a licensing fee, unless one uses a PostScript clone.

The most expensive component of a diskles NeXT station is the screen. For multi-user DPS terminal applications, one would not need a large 17" screen. A 14" job will do nicely.

The logic board for a DPS terminal would have video RAM buffer, video controller circuitry, keyboard and mouse controller, and ethernet controller. You would have a CPU, hopefully something fast, and some memory. Gone are the NuBus chips, the DSP chips, serial and parallel controllers, the ASIC floptical controller, and SCSI paraphernalia.

The interesting thing is, if you look at it that way, the DPS terminal becomes just another piece of hardware that ***any company can make without copyright infringement.*** I estimate the hardware involved to cost no more than $1,000 to the manufacturer at OEM quantities. If third party vendors start cranking these out in volume and at low cost, it will be a woeful day for the X-windows crowd.

The Application Server would be a very fast cube, possibly a 68040 with huge amounts of RAM (say 16M to start, plus 2M per client). Since most times all clients will be running the same software (the database application), all the executable code will be shared, as well as the large NeXT_s library. It can communicate with a Database Server box, or if the load is light, run Sybase on itself. The ethernet traffic will be pretty light, since the biggest network load is when you load programs and/or big data files across ethernet. This being totally eliminated, all that’s left are DPS contexts sending binary tokens back and forth.

The Application Server would not need a monitor anymore. That would be a cost extra option. As long as the CPU is fast and as long as RAM is plentiful, every DPS terminal should experience optimal performance. NeXT could easily make Application Servers to handle 10 users for $6,000. Add $1,800 for a monitor and keyboard and mouse.

Imagine an installation with the average cost per user at $3,000. It would give stiff competition to even the most frugual X-windows system.

All About Sybase

Since my company is jumping headlong into Sybase development, I have been trying to get all the facts I can about future Sybase directions, especially as it relates to NeXT. As regular Sybase users know, most Sybase applications are done under the APT Workbench, which consists of APT-Edit (a form editor), APT-SQL (a SQL-enhanced 4GL), and APT-Build (an application generator). These tools are not available for NeXT.

Sybase has announced their AWE product, which is the APT environment under X-Windows code, with a layer to translate it into the native GUI environment. This will be just horrible. What we need is a super APT tool made specifically for NeXT. I can't see Sybase doing any work towards this, so it'll have to come from third party vendor.

Last week I programmed under a beta copy of Sybase SQL server, running under Interactive UNIX 386. The APT suite had some bugs, and the SQL server sometimes refused to honor requests. If two people both wanted to select a table, it would sometimes just hang and timeout. But at least it would communicate with other servers on the net, unlike the limited version we get for free.

As I spoke with various corporate buyers, it became obvious NeXT as it stands will never be the server of choice for Sybase. First, many companies are still Blue shops, and wouldn't even consider anything else non-IBM. So if they really wanted Sybase, they'd rather buy R/6000 machines. Second, the cube hasn't got the raw horse power to handle a large installation. Lastly, the version we get for free doesn't communicate with APT programs written under other platforms, or with servers in a heterogeneous network.

It also became obvious that NeXT will not be widely considered the Sybase terminal of choice. First, most Sybase installations want to develope for APT Workbench, which can work as either a character-based terminal application, or with limited mouse/graphics capabilities. It's much cheaper to buy a bunch of dumb terminals, or X terminals if need be. Second, APT doesn't run under NeXT.

For most companies, just getting into Sybase is a scary major jump. To get into NeXT at the same time would just kill the proposal even before it is considered.

If NeXT really wants the business market, we will need to see a faster machine (now in the works), a full fledge version of Sybase, and a killer APT Workbench made specifically for NextStep. And then it needs to chop the price of the diskless NeXT so low that it can compete with X-terminals... we are talking the $2,000 to $3,000 range.

One way to reduce cost is to manufacture DPS terminals. These terminals do not run programs on their CPU, rather they only run the DPS software. You can reduce memory requirement down to 2 to 4 Mbytes. The DPS software can be bootstrapped from the application server, or it could be embedded in ROM. Either way, it'll mean paying Adobe

new] call.

It turned out that because lpd was spawned before the Workspace Manager, my program is considered an outsider, and so I had to have my Public Display PostScript Server flag turned on before it could establish a connection to my DPS and do its bitmap imaging.

The fix: 1. Start lpd under Workspace manager. Clumsy because that's not the way Unix works; 2. Write output into a /tmp file and IPC another process, started under the Workspace manager, to print. Again, this is somewhat clunky, since we'd often want to start the process under /etc/rc.local; 3. turn Public DPS bit on.

- *The mysterious disappearing instance variable*

I discovered that if I were to initialize an instance variable BEFORE I called the factory method, my instance variable would be wiped out. Most likely the factory method for Object wipes clear the instance variable space first. Fix: NEVER initialize instance variables before a new call. If necessary, use temporary variables first, initialize class, then assign temporary variables to instance variables.

On a related matter, I found out that outlets get initialized AFTER the factory method gets called, so NEVER assume outlets are valid during a factory method. This makes sense because outlets are instance variables, so they must be initialized AFTER the factory method call.

In particular, when a ScrollView wants to know the id of a ContentView that has been described in the .nib file through the outlet mechanism, only setDoView in the outlet initialization routine, when we know for sure the instance variable outlet is valid. Also, do not assume the order of initalization of the NIB objects. If you do, it may work the first time you compile it, but may crash when you modify your NIB file.

- *Posing as a ScrollView by a View*

I discovered that you can kludge a View to return an id of a ScrollView, then setDocView to self. But then subsequently all the outlet initialization messages get passed onto ScrollView class! So it is an interesting point, not all that useful.

I suspect the return value from a factory method is used to fill out the Subview hiearchy.

- *The Message Cold Shoulder*

If you create an action that gets triggered by say a button, make sure to declare it as - action:sender and not just - action. If you define it without the : it will simply not become the target and the button becomes effectively disabled. If AppKit was done right, it should have brought up an error message on screen.

8. Expect NeXT to offer a color laser, using Canon's laser engine technology, that hooks up to the old Printer port.

Everything above is based purely on my personal speculation. No information was leaked by any of the people at NeXT.

The classroom had a giant projector screen hooked up to the teacher's cube. We figured out how to launch an application across the network, so Dave and I painted the picture of Bill the Cat ("Ack! From Canada") and brought it up on the giant screen during class lab.

I got to talk to Doug Miller, who prepared the NeXT documentation. He told me WriteNow is all written in 68000 assembly! It is a port from the Mac version and hasn't yet been converted to Objective C. I guess they won't be porting it to IBM's R/6000 any time soon.

Rob Poor gave a good talk on the hardware aspects of the NeXT. He mentions an Ariel multi-DSP board in the works, which should allow you to play music, run digital eyes, run digital ears, and operate a software modem all simultaneously. Motorola assures us that the DSP is capable of 9600 bps V.32 protocol with the right software.

Rob was asked if you can boot the NeXT from any slot. As it turns out, there is kernel code which is slot dependent, and requires the motherboard to be in slot 0.

Someone asked if there was support for printing on an ImageWriter. Rob said no, and commented that people on the Internet have been asking for this stuff. So I decided I would work on this. It's all done now and will be made available, once I have time to write some installation script files. See "A Programmer's Journal" below for traps I encountered along the way.

The engineers told us how he would play music from across the ethernet, taking digitized files from another building through two bridges, and during most working conditions there would be no interruptions. Sounds pretty decadent. At sampling rate of 44.1Khz, two 16bit channels, playing music would require 86K/sec of throughput, only a small fraction of ethernet's 5Mbits per second (10Mbps raw * 50% encoding efficiency) actual throughput.

A Programmer's Journal

- *The lpd spawned bug*

I wrote a program to print PostScript on an ImageWriter. It was to be invoked under lpd's filter, /usr/lib/transcript/psif. I discovered that I was unable to perform the [Application

Four Days At the Developer's Camp

NeXT, Inc. offers a four days developer's training seminar for all the people who have just gotten their Registered Developer status approved. On March 18, I and Dave Murray drove down to California for our indoctrination.

According to the agenda, NeXT will provide for breakfast and lunch, as well as one dinner on the first night. I was particularly looking forward to this dinner, since Steve Jobs sometimes attends, and it is said he will answer very direct questions from the developers. I was really looking forward to meeting Steve. But he was packing up to go to Russia, so didn't make an appearance.

We did meet many NeXT employees in our four days there. The company tries to circulate their employees amongst us, so that they can hear our concerns, our feedbacks, our gripes. Everyone was extremely tight lipped about future plans, but from inferences and veiled hints, I did gather some impressions, facts, and speculations. So, the good stuff first, Robert's Fearless Predictions:

1. Expect a major product announcement in six months or so. We will see unveiled the new, 68040 based NeXT cubes. We will also see price cuts on the old 68030 model, which becomes the entry level machine, priced at $5,000 US, down from $6,500 US.

2. There will be two 68040 machines, one with 30 Mhz and a price tag close to the $6,500 we've been paying, the other having 32-bits color and a blazing 50 Mhz 68040.

3. The keyboard will be revised to have a tilt. This is to confirm with the German standards specification, and to quell complaints of ergonomic attrocity.

4. We will see an easy upgrade path from older 68030 machines, via a motherboard swap. The NuBus architecture remains unchanged.

5. The new floptical drive will feature at least 512M storage. In the long run, the physical media is good for 4 gigabytes per disk, so there is a lot of room to stretch.

6. The press release will coincide with Lotus' announcement of their financial modelling product, which Jobs personally endorsed as the most awesome application he's seen from third party. Lotus is delivering a heck of a lot more than just a 1-2-3 port.

7. System 2.0 will be shipped soon, with major enhancements to Interface Builder, and a whole slew of minor changes to most applications and the Workspace Manager itself. Color PostScript will come part and parcel with 2.0.

```
MINSCRIBM9380S|Miniscribe 9380S|MiniScribe 330MB:\
  :ty=fixed_rw_scsi:nc#1224:nt#15:ns#16:ss#1024:rm#3600:\
  :fp#160:bp#0:ng#0:gs#0:ga#0:ao#0:\
  :os=sdmach:z0#32:z1#96:ro=a:\
  :pa#0:sa#326040:ba#8192:fa#1024:ca#32:da#4096:ra#10:oa=time:\
  :ia:ta=4.3BSD:
```

Now use the BuildDisk utility and proceed as before.

- Doug Clapp has a new book out called "The NeXT hardware Bible". Besides for all the stuff that's dressed-up product review, there's an interview with Brad Cox (the guy who wrote Objective-C), a grand directory of files and their purposes, and a section on speculating the future of NeXT cubes.

- Steve Jobs has gone to Russia for a couple of weeks. Let's see how well glasnost and the NeXT mixes.

- Want to run your PostScript printer at 19200 bps? Here's what you do: bring up NetInfoManager from /NextAdmin, choose printer, and select the name of your current Postscript printer. You should have already installed it using the PrintManager. Now, press Cmd-e to bring up the edit window. On the left side of the window is a list of attributes; scroll down and select the "br" (baud rate) attribute. Enter in the right text field "exta" (19200 in UNIX jargon) and press return. Make sure you configure the PostScript printer for 19200 bps operation. Finally, put this line in your /etc/rc.local file:

  stty 19200 > /dev/ttya   # Or /dev/ttyb if its connected to Serial Port B.

  and your outputs should really fly.

- Rumor has it that Apple's new super Mac, the 40 Mhz Mac II **fx**, stands for "**f****k ne**x**t"

- A licensing agreement between NeXT, Inc. and Adobe restricts the rasterized PostScript output to a maximum of 600 dpi on a Next printer, or 150 dpi on any other raster devices. There are no limitations on PostScript devices, since they receive ASCII and not bitmaps. This stuff appears in your "Read This First" green booklet. NeXT wants that changed, presumably because it wants to sell printers at higher than 600 dpi resolution.

  Meanwhile, the fax people are at an impasse. The "fine mode" for Group III fax calls for 200 X 100 dpi, which is a no-no according to the agreement. An unnamed fax company's lawyer (dollars to donuts it's Abaton) is negotiating with Adobe to get this mess straightened out.

Hello, World!

Tao is an irregular tabloid meant to supplement the regular user's group newsletter. It will be released whenever there is enough new material to warrant the cost of postage. Though NeXT is generously helping Tao foot the postage bill, this rag makes no pretensions to be official, accurate, or respectable in any way.

Robert Lin
Apr 1, 1990

Bugs & Glitches

- Try this out: run the Saturn application. See the satellite go round and round. Now, click the left mouse on the title bar of the Saturn menu and hold the button down. Don't drag it, just hold the button down, and observe what happens to the satellite. (Are you reading this, Leo?)

- WriteNow bugs are documented in /NextLibrary/.../RelNotes/WriteNowNotes.wn. They forgot to mention what happens when you scroll horizontally while holding down the mouse button: you leave gray splashes all over the edges. This bug was documented in 0.9 release notes, so I guess they thought it was fixed...

- The *stty* man page wrongly documents the "tandem" option as for input flow control. It also works for output flow control. On a related matter, it seems there is no way to enable hardware (DTR) flow control. This is a serious problem, since certain serial devices will require hardware flow control.

Bits & Pieces

- Sybase documentation states the bundled server permits only five logins. But if you try to run a couple of isql sessions, you can actually get six sessions going.

- You can order the printed Sybase documentation. The price for the Command Reference, DB-Library, System Administrator's Guide, and SQL tutorial is $280 US. For serious Sybase programmers, this is a must.

- If you set the system time back prior to October 1989, you will be able to save your FrameMaker documents.

- Now that Miniscribe no longer makes its 330 meg SCSI drives, dealers are dumping them at very low prices to clean out their inventory. You can probably buy one at $1,000 US. You'll need to modify your /etc/disktab file to add this entry: