HANSA GCR

Microsoft

Microsoft Application Virtualization

Microsoft Desktop Optimization Pack for Software Assurance

Microsoft® Application Virtualization:

Saving Time, Improving Quality, and Reducing TCO

Abstract

This paper provides evidence for Technical Decision Makers and IT managers, documenting tangible ways in which organizations can reduce IT costs, complete IT tasks more quickly, and deliver higher-quality IT and business services by using Microsoft® Application Virtualization (App-V). A component of the Microsoft Desktop Optimization Pack, App-V delivers applications virtually, without installing them on user machines. This approach enables IT organizations to save time and effort while delivering more agile services to users and the business as a whole.

This paper describes how IT organizations can:

- Use App-V to achieve time, cost, and quality benefits throughout the application lifecycle.
- Deliver these benefits to both the IT and business entities of any size company.
- Use App-V to rationalize application portfolios.
- Use application sequencing to accelerate application preparation time and reduce IT effort and costs.
- Use integrated management capabilities to drive additional IT labor cost savings.

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About the Microsoft War on Cost team

The Microsoft War on Cost team is an internal strategy group focused on quantifying the business value of technology investments. By leveraging research partners and customer data, the team's mission is to identify the factors that influence customers' abilities to reduce costs, manage system complexity, and promote business agility. Formed in 2005, the team performs customer-centered analysis in a variety of core IT topic areas including desktop deployment and management processes, datacenter operations, application platform models, and virtualization.

For more information about the War on Cost team: wocinfo@microsoft.com

About Hansa|GCR, LLC

Hansa|GCR, LLC, a full-service marketing research and advisory firm and part of the R K Swamy|Hansa Group of India, is built on a legacy of over three decades of experience. Industry expertise includes Technology and Telecom, Financial Services, Media, Consumer Products, Restaurant and Retail, and Healthcare. Domain specialties include customer experience and relationship equity, brand strategy, and product and process innovation; sustainability and the psycho-economics of "Green"; and thought leadership for conducting business in emerging markets.

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Executive Summary

As the complexity of delivering and managing an increasingly large portfolio of applications continues to grow, many organizations seek to manage that complexity by standardizing on a fixed portfolio of applications in a locked-down configuration. While this approach may measurably reduce IT labor costs, the restrictions involved frequently lead to a frustrating user experience and constraints on flexibility and business agility. A better solution would enable IT to deliver and manage applications at reduced cost while enabling flexibility and agility.

Microsoft® Application Virtualization (App-V), delivers this solution. Part of the Microsoft Desktop Optimization Pack (MDOP), App-V represents a revolutionary shift in the way desktop applications are prepared, delivered, managed, and supported. App-V enables IT to transform applications into centrally managed virtual services to reduce the cost of application deployment, eliminate application conflicts and reboots, simplify the Windows® base-image footprint to expedite PC provisioning, and increase user productivity; all combining to help IT deliver more agile services to the user and to the business as a whole.

Most IT decision makers will immediately ask which specific benefits App-V can deliver in terms of time, money, and IT service quality. In late 2009, research firm Hansa|GCR was commissioned by Microsoft to engage in research to understand and quantify the impact of application virtualization in real-world organizations. In the course of the study, Hansa|GCR conducted in-depth research with 291 respondents across organizations of varying sizes and industries. (See Appendix A for details.)

The resulting research conclusively shows that the adoption of application virtualization for PCs enables organizations to measurably reduce IT labor effort; reduce the time required to deliver new or updated applications to users; reduce management complexity and application compatibility issues in the desktop environment; and deliver higher-quality and more responsive services to the business. The research shows that the benefits of application virtualization accrue throughout the desktop application lifecycle.

- **Reduced IT labor for application testing and preparation.** Participants reported spending an average 31% less time for application testing and preparing applications before delivery to the user. This improvement is equivalent to a reduction of **$26 per PC per year** in IT labor.
- **Less time and cost for application delivery.** Eighty-three percent of study respondents said they could deploy applications more quickly. IT labor in application deployment was reduced an average of 20%, which is equivalent to a reduction in IT costs of **$13 per PC per year**.
- **Less time managing and updating applications.** Eighty percent of study respondents realized a reduction in time required to update applications. The labor for updating and managing applications was reduced an average of 29%, resulting in a reduction of IT labor costs equivalent to **$22 per PC per year**.
- **Reduced demand for application-related user support.** Eighty-two percent of study respondents said their users spend less time dealing with application issues. Support calls were reduced an average of 18%, equivalent to a reduction in support-related IT labor costs of **$21 per PC per year**.
- **Improved business advantages.** A clear majority of study participants acknowledged that application virtualization helps IT deliver on their service level commitments to the business and drive business agility without introducing IT-centric constraints.

Organizations that adopted application virtualization were highly satisfied with the results. More than three-quarters of all participating organizations stated that their decision to adopt application virtualization was “good” or “great.” By examining a wide range of industries including technology, healthcare, banking and finance, education, government, and manufacturing, the study shows that application virtualization should be considered by any organization seeking to save time, reduce TCO, and improve service quality.

Put plainly, App-V helps organizations manage applications simply, easily, and more cost-effectively.

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Overview

The Microsoft War on Cost team exists to understand and quantify the total cost of ownership (TCO) of technology investments. It focuses on identifying ways to help Microsoft customers reduce IT costs and improve IT services within their desktop environments.

Traditionally, one of the most effective ways to reduce desktop TCO has been for IT professionals to reduce complexity by standardizing on a portfolio of applications, deploying those applications to every PC, and then locking down the environment to prevent change. While that approach can help reduce IT labor costs across the application lifecycle (preparation, delivery, management, and support), the inflexible nature of that approach can negatively affect the user experience and the ability of the organization to adapt and respond to changes in business needs.

Microsoft® Application Virtualization (App-V), a component of the Microsoft Desktop Optimization Pack (MDOP), represents a revolutionary change in the way applications are deployed. Rather than installing software directly on each PC, App-V enables the IT organization to deliver applications "virtually", to **users**.

With App-V, applications are not installed on a machine; therefore, many of the challenges associated with application conflicts are avoided. Because software and user access are managed centrally, applications can be deployed and updated more quickly, with less IT effort required. App-V helps reduce complexity in the application portfolio which, in turn, reduces application-related calls to the service desk, and helps support staff resolve calls more quickly. And because applications are not installed on a specific machine, users can move more freely within their environment, knowing that "their" applications will be available wherever they are.

What is Application Virtualization?

Application virtualization is one of many virtualization approaches available in the desktop environment, each of which has a unique set of capabilities and benefits.

Application virtualization is a way of running an application in isolation from other applications. The application runs within a bubble rather than having to be physically installed on a PC. The end results are that the underlying file system and registry settings are never changed, applications no longer conflict and the base operating system remains pristine. The ability to dynamically stream applications to a user provides flexibility, faster deployment, and greatly reduced IT labor required to deploy and update applications.

Client-hosted desktop virtualization is, in effect, a virtual PC running on a machine. This virtual PC can run a different operating system from the host machine itself and can provide a way for older applications to run on newer systems. The Windows XP Mode built into certain versions of Windows 7 is a client-hosted virtualization approach and enables users to avoid potential compatibility issues between older applications and Windows 7. Microsoft Enterprise Desktop Virtualization (MED-V) is an enterprise-ready, client-hosted virtualization solution, which combines virtual PC capability with tools to centrally manage the configuration.

Session virtualization with Windows Server® 2008 R2 Remote Desktop Services (RDS) is a proven approach to leverage datacenter resources for hosting applications or an entire desktop for remote users. The desktop or application runs in its own session on a server in the datacenter and is accessed from the client via a remoting protocol such as Microsoft's Remote Desktop Protocol (RDP). Session virtualization enables IT professionals to accelerate desktop and application deployment, helps secure data and applications, and increases remote worker efficiency. Like a virtual desktop infrastructure (VDI), session virtualization offers no offline capabilities; users must be connected to the network.

Server-hosted desktop virtualization, commonly referred to as VDI (Virtual Desktop Infrastructure), is an approach that leverages datacenter resources to host the full end-user desktop. A client image containing an operating system, applications, and settings is run on a server in the datacenter and accessed by the user through a network connection. This approach can require significant infrastructure investment, but for certain user profiles, the centralization and use of datacenter resources can yield benefits. VDI offers no offline capabilities; the user must be connected to the network.

One study respondent summarized App-V benefits succinctly, saying:

> ***"The amount of time and work and cost saved is mind staggering to an old-timer like me. It's like magic."***

App-V Delivers Cost, Time, and Quality Benefits

While many organizations are motivated to adopt App-V for IT-related reasons such as costs, they often experience a much wider range of tangible business and user benefits. App-V reduces costs and complexity at every level of the application lifecycle – reducing the cost of preparing, delivering, managing, and supporting applications throughout the desktop environment.

Beyond simply reducing IT labor costs, App-V reduces the cycle time required for IT staff to deliver and update applications, allowing them to be more responsive to business needs; App-V improves operational efficiency by reducing complexity in the desktop environment and making applications easier to manage; App-V reduces the risk of failure during application deployment, especially in complex application environments; and App-V helps IT professionals deliver faster, higher-quality services. Added together, App-V capabilities help the IT staff deliver true business agility.

The Hansa|GCR research shows that these benefits are achievable across:

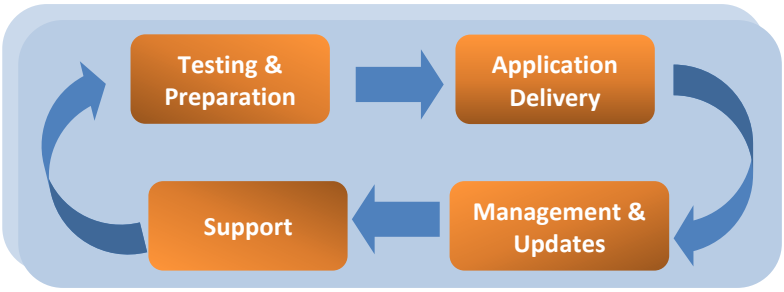
- Application types, including line of business and mission-critical applications.
- User categories, including office workers, task workers, mobile workers, and remote workers.
- Many industries including healthcare, banking, education, manufacturing, and government.
- Many different organizational profiles, ranging in size from 500 to well over 100,000 users.

Overall, 86% of App-V customers in this study report benefits of adopting application virtualization.

Instead of requiring a choice between speed, quality, and cost benefits, App-V enables the IT staff to deliver all three: **faster delivery, at higher quality, with lower IT costs**.

Application Lifecycle

Most applications go through a common lifecycle within an organization. An application is tested and prepared for delivery; it is then delivered to end-users; it is managed and updated; and users receive support when an application issue arises.



For many organizations, managing the application lifecycle is a series of complex and interrelated processes. Before deploying or updating an application, the IT staff must test against every other application and ensure that the applications can be installed on each desktop configuration in the environment. The processes for preparing and deploying applications are frequently complicated, and each application installed into the environment adds complexity to the management and support of the IT environment as a whole. Clearly, a solution that can deliver and manage applications more quickly and with less effort offers potential benefits to the IT staff.

The research performed by Hansa|GCR clearly indicates that App-V delivers direct benefits to the organization at every phase of the application lifecycle. The structure of this paper is aligned with those lifecycle phases in order to provide a framework for describing how App-V delivers quantifiable time, cost and quality benefits. Overall, this paper embodies research findings that show how App-V:

- Saves time for the IT staff when **testing and preparing applications for deployment**.
- Saves time **delivering applications** to users.
- Saves time for the IT staff when **managing and updating applications**.
- Saves time **supporting applications** and helps deliver an improved end user experience.
- Delivers business agility through improved quality and increased responsiveness.

Impact on Application Testing and Preparation

Any time an application is deployed by traditional installation methods, it must first be tested for compatibility with other applications already in the environment. Success or failure in the application lifecycle depends on identifying conflicts and resolving application issues before users are affected.

Compatibility and Regression Testing

Application testing, a critical facet of the application lifecycle, helps IT professionals ensure that applications are viable, stable, and supportable. Because installing an application by traditional methods actually changes the configuration of the target PC, different versions of applications may not be compatible, drivers may conflict, and many aspects of deploying the new application may introduce end-user issues.

Compatibility Testing

App-V addresses application-to-application compatibility issues by isolating applications from each other while still enabling the application to interact with the operating system and other dependent applications. This ability directly reduces the time spent by IT professionals for application-to-application compatibility testing.

About 50% of App-V customers participating in the study report that the ability to isolate applications decreased the time needed for application-to-application compatibility testing. Among those who reported a decline in time dedicated to compatibility testing, the average savings was nearly 32%. This represents a direct cost reduction of nearly $12 per PC per year, the result of fewer IT labor hours required to test each application.[1]

Regression Testing

Similarly, application isolation provided by App-V reduces the need for comprehensive regression testing against existing PC configurations when an application is modified or updated. The study found that 48% of the respondents reported that application virtualization provided a benefit in application regression testing labor, yielding an average reduction of 34% in the amount of IT labor in this category. This benefit represents an additional direct cost reduction of over $8 per PC per year, a result of fewer IT labor hours required for regression testing.

[1] Cost reduction estimates are based on existing research on baseline patterns of IT labor allocation, as detailed in Appendix B.

Together, the direct cost benefits of reduced testing can be significant. For the average participating organization included in this study, the total benefit related to application compatibility and regression testing can represent a savings equivalent to more than $20 per PC per year in reduced IT labor.

For the "average" organization of approximately 5,000 PCs, the labor savings means that a full-time equivalent (FTE) IT resource can be reallocated from application testing to other tasks. In addition to the direct labor savings, the reduction in testing requirements also helps the IT staff deliver a more reliable end user experience. More than 57% of the respondent organizations reported their users had fewer application conflicts after adopting application virtualization.

By reducing the time needed for application testing, organizations can reduce the time end users must wait before they get access to a new application. While difficult to quantify in monetary terms, delivering applications more quickly to end users clearly helps IT organizations improve service quality and agility for the business. More than 83% of the respondent organizations stated that they could deploy applications more quickly, in part due to reduced testing requirements.

Remarking on the value of virtualization to IT management, a study participant said:

> ***"We no longer have to worry about the different types of hardware and compatibility issues, now that we've gone primarily to virtualized applications accessed through our web apps portal."***

Application Packaging and Sequencing

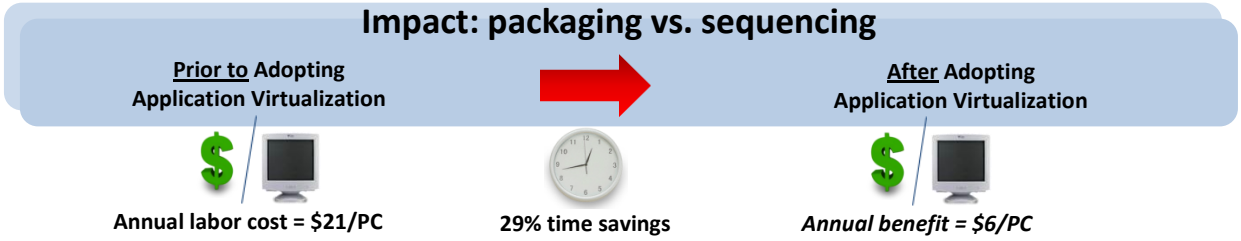
Packaging is the traditional process of preparing applications for delivery to an end user. The end result of a packaging process is an application "package," which will be installed on a user's machine. Many organizations package their applications before deployment by using a third-party tool to automate the installation process and then use systems management tools to "push" the packaged application to specific machines. The work involved in packaging applications can be time-consuming and complex, requiring that myriad configuration details and settings be pre-configured for installation on the targeted machines.

App-V uses a process called ***sequencing*** to prepare applications for delivery to users. Sequencing is a vastly more efficient method than packaging because sequenced applications never actually have to be installed on the target machine. Using the App-V Sequencer provided as part of App-V, IT professionals prepare applications with a wizard, which requires far less training. While preparing a package can take hours, sequencing an application may take only a few minutes. There is no longer a need to determine application-specific software switches associated with silent installation processes, no need to create custom actions defining how the application will behave during installation, and no more custom scripts

to ensure that everything comes together just right when the application is installed on the target machine.

As with traditional packaging, whenever an application is sequenced, it is best to start with a clean system. With App-V, however, this process does not require a lab PC. The IT staff may use a virtual machine such as Microsoft Virtual PC (VPC) to gain efficiencies and save time. Use of a virtual machine enables the IT staff to sequence an application and then, with a simple click of a button, rapidly revert to a clean state, so they can continue sequencing another application with no downtime.

An additional benefit of sequencing, as opposed to traditional application packaging, is that a sequenced application may be deployed to end users regardless of their desktop profile. The sequence file, in almost all cases, can be delivered to users whether they are using a rich-client desktop PC, session virtualization (Remote Desktop Services), or server-hosted desktop virtualization (VDI). The same sequenced application can also be easily enclosed in a Microsoft Installer (MSI) wrapper and delivered via a third-party software distribution system, should the customer decide not to leverage the benefits of App-V streaming. Sequencing once for multiple target environments can save significant IT labor and also reduce complexity in the user environment. Fully 60% of the respondents in this study indicated they had gained benefits from the ability to sequence once for delivery to multiple endpoint profiles.



When considered together, the benefits of sequencing versus traditional packaging show that sequenced applications can be prepared more quickly with less IT labor and less complexity. In addition, sequenced applications experience a lower failure rate than traditionally packaged applications, resulting in a reduction in negative impact on end users.

- Overall, 46% of organizations in the study reported a decrease in the amount of time they spent packaging applications.
- Among those who experienced a decrease, the average benefit was a 29% reduction in preparation time compared with traditional application packaging.
- Nearly one-third of organizations reported they have been able to stop packaging applications entirely as a result of adopting application virtualization.

Compared with traditional application packaging, the ability to simply and easily sequence applications for virtualized delivery can save meaningful IT labor. Based on the average organization size and staffing level in this study, the benefit is a savings equivalent to more than $6 per PC per year in IT labor.

On average, the total direct benefits of App-V in testing and preparing applications represent a direct-cost reduction of more than $26 per PC per year in IT labor savings. Indirect benefits include improved IT responsiveness through simplified processes, with lower failure rates and fewer application conflicts.

Impact on Application Delivery

When a traditionally packaged application is deployed, systems management tools are used to push the application install package to targeted machines, where the process of installing the software takes place. The installation of the software is ostensibly automated, but it can reduce user productivity because the user has to wait for the installation to finish. In addition, various factors can cause the installation to fail. The process of deploying a sequenced application is much faster and easier than deploying a traditionally packaged application.

This speedy delivery prompted a study participant to comment*:*

> ***"It's so easy, I hesitate to call it automation. We just click to deploy and know it has been reliably done."***

With App-V, once the sequenced application is delivered to a user, it is ready for use. The user does not have to wait for a software installation process. In fact, following the application's first use, sequenced applications frequently start up more quickly than traditionally installed applications. This means that App-V helps deliver a more favorable user experience. Fifty-four percent of the study participants say that users spend less time waiting for applications to install.

Application Migrating and Updating

Because application virtualization isolates applications from one another, multiple versions of an application can run on a single machine without conflict. This capability can provide significant benefit when, for example, migrating users to an updated version of an application. Users can undergo training on the new version of the application, while the older version is still available to them. When user training and transition are completed, the old version of the application can be retired. In this way, IT professionals can provide seamless support for the transition without disrupting the user's work. Sixty percent of the study participants indicated that the ability to run multiple versions of an application on the same machine helped them deliver higher levels of quality and agility.

Similarly, application virtualization can provide benefits when moving users to an updated operating system. By decoupling the applications from the underlying machine, application virtualization can help IT migrate users to a new machine or upgrade applications in place with minimal effort and no lost time spent reinstalling applications.

User-Centric Application Delivery

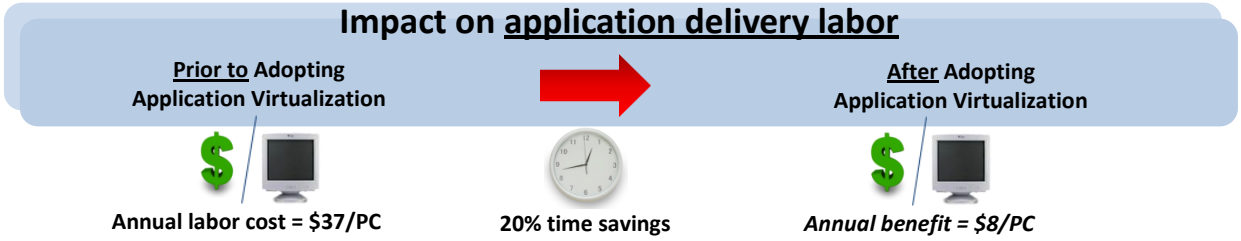
App-V provides an improved user experience in other ways. Because applications are not installed on a specific machine, users are not tied to a specific PC. If their machine breaks, for example, users can simply move to another one, and their virtualized applications will be delivered to them seamlessly. This approach means that App-V helps deliver on the vision of user-centric computing. Users gain the ability to move freely within their IT environment, knowing that their applications will move with them.

App-V even provides flexibility in the mechanism for delivering an application to users. A sequenced application can be delivered to users through normal software deployment tools, but the application may also be dynamically "streamed" to users. Streaming is a process distinguished from traditional download-and-execute application delivery**.** Using integrated capabilities within the virtual application

platform enables IT professionals to stream applications to targeted groups of users, ensuring that the right users get the right applications at the right time.

Rather than "pushing" down entire applications, the first time an application is requested, the App-V client rapidly "streams" only the code necessary to start the program from a central server— typically 20% to 40% of the total code. When the session terminates, application settings and profiles are saved in a non-volatile cache, providing instant access for subsequent use. The cached code enables applications to run locally with full functionality, even without a network connection. Applications may be streamed on demand over the Internet or via the corporate network to desktop and laptop PCs and to terminal servers, providing even more flexible options.

Because deploying virtualized applications is so simple, the IT staff can respond more quickly to user requests, delivering applications with significantly less waiting time for the user. In fact, more than two-thirds of all respondent organizations say that application virtualization decreased the time needed to give an end user access to applications. On average, those organizations indicate that application virtualization reduced the amount of time it takes to provide access to applications by 46%. The direct labor involved in deploying applications is reduced by 20%, representing a reduction in IT labor costs of nearly $8 per PC per year.



In addition, because virtualized applications are not installed directly on PCs, delivery of virtualized applications enjoys a lower failure rate than traditionally packaged-and-installed applications. Among study respondents who track call pattern and volume metrics, there was an average 18% reduction in IT labor effort required for failure resolution during the application delivery process, resulting in a reduction in IT labor costs of nearly $6 per PC per year.

A study participant commented on the integrated deployment capabilities, noting:

> ***"We are able to deploy applications through a single instance with no failure rate, and more easily target users as they move from system to system."***

Mission-Critical Applications

Respondent organizations indicated that about one-quarter of the applications that they deliver via application virtualization are deemed mission-critical; the business stops if these applications are compromised in any manner. Organizations typically follow well-designed processes and take extreme care in how these applications are delivered. Study participants indicated that, without application virtualization, the process of rolling out a new (or updated) mission-critical application took an average of 20 business days – four full weeks.

More than 70% of respondent organizations indicated that application virtualization decreased the time needed to roll out mission-critical applications, with an average time savings of 52%. This result represents a dramatic reduction in the amount of time it takes organizations to deploy mission-critical applications to end users, and a dramatic improvement in IT's ability to meet business needs

A study participant commented:

> ***"Applications can be reconfigured and distributed company-wide in a much quicker time period."***

The benefits of using App-V to deliver applications are significant when all categories of benefit are considered. Delivering applications through App-V helps organizations reduce IT costs, reduce time to delivery, and improve end user satisfaction. In addition to direct-cost labor reductions of $8 per PC per year, significant business benefits are achievable due to the ability to deliver applications more quickly than through traditional installation, with a lower failure rate and less negative impact on the end user.

Integrated Deployment with System Center

Microsoft System Center Configuration Manager (ConfigMgr) is a highly automated solution for assessing, migrating and deploying Windows, which allows organizations to significantly reduce the number of images they must manage. ConfigMgr provides the ability to integrate application installations with the deployment process. Using a flexible task sequencer, physical and virtual applications can be installed in parallel with the OS. This automation allows the required applications to be delivered with the OS before the user logs in, reducing time and improving the end-user experience.

The integrated deployment capabilities provided by App-V and ConfigMgr enable organizations to be more efficient in their use of IT resources, reducing cycle times and decreasing costs. Customers using App-V and Microsoft System Center together were more likely to gain benefits from integrated deployment capabilities than organizations using other solutions.

Eighty-five percent of all organizations participating in this study say that use of integrated systems management capabilities has improved the process of delivering applications to users. Study participants that were using both Microsoft App-V and ConfigMgr tended to achieve higher benefits than organizations using other combinations of application virtualization and systems management tools. This "better together" phenomenon, which leverages the integrated capabilities of the two products, will be covered in the next section. One study participant, reflecting on an early deployment of Windows 7, noted:

> ***"App-V, ConfigMgr, and Windows 7 together help us deliver applications to our users with fewer process obstacles. The result is greater agility for our business – a 35% reduction in cycle time to deploy applications – along with a 19% reduction in related IT labor."***

Impact on Application Management and Updates

Why does management matter? Quite simply, because the end user application environment can be very complex, and complexity can lead to expensive and time-consuming IT processes. Using management tools such as Microsoft System Center to deploy Windows 7 for example, can help the IT staff manage the environment more efficiently through integration and automation, rather than with costly and complex manual effort.

Management tools are also important because they enable desktop management processes which help maximize the benefits of application virtualization. Using application virtualization to rationalize application portfolios and deliver the right applications efficiently to users provides a powerful tool that can help IT deliver high-quality business services.

App-V, in conjunction with modern systems management tools such as ConfigMgr, helps the IT staff manage the application portfolio efficiently and effectively in a number of ways.

Standardization

As noted previously, one approach to managing an application portfolio is to standardize on a small number of applications and prohibit the use of any others. While this approach helps the IT staff control change in the IT environment, it can severely constrain end user flexibility and business agility.

Using App-V, IT organizations have a better way to manage applications in their desktop environment without implementing constraints on flexibility. Because virtualized applications are not actually installed on a machine, IT professionals can deliver applications to users according to business needs without negatively affecting the standard configuration. By standardizing processes using management tools, IT professionals can deliver agility without creating complexity, a key factor in controlling IT labor costs.

Microsoft System Center Configuration Manager

Microsoft System Center Configuration Manager (ConfigMgr) provides the control necessary to more effectively manage change in today's dynamic IT infrastructures. It delivers robust capabilities including comprehensive deployment and updating functionality, enhanced insight and control, and optimization for Windows 7. Configuration Manager provides these management capabilities across physical, virtual, distributed, and mobile systems. Built on key Microsoft technologies such as Windows Server Update Services (WSUS), Active Directory®, and the Windows architecture, and leveraging System Center knowledge-driven IT management, System Center Configuration Manager helps administrators reduce costs, meet configuration compliance requirements and improve systems performance and security to better manage today's dynamic infrastructure.

Comprehensive Software Deployment and Updating

ConfigMgr provides comprehensive deployment of operating systems, applications, and software and hardware updates across physical and virtual clients, servers, and mobile devices independent of location facilitating seamless migration and ensuring systems currency and security features. ConfigMgr is a highly automated solution for assessing, migrating and deploying windows that, independently or coupled with App-V, allows you to significantly reduce the number of images you need to manage.

Enhanced IT Infrastructure Insight and Control

ConfigMgr puts IT administrators firmly in control of their IT infrastructure by providing continuous visibility into the hardware and software assets they have, how they are configured, who is using them, and where the assets are. This information helps them make informed decisions about their IT assets and proactively manage compliance with configuration standards to improve IT operations and mitigate compliance risks.

Optimized for Windows 7 and Extensible Beyond

The powerful capabilities of ConfigMgr build on, and integrate with, the Microsoft platform, and specifically build on new technologies incorporated into Windows 7 like the User State Migration Toolkit v4.0 and the Application Compatibility Toolkit. Integration with these robust Windows technologies drives greater efficiency and better maximizes your infrastructure investments. Further, ConfigMgr includes application knowledge, so that administrators benefit from a familiar, easy-to-use solution that is optimized for your Windows environment.

Simplified Management Processes

The processes and IT labor involved in managing applications are greatly simplified with application virtualization. Application management tasks are more easily administered, either through the scalable management and delivery infrastructure that comes with the App-V platform.

Application assignment and change management can be centrally managed—often involving just a few clicks—to add users to a Windows Server Active Directory group. These capabilities are extended to mobile and remote workers as well by using the App-V MSI-based standalone deployment option. When used together, these built-in management capabilities enable IT professionals to spend less time managing applications, while improving their ability to deliver a portfolio of high-quality application services to users at low cost.

In addition to its inherent management capabilities, App-V has the ability to work in conjunction with systems management tools. While other systems management tools can be useful in managing a virtualized application environment, App-V particularly gains from robust integration with the Microsoft systems management tool, ConfigMgr. App-V and ConfigMgr together represent an unbeatable combination for delivering the benefits of application virtualization.

Using App-V and ConfigMgr together provides a highly efficient and powerful set of management tools. Through a single console, the IT staff can deliver and update applications simply and seamlessly.

By using ConfigMgr with App-V, for example, IT administrators can:

- Deliver applications by targeting both users and machines.
- Provide a single delivery and management workflow for physical and virtual applications.
- Orchestrate staging and replication of applications throughout the enterprise.
- Provide application inventory.
- Enable application metering to better manage where and to whom applications are deployed.

Notably, throughout this study the organizations using Microsoft App-V and Microsoft ConfigMgr together tended to achieve **higher levels of cost savings and other benefits** than organizations using any other combination of application virtualization technology and configuration management tools.

Streamlined Application Updates

App-V also greatly improves the process of delivering application updates. To deliver an updated application to users, IT professnals simply sequence the updated application and deliver the resulting sequence file to users.

The IT staff can centrally manage the update process, and by placing the update on the streaming server, each machine will pull down the new, updated sequence file the next time the application is launched. This approach ensures that each user has access to the latest version. Seventy percent of study participants said their users spend less time waiting for IT to deliver application updates.

Also, because the new version runs in isolation without being installed, the update process can proceed quickly and simply, without overnight scheduling, waiting for installation, or reboots. All of these tasks are accomplished without exhaustive labor required to perform regression testing and installation.

Overall, 80% of the respondent organizations say that application virtualization reduces the time that the IT staff needs to update applications. The respondents who realized this benefit saw a 29% reduction in the IT labor involved in updating applications. This improvement represents a $22 per PC per year savings in IT labor costs across the full spectrum of update tasks (testing, deployment, and failure resolution). .

Truly, effective management is central to IT efficiencies, and App-V's ability to work with systems management tools ensures that IT administrators can deliver updates more quickly, with less labor, and at improved service quality. And according to the data, the integration between App-V and ConfigMgr helps IT manage and update applications even more efficiently, helping their organizations achieve higher levels of benefits.

What About Windows 7?

How do App-V and Microsoft Windows 7 work together? Quite simply, App-V and Windows 7 are "better together," too.

App-V on Windows 7 delivers a consistent user experience, streamlined application deployment, and simplified application management for virtual applications. Integration between Windows 7 and App-V (version 4.5 SP1 and later) provides a seamless user experience regardless of application format - virtual applications behave the same as regularly installed applications.

Together, App-V and Windows 7 deliver complementary capabilities, which provide additional cost reductions, time savings, and quality improvements. Features in Windows 7 Enterprise such as AppLocker™ provide the ability to enforce consistent policy management for all application types, and BitLocker To Go™ provides the ability to deliver virtual applications on a removable drive. In conjunction with Windows Server 2008 R2, BranchCache™ enables more efficient delivery of virtual applications across the wide-area network (WAN), making them available to users more quickly.

In addition to those capabilities, though, App-V and ConfigMgr can help reduce the complexity of deploying Windows 7 itself.

In a typical operating system deployment project, a significant portion of the IT labor is devoted to installing the operating system. Additional labor is required to repackage applications for the new operating system and to reinstall those applications to complete the deployment process.

By using App-V and ConfigMgr together the IT staff can streamline and automate much of that deployment project. For example, IT can create a standardized Windows 7 image, including common applications, and deploy that image using the Operating System Deployment (OSD) capabilities in ConfigMgr. Then through task sequencing, ConfigMgr will automate the deployment of the required applications – physically or virtually using App-V – to targeted machines and users.

In this way, the Windows 7 desktop operating system deployment project can be simpler and require less IT labor. At the end of the project, the portfolio of physical and virtual applications can be less complex and less costly to manage and support, and IT will have capabilities that put the organization on a path toward an "optimized desktop" environment. Several early Windows 7 adopters have used exactly this approach to measurably reduce the cost of deploying Windows 7 and the labor involved in ongoing desktop management.

ConfigMgr OSD provides the ability to automate the deployment of Windows 7; in concert, ConfigMgr and App-V are the most efficient way to deploy applications for Windows 7. And together, Windows 7, ConfigMgr and App-V provide a solid foundation for a truly optimized desktop environment, providing improved IT services, reduced cost and greater agility.

That's a winning combination for any organization.

Impact on Application Support

Using traditional methods of application delivery, end users must often deal with an array of application-related issues, which often take time to resolve and may result in very negative effects on user productivity. The end user must wait for IT to isolate the problem, develop a resolution, and deliver it to the user. This process often takes days—sometimes weeks—and results in unnecessary delays that affect both the end user and the business.

With application virtualization, end users connect to applications in a manner similar to the way they access network services. The applications are always on, isolated from other applications, and do not need to be installed before they can be used. This approach not only eliminates the need for end users to troubleshoot application-related issues but also provides end users faster access to a wider range of applications and enables users to become productive more quickly.

In addition to affecting end-user productivity, though, application issues also affect IT support costs. A reduction in the occurrence of application-related issues directly enables a decrease in demand for IT services through reductions in call volume and escalated or dispatched support.

By providing users and staff with tools that reduce installation failures and application conflicts, application virtualization reduces the volume and complexity of application-related calls to the service desk and provides both users and support staff with efficient ways to restore application functionality. If a user experiences an issue with a virtualized application, for example, IT can restore the application without having to uninstall and reinstall it, they just simply refresh.

Because virtualized applications run in isolation from other applications, an issue with one application will not affect others. As a result, App-V provides all three types of benefit – cost, time and quality:

- IT professionals spend less time diagnosing and resolving application-related issues. As a result, the service desk has 18% fewer calls, resulting in a reduction in IT labor costs of $21 per PC per year. This means the IT staff can spend less time reacting to issues and more time on more productive activities.
- Eighty-two percent of study respondents said end users spent less time dealing with application-related issues, and issues that do occur take less time to resolve, enabling users to return to full productivity more quickly. As a result, 73% said App-V enabled a reduction in end user downtime.
- The IT staff can deliver improved quality in their application environment, yielding greater end user satisfaction. Fifty-seven percent say that users experience fewer application conflicts, and seventy-seven percent of App-V customers in this study indicate that that App-V helps them deliver higher-quality application services.

A study participant commented about the value of application virtualization to their support activities, saying:

> ***"The greater flexibility provided by application virtualization has reduced our support needs and allowed us to focus on doing what we do more than worrying about how we do it."***

Impact on Business Capabilities

Many organizations build a business case for technology investments purely on the basis of direct-cost IT savings. The benefits of application virtualization, however, do not exist solely within the IT budget; the benefits extend to the business as a whole. While IT-centric benefits may be of great interest to many IT decision-makers, it cannot be argued that the primary function of IT is to deliver services that the business needs to adapt and grow in an every-changing marketplace. The Microsoft War on Cost team believes the key non-cost areas of "business value" are business agility, quality of service (QoS), and governance/risk management/compliance (GRC).

The Hansa|GCR research strongly indicates that application virtualization **delivers benefits in all three of these areas**. The net effect is that when business needs change, application virtualization helps IT deliver enabling solutions quickly and seamlessly, positioning IT as a strategic partner.

Complexity vs. Agility

Application Management can be a complicated and time-consuming activity. Many IT organizations devote a significant portion of their staff to the processes of testing, deploying, managing and updating the applications in their environment. For some organizations, the labor required may result in delays in delivering the applications needed by business users, and perhaps even a decision to delay the adoption of critical new application functionality because of IT staffing constraints.

Yet without reliable access to the appropriate applications, business users cannot perform their essential functions. The challenge faced by many IT organizations is significant – IT must address the changing needs of the business, without increasing costs or lowering quality.

Business Agility

App-V helps to improve agility throughout business organizations. In the past for example, organizations that needed to combine disparate IT environments after mergers or acquisitions were challenged to integrate and standardize their applications. Of the respondent organizations that reported M&A-driven integration activities within the past five years, 59% of those organizations used application virtualization to facilitate the integration.

The majority of respondent organizations (60%) said that the ability to run multiple versions of an application on the same machine has helped IT operations improve services, and be more agile in delivering applications to users. Most organizations agreed that the ability to seamlessly provision multiple versions has, in turn, helped IT enable greater business agility for their organization.

App-V also delivers agility during PC upgrades, whether they are part of a major PC refresh or individual machine upgrades. Because virtualized applications are not actually installed on PCs, the process of moving a user to a new physical machine is much less complex.

Through the ability to deliver applications more quickly, App-V helps IT ensure that users always have up-to-date and trouble-free access to the applications they need. That's a strong foundation for business agility.

One study participant described the benefits of application virtualization as:

> ***"… a no brainer - the lowered cost of virtual application deployment and increased agility to the business is a great combination."***

Quality of Service (QoS)

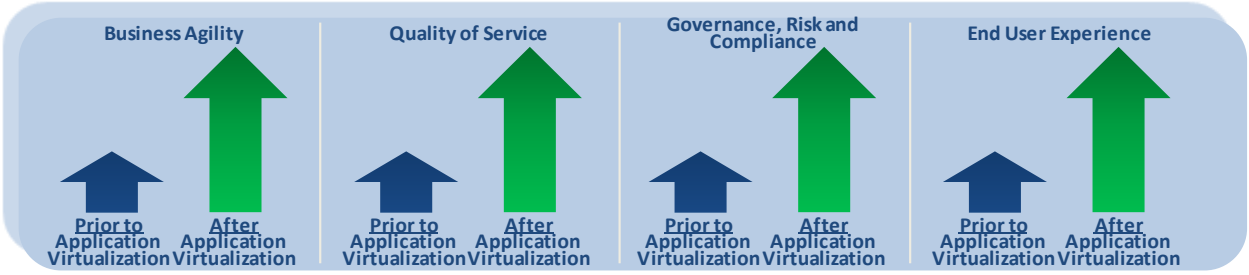
More than ever, the IT staff must enable high-quality business services that support users throughout the organization, anytime, anywhere, on any device, wherever users might be. The majority of respondent organizations indicated that application virtualization tangibly helped IT deliver services not just more quickly, but better.

More than 70% of study participants indicated that their process for delivering and updating applications was improved through their use of application virtualization. Well over half of the participants indicated that App-V helped reduce complexity in the desktop environment. And nearly two thirds of the participants said that application virtualization helped deliver a more flexible portfolio of applications to their users.

At the same time, 73% of respondents cited a reduction in end-user downtime, and 82% said their users spent less time dealing with application issues. The impact of application virtualization on an IT organization's ability to deliver services resonated strongly throughout the data, a fact directly corroborated when fully 77% of the participants said that App-V helps improve IT services.

One respondent indicated that improved quality allowed IT to refocus their efforts, saying:

> ***"Company resources worldwide have great confidence and improved flexibility. Which translates into improved services to our external customers, which translates to increases in revenue."***



Governance, Risk Management, and Compliance (GRC)

Regulatory compliance, corporate governance, and risk management are essential parts of running any business. App-V helps by enabling auditing and recordkeeping functions necessary to satisfy these requirements.

In many industries for example, increased audit or regulatory requirements create challenges for IT departments, who must keep records of license compliance or software updates. Among organizations that must deal with these issues, 53% say that application virtualization has helped with those requirements.

A study participant remarked:

> ***"We no longer have licensing issues or unlicensed software or applications running on our system. There is a clear audit trail for application upgrades and deployment, and tracking software use has become much easier."***

About a third of the respondent organizations indicated that they explicitly track business impacts such as agility and service quality. However, the metrics gathered through this research indicate that App-V can deliver significant benefits in the speed and quality with which IT professionals can deliver applications to business users. It is interesting to note that study **respondents reported results that exceeded their expectations.**

- *Thirteen percent* of respondent organizations expected an improvement in business agility; *53%* achieved it.
- *Eighteen percent* expected an observable reduction in complexity*; 52%* reported achieving it.
- *Twenty-eight percent* expected that App-V would enable improved processes; *70%* reported achieving them.
- *Forty percent* expected a reduction in IT costs; *nearly three-fourths* of them reported achieving lower IT costs.

Perhaps the most significant benefit of application virtualization is its potential to help IT professionals provide a user-centric set of services. Because App-V delivers applications to users rather than machines, the IT staff can deliver applications to users according to their business needs, regardless of their location or the configuration of their PC. By abstracting the application from the underlying device, App-V enables delivery of far more flexible application services than previously possible, and in doing so, truly becomes a strategic enabler for the business.

Put simply, App-V helps IT meet the needs of the business.

Summary

IT managers are confronted with the need to provide IT capabilities that reduce IT labor costs and deliver high-quality services to business. The Hansa|GCR study results show that Microsoft App-V delivers compelling benefits to organizations that adopt it.

Benefits of application virtualization throughout the application lifecycle are clear and widespread. Organizations benefit in the form of time savings, improved efficiencies, and reduced costs. Using the lifecycle context, this analysis of the Hansa|GCR data illustrates how Microsoft App-V delivers benefits.

Impact on Application Testing and Preparation

- Reduces costs associated with testing and preparation by **$26 per PC per year.**
- Reduces time involved in preparing applications, helping IT meet user needs more quickly.
- Improves quality by isolating applications, ensuring fewer end user issues.

Impact on Application Delivery

- Reduces costs associated with application delivery by **$13 per PC per year.**
- Reduces time required to deliver applications, helping IT be more responsive to user requests.
- Improves quality through streamlined processes, allowing IT to deliver a more flexible portfolio.

Impact on Application Management and Updates

- Reduces costs associated with testing and delivering application updates by **$22 per PC per year.**
- Reduces time required to test, prepare, and deliver updates, ensuring users have the latest versions.
- Improves quality through integration, allowing IT to manage complexity without constraints.

Impact on Application Support

- Reduces costs associated with application-related phone and desktop support by **$21 per PC per year.**
- Reduces time required to identify and resolve application issues.
- Improves quality by enabling an application that is more stable, more reliable, and more flexible.

Impact on Business Capabilities

- Enables IT to deliver the right applications to the right users at the right time, enabling business agility.
- Enables IT to deliver higher-quality services across the entire application domain.
- Enables IT to produce reports that help organizations meet audit and compliance requirements.

Although the impact of App-V will vary by company, several broad conclusions can be drawn from the study.

- Delivers benefits across many organization profiles, and at many stages of the application lifecycle.
- Leverages and extends the capabilities of System Center Configuration Manager and Windows 7.
- Helps IT improve processes, freeing the staff from manual tasks and enabling further process gains.
- Helps IT gain credibility as a strategic partner to the business, providing services that the business needs.

The data in this study underscores a remarkable finding: **IT organizations no longer have to choose between "fast, cheap, and good." Effective use of App-V enables IT organizations to deliver on all three needs – higher quality services, faster delivery, at lower IT labor costs.** Interestingly, the data also indicates that the more an organization deploys and uses the capabilities of App-V, the more benefits accrue.

The data proves it: across nearly 300 organizations of many sizes and industries, the benefits of using App-V are real and substantial. This is a truly compelling business case for deployment of Microsoft Application Virtualization.

Appendix A: Methodology and Participating Company Profile

Hansa|GCR collected 291 web surveys among U.S.-based decision makers responsible for the development and delivery or ongoing operations and management of applications within their IT infrastructures. Given the complex nature of the survey and level of detail required, respondents were asked to evaluate and provide data for either their department, division, or company based on their confidence level. This approach ensured that the study collected the most accurate information on IT labor and application virtualization for any single organization.

The online survey was administered from September 16 to October 23, 2009. All respondents were employed by U.S.-based, for-profit organizations with more than 500 PCs within their organization. Limitations were placed on government, education, and healthcare organizations to ensure that no single industry accounted for more than 10% of the total sample. Not-for-profit organizations were excluded from the study.

The distribution of respondents is fairly evenly distributed across organizations of various sizes. In terms of industry distribution, respondents represent a wide array of categories, with the highest concentration coming from IT, healthcare, banking and finance, education, government, manufacturing, insurance and real estate, and retail.

Overall, 60% of these organizations have been stable in terms of growth in the number of IT users each year. Almost half (47%) of the organizations in the sample have IT users spread across a mix of large, medium, and small-sized offices. Among the organizations surveyed, 42% earn $1 billion or more in revenue annually with a median revenue of $525 million.

For the purposes of illustrating cost savings, the "average" organization described in the text is based in North America with an average (median) of 4,917 PCs and an average (median) 26 desktop-facing IT staff at a fully-burdened average labor rate of $60 per hour.

PROFILE OF THE STUDY'S 291 PARTICIPATING COMPANIES	
Number of PCs (mean)	**22,272**
Number of PCs (median)	**4,917**
Number of PCs 500-2,999	34%
Number of PCs 3,000-14,999	39%
Number of PCs 15,000+	27%
PCs that receive applications via application virtualization	33%
Users who receive applications via application virtualization	47%
Number of applications delivered using application-virtualization (mean)	42
% of desktops managed using systems management software	73%
IT total FTEs (median)	94
IT desktop FTEs (median)	26
Industries represented at significant levels	▪ Computer/IT (11%) ▪ Healthcare (10%) ▪ Software development (10%) ▪ Education (10%) ▪ Banking/Finance/Investment (9%) ▪ Government (8%) ▪ Manufacturing (8%) ▪ Insurance/Real estate (5%) ▪ Retail (5%)

Appendix B: IT Cost Baseline

In 2005, Microsoft commissioned GCR (now Hansa|GCR) to engage in research focused on documenting the distribution of labor and associated costs in IT organizations. This research has served as the foundation of a cost baseline that has been used internally within Microsoft and externally for the past 5 years.

The labor allocations from the 2005 research are used to provide this paper with context for understanding the relative cost impacts of labor-saving capabilities.

The per-PC labor cost reduction figures in this paper are derived by applying the task-specific IT labor-savings identified in the current research against the overall proportion of labor efforts for that task in the baseline:

$$\frac{\text{Labor reduction x baseline labor amount x desktop-facing FTEs x labor-cost-per-hour}}{\text{Number of PCs}}$$

Where:

- Labor reduction = the percentage reduction in task-specific labor derived from customer responses.
- Baseline labor amount = the portion of overall labor allocated to that task.(*)
- Labor cost per hour = $60 per hour, agreed as representative by more than 65% of the respondents.
- Desktop-facing FTEs and number of PCs = the median values for participating companies as shown in Appendix A.

The labor-cost reductions cited in this paper are representative of the median of nearly 300 participating organizations as described in Appendix A. It should be noted that many organizations achieved significantly higher benefits, based on the scope of their adoption of best practices enabled by App-V. For reference, the baseline labor allocations used in the calculations are shown in the table to the right. (© 2005, Microsoft and Hansa|GCR. All rights reserved.)

Desktop Deployment		18%		
	OS Deployment		37%	6.7%
	User Settings		31%	5.6%
	Testing		28%	5.0%
	Other		4%	0.7%
Application Management		25%		
	Evaluation/test		22%	5.5%
	Regression Testing		15%	3.7%
	Packaging		13%	3.3%
	App Deployment		31%	5.7%
	Failure Resolution		19%	4.8%
Desktop Administration		18%		
	User Administration		27%	4.9%
	PC/User Security		17%	3.1%
	Other		15%	2.7%
	Data Backup/Restore		15%	2.7%
	Asset Administration		14%	2.5%
	Health Monitoring		12%	2.2%
Troubleshooting		24%		
	Dispatched Support		36%	8.7%
	Call Handling		36%	8.7%
	Self-help tools		28%	6.7%
Update/Patch		15%		
	Threat Assessment		24%	3.6%
	Testing		20%	3.0%
	Patch Deployment		30%	4.5%
	Failure Resolution		26%	4.0%

(*) Labor calculations in this study do not include application development effort. Application development labor is not generally considered a direct cost unless the direct-cost benefits of the resulting applications are also included in the analysis.

Appendix C: Microsoft Desktop Optimization Pack (MDOP)

Productivity, manageability and reduced TCO for enterprise desktops

Enterprise IT infrastructures are increasingly complex to manage. The Microsoft Desktop Optimization Pack (MDOP) is a dynamic desktop solution that is available by subscription for Microsoft Software Assurance customers. The Software Assurance solution suite enhances application deployment and compatibility, increases IT responsiveness and end user uptime, and helps reduce total cost of ownership (TCO) of your desktop software and IT management.

MDOP employs six innovative technologies to increase desktop manageability, reduce TCO, and improve overall user satisfaction:

- Microsoft Application Virtualization (App-V) turns applications into centrally managed services that are never installed, never conflict, and are streamed on demand to end users.
- Microsoft Enterprise Desktop Virtualization (MED-V) provides deployment and management of virtual PC images to enable key enterprise scenarios. The primary function of MED-V is to resolve application compatibility issues with a new version of Windows.
- Microsoft Advanced Group Policy Management (AGPM) enhances governance and control over Group Policy through robust change management, versioning, and role-based administration.
- Microsoft Asset Inventory Service (AIS) is a hosted service that collects software inventory data and translates it into actionable business intelligence.
- Microsoft Diagnostics and Recovery Toolset (DaRT) reduces downtime by accelerating troubleshooting, repair, and data recovery of unbootable Windows-based desktops.
- Microsoft System Center Desktop Error Monitoring (DEM) provides insights into application and operating system failures, allowing help desk staff to be more proactive in managing PC problems without installing an agent to the endpoint.

The Microsoft Desktop Optimization Pack for Software Assurance can transform the way that desktop challenges are managed. It will enable the IT staff to better control the desktop, accelerate and simplify application deployments and management, and enable IT professionals to provide highly responsive service.

Appendix D: For More Information

Microsoft Application Virtualization Overview
http://www.microsoft.com/systemcenter/appv/dynamic.mspx

Microsoft Application Virtualization and Configuration Manager 2007
http://www.microsoft.com/systemcenter/appv/configmgr.mspx

Microsoft Application Virtualization for Terminal Services
http://www.microsoft.com/systemcenter/appv/terminalsvcs.mspx

Microsoft App-V TechCenter (architecture guides and best practices)
http://technet.microsoft.com/en-us/appvirtualization/cc843994.aspx

Microsoft Desktop Optimization Pack (MDOP)
http://www.microsoft.com/windows/enterprise/products/mdop/default.aspx

Microsoft Optimized Desktop solutions
http://www.microsoft.com/windows/enterprise/solutions/default.aspx