The simple days of "nobody ever got fired for buying IBM" are long gone. More recent stages in the computer industry seem irrelevant now, too, such as the struggles between Microsoft's and Apple's operating systems, or among Microsoft's, Lotus' and WordPerfect's office suites. Microsoft has won most of those contests. Now the company is in the middle of a new fray, with a somewhat different set of players, the most important of which are Netscape and its range of applications, Sun's Java and Lotus Notes.

This new fray is pretty confusing, largely because it involves broader territory than office suites or Web browsers. Unlike most past encounters, which were straightforward feature wars among offerings of the same kind, the new battle ranges across all aspects of the computing and communications architecture. Companies collaborate at some layers in the system architecture and compete at others. At some layers there's little question who dominates; at others there is fierce competition or just the smoldering resentment of those not ready to concede defeat.

These conflicts cut across multiple layers. For example, Microsoft continues to drag features down into the operating system (soon to incorporate a Web browser); Netscape wants to establish an OS-independent platform of its own; and Java, the dark-horse technology that practically everyone has licensed, offers new entrants (or revitalized third parties) the possibility of bypassing the primary players. With Java licensed into all the major OSes, someone might write killer applets that are more compelling than what Microsoft and Netscape will deliver. As a bonus, those applets would run on a wide variety of platforms, potentially including set-top boxes and the re-emerging category of PDAs.

Creative destruction

The layers themselves are being redefined as part of a slow, painful reshaping of the computing and communications environment. The change will probably take a decade.

All this activity raises many significant questions that weren't
on people’s minds even a year ago. What matters most, the OS or the Web browser? Or is the front-end losing ground to servers? Will Oracle and others be able to create a significant market for the network computer? How does Java change these calculations? Which companies have the edge here? Can today’s user model really change, or do we already have too many users grooved into using standalone personal-productivity applications? If it changes, what might the new model(s) be? What will motivate users and corporations to make the change? And, of course, will Microsoft keep its dominant position through these changes?

Fun, huh?!!

Creative tension

This issue of Release 1.0 examines the tensions and movements in today’s market for cues about where we’re headed. In this issue, we pay more attention to the front-end than to the back-end, but both are changing dramatically. We also propose a few ideas of our own about how work patterns and server strategies are changing (see pages 11 and 21). Our ideas are inspired by Microsoft’s and Netscape’s directions, but differ from them in ways that may offer opportunities for others.

On the front-end, users will see two waves of change, roughly corresponding with the next major releases of Microsoft Internet Explorer and Netscape Navigator. In the first wave, users will become intimately familiar with Web features because the features will permeate everything. The OS will present itself through HTML, as will forms, e-mail messages, news postings and much more. Web links will be omnipresent.

The second wave will involve major changes to the applications that users work with every day, such as word processors, e-mail clients and presentation packages. The new applications will be better suited to the way many people work and communicate than today’s "fat" personal-productivity and office applications. The answer isn’t slim versions of the same applications or elegantly integrated "works" packages, but rather modular software components that make us rethink the process of authoring and communication in an environment that increasingly allows everyone to be connected all the time. Netscape is pointing the way. More on that in a moment.

Behind the scenes, in the server world, the change will also have two stages. The first stage, already under way, is the move toward server suites (the suites that matter now) that offer cooperative, wide-ranging, scaleable functionality. This stage is heavily influenced by Internet thinking. Other, proprietary systems such as Lotus Notes are opening their functionality to the Net and adopting Net protocols so they can be part of those suites.

The second stage will follow, once companies have figured out what to do with the server suites. It involves further media integration and a re-thinking of the infrastructure similar to the rethinking of the user model occurring at the front-end. An example of media integration would be an Internet protocol-based e-mail server that can also handle voicemail, faxes and pager notifications. Again, this isn’t merely about who will dominate the database or messaging market. There’s a larger, extremely worthwhile struggle under way to figure out how it all fits together.
Sure things

Amid all this turmoil, a few questions have been answered, at least in the near term. Microsoft will likely dominate desktop and server operating systems (see box, opposite). The Internet and its protocols are probably the connectivity platform of choice. Oracle will probably continue to dominate the relational database market.

Who else?

Microsoft has won the operating-system race for the next five years, possibly longer, for desktops as well as for servers. DOS and Windows 3.1 were so limited and hard to use that Windows 95 is a big relief. Unfortunately, it preserves many of Windows 3.1’s flaws, especially in communications. Nevertheless, Win95 is a great stepping-stone to Cairo and points beyond. Windows NT is the first major commercial OS written from scratch in a long time. It is a juggernaut.

Sure, there will always be niche markets dedicated to other platforms, legacy systems that don’t get ported to Windows and companies that hate Microsoft enough never to buy its products. But those will all be marginal markets. If you don’t like the idea of Microsoft owning practically every computer system, look at the alternatives.

IBM never managed to make OS/2 stick. It is now a footnote in history, for desktops as well as for servers.

Apple, the ultimate personal-system company, never had a production server strategy (even though AppleShare could turn a Mac into a personal server for other users years ahead of Novell and others). Several years ago, Apple unilaterally took itself out of contention for the broad, general-purpose desktop OS market when it chose not to license its system software and also stopped evolving that software in useful ways. Copland, OpenDoc, CyberDog and licensing deals are too little, too late. Too many companies have made Windows their home code-development platform.

If the Open Software Foundation had managed to unify the various flavors of Unix and if some entity had taken charge of making substantial improvements to it, Unix might have a chance. Unix still is the platform of choice for "heavy lifting" computing and communications assignments. It can handle transaction loads far greater than Windows NT can today. But NT is catching up. Microsoft has the budget to invest in it, the intent to make it dominant and the time to make it so. By improving important features such as symmetric multiprocessing, NT is almost certain to eclipse Unix as the server platform of choice in most business applications. SCO and Linux aren’t enough. Unix has no chance on desktops; future versions of NT do. If NeXT had figured out that it was a software company a year or two earlier, its flavor of Unix might have had a chance. Maybe.

There are some early candidates, such as lightweight OSes inside network computers (see JavaOS, page 23), but they are unlikely to establish a significant market share in the next five years.
The IT perspective

These days, when IT managers make computer infrastructure investments, they must answer broader, more strategic questions than ever before. Take, for example, the decision to deploy e-mail. As recently as four years ago, many companies treated e-mail as a tactical, departmental purchase for internal communications. Many probably still do; we may be idealizing a bit here. Low-level managers could install QuickMail or cc:Mail and get direct benefits for their workgroups.

About two years ago, e-mail began to reveal its systems-architecture implications. Companies started to consolidate their disparate e-mail systems and rely on single vendors with proprietary software -- a strategy with its own weaknesses. Companies with legacy e-mail systems began to get gateways or even to switch to newer, less monolithic mail systems.

Fed up with systems that wouldn’t interoperate, IT managers began to invest in client/server systems and to evaluate "middleware" packages. They also began to take Lotus Notes seriously for its robust, multi-OS capabilities and unique collaborative-work features. Notes proved to be a good platform for developing and operating custom, third-party applications, particularly for tasks such as market-intelligence tracking, expense approval and problem escalation. But Notes was uncompromising: Companies that adopted it had to jump all the way in, making large architectural and financial commitments.

Around that time, Microsoft, WordPerfect and Lotus were in the middle of the Office Suite Wars. Corporate site-license deals began to mix the elements together (e.g., buy our office suite and we’ll throw in e-mail and scheduling). On the whole, though, the middleware and office-suite decisions had relatively local effects, with little impact on corporate applications.

Zoom!

Then, little more than a year ago, the Internet became popular. The inspired term "intranet" caught on with business (see box). Between the Internet and the intranet, the software world has been turned upside-down. Nothing seems safe. Client-server computing is being reinvented. Legacy apps are getting wired and finding new life. Software development cycles have shortened markedly, to the delight of impatient users and the torment of software developers.

The Web has become the window to a wonderful assortment of applications, publications and services, from news feeds to search engines and research papers. IT managers appreciate Web browsers because they allow developers to deliver and integrate many applications without resorting to complex, proprietary client-server systems or standalone desktop applications.

Companies are creating Web front-ends for their applications. Health-insurance enrollment systems that would until recently have used voice-response technology are finding their way to the Web. Some companies are implementing both approaches using the same logic, with applications such as Edify’s Electronic Workforce. This allows users to choose the access method that they prefer.
Useful tools

In a remarkably short time, the Web has created what X Windows/Motif, IBM's Systems Application Architecture (remember SAA?) and other initiatives couldn't pull off: an open, accessible, distributed platform. In fact, the Web browser may be the most useful and extensible piece of software ever.

The (useful) myth of intranets

Intranets are hot. Microsoft recently held a big briefing about its intranet strategy. The week before, preemptively, Netscape published an intranet white paper. Then Oracle held an intranet day of its own. Dozens of other vendors have hopped on the intranet bandwagon.

But "intranet" is only a clever marketing term, a buzzword created by savvy Internet tool vendors so they could approach IT buyers without freaking them out about doing things on the lawless, evil Internet. Private subnets with varying degrees of security are relatively easy to set up (using passwords or even simply by using unpublished URLs) and quite useful. Some of them will link employees inside a company; others will link individuals between companies; still others will create boundaries around private communities.

False sense of security

But the idea that intranets are supposed to be cut off from the Internet is both wishful and limiting thinking. It's wishful because the safety zone is easily compromised by a few misconfigured machines that have alternate connections to the Net (with a modem connection to an outside access provider, for example). It's limiting because the mental image of a company cut off from the rest of the Internet may keep people from imagining ways that the technology can change relationships between individuals inside and outside the walls.

But that will come soon enough. Overall, it's great news that corporate buyers are turned on by Internet technology. In fact, "intranet" implies that the Internet's protocols and the applications that use them are compelling to corporations.

More importantly, Web access allows people outside your company (clients, shareholders, suppliers, prospective customers) to get to information you want them to have. IT managers don't have to worry about installing software on outsiders' computers. Everyone else is moving toward the same goal.

Web-based, inter-enterprise access is new. The tools are green. There are still security issues to resolve and services to deploy, but many hands are at work solving these problems. They will offer ways to block employee access to undesirable or time-wasting outside sites, tools for ordinary people to build Web-based content for their counterparts around the world and component software to make it all richer. The whole environment will be more useful, secure and controllable. Of course, the Internet has other tools, such as e-mail, newsgroups, chat and task-specific applications. Companies are exploiting them, too, but the darling is the Web.
TWO BIG INSIGHTS

Now that the corporate world is beginning to take the Net seriously, major players have put forth creative plans. These plans offer ways for the vendors -- Microsoft and Netscape -- to differentiate themselves, while cooperating on the variety of Internet protocols that make the market.

The differentiation they propose is substantive and foresighted, not superficial or petty. It also doesn't break the model of the Internet, but rather depends on it, stresses it, enhances it and takes it in new directions. In doing so, it creates new tensions for the principal vendors, who need to create revenue streams and maintain old ones. These plans are directly competitive.

(We defer discussion of Lotus, Oracle and others to a later section, because they have not yet set out such compelling strategies.)

Microsoft: own and enhance the frame

In early 1994, when it realized that the Internet was going to be big, Microsoft didn't sit on its hands. It internalized many of the Internet's concepts and began to think of how it could use the Net in conjunction with its component-software technology to change its offerings.

An obvious thing to do was to leverage Microsoft's dominance of the desktop. If most people would buy Microsoft's OS, why not give them a Web browser with it? Customers buying elsewhere would have to justify spending money on a separate application that did the same thing. This was an interesting, though not particularly innovative, approach that would almost certainly draw cries of "foul!" from the parties it affected. It also didn't take into account that browsers themselves would evolve quickly.

Microsoft's insight was to use the Web and other Internet protocols aggressively to simplify its own systems while making them more flexible and accessible to developers. The company was already making its OS more modular. By abandoning some development efforts that overlapped with the Web's capabilities, it could move quickly to deliver a new platform.

The result, which Microsoft will release later this year in its next browser release, code-named Nashville (see box, opposite), makes moving around one's desktop a natural extension of moving around the Web, complete with single-click application launching and a "back" button. With Nashville, users will be able to use standard Web-design tools to change the way their desktop looks and works. (More likely, corporations and software developers will use this to customize their systems.) Users will be able to save files anywhere on the Net as easily as on their own drives: Every file-management dialog box will include ftp, the Internet file-transfer protocol.

These changes drag Net functionality from the browser, Netscape's turf, down into the operating system. This begs the question of how Netscape will stop the feature erosion.

Microsoft also noticed commonalities between other functions and applications that it controls, and it has begun to meld them creatively. The process starts with the way Nashville blends the functionality of the Windows
Unraveling the Explorers

The tools that allow you to manage your files and find your way around your computer are essential. Lousy ones can sour the entire experience of using a machine. Windows 95 has a Mac-like desktop that replaces the Program Manager (which, as far as we're concerned, couldn't die soon enough). It also offers two ways to browse and manage files: a simple file browser, which gives users the choice of opening folders in a new window each time or drilling down in the same window; and the more sophisticated Win95 Explorer, a nifty program with a two-pane view that shows the file and resource hierarchy on the left and the folder or file contents on the right.

People who like the desktop and cascading folders can still use them. But the Explorer offers more power to those who want it. (In fact, the Explorer is far more powerful than the Macintosh Finder's folder view, which hasn't seen a significant new feature since 1991, when Apple introduced hierarchical views of its file system. Copland doesn't fix this, either.)

Now comes the confusion. Microsoft called its Web browser Internet Explorer. Version 2 (IE2), the current official version, is a placeholder, woefully short of functionality. The IE3 beta, the most recent version publicly available, is a serious browser. It can match Netscape Navigator on most features.

Visiting Nashville

IE4, code-named Nashville, is Microsoft's next-generation browser, shown publicly in several Internet-strategy briefings. It's a bit disingenuous to say IE4 is just a browser. By using OLE/ActiveX component-software capabilities, IE4 brings Web functionality deep into the Win95 OS. For example, in IE4 your system's "wallpaper" (the background image or texture) can be an arbitrary ActiveX control. The Web browser is a control, which means that the wallpaper can now display arbitrary HTML and other Net goodies, such as custom Web pages or real-time data feeds. That means, in turn, that the wallpaper could have most of the functionality of Pointcast's news- and ad-broadcasting system, delivered as part of the OS. Neat.

The same goes for viewing folder contents in the Explorer. The right pane has a new viewing option, "Web view," which places the contents of the folder viewed (an ActiveX control) into an HTML page that any user can modify. Companies and third-party developers will cheerfully use this feature to customize systems for their users. Also, when you select a link to a Web page in the left pane, the Web page is displayed directly in the right pane.

All of this is quite powerful, with some rough edges still. For example, the movement between file browsing, Web browsing and applications isn't quite seamless. When you are viewing a Web page in the right-hand pane, it isn't easy to "promote" the document so it occupies the entire screen, in a typical Web browser view.
Explorer everywhere

In this new view, Microsoft's merged Explorer is the center of activity, or, if you prefer, the platform that all applications run in and build on.

You can get a taste of this by downloading the lightweight, Internet-based mail and news clients that Microsoft has put on its Website for free use. The two applications integrate directly into the two-pane Win95 Explorer; they also create their own icons on the desktop. Select the mail client in the Explorer and a list of your mail messages shows up in the right pane, as if they were ordinary files. Choose a message and it opens in the pane. The right pane becomes a file list or file viewer. Think of the merged Explorer as a browser and launcher for all files, on and off the Net, and you're on your way to understanding its power. All applications live in the Explorer, and you can launch as many of them as you want.

Yes, Apple had some of these features long ago. For example, on Macs, remote files have always looked and acted like local files over AppleTalk. Apple's Open Collaboration Environment (AOCE) made the e-mail in-box a peer application on the virtual desktop; messages appeared as files one could move from the desktop. But the environment was closed and inflexible. Worse, Apple stopped evolving the core elements of the OS to make them more powerful and instead started focusing on colorful "themes" to personalize desktops and lively "guides" to help newbies get started. Meanwhile, Microsoft stole the lead.

What's left for Netscape?

Microsoft's OS dominance doesn't render Netscape irrelevant. Microsoft's integration of Web functionality into the OS doesn't, either. These things clearly complicate life for Netscape, but as long as Microsoft remains loyal to its core legacy applications -- most notably its office suite and Exchange (see page 14) -- Netscape has a viable way of offering unique value to buyers. Here's how.

You can glimpse Netscape's key insight in the first beta release of Navigator 2, which the company put on the Net back in October 1995. Navigator 2 added news and e-mail clients to the Web browser. More importantly, it allowed for e-mail and news postings that contain HTML. If you had looked at the e-mail client back then, you would have seen a welcome message from "Mozilla," the Netscape mascot. That message was an HTML document, complete with embedded images and tags. (It still is; the latest version of Navigator has the same message.)

In other words, the Navigator e-mail client can receive messages that are Web pages and present them properly. It's a browser. It can be the same.
browser that you use to cruise the Web. That's far more functionality than an e-mail client that can detect URLs and launch a separate browser. It also beats proprietary e-mail systems that support compound documents, because those documents work only within their systems. But we digress.

Coming soon...

The "Full Service Intranet" is Netscape's answer to Microsoft's intranet strategy. It has several parts. Galileo is the code name for Navigator 4, and Netscape wants to pack it with great features. Navigators 2 and 3 do only one thing well: browse the Web. Galileo promises to have powerful features, such as a far better e-mail client, groupware and collaborative applications (from Netscape's acquisition of Collabra), real-time audio and video communication (similarly, from acquiring InSoft), information publishing and sharing, navigation and full-text indexing and searching, and directories of people and things. The Gold version will include one editor capable of creating e-mail messages, news postings and Web pages.

Orion is Netscape's next-generation Internet server suite, replacing SuiteSpot. It includes ubiquitous support for the Lightweight Directory Access Protocol (LDAP); agent services; replication of directories, discussion groups, content and catalogs; management and security; integrated text retrieval and version control; extensive Java class libraries; dynamic content-generation capabilities; and user-state tracking.

Integrated authoring

Navigator's trajectory seems even more interesting -- and useful -- if you consider authoring. Netscape (re-)introduced the idea that the browser could also be an authoring tool with Navigator Gold, first released in February 1996. Why use a separate application to generate Web pages, when you could edit in place? It makes a ton of sense -- particularly if the authoring tool is strong. (Gold is pretty good, but it's not the best tool available. What if you could swap it for the tool of your choice, as long as it conformed to a set of APIs?)

Taking stock of what's in Navigator, we find the following: news and e-mail clients with primitive editors that let us view Web documents, and a Web browser with a decent, WYSIWYG editor. Why not integrate the editors into a single authoring tool? It's the obvious next step.

With such a tool, we could create messages, news postings and documents (and who knows what else!) from the same, simple elements using a single applica-

1 The original Web development system, which Tim Berners-Lee of the European Center for Particle Physics created on a NeXT machine, included an integrated browser and editor (see Release 1.0, 1-94). The two got separated when others, most notably the now-famous team at the University of Illinois that developed Mosaic, dropped the authoring features and added multimedia.

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tion. Web authoring wouldn't be a task reserved for the 23-year-old HTML hackers who maintain the corporate Website. It would become a mainstream activity, particularly because few people would have to see the raw HTML any more. For more complex authoring tasks, we could either swap in a more powerful authoring tool for permanent use, or enhance the one we have with on-demand applets or controls. That way we could also add features such as spreadsheets, presentations, charting and graphics. If the system were extremely well-designed and had enough features, we could use it all the time instead of an office suite.

Sandwich strategy

This approach wedges Netscape between Microsoft's strategic systems: An integrated, high-function Navigator lies above Windows and below Microsoft Office. What Microsoft is doing to Netscape by dragging functions into Windows, Netscape could try to do to Microsoft's Office.

If Netscape does its job perfectly, it could render the OS irrelevant and replace the office suite. This is, we need hardly say, a long shot. Nevertheless, the opportunity does exist.

Irrelevant does not mean nonexistent, just less important. Operating systems will continue to be a profitable business. Computers will still need OSes that manage memory, run peripherals and so on. If all OSes do more or less the same, low-level things, they will not be players at higher layers, where new value is added.

Netscape is taking the battle right to Microsoft's front door. It will deliver Galileo across operating systems, taking advantage of Microsoft's lags in delivering IE on Windows 3.1 and Macintosh. Netscape will also try to affect the way people navigate and use documents. Its next-generation systems will automatically index and link things, Webifying content and hopefully making it easier to use.

Netscape and Microsoft (and others) are also battling on servers, which we return to in a moment. Despite the efforts we have just described, neither company has yet pushed its interface and application set to the next stage of development, where it changes the user experience substantially. The Web and its links are useful ways to traverse well-designed information spaces, but designing them is difficult. The process resists automation. The rest of this section explores another approach to a new user model.

PUSHING A BIT FURTHER

Our preconceptions about e-mail make it hard to envision something beyond today's tools. We tend to think of e-mail as a separate application, with poor-quality, text-only transmission (monospace, even!), because we're used to the fact that formats and attachments seldom survive the gateways on the Internet. Yet if you check in which application people who are connected spend most of their time these days, it's usually e-mail.

E-mail is changing our work habits. Its informality is a plus. Colorful, bound reports are being replaced by e-mailed strategy memos from the CEO. You can respond to a dozen e-mail messages more quickly and in more detail than a dozen phone calls (of course, you lose the personal audio touch,
which is key for certain interactions). E-mail isn’t dominant; it’s just more convenient -- and increasingly more natural -- for connected workers.

On closer inspection

Think of e-mail as three different functions that were hard-wired together years ago out of necessity: keeping track of people, creating messages and keeping track of them. None is done really well by any e-mail package. In an environment where applications and computers are easily linked and connected, it makes less sense to keep these functions shackled together.

For example, the e-mail client doesn’t need to have its own mediocre address book that has no special features and forces users to double- or triple-enter address information. How about collecting address information from a PIM, database or directory service? For authoring, why use only monospace fonts? Netscape’s e-mail client points the way, as we described above.

Finally, messaging should be unified (see Release 1.0, 12-92 and 1-93). Why not see and manage all of your messages in one bin, instead of just e-mail?

Unified messaging update

Three and a half years ago, we were optimistic that unified messaging would emerge pretty quickly. Now we think it will take longer still. The problem is the cost and complexity of linking computers to traditional PBXes and voicemail systems. Near term, call-control mechanisms such as Novell’s Telephony Services API will be used by a few, foresighted companies that really need voice/data integration.

Unfortunately, general-purpose unified messaging will not take off until Internet-based telephony hits its stride and PBXes and voicemail systems are retired, which will take at least five years, if not longer. We believe this not because we think Internet telephony is compelling per se, but because smooth, unified communications will only be easy to create when the various media use the same protocols and are stored in similar fashion, perhaps even on the same devices.

Again, you can see hints of future functionality today. NetSpeak’s WebPhone lets callers leave voicemail. The messages they leave are not in the proper Internet mail format, but they could be. Near term, some companies will try kludges, such as attaching sound files to e-mail messages, then playing them back with streaming audio technology such as Progressive Networks’ RealAudio. True unified messaging will stay on the horizon until more fundamental changes occur.

The race for the e-mail front-end is still wide open. The major problem is history. Developers need to have two nearly opposite skills: They need deep knowledge of past systems, particularly what has been learned about interface design, and they need to forget all about how the old systems were designed. They need to achieve beginner’s mind in order to create new models of behavior, or at least in order to create new products that map to existing behaviors. (Other products that would benefit greatly from the same approach to redesign are PBXes and office suites.)
In the spirit of looking at the realms of communications and publishing from a fresh perspective, relatively free from history, we have created such a model. The only special thing it assumes is a well-connected world. Focusing on this model may lead to the kind of interface that will smoothly integrate these functions.

**ONE MODEL: WORK IN A CONNECTED WORLD**

We do things. Time passes. Sometimes what we do gets recorded, sometimes it doesn’t. Whether the recorder is on depends on which electronic tools we use. For example, when we talk on the phone, we typically don’t record what is said (in fact, we’re required to notify the other party if we do). When we leave a voicemail message, though, we expect to be recorded. When we type on a computer, the recorder is on by default -- especially if we remember to save the file occasionally.

As we work along, typing and editing, we periodically finish an item, be it a letter, report, contract, song or movie. Then we either send it to someone or publish it somewhere. We might publish our document locally, on our hard drive, or on a departmental server, where we can leave it for others to see and work on, or on the virtual back porch, the company’s public Website. None of the ugly details of getting the document to a particular server need to be visible to the individual user, who might only be changing permissions on the document.

When the document is put on the public Website, it is a published work. Any published document is a platform for further communications (see *The Social Life of Documents*, by John Seely Brown and Paul Duguid, *Release 1.0*, 10-95).

**Add and subtract**

As we create these electronic artifacts (called documents, songs or whatever), we often need to add or subtract two things: media and people.

Current PCs deal with multiple media pretty well, though it can get complicated quickly. Apple set the standard for integrating text with many other media types. Web protocols make multimedia documents useful and readable worldwide. The more recent ActiveX and Live Media architectures from Microsoft and Netscape, respectively, will continue to enhance multimedia capabilities.

In contrast, adding and subtracting people hardly works at all. That’s why we still resort to faxes, FedExes and the phone when we want to talk things over with people who are far away. This is the domain of groupware, which promises to offer the electronic equivalents of “come over here a second and tell me what you think of this,” and “here’s the document I’ve been working on; let me know what I should change.” Groupware has done well in a few, narrow markets. It is being revitalized by the Internet, but it has a long way to go (see box).

Imagine if we could communicate easily with one or many people, choosing whether to interact with them in real time or over time, and selecting from
Groupware woes

Groupware has been perking for many years, yet the only really successful application development tool today is Lotus Notes, which has somehow become nearly synonymous with the term, despite Notes’ limited range of uses for collaboration (see page 24).

Discussion databases, workflow tools and other asynchronous groupware tools are pretty good now, though they’re not great. They don’t leverage the power inherent in the medium yet. The real-time tools are still experimental; they’re not integrated into the way people work yet at all.

The major thing that has held real-time groupware tools back is the lack of an open, friction-free infrastructure. Why should people use their computers to view the same document, when it requires waiting three minutes each time, while their systems dial each other and copy the requisite files over (that’s after someone configures both systems so they have compatible hardware and software).

The Net offers the needed infrastructure, but the groupware tools that might use it haven’t been integrated yet into Net applications. Microsoft’s NetMeeting and Netscape’s CoolTalk are interesting first efforts. NetMeeting in particular shows promise.

a menu of tools with well-understood attributes. Subtle user-interface issues are critical to making such tools work. Bulletin-board systems vary: some of them foster quick, spontaneous interaction; others are better for longer, more thoughtful postings; some allow for embedded HTML, which adds yet another dimension.

For example, the lowly "mailto" tag, which Netscape invented, invokes an e-mail message pre-addressed to a specified person. A more powerful tag would allow us to specify how we would like to communicate: live or deferred; in text, with our voice or with video. We could make choices appropriate to the task at hand, the setting and the participants’ preferences.

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ASSESSING THE SUPERPOWERS

In this business, attention is power, and the two companies that have everyone's attention are Microsoft and Netscape. This section delves deeper into their strategies, motivations and vulnerabilities.

MICROSOFT: BALANCING FORCES

Microsoft has an interesting challenge on its hands to maintain its existing businesses and revenue streams while moving toward Internet protocols. As functionality migrates to the OS, how can the company keep people buying Office and the personal-productivity applications, which today bring in over half of Microsoft's profits? The bread-and-butter business is at stake, and it's causing some heated debates inside Microsoft.

Nashville (aka IE4) is a big step forward for Windows. It affects the look and feel of the platform as well as what services one can deliver with it, but it won't substantively change people's work process -- the way they create and interact with documents. The traditional process is alive and well: Microsoft is pitching the upgraded Microsoft Office suite as its solution for corporate intranets. For the Internet, it recommends Web authoring tools such as FrontPage and Internet Studio, as well as new server suites such as Normandy.

How much redesign?

Microsoft has driven more Web functionality into the OS than into its applications. It has an opportunity to create two parallel user environments, one that has rich functionality and is based on the existing Office, another that explores completely new ways to create, share and organize materials.

The Office suite is adapting to the Net. Already, every application in the suite has been retrofitted with Internet capabilities, mostly by adding export functions or wizards that make it easy to place some or all of a document on the Net. Office 97 goes further, making it quite simple to generate material to publish on private or public Webs. But the track that Office 97 is on does not lead to a convincing long-term solution for everyone. Many people, perhaps even a majority of users, will respond favorably to a better way of organizing work and distributing needed functionality in applications in a way that is completely open. In that context, Office is one of Microsoft's two major weak spots. The other is Exchange.

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2 Microsoft acquired FrontPage when it bought its developer, Vermeer; see Release 1.0, 9-95. Normandy is Microsoft's upcoming offer for companies that want to build Internet-based commercial services. CompuServe has licensed it to build an Internet service. The Normandy suite is modular and runs atop NT Server and Microsoft's Internet Information Server. It includes servers for personalization, community functions (chat, BBS and mail), membership services (security, billing and directories), information retrieval, merchant services (from its acquisition of eShop) and content and replication services. It adheres to more Internet acronyms than one can shake a stick at.
Here are three reasons why the revitalized Office isn't enough. The first we described above: An emerging user model requires different tools with a different focus. It is centered on communications, not printing. It uses a few, simple concepts recursively. Adding MAPI and HTML to standard applications doesn’t do the job.

The second reason is closely related to the first: Proprietary storage formats are obsolete (see box).

The third reason is that the division of features among office-suite applications no longer makes sense. Not only are there separate editors for e-mail and word-processing documents, there are also full-fledged applications where lightweight ones would do, such as spreadsheets and tables. Some people make a living analyzing numbers; they need the power of spreadsheets and other tools. Most other people seldom need much more than calculating tables. What they do need, they can now get on demand.

<table>
<thead>
<tr>
<th>Proprietary formats + feature creep &lt; collaboration</th>
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We are witnessing a long-overdue shift in the relative importance (real and perceived) of different aspects of applications. The Web works because most of the documents in it are built with HTML that any browser can interpret and display. Take the thought a step further: Connectivity has raised the value of sharing files to the point where it outweighs the value of proprietary features in personal-productivity applications. These features are usually reflected in the applications’ proprietary file formats, because it is difficult to add sophisticated features without affecting the storage representation. Nevertheless, those formats are on their way out. The .doc and .wp files that Microsoft Word and Corel’s WordPerfect create are today’s legacy systems.

For years, vendors and ISO committees tried to define compound-document standards (including the ISO Office Document Architecture, IBM’s Multiple Object Document Content Architecture and its various media-specific sub-architectures and Digital’s Compound Document Architecture). The SGML (Standard Generalized Markup Language) community tried to tackle other aspects of the compound-document problem, and ended up with an over-engineered solution that worked well for high-value documents such as aircraft-engine repair manuals but couldn’t serve average users.

All that time, word-processor and desktop-publishing system vendors added features and deepened their moats by elaborating their proprietary document-storage formats. All of these efforts have served as memes for the Web. Few of them are likely to survive it.

We say this knowing that HTML is a clunky, low-function format (see Release 1.0, 9-94), and that its future has become a contentious issue in the industry, a situation that threatens to splinter the standard and devalue it for everyone (see page 20). Nevertheless, many capable hands are working to improve it, and smart vendors are looking at it as a native storage format.

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A more compelling argument for rethinking functions in the suite is that some applications may not be needed at all. Why not use the Web for presentations instead of PowerPoint? Picture a "slide show" command on your Web browser's menu bar. When you select it, the title bar, scroll bars and other frame elements disappear and your document fills the screen. You can also point to a Web page that acts as a table of contents, listing the Web pages you want to visit in sequence if you simply hit the "next" key. That page might include transition effects.

At any point in the presentation, you could use the Web to show the things you are describing or to link to other presentations or applications around the world. If you're not connected, you could store files locally. Note also that your "presentation" would consist of a single table-of-contents page. The rest of your slides could be used repeatedly from different tables-of-contents, or shared companywide. Now if we had a decent document-management system....

A few vendors have introduced presentation plug-ins, but they aren't satisfactory. They still have proprietary storage formats, and they don't leverage the Net. Making traditional presentations viewable through the Web is not as interesting as rethinking the way we present, as well as the way we create and manage the presentations.

Exchanging mail systems

Exchange, Microsoft's oft-delayed, enterprise-grade mail, fax, scheduling and replication engine, highlights the conflicts that the company faces today, and its ambivalence about them. Several major corporations have chosen to use Exchange. Yet in light of the Internet and changes in Microsoft's OS and server strategy, Exchange must itself change considerably -- or be replaced entirely.

Much of the turmoil is on the client side; it is created by the many nifty features that Exchange makes possible. It seems that Microsoft will support two messaging solutions for a while. Exchange will be coupled tightly with Outlook, a PIM-like Microsoft product that combines e-mail capabilities with scheduling and general information management, all based on capabilities in Exchange. Within a large company, this combination will deliver features that standard Internet messaging systems won't have for a while. But this combination also dictates a particular way of working and a particular piece of software at the heart of everyone's work process: Outlook.

What's missing is the rich variety of offerings that are emerging in the open-systems world. Microsoft is participating here, too, albeit quite tentatively. Microsoft has quietly published lightweight Internet e-mail and net-news client software on its Website. When you install them, they integrate elegantly into the Explorer. We see more long-term potential in them than in the proprietary combination built around Exchange, although companies that want high-function e-mail systems soon will likely use Exchange. It has features now that will be difficult to add through the conventional standards process.

Office politics

These questions about Office, Exchange and other products have fueled considerable debate within Microsoft. The battles do come down to issues of
openness vs. functionality (and protecting the bottom line). They also
cover deeper issues, such as who within Microsoft should own messaging, and
what its role is.

If Microsoft plays conservatively and reins in the open-system efforts, it
runs the risk of repeating Apple's blunders. In order to make products such
as Newton stand out from the rest of its product line, Apple effectively
crippled other products. For example, a pen-based Mac was scrapped because
it might confuse Newton prospects. The nifty, advanced object graphics in
Newton never made it into Claris products. HyperCard got cut off, too. Now
Microsoft runs the danger of letting worthwhile projects lie fallow because
it doesn't want to hurt the cash cows.

So far, Microsoft hasn't moved aggressively to explore the new model, al-
though Brad Silverberg's Internet group is turning out nifty applications.
It needs to keep pushing and not let legacy stuff get in the way.

That sucking sound

It's worth taking another look at the leverage that Microsoft can derive
from owning and controlling the predominant OS. Of particular interest is
the company's ability to dictate look-and-feel issues for applications in-
side it and to siphon off functions because they are more appropriate as
elements of the OS than in individual applications.

Nashville is elegant and flexible. It takes the aesthetics debuted in IE3
(originally designed for Office 97) and makes them more functional. IE3 re-
places buttons on the tool bar with a textured tool surface that has icons
that highlight when you hold your mouse over them. It makes Netscape's
toolbar look downright stodgy. IE4 (Nashville) makes that the common tool-
bar look for the entire OS.

This is a battle for control over usability as well as identity. If Net-
scape adopts Microsoft's look, it will be less distinct; if it doesn't, it
may look out of place or worse: old. Another good example of this tension
is in the Options dialog and its property sheets. The Options settings in
IE3 are identical to a new control-panel item called Internet Settings. It
makes sense to generalize this functionality, but once it's outside the
browser, it looks like part of the OS.

Netscape will probably have to follow Microsoft's lead on many of these
items, though it will complicate Netscape's life on other platforms. It
will also make it harder for Netscape and others to distinguish themselves
with their applications.

Internet bypass

Microsoft realized recently that trying to beat Netscape at the HTML game
was futile. Nobody was paying attention to the tags that Microsoft pro-
posed. At the same time, the company also realized that what's at stake is
much larger than HTML, so it did two things. It started participating ac-
tively in Internet standards bodies, including the World Wide Web Consortium
(W3C). And it quietly allocated resources to work on protocols other than
HTML, so that it could shape the fabric of the new medium.
People accustomed to Microsoft’s aggressive, domineering and hyper-competitive attitude of old have had a hard time accepting that the company wants a place at the standards-setting table. Isn’t this the company that creates standards by fiat?

The protocol saga is far from over. In fact it has just begun. Microsoft is working on other NT server modules that support other protocols, such as Internet Relay Chat, persistent virtual spaces (MUDs, MOOs and beyond) and more. In some cases, particularly where standards activity has stopped, Microsoft wants to revive the work groups and enhance the existing standard. It is also quite active in defining user location services and the Point-to-Point Transport Protocol (PPTP). PPTP, which 3Com, Ascend and other companies also back strongly, allows applications to use the Internet simply as a conduit for their own sets of communication protocols, such as proprietary remote- or mainframe-access systems. All of these are ways to encircle competitors.

Now Microsoft must experiment and tune. It must learn what happens when companies split the servers, link them and balance them. It must think clearly and make smart decisions about what to spend its resources on next.

Revenue shifting

Drawing functionality into the OS works for Microsoft, as long as Office revenues stay healthy. International sales will probably keep them high for some time to come; many countries are just beginning to buy into suites. Long term, though, the suite is vulnerable, even to inroads made by throw-away products from Microsoft itself. The key question is whether there exists a compelling user model that is substantially different from today's office suite plus e-mail. That model will have to be spectacular to overcome the inertia already invested in traditional applications.

If Office revenues drop, Microsoft will have to charge more for the OS as well as find new revenue sources -- preferably annuities, such as subscription services. It will be interesting to see whether Microsoft prices Cairo for personal systems like Win95 ($95) or like NT Workstation ($260).

Microsoft is already trying to move buyers to its high-margin, high-performance products. For example, it recently floated the idea that it would drastically limit the number of Internet connections that one NT Workstation machine could handle, forcing companies that want to have Webs of even moderate traffic to buy NT Server, which costs $700 more. After some industry participants kicked up a ruckus about it, Microsoft wisely retreated. But what a short-sighted position! If Microsoft played today's trends forward more aggressively, it would realize that every laptop will eventually have a Web server and possibly others to handle messages, security and more.

Microsoft has time

All these issues notwithstanding, Microsoft has a big head start on most of its competitors. It also has deep pockets and amazing flexibility. It has already begun to revamp its tools (a bit) and platforms (a lot). Netscape and Lotus won't be able to change the rules of the game in the ways described above until after the next generation of their products (Galileo/
Orion for Netscape and Domino for Lotus). Microsoft has the luxury of waiting for others to stumble.

NETSCAPE: OPENNESS, VISION AND EXECUTION

Netscape is fortunate to have fewer legacy-system compatibility issues than Microsoft. This accounts for some of Netscape's early speed, and still affords it the opportunity to define and redefine things relatively quickly. For a while. As Netscape's products multiply, making them work together well gets increasingly difficult. Add drivers, helper applications, plug-ins and Java applets, and things get complex pretty quickly.

Despite the rapid pace in the Web market, or perhaps because it has been able to keep the pace rapid, Netscape's browser is still the standard by which others are measured. It continues to lead the market and offers corporations great value as a way of sharing or getting to information.

Beyond the browser, things get fuzzy quickly. The rest of Netscape's client suite is still quite green. The e-mail client doesn't have filters. Integration between e-mail, Web pages and newsgroup postings is clumsy. The vision we described above is not fulfilled yet. Navigator shows the way, but it's only a path now. We wouldn't send a corporation exclusively to Netscape's tools for production use today. Too much is missing. Galileo will have to fix all this. In order to become the platform of choice for most users, Netscape must execute its plans flawlessly for the next 18 months.

Three themes recur that will help Netscape succeed: openness, vision and execution. It scores at best a "B" on each so far.

Openness is the value proposition

Microsoft wants everyone to use its components all the time. The strategy that offers Netscape the best chance against Microsoft is to allow other companies to fit their products into Navigator.

The key is to be completely open and modular -- to define and publish great APIs inside each suite that allow users or resellers to swap in "foreign" components for those they don't like. Tired of the way Netscape's mail client handles your messages? Swap it for Eudora or someone else's (API-compliant) mail client. Hate Eudora's bare-bones address-book capabilities? Plug in your favorite PIM. Is Sausage Software's HotDog your favorite Web editor? Plug it in.

This isn't possible yet, and making it happen has been a low priority for Netscape so far. Moreover, the company isn't known for writing great APIs. To make modularity compelling, the containing unit has to support applications that range from extremely simple to super-sophisticated. Netscape is generally on the right path and its intentions seem good, even if it slips on execution. The question is whether it can create clean, new architectures and elegant new code that people really will use all the time.

In a step toward defining interfaces and inter-application connectivity, this week Netscape announced Netscape ONE, its Open Network Environment. ONE includes JavaScript 1.1; the Netscape Internet Foundation Classes, which
Netscape will post on the Net as source code; and support for CORBA-compliant object management through its Distributed Object Foundation Classes, which use the Internet Inter-ORB Protocol (IIOP);

Relative openness

Netscape scores poorly on another facet of openness: evolving the HTML specification. When it first burst on the scene, Netscape was arrogant about steering the HTML specification. These days, its approach is a bit humbler, but still controversial.

Netscape has a head-start program of its own: The company designs changes to HTML, creates products that use them, releases those products to the public and then -- some time later -- publishes specifications detailed enough that other vendors can duplicate the functionality with their own applications. While other vendors try to catch up, Netscape moves on to the next round of changes.

Some of the changes have conflicted with the stated direction or spirit of the W3C, the only other body with influence in developing HTML standards. Differences of opinion about matters of substance would be understandable, but Netscape often makes what appear to be shortsighted or capricious decisions. As a result, Netscape is getting beat up in the press and by some people whom it should be courting instead. The most cynical of them refer to HTML as the Netscape Markup Language.

Does this situation sound familiar? For years, Microsoft was criticized -- deservedly -- for its general disdain for outsiders' standards and for the way it whipsawed its developer community by shifting specifications around. It did hold periodic design reviews, during which it solicited comments from developers and customers, but there was no doubt about who made the major product and platform decisions. Netscape is more open than Microsoft has ever been, but it is losing goodwill.

Hell freezes over!

Now, suddenly, Microsoft wants to play by the rules. This has brought out a few more cynics, who declare that Microsoft is congenitally incapable of fair play. But Netscape's behavior has motivated many players to take Microsoft seriously in the standards process.

Microsoft seems to understand that it gains by collaborating with others at this layer in the architecture. To underscore its intent (and rub Netscape's nose in the mud a bit in public), Microsoft recently published a "pledge" to support HTML standards as they are evolved by the W3C (www.microsoft.com/internet/html.htm).

Much more significantly, Microsoft this week announced that it will turn its ActiveX technology over to an appropriate industry-standards body. ActiveX, the most recent incarnation of Microsoft's OLE technology (see Release 1.0, 5-94), includes the company's COM (Component Object Model) object framework and its network-object extension, DCOM (Distributed COM). This is an impressive signal of Microsoft's changing industry role and strategy, and goes far to deflate others' claims of Microsoft's proprietary systems.

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THE VISION THING, SERVER SIDE

Two years ago, having a server strategy often meant your company had chosen a relational database vendor, an e-mail system and perhaps a client/server toolset to live alongside the tangle of legacy systems. Now, with the announcement of server suites from Microsoft, Netscape, Oracle and IBM/Lotus, a clearer picture of how servers should be used is emerging. The Internet has served as an organizing principle.

The image is of multiple specialized, cooperating, scaleable servers, many of which map to Internet protocols. For example, a server suite might include modules for Web publishing, e-mail, newsgroups (or replication), database access, security and electronic commerce. For communication with customers or subscribers, one might also need servers for membership management, authentication and user-state tracking. Several might run on a single computer, or a single server might exist on multiple machines, supported by complex load-balancing and replication services.

How these functions are organized varies from vendor to vendor and is an important point of differentiation. Lotus, for example, is leveraging what Notes does well today -- security, replication, authentication of participants -- in its Domino initiative (see page 24).

Wanted: a convincing framework

All the major contenders offer some variation of this menu, yet none of them has set forth a convincing framework that ties the functions together -- particularly a framework that covers the range of functions from communication to publishing and relates it to ordinary worker's tasks, habits and tools. The new server suites are interesting, but we could use a little more vision here.

For example, the Web and Lotus Notes present opposite approaches to document sharing. On the Web, people usually browse documents that exist in a single location. As soon as a document is updated, everyone can see the new version. In Notes, documents are replicated between sites. If someone makes a change to a document or adds comments to it, those changes and comments are visible only after the servers replicate again, typically every half hour.

These two models lie at the extremes of a rich spectrum of information-sharing capabilities. There are other models, such as e-mail and mailing lists, bulletin boards, newsgroups and real-time chat systems. Each is best used for specific tasks and is inappropriate for others. People may want to use different delivery models for the same information because they prefer one kind over another, or because the information has different value for them. One person may want immediate notification of particular events that another person needs to see only once a week.

Pushme-pullyou

Vendors need to elaborate on the subtleties that this spectrum of options offers and put them to work. The options range from full participation on a mailing list and in-your-face spamming to more passive methods, such as bookmarks, keyword triggers and occasional solicitations. Now we have tools to implement the full push-pull continuum, but nobody has articulated how.

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Beware of glitz. Powerful and easily accessible tools such as mailing lists are consistently underrated; they usually don't figure in server suites. How come? Wouldn't it be powerful if any worker could easily set up and tear down an e-mail-based discussion with people around the world, regardless what software they use? (Marc Andreessen, apparently not a fan of mailing lists, feels that such discussions will take place on news servers. This seems like a stretch to us. If you're connected, you'll have e-mail. You may never have newsgroup access or the energy to use it.)

Finally, it's worth noting that the world doesn't end with legacy systems, databases and today's Internet protocols. Across the hall are other systems such as telephony services, which include PBXes, voicemail, interactive voice response, fax broadcasting, audio- and videoconferencing, automatic call distribution and predictive dialing. Internet telephony is the tip of the iceberg. How will all these features fit into today's server suites?

Some of those features and systems are applications, not separate protocols (e.g., a Web-based troubleshooting guide could run using the same code that drives a voice-response system). Others are extensions of existing protocols (e.g., voicemail should use the same protocols as e-mail). Then there are questions of support for mobility and other issues.

To begin heading in this direction, a smart vendor could offer a messaging server that supports common Internet e-mail protocols and incorporates voicemail, faxes and paging. Give us a call.

**Netscape now: execution, execution, execution**

This is a tall order. Netscape's LiveConnect and Live Media architectures are first steps. Other vendors have comparable statements. None are convincing yet.

In the meantime, Netscape has plenty of novel territory to cover. For example, the next version of its software will support calendaring and scheduling, which it has never tried before. Microsoft Exchange already does this well, albeit with its own standards.

Despite its acquisition of Collabra over a year ago, replication services are also new for Netscape. It's a technology that Lotus has defended successfully against Microsoft since 1990. But replication is now a generalizable feature that many different applications may need to draw on, from "briefcase"-style mobility services to distributed document databases and security settings. Every vendor must deal with issues like this to finish the new platform.
OTHER PLAYERS

We have deferred discussion of other companies besides Microsoft and Net-scape until here because the others haven't made their presence felt yet in a way that transforms the market. Java is probably about to.

JAVA'S ROLE(S): STABILIZER AND CATALYST

Java levels and broadens the playing field. Because it works consistently across operating systems, it mitigates the differences between OSes. It also makes for larger potential markets, since developers can create once and sell to all platforms. IT managers like Java because it's similar to C and C++, only better. If Java fails, the worst that can happen is that they will have C++ programmers with much better programming discipline. No wonder Java initiatives are booming.

Java also opens some wild-card opportunities for two kinds of bypass: application and platform. Application bypass involves Java applets that can replace other, conventional applications -- even essential ones. For example, one could write a browser in Java (such as HotJava). If it were powerful enough, it might become a major contender in the battle for the user's desktop. This is not easy to do, but it is possible.

Platform bypass is another long shot. It supposes that a computer or other device running a Java-based OS (such as JavaSoft's JavaOS) can bypass the Wintel platform entirely. Plenty of hardware companies would love to sell networked computers without paying Microsoft and Intel for each one. For this to happen, the world of useful Java applets has to expand at an extraordinary rate. The Java environment must also improve, quickly.

There is a fertile middle ground: applets that create unique value but don't attempt to replace the hardware or software platforms. FutureTense, a Massachusetts startup, has created a Java-based publishing tool called Texture that offers more layout and font control than HTML currently offers. It does this by rendering everything inside the Java applet. Thus, the presentation is consistent across different browsers and OSes. The idea is intriguing, but Texture doesn't offer enough new presentation value to justify yet another proprietary storage format. Nevertheless, it shows that substantial Java applets are possible and useful.

If it fulfills even some of its early expectations, Java may well spawn new ways to develop, distribute and use software. For that to happen, Java applets need to get faster, smarter and more persistent soon. Applets written in Java can be much smaller than traditional code, but today they have to be downloaded each time they are used and then interpreted by the Java runtime. These problems should be solved with aids such as Just-In-Time (JIT) Java compilers and methods that allow for local applet caching and validation.

Today, Java applets have no way of communicating with each other or interacting with their host containers. Sun's JavaSoft group recently announced Java Beans, an architecture- and platform-neutral API for creating and using dynamic Java components. It is comparable to Microsoft's ActiveX framework, and in fact is designed to interoperate with ActiveX and other architectures. One of the key features Java Beans will add is the ability for applets to recombine into larger components. However, timing is critical. ActiveX is available today, and Beans won't be available for a while.

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Overall, Java still has a long way to go, though it is moving at breakneck speed. The system must gain persistence, code signing and verification, speed, inter-applet communications and more. And it must do all this without compromising security and without adding too much junk to the language.

**LOTUS: BUY HERE NOW**

A month ago, Lotus showed it was serious about the Internet by announcing its Domino strategy, which effectively opens up the most useful functions of a Notes server and puts them to work on the Web. Domino makes Notes discussion databases accessible through Web browsers. It also allows users to create simple Web pages by filling out forms.

Domino I is a quick adaptation of Notes. Domino II, due next year, will be a more comprehensive overhaul of Notes, including support for all the major Internet protocols.

Now Lotus can take advantage of all the features inside Notes that other Internet server suites don't have, including fine-grained security (based on elements within documents and specific user roles and privileges), document replication and a large community of third-party application developers.

Lotus must capitalize on this lead, because the functionality it brings will slowly be emulated by others (see box). More importantly, Lotus needs to make a stronger statement about how its software will change the way people do their jobs. So far, the Domino server presents the same strengths and weaknesses that Notes has today.

**Radnet: some of Notes without Notes**

In March 1995, Reed Sturtevant showed InterNotes, Lotus' first Internet application, to PC Forum attendees. Later that year, he left Lotus to co-found Radnet, a company that is emulating Notes' functionality -- minus replication -- using only Web technology. Their product, WebShare, uses dynamically generated Web pages to present threaded discussions and many of the other constructs that Notes offers. In general, replication should be an option for discussion databases, not a requirement. Radnet is testing that idea, as are other, less Notes-like products on the market today.

Notes is best used for applications in which messages accrue about topics (a discussion database or bulletin-board application), or for serial tasks that require sophisticated routing and replication, such as approval or problem-escalation procedures.

Notes' underlying architecture is still limited by its original design intent. It is poorly suited for authoring documents that several people want to work on at the same time. It offers no facility to help reconcile different versions of a document. Its real-time tools, Intel's ProShare suite, were originally appended to Notes. The recent second release is somewhat better integrated with Notes, but doesn't change much. The Notes Internet mail gateway that has angered other Internet mail-system managers is finally being fixed.

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The problem is that Lotus hasn’t offered reasons why the Notes client is better than any other, or ways in which it will evolve the interface and services to better suit the way people work. One capability that Lotus could have added to make its proprietary client more appealing is mailing-list management. It would be a coup to make Notes the easiest way to set up and manage e-mail-based discussions with participants not using Notes.

COREL, ORACLE AND OTHERS

Corel bought Novell’s WordPerfect division and has recently been rewriting the PerfectOffice suite in Java. Its challenge is not just to re-create the office applications in Java, but also to rethink them.

Oracle will probably continue to dominate the database field and take advantage of its competitors’ slip-ups, but it is not likely to broaden its market much into new territory such as network computers. Its model remains database-centric, which will make a few IT managers very happy but probably won’t suit most of them, never mind their unruly end-users.

Few other computer hardware or software vendors have the size or power to have much of an effect in this market. Cisco, Bay Networks and other networking companies might field some radical new technologies, but they are in the pipe business, and the action is closer to the surface. Intel will have some say in how things evolve, but its software applications and directions matter less and less.

Large carriers and service providers such as AT&T and MCI will create some of their own software, but mostly they will purchase what the other companies create and mold it into service offerings. AOL’s proprietary service engine still has much merit, but over time it has to migrate toward the Internet. Other companies now have a head start.

THE LONELY IT MANAGER

These are hopping times for IT strategists. They have to juggle so many variables. Their tendency to go with what is proven, to work with shipping products rather than to wait for vendors to fulfill product promises, leads them to Microsoft and Lotus. But activist IT managers can participate in the radical redesign of the communications and publishing infrastructure. The changes under way now give them unusual influence on product directions.
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COMING SOON

- Collaboration and conversation tools.
- Networked object graphics.
- Navigation.
- The analog world.
- And much more... (If you know of any good examples of the categories listed above, please let us know.)

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Please let us know about other events we should include. -- Susanna Stromberg
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Daphne Kis
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