



BUSINESS ISSUES

It is widely acknowledged that business today is under ever increasing pressure to reduce operational costs while still ensuring that flexibility, service delivery levels, and business efficiency continue to improve.

Organizations are investing considerable time, effort, and hard cash to achieve this. The CIO and their IT team are expected to take a lead role in delivering both the savings on the one hand, and new IT systems which inevitably are seen as a requirement to help drive out these business improvements on the other.

Examples of some of these systems include Enterprise Resource Planning systems (ERP), Enterprise Content Management systems, and Information Life Cycle Management systems.

Each of these has, as a basic concept, the intention to take the fundamental functional requirements of an organization, which have been traditionally handled by isolated individual products, and to integrate all the individual data repositories, applications, and processes under the control of a single overarching IT system. Layering a level of intelligent workflow on top of this enables a common "highway" for interaction and exchange of information between systems, and therefore between the individual departments they serve.

Typically, projects of this nature look to review areas such as Human Resources, Supply Chain Management, Financials, Document Management, Content Management, and email management, with the ultimate aim of the IT team being to help the organization gain a competitive advantage through:

- Driving out the cost of IT infrastructure through more efficient use of available resources
- Responding faster to business change
- Increasing the consistency and predictability of operations
- Meeting the business' return on investment criteria
- Enabling scalable and flexible solutions
- Simplifying the infrastructure
- Increasing system availability
- Delivering consistently good performance
- Centralizing systems, data, and infrastructure

While there are examples of organizations that have introduced these new powerful application suites and re-engineered their fundamental business processes to fully leverage the benefits, many organizations are still struggling with the legacy of a general decentralization of IT infrastructure. This has been ongoing over the last 20 to 30 years as a result of developments in computing which has seen a move away from a strictly managed but inflexible mainframe environment to a more flexible but less stringently managed PC server-based one.

As a result, many critical line of business applications have grown up organically on ever increasing numbers of individual servers. Although often best-of-breed in their own vertical market space, these applications have for the most part been developed in isolation. This has led to each having their own specific requirements in terms of operating system, patch levels, driver requirements, security issues, etc., with little or no consideration of how they may have to co-exist with any other application. Consequently, when business requirement dictates the need for a new system, it is pretty much standard practice to deliver it on a separate server.

Another issue that organizations have to cope with now more than ever is downtime. Even those organizations that have well-coordinated suites of applications have to consider bringing them down occasionally to carry out routine maintenance tasks. A large percentage of organizations are now unwilling to allow system downtime during the business day and with business conducted more and more on a global stage, maintenance windows have shrunk considerably.

THE REALITY THAT MANY BUSINESSES ARE FACING:

- A need to look at business process to make the organization leaner and meaner
- Adopt as many elements as is sensible of the enterprise application suites available to help drive the process change and the efficiency gain
- Find a way to stage this change process to ensure total cost of ownership is controlled while return on investment is maximized

- Find a way to reduce the cost of managing legacy isolated systems and put a brake on the ever increasing numbers of servers and the proliferation of associated infrastructure and utility requirements
- Improve on areas of the service level that are directly affected by the availability of systems
- Improve the ability to recover systems quickly in the event of failure, and reduce the cost of doing so

VIRTUALIZATION AND HOW SHOULD IT BE USED

In order to help organizations tackle these issues, the IT industry has revisited an old idea which IBM has been using successfully within its mainframe environments for over 40 years – virtualization.

A great many people, certainly within the IT community, have heard of virtualization by now. There is, however, a question mark over how many truly appreciate just how significant an opportunity it represents. In short, virtualization is the most significant and exciting shift in the delivery of information systems to businesses since the inception of the microprocessor.

To many, virtualization equates to server consolidation and VMware. It is perfectly understandable that it should – it is thanks to pioneering work carried out by VMware in the late 90s that lead them to become the first vendor to develop successful virtualization on PC-based standard components without the requirement to make changes to processors or operating systems. In 2001, with the release of the ESX Hypervisor-based version of their server virtualization model, they were able to offer the first real opportunity to consolidate a number of physical servers into many virtual machines running on a single physical instance, with each VM being a completely encapsulated entity. This enabled organizations to begin to control the constant expansion of their physical data centers while overcoming the issues posed by individual application requirements.

Since then, VMware has worked hard to evangelize the benefits of a virtual server infrastructure, concentrating on the real cost benefits that can accrue from consolidation and the ability to be able to separate hardware, software, and operating system requirements within an IT solution.

Server consolidation has been the killer application for virtualization, with some organizations seeing consolidation rates of up to 30 to one. We are seeing more virtual machines being used to provide business critical applications rather than just in a development and testing role. However, if you are simply going to see virtualization as a way of shrinking your physical server farm footprint, then you are selling your organization short.

Virtualization is so much more than just about server environments; it promises the opportunity for forward-thinking organizations of all sizes to really deliver tangible business benefits. But it is not a magic bullet; there is any number of pitfalls for the unwary. However, to a large extent these can be avoided if some basic rules of common sense and good management practice are followed.

UNDERSTAND YOUR BUSINESS REQUIREMENTS

What is your business plan – are you looking to grow organically or by acquisition? Do you have a centralized or distributed infrastructure model? Do you make heavy use of the web? Where does your workforce spend most of its time? Are you looking to repurpose existing infrastructure or aggressively refresh? How dependant are you on your IT systems – can you afford downtime for a day, an hour, a second? What are your critical applications and how do they work?

GAIN AN UNDERSTANDING OF THE OPTIONS AVAILABLE

This is particularly important when considering virtualization, simply because of its diversity and potential to influence every area of your business and IT infrastructure. The key focus areas are:

Server virtualization: The market leader, VMware, is not the only player in the game. Microsoft obviously comes to mind with Virtual Server, and new releases from Virtual Iron and XenSource will certainly introduce a level of healthy competition.

Storage virtualization: It provides the ability to pool many different individual types of physical storage and manage these simply as logical pools of data which can be allocated to any number of different applications and services as required.

Software virtualization: It continues the common theme of abstracting the service or application away from its physical environment, enabling it to exist and run in any location. Virtualization enables the co-existence of applications on the same physical environment by encapsulating them so that everything they need to run is available to them within a virtual environment.

Virtual Desktop Infrastructure: VDI takes the concept of the virtual machine and uses it to run multiple PC client instances rather than server instances, thus virtualizing your PC requirements rather than having to run physical desktops in your organization. The benefits of VDI include:

- The ability to provide a unique environment for each and every user
- Each of these environments can be completely customized with different apps and settings without impacting other users
- Users can be granted more control of their own "virtual" desktop to allow them to install and modify applications if needed
- Applications that were not multi-user friendly can be run in this environment
- Users can have multiple desktops if required
- Corrupted or damaged environments can be quickly replaced
- Environments are fully backed up
- Environments are available at anytime, from anywhere

Data Center: (Network Virtualization) is really the logical development of the initiatives we have already covered. Further consolidation of the individual virtual environments

into a logical whole leads to a complete abstraction of these from any physical elements. Once infrastructure has become virtualized in this manner, it frees organizations up to treat their IT environment as a utility supplier. Storage and processing power can be allocated and used by services and applications as required, irrespective of the underlying hardware. Utilization of resources can be maximized without the risk of over provisioned capacity being wasted.

Develop a Plan: Every vendor is jumping onto the bandwagon as a way to sell product. Once you feel you have gained an understanding of the fundamental areas of virtualization, decide which of these are most important to you and develop your implementation plan.

Management and Control: Don't rush! If you don't have a history of service management, it is imperative you develop one. There is a trade off from the benefit that you get from virtualizing your infrastructure – management complexity!

Some organizations that have embarked on an unplanned process of server consolidation are falling into a trap of simply deploying more and more virtual machines to the extent that they over populate the physical host, leading to severe downturns in application performance and service level breach. There are also instances of VMs being created without any record of what they are being used for or by whom.

It is no point ignoring the fact that there are risks for a business that embraces a virtual infrastructure. However, good planning and management control coupled with good design will by and large negate them. Some of the key risks are:

- **Hardware failure:** Large scale consolidation inevitably means that you are potentially putting all of your eggs in one basket as you may have key processes, applications, and services running in virtual machines on fewer physical hosts. Obviously there is danger that a physical failure could have a more disruptive effect than if each of them ran separately on its own physical environment.
- **Over commitment:** A lack of understanding of the requirements of services, applications, or processor, and their interdependencies can lead to under or over provision of resources, poor performance, and unforeseen disruption to service.
- **Operational processors:** Without formal change control, configuration management discipline, and proactive monitoring, a virtual environment can quickly get out of control. It is very easy to replace physical server sprawl with virtual machine sprawl.
- **Skill shortage:** It is important to ensure your technical staff understands the principles of virtualization. However, while there are new skills that are specific to the virtual environments themselves – VM tuning, virtual network configuration, virtual storage configuration – there is also a need to develop other key skill areas such as:

o Incident and problem management.

- o Change and configuration management.
- o Capacity planning and management
- o Develop and enhance existing skills and competence

Although these risks are real, the good news is that there are a number of tools and methods to help negate them.

Any sensible organization will start with ensuring they have good operational processes – ITIL is possibly the most widely accepted approach to IT service management in the world. ITIL provides a cohesive set of best practice, drawn from the public and private sectors internationally. There is a wealth of knowledge that has been built up from the days of mainframe data centers which is absolutely applicable to the new virtualization paradigm. There is also a rich variety of vendors who have been developing toolsets to help organizations manage their virtual and physical infrastructure.

It is now possible to manage and automate many aspects of both the virtual and physical elements of an organization's infrastructure. The recent release of VMware's Virtual Infrastructure 3 makes it easier for organizations to dynamically aggregate hardware resources into logical resource pools, and optimally allocates them to applications running in virtual machines. Changes in workload can automatically trigger provisioning of additional resource or conversely when demand drops free up resource for use by other applications and services. In the event of a system failure, the failed VMs can be reallocated to additional physical resource and restarted from the point of failure.

Organizations such as VizionCore have developed products which deal with issues surrounding data management and protection in order to deal with high availability and business recovery. There are advances coming from the likes of Cassatt, which combine elements of service level management, system automation, and configuration templates to marry up business requirements to the entire system infrastructure. This holds out the promise of true on-demand delivery of processing capability.

2007 AND BEYOND

Virtualization is going mainstream; tools are becoming available to allow organizations to manage their

infrastructure in a cost efficient manner. IT teams are going to have to come to terms with managing a far more fluid infrastructure than they have been used to. There is a mindset shift required; the days of having one server with one application managed discreetly by the server admin team are over. The future is about good management controls, understanding the link between business processes and applications, and the interaction between application sets allied to infrastructure configuration and automation templates which allow changes in business demands to be dynamically mapped to real-time provisioning of IT resources and automation.

With the release of Virtual Iron 3.1, with Windows support and Xen Enterprise from XenSource, there is now for the first time real competition for VMware. This is going to drive down costs to the end-user and can only stimulate innovation.

Multicore processor technology from AMD and Intel is another factor which will ensure the successful uptake of virtual infrastructure. As more tasks can be offloaded to be handled by the processor, the normal performance overhead associated with running virtual machines will be significantly reduced allowing for near native performance of key applications.

VDI will begin to make inroads into organizations, especially those who need to regain management control of their users' desktop without adversely affecting the ability of their workforce to carry out some personalization of the PC environment. The ability to standardize the main configuration of the PC environment, reduce system management overheads, and simplify the physical desktop environment to a thin client without sacrificing the ability to run key applications natively is a compelling reason to move to VDI. So long as security and peripheral device support can be managed through the connection broker, uptake should be strong.

In 2007, virtualization has reached the point of truly being able to make a difference to business profitability. Management tools and techniques are now available and ready to be utilized. Those organizations who truly embrace them will have taken a major step ahead of their competitors who don't.