



**Driving business value with a
virtualized infrastructure.**

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Introduction: expanding a technical focus to address business challenges

Virtualization is not new. Its roots extend back to mainframe environments' time-sharing practices of the 1950s and 1960s. Operating-system virtualization was introduced in the early 1970s. Storage virtualization followed shortly thereafter, in the mid-1970s.

Today, virtualization can enhance nearly every aspect of the IT infrastructure: servers, operating systems, applications, storage, data and networks.

The technology of virtualization can enable multiple systems to behave as one. It can allow managing virtual resources from a single point of control. It can make possible the practically seamless expansion or reduction of resources as needs change.

And, in the process, virtualization can save the enterprise money.

But consolidating technology and saving money are no longer virtualization's most important value propositions. What's important is the way virtualization can help advance business goals—to achieve things in business, not just in technology, that the enterprise could not achieve before.

As today's successful CIOs focus on driving business value, they are thinking about virtualization in a different way. They are making virtualization part of the organization's business strategy to improve enterprise operations, become more market-focused, make better use of information, manage risk and regulatory compliance, and achieve business flexibility.

This white paper points the way for organizations to expand on virtualization's historical benefits and to use the technology to address business challenges.

Highlights

Virtualization's popularity is growing rapidly, but many organizations are using it primarily for technical functions.

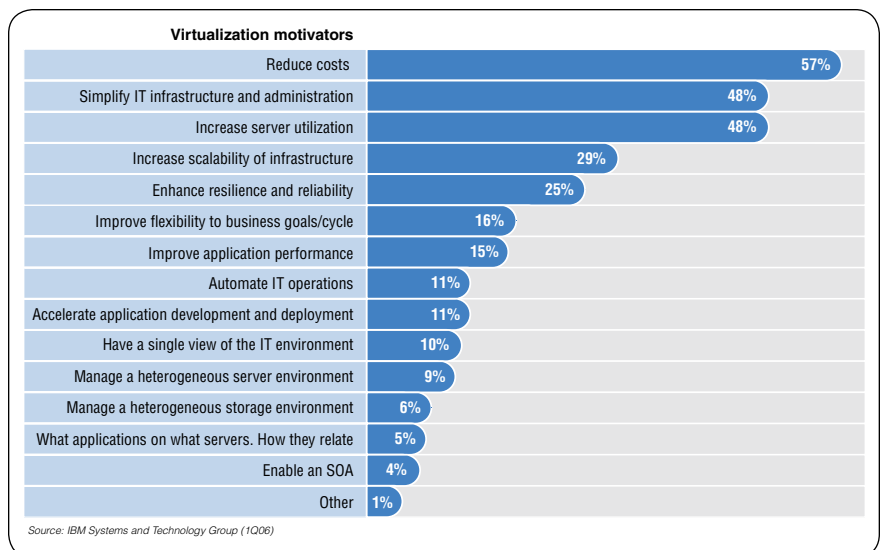
A growing popularity based on virtualization's ability to optimize IT

Virtualization is here to stay – and its use is growing rapidly. A recent survey of large organizations worldwide – those with 20,000 or more employees – found 33 percent of the firms already maintaining virtual environments, and 13 percent with plans to pilot within 12 months.¹

And smaller organizations are not far behind. Another study concluded, in fact, that smaller firms may be more likely than their enterprise counterparts to adopt the widest range of virtualization solutions because their environments are simpler and easier to manage.²

But what are these organizations using virtualization for?

Many are using it to achieve technical functions such as adjusting resources to better respond to changing workload demands, ensuring quality of service, or increasing the utilization of testing and development environments so they also can be used for backup. They are using virtualization to break down rigid



Virtualization has widespread appeal based on benefits that range from reduced IT costs to simplified IT environments, streamlined IT management and increased IT flexibility.³

Highlights

Technical functions represent only a portion of virtualization's potential benefits.

Virtualization can address strategic business issues including flexibility, responsiveness and the ability to achieve innovation.

IT infrastructures that are expensive and time-consuming to maintain; to consolidate physical devices and data centers; to increase utilization rates; and to span silos of functionality, manual processes and proprietary management tools.

All of these are important functions. But they represent only partial benefits. Consider, for example, the much-touted benefit of cost savings.

Tony Iams, senior analyst at Ideas International in New York, points out that the principal cost savings in virtualization occur at the acquisition stage, when organizations can use consolidation to reduce their equipment purchases.⁴ But in many organizations, acquisition is only an occasional activity.

In order to achieve ongoing—and strategic—benefits, virtualization must address ongoing operational issues. To benefit fully from virtualization, Iams suggests, "... it is necessary to drive the use of virtualization more directly into IT infrastructures and extend the scope of its functionality."⁵

Meeting boardroom opportunities by improving enterprise operations

The strategic appeal of virtualization lies in its ability to reach beyond such concerns as reducing cost to enhancing growth with new and higher levels of business flexibility and responsiveness.

This advantage aligns closely with the evolving role of today's IT organization and its emphasis on helping CEOs achieve a business vision. CEOs today view innovation as the lifeblood of successful organizations. They see the integration of business and technology as imperative for innovative efforts designed to enable organizations to reach their highest potential.⁶

Highlights

Virtualization presents a significant opportunity for the CIO to contribute more to achieving business goals.

The role of IT in enabling business functions, in fact, is more important today than ever before. And the role of IT in driving business innovation – enabling differentiating capabilities that can create a competitive advantage in the marketplace – is reaching paramount importance.

A recent study, however, suggests that the IT organization should contribute more to advancing the enterprise. According to Forrester, only 28 percent of CEOs believe that IT offers proactive leadership in creating business innovation, and only 30 percent believe that IT provides leadership in improving business processes.⁷

It is precisely in the areas of innovation and process that virtualization can provide business and technical capabilities that the enterprise has never had before.

If the boardroom opportunity is ...

to improve operations and business processes as a means of achieving efficiencies ...

CIOs must ...

apply new technologies that can increase operational excellence and reduce complexity ...

in order to ...

reduce cost and enhance system availability, performance and flexibility.

Improving operations: power and cooling

Virtualization's ability to improve operations clearly addresses the growing need to reduce power and cooling costs. Consolidating and simplifying assets while increasing utilization can reduce the need to add equipment and reduce the consumption of power and cooling resources.

Highlights

Virtualization can be a powerful solution for keeping power and cooling usage—and costs—in check.

The ability to consolidate dissimilar applications can dramatically reduce the need for physical machines in the data center.

This is no small feat in areas such as storage capacity, which, in some organizations, is growing by more than 30 percent a year.⁸ According to Gartner, “Today, energy costs typically form less than 10 percent of an overall IT budget. However, this could rise to more than 50 percent in the next few years.”⁹

Equipment is becoming more energy-efficient and “green” all the time. But virtualization, coupled with green design, can provide the best solution to keeping power and cooling costs in check. That’s because the most energy-efficient equipment is equipment that’s not being used—whether it’s a server, a router or a storage device. All of these devices can be consolidated with virtualization, making possible savings and efficiencies that have been difficult to achieve through the design of even the greenest systems or buildings alone.

Improving operations: dissimilar applications

Virtualization can improve operations with new ways of enabling consolidation. It now has moved beyond consolidating servers running multiple copies of the same applications—file and print servers or mail servers or database servers together, for example. It is now possible to consolidate dissimilar applications—Web applications with databases, for instance—in ways that were simply not possible before.

Highlights

The result can be a simplified infrastructure with dramatically reduced need for physical machines in the data center. Such a reduction can contribute to power and cooling efficiencies. It can increase security and performance. It can drive down management costs. Each efficiency can enable the reallocation of monetary and personnel resources to business initiatives that executive management is pursuing.

Virtualization's ability to insulate users and applications from the underlying physical infrastructure also creates an unprecedented freedom of choice. Just as the Linux® operating system and Java™ technologies freed applications from being tied to specific hardware platforms, virtualization enables organizations to leverage existing infrastructures to mix and match technologies.

With virtualization, organizations need not fear that they are locking themselves into a single vendor – or locking themselves out of technologies that may become available in the future.

Addressing business issues that are key to the organization's growth

In order to enable organizations to do things they've never done before, virtualization must address concerns and needs that have traditionally been the province of business, not technology. It must, for example, help organizations be more customer focused, responsive to regulatory requirements, and able to take advantage of new venues and opportunities for growth. In each case, virtualization can be a key strategic move that provides ongoing business benefits.

To be most effective, virtualization must address concerns that traditionally have been the province of business.

Highlights

The explosive growth of information makes it critical to connect the organization with an enterprisewide view of data, not a siloed one.

Virtualization can improve the sharing, use and management of information—so business can derive more value from its data.

Ensuring trusted data for insightful decisions

The problem for many business users is not a lack of information—the problem is controlling, finding and digging through the information they have. With data growth often outpacing the ability to store, manage, integrate and deliver information, it is critical to connect different parts of the organization with an enterprisewide view of data, not a siloed one. It is vital to enhance security by eliminating duplicate copies of data and by limiting methods of access control.

The explosive growth of stored data, in fact, has prompted one analyst group to declare: “Storage virtualization will not be optional in the next-generation data center.”¹⁰

If the boardroom opportunity is ...

to quickly respond to marketplace opportunities by being more customer focused ...

CIOs must ...

ensure that the right customer information can be delivered to the right people at the right time in the right context ...

in order to ...

support faster, more informed business decisions.

By breaking down silos of applications and data, virtualization can meet business needs for information in ways that were not possible before—but that are absolutely necessary to effectively reach customers and respond more quickly to marketplace opportunities.

Highlights

Failure to align technology with business goals and policies can result in inefficient use of resources and even legal troubles.

By bringing together information from across business processes and functional silos, virtualization can improve how the business shares, uses and manages information. It can enable business to derive more value from both structured and unstructured information. The result can be greater business responsiveness and competitive advantage.

Aligning technologies, objectives and policies

Many technology investments do not align with corporate objectives or governance policies. Such a dilemma can easily occur when purchases and planning are based on project objectives, not organizational ones. And the effects of this disconnect can range from an inefficient use of corporate resources to legal trouble for executives.

The challenge to business and technology management, therefore, is to achieve control over the environment that they have not had before – and to make use of technology to meet business goals.

If the boardroom opportunity is ...

to create a strategic advantage by building an organization that is more fully integrated in its operations ...

CIOs must ...

establish governance policies that align IT practices with business goals and procedures ...

in order to ...

break down management and operational silos, protect the business by better responding to threats and risks, and comply with governmental and industry regulations.

Highlights

Storage equipment can be tiered, and service level agreements can make assets available when and where they are needed.

Instead of “future proofing” environments with extra equipment, organizations can adjust and provision resources as needed.

The pooling of information that virtualization enables can make data gathered for the compliance process also usable for daily operations. The protection against data loss—whether from human error, theft, or technical or natural disaster—and the recovery that virtualization enables make the technology a significant tool in reducing business risk.

Other benefits of virtualization can include simplifying and reducing the cost of disaster recovery. Unlike mirroring in the physical world, backup equipment in a virtualized environment does not have to be identical to the primary equipment—allowing lower-cost equipment to be used at the secondary site. Virtualization can also facilitate the tiering of storage, with the importance of the data matched with different classes of equipment.

Service level agreements can be established with greater confidence, because organizations can be assured that assets can be provided when and where they are needed.

And because virtualization enables the expansion of system resources without application outages, there is less need to “future proof” environments by purchasing extra capacity, a practice that can waste money as well as capacity. Many server environments, for example, operate at only 5 to 40 percent of capacity.¹¹ The typical storage utilization rate is only about 25 to 40 percent of capacity.¹² Instead, the capability to adjust resources and provision in a virtualized infrastructure can help an organization better use the capacity it has, while facilitating its ability to seamlessly add new resources when required.

Highlights

Leading providers of virtualization services, in fact, can virtualize as much as 80 percent of a heterogeneous infrastructure – up to 100 percent for storage – and can identify usage and performance issues in most of the remaining infrastructure.

If the boardroom opportunity is ...

to identify new revenue streams that will help the organization grow profitably ...

CIOs must ...

provide capabilities that enable rapid business process change ...

in order to ...

respond to ever-changing customer and stakeholder needs.

Virtualization can meet customer and stakeholder needs for higher levels of business flexibility.

Using flexibility to capture opportunity

Responding to customer and stakeholder needs requires flexibility in business and IT. But many systems and architectures are static; they are not built to handle today's requirements for speed and modularity.

By delivering new, higher levels of flexibility, virtualization can help connect people, processes and information. It can improve the organization's ability to absorb and apply processes gained from acquisitions, better anticipate the needs of customers, implement technologies and processes with less disruption to business – or achieve any number of game-changing business transformations not otherwise possible.

Highlights

Virtualization can provide the ideal foundation for a flexible, service-oriented architecture, and both have the ability to add, subtract and rearrange resources.

Holistic management tools are key to bridging technologies, breaking down silos and reducing complexity.

By increasing application availability and ensuring resiliency, virtualization can empower employees, customers, allied companies and suppliers to collaborate and transact business more effectively.

And virtualization can provide the ideal foundation for a service-oriented architecture (SOA). Like virtualization, SOA connects services from disparate sources, so that it is extraordinarily flexible. If new business needs arise, services can be added, subtracted or rearranged to provide what the organization requires.

Providing a holistic view of the business as well as its technology

A business focus for virtualization requires a move from nuts-and-bolts IT concerns to a holistic view of the enterprise. But IT functions must be tended. Technologies cannot achieve results alone. Holistic management tools and broad skills are necessary if the CIO and the IT organization are to bridge disparate technologies and service infrastructures and break down silos of information, equipment, processes and people in order to reduce complexity and achieve the desired alignment of IT and business.

Highlights

A holistically managed environment can help transform IT from a service provider with a static infrastructure to a resource for business flexibility.

A virtualized environment that spans the enterprise must—despite its size—be able to respond quickly to changes in the marketplace. So as the environment’s size increases, the need to view it holistically and manage it as an integrated environment also grows.

A holistically managed virtualized infrastructure can adjust resources to help provide flexibility and agility; it can bring information together across processes and functional silos for unified access; and it can control the infrastructure according to business priorities. It can fundamentally change the way IT delivers services to the business.

Virtualization can transform IT from a service provider with a static infrastructure to a resource for business flexibility in which modular components can be dynamically connected or changed to create new functionality—and business capabilities never before possible—on the fly.

Building on a solid foundation of intellectual capital and expert assistance

A virtualized IT infrastructure can enable the organization to focus on business strategy and innovation. It can help ensure that the business remains operational and available, meets ongoing performance objectives and becomes more competitive.

Highlights

Intellectual capital and established processes can add the understanding of business challenges necessary to create a leading-edge deployment.

But because business cannot stop for change—and because it may incur risk of disruption or failure in making change—the organization needs a firm foundation of intellectual capital and expert assistance if it is to achieve virtualization’s full benefits. Access to established processes and experience in successful virtualization implementations is essential.

Leading-edge virtualization projects go beyond computing hardware and software. They include a comprehensive understanding of the challenges facing organizations that want to innovate in the way they do business. They tap fully integrated business and technology expertise, build on patterns and practices that document proven and repeatable architectures and approaches, and employ tools and techniques developed by harvesting the best aspects of previous implementation projects.

Virtualization can provide the backbone for a wide range of business services. It can weave together processes for executing stock trades, enable a business-critical Web site to be taken offline for maintenance or upgrades while remaining fully operational on other equipment, provide the computing power necessary to accelerate product design and testing, or integrate storage data from radio frequency identification (RFID) tags on pharmaceutical packages to fight drug counterfeiting.

Highlights

Virtualization can help achieve near-term and long-term business objectives.

Such a solution can deliver business results in the near term – with increased IT flexibility to support follow-on initiatives. It can integrate existing investments – to extend their value. It can deliver experience that helps bring heterogeneous environments together – to help maximize the value of every component. It can provide attention to a full range of critical details – including security, information lifecycle management and financing.

Such a comprehensive process can help the organization achieve faster delivery, managed risk and sustained value across the consulting, build and operational phases of a virtualization implementation. In the end, the organization can achieve an alignment with business objectives at both the business strategy and IT services levels.

For more information

To learn more about how IBM can assist you in leveraging virtualization, contact Annette Miller at 1 402 399-4029 or anmil@us.ibm.com, or visit:

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