



## Federates dispersed storage resources to:

- Maximize their combined value
- Overcome device specific differences
- Provide higher levels of service than devices can offer individually.

# SANsymphony™-V Storage Hypervisor

## Features Summary

*An introduction to the technology behind DataCore's advanced storage virtualization software.*

SANsymphony-V software solves many of the difficult storage-related challenges raised by server and desktop virtualization in contemporary data centers and Cloud environments. The software forms an active, transparent virtualization layer across diverse storage devices to maximize the availability, performance and utilization of disk resources in IT organizations large and small.

The integrated set of centrally-managed data protection, provisioning, caching, replication and migration functions operates uniformly over different models and brands of storage equipment, assimilating current and future technologies non-disruptively. You'll find that SANsymphony-V cost-effectively delivers uninterrupted data access, speeds up applications, and extends the life of your tiered storage investments, while giving you peace of mind.

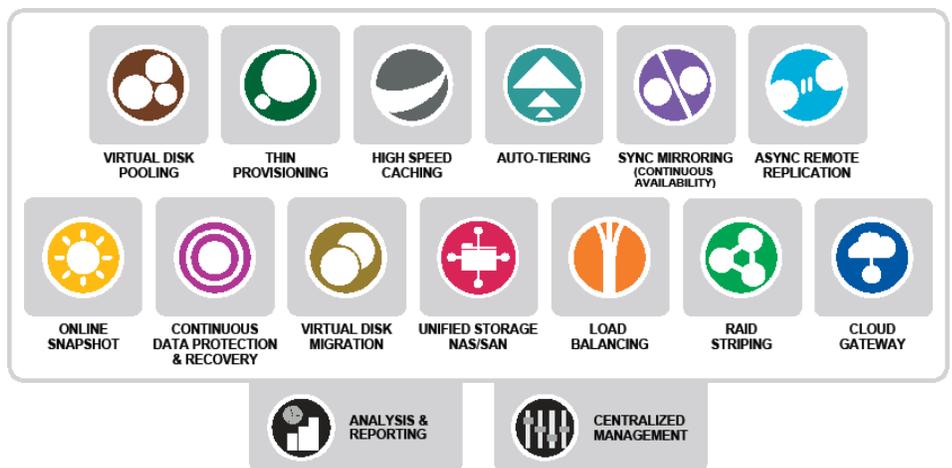


Figure 1 - Infrastructure-wide functions work across unlike and incompatible storage devices

## How it works

### Virtualization technology

SANsymphony-V forms a transparent, scalable virtualization layer across your storage infrastructure in order to enhance its capabilities and centralize its management. The many nuances and incompatibilities distinguishing different models and brands of storage no longer stand in the way of using them together.

You have complete freedom to mix and match storage devices, migrating between old and new in the background. SANsymphony-V works with all the popular models and brands of disks and disk systems supported on Windows Servers allowing you to balance between high-speed, premium-priced resources and lower cost, higher capacity gear.

The same flexibility applies to packaging. Larger environments generally use external disk arrays to house hundreds of drives in very high-density packages. On the other hand, compact applications in cramped rooms or hardened mobile enclosures can take advantage of drives housed inside the DataCore nodes. Still others start small with internal drives and expand externally. The software accepts direct-attached storage (DAS), SAN arrays and solid state disks / flash cards with equal ease, connecting to them via any of the standard disk interfaces.

### Simplifies & automates provisioning

- Auto-discovers available space
- Thin provisions
- Selects best path
- Sets adaptive cache
- Creates HA mirror
- Load balances disk channels

### Provisioning disk space

The SANsymphony-V administrator carves out virtual disks on demand from the physical disk pool according to the capacity, availability and performance needs of each workload.

For instance, some groups of virtual disks may be defined to be cached, synchronously mirrored, remotely replicated and thinly provisioned. In the background, the DataCore software draws on multiple devices and the necessary computing and network connections to meet those requirements. Auto-tiering functions dynamically determine which storage class will best meet the selected storage profile.

Hosts connect to the DataCore nodes over iSCSI and/or Fibre Channel just as they would connect to an external SAN disk array. Network ports and I/O channels may be configured from a wide range of host bus adapters (HBAs) and network interface cards (NICs) including iSCSI virtual SANs inside virtualized servers. The protocol between the hosts and the DataCore nodes may be different from what the nodes use to connect to the physical storage. For example, SANsymphony-V bridges iSCSI connections from hosts to trays of SATA and SAS drives.

For security purposes, hosts only see those virtual disks explicitly shaped and assigned to them over designated ports. In clusters, several hosts can share virtual disks even if the associated physical drives are not multi-ported (shareable).

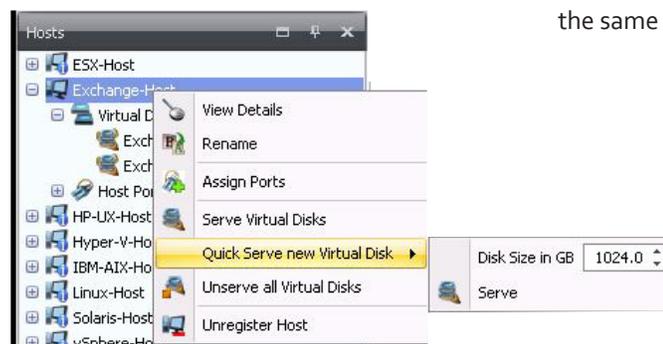
To maximize disk utilization and eliminate wasted space, DataCore implements very granular, thin provisioning techniques and space reclamation features.

SANsymphony-V serves virtual disks to physical hosts running any of the popular open operating systems as well as virtual machines hosted by the mainstream server hypervisors.

The extensive PowerShell scripting library, SNMP traps, and task scheduling wizards simplify integration with other workflows and systems management tools. Real-time / historical charts, e-mail event notifications and reporting features provide additional insights into the health and performance of the virtualized storage infrastructure.

### Uninterrupted access using mirrored nodes

SANsymphony-V shields applications from planned or unplanned outages in the underlying components by providing uninterrupted access to the virtual disks. It synchronously mirrors disk updates between nodes in separate rooms so they won't be exposed to the same facility-related hazards.



Stretching the mirrored nodes up to 100 kilometers apart decreases the chances that ordinary misfortunes such as roof leaks, fires, air conditioning failures, construction crew mishaps or floods will affect both sites. Virtual disks in these high-availability (HA) configurations appears like a single, well-behaved, multi-ported shared drive, although it is really made up of two widely-separated mirror images updated in lock step.

Entire sites, nodes, disk subsystems, channels and other components of the environment may be taken out-of-service, upgraded, expanded and replaced without disturbing applications or scheduling downtime.

## Replicate offsite for disaster recovery & migration

For additional offsite disaster recovery, or simply to migrate data between locations, SANsymphony-V replicates disks asynchronously over unlimited distances using conventional IP lines. You can also reverse the direction of replication to restore the original site after the danger has been averted. For additional confidence, remote restoration procedures may be tested regularly while normal production processing goes on at the primary data center.

## Cache overcomes I/O bottlenecks

DataCore taps each node's processing, memory and I/O resources to carry out advanced functions across all of the storage devices under its command. SANsymphony-V reserves up to 1 Terabyte (TB) of random access memory (RAM) per node for SAN-wide "mega caches".

Thanks to the sophisticated multi-threaded caching algorithms, data written to or read from disks move swiftly into and out of the caches, harnessing the full potential of each node's high-speed multi-processors. Caching makes application run faster than they would had they accessed the disks directly, whether connected to top-of-the-line storage systems or lower end gear.

## Automatically optimize disk access across tiers

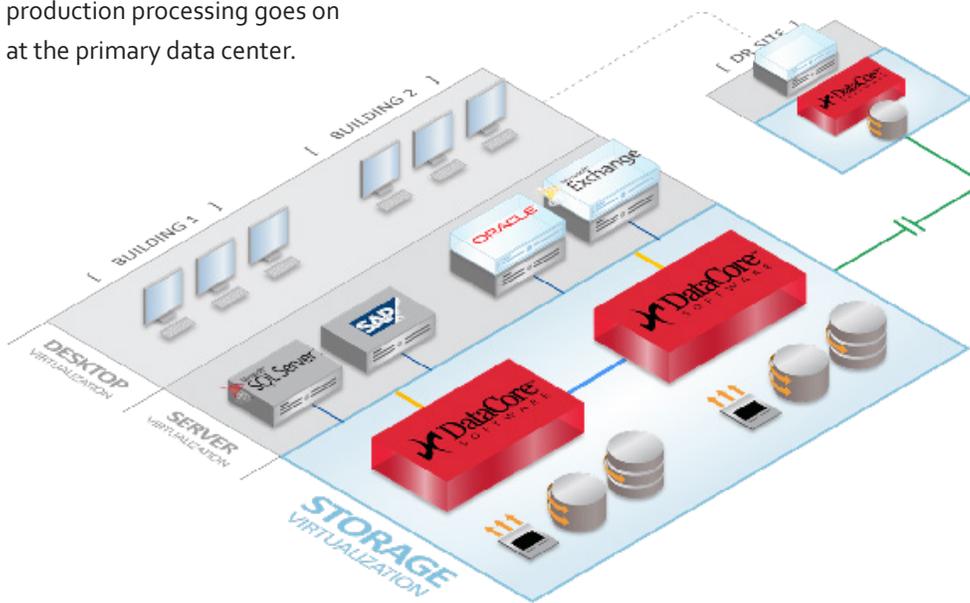
Disks with different price/performance attributes can be organized into separate storage tiers. For example, the fastest tier may be composed of Solid State Disks (SSDs), with lower tiers made up of SAS and SATA drives, respectively.

The same tier may include similar units from different manufacturers acquired over time.

SANsymphony-V automatically promotes frequently accessed disk blocks to faster tiers and demotes less active blocks to slower, more cost-effective drives based on the IT team's criteria. You may override auto-tiering policies by explicitly defining which disks should be used for special workloads or confine the selection of tiers to a narrower set of resources.

Groups of disks may also be segregated for specific requirements, such as test / development or to isolate multiple subscribers (multi-tenancy) in public, hybrid and private clouds.

Advanced features such as caching, synchronous mirroring, asynchronous replication, snapshots, thin provisioning and CDP operate across mutually independent devices within the same tier or across tiers. For example, we find customers prefer to take online snapshots of virtual disks in tier 1 and place them in a tier 2 or tier 3 pool to avoid consuming premium resources for the backup copies. Similarly, tier 1 devices may be remotely replicated to a disaster recovery site that only has tier 2 devices, possibly from a different supplier.



## Compatibility

### Storage manufacturers supported

All of the popular disk manufacturers are supported. These include:

- Astute
- Dell
- Dot Hill
- EMC
- Fujitsu
- Fusion-IO
- Hitachi Data Systems (HDS)
- HP
- IBM
- LSI
- NetApp
- Nexsan
- Oracle (Sun)
- Promise
- Seagate
- STEC
- Texas Memory Systems
- Violin Memory
- Whiptail
- X-IO

### Host operating systems supported

- Microsoft Windows Server 2012, 2008 R2, 2003 and 2000
- Microsoft Windows 8, 7 and XP
- Apple MacOS X
- UnixHP-UX
- IBM AIX
- Sun Solaris
- RedHat Linux
- SUSE Linux

### Server hypervisors supported

- VMware ESX, vSphere
- Microsoft Hyper-V
- Citrix XenServer

### Systems management

- Microsoft System Center
- VMware vCenter
- Hitachi IT Operations Analyzer

(Please see [www.datacore.com](http://www.datacore.com) for more recent updates to the list of supported environments)

### Disk packaging supported

- Internal disk drives
- External JBODs
- External storage systems

### Disk interfaces supported

- Direct-attached and SAN-based connections
- SAS
- SATA
- iSCSI
- Fibre Channel
- Fibre Channel over Ethernet (FCoE) via CNA switches
- SCSI
- IDE

### Media supported

- Flash Memory Cards and Solid State Disks (SSDs)
- Standard Magnetic Rotating Disk Drives (HDDs)

### Network compatibility

- Synchronous mirroring between nodes over iSCSI and Fibre Channel connections
- Asynchronous remote replication over IP LANs, MANs and WANs
- Inter-node management interface over IP LAN
- Remote console access using Remote Desktop Protocol (RDP) and other standard remote desktop access protocols supported on Windows Server

### Maximize value from your storage investments

As you can see, the SANsymphony-V storage hypervisor makes storage largely interchangeable. It reconciles disparities between different models of hardware devices, enabling you to choose across the full range of purpose-built products from your favorite manufacturers and later add attractive new technologies, unconcerned with backward compatibility. Furthermore, the skills you acquire to manage today's gear are the same ones you'll use to administer next year's lineup. This novel, yet transparent virtualization software brings unmatched flexibility and cost reductions in system design, procurement and ongoing operations. In so many ways, DataCore maximizes the performance and value you derive from your strategic and tactical storage investments.

0613

For additional information, please visit [www.datacore.com](http://www.datacore.com) or email [info@datacore.com](mailto:info@datacore.com)

© 2013 DataCore Software Corporation. All Rights Reserved. DataCore, the DataCore logo and SANsymphony are trademarks or registered trademarks of DataCore Software Corporation. All other products, services and company names mentioned herein may be trademarks of their respective owners.

