From: Bill Gates
Sent: Thursday, November 11, 1999 7:35 AM
To: Paul Maritz; Steve Ballmer; Jim Allchin (Exchange); Bob Muglia (Exchange); Jeff Raikes
Cc: Eric Rudder
Subject: FW: eWindows and tying it all together

One point of view on our strategy...

-----Original Message-----
From: **Jonathan Roberts**
Sent: Wednesday, November 10, 1999 5:41 PM
To: Bill Gates
Cc: Craig Mundie
Subject: eWindows and tying it all together

Bill, wanted to share with you some of my observations on where we need to go. My observations are based on a ton of customer meetings at Telecom, customer meetings throughout Europe and the US, and great discussions with Craig, Richt, and others. I also know you're meeting with Craig tomorrow and I hope these thoughts can be the basis for some discussion.

I propose that we Re-launch the Windows strategy. For discussion, we call this strategy the e or i Windows strategy. Windows morphs into the platform that delivers third generation internet apps and the architecture goes way beyond our OS to encompass UPnP, Smart Cards, XML extensions, and services. The mantra for the company becomes eWindows. We have an eWindows architecture (goodbye DiNA or whatever it is), we talk about what an eWindows app does and how it is different than old Windows apps (XML extensions, tied to services, providing a anytime/anywhere view), it's supported by Visual Studio, etc. We create eWindows points of light that allow folks to deliver this solution. Our scenarios become eWindows solutions. We drive this unifying view of the world deep though the organization and out into the market place. The first product that we re-brand would be Neptune. Prior to that we lay out the architecture and drive towards it in the relevant development communities. I'm personally confused about whether we believe in a sort of Net Docs type scenario or continue along monolithic Office type solutions with only links. Whichever the case, let's get clear, brand, and than evangelize the heck out of it. I would love to have our Appliance Vision map into that. I actually feel quite good about it (see attached vision doc), but it needs to be tied to a clearer Microsoft architecture.

Microsoft Appliance Strategy W...

Right now, I feel like we're trying to teach the market calculus by telling them to understand our complex set of technologies and solutions and they can only really understand arithmetic. If we work hard enough we'll get a few more guys doing higher math, but we'll never get a deep and unified message out until we start answering the hard questions more clearly. What does a next generation app/solution do, how is it different from what I do today, and how do I build it, and what do I run it on? In terms of implementation, we should do the following:

- deepen your Info and Services Anytime, Anywhere, on Any device strategy with framework that supports it.
- determine the points of light
- include our services strategy as one of the points of light. I know each division per your and Steve's challenge are thinking about this, but I think we need some broad mandates that we all tie to. For instance, I think we need to figure out how to be a subsidiary service on appliance devices. Ford, GM, Sony, AOL, AT&T, etc are all going to own the primary relationship to a set of devices largely because they control distribution and subsidize those devices. We need to become the LINK (would like to brand this) that ties them all together. We become the directory, transaction, security, proximity based networking set of services. To exploit this our products need to do X.
- phase it in. Where we are at is Phase 1, Neptune or 2 years out is phase 2, and full UPnP/Broadband available/next gen products are Phase 3
- consistently map to the framework in our platform, product, technology, and services area
- create development processes that drive unified thinking and compliance with the strategy. Same way we got Unicode or VBA. I miss Paul and the function he served. We need some deeper process that forces us out of our

silos and focused on the points above in the planning, program and dev, and marketing disciplines. We're a whole is > parts company and from the trenches it just doesn't seem to be hanging together as well as your vision suggests it should.

Hope this is helpful.

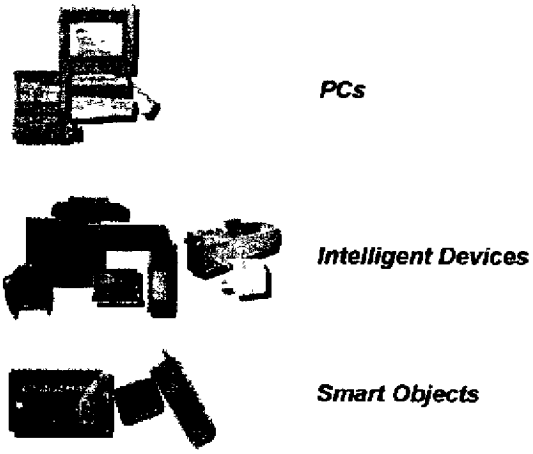
Thanks,

Jonathan

Microsoft

Very Personal Computing:
Making the PC-Plus Era A Reality

White Paper



In the new millennium, the remarkable power and flexibility of the PC will be available wherever it is needed. The PC-plus era will be about connectivity, scalability, and simplicity. It will be an era where people are at the center, where technology is a natural extension of the way consumers and businesses think about themselves and their interactions with others. The combination of experience, resources, and research that is unique to Microsoft puts us in a strong position to transform this vision into reality.

Bill Gates, chairman and CEO of Microsoft
from Microsoft's 1999 Annual Report

When Bill Gates and Paul Allen founded Microsoft in 1975, they had a simple but powerful vision for the new company a PC on every desk and in every home. In 1999, nearly 25 years later, Gates redefined Microsoft's vision as empowering people through great software – anytime, any place, and on any device. More than simply the evolution of one company's vision for its business, Gates' statement reflects three fundamental changes that are creating new challenges – and opportunities – for the entire technology industry as we enter the 21st century

- Digital technology and advanced software, together with the expanding power and influence of the Internet, are creating a vast array of new Web-based services to which people want easy, 24-hour access from wherever they happen to be.
- Microprocessors are rapidly becoming smaller, faster, more powerful and less expensive, which means they will be used more often, in more places, to create a host of intelligent devices and appliances that will increase access to those services.
- Wired and wireless bandwidth is expanding exponentially, providing the final component necessary to create "universal connectivity" among all of those new devices and the instant availability of the information and services they help to deliver.

The PC will undoubtedly will remain at the heart of computing at home, work and school, in part because of an *increasing* need for powerful local processing as more services are delivered over high-speed connections. However, it will be joined by a wide range of intelligent devices and appliances, from handheld and in-car computers to Web-enabled televisions and cellular phones, eventually expanding to include everything from stoves and refrigerators to smart gas pumps, light switches and thermostats. Whereas a PC is a collection of tightly wired devices – hard drive, disk drive, modem, etc., – this "PC-plus" era will usher in a world of loosely connected devices. And all of these devices will be equipped with microprocessors that allow them to receive, process and use information at amazing speeds – in short, to "think."

Today, the widespread use of motors to power everything from automobiles to can-openers has reduced physical distance and effort by assisting our muscles in ways unimagined by earlier generations. Over the years, as motors have become faster, more powerful and less expensive, people have used them wherever possible to make a job easier. Our use of microprocessors, advanced software and high-speed connections will be just as ubiquitous, continually reducing the distances across which information moves and people communicate, as well as the intellectual effort we must expend to manage and apply information to accomplish a wide variety of tasks – both personal and professional.

In this PC-plus era, Microsoft will provide software and services to help knowledge workers overcome the physical, cultural and technical barriers that often limit productivity. In business, these services will allow knowledge workers to seamlessly access their information anytime and anywhere Such universal connectivity will also revolutionize homes, allowing consumers to leverage the power of the PC on any intelligent device, remotely monitor or manage a host of household appliances and tasks, or access information and high-quality audio and video wherever they want it.

Although some "early adopters" of technology are beginning to connect some of these intelligent devices to enhance their lifestyle and increase their efficiency, most of us today would find such a project overwhelming. Yet with the cost of these devices falling rapidly, and their convenience and utility increasing just as quickly, consumers are beginning to demand different devices that can "talk" to each other and share frequently used information.

According to our research, a typical person soon will use more than a half dozen different intelligent electronic devices in the course of a day. Our goal is to make sure these devices become a natural extension of everyday life – creating greater convenience, flexibility and mobility, rather than more work. Microsoft is collaborating with hundreds of hardware and software manufacturers, service and infrastructure providers, and leaders in every industry that are eager to bring about this next phase of very personal computing.

In a world of increasing technological complexity, one of our primary goals is to make our products easier for people to use. At Microsoft, we've reorganized our company to make sure we're focusing completely on offering our customers what they need now and tomorrow, rather than what technology can provide, so although the underlying networking and integration of these devices and information may be complex, access will be seamless, transparent and automatic.

As intelligent devices join PCs as mainstays of everyday life, more software will be delivered over the Internet, and the boundary between online services and software products will blur. Just as consumers unknowingly access network software when they pick up a cellular phone and hit "send", they will use their intelligent devices to access software-based services to enhance the information flow within organizations, perform seamless e-commerce operations, and use Web-enabled products and services. As part of this change, Microsoft will provide software-based services that will enable you to transform the Internet into your own "personal Web" – an increasingly rich, customized resource that will learn from you over time, tailor services according to your preferences, and empower you with all of the information you need, when and where you need it, while protecting your privacy.

With universal connectivity, everything that can think will link, so that all of the information and services you need will be available to you regardless of where you are, what you are doing, or the kind of device you are using. And rather than entering your personal information into each individual device, you'll be able to avoid repetition by providing your information just once to your personal network. From there, it will be distributed appropriately and as needed, so that any device will recognize you and automatically know your privileges and preferences – and update these universally whenever new information is entered into any of your devices.

This creates a confluence of information, services and bandwidth in that everything you want will be in one place, but that place will be wherever *you* want it to be, not just at home or in the office. As you move through your day, from home to car to office and beyond, you will be able to review the latest company sales figures, check to make sure you remembered to turn off the oven before leaving home, collaborate remotely but in real time with colleagues on a new strategic plan for your division, make reservations for a weekend getaway and find directions to the field where your daughter is playing soccer that evening – all with equal ease and efficiency.

But confluence will not only make the combined power of the PC and the Internet available to you wherever you want it, it will do so intelligently, saving you from information overload and the need to sift through unwanted data. For example, if you're attending a baseball game on a summer afternoon, your personal network will "know" that player profiles, team statistics and an online link to all of the restaurants at the stadium are what you need on your Palm-size PC – not

your tax return or vacation itinerary. And because you control your personal network, you can also turn it off whenever you'd like, or set "rules" for who may contact you.

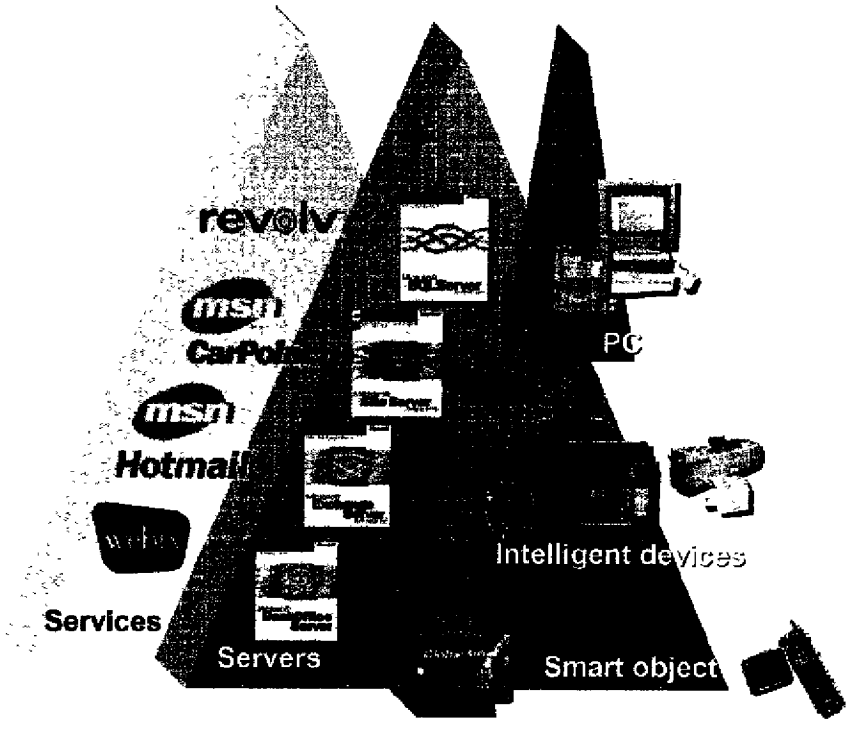
As always, visualizing a dream is much easier than achieving it. Science-fiction writers were thrilling readers with stories of manned space travel long before NASA launched its first successful mission. Movies and television shows in the 1970s showed us computers with continuous speech recognition, and PCs today are just now powerful enough to support this functionality. These examples have provided us repeated glimpses of the kind of universal connectivity and convergence that we're now on the brink of experiencing. The era of the PC enhanced our productivity, the PC-plus era will transform the way we live.

The New Computing Landscape

As already noted, the new intelligent devices of the PC-plus era will deliver information and services anytime and any place, and they will "know" that you are the same person with the same privileges regardless of the device you use To accomplish that, each of those devices will connect to back-end servers and services via some kind of network. Information that resides on the servers usually has to be reformatted and optimized for each type of device. In addition, an individual will be accessing personalized information from numerous sources, and each of these sources has different access mechanisms that must be incorporated into an easy user-experience model Finally, these devices must safely link to the networks so that each individual's information remains private

This relationship between a wide range of client devices and all of the information available through a host of servers and services is reflected in this three-pyramid chart.

The three-tier pyramid reflects the many different types of devices that will connect to back-end server information and services. The devices represented in the pyramid represent a rough hierarchy of capabilities -- the PC in many ways being the most capable, and items like the Smart Card at the bottom of the pyramid being less capable.



Smart Objects

The "smart object" tier on the pyramid represents the vast majority of appliances. There were about six billion non-32 bit microprocessors sold last year. Increasingly, these processors are finding their way into everyday items such as refrigerators, ovens, cars, and even credit cards. We think of these slightly more intelligent and connected devices as smart objects. Microsoft has a number of smart-object initiatives. The Smart Card for Windows® architecture enables card suppliers to build applications on a platform that is integrated with the rest of the Microsoft® Windows operating system through a common programming model. The Microsoft Mobile Explorer Micro Browser enables cellular phones to access HTML Web Pages. Finally, some future product lines from our partners will enable consumers to tie entertainment and home-control devices into a home network

Intelligent Devices

The "intelligent device" tier is immediately below the PC tier. Over time, the distinction between these two categories will blur. Computing systems in general will evolve toward a disaggregated model like processing, display and storage, and will make use of each other's capabilities. A phone, for example, is primarily a voice device that will be enhanced with data capability A TV is primarily an entertainment device that is enhanced with greater interactivity and Web content. Today, the primary difference between the PC and intelligent devices is that PCs are general-purpose devices while intelligent devices are really primary function devices intended to accomplish specific tasks. Every PC essentially can run the same applications as any other, whereas an intelligent device is optimized for a particular function.

Microsoft defines intelligent devices as having an advanced microprocessor, which is capable of performing a purposed activity (such as managing your personal information and messages, adding smarts to a phone, or adding new entertainment features to a TV) and/or participating in a more sophisticated networking solution. Last year, about 300 million advanced microprocessors were sold that were not used in PCs.

PC-Plus

The PC is the most dynamic of all the devices– and the most popular. Last year alone, more than 90 million PCs were sold worldwide. Over the years, the PC has evolved from simply being a typewriter replacement to being a fully internet-enabled, multimedia device.

The magic of the PC allows it to constantly change and extend to incorporate new technologies, changes in networking bandwidth, the type and number of devices connecting to it, and market conditions as a whole. The next wave of "very personal computing" will redefine the PC yet again. Now, it will become the place where integration between other intelligent appliances and the Internet occurs. With broader network bandwidth, people will get even greater use from their PCs by leveraging the local storage and processing capabilities. This, in effect, allows the PC to share its capabilities with other devices on the network, creating a PC-enhanced TV, telephone or refrigerator. PC's are also able to offer an amazing variety of functions in one place, from advanced 3D games and digital music jukeboxes to understanding natural language and a powerful tool to manage your money.

Services

The service pyramid represents all the information an individual may want to connect to. The range of server products, whether they are from Microsoft or other vendors such as Oracle or Lotus, allow businesses to run more efficiently by automating business processes, and to make

better decisions by allowing people to communicate and share information more easily. Making such information and services available in this range of convenient intelligent appliances logically extends these business processes.

Interconnections

The rigid world of tying a particular service to a specific device is passing. In the future, we will be able to access the information and services we want from the device we choose at any time, and the information we access will be current on whatever device we happen to select. This will be a world of loosely coupled devices.

Intelligent devices and smart objects need to have relationships with PCs, servers and services. The nature and management of these relationships are critical to providing a positive user experience and a secure overall system. Examples of Microsoft's solutions in this area include Systems Management Server and our synchronization applications.

Microsoft is working at all levels to create this integration, as shown in the pyramid diagram above. As an example, the first releases of our synchronization software essentially required that companion devices, such as the H/PC and Palm PC, connect first to the PC and then link to the rest of the network. We are now in the process of enabling seamless connectivity to servers and services, as well as to PCs. This loosely coupled set of services and devices will allow people to easily add additional services and/or new devices to the broader framework. The process will be as easy as adding a new phone or electric lamp to your home: simply plug in the device and the services are available to you.

Just as the relationship between devices and servers is critical from a user's point of view, so is the method by which all these devices learn about each other's existence and capabilities and how they present these capabilities to the user. This will eliminate the network configuration and management requirements that would normally be associated with a complex multi-device network such as this.

Microsoft is addressing this essential area with the Universal Plug and Play (UPnP) initiative that we launched with dozens of major partners early in 1999. UPnP is a standards-based approach to connecting all these devices into one broad computing framework. UPnP makes it simple for devices to advertise, discover and use the services or capabilities of other devices that are on the network. UPnP doesn't define the services themselves; rather it provides a mechanism for enumerating and describing them, and negotiating protocols. UPnP is akin to the dial tone you find on telephone networks – a necessary, enabling technology within a platform rich enough to support all of the services consumers will want to add in the future.

Summary

The combination of faster, smaller "appliance-like" computers and new high-speed networking technologies is dramatically changing the computing landscape. Microsoft's goal throughout this transition is to provide the software and services that will give people the power to connect to their friends, colleagues, personal and business information anytime and any place. Microsoft is working with industry partners and standards organizations, as well as investing directly in many critical areas, to deliver this powerful capability to our customers as quickly and effectively as possible.

Appendix

At Microsoft, we look at the way people have used personal computing technology to enrich their lives. Before the PC and the Internet, there was a set way of creating, gathering and disseminating products and information. Today, this has changed fundamentally; and new software will accelerate the rate of change in the future. Here are a few examples of consumer service platform technologies:

	Pre PC/Internet	**PC Era Narrowband Web Access**	**PC-Plus Era Broadband and Wireless Access**
Entertainment	Movies, Radio, TV, tapes and CDs	Interactive computer games, chat rooms	Web based multi-player games, multi-media chat sessions
Communications	Write letters, phone, paging, Telex	Cell phones, e-mail, instant messaging	Video Telephony, multi-mode messaging (e-mail, voicemail, fax)
Information	Print, radio, television	Web, push services	Wirelessly connected personal information devices
Productivity	Paper organizers, lists and paper files, pocket calculator	Computer-based check books, online finance tools, personal digital assistants, universal inbox	Telepresence, video teleconference, video Rooms, electronic Whiteboards
Convenience	Shopping malls, yellow pages	On-line shopping	Universal Directory

In many product categories, there will be a redefinition of what products and services are offered to consumers. Here are a few examples:

	Phones	**Electronic Organizers (PDA)**	**Cars**
Entertainment	Locate and book shows and events	Receive and use digital audio and video clips	On demand radio, movies (DVD)
Communications	Use text-based mail/messages and fax in addition to voicemail.	(Wireless) email and voice telephony calls	Email and voice telephony integration
Information	Real-time news alerts, web access	Web access, content subscription services (newspapers, newsletters, books)	Voice-interfaced Web, real-time traffic alerts, dynamic re-routing
Productivity	Manage all interpersonal communications from one device, Integrated personal digital assistants	Integrated personal digital assistants, rich email, view and edit productivity files (spreadsheets, documents, presentations)	Integrated personal digital assistants, voice-enabled email, access productivity files, mobile office
Convenience and personal safety	Emergency access to security and aid services; help finding products and shops	Find services close by; call for help when needed.	911 called when air bag deployed, real-time routing information to avoid traffic problems