



Authored by  
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# Reducing TCO with Windows Vista™

*Quantified Savings for Mobile PCs*

Published September 2007

Reducing the Total Cost of Ownership associated with mobile PCs (notebook PCs, Tablet PCs, and Ultra-Mobile PCs) has become a critical challenge for many businesses. Sponsored by Microsoft®, GCR Custom Research and Wipro Technologies performed an independent survey on Mobile PC Total Cost of Ownership. The results of the study show that Windows Vista®, with related technologies and best practices implemented, can reduce mobile computing TCO by **\$605/PC annually** (from \$4,407 in Windows XP® to \$3,802 in Windows Vista), which is **14% lower** than that of Windows XP.

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## Introduction

Mobile PCs (notebook PCs, Tablet PCs, and Ultra-Mobile PCs) are forecasted to become the dominant PC form factor in large and medium organizations by 2010<sup>1</sup>. As the mobile PC-centric world approaches, reducing the Total Cost of Ownership (TCO) of mobile PCs while improving service and security levels for mobile workers is a high priority for any CIO or IT manager. Since PCs and their supporting infrastructure represent 30 to 45 percent of an IT budget<sup>2</sup>, IT staff will need to augment their strategy and technologies to deal with a new set of mobility challenges, such as managing resources off the corporate network and ensuring security outside the corporate firewall.

Studies conducted by Gartner Group<sup>3</sup>, IDC<sup>4</sup>, and Alinean, Inc<sup>5</sup>. have already documented the substantial benefits of Windows Vista for organizations with primarily using desktop PCs. Those benefits include end-user productivity gains, better IT management tools, and increased security and compliance. This whitepaper, however, focuses on the TCO and related benefits of Windows Vista for mobile PCs.

## TCO Benefits

Based on in-depth surveys performed for this paper, we identified three sources that reduce the TCO for mobile PCs: 1) Windows Vista Enterprise<sup>6</sup> "out of the box" feature benefits, 2) "Best practices"<sup>7</sup> enabled by Windows Vista to improve Infrastructure Optimization (IO), and 3) Microsoft Desktop Optimization Pack (MDOP). By combining these technologies and best practices, organizations can reduce mobile computing TCO costs by \$605/PC annually, from \$4,407 in Windows XP to \$3,802 in Windows Vista, which is 14% lower than the mobility TCO in Windows XP.



Windows Vista "out of the box" features can reduce mobile computing TCO by **\$251/PC** annually, broken down into the following categories:

a) Security	\$55
b) Desktop Engineering & Support	\$46
c) Service Desk	\$8
d) User Labor	\$141
e) Hardware and software	\$1 (\$34 if additional memory not required)
<b>Total</b>	<b>\$251/PC annually</b>

<sup>1</sup> Microsoft PC Market Intelligence: November 2006

<sup>2</sup> Barna, William, "Infrastructure Optimization: Driving Down Costs of the Business Desktop", Microsoft White Paper, 2006

<sup>3</sup> Michael Silver, "TCO for Windows Vista Leads to Evolutionary Improvements", Gartner Group, 25 January 2007.

<sup>4</sup> Al Gillen, et. al., "Analysis of the Business Value of Windows Vista", IDC, December 2006

<sup>5</sup> Tom Pisello, "Does the Vista View include Real ROI", Alinean, Inc., 2007

<sup>6</sup> Windows Vista Enterprise of Windows Vista contains the features most appropriate to organizations of the size included in this survey. References to Windows Vista throughout the paper all refer to the Enterprise Edition.

<sup>7</sup> A "best practice" is an automated IT process designed to reduce IT costs.

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Best practices enabled by Windows Vista features enable organizations to increase their level of Infrastructure Optimization<sup>8</sup>, reducing mobile computing TCO by a further \$236/PC annually. The additional technologies in the Microsoft Desktop Optimization Pack (MDOP)<sup>9</sup> can reduce mobile computing TCO by an additional \$118/PC annually. (MDOP is an optional subscription offering that is part of Software Assurance and contains five TCO-lowering technologies.)

## Benefits beyond TCO

In addition to TCO benefits, Windows Vista provides tools that help in addressing regulatory compliance requirements such as Sarbanes Oxley (SOX), Health Insurance Portability and Accountability Act (HIPAA), and similar compliance requirements across the globe. Security for mobile computing users is significantly more robust, which is especially important when one considers that data-loss events are frequently high-profile news.

Windows Vista offers additional business productivity gains for mobile users. Wipro estimates that Windows Meeting Space can provide one half hour per month in time savings per Road Warrior, who is away from the office for extended periods, yielding a benefit of \$306/PC annually. Day Extenders, who use mobile PCs primarily in their offices but also in meetings and at home, would also benefit to a smaller degree; we estimate a \$102/PC annual benefit per worker. According to our survey, 60% of Road Warriors are interested in this feature (Details are documented in Appendix A and B.).

For organizations with large numbers of mobile workers, the combination of Windows Vista, improved Infrastructure Optimization, and MDOP delivers compelling capabilities that can both reduce TCO and improve the quality of delivered services.

This paper focuses on the steady-state TCO of Windows Vista on mobile PCs. For more information about deployment costs or ROI, please see "Maximizing the ROI of Windows Vista™ Deployments: Wipro Product Strategy and Architecture Practice's Study on How to Increase the Return on Investment for Windows Vista Deployments", Wipro Technologies, September 2007.

## Research Data

The Microsoft sponsored Wipro Technologies' Product Strategy & Architecture (PSA) group and GCR Custom Research to conduct the in-depth survey work that produced the data used in this paper. Wipro PSA's role was to provide subject matter expertise in IT benchmarking, data analysis, and Windows Vista capabilities. GCR developed the survey instrument, lead the data collection effort, and worked with Wipro on the data analysis.

The survey focused on four industries—financial services, health services, technology, and professional services. Only organizations that had both a high percentage of mobile PCs and that had standardized on Windows XP were considered. From an initial set of 131 qualified companies, 68 responses contained complete descriptions appropriate for more detailed cost and industry breakdowns (Figure 1 profiles this subset). The resulting dataset contained sufficient responses to compare the healthcare and professional services industries. The data further classified mobile workers by whether they were Road Warriors or Day Extenders. Day Extenders have a usage profile similar to that of desktop users, but the profile and cost structure for Road Warriors is significantly different. For this reason, we have made special note of the proportion of Road Warriors throughout our data analysis. (See Appendix C for more background on the research methodology.)

Average PCs/Site	195
PCs/Organization (range 200-10,000)	2,493
# Sites/Organization	12.8
% Road Warrior Users	23%
Sample Size	68

Figure 1: Profile of Surveyed Firms

<sup>8</sup> For the details of Infrastructure Optimization, please refer to pages 10-12 and appendix D of this whitepaper

<sup>9</sup> For the details of Microsoft Desktop Optimization Pack, please refer to page 13 of this whitepaper

## 1. TCO Savings from Windows Vista Features



### Overview

First, we created a detailed benchmark model for the TCO of Windows XP mobile PCs from our survey data. The resulting yearly Windows XP TCO is estimated at \$4,407 per PC, as detailed in Figure 2. This result is consistent with studies from other leading IT analyst firms' estimates of between \$4,260 and \$5,210 for mobile computing TCO<sup>10</sup>. Next, the potential savings from out-of-the-box Windows Vista features were projected onto this model, yielding an estimated improvement of \$251/PC annually for mobile PCs. The sources of these savings come mainly from the areas of Security, Desktop Engineering and Support, and User Labor, which is presented in more detail in the paragraphs below.

Cost Item	TCO of Mobile PCs with Windows XP (a)	TCO of Mobile PCs with Windows Vista (b)	Savings (a - b)
a) Security	\$224 (5%)	\$169	\$55
b) Desktop Engineering & Support	\$267 (6%)	\$221	\$46
c) Service Desk	\$235 (6%)	\$227	\$8
d) User Labor	\$2,171 (49%)	\$2,030	\$141
e) Hardware and Software	\$1,509 (34%)	\$1,508	\$1 (\$34 w/o memory)
<b>Total</b>	<b>\$4,407 (100%)</b>	<b>\$4,155</b>	<b>\$251</b>

Figure 2: TCO Comparison between Windows XP and Windows Vista

### 1a. Impact on Security Cost (\$55)



Security includes IT labor costs for policy development and communication, vulnerability assessment, and lost mobile PC resolution. Security costs, which constitute approximately one-third of all IT labor costs, for Windows XP averaged \$224/PC annually for the companies in our study (see Figure 3).

Statistics show that at least 1.53% of mobile computers are stolen each year.<sup>11</sup> Other figures put the theft rate even higher. The average cost in IT labor for lost mobile PC resolution in our survey was \$1,896 per incident, including the audit of lost contents, lost data risk mitigation, and working with legal authorities. *Windows BitLocker™ Drive Encryption*, available

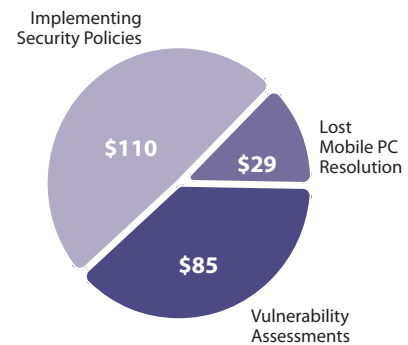


Figure 3: Security Cost Breakdown Mobile PC Centric Organizations \$224 Security TCO

<sup>10</sup> IDC reports annual IT and user labor costs at \$2,751 for Windows Vista; adding in the hardware/software costs used in this paper yields a TCO of \$4,206. Taken from Al Gillen, et. al., "Analysis of the Business Value of Windows Vista", IDC, December 2006. Gartner figures are for day-extender mobile computers, from Michael Silver, "TCO for Windows Vista Leads to Evolutionary Improvements", Gartner Group, 25 January 2007.

<sup>11</sup> The number of mobile computers stolen in the US in 2005 was 750,000, according to Absolute Software, a maker of tools to retrieve lost or stolen laptops. The installed base of mobile computers in the US in 2005 was 48.9 million, according to "Forecast: PC Market by Operating System, Worldwide, 2001-2011" by Gartner, published May 15, 2007. The resulting theft rate is thus 1.53%.

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to organizations with Software Assurance, provides full-volume encryption, including Windows system files and the hibernation file, protecting data from being compromised on a lost or stolen PC. We estimate that Windows BitLocker Drive Encryption can reduce the cost of resolution by 50% by eliminating the need to analyze and recover from information losses, which translates into a savings of \$15/PC annually when spread across the entire base.

User Account Control (UAC) makes it easier to use Windows with a Standard User account, which limits access to sensitive system resources and functions. Advances in the Windows Security Center simplify the process of monitoring and remediating security status. Windows Vista development included a fundamental architectural restructuring of the Windows client around a holistic security approach. Windows Services Hardening, an important architectural advance, decreases the ability of malware to take control of system services by introducing “restricted system services”. These services run under the minimum number of privileges, which restrict their activities to the local machine or network, limiting the ability of malware to cause damage. All of these features aid in the reduction of vulnerability assessment costs by an estimated \$10/PC annually out of the \$85/PC annually, according to our predictive model.

The next cost item, “Implementing Security Policies”, also benefits from the secure code and services hardening mentioned above. UAC makes it easy for IT pros to deploy systems without administrator rights. Together, these can reduce the cost of implementing security policies by \$30/PC annually out of the \$110/PC annually.

Total security TCO savings from Windows Vista are estimated at **\$55/PC** annually.

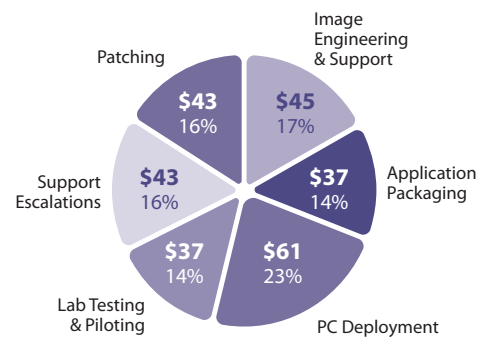
Impact on Security	
Cost in Windows XP	\$224
Cost in Windows Vista	\$169
<b>Savings</b>	<b>\$55</b>

## 1b. Impact on Desktop Engineering and Support (\$46)



Desktop engineering staff are responsible for creating PC images, deploying images onto PCs, applying patches and upgrading application, etc. Deployment costs are generally higher for Road Warrior, mobile PCs because of the travel or shipping costs necessary to service them. The average yearly Windows XP TCO cost for desktop engineering labor was estimated \$267/PC annually, broken down as shown in Figure 4.

Windows Vista has two significant advances that together can considerably lower image engineering costs. First, modularization of Windows Vista images makes customization easier, making it simpler to add device drivers, updates, and new languages to an existing image. Second, Windows Imaging (WIM), a hardware-independent, file-based imaging technology, makes it easier to capture, deploy, and service an image. The combination of the two technologies significantly reduces the number of images required; many organizations will need only a single image, even if they have multiple mobile PC hardware configurations. These imaging improvements not only make initial Windows Vista image creation easier, but they also lower TCO costs throughout the lifecycle. These advances



**Figure 4: Desktop Engineering Cost Breakdown  
Mobile PC Centric Organizations  
\$267 Total**

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are expected to lower the image engineering cost by an average \$22/PC annually (more specifically, thin image engineering costs can be lowered by \$28/PC and thick image engineering costs by \$14/PC.<sup>12</sup>).

New deployment support technology adds additional savings. The User State Migration Tool migrates user files and settings during large deployments of Windows Vista. It captures desktop and application settings, as well as user accounts and users' files and then automatically migrates them to the new Windows system. Remote and unattended installations are faster, more manageable, and less error-prone. There is a single unattended file format for the entire deployment process, rather than multiple formats as there are for Windows XP. The XML-based unattended architecture enables increasingly larger portions of the desktop engineering and deployment process to be automated. Mobile PCs can be wiped and reloaded while retaining all of a user's data and settings locally on their PC. Together, these features are expected to lower deployment costs by \$11/PC annually. Additionally, the more reliable code base is predicted to lower support escalation costs by \$5/PC annually and patching costs by \$8/PC.

Together, these savings amount to **\$46/PC** annually.

Impact on Desktop Engineering	
Cost in Windows XP	\$267
Cost in Windows Vista	\$221
<b>Savings</b>	<b>\$46</b>

## 1c. Impact on Service Desk (\$6)



Service Desk (tier 0-2) includes IT labor costs for phone, email, remote and desk side support. These costs are estimated at \$235/PC annually for the organizations in this study. The majority of these costs are unrelated to the operating system—for example, requesting a PC to be moved or asking about how to use a business application. Figure 5 delineates which subsets of break/fix category are impacted by Windows Vista (shown circled).

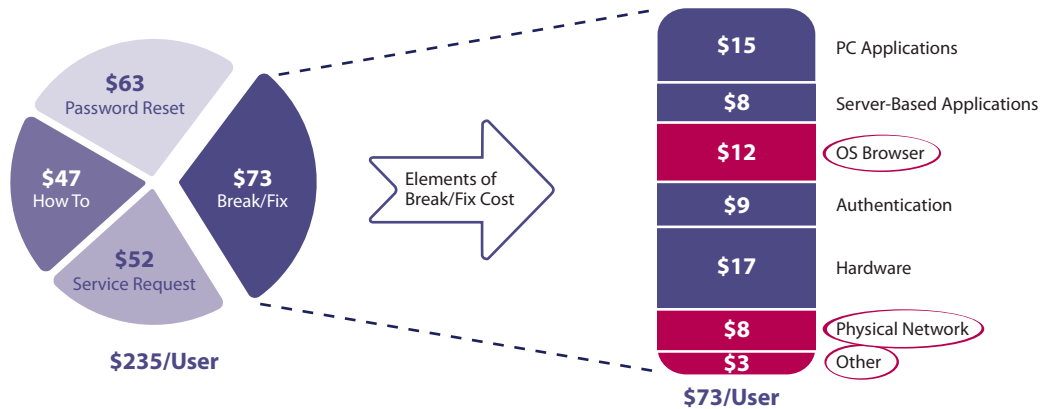


Figure 5: Service Desk Cost Breakdown  
Mobile PC Centric Organizations

<sup>12</sup> The research data revealed a significant difference in desktop engineering costs, based on the type of image used. Thin-image firms had image engineering costs 27% lower, which contributed to lowering their overall desktop engineering costs by \$41/PC annually. A thin image contains the operating system, security software, and minimum applications common to all users in an organization, while a thick image additionally contains the entire set of Line of Business applications. By using thin images, and then downloading the user-specific settings from Group Policies and applications from the enterprise software distribution tools such as Microsoft Systems Management Server (SMS), fewer images need to be created and maintained. Since the images are simpler, they are less expensive to create and support. Our research data showed that companies surveyed were split almost evenly in their use of thick vs. thin images.

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Costs are expected to drop by nearly half (\$5/PC annually) in the OS & Browser category. The self-healing features in Windows Vista can identify and fix problems, preventing many causes of “hangs” and crashes. Additionally, the improved Windows Vista code base means that many problems can be avoided in the first place. An additional \$2/PC annually comes from the improved Network Diagnostics. The Previous Versions capability allows a user to retrieve accidentally deleted documents. Windows Backup & Restore Center makes it easy for off-network PCs to be automatically backed up locally, reducing the calls to the help desk about backup by about \$1/PC annually (in “Other” category in Figure 5).

Impact on Service Desk	
Cost in Windows XP	\$235
Cost in Windows Vista	\$227
<b>Savings</b>	<b>\$8</b>

Together, total savings from Windows Vista features for the Service Desk are estimated at **\$8/PC** annually.

## 1d. Impact on User Labor Costs (\$141)



User labor costs include tasks directly related to managing, troubleshooting, or searching the PC. At \$2,171/PC annually, user labor costs constitute more than half the yearly TCO of mobile computing in Windows XP. Windows Vista can lower these costs by \$141/PC annually, as shown in Figure 6.

Task	Hrs/ Year	Cost/ Year	Savings
Troubleshooting	12	\$492	\$49
Formal and informal training	10.8	\$446	
Installing or updating software	4.8	\$197	
Configuring settings	4.8	\$197	
Phone with the service desk	4.8	\$197	\$16
Searching for documents	2.5	\$103	\$31
Installing patches	2.4	\$98	\$10
Optimizing or protecting (defrag, virus scan)	2.4	\$98	
Configuring wireless connectivity	2.4	\$98	\$25
Configuring hardware	2.4	\$98	
Building or managing applications and macros	2.4	\$98	
Data backup & synch	1.2	\$49	\$10
<b>Total</b>	<b>53</b>	<b>\$2,171</b>	<b>\$141</b>

Figure 6: User Labor Costs and Savings

Troubleshooting costs can be lowered by a collection of automated problem resolution features that eliminate or reduce the impact of computer problems on the business user. Self-healing technology can identify and fix problems, preventing many causes of “hangs” and crashes. The Startup Repair Tool automatically fixes unbootable systems without input from the mobile PC user. Built-in diagnostics detect impending disk or memory failures before they happen. The Previous Versions

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capability makes recovering accidentally deleted files easy. Greater reliability from the improved code base results in less need for troubleshooting. These self-help capabilities are especially important for Road Warriors, for whom IT support may be thousands of miles and half a dozen time zones away. These features are expected to lower troubleshooting costs by about 10%/PC annually or \$49/PC.

Service desk calls require five hours/year for the typical mobile worker. With the improved code base, self-healing, and improved connectivity, this time is expected to be reduced by nearly 10%, lowering user TCO by \$16/PC annually.

“Searching for documents” costs can be significantly reduced by a new on-the-fly search capability that enables users to instantly find data not only in documents but also in emails, email attachments, calendars, and other places on their local computer. Of special interest to mobile workers is that these search features work seamlessly over roamed content when local caching is enabled. We estimate search costs will be reduced by nearly one-third or \$31/user annually.

Patching is often performed manually by mobile users. Prior Wipro research has shown that increased operating system reliability lowers user patching costs by as much as 25% because fewer patches need to be made. Conservatively, we estimate the improved reliability of Windows Vista will reduce user patching costs by 10% or \$10/PC annually.

Configuring wireless connectivity is a challenge faced by mobile PC users who need to connect wherever they are – in another on-campus building, in a hotel room, at a coffee shop, or at home. Windows Vista contains new technology that makes it quicker and easier to join networks, troubleshoot network problems, and automatically adjust to bandwidth availability. The Mobility Center centralizes information relevant to mobile PC users (such as power management, wireless network, and presentations settings). These features are estimated to reduce wireless configuration user time by 25%, which is a savings of \$25/user annually.

Data backup and synchronization are often problem areas for mobile workers. The Windows Backup and Restore Center makes it easy for off-network PCs to be automatically backed up locally. Client-Side Caching of synchronized content preserves network bandwidth and provides the user with a seamless and reliable experience between online and offline states. The Delta Sync function in Offline Files provides faster synchronization of offline folders by synchronizing only the changes to a document rather than the entire document. These features reduce user backup and synchronization costs by over 20%, which is a TCO savings of \$10/PC annually.

Impact on User Labor Costs	
Cost in Windows XP	\$2,171
Cost in Windows Vista	\$2,030
<b>Savings</b>	<b>\$141</b>

Altogether, these provide a savings in user labor costs of **\$141/PC** annually.

## 1e. Impact on Hardware and Software (\$1)



Hardware and software consist of hardware depreciation costs (including decommissioning), operating systems, and applications. We used Gartner's data<sup>13</sup> on average mobile PC hardware and software costs as the TCO basis for this category. For the mix of PC types in this study, the average cost was \$1,509/PC annually.

We estimate that Windows Vista provides a savings in software costs of \$17/PC annually. Organizations can spend up to \$260 per PC on software utility licenses and support over the lifespan of a typical mobile PC. These utilities include tools for disk maintenance, drive encryption, PC imaging, backup/restore, and anti-spyware/malware. Windows Vista contains

<sup>13</sup> Michael Silver, "TCO for Windows Vista Leads to Evolutionary Improvements", Gartner Group, 25 January 2007.



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capabilities to perform many of these functions. For this paper, we assume that the average organization spends \$130 per PC over three years and that the Windows Vista features on average reduce this spending by 40%, resulting in an amortized benefit of \$17/PC annually. Of course, some organizations will receive less, and others will receive more depending on the number and type of utilities used in the organization.

An additional \$17/PC annually is saved from reduced decommissioning costs. With the entire system volume protected by Windows BitLocker Drive Encryption, there is no need for data scrubbing during decommissioning. Our research data shows that firms spend an average of \$50 per PC on this task, which results in an amortized savings of \$17/PC annually.

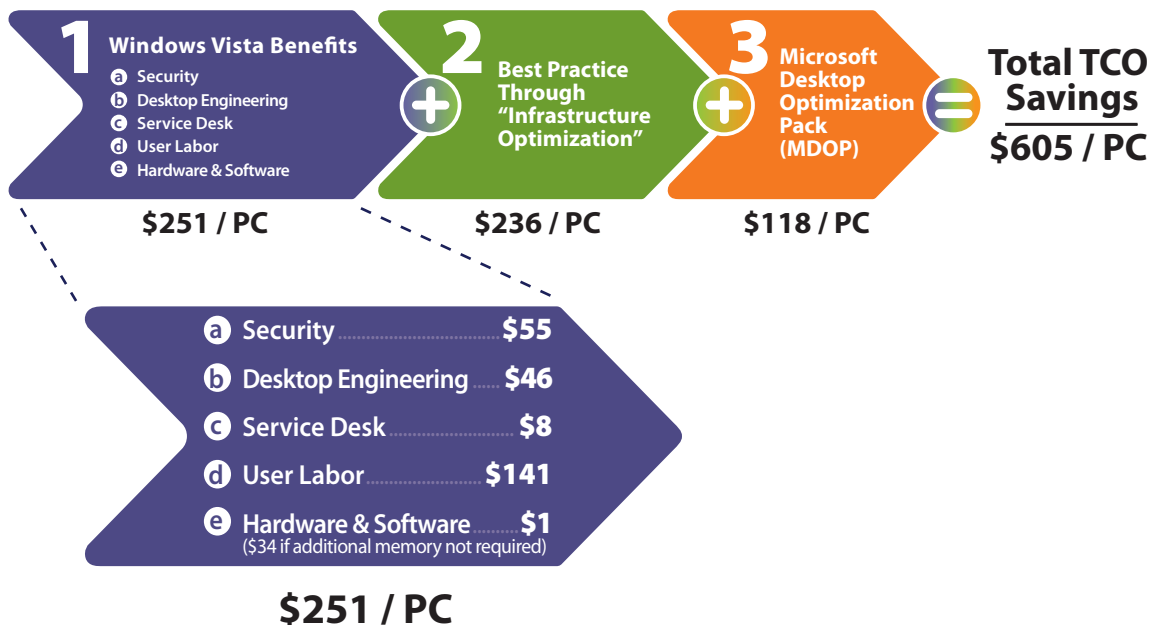
In total, Windows Vista creates software and decommissioning savings of **\$34/PC** annually.

Hardware costs may increase by up to \$33/PC annually. Firms with mobile PCs configured with the minimum required memory will need to acquire sufficient memory to support Windows Vista, whether during a hardware refresh or an upgrade of an existing system. But many firms configure their systems more robustly and thus will not face this additional cost. To be conservative, our predictive model includes this additional cost, which we estimate at \$100/PC or \$33/PC annually on an amortized basis.

The net savings are thus \$34/PC annually, which includes \$17/PC for software and \$17/PC from decommissioning. Net hardware cost ranges from \$0 to \$33/PC annually. Thus the total savings ranges from \$1 to \$34/PC annually; we used the more conservative \$1/PC in savings in our calculations.

Impact on Hardware & Software	
Cost in Windows XP	\$1,509
Cost in Windows Vista	\$1,508
<b>Savings</b>	<b>\$1</b>

To summarize, Windows Vista "out of the box" features can reduce annual mobile computing TCO by **\$251/PC** annually:



## 2. TCO Savings from Infrastructure Optimization



Infrastructure Optimization, encompassing IT best practices, refers to the set of practices and technologies required to optimally manage PCs and other IT infrastructure resources. Studies point to the importance of Infrastructure Optimization as a primary lever for reducing costs and improving the quality of delivered services. The Microsoft Core Infrastructure Optimization (IO) model defines four stages of optimization—Basic, Standardized, Rationalized, and Dynamic. Reaching higher levels of IO requires implementing best practices, many of which require or are made more efficient with supporting technology. (Appendix D provides a more detailed explanation of Infrastructure Optimization.)

Infrastructure optimization offers significant potential for lowering TCO costs. Earlier studies<sup>14</sup> have shown IT labor cost reduction (in the range of 30% to 52%) is possible when increasing by a single optimization level (e.g. moving from Standardized to Rationalized). Since we surveyed companies that had standardized on Windows XP, this tended to eliminate organizations at the Basic level; thus all survey participants were at a Standardized level or higher. Through an industry analysis of our research data the advantages of Infrastructure Optimization were clear. For Healthcare industry firms, annual IT Labor costs are 42% lower at the Rationalized vs. Standardized level, resulting in a decrease of \$236/PC annually in TCO (Figure 7).

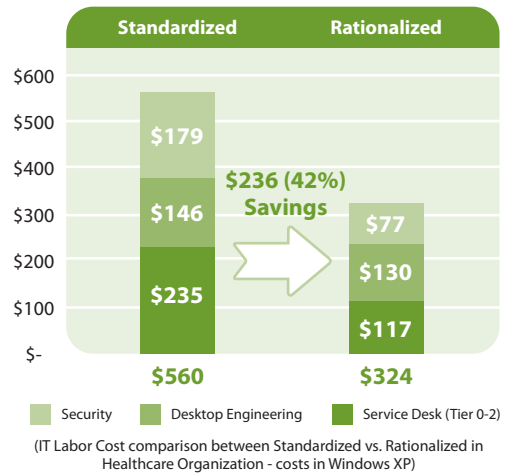


Figure 7: Impact of Infrastructure Optimization

To gauge the impact of Windows Vista on a mobile PC-centric infrastructure, we used six PC Best Practices that have been shown in earlier research to align with IO progress. A “best practice” is an automated IT process designed to reduce IT costs. Organizations with two or fewer best practices are considered to be at the Basic level; those with three to five are Standardized, and those with more than five are Rationalized. On average, surveyed firms had implemented 4.6 best practices. Even if they have not yet implemented the best practices, our research found that firms are aware of them and in many cases would like to implement them, as shown in Figure 8. Cost and technology barriers were contributors to the gap between the best practices they found valuable and the ones they actually were using.

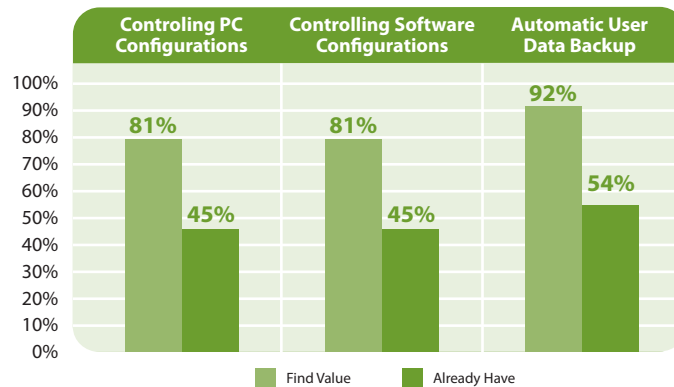


Figure 8: Desire for Best Practices Mobile PC Centric Organizations

<sup>14</sup> Barna, William, “Infrastructure Optimization: Driving Down Costs of the Business Desktop”, Microsoft White Paper, 2006.

The best practices are listed below along with the Windows Vista technologies that enable their implementation.

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## 1. Controlling PC Configurations.

With this best practice, IT groups determine which mobile PC settings are critical for reliability and security and use software policies to prevent unauthorized users from making changes, such as to the Windows registry or firewall settings. Active Directory and Group Policies are the main enablers of this best practice under Windows XP. But the ability to implement this practice was restricted by the need to give some users administrative rights in order to accommodate legacy applications. With Windows User Account Control (UAC) and directory virtualization, IT groups can redirect many of these applications into running in standard user context. This best practice can now be implemented without replacing a large number of applications or buying third-party party workarounds.

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## 3. Operating System Standardization.

Organizations that standardize on a single operating system save IT labor costs compared to those that run multiple systems. Application compatibility was a barrier for some organizations, which needed to keep older operating systems to accommodate legacy applications that were too expensive to replace. Windows Vista UAC reduces the number of application compatibility issues by redirecting applications that required administrative access to portions of file system and registry. Prior to UAC, these applications would not run as a standard user.

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## 4. Auto Password Reset.

With this best practice, mobile PC users can reset their passwords without assistance from the service desk. This best practice has been and continues to be supported by third party software.

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## 5. Centrally Managed PC Firewall.

Organizations with a centrally managed PC firewall can limit the ports on which PCs can send and receive traffic. Ports can be opened or closed in response to new security threats. Windows XP supports this best practice with Active Directory, Group Policies, and Windows Firewall. The improved firewall capability in Windows Vista and related group policies enable greater centralized control of ports and packet filtering than was possible with Windows XP.

## 6. Automatic User Data Backup.

With this best practice, data on mobile PCs is reliably backed up, even when Road Warriors are away from the corporate network. Mobile workers can easily retrieve accidentally deleted documents. Under Windows XP, offline folders, which create a mirrored copy of the document directory on the server, provided some backup protection. But offline folders can be complex to set up and at times slow, thus discouraging their use. Retrieving accidentally deleted documents required help desk intervention, if it was possible at all. Backups were limited to those with ongoing, fast connections to the corporate network. Windows Vista Backup and Restore Center provides off-network users a way to easily and automatically backup to USB-based devices. The Previous Versions capability provides quick recovery for accidentally deleted files. Offline folders are easier to configure and faster.

Adopting two, three, or more of the best practices listed above leads to an increase from a Standardized to a Rationalized optimization level, with its 30-52% savings in IT labor costs. For this paper, we use a savings of 42%, or \$236/PC annually, as experienced by the healthcare industry firms we surveyed. (Healthcare was the only industry that had sufficient data across the levels of optimization to compute savings from infrastructure optimization.)

## 3. TCO Savings from Microsoft Desktop Optimization Pack



Microsoft's Desktop Optimization Pack (MDOP), available to organizations with Software Assurance, is a new product created from five technologies brought to Microsoft through acquisitions in 2006.<sup>15</sup> MDOP includes:

- Microsoft SoftGrid® Application Virtualization dynamically streams software as a centrally managed service.
- Microsoft Asset Inventory Service translates software inventory into business intelligence.
- Microsoft Diagnostics and Recovery Toolset contains powerful tools to accelerate desktop repair, recovery and troubleshooting of unbootable Windows machines.
- Microsoft Advanced Group Policy Management enhances Group Policy through change management tools.
- Microsoft Desktop Error Monitoring provides IT with awareness and insight into application and operating system failures.

Together, these tools can potentially reduce annual mobile computing TCO costs by as much as \$118/PC annually, as shown in Figure 9 and described in the paragraphs below.

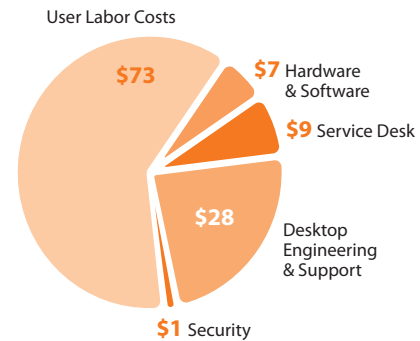
- **Hardware/Software costs.** MDOP licenses typically cost \$10/PC annually, for organizations with a Software Assurance agreement. Assuming a 40% savings in the average \$130/PC spent on licensing desktop utilities over a three year lifecycle (amortized at \$17/PC annually), the result is a net annual improvement in hardware software costs of \$7/PC.

- **Service Desk.** SoftGrid Application Virtualization reduces help required for application conflicts, while the Diagnosis and Recovery tools further reduce the length of service desk calls, for \$9/PC annual additional savings.

- **Desktop Engineering and Support.** MDOP features are particularly helpful in lowering desktop engineering costs. SoftGrid Application Virtualization reduces costs in several categories: application packaging costs are reduced by \$20/PC annually; PC deployment costs by \$5/PC, and patching costs by \$1/PC. The Diagnosis and Recovery Toolkit reduces the number of support escalations, for a savings of \$2/PC. In total, MDOP reduces desktop engineering costs by \$28/PC annually.

- **Security.** By making group policies easier to set and manage, the MDOP Advanced Group Policy Management tool can lower the cost of implementing security policies by \$1/PC annually.

- **End User TCO.** Microsoft SoftGrid Application Virtualization lowers the user effort required for installing and updating software, for a savings of \$40/PC annually; it also means less time for mobile workers to be on the phone with the service desk, for an additional \$23/PC in savings. Configuring settings for the operating system, browser, and applications is simplified with the MDOP Advanced Group Policy Management, saving \$10/PC annually. Together, MDOP reduces annual end user TCO by \$73/PC annually.



**Figure 9: TCO Savings from MDOP**  
**\$118 Total**

The total MDOP savings comes to **\$118/PC** annually.

<sup>15</sup> Wipro Technologies, "Microsoft Desktop Optimization Pack for Software Assurance", March 2007.

## Summary & Recommendations

With a potential annual TCO savings of up to \$605 per mobile PC, Windows Vista, supported by Infrastructure Optimization and the Microsoft Desktop Optimization Pack, is a compelling choice for taking mobile computing into the future.



Here are some ways to get started in evaluating the potential Windows Vista benefits for mobile computing at your firm:

- For IT managers in firms with mobile workers (now or planned for the future), look at your TCO breakdown to evaluate the level of savings that Windows Vista would provide across the different IT labor categories.
- For IT managers seeking to increase their level of Infrastructure Optimization, examine the additional best practices enabled by Windows Vista and evaluate the amount of software license cost and implementation complexity that could be reduced by Windows Vista adoption.
- For companies with a high percentage of Road Warriors, such as professional services firms, evaluate the increase in on-the-road productivity and billable hours that would result from the benefits of less user troubleshooting and more business productivity because of Windows Vista.
- For industries like healthcare and financial services, where security and regulatory compliance are paramount, assess the risk reduction potential from Windows BitLocker Drive Encryption, the increased control provided by Windows User Account Control and group policies, and the ability to reduce compliance testing costs through MDOP Application Virtualization.

For both Road Warriors and Desktop Extenders, Windows Vista offers compelling TCO benefits for IT staff, less troubleshooting and more productivity for mobile workers, and a level of security that is essential for protecting the valuable data assets of the corporation.

## Appendices

### Appendix A: Windows Vista and User Productivity

Beyond the TCO benefits described in this paper, Windows Vista contains additional features that enhance the business effectiveness of mobile workers. Sync Center centralizes and makes it easier to synchronize various mobile devices such as PDAs and Smartphones. Windows SideShow™ supports a secondary screen on a mobile PC for the display of important information whether the mobile PC is on, off, or in sleep mode. A new sleep mode combines the resume speed of Standby mode with the lower power consumption of Hibernation.

The most significant addition is peer-to-peer collaboration support for mobile workers provided by Windows Meeting Space. This capability allows meeting attendees to transparently share files and presentations with other attendees, even automatically creating an ad-hoc wireless network if the attendees are meeting outside the office. Wipro estimates about one half hour per month in time savings for users of Windows Meeting Space, which comes to a benefit of \$306/PC annually for those who choose to use the feature. For this survey (see Figure 10), we queried Road Warrior mobile workers for their interest in this capability. The results were consistent across industries and averaged 60% of Road Warriors interested. We estimate that the benefits to Day Extenders will be \$102/PC annually, about 1/3 that of Road Warriors, since they often have access to the corporate network while at work. They will, however, benefit from the ease of file and presentation sharing.

Salary/hour for typical road warriors*	\$42.6/h–(1)
Time saved by peer-to-peer collaboration feature**	12h/year–(2)
% people who showed interest in using Windows Meeting Space***	60%–(3)
(1) x (2) x (3) =	\$306–(4) <i>Productivity gain for Road Warriors</i>
A day-extender would have 1/3 of the benefit of a road warrior****	1/3–(5)
(4) x (5) =	\$102 <i>Productivity gain for Day Extenders</i>

**Figure 10: Productivity Gain for Road Warriors and Day Extenders**

\* Source: the annual salary for X industry is estimated at \$81,000 according to Alinean, Inc. Assuming that the hours worked by each American worker is 1,900 hours/y, the salary / h is estimated at \$42.6/h

\*\* Wipro Technologies' assumption: 1 hour per month

\*\*\* Source: the result from our survey (the average of healthcare and professional industries)

\*\*\*\* Wipro Technologies' assumption

### Appendix B: Windows Vista Features

This section contains a brief summary of the major features of Windows Vista:

1. Increasing user productivity by making it easier to find and use information.
  - Powerful, integrated search capabilities save users time by helping them quickly find just about anything on their PCs.
  - New user interface (Windows Aero) provides better stability, improved user experience, richer visualization, and easier navigation.

2. Enhanced data protection and security make computing safer, and easier to achieve compliance with regulations and policies.
  - Windows BitLocker Drive Encryption protects data if the mobile computer is lost or stolen.
  - User Account Control reduces the attack surface area while minimizing disruptions to user productivity.
  - Enhanced online security with Windows Vista browser protected mode and anti-phishing help protect user identity and data.
  - A re-engineered code base developed using a security-centric development lifecycle has increased intrinsic security and reliability.
  - More secure wireless connections protect mobile workers on the go.
  - Granular event logging, auditing, and tracking enable compliance.
3. Reducing the cost and complexity of deploying, managing, and supporting PCs.
  - New imaging format allows for hardware and language independence to reduce number of desktop images needed when deploying to corporate PCs with a variety of hardware and language settings.
  - Advanced Group Policies better manage critical usage scenarios and corporate PCs.
  - Self-healing and better supportability reduce helpdesk calls.
4. Enabling a better connected, more collaborative, and more secure mobile workforce.
  - Windows Meeting Space for ad-hoc, peer-to-peer meetings.
  - Configuring access to any type of wireless network with a single, easy user interface.
  - A new sleep mode combines the resume speed of Standby mode with the lower power consumption of Hibernation.
  - Built-in diagnostics, SuperFetch™ and Windows ReadyBoost™ capabilities for a more reliable, high performing and responsive PC and higher user productivity.
  - Faster and more intelligent synchronization for online/offline folders.
  - Faster and more powerful browsing of network resources.
  - An automatic Backup and Restore Center for creating easy local backups when away from the office.

## Appendix C: Research Methodology

To collect the data needed for the analyzing the impact of Windows Vista on mobile workers, Microsoft worked with consulting firms and IT industry analysts to develop a survey that would capture the essential cost and productivity parameters. GCR Custom Research of Portland, Oregon, identified firms that met the criteria of having a high proportion of mobile PCs, being standardized on Windows XP, and being within one of four selected industries (health care, financial services, technology, and professional services). All firms were US-based. A member of the IT staff of each of the qualified candidate organizations was asked to complete a detailed 40 minute telephone survey that examined costs, best practice use, and desires for improved capabilities. Additionally, three mobile PC users in the organization were asked to complete a 15 minute survey designed to capture the user TCO aspects. GCR surveyed 131 qualified organizations from the four industries mentioned above. These survey responses provided the basis for analysis on best practice usage and desired capabilities.



	Healthcare	Professional Services	Full Sample
IO Level	Standardized	Standardized	Standardized
Average # Best Practices	5.0	4.6	4.6
Average PCs/Site	336	137	195
PCs/Organization	2,587	2,580	2,493
#Sites/Organization	7.7	18.9	12.8
% Road Warrior Users	18%	33%	23%
Windows XP TCO	\$4,089	\$4,908	\$4,407
Sample Size	24	18	68

Figure 11: Profile of Surveyed Firms by Industry

Sixty-eight surveys were returned with full quantitative data in all categories. Wipro Technology's Product Strategy and Architecture Practice and GCR analyzed this data with SPSS, creating a Windows XP TCO benchmark for mobile computing. Because there were no large Windows Vista mobile PC deployments when the research was being conducted in early spring 2007, this team used the Windows XP baseline TCO to estimate potential Windows Vista benefits. A profile of the organizations surveyed is shown in Figure 11. Wipro worked with its own internal experts, with the Microsoft product teams, IT industry analysts, and Windows Vista early adopters in the TAP program to estimate the likely impact of Windows Vista on mobile workers. Note that the figures throughout the paper represent a "steady-state" environment, and thus do not include initial deployment costs.

Desktop Engineering	\$81,000
Security	\$85,000
Service Desk	\$51,000
End User Labor	\$81,000

Figure 12: Yearly Labor Rate Used in Analysis

Labor rates used to translate time into dollars are shown in Figure 12<sup>16</sup>.

As with any other TCO research, these numbers are estimates only. Organizations need to take into consideration their own specific situation, including the proportion of Road Warriors and Day Extenders, the level of Infrastructure Optimization, PC site density, and so forth, to estimate the actual impact of Windows Vista on their organization.

## Appendix D: Infrastructure Optimization

The following paragraphs give an overview of Infrastructure Optimization. See [www.microsoft.com/io](http://www.microsoft.com/io) for a full description and for advice on how to implement it in your organization.

The Infrastructure Optimization Model (Figure 13) has been developed using industry best practices and Microsoft's own experiences with its enterprise customers. A key goal for Microsoft in creating the Infrastructure Optimization Model was to develop a simple maturity framework that is flexible and can easily be used as the benchmark for technical capability and business value.

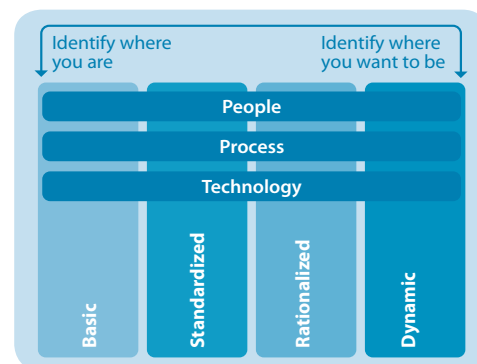


Figure 13: Infrastructure Optimization Model

<sup>16</sup> These rates represent fully-burdened average salary estimates provided courtesy of Alinean, Inc.

The first step is to evaluate what maturity level you are at in the model. Once the current maturity level has been established, the next step is to use the model to develop a plan on how to progress through each maturity level in order to reach the target level needed for maximum business benefit.

## **Basic: “We Fight Fires”**

The Basic IT infrastructure is characterized by manual, localized processes, minimal central control, and nonexistent or unenforced IT policies and standards regarding security, backup, image management and deployment, compliance, and other common IT practices. There is a general lack of knowledge regarding the details of the infrastructure that is currently in place or which tactics will have the greatest impact to improve upon it. Overall health of applications and services is unknown due to a lack of tools and resources. There is no vehicle for sharing accumulated knowledge across IT. Companies with Basic infrastructure find their environments extremely hard to control, have very high desktop and server management costs, are generally very reactive to security threats, and have very little positive impact on the ability of the business to benefit from IT. Generally, all patches, software deployments, and services are provided high touch and high cost.

Companies benefit substantially by moving from this type of Basic infrastructure to a Standardized infrastructure, helping them to dramatically reduce costs through:

- Developing standards, policies, and controls with an enforcement strategy.
- Mitigating security risks by developing a “defense in depth” posture, which is a layered approach to security at the perimeter, server, desktop, and application levels.
- Automating many manual and time-consuming tasks.
- Adopting best practices such as those of the IT Infrastructure Library (ITIL), the SysAdmin, Audit, Network, and Security Institute (SANS), and so on.
- Aspiring to make IT a strategic asset rather than a burden.

## **Standardized: “We’re Gaining Control”**

The Standardized infrastructure introduces controls through the use of standards and policies to manage desktops and servers, how machines are introduced to the network, and the use of Active Directory directory services to manage resources, security policies, and access control. Companies in a Standardized state have realized the value of basic standards and some policies, yet are still quite reactive. Generally, all patches, software deployments, and desktop service are provided through medium touch with medium to high cost. However, they have a reasonable inventory of hardware and software and are beginning to manage licenses. Security measures are improved with a locked-down perimeter, but internal security may still be a risk.

Companies benefit by moving from this Standardized state to a Rationalized state with their infrastructure by gaining substantial control over the infrastructure and having proactive policies and processes that prepare them for the spectrum of circumstances from opportunity to catastrophe. Service management is a concept and the organization is taking steps to recognize where to implement it. Technology is also beginning to play a much larger role moving toward a Rationalized infrastructure by becoming a business asset and ally rather than a burden.

## **Rationalized: “We Enable Business”**

The Rationalized infrastructure is where the costs involved in managing desktops and servers are at their lowest and processes and policies have matured to begin playing a large role in supporting and expanding the business. Security is very proactive, and responding to threats and challenges is rapid and controlled.

The use of zero-touch deployment minimizes cost, time to deploy, and technical challenges. The number of images is minimal and the process for managing desktops is very low touch. They have a clear inventory of hardware and software and purchase only the licenses and computers they need.

Security is extremely proactive with strict policies and control from desktop to server to firewall to extranet.

Companies benefit on a business level by moving from this Rationalized state to a Dynamic state. The benefits of implementing new or alternative technologies to take on a business challenge or opportunity far outweigh the incremental cost. Service management is implemented for a few services with the organization taking steps to implement more broadly across IT. Companies contemplating the value of Dynamic state generally are looking for their IT infrastructure to provide business advantage.

## **Dynamic: “We’re a Strategic Asset”**

Companies with a Dynamic infrastructure are fully aware of the strategic value their infrastructure provides in helping them run their business efficiently and staying ahead of competitors. Costs are fully controlled. Integration between users and data, desktops and servers, and collaboration between users and departments is pervasive, and mobile workers have nearly on-site levels of service and capabilities regardless of location.

Processes are fully automated, often incorporated into the technology itself, allowing IT to be aligned and managed according to the business needs. Additional investments in technology yield specific, rapid, measurable benefits for the business.

The use of self-provisioning software and quarantine-like systems for ensuring patch management and compliance with established security policies allows the dynamic organization to automate processes, thus improving reliability, lowering costs, and increasing service levels.

Companies benefit from increasing the percentage of their infrastructure that is Dynamic by providing heightened levels of service, competitive and comparative advantage, and taking on bigger business challenges. Service management is implemented for all critical services with service level agreements and operational reviews established.

## Appendix E: Vertical Industry Impact

The research provided sufficiently detailed data to profile two industries, Healthcare and Professional Services. The information intensity of each industry and the types of tasks its employees perform result in IT costs that vary significantly by industry, as shown earlier in Figure 11. Note that hardware/software costs are based on the mix of PC types (Road Warrior, Day Extender, etc.) for each industry. The data set shows that the percentage of Road Warriors (Figure 14) is directly correlated with TCO (It also correlates with PC density).

Professional Services had the highest proportion of Road Warriors, the lowest density of PCs, and the most expensive infrastructure, with TCO costs 11% higher than average, as shown in Figure 15. The opposite of Professional Services, Healthcare firms had the lowest proportion of Road Warriors, the highest PC density, and a correspondingly lower TCO (Figure 16).

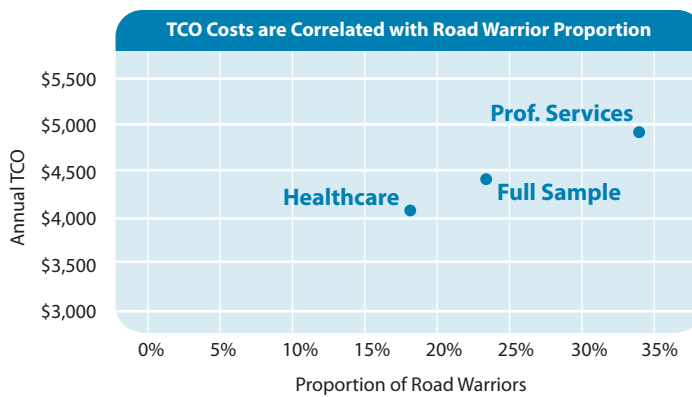


Figure 14: TCO Costs Rise as the Proportion of Road Warriors Increases

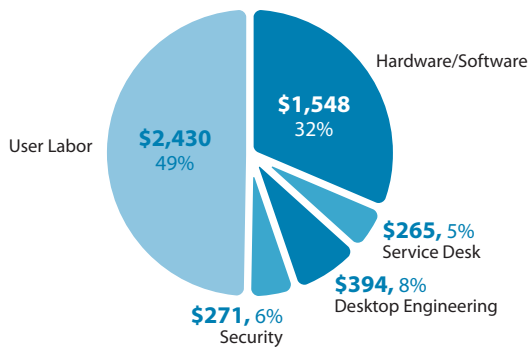


Figure 15: Windows XP Prof. Services TCO  
\$4,908 Total Annual TCO

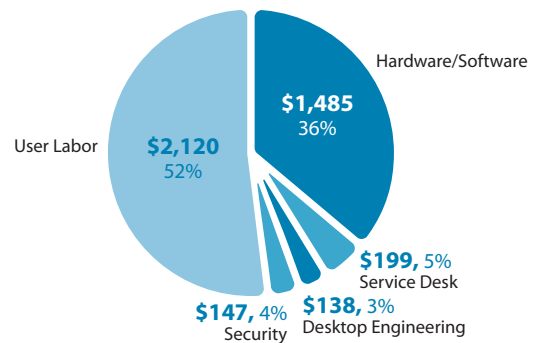


Figure 16: Windows XP Healthcare TCO  
\$4,089 Total Annual TCO

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## Overview of Wipro Product Strategy & Architecture Practice

The Wipro Product Strategy & Architecture (PSA) Practice is a division of Wipro Technologies, a global technology services division of Wipro Ltd. (NYSE-WIT). Wipro's PSA Practice has more than 10 years experience in researching, analyzing, and documenting the business value of technology solutions. Wipro's PSA practice helps enterprises and technology vendors develop innovative and effective product and IT strategies that enable them to expand their market opportunities, extend their competitive advantage and economize their business operations.

In addition to consulting to technology vendors, practice consultants and technologists work with global enterprises and service providers in architecting and implementing large-scale systems. This practical hands-on experience gives Wipro's PSA Practice consultants and technical architects first-hand knowledge that informs their business analysis work. For further information, contact [theodore.forbath@wipro.com](mailto:theodore.forbath@wipro.com) or visit [http://www.wipro.com/psa\\_practice](http://www.wipro.com/psa_practice).

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## Overview of GCR Custom Research

GCR Custom Research provides full service custom market research, analysis, and consulting for business-to-business and consumer product and service technology companies to help them better understand marketplace dynamics worldwide. Services include brand equity research, competitive positioning, customer satisfaction and loyalty measurement, product concept testing, market segmentation, image and positioning studies, all designed using a wide range of advanced research methodologies that deliver data-driven answers to tough questions about markets, customers, competition, trends and opportunities.

GCR has over 25 years of experience with technology markets and IT decision makers - experience that is crucial to ensure that your research is actionable. In a world where businesses need better information to reduce risks, seize opportunities and improve performance, insight from research is essential to making smart decisions. GCR's team of some of the best analytical minds in the business brings solutions to the challenges facing companies in the fast-changing technology world, where staying ahead of the competition is essential. For further information, please contact GCR at 503-241-8036, email: [info@gcrinsight.com](mailto:info@gcrinsight.com), or visit <http://www.gcrinsight.com>.