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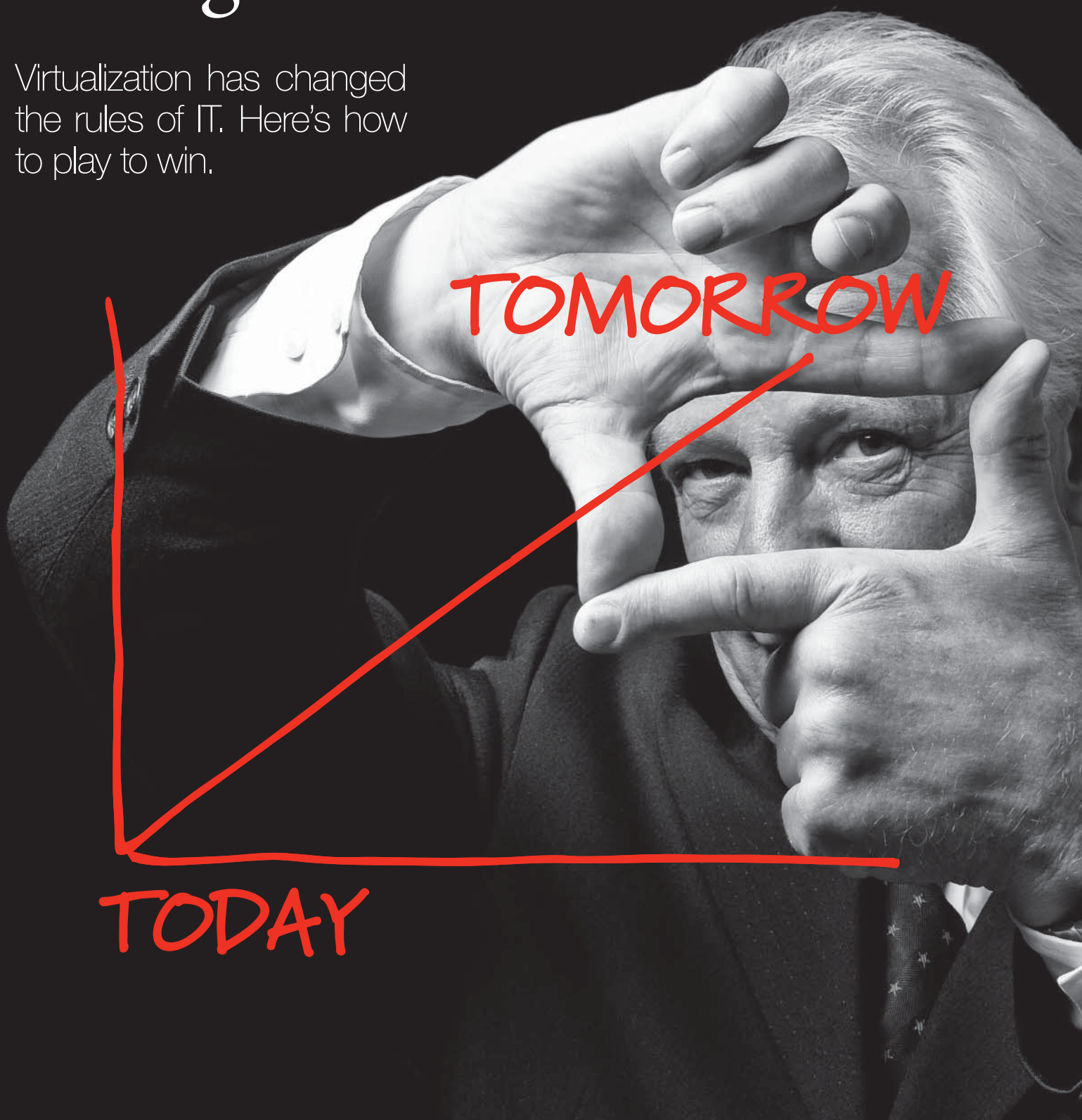
Business and technology working as one

Virtual Game Changer

Virtualization has changed the rules of IT. Here's how to play to win.



Virtualization technologies have set in motion a comprehensive transformation of IT.

Benefits

Easier Maintenance
When you separate and abstract the hardware layer with virtualization, you don't need to deal with all of the details of specific device drivers for one machine or another, or patching from one vendor to another. The hardware layer becomes much further removed and a less significant part of the overall management strategy.

Virtualization is not only creating a more dynamic IT environment, but it is also shifting the role of IT departments from a support role (i.e., cost center) to an active participant in the development of a winning business strategy.

As a result, virtualization requires you to think about what you are trying to accomplish in fundamentally different ways. The one-to-one ratio of applications to servers is only one of the conventions that have been retired. Systems that would have taken weeks, if not months, to deploy in the physical world can be deployed in hours in a virtualized environment. The implications of these changes are both profound and vastly desirable.

More than Consolidation

Initially pursued because of the dramatic savings from server and storage consolidation that it made possible, virtualization is more than just a compelling technology that allows you to do the same things better, faster and cheaper.

Often described as a journey, virtualization has taken IT to new horizons from which whole new sets of opportunities come into view. Simply put, you can do things you couldn't before: centralized control of a distributed environment, for example. Levels of disaster recovery that would have been prohibitively expensive become affordable. Run-of-the-mill Windows machines, and the services they provide, now inherit high availability and fault tolerance by being part of a virtualized framework.

Virtualization in the x86 server and desktop world has received the most attention in recent years, but on the UNIX platform, where the large corporate databases still reside, virtualization—under the less evocative handle "partitioning"—has been going on for decades. No virtualization strategy is complete until it spans the x86 and UNIX hemispheres of the IT environment.

The possibilities with virtualization are so far-ranging that a best practices approach needs to include periodic critical assessments of where you are and where you want to go.

"Too many organizations fail to follow through after their initial virtualization efforts and end up missing out on the full benefits of virtualized data centers," says Logicalis Vice President of Data Center Solutions Kevin Gruneisen. "A thorough assessment, as well as frequent checkups, can help them measure the benefits of what they have done. It should also establish a vision for what is yet to be accomplished through strategic virtualization of their IT infrastructure."

Benefits

High Availability
Physical servers, by virtue of becoming virtual servers, inherit the high availability with failover redundancy that the virtualization layer provides in a virtualized environment.

This story looks at different key stages along the virtualization journey. They include:

- Consolidation
- Disaster recovery (DR)
- Virtual desktop infrastructure (VDI)

Although most organizations have approached these stages sequentially, they don't have to be completed serially. Virtualization is not a linear process. IT leaders who understand that virtualization changes everything—including their roles—are going to propel their organizations and careers with a powerful competitive advantage.

Cheaper, Faster, Better

The consolidation of physical servers to virtual servers is not a new concept. The term has been bantered around in storage and UNIX markets for more than a decade. What gave it buzzword status were virtualization tools like VMware, which made it possible to consolidate the very Wintel platform that opened the Pandora's box to rapid IT decentralization in the first place. Now that virtualization makes it possible to consolidate the Wintel world, there is no element of your technology environment—including servers, storage, desktop and networks—that cannot be reconfigured in a more effective and efficient form.

Examples of the benefits of consolidation through virtualization abound: For example, one Logicalis customer with more than 750 servers had run out of room, but not out of demand, for more capacity. Consolidating the number of servers by a factor of more than 26 to 1 solved this customer's crisis. It also slashed the cost of energy for its data center from $1.3 million to $77,000 during a five-year period.

Another organization consolidated 94 servers down to four. In practical terms that amounts to an effective reduction of its server environment—including power, floor space and cabling—by 96 percent.

Layers of Benefits

The benefits of virtualization extend well beyond consolidation. When you separate and abstract the hardware layer with virtualization, for example, you still require maintenance for your physical devices, but you don't need to deal with all of the details of specific device drivers for one machine or another, or patching from one vendor to another. The hardware layer becomes much further removed and a less significant part of the overall management strategy.

Another benefit of the separation of hardware and software layers into a stack is that physical servers, by virtue of becoming virtual servers, inherit the high availability with failover redundancy that the virtualization layer provides in a virtualized environment.

A Logicalis customer got an unscheduled demonstration of the redundancy that is inherent in virtualization when the power went out in the building, a UPS failed and one of the four newly installed physical servers—each running four virtual servers—shut down entirely. Without incident, the virtual servers automatically switched over to a different physical server, so there was no interruption of service.

Anticipating such an event is why Logicalis establishes a conservative capacity threshold on physical servers. By doing so there will always be enough capacity to accommodate additional virtual servers if (or when) the need arises.

Planning is Everything

Planning for virtualization is its own specialized skill set. Because virtualization involves pools of resources—not just individual applications or systems—planning and designing a virtualized environment requires a comprehensive scope and approach. A strategic plan needs to take into account all of the functionality that will be provided, anticipate how the different applications will interact and provide room for ad-hoc adjustments. Virtualization establishes a very dynamic IT environment, which means, by definition, that things can change. And they will.

No other single technology has the potential for such far-reaching effects on an organization. A successful virtualization campaign, as a result, needs to involve more than just the IT department. It needs executive support for the policy and procedure changes that it will require. And, of course, the finance people have to understand the value to the bottom line that it represents.

Logicalis takes its evaluation beyond just the technology and provides its clients with a detailed analysis of the financial implications of different virtualization choices, including financial modeling to establish the return on investment (ROI), total cost of ownership (TCO), net present value (NPV) and other calculations favored by CFOs. This analysis also helps the IT department support its case for a long-term virtualization strategy.

> "Virtualization is not an IT strategy in and of itself. Virtualization allows you to drive great utilization of your infrastructure, to get more done with your management resources, but you still have a policy and process in place for recovery, for support, for patching...whatever it may be. You can't just virtualize everything and hope for the best."
>
> — Kevin Gruneisen
> Logicalis Vice President of
> Data Center Solutions

Once you have a plan, of course, you have to be prepared to change it on a regular basis. Capacity planning and asset management are never finished. They have to become a way of life.

Hazards of Success

The alternative to systematic planning has proved to be a major disappointment. Unfortunately, once virtualization has been established in the test development environment, there is a tendency to push everything into the virtualized world—including legacy systems that would have been better decommissioned.

An ironic hazard of the success of virtualization is, because it is so easy to deploy servers, the very server sprawl that consolidation curtailed in the physical world too often gets replicated in the virtual world, and at a characteristically rapid pace.

Not long after consolidating 200 physical servers down to 20, for example, one IT director was shocked to find he had 400 virtual servers running in his data center.

Rapid deployment of systems is a huge benefit for IT departments responding to short-term demands from their business users. The old setup procedure that involved detailed requirements, specs, approvals, shipping, physical configuration and finding a spot on a crowded data center floor typically consumed several weeks; it did, however, have the advantage of giving everyone involved ample time to reconsider. The tendency to rack 'em, stack 'em and forget 'em happens very quickly in a virtualized environment.

One of the false expectations of virtualization is that it makes everything simpler. In fact, even if you had 10 applications on 10 servers and through virtualization you now have 10 applications on one server, you still have 10 applications to manage.

"Virtualization is not an IT strategy in and of itself," Gruneisen notes. "Virtualization allows you to drive great utilization of your infrastructure, to get more done with your management resources, but you still have to have a policy and process in place for recovery, for support, for patching…whatever it may be. You can't just virtualize everything and hope for the best."

Monitoring and Management

It's easy to lose sight of everything you have in your IT environment once it is virtualized. When your servers and applications are running in pools of resources, there is no little red light you can see across the data center telling you a specific server is running. When the server in question exists in a pool of resources, you can't walk across the room and jiggle the plug.

To provide monitoring and management for its clients with virtualized IT environments, the Logicalis managed services team employs a broad range of sophisticated systems management tools, as well as ITIL-based best practices and a range of skills that literally spans all aspects of the IT infrastructure. Several dashboards of monitors provide real-time status of every system and are calibrated to performance levels and capacities to optimize efficiencies. These are not core competencies of most IT departments.

The good news is the level of centralized control that virtualization makes possible takes systems management to an entirely new level. Organizations today are implementing dynamic data center environments consisting of pools of high-performing computing resources that can be centrally managed, readily automated and efficiently maintained. Security and compliance are built in instead of bolted on, and the upgrade path is evolutionary instead of disruptive.

Improving Your Odds

The relative ease and affordability of implementing an effective DR strategy with virtualization is of particular appeal to IT directors who have been leaving the office every day for years with their fingers crossed, hoping that no data disasters happen before they return.

Hope doesn't always work. Stories abound about organizations that bet against the odds for too long: a chipmaker that was unable to place orders for two weeks, or a hospital that was hacked into by an ex-employee. Disasters can be caused by a wide variety of sources, including floods, fires, hurricanes or a reckless backhoe driver. Many are acts of nature, but a surprising number are caused by people and range across a scale of maliciousness, from sabotage and viruses to good, old-fashioned incompetence and honest mistakes.

The consequences can be devastating. According to research by the U.S. Bureau of Labor, 93 percent of companies that suffer a significant data loss go out of business within five years.

Before virtualization, DR was so expensive to implement that organizations had to choose only the most critical applications to protect and hope for the best for the rest. With virtualization, DR can now be provided for a much broader range of applications and data.

There are as many levels of DR as there are IT infrastructures. Determining the appropriate technology is actually the easy part. An often more difficult challenge is negotiating internally what levels of risk different departments within an organization are willing to accept for their applications and data.

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The two key considerations to determine acceptable levels of disaster recovery are:

- Recovery Time Objective (RTO)—How fast data must be recovered
- Recovery Point Object (RPO)—How much data you can afford to lose.

"Immediately" and "none" are the two most common answers from department heads.

Once realistic recovery parameters are identified, developing a tiered strategy that meets the specific requirements and budgetary constraints of your organization is relatively straightforward.

Virtual Desktop Infrastructure

The latest hot spot in the virtualization trend is VDI, which is the separation of a PC-desktop environment from the physical machine through a client-server computing model. The resulting "virtualized" desktop is stored on a remote central server instead of on the local storage of a remote client. All of the programs, applications, processes and data used are kept and run centrally, allowing users to access their desktops on any capable device, such as a traditional PC, notebook computer, smartphone or thin client.

Desktop and notebook computers represent the last great frontier of Wintel decentralization to be conquered. The incentives are huge. Just the costs of managing multiple PC platforms with their characteristically fluid—user-influenced—configurations is overwhelming computer help desks around the world.

"VDI is a more complicated and more textured environment than the data center, but it is one that will produce higher rates of return than classic virtualization once the soft costs are factored in."

— Dave Kurtz
Logicalis Financial
Assessment Analyst

Kurtz should know. He's responsible for the financial analysis that Logicalis includes with all of its virtualization assessments and is in the position to have a detailed understanding of exactly where the costs are in the IT environments of literally hundreds of Logicalis clients.

"VDI reaches deeper and deeper into a company," Kurtz says, "so you have to look at both the hard and soft costs to see the whole picture." He says the returns from VDI will typically come more from savings on operating expenses and improvements to productivity than classic hard-costs savings. For example:

- The primary hard costs savings from VDI will come from the cheaper price and longer life of thin clients. The useful life of a thin client, for example, is six to seven years compared to four years for a notebook. They cost less and last longer.
- Thin clients are vastly easier to manage than PCs. They are easier to patch and upgrade, and they have slower generational changes so you are not swapping out newer versions all the time.
- Backups are inherently easier with VDI. Because of the centralized server architecture, everything is backed up centrally, which is easier on data center operations and eliminates local drive issues.
- All of the above means that demands on help desks are dramatically reduced. And if there are problems, it's easier to troubleshoot standard images and integrate applications with standard hardware. End users also require less training because of standard images.
- From a regulatory and compliance perspective, because all of the data and applications are centralized, VDI makes it vastly easier to put in place better processes and procedures to ensure security, privacy and other best practices.
- VDI also converges with and empowers telecommuting and contributes to higher productivity, better morale and lower office space expenses.

Art and Science

Accurately calculating hard and soft costs is part art and part science in any environment. One of the challenges in managing a virtualized environment is allocating the costs of IT resources back to the individual departments that are using them. Meeting this challenge holds the promise of finally getting the IT department out of its traditional role as a cost center and into a new role as a service center that provides computing capacity as a utility.

Cost accounting a virtualized environment—including the ability to align IT assets with revenue sources—is going to be increasingly important as private virtualization environments begin to engage with public cloud computing services.

The idea of paying for only the computing power you use is very compelling to most business department heads, but the reality is both more complex and expensive when you actually identify all of the costs associated with maintaining and managing a fully functional enterprise-level computing infrastructure. Using sample data from existing virtualization assessment studies, for example, several cost comparisons conducted by Kurtz showed that paying for the same capacity and level of services from Amazon would cost more than providing the complete utility in a well-designed, virtualized internal data center.

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Just as virtualization isn't a panacea for all of IT's problems, neither is cloud computing. Both represent evolving and expanding sets of options. Getting the most from either an internal or external cloud requires a detailed and comprehensive understanding of your organization's current and future computing needs, including both the capacity and the services it will take to meet them.

The reality is that very few IT departments are going to be able to provide all of the computing capacity, systems management and associated skills they need to succeed today without delegating sets of requirements to others through selective outsourcing.

Just as businesses no longer generate their own electrical power, they will no longer need to provide all of their computing power. Virtualization has accelerated the transition from self-contained, isolated data centers to overlapping pools of resources that will form a computing grid that may one day be as ubiquitous as electricity.

The challenge and role for IT leaders going forward are to choose which are core competencies that only they can perform and which select aspects of their overall computing needs they can delegate. Making those choices is a high-level function that will require IT leaders to participate directly in the development and execution of an organization's overall business plan.

Virtualization has raised the bar for IT performance in the marketplace. Today you need to use virtualization just to stay in the race. To win tomorrow's race, you will need to use virtualization smarter than your competition.

Seven Best Practices for Virtualization

The following best practices can help you realize the full scope of benefits available from a comprehensive virtualization strategy:

1. Think differently. Virtualization is more than just a compelling technology that allows you to do the same things better, faster and cheaper. Getting the most from virtualization requires you to think about what you are trying to accomplish in fundamentally different ways.

2. Re-evaluate routinely. A successful virtualization strategy needs to be based on a critical assessment of where you are and where you want to go. Keep in mind that once you begin virtualizing your IT environment, where you are and where you want to go become very dynamic points. New tools and new capabilities emerge routinely.

3. Virtualize strategically. Too many organizations virtualize applications that would be better decommissioned. Just because you can virtualize something doesn't mean you should. Virtualizing a problem does not make it go away.

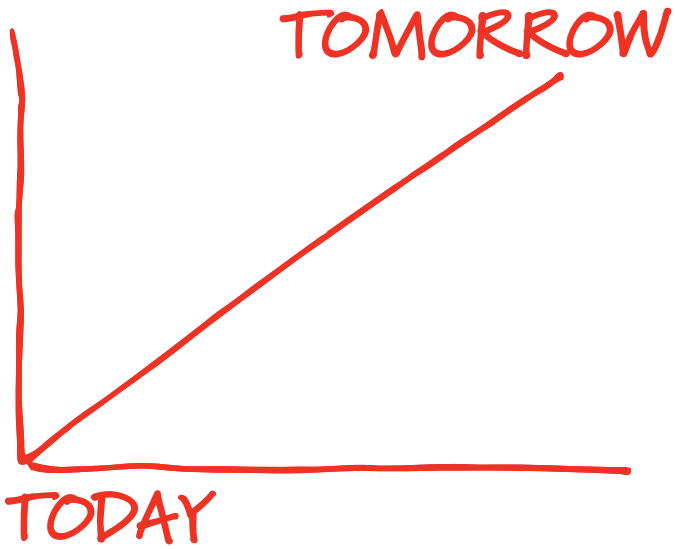
4. Change carefully. Change management procedures need to be refined and adhered to. Rack 'em, stack 'em and forget 'em can happen very fast in the virtualized environment.

5. Allocate costs. Accurate cost accounting of both hard and soft costs needs to be clearly articulated to ensure the true cost of conducting business is understood. Identifying costs makes it possible for IT to charge business units for the resources they consume, or to at least show the CFO the role IT plays in bringing in revenue.

6. Involve key stakeholders. A successful virtualization campaign needs to involve more than just the IT department. It needs executive support for the policy and procedural changes it will require. Business leaders need to see how virtualization serves their goals. The finance people have to understand the value that virtualization represents to the bottom line.

7. Monitor and manage. Monitoring and management of virtualized IT environments require a broad range of sophisticated systems management tools, as well as ITIL-based best practices and a range of skills that literally spans all aspects of the IT infrastructure. If these are not core competencies, then outsource them to a trusted partner.

These decisions involve stakeholders outside IT ranging from compliance officers and HR directors to the CFO, as well as most of the occupants of the executive suite.



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