like Sun Microsystems and Digital Equipment began moving deeper and deeper into Apollo's territory. To Apollo, it must have seemed as though the roof caved in overnight.

Things have indeed changed. During the last three years, Apollo faced up to many of its problems squarely. Apollo has increased the number of its customers so that no single third party is responsible for more than 15 percent of its business (Siemens is one of the largest clients representing 15 percent of the business). It has moved, albeit slowly, from its Aegis proprietary operating system to a Unix operating system. It managed to improve its communications technology with TCP/IP, NFS, and connections into mainframes and minicomputers. It has expanded beyond its traditional Motorola 68000 base to include Reduced Instruction Set Computer (RISC) products, which will provide Apollo with a broader range of products from workstations to multiprocessor and parallel processor engines. It has continued to add new, faster, and more cost-effective 68000-based workstations (though at a slower pace than we would have liked).

## New Products

Apollo has not been standing still in technology, either. Several weeks ago, the company announced a family of workstations based on the Motorola 68030 processor. The new workstations are intended as replacements for Apollo's aging Series 3000 family. Apollo has also been under

pressure to keep pace with the products announced by Sun Microsystems. The competitive pressure is one reason for some of Apollo's problems. The company was forced to lower prices more than it wanted to on its 4000 family in order to keep pace with some of Sun's aggressive marketing. The effect of this competition was evident in the 68030 pricing. For example, both the new low-end Series

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**In the long term, Apollo's future will depend on its forthcoming Prism architecture. Having this type of scalable product will be essential.**

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3500 (a 4 MIPS machine) and the Series 4500 (a 7 MIPS machine) are priced at about \$2,000 per MIPS.

The Series 3500 is the low-end 68030 based on the 25 MHz version, while the high-end Series 4500 is based on the 33 MHz version. The 4500, which will become Apollo's mid-range workstation (they call it a Personal Super Workstation), will have a dedicated cache, no-wait-state operation. It will also use a 64KB physical cache to improve overall throughput. Apollo contends that the 4500 is the only workstation that includes two-way interleaved memory. This feature is intended to eliminate bottlenecks associated with more traditional memory architectures. It allows the 4500 to handle full bus bandwidth in all of its memory configurations. The Series 4500 supports between 8MB and 32MB of main memory. Both the 4500 and the 3500 support options such as a floating point accelerator.

## The Future

While we think that the new 68030-based products are a needed incremental improvement over the company's previous offerings, they are not barn burners. In the long term, Apollo's future will depend on its forthcoming Prism architecture. Having this type of scalable product, ranging from the low end to parallel processors, will be essential, given the fact that all of Apollo's competitors will also have scalable RISC technology. In its favor, Apollo has achieved technological excellence with Prism.

Apollo has gained some ground during the past year. Its attempts to focus attention on its excellent Network Computing System (NCS) have

paid off. It has announced an excellent version of the Unix operating system that should satisfy customers, and it has spearheaded the creation of Open Software Foundation (OSF).

However, the financial loss in the third quarter and the loss of Pampel will hurt. Industry perception is that Apollo is on a downward spiral. It has lost credibility and will not recover it quickly. The following quarter will still reflect the same problems that landed Apollo in its quagmire. The company's new products will not be delivered until the fourth quarter, and it still must sort out problems with Siemens.

Apollo also lacks visionary leadership. When Bill Poduska left in 1986 to make his fortune elsewhere, Apollo lost the person whose charisma and vision had started this high-powered workstation company. Although Vanderslice has brought order to Apollo, he has not brought vision, a quality not easy to find.

From a technical perspective, Apollo has a lot going for it. It bodes well for the future that 90 percent of the R&D people Poduska brought with him to establish Apollo are still with the company. These are bright people with a lot of innovative ideas.

The same cannot be said of marketing. Apollo has become painfully aware that its marketing needs work. It's Open Dialog user interface is a good example. Open Dialog incorporates object-oriented technology and provides a good and viable user interface, yet this product is rarely mentioned or considered as one of the key user interfaces under X-Window. Apollo needs to do a better job of getting third parties and end users excited about its technology. The company intends to spend a lot more money on marketing in the future, but its efforts will have to be much more polished and professional. It will not get a second chance.

## Conclusion

The next six months will be very important for Apollo. The company must restore the confidence of its user base, deliver both its new 68030-based products and its RISC product family, and revise its marketing by creating an overall plan that can take it beyond the decade. Apollo has to find a way to plan better. It shouldn't be taken by surprise by inevitable pricing trends. The perception persists that Apollo is always reacting to competitors like Sun, that Sun is a leader and Apollo has become a follower. It will take work and planning for Apollo to overcome this label. ●

# A N N O U N C I N G

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*Bill Joy, V.P., R & D, Sun Microsystems*  
Digital Equipment Corporation  
**Measuring ROI**  
User Panel

**Measuring the Productivity Payoff**  
Hewlett-Packard  
*Thomas Pryor, Program Manager, Computer Aided Manufacturing International - Inc. (CAM-I)*

#### Concurrent Sessions:

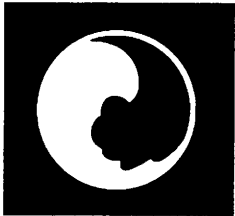
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**Simulating Organizational Dynamics**  
Digital Equipment Corporation  
**Coordinating Actions**  
Action Technologies  
**Inventing The Future**  
Northeast Consulting  
**Building Consensus**  
Wilson Learning  
**The Natural Planning Model**  
Insight Consulting

##### **Technical Sessions:**

**Object Oriented Environments**  
*Chris Stone, Mgr. Office Sys. Software, DG*  
*Dave Liddle, Chairman, Metaphor*  
*Michael Millikin, The Office Computing Group*  
**The Role of Standards**  
*Robert Ackerman, Chief Mktg. Officer, X/Open*  
Open Software Foundation  
*Judith Hurwitz, The Office Computing Group*



**DAY 2: WEDNESDAY, OCTOBER 26, 1988**

**Heading Toward Computer Supported Cooperative Work**

*Jim Manzi, Pres., CEO, Chairman, Lotus Apple Computer*

**Managing for Multiple Constituencies: Stakeholder Management**

*Charles Exley, Chairman, CEO, NCR*

**Approaches to CSCW**

*Anatol Holt, Chief Technical Officer, Coordination Technology*

*Tom Malone, Professor of Info. Technology & Management, MIT*

**Moving Toward "Real-Time" Systems**

*Stan Davis, Author, Future Perfect*

**The Payoffs From CSCW**

*Bob Johansen, Director, New Tech. Prog., Institute for the Future*

User panel

**Information Systems as Change Agent**

*Tom Gerrity, Chairman, CEO, Index Systems*

*David Norton, Principal, Nolan-Norton*

**Partnering for Progress**

*Ian Somerville, McKinsey & Co.*

User Panel

**Concurrent Sessions:**

**Teamwork & Technology Workshops:**

(Choose from the Teamwork & Technology Workshops on Day 1.)

**Technical Sessions:**

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# NEWS

PRODUCTS • TRENDS • ISSUES • ANALYSIS

# ANALYSIS

## • X/OPEN •

### Welcome, IBM

X/Open is beginning to have an increasingly important role in the international standards movement. After much debate and hesitation, IBM has finally taken the plunge and joined up. Now that IBM has staked (at least part of) its future on standards with its introduction of AIX and its sponsorship of the Open Software Foundation (OSF), joining X/Open was a natural next step, especially important because of the relationship between X/Open and OSF: OSF has pledged to comply with X/Open's Common Applications Environment.

IBM's membership comes just a week after X/Open announced its first Japanese member, Fujitsu Limited, the country's largest computer manufacturer (consequently, X/Open plans to open an office in Japan later in the year). The additions of IBM and Fujitsu bring X/Open membership to 15 companies. Members that also joined this year include NCR Corporation and Sun Microsystems. Earlier members include AT&T, Bull, Digital Equipment, Hewlett-Packard, International Computers Ltd., Nixdorf, Nokia Data, Olivetti, Philips, Siemens, and Unisys.

We are encouraged that such key players as IBM and Fujitsu have signed

on with X/Open. X/Open has been, and will continue to be, a driving force in the standards arena. The combination of X/Open, OSF and the National Bureau of Standards, and the IEEE Posix committees represents the future of the standards movement. The efforts that these organizations are making to establish the next generation of computing is impressive. These organizations must continue to work in concert, keeping in mind that the goal for all is the same: a standards environment that will benefit the end user. ☉ —J. Hurwitz

## • STANDARDS •

### OSF's Request for Technology

The Open Software Foundation (OSF) wasted no time translating its intent into action. To demonstrate just how serious it is, OSF has already issued its first Request for Technology (RFT). (An RFT, by the way, works like a Request for Proposal or RFP, except that it asks for a technology, not a product.) OSF is not tip-toeing around; it's starting with perhaps the most explosive standards issue: graphical user interface. Interesting prospect. Its choice of user interface will serve as a window into this young organization's opera-

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OSF Looks for a Graphical Interface Standard. **Page 16**

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AT&T Reacts to OSF and Tries to Calm its Customers. **Page 18**

tions. It will also be interesting to watch how OSF coordinates its user interface choice with that of X/Open.

The foundation needs a graphical interface to develop the User Environment Component (UEC) of its Application Environment Specification. This user interface component of OSF's overall plan includes:

- A style guide which will describe the direct manipulation of the interface. It will include the conventions of how the screen will appear and how users, groups of users, and applications will interact. The style guide will also provide guidelines about information management.
- An Application Program Interface (API) which will describe the mechanism for implementing the style guide conventions
- Utilities and run-time libraries which will support applications.

OSF plans to develop a software environment including application interfaces, advanced system extensions, and a new operating system, and it's starting with X/Open, XPG3 base level, and Posix specifications.

**THE RFT.** OSF is on a tight and ambitious schedule—looking at commercial shipping for early 1989. Candidates



have until September 16, 1988, to submit their interface technology proposals. Next, vendors in the running will have to present their material at an OSF membership meeting during the last week of September. In the first week of November, OSF members will meet to review the proposals with the OSF development staff. Finally, the selected technologies will be announced along with the selection rationale.

**Requirements.** Because the X-Window System is a de facto standard for window-based user interfaces in networked, multivendor environments, OSF will use it as an underlying technology, and all submitted technologies must support Version 11. This is a wise move, given the growing importance of X-Window and the fact that it has already been selected by X/Open as part of the Common Applications Environment. OSF has a number of other requirements, too:

- Standards conformity with Posix and ANSI C
- Portability across a wide range of hardware platforms
- Capability of shipping commercially in the first half of 1989
- International language support (European, Semitic, and Asian languages)
- Testing and validation support
- Licensing terms that give OSF the rights to use, modify, and sublicense

**Criteria.** Above and beyond the requirements specified by the RFT, OSF will evaluate each candidate technology according to its level of interactive performance, its degree of interoperability within heterogeneous networks, and the range of machine types it supports. OSF will also take into consideration things like extensibility (future versions might have additional interface components and extensions to the X protocol), provisions for embedded training and

help facilities, visual appearance, and innovation.

**CONCLUSION.** As the next frontier in the world of standards, user interface is a crucial issue right now. We're looking forward to OSF's selection, not to mention the rationale and process behind it.

X/Open will also select a standard user interface in October. Because OSF is committed to supporting X/Open specifications, it'll be interesting to see how the two selections coincide (or how they don't). ☉ —L. Brown

• IBM •

## Enhancements to RTs

IBM is continuing its commitment to the RT PC as a strategic platform with its roll-out of three new models in the Reduced Instruction Set Computer (RISC)-based AIX workstation family. The new machines—Model 130, Model 135, Model B35—emphasize increased processing speed and data storage.

Increased speed (up to 5.6 MIPS, according to IBM) is achieved through an enhanced CMOS RISC processor and an enhanced Advanced Floating Point Accelerator. Total data storage capacity has been increased from 5810MB to 7460MB, while standard RAM remains at 16MB. The RT now supports 32 users, double that of a year ago and four times the 8 users supported at the original introduction of the RT in 1986.

Additional enhancements include an X-Window V.11 interface, Network File System (NFS) support, and the ability for the AIX/RT to run as a DOS server. (Visual COBOL-85, a Cobol compiler for AIX developed by MBP Software and Systems Technology under a contract from IBM, has also been introduced.)

The new models are priced from \$23,220 for the Model 130 to \$32,165

for the Model B35, including the standard 16MB of memory, 114MB ESDI fixed disk, and 1.2MB floppy drive.

IBM claims that the new models are functionally compatible with existing RTs. However, the company notes that recompiling of programs may be necessary to achieve maximum performance on the new models.

When we last looked at the RT (Vol. 3, No. 4), we saw three areas for improvement for the RT line:

- More competitive price/performance ratio
- Addition of MicroChannel support
- Introduction of IBM's Transparent Computing Facility (TCF) on the RT

IBM has not overwhelmed us with its increased performance and still trails in the price/performance wars. For instance, the Sun 386i/250 monochrome workstation providing 5 MIPS, lists for \$13,990 including monitor, a seemingly great advantage for Sun. This advantage is mitigated by the standard 8MB of memory, as compared with 16MB on the RT. However, IBM still has a way to go.

We expect that the next-generation RT will show greater performance improvements. We also expect to see the MicroChannel and TCF support that we have been waiting for. ☉

—D. Marshak

• VENTURCOM •

## Real-Time Comes to 386/ix

The 386/ix operating system, from Interactive Systems Corporation (ISC), is about to receive a turbocharging from the RTX/386, just introduced by VenturCom. RTX/386 is an enhancement module to 386/ix (the precursor to the merged Unix and Xenix as agreed to by AT&T and Microsoft), whose

aim is to bring real-time capabilities to ISC's operating system.

The product targets areas not usually associated with Unix: Online Transaction Processing (OLTP), process control, interactive graphics, communications servers, and any application requiring higher performance than that normally provided by standard Unix systems.

**BYPASSING THE KERNEL.** RTX/386 is able to achieve greater performance by providing routines that bypass the standard Unix kernel. One of these enhancements is Preemptive Priority Scheduling. Standard Unix is essentially an equal access system. Processes are run for one-second intervals using Round Robin Scheduling: After a process gets its second, it must wait until all other processes have had theirs. With Preemptive Priority Scheduling, priorities may be set so that some processes have more frequent or longer access to the CPU cycles. This is very important in a server/client model where a server task (for example, a database engine) may be receiving requests from many client tasks. If each client's task receives priority equal to the server's, then essential server tasks will back up and performance will suffer.

RTX/386 also bypasses the kernel when dealing with I/O functions. The module provides direct hardware access, providing performance benefits particularly in the areas of disk I/O (VenturCom estimates improvement by a factor of 2 to 10) and screen output to the terminal. Both Preemptive Priority Scheduling and direct hardware access should significantly increase the responsiveness of an X-Window application.

The RTX/386 module is also able to increase performance by providing bounded context switch and interrupt latencies, a faster switching method between processes.

**STANDARDS.** VenturCom has made

the RTX/386 enhancements with an eye towards maintaining compliance with existing and emerging standards. According to the company, RTX/386 is fully compliant with AT&T's System V Interface Definition (SVID) and will be migrated to the Posix 1003.4 standard for real-time Unix systems when that standard becomes available. VenturCom also notes that 386/ix from ISC is itself an enhanced, certified port of AT&T's Unix System V, Release 3, for Intel 80386-based PCs.

**VENTURCOM AND INTERACTIVE SYSTEMS.** RTX/386 is a port of the real-time enhanced module currently available in VenturCom's Venix/386, Venix/286, and Venix/86. It will be comarketed by VenturCom and Interactive Systems Incorporated. VenturCom intends to port the RTX module to other systems.

**NOW IS THE TIME FOR REAL TIME.** Unquestionably, a more flexible Unix that provides real-time capabilities will be necessary for Unix-based systems to penetrate deeply into the business world. Enhancements such as RTX/386 are going to play an important role in this movement. ☉ —D. Marshak

• A T & T •

## Change in the Winds

Things just aren't the same at AT&T these days. The rumors are flying. We've heard everything from AT&T is joining the Open Software Foundation (OSF) to the possibility of AT&T starting a counter-OSF. The truth may lie somewhere in the middle. (At least, we haven't heard that Cassoni is coming back.)

While Bob Kavner may not be the technological visionary that his prede-

cessor was, he does seem to be a pragmatic businessman. If your customers are mad, you'd better make some changes. That makes sense. Thus, officials at AT&T have been pounding the pavement in recent weeks talking to value-added retailers (VARs), original equipment manufacturers (OEMs), and end-user customers to assess the state of their businesses.

Last month, for example, AT&T officials met with key VARs and OEMs. They wanted to know what they could do to restore the customer relations that have become increasingly strained. Kavner suggested that AT&T would spin off the Unix business, if that would placate its customers. This statement was met with skepticism. Kavner went as far as offering to change the nature of the relationship with Sun Microsystems. We believe that some decoupling will happen. However, we expect that this will take the form of a separate division, still headed by Kavner.

What seemed to be on the minds of AT&T's customers had more to do with the company's licensing practices and the components of System V.4 and System V.5 than with how closely held the Unix business is. AT&T officials hinted that they might decouple features such as Open Look and X-Window from System V Interface Definition (SVID). They also proposed unbundling Remote File System (RFS) and promised to bring Systems V.4 and V.4.10 up to B2 security. The timing of the System V.5 has apparently been pushed back.

We believe that the formation and support of OSF has had a profound affect on AT&T. We believe that AT&T will soon join OSF—that is, if AT&T can convince OSF to stay with the System V base. A united front would be a benefit to the computer industry overall and the standards movement in general. We think this could indeed happen. ☉

—J. Hurwitz



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By Judith R. Davis

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