Reengineering: Report From The Trenches, page 36

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DATAMATION FOR CORPORATE COMPUTING PROFESSIONALS WORLDWIDE

What's The Next Step After Client/Server?

> Scott McNealy (I.), Sun Microsystems, and Steve Jobs, NeXT Computer: objects are us.

UNCERTAIN FUTURE: ²⁶ Migrating From Client/Server? Ouch! ³⁰ Exclusive: Inside Cairo– Goodbye DOS/Windows

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COVER STORY

UNCERTAIN FUTURE:

ndeterred by the lackluster sales of its advanced 32-bit Windows NT operating system, Microsoft Corp. is readying a massive steamroller to push its many millions of existing Windows and DOS users over to a totally new and radically different object-oriented operating system (OOOS) based on Windows NT and using a totally new and innovative graphical user interface and application development framework.

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Elements of the new system—bearing the product code names "Chicago" and "Cairo"—have been under development for many months now, as part of Microsoft's ongoing upgrades of its existing Windows NT, Windows 3.1 and DOS 6.2 products. But even though word of the new technologies has been common knowledge since last year, Microsoft has been loathe to publicize the significant differences between the existing versions of Windows and DOS and the new NT-based products. Those differences will have far-reaching con-

sequences for the tens

of thousands of corpo-

rate IS managers who



BY J. WILLIAM SEMICH

are committed to Microsoft's existing Windows 3.1 operating system as the basis for their emerging long-term client/server application development projects.

Perhaps as early as next winter, literally millions of business and home computer users, as well as IS managers and software developers, will face the daunting prospect of migrating to an alien computer technology—when most have barely mastered the arcanities of Windows 3.1 and DOS 5 or 6. Microsoft claims close to 50 million users for Windows 3.x and over 100 million for various versions of DOS today.

By this time next year, every Intelbased computer will be shipping to cus-

tomers preinstalled with Chicago, the Continued on page 28



By 1995, Objects Will Be Everywhere

What Are The Migration Risks?

Migrating to any of the new distributed object technologies will take years, but they all entail different risks.

Meanwhile, it's every user and every developer for him and herself. And each of the four choices has its own level of risk. Here's the lineup: Conservative but risky choice: forge ahead with your current client/server strategy. Surprised? In effect, you decide to stand pat—just refuse to move into the future and stick with Novell Inc. and its Net-Ware network OS. Then you can mix and match your desktop options from your existing but soon-to-beoutdated operating systems that include Windows 3.x, OS/2 2.x and the Mac System 7.x. Novell's own UNIXWare desktop UNIX or DR DOS 7 are other options available, if you choose this route, and according to Novell, UNIXWare's on an upgrade path and is *not* soon to be outdated. Novell's AppWare cross-platform (Windows 3.x, Mac System 7.x and UNIXWare) icon-based client/ server development tool system will likely be among your choices for a development environment, if you take the conservative route to the future.

What are the risks of staying on your present path to c/s? Ingvar Petursson, chief information officer



at McCaw Cellular Communications Inc., sums them up: "If you're willing to rebuild all your apps five years down the road, then go ahead and use standard process-oriented approaches now and redo it in five years. But if you're looking for investment-grade software [now], then you're going to have to look at object development."

Less conservative and less risky choice: UNIX. If NetWare is the most conservative C/S OS you can side with for the future, then Novell's other industrial-strength technology—UNIX—is a close second. The difference is the NexT connection: it lets you keep UNIX underneath and build, run and maintain your apps in NextStep on top.

■ Leading-edge and somewhat risky choice: Microsoft's Cairo. Not without risk because Cairo is, as yet, an untried, untested implementation of a totally new application environment, user interface, distributed application system and file management system. True, it will rest on the enterprise-capable Windows NT operating system. But let's face it, NT is admittedly still a baby compared to UNIX. And all the rest of Cairo, top to bottom, will be new, both for developers and for end users.

The decision factor for users: can you trust Microsoft to move 100 million users to this new environment without a hitch—no hassles porting apps, no data lost in migration, no payroll or other mission-critical applications coming down?

Radical bleeding edge and most risky choice: Taligent. If you choose the IBM road to migrationthe Taligent OOOS and OOAE-you'll be waiting for two years or so for an all-new os to be built from the ground up and, eventually, supported by Apple, HP and IBM. Microsoft isn't in on this one, nor are Digital Equipment Corp., Novell or Sun. Although Taligent says it will support several existing operating systems-DOS, Windows 3.x, OS/2, AIX-UNIX, HP-UX and the Mac OS-at least two of these-DOS and Windows 3.x-won't even exist by the time Taligent ships. And OS/2 may be a totally different kind of animal by then, too-who knows?

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desktop version of Microsoft's new operating system family. The names of the preinstalled products will sound familiar—likely to be Windows 4.0 and DOS 7.0—but both are all-new technologies. Microsoft will no longer produce DOS 6.2 and Windows 3.1.

Functional differences between DOS 7 and DOS 6.2 will be comparable to the differences between MS-DOS' precursor—the CP/M operating system—and the latest versions of MS-DOS. The differences between Windows 4.0 and Windows 3.1 will be greater than those between Windows/286 and Windows 3.0. And Microsoft plans to ship Cairo, an even more advanced version of Windows, to users later next year.

Right behind Microsoft's new Chicago and Cairo operating systems will come the same kind of upgrade fever that accompanied the shift from DOS to Windows in 1990—costing unknown billions of dollars—for everything from standard word-processing and spreadsheet applications to custom-built Windows software for specialized industries such as manufacturing, medical services and finance.

The long-term implications of such a massive migration are far-reaching for businesses in the early stages of building new client/ server applications. Prudent IS managers will put a hold on their Windows-based software-reengineering projects in order to take a second look at technologies competing with Microsoft's. That possibility has pushed some leading UNIX system vendors to move rapidly to offer their own, more seasoned, alternatives to the Chicago and Cairo operating systems.

Late last year, for example, Sun Microsystems Inc. and Hewlett-Packard Co. joined with Steve Jobs' NeXT Computer Inc. to develop the OpenStep Object Oriented Application Environment (OOAE), a rapid application development environment based on NeXT's existing NextStep operating system and 00 development tools.

Just the fact that long-time rivals Steve Jobs of NeXT and Scott McNealy of Sun, chairmen and CEOs both, have buried the hatchet in order to get the



OpenStep will be based on NextStep (shown), which already delivers an object-oriented application environment and development system.

jump on Microsoft is a pretty strong signal of how seriously the UNIX vendors take Microsoft's new 000S and of how important they think it is to have a proven alternative available for confused users.

And not long after last year's Sun/ NexT announcement, Taligent Inc., the

Why You MUST Move To OO Technologies

Business Reasons

Competitive pressures are forcing corporations to reengineer business processes and strategies in order to:

- Meet quickly changing customer demands
- Keep up with competitors
- Address emerging markets
- Lower product development costs

IS Reasons

New business processes, combined with the reengineering process itself, mean IS must:

 Make all business information instantaneously accessible throughout the organization regardless of location

Support technical needs of ad hoc teams of workers from different parts of the company working collaboratively and, usually, temporarily

Closely monitor and fine tune information operations within the business

Quickly develop and deploy new, changing and often temporary tactical applications

Rapidly modify, enhance and support long-lived strategic enterprise applications

 Easily integrate the successful rapidly deployed tactical applications with flexible enterprise applications

alliance of IBM and Apple Computer Inc. and newcomer HP, changed strategies and said it would ship at least a portion of its Mach UNIX-based objectoriented operating system earlier than expected—perhaps as early as this

summer—to get ahead of the coming Microsoft migration.

What's the end result of all this? By next year, computer users will face an array of choices for future application development that will probably not include the systems they're using right now. Yes, it's likely they'll be able to reuse a lot of the applications they've already built as part of their not-yet-completed corporate move to those soon-to-be old-generation C/S systems. Users will still be able to data dip into Sybase or Oracle or whatever to find nuggets of important cor-

porate information, for example. And, yes, they'll still be using a highend reduced instruction set computing (RISC) or Intel-based server on their various local area networks, with maybe a central host running the old legacy applications or sorting through the big, big databases. Much of the hardware infrastructure will be of

> some use for several more months, at least until the new 000Ss and 00AEs demand even more processor speed, memory size and communications bandwidth down the road.

> But as for the development tools, middleware, file storage systems, network and user management tools or even the way developers and IS managers think about building or managing a distributed or networked application—all that will have to change, too.

> Why is Microsoft forcing its users to go through all of these changes? And why are the other leading computer systems vendors rushing to market with their own object-oriented operating systems and development environments? Because in the long run, 000Ss will make it a whole lot easier for businesses to custom build

and then maintain and modify—hundreds of unique business-specific software applications. Ditto for the applications that indepen-

dent software vendors build and sell on the retail market.

Fact is, the best new ideas in business just don't fit into legacy applications anymore—if they ever did. With these new systems, though, new ideas will find a way to fit.

Here's how Steve Jobs tells it: "Custom apps are very, very mission critical today, and they can create tremendous competitive advantage."

Take Next user Ingvar Petursson, chief information officer at McCaw Cellular Communications Inc. in Kirkland, Wash., who decided that "object development was the way to go two years ago because of its reusability, the quality of the code and the ability to use objects to model a complicated business scenario quickly and simply. Those were the technical reasons we moved to objects.

"But from a business perspective," he continues, "using objects for business modeling makes more sense. Look at the way the business works with human beings interacting, customers' calls, all the things people do at work, and they look a lot more like objects than they look like code."

Result: with the first application built using NextStep—customer acquisition—McCaw sales staffers were able to activate a new phone in less than 15 minutes; the previous system had taken as long as two hours.

The folks at Taligent and Microsoft say their new systems will do the same kinds of things for businesses, and along with Jobs they've been pushing hard to make sure corporate managers get the message that the all-new post-C/S 000Ss can mean better, faster and more responsive custom-built applications that can be easily modified and maintained as the business model changes.

So, dig in and begin to familiarize yourself with your emerging choices, because each differs in how thoroughly it implements the object model (with accompanying consequences in terms of productivity, reliability and ease of use) and how risky migration will be.



Object Oriented Application Environment Delivery: Early 1995

Steve Jobs' vision of future computing—based on OpenStep, the Next-Step object-oriented development environment—has now become the official future at two of the leading UNIX system vendors. That alone makes it a serious contender.

HP signed on for NextStep's Portable Distributed Objects last year and agreed to help NexT port the Next-Step OS to HP. Late last year, Sun's McNealy decided that Jobs may well be right, too, invested \$10 million in his former rival's company and signed onto the NextStep view of the world.

Says McNealy: "We looked at Taligent and we looked at NextStep, and we made a firm one-company, onearchitecture, one-interface decision. Our new strategy is NextStep."

Speaking to NeXT developers early this year, McNealy set out the ground rules for the Sun/NeXT relationship. The two companies will develop Open-Step, the NeXT application development and runtime environment. That means NeXT apps could be built and run unchanged on top of the Solaris (and HP-UX) versions of UNIX. All of the NeXT development tools, NeXT Objects and Distributed Objects will also work on OpenStep.

You won't have to throw out (or stop



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buying) Intel hardware with this choice, plus you'll even be able to move to IBM's PowerPC if you want, maybe even to a Digital Equipment Corp. Alpha workstation.

You can get a head start on Open-Step with NextStep 3.2, which has actually been shipping to users for some five years now and has gone

Steve Jobs To IS: Move To Objects Or Walk

■ "The greatest example in the last few years of how a custom application can



completely revolutionize the business was MCI's Friends and Family," says NeXT's Steve Jobs. "That was the most successful promotion in the last decade. It took AT&T 18 months to respond to that promotion. Why? Simple. They couldn't get the custom apps together

that could bill it." For too many years, says Jobs, managers like those at AT&T have been frustrated by the time and effort needed to build the IT resources that could put new business ideas into effect. With new object-oriented application environments like OpenStep, Cairo and Taligent, that's about to change.

through several versions, revisions and improvements.

Here's what's in it, which will form the core of OpenStep:

1. The NextStep Application Environment, which includes NeXT's Maclike Workspace user interface, along with its elegant Display PostScriptdriven graphics engine;

2. NexT's Distributed Object Framework for NeXT-to-NeXT distributed computing; and

3. Next's Portable Distributed Object (PDO) capability for Next-to-non-Next distributed computing.

Add to that NeXT's NetInfo network management tool, TCP/IP within NFS and NetWare network connectivity, all running on top of the Mach version of the UNIX OS.

As the result of the Sun/Next Open-Step agreement, Next has agreed to strip out its Mach OS and build the NextStep environment on top of the Solaris version (and eventually HP and others) of UNIX. Once that's completed—probably by late this year—all of the existing NextStep applications and objects will be able to run under Sun's operating system.

Because the Next Application Environment is an OOAE, developers merely need to link together a collection of objects using the Distributed Object capability of NextStep to create a custom application. Since NextStep uses dynamic runtime binding, objects can be modified without changing the overall application.

The end result of all of this is a modular development environment that produces easily modified applications using reusable business objects. Developers must build the objects themselves using C; C++; or, more likely. Next's preferred 00 development language, Objective C. But a growing industry of software vendors is already selling prebuilt business objects to NexT users, so that much of the more complicated hand coding can be avoided. For example, users can build in a powerful spreadsheet capability in their apps by using the Mesa spreadsheet object from Bostonbased Athena Design Inc. or they can build in group-scheduling capabilities using Pencil Me In objects from Sarrus Software Inc. in Foster City, Calif.

Next's Portable Distributed Objects lets developers run computeintensive objects on a central server under the HP-UX OS or Sun's Solaris. Developers merely select the platform they want the object to run on, and the Next Developer tools compile it for that OS, then ship it out to the selected server.

An added benefit to NextStep users of all this partnership among NexT, Sun and Hewlett-Packard is that, eventually, NexT will become an important part of the Unified UNIX environment coming out of the Common Open Software Environment (COSE) group. The result: what was once a small, but clearly leading edge, object-oriented development and implementation environment is suddenly a major player in the mainstream.



Object Oriented Application Environment and File System Delivery: Summer 1995

Despite the galloping popularity of Windows 3.1, Microsoft has no plans to enhance its DOS-based Windows 3.x line. The environment is just too fragile. The name *DOS* will survive, but the MS-DOS 7.0 that will ship later this year won't really be DOS at all; it will be the 32-bit multitasking "kernel" that Chicago (call it Windows 4.0) runs on top of. Sure, you can continue to use the DOS commands—plus a few more —just like in OS/2 2.0. But DOS it ain't.

Instead, by the end of the year, all Windows users will be looking at developing for, and/or installing, two totally new operating systems: Chicago (the new 32-bit version of desktop Windows) and Cairo (the object-oriented version of Windows NT), along with yet another Microsoft-developed file storage system, the Object File System.

Cairo users will also be committed to Microsoft's new Distributed OLE 2.0 and the NT RPC object distribution system, an outgrowth of Microsoft's desktop-centric concept of "embedded documents." Microsoft has partnered with Digital to tie the latter's Object Broker technology into OLE in order to implement distributed application capabilities across non-Microsoft systems. But the viability of that approach remains to be seen.

By building Cairo's distributed application capabilities on top of OLE and the NT RPC, Microsoft is still tying its 00 future to its own development tools-Visual Basic and Visual C++ (at least until tool vendors like Borland International Inc. and Powersoft Corp. catch up with their own Object Linking and Embedding development tools). Microsoft is also still firmly attached to its own applications, including the OLE-enabled FoxPro and Access database management systems, its Word word-processor program, its Excel spreadsheet and its Mail e-mail products.

Cairo has four basic elements:

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1. The new Mac-like Chicago user interface with some additional features for distributed computing like the Cairo Object Explorer, an object query tool, and Smart Folders, which remembers what's where.

2. An OO Application Environment composed of such distributed services as security, file systems, a directory, replication and object registration. As part of Cairo, all of these services are, in effect, OLE objects that link together using Cairo's Component Object Model (COM). COM works like NeXT's Distributed Objects to link processes together into a single logical application.

The differences, however, are substantial. First, COM is based on Microsoft's proprietary (but public) OLE 2.0 concept of embedded documents with several additional capabilities. Second, and more important, Microsoft is using OLE to locally implement the distributed object capability within the Cairo operating system itself. Much as a developer can string together objects to build an app in NextStep, Cairo developers can actually build OLE objects and add them into the Cairo operating system (the Cairo shell, actually), either as new OS services or as OLE controls (OCXS) that show up as Cairo commands.

Literally millions of computer users will have to move to Chicago and Cairo posthaste—or shift to OS/2 or UNIX when Microsoft OSs finally ship.

In effect, a Cairo value-added reseller could take OLE objects from literally hundreds or even thousands of third-party developers and plug them into Cairo's user interface and custom build a unique app.



3. The new Object File System (OFS), complete with native storage of OLE objects, their properties and data. As part of the OFS, Cairo includes a fully dynamic and distributed index and an object-based naming system.

4. A base operating system (call it the kernel, but it's more than that), which will be the next version of Windows NT.

Applications written to take advantage of Cairo's distributed objects will need Chicago or Cairo clients and won't work with Windows 3.1, says John R. Rymer, editor in chief of the "Distributed Computing Monitor," an industry technology newsletter published by the Patricia Seybold Group in Boston. "Windows 3.1 will be left out of Microsoft's distributed object computing picture," he says. "To get distributed objects [from Cairo], users will have to upgrade to Chicago."

This totally new Chicago OS won't have DOS as we know it—and it won't have the old Windows 3.x user interface, either. IBMers who say they've seen it say it looks a lot like the OS/2 2.0 Workplace Shell. Regardless of what it looks like, though, there are some changes on the way for Windows users and managers.

To make sure you upgrade, Microsoft is renegotiating its deals with the PC hardware vendors to bundle Chicago-and not the stand-alone DOS 7.0with their products. Needless to say, you won't be able to buy a 16-bit version of DOS or Windows 3.x, either. Your only options on that front will be to buy IBM's OS/2 2.1 and run its built-in versions of Windows 3.1 and DOS 6.0.; alternatively, you could move to UNIX and run Insignia Solutions Inc.'s SoftPC and SoftWindows 16-bit DOS and Windows emulators. But even Insignia plans to migrate SoftWindows to Chicago and DOS 7 soon after Microsoft begins shipping them to customers.

Literally millions of computer users will have to move to Chicago and Cairo posthaste—or shift to OS/2 or UNIX when the new Microsoft OSs finally and inevitably ship.

Microsoft says these upgrades won't cause any problems. "Ensuring a smooth migration from Windows to Windows NT to Chicago and Cairo is a critical concern for Microsoft," says the company in a confidential internal

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document. "Today's applications don't have to change at all to work with Cairo. It runs all existing applications for MS-DOS, Windows and the Win32 API." Let's all hope so. Even Microsoft appears to have some doubts. To assure absolute backward DOS compatibility, the company has built in a 16-bit MS-DOS Application Mode capability that can run (in a single session only) inside the 32-bit Chicago OS.

Taligent

Object-oriented operating system Delivery: 1995-96

Taligent began life in the research labs as Apple's attempt to build its own 32-bit preemptive multitasking operating system in a fully object-oriented environment. The folks at Taligent—now comprised of partners from Apple, IBM and HP—are quick to point out that the product they plan to ship sometime "in the mid-1990s" is the only advanced OS that will be truly object oriented right down to its UnderWare—the base OS kernel.

Here's what Taligent says it plans to ship in phases over the next two years or so:

1. The Taligent Application Frameworks. The Frameworks will be the first component of Taligent to become available to users and developers. Like NeXT's OpenStep, it will serve as the 00 application environment or "container" for Taligent's 00 applications. And like the operating services level of Cairo, it is itself comprised of several operating service objects that may either be invoked in toto or inherited by Taligent apps, which can then add additional functions.

Over 100 OS services will be in Taligent's Frameworks, including graphics capabilities, database access routines, multimedia functions, the user interface, international languages, networking protocols and distributedcomputing capabilities. Initial versions of Taligent's Application Frameworks will run on top of existing process-ori-



ented operating systems, including IBM's OS/2 and AIX, as well as HP's HP-UX. Plans call for Application Frameworks to eventually run on Apple's PowerPC version of its System7 operating system and on Taligent's own Mach kernel-based Object Services OS.

2. The Taligent Development System. Much like the NeXT Developer toolkit, the Development System is an objectoriented development environment that will let you construct objects using C++ and C initially and Smalltalk and other object-oriented languages eventually. It will also have tools to test and debug objects and will include dynamic browsers, incremental development capability, an automated build facility, on-line documentation and a GUI builder.

3. The Taligent Object Services. Call this the 00 operating system and you'll be right. These object services will run on a new version of the Mach kernel and will include system-level frameworks including I/O drivers, file management systems and networking and communications. As with Cairo,

developers and VARs will be able to add to the Taligent Object Services by building extensions that augment or modify existing OS functions. Taligent apps can access all Object Services.

Although IBM insists that it will continue to support (nay, enhance) its OS/2 and AIX desktop operating systems, if you choose Taligent for your future OO C/S direction, you'll be committed to moving away from your existing desktop applications, installing a whole new client and server operating system, bringing in a new development paradigm (can you spare another paradigm?) and buying allnew PowerPC hardware.

The implicit promise from IBM, however, is that you may have an easier time integrating Taligent than other distributed object technologies into IBM's existing infrastructure (OS/2, AIX, maybe even MVS and OS/400); but you may also have to say goodbye to standard UNIX apps and the new Cairo/Windows apps.