

white paper

The Virtualization Landscape to 2010

agility

Executive Summary

In a few short years virtualization technology has travelled a long way. Once a technology on the periphery looking for a business application, virtualization of IT infrastructure is underway in many larger enterprises and is definitely on the agenda of every forward-thinking CIO.

But the virtualization story does not end here. Virtualization is an evolving technology, as is the way it is used in the business enterprise and the innovations and productivity-enhancing processes it is spawning.

Virtualization plays an increasingly key role in enabling businesses to deploy a flexible IT infrastructure that allows them to quickly and easily respond to market changes – the agility provided by Real Time Infrastructure.

This white paper provides insights on the further evolution of virtualization now and through to 2010, what it will do to IT infrastructure, its role within business for those who embrace it and the detrimental impact on those who don't.

Virtualization: The Story so Far

The rise of virtualization technology in the modern enterprise was a response to IT capacity constraints in the business enterprise, particularly in the data center.

Over the last thirty years, computing power has become increasingly cheaper. As a result, bigger and more powerful IT infrastructure has delivered huge productivity and capability gains to businesses.

The CIO of recent times found it easy to add more and more inexpensive physical servers to their data center. But, as is usual when a resource is apparently cheap and its supply seemingly limitless, servers have often been used inefficiently. It is not unusual for a data center server to run, on average, at five percent of capacity.

The result has been 'server sprawl' - an inefficient situation featuring many servers with low utilization rates requiring enormous resources to manage whilst consuming vast amounts of greenhouse-gas producing power. For all its ingenuity, the technology world has had to face up to many traditional constraints: space and energy costs.

Virtualization's first big push into mainstream use was to combat server sprawl. By creating a number of virtual machines on each physical server and, therefore, increasing utilization rates, virtualization helped CIOs consolidate servers and slow the sprawl.

Sprawl Slowed, not Solved

However, the ease of creating virtual machines to run applications and business processes has (almost inevitably some would say) ballooned the number of virtual servers at many enterprises. The result is ‘virtual machine sprawl’ where the problem is not only limits to physical infrastructure, but our ability to manage potentially limitless capacity.

Infrastructure is becoming so complex and demanding to keep track of that IT heads are hitting space, staff and energy constraints in their quest to meet the accelerating demand for computing power.

Also causing concern is the question of who pays for what as costs cannot be easily allocated between IT and the business units when they want extra capacity.

Unisys believes that the increased automation possible in a virtualized server environment is key to managing IT infrastructure to support the real demands of the business.

Fortunately, we are now at the stage where automation tools and expertise are available. While mainframes have been automated for some time, the Wintel environment has become increasingly standardized, making the processes they run more consistent and suited to automating.

Virtualization was the first step to solving capacity constraints. But now automation addresses the management constraints.

For instance, some of the biggest issues in the data center are around managing patches, capacity and security. By identifying underlying consistent process and variables up front, many of these processes can be automated to negate the need for constant human intervention. This frees up resources and funds to invest in other areas of the business.

Workflow Automation: From Conscious to Subconscious Action

The complexity of managing modern IT infrastructure without automation is like the conscious brain operating the human body without using the subconscious. Imagine the seemingly simple task of picking up an object if you had to think about it – you’d need to identify the desired object, coordinate the appropriate arm and hand muscles to reach and grasp, and provision the other arm to respond when the load is sensed to be heavier than first perceived. It becomes an incredibly complex task but one, thankfully, humans can do automatically.

Similarly, automating a business’ IT infrastructure to “subconsciously” run the critical and mundane aspects of IT management will allow it to respond effortlessly, quickly and seamlessly to changes in circumstances – moving capacity where it’s needed, provisioning new servers and applications as demand spikes and running backups during slower periods.

Within an automated virtualized infrastructure a service governor acts like the conscious brain, setting the rules to be automatically carried out by orchestration software, the equivalent of subconscious and nervous system activity. Provisioning software is like arms and legs, moving resources to where they are needed. The hardware is the underlying skeleton.

Automation frees up the CIO and IT team to focus on the decisions and actions that will directly support the business objectives.

Look Ma, No Hands Provisioning

If the variation and complexity can be taken out of a process to make it more consistent, it can be automated.

Through the use of virtual provisioning software, provisioning and re-purposing of infrastructure will become increasingly automatic. Staff will physically rack once, cable once, and thereafter (remotely) reconfigure repeatedly, effortlessly, as needed.

An automatic infrastructure will rapidly change which servers are running what software and how those servers are connected to network and storage. It will re-purpose machines according to the real-time demands of the business. It will enable capacity to be "dialed up" or "dialed down". And it will bring up a failed server on new hardware, with the same network and storage access and addressing, within minutes. All without needing to make physical machine, cable, LAN connection or SAN access changes.

Rules-based Automation

The automated infrastructure will, of course, need a set of rules, and the provision of its demands from the business will need to be delivered in a structured manner. This rulebook will be the service catalog, essentially a huge database of functions an organization undertakes and the parameters for each - such as a description of the service, timeframes, SLAs, costs and actions required. And a runbook will provide step-by-step procedures for governing workflow.

In the automated infrastructure, these powerful workflow automation and management systems, with strict policy control, will:

- allocate resources to the applications and users that need them automatically in real-time
- continually monitor service levels to ensure business performance is on target
- provide a dynamic, on-demand environment, with support for the industry's leading virtualization, provisioning and re-purposing tools
- support major third-party servers, software and devices

The Ultimate Business Dashboard

On the governance side, the CIO will have tools to monitor and report on the performance of the automated infrastructure and its applications and services, and set policy and demand planning. These governance tools will enable them to view and manage the IT infrastructure by creating composite applications based on business priorities and activities - such as payroll, accounts payable and online sales. In collaboration with other components of the automated infrastructure, they will dynamically change the infrastructure to respond to changing business conditions.

Provisioning of Dollars, not Servers

Chargeback functionality will be integral to the automated infrastructure and key to its success. The CEO and CIO will know the demands the various business applications place on the infrastructure, allocate these costs accordingly and view outcomes in terms of the bottom line – profit and loss. It will lead to clearer decision making about resource allocation and viability of business plans.

Automation is the next step in the evolutionary chain, making technology do the business's bidding and driving growth, innovation and profitability. This will drive incredible cultural change within organizations as constraints are removed and management can drive innovation and growth knowing that IT can respond to the ever-changing priorities of the business.

Unisys Infrastructure Management Suite

Unisys, in conjunction with software partners, is at the forefront of automation.

Using leading-edge middleware from Unisys and its partners, along with Unisys services, the Infrastructure Management Suite solutions include:

- **Virtual orchestration**, which provides automated self-service provisioning and management of virtualized server environments
- **Disaster recovery automation and re-purposing**, which enables rapid re-purposing of infrastructure resources within minutes to support disaster recovery requirements
- **Test and development infrastructure automation**, which facilitates the transition to different systems and eliminates the manual effort, potential for error and time delay associated with provisioning servers
- **Automation and efficiency for production infrastructure**, which enables a pool of server resources to deliver just-in-time changes to accommodate business demand
- **Servers as a utility**, a custom solution leveraging Unisys outsourcing services expertise, which enables flexible provisioning of servers to support business-critical applications
- **Data center migration**, another custom solution, which draws on Unisys best practices and services to help clients more efficiently create data centers or transition to new ones

The innovative middleware underpinning the Unisys Infrastructure Management Suite solutions is based on software from key partners as well as from Unisys. It allows clients to create a sense-and-respond infrastructure for automated, real-time infrastructure management. The key components include:

- **Unisys uAdapt** software, which enables re-purposing of server assets on demand in real-time. It is based on software from Unisys partner Scalent Systems
- **Unisys uOrchestrate**, based on software from Unisys partner Enigmatec Corporation, which automates key IT processes that run the business – for example, keeping service level agreements (SLAs) within policy
- **Unisys uChargeback** software, developed by Unisys, which oversees and measures resource usage, enabling costs to be charged back to the responsible business organization

Later in 2008, Unisys also plans to add software capabilities for service governance and provisioning to the suite to control the way IT resources support critical business applications and automate allocation of IT resources according to application needs, respectively.

Unisys Infrastructure Management Suite solutions provide flexibility for a client to begin deployment at any point, whether through architecture services, business process or applications services, or at the infrastructure level.

Path to Automation

CIOs should be confident that deeper virtualization and automation will be the way of the future. It is clearly the logical route for computing, enabling a true Real Time Infrastructure that offers businesses an agile IT structure to quickly respond to market changes. Moreover, aspects of automation are already being implemented. Server re-purposing and provisioning software is now being used in larger enterprises. And as we move towards 2009 and 2010, increasingly sophisticated service catalog, runbook and governance technology will automate previously manual functions.

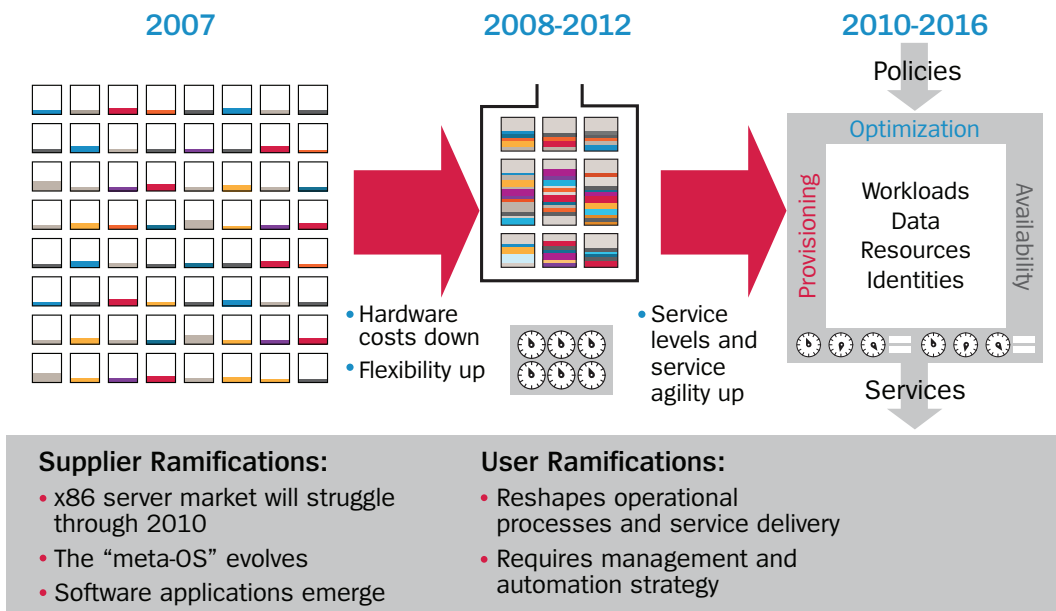
Soon after, there will come a tipping point. Enterprises who have stayed on the sidelines of the automation revolution will join the party, as the gains of automation – increased flexibility and agility – impact heavily on their ability to compete and innovate.

Virtualization: Liberating Software

Conventional computing machines, be they the PC on your desk or the server in a data center, are built on a well-established schematic. At the base is the physical hardware consisting of processors, hard drive, motherboard, memory and all the other physical elements encased in the hardware box. Above this sits the operating system such as Windows or Unix. Finally, a range of applications sits on top.

Virtualization breaks the one-to-one connection between the physical machine and its operating system. Virtualization technology inserts a layer (either below or above the original operating system) that allows multiple and different operating systems to run on one machine or, indeed, across several connected machines.

In effect virtualization has liberated software from its physical hardware or from a particular location. Looking at it another way, once virtualized, the underlying hardware in an organization can be viewed as one continuous resource, to be sliced and diced as per the organization's needs, rather than as a set of discrete server-size units.



Source: Gartner “The Virtualization Landscape to 2010”, Phil Sargeant, 2007.

Some Predictions

In relation to the likely trends in virtualization and automation, Gartner analyst Phil Sargeant states that when it comes to virtualization: “[it] will be one of the most significant trends in infrastructure and operations through 2010, changing: how you plan; how, what and when you buy; how and how quickly you deploy; how you manage; how you charge; technology, process, culture.¹”

At the data center level, Gartner sees a steady move from the poorly utilized physical machines we saw in 2007 to increased virtualization in 2008 through to 2012. More advanced automation of the data center will take place from 2010 to 2016. The industry analyst predicts a mature hypervisor (the virtualization software) for the x86 servers will essentially be free by the end of 2008, driven by fierce supplier competition for market share. This need for virtualization software, in tandem with falling costs, will see more than four million virtual machines installed on x86 servers, around 20 percent of the total potential market, according to Gartner¹.

One of the implications of better utilization rates will be a slowdown in the x86 based server market.

The Do Nothing Alternative

One way of looking at virtualization is that it enables organizations to keep up with Moore’s Law, the rule of thumb that computing power doubles every 18 months or so. Without the virtualization of physical machines, organizations are unable to absorb all the additional computing power contained within the new servers they own. In fact they are stuck with utilization rates of 10-15 percent.

These organizations will struggle relative to quick-footed competitors achieving 85 percent utilization rates with the associated flexibility and agility to respond and be accountable to business needs and opportunities that come from an automated infrastructure.

As such, it is inevitable that all cutting-edge, computer power-intensive entities will become virtualized and automated. The alternative is a lack of agility, longer timeframes to adapt and, possibly, extinction.

¹ Source: Gartner “The Virtualization Landscape to 2010”, Phil Sargeant, 2007.

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