DATE:	November 1, 2009
TO:	The Windows Team
FROM:	Julie Larson-Green
RE:	Planning Windows 8 Client

INTRODUCTION

Congratulations on completing Windows 7! From the moment we first released it at the PDC to today, our Windows 7 product has consistently received positive responses on everything from features to performance. Many in the industry are calling it the best release of Windows ever. On behalf of all of Microsoft, our partners, and the hundreds of millions of customers anticipating Windows 7, thank you for your efforts and your continued enthusiasm for building Windows. As a team we came together to build the highest quality, most secure, and most feature-rich operating system in the world. Without a doubt, Windows is and will continue to be the most important and most widely used software anywhere.

With the successes of Windows 7, we have begun setting a new course for the way we operate as a business and as a team. We still have a lot of learning to do and must not forget there are many challenges to overcome, both in technology and in execution, in Windows 8 and beyond. Overcoming these challenges starts with and will be rooted in developing our plan and a way of operating that allows us to do our best work against that plan. This document starts that discussion and is the *Windows 8 Planning Memo* for the next release of Windows client. It outlines the shared assumptions in our planning work across the team 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 our planning. It also sets the timeline and schedule for the Windows 8 product plan and it is the next big step toward a holistic vision that directly supports our business.

Think of this planning memo as a "request for ideas" in a set of strategic areas of investment that were established through our framing memo and pre-planning work. 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 that provides direction for further exploration of concrete feature ideas. As such, this planning memo *is not* the plan, nor is it the vision or our feature set. The planning memo starts our planning process and will be used by all feature teams to develop the vision and the feature set for their areas. Our feature teams are the experts on the scenarios and specific investments for their areas and are responsible for building the best customer solutions and ensuring those solutions correlate tightly back to our vision.

Our overall objective for our team is to create a learning organization that works together cooperatively on our plans and our shared goals, leading to a great product delivered on time and with high quality. And we have our amazing work on Windows 7 on which we'll build. We start with a transparent and

repeatable planning process, which helps reduce risk in our engineering and uncertainty in our ability to align with customer and business priorities. It also creates the framework and context in which our innovation can occur.

Innovation starts with you. Following this planning memo, we all begin creating the vision, through which we will determine our customer promises for the product and answer the questions raised in the Planning Memo. This effort will be led by Program Management (PM), working with all the engineering and marketing discipline leaders to ensure end-to-end consideration. Planning is a team sport that is cross-discipline, inclusive of all organizational levels, deliberately sharing information, debating issues constructively, and reaching a shared view of how the team will move forward. 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.

The output of our joint planning process will be our single *vision document* that spans the work in Windows 8, including our support of the Windows Server 8 plan. This will include the value proposition, tenets, top-level schedule, shared technology bets and dependencies at a high level, and feature commitments across our teams. We plan to publish the vision document in March. 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 represented in the vision document*, it isn't part of Windows 8*, so now is the time to ensure your ideas are heard.

Finally, as we did in Windows 7, 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. This means we want our focus to be on developing Windows 8 so that we maximize the impact of the release. We continue to believe that focusing our limited engineering abilities on a reliable, predictable, and planned release will maximize the benefit for customers, shareholders and partners and be the most efficient way for us to deliver value.

BUSINESS OVERVIEW

Windows is the heart and soul of Microsoft. With the launch of Windows 7 we will reinforce to our customers and partners around the world that Windows continues to be the most competitive and desirable operating system in the industry, and the cornerstone of Microsoft. Our renewed and stronger focus on the ecosystem has paid dividends in FY09 with increased hardware and software quality across a variety of metrics. During FY10 we will not only continue to deliver the highest quality, but also bring to market technology innovations across hardware, software and services that can only be found in the open and vibrant Windows ecosystem. The following sections provide details and context for how we will approach our business in Windows 8.

State of the Business

Windows is the flagship product for Microsoft, generating $14.7B in net revenue in FY09 and contributing over one quarter of total corporate revenue and roughly half of total corporate profit.

Our business is influenced primarily by these five basic factors:

PC Shipments. The first factor that affects our revenue is PC Shipments. Last year, *273 million* PCs shipped worldwide through our OEM channel. The number of PCs shipped correlates with macro economic factors, so we have experienced growth challenges in the past few quarters consistent with the global economy. In mature markets, we have become increasingly reliant on PC refresh rates that have lengthened to more than four years on average. In emerging markets, we are still seeing first PCs being sold, especially in the consumer segment.

Windows share. An important factor in our business is the percentage of PCs that run Windows. In this context, we consider Macintosh just like another PC. Globally, counting both paid and un-paid customers, approximately 96% of PCs run Windows. While this is a phenomenal success, that number is shrinking in certain segments of the market as Apple increased share, particularly in the United States. ARM-based PCs are shipping in very low volumes today, but could affect our overall market share as Windows does not run on those types of devices today. And of course we are surrounded by Linux competitors with different business models and many of our OEM customers continue to increase their Linux-based offerings. Google will approach the OS business with Chrome OS and challenge us in other unique ways as well.

Genuine attach. Globally, nearly three-quarters of PCs shipped in FY09 were shipped with a paid version of Windows. But this worldwide figure hides meaningful geographic differences. For instance, the percentage of PCs shipped in China in FY09 with Windows was very high, but only 38% of those had a Genuine Windows image. By FY12, we expect more than 420MM PCs in the install base to be running a pirated version of Windows.

Revenue per License. Pricing is a critical factor that influences our OEM revenue. Our approach here is to have offerings at different price points that cater to different customer needs. Premium Windows offerings have enhanced functionality at higher price points, such that an increased premium mix results in higher average revenue per license. With the trend of growth in the low-end laptop space, we face increased pressure on selling these premium additions. It is important that we continue to deliver new innovations that provide differentiated value to customers in ways that they understand and are willing to pay for.

Revenue over Time. Revenue over time refers to our ability to earn additional revenue on a PC after the initial OEM license. On the Business segment side, we generate $2.6B in revenue annually through Volume Licensing (VL) that offers version upgrades with tiered pricing for businesses and through Enterprise Agreements (EA) that give businesses the rights to the next release, access to the Enterprise SKU, and the rights to subscribe to the Microsoft Desktop Optimization Pack (MDOP). A significant improvement in our EA business occurred when we started to provide unique value to our customers

over and above the value they received in the OS that they purchased through the OEM. On the Consumer side, we have the opportunity to drive upgrade revenue from our large customer base through traditional retail, on-line (including the Microsoft Store) and through Windows Anytime Upgrade (WAU).

Business Challenges and Opportunities

While we can all appreciate the unprecedented size and success of the Windows business, we also recognize the many challenges that potentially impact our ability to grow that business and maintain it at current levels. The challenges come from both broad economic factors and direct competitors.

Channel Consolidation. Major multinational OEMs continue to take share from the smaller companies that assemble PCs (i.e. system builders) in the current economic climate, based on scale, cost advantages, branding strength, and the continued shift to notebooks/netbooks, which are not a traditional strength for system builders. While channel consolidation brings the opportunity for focusing our Genuine and quality efforts on a smaller number of partners, it also notably brings the challenge of increased pricing pressure.

Non-OEM Channels. Following a general trend towards consolidation, we expect that in the Windows 8 timeframe large retailers (e.g., Best Buy, Dixons) will possess as much market influence as major OEMs. Retailers increasingly have more influence over what PC specifications get sold at what price points, as well as what software should come pre-installed. Additionally, Telcos will continue to grow as PC distributors, accounting for more than one-third of netbooks sold in FY12, adding up to 7% of all PCs sold, according to estimates. This brings the challenge to scale our engagement efforts to these new channel partners.

PC Prices. Declining PC prices have reached a point where customers (OEMs) say that the price of Windows now consumes a significant percentage of the cost of a new PC. Largely driven by the rapid growth of netbooks, retail PC prices dropped 15% last year from August 2008 to July 2009 (source: NPD, August '09), a sharp decline from the historical 6% per year decline we've seen over the past decade. If we look ahead to FY13, we expect netbooks to make up 12% of total PC shipments, up from 9% last year and almost nothing in FY08. The recent emergence of new ultra-thin but powerful PCs provides us an opportunity to satisfy the demands for new PC usage scenarios in the low-cost category but with more capabilities for more premium Windows experiences. Our OEMs are consistently asking us for a version of Windows that is priced to reflect the low-end segment of PCs, but also with all the features we have on the high end of the segment.

Premium. Our ability to sell premium versions of Windows has been met with a lukewarm reception by our OEM partners, who challenged the notion of higher-priced PCs that are sold at a premium price. In fact, they would rather see us offering fewer SKUs to simplify their manufacturing process. Small businesses are increasingly asking whether there is enough value in Windows Professional to justify the additional cost. As more consumers purchase multiple PCs for their homes, their needs and the needs of a small business customer begin to merge which may call for revisiting our traditional ways of

segmenting the market to determine clear and differentiated value of a premium version. Additionally, the increased availability and adoption of cloud-based services starts to call into question the need for domain join, which has traditionally been a strength of the Pro SKU.

Revenue over Time. The sizable difference in recurring revenue between our consumer and business offerings is largely due to our recent success in securing Enterprise Agreements (EAs) with our largest corporate customers and by the low volume of consumer FPP/WAU uptake. Consumers need to see both a value proposition in the latest release as a motivator for upgrades and have confidence that the upgrade process will be easy for them before they will make a FPP or WAU purchase. For OEMs, we can learn a lot from the notion that an OS can provide revenue benefits over time for all parties in the ecosystem.

Emerging Markets. PC unit volume continues to shift to Emerging Markets. From FY03 to FY13, we expect the percent of total WW PC shipments from Emerging Markets to rise from 23% to 45%. That's effectively a doubling of the percentage of PCs going to Emerging Markets. This directly impacts our ability to sustain revenue as our pricing for emerging markets is lower to reflect the prevalence of piracy and purchasing power limitations in those markets. Additionally, emerging markets also have a higher number of shared PCs in places such as iCafés, where increased penetration and usage doesn't necessarily translate into higher revenue in today's business model.

Piracy. Multiple factors influence our Genuine Windows success including the quality of our engagement level with our OEMs, the distinct value we deliver in Windows relative to the competition or a non-genuine experience and the technological advancements we make to make piracy harder and Genuine Windows more compelling. In Windows 8 we need to find the right balance between these approaches by rewarding those running Genuine Windows with meaningful benefits while looking for ways to make it difficult to run an unlicensed copy without being told, without experiencing gaps due to what's missing, and without receiving reasonable and easy ways to get Genuine.

Competition

Daily we are faced with products and services positioned as competitors to Windows—they range from notional to substantial, but it is our responsibility as a team to acknowledge the anticipated and unanticipated needs they may represent to customers.

Apple. According to various internet sources, in FY09, Apple had approximately 4% of the PC market globally growing from just over 2% of the PC market in FY03. While we're optimistic that Windows 7 will change the competitive conversation with Apple, we continue to see significant pressure in the $1,000+ PC market. The most pressing example of Apple pressure is with U.S. consumers, where less than half of $1,000+ machines are Windows PCs (source: IDC, July 09).

Linux. On the consumer side, very cheap PCs have driven OEMs to reconsider the cost benefits of shipping a Linux-based OS in an attempt to lower the cost basis of the PC to the OEM, reducing the OS license share of the overall PC manufacturing cost. On a $200 netbooks, the cost of Windows can be

substantial, depending on which version of Windows. Our decision to license XP Home on netbooks at a reduced price was a direct response to such pricing pressure and competitive risk.

Google. Google has entered the operating systems market with Android, and will introduce Chrome OS later this year. The economics of the Chrome OS to the OEM are strikingly different from Windows. With Chrome OS, Google has the potential to offer the OEM a "free" OS and the opportunity to earn revenue share from search over the life of the PC, creating the perception that the OS can be a *profit* center for the OEM, not a *cost* center.

Browsers. Instrumentation data has shown that consumers spend more than 50% of their PC time in the browser. Our developer ecosystem is critical for the creation of third-party experiences that make Windows unique. As long as we are not adding value that lights up these applications, our ecosystem advantage versus Apple as well as lower-cost substitutes will deteriorate.

Pirated Windows. Today in markets like China, pirated software offerings have evolved to provide superior technology that allows for imaging and servicing of pirated Windows in more efficient ways. These techniques often bypass Windows Update by cloning the service to avoid any kind of connection between pirated Windows and Microsoft. Because of these sophisticated technologies to avoid detection, piracy continues to be an effective "competitor" to Genuine Windows.

Connected Devices. Many categories of consumer electronic devices are getting smarter at developing direct service and billing relationships with service providers. An increasing number of scenarios can now be accomplished without a single connection to the PC, diminishing our value over time.

TECHNOLOGY BETS

There are a few bets that we will make as a team and these initiative will require work from all of us to realize our vision. 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 group.

Internet Explorer and Windows Applications in HTML

Internet Explorer (IE) will be a central technology for reinvigorating developer value in Windows. IE represents a unique opportunity for Windows to connect with an incredibly large and fast-growing community of software developers that isn't typically part of our Windows developer audience taxonomy. IE is the essential piece of our developer story. With IE9 we will continue our renewed focus on improving our Web platform by investing in performance, standards conformance, security, compatibility, manageability and our developer tools. We're going to implement many of the existing and upcoming standards on top of our rich client APIs.

But we will also push beyond the obvious. Web applications built with Windows in mind will be able to integrate and take advantage of the operating system in ways previously reserved for desktop

applications. Developers will be able to deliver value to their customers with less effort by using a set of highly refined and customizable native controls bound to Web data, using a rich set of input technologies, accessing selected devices and integrating with the core user experience of Windows. Web applications on Windows will more closely approximate the look and feel of client software, yet with the same software lifecycle of a website, by tapping into integration points such as the taskbar.

The same IE engine will run on low-power devices with small screens as well as powerful business laptops and desktops. Developers will be able to target a consistent, ubiquitous platform and deliver compelling user experiences across a wide variety of form factors using a familiar programming model and modern, powerful and intuitive tools.

Low-end and High-end Hardware

A key differentiator for Windows remains our ability to run on the largest range of hardware available, creating the maximum opportunity for partners. Whether it is screen size, the number of cores or the size or type of processor, running on the breadth of hardware our partners are delivering will continue to be important in Windows 8. The overall ecosystem is changing rapidly, reflecting the advancement of Moore's law, mobility, power savings, and the adoption of virtualization. The investments we will make across Windows relate to performance across the entire system, continued layering and componentization, and support for new system architectures.

The investments we need to make are not only in the lower 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 continuing dualism. Display size is a place where we already have challenges and we will make a bet toward running on increasing smaller screens, perhaps as small as five inches, in both the Windows user interface and our developer platform. With the advent of the Atom processor, it is clear that there will be a large number of 32-bit devices when our next OS release comes out so we will need to continue to invest in both 32- and 64-bit systems, which is a change from our trajectory. 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. We will strive to support and showcase the advantage of many-core computing, with targeted focus on areas where we can clearly show differentiation through increased parallelism and associated improved performance. This should be done by identifying and focusing on a few key scenarios, not by casting an overly broad net and asking every team to try to parallelize everything.

Windows Live and Web Services

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 running on Windows 8, using the open and

documented APIs of Windows. We will also think about unique developer scenarios and APIs for the combination of rich client and third-party services. We expect every customer to want Windows and Windows Live.

Scale for Data Centers

Customers who deliver their products and services via datacenters need to scale their infrastructure to match demand. Today, datacenter workloads are constrained to specific, physical systems in which disks, computers and network topologies are managed individually. This rigid design makes it costly to provision networks and can lead to over provisioning and excessive capital, maintenance and energy costs. It also makes networks less flexible, in turn making it harder to modify applications or add new ones.

Windows can deliver more value to enterprise customers by virtualizing server workloads and supporting flexible networking technology that allows customers to programmatically scale workloads across existing infrastructure. The Windows Server 8 team will focus on making it easy to manage these workloads and deploy them at scale with new flexibilities. Working together with the Server team, and taking advantage of lesson learned by the Azure team, Windows client will enable the best networking performance, reliability, and management capabilities for virtualized, large-scale, converged networks.

Simplified Log-On and Identity

The explosive growth of social networking services coupled with the aspiration of many groups to create more user-centric experience have led to a number of initiatives inside and outside the company to build “identity enabled” experiences. Working closely with the Windows Live team, Windows has a unique and valuable opportunity to improve consistency and reduce friction in identity and authentication experiences.

Unlocking all of this potential based on broad aspects of a person’s identity (key personal attributes, credentials, social network/graph, favorites, key settings, apps, etc.) means that we need a strong assurance we’re making this experience available to the right person and not an attacker. This along with ever-changing form factors (phones, touch, devices, AutoPC, etc.) mean that today’s traditional password-based means of authentication will be insufficient for the world of tomorrow. To complete the user-centric computing experience of tomorrow we need modern ways of authenticating that fit the form factor and also protect the user’s identity from attackers even when inadvertently logging on to a compromised machine. In addition to managing identity, we need to reduce the complexity we have created around password, passphrases and passcodes and create a shared taxonomy and a shared and unifying infrastructure for features that need this type of added security in Windows.

Wireless

The demand for persistent Internet connection is driving sales of wireless modems and the continued importance of 3G, and the emerging addition of 4G, is a safe, important bet for Windows 8. The work

required is much more than simply supporting the networking protocols. We need to think through the customer and partner scenarios for 3G and 4G to make sure that we are keeping providers in control of their network and customers in control of the cost and reach of their service. In addition to making sure Windows fits well with the lifestyle implied by mobility, there will be work to do across the system to avoid inadvertent or intrusive network access experiences. We will also need controls for developers and customers to throttle their use of bandwidth and need mechanisms for customers to track usage consistent with expectations of cell phone service. This is important because Telcos represent a new opportunity and important distribution channel for 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 an early draft for how we will market and sell Windows 8. Our planning themes are:

- ***Blending the Best of the Web and the Rich Client***
- ***Defining a Modern PC Experience***
- ***Extending the Reach Of Windows***
- ***Connecting to Windows From Anywhere***
- ***Helping IT to Deliver Work Anywhere Infrastructure***
- ***Showcasing Quality the First 30 Days and Over Time***

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 yet 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. Although it may feel random at times, it's actually highly deterministic. Because we're all operating from the same set of assumptions developed through planning together 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 a perceived 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 suffice. 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 okay 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 and eventual feature and experience investments for our product.

You will also notice that many of 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. 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 transform 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 based on well-understood architecture and development design plans, test plans, and collaboration across the engineering disciplines.

Blending the Best of the Web and the Rich Client

Windows is a cornerstone of the computer industry, with a broad and diverse spectrum of engineers and designers creating an equally diverse set of devices and applications. On one end of this spectrum are developers challenging the conventions of human computer interaction and developing experiences that take full advantage of a PC's capabilities like performance, form factor support, and integration of hardware and software stacks. These applications are built natively for the operating system and

depend on the control of key aspects of the computing device, maximizing the value of underlying software and hardware. These run the spectrum from games, engineering software, photo and design software, productivity software, and of course, application support for broadly used hardware devices.

On the other end of the spectrum are applications and experiences optimized for delivering end-user value by discovering and collecting information, managing social relationships and publishing content. These applications take advantage of the advances in highly available connectivity and are designed to reach the widest possible audience by being hardware and software agnostic. These applications are typically powered by the runtime of the standards-based Web.

We recognize the distinct role and value of both sides of this spectrum. However we also recognize that developers don't live in our taxonomies, but in the real world, where the best tools, the broadest reach, and the greatest revenue opportunities win. Developers want to monetize their efforts and they want to have fun while experimenting, innovating and creating value for their customers.

We should also learn from the experience on the iPhone platform where we have seen a massive number of new applications that prove the high value of "rich client" interaction that connects to a web site. There are dozens of applications—weather, traffic, bus/train/airline schedules, currency conversion, social networking—that are each rich clients built to take advantage of the unique interaction and graphics model of the platform while connecting to web services. Developers are working to profit from providing the combination of these to their customers.

We should also acknowledge the challenges Windows currently represents to the developer community and reinstate Windows as the platform of choice for software and hardware innovation projects of all sizes and levels of sophistication. Developers of native Windows applications are critical to our Windows ecosystem and significantly contribute to the value of the Windows brand. However, every software project, regardless of scope, requires that developers consider which Microsoft technologies and tools to use. Understanding the limitations and complex interactions between the different components is no small task and represents a significant developer investment. In addition, developers face challenges with respect to connecting with their potential customers. For newcomers, it is just too difficult today to establish trust and positive reputations with the customer base, particularly with a customer base as diverse as ours. Deployment of native applications is unnecessarily complex and brittle, and servicing and usage telemetry are both hard to get right for native applications. The deployment of Web applications is already friction free, the telemetry is part of the fabric of the Web, and fast iteration and instant gratification are part of the programming model.

However, not everything is rosy in the world of Web development, particularly when we consider the needs of developers working on complex and large-scale software projects. Tooling for development and debugging of Web applications are nascent and Windows offers very limited value to the Web developers in terms of reliable, secure and fast access to the capabilities of the rich client. The Web platform and associated Web standards are undergoing rapid evolution. Despite recent advances in the various Web browsers and the myriad of libraries and toolkits designed to abstract the complexities and shortcomings, the Web platform is still limited and cumbersome to use. It's very difficult to achieve

smooth animations and rich interactions across different browsers with a high level of integrity, and it is still too difficult to achieve good performance even if we constrain the problem to one operating system. Access to hardware such as the GPU is formative, and integration with specialized or even ubiquitous capabilities such as storage or the variety of input and sensor technologies is possible only with proprietary extensions such as Google Gears, Adobe Air or Microsoft Silverlight. Developing consistent user interfaces across a set of related applications or having those applications integrate with each other or other user data are all difficult and come with little help from tools or the OS.

In Windows 8, we will blend the best of the Web and rich client such that customers and hardware and software developers value Windows as the best and most desirable platform. We need to address the obvious problem of native application deployment and bring more of the rich capabilities of Windows to the Web in a secure and standards-conformant way. We will accomplish this by defining a complete, end-to-end developer experience for building, deploying, and profiting from Windows applications. We will provide building blocks that enable Windows Web applications to closely approximate the look and feel and behaviors formerly reserved only for the rich client apps. These building blocks will conform to the programming idioms of Web standards wherever possible and extend them only if absolutely necessary. This rich runtime of Windows-based services builds on the basis of Web technologies and extends them with the richness of Windows. Together, with a dedicated toolset, we will connect those applications in a secure and verifiable way to an integrated Windows Store for purchase by customers.

While customers benefit from a modern, connected experience that helps them discover and acquire the best Windows applications that suit their needs, developers benefit because they connect with their target customers. A new Windows Store will make it easy for developers to reach customers and get paid for their work. Additionally, a Windows Store will bring together all of the things people make for Windows PCs and grow their reach by placing it front and center in the Windows user experience.

Our investments will also help hardware engineers. We want Windows to inspire new hardware innovations and use ongoing telemetry to drive quality improvement with our existing hardware partners. We will explore synergies between low-level native applications, the programming model of Web applications and Device Stage introduced in Windows 7 and will blur the distinction between content and code. We will closely examine how to isolate user state created by applications so migration between different Windows-based devices is easy.

With an increasing number of form factors entering the market, we can further differentiate by extending our work in touch computing and continuing to invest in other emerging opportunities in human computer interaction such as speech, camera and Project Natal. We want to provide scaling independent of resolution, and we should even think about how Windows itself fits on a screen smaller than 800x600. This isn't about shrinking or wrapping a new UI description, but rather whole new ways of authoring UI (and Web content) that allow developers to define multiple descriptions that target different form factors.

We will continue our work in improving and streamlining our development kits—their composition, as well as their presentation and delivery models—which are so vital for developers to bring new products

into the Windows ecosystem. Our APIs and code samples will reflect the diversity of our customer base, taking into consideration support for accessibility and the needs of the international market.

Partnering with Developer Division, we will pay close attention to the end-to-end developer experience, starting with the download of the development tools, headers and libraries, complete and well organized documentation and code samples, and ending with making connections with prospective customers. We will deliver compelling and actionable telemetry about how a developer's app behaves in the market with respect to reliability, performance and usage as well as provide a better chance for monetization. We will also provide an easy way to manage updates for developers and customers alike, making the complete software lifecycle on the Windows platform a streamlined experience.

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

- **Make web applications first-class citizens on Windows** through a model that enables Web applications delivered via Internet Explorer to fully integrate with the Windows experience and still preserve the integrity of the security model. These applications should bring the same reliability and predictability of performance and user experience associated with Windows applications, and it should be easy to extend them by taking advantage of the features and capabilities of the PC, such as hardware accelerated graphics, rich media and natural input. The delivery of this would include a complete API set and runtime, much of which just exposes existing Windows functionality.
- Make it possible to discover what applications are available for Windows **by creating a Windows Store for securely publishing applications** directly to all Windows users across their multiple machines and for developers to get paid for their work.
- **Streamline the developer experience** and make it easy to find the latest tools, headers and libraries and all the corresponding documents necessary to start a new application or improve an existing one. Developers should have access to telemetry that helps them become better citizens of the Windows ecosystem and the same telemetry should provide for potential customers enough information about the quality and impact of given application on the system. In fact the toolset will be streamlined and easily used by "average" developers to create these applications, and the projects will scale so that our sophisticated developers can use the high-end tools to create applications for Windows.
- **Establish and support new application interaction models** that scale from small-screen form factors to in living room displays with gesture-based navigation.
- Enable our **graphics and media platform to scale** from low-power, smaller devices to full-scale gaming PCs.

Defining a Modern PC Experience

The basic elements of today's Windows user experience—the Desktop, Taskbar, Start menu, and Explorer—were introduced in Windows 95, and their success has made Windows the world's most familiar computing environment. But today's modern world is in many ways different from the mid-1990s world in which Windows 95 was designed.

In Windows 8, we can evolve the user experience of Windows to optimize for today's scenarios, modern user expectations, and the diverse global ecosystem. We can deliver a fast, fluid, and high-quality experience in every supported language—one which is consistent with our Windows Experience Principles and aligned with our brand and Microsoft's overall design point-of-view.

The importance of the Web and the impact of mobile phones in today's world can't be ignored. While it is crucial for us to advance the state-of-the-art in program launching, window switching, navigating, and personalization, we must also focus on every-day "connected" scenarios that span the Web, the phone, people, context, location, and the Windows community. Windows 8 and Internet Explorer together form the core user experience of the PC—one in which the Web is "native" to Windows and in which Windows is the best way to use the Web. Search is the primary user interface to the Web, and is arguably the most essential user interface construct in the modern world. By investing in Search as a native experience for not only finding things, but also doing things, we can help to further bridge the Web and Windows worlds.

Services like Windows Live and our Windows website are central parts of how we deliver a "connected" Windows experience. The Windows Live service will help to infuse the Windows experience with the Web: friends, social networks, Web services, and online storage, while the Windows website will connect people to personalization options and the broad community for information and assistance. Our goal is for Windows Live, and similar web services developed outside of Microsoft, to use our open and documented APIs to truly "light up" Windows 8, and we will design assuming these services are present. When you identify yourself to any PC in the world, Windows and the web services you select should know who you are and personalize the experience based on your past experiences with Windows: your personality, preferences, how you use your PC, what programs and music you like, where your stuff is and who your friends and colleagues are.

Today, finding and acquiring new Windows programs is difficult and time-consuming. Because of the popularity of Web apps and the iPhone, people now expect getting new app experiences to be quick, easy, and repercussion-free. As discussed previously, a Windows Store can fulfill this expectation, delivering a connected experience optimized around discovering and acquiring the best Windows applications and content—from applications built on the new app platform to Web slices, gadgets, themes, and improved reading and format support that open up additional experiences on Windows. Because Windows knows your context and usage habits, we have an opportunity to make it easy to discover and acquire high-quality software and content that suits your needs and interests, and which has been highly-rated by friends and the community.

We lack a clear story today for customers about how to listen to music, watch TV and movies, and view video on the PC. Media Player, Zune, and Media Center are all optimized around a specific set of scenarios, devices, and service offerings that make sense individually but when viewed as a set are confusing and unwieldy. Working towards a unified media story for Windows—one client experience that scales from the light in-box experience to a "light up" service offering—is a crucial starting point for being able to explain our value proposition to customers. When creating this new unified experience, we must also pay attention to new and emerging opportunities in 3D technology, where we have a chance to go beyond fixing the problems of the past to deliver a truly unique set of experiences.

We must also consider evolutions in form factors and methods of interacting with the system. Traditionally, we have designed Windows around a desktop PC with a 1024x768 display as a reasonable baseline experience. Moving forward, we must design the Windows UI to scale up and down for an increasing diversity of hardware capabilities, ranging from ultra-low-power PCs with a tiny 5" display, to high-powered PCs with relatively unbounded processing power and TV-sized displays, to displays with 3D capabilities. Optimizing for these form factors will require not just thinking about the display size and processing power, but also the optimal input methods for each experience. We will also continue to embrace aspects of Natural User Interface, such as touch and speech, and we will explore novel methods of interaction such as those introduced in Project Natal.

While humans are a primary and obvious audience for the Windows user experience, we have another critical focus: enthusiasts. Enthusiasts are different in many ways from typical users of Windows. They use more of the system, and they do so while pushing the limits of the mainline Windows UI. Enthusiasts don't just rename a file; they batch rename thousands of them. They don't just copy a few pictures; they replicate 2TB of ripped movies to external arrays. They choose to record movies in .mkv, encode and stream audio to .oog, and compress files to .rar and 7-zip. They have multiple monitors and several bootable partitions. They are obsessed about getting the most out of their system, knowing what Windows is doing, and in tweaking Windows to customize and to improve their perceived performance. So why are enthusiasts important? Because they're powerful; they influence the public perception of whether a release of Windows is worthwhile or not. Enthusiasts participate in blogs about Windows, comment on news articles, and pontificate to their human friends when they ask if they should upgrade or not. Enthusiasts will be an area of focus for Windows 8; our job is to ensure that they view it as a must-have upgrade.

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

- **A new user experience for core tasks** in Windows so that tasks are more front and center in the experience rather than control panels and file explorer. We will optimize for modern, connected, real-time scenarios that scale from small, low-power devices with small screens to high-end workstations with large displays and unbounded processing power.
- **A new desktop focused on the needs of enthusiasts**, with a playground of goodies for them such as a rich, extensible file management experience optimized around batch processing or tools to get a better sense of what's going on in the PC and how to tweak it for better performance.

- **An experience that assumes a modern set of connected services are available** to provide social capabilities—identity, social aggregation, reputation—to complete the Windows experience
- **A Windows Store** to help people discover and acquire the best Windows applications and content assets—software and content that have been rated by the community and friends, and is easy and fast to try, buy or acquire, and remove.
- **A single, coherent media story** that seamlessly scales from a simple in-box player to a "service and store" experience that complements people's expectations of Windows and Windows Live.

Extending the Reach of Windows

Over the last two decades, Windows has been built on a business model where revenues flow primarily from royalties paid by OEMs for every copy of Windows that comes pre-installed on new PCs. This model has scaled globally and enabled Microsoft and its partners to profit from the sale of hardware, software and peripherals built on Windows. With more than a billion desktops, Windows is among the most recognizable and successful brands in the history of business.

However, the business climate is dynamic and many changes are bringing challenges to the core of the Windows business model. These include partner profit margins shrinking with PC price deflation; the rise of new software business models associated with service offerings; value perception associated with pirated software; locale-specific software and service offerings that increase the relevance of the PC experience but have no business, user experience, or brand relationship to Windows; and increasing competitor share of premium hardware, software and service offerings.

In addition, markets we term today as 'emerging' will have emerged during the Windows 8 timeframe, in terms of number of PCs sold and total revenue associated with PC hardware, software, and service sales. China will surpass the United States as the #1 PC market, though piracy remains a huge challenge and will prevent billions of dollars of that PC revenue from reaching Microsoft if we don't increase legal ownership. To increase legal ownership, we must continue to enhance the value of a genuine copy of Windows, ensuring that it is not just superior to a pirated version of Windows in both value and functionality across all markets—but *at-a-glance*, *obviously* superior.

We also need a platform that adds new ways for our partners to make money from the sale of a Windows PC, increasing the diversity of locales and economic sectors in which a set of genuine (licensed), Windows-based PC experiences is desirable, possible, and purchased. We need to enable greater, more substantive differentiation, so that the range of choices associated with the PC experience is more locale-specific and benefits both consumers and channel partners—from language selection scenarios to locale-specific service discovery, enablement, and management. Creating a rich set of services that seamlessly connect the client to content and other offers increases the dynamism and personal relevance of the PC, and provide new surface area for ecosystem partners and developers to add value. Rich Web experiences that extend from the client are vital to anchoring the PC in a world of increasing digital choices.

The demand for low-cost PCs along with the rise of mobile broadband has spurred interest from service providers to sell services on subsidized PCs. These service providers—Telcos—look to PCs with Windows as a way to grow their revenue and long-term relationships with customers beyond data communication, while keeping costs of bandwidth and support at manageable levels. Windows has the opportunity to cater to and increase the appeal of a model in which the PC seller and data plan provider has an ongoing service and billing relationship with the customer. While this opens up new possibilities of revenue over time and alternative business models in the consumer space, it also elevates the importance of fundamentals, local relevance, and customer satisfaction. These factors combine to play a critical role in establishing long-term customer relationships and profitability.

Enabling greater partner differentiation in hardware, software, and service offerings is also crucial to helping our partners compete effectively against common competitors. It liberates them to compete productively between themselves—consistent with Windows business and user experience principles—rather than compete with core Windows experiences. Connecting differentiation capabilities to hardware will fuel premium experiences. Ensuring opportunities for software and service differentiation, tied to platform capabilities including licensing and payment models, can incent partners to innovate around and market higher end SKU offerings. And creating more substantive, locale-specific differentiation opportunities will make obvious the value of genuine Windows relative to pirated local software/service offerings.

Giving local hardware, software, and service ecosystems opportunities to connect their offerings to Genuine Windows opens up both local business opportunities and will help tie the Windows PC experience meet the needs and desires of local markets. Winning in key growth markets like China will also require embracing the local ecosystem of software and services to deliver a competitive and locally-relevant experience.

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

- **Offering built-in support for mobile broadband connectivity**, intelligent bandwidth and cost management, seamless network switching without disruption, and the ability to always pick the best network.
- **Providing extensible supportability, self-help, and community help platform** so that service providers simply register and the best of Microsoft, the ecosystem, and our customers combine to provide solutions and answers.
- **Reducing piracy through hardware markers and rethinking Genuine and trial**. Genuine Windows can be tied to hardware markers that increase the complexity of 'cracking' and pirating Genuine Windows. Trial is a 'state' of the full OS experience, for any SKU, that leads to friction-free purchase and validation of a Genuine copy of Windows. The meaning of Genuine moves from a state of being activated to the definition of a quality, rich, locally relevant PC experience.
- Winning globally—including China, Brazil, and emergent markets—by **enabling substantive local differentiation with software and service discovery, attachment, and management** that

extend the local definition of Windows beyond how Windows looks to what Windows says, does, and is.

- **In-box support for Telco licensing and commerce models.** Service providers can provision Windows for subscription, provide Windows features and custom services through data plans, and easily service and reset PCs as they do with cell phones today.

Connecting to Windows from Anywhere

The computing landscape continues to change as customers are spending more time connected to their life and friends across their computers, their phone and other devices. In fact, they're often using more than one of these devices at a time, and they sometimes need to share PCs or devices or allow "guest" users. In this rapidly evolving world, Windows is challenged to give people the connectivity they want while keeping their data private and secure.

In Windows 7 and Window Live, we began tackling these challenges by delivering specific scenarios using a variety of solutions. We have SkyDrive to help you get access to your files from anywhere. We built HomeGroup to help you get access to other PCs and the documents, music and video on them from inside your home network. We also delivered Remote Media Access where you can stream music and video over the internet to PCs that, together with a Live ID, have been identified as trusted members of your HomeGroup. Beyond the OS and Windows Live, Home Server represents yet another approach to many of these same challenges.

These features are a great start but they fall far short of our customer's needs. SkyDrive is a wonderful feature to access files from anywhere over the Internet but even happy SkyDrive customers have many files trapped in and among PCs, external hard drives, thumb drives and other devices. This makes it difficult to keep important information in sync across PCs and devices. HomeGroup helps with a large portion of this by making it easy for people to find things across the Windows PCs in their homes but it doesn't let people access the files from outside the home unless they are streaming media files in Windows Media Player over the Internet. Windows Media Center Extender also provides the ability to connect you to your Xbox console to enable entertainment scenarios from your PC to your Xbox, but not to another PC.

In addition, each of these features offers a different way for people to identify themselves to the system including Live IDs, HomeGroup passwords, authentication keys for devices, computer logon credentials, and network security authorization keys. The result is a mish-mash of features and capabilities that don't give people confidence that Windows and Windows Live provide them with an easy path to truly give them access to the things they care about.

In Windows 8, we will improve how our customers identify themselves and their devices. We will help customers easily manage multiple identities and switch between identities quickly and simply. By using services such as Windows Live, we will help people connect to their content, settings, applications, media and games across multiple PCs quickly, easily and ubiquitously without having to completely log out of Windows.

Increasingly, devices are able to connect to networks and the internet. Working with Windows Live, we will drive enhancements to HomeGroup that enable people to connect to their PCs and other devices via home networks and the internet. We will build our remote access and sharing scenarios using technologies that could include Macintosh computers and other CE devices that may be running Linux or other operating systems.

Stated simply, our goal is to make easy for people to connect to the people and information they care about from wherever they are using Windows and services such as Windows Live. Working closely with Windows Live, we can pull these scenarios together into a simple and cohesive experience that makes sense to customers and also creates opportunity for partners who deliver computers, connected computing devices and related services.

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

- Provide a **common way to identify and manage your personas**, passcode, passphrases and other identification in a safe and secure store.
- **Access data on your Windows 8 PCs from anywhere.** If you are running Windows 8 and forget a document at home, or want to share a photo you left on your laptop, you can securely connect back to your HomeGroup PC.
- Broaden the notion of HomeGroup to **enable access to devices on your home network from any Windows 8 PC**.
- **Synchronize data and settings across PCs and devices.** Working with Windows Live, we will make it easy to keep files in sync, replicate files across machines and back up critical information.
- **Connect to you Windows 8 PCs from anywhere.** Together with Windows Live, we will make it safe, efficient and simple to remotely access your entire PC experience including your user profile personal themes, documents, settings, browser favorites and applications.

Helping IT to Deliver Work Anywhere Infrastructure

Up until recently, running Windows on work computers was largely made up of predictable, stable and static set of work scenarios. One of the most common is working on a desktop computer or laptop that is connected to the corporate network in an office or through a VPN connection. Today's newly emerging work environments are much more dynamic, flexible and mobile. Employees are accessing and performing work in a range of locations and environments, from a variety of devices and connection types. Customers are working from home on their personal computers, performing personal tasks on their work computers, working and playing on their mobile phones, and trying to get work done from multiple computers. IT departments need to support these scenarios, while remaining committed to security, compliance, manageability, and performance. These usage expectations will increase as more of the workforce becomes mobile, pervasive connectivity increases, and more work is desired from yet more remote locations.

Given this trend, IT is starting to investigate and evaluate new infrastructure solutions to securely deliver the work experience to a variety of devices in different locations. For example, many IT organizations still depend on cumbersome VPN technologies to enable customers to connect to work remotely. However, working remotely from a personal home computer is almost out of the question for most customers because of the technical expertise required by end users to get this to work and the compliance risk it brings. Some IT organizations are experimenting with hosting Windows clients in the data center and delivering the work experience to remote computers using Remote Desktop or competing solutions from companies like VMWare. This presents an entirely different set of challenges around offline use and management.

In Windows 8, we have the opportunity to help IT adapt to the evolving work environment and enable customers to work more efficiently and effectively from the office on a work computer, on the road from a work computer, or from a home personal computer. The tools, experiences, and infrastructure that we provide to IT professionals need to address the deployment, management, and security needs across these different work environments. Although we offer a number of infrastructure possibilities today such as roaming user profiles and folder redirection, Virtual PC, Remote Desktop, VPN support and most recently DirectAccess, these are only partial solutions to the overall work anywhere problem.

Virtualization in the enterprise can take many different forms and IT is using client virtualization to address problems such as application compatibility, desktop management, and information security. Many enterprises envision that by hosting the Windows desktop experience in the data center, they will reduce the cost and complexity of managing Windows and keep sensitive information safe from leaks and misuse. In Windows 8, we need to make the right long-term bets on virtualization and rationalize its use in addressing these and other IT and customer needs.

The tools and services we provide to IT for deploying and managing Windows 8 clients also need to align with the modern realities of the supported end-user work environments. IT policies that used to manage employee work environments will have to extend to personal computers that are used for work. It is insufficient to enable work from the home PC; it's important to enable both the work environment and settings and personal environment and settings to coexist and complement one another across different PCs.

Historically, IT professionals have taken a very PC-centric approach to managing what a customer can do. However, with the emergence of pervasive connectivity, powerful mobile devices, sophisticated web-centric applications, and an increased focus on regulation, the PC-centric approach needs to change. In Windows 8, we need to provide IT with the ability to provision capabilities dynamically based a combination of policy and factors such as the user's location, the device they are using, the role they are in, their type of network connection, and what data they are trying to access.

The growing mobile workforce also introduces security risks. To address these challenges, Windows 7 took strides toward reducing the risk of data leaks and misuse by delivering BitLocker to Go to protect data on removable drives and policy enhancements to enforce the encryption of data when stored on removable drives. Information Protection, Encrypting File System, and BitLocker are different Windows

data encryption technologies that approach the problem of keeping information safe from different perspectives. None of these help IT departments to know when something has been lost, whether it was encrypted or not. The mobile workforce is only going to continue to grow, and in Windows 8 we need to provide a method that protects and reports on the data by default in any place it is stored and accessed.

We need to rationalize the different infrastructure approaches we provide IT today to make it much easier for them to enable customers to work in the office, on the road, and from their personal home computers. Working closely with the Windows Server team, we can define key scenarios that build on the technology assets we have in management, virtualization, directory, security, and other infrastructure areas that keep IT in control of the work environment while providing customers with the flexibility to work from more places and more devices.

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

- **IT can deliver a secure and predictable work experience to customers who want to work from their personal computers.** Using policy, they can control which PCs and devices a customer can use to access their work environment based on factors such as network connection, device type, and location. It's obvious to the customer how they facilitate this and when they work from their personal computer it's clear they are in their work environment and this doesn't impact their personal settings.
- **A more intuitive user experience to aide in discovery and use of the 'work anywhere' feature set.** We can do much to better help customers choose among and realize the full benefits of all technologies involved: Direct Access, BitLocker, EFS, session-based computing, Client-side caching, redirected folders, effects of policy, and more.
- **By default, company data is always secure and encrypted.** This is invisible to the customer and has no impact on the performance and responsiveness of the system. IT needs to be able to ensure that data is encrypted regardless of where it's stored and have the ability to prove this to auditors.
- **IT can replace a customer's lost/stolen or broken PC in minutes.** The customer's settings and information are synchronized to the new PC. Any data stored on that PC is encrypted and IT can even remotely wipe the contents.
- **Windows clients can be hosted in the data center and delivered to the customer remotely**. Customers can check in/out the hosted image form and run it locally and offline on any PC.

Showcasing Quality the First 30 days and over Time

Perceptions of great quality begin with the initial purchase consideration, continue through purchase and day-one experiences, build in the formative period of the first few weeks of ownership, and are reinforced through the life of the PC.

Today we face many challenges across all of the phases of ownership. The burden of ensuring that a new PC is running as well as it should is placed on the customer who purchased it. As a result, the first days of usage, rather than being a period of exploration and fun, can often be labor intensive and exasperating. The customer perception of Windows quality also incorporates all of the third-party software and hardware that they use with Windows, especially the initial package of hardware and software provided by the OEM. If problems exist in any component, the experience of the customer with that system—and with Windows—will not be satisfactory.

The first days of ownership for many customers includes support calls to their OEM to resolve problems. Although close to half of these calls are how-to questions for usage of the PC and the initial software payload, the majority are support requests to address problems customers are facing. Many of these problems occur because the OEM image was not optimized for a problem-free experience, either because the OEM wasn't able to effectively validate their preload and investigate and resolve problems in the image before it shipped, or because updates were not being effectively applied to customer systems after they've left the factory.

Making matters worse, Windows itself is not running at its best during the first days of ownership. Besides the impacts of the reconfiguration and removal of software by the customer, which can affect cache contents and component dependencies, Windows performs all of its initial self-tuning and post-out-of-box-experience tasks during this critical time. Here is just a sample of system services that can run during this time: boot layout optimization, Windows system assessment tests, media library scan, search indexing, Windows Update, font cache creation, code integrity cache creation, thumbnail generation, Windows backup, and Defender scans.

In addition to these Windows tasks, other software on the system may be active during this initial time as well, doing similar things. These activities can collide with each other because they are not coordinated or don't know how to prevent unwanted behavior. For example one activity may trigger others, such as thumbnail creation triggering the antivirus to scan the newly created thumbnail files, or metadata or logs for third-party applications being created in a place that is indexed.

Beyond these service conflicts, preventing file degradation over time is a continuing focus for us. Many components struggle over time with the accumulation of software, files, metadata, and logs. For example, large numbers of fonts being installed—which may come just a few at a time with apps—can have an impact on boot times and memory utilization. Even simple things like whether a log file truncates or wraps vs. growing unbounded can have significant impact over a long timeline and lead to system degradation.

Performance and reliability can also be significantly affected through normal and expected use as the accumulation of applications, services, plug-ins and drivers consume and compete for resources or destabilize each other. Software won't always uninstall cleanly, often leaving residual components, files, logs and registry entries behind. This means that even when the customer detects that a change they've made has created a problem, they may struggle to get back to a state in which the PC was working properly.

These problems seem even more acute in multi-PC households and in small businesses. For each additional PC, the customer has to perform the exact same configuration, maintenance, and management tasks on each and overcome new issues when connecting many PCs together. Windows could do a better job helping the customer manage these systems, shortcut configuration options, or enable new maintenance and management scenarios.

Windows 7 demonstrated the value in nailing core quality and how delivering that can delight our customers. Windows 8 can take this further and ensure that Windows is seen as the operating system of choice to ensure great initial quality that is durable over time.

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

- **Reduce the tax on the customer for initial configuration and setup** by helping OEMs and retailers to do more of the steps required up front by providing tools and telemetry to the ecosystem.
- **Improve the perception of quality by streamlining initial Windows Updates.** We can batch and optimize delivery for these, so that it appears to the customer to be only a single update.
- **Reduce degradation of the system over time by hardening the OS.** We must systematically investigate and address the parts of Windows that do not scale well over time and with accretion of files, plug-ins, and applications.
- **Automatically provide the ability to reset to a known good state.** System Restore and Windows Recovery Environment are two great systems in Windows today, allowing a quick reset to undo a recent change and a major reset back to straight-from-the-factory conditions.
- **Support the deployment and manageability multiple PCs centrally without a server**. We can provide a "control center" that allows customers to clone a new system based on an existing system in the home or business, or based on Live ID, then globally view status of PCs under their purview and reach out and apply changes remotely in a convenient way.

OUR PHILOSOPHY

We are committed to running our Windows business in accordance with principles that address computer manufacturers, user choice, opportunities for developers, and interoperability for users. These principles apply to all of our Windows desktop development projects going forward. Our principles can be reviewed at: http://www.microsoft.com/presspass/newsroom/winxp/windowsprinciples.mspx.

We expect everyone on the team and everyone who contributes to our Windows 8 release to read and internalize these principles. If you have any questions or concerns about this at any time during our development cycle, please do not hesitate to ask your manager or any manager on the team.

Engineering Excellence

The capabilities and features in Windows continue to grow—making it paramount that our engineering tools, infrastructure and practices keep pace to support our goals in each release. Our engineering environment needs to enable the delivery of a high-quality product on a predictable schedule. To accomplish this, we are continuing to bet in Windows 8 on shared goals, planning and a common schedule and a commitment to working within a core set of engineering standards and a common engineering process.

With Milestone Q (MQ) we have an opportunity between now and the start of Windows 8 Milestone 1 to make a small number of prescribed changes to our engineering processes and standards, including shoring up any differences in standards or execution that existed in our previous release. We will 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 ensure that we front-load discovery in our product engineering schedule on all fronts. Doing so means we will evolve every aspect of what we do, from planning and design, to development of our product, tools and test code, our build process as well as test and release, all the way through to how we sustain our products once we deliver to customers and partners. 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. Developers, testers, program managers and other engineering disciplines will be planning and partnering together more consistently and earlier in our product schedule than ever before.

To support these goals, each team will invest in our Milestone Q as time dedicated to investing in ourselves. The definition and scope of this milestone will vary team by team. The leadership of each feature team will define this work in conjunction with the many Windows-wide investments we are making during MQ. Some innovation and change during this milestone will be team specific, but much of it will be also be Windows-wide in scope, impact and benefit. This dedicated time will be focused on some of our biggest investments such as our test automation, code quality, engineering systems and tools. It is also a time to invest in architectural changes that enable more agility and flexibility in our code delivery as well as structured innovation and experimentation before the official start of coding (M1) for our next release. During the MQ milestone, we will also inventory the existing code and

services in our teams and make sure we understand and rationalize any per-team differences in our core engineering standards and practices. We will also complete the transition of Windows 7 to our SE team. During MQ, therefore prior to M1 start, we expect teams to complete any required prototyping of new ideas or architectures germane to making final implementation and design decisions as part of our Windows 8 release. A successful Windows 8 depends on ensuring there is a very tight link between our vision, our features, our specs, our code and test execution and our schedule. Doing so means we must also minimize risk and randomness in our code, engineering processes and end-features. An important characteristic of our MQ work is that we will manage this milestone as any Window milestone by following 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 problem space takes place.

Servicing Our Product with SP1

The focus of our first service pack for Windows 7 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 7. By carefully managing SP1 to focus on just those customer-identified issues, we support our ability to deliver a high-quality Windows 8 product on a predictable schedule.

Out-of-Band Releases

As during Windows 7, we will continue to thoughtfully minimize the number of out-of-band releases that we create so we keep our focus on delivering our next version of Windows. Shipping something out of band (OOB) takes focus away from the current release and has the potential to leave people out of sync. No new features or non-critical bug fixes should be shipping out of band. During MQ and our Windows 8 planning process we will work across teams to understand any pending OOB desires and rationalize them especially against our planned Windows 8 work. At this point, we only expect to have one small down-level pack designed to help developers transition to Windows 8.

TECHNOLOGY BETS AND THEME TEAMS

In order to move forward on planning for Windows 8, 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 comprise all engineering disciplines. We all have important contributions to make. Building on the information presented at the Planning Forum, these Theme teams will share findings and recommendations to the larger team. This, in turn, will inform the individual feature team vision determination. Team visions are intended to explore how specific work fits into the larger planning effort.

Once the vision areas are defined and the vision for Windows 8 is published, we will have Vision Week. Vision Week is a time for Product Marketing, 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. Vision Week 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. The effort will be led by the PM, Design and Research teams, with coordination and communication across our team and partner teams. 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 8 together. We expect to deliver the seamless Windows experience our customer's desire, so we cannot allow our own organizational seams to be reflected in the product.

Themes	Leader
Blending the Best of the Web & the Rich Client	Linda Averett
Defining a Modern PC Experience	Jensen Harris
Extending the Reach of Windows	*Ted Dworkin*
Connecting to Windows From Anywhere	Dennis Flanagan
Helping IT to Deliver Work Anywhere Infrastructure	Iain McDonald
Showcasing Quality the First 30 Days & Over Time	Gabe Aul
Technology Bets	**Leader**
Internet Explorer and Windows Applications in HTML	Ian LeGrow
High-end and Low-end hardware	Bill Karagounis
Windows Live	Katie Frigon
Scale for Data Centers	Sandeep Singhal
Simplified Log-On and Identity	Dustin Ingalls
3G Networking	Billy Anders

NEXT STEPS

The planning for Windows 8 begins today. 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 a clearer team vision. 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 7 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
September	**Planning Memo**	**Frame our plan, business, strategy, themes & schedule**	**JulieLar**	**Start participating in planning activities & offsite**
	MQ	**MQ work begins**	**Dev and Test MGRs & GPMs**	**Focus on MQ**
October-November	**Theme Planning**	**Ideation, prioritization & scoping of scenarios**	**Themes and Big Bet Leaders**	**Theme planning meetings & checkpoints**
December	**Draft Vision pillars**	**Consolidation of scenarios from Theme planning into major release pillars**	**JulieLar**	**Leadership offsites**
	Team Planning	**Teams take draft vision pillars, plan their work & engage partner teams**	**PM Leaders, Product Planning, Product Mgmt**	**Team planning meetings**
January	**Team Planning**	**Continue planning activities/engage partner teams**	**GPMs**	**Planning within teams**
	Vision Drafts Complete in Teams	**Teams scope work, scenarios, customer promise, map these to themes & bets & review in teams**	**PM leaders**	**Planning within teams, cross team dependencies, planned spec writing begins & MQ continues**
February	**Vision Drafts and Vision Checkpoint Meetings**	**Detail the vision for each planning team, customer promises, scenarios, click-through prototypes & feature list**	**PM Leaders**	**Vision meetings continue, Spec writing continues & MQ continues**
March	**Vision Memo**	**Complete vision & feature list, combining the vision drafts from each team, and press releases**	**JulieLar PM leaders**	**Teams complete vision drafts, Spec writing begins &MQ & SP1 continues**
	Vision Week	**Present vision to team, management & partners**	**All**	**Attend vision week**