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INSIDE

PRODUCTS • TRENDS • ISSUES • ANALYSIS

Surveying the Users

Taking the Pulse of Commercial Unix

By Judith S. Hurwitz

THE QUESTION that we get asked most these days is not whether Unix as an operating system will be successful, but whether commercial Unix is or is not real. Are real data processing managers seriously considering Unix? Are they implementing it? If so, why? Are they boldly venturing forth because they have "seen the light"? Have they suddenly *(continued on page 3)*

• E D I T O R I A L •

And What about Security?

By Judith S. Hurwitz

AROUND HERE, we like to talk about Distributed Network Computing (DNC). We get excited by the notions that all the computing power in a company—whether it is PCs, servers, or mainframes—becomes one virtual computer and that parts of applications can be parceled out to different processors on the network. And it looks as if the industry is actually making some progress in DNC. Now that Hewlett-Packard has acquired Apollo, it will be able to implement Apollo's sophisticated Network Computing System (NCS) a year earlier than originally planned. Digital Equipment and Apollo continue to make progress extending NCS by adding wide area networking facilities. In addition, the Open Software Foundation (OSF) has issued a new Request for Technology (RFT) for DNC.

All this is good news. DNC is indeed the next-generation model for distributed computing and offers incredible potential. However, one thought keeps nagging at me: security. When a system is based on centralized processing, security is more controllable. Once centralized control disappears, maintaining secure systems becomes a major headache. When files are spread across processors across a vast network, how do you ensure that an unauthorized individual never gains access? When Remote Procedure Calls (RPCs) are flying around a network, how do you guarantee that access to files and data is secure?

It is interesting that, as X-Window grows in popularity, security is one of the sorely neglected issues. At the recent X-hibition in San Jose, California, developers spoke about the problem of security in X. More disturbing is the fact that security is not a key issue for standards organizations for next year, either.

Some in the industry have suggested that Unix and security are strange bedfellows. Traditionally, developers liked the Unix environment because it was so easy to access just about anything. You could test out any circumstance without bumping into roadblocks imposed by more secure operating environments.

Now that Unix is moving, albeit slowly, from the development arena to the commercial MIS environment, security is bound to take center stage. Developers, however, may take exception to losing their free and open environment, and commercial users will not be satisfied with openness. This dichotomy is a snapshot of the Unix industry. How do you keep a technology that works just fine for one group (i.e., developers) and, at the same time, add all the constraints and controls necessary for the other group (MIS)? It is an interesting problem, and one that will not be solved easily. For instance, will the developer be willing to give up the superuser ID? Will the MIS manager stand for such a concept?

Security is a high hurdle for Unix as it moves out of the lab into the office. Without attention to this issue, Unix will never make it to prime time. One ray of hope—security was the hot topic at this year's Usenix conference. Remember that, two years ago, the most widely debated topic was user interface.

One possible solution that has been suggested is the use of kerberos. This technology, developed for Project Athena at MIT, requires that a system first send to a node an encrypted message that the user on the receiving end would decipher and answer. This mechanism is also part of Carnegie Mellon's Andrew File System.

The problems of distributed networking and Unix are only beginning to surface. They will become even more difficult once object orientation becomes more prevalent. Because object-oriented systems imply the use of inheritance, a developer might use an object that has pointers back to historical data. How will users of object-oriented applications make sure that secure data remains secure and does not accidentally become part of an inherited characteristic of an object?

These are the problems that the Unix industry will have to address—and quickly. Sometimes, it is too easy to become excited about the promise of new technology. We forget to pay attention to the details that make it work in the commercial world. ◐

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•USER SURVEYS•

(continued from page 1) become disillusioned with proprietary systems? Just what is going on out there?

Methodology

To get a sense of commercial Unix in the real world, we surveyed approximately 100 commercial users of computer systems. In two different surveys, we asked a variety of questions to determine just what data processing managers are thinking and planning to do about implementing open systems and Unix in their organizations.

The first survey solicited information from traditional, IBM-dominated data processing organizations that have not necessarily indicated any interest in Unix. They were asked questions ranging from "Is the meaning of the term 'open systems' clear to you?" to "Do you expect open computing standards to raise, reduce, or not change the cost per seat in your organization?" The first group of respondents were culled from medium and large companies (at least 1,000 employees). They tend to employ more than 10,000 people and represent a variety of industries, ranging from government to insurance/financial services and real estate to manufacturing and medical (see Charts 1 and 2). We'll refer to this group as "Traditional MIS."

We also surveyed another group of users, those who attended the recent Executive UniForum Symposium. We asked them a series of questions related to the acceptance of Unix in their organizations, including issues such as "What do you see as the major stumbling blocks on the road to commercial Unix?" and "Which of the following [list of] graphical user interface characteristics are most valuable to you?" These users differ from the Traditional MIS group in that they chose to attend a commercial Unix seminar. Therefore, they either have already begun to implement commercial Unix or are taking a hard look at the Unix option. From now on, we'll call this group "Unix Aware MIS."

In addition to gathering statistics about commercial Unix, we also talked directly to a cross-section of commercial data processing managers. We interviewed not only those who are already convinced that Unix is wonderful, but also those who have no interest and those who plan to implement Unix only sporadically in their organizations.

What Are Open Systems, Anyway?

Even though 66 percent of the respondents stated that they understood the term "open systems" (Chart 3), their interpretations varied widely. To some, IBM's MVS operating system is open. To others, Digital's DECnet operating system is an open system. The biggest winner in the Open System sweepstakes was MS-DOS, which 24 percent of respondents felt was open.

In the survey, the Traditional MIS managers were asked if the term "open systems" was clear. Although 66 percent answered yes, there seemed to be a disparity over what the term "open" meant. To some Traditional MIS managers, it meant IBM's SAA (Systems Application Architecture). To others, it meant Digital's VMS. Still others interpreted open systems to mean the DOS operating system. Some understood open systems to be related only to communications standards. Those anticipating that there is indeed commercial interest in Unix will be heartened to know that 18 percent of these respondents considered Unix to be an Open System. Unix came in second—after MS-DOS. Interestingly, OS/2 was a big loser, with less than 1 percent of the Traditional MIS managers stating that it was an open standard. Fifteen percent considered SQL open. Networking technology considered open by Traditional MIS managers included X.25 by 18 percent, 802.3 by 15 percent, 802.5 by 16 percent, and X.400 by 13 percent (Chart 5). These selections are not surprising, since 802.3 (Ethernet), 802.5 (Token-Ring), and X.400 are all part of the Open Systems Interconnect (OSI) standards protocol stack. If OSI isn't seen as open, what would be?

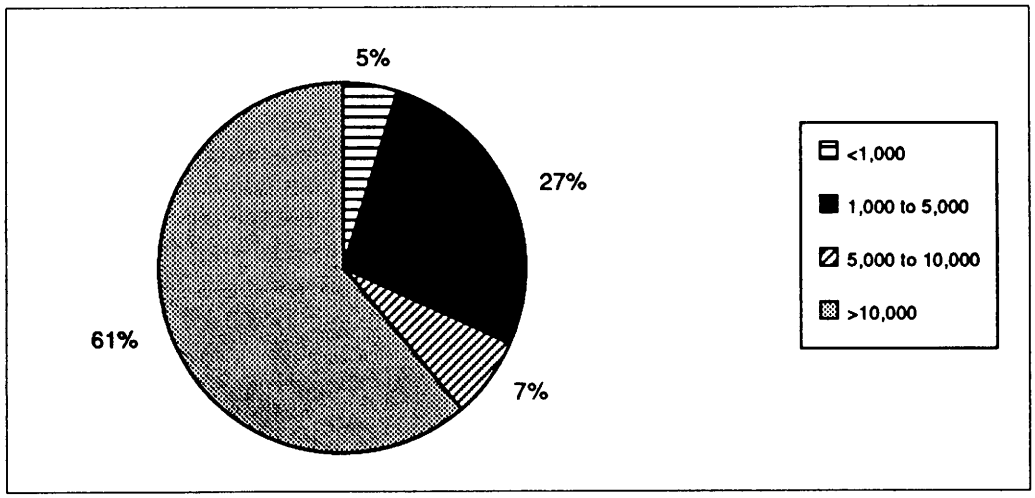


Chart 1. Number of employees in companies surveyed.

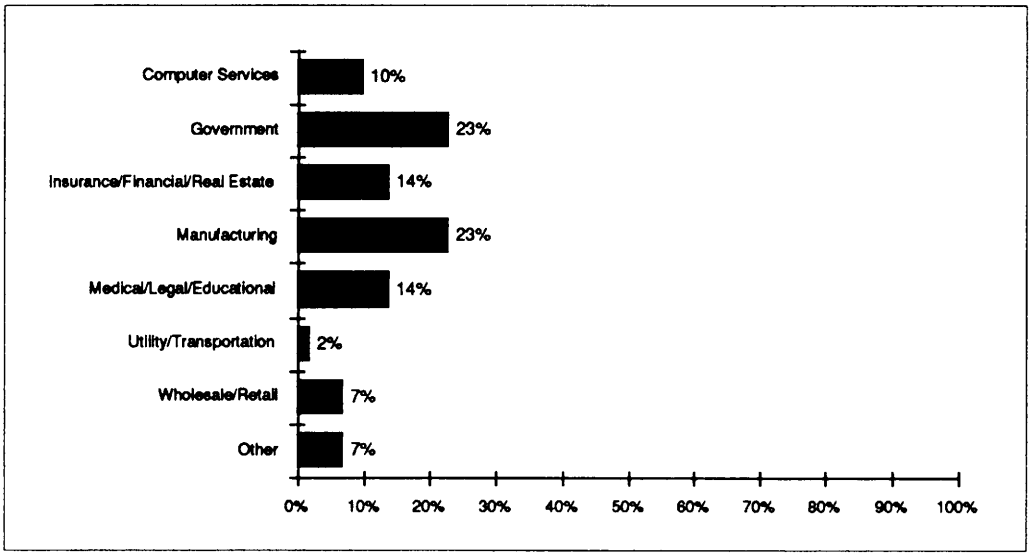


Chart 2. Industries represented in survey.

Many traditional MIS Managers are content with a one- or two-vendor strategy. They tend to implement safe systems, like IBM mainframes and Digital mid-range systems. Therefore, they are not frustrated in their attempts to get the software they need.

What is the significance of so many different interpretations of "open systems"? First, these MIS managers apparently view openness from the perspectives of their own organizations. In other words, if their departments are "true blue," with IBM mainframes, mid-range systems, and PCs, and if they are relatively happy with the situation, managers will tend to see IBM's SAA as open. After all, the third-party software packages they rely on are quite often ported to various IBM operating systems. Therefore, they are less frustrated by a lack of software options. They are also less likely to be considering a move from one hardware vendor to another. Their traditional orientation has been to rely on a one- or two-vendor environment, which has proven to be a safe path over the past 20 years.

What Makes Unix and Open Systems Attractive?

The Open Systems movement and the Unix operating systems are beginning to have a profound impact on data processing organizations. Even those MIS managers who are not currently interested in Unix or open systems are beginning to appreciate some of the benefits of an open systems environment—especially in the area of applications portability.

We wondered what aspect of open systems was making Unix Aware users take a hard look at Unix (Chart 7). To find out, we asked which of the following reasons was most important to them:

- Hardware independence
- Operating system independence
- Applications portability
- Binary compatibility between Unix systems
- Availability of a large library of applications for Unix
- Consistent graphical user interface for different Unix systems
- A single standard Unix version
- Database portability
- A single standard for SQL
- Other

It was clear from the responses that all of these factors are almost equally important to Unix Aware users. Each factor received no more than 12 percent of the total, and no factor received less than 10 percent. The two factors that received 12 percent were applications portability and the availability of a large library of Unix applications. The three factors receiving 11 percent were a consistent graphical user interface for different Unix systems, database portability, and a single standard for SQL. Given all debates over which version of Unix should become the standard, it was somewhat surprising that a single standard Unix version was not at the top of these users' wish lists. But, at another level, the top vote-getters made perfect sense. If Unix is to gain popularity in the commercial sector, a large portfolio of applications must be available and must also be portable.

Because the percentages were so close, it is hard to draw too many conclusions. But a common theme emerges from the four top vote-getters (applications portability, the availability of applications, user interface across different Unix systems, database portability and a single SQL standard): Unix Aware users are looking for lots of applications that are independent of

the hardware environment. Therefore, one conclusion that can be drawn is that users who select Unix as a deliberate strategy (rather than because of price or the availability of a particular application) do so because of the freedom it offers.

A similar question was asked of the Traditional MIS managers: "What are the most important benefits of standards today, and what will be the benefit of open systems?" (See Chart 8.) The following six items were the options:

- Applications portability
- Reduced training effort
- Vendor-independent purchasing
- Streamlined system development
- Higher performance/lower cost
- Simplified interfaces between systems
- Other

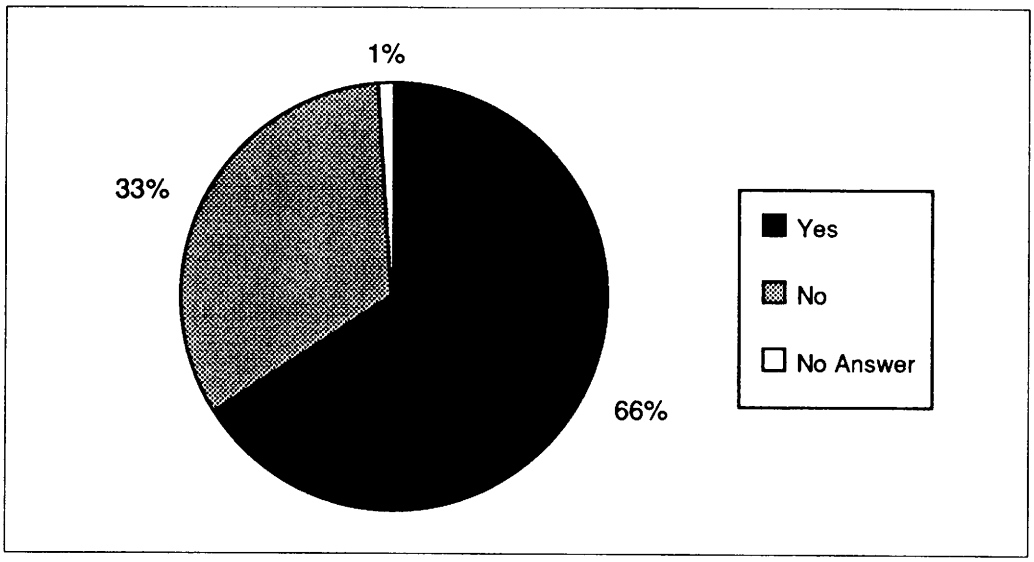


Chart 3. Is the term "open systems" clear to you?

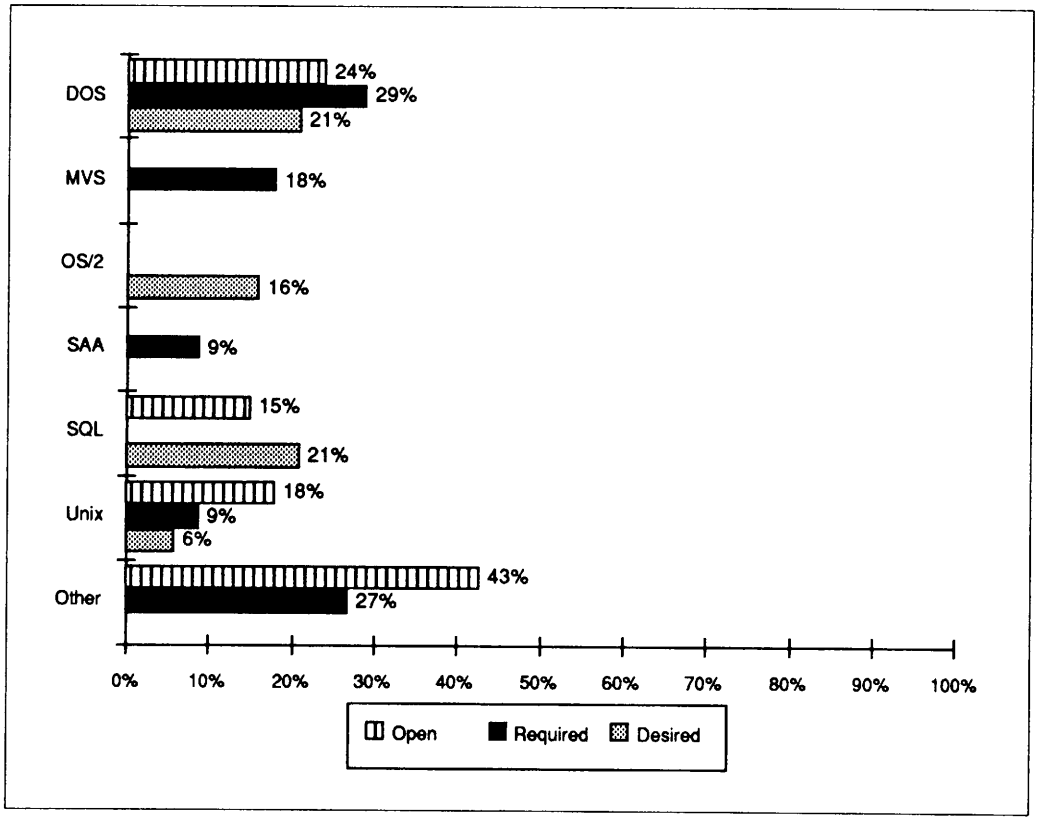


Chart 4. Which operating systems are required, which are desired, and which are open?

Despite the fact that vendors of Unix systems try to promote vendor independence as a key benefit, Traditional MIS users didn't see this factor as a key purchase criterion. It was rated as important by only 13 percent, sixth on the list. Applications portability was fifth, with 15 percent. Three factors were rated as equally important: Reduced training effort, streamlined system development, and simplified interfaces each received 17 percent. Interestingly, these three are the top issues that data processing organizations deal with on a day-to-day basis. Therefore, it is encouraging that Unix is viewed as strong in these key areas.

If there is a single issue that is driving data processing organizations to seriously examine Unix, it is the development environment. A move from one operating system to another requires incredible systems development and training efforts. We were somewhat puzzled by the managers' emphasis on a simplified interface. One explanation could be that they perceive that, under Unix, developers deal with fewer different

interfaces than do data processing professionals, who must deal with several different operating systems at once.

Traditional MIS managers were also asked to rate these same options for a future time when there are true "open system standards." Under this proposed scenario, the emphasis changed. Applications portability became the top vote-getter (18 percent of the total). Vendor-independent purchasing rose from sixth to second place (17 percent). Streamlined systems development and reduced training fell a little, each receiving a 16 percent vote. Again, the percentages in this category are close.

The highest percentage that any category received was 18 percent, and the lowest was 14 percent. Clearly, these are all important issues. But we think that the subtle shifts in position from the "today state" to the "open systems state" are significant.

We can look at this shift from two perspectives. First, if we put on our "Unix evangelist" hat, it means Traditional MIS users understand that, once open systems are achieved, they will attain true applications portability. Second, if we put on our cynic's hat, this shift in emphasis could represent an idealized view of open systems. In other words, when everything is "open," all the problems of traditional systems development will go away. This shift could also mean that the messages Unix vendors have been giving the industry are beginning to have an impact. Even the Traditional MIS folks see open systems as beneficial.

An aside: It was interesting to read the questionnaires submitted by traditional data processing managers who are deeply committed to their existing data processing environment (i.e., mainframes running MVS). These respondents tended to protest strongly by giving Unix questions as low a score as possible. They often wrote statements like "We have no intention of implementing any Unix." Logically, their answers to other questions, such as whether standards cost more or less, indicated their extreme position.

Single-Vendor Standards versus Open Standards

Traditional MIS managers stated that single-vendor standards were extremely important to their organizations and would continue to increase over the next three years. These centralized MIS organizations require a more homogeneous environment to cope with maintenance issues. On the other hand, these same managers also foresaw that their organizations would increasingly implement open systems over the next three years.

Just how important is it for MIS organizations to have a single-vendor standard? How important is an open system? We took a look at these issues over time. We asked users how important it was today, and how important it would be in 12 months and in 36 months. Our objective was to spot a trend.

First, we asked Traditional MIS managers to indicate how important a single-vendor standard such as MVS would be between now and the next three years. Twenty-six percent of the users felt that a single-vendor environment was important today and for the next 12 months. However, 30 percent felt that, in 36 months, the single-vendor standard would actually increase.

Does this mean that more Traditional MIS managers will remain loyal to one vendor in the future? Not necessarily. Remember, these are large, traditional IBM customers with a huge installed base of IBM mainframes. The trend upwards simply indicates that these organizations do not intend to move away from their mainframe orientation for key corporate databases. In addition, these respondents represent centralized MIS organizations. In order to maintain

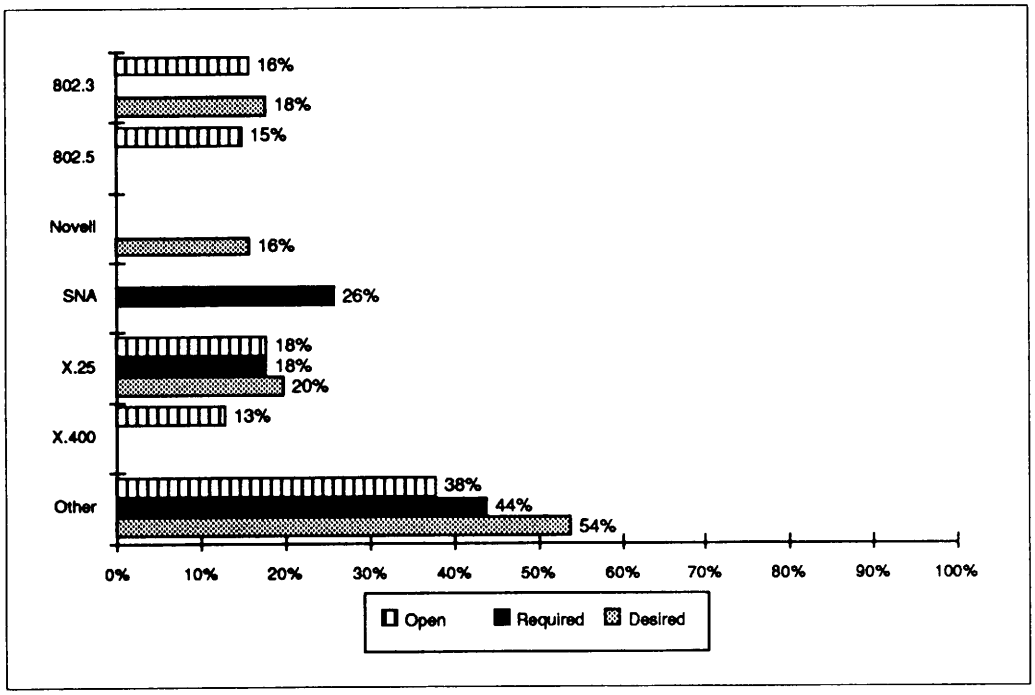


Chart 5. Which networking standards are required, which are desired, and which are open?

maximum control, it is far better to have fewer operating systems and less hardware to maintain. Therefore, it is easy to understand why these organizations not only desire but strive to support as few different options as possible. In contrast, individual department managers tend to be less concerned about consistency of acquired systems with the installed base of the overall organization and more concerned about price/performance and gaining access to applications and the development environment they need.

We also asked about the importance of open systems over time. The answers indicate continuing growth for Unix. For example, 11 percent of these users felt that Unix was important today, and 22 percent felt it would be important in 12 months. The 11 percent increase is significant for this conservative group. Forty-nine percent of users felt that Unix would become important to their organizations within three years.

Does this contradiction make sense? How could MIS managers be committed to a single-vendor standard at this time and to Unix and open systems in the future? One answer is that the pressures to implement Unix systems are coming from external sources, sometimes beyond the control of the MIS managers. In some cases, their superiors, taking note of the promised benefits of open systems, are requiring them to plan to implement Unix in the future. In other cases, such as U.S. federal government agencies, these standards are becoming a systems requirement. In still other cases, in order to remain competitive, these managers feel that they need to anticipate future systems directions. The fact that MIS-sanctioned companies like IBM and Digital are making loud noises about Unix has made these managers begin to take Unix seriously for the first time. Some are taking these steps reluctantly. Others view Unix as more cost-effective than OS/2 because, in the words of one of these managers, "at least Unix is also multiuser."

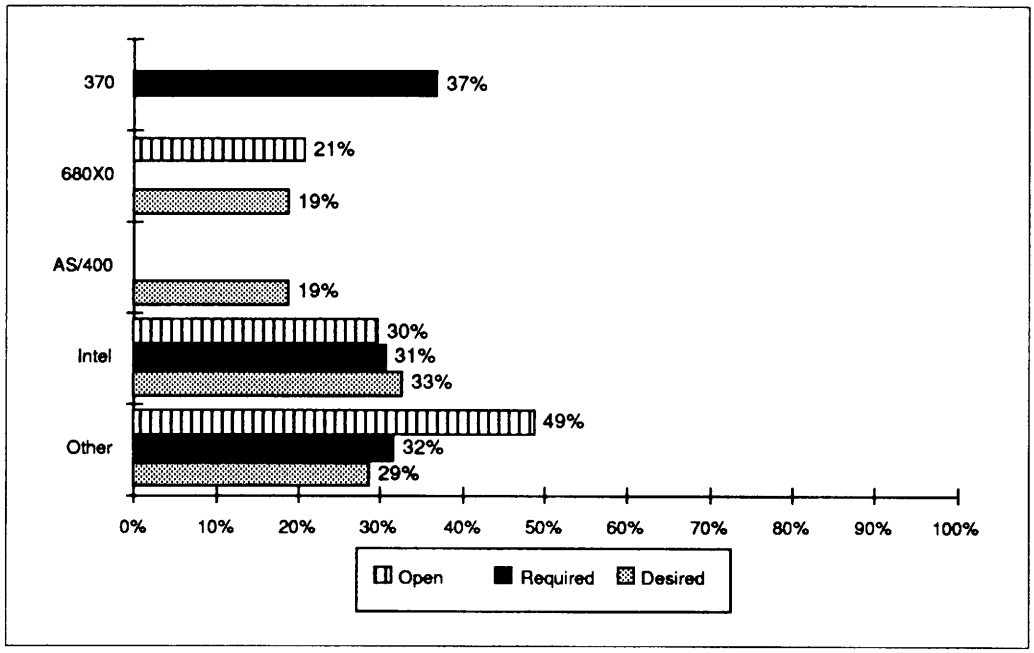


Chart 6. Which hardware architecture is required, which is desired, and which is open?

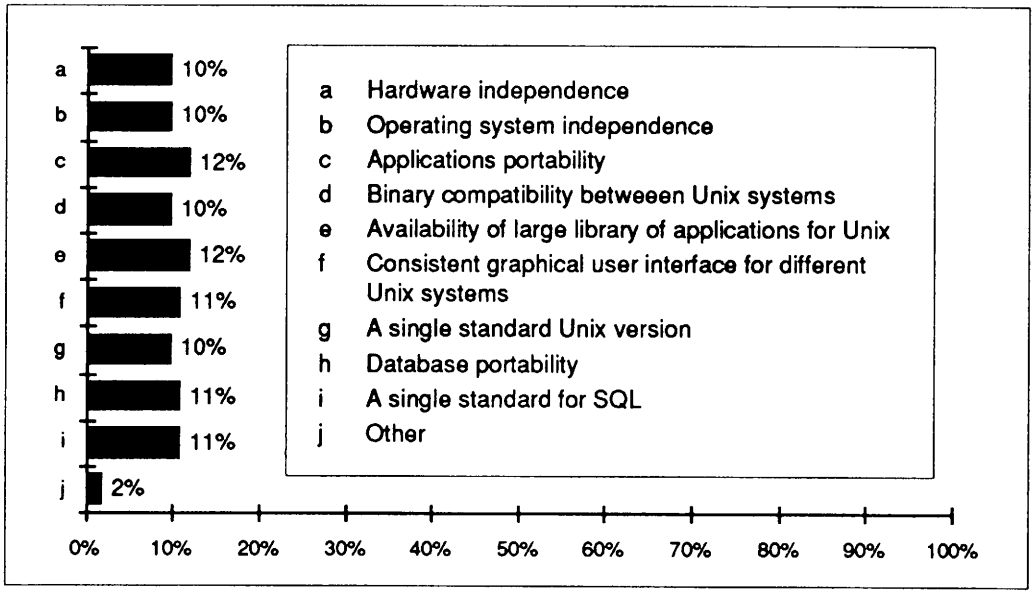


Chart 7. Which issues are most important to your organization?

The OSF versus UI Question

While Unix Aware users are interested in the goings-on between UI and OSF, they are not as concerned as one might think with a merger of the two groups. They are much

more concerned about issues such as a common API between different versions of Unix.

How important is it to Unix Aware users that OSF (Open Software Foundation) and UI (Unix International) merge? We expected that, given the intensity of the battles between the two factions, these users would want to see quick resolution. However, it was not so simple. Only 30 percent of the respondents said that they wanted the two groups to merge. The remainder either did not want a merger or did not care. Why? We suspect that the element of competition has suggested to many users that better technology will result. Many also infer that, since both groups promise to conform to X/Open Common Applications Environment (CAE) and the Posix specification, their differences will be minor. What is much more important to users, especially those writing applications, is a common Applications Programming Interface (API), which will allow their applications to run under different versions of Unix with different user interfaces without rewriting.

Graphical User Interface

The problem of multiple and incompatible user interfaces within Unix is perceived as a bigger problem by software developers than by end users. The software developers that we talked to are concerned and even angry that vendors are forcing them to write their applications to so many different user interfaces. They hesitate to pick one of the current implementations for fear that it might not dominate. They feel the urgent need for at least a common API. End users, on the other hand, are less concerned. The Unix Aware MIS managers responding to a survey at Executive UniForum were given five user interface criteria to rank in order of importance (Chart 11). The criteria were as follows:

- Ability to apply the interface across your company, regardless of platform.
- Ability to tailor the interface to different applications
- Ability to design a custom user interface for use across your entire company
- Applications that adapt to the preferred interface conventions of the various "standard" platforms (e.g., WordPerfect on a Mac and WordPerfect on a PC)
- An industry graphical user interface standard (across operating systems)
- Other

Of these five choices, the most important was the ability to apply the interface across the company, regardless of platform. Of the total of 60 respondents, 19 selected this as their first priority; another six users selected it as their second. Coming in as a close runner-up was the ability to tailor the interface to different applications (15 selected this as their first priority; 9 selected it as their second). The combination of these two answers indicates that Unix Aware users are looking for consistency at all levels.

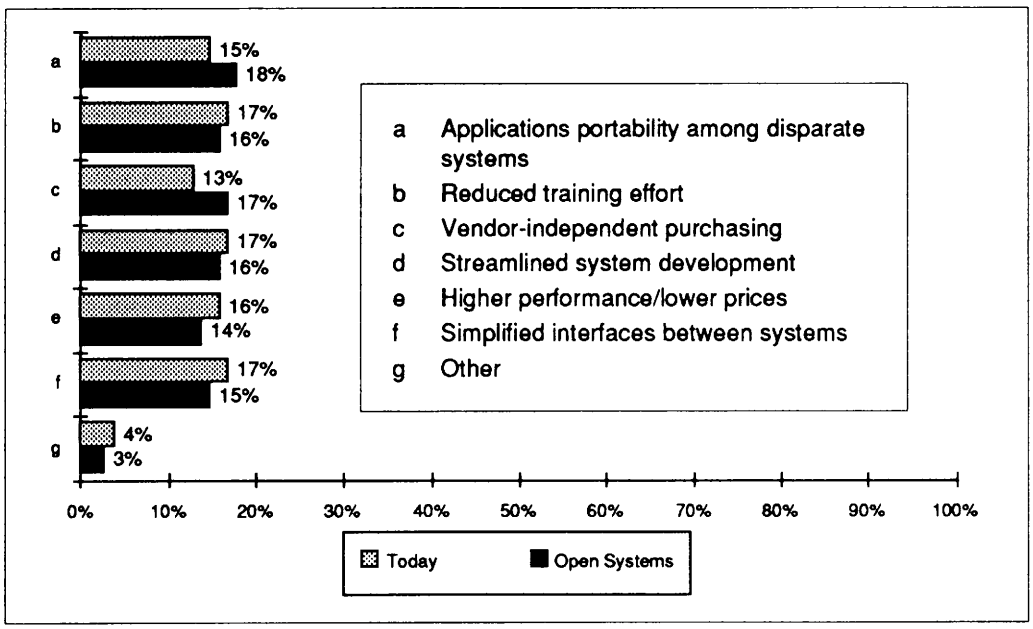


Chart 8. Which are the most important benefits your organization receives by using standards today? What will the benefits be in a standards environment?

Applications Environment

We wondered about the importance for Unix Aware users of the new generation of applications enablers, such as graphical user interface, compound documents, and procedural automation (Chart 12). Therefore, we asked them to indicate which of the following features were required and which were desired:

- Compound document/object architecture
- Procedural automation
- Scheduling capability
- Graphical user interface
- DOS/Unix integration
- Other

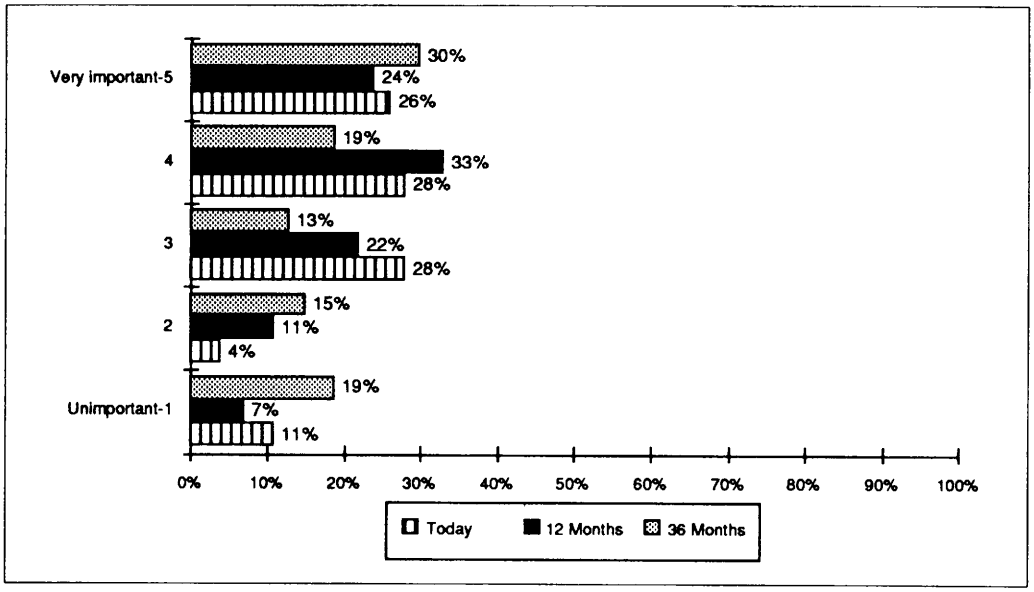


Chart 9. On a scale of 1 (least important) to 5 (most important), how important are single-vendor standards (e.g., MVS) to your organization over the next 36 months?

Of the six categories, the highest percent of managers (42 percent) voted for scheduling capability. Since electronic mail is already well-implemented under Unix, it is understandable that users take advantage of the system to help schedule meetings. We were also not surprised that DOS/Unix integration was a close second, with 41 percent. One of the secret weapons of Unix—and, we suspect, one of the reasons that it has begun to make inroads into corporations—is its ability to run DOS applications. The third most important requirement, with 40 percent, was graphical user interface. Over the next year, we suspect that a common API set will supplant the actual user interface as the key issue. For application developers, a common API is the single most important issue.

Procedural automation (35 percent) and compound document/object architecture (24 percent) were less important to users. This can be attributed to the fact that most vendors have not yet implemented these technologies in their systems. This is supported by the responses of another 41 percent of the users that compound document/object architecture was desirable and responses of an additional 29 percent that they wanted procedural automation for their applications.

In the "other" category, users wrote in fourth-generation languages, electronic mail, ODA/ODIF/MO:DCA, system and network administration menus for easier use, network support, network management and remote diagnostics, and SNA and X.400 integration.

Wish List

We wanted to know what would help Unix Aware users feel more comfortable with commercial Unix. Therefore, we asked, "What is the one thing vendors could do for you today that would cause you to buy more Unix systems?" Three areas kept reappearing: better and easier-to-use system administration and management, better and more applications, and better interoperability with existing non-Unix applications. Over and over again, these users compared the Unix and DOS environments. They wanted the same applications and the same level of software innovation that they have found in DOS to migrate to Unix. We thought some of the answers were worth repeating:

TOPIC: **System Administration and Management**

Comment: "Bring the common foundation which is promised by Unix to the marketplace. Safe, secure, easier administration, and improved file management."

Comment: "More stable operating system, more dependable (i.e., no start-over) mentality, more automated operations (system administration)."

Comment: "Improve end-user ease of use. System administration is difficult."

Comment: "Bullet-proof the installation and management and operation procedures to the level of the average DOS user."

Comment: "Offer high availability and continuous operations features along with security assurances."

TOPIC: **Interoperability and Integration**

Comment: "Develop more applications that allow for integration with other vendors' applications."

Comment: "Pursue a coexistence between IBM and Digital hardware."

Comment: "Provide and support a single-vendor solution that will satisfy my networking, applications, and multivendor integration needs."

Comment: "A firm commitment to OSI standards for standards for networking and data interchange. We must move away from ad hoc translators to integrate with the total information systems environment."

Comment: "Build interoperability with my existing proprietary systems."

TOPIC: The Applications Environment and User Interface

Comment: "Develop the applications depth and maturity available from IBM-based platforms."

Comment: "Hardware vendors need to pursue software support/development. Hardware vendors should follow Sun's lead."

Comment: "Provide innovative applications software and excellent support."

Comment: "Reduce the cost of moving current workload of Cobol IDMS applications to the Unix environment at a mainframe level."

Comment: "Package with excellent applications programs (third-party) with full support."

Comment: "Increase the quality and quantity of application offerings."

Comment: "Provide equivalent (or better) office automation applications functionality and price relative to DOS."

Comment: "Run Macintosh applications such as MS-Word, Excel, Aldus Persuasion."

Comment: "They should stop selling religion and start selling solutions!"

Comment: "We need a specialized line of software-development houses to emerge. These software houses would specialize in porting applications from aging systems to Unix-based platforms, preserving external communications requirements."

Comment: "Create common Graphical User Interfaces so different systems behave/appear similarly (tough for a Unix vendor to answer!)."

We decided to ask a number of traditional MIS respondents why some were so adamantly opposed to Unix in the commercial environment and why others were planning to implement some commercial Unix over the next three years. We provide here some key statements that reveal important criteria.

"We are beginning to look at Unix, particularly Sun machines because they are competitively priced. We have found a lot of support in the Sun environment third-party products. One appealing thing for us is portability. But users don't use an operating system; they use applications like databases."

"We have no interest in Unix. There is no need. We will have anything that counts under OS/2. We have a few copies of OS/2 in-house. Down the road, we are planning to use OS/2 instead of DOS."

"We're not using Unix and I'm not a great admirer of Unix, but it's inevitable. Unix has the advantage of networking."

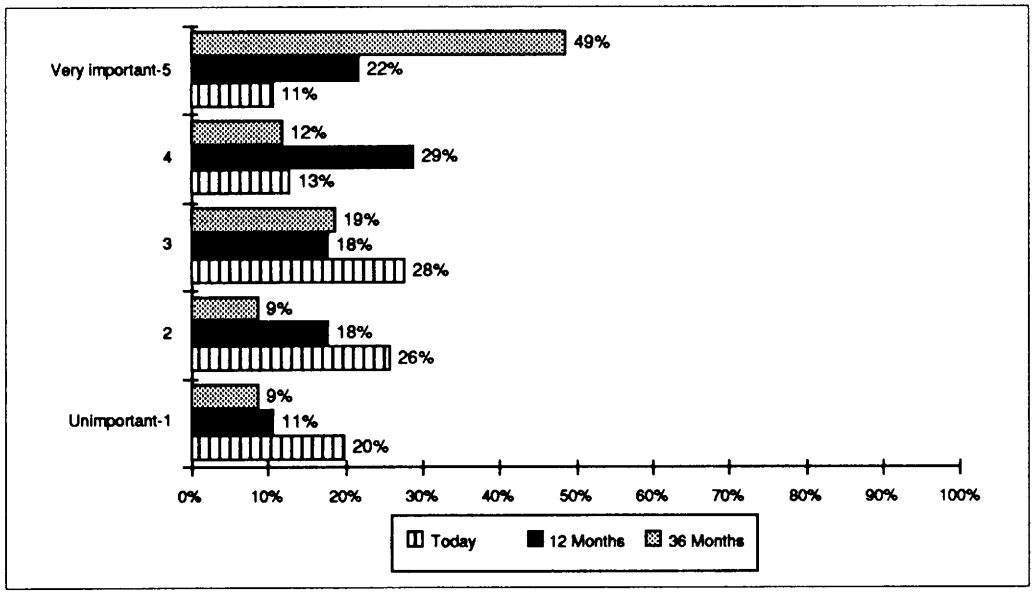


Chart 10. On a scale of 1 (least important) to 5 (most important), how important are open standards (e.g., Unix) to your organization over the next 36 months?

Impressions

To take the pulse of commercial Unix, we began talking to managers in a variety of data processing organizations, not necessarily those companies on the leading edge of technology. While our sample isn't statistically valid (we have talked to approximately 25), we did notice some interesting trends. The enthusiasm about open systems and Unix ranged from enthusiasm (usually about one aspect) to hostility. One data processing manager felt that Unix was inevitable, so he'd have to implement it sooner or later. But he wasn't very happy about the prospect. Another manager didn't like Unix because the names given to its commands seemed elusive. Yet another manager stated emphatically that he was not interested in Unix. Why? His organization had only IBM mainframes and PCs, and portability was not an issue discussed in his organization.

And, as for those users who are beginning to implement some Unix, most are not making philosophical decisions, but decisions based on price.

It is becoming increasingly clear to us that commercial Unix will not emerge from the traditional data processing organization. Much in the same way that the minicomputer and microcomputer revolution started—in departments of large companies and in small organizations—so will commercial Unix emerge from these sources as well. Why? Traditional data processing organizations are often caught up in the ever-increasing backlog of requests. These organizations are often too worried about their political survival to take a chance with something as risky as Unix and open systems. There are, of course, exceptions. In some traditional organizations, mavericks may appear who suddenly discover the importance of impending change—whether it is DOS, a minicomputer for local processing, Unix, or distributed network computing. They often become obsessed with the need to move the organization

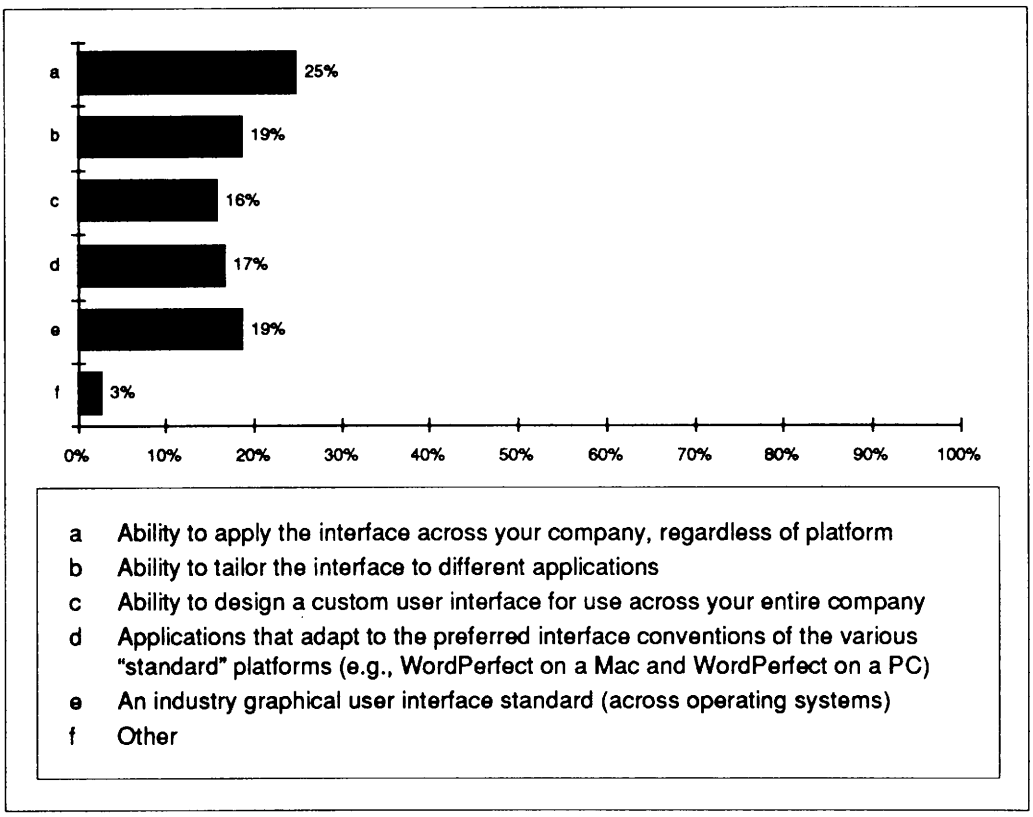
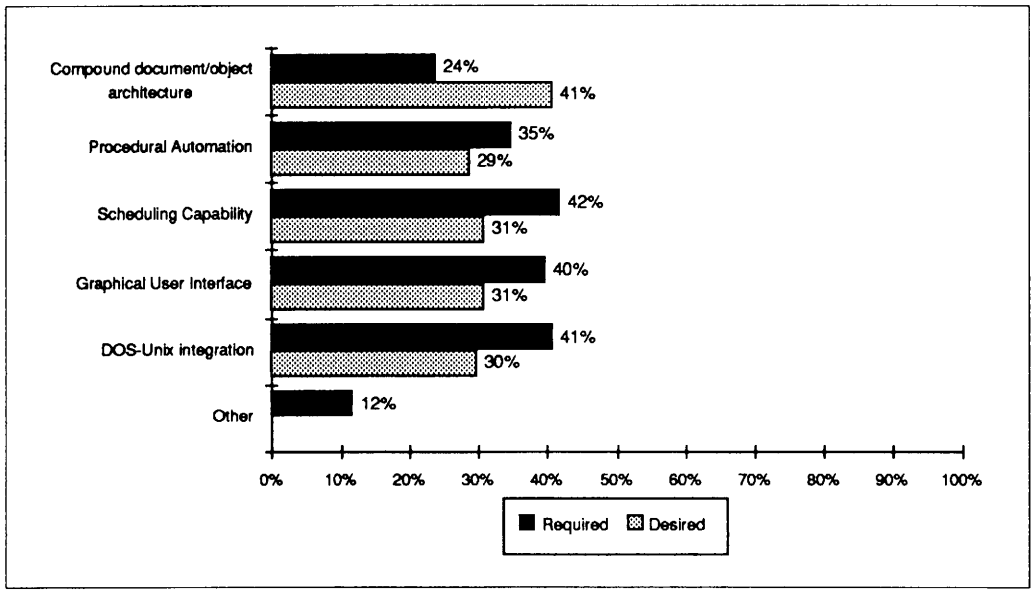


Chart 11. Which of the following graphical user interface characteristics is most valuable to you?



Chare 12. Which of these features are required and which are desired?

to a new plateau, and they are willing to put their careers on the line. Mavericks can often do the impossible—take a traditional, slow-moving data processing organization and make it move.

The Need For Education

If Unix is to become an acceptable commercial operating system, vendors have their work cut out for them. It is not enough to "preach to the converted." Vendors have to reach out to the masses of computer users who are skeptical about the value of Unix and the notion of applications portability. Most commercial information systems managers have heard of Unix and open systems, but their primary source is the publicity about the creation of the Open Software Foundation and Unix International and the infighting within the Unix community. They have little or no knowledge about the Unix development environment, the applications available, or the improvements being planned.

Most typical commercial end users do not believe that there are many Unix applications they would be interested in. It will take a concerted and planned effort on the part of major software and hardware vendors to get the message across that Unix is becoming a commercial operating system. Vendors will have to encourage third-party developers to write creative and innovative applications for Unix. Next, they must help developers promote these applications to the commercial information systems world. If Unix vendors would spend as much time promoting and developing commercial Unix applications as they have fighting the wars over control of Unix, the results of this survey might have been more overwhelmingly positive.

NEWS ANALYSIS

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• OSF •

The Latest RFT

Now that the dust has settled over Motif, OSF (Open Software Foundation) has released another RFT (request for technology), this time for a distributed computing component. With the resultant technology, OSF wants to create a vendor-independent networking and distributed computing environment to support distributed applications. OSF has a number of objectives here, including:

- A single, reliable, consistent environment for both users and application developers
- Hardware-, device-, and operating system-independence
- Tools for easy systems administration
- Portability and scalability

The RFT includes RPC (remote procedure call), naming, authentication, and presentation services, as well as a distributed file system. In addition, OSF is welcoming technologies beyond these core services—technologies that aspire to improve DNC (distributed network computing) under Unix, like transaction processing. However, candidates don't have to do it all. They could, for instance, just submit an RPC mechanism. Therefore, the OSF distributed computing environment selection will look a lot like its user interface selection—a mix and match solution, made up from the various RFT submissions. This is really a good way to go. Not only is the resulting technology comprised of the best components, but it's more diplomatic.

REQUIREMENTS AND EVALUATION. Although candidates need not offer each DNC component, they each must meet a number of requirements:

- Candidate technologies must conform to Posix standards and be written in C.
- Portability is essential. OSF wants a number of different machines to be able to play in its environment. Furthermore, submissions that demand OSF1 kernel modifications should take a modular approach.
- All submissions must be ready for commercial shipment in the first half of 1990.
- Validation and testing.
- Documentation (including architectural overview, specifications, interface reference, programmer's guide, and user's guide) must accompany all submissions.
- Obviously, candidates must be willing to license their wares to OSF.

Above and beyond these requirements, OSF will evaluate each candidate technology according to the richness of its features and its extensibility, ease of use and administration, performance, reliability and security, transparency, technical maturity, interoperability, and conformance to OSI protocols.

SCHEDULE OF EVENTS. OSF is wasting no time. Letters of intent are due July 28, and candidates have until October 6 to submit their proposals. Next will come the semifinals. Those in the running will have to present their material to an OSF Members' Technology Review Meeting in November. After an evaluation team examines the final round of technologies (the date has not been given yet), OSF will announce its selections.

CONCLUSION. We think OSF is choosing the right path with its decision to incorporate an open distributed computing component. Better DNC solu-

tions are vital to the growth of Unix as a commercial system. The common Unix communication mechanisms (e.g., pipes, sockets, signals) aren't the most efficient ways to answer the demands of distributed applications, so a standard RPC is a good idea. In fact, the development of an industry-standard RPC is the root of Digital Equipment's involvement with Apollo. (Although Hewlett-Packard purchased Apollo, the RPC work with Digital is on-going.) Interestingly, IBM has also licensed NCS technology. Hand-in-hand with the RPC is security, which has recently become an especially critical area. Thus, we'll be eyeing security segments keenly.

However, the distributed computing selection may be somewhat more problematic for OSF than was its user interface selection. There was no clear standard Unix user interface, but NFS (Network File System) from Sun is a de facto standard. This doesn't mean that NFS offers the best solutions. It doesn't. For example, Apollo's NCS (Network Computing System) and CMU's AFS are very credible systems, and are, in many ways, better than NFS. All the same, given NFS's status in the community, OSF can't ignore it—in fact must support it—whether or not NFS is included in the final selection. ◐ —*L. Brown*

•RISC•

Toshiba Jumps on the SPARC Bandwagon

Sun, trying to regain momentum for its SPARC RISC architecture after the much-publicized debut of the Motorola 88000 machines, has signed an agreement with Toshiba under which the Japanese computer company will develop low-cost workstations based upon SPARC and SunOS.

With these low-priced workstations, Toshiba will try to enter that hazy area of the market between high-end PCs and low-end graphical workstations. Toshiba hopes to ship these in PC-like volumes, with the systems running many mainstream PC applications.

In addition to licensing SPARC and SunOS, Toshiba will incorporate the Sun Open Windows application environment (made up of Open Look, X11/NeWS, and the XView toolkit), and ONC/NFS, Sun's networking software. Toshiba will purchase microprocessors from one or more of the five semiconductor vendors currently licensed to develop SPARC chips. Toshiba will utilize products such as SPARCsim—an architectural simulator—along with other SPARC development tools.

> *The distributed computing selection may be somewhat more problematic for OSF than was its user interface selection because a de facto standard, Sun's NFS, already exists.*

Toshiba has a strong history in the Unix arena, being the first to market a Japanese version of Unix licensed from AT&T. Toshiba was the first to OEM a Japanese version of Sun's 68000-based workstations, and its 32-bit laptops support Unix.

TWO TAIWAN COMPANIES HOP ON, TOO. Sun also announced that Datatech Enterprises Company and Tatung Company, two leading Taiwan-based PC clone-makers, will begin volume manufacturing and distribution of low-cost SPARC-based systems next year. The two companies will also license the SunOS, OpenWindows, ONC/NFS, SPARC-optimized C and Fortran compilers, and other SPARC development tools.

SHRINK-WRAPPED UNIX APPLICATIONS. For Sun, agreements such as the recent ones with Toshiba, Datatech, and Tatung, and, last year, with Solbourne (in which, interestingly, Matsushita—read Panasonic—has a 52 percent stake), are key steps in its attempt to establish SPARC as the predominant RISC architecture. The more SPARC machines that are out there, the more software developers who will write for them (as they are all binary-compatible), and the more users who will buy the SPARC machines, and the more developers who...

88K Users Fire Back. This strategy is not going unchallenged. The 88open Consortium (users of Motorola's 88000 RISC chip) recently announced the availability of an Object Compatibility Standard (OCS) for 88000-based microprocessors. Not to be confused with object compatibility à la Object Management Group (the ability of applications to pass messages and work together), OCS provides object-code compatibility across all 88000 platforms.

Phase I of creating a shrink-wrapped environment for 88Ks includes the Binary Compatibility Standard (BCS), which allows software vendors to create a single version of software for all manufacturers of 88000 systems. Phase II will also include the ability to produce single versions of library software products. At first implementation, OCS covers Cobol, Fortran, and C, with Phase II to include Ada, C++, and Pascal support.

RISC WARS. The battle for dominance (or survival) in the RISC arena is just beginning. MIPS, with its alliances with Digital, NEC, and Siemens, has staked a leadership claim. 88000s, led by Data General's AViiON, show a strong price/performance presence. Intel's i860, particularly as a BusMaster multiprocessor on a high-end PS/2,

is very impressive. This is not to mention the combined force of Hewlett-Packard and Apollo. And let's not forget that a new generation of RTs is due.

Though Sun will be hard-pressed to maintain a clear lead in this environment, its open strategy will serve it well. For, in the days to come, Sun is going to need all the friends it can get.

—D. Marshak

•VERITY•

The Topic Gets Hotter

Verity, Incorporated (Mountain View, California) continues its aggressive pursuit of the full-text retrieval market with Version 2.0 of the Topic text information management system. Version 2.0 adds some significant enhancements. Users now have the ability to add hyperlinks to documents to reference images, annotations, and/or related documents; to build queries (topics) by example; and to support real-time information feeds. The company also stated that its SQL-Bridge option, which provides an interface that links Topic with four popular relational database management systems (Informix, Ingres, Oracle, and Sybase), is now in production. (See our news coverage in the January *Office Computing Report*—Vol. 12, No. 1—for a description of the initial release of Topic and the SQL-Bridge product.)

Verity recently completed its second round of financing, securing $6.4 million to bring the total venture capital investment in the company to $9.4 million.

HYPERTEXT. Topic's new HyperLinks feature creates links between a document and other related objects. These include images, annotations, and other documents. A link can be inserted anywhere in a document. To do this, you move to the appropriate location in the document, invoke the menu option for creating a link, and define the type of link—annotation, image, document. You are then prompted for the necessary information to complete the link. For an image, this is the name of the image file. For a document, it is the name of the document as well as the location in the document where you want the reader to land when the link is invoked. For an annotation, it is the text of the annotation, which becomes a sort of "sticky note" attached to the document. As is its rule, Topic never modifies, reformats, nor moves the original document itself. The additional pieces of information are essentially pointers maintained by Topic.

Though Sun will be hard-pressed to maintain a clear lead in the RISC environment, its open strategy will serve it well. In the days to come, Sun is going to need all the friends it can get.

For each link, the user also defines the link text in the original document. This entry will appear in square brackets, which is the default convention Verity has chosen for displaying links. For example, entering "note" as the link text means that "note" will be displayed at the link location when the original document is viewed within Topic. Verity calls this an "icon," which is obviously in preparation for future releases of the product. We would prefer that link locations be more obvious to the user—outlined or highlighted in some way, or actually iconified. The company indicated that the appearance of the "icon" is, in fact, customizable by the user. And on bit-mapped workstation, such as a Sun, it can, in fact, be a graphical icon.

Each link can be modified, deleted, or moved to another location in the document. There is no facility in this release for operating on multiple links at once.

When the user invokes a link, the linked object is displayed. If it is a document, it can also have its own links, allowing the user to navigate through a series of documents looking for specific points of interest. Pressing the Escape key pops the user back one step through the chain of links. Currently, you cannot create links in an annotation—a feature we think would be helpful as a preface to a link or as a branching mechanism—nor can you search the text of an annotation. Another missing feature is a visual map of some kind showing the connections between objects. If you build a complex, multilevel link structure, you can get lost in hyperspace. However, considering that this is a first implementation in a product where hyperlinks are not the major focus, we are impressed with the direction the company is taking.

The database administrator has the option to allow only certain users to create links.

IMAGES. Viewing images obviously requires the appropriate hardware on the workstation (without it, you get an error message). You can zoom/unzoom an image with the +/- keys as well as pan in all four directions with the arrow keys. Handling images is the company's first step toward incorporating compound document capability within Topic.

The company has developed Image Filters, C programs that allow Topic to access images in the following formats: TIFF, PC-X, Sun Raster, and PDA. These formats have been developed on a customer demand basis, and others will follow. Topic also supports image compression conforming to standards for CCITT levels three and four. In addition, Verity has defined a Verity Imagefile Format to accommodate other image formats.

Another feature of Topic is what the company calls "synchronized im-

ages": A document has an associated image that can be accessed any time the user is viewing the document. The user can move between the character-based version of the document, with its embedded links and highlighted search words, and an image of the way the actual published document appears.

TOPIC-BY-EXAMPLE. Topic-By-Example is a query-by-example tool, allowing the user to mark up a model document as an example of what would be relevant to a search. The user highlights the words or phrases of interest, and Topic automatically generates a "topic" from the model document and retrieves the resulting documents (those that are similar in content to the model document). At that point, the user can browse through the results and review, edit, and save the topic.

In building the topic, each word or phrase highlighted is given a default weight of 0.5. The only exception is a word/phrase that already has a topic created for it. In that case, Topic will integrate the existing search definition and give it a higher weight of 0.7.

REAL-TIME CONNECTIONS. The Topic Real-Time System supports filtering live documents from dynamic data sources, such as news wires, electronic mail systems, and satellites. This optional system will have particular appeal to financial analysts, trading operations, and intelligence-gathering and news services. As a user, you define the topics (queries) you are interested in, the minimum relevance level a retrieved document must have, and the way you want to be notified that a document has met your requirements. The latter can include beeping your workstation, sending the document to your E-mail inbox, putting the document in a file, or routing the document to a printer.

Topic passes every document coming in through the live feed against its file of queries, automatically classifying the relevant documents and routing them to the appropriate users.

OTHER NEW GOODIES. Verity has added some other enhancements and tools to help the user in Version 2.0: A thesaurus helps locate synonyms for building more complete queries; wildcards provide flexibility in searching for partial words or phrases; a soundex feature allows for phonetic searches; and a "revert" (or undo) function discards all edits to a topic since the last saved version.

Once you locate a document with a query, you can search through the document for a type of link or for a string of user-defined words.

A level of security above that provided by the native operating system has also been added. The Topic database administrator can set up user accounts with passwords assigned to control access at the document level. If a user does not have permission to see a particular document, Topic acts as if the document doesn't exist for queries generated by that user. The administrator can also define groups for security purposes and assign users to one or more groups.

Usenix is still a techie's conference—a soapbox for discussions and arguments about the future of things like operating system design and communication mechanisms.

APIS. For VARs, OEMs, and system integrators, Verity provides a developer's kit with a set of APIs to allow the embedding of Topic text-retrieval functionality within third-party applications. Currently, this is aimed at developers building vertical applications. The developer's kit costs 70 percent of the full product price and includes a license for run-time versions of Topic.

COST AND AVAILABILITY. Topic 2.0 is scheduled to ship this month. The Topic Retrieval Client software costs $695 for the IBM PC and $2,500 for workstations (e.g., Sun and Digital). Typical installations, including the Topic Database Builder, the Database Server, and Retrieval Client, range from $6,000 to $110,000 depending on platforms, configuration, and number of users. The Topic Real-Time System (RTS) option starts at $15,000, and the SQL-Bridge costs $2,500 for integration with one of the supported RDBMSs. Topic runs on Digital's VAX/VMS and VAX/Ultrix; Sun3, 4, 386i, and SPARCstation I workstations (Unix); MIPS computers (Unix); Pyramid (Unix); SCO (Xenix); and IBM PCs/DOS.

Topic is document format-independent and currently supports ASCII, MS-Word, WordPerfect, Interleaf, and FrameMaker document formats. ◐

—J. Davis

•USENIX•

A Techie's Haven

Leave the commercial issues to UniForum. Usenix is still a techie's conference—a soapbox for discussions and arguments about the future of things like operating system design and communication mechanisms. (Where else would you overhear barefoot hackers complaining about application development and reminiscing about their days with the kernel?) While no single theme dominated the Baltimore conference, as has sometimes been the case in Usenixes gone by (e.g., the Andrew system, X-Window, Mach), there were some obvious hot buttons, network security being the most notable.

NETWORKING. Networking was the

topic of the opening keynote speaker, William Wulf from the National Science Foundation, and it reverberated throughout the sessions that followed, even the ones not devoted to networking per se. The critical issue seemed to be security, not only in the sessions (although the last day's agenda was practically devoted to it), but just in conversation. Complex interconnecting computing paradigms are driving the issues of privacy, data integrity, and reliability. Obviously, an appropriate balance of distribution and security needs to evolve.

USER INTERFACE ... OR LACK THEREOF. While commercially user interfaces have center stage, at Usenix, the interest seems to be fading. That's not to say no one was interested in user interfaces (UIs). An entire session was on windows, and a couple of Birds of a Feather (BOF) sessions dealt with user interfaces. (BOFs, incidentally, are smaller-group, offshoot sessions, where people gather to butt heads on particular points.) One UI BOF was pretty interesting. The group started out talking about a standard X widget set, but wound up speculating about what users wanted in an interface. (Alas, they kept coming back to what they wanted in an interface. As one techie put it, "Programmers don't give squat for user interfaces.") However, UI just didn't carry the same energy that it does in the marketplace. Why not? Probably because Usenix attendees have been haggling window systems and GUIs for the past few years.

The exhibition floor was another story entirely. X was all over the floor. Booths blazed their allegiances to either Motif or Open Look (or both).

IBM, IS THAT YOU? IBM, riding high on AIX, was very visible at Usenix. Talk about knowing your target audience. IBM used Gummy Bears to lure attendees to play on their workstations. It also sponsored a seemingly never-ending hospitality gig, and handed out kazoos (yes, kazoos) and mini flashlights inscribed with "AIX: We've Seen the Light." Perhaps they have.

ON THE USENIX AGENDA. The Usenix board of directors announced that, for the next Usenix conference, they would offer two session tracks: one traditional technical track, and another more issues-oriented track. The decision sprang from Unix's commercial success. A lot more people are involved with Unix than there used to be, and Usenix would like to appeal to a broader spectrum. Since Usenix built its reputation as a developer's conference, we hope this decision doesn't interfere with its culture, which is pretty unique. And we somehow doubt the attendees would let that happen. ◐

—L. Brown

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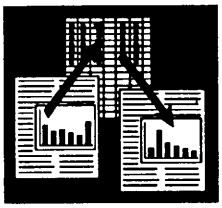

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By Michael D. Millikin

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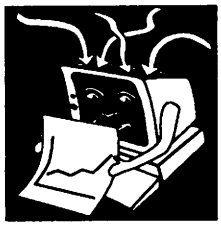
We explore the functionality defined in each specification, and, where possible, give examples of sample applications.

Additionally, we will touch on the strategy for document architectures of two other vendors: Hewlett-Packard and Microsoft.



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OSF And UNIX International

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By Judith S. Hurwitz

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- User Interface: A close look at OSF's Motif and AT&T's Open Look
- Operating System Kernels: Design, implementation, and technologies
- Communications and Networking Foundations: How each group is building its networking underpinnings
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