WHITE PAPER

Dell PC Deployment Optimization Model

Sponsored by: Dell

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IDC OPINION

PC prices continue to fall, yet the total cost of ownership (TCO) for PCs in business environments continues to be quite high. While the cost of PCs is part of doing business today, the cost of deploying new PCs can be daunting enough to persuade large enterprises to delay upgrading their PC environment and thus delay the benefits that technology upgrades yield. In addition to the cost of the PCs themselves, companies must also face up to the cost of deployment activities. IDC interviewed 200 large enterprises about their PC deployment practices and found that, on average, the cost of deployment activities was $527 per PC but often ranges to as high as $700 or more.

IDC’s research not only tracked the costs of deployment but also identified critical deployment activities (staging, logistics, applications loading, user state migration, image loading, program management, and post-deployment support) and specific practices related to those activities. These activities and practices form the Dell PC Deployment Optimization Model. The research shows that companies that optimize their deployment practices enjoy significantly lower costs to deploy PCs, as much as 62% less (over $400 per PC) compared with companies with basic deployment practices.

Leveraging Dell’s PC Deployment Optimization Model, IDC structured an approach for optimizing PC deployment. CIOs can use this research to map out a plan to reduce their organization’s PC deployment costs while deploying faster and with less disruption to workers using PCs.

METHODOLOGY

The research provided in this white paper is based on interviews conducted in summer–fall 2006 with 200 large enterprises (median = 7,000 PCs) based in North America. Companies in this study represent over 20 major vertical markets, including government and education, with no single vertical accounting for more than 6% of interviewees. Companies were asked for information specific to their deployment of PCs. The research was designed to test Dell’s IT optimization model for PC deployment to determine if optimized practices lower the cost of deployment.
IN THIS WHITE PAPER

IDC examines the process of deploying PCs in large enterprises and quantifies the costs for each part of the process. In addition, this white paper provides insight into how deploying certain best practices can reduce these costs.

SITUATION OVERVIEW

A quick glance at the enterprise PC market could lead some casual observers to believe that prices continue on such a downward trend that there may come a time when PC hardware is practically free. Of course, the reality is not that rosy, but the fact is, average selling prices (ASPs) for enterprise desktop and notebook PCs have been on a steady decline for over a decade, with price drops averaging around 9.5% annually over the past five years. Looking forward, IDC forecasts ASPs to decline at about a 6% compounded rate over the next five years.

But purchase price is only a small part of the total cost of ownership for PCs in large enterprises. Management costs (IT labor) make up a significant part of the monies that companies spend every year to keep PCs on everyone’s desks. Annual IT labor will average $500–600 per PC, while average annual hardware and software costs total $100–160. PC deployment activities can cost as much as $650–700 in certain business environments. Fortunately, our research has shown that deployment costs can be reduced by adopting optimization practices within the area of PC deployment. In fact, it’s possible to reduce those costs by over $400 per PC by taking advantage of all the best practices that will be discussed in this white paper. For organizations that regularly deploy thousands of new PCs each year, that can translate into very large sums of money — cost savings that can be directly transferred to a business organization's bottom line.

Optimization Model

The key to achieving these kinds of savings is to first understand the level of IT maturity of your organization and then determine the policies, practices, and technologies needed to transition the IT organization into the more advanced levels. In recent research, IDC has tracked the relationship between levels of maturity (optimization) and IT costs, service levels, and business agility. The model for IT maturity levels being referred to in this white paper was originally developed by Microsoft (among others) for overall IT environments. In another research project, IDC quantified the benefits that companies receive in the area of PC management through optimizing their IT environments.

The Microsoft model defines four states of IT maturity: Basic, Standardized, Rationalized, and Dynamic. Dell worked with Microsoft to adopt the basic principles of this IT Infrastructure Optimization Model to the specific task of PC deployment, and in doing so created the Dell PC Deployment Optimization Model. Figure 1 defines some of the characteristics of the model at each of the four optimization (maturity) levels.
At the Basic level, there is no centralized IT, most steps are done manually, and there are few well-defined procedures for efficiently completing many IT tasks. As a result, IT costs are very high. At the Standardized level, IT manages the process and established procedures are in place, but there is very little automation of these tasks. Companies at the Rationalized level have automated most steps and have strong centralized IT control. Finally, at the Dynamic level, companies are using IT as a strategic advantage over their competitors by completely automating all tasks and proactively supporting their users via automated help systems. The bottom-line result is greatly reduced IT costs and less user downtime when a new PC is deployed.

The reality of today's IT environments is that many companies practice deployment at the Basic and Standardized levels, far fewer companies practice deployment at the Rationalized level, and very few companies practice deployment at the Dynamic level. In part, this is because systems to automate some of the IT procedures described in their model aren't yet available. The picture also isn't quite as simple as it first appears because companies generally do not operate at the same optimization level for all activities. A typical company may practice some activities at the Standardized level, while other activities are practiced at the Rationalized or even Dynamic levels. Taking this into consideration, IDC characterized each of the 200 companies studied by the most prevalent level of optimization in its deployment activities to create a snapshot of deployment optimization in large U.S. enterprises today. The results show that 16% of the companies can be generally characterized as Basic, 62% as Standardized, 17% as Rationalized, and 5% as Dynamic (see Figure 2). For the remainder of this white paper, IDC uses *italics* when referring to companies as their "overall" level of optimization.
**PC Deployment Model**

The PC Deployment Optimization Model developed by Dell focuses on deployment management and execution. It describes all the critical activities that are involved in the deployment of desktop and notebook PCs in working environments and organizes each activity by practices that correspond to the hierarchy of optimization levels. There are six specific activities defined in Dell's PC deployment model:

- **Deployment management** covers the planning and organization of deployments, including work instructions and scheduling.
- **Staging and logistics** include the purchase, shipping, storing, and staging of the PC.
- **Image loading** includes the loading of images onto new PCs. While the creation of image files is not defined as a direct deployment activity (or cost), it plays a role in determining a company's optimization level for the image loading task.
- **Application loading** is the process of installing applications on the machines.
- **User state migration** is the process of moving each user's individual data and settings from his/her old PC to the PC being deployed.
- **Post-deployment support** is IT support that is provided to the end user in the first few days after he or she receives the new PC, including help desk and on-site support. It specifically targets the number of calls to the help desk, the amount time spent with the help desk, and other related metrics.
Figure 3 shows the practices of deployment activities associated with each level of optimization. At the Basic level of maturity, for example, very little automation of the deployment process is done, while at the more advanced levels, many tasks are either automated or tightly controlled. Not surprisingly, IDC found that the more steps of the process that are automated, the lower the overall costs for deployment will be and the quicker the deployment will be completed.

**Figure 3**

**Dell PC Deployment Model**

<table>
<thead>
<tr>
<th>Basic</th>
<th>Standardized</th>
<th>Rationalized</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment Management</td>
<td>PCs installed individually, no set process</td>
<td>Project managed; standard process and tools</td>
<td>Process managed centrally using quality metrics and knowledge management</td>
</tr>
<tr>
<td>Staging and Logistics</td>
<td>Multiple shipping legs</td>
<td>Central staging with multiple locations</td>
<td>Just-in-time delivery for on-campus workers. Staging for remote users</td>
</tr>
<tr>
<td>Image Loading</td>
<td>Departments may delete the standard image upon arrival</td>
<td>Standard core image, scheduled updates</td>
<td>Standard cross-platform image</td>
</tr>
<tr>
<td>Applications Loading</td>
<td>Load from CD</td>
<td>Technician installs from network</td>
<td>Automated electronic software distribution system</td>
</tr>
<tr>
<td>User State Migration</td>
<td>Files copied and settings moved manually</td>
<td>Tool moves files, settings moved manually</td>
<td>Tool moves files and most settings, some manual configuration</td>
</tr>
<tr>
<td>Post Deployment Support</td>
<td>No proactive process</td>
<td>Onsite technician</td>
<td>Less onsite support, more aids, helpdesk, on-call support</td>
</tr>
</tbody>
</table>

Source: IDC, 2007

In the case of image loading, for example, a company at the Basic level of IT maturity would delete the standard image that comes on the machine and then manually install all the necessary elements, whereas a Dynamic organization would have a standard company-wide image with department overlays and an automated image installation procedure that initiated as soon as the new PC is physically attached to the network, or the image may have been loaded during the manufacturing process. The Standardized and Rationalized solutions fall between those two extremes.
For a more in-depth explanation of the tasks within each activity that were covered in IDC’s research, see the Appendix in this white paper.

RESEARCH FINDINGS

The primary purpose of IDC’s research was to quantify the activity levels, costs, and potential benefits of specific optimization practices in the area of PC deployment. We used cost per PC deployed as our metric. Costs to deploy consist of the following three elements:

- **IT labor.** Number of IT full-time equivalents (FTEs) directly involved in deployment activities times the average burdened salary of an FTE ($64,000 annually)

- **User labor (lost productivity).** Number of hours during the deployment when the user cannot use his/her PC because he/she or IT are working on it for deployment activities (loading user state data, loading applications or settings, and recovering lost settings, including both planned and unplanned downtime [outages]) times the average user burdened salary (based on $52,000 annually)

- **Logistics.** Cost for the space required for PC staging at an average $25 per square foot, plus shipping costs

In our analysis of the research, we looked at the data from two different perspectives:

- **Bottom up.** What are the incremental benefits (costs savings) of each higher level of optimization?

- **Top down.** On average, what does it cost a Dynamic company to deploy a PC compared with companies at lower levels of IT optimization?

**Bottom Up: The Value of Optimized Deployment Practices**

IDC’s research shows that a company with Dynamic practices in all deployment activities can possibly reduce deployment costs by as much as $418 per PC (62%) as compared to a company with all Basic practices. Total cost savings per PC include IT costs of $278 (54% reduction), logistics $73 (88% reduction), and user labor $67 (87% reduction). The largest reduction in moving from one level to another was in moving from Rationalized practices to Dynamic, $166 per PC (39%). Deployment costs by optimization level are shown in Figure 4.
IDC quantified the cost savings generated by implementing the practices to migrate from one optimization level to the next for each deployment activity. The results of each best practice implementation are summarized in the sections that follow.

**Staging and Logistics**

Overall staging and logistics account for 18% of IT labor in PC deployment. By moving from a decentralized multiple staged deployment (Basic) up through subsequent optimization levels, the IT labor savings shown in Table 1 are achieved from moving one level at a time.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Staging and Logistics IT Labor Savings per PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>From:</td>
<td>Savings ($)</td>
</tr>
<tr>
<td>Basic to Standardized</td>
<td>8</td>
</tr>
<tr>
<td>Standardized to Rationalized</td>
<td>6</td>
</tr>
<tr>
<td>Rationalized to Dynamic</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: IDC, 2007
In addition to the impact of IT labor, staging and logistics activities also include shipping and space costs. Shipping costs account for any external shipping charges plus internal shipping of PCs from a central site to staging areas to users. Space costs for the staging activities averaged $25 per square foot for rent and HVAC. Not surprisingly, IDC found that the more stages there are, the higher the logistics costs are. In a Dynamic environment where the PC goes from OEM directly to user without internal staging or reshipping, staging costs should be zero (theoretically). In our study, companies with Dynamic practices averaged $10 per PC compared with $39 per PC for Rationalized, $59 for Standardized, and $82 for Basic.

**Image Loading**

Image loading accounts for 18% of IT labor in PC deployment. By moving from departments being able to delete standard images (Basic level), thus creating complexity by reducing IT control, up through subsequent optimization levels, the IT labor savings shown in Table 2 are achieved from moving one level at a time.

<table>
<thead>
<tr>
<th>From:</th>
<th>Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic to Standardized</td>
<td>14</td>
</tr>
<tr>
<td>Standardized to Rationalized</td>
<td>12</td>
</tr>
<tr>
<td>Rationalized to Dynamic</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: IDC, 2007

**Applications**

Application loading accounts for 15% of IT labor in PC deployment (Basic). Basic application loading typically uses CDs and has little or no centralized control. A fully Dynamic solution can identify which applications a PC or user should have and automatically install them with no manual intervention. By moving up through subsequent optimization levels, the IT labor savings shown in Table 3 are achieved from moving one level at a time.
### TABLE 3

**Applications IT Labor Savings per PC**

<table>
<thead>
<tr>
<th>From:</th>
<th>Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic to Standardized</td>
<td>15</td>
</tr>
<tr>
<td>Standardized to Rationalized</td>
<td>6</td>
</tr>
<tr>
<td>Rationalized to Dynamic</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: IDC, 2007

### User State Migration

Migrating the users’ data and settings to the new PC accounts for 15% of IT labor in PC deployment (Basic). Basic migration is a fully manual process where files are copied over to the new PC, and settings are usually ignored. Dynamic migration utilizes a fully automated off-the-shelf tool to move data and settings, usually over a direct connection instead of the network. By moving up through subsequent optimization levels, the IT labor savings shown in Table 4 are achieved from moving one level at a time.

### TABLE 4

**User State Migration IT Labor Savings per PC**

<table>
<thead>
<tr>
<th>From:</th>
<th>Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic to Standardized</td>
<td>23</td>
</tr>
<tr>
<td>Standardized to Rationalized</td>
<td>1</td>
</tr>
<tr>
<td>Rationalized to Dynamic</td>
<td>24</td>
</tr>
</tbody>
</table>

Source: IDC, 2007

### Post-Deployment Support

Providing IT expertise and support to users within the first few days of deployment accounts for 17% of IT labor in PC deployment (Basic). Basic support relies on onsite technicians, help desk, and coworkers. As maturity progresses, end users are provided FAQs and self-help tools. Dynamic solutions also include remote control for troubleshooting and repair. By moving up through subsequent optimization levels, the IT labor savings shown in Table 5 are achieved from moving one level at a time.
## TABLE 5

Post-Deployment Support IT Labor Savings per PC

<table>
<thead>
<tr>
<th>From:</th>
<th>Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic to Standardized</td>
<td>22</td>
</tr>
<tr>
<td>Standardized to Rationalized</td>
<td>10</td>
</tr>
<tr>
<td>Rationalized to Dynamic</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: IDC, 2007

### Deployment Project Management

Managing the deployment process accounts for 12% of IT labor in PC deployment (Basic). At the Basic level, deployment is managed independently at each company site, with no documented process. Dynamic companies use a central deployment system to manage all IT activities, assets, users, and issues. The IT labor savings shown in Table 6 are achieved by moving up to the next optimization level.

## TABLE 6

Deployment Project Management IT Labor Savings per PC

<table>
<thead>
<tr>
<th>From:</th>
<th>Savings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic to Standardized</td>
<td>9</td>
</tr>
<tr>
<td>Standardized to Rationalized</td>
<td>16</td>
</tr>
<tr>
<td>Rationalized to Dynamic</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: IDC, 2007

The IT labor savings described above for moving to the next level of optimization are summarized for all deployment activities in Figure 5.
In summary, as companies employ best practices, they tend to optimize their IT infrastructure and reduce the costs for implementing change in their environment — in this case, deploying PCs. But there are several issues to be resolved to take advantage of the best practices, such as which practices to employ first and whether companies can skip steps and go directly from Basic to Dynamic. The answers to many of these issues lie in understanding where your company falls overall as to level of IT optimization.

**Top Down: Becoming a Dynamic Environment**

IDC’s study did not find any companies with practices in all deployment activities at the same level of optimization. There were no “pure” Standardized companies for example. Rather, each was a mix of optimization levels. Still, IDC was able to categorize each company studied by an overall optimization level that best corresponded to its deployment practices. (For the percentage of companies in each of the optimization levels, refer back to Figure 2.)

Figure 6 shows the distribution of practices in relationship to the companies’ overall optimization levels. For example, if we examine companies categorized as Dynamic, we discover that 66% of their practices would fit the definition of the Dynamic level.
(according to the Dell deployment model), 11% would be at the Rationalized level, 23% would be at the Standardized level, and there would be no practices at the Basic level. A deeper analysis shows that 90% of Dynamic companies are at the Dynamic level for user state migration and applications loading, but only a third are at the Dynamic level for staging and logistics (ship directly from OEM to all users). For this group of companies, therefore, most will need to improve on staging and logistics to achieve a total Dynamic level, but relatively few will need to improve on user state migration and applications loading.

**FIGURE 6**

*Overall Optimization Distribution*

<table>
<thead>
<tr>
<th>Type of Company</th>
<th>Basic</th>
<th>Standardized</th>
<th>Rationalized</th>
<th>Dynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>46%</td>
<td>21%</td>
<td>7%</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>29%</td>
<td>41%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>33%</td>
<td>66%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20%</td>
<td>24%</td>
<td>32%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>14%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: IDC, 2007

**Other Cost-Complexity Factors Assessed**

To ensure that the deployment best practices were the primary factors in cost of deployment, IDC also examined other traditional drivers of IT costs. We wanted to see if any of these factors could be more significant than deployment optimization levels in determining deployment costs:

- **Organization size.** In other studies, IDC has seen economies of scale being a factor, with large enterprises having lower IT costs than medium-sized and small companies. But the break point here is around 1,000 PCs, above which companies do not get additional economies of scale.

- **Distribution of users.** Typically, fewer IT staff are able to support PC users in high-density environments with few remote sites. The more distributed the users (low average number of users per site), the more IT staff that is required. In this study, the Basic companies and Dynamic companies were similar in being the least dense (460 and 471 PCs, respectively, per site), while having very different costs of deployment.
**IT salary.** If dramatically different, the average IT salary can skew IT labor results. In this study, we found that average salaries were about equal at most optimization levels, but about 10% lower for Basic companies than the other levels, which is counter to the finding of Basic companies having higher deployment costs.

In summary, we found that factors examined per the above were not as significant as optimization levels in determining deployment costs.

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**Other Benefits of Optimized PC Deployment**

While this study focused primarily on costs of deployment, IT managers are also keenly aware of their responsibilities to support business agility. Business agility is the ability of a business to respond to changing business requirements or pursue new opportunities. In this study, IDC assessed the time required to conduct a major PC deployment. This could be a regularly scheduled upgrade, but it could also be part of a major acquisition or the creation of a new business unit. We found that the more highly optimized environments were also more agile. As shown in Figure 7, given the same number of PCs to deploy, the Standardized companies could deploy in about half the time of the Basic companies, the Rationalized companies took one-third the time to deploy, and the Dynamic companies required one-quarter the time to deploy.

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**FIGURE 7**

*Time Required to Deploy PCs by Overall Optimization Level of Company*

Source: IDC, 2007
Companies that want to take advantage of the potential cost savings from moving to higher levels of deployment optimization will need to take several steps to achieve these results. First, they will need to assess their current optimization level in each of the different critical activities involved with PC deployment. As discussed, any given company is rarely at the same level of optimization for all activities — instead, most will be at different levels for different activities. Armed with that information, they will then need to analyze which steps make the most sense for them to make. In some cases, that may mean focusing on areas where they are weakest, but in others, it may mean taking an area of relative strength and moving it to the next level of optimization because the greatest cost savings can be found there. Companies can get help in making an objective assessment of their position and how to improve it. For example, Dell offers services that analyze a company's current processes and provide a business case for optimization.

Becoming a Dynamic organization should be the overall goal for IT staff, but often other priorities and overriding corporate goals may direct IT resources elsewhere. Much may depend on the decision-making process in the company and the relative influence of IT and corporate management and business unit management. Becoming a Dynamic organization may be a long-term goal for the next major PC deployment after the current one.

In the short term, companies can improve by making the move from one optimization level to a higher level in selected activities. This will involve benchmarking current practices to identify the company's general, overall level within the Dell optimization model, then identifying which best practices will generate the highest cost savings — or if user productivity and satisfaction are the critical factors, then identify which practices will minimize downtime. Based on the analysis of companies studied, IDC has compiled recommendations as to the leading best practice to deploy, depending on a company's current overall level of optimization:

- **All companies.** For the majority of companies, moving up a level in staging and logistics practices has the largest potential for overall savings because improving those practices can decrease not only IT labor costs but logistics costs as well. Most companies, except for the relatively few at the Dynamic level overall, are at the Standardized level for staging and logistics activities, using centralized staging. They should consider moving to a direct OEM-to-user distribution for campus employees (Rationalized level), which would reduce IT labor costs by $6 and shipping and space costs by $20 per PC.

- **Basic companies.** Most companies at this overall level use purely manual means for user state migration, and moving to automated data saving would reduce IT labor costs an average of $23 per PC.

- **Standardized companies.** Most are at the Standardized level for staging and logistics and should consider moving to the Rationalized level as noted above.

- **Rationalized companies.** While these companies mostly employ Rationalized and Dynamic level practices, most still are at the Standardized level for staging and logistics and would benefit a combined $26 per PC from moving to a direct OEM-
to-user distribution for campus employees. Beyond the change in logistics practices, many companies can improve their user state migration practices by moving from a partially automated to a fully automated process, reducing IT labor by $24 per PC.

Dynamic companies. By definition, Dynamic companies have Dynamic practices in most activities, but not all. The activity in which the majority of Dynamic companies can gain the most improvement is staging and logistics, initiating just-in-time deployment in conjunction with direct OEM-to-user shipping for both campus and remote users.

CHALLENGES/OPPORTUNITIES

IT managers who feel motivated to improve their deployment activities after reading this white paper will likely run into some roadblocks that prevent them from making a swift migration to the next level. Some of the recommendations are relatively easy to make and can translate into directly measurable cost benefits, but others are more difficult. One of the main reasons is the classic budgeting dilemma — it often takes money to make money, and many IT department budgets are so strapped that it will be difficult to justify new expenditures, even those that can theoretically translate into direct benefits. Between the politics of budget infighting found in most organizations and the multitude of distractions that get in the way of pursuing new strategic objectives, real life can block even the best of intentions.

For those IT managers who prioritize these kinds of changes and wisely pick the ones that their organizations can most realistically achieve, however, there are some significant opportunities to both save money and streamline their organizations' procedures. One way to help achieve these savings is by working with companies such as Dell's Services Group that are experienced in making these kinds of changes across many company types in varying industries. Dell offers deployment assessment services that enable companies to understand where they are in the deployment optimization model as well as deployment optimization engineering services that can help companies make the transition to an optimized deployment.

CONCLUSION

Today, enterprises' increasing dependence on business applications means that PCs sit at the very heart of enterprise operations. The process of purchasing and deploying PCs will continue to be a critical issue for IT managers for years to come. As inevitable and daunting as new deployments may be, the practices and cost structure associated with those deployments can be improved. Adopting optimized practices or simply improving processes in certain key activities can translate into savings of hundreds of dollars per PC deployed. Regardless of the level of PC deployment optimization in which organizations currently find themselves, there are real, practical steps to be taken that will lead to improvements not only to an IT department's costs but also to an IT department's efficiency and strategic value to the company as a whole.
In fact, while reducing costs is certainly an important goal, IT organizations are increasingly being asked to help improve a company's agility and competitiveness. In that regard, steps taken to optimize the overall IT infrastructure, through optimizing the PC deployment activities, can have a far-reaching impact on an organization's long-term success. By taking the initiative necessary to achieve higher levels of PC deployment optimization, companies can improve their bottom line and help develop a culture of agility and action that can translate into renewed vigor and success in their given market.

APPENDIX

IDC Research on PC Deployment Activities

IDC's interviews with 200 companies covered the PC deployment activities discussed in the sections that follow.

Staging and Logistics

For staging and logistics, IDC looked at whether or not companies had a centralized staging location, whether PCs were shipped to a staging area or directly to users' desks, and whether companies used a just-in-time ordering system. In addition, IDC looked at the amount of time that IT managers and staff spent on these activities, the space needed for storage, and the shipping charges per PC.

Image Loading

The image loading activity category looked at whether or not companies had a centralized image, whether departments and business units may delete the centralized image on arrival, whether the centralized image had scheduled block updates, and whether or not a company also offered department overlays. In addition, this activity considered the number of images a company had, where the company's images were created, and how much time was spent deploying the company's images.

Applications

Research on this activity looked into applications (other than those included in a centralized image) that were loaded onto the PCs at the time of deployment and the manner in which applications were loaded: via CD, network share, electronic software distribution (ESD) system pushes, or user self-installs. For those using ESD, we also considered what percentage of applications were deployed. In addition, we considered how many applications organizations used and tracked how much time was spent managing application distribution at both the IT management and IT worker level.
**User State Migration**

User state migration research looked at the techniques used to move user data and settings to the new PC, including manually copying data and settings, tool-based data copying and manual settings copying, tool-based copying of most data and settings and, finally, automated migration of all data and settings. IDC also looked at how much time was spent performing these tasks, the amount of data moved per PC, and the amount of time spent by users needing to change settings or move data after the fact.

**Post-Deployment Support**

Research on this activity looked at companies’ systems for supporting newly deployed PCs, including whether they had a process at all; whether an onsite technician was available for the first day or two; whether additional aids such as FAQs, augmented help desk, or on-call support were available; and, finally, whether remote issue resolution from a command center was available. As with the other sections, the amount of time spent on these activities was also tracked, both for IT managers and for IT users.

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