OS Coexistence:
The New World Order

Suppliers of Windows NT and Unix systems may believe they're locked in a battle for the hearts and minds of customers, but many of those buyers plan to use them both.

By Peggy King

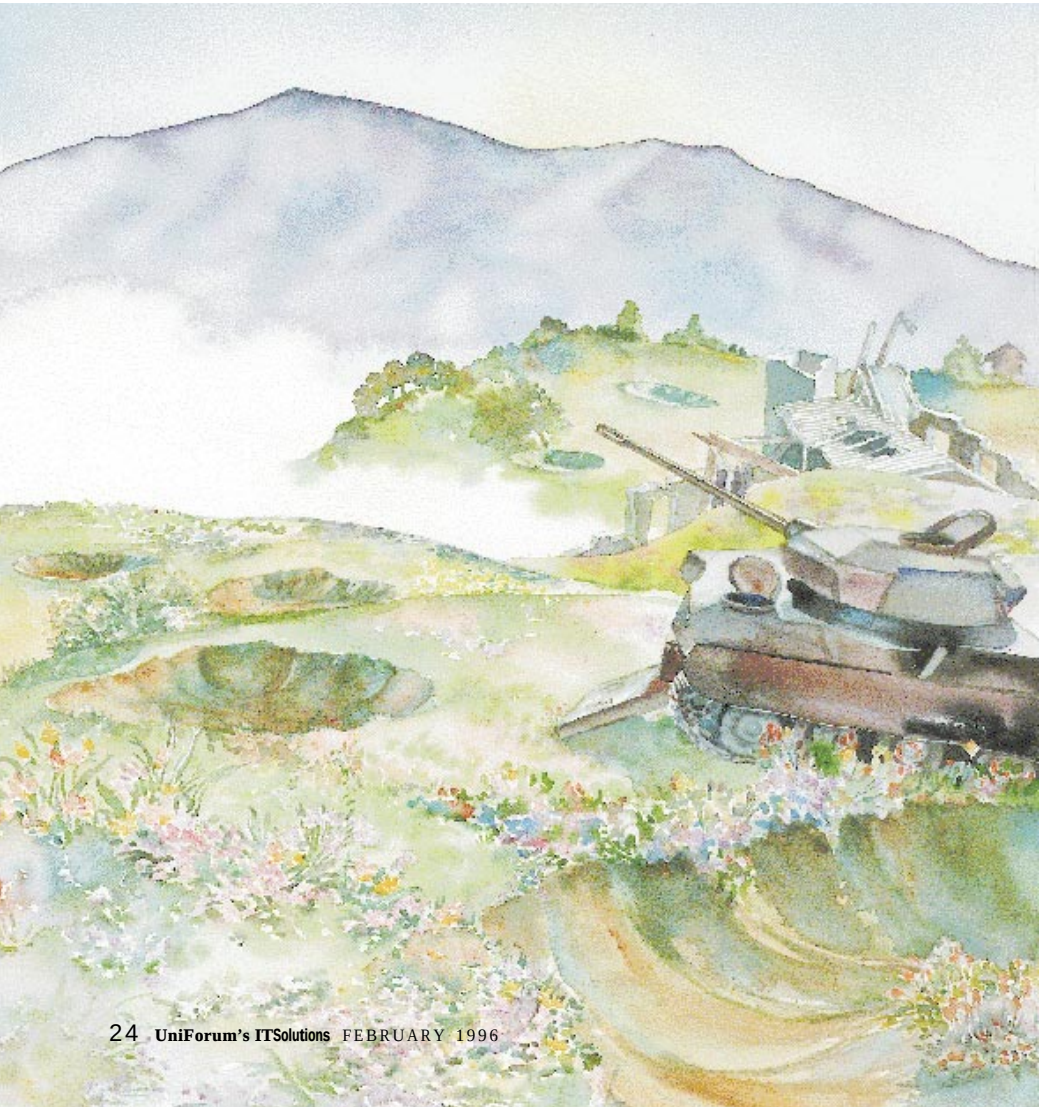
The operating system wars of the early 1990s have cooled off. An unofficial truce accepts that Microsoft Windows dominates corporate desktops. Still to be decided in some quarters is the role of Microsoft Windows NT as a server OS. Corporate data center customers are beginning to use NT servers as alternatives to Novell NetWare LANs for file and print services. And despite scalability problems that still limit the processing load NT servers can handle, some corporations are considering NT as an alternative platform to Unix for applications moved from legacy systems to client/server environments.

Having enjoyed much success as mainframe alternatives in new enterprise architectures, the leading Unix vendors are not eager to provide integration between NT servers and their own more powerful—and more expensive—server solutions. Only Digital Equipment Corp., whose Digital Unix ranks behind HP-UX, IBM AIX and SunSoft Solaris in volume sales, has welcomed NT into its operating system fold, offering both on its Alpha reduced instruction set computing (RISC) processors. "Unlike the other major Unix vendors, Digital sees Windows NT as an opportunity rather than a threat," says Michael Goulde, a senior consultant at the Patricia Seybold Group of Boston.

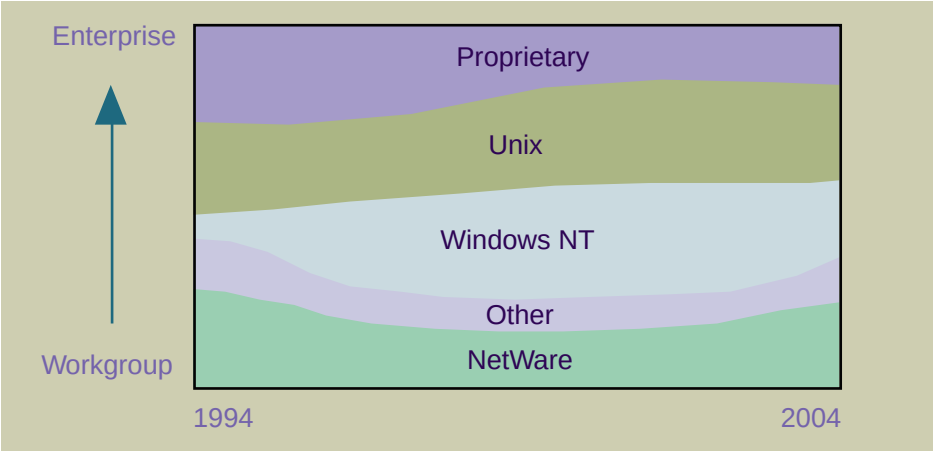
User companies are running both Unix and NT servers for a variety of reasons. Some are using NT to link up their substantial Windows presence. Others wait to see whether NT will acquire the scalability and the applications that they require in order to deploy it as an enterprise platform. Still others prefer to have the two server operating systems coexist, each doing what it does best. In general, Unix shines in the areas of networking, communications among heterogeneous systems and processing-intensive applications. Windows NT brings to the server qualities derived from Microsoft's success on the desktop.

Over the past two years, industry analysts, independent software vendors (ISVs) and technologists in user organizations have examined the relative strengths and weaknesses of each OS. Goulde sees similarities between Unix and NT and some differences. "The two technologies are comparable in many key areas: 32-bit support, multitasking, multithreading, security, integrated networking and support for symmetric multiprocessing," he says. "The advantages of Unix lie in its maturity, standards support, distributed networking and scalability. NT's advantages are its ease of installation, richness of graphical administration and support for a large number of Windows applications."

Jerry Popek, chief technology officer for Platinum Technologies of Oakbrook Terrace, IL, adds that Unix offers better support for database applications, high-availability systems and asynchronous transfer mode (ATM) networking, while NT offers better compatibility with the Win32 application programming interface (an API specification published by Microsoft) and better support for Microsoft's own networking protocols.



Running applications on both platforms is not the only way to integrate them. Additional scenarios for the coexistence and/or integration of Unix and NT include using one for application development and the other as the deployment platform; deploying the "native" networking architecture of one OS on the other; using both platforms as file and print servers; sharing database applications in a three-tier client/server environment; and using messaging middleware to provide a basic set of services for all users. A look at some of the diverse issues surrounding Unix and NT coexistence may suggest inklings for the future regarding integration between the two.



The server market will yield increasing shares to Unix and Windows NT systems, according to research firm Summit Strategies, Inc.

Bridging the Development Divide

Younger application developers often gain experience developing on PCs, using tools such as Microsoft Visual Basic and PowerBuilder from Powersoft of Burlington, MA, a division of Sybase. But in many large organizations Unix remains the platform of choice for application development, especially for those with enterprise-wide scope, because of its abundance of fourth-generation languages and emerging object-oriented tools. As these once divergent development styles and platforms meet in today's corporations, cross-platform porting tools can help developers who prefer to work in Unix (even if the applications are deployed on a Microsoft OS), as well as those who would rather develop Unix applications using PC-based tools.

Some companies have decided to switch existing applications to NT in order to migrate internally developed applications to less expensive server platforms; nevertheless, they may want to retain their Unix development environment. A company that decides to deploy Unix-based applications on NT has a few options for doing so. It can retrain its developers to write to Win32 APIs, hire new developers or port the applications. Tools such as NuTcracker from DataFocus of Fairfax, VA, and Portage from Consensys Computers of Markham, Ontario, Canada, enable developers working in Unix to port their software to NT without having to rewrite it to Win32. To date, most of the customers for these tools are ISVs who want to port their products, rather than users.

Both NuTcracker and Portage implement Unix APIs, including the system calls, on NT. NuTcracker includes utilities provided as part of the MKS Toolkit for NT from Mortice Kern Systems of Waterloo, Ontario. On the other hand, NT-based products, including EXceed/NT from Hummingbird Software of Markham, Ontario, and eXcursion for Windows NT from Digital Equipment, integrate NT and X-based hosts by providing access to X Window System clients.

Tom Bosanko, president of Data Focus, argues that most development organizations will retain their Unix orientation. "We don't have a single customer that is replacing Unix with NT. Most of our customers are looking for compatibility between the operating systems," he says. "Widespread acceptance of Unix APIs helps protect investments in Unix training. Interoperability, not replacement, occurs when NT is added to an existing environment."

Conversely, some developers skilled in working on PCs have to meet their organizations' demand for Unix as the OS base. For example, application developers at Lehman Brothers, a Wall Street financial services provider, use Pentium-based PCs running Windows to create Unix server applications. The firm has chosen Delphi from Borland International of Scotts Valley, CA, because of its facility in reuse and rapid application development (RAD), according to Jeffry Borror, managing director for Lehman Brothers in New York. "Applications developed in Delphi are fluid and malleable yet secure," he says. "They allow reuse down to the component level. Unix has better networking, but when it comes to RAD the best tools are now on the PCs."

Despite demand for NT-to-Unix porting and migration tools, Microsoft sets limits on the support it offers to companies that want to use NT as a platform for developing Unix applications. It allows source code access only to companies selected to be part of its Windows Interface Source Environment (WISE) program. Two WISE participants, Bristol Technologies of Ridgefield, CT, and Mainsoft of Sunnyvale, CA, sell NT-based development environments that allow an application written in conformance with Win32 to be ported to various Unix platforms. Again, to date the vast majority of customers for these porting tools have been

ISVs and development teams within Unix system vendor organizations.

Networking Across Three Tiers

Perhaps the most typical environment in which OS coexistence is required today is a three-tier client/server architecture. For many companies that have reengineered their IT to support distributed computing, this includes a back-end server, typically running Unix; a mid-level server for file and print services that uses Unix, Windows NT or a network operating system (NOS) such as NetWare; and PC clients running a Microsoft desktop OS. In environments such as these, the network operating system architecture provides the glue that integrates the diverse environments. Novell's decision not to bring out "SuperNOS" versions of NetWare for Unix environments removed one of the choices for users who wanted a NOS that would support both Unix and PC environments.

Tim Yeaton, a director in Digital's Unix business segment in Nashua, NH, describes two types of environments in which users have reason to use both Unix and NT. In "Unix-centric" environments, PC servers running NT often replace not the underlying Unix networking but NetWare in workgroup and departmental servers. Connectivity to Unix enterprise servers and, increasingly, to the Internet are key concerns. Support for TCP/IP and network file systems, including NFS and AFS, are standards-based choices for providing integration in environments that have Unix-based enterprise servers.

Microsoft has provided a 32-bit TCP/IP protocol stack in NT, but it leaves support of NFS and AFS clients and servers to others. Third-party versions of NFS for NT include BW-Connect NFS Server for Windows NT, from the Beame & Whiteside subsidiary of Hummingbird Communications, and Chameleon 32NFS from NetManage of Cupertino, CA. MultiNet for Windows version 1.2, a TCP/IP product from TGV, Inc., of Santa Cruz, CA, includes NFS client support and support for FTP clients and servers. Support for AFS on NT is available as part of PC-Interface version 5.0 from the Locus Computing division of Platinum Technologies.

Microsoft may have been responding to the wish lists of enterprise customers by including in release 3.5 of NT support for the Microsoft-developed Dynamic Host Configuration Protocol (DHCP) for TCP/IP. Using DHCP, system managers avoid the error-prone process of assigning IP addresses manually. At the New Mexico Department of Public Safety (DPS) in Santa Fe, which has Digital 2100 Alpha servers running both Unix and NT under TCP/IP, technical director Larry White recalls having a major problem when a technician inadvertently confused client and server IP addresses before support for DHCP was available. "Dynamic assignment of IP addresses is a real advantage. The DHCP database included in the server version of NT 3.5 allows us to keep track of our remote users who log in on notebook computers," says White.

Despite this advance, NT sites with enterprise networking still have lengthy wish lists. Bob Riddle, manager of client/server technology at the University of Michigan's Center for the Integration of Information Technology (CIIT) in Ann Arbor, hopes that built-in support for AFS, which is rumored to be under development at Microsoft, will be part of the next release of the NT server version.

For "Microsoft-centric" organizations that nevertheless have Unix servers, a product such as Advanced Server for Unix (AS/U), an enhanced version of LAN Manager for Unix from the Software & Communications Solutions Group of AT&T GIS in Lincroft, NJ, helps. AS/U is a Unix-based NOS that integrates PC systems running Microsoft Windows desktops and provides Windows users with full NT server networking, including trusted domains and network security. AT&T GIS licenses AS/U and resells it on an OEM basis to other Unix vendors, among them Data General, Groupe Bull, Pyramid Technology, the Santa Cruz Operation (SCO) and Unisys. HP and DEC, whose version of the product will be called Pathworks version 6 for Digital Unix, plan to release their versions early this year.

State Fund Mutual Insurance in Minneapolis had been a user of LAN Manager for Unix on the SCO platform before the company began to rearchitect its computing environment. The new architecture will have a DG Aviion 9500 running an Oracle database as the enterprise server. In the middle tier, a Compaq Proliant 1000 will run key applications, including the company's fax software and an electronic data interchange (EDI) application, on SCO OpenServer release 5.

The company is in the process of migrating its desktop clients from Windows 3.1 to Windows 95. During the migration to Windows 95, system administrator Bill Slott discovered that the graphical network administration tools he had been able to use under LAN Manager for Unix no longer worked. Rather than switch to Unix-style networking, State Fund Mutual became an early customer for Advanced File and Print server, the SCO version of AS/U. At present, State Fund Mutual's only need for NT is on the client side, as a network management console to use the graphical administration tools. By moving to Advanced File and Print Server, Slott

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and his team are prepared to implement NT as a second middle-tier server if the company needs PC applications not available on the SCO platform.

Another way to integrate Unix and NT is through cross-platform implementations of the Open Software Foundation's Distributed Computing Environment (DCE). It offers a means of establishing uniform services for users without regard to which operating system they have. "We're not in a position to dictate what platform our customers use," says Bob Riddle of the University of Michigan's CIIT. One of its goals is to provide each user with a set of services including directory lookup, Kerberos security, mail, news, conferencing and file services. The university has Unix workstations, Windows PCs and about 20,000 Macintosh desktops. "For us, DCE is another level of abstraction upon which to build services," says Riddle. "By building on APIs, we can, for instance, build our e-mail on Unix one year and switch to NT the next." CIIT used PC-DCE32 for Windows NT from Gradient Technologies of Marlboro, MA.

NoT Yet for the Database

Moving up the tiers of client/server, one finds little of NT now. For example, it has not penetrated the enterprise-level database server, for both marketing and technical reasons. Lack of scalability is a key issue on the technical side. "Until support for symmetric multiprocessing systems with more than four processors matures, there's a ceiling to the scalability of NT," says Goulde of the Seybold Group. "Unlike high-end Unix servers, NT servers can't support terabyte databases, which require at least 256MB of memory to provide adequate performance."

Vendors of relational database management systems (RDBMS) whose main platforms run Unix seem to be in no rush to support NT at the enterprise level. Their reasons range from the technical effort required to the business fact that PC-based products traditionally sell for less than Unix ones. By limiting support for NT to the workgroup level, the vendors can avoid, at least temporarily, the price erosion that usually accompanies a port to a Microsoft operating system. All of the major Unix RDBMS vendors have products available on the NT server platform, but these tend to be workgroup implementations that lack industrial-strength features such as replication and support for multiprocessing found in the Unix-based enterprise versions.

When vendors deliver full-featured versions of their flagship RDBMS products, some customers will be ready to buy. The New Mexico DPS has designed its integrated criminal justice system with the goal of being able to move its Oracle database applications to NT. Because its Unix database is implemented on a 64-bit Digital Alpha server that can also run NT, this anticipated change of OS will occur without change of hardware. According to Larry White, the department decided to cluster its Alpha servers to achieve fail-over capabilities. "It costs us only a bit more to get fault tolerance for our mission-critical applications," he says.

Microsoft's goal is to reach the top of the enterprise, and its efforts to do so will focus the attention of everyone, friend or foe.

The department is willing to be a beta site for NT clustering that would make it possible to cluster Alpha RISC servers with smaller Intel Pentium-based servers. Digital is working with Microsoft to deliver this type of multiplatform clustering. "Clustering different types of NT servers would give us both high availability and load balancing," says White. But having such a solution for the department's enterprise database depends upon Oracle delivering a version that supports the clustering.

Enterprise Platform Prospects

In the current state of the art, the high end of distributed computing belongs to some repositioned legacy systems and to Unix servers. Microsoft's goal is to reach the top of the enterprise, and its efforts to do so will focus the attention of everyone, friend or foe. "Microsoft is building its capabilities as an enterprise supplier, but it has quite a distance to go," says Goulde. "It will take several years of tuning and optimizing before NT will scale up well on 16-, 24-, and 32-processor systems. How fast this will happen depends to a large extent on how much of a priority it is for Microsoft."

Stock brokerage Cowan & Co. of New York is moving third-party applications to NT as they become available. For example, the company has decided to move Lotus Notes from OS/2 servers to NT when Lotus brings out the full 32-bit NT version that was announced before IBM acquired Lotus. "We still use applications that run only on Unix, but we encourage our vendors to provide them under NT," says CIO Armand Keim. "As a midsize company, we have to be pragmatic about moving to NT, because we aren't big enough to do the migration work ourselves."

Keim can envision using NT at the enterprise level if it were possible for Cowan to replace its mainframe with servers running NT applications. Until NT servers can scale beyond four symmetric multiprocessing CPUs, however, he won't risk attempting an all-NT environment on the enterprise level.

Whether NT servers will become capable enterprise servers, and whether they will replace Unix systems in doing so, are among the most pressing questions in the IT industry. Some midsize companies will find the applications they need, but to use them may mean having to manage a complex network configuration with numerous single-application PC servers. Enterprise-quality applications from major ISVs, including CA-UniCenter from Computer Associates of Islandia, NY; R/3 from SAP America of Philadelphia; and the Tivoli Management Environment from Tivoli Systems of Austin, TX, are scheduled to debut on NT servers. Whether those versions will match the functionality of their Unix equivalents remains to be determined. It will be more than interesting to see what servers reside in corporate data centers a few years from now. IT

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