

By Andrew Gilman

VIRTUALIZING MICROSOFT APPLICATIONS WITH VMWARE vSPHERE ON DELL SERVERS AND DELL EQUALLOGIC STORAGE

Deploying VMware® vSphere™ 4 virtualization with 11th-generation Dell™ PowerEdge™ servers and Dell EqualLogic™ PS Series Internet SCSI (iSCSI) storage helps IT organizations confidently virtualize mission-critical Microsoft® applications and achieve outstanding performance, simplified management, and granular data protection.

Organizations in a wide range of fields are virtualizing their data centers in an effort to reduce costs, enhance resource utilization, increase IT responsiveness, and maximize the flexibility of both IT and the enterprise. After beginning with file share, print, Web, and legacy applications, many IT groups are now looking to virtualize mission-critical applications such as Microsoft Exchange, Microsoft SQL Server®, and Microsoft Office SharePoint® Server software. To succeed with this next phase of virtualization, administrators must ensure that their infrastructure is up to the task.

Because applications share resources in a highly consolidated IT environment, administrators need tightly integrated, virtualization-optimized software, servers, and storage that can work together to deliver the scalable performance that helps ensure fulfillment of service-level agreements (SLAs). They also require granular data protection and data recovery capabilities that can prevent the loss of critical data, enhance recovery time, and support enterprise productivity and responsiveness. And they must be sure that virtualizing these applications can extend the value of their virtualized infrastructure without adding costs or complexity.

Dell has worked closely with Microsoft, VMware, and Intel to develop products and tools that help organizations confidently virtualize and protect key Microsoft applications (see the “Dell Infrastructure

Consulting helps accelerate virtualization deployments” sidebar in this article). Combining VMware vSphere 4 with 11th-generation Dell PowerEdge servers and Dell EqualLogic PS Series Internet SCSI (iSCSI) storage area network (SAN) arrays can help IT groups extend the benefits of virtualization to Microsoft applications while simplifying IT management and enhancing data protection.

VMWARE vSPHERE 4: EXTENDING THE SOFTWARE FOUNDATION FOR VIRTUALIZATION

The VMware vSphere 4 virtualization platform can play an important role in extending virtualization to mission-critical Microsoft applications. Designed as a cloud computing OS, vSphere enables IT groups to apply a flexible and highly scalable cloud model within their internal IT infrastructure.

Adopting vSphere for Microsoft Exchange, SQL Server, or SharePoint enables organizations to consolidate their hardware and run these applications cost-effectively with managed SLAs. For example, organizations can potentially move two Exchange hubs, each running five physical servers, onto just two physical servers running vSphere. In the process, they can consolidate Exchange server roles and help avoid the need for dedicated standby servers. Similarly, they could potentially migrate four instances of SQL Server,

each running on its own physical server, to just one host running vSphere—helping substantially reduce hardware and software licensing costs (see Figure 1).

vSphere also helps organizations achieve high performance for Microsoft applications when moving those applications to a virtualized environment. In vSphere 4 deployments, administrators can dramatically increase the server resources allotted to each virtual machine (VM) while decreasing the resource overhead incurred by running VMware software. This current release is designed to support VMs configured with up to 8 virtual processors, 256 GB of RAM, and 40 Gbps of I/O. Meanwhile, the server overhead for running vSphere continues to decrease steadily with each successive release. Capitalizing on these capabilities with high-performance 11th-generation Dell PowerEdge servers can enable organizations running SQL Server on vSphere 4 to easily scale their deployments as enterprise needs grow.

VMware Distributed Resource Scheduler (DRS) helps sustain that high

DELL INFRASTRUCTURE CONSULTING HELPS ACCELERATE VIRTUALIZATION DEPLOYMENTS

Dell Infrastructure Consulting applies the experience accumulated through thousands of engagements to help organizations take full advantage of data center virtualization. Dell team members can provide an assessment to help evaluate potential IT benefits and make a business case for virtualization. By offering an array of tools and guidance on best practices, they can also assist with virtualization design, planning, and implementation to help accelerate the deployment process, reduce complexity, and avoid risks inherent in migrating mission-critical applications to a virtualized environment.

application performance without requiring manual intervention from administrators. This automated, policy-based capability is designed to monitor resources used by VMs and applications and perform load balancing across physical hosts to avoid resource constraints. If an application approaches the resource limits of the physical host, VMware DRS can move the application to another host to help avoid performance degradation for end users.

vSphere also offers high-availability capabilities that help ensure business continuity in the event of physical hardware

problems or a disaster that affects the entire data center. VMware High Availability (HA) constantly monitors VMs, and if an OS or hardware failure occurs, it can automatically restart VMs on another physical server without manual intervention. VMware Fault Tolerance (FT) enables administrators to create—with just a single click in the interface—a mirrored Exchange or SQL Server VM that runs in lockstep with the original. If there is a problem with the primary instance, the application can fail over transparently to the mirrored version, helping avoid downtime or data loss for end users.

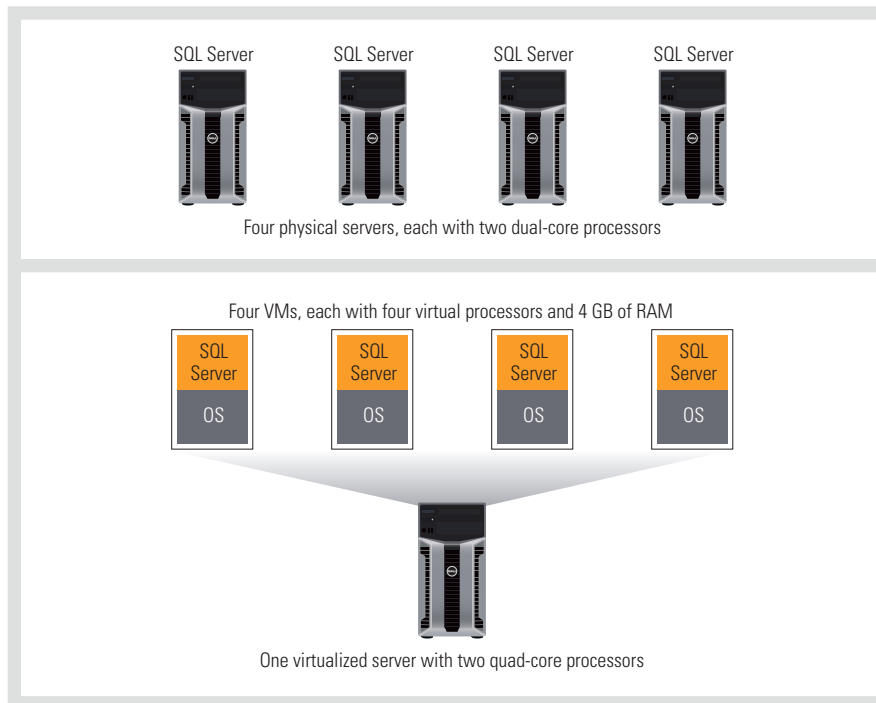


Figure 1. Migrating four instances of Microsoft SQL Server to a single host running VMware vSphere

DELL POWEREDGE SERVERS: DELIVERING PERFORMANCE FOR MISSION-CRITICAL WORKLOADS

11th-generation Dell PowerEdge servers provide a robust hardware foundation for running Microsoft applications in an environment virtualized with VMware vSphere 4. Equipped with the Intel® Xeon® processor 5500 series, these PowerEdge servers are designed to deliver outstanding processing performance, significantly greater memory bandwidth, and enhanced energy efficiency compared with previous-generation servers. Consequently, 11th-generation PowerEdge servers running vSphere 4 can deliver up to 160 percent greater performance¹ and up to 130 percent more energy efficiency than servers based on previous-generation platforms. The increased performance, power efficiency, memory capacity, and networking ability of this latest generation of PowerEdge servers can help organizations

¹ Based on VMmark benchmark testing performed by Dell Labs in March 2009 on a Dell PowerEdge R710 server running VMware ESX 4.0 (results published April 21, 2009), compared with September 2008 tests on a Dell PowerEdge 2950 III server running VMware ESX 3.5.0 Update 2 (results published September 29, 2008). For details and complete results, visit www.vmware.com/products/vmmark/results.html.

achieve greater consolidation ratios for hosted VMs than previous-generation servers, helping reduce costs by further consolidating hardware.

Combined engineering efforts by Dell, VMware, and Intel have created a range of capabilities that help simplify the deployment and management of virtualized environments. With an optional embedded VMware hypervisor, 11th-generation PowerEdge servers help avoid the need to download or install additional software to get started. Meanwhile, Intel Virtualization Technology (VT) FlexMigration allows administrators to integrate multiple generations of Intel Xeon processor-based servers into the server environment, facilitating deployment and helping protect existing investments. To help ensure the compatibility of hardware and software components, Dell and VMware have tested and validated tier-1, mission-critical application workloads in environments that combine vSphere 4 with PowerEdge servers and Dell EqualLogic PS Series iSCSI SAN arrays.

VMware functions are tightly integrated into PowerEdge management tools. The Dell OpenManage™ management suite for VMware ESXi enables administrators to manage, monitor, and update PowerEdge servers running VMware ESXi with a selection of management tools, including the Dell Management Console Powered by Altiris™ from Symantec™ (see the “Dell Business Ready Configurations help simplify virtualization” sidebar in this article).

To help deliver high application availability and avoid unplanned outages, Dell servers include multiple redundant components. For example, the PowerEdge M1000e modular blade enclosure can be equipped with redundant power supplies, redundant cooling fans, and up to six total I/O modules for three redundant fabrics. IT groups can also select a redundant Chassis Management Controller (CMC) to help ensure uninterrupted access to key management functions.

DELL EQUALLOGIC SANs: STORING AND PROTECTING MISSION-CRITICAL DATA

Dell EqualLogic PS Series iSCSI SAN arrays provide an excellent complement to a VMware vSphere 4 environment running Microsoft applications on Dell PowerEdge servers. As with the virtualized server environment, EqualLogic arrays help administrators consolidate storage and increase flexibility. EqualLogic arrays also include a variety of capabilities to help ensure application availability and deliver granular protection for critical data while providing high levels of performance. In Dell-commissioned tests performed by Principled Technologies in November 2008, for example, a Dell EqualLogic PS Series iSCSI SAN under a Microsoft Exchange Server Jetstress workload delivered 86 percent more achieved IOPS per disk than an HP StorageWorks 4400 4 Gbps Fibre Channel array.²

Designed to provide virtualized storage, EqualLogic arrays use a peer storage architecture that enables them to share resources, evenly distribute workloads, and provide data protection for VMs. Data volumes are provisioned automatically from a single scalable pool of storage. EqualLogic SANs apply resources automatically even as virtualized servers and their workloads

change. Nondisruptive, online migration of data volumes among storage tiers and pools allows administrators to reallocate physical storage resources to help meet changing needs or to accommodate specific workloads.

This virtualized storage environment provides the flexibility to accommodate a dynamic IT infrastructure. EqualLogic arrays enable administrators to mix and match arrays with different disk types within the same SAN, using solid-state drives (SSDs), Serial Attached SCSI (SAS) drives, or Serial ATA (SATA) drives depending on the needs of their organization. And adding capacity is simple: with the modular design of the EqualLogic PS Series, administrators can add arrays without disrupting operations. The arrays can automatically balance loads across resources to help ensure consistent application performance.

The EqualLogic PS Series is also designed to deliver the high availability required for mission-critical applications. Redundant, hot-swappable components—including power supplies, controllers, enclosures, and disk drives—can help prevent unplanned outages. With the modular architecture, redundancy increases dramatically as resources are added. Administrators can also set up redundant Dell PowerEdge servers and Dell PowerConnect™ switches to

DELL BUSINESS READY CONFIGURATIONS HELP SIMPLIFY VIRTUALIZATION

Dell now offers Business Ready Configurations for virtualization based on VMware vSphere 4 to help avoid cost-inefficient, time-consuming trial-and-error processes during infrastructure design and implementation. The engineer-tested configurations, which integrate VMware software with Dell PowerEdge servers and Dell EqualLogic PS Series storage, enable IT organizations and business groups to confidently migrate mission-critical Microsoft applications to a virtualized environment.

These prebuilt configurations offer simplified design, ordering, and deployment of production-ready virtualization infrastructures and include best-practice recommendations and guidelines. They can be deployed as designed or customized to meet individual requirements. By using Dell Business Ready Configurations, IT staff can refocus their time and energy on other strategic tasks.

²For the complete report, including detailed information on the test environment, benchmark workloads, methodology, and results, see “Exchange 2007 SAN Performance Test: Comparing Performance Between Dell EqualLogic PS Series SAN and HP StorageWorks 4400 Enterprise Virtual Array,” by Principled Technologies, November 2008, www.principledtechnologies.com/clients/reports/dell/EQLPS5000XVExchange1108.pdf.

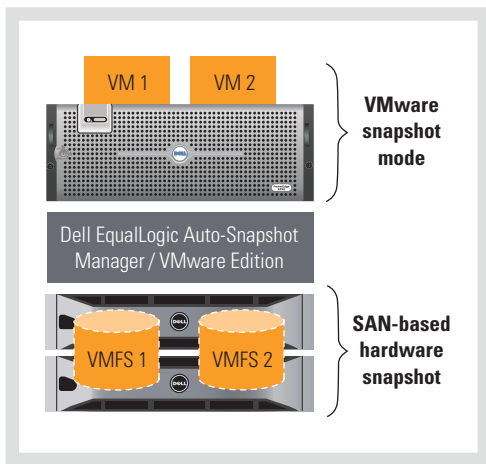


Figure 2. Protecting virtual machine and application data on Dell EqualLogic PS Series storage

help remove single points of failure from the storage network.

To strengthen availability and scalability, the EqualLogic Multipathing Extension Module (MEM) for vSphere 4—available in a beta version at press time—is expected to provide storage-aware, end-to-end management of the data path between the host and storage and help automate the process of creating and managing multipath connections to deliver high levels of performance and reliability. If there is a problem with an array or a need for additional capacity, the MEM is designed to load balance the SAN and help ensure that applications continue to run smoothly. For example, during high traffic times for Microsoft Exchange, the MEM could help ensure that all paths are utilized efficiently, so end users can access their e-mail without experiencing performance issues.

EqualLogic arrays can also help avoid downtime during management tasks and capacity upgrades. Administrators can use vSphere and EqualLogic arrays to provision VMs and reconfigure applications while they remain online. Similarly, administrators can add storage capacity or reallocate storage without taking the system offline.

By integrating EqualLogic PS Series SANs into the vSphere environment, IT organizations can implement multilayered data protection for mission-critical applications. EqualLogic Auto-Snapshot


Manager / VMware Edition 2.0 uses VMware vStorage application programming interfaces (APIs) to create fast, online, hypervisor-aware snapshots, clones, and remote replicas of VMs and VMware Virtual Machine File System (VMFS) data stores. An easy-to-use interface enables administrators to create automated schedules for individual VMs, groups, or even all VMs in the data center, helping save time compared with the manual creation of VM snapshots. By producing space-efficient, SAN-based snapshots, Auto-Snapshot Manager / VMware Edition enables organizations to back up data frequently, without using excessive storage capacity (see Figure 2). Administrators can also replicate data to off-site locations for additional protection.

Auto-Snapshot Manager / Microsoft Edition helps protect application data by taking application-aware snapshots for virtualized transactional workloads from Exchange, SQL Server, and other Microsoft applications as well as Microsoft file systems. It includes built-in scheduling capabilities so administrators can create frequent, automated backups, as well as replication capabilities for storing application-aware snapshots off-site to help protect against disasters. Integration with Microsoft Cluster Service (MSCS) and Volume Shadow Copy Service (VSS) helps produce clean, consistent snapshots that can be restored successfully.

The VMware vCenter™ Site Recovery Manager (SRM) Storage Adapter for EqualLogic arrays helps organizations capitalize on the tight integration of the EqualLogic PS Series and VMware vCenter Server to provide automated disaster recovery. Administrators can easily and cost-effectively configure replication between EqualLogic arrays using the included auto-replication feature, and can configure VM protection groups and recovery plans using SRM. They can also test recovery plans without affecting production environments. At the time of failover, SRM

can automatically run the recovery plan, booting up VMs in a predetermined order.

VIRTUALIZING MISSION-CRITICAL MICROSOFT APPLICATIONS

By combining VMware vSphere 4 with 11th-generation Dell PowerEdge servers and Dell EqualLogic PS Series iSCSI SANs, organizations can gain the confidence they need to virtualize mission-critical Microsoft applications. vSphere 4 virtualization allows organizations to take advantage of the performance capabilities of 11th-generation PowerEdge servers and continue to deliver outstanding performance for these applications after they have been migrated to the virtualized environment. Tight integration among vSphere, PowerEdge servers, and EqualLogic PS Series storage helps to simplify management of a unified environment that can deliver powerful and granular protection for VM and application data. Together, Dell and VMware are helping IT organizations realize the full potential of data center virtualization and enabling them to enhance support of business goals. 

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