

# Windows XP Professional: The Business Case for an Accelerated Desktop Refresh

Measuring the  
Financial Value  
of Deploying  
a PC Desktop  
Standardized  
on Windows XP  
Professional



## Abstract

This report summarizes the results of business value studies conducted at nearly 50 enterprises over a two-year period. The results of these studies demonstrate the financial value of deploying a PC desktop standardized on Microsoft® Windows® XP Professional.

This business value evidence was compiled from eight previously published Microsoft white papers, which focused on the security and reliability, deployment and operations, and mobile user benefits of using Windows XP Professional. Key findings include:

- Business benefits comprise more than 70-percent of the realizable value, compared to an estimated 30 percent for IT-related benefits.
- Organizations can work more productively and lower client PC management and support costs more effectively than is possible with earlier versions of Microsoft Windows client software.
- Organizations can start realizing both business and IT benefits directly after deployment.
- A 3-year refresh cycle can help organizations avoid delays in realizing the value generated in business- and IT-related benefit scenarios.

This report was prepared for line of business, financial, and IT leaders who are concerned with or make decisions about their organization's IT investments.

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## Executive Summary

This white paper showcases the financial value of deploying client PCs that run Microsoft® Windows® XP Professional on a 3-year refresh cycle. By standardizing on Windows XP Professional, any organization can improve its workforce productivity and reduce the costs and complexity of installing, upgrading, and managing desktop PC software.

Key findings of this report are the results of business value studies conducted by Microsoft Corporation at nearly 50 enterprise customers over a two-year period. Additional data was gathered and analyzed by Immedient Corporation and Wipro Consulting (formerly NerveWire Corporation).<sup>1</sup>

Details of the business value studies, which were assessed by third-party evaluators such as Gartner, Inc., are documented in eight Microsoft white papers published from March 2002 to May 2004. Results of these studies demonstrate that:

- Organizations can realize substantial business value, often as much as 70 percent of total value, by deploying Windows XP Professional as the foundation of a standardized desktop.
- IT-related benefits, which represent as little as 30 percent of total benefits, provide sufficient direct realizable value to warrant immediate deployment.
- A Windows XP Professional-based desktop provides the foundation for directly improving customer relationships and increasing revenue by providing information workers with the right information at the right time. The resulting improvement in communications is in part enabled by better collaboration technologies and by connecting the desktop more ubiquitously with back-end or network resources.
- Deploying Windows XP Professional in a 3-year desktop client refresh cycle enables organizations to realize the full range of benefits directly after deployment and helps them avoid opportunity costs derived from a deferred IT investment.

Key findings of studies conducted at 17 enterprise organizations and other research identified:

- **Rapid return on investment.** Customers are able to achieve an average return on investment (ROI) of 203 percent and an average 13-month payback period. The net present value (NPV) was \$375 per PC.
- **Significant mobility benefits.** User productivity per PC increased by \$46 annually due to reduced downtime. Companies with mobile users realized an additional \$259 per notebook PC annually due to mobility benefits.
- **Reduced IT support costs.** Average reductions in IT support costs were \$46 per PC annually. Help desk calls decreased by an average of 10 percent, and desk-side support visits decreased by an average of 3 percent. The Gartner TCO Analyst Tool estimated that requirements for help desk full-time equivalents (FTEs) decreased by an average of 11 percent.

## Introduction

During uncertain economic times, investing in information technology (IT) can make even the most seasoned executive pause before signing the check. This caution is evident in the refresh cycle for the enterprise client PC, which has grown from an average of 3 years during the 1990s to the 4- and 5-year cycle that is more common today.

Business leaders responsible for evaluating and deploying IT have traditionally based their investment decisions on total cost of ownership (TCO) and IT-related metrics. However, new business value measurement methods indicate that the client PC operating system can also provide organizations with realizable value in many business categories.

This report showcases the results of business value studies conducted by Microsoft Corporation at nearly 50 enterprise customers over a two-year period. Additional data was gathered and analyzed by Immedient Corporation and Wipro Consulting (formerly NerveWire Corporation). The business valuation methodologies used for these evaluations were the Microsoft Rapid Economic Justification (REJ) framework and the Gartner Inc. Total Cost of Ownership (TCO) and Total Value of Opportunity (TVO) methodologies.

The TCO and REJ studies focused on traditional IT-related metrics, such as hardware and software costs, deployment and management costs, help desk and support costs, and training costs. Most of these studies were assessed by Gartner, Inc. The detailed results of these studies, which focus on the security and reliability, deployment and maintenance, and mobile user benefits of Windows XP Professional, are documented in six white papers published during 2002 and early 2003.

During 2003, Microsoft also conducted business value studies based on the Gartner TVO methodology at 23 different enterprise customers. These studies measured the financial returns of both business- and IT-related benefits of deploying Windows XP Professional. Nearly all results of the TVO studies were assessed by Gartner Inc. The detailed results of these studies are documented in two white papers co-published by Microsoft and Intel Corporation in late 2003 and mid-2004.

### **Business-Related Benefits Exceed IT Benefits**

The results of the TVO studies conducted at 23 enterprises show that for the organizations profiled, traditional IT metrics measured as IT Responsiveness represent only 29 percent of the value derived from refreshing the desktop client PC. Correspondingly, 71 percent of the value realized was derived directly from business-related benefits such as improved information worker productivity and increased business process efficiency.

For decision-makers who have previously made IT investment decisions based principally on TCO and IT-related metrics, it is an important new discovery to identify that nearly three-quarters of the value of refreshing the desktop client is derived directly from business-related benefits.

Exhibit 1 shows that the majority of the financial value of refreshing the desktop PC is found in business-related categories.

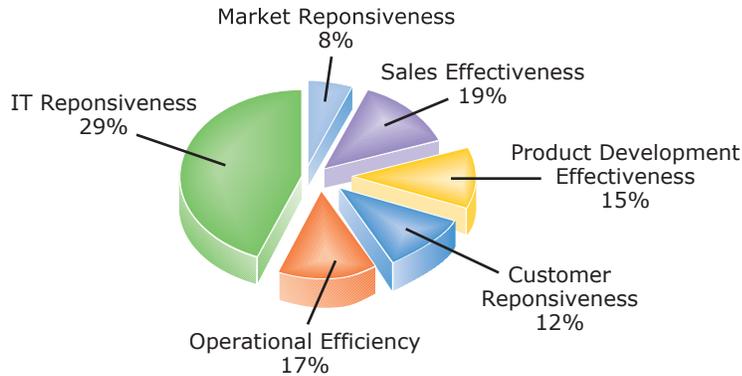


Exhibit 1 - Sources of value from refreshing the client PC

Although the metrics shown in Exhibit 1 reflect the unique circumstances of each of the organizations profiled in the TVO studies, the key takeaway is that IT benefits alone are not sufficient to base business-critical decisions about refreshing the desktop client PC.<sup>2</sup>

Exhibit 2 shows results of the TVO analyses for the organizations profiled in this report.<sup>3</sup>

Gartner Business Performance Framework	TVO Aggregate	All TVO Studies	
		Total Value	Value / PC / Year
Demand Management	Market Responsiveness	\$13,059,730	\$2,612
	Sales Effectiveness	\$32,155,392	\$616
	Product Development Effectiveness	\$26,336,022	\$1,177
Supply Management	Customer Responsiveness	\$20,991,209	\$320
	Supplier Effectiveness	n/a	n/a
	Operational Efficiency	\$28,269,490	\$338
Support Services	Human Resources Responsiveness	n/a	n/a
	IT Responsiveness	\$49,177,972	\$408
	Finance and Regulatory Responsiveness	n/a	n/a

Exhibit 2 - Financial results of TVO studies

### Traditional Measures of Valuation Demonstrate High ROI

In addition to the TVO analyses, each organization's investment was measured as any other capital investment is measured, by using time-tested valuation methodologies that conform to generally accepted accounting practices.

Results presented here include nine complete TVO studies that have been assessed by Gartner, Inc. and other studies that utilized parts of the TVO methodology for consistency in analysis. The average value and the range of values for each study group are presented in Exhibit 3.<sup>4</sup>

Traditional Valuation Measure	All TVO Studies		Gartner Assessed TVO Studies	
	Average Value	Range of Values	Average Value	Range of Values
Internal rate of return	115%	26% to 199%	99%	26% to 199%
Return on investment	218%	55% to 583%	206%	55% to 479%
Payback period	14 months	12 to 23 months	16 months	12 to 23 months
Discount rate	10.9%	10% to 15%	11.3%	10% to 15%
Number of PCs per organization	30,000+ seats	2,500 to 120,000+ seats	30,000+ seats	2,500 to 120,000+ seats

Exhibit 3 – TVO results presented as traditional measures of financial valuation

Results of other business value studies, including those that used the Gartner TCO and Microsoft REJ methodologies showed similar results. For example, organizations that deployed Windows XP Professional achieved both dramatic reductions in their IT infrastructure costs and higher returns on their people.

Exhibit 4 presents the results of these business value studies as traditional business metrics.

Traditional Measure	Average Value	Range of Values
Return on investment (ROI)	203%	90% to 351%
Payback period	13 months	8 to 18 months
Internal rate of return (IRR)	62%	51% to 129%
Net present value (NPV) per PC	\$375	\$62 to \$519
<b>Return on IT Infrastructure</b>	<b>Annual Benefit Per PC</b>	<b>3 Years per PC</b>
Desktop benefit	\$187	\$561
Notebook PC benefit	\$387	\$1161
<b>Return on People</b>	<b>Annual Benefit per PC</b>	<b>3 Years per PC</b>
Reduced downtime	\$46	\$138
Mobile knowledge worker	\$259	\$777

Exhibit 4 – TCO and REJ results presented as traditional measures of financial valuation

This report compiles and summarizes the evidence presented in these eight white papers. These results provide confirmation that deploying Windows XP Professional in a 3-year desktop refresh cycle enables enterprises to more quickly realize a deeper and broader range of business and technical benefits that result in demonstrable value to the bottom line.

For details about the Microsoft white papers that provided source material for this report, please go to Appendix A, “About this Report.”

## Improved End-User Productivity

All organizations want employees to accomplish more with existing resources. Results of business value studies, which used the REJ and TVO methodologies, demonstrate that standardizing on Windows XP Professional for desktop and notebook PCs can result in significant increases in information worker productivity.

Results of the business value studies that use the TVO methodology show that for the organizations profiled in the white paper, “Empowering Business On The Desktop: Using Gartner Total Value of Opportunity to Measure the Financial Value of Enterprise Client Refresh,” more than 70 percent of the financial value of refreshing the desktop PC is found in non-IT-related benefit categories.

These business results focus on improved end-user productivity and improved workflow process efficiency. Of the organizations profiled in all eight white papers, those that realized end-user productivity benefits did so by providing:

- A powerful, secure, and reliable desktop client that reduces end-user downtime caused by viruses and application compatibility problems.
- PC platforms and access to data and applications that help mobile workers work more efficiently with fewer interruptions.
- Mobile PC technology that business users can employ in new situations and in new ways.

## Access to Customers, Data, and Applications

One of the most important contributions of business value analysis to IT investment evaluation is its consideration of productivity of the end-users, principally information workers, who use information technologies every day. The business value studies that used the TVO methodology for analysis show that access to collaboration tools and quicker, easier access to data stored in back-end databases is an important element in helping end users to work more productively and respond more readily to customer needs.

Providing dedicated collaborative workspaces is a new way to promote end-user productivity. Windows XP Professional provides the foundation that enables end users to access collaboration services on the desktop by the use of the Microsoft Windows SharePoint™ Services component of Windows Server™ 2003.

Business-related results show that collaboration services promote end-user productivity by increasing business process efficiency and reducing the time and effort of finding, compiling, reporting, and sharing documents and project information.

### **Case Study: More Loans Processed Due to Shorter Sales Cycle**

*The sales group at a large bank with more than 100,000 PCs spends from 15 to 40 percent of their time finding, compiling, and analyzing customer data before they make sales calls. Infrequent data updates and isolated stores of customer information made it difficult for sales teams to find up-to-date information and create effective sales proposals.*

*A new desktop solution based on Windows XP Professional operating on PCs running Intel® Pentium® 4 Processors with Hyper Threading Technology (HT Technology) will streamline data analysis tasks and accelerate communications with customers. With the Windows XP Professional solution, the company expects to decrease its sales cycle time, improve customer satisfaction, and process more loans each year. By using an industry-standard PC desktop and a standardized way of capturing customer information and sharing it with colleagues, bank sales representatives have an opportunity to transform their customer relationship from a transaction focus that emphasizes volume to a consultative relationship that emphasizes customer satisfaction.*

*The TVO analysis projects information worker productivity benefits and increased revenue potential due to increased loan volume valued at \$1,467 per desktop per year. The bank expects a 25-percent IRR with a payback period of less than 24 months.*

*TVO results in several other organizations also showed the benefits of connecting information on desktops with back-end databases more quickly and easily. Several organizations used Microsoft BizTalk® Server and Microsoft Host Integration Server to operate with legacy computing systems to access data that can be manipulated by using Microsoft Office XP or Office 2003.*

### **Case Study: Quicker Time to Market for Market Reports Helps Increase Sales Opportunities**

*A European bank with more than 12,000 desktop PCs running Microsoft Office 97 on Microsoft Windows NT® Workstation version 4.0 or Windows 9x wanted to extend the value of their existing IT infrastructure by maintaining the legacy platform for several more years.*

*A TVO analysis showed that although the bank would save money by maintaining its legacy desktop, it would also be blocked from implementing new communication and data access flexibility that was required to meet new business challenges. Based on the TVO analysis, the bank has decided to further examine a solution based on an Intel Architecture-based PC desktop using Windows XP Professional and Office 2003. This collaboration solution, which uses Microsoft Office SharePoint Portal Server 2003, achieves better integration with legacy databases by using Microsoft BizTalk Server and Microsoft Host Integration Server.*

*The company expects that its IT investment will provide a centralized, customer information repository and help information workers to collaborate more effectively. This approach is expected to reduce the time to market for highly time-sensitive capital market reports, reduce the sales cycle, and improve the sales opportunity process. The TVO analysis showed that the company can anticipate a 1-percent improvement in the Time to Market Index Prime valued at \$1,559 per desktop per year. The bank anticipates a 210-percent ROI and 17-month payback on its investment.*

### **Empowered Mobile Users**

As mobile IT services become more important, the financial value of helping mobile users improve their productivity increases as well. Windows XP Professional provides a more secure and reliable desktop than previous versions of Windows client operating systems. Solutions based on Windows XP Professional also enable more efficient mobile PC management and make time-saving collaboration services accessible to mobile users.

## Secure, Reliable, and Manageable Mobile Client

Profiled organizations used Windows XP Professional to eliminate or reduce many causes of work interruptions that users experienced while using their notebook PCs out of the office.

- **Windows 32-bit architecture, application and device compatibility, and versioning support.** Seventeen organizations gained an average \$46 per mobile notebook PC per year based on reduced downtime and improved end-user productivity.<sup>5</sup>
- **Windows File Protection, Device Driver Rollback, System Restore, and DLL protection.** A financial services firm regained 68 hours per user per year valued at \$637 per PC (or \$2,024 per user) per year by reducing the time spent recovering from DLL conflicts, delays caused by printer driver incompatibility, and stalled applications.<sup>6</sup>
- **Hot docking.** Six organizations gained an average \$457 per user by avoiding delays caused by restarting their notebook PCs after docking and undocking.<sup>7</sup>
- **Hibernate/Standby mode.** Mobile users at a global pharmaceuticals firm recovered 34 hours per user per year valued at \$2,356 per user per year by avoiding delays caused by rebooting PCs after docking and undocking.<sup>6</sup>

By upgrading 40,000 Windows NT Workstation version 4.0-based notebook PCs to Windows XP Professional, a major manufacturer expects that Hibernate/Standby mode will eliminate unnecessary reboots and provide an annual end-user productivity benefit of nearly \$600 per notebook PC user.<sup>7</sup>

## Continuous Access to Network Data and Personal Computer Settings

Getting the latest version of updated information and documents is an important part of mobile computing. When mobile users visit customers or travel between company offices, Windows XP Professional helps them avoid time-consuming tasks such as re-establishing their personal computer settings and synchronizing files to network file shares. This improved efficiency is made possible by a group of features that makes access to network resources and customized desktop settings quick and easy.

- **Synchronization Manager and Offline Files and Folders.** Approximately 20,000 mobile employees at a global pharmaceutical company spend an average of 25 percent less time per week creating and revising documents offline by using the Synchronization Manager and Offline Files and Folders features. The 45-minute-per-week time saving is valued at \$2,356 per mobile user per year.<sup>6</sup>
- **Offline Files and Folders.** A large manufacturer anticipates that upgrading its 40,000 notebook PCs to Windows XP Professional and using the Offline Files and Folders feature alone will result in a benefit valued at \$300 per PC per year.<sup>8</sup>
- **Secure reliable wireless LAN computing.** A bank and financial services company is introducing telecommuting to the company's remote and mobile information workers by providing them with notebook PCs running Windows XP Professional

Secure, reliable remote computing and wireless local area network (WLAN) connections will enable this shift towards remote, mobile, and wireless operations and help the firm save \$108 for each of more than 22,000 desktops.<sup>9</sup>

- **Zero Configuration Wireless.** Sales representatives at a high-tech manufacturer avoided time-consuming configuration tasks and recovered 14 hours per user per year of non-productive time valued at \$966 per user. Non-sales information workers will save \$3,243 per user per year by avoiding wireless configuration tasks.<sup>6</sup>

#### **Case Study: Self-Hosted Virtual Private Network Reduces IT Support Costs**

*A global energy company with more than 50,000 desktops wanted to improve operational efficiency by reducing network access costs for its mobile workforce. Upgrading to Windows XP Professional enables the company to replace its current virtual private network (VPN) solution with native VPN capability. The new capabilities are expected to reduce IT support costs, enable scale-up of the new solution, and avoid an estimated 25 percent—\$4 million—of its current dialup call costs of approximately \$16 million per year across the entire company. The projected annual benefit is valued at \$65 per desktop per year.<sup>10</sup>*

#### **Effective Collaboration Environment**

Organizations concerned with PC users staying connected and productive wherever they work used solutions based on Windows XP Professional, Office 2003, and Windows SharePoint Services. These solutions helped users to make faster and better decisions and to build stronger, more effective relationships with colleagues, customers, and business partners.

#### **Case Study: Improved Collaboration Enables Greater Top-Line Growth**

*A leading U.S. provider of integrated marketing solutions to clients in the pharmaceutical, healthcare, and life sciences industries deployed a collaboration and document development platform. The company deployed the rich collaboration features of Windows SharePoint Services, Office SharePoint Portal Server 2003, and Office 2003 to streamline the creation and review of collateral documents its subsidiaries prepare for local clients. The platform's workspaces, centralized data repository, and document version control capabilities automated many formerly manual data sharing and document handling tasks. The streamlined document development process eliminated the time-consuming process of handing off and revising paper files, improved access to vital data, and provided a more structured document development environment. These improvements helped the company to:*

- *Reduce the use of contractors by 50 percent, leading to a 2-percent increase in operating margins.*
- *Increase the number of sales pitches, which resulted in a 2-percent increase in revenue.*
- *Realize productivity improvements and new revenue valued at \$3,833 per user per year.<sup>11</sup>*

#### **Case Study: Advanced Collaboration Features Streamline Regulatory Compliance Effort**

*A community hospital in the Northwestern United States created a project dashboard to expedite its U.S. Health Insurance Portability and Accountability Act (HIPAA) compliance effort. The dashboard used Microsoft Office Professional Edition 2003, Microsoft Office InfoPath™*

2003, and Microsoft Windows SharePoint Services. Compliance team members collect HIPAA-related information by filling out XML-based forms and uploading the information to Windows SharePoint Services team sites. Web service routines automatically pull key status information from the team sites and update a master site used by hospital's management team. By simplifying data input and tracking, providing centralized team workspaces, and automating data transfer procedures, the solution helps the teams to streamline data collection and reporting processes and ensures that up-to-date information is always available to the individual compliance teams and hospital managers. As a result, the solution helps hospital compliance teams to:

- Reduce the total cost of HIPAA compliance.
- Spend 87 percent less time responding to HIPAA audits than previously possible with manual data compilation and reporting practices.
- Spend 19 percent less time creating compliance procedures.
- Improve customer service by resolving customer complaints in 20 percent less time than previously.

Improved collaboration provided by this solution resulted in productivity gains valued at \$867 per user per year.<sup>12</sup>

## Enhanced PC Usability for Business Users

Businesses are always searching for ways to help individual employees and work groups to work more efficiently. Tablet PCs represent a new way for highly mobile information workers and users of specialized line of business applications to gain further improvements in individual and group productivity.

By running a lightweight and highly portable notebook PC with Microsoft Windows XP Tablet PC Edition, the new mobile desktop operating system based on Windows XP Professional, and adding unique digital pen-and-ink-based computing capabilities, tablet PCs enable users to use notebook PCs in new situations and in new ways.

Results of five business value studies taken from the tablet PC report demonstrate productivity improvements gained by upgrading notebook PCs running Windows XP Professional to tablet PCs running Windows XP Tablet PC Edition.

The first three benefits apply to all tablet PC users; the fourth benefit applies to information workers who used tablet PCs in a wireless LAN environment.

- **Capture and organize information more efficiently.** Five organizations used digital ink and Windows Journal to take meeting notes instead of transcribing paper-based information. Time spent in this task decreased by 39 percent, a time saving valued at \$1,951 per user per year.
- **Reduce information search costs.** Four organizations used digital ink and Windows Journal to reduce the time and costs of searching for handwritten paper-based information. As a result, users spent 62 percent less time performing these tasks, a time savings valued at \$3,815 per user per year.

- **Accelerate information review process.** One organization used digital ink to add and annotate diagrams to Microsoft Office documents and third-party applications. By spending 27 percent less time in these tasks, the organization saved \$3,759 per user per year.
- **Improve information sharing and enhance collaboration.** Two organizations used digital pen-and-ink computing in a wireless LAN environment to simplify and expedite routine communication tasks such as e-mail and scheduling meetings. Spending 22 percent less time in these tasks enables the organizations to save \$4,278 per user per year.<sup>13</sup>

## Lower Total Cost of Ownership

Business value and TVO study findings also showed that deploying Windows XP Professional on desktop and notebook PCs significantly improved IT operating efficiency and correspondingly decreased overall TCO.

Improvements in operating efficiency resulted from greatly improved reliability and stability, which had a direct impact on end-user productivity and support costs. Additional benefits accrued through more efficient desktop administration and management.

### Improved Dependability

Business has gone global, and the need to provide continuous operations is a fact of life for many organizations. This requirement is especially challenging in desktop environments that run on aging desktop platforms and cost more to support and maintain. Reliability concerns involved avoiding service interruptions, recovering rapidly when interruptions do occur, and reducing the IT support costs related to system downtime.

Firms use industry-standard security and reliability capabilities of Windows XP Professional to protect their desktop environments from downtime caused by internal and external viruses and hacker attacks and to reduce or avoid the IT support costs related to these protective measures. IT-related benefits gained from greater desktop dependability include:

- **Virus protection.** The virus protection built into Windows XP Professional helped a global pharmaceutical company save \$147 per user per year by avoiding the cost of third-party anti-virus software.<sup>14</sup>

Another firm used the location-aware Internet Connection Firewall to increase mobile client security from attacks outside the corporate network. This organization reported a 20-percent decline in the hours per year spent managing and avoiding virus attacks.<sup>15</sup>

- **Better enforcement of access controls and policies.** Two other firms report a 50-percent decline in IT support effort involved in engineering, testing, and maintaining security services and a 70-percent decrease in support effort needed to enforce access controls and security policies, respectively.<sup>15</sup>

### Lower Desktop Management Costs

IT managers are concerned about improving the operational efficiency and total cost of owning their desktop environment. Organizations upgrading to Windows XP Professional report these common management strategies:

- **Employ easy-to-use tools, techniques, and processes** to manage desktop images, component updates, and configuration settings.
- **Use centralized administration and data management capabilities** of the Active Directory® directory service to manage quality and release cycles and to integrate and provide easy access to organizational and user information.

Results from the deployment and operations report showed that organizations that deploy Windows XP Professional saved an average of \$105 per PC per year in management costs. In most cases, cost reductions came from a standard desktop that could be supported with advanced management tools such as the Active Directory service. Standardized desktops deployed at these organizations reduced the number of platforms supported, thus reducing the need to train and maintain IT staff dedicated to different platforms.

Windows XP Professional also provides enhanced administration capabilities through Remote Assistance and Remote Installation Services (RIS). When used with centralized management tools such as Active Directory and Group Policy, these features help automate manual administration processes, reduce end-user help desk calls, and improve the efficiency of IT resources, all of which contribute to a lower TCO.

### **More Efficient Management**

Combining the centralized role-based desktop administration capabilities of Active Directory and Group Policy with Remote Assistance enabled organizations participating in the deployment and operations studies to make software maintenance and upgrade tasks quicker and more efficient. This strategy produced the following benefits:

- Time needed to install security patches was reduced by 86 percent.
- FTEs required to manage security policies decreased by 35 percent.
- Help desk and support staff FTEs were reduced by 25 percent.
- For three participating companies, a series of new Group Policy objects resulted in an average 51-percent annual cost saving for operating system management and maintenance.
- Remote Assistance enabled IT professionals to avoid 25 percent of remote user help desk calls annually.

### **Easier Image Engineering and Deployment**

The challenges of operating an enterprise client PC environment are made more complex by the need to support a diverse range of operating systems, which have different service packs and security upgrades that must support different line of business applications.

The organizations profiled in the deployment report had mixed computing environments that consisted of Windows 2000 Professional, Windows NT Workstation version 4.0, and Windows 9x. In most cases, the organizations that upgraded to Windows XP Professional reduced the number of supported images by more than half. Results from the deployment and operations studies included these benefits:

- Standardizing on Windows XP Professional as an enterprise desktop resulted in an average 74 percent fewer core desktop images.
- IT professionals at one of the organizations profiled in the report required 40 percent to 50 percent less time to load desktop images.

- A global chemical company was able decrease from eight desktop images to one desktop image for its fleet of 50,000 PCs.
- Standardizing on a desktop based on Windows XP Professional enabled a company engaged in a 1,500-user deployment to reduce the number of desktop images from 75 to 1, an effective reduction of 99 percent. This substantial decline in desktop images and the associated IT support effort resulted in a deployment cost reduction valued at \$36 per PC per year.<sup>16</sup>

## Reduced IT Support Costs

In the ongoing effort to keep client PCs and networks operational, the IT support staff is at the front line. They are the people end users look to for answers and assistance when things go wrong. Windows XP Professional aids the IT support effort by providing tools and services that help solve support problems more quickly or avoid them altogether.

Results of the business value studies in “Higher Yields: The Financial Benefits of Windows XP Professional” show that deploying Windows XP Professional on desktop and notebook PCs significantly improves IT operating efficiency and correspondingly decreases TCO. Results from these studies indicate that IT support costs declined an average of \$46 per PC annually.

Findings from four REJ and three TCO studies identified an average three-year benefit of \$561 per user, which resulted from reduced IT infrastructure spending.<sup>17</sup>

## Fewer Help Desk Calls, Faster Problem Resolution

Improved reliability and new tools that accelerate help desk response time, Remote Assistance, and secure network access and authentication are just three Windows XP Professional capabilities that can reduce IT support costs.

Windows XP Professional provides improved reliability, which reduces the number of calls to the help desk, and new tools, which enable help desk personnel to resolve issues more quickly. The net effect of these benefits is that after Windows XP Professional is deployed, IT departments can either reassign some of their help desk employees to other value-added activities or reduce the number of employees.

Results from the same study indicate that organizations that upgraded to Windows XP Professional from a combination of earlier versions of Windows software achieved:

- A 20-percent reduction in problem resolution time.
- An 11-percent increase in users per support staff member.
- A 10-percent reduction in help desk calls.
- An average 25-percent decrease in help desk call duration.

Company-specific IT support benefits included:

- **Faster resolution of help desk calls.** Remote Assistance and the Microsoft unified Help and Support Center are expected to help one company reduce the time spent providing help desk assistance by 76 percent.<sup>18</sup>
- **Fewer desk-side visits.** The Remote Control feature enabled an average 3 percent of help desk calls to be resolved without a desk-side visit.<sup>17</sup>
- **Reduced IT support effort.** Improved operations and management tools such as Microsoft IntelliMirror® and Group Policy help deliver IT services to mobile and remote users with less IT support time and effort. Many organizations profiled report a decrease in TCO that averaged U.S. \$387 per notebook PC per year.<sup>19</sup>

Another company expects that Remote Assistance will reduce TCO by reducing Tier II desk-side support by 70 percent and overall support efforts by 35 percent.<sup>18</sup>

- **Fewer calls to the help desk.** Greater reliability and stability improved system availability to end users and contributed to 10 percent fewer help desk requests.

Companies profiled in the deployment and operations report used the Windows XP Professional System Preparation tool (SysPrep), the Microsoft unified Help and Support Center, and Remote Assistance to create standardized, easier-to-support desktops, avoid help desk calls by putting all support services in one easily accessed place on PCs, and avoid costs of sending computers to repair facilities. This strategy provided participating organizations with the following benefits:

- One company expects to spend 78 percent less time installing applications and 58 percent less time in quality assurance and application testing tasks.
- Another company expects to spend 76 percent less time providing helpdesk assistance and to increase Tier I resolution rates from 0 percent to 56 percent.

The impact of Windows XP Professional on help desk cost reductions will depend on the operating system from which an organization is migrating. Customers with systems running Windows 9x will see the most dramatic results, followed by systems running Windows NT Workstation version 4.0. Windows 2000 Professional had reliability levels similar to those of Windows XP Professional. Therefore, incremental reductions in the number of help desk calls are expected in organizations that upgrade from Windows 2000 Professional.

### **Self-Help, Auto-Configuration, and Remote Assistance**

The best way to reduce support costs is to reduce help desk call volume. That goal can be achieved by improving system reliability and providing self-healing applications. Other ways to relieve help desk traffic include providing programs that configure themselves automatically and giving users the ability to help themselves. Windows XP Professional uses all of these strategies to reduce the volume of help desk calls and their related costs.

- **Help and Support Center.** By providing a single place where users in distress can go to look for solutions and use utilities that help them diagnose their problems, the Windows XP Professional Help and Support Center offers improved help and integrated support on the Internet. In one business value study, an organization estimated that the Help Center alone could reduce IT support costs by as much as \$21 per PC annually.<sup>20</sup>
- **Zero Configuration Wireless.** Interviews with members of two corporate IT departments indicate that plans to deploy Windows XP Professional on notebook PCs and use the Zero Configuration Wireless feature should help them save an average of \$68 per notebook in annual user support costs.<sup>21</sup>
- **Remote Assistance.** If users cannot get what they need from Help Center, they would still need to call the help desk. Whenever this happens, tools such as Remote Assistance can help the IT staff to quickly solve the user's problem, thus saving both IT and user resources.

According to TCO studies conducted at several companies profiled in "Higher Yields: The Financial Benefits of Windows XP Professional," Remote Assistance will save an average of \$27 per desktop annually. This projected result is based on more effective help desk operations, not having to purchase specialized third-party software, or both. Remote Assistance also enabled fewer remote user help desk calls, which reduced total calls by 25 percent annually.<sup>20</sup>

- **Terminal Services and Remote Desktop.** Help desk technicians at a global aerospace and manufacturing firm spent 60,000 hours per year assisting 5,000 end-users with problems on their mobile PCs. Terminal Services and Remote Desktop features built into each Windows XP Professional-based client PC helped to:
  - Reduce the time support technicians spent assisting remote users by 50 percent.
  - Improve IT support technician efficiency by 50 percent.
  - Save the company an estimated \$264 per user per year in IT support costs.<sup>14</sup>

### **More Secure Network Access and Authentication**

Windows XP Professional security features such as Encrypted File System (EFS), Public Key Infrastructure (PKI), and Kerberos security integration help to reduce IT support costs by eliminating the need for specialized security applications.

### **Case Study: Built-in Security Capabilities Help Reduce Mobile PC Operating Costs**

*A global pharmaceutical manufacturer used only third-party anti-virus software to protect 20,000 mobile notebook PCs users when they were connected to the Internet. This simplified approach to data security put company data at risk and incurred security-related IT support costs. The company expects that the built-in security capabilities of Windows XP Professional will save \$147 per mobile PC user per year by avoiding the purchase of third-party security add-on programs.<sup>22</sup>*

## Easier Deployment and Maintenance

Most organizations considering an upgrade to Windows XP Professional from earlier Windows operating systems are concerned with two key issues: the initial cost of deployment and follow-on software maintenance and upgrade costs. Deployment cost studies indicate that compatibility with existing critical line of business applications and peripheral hardware devices and updating software quickly and efficiently are also of particular concern.

The results of business value and deployment cost studies demonstrate that by deploying Windows XP Professional, organizations can save time in planning, image engineering, and deployment tasks. Deployment cost studies show that using automated deployment tools of Windows XP Professional helps to improve the productivity of IT staff and reduce overall deployment costs.<sup>23</sup>

### Enhanced Deployment Tools and Capabilities

Enhanced deployment capabilities in Windows XP Professional effectively reduce upfront image engineering and planning costs and provide faster, easier automated deployment by using a standard set of deployment and maintenance tools.

These new and enhanced features include the User State Migration Tool (USMT), SysPrep, Unattended Installation, and multi-language support. Additional benefits accrued from reducing repetitive deployment tasks by using the policy-based management capabilities of the Active Directory and Group Policy objects.

The results of studies documented in the deployment and operations report demonstrate how organizations using specific deployment tools in Windows XP Professional helped to achieve lower deployment and ongoing maintenance costs than could be realized by remaining on older versions of Microsoft Windows software.

Deployment-related business value studies were conducted at nine organizations that installed Windows XP Professional. These studies confirmed that organizations deploying Windows XP Professional as part of their normal hardware refresh cycle experienced lower overall deployment costs.

Organizations that opted to upgrade rather than replace PCs had slightly higher upfront hardware costs, but they also extended the useful life of their PCs. It is important to recognize that depending upon the age of the replaced PCs or the requisite hardware upgrades, organizations could experience either higher or lower hardware costs than the companies profiled in this report. Because Windows XP Professional did not require significant hardware changes, deployment costs were kept low.

### New Technologies and Enhanced Features that Improve IT Efficiencies

Most organizations want to free IT personnel from labor-intensive and routine deployment activities, thereby allowing them to provide more value-added services to the organization. IT managers are also concerned about improving the operational efficiency and reducing the deployment costs of their desktop environments.

Windows XP Professional provides enhanced administration capabilities through advanced hardware device support, Remote Assistance, and Remote Installation Services (RIS). When

used with centralized management tools such as Active Directory and Group Policy, these features help automate manual administration processes, reduce end-user calls to the help desk, and improve the efficiency of IT resources, which contribute to lower TCO.

The deployment and operations report indicates that organizations often combined new and enhanced features of Windows XP Professional to reduce deployment costs and make the software deployment process more efficient.

For example, by combining automated deployment tools such as USMT, SysPrep, Remote OS installation, and RIS with the centralized role-based management capabilities of Active Directory and Group Policy, participating organizations realized these benefits:

- Customers spent 25 percent to 67 percent less deployment time per PC compared to installations of Windows 9x and Windows NT.
- One company needed 33 percent fewer FTEs for deployment.
- Another company required an average of 2 fewer hours per client configuration compared to previous Windows installations.

#### **Case Study: Centralized Administration Reduces Costs of Client-Side Software Distribution**

*By combining the capabilities of IntelliMirror and Group Policy, a regional power utility company can distribute the right software applications to 2,000 users at the right time. By using Group Policy role-based information management and the IntelliMirror capabilities of Windows XP Professional, the company can perform client-side software distribution. As a result, the company expects to reduce deployment time from 2 hours to 1 hour per client PC and to decrease application deployment costs by 20 percent. This increased efficiency saves 2,000 hours a year of network administrator time, which is equivalent to \$77,826 a year.*

#### **Remote and Multilanguage Desktop Deployments**

For an increasing number of organizations, remote and multi-language deployments pose problems unique to operating in an international arena. Results from the deployment and operations study demonstrate that the integrated deployment capabilities of Windows XP Professional can reduce the costs of ongoing support for multiple facilities or desktop images.

The policy-based management and remote operating system installation capabilities of Windows XP Professional enabled organizations profiled in the deployment and operations report to perform long-distance deployment, often without the intervention of an IT support technician. When deployment to remote facilities was important, the remote operating system installation capabilities of Windows XP Professional automated deployment and desktop customization tasks.

For example, by using the capabilities of the Multilanguage User Interface (MUI) Pack in an automated process, one company reduced desktop imaging costs by 25 percent. This approach enabled the company to reduce deployment time by creating a standard client image that supported multiple languages.

## Enhanced Application Compatibility

Although application compatibility is technically not a reliability issue, customers often regard it as one. As a result, companies want the assurance that as they build larger, more complex desktop environments, the mix of off-the-shelf and customized applications will continue to run with low operating costs and without interruption.

Most organizations use multiple client PC operating systems, some of which are based on technology more than a decade old and are less stable than Windows XP Professional. Although multiple operating systems increase support costs, application incompatibility problems have prevented many organizations from standardizing the PC desktop. Additionally, many organizations are concerned with application compatibility between their existing line of business applications, which do not require an upgrade (or newer version), and Windows XP Professional.

### Out-of-the-Box Compatibility

Windows XP Professional significantly improves the application incompatibility problem and for the first time provides organizations with an effective and practical way to adopt extensive desktop standardization.

Windows XP Professional accomplished this by including superior design, compatibility certification, and versioning support that can help to prevent compatibility-related problems.

- **Lower application development costs.** Using the broad application compatibility of Windows XP Professional helps developers to extend the value of existing AutoCAD applications and integrate line of business applications with legacy databases more easily. Tight integration between data and applications results in faster data transfer to a central database and reduces application development costs.<sup>24</sup>
- **High level of user confidence.** The deployment and operations report indicates that study participants tested 70 percent of packaged applications and 75 percent of custom applications. In addition, participants expressed a high degree of confidence in the compatibility of Windows XP Professional with their existing applications. Typically, application compatibility problems were resolved when third-party software providers updated their products to catch up with Windows XP Professional.<sup>25</sup>
- **Faster time to use.** Greater application compatibility also enabled applications built for Windows 9x, Windows NT Workstation, or Windows 2000 Professional to be used immediately after deployment of Windows XP Professional.

### Application Compatibility Mode

For organizations that use a mix of Windows 9x, Windows NT Workstation, and Windows 2000 Professional operating systems (where application compatibility issues prevent creation of a standard desktop), results from the deployment and operations report demonstrate that an upgrade to Windows XP Professional and its Applications Compatibility Mode will ease standardization and pay significant dividends in reduced management costs.

A financial services organization profiled in the deployment and operations report achieved compatibility with 97 percent of its existing applications during its pilot of over 2,500 users.

The deployment cost studies showed that Application Compatibility Mode enabled 98.7 percent of packaged software applications and 97.3 percent of custom applications to pass application compatibility testing.

## Software Update Services

One of the most effective ways to protect PC desktops from downtime resulting from virus or hacker attacks is to identify out-of-specification PCs and use Web-based and automated update services to install the latest security patches.

Windows XP Professional provides three services that can eliminate the time and effort IT professionals spend identifying out-of-specification PCs and deploying the appropriate security patches. Dynamic Updates, Windows Updates, and Automatic Updates provide companies profiled in the deployment and operations report with the following benefits:

- **Less time applying hot fixes and security patches.** A company reported spending 86 percent less time applying hot fixes. Another company in the same study spent 75 percent less per year applying security patches.<sup>15</sup>
- **Greater IT support efficiency.** Another company used Windows XP Professional update services to deploy application patches in 50 percent less time than with manual methods.<sup>15</sup>
- **Less downtime-related management effort.** Out-of-date software was making the network of a global aerospace and manufacturing company vulnerable to virus-related service interruptions. Using the Automatic Updates feature of Windows XP Professional to distribute updates of critical Windows XP components to its worldwide facilities will help to reduce the time the IT staff spends responding to these incidents by 75 percent. This time saving is valued at \$59,040 annually.<sup>26</sup>

## Conclusions

This report provides evidence gathered from business value studies conducted at nearly 50 enterprise organizations at customer facilities located throughout the world. These studies demonstrate that organizations deploying Microsoft Windows XP Professional can work more productively and reduce PC management and support costs more effectively than is possible with earlier versions of Microsoft Windows client PC operating systems and other client PC platforms.

Enterprises that evaluate the financial benefits of a PC desktop upgrade from both a business and an IT perspective are better positioned to transform these potential benefits into business value and make strategic decisions about the value of a new PC desktop to their organization. Enterprises that seek only to minimize costs are well positioned to realize positive ROI. However, because the investment is viewed only from an IT perspective, the full business value may not be realized because many value areas are not identified or implemented.

The Gartner TVO approach to business value measurement analyzes financial benefits presented by different business scenarios and enables any organization to identify key areas of value and adjust their deployment plans accordingly. This approach is especially important today because advanced collaboration capabilities and integration with business processes unlock new usage scenarios that were not feasible on older desktop platforms. The results of the TVO analyses identify significant financial benefits in distinctly different usage scenarios. These results can be readily extrapolated for any organization in any sector.

The TVO approach bridges the IT and business views of IT investments. As a result, enterprises that conducted even a partial TVO analysis achieved better insight into how a new desktop PC platform could help them achieve their goals. Many of the TVO study participants found substantial value in exploring new business scenarios that use new technologies.

Four points help to rationalize refreshing aging PC desktops to an industry-standard desktop that operates on Windows XP Professional and that runs on Intel Architecture-based hardware. These considerations include:

- **A strong financial justification** for upgrading client hardware and software due to tangible productivity gains and cost savings.
- **Business benefits** from client upgrades are at least as important as IT benefits, which are the focus of more traditional cost-only analysis.
- **Hardware refresh decisions** should be based on the type of business solutions that an organization plans to run during the PC lifecycle. Upgrading to hardware built with current technologies will provide mid-to-longterm benefits that more than compensate for any incremental cost.
- **Significant future value**, including optional benefits achieved by implementing solutions based on the business-capable Windows and Intel platform.

Because organizations can start capturing the value of both business and IT benefit scenarios directly after deployment, waiting until the next desktop refresh can mean forgoing substantial business benefits over a 1-to-2-year period. As a result, organizations should consider a 3-year desktop refresh rather than a 4-to-5-year cycle.

## Appendix A: About This Report

This white paper summarizes study results compiled from eight Microsoft business value white papers, which were published between March 2002 and May 2004. These white papers, which document benefits observed and measured during Windows XP Professional deployments, were designed to help organizations justify the business case for upgrading to Windows XP Professional.

These studies demonstrate how organizations can use Windows XP Professional to achieve both dramatic reductions in IT infrastructure costs and higher returns in business-related benefits such as end-user productivity and improved business processes. Downloadable copies of these reports are available at the following Internet locations:

- **“Higher Yields: The Financial Benefits of Windows XP Professional.”** This paper presents business value by using standard financial methods of measurement.  
<http://www.microsoft.com/windowsxp/pro/evaluation/whyupgrade/bizval/default.asp>
- **“Security and Reliability: Pillars of Value for Customers of Windows XP Professional and Office XP.”** This paper documents the security and reliability benefits of Windows XP Professional.  
<http://www.microsoft.com/resources/desktop/evaluation/securityandreliability.asp>
- **“Empowering Mobile PC Users: The Financial Benefits of Windows XP Professional and Office XP.”** This paper describes the benefits of using Windows XP Professional in mobile PC scenarios.  
<http://www.microsoft.com/resources/desktop/mobility/financialbenefits.asp>
- **“Windows XP Professional and Office XP: Realizing Financial Value Through Lower Deployment and Operational Costs.”** This paper shows the value of using Windows XP Professional to reduce the complexity and cost of desktop management.  
<http://www.microsoft.com/resources/desktop/evaluation/financialvalue.asp>
- **“Empowering Information Workers: The Financial Benefits of Windows XP Tablet PC Edition.”** This paper introduces the usage scenarios and financial benefits of Windows XP Tablet PC Edition.  
<http://www.microsoft.com/windowsxp/tabletpc/evaluation/financialvalue.asp>
- **“Empowering Business On The Desktop: Using Gartner Total Value of Opportunity to Measure the Financial Value of Enterprise Client Refresh.”** This paper introduces the Gartner TVO methodology as a tool for measuring business- and IT-related benefits.  
<http://www.microsoft.com/resources/desktop/businessvalue.asp>

- **“Using the PC Client Refresh to Transform Customer Relationships: Measuring the Financial Value of PC Client Refresh for Retail Banking and Financial Institutions.”** This paper details findings of TVO studies at banking and financial institutions.  
<http://www.microsoft.com/windowsxp/pro/evaluation/whyupgrade/default.aspx>
- **“Process Goldmine: Microsoft Office System Integrated Solutions Deliver Business Value.”** This paper summarizes the results of business value studies that demonstrate the financial impact of Microsoft Office System solutions.  
<http://www.microsoft.com/office/business/value.aspx>

To ensure consistency in data gathering and analysis, the studies documented in each of these reports were either validated by third-party evaluators or were assessed for conformance to established methodologies and tool sets.

## Appendix B: Partner Profiles

This white paper summarizes the results of business value, TCO, TVO, and deployment cost studies performed at organizations across multiple industries over a two year period. These studies were conducted, analyzed, and assessed by any of four Microsoft Partners

**Gartner Incorporated** ([www.gartner.com](http://www.gartner.com)) developed the Gartner TCO Analyst tool and the TVO analytical model used in many of the business value studies cited here. Gartner also provided independent, third-party assessment of the results of many of the TCO and TVO studies. Since its founding in 1979, Gartner, Inc. has become a leading provider of IT industry research and analysis. Gartner services support enterprises as they drive innovation and growth through the use of technology. Gartner services help clients make informed technology and business decisions by providing in-depth analysis and actionable advice on virtually all aspects of technology.

**Immedient Corporation** ([www.immedient.com](http://www.immedient.com)) conducted some of the business value studies cited in this report. Immedient has earned a reputation for consistent delivery of results-driven solutions in more than 1,100 engagements for more than 600 different clients. The firm provides a range of services using technologies primarily based on the Microsoft technology platform.

**Wipro Infotech** ([www.wipro.com](http://www.wipro.com)) performed IT-related benefits calculations used in some of the business value studies cited in this report. As the IT consulting and systems management business unit of Wipro Limited, Wipro Infotech designs, implements and manages the entire IT lifecycle of their customers with a complete portfolio of IT services. The company's consulting group provides strategic, IT governance, business process and risk management solutions to a global clientele of financial services, manufacturing, information technology, and telecommunications companies.

**BearingPoint, Incorporated** ([www.bearingpoint.com](http://www.bearingpoint.com)) formerly KPMG, assessed the results of some of the profiled business value and deployment cost studies. As one of the world's largest business consulting, systems integration and managed services consultancies, Bearing Point provides Global 2000 companies, medium-sized businesses, government agencies and other organizations with business and technology strategy, systems design, architecture, applications implementation, network infrastructure, systems integration and managed services.

## Notes

- <sup>1</sup> For more information about Immedient Corporation services, go to [www.immedient.com](http://www.immedient.com). For more information about Wipro Consulting, go to [www.wipro.com](http://www.wipro.com).
- <sup>2</sup> These values are not intended to provide exact numeric guidelines on the potential value other customers may achieve but to underline key value areas identified by the customers profiled in this report.
- <sup>3</sup> At one company, the financial value is derived from estimated revenue generated by a new service offering based on a new Microsoft and Intel client platform. See Case Study: Telecommunications Company #1, Demand Management, Market Responsiveness, in “Empowering Business On The Desktop: Using Gartner Total Value of Opportunity to Measure the Financial Value of Enterprise Client Refresh.”
- <sup>4</sup> Two outliers of 3 percent and 27 percent are not included in the discount rate range because they represent unusual environments and circumstances. The weighted cost of capital for one European financial institution was unusually low (3 percent), while for a South American manufacturing company it was 27 percent due to an extraordinarily high rate of inflation.
- <sup>5</sup> See “Higher Yields: The Financial Benefits of Windows XP Professional,” Microsoft Corporation (2002), p. 15.
- <sup>6</sup> See “Empowering Mobile PC Users: The Financial Benefits of Windows XP Professional and Office XP,” Microsoft Corporation (2002), p. 5.
- <sup>7</sup> See Higher Yields, p. 18.
- <sup>8</sup> See Higher Yields, p. 19.
- <sup>9</sup> See “Empowering Business on the Desktop: Using Gartner Total Value of Opportunity to Measure the Financial Value of Enterprise Client Refresh,” Microsoft Corporation (2003), p. 14.
- <sup>10</sup> See Empowering Business on the Desktop, p. 14.
- <sup>11</sup> See “Process Goldmine: Microsoft Office System Integrated Solutions Deliver Business Value,” Microsoft Corporation (2003), p. 13. A case study that supplements this information is available at [www.microsoft.com/resources/casestudies/CaseStudy.asp?CaseStudyID=14564](http://www.microsoft.com/resources/casestudies/CaseStudy.asp?CaseStudyID=14564).
- <sup>12</sup> See Process Goldmine, p.11. A case study that supplements this information is available at [www.microsoft.com/resources/casestudies/CaseStudy.asp?CaseStudyID=14566](http://www.microsoft.com/resources/casestudies/CaseStudy.asp?CaseStudyID=14566).
- <sup>13</sup> This benefit applies only to locations with a wireless local area network (WLAN).
- <sup>14</sup> See Empowering Mobile PC Users, p. 15.
- <sup>15</sup> See “Security and Reliability: Pillars of Value for Customers of Windows XP Professional and Office XP,” Microsoft Corporation (2002), p. 4.
- <sup>16</sup> See “Windows XP Professional and Office XP: Realizing Financial Value Through Lower Deployment and Operational Costs,” Microsoft Corporation (2002), p. 4.
- <sup>17</sup> See Higher Yields, p. 7.
- <sup>18</sup> See Windows XP Professional and Office XP, p. 13.
- <sup>19</sup> See Empowering Mobile PC Users, p. 1.
- <sup>20</sup> See Higher Yields, p. 11.
- <sup>21</sup> See Higher Yields, p. 8.
- <sup>22</sup> See Empowering Mobile PC Users, p. 15.
- <sup>23</sup> For a detailed description of the methods and results of the NerveWire deployment cost studies, see Higher Yields, Appendix C, “Deployment Costs.”
- <sup>24</sup> See “Empowering Information Workers: The Financial Benefits of Windows XP Tablet PC Edition,” Microsoft Corporation (2002), p. 15.
- <sup>25</sup> See Windows XP Professional and Office XP, p. 5.
- <sup>26</sup> See Empowering Mobile PC Users, p. 18.



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