

TO:	Windows Experience Team; Core Operating System Division
FROM:	Julie Larson-Green, Jon DeVaan
RE:	Planning Windows 7 Client

INTRODUCTION

Congratulations on completing Windows Vista! It is a tremendous release and is already receiving accolades. On behalf of all of Microsoft, our partners, and the hundreds of millions of customers anticipating Windows Vista, thank you for your efforts and for your continuing enthusiasm for building Windows—as a team you came together and built the highest quality, most secure, and most feature-rich operating system on the planet. Without a doubt, Windows is and will continue to be the most important and most widely used software anywhere.

This document is the *Windows 7 Planning Memo* for the next release of Windows client. It outlines the shared assumptions in our planning work across the Windows Experience (WEX) and Core Operating System Division (COSD) teams and explores our connection to Internet Explorer, Windows Live, Windows Server, and other internal partner teams. It covers the state of the market, including business, customers, external partners, competition, technologies and challenges. It outlines the areas for investment in Windows, as well as the questions to be asked and answered as part of planning. It also sets the timeline and schedule for the Windows 7 product plan and is the first big step toward a holistic vision that directly support the business priorities established by Windows Product Management. Given other priorities and different release schedules, the plan for Windows 7 will assume no new work from the Server teams that build client components. We will continue to work closely with the server team to complete Longhorn server, followed by R2 for Longhorn Server. Windows 8 will be our target for joint planning across Client and Server.

Think of this planning memo as a “request for ideas” in a set of strategic areas of investment. Its purpose is to put emphasis on shared planning themes, but it is not designed to be all-inclusive nor eliminate ideas being contributed in other areas. It is a framework to provide direction for further exploration of concrete feature ideas. As such, this planning memo *is not* the plan. It is not the vision nor the feature set. The planning memo starts our planning process and will be used by the WEX and COSD teams to develop the vision and the feature set for their areas. These teams are the experts on the scenarios and specifics for their areas and are responsible for building the best customer solutions.

Some reading this memo will think it is probably too long, especially since it is not the plan itself (though the reviewer’s guide for Windows Vista ran nearly 300 pages). Some might think this is too short since how could it cover all of Windows in just thirty pages. Similarly, some might wish there was more detail and some might think this is too constraining. This planning memo balances all of these issues and more and represents a way of focusing our ideas and assuring organizational alignment in the pursuit of those ideas. While reading this document is an investment of an hour or so, it is an investment that will pay off in the weeks and months to come. It is a critical part of us working together as a team.

This is the first time our new organizations have gone through planning together so it is important to outline the process we will use across Windows; including roles and responsibilities. Our overall objective is to create a learning organization that works together cooperatively on shared goals leading to a great product delivered on time. That starts with a clear planning process that we use for this release and then refine for the next release. A transparent and repeatable planning process helps reduce risk in our engineering and uncertainty in our ability to align with customer and business priorities. It also creates a context in which innovation can occur.

Innovation starts with you. Following this planning memo, we all begin creating the vision. Visions discuss proposed scenarios and customer promises for each feature team. They should clearly address investments in each of the themes that span the release. And they should ask and answer the questions posed in this memo. This effort will be led by Program Management, working with all the engineering and marketing discipline leaders. The PM leaders will work across dependent teams as they are writing their vision drafts to ensure scenarios and features that span teams are represented end-to-end. Issues that arise must be resolved as part of the visioning process. At the end of the planning process, we will load balance across teams to make sure that the top scenarios and themes are funded for the release. This memo talks a lot about teams, because we expect teams to be operating together—including all members of the team and all disciplines, sharing information, debating issues constructively, and reaching a shared view of how the team will move forward.

The output of the planning process is a single *vision document* that spans the work in Windows 7. This will include the value proposition, tenets, top level schedule, shared bets, and feature commitments across our teams. We expect to publish the vision document in May. By the time we get to the vision document we will have narrowed down what will and won't be in the next release; if it isn't in the vision document, it isn't part of Windows 7, so now is the time for making sure your ideas are heard.

Finally, we will establish a release rhythm that meets internal and external expectations, inspiring people to align rather than bet on incremental out-of-band releases. We have been spread too thin on too many releases that are not valued by enough customers. This means we want the team to be focused on Windows 7 so we maximize the impact of the release. This first cycle will be a bit of a challenge in that it is our first together. Some will be worried we might not make the dates for Windows 7, some might not have faith we will stick to the plan, and still others will remain convinced that we simply must get some deliverable done sooner. We are making a big bet that focusing our limited engineering abilities on a reliable, predictable, and planned release will maximize the benefit for customers, shareholders, and partners, and will also be the most efficient way for us to deliver value.

WHERE WE'VE BEEN

Windows XP is deployed on more than 650 million desktops, and while creating Windows Vista, we've continued to deliver value and innovation for those XP customers. Since Windows XP Gold in August 2001, we have shipped XP SP1 and the breakthrough XP SP2; XP N and K/N; Windows Server 2003 and R2; 64-bit desktop and server; Windows Tablet PC; two versions of Media Center Edition; Internet Explorer 7.0; Windows Media Player 9, 10 and 11; Windows Defender; and a host of updates, security

fixes, and out-of-band releases that kept OEM, corporate, developer and retail customers satisfied and believing in our commitment to them. Following all of this, with Windows Vista we have advanced the state of the art in many areas and delivered great new value to our customers. Here are a few highlights:

- **Security and Data Backup.** Major architectural improvements, Defender, User Account Control, BitLocker, and the most secure web browser ever made by Microsoft contribute to making Windows Vista the standard by which secure the OS will be measured.
- **Networking and Mobility.** The Network and Sharing Center, wireless networking, network diagnostics, Mobility Center, Tablet/Touch technology, Meeting Space, power plans, IPv6, a new networking stack and peer to peer all bring a new generation of performance and versatility to consumer and enterprise communication.
- **User Interface and presentation.** DWM, AERO, Welcome Center, Start Menu, Control Panel search, user model, explorers, and system search offer a clean and comforting Windows desktop.
- **Deployment and manageability.** Single image management, enhanced Group Policy, Services for Unix and powerful tools to aid in Enterprise management like Business Desktop Deployment tool and Application Compatibility Tool all make Windows easier to manage.
- **Inking.** Pen improvements, snipping tool, and touch screen support provide the richest experience for ink ever.
- **Media and Web browsing.** Photo Gallery, WMP 11, Media Center, audio support, the new IE. The Windows PC is not just relevant, but desirable for every web and media scenario.
- **Graphics.** New Display Driver Model, and DX10 all set the standard for desktop graphics and gaming.
- **Printing and Documents.** XPS, high-fidelity output, and improved color printing deliver innovation in a scenario that everyone relies on, even in today’s online world.
- **Help and Feedback.** New client and web experiences, new tone, feedback platform, better when connected, and continuously published. Help is no longer dead on arrival.
- **The list goes on and on...** Searching and organizing, better deployment and installation, diagnostics and much, much more have made Windows Vista a flagship release.

BUSINESS OVERVIEW

The Windows Client mission is to *“Make the Windows experience a vital and loved part of people’s lives.”* Windows integrates the widest range of applications, services, and hardware in a familiar way, so each person and organization can easily and confidently use technology to achieve their goals and pursue their passions. The following sections provide details and context for how we approach this mission and align product objectives and investments with the overarching business goals.

State of the Business

During our ramp year to Windows Vista, FY06 performance remained strong, with net revenue growing 8% from \$12B to \$13B. It is worth pausing to realize what a huge growth rate that is on top of a huge

business—it is amazing! But we also aspire to beat these numbers with Windows Vista. To better understand the business drivers, the market can be broken down across five major segments:

Market Segment	PCs	% Install Base	Shipments	% Shipments	FY06 Revenue	FY06 % Revenue
Consumer	355	46%	66	34%	\$3.6	27%
Education	55	7%	15	8%	\$0.9	7%
Small Business	170	22%	48	25%	\$2.4	18%
Med Business	100	13%	27	14%	\$2.1	16%
Enterprise	95	12%	36	19%	\$4.1	31%
Total:	775	100%	192	100%	\$13.1	100%

Contrary to common perceptions that the consumer segment is the largest Windows revenue source, the Enterprise market contributed 31% of revenue on only 19% of PC shipments. Enterprises also have the lowest piracy rate and higher attach to premium SKUs. Taken together, business customers represent two-thirds of the business overall.

The consumer market remains the largest Windows installed base and driver of new PC shipments and more than 90% of Consumer revenue is associated with new PC purchases. However, we cannot turn our attention away from the in-place upgrade experience. In the first six months we expect to sell 2.5 million upgrades, either Windows XP to Vista or Windows Vista SKU upgrades. Consumers also serve as influencers to *pull* adoption of newer Windows versions in business segments.

Small and Medium Businesses are often the afterthought in Windows planning, yet, when combined they represent the largest segment of new PC shipments (49%). Small Businesses are the main source of lost premium SKU mix revenue with defections to lower price home SKUs.

Microsoft sells Windows Client licenses through 4 major channels:

Channel	Description	Revenue %
DOEM	Direct OEMs: <i>Major OEMs (Dell, HP, Toshiba, Sony, etc.)</i>	71%
COEM	Commercial OEMs: <i>System builders (beige box builders)</i>	13%
FPP	Full-Package Product: <i>Boxes sold in retail stores</i>	3%
VL	Volume License: <i>Open, Select, & Enterprise Agreements</i>	13%

The Direct OEM (DOEM) channel is by far the largest channel, meaning Windows revenue is very dependent on PC market growth, expected to hover around 6% annually through FY09. The DOEM channel has both the fastest growth and the lowest revenue per license (RPL). As the DOEM channel has grown and gained share in recent years, overall RPL for Windows client has decreased about 1%.

In contrast, the Volume Licensing (VL) channel is not directly linked to new PC purchases and has great upside. Enterprise Agreements (EAs) are the premium annuity form of VL. In FY06, the Windows EA business rebounded due in large part to EA Windows Vista upgrade rights and the introduction of Windows Vista Enterprise Edition. Yet, only ~34% of PCs in large organizations are covered by EAs. For Microsoft, there is no better or more important customer than an EA customer. An EA customer generates ~4 times the revenue of a consumer buyer over 4 years.

The above captures the Windows business for developed markets—those major markets that represent the vast majority of our revenue. We are also expanding our view to aggressively develop our business in emerging or developing markets around the world. In many cases we will need to develop software that meets local market demands. In these markets we also must deliver a product that competes with challenging views on software piracy or on the overall monetary value of software relative to hardware, especially as the price of a *good enough* desktop drops below \$300. For these markets we are focusing our efforts on legalization offerings and market-specific offerings, such as Starter Edition. We’ll also continue to develop new ways of selling Windows, such as FlexGo or the Start Key. As we develop the technology behind these offers we will likely find creative uses for these in developed markets as well, so it is important we consider these technologies from the start.

Looking forward, Windows revenue is projected to grow ~10% annually to \$17B in FY09. Windows Vista will be a major driver and is expected to account for over 45% of the installed base by 2009. However, we cannot achieve these goals by simply riding the 6% PC market growth wave, particularly when a significant portion of PC growth stems from developing markets with the lowest revenue per license and highest piracy rates. Incremental growth must come from a business and product development strategy that prioritizes the largest growth opportunities and delivers on a more predictable schedule.

Business Priorities

There are four primary paths to Windows business growth, with a distinct set of drivers for each that are tied to the creation of customer value and excitement in the product. It should be clear how features in Windows 7 roll up to a scenario, who is the customer for that scenario, and how the behavior of that customer will drive revenue and/or strategic growth for Windows.

Paths to Growth	Growth Drivers
I. Grow PC Purchases	<ul style="list-style-type: none"> • First PCs: Spur first-time PC buyers in emerging & developed markets • Replacement PCs: Accelerate PC replacement rate • Additional PCs: Sell additional (Nth) PCs to existing users/households
II. Grow Paid-for Share (Reduce Unlicensed Units)	<ul style="list-style-type: none"> • Unlicensed: Reduce piracy & convert unlicensed to genuine
III. Grow Revenue Per License (Move the SKU Mix)	<ul style="list-style-type: none"> • Consumer: Make Home Premium a high-volume (mainstream) choice & make Ultimate the SKU of choice for high-end PCs • Small Business: Provide compelling reasons for SB buyers

	<ul style="list-style-type: none"> to choose the Business SKU over Home or Home Premium Enterprise Agreements & Software Assurance (EA/SA): Add value to Enterprise SKU and drive annuity revenue
IV. Grow Post-Purchase Revenue	<ul style="list-style-type: none"> FPP Upgrades: Drive OS upgrades independent of new PC sales and product/SKU upgrades via WAU Content & Services: Add a stream of subscription & ad-supported revenue to the base OS revenue

Starting with the Windows Vista release, we begin transforming the PC market to a predominantly premium SKU mix and we will continue to proactively seek ways to increase the differentiating value of each SKU—because we believe customers desire more value and are willing to pay for such value. Developing the business specifics of these SKUs takes time so our engineering focus will be on the tools, processes, and systems that we can put in place to maximize the points of flexibility for the business team while improving engineering and servicing efficiency.

Customers and Partners

In planning our next release, it is important that we consider the different segments of our customer base and the unique aspects of creating compelling value propositions for each.

OEMs. Collectively, OEMs are our biggest customers and our biggest partners. They are facing challenges on multiple fronts with strong pricing pressure depressing their margins and elevating Windows as higher percentage of total PC costs. This is increasing their desire to find additional revenue streams by differentiating their PCs with software that is complementary and competitive to Windows. OEMs value release predictability and standards over innovation frequency but they also desire compelling scenarios and a consistent stream of innovation to drive demand for new PCs.

IHVs and ISVs. Like OEMs, IHVs face significant pricing pressure (e.g., digital cameras, mobile phones) but some sectors are enjoying strong unit growth and it is unlikely IHVs will target specific versions of Windows and pay the opportunity cost of targeting a reduced total addressable market. Similar Windows versioning implications apply to ISVs and the software landscape is consolidating even though new software business models are emerging. The top 10 software vendors who in 2000 held 34% market share, now hold 43%. In addition, Open Source and Web 2.0 applications are becoming increasingly disruptive and acquiring new customers and financial value.

IT Professionals. The IT Pro audience is the focus of the majority of sales, marketing, and design for Windows in the Enterprise space. There are 27 million IT influencers worldwide, and nearly 40% of them have direct impact on Windows purchase and deployment decisions. IT Pros are not always the final approver of a purchase, but they often have the ability to terminate a buying decision.

Individual end-users. In Windows 7 we will be looking across the spectrum of the end-user PC experience from work at home, home at work, work on the phone, and from other locations to support increasingly mobile lifestyles. However, we cannot lose focus on nailing the fundamentals (UX,

performance, PC management, back-up, etc.) and delivering flawlessly on mainstream scenarios like location awareness, browsing, memories, music and gaming.

Small Business Owner/Managers (O/M). Often overlooked or lumped-in with end-users, O/Ms represent a major customer segment with their own set of unique needs. Because the O/M is busy running the business, managing sales and marketing activities, managing people, and managing finances, they cannot focus primarily on IT management. O/Ms typically spend one day per week managing various IT issues, such as providing tech support for employees, installing or configuring applications, and dealing with security. Future versions of Windows must incorporate simple solutions to common IT management problems that are visible enough to drive Pro/Business SKU mix.

Developers. Our Windows XP and Vista releases have delivered major advances in the end-user experience. While Developer was a large focus in the beginning of the Longhorn project, significant focus was lost after the reset. Windows 7 needs to reenergize our commitment to the Developer audience and win them back from our most ubiquitous platform competitor: The Web Platform. For a variety of reasons, developers in all segments are increasingly choosing to build applications for the Web, as opposed to rich Windows applications.

Business Challenges

While our work in Windows Vista is a breakthrough in many areas, we face several significant challenges in the marketplace and the previous sections point to some of these challenges. Challenges exist at many other levels, including how we design our products, how we engineer them, and how we study and understand our customers. We need to internalize these completely and attack them head-on with deliberate changes in how we do our work.

Business Value and Deployment. Because of the high cost and complexity of deployment, most Enterprise customers upgrade desktops every three or four years. These upgrades often coincide with the lengthening desktop hardware refresh and many are even choosing to downgrade their desktops to older versions because of these deployment costs. We are also seeing increasing interest in thin client and network-centric computing in the face of these deployment burdens and increased desire to lock-down IT infrastructure. This challenge—where we are being asked to innovate while maintaining compatibility—represents one that is at the core of the planning process and reinforces our need to align on assumptions and a decision framework. Shifting the lens to small businesses, our existing value proposition is largely targeted to businesses with servers. For the extensive, non-server business segment (~20 million by FY10), we are lacking a differentiated value proposition across the home and business SKUs. Without a fortified Windows 7 value proposition, we run the risk of lower premium business SKU attach.

Consumer Premium. In spite of rapid technology changes, many of the most frequently performed activities on Consumer PCs have remained constant for the past five years (e.g., Internet use, games, PC management, photos, productivity, music). Driving premium differentiation will require advances in these core scenarios as well as placing bets on new areas of innovation. Packaging these advancements

in an integrated premium SKU value proposition will be critical to successfully garnering increases in SKU mix and consumer value perceptions. These features must be discoverable and consumable immediately so customers have a simple out-of-box experience.

Platform Innovation. The software and hardware markets today are experiencing significant disruption. The software market is increasingly shifting to open sources and web 2.0 based apps while the hardware market is seeing an explosion of new types of devices but also increasing pressure on profits. Both of these are causing technology analysts to forecast a decline in the importance of the Windows OS with the increased availability of OS-agnostic applications that are not dependent on a specific operating system. We can change this trajectory with a renewed focus on exploiting new hardware innovations while also working with partners to deliver a great experience.

Windows Web Platform. The browser is a core user experience in Windows and a platform for increasingly rich Web 2.0 applications. Driven by Firefox's innovation and perceived security enhancements over IE, IE has been losing usage share among enthusiasts who have actively chosen to install Firefox. Enthusiasts make up about 40% of users in some geographies; individuals who would passively use whatever browser is set as the default on their machine by the OEM or an IT decision-maker make up the bulk of the rest. It is these passive users and the active users who have not switched who are upholding IE's current 87% usage share worldwide. The biggest risk to IE usage share is the large scale loss of passive users, most likely precipitated through a large OEM setting Firefox as the default. While somewhat less of an immediate risk relative to the OEM, declining usage in the enterprise should be taken seriously. When enterprises switch, they are slow to win back.

Mobility. In the lifetime of Windows Vista, consumer mobile PC shipments will exceed desktop installations and we must excel at mobile fundamentals such as power management, fast on/off, backup & sync, ubiquitous connection, and location awareness. Compared to desktop PC, mobile PCs have higher usage rates, are replaced more frequently, have lower piracy, command a higher price and carry the potential for driving higher premium SKU attach. Mobile PCs also introduce cost (more expensive to buy and support), complexity (more difficult to manage), and risk (vulnerable to theft/loss plus malware infections). Reducing the cost and complexity of managing mobile PCs may give us an opportunity to package these enhancements in premium SKUs.

Piracy. Windows' 10-year aspiration is to drop the Windows unlicensed run rate for annual PC shipments from 29% to <10%. Windows 7 must continue to evolve the value proposition for Genuine Windows. The most compelling value propositions for genuine software are: substantial additional benefits, including planned updates and additions to Windows; protection from security and reliability dangers of counterfeit software; support from Microsoft and partners for their software; peace of mind knowing their copy of Windows is Genuine; and improved software asset management for corporations.

Competition

Linux. While Linux adoption on the enterprise desktop remains small – due to lack of drivers, applications and inherent usability issues – there continues to be an interest in these alternatives to

Windows. Primarily the interest is on thin clients where applications are accessed remotely or via the web. Many of the companies repurposing older PCs into thin clients do so because they are looking for a low-cost alternative to purchasing new hardware or because they are believers in *good enough*.

Apple. Apple has enjoyed strong consumer demand recently for their Macintosh computers, driven from their strong brand, pull from their success in digital music players, and from their perceived strength in the fundamentals. The transition to Intel-based hardware allows Apple to tap the economics of the PC platform in terms of lower price/higher performance driven by much higher volumes than their previous platform. OS X is also creating demand due to a perceived strength of delivering on the fundamentals; both Mac and PC users agree that the Mac is “less vulnerable to viruses,” “reboots less often” and is “easier to learn” than a PC. By delivering on the fundamentals and providing strong customer value with iLife on innovative hardware, Apple enjoys strong customer loyalty (with over 90% of Mac users “definitely” repurchasing) and high customer satisfaction (over 94% “very satisfied”). These strengths have led Apple to strong growth over the past two years as their PC market share has increased from 3.4% to 5.7% in the US, primarily fueled by their laptop lineup, which has grown from 5.0% share to 8.9%.

Web as a Development Platform. Web 2.0 is a term that has come to mean the realization of a dynamic and agile web. AJAX has evolved as a key driver of this new world of browsing, enabling web pages to be more responsive by eliminating the need for a page to reload every time a user takes an action. As developers find the web a more dynamic and ultimately satisfying platform for end-users, the shift toward development of web-based applications will continue to marginalize the rich client. For Windows 7, we need to think about how our rich client platform, in combination with Internet Explorer, is a compelling solution for today’s web 2.0 developers.

Google. With the Google desktop, Google has taken the first step from an Internet services competitor to an operating system competitor. In the future, Google could build a model where applications are run over the net and executed locally on thin-client devices or set-top boxes or at the very least in an OS-agnostic manner delivering a least-common-denominator experience to customers. In that world, the PC and OS become more commodity-like products, and open source becomes a serious competitor. While there is attraction to this, we believe deeply that this approach reduces innovation and value delivered to customers—it forces experiences to be delivered through a much narrower pipeline that is not always the best way to deliver functionality.

Alternative devices (Smart Phones, Portable Media Players, Game Consoles, Set-top boxes, etc.). As alternative devices gain computing power, they may start running alternative operating systems and assume scenarios previously handled by PCs. In these scenarios, mobile devices could displace PCs in the home and in the mobile workforce. In developing markets, mobile devices unleashed the power of voice communication in places that have never benefited from it, and thus for many the first *computing device* will be a mobile phone.

BIG BETS

There are a few bets that we will make as a team and that will require work from all of us toward realizing our vision. These bets represent initiatives across the team. As the planning process evolves we will better understand the model for how development along these lines will move forward. For some initiatives we might follow a model that expects every team to contribute to the work. For some we might choose to have all the work done by a shared team with expertise from across the product. Or we might choose an alternate model. As a management team we will commit to no unfunded mandates. In all cases, work on these bets is key to our success and will be rewarded as an important contribution just as much as work within a specific feature team on team-specific features.

Hardware-driven Innovation.

Future OS releases should exploit new hardware innovations in processors, networking, storage, and other areas. Windows, at the core, is about memory, connectivity, processes, and disk, and we will be creative in how we take these to a new level. Advancements in chip architecture, such as multi-core, open up new possibilities for performance. Our core operating system will exploit such processor evolution, as well as other hardware innovations in GPU utilization, networking, storage, and other areas. The best experience of the new OS will be on the newest hardware, but the Windows 7 should install and run the base value proposition on any Windows Vista-capable PC.

Virtualization.

PC virtualization technology enables one or more virtual machines to run simultaneously on a single PC. We will embrace virtualization on a number of different levels and think through the impact of hardware virtualization, application virtualization and API virtualization, and our business team will develop licensing and business models to support these innovations. The concept of virtualization represents a big shift in our thinking and provides opportunities to us as the Windows development team and to our customers. Virtualization can potentially drive cost down for us around application compatibility efforts, management, and hardware utilization and can also provide protection against rogue software and malware to improve the everyday user experience. Virtualization also represents user experience challenges like complex window management issues and well as data and state migration issues.

State Separation and Roaming

Our focus must be on separating the user state from the state of the OS from the state of applications. User state represents data created and generated by applications to a variety of useful settings and customizations and is often laboriously collected by customers over time. We need to provide robust and performant mechanisms to roam the user state seamlessly between devices. Having a way to manage all user state is also essential for solving upgrade problems and offering a value proposition to consumers and enterprises for multiple machines and replaceable machines.

Windows Live

Our company has bet on the combination of software and services as our winning strategy against *pure* web competitors. We are uniquely positioned to offer such a powerful combination to customers in all segments, from consumer, to businesses, to developers, to our partner ecosystem. While differences in release cycles make integrated planning for Windows and Windows Live more challenging, we will deliver outstanding scenarios with Windows Live Wave 3 running on Windows 7, using the open and documented APIs of Windows Live. We will also think about unique developer scenarios and APIs for the combination of rich client and third-party services. For instance, we might be able to engineer controls that are win32, bound to web data, and also light-up controls when using a plain old web page in IE. No other company in the world can deliver this kind of value to developers.

Continuing Bets

Security. The world continues to become more expert at exploiting computer systems. Much of the escalation comes as hacking moves from amateur status seekers to professional criminals and state espionage agencies. Microsoft is gaining credit as we have significantly improved over recent years and we show better on the overall statistics than competitors. We are not perfect, however, and the sheer numbers of Windows machines means that we need to be much better than our competitors and yet more secure than we are today. New technologies are emerging that can help customers keep their systems and data more secure. We can help end users by making the security experience simpler.

64-bit and Multi/Many Core. Since it is clear that there will be a large number of 32-bit devices when our next OS release comes out, we need to continue to invest in both 32- and 64-bit systems. The investments we need to make are not only in the low level of the operating system, since we need to be able to explain to customers and developers how to manage the complexities associated with this dualism. During this transition we need to enable the ISV ecosystem to properly address the needs of users running the 64-bit native computing platform because today's experience suffers from missing extensions and drivers. The user experience must not degrade on the most modern and most expensive computing platform. During the planning process we will decide critical issues such as upgrade from 32-bit to 64-bit and how to use 64-bit as a chance to break from particularly burdensome compatibility and security challenges. Our processor partners are also investing heavily in processors with many cores on one chip, increasing the demands on Windows to provide support for large processor counts for servers, and transparent strategies for clients to derive value from the large amount of computing power that will arrive through multiple cores in each CPU.

System Layering and Componentization. Windows is the most sophisticated and open software product known to mankind and our development and servicing process faces challenges that are tied to that sophistication. In order to improve agility, predictability and reduce the cost of maintenance, we need to invest into rationalizing the overall architecture of the system. We cannot afford to take Windows offline and spend years reworking the architecture without delivering customer value to the market, so we must develop a plan to do this in stages over several releases of Windows. We need to focus our investments along the areas that impact our other big bets.

The Windows Engineering System. While not part of the product, we will be investing in improving our engineering system both before Windows 7 coding starts and over the course of the Windows 7 project (whether we choose to make changes mid Windows 7 or simply incubate improvements for Windows 8). We will use the planning process to drive the best ideas for improving how we work on Windows.

PLANNING THEMES

The planning process is about focusing the team on the most critical problems to solve and helps us create a clear vision for the release. The planning themes articulate the direction in which we want to head based on our business and customer challenges. For these reasons they must become the basis for our brainstorming and data gathering. Everyone should think of the planning themes as the rough draft for how we will market and sell Windows 7. The planning themes are:

- Refining the Vista User Experience
- Building Customer Confidence
- Embracing the Best of Web Development
- Helping OEMs and IHVs Win the Hearts of Customers
- Turning IT Pros into Windows Evangelists
- Making it Easy to Add or Replace a PC
- Lighting Up Everywhere with Servers and Services
- Finding Everything Easily
- Connecting Multiple Devices to Multiple PCs
- Embracing Hardware Advances for Better Multimedia Experiences

These themes will prompt the unanswered questions we have about our users, customers, competition, and partners. These questions drive the research agenda for Product Planning and UX Research while simultaneously feeding creative ideation across the engineering disciplines. We should not expect magic answers about what we should do from research or listening to customers—we will make some bets and develop features even when we cannot prove they will be successful. Conversely we will develop many features that relieve customer pain points with novel implementations customers may not have anticipated.

Designing is a social process, so generating ideas mostly means spending a lot of time talking to each other, our customers, our users and our partners. Highly social and informal processes are inherently ambiguous and consequently somewhat stressful. There will be very few big, formal *creative* meetings and most ideas will be vetted by documents, demos, sketches, and discussions. There will be dozens of offsites, smaller meetings, hallway conversations and mountains of email threads. Ideas gain momentum and then they stall and although it may feel random at times, it's actually highly deterministic. Because we're all operating from the same set of assumptions and are driving toward a set of shared and scheduled goals, we are able to create, contain and control the chaos. Ideas that achieve critical mass should do so because a large set of people believe in the idea and how it fits in with these themes, not because the most head-strong person was championing it or because someone won the debate. It is neither design by committee nor design by a single hero. Ultimately, planning themes

are intended to create an environment where best ideas that meet customer and business goals are given a platform and forum for consideration and the very best ideas achieve a broad level of support. If ideas make it into the product because of sheer force of will of a single person against all others then we have probably failed.

During this process, ideas need to be written down. This is the primary *work product* during the planning phase. “Writing is thinking” is our mantra and PowerPoint slides don’t count. This comes with the added responsibility that when you’re given a document to review, you will want to review it and use that as a chance to provide feedback and input. Clearly, envisioning requires more than just words; ideas will be sketched and images will be created. Often, one person’s drawing and another’s writing end up being very different things. And that’s ok too. Writing and visualizing are often symbiotic. But if you find yourself in a debate over a picture, then the parties in the debate should take the time to write a more detailed description. Eventually the writing and the picture will bond together as one idea. This is what must be documented and will form the basis of our commitments for the product.

You will also notice that the planning themes cut across the organization and do not represent the team structures. This is deliberate. We can never organize the team so that any given initiative is contained wholly in a single team—the product is too multi-dimensional for that, and of course customers do not want a silo of features from us. We also need to strive to avoid *hard seams* in the scenarios where shipping those seams to customers has a negative effect on the overall experience. But to avoid the painful *sea of dependencies* we will use the planning process to be deliberate about the connections across the organization and to define accountability and ownership clearly. As with bets, we expect people to work on cross-group initiatives and more importantly we expect the plan to reflect these bets and the allocation of resources to follow logically from what we intend to accomplish. With a good plan we can morph dependencies into partnerships, greatly reducing the stress and strain on individuals and the organization.

Due to the ambiguous and creative nature of the planning process, it’s easy to get lost in it. It needs cohesion, communication and action. For this reason, we’ll rely on program management to orchestrate the process—starting with prompting discussion around these areas, coordinating deeper planning, prototypes and local area visions. Finally it will all converge into a well thought out, thorough, detailed, executable vision and plan for the release. And this plan will be based on well-understood architecture and development design plans, test plans, and collaboration across the engineering disciplines.

Refining the Vista User Experience

Now that we have delivered a user interface revamp in Windows Vista, the next step will be to understand what customers really think of it after widespread adoption. As we start hearing more about what they would like to see, we will need to respond to their concerns and improve the experience.

While people are adopting and adapting to the new interface in Windows Vista, we will be focusing the next release on making the Vista interface better, not redefining it. That means no dramatic changes to

the interface or revamping of features that we just changed for Windows Vista. Instead, the focus needs to be on listening to our customer and understanding where the seams are in their experience and how we can improve accessibility of our product to all our customers.

This starts with eliminating the “gotchas” that our users come across in the system everyday and defining the top things people do frequently that we can just make easier. We need to make sure the most common tasks are the easiest tasks, the harder tasks are at least possible to figure out and there are no dead ends in the system. We need to look into some new areas where we can take the load off our customers in managing their workspace. One such area for exploration is window management—we can make it easier to manage all the rectangles on their desktop.

Our aspirations for the Vista user experience were very high and while we succeeded in a number of areas, we also increased the complexity of the system by adding several new concepts without eliminating others. We need to take a look at the things we have added and how they mesh with the “old” things in the system. We need to think about how we reduce the number of concepts and how we unify them and create a more seamless experience. Too many times we interrupt the user with information we think they need to see; we need to take a much more “Do not disturb” approach to keeping users productive and on task with their work. We need to reduce or eliminate as many error alerts, pop-ups and warnings as possible and keep things running without needing user intervention. Thinking through the scenarios that interrupt users includes being super efficient with power management and how we recover the system from sleep. Anytime the PC is not ready to take the direction from the user, it is lost time and increased annoyance for our customers.

This is a theme that is likely to very quickly develop a long feature list, particularly a list based on ideas we did not have time for with Vista. The key to developing our ideas here and prioritizing them will be the real-world experience of customers. This area is not about quickly front-loading the Windows 7 project with the next (or last) 1000 features, but about being very focused with what we decide to continue. Looking at this theme from a resource perspective, we expect that no more than 20% of the efforts of any team will go to *fixing* Windows Vista issues and that 80% of the effort will go towards innovation. Some innovation will go on top of Windows Vista features, of course, but we expect this to be in a direction that is novel and based on feedback, not based on the Vista cutting room floor.

Examples of features we could build to support this theme include:

- Make the top 10 tasks easy and pleasant to accomplish in half the number of clicks it takes today.
- Rethink the windowing model and help users work with arranging multiple documents on their desktop or on multiple desktops.
- Remove barriers to easily accomplishing user actions by reducing the number of mechanisms and number of prompts a user has to deal with and enforce more consistency across the system.

- Close the loop for customers with “performance Watson” to monitor the performance of a user’s machine (time to boot, load drivers, login, etc), diagnose slowdowns, fix it transparently or present the user with clear choices and plan to address the top x% each month and provide to customers via WU, the Help system or OneCare to keep their machine running at its peak.

Building Customer Confidence

PCs are the most complicated machines most people interact with. But few people take any kind of formal training, most lack a clear picture of how a PC works, and for many the PC often appears to behave mysteriously. Add to that the real and complex threat of security breaches on their system and many computer experiences leave our customers feeling incompetent, vulnerable, lost, and generally unhappy. Perhaps their biggest fear is how they will recover their data (digital memories, work files) when something bad happens.

For many years, we have approached this goal by trying to make Windows more reliable and easier to use and those remain key objectives. The difference in this release is that we will address the problem holistically, where we measure success by overall customer confidence, rather than the individual performance or design of any specific feature or component. This means we need to work on seemingly disparate parts of the OS with much better coordination.

A big part of helping people feel secure in their PC experience is having a system that is responsive and predictable. This starts with everyday processes, like logging on and off and launching programs to what happens when something unexpected occurs, such as a security warning or a crash. We need to deliver a secure system that still allows people to do what they need to do uninterrupted, one where the PC doesn’t surprise you—by failing, or by pulling you through a peculiar user experience. We also need to ensure that performance doesn’t degrade over time and when it does, help users understand reasons or fix the problems. Often our attempts to help people understand how to use their computer in a safe and secure manner have not resulted in the user feeling in control of their PC experience. We need to put the user back in control by making it easy for them to know what to do or where to go when they have a question.

It is important to realize that people learning how Windows works is not a goal for our users. They are using the system to get something done. We need to be respectful and helpful of what they are trying to achieve. We need to think carefully about how we help our customers focus on their tasks and set the system up so the need to take their mind off their work is minimized and learning to use the user interface is more seamlessly integrated as part of the experience of using the system.

We should also keep in mind that most people believe they are not using the full set of features available to them, and yet don’t have time to take formal training. We should think about ways to solve the discoverability problem explicitly, especially for features that can’t be bubbled up in obvious places like the Start menu. A good discoverability solution could also be extended to internal and external partners such as Office and other ISVs, to help them promote the value of their product. It is obvious,

but the more surface area of Windows our customers use the more they will value Windows and what it offers them.

Our overall goal should be better communication with the customer when there is a problem—fewer mysteries and more user control on how they get through the problem. Once more radical actions are required, such as resetting the system to “like new” condition to get it working again, those actions should be easily done. Even in areas where customer are likely to need education on why things are necessary (backup, security), it should be easy and straightforward to get the information to quickly unblock them and help them continue working. In areas where we cannot always foresee problems, we need to rely on the connected state of their PC to provide updates and support, connecting them to the millions of other helpful Windows users who can help solve problems and provide moral support. At the same time, we don’t want to make applying updates and fixes a task that end users think much about.

Customers have made it clear that they expect ever increasing levels of performance, reliability, and compatibility. The Windows organization has improved how it operates to deliver on fundamental quality. We need to make it easier to ensure every Windows component and feature has better fundamental quality than ever before.

Examples of features we could build to support this theme include:

- Improve responsiveness of common tasks (log on/off, launch programs, boot, wake from sleep).
- Integrate help into the flow of the users work so they are in context to find information.
- Help customers avoid reliability problems through auto diagnosis and detection of problems.
- Bring together PC Health features (Help, security, error reporting, performance, and maintenance) in a unified experience and integrate with overall PC Health settings.

Embracing the Best of Web Development

Technologies like AJAX and XUL are making it easier and easier to create web experiences that work more like desktop experiences. These technologies are really evolving how quickly developers can create solutions and extend their customer reach. And while the graphics and presentation layer for these web applications is still cumbersome and difficult to use consistently across different browsers, it is very attractive to create apps for browser instead of the client. The Web 2.0 platform offers things that Windows doesn’t have today and demand our focus on going forward. Addressing things like easy discovery, monetization for developers through syndication, easy deployment and updating, versioning, location independent state management, and telemetry will all increase the appeal of our platform. We also need our application model to be as friction-free as using a web application without requiring, a setup program or state management; we should even find ways to return the machine back to clean when the user is done.

We are uniquely capable of providing the best of both of these worlds by integrating the rich client metaphor with the web metaphor. We can help developers move data between devices and computers

and take advantage of the capabilities of rich client facilities for better accessibility, localizability and performance. We also have real needs for hardware vendors to build desktop applications for their devices—things like sync applets, control panel applets, and shell extensions—that we can solve with the same kind of platform, one that is built on the rich graphics of Windows but also has a relationship to browser extensions and web interfaces where we blur the distinction between content and code.

With an increasing number of different form factors on the market, we can further differentiate ourselves from browser-only solutions by providing a platform that also scales independent of resolution and even think about how Windows itself fits on a screen smaller than 600x800. This isn't about shrinking or wrapping a new UI description, but whole new ways of authoring UI (and web content) that allow you to define multiple descriptions that scale the experience, much like people are beginning to do on the web by targeting full screen for the desktop experience and much smaller for the mobile phone experience. This same notion applies to hardcopy output where we have an opportunity to lower the cost of printing and increase the quality of the output by providing a platform that can express complex data and graphics concepts in a fraction of the size.

By standardizing on a format, like XAML, that separates the user interface from the application data using “browser-like” techniques, we can revolutionize the way developer write the apps for windows and how they leverage live services.

Examples of features we could build to support this theme include:

- Provide a new app development platform with friction-free deployment and auto-software updating (RSS-feed style) for developers, with uniform access to OS services, though a common, high-level programming model.
- Bake customer feedback mechanisms into the application platform for developers so that all developers benefit from learning about how their software is used and how it performs.
- Make it possible to discover what applications are available for Windows by working with Windows Live search to extend their search queries and/or create a marketplace for applications on our own website.
- Develop a model for local execution of web-based technologies that is delivered via Internet Explorer and provides security, reliability, and predictability associated with Windows applications but for applications built using web building blocks, and then make it easy to extend those applications to take advantage of the resources and capabilities on the PC.

Helping OEMs and IHVs Win the Hearts of Customers

Our business relies on OEMs being successful and there are many things we can do to help them achieve their business objectives. OEMs are increasingly seeking ways to differentiate their product lines through unique industrial design, unique hardware, additional software, or novel scenarios. The challenges faced by OEMs that focus solely on low cost and the rising competitiveness of Apple have

raised the awareness that design matters, especially in the consumer space. Our work with OEMs on form factors, consumer preferences, and in supporting innovative hardware with unique and innovative software is a big opportunity. We might look to making a big bet on a single class of device that is forward looking and not yet in the ecosystem and partner with the OEMs willing to make the bet.

In addition to focusing on the long-term effects of great design, we can make pragmatic investments that will greatly impact OEM margins. Things like single worldwide binaries, improved imaging tools, and increased performance of language configuration help them be more efficient and reduce costs. There are also opportunities around post-purchase revenue generation, some of which OEMs try to capture by partnering with other companies that are trying to sell to the same customers. The outcome has been a growing number of icons, applets, and entry points on new PCs offering customers additional products and services. This does offer lots of ways for customers to experience new functionality, but we all know the UX downside. We should look at this issue holistically and help OEM achieve their revenue goals without sacrificing the user experience.

We should also consider the growing “basket” of things customers buy. This includes purchase of more devices, more memory, more powerful graphics, etc. But we have to do this in a way that retains customer flexibility to invest in things they think are valuable and “must have,” as opposed to mandatory system requirements. For instance, our Ultimate strategy for Windows Vista makes Media Center Edition more mainstream, while at the same time encouraging that segment of buyers to upgrade components of their choice to enhance their experience.

Finally, OEMs and our hardware ecosystem partners rely on us to support new technologies as part of the operating system. Our challenge is to define how to best architect our engineering process to support that ongoing innovation, without forcing them to go to third-party stacks that may or may not provide long-term benefits to customers.

Examples of features we could build to support this theme include:

- Create a framework for OEM value-add at multiple levels of the platform, being prescriptive about areas where we encourage innovation and differentiation.
- Build a platform such that OEMs can broker third-party services to their customers, supporting multiple business models such as pay per download, pay per use, etc.
- Deliver single worldwide binaries and help OEMs with other operational cost reduction initiatives.
- Always support the latest hardware and have a plan for updating OEMs quickly after new hardware is available.

Turning IT Pros into Windows Evangelists

Even though consumers make up the majority of our users, our business customers make up the majority of our revenue. We will put increased focus on this customer segment for Windows 7 and make sure it easier for corporations to upgrade enterprise-wide without waiting for SP1.

The way our enterprise customers purchase Windows also adds complexity in how we think about building our product. Despite some initial challenges, a large number of our customers have jumped on the SA bandwagon and are now on three-year annuity contracts with us. In FY06, about 25% of our enterprise revenue came from SA annuity, making it a billion dollar business for us. But SA has a lot more potential. A large number of our customers have chosen not to sign on to SA because we have not done a good job explaining or delivering annuity advantages and because our release timing has been unpredictable. Up until recently, the advantage of an annuity agreement was limited to upgrade rights during the duration of the contract. Just recently, we have added unique product differentiation by offering certain technologies to SA customer only, such as the Desktop Optimization Pack for Software Assurance. We believe that this is right strategic direction and the feedback from customers has been quite positive.

As we continue to drive more customers toward buying through annuity models, we must consider changes in the way we design our products to focus on creating on-going value without needing to deliver out of band features. Services will obviously play a prominent role in this area, but we should also consider other ways in which we can design the product to clearly benefit from an ongoing “connection” to Microsoft. It is important, however, to take a segmented approach to this opportunity. Annuity customers are a well defined segment of the market and include only enterprise customers. We can focus on problems that matter most to enterprises, as opposed to things that might add value to other market segments.

Enterprise customers take longer to evaluate and deploy our product. A whole year after XP shipped, only 6% of enterprise desktops had the new version. At the same time, there is a high positive correlation between companies that deploy our software and their levels of satisfaction. We must focus our efforts on areas that help our enterprise customers deploy and realize the full value out of their licenses. For instance, the number one reason for not deploying a new OS is application compatibility. While we will make sure to attack this problem in its root cause, we also want to explore ways to ease compatibility testing over the lifetime of a release and especially in the first 12 months after RTM.

We also need to make Windows more serviceable for IT Pros once it is deployed, investing in areas such as increased control over user settings, security of mobile data, and self-monitoring. At the same time, we must remember that delivering a product that is incredibly easy and cost-efficient to deploy still won't be attractive to enterprise customers unless there's a *reason* to deploy. In other words, we must balance the IT, deployment-oriented features with real value aimed at information workers and business decision makers, not just re-purposed consumer features.

A big part of annuity value is delivering on a predictable roadmap and understanding the ROI for enterprises deploying the new OS version upfront, not just trying to measure it after the product is built.

This roadmap comprises the investment areas we articulate to customers very early in the development cycle and also the timeline that we will communicate later in 2007. Our credibility as an engineering organization and as a partner with enterprise customers hinges on being reliable and predictable. The ideal from customers is to deliver significant Windows releases every 3 years. We are not committing to any pattern of releases up front, but we are committing to delivering SP1 and getting on a solid and understood path to delivering Windows 7 in a predictable manner.

Examples of features we could build to support this theme include:

- Keeping the machine requirement for business users the same as for Windows Vista to ease the burden on upgrading.
- Create a deprecation guide for all feature changes in the release and a validation script that exercises basic PC operations after an upgrade or image to make sure things still work.
- Provide migration tools for IT Pros for keeping systems up and running, secure, and “user-proof” through reliable back-up and recovery with increased capabilities for monitoring and self-healing.
- Extend BitLocker to portable devices and provide audit trails for corporate data that is written to portable storage devices.

Making it Easy to Add or Replace a PC

Buying a computer or upgrading to a new OS should be less work than it is today. With the PC market maturing, a majority of new PCs sold become replacement PCs. But getting a new PC or even just migrating to a new operating system takes a lot of upfront planning. Customers have questions about hardware (how much memory? How much disk space? What graphics card do I need?). They have concerns about migrating their personal data (What files do I need to take with me? How do I move my applications and settings? How do I replicate my preferences?). Finally, they have fears of what the future brings (Will it take me time to learn the new features? Did the features I always use change? What’s the quality level and performance of the new system? Will my devices and peripherals work on this new system?). For enterprises, application compatibility is the number one concern (Will my LOB systems work? Will my custom solutions run? How will users migrate their settings and files?). In short, people really feel like they need time set aside to “deal with” getting a new machine or a new OS. We have all fielded with these questions from family and friends and we have all subsequently helped them through this upgrade experience.

Because of the amount of time it takes, people delay the purchase of a new PC or upgrade of the OS. Adding a new PC to your environment, replacing a PC or upgrading the OS on an existing PC is still a really big decision for our customers to make. We need to find ways to reduce this cost so we can increase the replace/upgrade value proposition for our customers. For consumers and small businesses, this is especially true with the *n*th PC because the more PCs you have, the greater the complexity and the number of decisions necessary (Will things still work if I don’t upgrade them all? How do I support

people on the old system and the new system? How do I make apps that run on both? How do I share information across them?). Success in this area might be a scenario such as getting a volunteer laptop from any audience and migrating that person's experience to a new Windows 7 machine on the spot—imagine the applause that would generate (and imagine the happiness that could bring to our own family holiday gatherings).

This is different from the purchase decision for other kinds of consumer electronics devices. Even complex devices like phones with services associated with them have figured out a way (SIM cards) to make it easy to move to a new phone with little downtime for customers. Having ease of movement is key to the PC becoming more like any other consumer electronics device. And combining that with low prices, new features and cool hardware, gets us on the road to being impulse more lightweight purchase decision.

Investments we do in this area accrue to other scenarios around mobility and roaming. For instance, we could architect a solution around upgrading to a new PC as a broader roaming solution. This would bring my application settings, data, email auto signatures, initials and settings, printers, and web favorites that were stored on a central location or a thumb drive every time I log into a Windows 7 PC. Today, users have to configure these things over and over, at every PC they access.

Examples of features we could build to support this theme include:

- Store documents, applications and setting on removable media or a central repository so that it is easier to take with them you to another PC.
- Create a service that uploads and freezes an entire PC image and lets you get at it again in the future (time capsule).
- Eliminate the install process and stop using the registry, so that applications can be dragged and dropped to other locations and moving things between PCs *just works* for consumers.
- Run old applications in the old OS using virtualization so that they do not need to be retested.

Lighting Up Everywhere with Servers and Services

As the boundaries between the web and the client continue to diminish, Windows has the opportunity to become a fully server-aware client and our customers' home base for taking advantage of a connected state. We need to find ways to provide them the power of the web with the ease of use and convenience of the client and continue our work on keeping them seamlessly and securely connected.

The promise of a continuous connection to customers is beginning to revolutionize the way we think about and deliver software. We have begun this relationship through continuous publishing of help content and with Windows Update to push value to customers, but it remains a fairly one-sided relationship today. We need to make it more valuable and more interactive and use the connection to build a true feedback loop with customers. Watson remains the best example of a feedback loop, changing the way we triage and prioritize bugs. Going forward, all the features we deliver should all be driven by the feedback loop.

Windows is still a hodgepodge of experiences when it comes to connecting to the web. From the web-like interfaces sprinkled into the Win32 experience in our wizards to needing to go to the browser to launch a web application, we do not have a clear point of view about how Windows and the web fit together in the user experience; we need to establish one.

With always connected PCs, we can also redefine how we think about “in box” and perhaps offer more pieces of Windows online. We have started this with the way we treat the large library of drivers in Windows Vista. We could revolutionize how we think about deploying Windows. Given the ubiquity of Internet connections, we should also be able to take greater advantage of the connected state to make Windows better every day—with connected features and applications, as well as by partnering with the IE and Windows Live teams to extend our reach.

The flip side of this is how we think about the *dis*-connected and *rarely*-connected experiences. In the Windows 7 timeframe there will still be many enterprise customers and emerging market customers dealing with people who are never or rarely connected. We can't forget that users change states and these changes should be managed appropriately with solid offline scenarios.

Finally, connecting customers to one another, to MS, and to partners through community is how we make the desktop a true command center and necessary element for connecting to the rest of the world.

Examples of features we could build to support this theme include:

- Add the ability to save and launch web apps securely from the Start menu just like client apps.
- Represent key capabilities of a PC, such as access to my picture collection or access to a connected printer, as web services that can be included in Web 2.0 mashups.
- Web-enable the existing applets in Windows and make them come alive with web service connections (Calculator to do currency conversions; Paint to edit pictures from the web; WordPad to help you blog) and provide this service connection to developers to incorporate easily in their applications.
- Integrate community features into the client user interface rather than in a separate window and find a better ways to close the feedback loop with customers.

Finding Everything Easily

People have very different expectations of web and desktop search today. On the web, the general emphasis is on finding a destination and navigating it. For example, a customer uses LIVE.com to find a new pair of snowboard boots and then navigates to REI.com for the remainder of the scenario and experience. The destination website defines what can and can't be done within the ‘snowboard boots’ result. In contrast, when using desktop search, searching is just one of the many steps involved in the user's task flow in Windows. For example, searching for a particular email may result in the user reviewing the attached Word document and then updating their own related document. In another

example, the user may have searched for a set of photos that they want to burn to a CD. Today's desktop search emphasis is on creating a result set upon which the user can take action in exactly the same way they could have taken action had they browsed to an Explorer folder containing the same items. The actions possible are expected to be as rich as those offered traditionally within the rich Windows Client user experience. Windows XP, Windows Desktop Search, and Windows Vista all have features and improvements to support these expectations and scenarios.

We are embarking now on the era of client initiated search—the ability for the user to initiate search from their client and reap the benefit of having results returned from all interesting (and relevant-) scopes of data. *Finding Everything Easily* is about empowering users to search for data regardless of where the data lives while still enabling a set of rich client actions to be taken on the results. In essence, we will make Windows items appear more web-like and the web data appear more Windows like. This is no small challenge. Desktop search must effectively grow to be a client-initiated search offering where the results—and the capabilities for each of the returned items—can come from a multitude of interesting locations: other PCs in your home; file servers and document repositories at work; vertical data stores within both the consumer space (Instant Messenger contacts, Zune media cards, LIVE community) and the corporate space (Headtrax, SharePoint services, Groove, SQL databases). This *federation* is necessary to achieve the goal of returning the desired results regardless of where the data lives. The challenge is in creating a federation framework that preserves the rich client capabilities that users of Windows expect.

We will enable an open platform for getting access to valuable data stores and for helping people manage their data and the visibility of it to others. The management infrastructure we are building for this data creates an interesting requirement on the computing ecosystem with respect to performance and citizenship (CPU, battery life, and memory consumption). Many of the document formats that people use are well known to us and to our partners in Office, and we need to create a document infrastructure that takes advantage of this more intimate knowledge and exposes the capabilities to other document format owners and to ISVs to leverage.

We should think more about how people collaborate and share documents, as well as how they find documents created by others. Search and organize is not a destination. It is a means of finding data that the user needs to do something with and our search platform needs to be an invaluable part of the entire document lifecycle, from document acquisition to metadata creation to retrieval to consumption. It's still too hard to set document-level permissions and give appropriate access to others in a networked environment. And there are so many places to store things—your computer, the network, SharePoint, Outlook, a USB drive—that they need to be seamlessly searchable. The problem grows as the need to collaborate with partners outside the company increases.

Examples of features we could build to support this theme include:

- A simplified, natural input model that will make the 'Search box feel like magic.'
- The ability for any content store to expose its data to Windows such that all returned items are seen by our users as first-class Windows objects.

- Develop advanced techniques for searching image and video data without the laborious tasks of tagging.
- Use our knowledge of file formats to let people search for related, non-text objects inside their documents, such as charts, graphics, images and sound.

Connecting Multiple Devices to Multiple PCs

The market for consumer electronic devices is exploding with new phones, headsets, cameras, baby monitors, heart-rate monitors, automotive head units and loads of others popping up every day. Most of these can connect to the PC (through USB or increasingly through wireless). Device manufacturers often create companion applets so their customers can use these devices with Windows.

In addition to this, our customers are increasingly mobile both at work and at home and are becoming adept at using more than one PC—a PC at work, a PC at home, a laptop and they may even use kiosk machines in the airport or the old PC at Grandma’s house during a visit. They also want to use their mobile devices with other PCs and networks or gain access to devices (such as a printers) when using their PC as a guest on another network. In large corporations with multiple locations, employees “hot desk” and share resources or use PCs in another location not necessarily “owned” by them.

This complex multi-device world gives us an opportunity to rethink the role of a PC. Rather than an isolated machine in a “one user – one device” system, Windows users want to use their PCs as essential companions to an array of other devices. This desire presents many challenges because there is no common device experience and no consistent platform for hardware vendors. We need to provide a consistent experience for connecting these devices with Windows PCs, associating them with applications and services and moving or syncing data between them. We need to make a platform that enables CE companies to easily build compatible devices. And we need to provide commercial incentives for hardware companies to target Windows compatibility instead of proprietary applications. We need to pick a few key devices and focus on developing a clear end-to-end opportunity for the Windows PC and for device makers.

Examples of features we could build to support this theme include:

- Improve our device center to show the visual connectedness and proximity of devices, and helps you transfer or sync data between them and enable “guest” network accounts to get access to shared local devices (such as a printer).
- Make a simple experience for connecting and associating devices (no redundant toast, no unnecessary scrolling list boxes, no driver installation).
- Provide a toolkit that easily enables Windows device manufactures to make UX compliant companion applets and sidebar gadgets.

- Create a way for developers to register new devices over the web so Windows can automatically “do the right thing” and help vendors update drivers, as well as offer experience enhancements for logo’d devices without having to install special software.

Embracing Hardware Advances for Better Multimedia Experiences

There is an explosion of digital data being generated and consumed, both at work and at home. Proliferation of media devices, reduced cost of storage, and ease of distribution have increased the demand for more effective tools to navigate and sort through media content. People want to do more with their computers to visualize and play back data in interesting, multi-dimensional ways. For instance, not only do people want to see their pictures in a timeline view, but they also want to see them in spatial views. Such multi-dimensional views need rich visualization techniques that server rendering or web-browsers are not able to provide.

We made big investments in Windows Vista to start enabling such rich visualization and to continue to maintain edge in entertainment software. While this is sufficient for today’s workloads, we will need to do more to enable the emerging workloads where there are many applications running simultaneously on a PC (which is really the PC’s advantage over any fixed function device). We should continue to look into solutions that will enable this scaling. We need to help developers bring together all these different elements in their applications and provide a platform that is abstracted from specific hardware, so that developers have one consistent API surface that allows them access at different levels of the stack. Whether developers are making games, productivity applications, prosumer audio visual applications, we need a platform that is always available and always works; we must also consider the right downlevel strategy to optimize adoption between versions of Windows.

A key enabler for all this is hardware innovation. On the graphics side, we are seeing the tremendous growth of the GPUs (far outpacing the predictions of Moore’s law). The highest end modern GPUs contain about 650 million transistors (much more than the most complex CPU). GPUs have always been highly parallel architectures, with multiple cores, and are now becoming increasingly programmable. Shaders in DirectX are a testament to this programmability. Developers can now download code to the GPU and have it executed in parallel on SIMD and MIMD cores. On the processor side, AMD and Intel are putting more CPU cores on one die giving rise to multi-core. The next logical step dictated by laws of semi-conductor economics and physics is to have many-core, where not all cores are identical, and there are lots of them. This means both GPUs and CPUs are converging towards a many-core architecture. This will greatly impact the way we think about programming models and scenarios that leverage extreme parallelism. This should give us the opportunity to look again at heavy duty 3D graphics on the multi-core CPU in preparation for the many core world.

To support advancements in hardware, we need to focus on creating new market opportunities for our partners, reducing the cost of introducing new hardware products, and delivering our platform on a predictable schedule so they can confidently align their hardware roadmaps with our releases. Our engagement needs to range from PC audio/video chip manufacturers to CE companies making such

products as high-definition TVs and displays, high-dynamic-range monitors, prosumer digital audio peripherals, and consumer video cameras and headsets.

Examples of features we could build to support this theme include:

- Develop the next generation of low level Graphics APIs which expose innovation in the GPU, including things which are not graphics related (GPGPU)
- Look into developing a compelling, performant API set that seamlessly enables applications to integrate various sensory elements while harnessing the power of the underlying HW, whether it is CPU or GPU.
- Make it as easy to write media applications which can take advantage the capabilities of the GPU for both creation and consumption of media (images, video, music, 3D etc) with high performance.
- Investigate refactoring of the desktop infrastructure with an eye on enabling compelling window management paradigms

OUR PHILOSOPHY

We are committed to running our Windows business in accordance with principles that address computer manufacturer and user choice, opportunities for developers, and interoperability for users. These principles apply to Windows desktop development projects going forward. Please review them at: <http://www.microsoft.com/presspass/newsroom/winxp/windowsprinciples.mspx>.

It is expected that everyone on the team and everyone who contributes to Windows 7 read and internalize these principles. If you have any questions or concerns at any time during the development cycle, please do not hesitate to ask your manager or any manager on the team.

Engineering Excellence

The complexity of Windows continues to grow and it is critical that our engineering tools, infrastructure and practices grow in proportion so we can handle the added complexity efficiently and deliver high-quality software on a predictable schedule. To do this, we are making a big bet on shared planning and delivering on a shared schedule with shared goals as well as committing to working within a core set of engineering standards and a shared engineering process.

With Milestone Q, we have an opportunity between now and the start of Milestone 1 to make some significant changes to our engineering processes and standards. We should use this time to understand how we can make our processes less susceptible to bottlenecks, to allow them to “scale out” as we continue to grow Windows and assure that we front-load discovery in our product engineering schedule. We need to evolve every aspect of what we do, from planning and design, to build, test and release, all the way through to how we sustain our products once shipped. An important measure of our success as a team will be writing down our plan for the next release and then *delivering* on that plan. In

some measure, developers, testers and program managers and other engineering disciplines will be planning and partnering together more consistently and earlier in our product schedule.

As we have mentioned before, each team will invest in a quality milestone (MQ). The definition and scope of this milestone will vary team by team, and the leadership of each feature team will define this work. Some innovation and change during this milestone will be team specific, but much of it will be Windows-wide in scope, impact and benefit. This is dedicated time to invest in test automation, code quality, and our engineering systems and tools. It is also a time to invest in architectural changes that enable more agility or flexibility in our code delivery as well as structured innovation and experimentation before the official start of coding for our next release. During the MQ milestone, we will also inventory the existing code and services in the teams and make sure we understand the plans for servicing Windows Vista (SE work) and we will transition responsibility to new teams as appropriate relative to how we further refine our new org structure. We will inventory the release roadmap and existing commitments that may impact our schedule. During this time, we expect teams to prototype new ideas and do targeted feature investments in their areas, as long as they are part of the longer-term plan with specs and testing resources assigned. In order to achieve predictability, quality, and timely delivery of our features, we must ensure tight linkages between our vision, our features, our specs, our code and test execution; we must also minimize risk and randomness in our code, engineering processes and end-features. We will also ensure that all engineering prowess put in to tools to support our work follow the same requirements of product-shipping code; namely high-quality specs, code reviews, target audience identification, and tracking our tools investments broadly to ensure no redundant engineering in the same spaces or problem sets.

Servicing Our Product with SP1

The focus of our first service pack for Windows Vista will be will be on deployment blockers for OEMs and corporations that we discover after shipping and critical issues that occur in the field such as new security exploits. SP1 is not a feature-release delivery vehicle for work that did not make the bar or timetable for inclusion in Windows Vista. A large SP1 disrupts our ability to deliver a high-quality product on a predictable schedule with innovative features and inhibits all disciplines from participating and contributing as peers from the day we start coding on the next release. We will complete the review of remaining DCRs before the end of this calendar year, and we will define the full SP1 plan before the end of the year for review in January, along with the MQ investments.

Out-of-Band Releases

One of the ways we will reduce complexity and keep focused on delivering our next version of Windows is by reducing the number of out-of-band releases that we create. Shipping something out of band (OOB) takes focus away from the current release and leaves people out of sync. No new features or non-critical bug fixes should be shipping out of band. There are a few things that we want to continue to deliver as part of continuous value to our customers, such as new releases of IE and MCE, Windows Online website refreshes, hardware updates, language packs, Ultimate Extras and Windows Genuine

Advantage items—but not many more than that. During the planning process we will work through a new process for delivering OOB value.

Customer data

Complete solutions require a complete picture of our customers and users. Today we sit on a mountain of customer and user data. Some of it is derived from high-touch research from the lab or the field and some of it is derived from large sample size research from instrumented software. Even more data is sitting in the hands of our marketing partners. And we, software professionals, have amassed tons of knowledge through years of observation, analysis and experience. Hidden in this morass of complex, interdependent, ever-changing data are the nuggets of information that we must identify in order to achieve great design solutions. Great design solutions are not divined, they are derived. And this is especially true of the rich, diverse and scalable solutions required of us. Our deep well from which to draw knowledge and insight affords us a great advantage. But the well must not run dry nor become stagnant. And for this reason, we must continue to invest in new and different ways to continue to collect, analyze and understand customer data. And it has to start with instrumenting as much of the product as possible.

The best example today of telemetry is Watson. Instrumented software allows us to see what people are using and not using in our software. And because it's derived from a large set of customers, we're able to find useful and valid usage patterns. While *what* people are using is valuable and interesting it doesn't always tell you *how* it's being used. Increasingly, however, we're finding deterministic ways to identify sequences and probable sequences from instrumented usage data. This kind of analysis allows usage patterns to emerge and lead us to where we need to be more focused and attentive and directs us toward our most critical user experience problems. Answering *what* and *how* and *where* problems exist is necessary so that we can then ask *why*. *Why* do people use what they use? Or why aren't more people using these features? Or why are so many people using this feature after this feature? Answering these questions leads to innovative design solutions. But answering *why* questions is not as easily achieved through telemetry. While efforts are being made to make this easier and more reliable, we need UX Research to help answer these questions through more traditional high-touch observational methodology. We also need Product Planning to help us with primary research focused on key product decisions and with surfacing the right data sources about customer needs, competitive landscape, industry trends and market opportunities. Telemetry, or high (n) research, aids in identifying the patterns that lead to in-depth, high-touch inquiry. This triangulation of user data is what we'll use to derive unique discoveries and lead us to great solutions.

BIG BET AND THEME TEAMS

In order to get the ball rolling on planning for Windows 7, the PM leaders have been assigned ownership of the various planning themes. These owners will be putting together virtual teams responsible for fleshing out the themes in more detail. The teams will comprise folks from all engineering disciplines. We all have important contributions to make. Early in this ideation process, the Product Planning team will organize the Windows 7 Planning Forum, where planners, UX researchers, CMG researchers, and

product managers will present available research data related to the planning themes. This process will culminate with a series of planning theme presentations, during which each team will present their views, findings and recommendations to the larger team. This, in turn, will inform the individual feature team vision. Team visions are intended to explore how specific work fits into the larger planning effort. During this process, we will converge from exploration of many planning themes to five to seven vision areas that all teams will work toward.

Once the vision areas are defined and the vision for Windows 7 is published, we will have “Vision Week.” Vision Week is a time for Product Management, Product Planning and User Experience Design and Research, along with key internal partners, to present customer and user research findings, interaction design principles and vision prototypes. This is an opportunity to bring better definition to the vision areas while also bringing user scenarios to life. This level of detail makes it easier to turn the high-level vision into detailed specifications.

Many of the deliverables for Vision Week are then used to communicate and bring further clarification and accountability to each team. Along with a team vision document, each team will also create a press release describing the customer facing value of their work and a corresponding click-through prototype. This effort will be led by the GPM, with coordination and communication across the PM team, partner PM teams and all engineering disciplines. Cross-team dependencies will be identified and committed to and while this undoubtedly complicates tracking and progress, special emphasis should be put on working across feature teams, feature groups and engineering teams. We *have* to plan and develop Windows 7 together. We expect our users to encounter a seamless Windows experience, so we cannot allow our own organizational seams to be reflected in the product.

Theme/Big Bet	Leader(s)
Refining the Vista User Experience	Linda Averett (WEX)
Building Customer Confidence	Ted Dworkin (WEX), Reza Baghai (COSD)
Embracing the Best of Web Development	John Tippet (WEX), Tony Chor (IE)
Helping OEMs and IHVs Win the Hearts of Customers	Steve Cullen (COSD)
Turning IT Pros into Windows Evangelists	Madelyn Bryant McIntire (WEX), Michael Beck (COSD)
Making it Easy to Add or Replace a PC	Dennis Flanagan (WEX), Chuck Chan (COSD)
Lighting Up Everywhere with Servers and Services	Kip Knox (WEX), Sandeep Singhal (COSD)
Finding Everything Easily	Dan Plastina (WEX)
Connecting Multiple Devices to Multiple PCs	Dennis Flanagan (WEX), Sriram Rajagopalan (COSD)
Embracing Hardware Advances for Better Multimedia Experiences	Anantha Kancharla (WEX)
Hardware-driven innovation	Steve Cullen (COSD)
Virtualization	Mark Kieffer (COSD)

State separation and roaming	Richard Ward (COSD)
Windows Live	<none> Windows Live Experience team drives this
Security	David Cross (COSD)
64-bit	Dean DeWhitt (COSD)
System layering and componentization	Rich Neves (COSD)
Windows Engineering System	Alex Simons (COSD), Russ Albright (WEX)

NEXT STEPS

We shipped Windows Vista on 11/8 and many folks may want to take some time to celebrate this incredible accomplishment. That is completely natural, expected and encouraged. Please use up all that unused vacation time and come back fresh and ready to go in January!

After celebrating Windows Vista, the next priority is for teams to plan their infrastructure investments for MQ and SP1. Mail has been sent with guidelines for how to plan MQ, and each feature team owns developing their plans. We will have reviews of these plans in early January and begin to share them with each other. The MQ release owners are Russ Albright, Mike Schmidt, and Craig Fleischman from WEX and Alex Simons, Monte Christensen, and Maher Saba from COSD. The SP1 release owners are Howie Kroehl, Mike Schmidt, Michael Raschko from WEX and Chuck Chan and Mak Agashe from COSD. Look for more details to come from them and please feel free contact them with any questions that come up.

While MQ and SP1 are in progress, the planning for Windows 7 will begin in earnest. Expect the process to be highly social and iterative and involve all disciplines, other Microsoft teams and our customers and partners. There will be a number of offsites where the planning owners (listed in the section above) will take the themes outlined in this document and start working toward individual team visions. There will be a few big meetings, but most ideas will be vetted by documents, demos, sketches, and discussions giving everyone plenty of opportunity to get involved.

A detailed view of the planning schedule is listed in the appendix and there will be more detail on each of these deliverables as they approach. And of course, the goal of having a plan is to increase our ability to adjust and absorb change as necessary. If our needs for SP1 change, we will be flexible and adjust these dates.

Thank you again for all the hard work on Windows Vista, and for joining us on the journey to design and develop the next great version of Windows!

APPENDIX – PLANNING SCHEDULE

Timeline	Deliverable	Description	Owners	Team Activities
December	Planning Memo	Frames our plan, outlines state of the business, strategy, themes, and schedule.	JonDe, JulieLar	Start participating in planning activities and offsite Take some down time after Vista!
	MQ and SP1 planning		Dev and Test managers and GPMs	
January	MQ and SP1 begins	MQ and SP1 work begins	Dev, Test and PM managers	Focus on MIQ and SP1
	Team Planning	Teams take planning memo, plan their work	PM Leaders, Product Planning, Product Management	Team planning meetings, Global planning forum
February	Team Planning	Continue planning activities/engage partner teams	GPMs	Planning within teams
March	Vision Drafts Complete in Teams	Teams scope work, scenarios, customer promise, map these to themes and bets, review in teams	PM leaders	Planning within teams, cross team dependencies included, planned Spec writing begins MQ continues
April	Vision Drafts and Vision Checkpoint Meetings	Details the vision for each planning team, including customer promise, scenarios, click-through prototypes, and feature list	PM Leaders	Vision meetings continue Spec writing continues MQ continues
May	Vision Memo	Complete vision and feature list for Windows 7, combining the vision drafts from each team, and press releases	Julie, ChuckC, BradGold and other PM leaders	Teams complete vision drafts, Spec writing continues, MQ and SP1 continues
	Vision Week	Present vision to team, management, and partners	All	Attend vision week Spec reviews begin