Building a Powerful, Resilient, Affordable IT Infrastructure

Business Infrastructure Virtualization for

Small and Midsize Companies

vmware   IBM.

Table of Contents

EXECUTIVE SUMMARY

Over the past decade, companies worldwide have invested trillions of dollars in IT to try to gain competitive advantage in the marketplace. For small and midsize organizations, constrained budgets can make it difficult to leverage technology to get ahead. Yet, when any size company invests in more IT assets, the result is typically greater complexity in the IT environment—along with higher operational and administrative costs, diminishing infrastructure productivity, plus greater difficulties in meeting development and business growth objectives because of spiraling IT operational costs.

For small and midsize companies, the best approach to getting ahead is to optimize their IT infrastructures to create a simplified yet dynamic IT environment. By taking a strategic approach and consolidating resources, strengthening and streamlining IT management, and deploying proven conservation techniques, smaller companies can gain a sustainable competitive advantage. Virtualization offers small and midsize companies an extremely cost-effective option for transforming IT into a simpler, more powerful computing infrastructure, for distinct competitive and profitability gains.

VMware® vSphere™ takes virtualization to the next level. VMware vSphere is a next-generation virtualization platform that enables businesses to deliver efficient, reliable, and flexible IT. When deployed on IBM® System x™ and BladeCenter® servers and IBM System Storage, VMware vSphere offers affordable computing, flexibility, and scalability, high application availability, and simplified IT—for a powerful and resilient infrastructure that reduces your total cost of ownership and provides a quick return on investment.

THE CHALLENGE TO INNOVATE FOR SMALL AND MIDSIZE BUSINESSES

Small and large companies alike need to innovate to efficiently run day-to-day business operations and to remain competitive. Yet, innovation can come at a steep price given the complexity of managing an expanding IT environment. Instead of improving the bottom line through innovation, companies potentially face the opposite: significant costs associated with the time and resources needed to build and manage a robust and typically complex IT environment. For small and midsize businesses, innovation can seem altogether out of reach due to budget constraints, and IT may fail to support the increasing demand for new capabilities and services. The existing IT environment built to support yesterday's demands remains complex and inflexible, and therefore costly.

The Cost of Building and Maintaining the IT Environment

Small and midsize companies typically lack an abundance of discretionary funds for IT, facing even tighter budgets in today's difficult economic environment. So the capital costs for procuring newer, more efficient solutions are often prohibitive. At the same time, operating costs continue to rise, including those associated with floor space, as well as systems management and administration. System maintenance can be costly, particularly for aging systems—systems that fail to offer the flexibility to meet rapidly changing business requirements. Businesses increasingly depend on IT services and the effective delivery of applications. Yet staffing shortages or inexperience, server sprawl, and the traditional approach to system management are impacting the ability to efficiently manage, secure, and optimize IT.

The Solution

Smaller companies must look to IT improvements that will ultimately reduce costs while enhancing operations.

Importantly, they need cost-effective solutions that can enable them to leverage their existing storage, network, and server resources. They also need to focus on IT investments that can yield longer-term efficiencies and ultimately help the business grow.

Application Delivery Struggles

Enabling business continuity, reliable disaster recovery, and ongoing access to applications and data for employees, partners, and customers is critical. For small and midsize companies, however, limited IT budgets, scarce resources, and inefficient backup and recovery processes can impact day-to-day business operations and increase risk. Failed applications can lead to lost data and lengthy recovery times, and can negatively affect the company's reputation and profitability. While most companies employ some backup processes, they are difficult to test. Additionally, planned downtime for activities such as hardware maintenance either impacts business operations or must be done after hours. Small and midsize companies need proven methods for backing up and restoring systems while minimizing downtime.

Inefficient application testing and deployment strategies can lead to significant costs and risks that can be especially difficult to absorb for smaller companies. Unplanned downtime is often caused by application and production errors, impacting operations and utilizing valuable IT resources to rectify. Smaller companies typically lack the resources and staging infrastructure for thorough patch testing, migration, and upgrade projects.

The Solution

To protect data and application delivery, small and midsize companies should establish a full business continuity plan to maximize the ongoing availability of business-critical systems. In some cases, a preproduction environment should be developed to test solutions before deployment, and once thoroughly tested, applications should be deployed into secure environments.

IT Complexity and Inefficiency

Even with limited budgets, the IT solutions used by small and midsize companies have steadily grown to support changing business objectives. Yet as IT assets multiply—server and storage systems, applications, and system management tools—IT increases in complexity. This creates significant management problems for an overextended IT administrative staff, particularly when relying on standard service provisioning. As a result of a counterproductive IT infrastructure, some companies are forced to decrease investments in application development and business expansion just to maintain and support an increasingly complicated IT environment.

The traditional IT stack with its tight coupling of software and hardware often fails to support dynamic business requirements or offer opportunities for reducing costs. This expensive model of applications tied to specific systems and architectures can lead to peak-load capacity problems on some occasions, under-utilized systems at other times, inefficient use of resources, and low productivity.

The Solution

Small and midsize companies with limited IT headcount need easy-to-use solutions that can automate their tasks and simplify their IT environments, thus reducing the amount of time and money needed to manage and maintain them. They need a seamless path to a self-managed, dynamically optimized IT environment for the most efficient delivery of business services.

THE PROMISE OF VIRTUALIZATION

For small and midsize companies eager to find a simpler, more efficient, and cost-effective way to run their computing environments, virtualization might be the answer.

Virtualization can transform IT into a dramatically simplified environment. Virtualization is also an important first step on a journey toward "cloud computing." Companies can take advantage of cloud computing today by leveraging the power of virtualization to create a dramatically simplified IT environment, and in the future, benefit from even greater flexibility with the option of using external cloud resources when needed.

Business Infrastructure Virtualization

In a virtualized environment, hardware management is separate from software management and can be reallocated on the fly to various software services. Users see resources as if they are dedicated to them, while administrators have the ability to efficiently manage and optimize resources to service the ongoing needs of the business.

By simply abstracting applications and information from the complexity and rigidity of the underlying infrastructure, companies gain a new level of flexibility and control over IT services. They can also position themselves to take advantage of and link to external, public clouds in the future, for the next generation of IT services if they choose that path down the line.

Using virtualization, IT resources can be managed as a seamless, flexible, and dynamic operating environment. Applications can run more efficiently, capital and operating IT costs are slashed, and IT responsiveness increases dramatically. IT can also provision applications and specify service levels, response times, security policies, and availability—at the lowest possible cost with minimal maintenance.

Reduced IT Costs

Virtualization technology simplifies IT, allowing small and midsize companies with lean IT budgets to more cost-effectively utilize their server, storage, network, and computing resources. Through virtualization, IT can convert physical systems into virtual machines, consolidating servers and storage, improving server utilization up to 80%, reducing CapEx up to 50%, and reducing OpEx up to 60%.[1] Companies can save on floor space while reducing power and cooling costs up to 60%[2]. They can also simplify and automate system management, requiring far less IT resources day-to-day. Companies can further reduce costs by accelerating application development, enhancing the application testing environment, and improving application availability after deployment.

Increased Application Availability, Smoother Operations

Application availability and security are top priorities for every organization, but for the typical small and midsize IT operation, they can require more resources and budget than is available. Virtualization, however, can offer comprehensive data protection, continuous application availability, and simplified and automated disaster recovery across physical sites. Automated patch management of server hosts and virtual machines and an integrated firewall can help maintain security policies across the environment. Companies can test more applications by deploying and optimizing preproduction staging environments, and deploy in a secure environment after testing, resulting in less downtime for important

business applications. Virtualization can help protect critical data and applications that keep the business running, with zero-downtime hardware maintenance, for more responsive IT and business resilience.

Simplified IT, Increased Productivity

Managing an IT infrastructure is usually a complex undertaking, and is often done inefficiently, leaving IT resources overextended and IT assets underutilized. The virtual IT infrastructure, however, can transform the data center, greatly simplifying IT and increasing IT productivity. Virtualization solutions can be easy to deploy and simple for IT to use and manage. By allocating virtual services from the physical IT infrastructure, companies can more effectively utilize storage, network, and computing resources. Virtualization can free IT professionals from menial tasks so they can take a more strategic role in the company. Virtualization can enable faster provisioning of new applications, and can accelerate change request response times. It can also centralize and improve the efficiency of backup and recovery tasks while simplifying the management of security policies. Managing a virtual infrastructure allows IT to quickly connect and manage resources to meet changing business needs, establishing a highly responsive IT infrastructure.

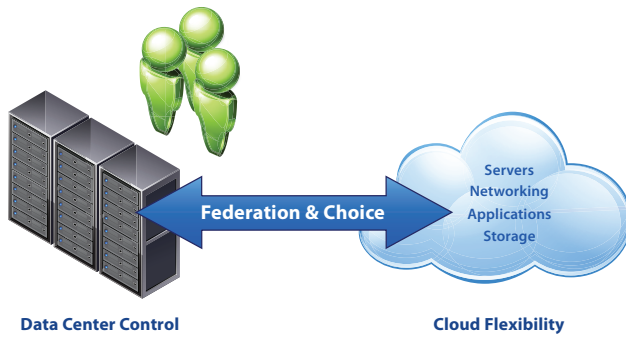## BUSINESS INFRASTRUCTURE VIRTUALIZATION FROM IBM AND VMWARE

VMware and IBM bring the power of virtualization to companies of all sizes today. VMware vSphere 4 offers affordable virtualization and cloud computing to small and midsize companies. Maximizing TCO and operational benefits from virtualization requires server and storage systems that can optimize the VMware vSphere solution. IBM System x® and BladeCenter servers and IBM System Storage™ DS3000, DS4000®, and DS5000 are powerful, cost-effective, resilient platforms for delivering VMware vSphere technology.

Business Case: Danske Telecom

Danske Telecom is a Danish company that delivers wireless high-speed telecommunications, IP, and data solutions to households and companies throughout Scandinavia. This midsize telecommunications company needed to improve systems reliability and expand capacity. Danske consolidated 25 servers onto four IBM System x3650 servers, implementing virtualization through VMware and creating a storage area network (SAN) consisting of an IBM System Storage DS4700 storage subsystem and IBM System Storage DS4000 EXP810 Expansion Unit. The new systems environment offers improved systems reliability, expanded capacity, new levels of flexibility, and reduced operating costs. To find out more, visit: www.ibm.com/software/success, and search on "Danske Telecom."

VMware vSphere

VMware vSphere, an evolution of the industry-leading VMware Infrastructure software suite, abstracts applications and information from the complexity of the underlying IT infrastructure, creating an internal cloud infrastructure that delivers IT as internal application and infrastructure services based on business priority. With VMware vSphere, IT can centrally manage hardware resources, while depending on built-in application service-level controls. It eliminates server sprawl to help companies achieve the capital and operational cost savings associated with having fewer, high-performance platforms supporting the workloads. In addition, VMware vSphere eliminates virtual server sprawl—the proliferation of virtual machines without clear ownership and usage requirements. Instead, companies can implement a consistent, automated process for managing the lifecycle of virtual machines, from provisioning to operation to retirement. VMware vSphere also provides a starting point for the future option of creating a "private cloud" composed of both internal, company-owned resources, and external, on-demand resources from service providers.

Data Center Control **Cloud Flexibility**

Federation & Choice

Servers
Networking
Applications
Storage

Virtualization now, and flexibility to leverage external cloud resources in the future.

VMware vSphere offers key capabilities for simplifying IT:

- Eliminates unnecessary IT investments and reduces the cost and complexity of maintaining the IT infrastructure.
- Optimizes how data is being manipulated today, reducing the number of servers needed in the process.
- Allows companies to scale their virtualization strategies and expand the architecture incrementally over time as desired, since VMware is modular in nature.
- Helps companies achieve significant consolidation ratios and maximum IT efficiency, with automated management and dynamic allocation of resources to applications across internal and external cloud infrastructures.
- Offers enormous control over the delivery of IT services, supporting the intensifying reliance on IT today for the effective delivery of applications.
- Helps build an automated, controlled environment that is resilient to failures and responsive to fluctuating requirements, without complexity and operational overhead.

IBM System x3650 M2

IBM System x3550 M2

IBM BladeCenter HS22

- Preserves the flexibility to choose from among various operating systems, applications, and hardware.

VMware vSphere is available in a variety of editions, with VMware vSphere Essentials and Essentials Plus customized for smaller companies. These all-in-one solutions can virtualize up to three physical servers, supporting 20 or more application workloads and reducing hardware and operating costs with a low up-front investment. VMware Essentials is the most cost-effective starting point for virtualization, yet many companies start with Essentials Plus in order to provide business continuity with features including VMware High Availability. VMware also offers a full enterprise portfolio for virtualizing business-critical applications, with a host of built-in application services such as VMware Fault Tolerance for continuous availability, and, available separately, VMware vCenter Site Recovery Manager for disaster recovery.

IBM System x and BladeCenter Servers

IBM System x and BladeCenter servers tackle the most demanding workloads while helping manage complexity and risk in a virtualization environment. Options include the x3400 M2 and x3500 M2 towers, high-performance x3550 M2 and x3650 M2 rack servers powered by Intel® Xeon™ processor 5500, and the highly-scalable x3850 M2 and x3950 M2 enterprise servers supporting the Intel Xeon processor 7400 with up to 1 TB of memory capacity and support for 2-16 processors. IBM BladeCenter delivers an open platform that is easy to manage, energy-efficient, and scalable, with a range of blade servers, including the HS22, powered by Intel Xeon processor 5500. These IBM servers provide an ideal environment for virtualization with VMware vSphere:

- Improving reliability and business continuity
- Maximizing scalability and flexibility
- Improving systems management
- Optimizing total cost of ownership

IBM offers a broad portfolio of server options for VMware deployments. They include the high-performance x3550 M2 and x3650 M2 rack mount servers powered by Intel® Xeon™ processor 5500 for all company sizes, to the highly-scalable x3850 M2 and x3950 M2 enterprise servers supporting the Intel Xeon 7400 series processors with ample memory capacity and support for four or more processors. IBM BladeCenter delivers a highly-integrated open platform that is easy to manage, energy-efficient, and easy to scale, with a wide range of blade servers including the Intel Xeon 5500-powered HS22 blade server. These IBM servers feature capabilities that provide an ideal feature-set for virtualization with VMware vSphere:

- Redundant, hot-swap power supplies and cooling fans.
- IBM Predictive Failure Analysis and light path diagnostics to warn of pending hardware failures on critical components.
- Energy-smart designs for exceptional cost-effective application computing.
- Energy savings of up to $100 per server per year with the Xeon 5500 based servers.
- High memory throughput and robust processing for effective response times at peak volumes.
- Ease of virtualization deployment with the option for the VMware ESXi hypervisor—the platform for the VMware capabilities—embedded in the servers.
- IBM System Director 6.1 with easy-to-use, powerful tools for managing both physical and virtual resources.

IBM System Storage DS3000, DS4000, DS5000
These IBM System Storage solutions for VMware vSphere help improve CPU utilization, increase operational efficiencies, and reduce TCO. The DS3200 (SAS), DS3300 (iSCSI), and DS3400 (Fibre Channel) are the most cost-effective solutions in the series, and are especially suited for smaller companies and remote locations. The DS4000 Fibre Channel storage systems

are suitable for the larger midsize companies and offer outstanding performance, capacity, and remote mirroring capabilities. The DS5000 Fibre Channel storage systems offer the highest performance, expandability, investment protection, and remote mirroring capabilities for the enterprise.

IBM System Storage DS3000

IBM has a history of making mission-critical applications work on virtualized infrastructures. IBM System Storage DS3000, DS4000, and DS5000 solutions for VMware offer companies tangible benefits over other storage solutions, including:

- The flexibility to support SAS, iSCSI, and Fibre Channel server-attached shared storage.
- Outstanding high-performance block-level storage that scales with VMware's file system to support the demands from virtual machines and multiple applications.
- Real-world Balanced Performance for transaction and sequential applications such as Exchange, SQLServer, Oracle, Sharepoint, backup and file server.
- DS4000 and DS5000 platforms—offer highly effective and affordable disaster recovery with automatic failover in conjunction with VMware Site Recovery Manager.
- Low TCO—One of the lowest TCOs in the industry, derived from one-time software licensing fees, included storage management, fast time-to-provision, and bundled software / hardware maintenance fees.
- Cost-effective tiered storage within the same storage system, leveraging Fibre Channel drives for high performance and SATA drives for economical capacity, plus low-cost, simple direct-attached storage (DAS) using the SAS-attached DS3200.

- Flexible storage management and fast time to provision.
- Efficiency gains provided by Data Services features such as FlashCopy and Volume Copy, which enable disk to disk backup and eliminate backup windows.

IBM Support

IBM offers critical areas of support to help meet the business needs and budgets of small and midsize companies:

- **IBM Global Services and IBM Business Partners**— to assist with any virtualization project, from conception to implementation to management.
- **IBM managed hosting for midsize companies**— solutions specifically designed for midsize companies looking for flexible hosting options with predictable pricing.
- **IBM Service Management for cloud computing**— to help manage the complexities of cloud computing by delivering visibility, control, and automation across a dynamic, virtualized environment.
- **IBM Global Financing**—helps small and midsize companies acquire the IT solutions needed in the most cost-effective and strategic way possible.

IBM Global Financing

It pays to consider your financing options hand-in-hand with your technology needs from the very start of your IT discussions. This will help develop a strategic, end-to-end financial roadmap. Such a strategy can help a small or midsize company manage cash flow and balance operational and capital expenditures while minimizing the financial strain on the business.

Understanding the powerful ways that customized funding from IBM Global Financing can help to conserve cash and maximize investments can be crucial to getting the green light to proceed with an IT

Extend the IBM-VMware virtualization solution with IBM Tivoli Storage Manager FastBack

IBM Storage offers Microsoft Windows users the perfect balance of data protection and recovery when paired with IBM Tivoli® Storage Manager FastBack™. Tivoli Storage Manager FastBack delivers seamless data protection and recovery for critical Windows applications. The solution is based on continuous, frequent, and scheduled policy-based backups, and when paired with a DS3000 storage system, data recovery is quick and easy for both remote workgroups and central-office environments. Together, IBM Storage and Tivoli Storage Manager FastBack solutions offer:

- Rapid disk-based recovery and recovery reliability at the transaction level
- Protection for both servers and applications
- Easy administration with an automated policy engine
- Granular data protection of individual files, e-mails, and database transactions as well as entire volumes of data
- Regulatory compliance through easy access to relevant data
- Reduced IT requests via increased end-user capabilities for simple restores

strategy—including virtualization—and to do so on the scale, scope, and schedule to fit the business' needs.

IBM Global Financing offers funding options for every aspect of a virtualization solution—hardware, software, and services—turning large upfront costs into affordable monthly payments in customized structures that match payments to anticipated benefits. IBM can help create a comprehensive financing strategy for the total virtualization project that may include sale-leaseback, buyback or disposal of retired IT assets and pre-owned equipment.

The Power of the Combined Solution

By leveraging the innovation of VMware vSphere with the economy and performance of IBM systems, support, and financing, small and midsize companies can virtualize the IT infrastructure cost effectively. Key benefits of the combined solution include:

- **Reduced costs**—Multiple virtualized workloads on fewer, more powerful systems, reducing floor space and hardware costs; decreased power and cooling requirements from energy-efficient IT; savings on applications licensed by physical server; business process improvements and cost savings through disaster recovery, fault tolerance, and high availability.
- **Increased application availability**—The elimination of planned downtime; rapid recovery after system failures; enhanced data protection and security
- **Simplified, efficient IT**—Responsiveness to peaks in IT demand; rapid provisioning of new services; fewer management systems and interfaces, with IBM System Director integrating with VMware vSphere
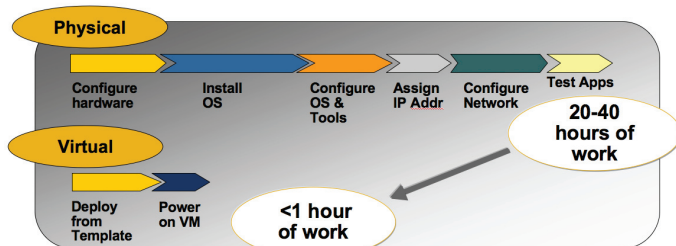
Provisioning time reduced from days to minutes in a virtualized environment

- **Tangible ROI**—Up to 50 percent reduction in capital expenses; up to 60 percent reduction in operational expenses per application; estimated 50 percent improved performance for application development workloads; approximately 30 percent increase in consolidation ratios, further decreasing the cost per application

STEP-BY-STEP GUIDE TO VIRTUALIZING WITH IBM AND VMWARE

Unlike many long-range strategic IT plans, virtualization and internal cloud computing can be realized in a matter of months with IBM and VMware available to help. The following outlines the basic steps companies can take to go from analyzing the current IT environment to implementing a virtualized IT infrastructure in approximately six months:

1. **Assess your opportunity for cost savings**—Analyze your current IT environment to assess your potential costs savings using the online VMware Virtualization TCO and ROI Calculator www.vmware.com/go/calculator.
2. **Contact IBM or an IBM Business Partner with the results**—Engage in more in-depth analysis of your server environment, complete a hardware/software inventory, analyze peaks and valleys in performance, and even conduct a detailed onsite study customized to your environment.
3. **Make preparations for a pilot project**—Analyze, recalculate, and evaluate your TCO and ROI to make decisions based on potential cost savings and gain approval for a pilot project; VMware, IBM, and IBM Business Partners can advise you as needed.
4. **Engage in testing and development**—Pilot and migrate some of the non-critical workloads in your development environment into VMware vSphere for testing purposes.
5. **Roll out virtualization**—Deploy virtualization and your internal cloud; most if not all applications may be virtualized at this point to maximize savings and management efficiencies.

Business Case: Northwest Radiology Network

Northwest Radiology Network is a healthcare organization that provides comprehensive diagnostic reporting services throughout the central area of the state of Indiana. The company needed to increase redundancy and resiliency in its vital systems. Northwest Radiology replaced seven existing servers with two IBM System x3650 rack servers, load balanced over Fibre Channel connections. The functional hardware environment, which includes an IBM System Storage DS3400 device, was virtualized with VMware ESX Server, more than doubling computer resources while increasing and consolidating storage space. The combined solution eliminates single points of failure, consolidates storage, expands capacity, and simplifies systems maintenance and management. To find out more, visit: www.ibm.com/software/success, and search on "Northwest Radiology."

CONCLUSION

Small and midsize companies with strapped IT budgets and limited IT resources do not have to be limited to inflexible, inefficient IT infrastructures that offer unreliable IT services. Instead, smaller companies can empower their IT environments through virtualization, optimizing assets and realizing new opportunities for efficiency. They can reduce the cost of building and maintaining the IT environment, improve application availability to keep the company up and running, and reduce IT complexity to improve productivity. By virtualizing today with VMware vSphere and IBM server and storage systems, companies can achieve a cost-effective yet dynamic operating environment. The result is a simplified IT environment, with the flexibility to seize the benefits of external cloud services in the future.

FOR MORE INFORMATION:

- www.vmware.com/go/ibm
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- www.ibm.com/systems/bladecenter
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- www.ibm.com/systems/storage/disk/ds3000
- www.ibm.com/financing/us/lifecycle/plan/virtualization
- www.ibm.com/services/us

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