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INSIDE

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Positioning Desktop Options

How Does Unix Fit in the Client Environment?

By Judith S. Hurwitz

IN BRIEF: The desktop market is in a state of transition. What appeared to be a simple en masse migration to MS Windows will, instead, result in a more complex multifacited marketplace with several different desktop managements and operating systems playing major roles. Over the next two years, Unix will have a role as a complex client environment in specialized markets such as On-Line Transaction Processing. In addition, desktop managers must continue to grow in sophistication in order for users to be truly satisfied.

Report begins on page 3.

When Proprietary Is O.K.

When Enough Standards Are in Place at the Infrastructure, Then Proprietary Value Is Welcome

YES, I AM using the "P" word in *Unix in the Office,* and for good reason. I believe that, as we begin to have more and more common underpinnings based on standards, the new software developed to operate on top of those common infrastructure components will be very proprietary, and that will be good. In fact, I believe we will know that we have achieved open systems when we are able to look at unique technology and not worry about whether or not it is proprietary.

Over the last year or so, the word *proprietary* has become synonymous with wife-beating, tax evasion, and other nasty habits. Even the most ardent IBM mainframe supporter proudly displays an open systems strategy. But, in reality, there is nothing wrong with proprietary technology—nothing, that is, when it can reside in a standards environment. Let me give a rather simple example. No one would expect the world to converge on a single spreadsheet for all time. Users benefit when new competitors offer new functionality that an industry leader has never dreamed of putting into the product. Competition in the spreadsheet market has led to innovation. As long as users know that they can move their spreadsheet from one platform to the next, they will not demand that there be no options. They are even happier when they find that there are standard formats that allow them to transfer data from one spreadsheet application to the next.

So, does this mean that proprietary should be reserved for applications software? No, I believe that it will become apparent that there is room for many different proprietary operating system level kernels. As kernel technology becomes more sophisticated, vendors will begin to use microkernel technology in order to create more specialized environments. This type of innovation at the kernel level is acceptable because the industry is beginning to converge on higher level technology such as the Open Software Foundation (OSF) Distributed Computing Environment (DCE). When standards make the underpinnings transparent, then it is possible to concentrate on value-added and to change "proprietary" from a word spoken in hushed tones into a valued component of a commercial computing environment. Therefore, users should insist that vendors conform to all of the critical industry standards coming out of the legislated standards bodies as well as the key consortia, including OSF and the Object Management Group. Vendors must not just pledge allegiance to the Posix interface standards, but must quickly implement these interfaces on all of the operating system technology they sell. Users must impress upon software developers that they will only buy software developed in accordance with these standards. It is simply not good enough for computer technology to be developed to conform to the latest fad.

System vendors are learning the hard way that today's hot technology is tomorrow's broken promise. Software developers, too, have learned hard lessons. The winners in all camps will be those who learn to write and develop applications that are based on standards and to innovate at the top levels. In the end, the marketplace will prove that innovation, standards, and proprietary can be said in the same sentence.

UNIX IN THE OFFICE

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Positioning Desktop Options

How Does Unix Fit in the Client Environment?

As the decade of the terminal wanes, the graphical desktop environment emerges as one of the critical components shaping the direction of the computer industry. As distributed computing becomes a reality, the desktop becomes the literal window into the power of the network.

According to conventional wisdom, there will be a single desktop adopted by users, and that desktop will be Microsoft Windows 3.0 and its follow-ons. If this is true, what are the implications for the role of Unix on the desktop? I believe that, for the average user of a standalone or low-end client environment, MS Windows will dominate. However, the battle of the desktop is not over. I believe that, as distributed computing becomes a reality and as users begin to design complex applications that require powerful clients, Unix will become a viable option. I believe that this will become increasingly clear in markets traditionally dominated by Unix such as CAD/CAM, geographical information systems, and emerging distributed online transaction processing markets.

Critical Success Factors

The factors that will mean the difference between success and failure in the desktop environment are varied. The rationale for attaining market share in one arena may be of no consequence in another. For example, a localized cross-application macro capability may be acceptable in a single-user desktop environment but of limited use in a full distributed computing environment. However, there are general success factors for all desktop environments, and some of these can be found in existing products. In other cases, vendors have concentrated so much on the basics (i.e., intrinsics and portability) that they haven't had time to think about other critical long-term factors. If Unix desktop products are to compete for the attention of commercial users, they must be able to compete with all desktop environments. The following is a list of what I consider to be the most critical factors for success:

1. The desktop environment should make it easy for the user to navigate smoothly from one facility to the next. Simply placing a series of icons on a desktop does not necessarily provide instant ease of use. Therefore, icons should be used only where they make navigation more intuitive (i.e., dragging a document to a printer). In addition, the interface must not stop at the desktop. It must provide the same consistency at the applications level. Ideally, tools should be available to allow users to migrate their existing applications so that they can work in the same intuitive manner as their desktop. Therefore, the desktop environment should provide a rich set of development and data access tools, and must impose conventions on tools developers so that the user is assured of consistency.

Critical Success Factors

2. The desktop environment should be robust and extensible. A user should be able to start small with a single application on the desktop and expand with other facilities and applications as requirements change. Therefore, the desktop environment should be modularly designed.

3. The desktop environment should be able to support a true client environment. This means that a portion of an application will reside and operate directly on the desktop. Likewise, the desktop must have the power to communicate and participate with a back-end, server-based application. The desktop must support a range of power and processing requirements in this environment.

4. The desktop environment must be able to transcend different hardware and operating systems.

5. The desktop environment does not have to be all things to all users. It is not necessarily the optimum metaphor for all users in all environments, but can be targeted for different users in different environments. Some users may prefer the rooms metaphor Xerox has developed. Others may prefer an interface consisting of a series of dials.

6. A graphical environment must conform to standards as they emerge, including standard behavior and standard data interchange.

In this overview of the desktop landscape, we will position the Unix desktop environment with its key competitors. As a means of talking about the Unix desktop, we will mention several of the key contenders, including Santa Cruz Operation's (SCO's) Open Desktop, Sun Microsystem's Solaris, and Hewlett-Packard's Visual User Environment (VUE). These three environments comprise some of the most important characteristics of the Unix desktop. Within the Unix environment, the focus is on standard APIs and the X Window standard. We will also mention other desktop managers, such as IXI's X.Desktop and Visix's Looking Glass, as examples of Motif managers. One of the biggest hurdles that Unix on the desktop faces is the perception that there are too many inconsistent choices. Therefore, it is difficult for Unix to fight against forces that appear to be more unified. The primary competitors for Unix include:

- Microsoft's MS Windows and New Technology (NT) kernel technology
- IBM's OS/2 Presentation Manager desktop
- Apple's Macintosh environment

Unix on the Desktop

In the Unix marketplace, there is never a single winner. Rather, it consists of a series of competing options. Users are forced to choose between Sun's OpenLook user interface management system and a large variety of Motif-based desktop environments. The Unix desktop environment is no exception. However, because of the progress in the standards area, we expect that several Unix desktop options will become important in the next five years, especially in distributed client/server implementations.

Unix desktops possess considerable sophistication and power. They tend to have a superior tools environment and superior window navigation and graphics support. Admittedly, they are priced higher, and they are more complex than the typical personal desktop user needs.

Unix on the Desktop

However, as we move into complex distributed computing environments, this power and sophistication will pay off for the Unix desktop.

Common Underpinnings

All of the Unix desktop options have the X Window system in common. The key difference between the two major competitors is the layers on top of X Window. Clearly, Motif from the Open Software Foundation (OSF) has captured the users' mindshare. However, because of Sun's clout with ISVs, it continues to push its OpenLook user interface platform. Ironically, one of the key differences between Motif and OpenLook is that Motif is a low-level toolkit and style guide with no upper-layer management system. Vendors that license Motif can add value by implementing a desktop manager on top.

Managers for Motif

The lack of a desktop manager on top of Motif has spawned a new generation of desktop manager products that are intended to fill this gap. These include SCO's Open Desktop (ODT), which uses IXI's X.Desktop as a manager on top of Motif and is intended to be a distributed desktop environment. X.Desktop is a desktop manager that allows ISVs to add a lot of value on top of it. It is geared to provide a common desktop to mask the complexities of Unix commands. In addition, ODT incorporates networking in the form of DCE and allows for database technology to be integrated. Today, it uses SCO System V.3.2 as the underlying operating system. Since SCO is a key player in the ACE Initiative, Open Desktop will evolve to incorporate OSF's OSF/1 operating system.

Another player in the desktop manager game is Visix with its Looking Glass product. Looking Glass has gained popularity as an alternative to OpenLook on Sun workstations. It incorporates a powerful set of application design tools. Visix's future product, called Galaxy, is intended to target applications development beyond the desktop manager.

Hewlett-Packard has taken a different tack with its Visual User Environment product, which offers a compelling and intuitive environment. Today, it is primarily geared to its own Unix workstations. But, because VUE is based on Motif and X Window, it would be easy for HP to try to push that technology into the open market.

The OpenLook Environment

While it has lost market momentum, OpenLook provides a consistent environment. Over time, implementations of Motif and OpenLook have become more alike. The best hope for OpenLook may be as the interface for Sun's Solaris distributed environment. In addition to OpenLook, Sun bundles its Open Network Computing (ONC) infrastructure to complete its client desktop environment. However, even Sun has been forced to concede to the power of Motif by offering an API level interface developed by Unix Systems Laboratories. Motif OpenLook Intrinsics Toolkit (MOOLIT) allows users to write their applications to one API. Then, at run-time, the user can choose either Motif or OpenLook.

This approach is being widely adopted by software providers that want to leverage their software efforts. Therefore, companies are cropping up that offer higher-level toolkits that allow users to select whichever graphical environment they want. Companies offering these tools include Neuron Data with its Open Interface product.

Other Competitors for the Desktop

Microsoft Windows 3.0.

The market penetration of Microsoft Windows is vast. While it leaves much to be desired in terms of sophistication of functionality, it serves the needs of the traditional desktop user. There are already more than 2 million MS Windows desktops. However, to put some perspective on this, one must remember that most PC distributors are bundling MS Windows with their PCs. Even if users are forced to purchase MS Windows as a separate

option, they are likely to pay under $50. Developers are therefore flocking to write their application to Windows 3.0. This frenzy of activity makes it appear as though Windows 3.0 will emerge as the only viable desktop environment for the coming decade. In reality, this view is short-sighted.

Let's look at the strengths and weaknesses of the MS Windows environment. What makes Windows 3.0 strong is the growing interest on the part of ISVs and the availability of shrinkwrapped software. The key weaknesses of Windows 3.0 are that it is a single hardware platform environment and that it relies on DOS. Therefore, when users attempt to put a complex graphical application into the Windows 3.0 environment, they experience severe performance problems. Windows 3.0 is not intended to work in a distributed computing environment. It lacks the power and the underlying software infrastructure to support distributed computing. For example, Microsoft's Object Linking and Embedding (OLE) protocol is intended to link objects within a single desktop environment. It does not help users link objects across a network. Given these strengths and weaknesses, it is becoming apparent that Windows 3.0 will dominate in the personal productivity desktop environment. Typically, this environment tends to be appropriate for users requiring tools such as spreadsheets, word processing, small databases, and desktop presentations. It will also be appropriate for relatively simple client/server applications such as an electronic mail client.

The NT Kernel Environment

Microsoft recognizes the limitations of Windows 3.0 and the need to have more robust technology on a multitude of platforms. Therefore, NT will be positioned as the next-generation 32-bit desktop and server environment. NT is based on a Mach-like, object-oriented kernel implementation. The first generation of NT will be a desktop follow-on to Windows 3.0. Microsoft will ride on the success of 3.0 and hope that ISVs will come on board because of the marketing momentum generated by 3.0. Microsoft will be helped tremendously by its new friend in the industry, Digital Equipment. Digital will take advantage of Microsoft's vast marketing clout and its divorce from IBM to bring NT into both its ACE platforms and its forthcoming Alpha RISC product. Therefore, NT as implemented as the 32-bit version of MS Windows, has the potential to be very successful. It will operate on a variety of different RISC workstations and could emerge as a threat to Unix on the desktop. The caveat is that Microsoft must ensure that this product is reliable when released. If it takes Microsoft an additional 18 months to get the product stable, ISVs and users will be wary of the product and evaluate other options. We are less certain of Microsoft's ability to successfully implement the server version of NT.

IBM's OS/2 Presentation Manager

OS/2 and Presentation Manager are at a critical juncture. As a desktop environment, OS/2 PM will have a limited role to play. In many respects, by positioning the OS/2 desktop environment as a better windows than Windows, IBM has conceded the desktop to Microsoft. Was this IBM's intent? I don't think so. It was simply an attempt to try to capitalize on the marketing momentum behind Windows. IBM's strategy with PM and OS/2 is to try to regain market share by packing this environment with as much additional functionality as possible. Therefore, what had been the desktop environment for OfficeVision now becomes the standard desktop metaphor for OS/2. It is possible that IBM will continue to pursue this strategy in the hopes of capturing more user acceptance. It is also possible that IBM will continue to promote OS/2 as a client environment for SAA, attempting to make it the easiest and most transparent way to have client/server applications in an IBM environment. Therefore, as a practical matter, CASE tool vendors will continue to flock to OS/2 because of the close ties between OS/2 desktops and back-end data repositories. In these environments, OS/2 PM could find its niche.

Apple's Macintosh

The Macintosh Desktop. When users think of ease of use, they immediately use the Macintosh desktop as their frame of reference. This lesson was not lost on competitors including Microsoft, IBM, and the variety of Unix desktop providers. All have focused on the Mac as the environment to beat. How successful will they be? And will IBM be able to propel itself back into the limelight by adopting the Macintosh interface as its standard? These are the questions that the marketplace will answer over time. However, there are certain indications that, despite its leadership, the Macintosh will lose out to the competition if it continues to assume that just being the Mac is all that is required to win. Although those users devoted to the Macintosh will not switch in the short term, new users may not see enough differentiation between the Macintosh interface and MS Windows to seriously consider the Macintosh.

Unix and the Macintosh. Part of the joint arrangement between IBM and Apple calls for the Macintosh user interface to be made available under Unix (a combined version of A/UX and AIX). This has the potential to subtly change user perceptions. If the new portable Macintosh user interface becomes widely licensed and available on both Unix and IBM platforms, it may change how well the Macintosh fares in the market. Two factors could make the Macintosh interface a success. First, the Macintosh interface must be noticeably better than competitors such as MS Windows and Motif-based systems. Second, the Macintosh interface will have to be perceived as open (i.e. conforming to de facto industry standards). This conformance to standards will make the Macintosh interface safe. If, on the other hand, both Apple and IBM take the attitude that they alone will benefit from the marketing power of the Macintosh interface, there is the chance that users will be weary of the technology, even if it becomes much more in tune with future user requirements for seamless navigation and ease of use. This is precisely the problem that users had with the idea of using the NeXT interface on IBM RS/6000. Many were intrigued by the ease of development offered by NeXT and the pleasing interface, but they worried about being caught with a standalone technology.

Conclusion

It is hard to say precisely what will happen as these individual desktop environments mature. Clearly, no one desktop will win in every instance. Over time, each desktop environment will find a niche or role within the market. If one desktop tries to be all things to all users, it will not survive. The future of Unix on the desktop is not as bleak as some might think. The demands that will be presented by a complex distributed applications environment may prove the true testing ground for the Unix desktop. ◐

Next month's *Unix in the Office* will address
Unix System V.4

For reprint information on articles in this issue,
please contact Donald Baillargeon at (617) 742-5200, extension 117.

REPORT: BY ANDREW D. WOLFE, JR. & ROSS S. GALE

HP Visual User Environment (HP VUE)

More than Meets the Eye

HP VUE is Hewlett-Packard's entry into the Unix GUI race. This offering is the beginning of NewWave for Unix and boasts much of NewWave's object-oriented capability. As shown in Illustration 1, HP VUE's distinct presentation, high configurability, and thorough maintenance of each user's work context sets it apart from other Unix GUIs. (In-depth information on the Unix GUI market is available in *A Kinder, Gentler Unix,* one of the Seybold Special Reports. For more information, call (800) 826-2424.)

General Presentation

On logging in, a user finds X Windows a rather unusual and refreshing display, providing a sort of engineering ambience. While X, Motif, and X applications do not adorn the display background, HP VUE paints a backdrop behind all of the active windows and icons. A user can select from dozens of backdrops (including one covered with HP logos), color schemes, and names (instead of the "one" through "six" names that come with the system. Toward the bottom of the screen, HP VUE also displays a "workspace-manager" panel, a block containing various control buttons. This panel provides a central location for principal session functions and a few handy indicators, such as a clock and calendar. Users can always see this panel; no windows can overlap and obscure it.

HP VUE maintains six "workspaces" for the user; these are virtual-display screens, only one of which can be presented at a time. The user can change the workspace in use by clicking on one of the named selector buttons in the workspace manager panel. The workspace-manager panel remains unchanged, regardless of which workspace is active. HP VUE supports a consistent Motif look and feel, and its overall display organization is clear and effective.

Workspace Metaphor

HP VUE provides an iconic file browser called the file manager, or "vuefile." This provides the usual set of operations on files and directories—opening directories on double-clicking, starting applications, or invoking an application with a double-clicked document. Unlike some GUIs, HP VUE does not allow the user to place icons arbitrarily within the directory window but forces them into a grid. However, the user can select the order of placement according to name, date modified, or other criteria, which is often sufficient. The HP VUE file manager runs generally in a single window; opening a directory causes replacement of the current window contents, rather than opening a new window for that directory. To get a new directory window, the user can press the File Manager indicator (a file cabinet) on the Workspace Manager panel. Alternatively, users can drag the icon for the desired directory out over the display background. This drag-and-drop operation actually invokes the default open operation for all types of files, not just directories.

Unlike some other interfaces, the HP VUE file manager, as shown in Illustration 2, allows a few different generic operations to be run on a file in addition to "open" and "print." Users can access these operations via a pull-down menu entitled "Actions." Vuefile can invoke these operations on several objects at a time. When users select objects, vuefile changes the Actions menu according to the operations that are available for those objects. Unlike most

of its competition, HP VUE even allows running operations on different kinds of objects at the same time. When users select different types of objects, the menu includes only those actions that are common to all of the types of the selected objects. Sites and users can also program as many actions for existing or new object types as they want, if the HP-supplied generic actions do not suffice.

HP VUE

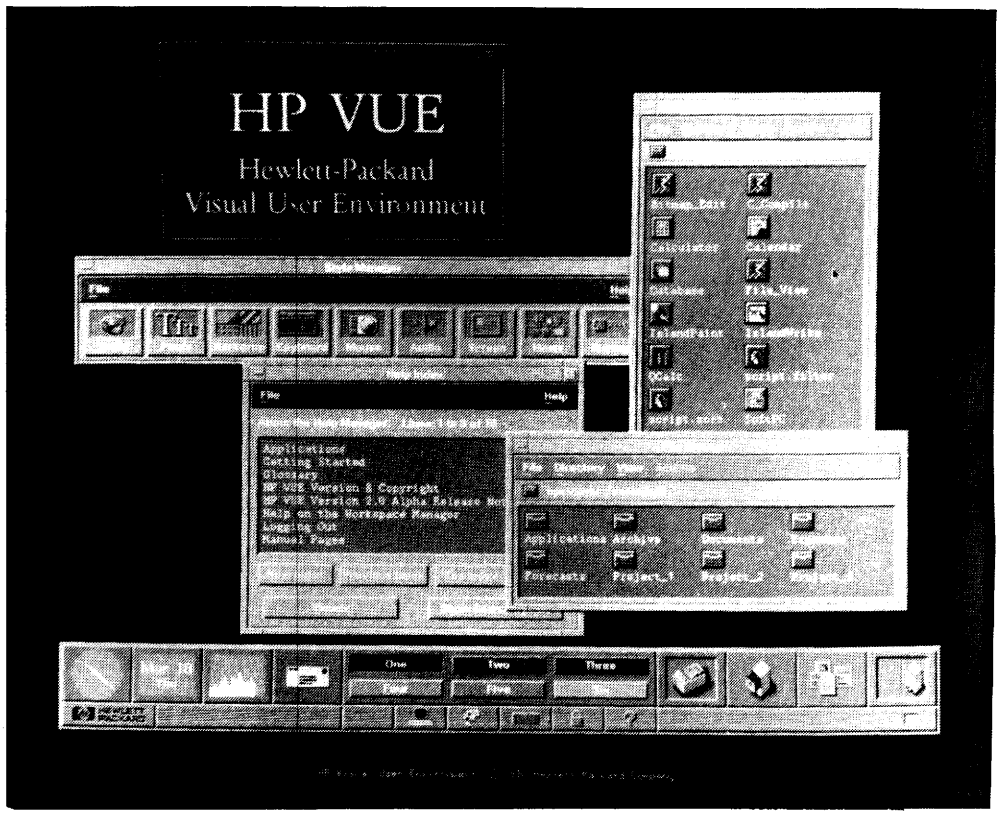

Illustration 1. HP VUE boasts a distinct presentation that sets it apart from other GUIs.

Internal Structure

The HP VUE display is based on X Windows, but the environment itself includes more than the usual window manager and standalone client applications. The window manager used in HP VUE is an extension of the Motif window manager, with capabilities added to support HP's control panel and multiple workspaces and other distinctive features. This "Vuewm" program recognizes multitudes of resource specifications in the .Xdefaults configuration file, allowing users to exhaustively tailor their HP VUE environment.

An HP VUE session manager program essentially augments the primitive inter-client communication supported by raw X. This session manager implements a drag-and-drop protocol between HP VUE client applications and acts as a registry for these clients. The HP VUE session manager saves the context for its clients on session termination, restarts them, and reloads their context, such as sizes, placement, open files, and colors of windows and applications, on session startup. HP VUE also supports session management according to the ICCCM for non-VUE clients that comply with the ICCCM.

Internal Structure

The session manager maintains an HP VUE database in the user's home directory, under a subdirectory named ".vue." This database contains not only session context files, but also bit maps and other HP VUE files users might want for their sessions. Users can build a personalized environment in this database. HP VUE can distribute the identical environment throughout the network, giving users their own configuration, regardless of the display in use.

HP VUE File Manager

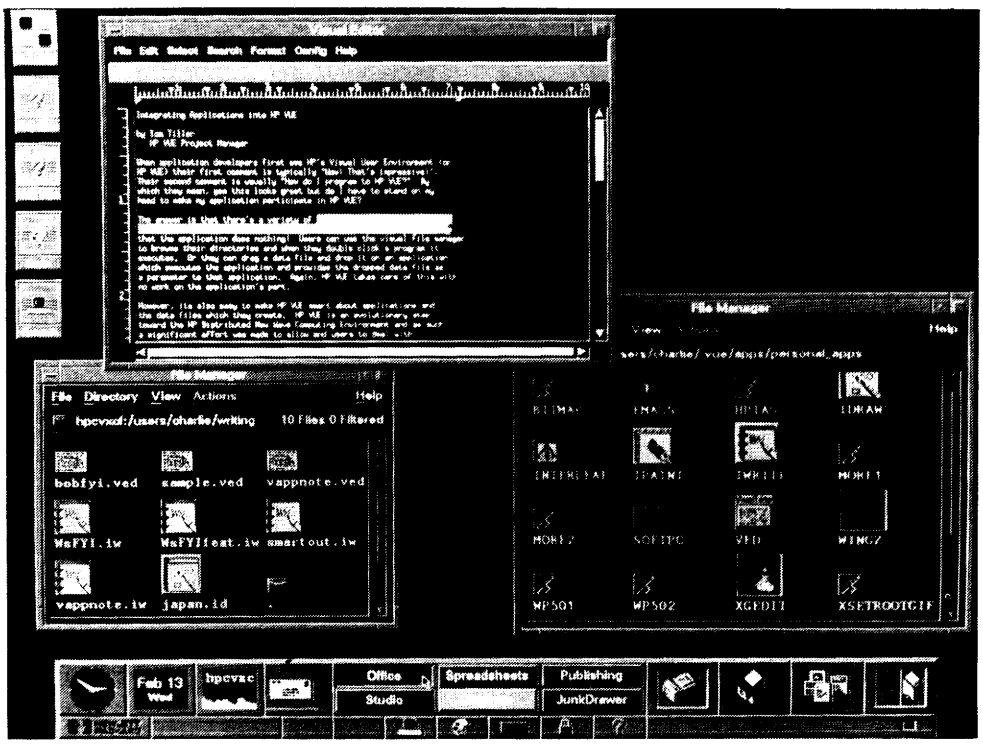

Illustration 2. HP VUE file manager provides generic operations via a pull-down menu called Actions.

Accessibility of the User Interface

Simple to Use File Manager

Unlike many other GUIs, HP VUE comes with popup menus not configured. The workspace manager panel provides most of the common functions, however. Although the controls on this panel are unmarked, except for symbols, it is easy to use HP VUE as delivered. Experimentation with the various controls on the workspace manager yields easy mastery of the interface. Selecting a control for a sensitive operation causes the system to request confirmation. For example, one panel control button starts the logout process, first requesting a confirmation from the user. The file manager is simple to use, as well. HP's drag-and-drop protocol allows printing, mailing, and deleting files by dragging them to special controls on the workspace-manager panel. This provision is better than that of many systems because it never allows other windows to obscure the workspace manager panel; thus, these operations are always available. Many users of other systems start a drag-and-drop operation, only to find that their drop target is invisible. Under HP VUE, the most common operations are always available for drag and drop.

Efficiency of the User Interface

The provisions of commonly used operations in the workspace manager panel and multiple named workspaces add up to efficiency for HP VUE users. HP also provides numerous accelerator keys for operations under the file manager. However, HP would do well to have HP VUE allow the use of the display background as a desktop holding area, which would probably speed things for users who need to access objects in several directories at once. Of course, users could access a directory for the same purpose, but this is an unnecessary level of indirection. It would be convenient for users to be able to put objects wherever the users want, including dragging an object from a directory window and dropping it at a desired spot on the workspace. HP VUE does allow users to drag objects from the file manager directory windows and drop them into the background workspace. Rather than simply placing objects there, however, the file manager then executes the default command on the dragged object. For example, it opens a directory icon into a new directory window, or it executes an application. This adds to the efficiency of running the default actions. Similarly helpful is that the user can perform the same action on multiple and different-typed objects at the same time. Rather than going through file after file, selecting and doing a print, for example, a user can select a whole group of files and then print them in a single action.

Availability of Desktop-Type Tools

HP VUE includes an acceptable, but not exceptional, complement of desktop tools. HP packages the ELM mailer under a GUI, but this packaging remains incomplete; it is essentially a character-mode application running in a terminal emulator. HP provides a more thorough mouse-operated graphical datebook program, displaying calendars and other graphics. It allows users to schedule events and specify alert messages to distribute before events. HP also includes a mouse-driven windowed text editor and an HP-style calculator, with financial, scientific, and programmable interfaces.

Availability of Help

As shown in Illustration 3, HP has included profuse help in HP VUE.

Many of the supplied windows include help menus, but there is also a base help facility, available via the workspace manager panel. This is a multiwindow text browser allowing efficient navigation through a large volume of help texts and the HP-UX manual pages. It includes no hot links or other hypertext-type capabilities but does have direct navigation along "see also..." cross-references, accessible in a distinct menu. Developers can also install their own texts for access under the help system or link the help facility into their applications. While the Help Manager, as it is called, is basically a single-window application, it allows the user to save a window full of text into the workspace while exploring the help files. HP calls this a "snapshot," a copy of the help text in a ready display window, which is also saved and restored with session context. The only significant drawback in the HP VUE help system is the use of only plain text for the help; the use of typeset text and graphics would greatly enhance usability and clarity.

Completeness of File/Object Type Dictionary

HP uses name and file modes alone to determine type under HP VUE. It comes with a scant set of file and object types. When Vuefile checks them, most files tend to drop through to base types such as "text" or "executable." Because of this, the file manager browser often cannot effectively distinguish among file types. Such restricted granularity is clearly the result of HP decisions about allocation of effort. Users can add object types, icons, and

Completeness of File/Object Type Dictionary

actions indefinitely to HP VUE. Even with the small complement of object definitions, users can define multiple actions, such as "edit" or "print," for each file type. When a user selects a file in the file manager, the actions applicable for that type are activated in the Actions menu of that window.

Help Viewer

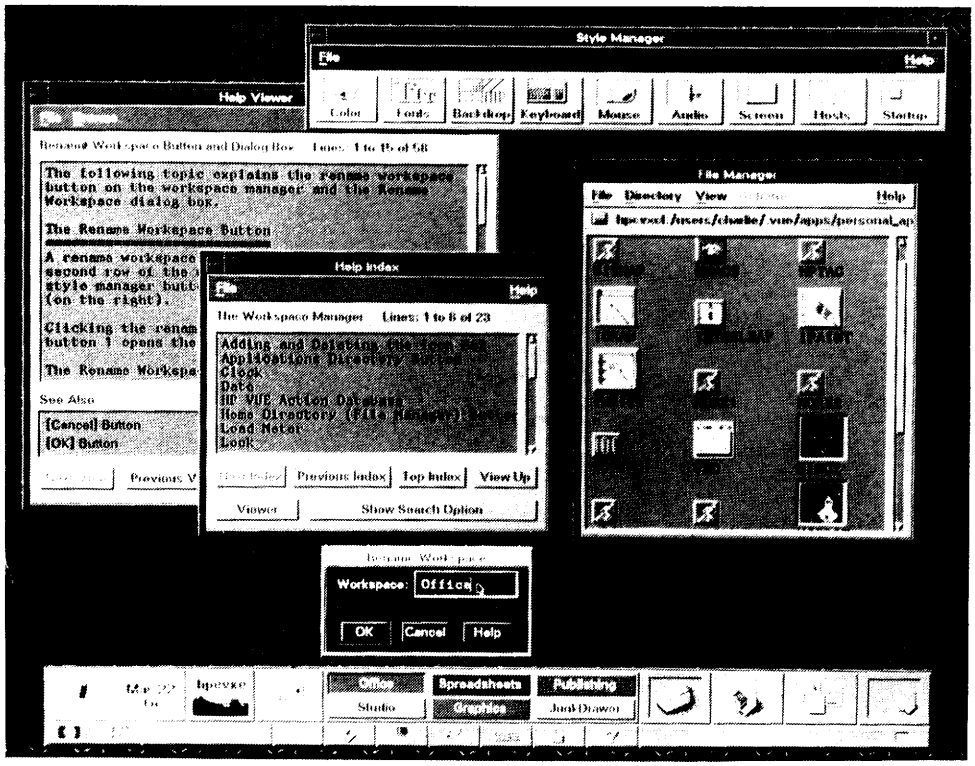

Illustration 3. HP VUE supplies help menus and a base help facility via the workspace-manager panel.

Facility for Cooperation of Applications

Tight Integration between Applications and Communication

The principal support for interapplication cooperation is the implementation of a drag-and-drop protocol. This operates between the file manager and the various other HP VUE applications, for example, the mailer. HP VUE applications are very tightly integrated through various communication mechanisms. This allows color schemes and object states to be exchanged throughout the environment. This level of integration of applications is somewhat higher than that of many of its competitors, but it still has room for improvement. The data exchanged among applications is relatively restricted. In addition to the HP VUE coloring and session information, users can exchange only text between applications. HP could improve this product by providing or promoting common interchange types, such as bit-map or line-drawn art, and by implementing a protocol for "live links" by which documents could be included in other documents, regardless of type, with updates propagated immediately to those documents. Notwithstanding these flaws, which are shared by practically every product reviewed, HP VUE ranks high in its support for cooperation of applications.

Effectiveness of Managing Multiple Applications

HP VUE is excellent for managing multiple applications. Its multiple workspaces greatly facilitate the organization of windows, partly because it provides users with six screens instead of one. The ability to name workspaces and the clear visual distinctions between the workspace screens and between active and inactive windows give users a clear grasp of what is going on at all times. Also, the ability to hold a complete session context between logins is a boon. Users can automatically restart all of the HP VUE applications—with open objects—at login, thus enabling them to start at the same place they left off. Illustration 4 shows some of HP VUE's multiple-application abilities.

Drag and Drop under HP VUE

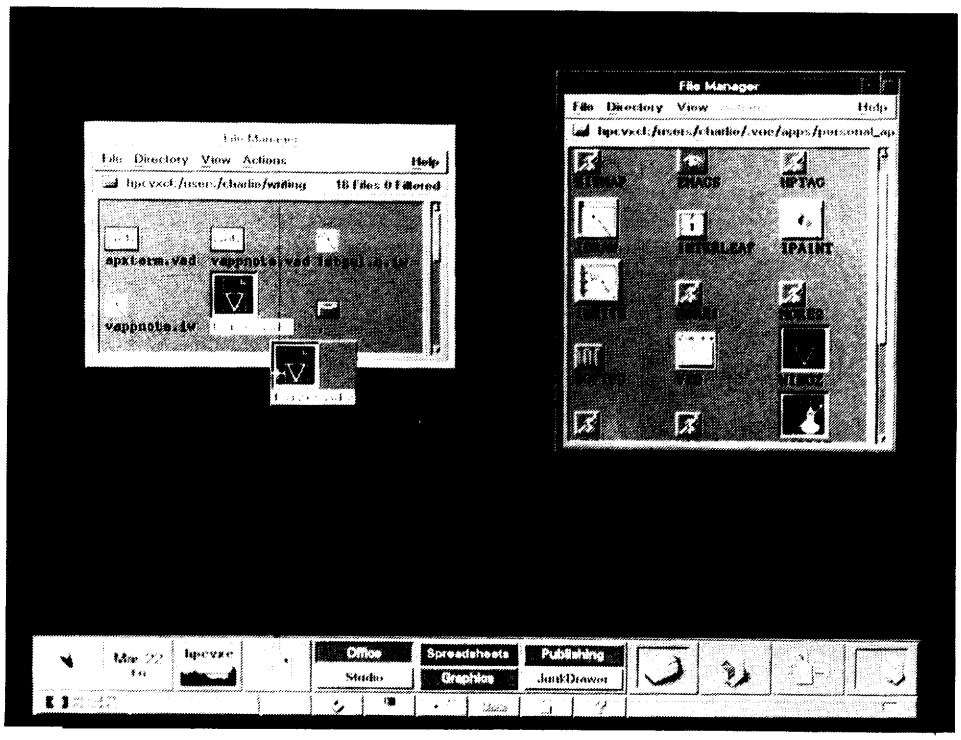

Illustration 4. HP VUE's drag-and-drop facility helps users manage multiple applications.

Ability to Extend, Customize, and Personalize.

HP VUE is perhaps the most comprehensive GUI with regard to extensibility, customization, and personalization. To begin with, HP provides a program called style manager among its standard workspace manager applications. Style manager, shown in Illustration 5, provides easy access to standard settings for mouse and keyboard, screen saver, screen colors, and workspace backdrops. Under the style manager, users also can specify what session context they want to maintain from login to login, what remote hosts are allowed to use the display, and what fonts are to be used.

However, style manager is only the beginning of how users can customize HP VUE. HP VUE also recognizes X resources by the dozen, both in the .Xdefaults file and via the server resource manager. Many of the HP VUE resources actually refer to other files, directories, and resource definitions rather than specifying them directly. Because of this, multiple users could, for example, share a workspace definition. In fact, HP VUE will check the server

resource manager, .Xdefaults, and various other places in setting up its environment. On seeking a resource, it could check the user's environment, then a group environment, a network-specific environment, and so on. Using these HP VUE mechanisms, the administrator can set up custom environments for users, groups, departments, and sites.

HP VUE's Style Manager

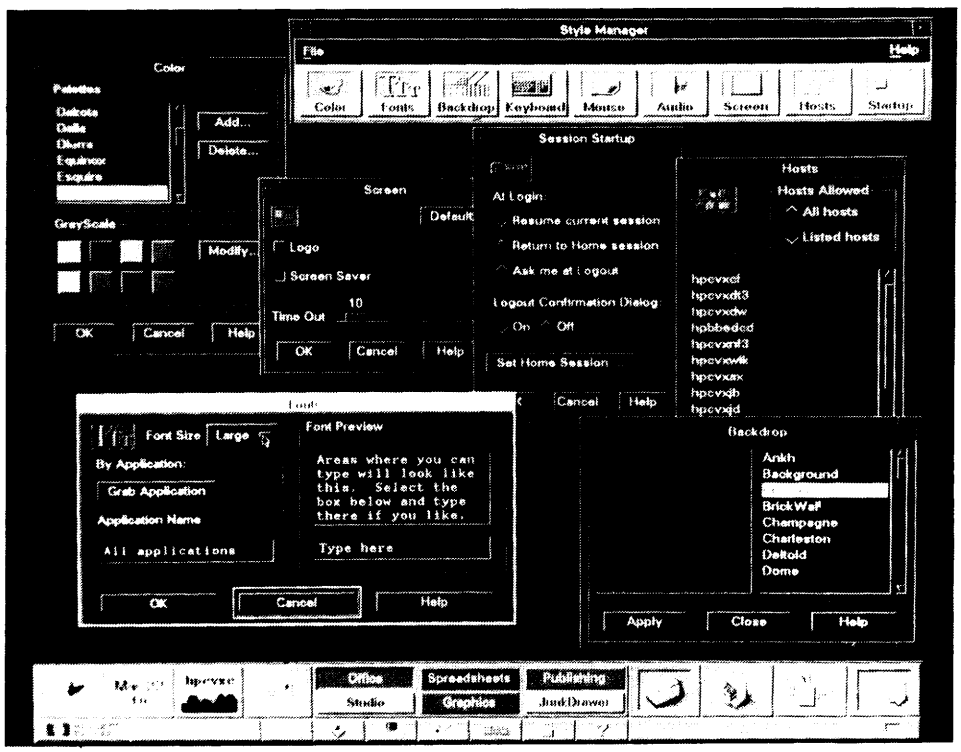

Illustration 5. HP VUE's style manager provides easy access to standard settings for mouse, keyboard, screen colors, and workspace backdrops.

HP VUE's resources and configuration files allow users a high degree of workspace customization. For example, users can change files and directories for workspace backgrounds and icon bit maps, they can configure the standard display panel used for the workspace manager with, for example, 3 or 10 workspaces; or they can remove the printer or mailer from the workspace panel.

Users can also configure new file types and various commands to run on them into directories identified by HP VUE resources. File types are determined on the basis of file name and location, and a few attributes of the file, as such, whether it is a directory or a plain file or whether it has read or execute permissions. Using HP VUE resources and directories, users can configure a new file type with display icons and actions for the file manager. HP VUE's action definitions are quite flexible, even allowing users to select a host on which to run the action. The system transfers files as necessary to execute the actions, all without the knowledge or intervention of the user. Actions for the new file type appear on the file manager actions menu when files of that type are selected. This facility enables users to configure new file types for source-code files, assign icons, and add a number of our conventional source-code actions to them.

HP VUE also provides tremendous extensibility, the only difficulty being selecting the proper way to organize and implement extensions within an installation. This is the downside, perhaps unavoidable, of providing such a large number of customizable items in the GUI. An administrator trying to manage several different HP VUE configuration

databases faces an involved task because it necessitates effective organization of the environment variables, Xdefaults files, and shared and private configuration directories.

Flexibility in Administration

The extensibility of HP VUE also makes it extremely flexible to administer. In addition, administrators can localize HP VUE with messages and text in languages other than English, including Japanese in the 16-bit Kanji encoding. In terms of administering HP-UX, however, an instance of rigidity affects HP VUE somewhat. Changing the host name under HP-UX means that administrators have to track the host into a number of different files before HP VUE runs properly on the renamed system. On the other hand, simply changing the host name through the "sam" administration utility does not reach into some important HP VUE configuration files. This illustrates the need to aggressively manage the HP VUE database.

Simplicity of Performing Administrative Tasks

System administration is a weak point under HP VUE and HP-UX. Administrators perform tasks not through HP VUE or a graphical application but through the HP-UX "sam" utility. This utility can run in an emulator window for an HP terminal, providing mouse-click access to standard HP function-key operations, but it remains a character-mode administrative interface. While "sam" provides access to several administrative functions, it contains a few troubling bugs such as the host name change just mentioned. Executing this change under "sam" can cause HP VUE to abort on login. This incompleteness makes it unlikely that the HP VUE setup, strong as it is in many areas, is ready for unassisted naive users. It seems advisable that an organization installing HP VUE maintain an expert resource in configuring the system.

Summary

Although HP VUE is impressive, it does have its foibles. Its basic presentation is rather intimidating for novices. Administration and some desktop applications are somewhat clumsy, and the system may overpower small, nontechnical environments or those with intermittent usage. However, HP VUE is powerful, flexible, and exquisitely customizable. With some expert oversight and customization—which practically every computer system needs—it will pay off handsomely in utility and productivity. Among Motif interfaces, HP VUE offers the most in terms of control and functionality. The multiple workspaces, availability of help, and easy drag-and-drop operations ably acquit HP VUE among the GUIs reviewed. HP VUE is an excellent choice, not only for technical installations, but also for any site where HP VUE will be in use full time. HP VUE rates among the best options for large installations; these can afford time for thorough customization and benefit handsomely from HP's excellent network and site-configuration capabilities.

Open Systems: Analysis, Issues, & Opinions

PowerHub

Scalable Bandwidth Solution

Fiber optic cabling isn't a panacea for a bandwidth shortage. Installing fiber optic cabling is one part of a complete strategy to raise the network bandwidth available to individual users and applications now and to keep it optimal in future. Switching to fiber and FDDI doesn't solve all of the problems of bandwidth availability—even if that is an affordable option.

The issue is, essentially, one of organizing available bandwidth for cost-efficient distribution to users and applications on demand. In networks of Unix workstations supporting engineering applications, for example, one user moving large drawing files on the network can drag down an entire LAN's performance. If that user is part of a workgroup—such as an engineering design team—other members of the group will suffer as a result. Ultimately, in applications involving high-performance workstations, organizations will need to be able to give *each* workstation its own 10 Mbps of bandwidth pipe—its own Ethernet segment.

The solution most Ethernet sites with high-bandwidth requirements for fast workstations turn to is *segmenting*. Segmenting is a way to raise the bandwidth available to each user on a LAN by reducing the number of users dependent on a particular Ethernet LAN, or segment.

Organizations typically segment Ethernet bandwidth using one of two techniques. First, they segment Ethernets using multiport routers. Typically, each segment is managed by a 10-Base-T (UTP) hub and connected to a large internetwork of Ethernets via a router. (See Illustration A.) Using this design, each segment is a subnetwork, with traffic routed between ports on the router.

The second technique is to place multiple Ethernet cards in a network server, essentially offloading networking to the server.

Neither alternative is optimal in a workgroup setting. Embedding networking into servers overloads them. At between $3,000 and $4,000 per port, the router-based approach to segmenting is too expensive. As requirements for bandwidth rise, users of the router-based architecture will have to continually subdivide and resubdivide their internetworks into ever greater numbers of subnetworks to prevent conflicts from competing users and resources. Each new segment requires a hub and router to interconnect it with other subnets. Ultimately, it will be an ineffective solution.

Alantec Incorporated, a Fremont, California, firm, offers an alternative to the router-based approach to segmentation. Alantec's PowerHub combines the function of a multiport router and a 10-Base-T hub in a single unit. The result is a device that can deliver scalable Ethernet *and* FDDI bandwidth for the price of about $1,400 per port (UTP).

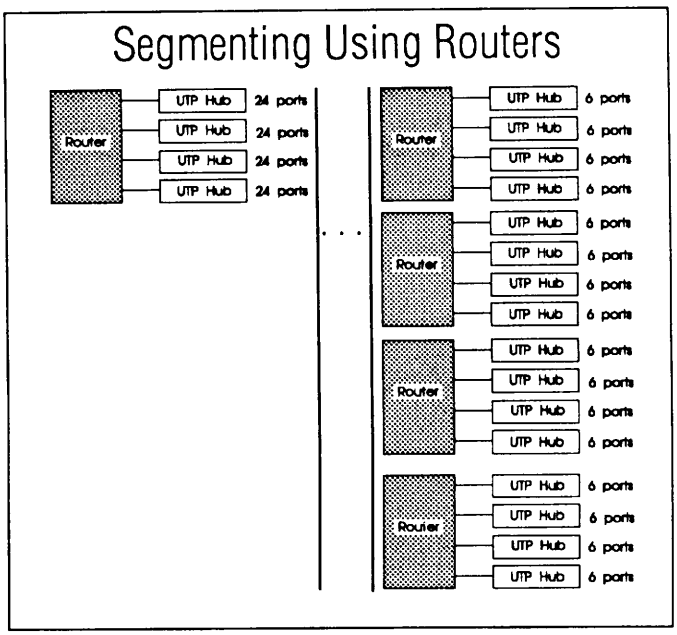

Illustration A. The most widely deployed architecture to increase available bandwidth on Ethernet LANs is segmentation of Ethernets using UTP hubs and routers. The problem with this architecture is that, as requirements for bandwidth rise, users have to continually subdivide and resubdivide their internetworks into ever greater numbers of subnetworks to prevent conflicts from competing users and resources.

Who Is Alantec?

Alantec was founded in May 1987 to develop multiport bridge technology. With PowerHub, the company is essentially relaunching itself in the internetworking market. Alantec is backed by a variety of leading venture capitalists.

To develop the PowerHub business, Alantec recently brought in as CEO George Achuleta. the CEO who built Vitalink Communications Corporation into an internetworking powerhouse during the mid- and late 1980s.

The company is distributing PowerHub through its own direct sales force (a staff of six, nationwide), as well as independent distribution representatives and VARs. Distribution overseas will be through independent distributors.

What Is PowerHub?

PowerHub is a router hub for workgroups. Depending on the configuration, PowerHub provides from 60 Mbps (Ethernet only) to 160 Mbps (with optional FDDI modules) of forwarding bandwidth. Users can plug servers, individual workstations, or hubs supporting multiple workstations into PowerHub. PowerHub allows users to configure subnetworks as multiple physical Ethernets. PowerHub bridges at the rate of 61,000 packets per second and routes at the rate of 50,000 packets per second. PowerHub supports 10-Base-T, AUI, BNC, and FOIRL network interfaces.

Each PowerHub port represents a single 10-Mb Ethernet segment. The hub can also accommodate two optional FDDI modules to add FDDI support.. All of the ports can be configured to bridge or route packets using PowerHub's bridging-routing engine.

PowerHub comes in a 12-port UTP version for $16,800, a 12-port AUI/BNC version for $19,800, and a 36-port UTP version for $18,800. All of these products have been available since October 1991. Alantec's FDDI modules will cost $9,000 each and are scheduled for availability in mid-1992.

Alantec's target customers are users of powerful Unix workstations—RISC, mostly—on TCP/IP-Ethernet networks with large volumes of data or applications that generate large amounts of data, such as simulations. These users tend to work in groups, with each member of the group putting tremendous demands on available bandwidth.

Alantec believes its target customers want the option of assigning each individual workstation in the group to its own Ethernet segment. However, using the current router-based approach, this option is too expensive for most users. Thus, in the 36-port version, Alantec allows up to three workstations to be attached to each segment.

PowerHub Architecture

PowerHub is designed around a bridging-routing engine implemented using a multiple RISC chip and a unique shared memory architecture. PowerHub uses daughterboards to support FDDI connections, also implementing them with RISC chips. Alantec uses the R3000 RISC chip from MIPS Computer Systems in the PowerHub. When configured with two FDDI daughterboards, the PowerHub is rated at about 145 MIPS of raw processing power. (See Illustration B.)

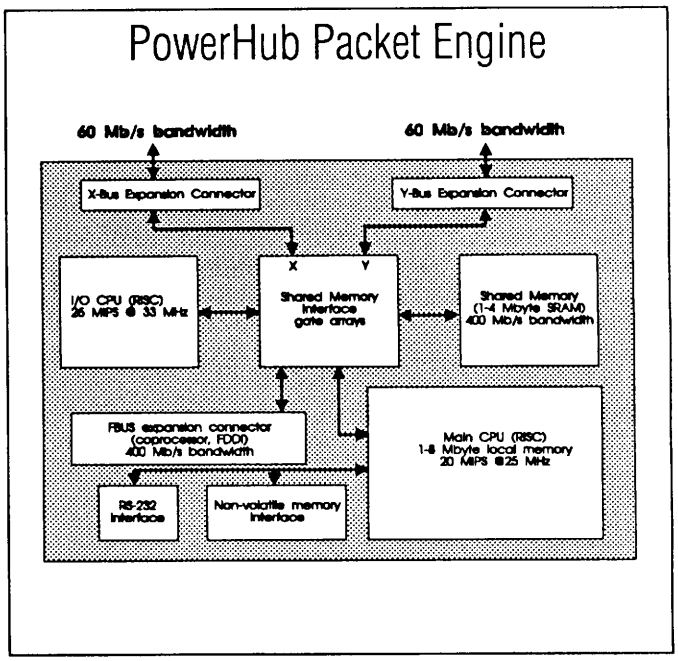

Illustration B. PowerHub is designed around multiple RISC chips and a unique shared memory architecture. The I/O CPU manages the network interface chips and packet buffers. The Shared Memory Interface gate arrays are of Alantec's own design. The main CPU runs bridging and routing algorithms, management routines, and provides PowerHub's interface to external network management systems.

SHARED MEMORY. The key to the PowerHub is its shared memory architecture. Alantec doesn't use a backplane to carry packets between ports. Rather, port connectors are portals into shared memory. Packets are injected into the shared memory pool and then zipped out to their destination. The gate arrays that implement this architecture are proprietary to Alantec.

ADD-IN MODULES. Alantec supports 10-Base-T, AUI/-BNC, and FOIRL interfaces via separate modules, and individual Ethernet segments and FDDI rings via separate processors. In the case of Ethernet, each supported segment is supported by an individual chip.

Alantec supports FDDI rings via RISC-based modules that plug right into the main board. Each FDDI module is based on dual MIPS R3000 chips rated at about 50 MIPS of raw processing power.

THROUGHPUT PERFORMANCE. PowerHub's internal throughput is 400 Mbps. It can support up to 60 Mbps of network bandwidth. Throughput performance will vary according to packet size and other factors. For example, for 64-bit packets, PowerHub can bridge a maximum of 61,000 packets per second and route 50,000 per second.

PowerHub vs. the Router-Based Approach

PowerHub compares favorably with the router-based approach to segmenting to support workgroups. Users get higher throughput for a lower cost with PowerHub than they do with the router approach. The typical cost of multiport routers is about $3,000 per port, plus the cost of a 10-Base-T hub. PowerHub costs $1,400 per port in a 12-port configuration, and less in larger configurations.

In addition, the cost per *user* can be lower if multiple users share a single Ethernet segment.

PowerHub Migration Issues

PowerHub appears to be easily dropped into existing networks. Users of 10-Base-T can just unplug their workstations from existing 10-Base-T hubs and connect them to PowerHub. Once deployed, the product allows users to increase available bandwidth to individual users by unplugging workstations from particular segments.

Indeed, PowerHub appears to be a good tool for managing a migration from Ethernet to FDDI networks. Alantec envisions four architectures in which PowerHub will be used. These are pictured in Illustration C (on back page).

Conclusions about PowerHub

PowerHub impresses us as a good solution for the problem of providing scalable bandwidth to workgroups. PowerHub is not a general solution to many internetworking problems. It doesn't support WAN connections, and it doesn't route non-TCP/IP protocols such as SNA and DECnet. Thus, PowerHub is too limited in routing functionality to support a wide range of needs.

PowerHub does not eliminate the need for multiport routers; rather, it puts them in their proper place. As a mechanism to provide maximum available Ethernet bandwidth to individual users, routers have clear price/performance limitations.

In future releases of the product, Alantec plans to add support for the routing of additional protocols, which may give PowerHub users opportunities to begin replacing routers with PowerHubs. At this point in its evolution, Alantec will have to decide what kind of a company it is going to be. It has two basic choices. One, it can continue to develop specialized internetworking hubs, adding enough function to address a greater range of requirements over time. Two, Alantec can develop specialized servers that fit within "superhubs" developed and sold by vendors such as Synoptics, Cabletron, Ungermann-Bass, 3Com, and Hughes.

Some, including our contributing editor James Herman, believe that the superhub vendors will offer the same function as Alantec in relatively short order. The result would be that Alantec's market uniqueness would disappear.

Alantec is more optimistic about its ability to continue to offer unique value for years to come. It plans to go it alone for the foreseeable future, eschewing a strategy of developing modules for superhubs made by other vendors.

We view PowerHub both as an interesting product and as a call to action for the industry. Alantec is only addressing a small segment of the distributed computing market with PowerHub. That segment is the high-performance workstation market, which is feeling the crunch on bandwidth today. However, it won't be long before the bandwidth problem Alantec addresses is felt in the broad market currently dominated by PC LANs.

If the answer to ever shrinking bandwidth is not strictly a move to high-capacity media, will the PC LAN industry be equal to the challenge of providing appropriate solutions? We can only hope so. —*J. Rymer*

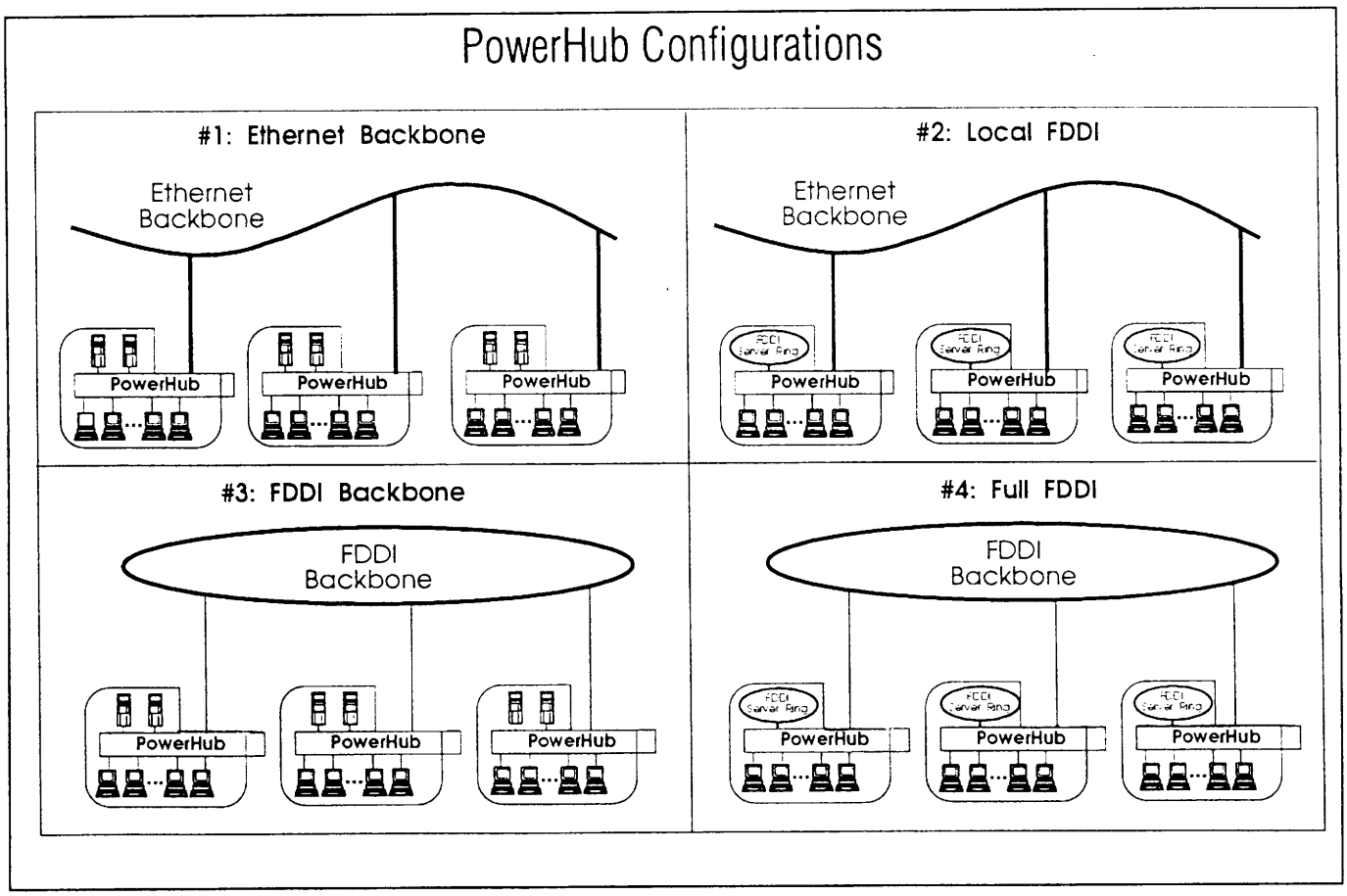

Illustration C. Alantec envisions four architectures in which PowerHub will be used. In the upper left quadrant is the basic configuration of an Ethernet backbone and Ethernets serving individual groups of workstations. In the upper right quadrant, an Ethernet backbone services local net rings. In the lower left quadrant, an FDDI backbone services local Ethernet networks. Finally, in the lower right quadrant, PowerHub supports a full FDDI implementation.

X/OPEN

X/Open's New Agenda

For the third year in a row, X/Open held its user conference, called Xtra. The purpose for starting this annual event was to provide open systems vendors with directives to help them sort out user requirements. Until X/Open started the Xtra process, it had been criticized for being too concerned with vendors' agendas and not focused on user requirements. Xtra has gone through some growing pains since its inception. In the first two meetings, it was a struggle to prioritize all the various requirements that users were concerned about. At the top of the list were issues such as the operating system and user interface. In fact, user interface was at the top of the list for two years in a row.

This year's conference had some marked differences from the two prior events. The most notible difference is the dramatic transition that X/Open itself is going through. X/Open began as a grass roots, pragamtic organization. It's goals and objectives were clear and well articulated. It was a vendor organization and Unix was its orientation. Now with the industry consolidation is well underway, X/Open is being forced to bring users into the core of the organization. Therefore, this year's Xtra conference consisted of working groups led and directed by the users. While the issues have not changed dramatically from the two previous conferences the complexity of their approaches to these issues have changed. For example, users were no longer debating between different user interfaces. They seem to have setttled upon Motif as their standard. However, now their concerns are with behaviorial aspects of user interface and the way the standards process has been deadlocked. One topic brought to the floor by a user from American Airlines concerned the need to have interactive design tool data interchange standards within

a graphical user interface environment. Of particular concern is the fact that interactive design tools do not allow for the interchange of graphical objects when a user moves to a new tool. Clearly, users are moving well beyond the question of which GUI they will choose.

Security is another issue that has become increasingly important to users in the open systems context. Security becomes even more important as users begin to implement mission critical applications under an open systems umbrella. This is in contrast to previous years where security was deemed important but not highest on the list of issues.

One of the most interesting sessions centered around the topic of mainframe data access. Users are beginning to implement open systems in the context with their mainframes, minicomputers, and PCs. Therefore, the ability to transparently access and share data becomes of paramont importance. Data is not confined to only text and numbers. Rather, it is inclusive of image, graphics, audio, meta data, CASE data, geographic data and rules-based data. Users debating this issue argued that it is inappropriate for vendors to continually invent APIs so that users can access proprietary data. Rather, these users would prefer to see this data be made usable in an open systems framework. Like many users we have talked to lately, this group felt that DCE with transactional extensions is a vital requirement. In addition, these users addressed the need to have a transparent enterprise wide access to a single logical data dictionary. Not surprisingly, global data integrity was high on the requirements list. Two other requirements included the need to be able to easily access remote data and to have a single standard access language for all data types and data models.

The mainframe data access group was indicative of the best that can come out of this type of intense workshop atmosphere where users, ISVs, and system vendors all contribute to the discussion and debate. In an effort to show how concerned X/Open was to prove its ability to address user requirements, only users were able to vote on the validity of requirements. This may have weakened the results of the process especially since vendors made some significant contributions to the discussions.

X/Open's goal with Xtra was to come away with a mandate from the user community to be its voice in setting and bringing forward a process for agreeing on user requirements. Given the fact that no other group has the strength or organization to carry the process forward, X/Open may win by default.

But even if X/Open does win, it will have to prove itself to a sceptical user community that doubts the motivations of an organization so long dominated by vendors. Therefore, X/Open will have to excellerate the process of refining and defining solutions to user needs. The Xtra process will have to be run more than once a year if it is to be effective. Yet such a program and effort is expensive. Will the users who have the most to benefit from this intense scrutiny of issues, technology, and standards be willing to come up with the funding to have real value emerge? This is the critical question as X/Open moves into its next stage of life. —*J. Hurwitz*