



ThinkVantage Technologies: Saving Dollars and Improving Productivity Through the PC Lifecycle

Lenovo ThinkVantage Tools Generate Hard Dollar Savings Through Every Stage of the PC Lifecycle

BACKGROUND

Lenovo has made significant investments in creating a portfolio of PC management tools that provides IT managers and end users with the opportunity to save time, reduce costs, improve security and deliver a better experience across every stage of the PC lifecycle, from deployment to disposal. Lenovo has retained TBR to conduct in-depth interviews to help quantify the actual dollar savings and productivity gains that Lenovo customers have experienced through implementing the ThinkVantage Technologies; the end result of those interviews was this white paper. TBR has fine-tuned the methodology for this paper over the past several years, as this is the fourth version that has been created, allowing us to follow customers through various stages of implementation. In completing the paper, TBR followed a three-pronged approach. First, TBR analysts were briefed on each of the ThinkVantage Technologies by Lenovo product managers. Second, TBR conducted interviews with customers using the TVTs to understand the impact to their PC management costs and productivity. As an additional checkpoint, TBR interviewed customers within our own database of users that had switched to Lenovo from another vendor to assess the tools' influence on their decision to change vendors.

INTRODUCTION

The management of the PC environment is becoming increasingly complex, despite the fact that PC prices continue to fall. Compliance and security issues have become paramount, with the potential for large fines and jail time for IT managers and executives of companies that disclose private customer data. An increasingly mobile workforce adds another layer of complexity in ensuring that end users can easily connect wherever they are, in addition to ensuring data stored on their PCs is secure when it leaves company premises. Traditionally, PC lifecycle cost estimates have indicated an 80%/20% rule, meaning 20% of costs associated with the full PC lifecycle are actually related to hardware costs, while the other 80% are associated with deploying, supporting and disposing of systems throughout their lifecycles. However, lower hardware pricing and increasing PC management complexity indicate that PC lifecycle costs are likely shifting to a 90%/10% model.

In conducting research for this paper, the consistent message from customers and business partners is that Lenovo understands PCs are not a commodity and there is significant room for innovation in PC hardware and through PC management software. Through its ThinkVantage Technologies portfolio, Lenovo provides tools that support and enable image creation and ongoing image management; system migration and deployment; support of PC users and disposal of PCs in a way that protects sensitive company and customer data. Most of these tools are included free with every Lenovo system, although the fact that the tools are free represents only a small portion of the overall savings opportunity. Customers who implement the tools report measureable and significant time savings and productivity improvements in managing their PC environments. In many cases, ThinkVantage Technologies reduced the time associated with a PC management task from 50% to 80% over the client's previous method. Customers experience other business benefits that are even harder to quantify but have a positive impact on the company's bottom line, such as reduced downtime for revenue-generating salespeople and consultants, improved end-user productivity and satisfaction and the ability to avoid reputation-damaging leaks of confidential customer information.

EXAMPLE: A Large Bottler/Distributor

Coca-Cola Enterprise is the world's largest bottler and distributor of Coca-Cola products with operations in the United States, Canada and Europe. With an installed base of 27,000 PCs, CCE faces the challenge of efficiently managing a large, global IT infrastructure. CCE has been leveraging ThinkVantage tools for several years now with significant cost benefits. In 2006, the tools were a contributing factor to CCE reducing the time spent in PC support activities by over 30%.

- **Image Ultra Builder and Systems Migration Assistant:** CCE has made a significant monetary and training investment in IUB and SMA which has allowed CCE to deploy PCs much faster than before. CCE recently modified its PC refresh strategy and now redeploys PCs more frequently versus systematically replacing PCs based on their age. With IUB and SMA, CCE has reduced the time to deploy a PC from more than 90 minutes to less than 30 minutes. With a savings of at least one hour per PC, CCE would save \$810,000 in refreshing its installed base of 27,000 PCs. IUB and SMA have also supported CCE's strategy to transition to user self-service and self-support versus a fully-assisted deployment process.
- **Rescue and Recovery:** R&R is deployed on all of CCE's PCs and is used as an important backup and recovery tool. R&R provides CCE with a tool with high ease-of-use which supports CCE's user self-service strategy. CCE employees are now able to recover data themselves and are able to restore their systems to a state that is better optimized and closer to the original level of performance.

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KEY WHITE PAPER FINDINGS

TBR looked to several sources of information to understand the benefits to customers in implementing Lenovo's ThinkVantage Technologies. To create a strong background and understanding of the tools, TBR conducted interviews with ThinkVantage product managers. To verify the benefits associated with the tools, and to understand how they are implemented in the real world, TBR spoke with ThinkVantage customers and business partners. Customers were able to provide a view of how ThinkVantage Technologies had improved their PC management experience from cost, time savings and end-user productivity perspectives. At the same time, business partners were able to substantiate these findings with additional customer examples and share their own experiences in leveraging the TVTs for delivering value-add services like image management or deployment services to their own customers. Finally, TBR spoke with customers from our own database of users who had switched to Lenovo PCs from another brand within the past 18 months to understand how the tools impacted their decision to change vendors.

These three components of our research are the basis for the following findings and conclusions :

1. True Dollar Savings

Customers generate savings through implementing ThinkVantage Technologies in a variety of ways. Customers save money based on the elimination of PC management tools, purchases and services from third parties, as the majority of TVTs are offered at no charge. However, through TBR's interviews with TVT customers, it is apparent that more significant savings occur through the improvements in efficiency driven by using the tools. This has reduced the need for customers to add new resources to manage an expanding installed base and has created

the opportunity for the IT team to focus on other strategic projects.

2. A Unique Integrated Hardware and Software PC Management Solution

Lenovo has created a combination of software- and hardware-based PC management features that is unique in the market. Hardware features include the Hard Drive Active Protection System, the ThinkVantage "blue button" for support and recovery and the Trusted Platform Module (TPM) embedded security chip. In the software area, Lenovo's ThinkVantage PC management tools cover the entire PC lifecycle including deployment and migration tools, support tools, backup and recovery and the secure removal of hard drive data when systems are disposed of. No other vendor can deliver all of these functions with a single point of contact and accountability.

3. Leading Partnerships

While Lenovo is the only vendor to offer an integrated hardware and software PC management solution, the company realizes partnerships with third parties are also an important piece of the overall solution, particularly in the security space. Lenovo has partnered with security leaders such as Utimaco, Absolute Software and Softex to ensure that solutions from these leading security vendors work in conjunction with the TVTs.

4. Flexibility to Customize and Increased Manageability

The ability to customize the tools within the ThinkVantage portfolio is a key theme for Lenovo. IT managers have the flexibility to manage the content, level of access, and scheduling of TVT features. Lenovo has also partnered with LANDesk for the creation of a specific LANDesk Management Suite for the ThinkVantage Technologies console to enable centralized management of the TVTs. Additionally, Lenovo has ensured that the tools are compatible and integrated with

EXAMPLE: Coca-Cola cont.

- **R&R (cont.):** CCE estimates it used R&R to restore about 200 to 300 PCs last year, allowing the system to be restored in 20 minutes or less, compared to the previous method which took three to four hours. At a rate of \$30 per hour for on-site support, the time savings associated with R&R would result in a cost equivalent of \$19,000 to \$28,500 last year.
- **Access Connections:** AC has proven to be an important tool for CCE in rolling out a home connectivity program for its employees as well as an initiative to arm a group of 3,500 sales people with a new Lenovo T60 or T61 laptop and wireless connectivity card. With AC, the CCE sales team can seamlessly connect at home before they begin their day, on the road and back home to finish the day. For the home connectivity program, AC has allowed CCE to create a program that drives employee satisfaction and is easy to support: Employees purchase a standard router, which CCE configures, and then through AC employees can seamlessly transition from the office to home.
- **Secure Data Disposal:** SDD provides CCE with a flexible tool to choose how to dispose of assets. CCE uses the services of a third party for some of its disposal requirements; however, SDD has allowed the company to efficiently bring some of those processes in-house for a savings of \$24 to \$34 per PC that is sent out. As a result, CCE received a \$68,000 rebate from its supplier last year for services it was able to complete in-house.

Active Directory and new PC management capabilities announced as part of Microsoft Vista.

5. Improved user productivity and high end-user satisfaction

End users are happiest when they can avoid a call to the helpdesk. Lenovo customers report high levels of end-user satisfaction, as the tools allow IT managers to preemptively address common problems before they occur. For example, Access Connections helps to avoid calls regarding wireless connectivity, while the Password Manager helps to avoid support requests for password resets. For users needing technical assistance, the Productivity Center provides an end-user self-help solution. End users also benefit from the increased uptime that avoiding a technical support call can deliver. For an online college, Rescue and Recovery allowed students to restore their own systems, when the previous method would have required sending in their laptop and being without it for three days, leading to missed classes and homework assignments. For customers with mobile sales forces, increased PC uptime typically equates to higher revenue generation.

6. Continued commitment to leading R&D

Lenovo has absolutely committed to maintaining ThinkVantage Technologies as the leader in PC management tools and functionality. Lenovo continues to substantiate this commitment with new versions of the tools, adding functionality and improvements in the ease of use. One of the consistent comments TBR hears from ThinkVantage customers is that Lenovo is very focused on taking customer feedback regarding the tools and implementing changes based on these suggestions.

THINKVANTAGE TECHNOLOGIES BACKGROUND

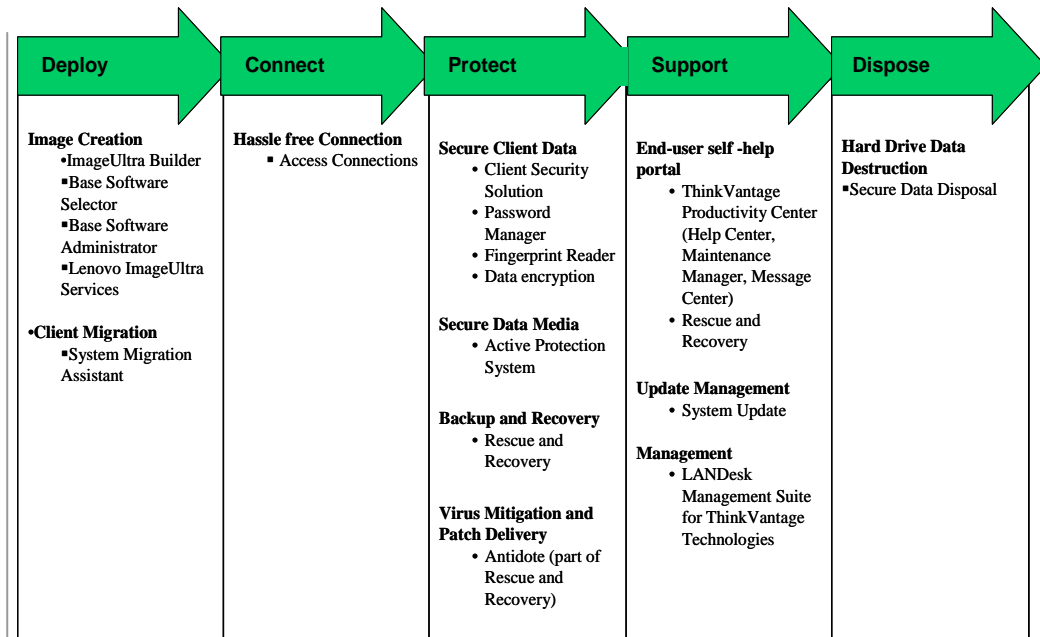
The average cost of PC hardware continues to decline while the complexity of managing the PC environment, including security and compliance requirements as well as an increasingly mobile workforce, continues to escalate. Customers must increasingly look at the big picture, since the true costs associated with managing and supporting their PC environment represent the vast majority of spending throughout the PC lifecycle. While some PC vendors continue to base their value proposition on offering the lowest price, TBR believes this approach has become short-sighted and does not take into account the true costs that customers face. In speaking with Lenovo customers, a constant theme TBR heard was that Lenovo differentiates itself based on "innovation", both with its PC hardware and PC management tools. TBR notes that Lenovo is the only hardware vendor offering a fully integrated suite of PC management tools, complemented by unique hardware features such as the Hard Drive Active Protection System, the "blue button" and the TPM embedded security chip. Competitors would need to partner with a variety of third parties to build the type of solution that is currently available directly from Lenovo – and most of the ThinkVantage Technologies are offered free of charge with the purchase of a Lenovo PC. TBR believes in many cases the cost savings associated with implementing the full ThinkVantage portfolio can offset the full acquisition price of the PC.

While Lenovo is the only PC hardware vendor with a broad portfolio of PC management tools, it is important to note that the company realizes partners are necessary to provide customers with the most complete and manageable solutions possible. Given that many of its customers have security solutions or centralized management tools in place, Lenovo has partnered with the leaders in these areas to ensure that ThinkVantage

EXAMPLE: A Managed Service Provider

Dempsey Bluevar is a provider of managed IT services to the small- and medium-sized business market. In providing outsourced desktop services, several of the Lenovo ThinkVantage Technologies help Bluevar to reduce the costs associated with service delivery as well as improve customer satisfaction. With ImageUltra, Bluevar has generated significant time savings, reducing the typical time associated with building a customer image by 75% - from 16 hours to four hours. Access Connections and Rescue and Recovery are important tools for Bluevar in improving customer satisfaction and reducing costs. Access Connections combined with the Password Manager, allows Bluevar to implement a user friendly solution that reduces the number of help desk calls. Rescue and Recovery has also allowed Bluevar to save time and cut down on overall support costs. These savings coupled with the high durability of Lenovo hardware are the foundation for Bluevar steering customers towards Lenovo-based solutions.

System Lifecycle



SOURCE: TBR AND LENOVO.

Technologies are optimized to work with these tools; for example, Lenovo has partnered with LANDesk for the creation of the ThinkVantage-specific LANDesk management console, and has partnered with the leaders in PC security to ensure that Lenovo can have an integrated security solution that includes features such as full hard drive encryption.

In speaking with ThinkVantage customers over the past five years, TBR has found that customers typically pick and choose the tools that will have the most immediate impact to their business or fill a gap in their PC management strategy. It is important to note that each ThinkVantage Technology can stand on its own and deliver its own ROI. However, TBR has found that customers typically expand the number of tools implemented based on the measureable savings and ROI delivered by their initial implementation.

The ThinkVantage Technologies portfolio includes a broad offering of tools that address the pain points IT managers face in

administering systems across the five stages of the PC lifecycle. The graphic above depicts the five lifecycle stages and the corresponding ThinkVantage tools that address each stage

While ThinkVantage Technologies clearly generate cost and time savings for customers, there are many other benefits as well. In many cases, the Secure Data Disposal tool will provide the customer higher levels of security and data destruction for systems that are either being cascaded, sold or discarded. The protection of confidential company and customer data is priceless. For mobile workers, the ability to seamlessly connect their laptop across a variety of locations, coupled with the backup and recovery features of Rescue and Recovery, provides a solution to keep them up and running when they are away from the office. There is no doubt that improved uptime can have a direct impact to the customer's bottom line. For example, in a consulting firm, more uptime for consultants means more billable hours and revenue. For sales resources, a down PC can impact the sales

EXAMPLE: Lenovo Business Partner

MCPc is a large Cleveland-based Lenovo business partner with 325 employees, 22 offices and over \$200 million in revenue. Lenovo's ThinkVantage Technologies play an important role in MCPc's delivery of Lifecycle Management services to its customers, allowing MCPc to focus more on the delivery of value-added services. By leveraging the TVTs, MCPc has found that it is able to deliver customers a real savings of \$50 to \$200 per PC depending on how many tools are implemented.

- **Systems Migration Assistant:** For one of its midmarket accounts, MCPc has been able to significantly reduce the time and complexity of deploying new systems. Where new system deployment previously required an on-site technician visit, MCPc has been able to reduce the cost by sending out a PC pre-loaded with the customer image and System Migration Assistant which allows the end user to easily migrate their system settings and data to the new system.

- **Rescue and Recovery:** MCPc works with a larger charter school focused on online education. Students are provided with a new Lenovo desktop. When students experienced a problem under the previous model, the student would ship out the desktop to be reimaged. However, with the Lenovo solution the help desk can direct the student to use R&R to restore the system, allowing the customer to avoid the cost of shipping the PC and several hours of technical support resources to reimage the system, which could range from \$150 to \$175 in total for each incident. Additionally, students benefit as they are able to continue their schooling without a three-day interruption due to the loss of their PC.

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cycle and the opportunity to bring in more revenue.

Lenovo has focused heavily on ensuring the ThinkVantage Technologies are highly manageable and customizable. To name a few features, IT managers can customize information and access to end-user self-help options, schedule backup and recovery tasks, push out Access Connections wireless profiles to users and choose what level of data overwrite to use for hard drive data destruction. Additional management features are available through the LANDesk Management Suite for the ThinkVantage Technologies console as well as through Active Directory. Lenovo has also worked to ensure the ThinkVantage Technologies are compatible and complementary to Microsoft Vista capabilities.

It is the combination of cost savings, time savings, improved business results and higher end-user satisfaction which is the winning combination for ThinkVantage customers.

THINKVANTAGE TECHNOLOGIES DEPLOYMENT, SUPPORT AND TRAINING SERVICES

As with any new implementation of hardware or software, there is an upfront investment customers must make in training and educating their installed base. Lenovo realized that for some customers this may be a challenge and therefore offers a range of ThinkVantage support and service offerings to smooth the transition phase. Lenovo offers free Web and phone support, Web-based resources, on-site assessment services and a range of customized solutions including on-site training and education services. Customized services related to ThinkVantage deployment are also available through Lenovo and many of its business partners. TBR acknowledges that there are always challenges in rolling out new solutions such as ThinkVantage. However, through conversations with customers TBR has found

the benefits available through leveraging the ThinkVantage Technologies far outweigh the investments in implementing the tools and ensuring that its end users are using them to their full benefit.

By leveraging the TVTs, Lenovo business partner MCPc has been able to deliver customers a real savings of \$50 to \$200 per PC, depending on how many tools are implemented.

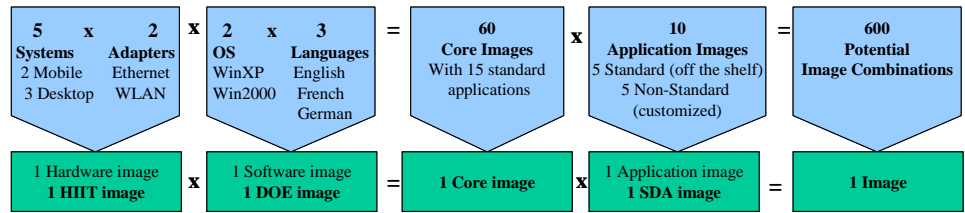
Deploy

The Impact of ImageUltra Technologies

EXAMPLE: MCPc cont.

• **ImageUltra Builder:** With IUB, MCPc can replace the typical static customer image management system which requires an updated image for any technical changes or new models. IUB provides a dynamic provisioning solution with one single repository for all of its hardware platforms, applications and OS versions where new models can be easily rolled into the repository. Under a static provisioning image model, it could typically take a customer two to three weeks to develop, test and roll out the new image, while MCPc can accomplish this in a matter of a few days with IUB.

With IUB, SARCOM has been able to significantly reduce the amount of time it takes to develop and update customer images. While it previously took five to eight hours to take an image to the Gold level through loading and testing, SARCOM has been able to reduce this to one hour using IUB.



SOURCE: TBR AND LENOVO.

Image Creation

ImageUltra Builder (IUB) is a portfolio of tools that allows an IT organization to build, manage and deploy corporate system images. With IUB, a module is created for each image component including applications, operating systems, language requirement and hard drivers. When a module needs to be updated, it can be easily replaced without going through the long process of creating a brand-new image. Once a single image encompassing all possible modules for the customer environment is created, the image can be installed onto every PC. Through a menu-driven process, the appropriate modules can be selected for each PC, greatly reducing the need for manual application installation, hardware testing and support. The graphic above depicts the potential impact IUB can have on a large, global organization with varied application and language requirements, reducing the potential for 600 separate image combinations down to one single image.

There are three key components that form the ImageUltra suite:

System Update (SU): With System Update, customers can use a generalized image and then use SU to customize. Systems Update will ensure the latest drivers and bios are installed as well as enable software distribution.

Dynamic Operating Environment (DOE): DOE focuses on consolidating all of the Microsoft Windows versions and language variations that are present in an organization into a single operating environment image.

Hardware Independent Imaging Technology

(HIIT): HIIT is a Lenovo technology that picks the appropriate hardware device drivers and Windows operating system options. This information is stored on a hidden partition on the hard drive, meaning the system's master image does not need to be updated when there is a change to the hardware configuration. The change is instead updated on the hardware-independent code stored in the hard drive partition.

The LANDesk Management Suite for ThinkVantage Technologies also extends the ImageUltra technologies with reporting and deployment methods.

The **Base Software Administrator** is an alternative imaging solution targeted at small- and medium-sized businesses, although it is applicable to large enterprise as well. Rather than provide customers with a locked-down corporate image, BSA provides a factory preload as the core image which users can then customize through downloads via the Web. BSA allows for the creation of manifest files for deployment of custom preloads, which essentially provides the customer with an "image on demand" image management model.

Lenovo Image Services

While IUB is a tool enabling customers to internally build and manage their images, it is important to note that Lenovo also offers a portfolio of services through the Lenovo Imaging Technology Center to design, build and maintain images for its customers.

EXAMPLE: Leading Chemical Company

Dow Chemicals, a leading U.S.-based chemical company which does business in more than 175 countries and has an installed base of 45,000 PCs, understands the challenges of managing a complex IT infrastructure.

•**Systems Migration Assistant:** Dow has used SMA for its last two rollouts of new systems. In its last rollout, SMA was used to transfer both user settings and data. Compared to the previous homegrown solution it was using to migrate systems, Dow was able to reduce the time spent migrating data by 75% using a direct connection versus using Ethernet. For lower bandwidth locations, the time savings could be tenfold.

Client Migration

System Migration Assistant (SMA) provides users or IT managers with a tool to migrate user data from old systems to new systems. SMA will easily transfer user data and personality settings (including Windows settings, application-specific settings, and connectivity settings), applications, data files and IDs. Once the SMA process is complete, the user is provided with a new PC that has the exact look and feel of their old system. SMA also saves time during the migration process, allowing IT managers to migrate systems more quickly and users to be back online sooner. SMA can reduce the typical two to three hours it takes to migrate a system through a scripted/manual process to 30 minutes while simultaneously providing a more thorough transfer of data and settings, reducing additional technical support requests from the user. In designing SMA, Lenovo has also focused on ease of use, making it simple for the end user to transfer their data and settings. This has provided a significant savings to companies with remote locations, which can ship the new PC to their end users and have users migrate their own PC with SMA, avoiding an expensive on-site visit by a technician. Lenovo has also ensured that SMA is customizable, allowing IT managers to choose which settings and data are migrated and automate batch migrations. Lenovo's partnership with LANDesk provides further customization and manageability of SMA through the LANDesk Management Suite for ThinkVantage Technologies offering.

Connect

EXAMPLE: Technology-focused College.

As part of its strategy to prepare its students for professional careers, Babson College emphasizes technology within its educational program through a mandatory laptop program. Incoming First Year undergraduates receive a ThinkPad T series that is then replaced with a new ThinkPad T series at the start of the Junior year. Babson currently has 1,750 students in its undergrad laptop program as well as another 400 faculty and staff with Lenovo laptops. By leveraging a variety of ThinkVantage Technologies, Babson has been able to reduce the number of hours spent on standard support issues by 20%.

- **Access Connections:** Helping students manage their wireless connections in an environment where they are moving around campus as well as traveling home presents challenges from an IT support perspective. Under its previous system, students often lost their Babson configuration after traveling home. However, with Access Connections Babson can push out campus profiles to students that are preserved regardless of where the student travels. This has allowed Babson to avoid about 100 support calls from students locked out of their Babson wireless configuration. At 10 to 15 minutes per call, this is saving Babson up to 25 hours per year in supporting student systems.

- **Rescue and Recovery:** Rescue and Recovery is a critical tool for Babson in managing systems that are shared across multiple users, such as loaner systems and campus kiosks. R&R also provides Babson with flexibility to support its remote campus in Oregon, which requires support in off hours.

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Seamless Connectivity

With an increasingly mobile workforce, the ability to connect a laptop across a potentially limitless number of locations (home, office, remote office, conference room, airport, hotel) has become a pain-point for both users and IT administrators. With **Access Connections**, Lenovo has created a connectivity solution that addresses these issues by automatically managing users' network settings, regardless of location. Profiles that include network configuration and printer setup can be created and easily managed for every location. Users can seamlessly move across WLAN, WAN, Ethernet and wireless Bluetooth environments. Lenovo is also committed to ensuring that Access Connections supports the latest and greatest technologies including wireless 3G and support for updated Verizon and AT&T Wireless WAN.

Providing IT administrators with a set of PC manageability tools that can be easily customized for their own unique IT environment is a major theme of the TVT strategy. Therefore, AC allows administrators to easily build and distribute commonly used connectivity and security profiles for users. Distribution of AC profiles can be further simplified, as Lenovo has ensured that profiles can be deployed directly from the LANDesk management console or through Active Directory.

Support

EXAMPLE: Babson cont.

- **Active Protection System:** There is no doubt that students can be tough on laptops. Babson has found that not only does APS help protect the hard drive, but it has also proven to be an effective tool to help students understand when they being too aggressive in treating their hardware.
- **System Update:** Babson leverages System Update to ensure its systems have the latest drivers, firmware, BIOS and software. With System Update, Babson has been able to reduce the time it takes to build a pre-load image to between 20 and 30 minutes versus the three to four hours it previously took. With 12 separate loads, this process can save Babson more than 40 hours in the update process.
- **System Migration Assistant:** When students transition to new laptops in their junior year, Babson provides a free SMA option for students to back up and save their data to a secure network drive which can be leveraged for their new system.
- **Secure Data Disposal:** Under its previous system, Babson was leveraging its leasing company to scrub data from hard drives of high-level machines with the most sensitive data. However, with SDD Babson can now cost-effectively remove data from all of its machines before they are sent out to the leasing company – and at a higher level of data scrubbing than what was provided by the leasing company.

Secure Client Data

IT managers and company executives are increasingly faced with security compliance and governance requirements through legislation such as the Health Information and Portability Act (HIPAA) and Sarbanes Oxley (SOX). This situation is further complicated by the fact that the overall workforce is becoming increasingly mobile, meaning sensitive data is often stored on laptops that travel outside of the company's operations. Stories abound in the press of companies that have lost private customer information through lost or stolen laptops. For example, in 2006 Fidelity Investments reported the theft of an employee laptop containing information including names, addresses and Social Security numbers of up to 196,000 Hewlett-Packard employees with Fidelity retirement accounts. While Fidelity reported the data would be difficult to access as the application with the data has a temporary license, the company still notified affected employees and put in additional security measures. Also in 2006, an Ernst & Young employee lost a laptop containing data including credit card information on 243,000 Hotels.com customers – and there are many more examples. Companies face security threats from a variety of sources. In its 2007 CSI/FBI Computer Crime and Security survey, 46% of respondents reported that they had experienced a security incident over the past 12 months. The average security-related loss per respondent in the survey increased to \$345,000 for 2007 compared to \$168,000 in the 2006 survey.

The combination of Lenovo's Client Security Solution (CSS) with its hardware-based Trusted Platform Module (TPM) provides an integrated software/hardware solution that protects both the security of the network and data residing on individual PCs. CSS utilizes different forms of authentication including a password, passphrase or fingerprint for access to protected data and allows IT

managers to customize the level of authentication required. CSS has the capability to function as an RSA SecurID authenticator, allowing users to reduce cost by replacing expensive RSA hardware tokens with software tokens. Lenovo also provides customers with the option of an embedded chip called the Trusted Platform Module (TPM). CSS works together with the TPM chip to manage encryption keys and processes.

Lenovo's Integrated Fingerprint Reader, available on ThinkPad laptops, is also an integral part of the company's PC security solutions. The Fingerprint Reader provides an easy-to-manage and more secure tool for log-on passwords. In addition to increased security, the Fingerprint Reader also has the capacity to reduce costs and improve ROI, as it can significantly reduce the number of passwords necessary to manage Windows, bios and Web site log-ons and wireless connectivity log-on information. With a single fingerprint replacing multiple passwords, the potential for helpdesk calls to reset passwords is greatly reduced. Lenovo's Password Manager provides further simplification of security management by allowing users to manage multiple passwords with a single password or fingerprint. Together, these solutions provide a comprehensive portfolio for protecting data on both the PC and network.

Lenovo understands that to offer the most complete and integrated security solution possible, it must combine its own integrated hardware/software solutions with those of other security leaders in the market. Therefore, integration with other leading security solutions is a necessity and key differentiator for Lenovo. The company works closely with – and integrates solutions from – security partners including:

- Utimaco: Full hard drive encryption through SafeGuard Easy solution

EXAMPLE: Catholic Education, Diocese of Parramatta

The primary mission of Catholic Education, Diocese of Parramatta is to provide quality Catholic Education for the 76 schools and 41,000 students in its system located in the Western Sydney area of Australia. One of the key priorities of Catholic Education is to utilize 21st-century technology to enable 21st-century learning, ensuring its students are fully equipped for the future. Catholic Education is dedicated to providing students with the best possible learning opportunities and that requires a robust and dependable learning technology environment for students. However, it is extremely important to Catholic Education that its teachers' time is invested in the students, rather than in maintaining computers. This led Catholic Education to choose Lenovo systems leveraging the TVTs for improved manageability and reduced maintenance time.

- **Rescue and Recovery:** R&R was a critical factor in the decision to choose Lenovo. Assuming that R&R would eliminate one on-site visit per PC each year, Catholic Education has estimated the potential cost saving of R&R at \$50 for each machine annually, or \$200 over the four-year expected lifespan. With 2,600 ThinkPads installed, this could amount to an annual savings of \$130,000 annually or \$520,000 over the PC lifetime.
- **Access Connections:** Like many school systems, Catholic Education runs a lean IT organization. Therefore, AC has proven an invaluable tool for Catholic Education in rolling out an organization-wide wireless network. With security credentials and AC preloaded on machines, Catholic Education has been able to provide its students and staff with ubiquitous user access without the need for IT staff intervention.
- **Productivity Center:** Catholic Education also leverages the Productivity Center to provide a repository of technical support information, such as monitor configurations, to its users.

- **Absolute Software:** Secure asset tracking and recovery through its CompuTrace solution
- **SofTex:** Secure single sign-on with central management that can be used in conjunction with Lenovo's Fingerprint Reader
- **ActivCard:** SSO, Smart card management and biometric management
- **Safend:** Centrally managed PC port control

Secure Data Media

There is no doubt that the cost of damaged equipment and lost data as a result of laptop drops has grown along with the increasing percentage of laptops in the workforce. Lenovo has addressed this problem with the Active Protection System (APS). Featured on ThinkPad laptops, APS is able to sense when impact to the system is imminent by continually monitoring system movement. Hard drives are most susceptible to damage from drops when they are actively writing or reading data on the hard drive. Therefore, if APS senses a sudden change in movement of the system, it temporarily removes the hard drive head to a safe location on the disk before the damaging event occurs. APS also provides protection for secondary hard drives installed in the UltraBay of ThinkPads.

Backup and Recovery

Lenovo's Rescue and Recovery is a one-button backup and recovery tool built into every Lenovo system at no charge that allows users or IT administrators to bring systems back online after a crash on their own or remotely. Whether due to a virus, worm, software or hard drive failure, Rescue and Recovery can retrieve files, restore the entire system or allow for connection to the Internet if the operating system has failed. Using a pre-boot environment, Rescue and Recovery can restore the system; users just push the "blue button" and they are on their

way back to a fully-functioning system. Lenovo continues to make improvements to Rescue and Recovery, with advancements based on customer feedback. Manageability is also a key feature of Rescue and Recovery. By using LANDesk Management Suite for ThinkVantage Technologies, a customer can manage and reinforce companywide Rescue and Recovery policies, as well as easily deliver IT reports on usage and implementations of the tool. Additional Rescue and Recovery features include:

- **System Rejuvenation:** Preserves data and personality settings when recovering, and shows the user a list of applications and updates that were not included as part of the image from which the recovery is being generated.
- **Single Instance Restore:** Features backups of only the most recent versions of large files such as mail files and databases, allowing for smaller backups and reduced storage requirements.
- **Migrate from Backup:** Saves data and system settings into the Systems Migration Assistant format, allowing users to recover data and settings on a completely different system. This technology also protects users that have no external backup option.
- **Back-up Analyzer:** Creates a greater opportunity to customize Rescue and Recovery by allowing users to view files by size and number of backups performed. This capability allows users to choose those files that should be excluded from the backup or only be backed up with a single copy.
- **Password Persistence:** Keeps the user's current Windows password, even when restoring from a backup with an older password.

EXAMPLE: Professional Services Firm

A professional services firm in the United Kingdom understands the challenges of managing a highly mobile workforce. With approximately 15,000 employees and consultants in the country, Lenovo's ThinkVantage Technologies have provided significant value to the firm through enhanced security for important customer data and reduced consultant downtime, which improved utilization. Also, additional revenue is generated given the high billing rates of these employees and increased manageability and interoperability through Lenovo's partnership with LANDesk.

- **Access Connections:** With a large number of mobile consultants, the flexibility to easily connect across a variety of locations was essential. Access Connections allow the customer's consultant to connect to the wireless infrastructure across various office locations and seamlessly switch to wireless 3G while working at client sites.
- **Rescue and Recovery:** Rescue and Recovery is providing benefits in the form of fewer system crashes and savings in terms of support resources.
- **ImageUltra Builder:** ImageUltra Builder has provided benefits to the deployment process including cost savings as well as the ability to roll out deployments more rapidly and get consultants up and running quickly.
- **Client Security System:** With protection of sensitive customer data a key requirement, Lenovo's fingerprint reader and partnership with Utimaco for Safeguard Easy have lowered the risk profile while providing an improved user experience through faster, more secure access to applications.
- **Active Protection System:** Given the nature of its workforce, users in this firm typically experience more droppage due to high levels of mobility. By leveraging ThinkPads with the Active Protection System, the customer has experienced reduced support costs and avoided expensive lost productivity. With Active Protection System, it has also been noticed that the level of hard drive damage has declined significantly during hard drive data wipes.

- **Express Repair:** Targets and repairs key system files, letting the user avoid the more time-consuming process of a full restoration. With Express Repair, the average user will benefit from an 80% reduction in the time it takes to restore a system.

Virus Mitigation

The Antidote Delivery Manager is a feature built into Rescue and Recovery that allows IT managers to deliver critical updates and patches to systems under a variety of circumstances. ADM allows IT managers to access systems that have traditionally been a challenge to reach and repair, including users who are already infected or disabled by a virus, users who are not on the corporate network for VPN or users whose systems are not registered in the corporate asset system. ADM accomplishes this by allowing recovery from the pre-boot environment, so that updates may be delivered via the Web for users that are not connected to the intranet and providing automatic updates from a central repository which can reach systems not registered in the asset repository. Additional manageability is available by using the LANDesk Management Suite For ThinkVantage Technologies, which allows for centrally configured repositories and Antidote capabilities.

The following description provides a typical chain of events for an IT administrator protecting systems through Rescue and Recovery with Antidote Delivery Manager: Once aware that a virus has hit the network or is about to hit the network, IT administration creates a patch. The patch is then placed in the Antidote repository and, based on a set of defined events (reboot network connection every 60 minutes, etc.), systems with Rescue and Recovery will go to the repository and check for updates. When the patch is found, the user is informed that an emergency update is going to occur in a

defined number of minutes and their system is removed from the network. After the designated time, the system reboots to the Rescue and Recovery pre-OS environment where connectivity is enabled in a more secure environment. The patch is downloaded and the system automatically reboots and applies the patch. Once all patches have been applied, the system restores the original network connection and the user can resume normal operations. Under this model, Antidote Delivery Manager provides IT administration with a highly automated tool that protects a variety of machines, whether on the network or not, and provides an added layer of protection by removing systems from the network until all patches and updates have been applied. Like other ThinkVantage Technologies, administrators have the capability to customize the policies associated with Antidote to meet the needs of their unique operating environments.

EXAMPLE: Lenovo Business Partner

SARCOM is a leading Lenovo business partner with over 700 technicians, project managers and engineers located in Columbus, Ohio. Like many Lenovo business partners and customers, SARCOM believes Lenovo's value lies in the company's view of the PC as more than a commodity, adding value through innovation and technology.

• **ImageUltra Builder:** With IUB, SARCOM has been able to significantly reduce the amount of time it takes to develop and update customer images. While it previously took between five and eight hours to take certain images to the Gold level through traditional loading and testing methodologies, this same image can take as little as one hour to certify as Gold using IUB.

• **Systems Migration Assistant:** SARCOM uses SMA internally in its integration center for cascading or recycling systems. Without SMA, migration typically takes anywhere from one to three hours, depending upon the availability and accuracy of pre-written scripts and search utilities. In addition to being time-consuming, this manual method often results in some data files, user preferences and configuration settings being missed. With SMA, migration will be reduced by about 80% to 30 minutes with a much higher level of accuracy.

• **Rescue and Recovery:** Quite a few of SARCOM's customers are using R&R, with some clients using it to initiate reimaging. SARCOM believes 50% of helpdesk calls that relate to PC software issues can be solved through reimaging, with significant time savings for the customer.

End-user Self-help Portal

Providing end users with tools to enable self-help and reduce technical support calls and visits are key to both improving end-user satisfaction and reducing overall IT support costs. There is no doubt that helpdesk support represents a significant portion of the expense in managing a PC throughout its lifecycle. With the ThinkVantage **Productivity Center**, Lenovo provides end users with a single tool to manage their ThinkVantage tools and utilities. The Productivity Center is also highly customizable, allowing IT administrators to add internal help files, applications and links, providing end users with a single interface for managing a range of self-help options for their PC.

The Productivity Center has three main components:

- **Quick Links:** Includes links to commonly performed tasks and their status. Quick links can also be customized by the end user.
- **Resource Center:** Provides users with a point to launch and manage the ThinkVantage portfolio of tools, the Help Center (learning center) and the Maintenance Manager (a tool to manage the launch of maintenance tasks). The Help Center represents the user's repository of tutorials, help files and links for managing their PC.
- **Message Center:** Provides an interface for end users to receive messages regarding updates, which can be pre-loaded or sent directly for the IT support center. It also provides a tool for educating end users on system or support features they would not likely discover on their own.

The Maintenance Manager is a feature of the Productivity Center that allows users or IT managers to schedule maintenance tasks for

times when it is most convenient for the user, typically when they are away from their desk. When maintenance tasks such as backup or disk defragmentation are scheduled to run at a time when the end user is going to be using the system, Whisper Mode is available to reduce the impact to the end user. Whisper Mode limits the percentage of CPU capacity that is dedicated to the maintenance programs, allowing the user enough capacity to continue to perform other tasks.

Update Management

System Update provides end users and IT managers with a tool to ensure the latest system and software updates are installed on the PC, keeping the PC running more smoothly and reducing IT support costs. System Update provides Active Directory Policy integration and has a similar look and feel to Windows Update, so users are familiar with the environment. With System Update, IT managers no longer need to target each machine with the correct updates. Instead, it is a client-based model: System Update will access the status of the system, inventory available updates and only select those appropriate for the system. System Update links to Lenovo e-support to obtain drivers, utilities, BIOS and ThinkVantage Technologies software updates. Two administrative functions have also been added to System Update: Package Builder for software distribution and Update Retriever, which searches for and obtains drivers, applications and TVTs that will be distributed. Using the Package Builder and Update Retriever, customers can look to their servers or Lenovo for updates and then package and distribute them. As is the case with all the ThinkVantage Technologies, System Update is customizable by the IT manager to allow for either automatic scheduling or manual downloading of updates.

Dispose

Hard Drive Data Disposal

The proper disposal of PC hard drives and the data that resides on them is becoming an increasingly important issue for both companies and IT administrators. There have been many stories in the press regarding sensitive data that has been recovered from discarded hard drives, including the two MIT graduate students who recovered personal data including 5,000 credit card numbers from 158 used hard drives they purchased. There is no doubt that the accidental disclosure of sensitive customer information creates serious problems from a customer, reputation and publicity standpoint. The negative publicity and potential impact to the business of a company that inadvertently allows access to private customer information can be enormous, making the avoidance of these issues priceless in many situations. However, the stakes are getting even higher and could include significant fines and/or prison sentences for executives and IT managers of companies who disclose private customer information. For example, the Health Insurance Portability and Accountability Act (HIPAA) includes maximum fines of \$250,000 and prison terms of up to 10 years for violations for violation of patient privacy rules, and similar regulations are in place for the financial services market.

While many companies believe reformatting the hard drive provides adequate protection, this is not the case. Data from reformatted drives has not been destroyed and can be accessed. Lenovo's **Secure Data Disposal (SDD)** provides a tool for overwriting the hard drive and permanently destroying hard drive data. SDD is also customizable, with five levels of data overwrite protection - the highest level meeting the United States Department of Defense guidelines. SDD also provides important audit tracking capabilities and can be centrally managed through LANDesk Management Suite for ThinkVantage Technologies, allowing IT managers to track and document the

scrubbing of drives in a central database and capture hard drive serial numbers for audit requirements.

Conclusion

Leveraging a variety of ThinkVantage Technologies, Babson has been able to reduce the number of hours spent on standard support issues by 20%.

Lenovo Management Tool Applicability				
Technology	1s to 10s	10s to 100s	100s to 1000s	Multiple 1000s
Rescue and Recovery				
Active Protection System				
Productivity Center				
Secure Data Disposal				
System Migration Assistant				
Fingerprint Reader				
Password Manager				
Access Connections				
Client Security Solution				
Antidote				
ImageUltra Builder				
ImageUltra Services				

SOURCE: TBR AND LENOVO.

WHO SHOULD USE THINKVANTAGE TECHNOLOGIES?

The ThinkVantage portfolio offers benefits for businesses of all sizes. While there are some tools that may not be as appropriate for individual users or very small companies, most tools offer cost savings and return on investment opportunities for businesses of all sizes. For small businesses, which may have less mature IT infrastructures, the tools often offer a significant improvement in the quality of PC support and manageability. For enterprise customers, Lenovo has ensured the ThinkVantage portfolio is both customizable and highly manageable.

THE BOTTOM LINE

IT managers face increasing challenges in the management of PC environments due to the combination of increasing security and regulatory requirements coupled with a growing mobile workforce. Every day, laptops containing sensitive company and customer information leave company premises and are exposed to potential theft or loss. Without the implementation of proper security tools, the value of lost data or the damage to a company's reputation as it discloses that it has lost private customer data is priceless.

The implications of disclosing personal customer data could even include jail time and fines for IT managers and executives.

At the same time, IT managers face the ongoing challenge of doing more with less, and that is where Lenovo's ThinkVantage Technologies come into play. Lenovo has built a comprehensive portfolio of tools that work to address and improve processes for managing PCs through every stage of the PC lifecycle, from deployment to support and maintenance to disposal. There is no doubt that there are pain points for IT managers at each stage of the PC lifecycle. The ThinkVantage portfolio addresses these pain points by improving the process to not only reduce time and costs associated with PC management but also improve the overall quality of the process. Examples of quality improvements include system migrations that are more complete and include users' personal settings, wireless connectivity that is seamless and ubiquitous to the user and a back-up and recovery solution that reduces downtime.

Security and protection of data is also an integral focus of the ThinkVantage portfolio. To support these efforts, Lenovo has partnered with leading PC security firms such as Utimaco, Softex and Absolute Software to

offer its customers a full portfolio of security solutions that are compatible and integrated with the ThinkVantage portfolio. These solutions, coupled with Lenovo's ThinkVantage Client Security Solution, Trusted Platform Module (an embedded security chip) and the Secure Data Disposal tool for destroying hard drive data for safe hard drive disposal provide a complete portfolio of security solutions.

There is no doubt that the ThinkVantage Technologies offer opportunities for cost savings and time savings associated with the duties of PC management. Based on the customer interviews conducted by TBR, cost savings go far beyond the fact that Lenovo offers the majority of ThinkVantage Technologies at no cost; ThinkVantage Technologies also offer flexibility in terms of how the customer chooses to implement. TBR has spoken with customers who initially implemented a single tool to address a specific pain point, while other customers such as Coca-Cola leveraged a broad range of tools as part of a major initiative to improve the efficiency and reduce costs in managing a large PC installed base. TBR notes that the ThinkVantage portfolio offers benefits to businesses ranging in size from the home office to the large enterprise. TBR has seen small businesses that have rolled out a wide variety of the ThinkVantage portfolio and generated similar benefits to enterprise customers. For enterprise customers, Lenovo has ensured a high level of customization as well as centralized manageability through partnerships such as LANDesk.

There are other benefits in addition to the cost savings and time savings associated with the tools, however; the value of these benefits is much harder to quantify, and in some cases could be priceless. Benefits include increased user productivity, reduced down time and improved end-user satisfaction. From TBR's interviews with Lenovo customers over the past several years, there are countless examples of

customers who implemented the ThinkVantage tools and generated not only cost savings but improved business results. For example:

- A university leveraged ThinkVantage Technologies in shifting its student laptop program from an outsourced PC management model to a self-maintainer model. Students had access to on-the-spot PC services instead of depot services, which had taken weeks to return their systems. Not only were the students pleased, but the university was able to transition the PC maintenance operations from a cost center to a source of six-figure revenue generation. The university was able to save \$150,000 to \$200,000 by eliminating both the outside vendor it was using for laptop repairs and a 24-hour software support hotline that was proving ineffective with only minimal staff increases and a student technician program.
- One customer indicated it has been able to improve productivity without significant headcount additions by providing its workers with laptops. The ability to efficiently manage a mobile workforce allows employers to tap into the resources of its workforce well beyond the traditional nine-to-five workday. Another customer was able to roll out a laptop program with wireless access for its traveling salespeople, allowing them to keep updated while on the road rather than waiting until they arrived at home. With Access Connections this customer also rolled out a home connectivity program for its workforce, allowing improved communications and productivity for workers who could access the company VPN from home.
- For a small business customer, the Client Security Solution increased security of confidential company files stored on employee systems. The

The cost savings associated with implementing the full ThinkVantage portfolio can offset the full acquisition price of the PC.

customer replaced its hard RSA tokens with embedded tokens in the CSS chip, providing a solution that is easier to set up and manage, and is more secure, since the token is stored off the hard drive. As a provider of consumer goods, protection of private company information, including customer data, is critical for this customer.

To help confirm and validate the findings of this white paper, TBR contacted 28 users from our internal database that had recently switched from another hardware vendor to Lenovo PCs. A total of 11, or 39%, indicated they were using ThinkVantage Technologies and/or the tools had been an influencing factor in choosing to switch to Lenovo. Another handful of respondents who were not currently using the tools indicated they are considering using them in the future.

Another trend that has been clear through several years of interviewing customers using ThinkVantage tools is that customers very often expand the number of tools that they are using over time as they see the value associated with their initial implementation.

IN SUMMARY

TBR believes the ThinkVantage Technologies are a true differentiator for Lenovo and offer a unique value proposition. No other PC hardware vendor has developed a full portfolio of PC management lifecycle tools. And Lenovo has also been able to develop unique hardware features that integrate and complement the ThinkVantage Technologies, including an embedded security chip, a fingerprint reader, the Active Protection hard drive protection system and the “blue button” which is included on Lenovo PCs and provides the user with immediate support and back-up and recovery features. While other PC vendors may partner for some PC management functionality, no other vendor offers the breadth of offering or hardware integration available through Lenovo.

Through interviews, it has become clear that customers understand Lenovo does not view the PC as a commodity. Customers often mention Lenovo’s focus on innovation as a key strength of the vendor and TBR believes the ThinkVantage portfolio is a natural result of that focus.

As PC hardware prices continue to fall and PC lifecycles extend for some customers, the cost of managing a PC through its lifecycle becomes a larger piece of the overall lifecycle cost model. IT managers who understand this equation place more value on the reliability and ability to efficiently manage the PC versus the initial acquisition price. The real opportunity for savings lies in the costs associated with building image loads, deploying systems, managing a variety of wireless environments for mobile users, protecting PCs from viruses, security threats and the risks of lost or stolen laptops as well as the damage due to laptop drops, supporting and managing PCs and PC helpdesks – and finally, ensuring data is destroyed before the company disposes of hard drives.

Lenovo understands these challenges and has developed the ThinkVantage Technologies portfolio to specifically address each pain point across the full PC lifecycle. No other hardware or software vendor can offer the level of integration between PC management hardware and software features that are available through Lenovo. And furthermore, the vast majority of ThinkVantage Technologies are bundled with the PC at no cost. And customers benefit significantly by having a single point of contact for their PC management support, rather than dealing with integration problems between a separate hardware and software vendor.

Through interviews it is clear that no two customers are alike in terms of their PC environment or PC management requirements. TBR has spoken with a variety of customers of all different sizes and

different vertical markets as well as Lenovo business partners who both help customers implement the tools as well as leverage the tools in their own internal operations. However, what we consistently heard from these ThinkVantage customers were examples of:

- Hard dollar savings
- Time savings associated with PC management tasks
- Improved user satisfaction
- Improved user productivity
- Improved security and protection of critical company data

The message from ThinkVantage customers is clear: Through ThinkVantage Technologies Lenovo provides customers with a portfolio of tools that create flexibility in managing the overall IT environment. Cost savings that are created through the implementation of ThinkVantage Technologies can be funneled to the company's bottom line or leveraged to invest in other strategic IT initiatives. And that does not take into account the broader

business benefits associated with increased end-user productivity which in turn presents the company as a whole with potential for improved profitability.

With the ThinkVantage Technologies portfolio, Lenovo is providing tools for IT managers to do their jobs more efficiently with greater end-user satisfaction. For IT managers and purchasing managers, the potential savings and real business benefits associated with implementing the tools should shift the PC buying decision away from one that is focused on price alone – and most of the ThinkVantage Technologies are offered at no cost. TBR believes responsible IT managers and PC purchasers will investigate the potential cost savings and benefits that Lenovo's integrated approach to leveraging both hardware and software PC management features could deliver to their IT organization and their company's bottom line.

ABOUT TECHNOLOGY BUSINESS RESEARCH

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