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BILL GATES AT SEYBOLD S.F. '97

BILL GATES: It was five years ago when I last had a chance to keynote this conference, and a lot of interesting things have happened in the past five years. It was five years ago when there was a bit of a split in type standards, and in fact that became a very controversial issue. It's only recently that through a renewed partnership between Adobe and Microsoft that we've been able to really pull together the best of those two things. Something else that happened five years ago was that Microsoft had its first developer conference for Windows NT. It was here in the Moscone Center, and it was a big roll of the dice for us because Windows itself was not yet established. Yet here we were starting from scratch to write a new operating system that would try to bring together the best of Windows, the best of UNIX, and the best of the high-speed networking that had been available through NetWare, building on the graphical interface and saying that something powerful was needed. Five years later that's an investment that's starting to pay off. The momentum behind Windows NT is very strong.

Something else fun that happened five years ago was I started to build the new house. That's been more complicated and controversial than those other two things I mentioned, but I can tell you that I came back from a vacation a couple of weeks ago and moved into that new house, and it kind of works. The beds work, the doors work. The computer technology we're still working on, but when I'm back here five years from now, I think I'll be able to say that that's all in fantastic shape.

So the pace of this industry continues to be quite amazing. Behind all that is really unbelievable innovation. I think we all should remember if it wasn't for Moore's law, these faster and faster processors and the cheap, fast memory that goes with them, it wouldn't be possible for us to be so ambitious, for us to take on so many new things. However, because of that innovation, it's fair to say that this group will change the way that people deal with information, the way that they're entertained, the way that they reach out to each other. Our phrase for this is what we call the Web lifestyle, the idea being that in the future people will take the Web for granted. They'll use it for all their activities. Today we essentially live a TV lifestyle, or a car lifestyle. It's almost silly to say it. You don't really think about it because it is so much a part of the fabric of everyday life that you just take it as given. Very few people do that with the Web today. If you look around a college campus, you might find some examples of people living a Web lifestyle where they work with their bank electronically. When they want to make a major purchase, they go out to the Web and get the information, send mail to their friends, sign up for classes, submit their homework—all through the magic of the Web. It's interesting that once somebody's drawn in, they become evangelical. Students tell their parents, 'hey, if you want to stay in touch with me, you'd better get electronic mail. That's the only easy way for me to reach out and send you information.' So the size of the market for information on the Web will grow dramatically.

I think it's a very safe prediction to say that 10 years from now the majority of people in the United States will be living a Web lifestyle. It's partly because as more and more

people get connected up, they encourage other people to do the same. It's also because the quality of the content and the hardware devices will be so much better in a 10-year time frame. Anybody who predicts the future often gets up and says things will be radically different in the next year or two. But that never really happens, because it takes more time than that for all the pieces to come together. The things that get underestimated are the trends that build on themselves year by year where over a span of a decade the total change can be very, very substantial. I think that's exactly what we have here. The amount of entrepreneurial spirit we see in building all the pieces to make this happen are really quite amazing.

We're already starting to see more and more activities become Web-based. I can't go to a meeting with a company – whether it's a retailer or a manufacturer, a bank, any type of company – without them wanting to discuss what should they be doing on the Web, how should they be creating their products in a more efficient fashion, and how should they be reaching out to customers in new ways? We've seen a radical change at Microsoft in our ability to work with customers because they're coming to our Web site to get the latest information. Most of our developers come and visit the site once a week, and they spend over 45 minutes browsing through the material, downloading new things that we've put together. So our ability to get the work out to them and to help them out has been dramatically improved. Our Web site has become our primary marketing vehicle. I think over time we'll actually cut back on many of the other vehicles, whether it's direct mail, attending trade shows, or other things like that, because the investment in the Web site will be where we get the highest leverage.

The Web lifestyle implies that all your services—setting up an appointment with your doctor, collaborating on a document with an accountant, going out to purchase gifts or researching travel possibilities—those things will all be connected up to the Web. Even learning new things should be something where it's easy not only to get the information, but to find other people who have similar interests. So this vision is building. What the Web was two or three years ago is not what it is today. One interesting statistic to consider is what percentage of PCs are connected up to the Web. The fact that there was a huge installed base of PCs out there was one of the enabling factors for the Web to get to critical mass. And yet today only about half of those machines are connected up. So the very low-hanging fruit that we still have is to take all those machines, and the new machines as they're sold and have people see the Web as one of the big benefits of connecting up.

Of course, that brings us into the tricky issues of the cost and speed of communications. That's one area where the progress won't be as simple and as swift as improving the microprocessor. Because of the need to dig ditches, install infrastructure, and regulatory issues, it will proceed at a slower pace. One analyst in the industry got up and gave a speech where he asked if there is a Moore's law to cover digging ditches? He did a comparison of the various backhoe equipment that's been available, and it seems they improve about 3% or 4% a year, which for all of us that were used to 50% or 60% improvement a year, was very sobering to see that these ditches are going to be hard to go out and dig. Now that's the bad news. The good news is is once you dig that ditch,

you can put a fiber in there which has so much capacity, and just by changing the equipment on the two ends can even increase in capacity so that any home that does get connected up should have all the information delivery capacity that we can foresee needing in many, many decades to come.

We also think it's important for the devices to not only get cheaper but easier to use, and for there to be a wide variety of devices. Part of the vision for a long time has been to have a wallet size device that connects up to the digital wireless, and we are seeing the cost of LCD screens and battery life improving. There are hand held PCs, some of which Microsoft is providing software for, that are moving in that direction. But if you compare the number of hand held devices sold today, it's less than 5% of the PC market. The PC market's well over 80 million units a year, and this is well under 4 million units. So it hasn't developed all that well. Another part of the vision is that your TV set will be connected up, not just with a dumb set-top box to give you passive video, but with a set-top box with a rich microprocessor and the same type of Internet standards and software architecture that your PC connects up to. This will sound a little bit like the old dream of interactive TV, and it is. That dream has not died. There were some unrealistic views of how quickly the infrastructure would come into place a few years ago, but those costs are coming down.

The Internet has built up the applications, and so it will be a mix of PCs -- the PCs is the primary device, the most powerful device -- TV connections, and portable devices that'll make the Web pervasive. Consider the scenario of looking up a restaurant. If you get the

map with your PC, it's kind of hard to print it out and take it with you. Having that on your hand held device would be a far more natural thing to do. Now for publishers, these new forum factors raise some interesting problems. You don't want to have to author material for all the different screen sizes and device capabilities. That's why rich abstractions, which we're starting to see now with CSS style capability, and with these XML descriptions, are very important because we're not going to be able to afford to sit down and reauthor simply because there's quite a variety of screen and interface techniques.

In this 10-year time frame, I believe that we'll not only be using the keyboard and the mouse to interact, but during that time we will have perfected speech recognition and speech output well enough that those will become a standard part of the interface. Perhaps more controversial, we think that the once-promoted and failed handwriting interface approach will also be valuable. And with the digital cameras that we're seeing on these machines, with the software behind them, at a minimum they'll be able to recognize when a user is there, who the user is, what gestures they're making, and have that be part of the interface. So that kind of improvement in how natural it is to work with the device is part of why I'm so optimistic about where the publishing market will go and what kind of impact that's going to have.

Now there are many pieces to get this great content pulled together. The word "content" is a very broad word. It includes the text, the graphics, the pieces of logic that people want to put in now. It's very complex in terms of how it gets staged on the server, and

how much of the preparation gets down there versus allowing the richness, the intelligence, of the client to allow the person to browse and change things simply on the client. The client side will continue to be important because machines that are portable and, therefore, either disconnected or have low-speed connections, will be an increasing percentage of the market. In the corporate PC space, almost half of the new machines are portable computers, and as the premium price for those machines continues to come down, that percentage will be increasing constantly. So these off-line issues that have not been handled well in the past are very, very important.

Infrastructure implies many, many things, not just the pipes to send the bits around, but all the things to help people coordinate and work together, and certainly partnerships will be a big part of that. I want to talk through each of the points here because I think they're all quite critical. On the authoring side, there are some issues that should simply come with the platform, and some of these are areas where Microsoft is definitely playing catch up to get all the pieces there. Other ones we're actually moving out in front of. Windows 98 and Windows NT 5.0 are major releases that Microsoft will make in the first half of calendar year 1998, and those platforms are a big step forward in authoring fidelity. They both include a color management system that comes from Linotype. We call it our ICN 2.0, and it does the full device characterization to allow applications to do rich color management. So the enabling pieces will be there. This is also the platform where you'll see the open type capability. This is the best work of Adobe and Microsoft brought together, so without any extra efforts, you're there. You can use any of the popular font types that you've wanted to work with without any interoperability problems

or complexity. There's a lot more to be done in terms of making printing simple. Although we believe very much in screen as the target output device, we think printing will be a huge part of what goes on, both printing in bulk and delivery through the Internet for local printing. And that's one area that the HTML standards haven't gone far enough yet. We're certainly one of the companies involved in pushing those forward.

Ease of use has emerged as a major issue for the personal computer industry as a whole. People have recognized a lot of their costs are not just the cost of the device, but making sure it stays up and running. The complexity of the PC has allowed that to grow and grow over the years. It's very difficult when you buy a new machine to say how do I get all the work on the old machine onto this new machine. Or if you want to walk over to somebody else's machine and just simply use that and have your information available, it's very complicated to do that. There's a philosophical debate here about centralized storage versus local storage. Local storage has really won out because local storage gives you the high speed, gives you disconnected operation, gives you the flexibility; and so PCs largely keep their information on their local disks. The people who believe in central storage say that, hey, this means we can back things up. If your device fails, it's all there for you, and so that, too, seems to have some real merit. And we'll never be able to pick between the two. The real break-through idea is to replicate all the state on your local machine up to the server, and anything that gets updated on the server—for example, the patches to the operating system or applications updates—that those automatically flow down to your machine. That kind of built-in replication technology is something that should just be there in the operating system and you shouldn't have to

think about. That's part of what we're doing with Windows NT 5.0, under the brand IntelliMirror. This will be a major reduction in cost of ownership. It's important that people see that not only is the cost of ownership going down, but the value they're getting out of these systems is constantly rising. I certainly believe that companies that move information around electronically will be more competitive than companies that do not. Whether it's project management, customer service, collaboration with other companies, the electronic systems are superior. Whether it's dealing with planned events like sales budgeting or personnel review, or dealing with unplanned events, like responding to the competitor who does something very well. Or the case of a customer who has a particular demand, getting teams that are in different places together to respond. The electronic systems really will work to the advantage of the companies that are out front with them, and they'll move ahead of the companies that are using simply paper-based systems.

Performance has got to continue to go up. Even though these systems have very powerful processors, we're correspondingly putting huge demands on them. Multiprocessor systems, even at the desktop, I think, will be very important. Cross-platform has been a challenging issue, and it is critical, certainly, for Internet publishing to have content standards that reach across all the different machines.

In order to take a quick look at some of the advances here, I'd like to ask Kevin Conner to come up. Kevin's from Adobe, and this is a great chance to show not only Windows NT, but some of the things we've been doing together. Hi, Kevin.

Demonstration

BILL GATES: Another key issue in Internet publishing is making the server rich enough for all the business needs. In the good old days, it was simple enough to just put some static HTML up on a server and hope that people would come use it. Today it's quite different. Today you want to track exactly who's coming in and browsing your site. You want to see what they're looking at. You want to be able to personalize the content based on the characteristics of that customer and the history of transactions that they've done with you. You might even want to offer special prices to customers who have a loyal purchasing pattern. So the Web site becomes the place where you can get your key marketing information. You can even try out new offers and see within a 24-hour period exactly how things work there. But that means a huge information management problem, taking all that history of click streams and being able to analyze rapidly, get the information out in a simple-to-understand fashion. It's no longer good enough just to have a high-speed HTTP server. Microsoft with its Internet Information Server got into that part of the market last year and with that now integrated in as a standard, no-cost feature of Windows NT, it's risen in popularity. The interesting thing, though, since we've done that, is all these other issues of what people want—electronic commerce, handling credit cards easily, security verification on the site—all these other demands have come along, and the whole definition of what is a great piece of server software has changed very substantially. People want to use databases to do on-the-fly content generation. That's very important because even with text information you have such a breadth of information that's tagged in various ways. You don't want to have to lay that

out by hand. And so these servers require great software tools. We've been pulling together an integrated suite, partly by merging with companies that had pieces that made sense, but bringing an overall philosophy of how this should be done in a fashion that pulls it all together. The number of companies building server pieces is rather amazing. Although content management has improved a lot, I still think there's a lot that could be done. Say you have a company that wants to go back and see what its Web site looked like a month ago. You know, some customer says, "no you made this offer to me a month ago." I want to verify what was said there. Could most companies reconstruct their Web sites, particularly with the rich behavior that's there? Well, that's a pretty complex thing. And the software's going to have to make that and many other things a lot easier, so the investment taking place here is very, very large.

Another big issue, I think, for a lot of the people here, is the mixed environment. Mixed can mean a lot of things. It can mean various versions of Windows mixed together. It certainly means mixing in a Macintosh platform with Windows machines. One of the things we've tried to do is make Windows NT Server capable of connecting up to all of these systems in a great way. We've built into Windows NT Server the specific code to reach out and be able to connect up to the Macintosh. That's a piece of code where we're constantly getting input on. Because of our belief in supporting the mixed environments, that's an area where we'll continue to add features. There are many things that can be done to help with the mixed environment—having common tools that run across the different environments makes sense, and having a high level of cooperation between the vendors of those environments. We think that's quite valuable. The vendors should pick

which things they want to have interoperable and are not going to be different as a basis of separation, and then pick a few other things, like the user interface that will be separate, and each will do their best to create the strongest environment. In that spirit of interoperation, we were very pleased a few months ago to reach a pretty major agreement with Apple to work together on a lot of things, extending some cooperation that had broken down in the past that we thought was very important, and adding some new things as well. One of the things we've always had is a dedicated team focused on our Macintosh browser work—the Internet Explorer group for the Macintosh. That team is actually down in this area. It makes it easier for them to work closely with Apple. They don't just take the approach of porting the code across. They do take advantage of some of the Windows code, but they also do the special work to take advantage of the unique Macintosh environment, and so we're very pleased to be working with Apple, including supporting unique things. We're working on how we can support the color management on the Mac platform. We'd be the first browser to do that very well.

With Microsoft Office, the last release we did didn't do a great job of taking advantage of the Macintosh, so now we're hard at work on a release that is indeed a big test. In fact, we showed it at the last Mac World and got a very good response. We'll have that out before the end of this year. It'll certainly reverse any notion that we're not tuning and doing a really first class job on the Office environment for the Macintosh platform. It's interesting to remember that our graphical applications really got their start on the Macintosh. It was a very risky bet that we made back in the early '80s to say that we would divert our development resources away from character mode applications and

focus on the Macintosh. And in fact during the development of the Macintosh, we actually had more people doing Mac applications than Apple had working on the Mac itself. That was a period of great collaboration, and it's great to see with the new agreement, and with an investment included as part of that, some of that spirit of collaboration coming back into the work between the two companies.

The user expectations around Internet content are rising month by month. Those simple static pages that are mostly text-based are a thing of the past. Content has got to be more dynamic. It's got to be personalized down to the client level so you can choose what you care about, what you're interested in, and have that be what's presented. The business model here has been a challenge for people. The way you can succeed is by getting your brand exposed, but it's been very difficult to have branded content. It's been very difficult to deliver the content so that people who use dial-up phones, or have portable computers, can get at the wealth of what you're providing on your site. Many of the techniques for creating dynamic content have involved things that are very slow. You have to load up too much code, and they don't even work that well back on the older 16-bit platforms. The pace of improving the browser has really been aimed at dealing with these issues. We've worked with a lot of content site builders to pull their priorities together. We're very pleased that yesterday we were able to announce the release of the Windows version of the Internet Explorer 4.0. And just to take a quick look at how we see that really shaping much better content, I'd like to ask Tom Johnston from the IE team at Microsoft to come on up and give us a quick look. Good morning.

Demonstration

BILL GATES: Standards will be in a central position making sure that the Web lifestyle moves at full speed. I think it's rather impressive how well standards groups like W3C, IETF, ITU, and many others have been discharging their responsibilities. The standards here are ones where no company plays a unique role. Everybody pitches in, gets the standard put together, and then works to make sure that there's great interoperability between the different implementations. There's still a lot of work to be done here—advanced video and audio, security, and directory services. And even though scripting has taken a big advance just in this last year, I think that's something that's going to get richer and richer. You want to deliver content across a broad set of users. The ability to make it dynamic is going to require scripting. Scripting is small. It comes down with the page. It loads fast, so we need to make sure it's absolutely rich enough to do what people are interested in. We're putting a lot of investment into these standards groups. We've got more people involved in W3C and IETF than any other company because for us it really is going to help drive the market growth that we think is very possible.

Another key issue for us is working with technology partners. I talked about how our relationship with Adobe has flourished. And one part of that we haven't mentioned is the work together on postscript drivers. We felt that working on our own we weren't doing a good enough job on the postscript driver, and so we put our team together with the Adobe team, and in the next releases of Windows you'll see the fruits of that joint driver effort.

Another key technology partner for us has been Quark, and we're certainly pleased to see them announcing their 4.0 product being available on the Windows platform at this conference. That's a big milestone for us, and another exciting thing is that they've committed to bring their high end extended publishing system over onto the Windows platform. So we are seeing great ISV support there for the Windows environment.

On the content side the list is even longer. Last night with IE 4.0 we announced 700 people who have channels available today. You go up to the channel guide and you browse through any topic area you can think of, or pick your favorite brand name in the media world, and I think you'll find some very interesting things that are being done there. The channel concept is one of these things that we thought was pretty neat, but they've taken it even further than we expected. Disney, Warner Brothers, Better Homes and Gardens, and all the different companies we went to were really looking for ways to help set up a subscription, or allow people to work off-line, making things quite a bit richer. The response has been really even better than was expected.

Microsoft's primary role is investing in building blocks, and our R&D, which is now over \$2 billion a year, is 90% focused on these building blocks. At the center of that is Windows NT. Now certainly our message to business users, from small business to large business, is that they should make the move up to Windows NT. The power, the security of that environment is driving it certainly to be the mainstream, not only on the desktop, but also on the server. Our other two big businesses are Office, and BackOffice, the collection of all the server pieces that we pull together. The key for Microsoft has always

been constant improvement, using the feedback loop, investing in the research group that is growing more rapidly than any other part of Microsoft, and pulling those together into the products. That's why year by year we've managed to expand not only the list of products, but the richness of every single one. In summary, there's a huge opportunity out there. We're just at the beginning of taking all the great publishing skills represented here and applying those against the interest as people move to the Web lifestyle. Microsoft is here to deliver a full set of platform pieces, and we want to listen and learn from all of you. Thank you.

It's a Seybold tradition for the speaker to be grilled a little bit, and I'm very pleased that my friend, Jonathan Seybold, has agreed to come back and help dig into Microsoft strategy. So let's welcome him to the stage.

JONATHAN SEYBOLD: I was supposed to be off doing other kinds of things these days, but when Craig Kline called me and said he wanted me to come back and talk with Bill today, I thought for a bit and thought, well, I couldn't really refuse that, so here we are. Bill, I want to pick up on a couple things you've said and sort of pursue these for a minute. One of the things you said here at the end was that you would focus your business in terms of the software platforms and software tools that you're developing. Let me just ask directly a question that is in this audience's mind. You're also involved in content, and that makes you in some areas a competitor for some of the people in this room. How does that play into your business model?

BILL GATES: Well, we've got, really, four businesses. Now the first three are very well established, pretty amazing businesses—the Windows business, the Office business, and the BackOffice business. The first two are over \$5 billion in size, and the third is on its way to be over \$5 billion. Those businesses are the core of Microsoft—hiring great developers, doing new versions—that's always what we think of first and foremost, and 90% of the R&D goes there. We are trying to build a fourth business which is taking this new Web lifestyle and putting together some interactive content there. Most of those involve partnerships, things like the MSNBC site that we've done, or our joint venture down in Australia to do a wide variety of things. We think that as that market grows, for people who get in early, do some smart work, and have the patience to see the markets develop, there are big opportunities. We'll pursue a certain number of those—the array of possibilities is quite vast. I'm sure some of those we won't be successful in, but I'm equally sure that in a number we will come up with what are good businesses.

JONATHAN SEYBOLD: You can afford at this point to place a number of bets in the hope that most of those, or some of those are going to pay off?

BILL GATES: Yeah, what we've found so far is the ones we do best in are where we go back to our core skill which is building software technology. The site we have that is already profitable is Expedia, which is a travel site, and although there's some neat content up there, the thing that really has distinguished us is software. Last year we introduced a number of new sites. This year you won't see us introducing new sites.

You'll see us refining and improving the ones we have and getting the volume up on, hopefully, all of them.

JONATHAN SEYBOLD: On one sense I can see that doing this helps you understand the needs of the marketplace because you're involved yourself, and that helps you build better tools. But I can also see that if you're involved with a project with, say, NBC, then NBC's competitors may not be so happy about that.

BILL GATES: Well, that's a topic that comes up. For example, as we sat down with Disney and said we want to be your technology platform, we want you to exploit IE 4.0, and we want you to use Windows NT Server, they really wanted to make sure that they were going to have the same access to our technology that our joint venture group did. We were able to make that pledge to them, and that's been a very fruitful partnership. So having the platform relationships, and the content work we're doing—having some separation there—I think is fairly critical. We're all headed into this new world. It's a world of opportunity, and the boundaries between what businesses were in the past will change. You know, I was speaking with one of the newspaper people, and their view is not that they're defending their turf, but they're going to go get that yellow page revenue, and that real estate listing revenue, and lots of new things they hadn't done before. And so exactly how it's going to sort out in terms of what are the great brands is a little unclear. The only thing I think is totally clear is that users are benefiting from all this investment. You know, it's almost hyper-investment because it's assuming the large market that will certainly take years to develop.

JONATHAN SEYBOLD: You made that point which people have made before and that is that we have a tendency to expect change to happen more rapidly than is reasonable in the short term, but underestimate the size of the change in the long term. This would suggest that people will be disappointed in terms of the immediate payoff for some of these investments.

BILL GATES: I think that's fair. If you took the business plans being prepared just within a mile of here and took all the Internet ad revenue they expect to get and sum it together, I'm sure it would exceed by quite a bit the amount of ad revenue that's going to be out there. It just takes time for advertisers to see the value, and even the nature of what those ads look like, and how they deliver. I think there's a lot of experimentation that still needs to go on.

JONATHAN SEYBOLD: Now looking again at your business issues, there's another thing that I think you're doing that didn't fall under those categories. You had mentioned how difficult delivery is going to be, citing bandwidth issues. You are involved in a number of different initiatives, both as Microsoft and you personally, from Web TV through the Comcast investment...you know, this is not a modest investment...through television. So it seems to me that you're also pushing the delivery side of things as well.

BILL GATES: Well, I believe that the opportunity for Microsoft as a software company could be gated by how quickly this high-speed bandwidth becomes available. In the area

of microprocessors, we need that higher speed as well, but I feel confident that that's going to happen. Intel and the other people in that business know what they're doing, and it goes at high speed. I do worry about getting the bandwidth, not only to businesses, but into the home. So we did a number of things. We invested in Comcast to help them accelerate it. We're really driving ADSL trials, and we're having a big ADSL event later this year and trying to encourage the phone companies to get quite a bit more aggressive on that because we do think that will be an important part of the mix. I personally invested in this satellite scheme which will provide good connectivity to rural areas. In cities you might as well run the fiber, as it's the most economic thing, but when you get out where you don't have that kind of population density, it won't be economic to run the fibers, and that's where a low orbit satellite approach, could come in and give you the same very high-speed connectivity to every point of the globe. We're not in the delivery business. We're not going to buy fibers or communications companies because that's not our expertise, but we're going to do everything we can to help drive that forward.

JONATHAN SEYBOLD: Now you also at the end, you also made clear something I think has been clear for quite some time, and that is that Windows NT is the future. I could almost visualize you moving fairly rapidly to a marketplace in which your major system products are Windows NT and Windows CE with the people who are currently Windows people being pulled up to Windows NT. Is that, in fact, the direction you're heading?

BILL GATES: In '98, once we ship NT 5.0, the message to business users will be very clear, that we want to help you move to Windows NT, and that the price for the 32 megabytes that are required, has come down now enough that it's not a real problem. For the consumer market, Windows 98 will be our primary product because we won't have developed a special version of Windows NT. But later we will do a special version of Windows NT that aims at that home consumer market. It will become our primary technology base. Then as the new devices come in, the next version of Web TV, some of the hand held devices, some of the set-top box activities, those will be based on Windows CE. So Windows 95 and 98 are going to be around for a long, long time; but the biggest investment will be up there in Windows NT.

JONATHAN SEYBOLD: You also mentioned Apple, and in terms of the stuff you're doing with Apple, one of the things you mentioned there is common work on Java. That's the only mention of Java you had in the entire presentation. Is that an accident?

BILL GATES: No, no. I mean, I didn't mention C, or Visual Basic, or COBOL. Seriously, I'm a programmer. I love programming languages, but I didn't think this was the audience for that particular thing. In Java you do see an opinion from Microsoft that differs from some other people, which is that we see Java as a great language, and certainly some applications can be written so they only call the Java run time. But when you look at a serious application, we think users want applications that take advantage of their platform. Now look at the history of the Macintosh. Anybody who shipped an application that didn't exploit the Macintosh couldn't sell any. Even when we would

make a small little mistake and pass through some little Windows hint in our Mac applications, we were slammed. So people care about their platforms. They want platform exploitation. And so no matter which language people use—C, Java, Visual Basic, any of those—I don't think applications are going to be written in such a way that they can run on a wrist watch, and then you say, OK, it doesn't take advantage of your screen. I'm sorry, I wanted to write it for the wrist watch. Well, that's nice for the developer, but how does the user feel about that? Take a spreadsheet. Would it be a great spreadsheet? So we doubt that successful applications will go down the path of forgetting exploitation of the platform on the user's behalf.

JONATHAN SEYBOLD: The other side of this is you're putting a lot of emphasis behind XML, and one of the things that strikes me about XML is that finally we are breaking the Web page paradigm because with XML I don't need to have pages any more. I can think of documents as being much richer than just pages.

BILL GATES: This is the classic problem in which there are presentations, and then there is the information behind them. There are some nice things that happen when you mix those two together, but if you get the architecture where they get too bound up with each other, you lose all the flexibility. In the history of publishing that you've been very involved with, sometimes people bring those together in a way, but then it holds back innovation. I think XML is really a break-through because it brings the database and the publishing world into having an abstract way of describing properties, and then you can pour that into these pages—the HTML pages—to get the presentation.

JONATHAN SEYBOLD: One other point, and this wasn't covered in your presentation, but I've been thinking about it a lot recently, this Web lifestyle you're talking about. We're talking about delivering a really rich mix of information to people. We're talking about delivering text, and graphics, animation, interactivity, audio and video. We've never done this sort of thing before, so this is a challenge, not only from the standpoint of the technical people, this is a challenge from the standpoint of the people who are trying to manage all these skill sets and learn how to package this stuff and deliver it to people. Isn't this going to take a long time to learn this aspect of it as well?

BILL GATES: I think that's probably the neatest thing going on. Every day some Web sites get a lot of users, and those users talk to other users and mail the URLs around. Other Web sites don't get the repeat usage. And so what's important is striking the balance. Do you try and use those elements to engage the viewer? Do you overuse them so it takes too long to download it so they kind of get confused about what's going on there? We are in the early days. You know, it's like in TV where somebody just sat down and read a script because that's what they were used to doing in radio. And I don't think one style will necessarily emerge. We talked about a learning site, versus a shopping site, versus a travel site. There'll probably be different lessons that come out in terms of how those things should be presented, but the beauty of the current situation is that anybody who can buy a PC and a few software tools can come up with their ideas about how this should be done. The technical foundation gives you all that flexibility, and so it's really, not only a thousand, maybe hundreds of thousands of flowers

blossoming to try out different things. And during this 10-year period, I think we're going to learn a great deal.

JONATHAN SEYBOLD: You made the point, even through this 10-year period, though, that the number of low bandwidth devices is not going to decrease because of the portable computer, and that people will have access to high bandwidth in some situations, but they won't in others. So we're going to face this problem, this tradeoff between bandwidth and richness. You are doing some stuff with Web TV to try to address that. Maybe you can talk about that for a second.

BILL GATES: There is an approach that I don't think has gotten a lot of coverage which has to do with the degree to which you can predict what people want to see in advance -- what sports, or topics, or news, or financial information they care about in advance. You can use the fact that the cost of storage is coming down dramatically. It's actually following a Moore's law exponential improvement curve. The 1997 version of Web TV that's just now coming out has a gigabyte disk in it, and you can use the vertical blank interval, or any other broadcast approach, but that's what's built in, to predeliver data. For the pages that you typically go to, when you turn on your Web TV, they will immediately be there. You won't have to wait for the phone connection to take place, even if it has a big movie clip or sound, because it will have come down onto your local hard disk. You're going to feel like you've got ADSL. So using local storage is a great way to deal with the bandwidth problem that will be a huge problem for more than a decade.

JONATHAN SEYBOLD: Is this push or pull? Is this the device requesting these things, or is this people in channels sending this down to the device?

BILL GATES: It's a little bit of a mix because when you use the machine, you indicate your preferences, and it watches what things you go and get typically when you are connected, and it keeps a history. And then as all of the content is being broadcast, it compares and says should I use my scarce local disk space to hold the Disney channel, or CNN? Is that something that you care about, and if so, how deep should it go? And based on that, it decides to cache it.

JONATHAN SEYBOLD: Selectively caching what is sent out over the channel?

BILL GATES: Exactly. And so then when you come on, it just knows to go to the hard disk for the things you typically use.

JONATHAN SEYBOLD: One final question. You have been...that is, Microsoft has taken a long time to address some of the issues that some of the people in this audience care a lot about. Why is this? Why has it taken so long to get to get to this thing we're now seeing with Windows NT 5.0?

BILL GATES: I think that if we had to do it all over again, there are things we would do better, but the most important thing is to have a strong foundation, and for us that's

Windows NT. I can't emphasize that enough -- to get the richness of the architecture, the breadth of the applications, the relationships with hundreds of hardware manufacturers who are going to compete to build the best hardware around it -- that is the promise of Windows NT. So now that we have that, we need to get all those other pieces on top of it. And through partnerships, I think recently we have made a lot of progress there. Part of it was that the whole publishing thing is much more point and center for everyone now than it's ever been before, and the Internet deserves credit for that. You know, we could think of mass publishing — Word, Publisher, things like that — and not address the high end. But that high end, the skills and the things that they're doing are really what's going to drive the Web. That's where these experiments are going to take place, and we can't afford to ignore it, and so we're doing better.

JONATHAN SEYBOLD: So it's the Web that brought you to publishing?

BILL GATES: To all the publishing, yes. That's fair.

JONATHAN SEYBOLD: OK. Let's open up further questions here. If you can bring the house lights up and if you'll go to microphones and identify yourself and your company and ask your question.

DIFFERENT SPEAKER: My name is Steve Osbourne, and I'm president of Osbourne Company. I do marketing and Web site designs. My question is what would be the most

compelling reasons to tell a company that they should get on the Web now and develop a good Web site?

BILL GATES: I think we're going to have some pioneers who get out there early and show the potential, show that they can deliver better customer services, they can recruit employees more effectively, they can work with partners in a more efficient way. Some companies, though, will only be drawn in through fear. They'll say, wow, my competitor was a pioneer and did this, and if I don't do those same things, I will miss the opportunities. We have to show them that the cost of doing these things can be reasonably low. If you start out by having a server at a service provider, use an outside design firm that's done similar templates before so they don't have to spend millions and millions to build your site, it's amazing how quickly these things can be put together. So I'd say ease them in slowly, ease them in with a reasonably straightforward site that doesn't do personalization, maybe doesn't even take the transaction, but simply takes the material and order forms they've had in print and puts that up on the Web. A staged approach, exposing them to what their competitors are doing, making clear what those budget limits look like, should help you to be able to get businesses of almost any size to jump already today.

JONATHAN SEYBOLD: I would say also that this is moving so rapidly. Look how much has happened in the last couple of years, and the pace is accelerating, if anything, and the problem that companies face is if you don't get on that now, when you go to do it

later on, you'll be further behind. You'll have a much bigger gap to try to make up. Let's go over to this one.

DIFFERENT SPEAKER: Bill, I think this has been a great presentation. I guess my question is in the category of do you really, really love us? I'm Mills Davis from Digital Road Maps. In five years, 90% of the income of people in this room is still going to be related to print. No, this is true. I mean, there are many reasons about how big and established the sixth largest industry in the world is, and it couldn't change that quickly anyway. But the fundamental transition, I think, that you're indicating is moving the entire business of doing printing and publishing in whatever form toward networks, toward server-centric workflows I think is absolutely critical. You spoke about productivity gains, and I think whether it's cycle time reductions or quality -- there's a whole litany of reasons why the industry is going to embrace this and have to move. But the issue of standards raises some other kind of questions, and there are some things that I hear missing in your presentation. I want to pose a question. Currently, this industry is in the process of retooling its business process, its content streams around PDF. PDF is the successor to postscript. Now XML is very important for the very reasons you mentioned, but in terms of the kinds of standards that are needed to integrate commerce, the content streams, the media streams for both print and non-print media, and the process models that work in the graphic arts would imply getting together with the standards activities to relate to these kinds of business concerns. Question: Do you really, really love us, and will Microsoft be involved in publishing related and printing

related standards activity, and what kind of integration of effort between Adobe and Microsoft might we expect to see relative to, say, XML meets PDF over a cup of Java?

BILL GATES: Well, the answer is yes, absolutely. Microsoft's a company that, once we get involved in something, we're very serious about it. And this is a market that's really going to drive our technology, push it to the limits. In a lot of the high-end Windows NT workstations, the need for graphics performance, the need for a richer software base, the need for document management—it's going to come out of the publishing industry. And so it's valuable to us not only as a big market, but also as something that improves our products for an even broader market that we're involved in. In terms of PDF, I agree PDF is important. I don't see it being the sole standard of importance. We are working with Adobe on PDF. PDF is where you've done your layout; you've decided to be print-based; and when you have material that that's the only way you're going to deliver it, then, great, you can transmit it in that form. And so it should have a close relationship to the other standards, to HTML and XML. And our relationship with Adobe is very complementary. They do high-end publishing tools; we do not do high-end publishing tools. And so we're able to sit down together, and say, hey, how can we grow the market very easily, and that's the dynamic you've seen over the last 18-month time period.

DIFFERENT SPEAKER: Walter Shield from Genex Interactive. The first quick part is if there is a split of Microsoft into OS applications and operating systems in one area, and you've got productivity and applications in the other, which would you choose?

BILL GATES: Well, Microsoft is an integrated company. We hire people. We sell our software around the world. And so there's no split between those things. Take something like document management. Is that an operating system thing or an Office thing? Well, we need to have richer storage structures. We need to advance the file system so that basically there's all the power of SQL built into the operating system. And take the things we're doing in security. We need to make sure that the applications do those and the operating system does those.

DIFFERENT SPEAKER: There are applications that address security, and there's operating system issues, but just part of the curiosity was with all the things I read in my reading about the Department of Justice and the growth of Microsoft, I was curious about that, and the reason why...I think Jonathan had a very, very interesting point. Microsoft has been a software developer for a long time with OS. With the acquisition of Web TV, which is a hardware device, and the growth, whether it's Microsoft's mice and keyboards as that grows, you are now controlling the hardware device, the software on the device. You've put a hard disk in it so you can control what's downloaded to it. You can broadcast via your satellite systems, or through the modem, and you're really getting control of a lot of the different areas. And as a small software developer, I just want to know...I'm glad I didn't create an Expedia competitor a while ago, but what...can you make a list of things you won't be doing so I can just...I just want a little piece of something I can grab onto so when I'm dead in 20 years, my kids will have something that's part of me. So I think it's a fair point, though, that Jonathan...you did have an

elegant answer, but I don't think it was really addressed. This was a big picture, and that device has a huge growth potential that I don't think we see right now for the set-top box. And that's why if there were this split up long term like I've seen in my young life with the Bells before, and now with the deregulation of cable, I was just curious.

JONATHAN SEYBOLD: Well, Walter, let me...without getting Bill off on what he'd do if...if...if, let me just narrow the question to your question about what can you safely do that Microsoft won't tromp on?

BILL GATES: There are two things that characterize areas that we get involved in. They're areas where we think software is very, very key, and we've really gone back to basics on that; and where the market size for doing that activity will be over \$500 million. Take something like news. We decided, hey, we thought news on the Internet would be a key application. We knew we couldn't do it ourselves. We decided to get in it, and we worked with a partner. That's gone very well with some very exciting things that have come out of that. If you take something like SAP vertical applications, we've chosen not to get involved in that because it's not our type of software talent. It's much more understanding the domain of accounting and payroll. So even though it's a very large business, it's not the kind of thing that we've gone after. And so at Microsoft our size is an advantage when we want to go after operating systems, horizontal productivity packages, or BackOffice applications. But for any of the markets that are out there, and there are tens of thousands that require you to understand a certain customer type, and what they're doing, we're not going to be very effective at that, so all we can do is

provide building blocks and work with other developers. If you say in the computer industry what have been the great successes of the last decade, well, every one I can think of are cases where we were partnered together, whether it's small software companies who built on Windows and got the volume benefit to build great businesses, or Compaq, or Intel. So that kind of openness of the platform where the information is there, we don't charge people to use it. And you know the variety of things is going to be incredible. That's the framework that has been successful, and that's the framework that continues to expand its role in this industry. To say that on the Internet because we picked seven things we're going to do, and that, boy, what does that leave? That's like saying that somebody's going to write all the books in the world. You know, we picked a few big ones, like the encyclopedia. That's one that we started a long time ago, and it was an interesting one because we went to the established encyclopedia companies, and we begged them, please, work with us through a joint venture. And they said, no, we don't see an opportunity there. You're trying to spend too much money to do this CD-ROM thing. We want to stay away. So we built a business, got some smart people there, and now it has a certain strength, and it has been very successful. But I think you can feel pretty good looking at what we're doing today as pretty much the scope of what we're after there.

DIFFERENT SPEAKER: I'm going to go in a real different tack. My name is Michael Brusell. I've got a small graphics company in Santa Cruz. My background is in anthropology...non-verbal communication. The graphics that accompanied your talk could have been out of a BellTel presentation from the '50s or '60s...

BILL GATES: Thank you.

DIFFERENT SPEAKER: No, no, no, no. I'm sorry. I'm sorry. Pink and purple backgrounds, static words, but you wanted to make your point, and you did use very single static words and when you had the wired presentation with all the dynamic quick cuts, the talking heads still made their points better than any of that fast and furious camera work. My question is...the simple question...Can less ever be more?

BILL GATES: Well, I think the marketplace will decide. Do people want fonts versus fixed space type? Yes, they do. That's something that even though it's complicated to do, they want it. Do they want rich color images? Absolutely, they want it. How much interactivity do they want? That's going to vary so much by different area. You know, I don't think I'm the one who knows the answer to this. I think the fact is that those wired guys are going to push the limit, and I think that's very cool. They'll be the first to admit they're going to be out of control and go a little bit too far, and then they have to pull themselves back in. The stuff I read on the Web, a lot of it's very straightforward. It's text. It just happens to be a very nice, efficient way for me to get it. I get the Economist on line sooner than I used to because it's up on the Web, and I don't mind that it's not very interactive at all. So for a lot of what we want, you bet. Simple is going to be what is preferred.

DIFFERENT SPEAKER: Rick Allen from Digital Village Radio, and inquiring listeners want to know...This is more of a general question. What are you doing to fight the perception that Microsoft tends to stifle the development of what may be better applications and products by their buying competitors' companies. You're saturating the market with your products so that innovative developments may never get a fair shake. Do you realize that perception is out there, and what are you doing to combat it?

BILL GATES: Well, certainly the beauty of the software market is how easy it is to enter the software market. The thing that's scary about the software market is that your products, the ones you're shipping today, won't sustain you. No product Microsoft has today will be competitive in five years. If we don't improve it, there are plenty of people out there just dying to step in and do it. For example, if I don't build an operating system that deals with linguistics and vision very well, then Windows will disappear. It'll be obsolete, and it's only by hiring great people, spending lots of money to pull those pieces together, including things like the testing, and all of that, that we're going to be able to sustain ourselves. So it's fun being in the competitive market, but I have to say it's also a little bit scary. It's not like Coca Cola where you know, hey, 20 years from now, they don't have to change the product. In fact, when they did try to change the product, they screwed themselves, and they went back and made it differently. Why do we all like technology so much? Because no one has a guaranteed position. Everybody's got to be on his or her toes and pay attention to what's new and different. It was very visible that Microsoft went through this. We didn't see exactly how the Internet was coalescing. We didn't see what was important there, and we had to play catch up. We had to get a lot of

guys working long hours. We did buy some very innovative companies. Those people came up and joined Microsoft, and that kind of work, pulling it together, seeing IE 4.0 come out—that's fun. And that's the lifeblood of this industry, and so nobody gets to hold this industry back. We're all just trying to keep up and trying to make a contribution.

DIFFERENT SPEAKER: Is there any way that you have a means for the common end user to give feedback, not just your beta people? Something like as simple as what happened to print preview in the Internet Explorer? Things like that that maybe developers and beta testers may not notice because they're so involved. Do you have a kind of feedback going on so that the common end user can get in touch and let you know how they feel about things?

BILL GATES: Well, certainly we have 800 number wishlines for all the products. We have e-mail addresses for wish lists for the products, and we get over a million phone calls a month from people saying, hey, this product is confusing. And we take all of that, and that's the input that drives us. If I have any advice for a software company, it's to take advantage of that feedback loop. It's amazing how much users are willing to look at your product and help you figure out what's wrong with it. Any company that pays attention to that should be able to maintain a very strong position.

JONATHAN SEYBOLD: I would say that one of the things that distinguishes Microsoft is that more than any company I know of in this business, it is driven by the

feedback it gets from customers—for good and for bad. I mean, your product groups are, all of them, very focused on that. Bill, how much time do we have here?

BILL GATES: Another five minutes.

QUESTION: All right. You mentioned color management support in Internet Explorer. When will that occur for both Mac and Windows and to what extent?

BILL GATES: We use an add-in structure to do that with IE 4. And then we'll do it on a native basis. The key question is with IE 4, because it's got that add-in capability, is when is their color management in the platform? Because of the add-in we can take advantage of it on the Macintosh, immediately once IE 4 is released. Windows 95 we have what we call Color Management 1.0. And so IE 4 already takes advantage of that. As Windows NT 5 gets shipped with ITM 2, which is a super-set of that, Internet Explorer 4.0 will automatically take advantage of ITM 2.

QUESTION: I'm Victor Landweber. I'm an independent user of a computer. And I have a very brief story and a question. The story involves a search on the Microsoft Web Site for a simple upgrade .dll file and finding that the search result said that it was not there. And then after a convoluted series of inquiries for this upgrade .dll and eventually finding it and even finding that the very word that I had been searching for was in the description, my question is about the indexing of the sites. And with such wonderful tools as Alta Vista available—I don't know what's used to index your site—cannot the

indexing there be improved? It's the second time, as I recall, that I've searched for something which I knew was there and just could not be located.

BILL GATES: You're absolutely right. The indexing has been poor. By the end of the year, it will be good.

QUESTION: Good, I'll try some more searches.

QUESTION: Hi, I'm Joanna Prostein with Mac Week. Just about a month and a half ago you were speaking with Steve Jobs at Mac World Expo in Boston about your new investment in Apple. At that same time Apple was talking about its renewed focus on markets, including publishing. And I'm wondering how you reconcile your strategy of targeting Windows NT at the publishing market with your new investment in Apple.

BILL GATES: Well, I think it's fair to say with our focus making Windows NT great for publishing and Apple's renewed focus on publishing, the only clear winner is people who do publishing. You know, we're all going to give you a choice of two great platforms—two platforms that work together with each other. We do cooperate with Apple on the Internet Explorer. So all the things—the advances—are available to publishing people, no matter which platform they happen to be working on. Likewise, with Office, which is a product we're constantly improving, because we've got Mac and Windows versions out there, and the people who are using them will benefit from that. I think our commitment is to improve all of our products, including the products that went

on the Macintosh, which we think will be helpful to Apple. That duality really gives users the best of both worlds.

JONATHAN SEYBOLD: Bill, thank you very much.

BILL GATES: Okay.