



SOLUTION
READINESS

Microsoft SharePoint 2010 on VMware Use Cases

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1. Background

“Enjoying success requires the ability to adapt. Only by being open to change will you have a true opportunity to get the most from your talent.” – Nolan Ryan

Microsoft SharePoint is a popular business collaboration platform for the enterprise and the Internet upon which many organizations base their document management and collaboration strategies. SharePoint 2010 delivers a strong productivity experience by letting people work together in ways that are most effective for them, offering a familiar user interface and integration with the Microsoft Office 2010 suite.

Designing a large-scale SharePoint architecture is not an exact science and workload requirements can vary widely across an organization. As with many applications, uncertainty of the workload can cause several operational problems. Infrastructures based on physical servers can suffer from hardware over-provisioning resulting in higher server counts and lower utilization of resources. Change can be difficult to manage, often involving costly redesigns. Finally, application availability on a physical server infrastructure can be complicated and expensive.

The VMware vSphere® platform provides a robust, private cloud environment that helps to control costs while increasing flexibility and availability for SharePoint application and database servers. Running SharePoint servers on vSphere allows you to optimize compute resources through server consolidation and maintain application flexibility through role isolation. For high performance application and database server roles, VMware and partners have demonstrated the capabilities of vSphere to run the most challenging workloads. For smaller, specialized server roles, vSphere offers high consolidation ratios and advanced resource scheduling features, giving application owners the flexibility and performance they need while simplifying and lowering costs for the enterprise.

2. Microsoft Support Considerations

Customers looking to take advantage of VMware virtualization technology in their Microsoft environment can now benefit from recent improvements in Microsoft licensing and support policies. In particular, there are two important changes:

- Support for SharePoint 2010 running on VMware Infrastructure/vSphere – VMware ESX® 3.5 Update 2 was the first hypervisor to be listed under the Microsoft Server Virtualization Validation Program (SVVP). This certification assures that our customers who run ESX 3.5 Update 2 or later (including vSphere), Windows Server 2008, SharePoint 2007 or 2010, and SQL Server 2005 or 2008 have access to cooperative technical support from Microsoft and VMware. Additionally, if escalation is required, VMware can now escalate mutual issues rapidly and work directly with Microsoft engineers to expedite resolution. With this support program in place customers can now take advantage of the many benefits that come with virtualization of Microsoft applications on vSphere. For more information on the Microsoft Server Virtualization Validation Program visit: <http://windowsservercatalog.com/svvp.aspx?svvppage=svvp.htm>.
- Relaxed policies for application license mobility – Microsoft has updated its licensing policy for over 40 server applications, including SQL Server, to more effectively accommodate their use in a virtual environment. The application licenses are still tied to a physical server; however, Microsoft has removed the clause that had restricted reassignment of an application license between servers to once every 90 days. The new amendment allows customers to more freely reassign application licenses to from one server to another, effectively removing the need for excessive application licenses to remain compliant while performing virtual machine migration (VMware vSphere vMotion®) and providing high availability in a virtual environment (VMware High Availability). Additional information can be found at: http://download.microsoft.com/download/3/d/4/3d42bdc2-6725-4b29-b75a-a5b04179958b/Application_Server_License_Mobility_VL_Brief.doc.

3. Benefits of Virtualizing SharePoint 2010

Some of the primary technical benefits that can be achieved by deploying SharePoint 2010 on VMware vSphere are:

- Cost Control
- Dynamic Scalability
- High Availability
- Enhanced Security

3.1 Cost Control

IT organizations strive to limit the financial impact they place on the bottom line of their companies. As datacenters grow larger, physically and from a service offering perspective, they must look to use resources as efficiently as possible. SharePoint 2010 can range from an “all-in-one” configuration in development or small environments to a multi-instance deployment which employs a multi-tier architecture. Regardless of which of these categories your environment falls into, virtualizing your SharePoint 2010 environment with VMware can lead to considerable cost savings. VMware allows you to consolidate production tiers on today’s large server offerings as well as establish a foundation to make deployment of test, development and disaster recovery environments more agile than in a physical deployment. Features such as VMware Distributed Power Management (DPM) allow you to provide the compute power necessary to run your daily operations, but reduce power and cooling consumption after hours. In this section we explore the cost saving benefits virtualizing SharePoint 2010 can provide:

- Consolidate servers onto fewer physical hosts.
- Co-locate test, development, and disaster recovery servers.
- Use Distributed Power Management (DPM) to reduce power and cooling.

3.1.1 Consolidate Servers onto Fewer Physical Hosts

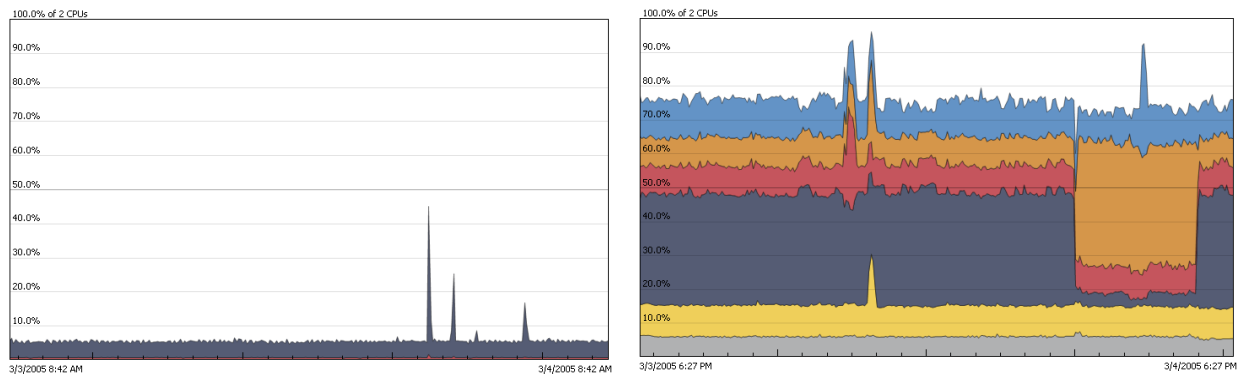
VMware virtualization allows you to take full advantage of large multi-core servers without having to sacrifice the benefits of server role isolation. Server role isolation is not only beneficial in troubleshooting scenarios, but also provides a solid foundation for a design that accommodates future growth.

One of VMware’s most popular use cases is server consolidation. Organizations look to cut costs of datacenter floor space, power, and cooling, and VMware has proven to be the leader in server consolidation with little to no impact on application performance. Advances in server hardware capacity and throughput have driven organizations to look past the obvious cost savings of server virtualization. Most applications are unable to take advantage of the compute power of today’s server hardware and co-location of workloads using virtualization is looked at as the answer to the question of “How do I use my commodity server efficiently?” Multi-tiered applications like SharePoint 2010 provide access to large amounts of data that end users rely on for their work-related tasks. These systems must be responsive as well as highly available. It is not uncommon for these solutions to require many server instances to provide even basic servers with some level of redundancy.

In most situations, SharePoint 2010 is deployed as a multi-tier solution. In fact, Microsoft recommends co-locating all roles of the SharePoint stack on a single instance only when the environment supports fewer than 100 users. In small environments the topology might contain only a single Web front-end which hosts the application service roles and a separate database server. This entry-level deployment requires two servers, which with the server hardware available today might not be feasible for the organization that is looking to deploy this small an environment. In this situation implementing the two-server architecture might easily be accomplished by deploying on VMware vSphere using two virtual machines sized appropriately to support the expected user load.

At the other end of the spectrum is large scale farm deployment. These environments can contain multiple server groups at each tier which perform similar functions. Each of these server groups must provide redundancy as well as have sufficient resources to account for service or operating system failure. At the Web layer a pair of Web servers can accommodate incoming Web requests, while a separate set of Web servers provide crawl and administration access. The application layer can be broken into multiple server groups to handle functions such as query services, central administration, and other required service applications. Larger environments scale out the database servers to target compute resources to the highest consumers. The database layer might contain groups dedicated to search databases, content databases, and a group for lighter, smaller service databases. This can be a full rack of servers using a physical deployment strategy. However, many of the resources might be idly spinning away, consuming valuable space, power, and cooling costs. A VMware solution can reduce the overall server footprint while making use of the compute power available today.

Figure 1. CPU Utilization on an ESX Host Before and After Consolidation



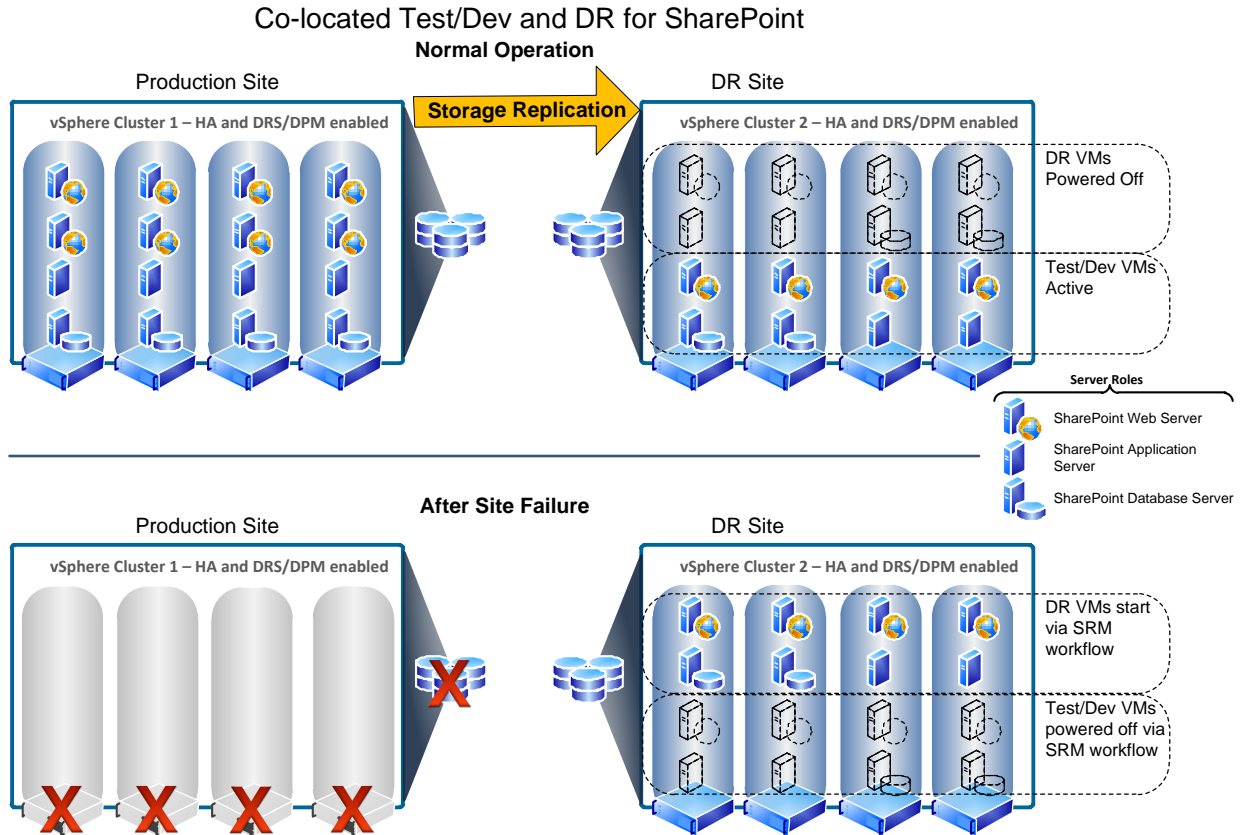
3.1.2 Co-Locate Test, Development, and Disaster Recovery Servers

It can be expensive to maintain separate environments for testing, development, and disaster recovery, especially if you work in a small organization. In some cases the extra cost for these support systems can result in delayed adoption of the application or a decrease in the provided feature set.

Most organizations deploying SharePoint 2010 look to develop against and customize their collaboration suite. Whether a simple upgrade to a theme or a full-blown application that takes advantage of content housed in SharePoint, a best practice is to avoid working directly with the production environment. Companies that follow a software development life cycle (SDLC) model typically have more than one environment which mimics the production environment. These environments can be used for the development of code, testing of that code and software or operating system patches, a staging environment and finally the production environment. This can end up consuming many servers in a physical deployment.

The previous section discussed server consolidation and the benefits to an application like SharePoint 2010. Even with virtualization in use for a SharePoint deployment some organizations with strict environment separation policies can end up with many more physical servers than are actually required. Often this is due to a fear or uncertainty of how the production workloads might be affected by co-locating production virtual machines with test or development virtual machines. When performance and isolation requirements are defined, co-locating development and test with production virtual machines can be accomplished successfully.

Figure 2. Co-Locating SharePoint Test/Development and Disaster Recovery Environments



3.1.3 Use Distributed Power Management to Reduce Power and Cooling

In many cases, SharePoint environments experience peak usage during normal business hours with a sharp drop-off in utilization after the work day is complete. VMware Distributed Power Management (DPM), which relies on vMotion and VMware Distributed Resource Scheduler (DRS) technologies, can intelligently “wind down” your SharePoint environment to use fewer physical resources during these quiet periods, shutting down unused physical host machines to save on power and cooling costs. In the morning, when user activity begins to accelerate, DPM can expand the environment back to full capacity to handle the peak workload.

Computing resource requirements vary throughout the course of the day. Sizing of enterprise systems must take into account spikes in consumption that can come from users coming online, and extra capacity for failover. While necessary for the system to be responsive and available, this can lead to excess power and cooling consumption during low usage times such as evenings and weekends. Besides using power saving features that might lead to reduced performance, physical deployments do very little to help with this problem.

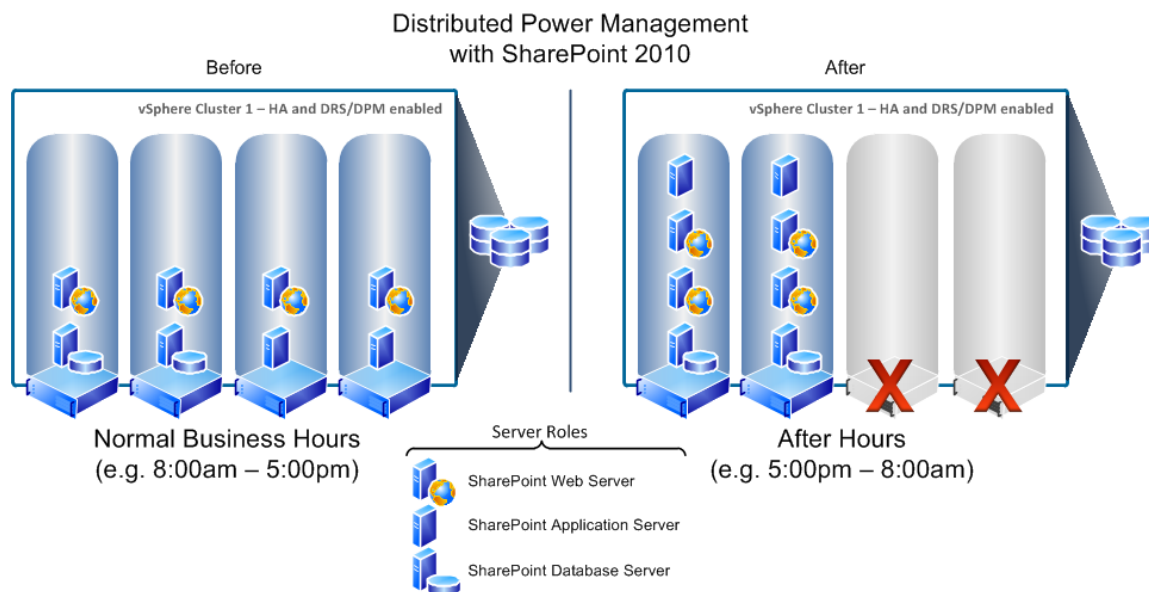
DPM provides savings in power consumption and cooling needs by dynamically adjusting the available compute power based on vSphere cluster settings. DPM can calculate the usage and capacity requirements based on CPU and memory utilization of the vSphere hosts. During periods of low usage DPM evaluates the needs of the cluster, consolidates virtual machines using VMware vMotion, and places ESX hosts into standby mode. If host usage begins to rise DPM can power-on ESX hosts to satisfy the resource requirements.

DPM can provide a completely automated mechanism for reducing power and cooling consumption for most environments. In a SharePoint 2010 environment where test, development, and production are collocated this can be very effective. The production environment might have specific requirements that

do not necessarily decrease during off-hours due to crawling, indexing, and backups. The test and development environments might only be used during normal business hours and require little to no resources after hours. DPM can be enabled to monitor the usage and consolidate virtual machines to reduce the overall consumption.

While DPM can be used to automate the entire process based on usage, the administrator can control when DPM is used. Scheduled tasks can be created to enable and disable when DPM runs. For example, it might be feasible to run DPM only on weekends. In such a case the administrator can create a task to enable DPM on Friday evening and, assuming resource utilization is lower than the threshold, ESX hosts can be placed in standby mode. Another scheduled task can turn DPM off early Monday morning. When DPM is turned off any ESX host that was in standby mode is powered back on.

Figure 3. vSphere Distributed Power Management and SharePoint 2010



3.2 Dynamic Scalability

SharePoint 2010 can be quite difficult to properly size, especially when no existing data exists on user concurrency or how much content must be stored. Microsoft provides general guidelines on sizing Web front ends and application servers. However, during deployment and into production the new environment must be monitored carefully to understand the performance characteristics and be able to react if more resources are needed.

VMware has tools and features that can provide the insight and quick turnaround needed when requirements change. The following section explores operational advantages that make VMware the best platform for SharePoint 2010 as well as additional tools that you can use to effectively monitor and manage your environment.

Running SharePoint 2010 on vSphere provides significant operational advantages, as covered in the following sections:

- Rapidly provision new SharePoint servers.
- Hot-add processor and memory to running SQL Servers.
- Monitor performance with VMware AppSpeed™ Server.
- Intelligently monitor capacity with VMware vCenter CapacityIQ™.

3.2.1 Rapidly Provision New SharePoint Servers

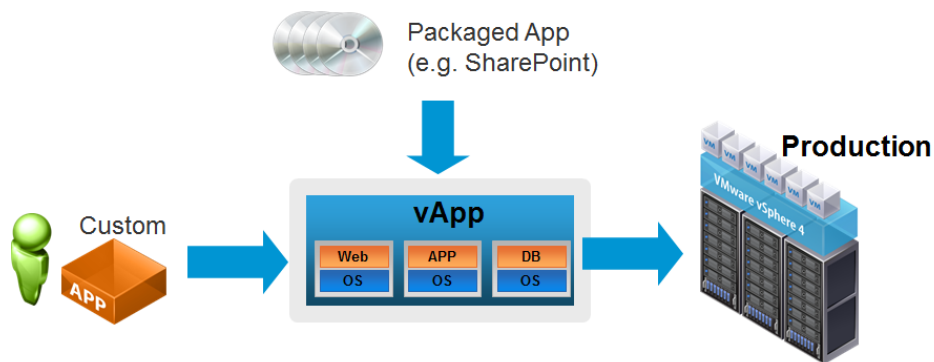
Virtual machine templates can speed deployment times by eliminating repetitive operating system installation and patching tasks. New virtual machines can have their core configuration deployed in a matter of minutes, allowing rapid provisioning of applications into production and reduction of manual work required during their deployment. In addition, products like VMware vCloud™ Director and VMware PowerCLI can help accelerate and further automate the process of moving tested SharePoint virtual machines into production.

In an environment with established procedures, deploying new application servers can be a streamlined process but still take many hours or days to complete. Not only must you complete an operating system installation, but service packs and security updates can add a significant amount of time to download and install. Applications like Microsoft Internet Information Server (IIS) and SharePoint require features that are not installed with Windows by default and must be installed prior to installing the applications. Inevitably those features require more security updates and patches. By the time all is said and done, more time is spent waiting for downloads and installs than the amount of time configuring the application.

Virtual machine templates can help speed up this process by eliminating most of these monotonous tasks. By completing the core installation requirements, typically to the point where the application is ready to be installed, you can create a golden image which can be sealed and used as a template for all of your virtual machines. Depending on how granular you want to make a specific template, the time to deployment can be as little as the time it takes to install, configure, and validate the application. PowerShell tools for SharePoint and VMware (PowerCLI) can be used to bring the time and manual effort down dramatically.

Templates are not limited to helping reduce time to deploy new services. In scenarios where redundancy has been built into the Web and application layers it can be more advantageous to deploy a new virtual machine rather than troubleshooting a failed one. The practice of making servers “disposable” works out very well when deployment procedures are well documented and manual configuration is kept to a minimum.

Figure 4. Provision vApps on Demand



Standardize on optimal OS / app configurations

Provision in minutes

Minimize configuration drift and errors

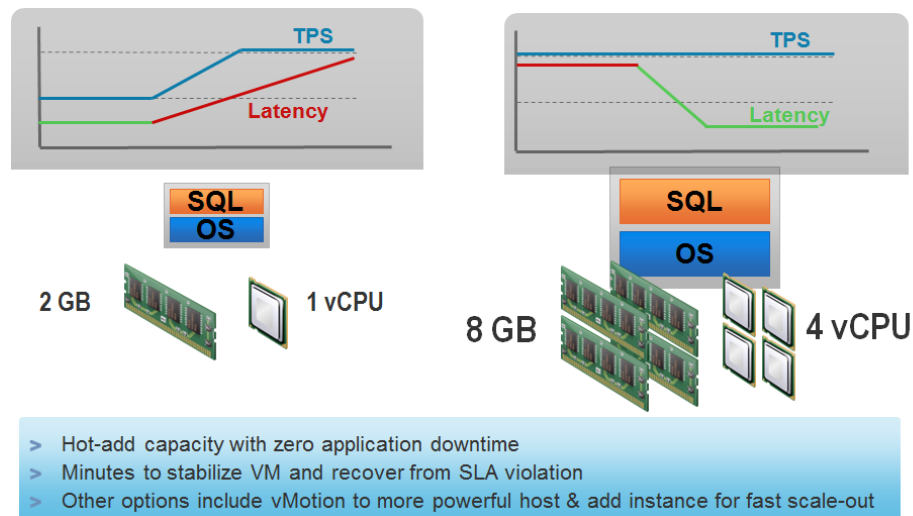
3.2.2 Hot-Add Processor and Memory to Running SQL Servers

With the vSphere Hot-Add feature, applications can be provisioned in a “future proof” manner. As applications grow over time and require more compute, memory, network, or storage resources, administrators can scale up virtual machines dynamically and on the fly, without disrupting the application or requiring complex re-provisioning. Hot-add is available to SQL Server 2008 and later versions and requires Enterprise or Datacenter licensing.

In much the same way that VMware makes scaling out easier for SharePoint application and Web services, virtualizing the database layer of SharePoint can provide faster response to increased demand. VMware vSphere brings the ability to increase memory and processing power to a running virtual machine with no downtime. Windows 2008 and SQL 2008 can both take advantage of the hot-add capability of vSphere by dynamically recognizing the change in resource allocation and making use of the expanded capacity.

Hot-add of resources does not have to be used only as a way to mitigate unforeseen demand increases. Many organizations build systems with future growth in mind. Often this leads to over-provisioned servers that never fully utilize their resources. By sizing your virtual machines for today’s load you can fully utilize the potential of the underlying hardware. Leveraging hot-add allows you to meet the demands that might come about tomorrow. SQL might not be able to scale out as easily as SharePoint applications and Web servers, but increasing capacity allows them to scale to meet the workload.

Figure 5. Hot-Add of CPU and Memory



In Figure 5, the transaction rate (TPS) is increasing and, as a result, latency increases beyond the SLA limits. The administrator can respond to this problem by hot-adding capacity to the virtual machine, and SQL Server 2008 automatically detects this new capacity. In a matter of minutes and without downtime, SQL Server stabilizes with new capacity, and the latency reduces to within SLA requirements.

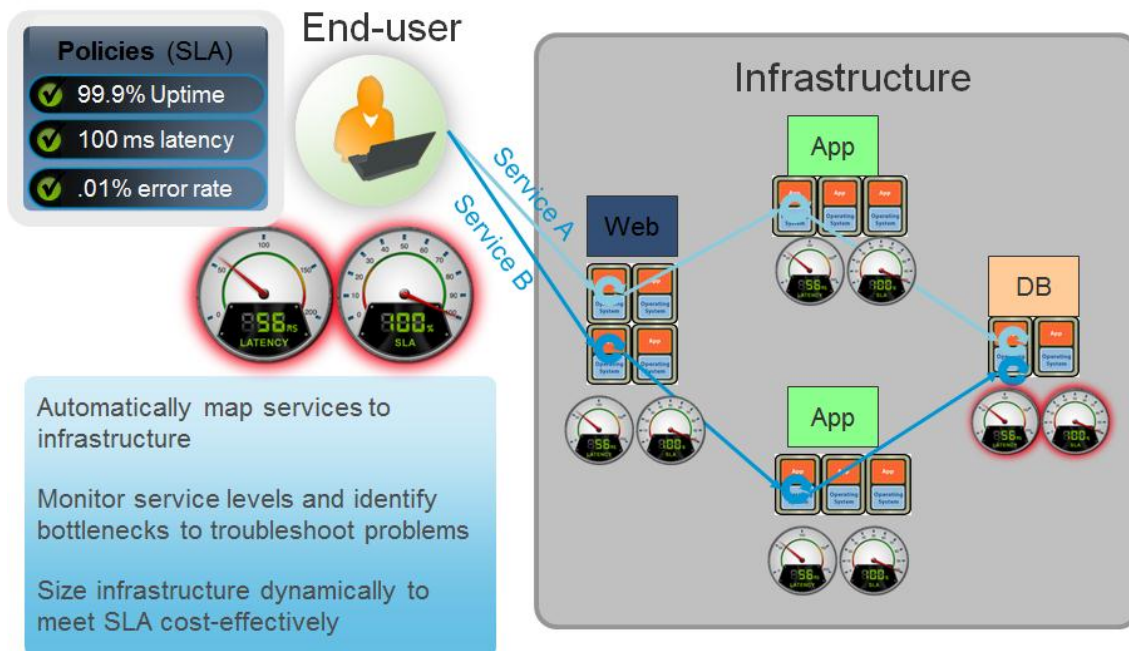
3.2.3 Monitor Performance with vCenter AppSpeed

AppSpeed is designed to provide infrastructure teams with the ability to monitor and control the service levels of multi-tier applications running on vSphere. In a SharePoint environment, AppSpeed can help identify bottlenecks at each tier of service, allowing administrators the ability to respond by increasing the resources available to the affected servers.

Isolating performance issues in a multi-tier environment can be a tedious task. Having tools that understand the communication patterns of the application and provide insight into dependencies and how servers communicate can reduce the time needed to troubleshoot performance problems.

VMware vCenter AppSpeed can provide a real-time view of application performance from an end-user point of view. When integrated with your vSphere environment, AppSpeed discovers and maps the applications and protocols found traversing the virtual network. The data collected by AppSpeed can be used to measure performance and meet SLAs. Besides monitoring the data collected it is used to map dependencies and help you understand where in the stack the degradation of performance occurs.

Figure 6. Monitor Multi-Tiered Application Performance with VMware AppSpeed



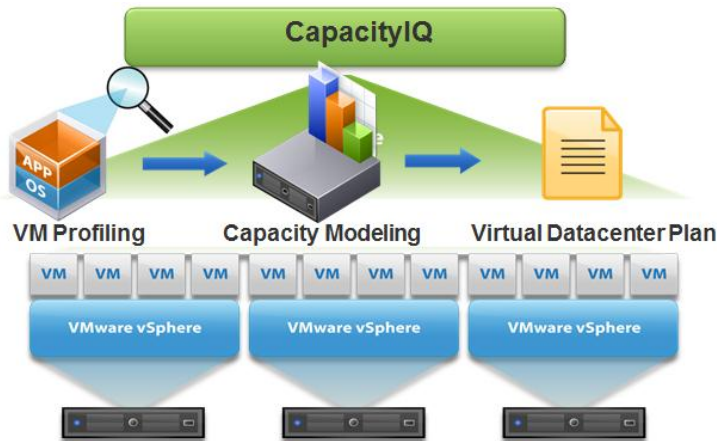
3.2.4 Intelligently Monitor Capacity with vCenter CapacityIQ

VMware vCenter CapacityIQ allows you to efficiently manage resources for each virtual machine and application deployed in production, with the ultimate goal being to right-size the virtual machines to meet SLAs. CapacityIQ can provide forecasting of resource consumption and usage details to help you determine whether virtual machines are over-provisioned, and help to reclaim unused capacity.

Many organizations deploy tools to monitor SharePoint and the underlying operating system and hardware for faults and capacity warnings. Tools like those from Microsoft and other third-party vendors do a great job of providing application and operating system level details. Unfortunately, when virtualized, these tools do very little to monitor the capacity of the underlying environment. Often times SharePoint application and Web servers are built with a set amount of memory and CPU, based on recommendations from Microsoft. While deficiencies in this design might quickly be observed by the users, over-provisioning is usually overlooked. Application owners might not complain about the fact that their application has more resources than it really requires, however this can lead to inefficient use of the resources and lower the levels of consolidation possible.

Capacity IQ brings vSphere-aware capacity monitoring and reporting to vCenter. By monitoring the usage and performance characteristics of virtual machines, CapacityIQ can provide forecasting of resource consumption over time. In many cases development and test environments are built to mimic production at the request of developers. CapacityIQ can provide usage details to help you determine whether these virtual machines are over-provisioned and help reclaim unused capacity.

Figure 7. Right-Size Applications with vCenter CapacityIQ



Forecast timing of capacity shortfalls and needs

Perform “What-If” impact analysis to model effect of capacity changes

Identify and reclaim unused capacity

3.3 High Availability

Achieving high availability with SharePoint 2010 takes on different forms depending on the tier and service that must be redundant. Web servers are typically deployed with enough resources to meet the demand, with additional capacity to protect from degrading performance in the case of a failure. Web servers are placed behind a hardware or software load balancer which in the case of a failure can redirect traffic to remaining nodes. Most service applications in SharePoint 2010 use an SQL database to store data. In the case of these service applications, redundancy must be considered both from the application’s perspective and the database. SQL database mirroring or clustering can be used to protect the data, and service applications can be scaled out. For applications that do not use SQL databases to store data, such as Access Services and Excel Services Application, deploying redundant application services can provide sufficient redundancy.

There is a cost with providing high availability. In a virtual environment that cost might not be as apparent since it is relatively easy to deploy more virtual machines and add physical compute capacity. The cost can be realized from the management overhead that can be incurred when all services are made redundant. Not all services require the same levels of availability, and as such it must be evaluated to determine which are the most critical to keep online. It is highly likely that some services can leverage a purely VMware approach to availability.

The next sections cover:

- Protect from planned and unplanned downtime.
- Reduce unplanned downtime due to hardware failure or resource constraints.
- Implement simple and reliable SQL Server disaster recovery.

3.3.1 Protect from Planned and Unplanned Downtime

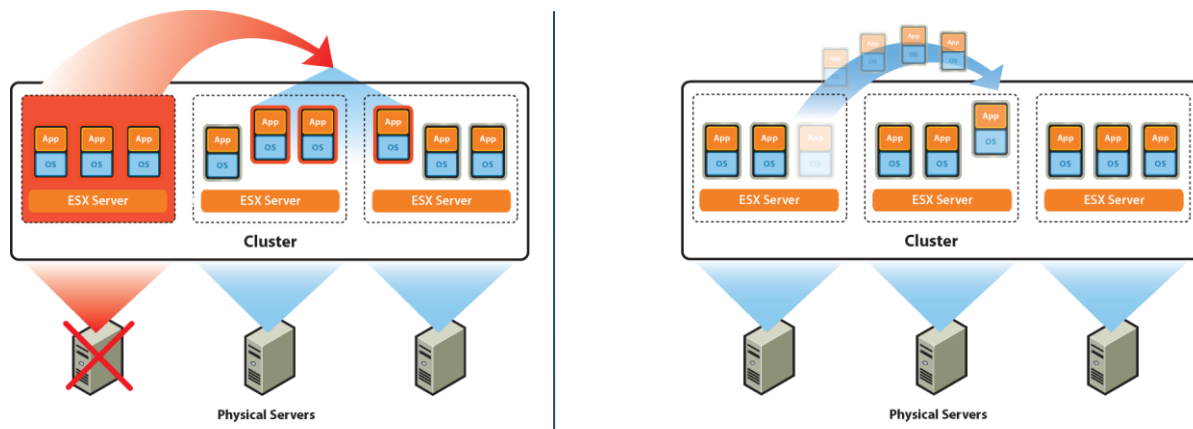
The vSphere platform can be leveraged to provide a wide range of availability options. VMware HA provides protection from server hardware failure that is independent of the operating system or applications and works for every virtual machine running on vSphere. To aid in dynamic load balancing of SharePoint virtual machines, VMware Distributed Resource Scheduling (DRS) can be used to balance workloads automatically. Base solutions built on VMware HA and DRS can be deployed with minimal configuration changes and provide a robust availability solution. These solutions can also be enhanced to provide higher levels of availability by combining them with more traditional clustering and replication options.

VMware features can help provide the highest levels of availability for SharePoint. Whether your environment uses single instance service applications or requires the use of clustering for databases and scaled out application and Web servers, VMware features can play a part in your availability strategy.

VMware HA provides infrastructure monitoring and recovery for virtual machines. At the most basic level, VMware HA monitors vSphere hosts. In the case of a host failure VMware HA can power-on any failed virtual machines on remaining vSphere cluster nodes. Because VMware HA is operating system and application agnostic, any application can benefit from improved availability. VMware HA can also be used to monitor the guest operating system and reboot the virtual machine if a failure is detected. Redundant and clustered virtual machines also benefit from VMware HA. In the event of a failure the service remains available while the failed virtual machine is rebooted on another host, bringing the application back into a redundant state.

Downtime due to patching and software upgrades is an inconvenient necessity. Depending on the architecture, downtime can be minimized by way of rolling upgrades. However, even in this scenario, there is typically a small amount of downtime required to fail over client sessions. With VMware vMotion and DRS, patches and software upgrades can be completed with no downtime. VMware vMotion enables virtual machines to migrate from one vSphere host to another without service interruption. VMware DRS takes vMotion a step further by automatically migrating workloads across vSphere hosts based on current conditions. During planned patching of Microsoft Windows, a vSphere host can be placed in maintenance mode causing DRS to seamlessly evacuate virtual machines to other hosts. After the vSphere host has been patched or upgraded, DRS automatically balances the load across the vSphere cluster.

Figure 8. VMware HA (left) and DRS (right) Help Protect from Downtime

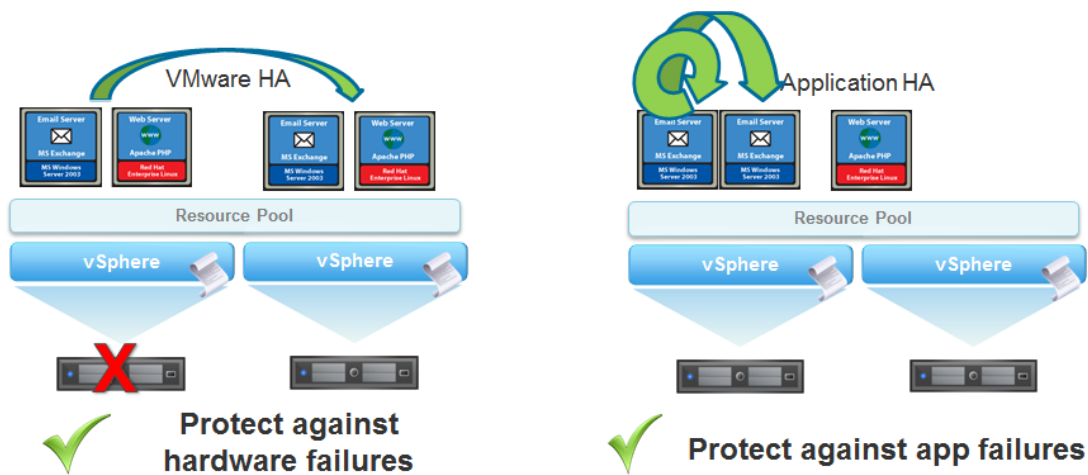


3.3.2 Expanded Application-Specific HA Support

Application-aware HA bridges the gap between standard VMware HA features and application-level clustering. It provides automated recovery from both hardware and software failures by implementing the Application Health Monitoring API that allows third party agents such as Symantec ApplicationHA to detect application and operating system failures. Also, with the release of vSphere 4.1, VMware expanded support for Microsoft Clustering Services, allowing more flexibility in design and configuration.

VMwareHA can be considered high availability for the infrastructure layer, in our case the hypervisor, and with vSphere 4.1, VMware introduced application monitoring. Application monitoring allows third party vendors to create software that can interact with VMware HA by establishing an application heartbeat. In the case of an application failure, services and dependencies are checked and any found to be offline can be remedied in an application consistent fashion. The administrator can also define at which point VMware HA must step in and initiate a virtual machine reboot.

Figure 9. VMware Application HA Can Restart Virtual Machines and Application Services



App-aware HA bridges the gap with app-level clustering

- > Automated availability for both hardware and software failures
- > 3rd party agents detect application and OS failures (eg Symantec ApplicationHA)
- > Invoke VMware HA through “Application Health Monitoring API”

Application monitoring is meant to bridge the gap between infrastructure HA and a dedicated clustering solution, such as Microsoft Cluster Service. SharePoint Web front ends and application servers are easily made redundant by employing a scaled out architecture. When deployed on vSphere this is accomplished by deploying more virtual machines based on your capacity and availability requirements. Unfortunately the underlying databases that SharePoint relies on are not as easily made highly available. Traditionally, Microsoft SQL Server had to use failover clustering or mirroring to provide HA. Both technologies are completely supported in a VMware environment, however they are not always be the best fit for all organizations. Failover clustering uses shared storage which can limit virtual machine portability in a virtual environment. Mirroring can be used to mitigate any portability concerns but requires twice the storage as a stand-alone solution. By coupling vSphere and a partner’s compatible monitoring agent you can increase the availability of SQL Server and SharePoint with minimal management overhead.

Figure 10. VMware Clustering Support

Non-shared disk clustering has no support restrictions

Non-shared disk clustering does not have support restrictions and can be run on vSphere, including:

- > MS SQL Database Mirroring
- > Exchange Database Availability Groups (Exchange 2010) and CCR (Exchange 2007)

MSCS clustering now supported with VMware HA

	Support on ESX 3.x	Support on ESX 4.0	Support on ESX 4.1
Storage protocol	FC only (no iSCSI, NFS, or FCoE)		In-guest iSCSI OK
RDM vs VMFS	RDM only		
# nodes	2 Nodes only		
VMotion, DRS and Fault Tolerance	Not supported with MSCS		
VMware HA	Not supported with MSCS		OK

This is official VMware support position only!

- > Many customers choose to run 'unsupported configs' successfully

3.3.3 Reduce Impact of Backup and Recovery

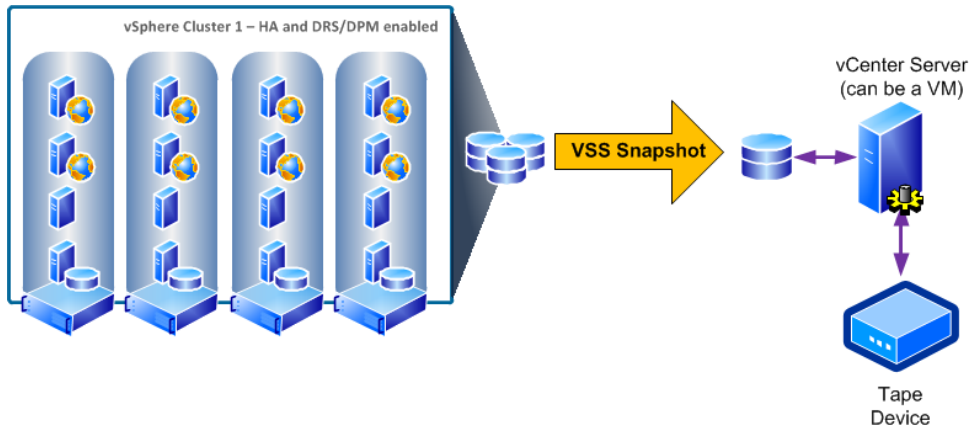
Enable quick, simple, and complete data protection for your SharePoint virtual machines with VMware® Data Recovery, a disk-based backup and recovery solution. VMware Data Recovery is your first line of defense for data protection. Fully integrated with VMware vCenter Server, it enables centralized and efficient management of backup jobs and also includes data de-duplication to save on disk storage for your backups.

Data protection and availability efforts often focus entirely on the data and less on the configuration of the operating system and application. This is no different with SharePoint. Because the majority of service application data is held in SQL Server databases, it is assumed that if we can make that single point resilient from failure and have solid data protection capabilities we can recover from failures up the stack much easier. While it is true that recovering from a failure at the Web or application layer can be easier than from one at the database layer, the time to recovery varies greatly depending on the complexity of the configuration. Are changes documented so that a new build incorporates those changes? Are configurations between redundant Web front ends or service application servers kept in sync? How fast can we rebuild one of these servers if we were to lose one? These are all questions that must be asked when determining how a failure might affect the environment and how best to protect against it.

Most customers already have a data protection strategy, software, and run books that work well for protecting the main content databases. These typically involve an SQL Server-aware backup utility from a third-party vendor and are geared towards recovering from an SQL Server application or database failure. What about when a Web or service application virtual machine fails? If the configuration is well documented then perhaps recovery can be accomplished with a virtual machine rebuild. However, this requires deploying from template, configuring the application and testing before services can be back online. In-guest backups provide the administrator with a familiar interface from which to run backup and restore operations. The time to recovery of services in that scenario depends on the type of failure. If the operating system becomes corrupt, the administrator must deploy a new virtual machine, install the backup agent and initiate a restore. This is faster than the previous scenario, but can require significant manual effort.

VMware Data Recovery adds the capability to perform virtual machine level backups to vCenter Server. By backing up the entire virtual machine you can guarantee that the configuration restored is consistent with what was running in production before the failure. This helps reduce the service outage or degradation time by minimizing the manual effort involved to rebuild virtual machines and qualify the configuration. VMware Data Recovery is a disk-based backup solution which creates and de-duplicates virtual machine based images. Administrators use the vCenter client to configure and schedule backup jobs, and restore from multiple point-in-time copies. Using the Microsoft Volume Shadow Copy service with VMware snapshots, VMware Data Recovery can take consistent backups of SharePoint virtual machines without requiring additional in-guest agents.

Figure 11. SharePoint snapshots with VMware VDR



3.4 Enhanced Security

For many organizations, SharePoint is the central repository for all content. Providing ease of access and management of the data while maintaining secure access to the content can prove to be a challenge using built-in tools. The VMware suite of security tools can provide vSphere ready security. The following section explores features available within vSphere as well as the VMware vShield line of products that can be used to easily meet your organization's security and data protection requirements.

- Protect SharePoint data from external threats
- Co-locate SharePoint sites without compromising security
- Offload antivirus scanning

3.4.1 Protect SharePoint Data from External Threats

VMware vShield Edge™ provides comprehensive perimeter network security for virtual datacenters. vShield Edge integrates seamlessly with vSphere and includes essential network gateway services so you can quickly and securely scale your SharePoint infrastructure.

As SharePoint makes its way into more organizations it is becoming as much a standard of collaboration across companies as it is within. Providing secure external access to SharePoint requires careful planning from both the application and infrastructure teams. Applications teams must understand methods of authentication, protocol usage between tiers, and hardening techniques for the Web, application, and database roles. Application-specific security considerations remain the same regardless of whether the underlying hardware is physical or virtual.

Infrastructure teams must provide the resources to deploy SharePoint services securely to external users while minimizing the exposure of any sensitive information. In physical environments this meant many more resources needed to be used to maintain a secure environment. Hardware firewalls, physically or logically separated networks, and logging for monitoring and compliance are a few of the requirements

that needed to be implemented. Each of these components requires different expertise and typically spans multiple vendors and products.

VMware vShield Edge provides perimeter protection for virtual datacenters. Deployed as a virtual appliance, vShield Edge serves as a network security gateway for your SharePoint virtual machines. Some of the features provided by vShield Edge include:

- Stateful inspection firewall – Allows administrators to create access rules based on source and destination IP addresses, ports, or by protocol.
- Network address translation – Masks the IP addresses being used within the virtual datacenter and allows for cloning an entire SharePoint environment for testing without having to change IP addresses.
- Site-to-site VPN – Connect SharePoint instances securely between two virtual datacenters using an IPSEC VPN.
- Web load balancing – Balance HTTP traffic to SharePoint Web front-ends.

3.4.2 Co-Locate SharePoint Sites Without Compromising Security

VMware vShield Edge supports multi-tenant IT environments where network resources are safely shared by creating logical security boundaries that provide complete port group isolation for virtual datacenters. vShield Edge provides granular control and visibility over network gateway traffic, along with VPN services to protect the confidentiality and integrity of communications between virtual datacenters.

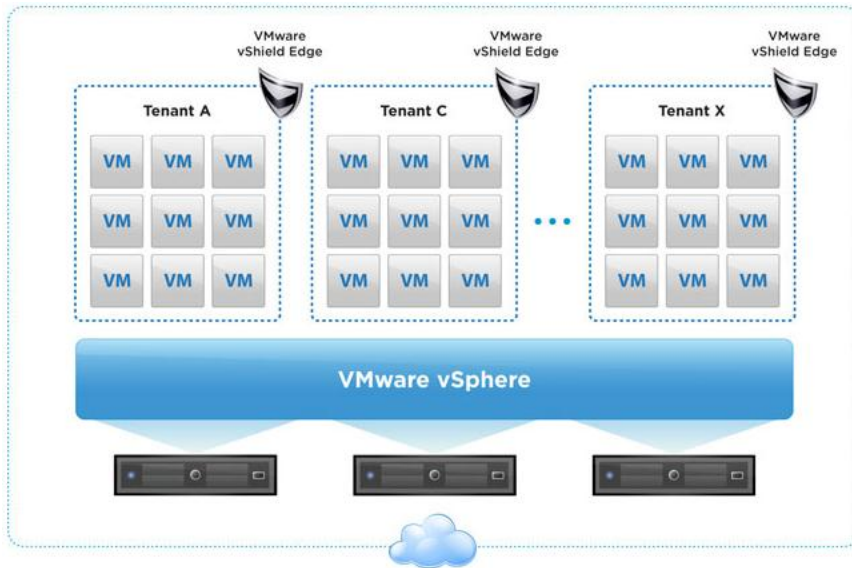
vShield Apps protects your SharePoint environment against internal network-based threats and reduces the risk of policy violations within the corporate security perimeter using application-aware firewalls with deep packet inspection and connection control based on source and destination IP addresses.

A SharePoint environment is often shared among various groups within an organization, or even separate companies in the case of hosting providers. Each of these groups might have their own data security, compliance, and availability requirements. In such situations it might not be feasible to co-locate SharePoint sites and content on the same servers but requirements might not justify separate hardware and support. Whether the customer is another group within the same organization or a completely separate entity, vShield Edge can help achieve security requirements while efficiently providing the application and compute resources required.

In much the same way that vShield Edge provides security between virtual datacenters, vShield App provides protection for SharePoint within the virtual datacenter. SharePoint environments that previously required separate physical servers due to data security requirements can now run in the same virtual datacenter and efficiently use available resources. Policy management is handled centrally through the vCenter Server interface and provides full logging and auditing, traffic flow monitoring, and a programmable interface. Features of vShield App include:

- Hypervisor-level firewall – Provides policy based control of traffic between virtual machines, migrates the protection level as the virtual machine migrates with vMotion, and guarantees that application traffic is kept within the application zone.
- Flow monitoring – View network activity between virtual machines to help refine firewall policies, identify anomalies in network communication and increase visibility through detailed reporting of application traffic.
- Logging and auditing – syslog format logging, provides logging for firewall rules, and is accessible through REST APIs and the VMware vShield Manager™ user interface.

Figure 12. vShield Edge Multi-Tenancy



3.4.3 Offload Antivirus Scanning

You can offload key antivirus and anti-malware functions to a hardened, tamperproof security virtual machine, eliminating agent footprint. The robust and secure hypervisor introspection capabilities in vSphere prevent compromise of the antivirus and anti-malware service.

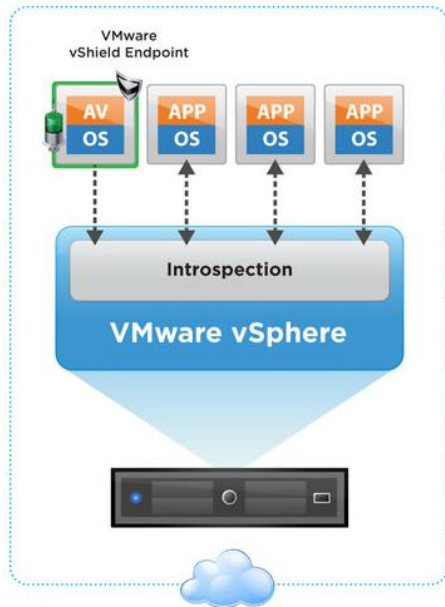
Antivirus protection is critical for production environments. Short of complete isolation with no possibility of external influences, systems can become infected at any time. This threat can increase dramatically when managing a large content repository such as SharePoint.

Traditional antivirus agents installed locally in the operating system have helped mitigate these threats. On-access file level scanning provides real-time protection for frequently accessed files, while on-demand scanning rounds out the protection by periodically scanning all files on a system. With threats constantly emerging and evolving, updates are critical. The frequency of these updates is different from vendor to vendor, but typically ranges from hourly to daily. Constant file scanning, network queries for updates and the application of those updates can wreak havoc on a collaboration system where files are constantly being checked out and back in. Not only does this impact end-user productivity, it can impact perception of service levels, operational efficiency, and overall infrastructure performance.

VMware vShield Endpoint offloads antivirus and anti-malware processing to dedicated, security-hardened virtual machines provided by VMware partners. vShield Endpoint consists of the hardened virtual machine, a driver for virtual machines to offload file events, and the VMware Endpoint security (EPSEC) loadable kernel module to link the first two components at the hypervisor layer. vShield Endpoint provides the following benefits:

- Streamline antivirus and anti-malware deployment – Deploy an enterprise antivirus engine and signature file to a single security virtual machine instead of every individual virtual machine on a vSphere host.
- Improve virtual machine performance – Securely achieve higher consolidation ratios using this offload mechanism.
- Prevent antivirus storms and bottlenecks – These can be associated with multiple simultaneous antivirus and anti-malware scans and updates.
- Protect antivirus security software from attack – Deploy and run the antivirus and anti-malware client software in a hardened security virtual machine to prevent targeted attacks.

Figure 13. vShield EndPoint



4. Deployment Alternatives

This document described several benefits of virtualizing SharePoint on vSphere. There are a number of ways that virtualization can be used to take advantage of these benefits today to assist in SharePoint 2010 deployments. A few common deployment scenarios include:

- Virtualizing SharePoint 2010 in test and development environments – Virtualization provides a simple and cost-effective method for running SharePoint 2010 in a staging or test lab environment using minimal server hardware. Testing on virtual machines is a great way to simulate application or migration scenarios in a controlled environment before rolling out new releases into production.
- Virtualizing passive SQL Server mirrors or cluster nodes –Virtual machines can be used as “passive” nodes whether using Microsoft failover clustering or SQL Server database mirroring. Using virtual machines as passive nodes can reduce the amount of hardware required for availability while still providing application-level protection.
- Virtualizing SharePoint 2010 disaster recovery servers – In the physical world, disaster recovery essentially doubles your production hardware costs. Every production physical server requires an identical match of equipment provisioned at the disaster recovery site. Moreover, physical server-based recovery procedures can be complex and error-prone. Virtualizing your disaster recovery site can greatly decrease cost and complexity. First, you are not bound to the 1:1 ratio of hardware required at both production and DR sites, and you can run as many virtual machines on a physical host as performance allows. Second, you can use any hardware you want; your DR servers do not have to be identical. And finally, disaster recovery design and testing can be completely automated using VMware vCenter Site Recovery Manager™.
- Full virtualization of all SharePoint 2010 servers – With Microsoft SQL Server 2005 and 2008, performance in a virtual machine is very comparable to native performance, proving that even the database servers can take advantage of the benefits of virtualization.

The decision of which components to virtualize in a production environment depends on many factors, including your level of proficiency with SharePoint, SQL Server, and vSphere, and support agreements with Microsoft, VMware, and your hardware vendors. Regardless of the method that most suits your needs, you can begin to maximize value from IT assets with virtualization today.

5. Conclusions

Any new platform chosen for hosting application and database workloads must be as reliable and proven as the traditional physical server alternative. More than 100,000 customers worldwide use VMware products. More than 50% of VMware customers running SharePoint and SQL Server have virtualized those roles for production use. The vSphere platform has the maturity, stability, performance and functionality required to host critical SharePoint 2010 infrastructures.

To meet the needs of a continually shifting business landscape, today's application and database environments must also be highly available, flexible, and cost efficient. Using vSphere as the preferred platform for SharePoint 2010 can help you to better align your application environment to your business goals.

Features such as VMware HA and DRS can decrease downtime associated with server hardware failure and allow for more rapid recovery of messaging services. Virtual machine snapshots and clones help with troubleshooting and resolving other deployment issues and can greatly enhance efficiency in the development cycle.

By decoupling the operating system and associated applications from the underlying hardware, VMware vSphere vMotion greatly enhances the resilience and agility of your application, allowing for on-the-fly hardware replacements and upgrades and the ability to quickly scale to changing workloads.

Finally, vSphere helps to maintain a cost-effective SharePoint 2010 environment by maximizing utilization of computing power through conservative resource requirement sizing and taking advantage of other physical server consolidation opportunities. The robust feature set of vSphere can help to reduce management costs as well, eliminating many mundane and repetitive tasks and freeing up IT administrators for other challenges that are strategically important to the business.

For more information, go to <http://www.vmware.com> or contact your local VMware sales representative