

## EMC Celerra An Ideal Platform for VMware

### EMC Celerra is the reliable, affordable, and flexible networked storage platform

#### The Big Picture

- **No-compromise availability for virtualized IT environments:** Advanced failover for high availability
- **Continuous operations and disaster recovery:** Information protection with Celerra Replicator
- **Most flexible network deployment options for VMware:** NAS, iSCSI, and Fibre Channel connectivity
- **Advanced functionality at no additional cost:** Automated volume management and virtual provisioning
- **Ease of use for dynamic virtualized infrastructures:** Manage the physical and virtual environments
- **Accelerated end-to-end deployments with EMC-tested reference architectures and service offerings**

#### Virtual infrastructure requires high availability

Virtual infrastructure requires high availability at all levels—applications, servers, network, and storage.

VMware® High Availability (HA) provides easy-to-use, cost-effective high availability for applications running in virtual machines. In the event of server failure, affected virtual machines are automatically restarted on other production servers with spare capacity. VMware HA allows IT organizations to minimize downtime and IT service disruption while eliminating the need for dedicated standby hardware and installation of additional software. It also provides uniform high availability across the entire virtualized IT environment without the cost and complexity of failover solutions tied to either operating systems or specific applications.

However, the availability of your virtual machines is only as good as the storage they depend on. No-compromise availability means your VMware applications continue to run at the same performance and service levels, even in the event of a failure. EMC® Celerra® network-attached storage accomplishes this via an active-passive N+1/N+M advanced failover architecture (where N equals the active X-Blade and M equals the pool of failover X-Blades), and by eliminating any single point of failure from the network to the disk drive. The Celerra family inherits the industry-leading fault tolerance of the CLARiiON® UltraScale™ and Symmetrix® DMX storage systems. Celerra systems are designed for hot-swappable component replacements and automatic notification if the system detects a problem. Problem detection happens using an extensive set of internal diagnostics, backed up by additional remote support from EMC. An additional way to improve availability and increase functionality for VMware environments is through the use of local and remote replication. The Celerra platforms are designed to deliver five-nines availability—99.999 percent uptime.

#### Virtual infrastructure requires information protection

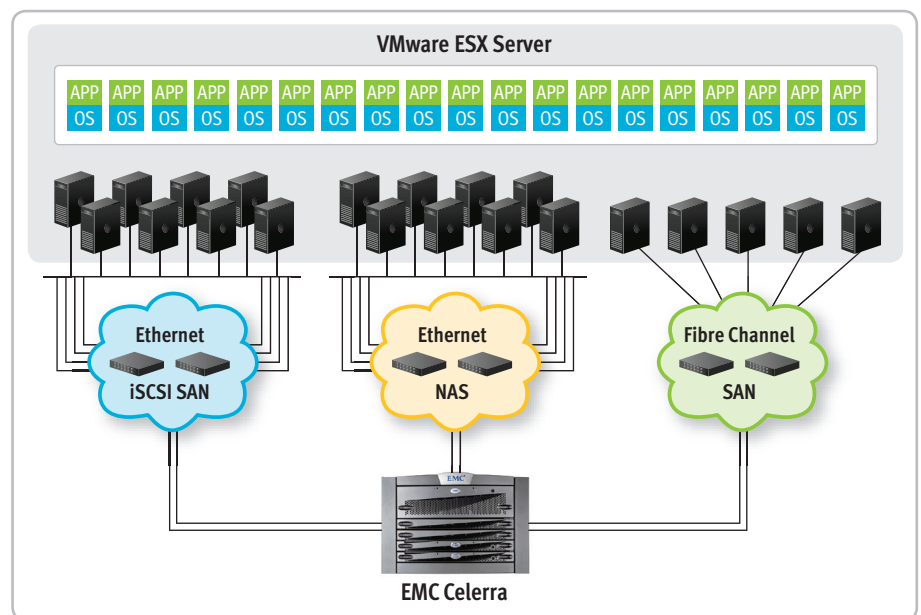
Virtual infrastructure requires robust data replication solutions to support disaster recovery requirements of the most demanding customers around the world. VMware Site Recovery Manager (SRM) provides DR planning and recovery execution. It enables customers to move data from one data center to another based on policies. Customers can move all the virtual machines or a subset.

SRM requires storage replication to be performed by external solutions. Celerra delivers advanced IP replication solutions with Celerra Replicator™. It provides asynchronous replication for iSCSI and NAS with easy-to-define replication service levels and efficient use of network bandwidth. Celerra Replicator with iSCSI supports disaster recovery, integrated with SRM.

## Virtual infrastructure requires flexible connectivity

Virtual infrastructure requires flexible connectivity to take full advantage of VMware dynamic functionality, including Storage VMotion™ and DRS. VMware Storage VMotion allows virtual machine disks to be relocated to different data store locations, completely transparently and while the virtual machine is running, with zero disruption or downtime. This makes array migrations and performance optimization of virtual machines with the optimum storage type and connectivity simple and non-disruptive. VMware Distributed Resource Scheduler (DRS) dynamically allocates and balances computing capacity across a collection of hardware resources aggregated into logical resource pools. When a virtual machine experiences an increased load, VMware DRS automatically allocates additional resources by redistributing virtual machines among the physical servers within the network.

Celerra delivers the flexibility of NAS, iSCSI, and Fibre Channel connectivity in a single package. Furthermore, Celerra allows you to deploy storage on multiple tiers, from high-performance FC drives to high-capacity SATA drives, plus the ability to choose the RAID scheme that meets your performance and protection requirements. Celerra gives VMware customers the ability choose the optimal storage and connectivity for their virtual infrastructure and take advantage of Storage VMotion and DRS to dynamically and non-disruptively adapt to changing requirements.



## Virtual infrastructure requires advanced functionality

To realize the value of VMware higher-level functionality, you must deploy shared storage. All ESX Servers in the cluster need to have access to all of the storage. One of the benefits of virtualization is getting maximum resource utilization out of your hardware investment by consolidating applications. Furthermore, VMware functions like VMotion, Storage VMotion, HA, and DRS optimize performance by moving IO loads dynamically.

EMC Celerra offers the most comprehensive suite of built-in features—critical for today's VMware users who need advanced functionality to improve storage utilization and simplify provisioning. Celerra Virtual Provisioning is a thin provisioning capability to further improve capacity utilization. With Virtual Provisioning, VMware can create storage devices that do not fully allocate storage capacity until the application generates data for the virtual disk. File systems and iSCSI LUNs can be logically sized to required capacities and physically provisioned with less capacity. Like VMware virtual devices, storage resources can share from a pool of physical disk resources. This means unused virtual machine storage doesn't need to sit idly in a file system or LUN until it is used. Celerra Automated Volume Management (AVM) lets you provision storage for VMware, optimized by workload, in only four clicks. You merely enter a name, size, workload type (e.g., performance, economy), and click OK. AVM handles all the details associated with different disk types and RAID levels.

## Virtual infrastructure requires simple management of both physical and virtual

Virtualization changes the way we view resources in the data center. First, virtualization adds another layer to the relationship stack. What we traditionally managed as an “Exchange Server” now has two components—the “Virtual Exchange Server” and the physical ESX Server™. This virtual server could be running on one ESX Server this evening, and on a different ESX Server tomorrow morning. The movement could have been done by a repetitive script, a one-time human action, or as part of an automatic load-balancing activity. Second, where it used to take weeks to deploy a new server, virtualization allows it to be done in minutes, requiring additional network, storage, and physical server resources. Furthermore, virtual servers can be easily created for a short-term project and then be “destroyed” just as easily.

Since VMware virtual machines can be deployed on the fly, ease of use becomes a key consideration when choosing which storage platform and related storage management software to implement. EMC has added “virtual knowledge” to the EMC ControlCenter® and Smarts® product lines to provide configuration, change, problem, performance, and capacity management. You can have one set of tools to manage both your virtual and physical infrastructures. Celerra includes a number of built-in ease-of-use capabilities that speed deployment and simplify management of VMware deployments. The Celerra Startup Assistant is a software utility that streamlines the initial configuration of an integrated Celerra platform—15 minutes from power-up to production. The web-based Celerra Manager handles configuration and management, including at-a-glance system status, performance, and the ability to provision an NFS data store in only four mouse clicks. Wizards make common administrative tasks a snap. EMC Replication Manager supports Celerra Replicator for iSCSI in VMware environments. It provides application-consistent replication for key applications like Exchange, SQL, and Oracle. With EMC Replication Manager, the disaster recovery management is performed from the host.

## Accelerate virtual infrastructure benefits

To fully realize the benefits of a virtual infrastructure, many existing operations need to adapt. With limited IT resources, customers need best practices, reference architectures, and comprehensive services to optimize their infrastructure and accelerate their VMware deployments.

There are many areas of your virtual server environment where EMC can bring value by helping you optimize the surrounding infrastructure to accelerate your time to value with virtualization. EMC publishes VMware-certified blueprints for Celerra. These include reference architecture best practices from thousands of engagements, which means that your company will benefit from EMC’s and VMware’s joint experience, thereby increasing your staff’s efficiency and reducing both costs and risks.

EMC’s comprehensive suite of virtualization services and solutions can help your organization transform your entire infrastructure by leveraging the capabilities of VMware along with EMC Celerra systems.

- **EMC Infrastructure Assessment and Strategy** examines your current infrastructure and business objectives to provide an analysis and design recommendations showing how you can realize your most rapid return in building out your virtual infrastructure. It will also help you adapt and develop best practices around virtual infrastructure management, backup/recovery, business continuity, security, network storage design, and more.
- **EMC Virtual Infrastructure Design and Implementation** services provide a detailed design and migration plan for x86 server virtualization with storage consolidation based on the results of the Assessment Service and your future business needs. EMC can provide insights that will help you understand where and how to apply these technology or process changes to realize maximum benefit of a virtual infrastructure.
- **EMC Virtual Infrastructure Data Protection** solutions will help you guard your virtual infrastructure against downtime and provide the high availability you expect for critical workloads. Our protection solutions integrate EMC’s wide range of business continuity and backup and recovery technologies with your VMware server virtualization. To ensure your success, we validate this integration with extensive interoperability testing and thorough documentation of best practices.

- **EMC IT Operational Readiness** services enable you to optimize your virtual infrastructure through service definition, process optimization, and policy-based information management that address people, process, and technology issues. These services reduce costs through more efficient operations while improving service quality and business agility in your virtual infrastructure.

## Virtual infrastructure with Celerra

There are a number of common use cases for deploying a virtual infrastructure with Celerra. These include:

- **Infrastructure Optimization:** Server and storage consolidation with Celerra multi-protocol connectivity lower costs and improve utilization without sacrificing performance or availability. Use Celerra and the NAS protocols to simplify provisioning and improve backups.
- **Desktop Management:** Use Celerra with VMware Virtual Desktop Infrastructure (VDI) to lower costs and control and secure the desktop environment. With Celerra SnapSure™, copies of the virtual desktop images can be created quickly and stored in a small fraction of the space that would be required with physical copy methods.
- **Disaster Recovery:** EMC has long been recognized as the leader in storage BC/DR solutions. Celerra Replicator integration with SRM automates the failover process and makes DR a property of the virtual machine.



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### Take the next step

Find out how EMC Celerra systems can maximize your VMware environment's potential. Find out why customers are choosing Celerra as the reliable, affordable, and flexible networked storage platform for their VMware environments. For more information, contact your local EMC sales representative or authorized EMC value-added systems integrator today. Or visit our website at [www.EMC.com](http://www.EMC.com).