

VMware VMFS

High-performance cluster file system for storage virtualization

What Is VMware VMFS?

VMware® Virtual Machine File System (VMFS) is a high-performance cluster file system that provides storage virtualization optimized for virtual machines. Each virtual machine is encapsulated in a small set of files and VMFS is the default storage system for these files on physical SCSI disks and partitions. VMFS allows IT organizations to:

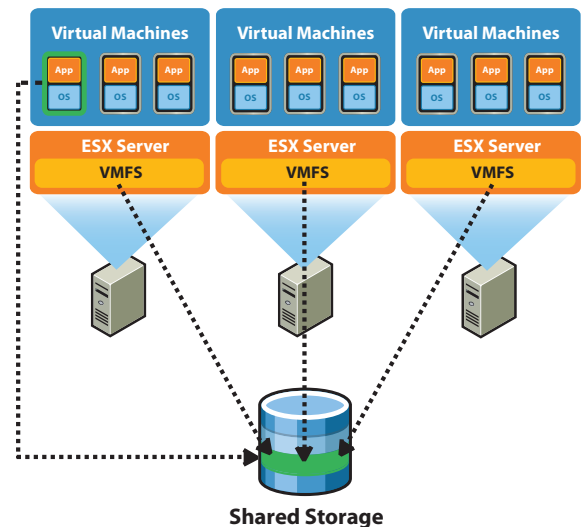
- Greatly simplify virtual machine provisioning and administration by efficiently storing the entire virtual machine state in a central location.
- Run multiple instances of ESX Server to access the same virtual machine storage concurrently.
- Support virtualization-based distributed infrastructure services using VMware VirtualCenter, VMware VMotion™, VMware DRS and VMware HA.

How Does VMware VMFS Work?

VMware VMFS is optimized, rigorously tested and certified for a wide range of Fibre Channel and iSCSI SAN equipment. VMFS efficiently stores the entire virtual machine state in a central location and can be created in advance, enabling instant provisioning of virtual machines, without relying on a storage administrator.

Conventional file systems allow only one server to have read-write access to the same file at a given time. In contrast, VMFS is a cluster file system that leverages shared storage to allow multiple instances of ESX Server to read and write to the same storage, concurrently. VMFS provides on-disk locking to ensure that a virtual machine is not powered on by multiple installations of ESX Server at the same time. Should a server fail, the on-disk lock for each virtual machine is released to allow the virtual machine to be restarted on other physical servers.

The cluster file system enables innovative and unique virtualization-based distributed infrastructure services such as live migration of running virtual machines from one physical server to another, automatic restart of a failed virtual machine on a separate physical server, and clustering virtual machines across different physical servers.



VMware VMFS virtualizes storage enabling high availability and resource management for virtual machines.

How Is VMware VMFS Used in the Enterprise?

VMware VMFS a prerequisite for building the dynamic, automated and self-optimizing data center. VMware VMFS enables virtualization-based distributed services including:

- **Distributed resource optimization.** VMFS allows multiple instances of ESX Server to access the same virtual machine storage, and as a result, virtual machines can be dynamically and automatically migrated between instances of ESX Server enabling:
 - » Dynamic allocation of resources in resource pools
 - » Live migration of running virtual machines among different servers
- **High Availability.** VMware VMFS handles on-disk locks and SCSI reservations enabling:
 - » Virtual machine clustering with Microsoft® Clustering Services.
 - » Automatic restart of virtual machines on different physical servers.
- **Efficient off-host backup.** VMware VMFS allows a proxy server to backup a snapshot of a virtual machine while the virtual machine is simultaneously reading and writing to its storage.

KEY FEATURES

- **Cluster file system.** Enable virtualization-based distributed infrastructure services by storing virtual machine files on shared storage as Fibre Channel and iSCSI SAN .
- » **Shared data file system.** Enable multiple installations of ESX Server to read and write from the same storage location concurrently.
- » **Online insertion or deletion of nodes.** Add or delete an ESX Server from a VMFS volume without pausing or halting the processing of other instances of ESX Server.
- » **On-disk disk file locking.** Ensure that the same virtual machine is not powered on by multiple servers at the same time
- **Performance and scalability**
 - » **Optimized for virtual machine I/O.** Store and access the entire virtual machine state efficiently from a centralized location with virtual disk performance close to native SCSI.
 - » **New – Adaptive block sizing.** Uses large block sizes favored by virtual disk I/O. Use sub-block allocator for small files and directories.
 - » **New – Dynamic increase of VMFS volume size.** Create new virtual machines without relying on a storage administrator. Adaptive block sizing and addressing for growing files allows to increase a VMFS volume on the fly.
 - » **New – Increased number of ESX Server per VMFS volume.** Connect up to 32 ESX Servers to a single VMFS volume.
 - » **New – Extended block size and file limits.** Run even the most data intensive production applications such as databases, ERP and CRM in virtual machines
 - Maximum virtual disk size: 2 TB
 - Maximum file size: 2 TB max
 - Block size: 1MB to 8MB
 - » **New – Caching.** Benefits form enhanced VMFS performance with volume, device, object and buffer caching.
- **Interoperability**
 - » **Certification.** Use VMFS with a wide range of Fibre Channel and iSCSI SAN equipment. VMFS is optimized, rigorously tested and certified for these storage systems.
 - » **Idealized SCSI compliant virtual disks.** Use virtual disk files that appear to the virtual machine as a mounted SCSI device. Virtual disks hide all intermittent SAN errors from the operating system, allowing even operating systems not certified for SAN to run inside a virtual machine.
- **Manageability**
 - » **LUN discovery and management.** Simplify storage management with automatic discovery of LUNs in the shared storage and mapping of those LUNs to a VMFS volume.
 - » **New – File directories.** Enable easy virtual machine administration with file directories. All files for a virtual machine are stored in a separate directory.
 - » **Direct pass through of virtual machine data.** Ensure correct application behavior and data integrity for applications running in virtual machines. VMware VMFS preserves the internal file system semantics of the operating system running inside the virtual machine.
 - » **New – Unified hierarchical namespace.** Manage all available physical disks, logical volumes and VMware VMFS volumes with a consistent namespace that eliminates potential conflicts.
- **High Availability**
 - » **New – Virtual machine snapshots.** Increase application availability while reducing backup windows using virtual machine snapshots. Create a point-in-time copy of virtual machine data that can be used for testing, backup, and recovery operations,
 - » **New – Hot add virtual disk.** Add virtual disk to a running virtual machine to increase available resources or for backup.

- » **New – Distributed journaling.** Recover virtual machines faster and more reliably in the event of server failure.

How Can I Purchase VMware VMFS?

- VMware VMFS is included in VMware Infrastructure 3 Starter, Standard and Enterprise.
- The version of VMFS included in VMware Infrastructure 3 Starter can be used on local storage only and does not include cluster file system, since SAN storage connectivity is not included in VMware Infrastructure 3 Starter.
- VMware VMFS is not available for purchase as a stand-alone product

Product Specifications and System Requirements

VMware VMFS requires VMware ESX Server. For supported storage systems and system requirements refer to the VMware Infrastructure SAN Configuration Guide located at http://www.vmware.com/support/pubs/vi_pubs.html.