TECHNOLOGY MARKETER’S PLAYBOOK TO ENTERPRISE VIRTUALIZATION
The Technology Marketer’s Playbook for Successful Enterprise Virtualization is a go-to guide that presents a practical, bird’s-eye view for enterprises looking to virtualize their IT operations. Successful Enterprise Virtualization helps you assess whether your organization should virtualize, the impact of it on the corporate bottom line, and what you should expect before and after. Our Playbook links you to a bunch of virtualization quizzes, provides some important checklists, and points you to detailed security and implementation ‘to do’s. Since we research closely related areas such as cloud computing and the software-defined data center, we’d value your comments.
Introduction

A 2013 survey by the Blackstone Group showed top executives were convinced that virtualization made good on its claims: cost reduction, efficiency improvement, and business continuity. In fact, today, around 7 out of 10 server deployments worldwide are virtual. As many as 86% of large businesses use virtualization to some degree. Businesses are looking to virtualize their IT, keen to re-architect their infrastructure and seamlessly scale their enterprise computing, data, and networking loads.

But virtualization projects are still considered among the most difficult enterprise IT initiatives to deploy. Of the organizations which have server virtualization in place, 44% are iffy about deployment success. Enterprise virtualization can be a complex, high-stakes challenge. The technology demands that you revisit the fundamentals of hardware-software coupling and break away from traditional operations, addressing the unique features of your enterprise environment.

Yet virtualization is inevitable. It’s a powerful lever for cloud-based operations, data center centralization, virtual desktop infrastructure (VDI) implementation, ‘bring your own device’ (BYOD) enablement and service-as-a-software (SaaS) deployment. That’s why we’re happy to bring you this playbook, which will tell you how you can make enterprise virtualization successful in your organization.

But before you wade in, want to check your virtualization IQ? Try the quizzes here:
http://whatis.techtarget.com/reference/Virtualization-Quizzes

And if you feel you’d like to take on more, here’s a quiz from one of the top players in virtualization:
http://searchvmware.techtarget.com/quiz/VMware-terminology-quiz-Do-you-speak-virtualization
1. WHAT IS VIRTUALIZATION?
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WHAT IS VIRTUALIZATION?
What Is Virtualization?

Virtualization can be defined as a technique that hides the characteristics of physical or actual computing resources – desktops, applications, servers, storage devices, and networks – from the users of those IT systems and re-presents those resources in a logically abstracted, reconfigured manner.

Virtualization can thus make multiple physical or actual computing resources appear to a user as a single logical resource or vice versa.

Virtualization is a powerful and increasingly popular technology that prepares you to move to the cloud, make your data center highly efficient, and implement a strong enterprise BYOD policy.

The logical view that virtualization generates of your physical IT infrastructure is made possible by a hypervisor – a layer of software that abstracts your actual desktop, application, server, storage, and networking resources and presents them on a single map.

Virtualization lets you view your multiple physically or geographically distributed IT resources as consolidated entities. Depending on how you wish to allocate these resources to the business, you can dynamically group and re-group CPUs, memory, applications, storage devices, and network elements to set up a range of virtual operating environments or "machines" (VMs). In IT strategy, virtualization packs a punch.
Five Types Of Virtualization

Five basic types of virtualization apply to large enterprises – desktop, application, server, storage, and network virtualization.

1. Desktop Virtualization

Desktop virtualization (a.k.a “client virtualization”) is the process of relocating a desktop PC’s OS, programs, and hard disk from the PC’s “box” or cabinet (where these typically reside) to one or more centralized servers on the organizational network. The desktop then becomes an input/output device and the set-up is known as Virtual Desktop Infrastructure (VDI). End-users do not notice the difference between working on a standalone PC and a virtualized desktop because the required resources are served to the desktop in real time. VDI is used also to virtualize tablets, smart phones, and other handheld devices that employees carry with them into the company.

2. Application Virtualization

Large companies commonly use business applications for Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Business Intelligence (BI), marketing analytics, asynchronous and synchronous communication (e.g. email, text chat, and video conferencing), collaboration, etc. Such organizations also need middleware and database platforms. Application virtualization covers the virtualizing of these. It involves de-linking all these categories of software from the organization’s OSs and hardware. Thus, the applications can be served to users as, when and from wherever needed, impacting minimally other applications on the network even during upgrades.

3. Server Virtualization

Server virtualization, the most ubiquitous type, abstracts server resources – the number, location, clustering, apportioning, scaling, and backup of physical servers, CPUs, and OSs – to dynamically meet users’ needs. This results in reduced Total Cost of Ownership (TCO), high utilization, low downtime, quick recovery and enhanced business continuity. Virtualizing servers to consolidate enterprise computing enjoys a prime position in virtualization because of the considerable cost savings and efficiency improvements it brings to organizations.
4. Storage Virtualization

Large company networks are characterized by a myriad physical storage devices distributed across the company’s business locations. Storage virtualization plays a crucial role here because organizational data volumes are exploding, having crossed the 2.5 quintillion mark daily, as of mid-2012. Storage virtualization creates logically consolidated storage capacity which can then be redistributed and reallocated flexibly in real time. Storage Area Networks (SANs) are common instances of its efficacy.

5. Network Virtualization

Corporate networks, like their storage elements, have acquired a level of complexity that poses a serious challenge to effectively and efficiently managing them without virtualizing those resources. Network virtualization pools network resources, allocates bandwidth and divides traffic among available channels. Depending on requirements, it creates independent, real-time flows that dynamically balance loads on servers and devices. Thus, network management becomes simple, fast and accurate.

Why Virtualize?

Let’s say a department in your organization uses three servers at peak time to meet customer transaction loads, testing and Quality Assurance (QA) requirements. But, during off-peak hours, only one server’s enough. Now, the department has excess capacity, which is under-utilized. Thus, capital costs, and cabling, cooling, power, and running costs are wasted. So is the physical space required for the servers, not to mention the human capital for managing and maintaining both hardware and software.

But if the department virtualizes the servers and data, it can share its CPUs and storage with other departments, during off-peak timings. This would raise capacity utilization significantly and minimize wastage, while cutting back drastically on costs. In fact, utilization could easily double or even triple, and the savings re-allocated, saving corporate dollars.

With the VMs thus created, all departments sharing the physical infrastructure could move around their data and applications as and when needed. This could make data backups, crash recoveries, hardware and software upgrades, installations, testing and QA activities possible without system downtime or performance loss. Users would not have their work disrupted, productivity would improve, and the organization would enjoy business continuity.

Virtualization could also automate dynamic VM availability and enable auto-booting the network and storage connections for VMs, making the process fast and foolproof.

Read on, to find out how you can get these and more done at your organization.
Benefits Of Virtualization

It’s a story every business leader knows. Enterprise IT budgets are coming increasingly under pressure. Return On Investment (ROI) expectations from IT infrastructure investments continue to mount. But what isn’t such an old story is the silver lining – virtualization – an opportunity for top execs to cut costs, enjoy productivity gains, and ensure business continuity.

Virtualization not only leverages your company’s costs and resources, it promises to make your organization’s ecosystem more solid, nimble and responsive. Virtualization can re-cast your IT as an innovative, business-strategic function. Virtualization works on two key fronts – cutting costs and boosting business efficiency – that result in seven advantages for your enterprise.

✔ Expense Reduction

Reduction in server and desktop infrastructure costs is virtualization’s most important advantage. Consolidating these hardware categories results in increasing utilization rates to as much as 60%-80%. Less hardware also means lower electricity consumption and a smaller carbon footprint, which are otherwise concerns at many businesses, given the thrust on slowing global warming.

✔ Hardware Consolidation

Virtualization allows using fewer servers per application, consolidating applications, and eliminating server sprawl. This, in turn, means cutting back on expensive commercial floor space and lowering hardware & maintenance costs by as much as 50%.

✔ Productivity Enhancement

Virtualization simplifies your IT operations. With fewer applications, storage arrays and servers in the enterprise, less human effort is needed for routine administration. Thus, your IT teams are free to take up strategic, value-added, and business development activities, including customer relationship management transactions, especially if your organization runs a small or mid-range business. IT need no longer be a cost item.
Downtime Minimization

Since the VMs you create during a virtualization exercise are pieces of software that runs and manages your physical IT assets, they – and the data they manage – can be moved easily from one asset to another. This means that backup, recovery, upgrade, installation, testing, and QA can continue without disrupting business-as-usual, thus protecting your systems from succumbing to downtime.

Swift Disaster Recovery

An allied benefit is faster and simpler Disaster Recovery (DR) which, as explained above, correlates with shorter or minimal downtime in virtualized environments, including that for smaller organizations. Virtualization enables you to switch cost effectively to an alternate virtual site, from where your critical operations are restored. In contrast, traditional businesses must fork out significant sums to acquire and deploy DR and business continuity solutions.

Improved Responsiveness

Virtualizing your IT enables your infrastructure teams to set up, manage, monitor and re-distribute resources dynamically, flexibly, and efficiently, scaling allocations up or down, as needed. Besides, automation solutions for virtualized systems are also available. Virtualization therefore frees your IT workforce to become more responsive not only inter-departmentally but to external customers as well.

Asset Protection

Virtualization helps enhance security of your enterprise data across the corporate network. Thanks to consolidation, your IT team can apply security patches on the go, while moving applications from one VM to another, without any disruptions in business. Also, since the number of physical assets is lowered, your business is protected better.
WHAT TO CONSIDER BEFORE EMBARKING ON VIRTUALIZATION?
What To Consider Before Embarking On Virtualization

Here are some common questions to answer before starting your virtualization journey:

**Will virtualization be good for my business?**

Yes, provided you intend to consolidate your hardware so that you can lower your costs and make your business resilient. Stay focused on these objectives. Develop a complete inventory of all current application servers. Plan for hardware redundancy. Decide your compute, storage, and network strategies. Do a workload analysis. Choose a platform that can scale. Don’t miss on budgeting for licensing and support costs associated with the virtualization infrastructure you will acquire.

**What about resource-intensive hardware or applications?**

Leave till the last the virtualizing of computers or software that hog computing resources, e.g. RAM, disk I/O operations, and CPUs, such as streaming video and transaction processing systems. Keep them instead in their physical boxes or dedicate a single host to them. Needless to say, you must try to minimize such instances, or be prepared to erode value from your Enterprise Virtualization.

**Should I take the big-bang or the phased approach?**

Applications may fail to run, post-virtualization. So, although this is nothing new when installing new systems, make sure you carry out capacity planning thoroughly and virtualize low-utilization applications first. Provision resource intensive applications in phases, and mission-critical applications last. At each stage, test the virtualization and consult your hardware vendors on issues like compatibility and efficiency.

**How do I address compatibility and efficiency?**

These are critical features for the infrastructure to be virtualized. Take the time to ensure that these are in place, ramping up your team with the right skills and procuring sophisticated equipment. As part of your planning, prepare a full list of your must-have changes and improvements.

**How do I fix on the number of hosts I need?**

Estimating the number of host servers is part of capacity planning. It depends not only on the hardware resources you have, but also on the type of virtual server. So distribute your VMs judiciously. Create clusters that are fault-tolerant. Maintain adequate redundancy, as a buffer.
Isn’t virtualization a one-time activity?

Virtualization’s battle with VM sprawl is common and most long-drawn. Until your organization culture fully embraces the virtualization lifestyle, you’re likely to find VMs sprouting all over the enterprise, hogging computing and human resources and administration overheads. Use advanced configuration management software to counter this trend.

How long will my virtualization project take?

Virtualization is never time and budget-bound, like an IT project. Instead, think of virtualization as a way of life, a change in mindset. Virtualization marks the beginning of a fundamental shift in your IT operations. It’s like dieting and exercise. The payoffs come as you keep at it.

How important are management and monitoring tools?

The importance of having VM management and monitoring tools from the start cannot be overemphasized, even if you’re a small organization. Your team will need to do lifecycle management for your IT assets – a task that gets near-impossible without tools to fall back on, especially with VM sprawl to contend with alongside. Add automation tools as soon as possible thereafter.

Whom should I enlist in my virtualization exercise?

Find the right people and then train them thoroughly in storage, architecture, networking, and security technologies and the ability to work on a variety of virtualization platforms. Avoid taking on uninformed or untrained people or those who are in for a lark. Among other qualities, virtualization needs diligence, discipline, maturity, the willingness to collaborate, and commitment to the organization.

How do I ensure security?

The security risks in a virtualized setup are different from those in traditional environments. Pay special attention to host security, enforcing strict access to and control of the host system. Ensure due diligence for all applications and make all VMs conform to the organization’s security policy.

How about implementing Virtual Desktop Infrastructure (VDI)?

When implementing VDI, remember that your desktop users need more than the desktop PCs they earlier had. They need the monitor and a thin client, the virtual desktop and the network storage array. All of these need to work, for your user to enjoy a virtual experience of their desktops. Also, virtualizing reasonably up-to-date desktops is a waste; virtualize only desktops that have nothing much left under the hood.
3 TIPS FOR VIRTUALIZATION SUCCESS
Tips For Virtualization Success

What do you need to do to ensure successful virtualization in your organization? Try these, step by step, as part of a team:

- **Create**: Install and load your servers, hosts, hypervisor, and virtualization management tools and solutions.

- **Configure**: Now, configure the servers, their IP addresses and network settings and VLANs.

- **Assign passwords and authorizations**: Set host passwords, create groups, add administrators. Assign authorizations to all roles and levels, as needed.

- **Add VMs**: Add new VMs to the virtualized infrastructure.

- **Monitor**: Start hypervisor-based monitoring of your new hosts for performance indicators.

- **Maintain the environment**: Initially, manually and later, using tools, start maintenance for the virtualized environment.

- **Back up your virtual environment**: Using backup software, create virtual server, file, and image backups so that you can trace VMs and their hosts at any point in time. Deduplicate and replicate data.

- **Troubleshoot, if needed**: Make sure you've studied the necessary documentation, including the contracts. Contact the vendor representative for support.
LET'S RECAP
Let's Recap

Virtualization, as we’ve seen, cuts your costs and boosts your business efficiency: It leverages your company’s costs and resources. It makes your organization’s ecosystem more solid, nimble and responsive. And it re-casts your IT as innovative and business-strategic.

But virtualization can also trip people up. VM sprawl, overloaded hosts, and not managing virtual resources and physical machines separately can complicate matters for IT team. Here’s how to sidestep the landmines:

Govern Resource-Sharing

Dynamic resource-sharing characterizes virtualization. So issue clear business-aligned guidelines covering acquisition, management, usage and support of enterprise resources, to avoid user heartburn and conflict and obtain stakeholder buy-in.

Balance Resource Use

Virtualization will raise resource utilization. Nonetheless, if too many applications target the same resources, poor VM availability will disappoint many users. So, before virtualizing machines, assess computing need vs. power availability and distribute applications for optimal performance.

Distribute Physical Server Loads

Physical hosts need regular maintenance and management, too. So distribute your applications and load so that downtime on one server is compensated by equal uptime on another, preventing service disruptions, especially in mission-critical applications. Similarly, balance peak loads on virtual servers also, using clustering with care.

Prevent Server Sprawl

Virtualization’s strength is scalability, and its bugbear, VM sprawl. Therefore, establish standardized policy, processes, and practices early. Control VM creation so that confusion and messiness are prevented later on.

Draw On Teamwork

Virtualization is like making lifestyle changes in organizations. It’s ambitious and must be planned for the long term. So choose your team and keep them motivated and involved. Once you raise the bar on performance, there’s only one way to go-forward.
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THINK YOU NEED TO VIRTUALIZE? CHECK.
Think You Need To Virtualize? Check.

Yes if:

- **You have the right team**
  Well-trained IT architects, networking specialists, storage pros, and security experts are a must. Virtualization is a technologically sophisticated initiative.

- **Technology is your company’s core**
  If you’re an IT business or have numerous servers and vast storage needs, the V-word spells savings for you. Storage efficiency and a lean IT payroll will be yours.

- **It’s dicey on the server front**
  Are your servers taking up floor, rack and shelf space all over the place? Are they dedicated to one or a few applications each? Are your servers heading for obsolescence? If your answer to any of the above is yes, you need virtualization.

- **You don’t have too many sensitive applications**
  Do you have just a few applications that need high-power processing or memory? Or are many of them specialized enough to warrant them being sandboxed? If it’s a no for the former, then you’re a candidate for virtualization.

- **Storage is centralized**
  If your business requires centralized storage shared by users across the enterprise, virtualization will certainly help.

- **Rapid deployment is a must-have**
  Does rapid server provisioning constitute a clear competitive edge for your enterprise? Then you must virtualize. Ordering and deploying physical servers could take up to weeks to complete. Virtual deployments can be done in a jiffy.

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WHICH VIRTUALIZATION PITFALLS SHOULD YOU AVOID? CHECK.
Which Virtualization Pitfalls Should You Avoid? Check.

Silos
Virtualization requires advanced skills in IT architecture, networking, storage, security, and multi-platform systems. And since, with specialization, silos form naturally, collaborative working becomes a necessity because virtualization cuts across technologies. Virtualization teams need holistic thinking. On an everyday basis, they look at dashboards that abstract the enterprise, as a whole. And they create value only when each team blends its perspective with the other’s, rather than insulating itself.

Non-Standard Applications
Virtualization is most amenable to standardized IT infrastructure, and since automation forms a key aspect, so is repeatability. Thus, virtualization initiatives in which legacy applications are continuously changing are prone to failure. Similarly, trying to virtualize high-performance applications is foolish because their intensive computing requirements prevent them from being migrated.

Marketing Hype
Slick sales talk can make even senior IT managers sign deals they later regret. As a result, IT teams handling virtualization on the ground can get stuck, holding expensive and ineffective solutions on their lap. Few IT teams have the time or skills for competitive analysis, vendor research, or the grapevine.

Poor Baselining
Change is always difficult, and the way through it is through data. However, when key metrics and benchmarks are unavailable, baselining existing systems with a view to transitioning or decommissioning is a challenge. And without data, it’s always my word against yours.

Weak Knowledge Management
Virtualization initiatives are founded on a variety of in-depth skills that need constant updating through research, knowledge-sharing, and formal training. But, unless virtualization teams own these processes, virtualization becomes weak and non-value adding.

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KEY PERFORMANCE MEASURES AND METRICS
Key Performance Measures And Metrics

And here are some useful virtualization metrics:

Physical Servers Used

Expressed as a percentage, using the formula:

\[ \text{Servers Used for Virtualization} = \frac{\text{Servers with a Hypervisor}}{\text{Total Servers}} \times 100 \]

Comment :

- Widely used industry metric
- Tracks percentage of servers shipped for virtualization
- Makes it easy to track your performance against the industry as a whole
- Use it with physical server utilization data and CapEx spending

Virtualization Rate

Expressed as a percentage, using the formula:

\[ \text{Penetration Rate} = \frac{\text{Virtual Servers}}{(\text{Virtual Servers} + \text{Physical Servers})} \times 100 \]

Comment :

- Percentage of all physical and virtual servers virtualized
- Indicates degree to which you have leveraged virtualization for efficiency improvement

Proportion Of Virtual Desktops

Expressed as a percentage, using the formula:

\[ \text{Desktop Virtualization Rate} = \frac{\text{Virtual Desktops}}{\text{Total Desktops}} \times 100 \]

Comment :

- Percentage of total number of client desktops and laptops virtualized
- Could indicate IT organization’s ability to respond quickly to new demands
- Represents IT capability to quickly deploy changes to users including changes to multiple device types
VM-To-Admin Support Ratio

Expressed as a percentage, using the formula:

\[
\text{VM-To-Admin Support Ratio} = \frac{\text{Number of VMs}}{\text{Number of VM Admin FTE}}
\]

Comment:
- Compares the total number of VMs with the number of FTEs required to support them
- Common virtualization benchmark
- As organizations virtualize, the absolute numbers of FTEs should go down
- Large hosting provider ratios could be 1000:1 or higher
- Large businesses with higher VM numbers could have ratios of 250-400:1
- Smaller organizations could have ratios of 100-150:1

VMs Covered By DR Protection

Expressed as a percentage, using the formula:

\[
\text{VMDR} = \frac{\text{VMs Covered by DR}}{\text{Total Number of VMs}} \times 100
\]

Comment:
- Indicates type of use of VMs

Days To Provision A VM

Expressed as a percentage, using the formula:

\[
\text{DaysVM} = \text{Average Number of Days Required}
\]

Comment:
- Represents number of days to provision a VM across the request-and-procurement cycle
- Service performance metric that automation and process maturity can improve
- Measures speed of execution

For detailed performance metrics, see:
TO SUM UP
To Sum Up

An enterprise virtualization initiative should cover all elements – desktops, applications, servers, storage devices, and networks.

VDI helps improve your employees’ responsiveness, human productivity, collaboration, and teamwork by creating a seamless, always-on professional environment. With application virtualization, your business-critical IT platforms record high performance, continuously raising the bar on your designed quality of service levels and contracts.

Server virtualization can drastically improve server utilization and notch up capital and operating cost savings through high server consolidation ratios. Storage virtualization provides you with high-performance storage infrastructure that has a much smaller physical footprint than in the pre-virtualization era. Like server virtualization, this results in greatly improved utilization, flexibility, uptime and backup. And network virtualization enables swift ramp-ups, 24/7 monitoring, maintenance, and support for your legacy as well as newly acquired systems.

A November 2013 survey by Cisco Systems, NetApp and VMware of small and medium businesses (SMBs) showed that C-level executives know virtualization implementation costs are offset by far with its benefits, in the long run. While companies with some degree of virtualization in place believe they have a competitive advantage over their non-virtualized counterparts, organizations yet to virtualize know there’s potential in hopping on to the virtualization bandwagon. Although conducted for the SMB segment, these findings apply equally to large enterprises.

Virtualization is the way to go, and we hope you found this playbook as useful as we found it exciting to put together for you. For more information on virtualization, cloud computing and the new face of data centers, contact Regalix at research@regalix-inc.com
Headquartered in Silicon Valley, we help the CMO organization leverage emerging digital practices for creating marketing leverage as they bring new products and innovation to market. Regalix Research helps marketers through research-based insights, consulting and peer-to-peer programs that guide marketing strategy development and execution. Our focus is helping Technology companies leverage innovation and best practices to create real differentiation. Our analysts are practitioners with a successful track record of delivering real marketing results for both leading Fortune 500 companies as well as venture backed firms.

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For over a decade, we have provided complete marketing services – Social, Mobile, Content, Multi-channel Campaigns, Technology Development, and Analytics – to companies such as CA Technologies, Citi, Apple, eBay, Cisco, VMWare, NetApp, Cypress, LSI, Keynote, and MetricStream.

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