

ACCELERATING YOUR IT TRANSFORMATION WITH EMC NEXT-GENERATION UNIFIED STORAGE AND BACKUP

Virtualization, in particular VMware®, has changed the way companies look at how they deploy not only their servers, but their applications and the underlying infrastructure as well. The systems in place today not only may prohibit companies from fully experiencing the advantages of virtualization, but can slow or even stall the virtualization transition. This overview explores the information infrastructure that is required to support a virtualized environment.

In today's data center it is critical that the IT infrastructure be robust, powerful, and flexible. The storage platform stores and feeds your application environments while ensuring the integrity of the data that is critical to maintain application availability; backup provides the critical data protection required for ensuring you can recover your essential business data in the case of corruption, data loss, or disaster. EMC is the market leader in storage and backup optimized for virtual environments and offers the ideal storage and backup solutions for the challenges of a virtualized environment.

CHALLENGES OF THE VIRTUALIZED ENVIRONMENT

As virtualization technologies have matured and server hardware scale and efficiency has grown, more organizations are now moving mission-critical applications to virtualized infrastructures. The benefits of virtualization are many, including greater efficiency, productivity, and agility. Virtualization helps bring management costs down and makes applications more highly available, something that wasn't always cost effective in the past.

At the same time, virtualization places new demands on the infrastructure, which is further complicated since most companies on the path to virtualization have a mix of physical and virtual servers in their environments. Data storage and backup solutions must be able to support the needs of the new virtualized infrastructure.

STORAGE

Storage systems now must be able to scale to meet the I/O demands of mixed workloads, such as file servers, databases, email systems, and other applications. Managing numerous file and block systems to meet the dynamic needs of growing storage environments can be challenging and complex. Storage administrators need to be able to make quick provisioning decisions. In addition, the integration of storage to the virtualized environment and the ability of virtual server administrators to manage the storage from native virtualized management interfaces are important. In the new paradigm there may not be a storage administrator, and even if there is, the virtual server administrator now often requires the ability to easily allocate and deploy storage to their virtualized applications.

BACKUP

IT backup administrators face many challenges as they see virtual environments growing exponentially, and, as with storage, few aspects can pose greater difficulty to this growth than backup and recovery. While virtualization technology optimizes the use of physical server resources, this leads to a challenge when doing backups. Today's virtual environments typically contain hundreds if not thousands of virtual machines (VMs). With fewer VMs, backup was somewhat manageable. However, given the explosion of virtualization seen today, backup of the environment is no trivial task and can in fact become an impediment to expansion efforts.

EMC SOLUTIONS FOR VIRTUALIZED ENVIRONMENTS

EMC® has the broadest portfolio of storage, data protection, data management, and security products available on the market today. Many of the world's largest and most demanding corporations, governments, and financial institutions depend on products from across the EMC portfolio. EMC's next-generation storage and backup and recovery offerings are optimized for virtualization. An EMC solution can accelerate your application server consolidation efforts.

NEXT-GENERATION UNIFIED STORAGE

The EMC VNX™ family delivers industry-leading innovation and enterprise capabilities for file, block, and object storage in a fully unified, scalable, and easy-to-use solution. VNX enables organizations to have multi-protocol SAN infrastructures such as Fibre Channel and iSCSI block-based protocols and NFS and CIFS network-attached storage (NAS) interfaces fully integrated into one storage platform. The entire platform can be managed with a single, easy-to-use management interface—EMC Unisphere™. Plug-ins to VMware vCenter™ allow storage administrators to see “up and into” the VMware environment and virtual server administrators to see “down” and manage the storage.



The VNX series was designed to deliver unparalleled performance to support the world's most demanding applications, such as VMware virtualized server and workstation environments.

FLASH 1st

Advanced storage technologies such as Solid State Disk/Flash together with Fully Automated Storage Tiering for Virtual Pools (FAST VP) can lower the total cost of ownership and improve performance for virtual servers and virtual desktop deployments with self-optimized storage tiering. With FAST VP and set-it-and-forget-it policies, you'll optimize data on Flash, SAS, and

near-line SAS drives. You can purchase only what you need for capacity and do not have to over-invest to get the performance your applications and users require. Additionally, FAST Cache allows you to use your SSD/Flash drives as an extension of system cache, mitigating the impact of both read and write I/O spikes and delivering consistent performance for activities such as recompose operations and VDI boot storms. Together, FAST VP and FAST Cache allow you to implement a FLASH 1st strategy with results such as tripling the speed of virtualized Microsoft® SQL Server® or Oracle workloads and booting up to 500 virtual desktops in just five minutes.

Unisphere

EMC Unisphere provides simplicity, flexibility, and automation—key requirements for optimal storage management in a virtualized environment. Unisphere's unprecedented ease of use is reflected in its intuitive, task-based controls, customizable dashboards, and single-click access to support tools. Unisphere allows storage managers to view up-to-the-minute, end-to-end relationships of VMware ESX® Servers, the VMs they support, and the VMs' storage devices to the storage system. A convenient Unisphere Search facility easily finds VMs that have been moved about the SAN.

VMware integration

In addition to robust system features, the VNX series has many points of integration with VMware. The VNX Operating Environment supports VMware's APIs for Array Integration (VAI), which allows vCenter to offload storage tasks, and Storage Awareness (VASA), to optimally configure virtual machines and their storage objects. Additionally, the Virtual Storage Integrator (VSI) vCenter plug-in affords detailed views of attached VNX systems and, in its latest release, the ability to provision storage directly from vCenter.

NEXT-GENERATION BACKUP AND RECOVERY

EMC backup and recovery solutions—EMC Avamar®, Data Domain®, Data Protection Advisor, Disk Library for mainframe and NetWorker®—provide an unparalleled combination in ensuring your company's most valuable assets are protected and available should you need to recover from unforeseen data loss or corruption issues. The ability to integrate and support a unified platform is a key requirement, and the ability to provide speed, efficiency, and scale for both file-based NAS and host-based SAN backup are of the utmost importance. Avamar and Data Domain provide a disk-based deduplication infrastructure that can handle file-based NAS utilizing NDMP and standard host-based backup using block-based SAN storage.

Avamar

Traditional backup solutions require a rotational schedule of full and incremental backups which move a significant amount of redundant data week over week. Because of the unnecessary data movement, backup windows often roll into production hours, constrain the network, and result in too much storage under management. In virtualized environments, server consolidation can mean overlapping backup windows and heavy impact on hardware resources.

EMC Avamar deduplication backup software and system with integrated data deduplication solves these challenges, enabling fast, daily full backups for VMware environments, NAS systems, remote offices, and desktop/laptop systems. Unlike traditional backup solutions, Avamar identifies redundant data segments at the client—before they are transferred across the network. By moving only new, unique sub-file data segments, Avamar delivers fast daily full backups—even across slow or congested IP networks and infrastructures.



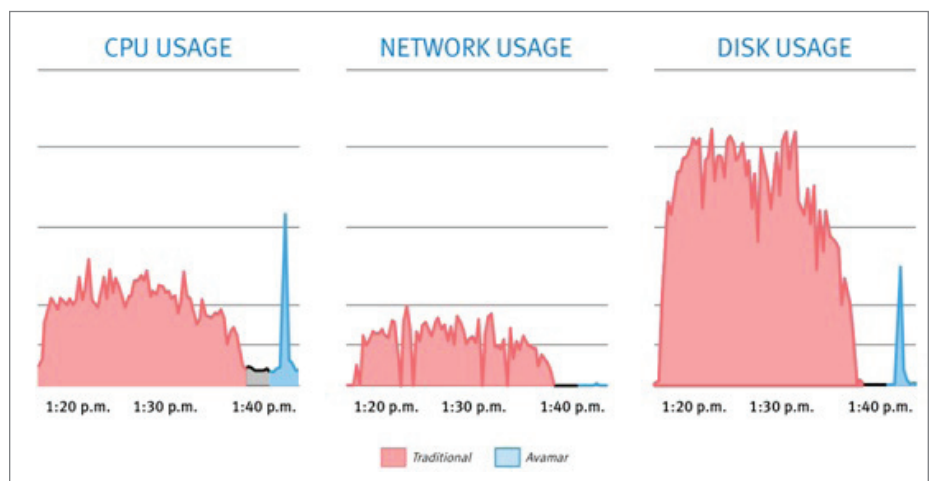
EMC Avamar deduplication backup software and system

By storing just a single instance of each sub-file data segment globally, Avamar also reduces total back-end storage by up to 40 to 60x for virtualized environments, enabling cost-effective, disk-based recovery over extended periods of time. Although Avamar backs up data to disk, it is integrated to traditional backup software such as EMC NetWorker for long-term, tape-based retention. Avamar can also integrate with Data Domain deduplication storage systems for specific applications.

Avamar for VMware

Avamar software quickly and efficiently protects virtualized environments by reducing the size of backup data within and across virtual machines—using agents as a guest in the virtual machines or on a proxy VM via the VMware vStorage™ APIs for Data Protection. For virtual machine backups, Avamar eliminates traditional backup bottlenecks caused by the large amount of redundant data that must pass through the same set of shared resources—the physical server’s CPU, Ethernet adapter, memory, and disk storage. Avamar reduces the traditional backup load from up to 200 percent weekly to as little as two percent over the same day period, dramatically reducing backup times and resource utilization.

The following illustration represents a comparison of full backups using traditional methods versus full backups using Avamar. The left side of each graph represents the impact on the shared resource (CPU/network/disk) using traditional backup solutions, and the right side of each graph represents the impact of the Avamar solution on the shared resource. This reduced impact on the shared resources of an ESX server, when running Avamar at the guest or vStorage API level, allows users to easily meet backup windows and reduce the network bandwidth requirements for a backup and recovery infrastructure.



Backup for a VMware guest—Avamar vs. traditional backup methods

Avamar in a VMware environment offers you the flexibility of implementing your data protection solution based on your requirements. There are two approaches: guest-level backup and image-level backup via vStorage APIs for Data Protection.

Avamar VMware guest-based backup

Guest-level backup involves installing the lightweight Avamar Agent inside each virtual machine. Backup configuration for this method is no different from that for a physical server. The main advantages of this procedure are:

- Highest level of data deduplication
- Backup of applications inside the virtual machines
- Granular-level recovery options
- Application consistency, enabling reliable restores

- No requirement for advanced scripting or VMware software knowledge
- Unchanged day-to-day procedures for backing up

Avamar VMware image backup based on vStorage APIs for Data Protection

VMware's vStorage APIs for Data Protection enable LAN-free backup and offload the backup workload to a backup dedicated or "proxy" VM. Using the Avamar Agent to back up the virtual machine disks (VMDK), Avamar provides deduplication at both the file level and the .vmdk level. VMware's vStorage APIs for Data Protection consist of a set of utilities and APIs that work in conjunction with Avamar. The advantages of using Avamar and the vStorage APIs for Data Protection include:

- Full image backups of running VMs and full bare metal restore of VMDK
- Efficient transport by not copying entire virtual disk images over the network
- File-level restores from image-level backups
- Changed block tracking for backups—up to 3x faster than competitors
- Changed block tracking for restores—up to 30x faster than traditional solutions
- Minimizes network traffic by deduplicating and compressing data
- Eliminates managing backup agents in each VM for most scenarios

VMware vCenter integration

Avamar provides unique integration capabilities with VMware's vCenter management to provide key data protection information to simplify management of backup and recovery activities. The features of this integration include the ability to:

- Discover VMs and their associated groups in the Avamar user interface
- Add individual VMs or groups and define backup policies
- Initiate and monitor backup or restore operations
- View VM protection status

The resulting benefits are simple views of whether VMs have been backed up or not, insight into how a VM was backed up (guest, VM, or not at all), and automatic addition of backup policies to virtual machines as they are added.

Avamar and Data Domain integration

Avamar 6.0 brings many new capabilities, including integration to Data Domain systems through DD Boost software. For larger, high-change rate databases, such as Oracle, Microsoft SQL, SharePoint®, and Exchange, Avamar can send the data to Data Domain systems for deduplication and storage. Avamar continues to manage the backup policies, restores, and system maintenance, as well as managing Data Domain system replication. Now users can leverage the best deduplication technology based on workloads with the efficiency and simplicity of Avamar managing backup and recovery for the enterprise.

Distributed virtualization

For environments that have standardized on a VMware virtual infrastructure at remote sites, EMC offers the EMC Avamar Virtual Edition for VMware: the industry's first deduplication virtual appliance for backup, recovery, and disaster recovery. Avamar Virtual Edition enables a complete Avamar server to be deployed as a virtual appliance on an existing ESX server, leveraging existing disk storage (SAN, iSCSI, DAS). Avamar Virtual Edition also provides cost-effective disaster recovery through secure, efficient replication.

CONCLUSION

With the ever increasing demands placed on storage and backup infrastructures via greater server virtualization, the need for modern storage and backup infrastructure is becoming critical.

Traditional storage doesn't have the power and flexibility to handle the demands of dynamic virtual environments, providing inconsistent performance and requiring over-provisioning to keep up. Employing traditional backup methods to the virtual environment may be sufficient at the early onset, however as the virtual environment quickly grows in size, backup windows begin to be largely unmanageable.

EMC's next-generation VNX unified storage platform was built for demanding virtualized data centers, simplifying storage and data management with unprecedented levels of automation. EMC's VNX series helps you thrive in the virtualized IT environment, supporting more transactions, more users, new applications, and achieving better performance without going over budget. EMC backup solutions provide customers today with more efficient VMware backup and recovery. EMC Avamar helps you breakthrough barriers, speeding VMware backups by dramatically reducing the traditional backup load via client side deduplication and through tight integration with VMware vADP, leveraging Changed Blocked Tracking support for both backup and recovery. Both deliver unmatched simplicity, and together are enabling worry-free and cost-effective virtualization expansion by customers worldwide.

CONTACT US

To learn more about how EMC products, services, and solutions can help solve your business and IT challenges, contact your local representative or authorized reseller, or visit us at www.EMC.com.

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