Top 10 Considerations for Getting Started with VMware Virtualization

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Moving your workloads from physical servers to a virtualized environment can help your business drive down costs, increase IT efficiencies and improve application availability. It's important to carefully plan the transition to virtualization in order to avoid any complications, such as service downtime or data loss, that can negatively affect your employees, your customers and your business. Consider these tips as you plan your move to virtualization to ensure a smooth transition and a successful project.

1 Preparing to Move from Physical to Virtual

Before you move your physical server workloads into virtual machines (VMs), assemble a detailed plan. Outline the full scope of the project and its phases. If you'll need new hardware, such as servers, storage arrays or networking gear, make sure to budget for it.

Next, decide which workloads will be your highest priority for the physical-to-virtual (P2V) migration. For example, you might start with test and development workloads, then virtualize your Tier 2 applications, and finally virtualize the Tier 1, mission-critical applications.

Before you roll out the new virtual environment, allow time to test it thoroughly. Be sure that applications in virtual machines perform as well as they did previously in your physical environment. Make sure you have a working management network with all the virtual machine hosts in that environment. Verify that all of your virtual machines are online and that you've distributed virtual machines to optimize your use of your server hardware.

Finally, as always with such efforts, be certain to carefully schedule the migration and expected downtime for the workloads you're migrating. Using a proven P2V conversion tool, such as VMware® vCenter Converter™, can help you minimize downtime and maximize automation during your migration process. vCenter Converter converts both Windows and Linux physical machines to a VMware virtual machine format and brings them into your VMware environment, automating the migration process semi-transparently for your users. (See Figure 1 for more details.)
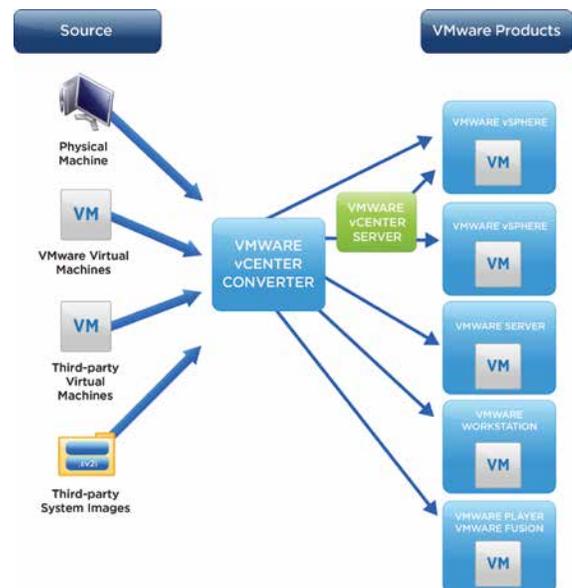

Figure 1: VMware vCenter Converter

2 Ensuring Hardware and Operating System Compatibility

Make sure that the processors in your host clusters are either identical or in the same family. Certain features of VMware vSphere® with Operations Management™, such as vMotion™, require processor architectures to be compatible.

For each physical source server you're planning to migrate, review the list of 85 guest operating systems VMware vSphere supports to ensure the operating system on that server is compatible with vSphere.

For each destination server you plan to use to host virtual machines, review the VMware Compatibility Guide to ensure vSphere and that server's hardware are compatible. Also, check for applications that have special hardware requirements or that rely on proprietary systems. These requirements might make those applications difficult to decouple from their current servers, so you may want to keep these applications on their physical servers rather than virtualizing them.

3 Using Traditional Storage Versus Virtual Storage

Shared storage improves availability and leverages capabilities, such as vMotion, to migrate running virtual machines across hosts for zero-downtime maintenance. Today, there are two options for shared storage:

1 **Traditional external SAN array** – Of the two options, this one can be more expensive and need more technical expertise because SAN arrays need specialized hardware and IT staff. For organizations with available capital and larger IT environments, traditional arrays may provide more enhanced performance and management features, such as automatic storage tiering, multiple storage controllers and processors, deduplication and unified storage offerings (e.g., NFS, iSCSI, Fibre Channel).

2 **Virtual storage** – This option is simpler because it does not require the purchase, configuration and maintenance of an external hardware array. For businesses that need shared storage but do not need all the features of an enterprise storage solution, virtual storage saves in capital expenditure and ongoing management costs.

VMware vSphere Storage Appliance™ is a software-based storage solution that creates a single shared storage solution using the internal storage of multiple host servers. This approach lets you provide the reliability, flexibility, and performance you need for a successful virtualized environment without having to use a separate SAN solution. Figure 2 shows the storage setup of a virtualized environment using vSphere Storage Appliances.
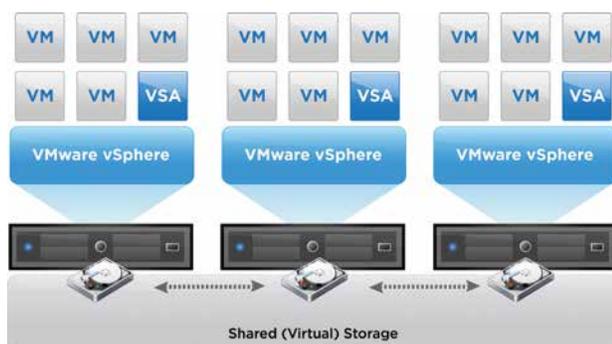

Figure 2: Virtual Storage Configuration with vSphere Storage Appliance

4 Sizing and Managing Shared Storage

Virtualization allows you to pool your storage infrastructure, which gives you flexibility for optimal workload placement. You can place highly volatile I/O workloads, such as Tier 1, mission-critical database applications, on Tier 1 backend storage, such as high-speed SSDs or enterprise-grade SAS disks. In contrast, you can move test and development environments or rarely accessed data to slower and lower-cost storage to save on expenses over the long run. When sizing and managing your shared storage, consider the following:

• Calculate the storage needs, in both raw capacity and IOPS (I/Os per second) of your current and future workloads, and determine how best to meet those needs. You may require a traditional Fibre Channel or iSCSI storage solution, or a virtual shared storage appliance might be adequate.

• Consider using the new storage efficiencies that virtualization enables. For example, on a traditional physical server, expanding disk space may have been difficult, while in a virtualized environment, adding storage is easy. You can choose thin or thick provisioning of virtual disks for individual virtual machines. Thick provisioning allocates all the space for a virtual disk the moment you create it. Thin provisioning allocates space as necessary throughout the virtual disk's life. If you have a dedicated storage solution from a third party, there may also be thin provisioning available at the array hardware level as well; see your storage's documentation for more details.

• Using vSphere, you can configure Storage I/O control, which lets you guarantee a certain amount of I/O resources for each virtual disk. This option lets you ensure that no particular workload will dominate the resources of any physical array.

• Monitor how much space is used on your existing physical volumes, and also the number of IOPS your workloads use. This information can help you choose the right type and size of disks for your new environment. (See Figure 3 for more details.)
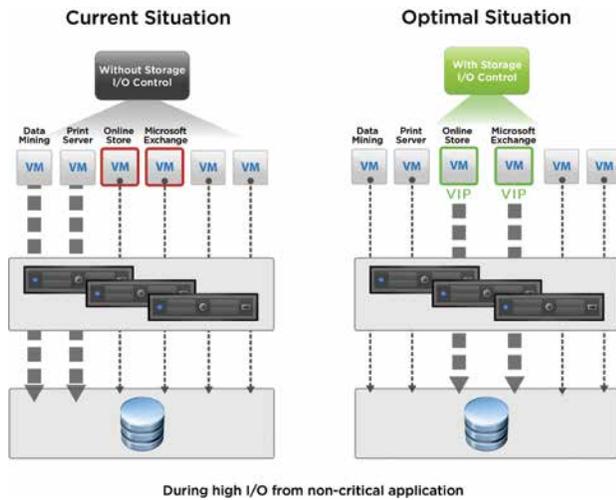
Figure 3: VMware Storage I/O Control Isolates and Caps Storage Bandwidth

5 Security and Compliance Concerns

Just as with physical servers, it is essential you have the appropriate security and compliance policies in place for your virtual machines. Keep in mind the following considerations to meet security and compliance policies:

- If your business must comply with any government regulations, consider any audit rules that apply. For example, will it be acceptable for each workload to access different networks? Must the data itself be on separate physical storage?

- As you set up policies and provisioning, keep in mind the challenge of managing sensitive data from different applications. Do the rules allow that data to reside with the data from other applications at the compute, networking and storage layers?

- Balance virtual machine protection with performance by scheduling security scans and other checks for off hours. Also, consider using features built into vSphere, such as VMware vShield Endpoint™, which offloads anti-virus and anti-malware processes to different virtual hardware. This approach can also lower the risk of antivirus "storms" by centralizing those functions.

6 Memory and Resource Management

In a virtualized environment, it's easy to create virtual servers, but you still must manage the memory and other resources for each virtual machine. Otherwise, those virtual machines may not perform optimally.

Different departments might need to share memory resources differently. You can create resource pools for virtual machines with varying amounts of CPU and memory to meet the specific needs of the departments that use them. Then, as the needs of the departments change, unused resources from one department automatically become available for the one that needs them. By using vSphere features in this way, you can optimize the use of your hardware and allocate memory and CPU resources to business functions that require it. This can reduce the number of servers you need to purchase in the future.

It's also important to keep track of virtual machines and the applications that run on them. To efficiently use resources and meet service-level agreements (SLAs), you will need the same sorts of processes and tools as those you used to manage your physical environment. Available as part of vSphere with Operations Management, vCenter™ Operations Manager delivers data on the health, risk and efficiency of your resources. It can provide that data by application, line of business, production workload, configuration type and other relationship type. In addition, vSphere SAN Operations Manager is now integrated with vSphere capabilities and provides the same sorts of features for storage operations. You can change group memberships dynamically so you can better align your business and operational teams.

Figure 4: The Operations Management Dashboard

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7 **Balancing Common and Unique Virtual Machines**

Another aspect of managing virtual machines is controlling how many different types you create. Different applications have different requirements, so customizing a virtual machine for each one may be helpful, but may make managing them more difficult.

Identical virtual machines let you easily combine them by copying files and configuring virtual host features. However, this removes the built-in protection of virtual machine isolation, which stops anything running in one virtual machine from affecting the applications in any others. Making each virtual machine unique would afford you those protections and let you fine-tune each one to its application workload, but at the cost of managing more different types of virtual machines.

8 **Virtual Machine Performance and Availability**

Monitoring virtual machine performance and availability is vital. Historical data let you anticipate peaks in memory and CPU consumption so that critical applications do not end up facing resource issues. vCenter Operations Manager and SAN Operations Manager use automated tools to help you monitor and analyze your virtual machine work and diagnose any problems, so you can make sure I/O performance remains optimal.

You should also determine the Recovery Time Objective (RTO) for each workload, so that when you do business continuity and disaster recovery (BCDR) planning, your backup and recovery policies reflect well your business requirements.

9 **Using vSphere with Operations Management Features to Meet Business Objectives**

Application virtualization lets you share resources among your servers, which gives you a great deal more flexibility. It's essential, however, to make sure your mission-critical applications have all the resources they need to perform well, while ensuring they follow the compliance and security policies your company requires. To do these things using vSphere with Operations Management, consider the following:

- Do you need to create any special affinity rules for your virtual machines? For example, you can define host affinity and host anti-affinity rules that direct and constrain workload placement within a cluster of hosts.

- Design your Distributed Resource Scheduler (DRS) configuration carefully around the setups that meet your business needs. Weigh the optimal placement of virtual machines, available resources, and security and compliance policies.

- Determine if your applications must reside on specific hardware for compliance or process reasons.

10 **Planning For Future Virtualization/Architecting**

After you've virtualized your servers, there are other projects that you might consider in the future, such as cloud computing or desktop virtualization. As your organization grows, you can use tools from VMware, such as vCenter Operations Manager, to help with capacity planning and determine what resources your infrastructure consumes and where you might need to add more, such as additional storage or compute resources.

Looking at the growth your business anticipates for the next few years can help you determine if your infrastructure will be able to keep up with the increased demand on your IT infrastructure, and VMware virtualization enables enormous potential for dealing with future growth. Its tools provide important analytical data and can help you extend business operations, virtualize even further through desktop virtualization and explore self-service provisioning for a more service-oriented infrastructure.

Resources

Learn more about VMware virtualization

- Virtualization Basics and Overview video
- Virtualization in small business
- vSphere Evaluation Guide
- Try vSphere with Operations Management

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