Microsoft's goal, says Hyer Bercaw, Jakarta product manager, is to make programs written in Java run as fast as an equivalent program written in C++.

Apple Computer Inc., meanwhile, seems to be playing both sides of the fence. Earlier this year, Apple licensed the lightning-fast Java runtime system written by Natural Intelligence Inc., a small Macintosh development shop in Cambridge, MA. "The competitive

John W. Kelley Jr.

advantage is that ours is the best," says Hillel Cooperman, Natural Intelligence's director of business development. "It's the fastest, most stable and the most complete."

But Apple has licensed Java from Sun as well. The company plans to combine aspects from both Java implementations in a future version of its operating system.

Cooperman boasts that Natural Intelligence's Virtual Machine interpreter is faster than other JIT compilers already on the market. And by sticking with the Macintosh platform, he hopes to avoid competition from the Seattle giant. "Microsoft has their act together," says Cooperman. "Big time."

Charles Perkins, an expert in object-oriented programming and co-author of the best-selling book *Teach Yourself Java in a Week*, says that users will ultimately have a choice of many different Java runtime systems to run on any given machine. On each plat-

form—Windows, Macintosh and UNIX—there will be a plug-and-play architecture for Java engines and JIT compilers that will allow a user to unplug one vendor's Java clone and plug in another.

Perkins says he is pleased to see the existence of the clones. "I think it's healthy. It means that people can second-source the supplier of the Virtual Machine and not be afraid that they are tied into a single vendor. It's also a good idea for someone to test the documentation of the Virtual Machine to see if it is sufficiently detailed to allow a perfect copy to be made."

However, Perkins says he is concerned that vendors other than Sun might not spend enough time testing the most complicated part of the Java runtime system—the verifier, which analyzes the Java byte code and determines if it can execute instructions that would cause security violations.

"Sun's VM is guaranteed to be as safe as possible," says Perkins. "They are open to the network [community] and the press, [they publicize their bugs], and they fix them as soon as possible."

Perkins says that a small company such as Natural Intelligence doesn't have the same resources to put into security that Sun does. Although the Natural Intelligence Virtual Machine is likely to be fine for general use, he says that it can't be as secure as Sun's. And he would never trust a Virtual Machine written by Microsoft. "I wouldn't trust Microsoft because they don't have an open attitude," he says.

But trust isn't part of Microsoft's plans for Java. The company is developing an architecture to allow Java applets to be signed with a digital signature. Companies can then distribute lists of approved Java vendors, so that users will only be able to run applets from these companies.—*slg*

Ultra 1 Gets Performance Boost

Sun users can now purchase the Ultra 1 Model 200E equipped with a 200-MHz UltraSPARC I processor. The 200-MHz processor was previously reserved for the high-end Ultra 2s. The computer can be purchased as a complete system, or as a full motherboard swap to an existing system.

The Ultra line features a 64-bit architecture and Creator graphics card. It is most often used in technical and scientific markets, for applications such as EDA and MCAD. Before the introduction of the 200-MHz processor with the Ultra 1 line, the fastest processor on the market was a 170-MHz. Sun says the 200-MHz processor represents between a 15% and 20% increase in performance.

In addition, Sun also reduced the price of its add-in memory modules by 40% to 50%, reflecting the recent industrywide drop in prices. For example, a 64-MB SIMM that used to cost $2,950 is now priced at $1,400.

Pricing for a full Ultra 1 Model 200E system starts at $26,995. A full motherboard swap costs $8,995.—*as*

OpenStep Steps Forward

Alex B. Cone is a happy camper. But it's been a long time coming.

Six years ago, Cone started Objective Technologies Inc., a Wall Street consulting firm that dealt exclusively with the NextStep object-oriented operating system. Times were good then, with plenty of contracts and a 15th-floor office on Day Street in the middle of New York's financial district. OTI was doing so well that it decided to go into the shrink-wrapped software business, selling NextStep-specific objects.

Then Steve Jobs, president of NeXT Computers Inc., announced that his company would be discontinuing its line of designer black computers and putting all of its effort into NextStep software. OTI's clients and customers held back with their orders, waiting to see what happened. The following year, when NeXT announced that it had formed a partnership with Sun Microsystems Inc. to put the NextStep developer envi-

ronment on top of Solaris, and that the so-called OpenStep environment wouldn't be ready for another two years, Cone had to fire his eight employees. There was simply not enough revenue to support them.

Today, Cone is first vice president of Development Services Organization at Lehman Brothers. On his desk is a four-processor Sun SPARCstation 20, running Solaris 2.5. And it's running OpenStep.

"It's proof that there is light at the end of the tunnel," says Cone.

After nearly three years of work, Sun has finally shipped the beta release of OpenStep. According to Cone, Open-Step fulfills the promise of wedding NeXT's easy-to-program object-oriented technology with Sun's industrial-strength Solaris operating system. But questions remain about Sun's long-term commitment to OpenStep, in light of the company's growing relationship with Java.

Cone says that he can run Solaris, OpenStep and Windows 3.1 applications on the same desktop. And even though he's got Sun's CDE installed, he prefers to run the system with the OpenStep window manager, which he says is easier to use. "It looks just like my NeXT box, except there's a Sun logo at the top of the dock," Cone says.

Getting to that point has taken a lot of work, says Greg McLaughlin, Sun's director of OpenStep development. "Our original hope when we started the product was that we would be in a position to ship by the summer of 1995," says McLaughlin.

The reason for the delay, he says, was the difficulty of "adopting Next-Step to become OpenStep."

When NeXT signed its deal with Sun in 1993, it handed over the source code for NextStep 3.2 to Sun. But by that time, NeXT was already thinking about NextStep 4.0–a complete revamping of the developer environment's architecture to make it more consistent and object-like. The changes throughout the environment have been considerable. For example, says McLaughlin, whereas NextStep frequently passed C strings as arguments in function calls and object messages, OpenStep has a

string object called NXString. But modifying every function call and message to use that string object has taken time.

There have been other delays as well. Sun had to change NextStep so that it would work with Display PostScript running inside Sun's X window system, rather than running natively, as it did on NeXT hardware. And Sun decided to build support for Objective-C, NeXT's object-oriented language, directly into the Sun compilers, rather than using NeXT's custom-modified version of GCC.

Those decisions have all paid off, says McLaughlin. For example, "there is a facility to support NEO-based application development as well. So there is a new view in InterfaceBuilder that allows you to instantiate IDL-derived CORBA objects and make outlets and connections to those from your OpenStep-derived interface." This allows an organization to access CORBA-based servers using new applications developed in OpenStep, "without having the [OpenStep] programmers know anything about CORBA in the CORBA environment."

Pricing for the OpenStep environment, which consists of both a user

runtime and a developer environment, has still not been set. McLaughlin says rumors earlier this year that the developer's environment would be priced at over $14,000 were incorrect. "I can assure you that is way high."

Pricing of the OpenStep runtime system, which is required to run OpenStep applications, is more contentious. "We are certainly looking at the runtime as something that we will not price as a barrier to entry," says McLaughlin, a roundabout way of saying that there would be some cost, but that it would not be very high.
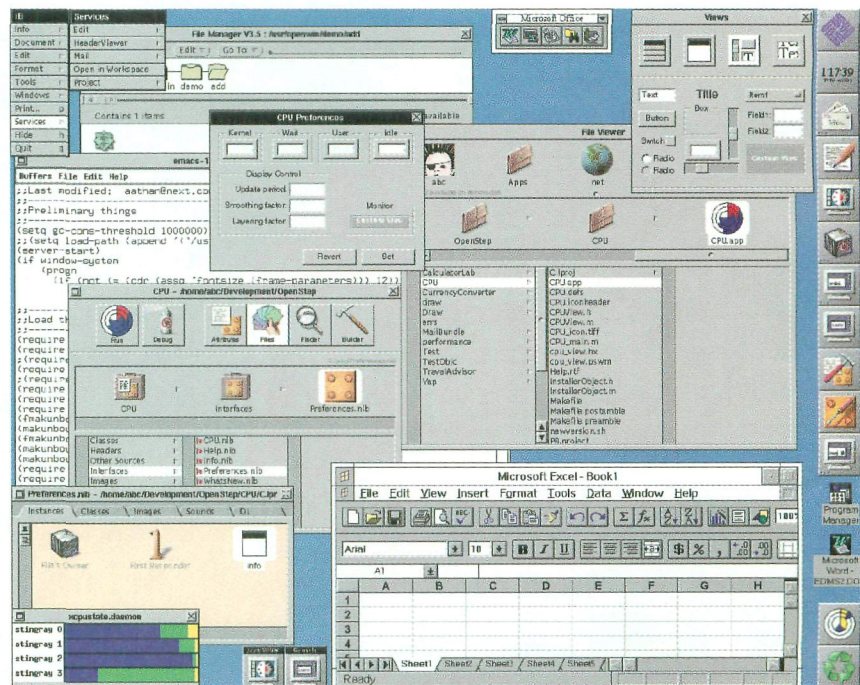
Sun has finally shipped the beta release of OpenStep, but questions remain about the company's long-term commitment.

But back at Lehman Brothers, Cone wants the OpenStep runtime to be bundled as a standard part of the Solaris environment. One of the reasons, he says, is that he would like to start offering his users OpenStep productivity applications as an alternative to programs like Microsoft Word and PowerPoint.

Earlier this year, Sun acquired Lighthouse Design Inc., the most successful and last remaining developer of shrink-wrapped NextStep applications. Lighthouse made an early name for itself in the NextStep marketplace with an object-oriented drawing program called Diagram!, a presentation

program called Concurrence and a project management application called TaskMaster. Over the past three years, Lighthouse steadily acquired other NextStep applications from failing companies as the NeXT marketplace shrunk.

Today Lighthouse has a comprehensive suite of NextStep applications, including two word processors, an image editing program, two spreadsheets and various other productivity programs. All of those programs have either been or are in the process of being ported to OpenStep.

"We are certainly looking forward to getting the Lighthouse applications on OpenStep [and] on Solaris," says McLaughlin. Lighthouse also has a number of developer tools and object libraries that it intends to sell.

Overall, says Cone, he is extremely impressed with OpenStep. "If it wasn't for the fact that it is officially in beta, I would start pushing this onto user desktops."

The only question that remains, he says, is what Sun's long-term commitment to OpenStep will be–especially in light of Sun's increased emphasis on Java.

"I'm trying to figure out if I should be doing any development in OpenStep [this year] or if I'm going to be doing Java next year. If I had to build a trading system for deployment this fall, there is no question that I would do it in OpenStep."

But what about next year? Right now, Cone says, he can't get a straight answer from Sun.

"Sun is looking at OpenStep and Java as very complementary solutions for different parts of the market," says McLaughlin. "We really have focused the OpenStep activities and the broader object strategy on the volume end-user customers of financial services [and] telecommunications," which were NeXT's strongest markets before the company discontinued its hardware offering.–*slg*

X Weds the Web

The Web and the X Window System protocol seem to be headed for the altar. Two companies–Network Computing Devices Inc., Mountain

View, CA, and Hummingbird Communications Inc., also in Mountain View, CA–are already offering similar but competing announcements.

X Window is the protocol developed for graphical display that is now the de facto standard for UNIX (and some other) devices. Its role, though, has been complicated by Web browsers and other HTML interfaces. Increasingly, computing gets done within a browser rather than a more

traditional graphical user interface. As a result, there have been several proposals to blend X and the Web. The X Consortium, Cambridge, MA, has already announced long-term plans for Broadway, a wholesale merger of X with the Internet.

However, in the short term, NCD and Hummingbird say they have the means for launching X Window applications from within a Web browser. Both say that, in the long run (on the
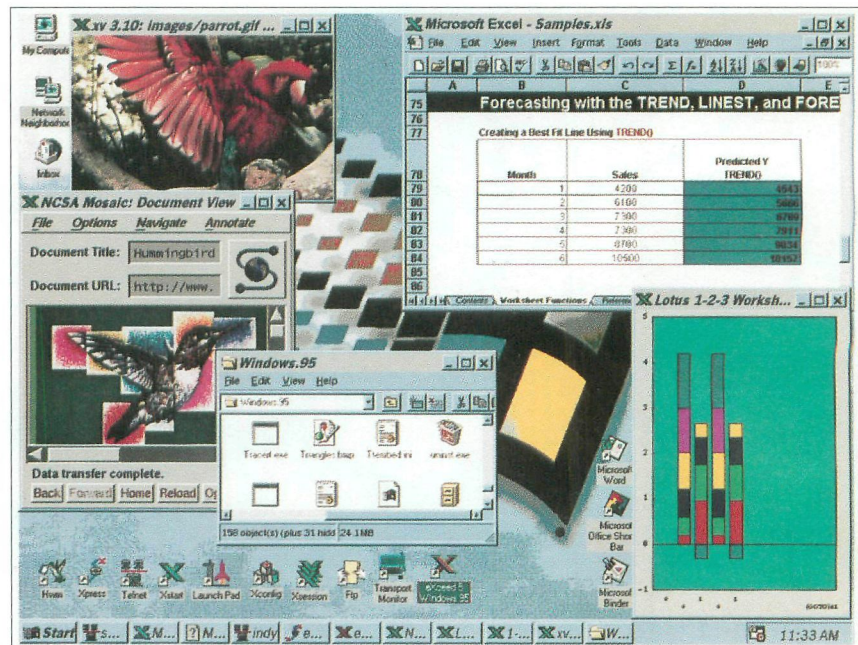
Hummingbird's Exceed has a feature called Xstart that lets you map an X process to a URL.
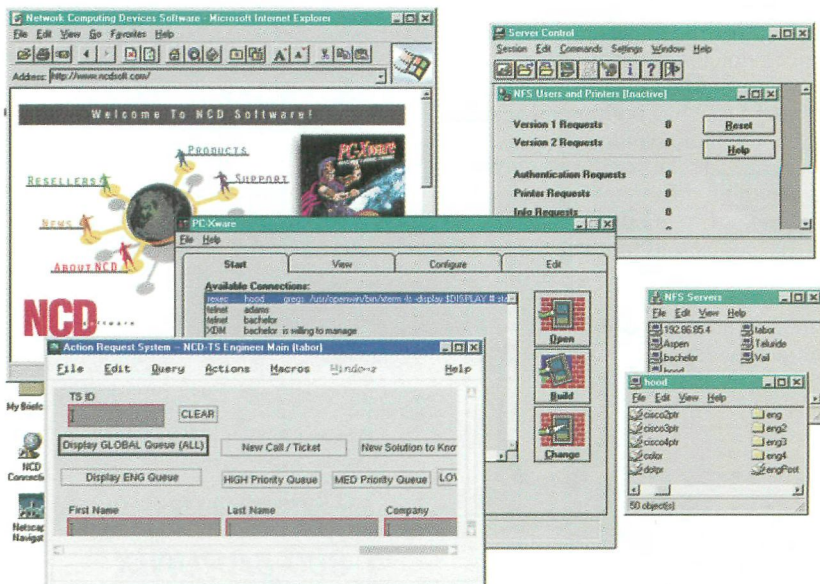
Web-Enabled X, NCD says, will allow users to move forward into Web-centric computing, while being able to access X applications from their browsers.