

## IBM Storwize V7000 Unified Disk System

### IBM Redbooks Product Guide

The IBM® Storwize® V7000 Unified Disk System is the most powerful and easy-to-use innovative disk system in the storage marketplace. The powerful storage system combines hardware and software components to provide a single point of control to help support improved storage efficiency. By enabling virtualization, consolidation, and tiering in your organization, the IBM Storwize V7000 Unified Disk System helps to improve application availability and resource utilization. The system offers easy-to-use, efficient, and cost-effective management capabilities for new and existing storage resources in your IT infrastructure.

Storwize V7000 Unified is virtual storage that offers greater efficiency and flexibility through built-in solid-state drive (SSD) optimization and thin provisioning technologies. The advanced functions of the Storwize V7000 Unified system also enable rapid deployment without additional resources, nondisruptive migration of data from existing storage, simplifying implementation and minimizing disruption to users. By using the IBM Storwize V7000 Unified Disk System, you can virtualize and reuse existing disk systems, supporting a greater potential return on investment (ROI).

The IBM Storwize V7000 Unified Disk System consolidates block and file workloads into a single storage system for simplicity of management and reduced cost. The Storwize V7000 systems are also available for block-only workloads. Figure 1 shows a Storwize V7000 with block only support and a Storwize V7000 Unified with block and file support.



Figure 1 IBM Storwize V7000 and Storwize V7000 Unified

### Did you know?

The IBM Storwize V7000 is at the heart of the new IBM PureFlex™ Systems. This IBM family of expert computing systems integrates server, storage, networking, and management systems for IBM Power Systems™ and IBM System x® architectures. Storwize V7000 storage systems, integrated into PureFlex Systems, are easy to use and enable rapid deployment. They support performance and flexibility through built-in SSD optimization and thin provisioning technologies. With nondisruptive migration of data from existing storage, you benefit from simplified implementation, minimizing disruption to users.

## Highlights

In storage management today, breaking the cycle of increased complexity and explosive data growth can be a big challenge. The old ways of buying and managing storage have become less effective. Due to resource constraints, both physical storage resources and human resources in IT organizations must act quickly to optimize and simplify their infrastructure. Unchecked complexity and growth will only become bigger problems over time.

Small and midsize organizations can also suffer from a range of challenges:

- Disruptive migrations
- Difficulty deploying tiered storage
- Inability to share storage among servers
- Reduced productivity and increased cost caused by isolated server and storage management tools
- Inability to use virtualized storage, such as virtual servers, as a tool for optimizing expenditures, resources, and capabilities

To stand up to these challenges and allow businesses to respond to a rapidly changing marketplace, IBM Storwize V7000 Unified is a virtualized storage system. It complements virtualized server environments by providing unmatched performance, availability, advanced functions, and highly scalable capacity never seen before in midrange disk systems. With its virtualized storage design and tight affinity with technologies, such as IBM PowerVM® and VMware, Storwize V7000 Unified is the ideal complement for virtualized servers that are at the heart of cloud deployments.

The Storwize V7000 Unified offers the following support:

- Delivers sophisticated enterprise-class storage function for businesses of all sizes
- Supports your growing business requirements while controlling costs
- Provides up to 200% performance improvement with automatic migration to high-performing SSDs
- Allows you to purchase only the disk capacity you need with thin provisioning
- Enables near-continuous availability of applications through dynamic migration
- Integrates instant copy capabilities for critical business needs
- Supports faster and more efficient data copies for online backup, testing, or data mining
- Replicates data synchronously or asynchronously between systems for backup efficiency with Metro Mirror and Global Mirror
- Supports SSDs for applications that demand high speed and quick access to data
- In block only, clustered systems, supports growing business needs while controlling costs
- Supports RAID 0, 1, 5, 6, and 10
- Consolidates block and file storage in a single system for simplicity and greater efficiency
- Includes policy-based file management
- Offers flexible server and storage management with an easy-to-use graphical user interface (GUI) for block and file storage management
- Integrates with McAfee and Symantec Antivirus to isolate or delete compromised files and take to advantage of the most commonly deployed ISV antivirus applications

## Benefits of the advanced features

The IBM Storwize V7000 Unified Disk System includes several advanced features.

### Clustered systems

For block-only configurations, two control enclosures (each with up to nine expansion enclosures) can be clustered together in a single system for even greater capacity and performance growth potential. This feature enables growth from the smallest configurations up to systems with 480 drives.

### IBM FlashCopy

The Storwize V7000 includes an integrated, robust IBM FlashCopy® function that creates an almost instant, point-in-time copy of active data. Up to 256 copies of each volume can be created for backup or for parallel processing activities. This type of copy, called a *snapshot*, can help improve overall storage utilization and reduce the amount of capacity that is required for copies. Incremental FlashCopy operations can save time and resources. This capability improves efficiency by copying only the portions of the source or target volume that have been updated since the FlashCopy function was last used and it avoids making copies of copies.

### IBM System Storage Easy Tier

By using IBM System Storage® Easy Tier® technology included with the Storwize V7000, you can confidently and economically make effective use of SSDs by continuously monitoring disk performance and dynamically moving frequently accessed data from hard disk drives to high performing SSDs. Microsoft Exchange environments can optimize SSD deployment and realize improved application throughput by using the high-performance characteristics of SSDs without requiring costly analysis or manual administration.

### Thin provisioning

Thin provisioning on the Storwize V7000 helps optimize the amount of storage capacity in the storage network. Because the thin provisioned volumes consume only the space that they actually use, thin provisioning can ensure that you have the storage capacity you need for high availability and disaster recovery scenarios. When combining FlashCopy with thin provisioning, for example, you can create copies by using only a fraction of the amount of storage that is required for a full physical copy. Using thin provisioning with Metro Mirror and Global Mirror similarly results in more efficient high availability and disaster recovery operations within a smaller maintenance window.

## Additional available advanced features and products

The following advanced features and products are also available with the IBM Storwize V7000 Unified Disk System.

### IBM Active Cloud Engine

IBM Active Cloud Engine™ can reduce costs with policy-based management of files by using tiered storage and can also improve data governance. Active Cloud Engine automates movement of less frequently used files to lower-cost tiers of storage, including tape in an IBM Tivoli® Storage Manager system. It also automates the deletion of unwanted or expired files.

## **IBM Systems Director**

For organizations that need to manage physical and virtual server infrastructures and the storage that they use (including provisioning and monitoring for higher availability, operational efficiency, and infrastructure planning), Storwize V7000 Unified is integrated with IBM Systems Director Storage Control. A single administrator can manage and operate IBM servers (IBM System x, IBM Power Systems, and IBM BladeCenter®) with a networking infrastructure and IBM storage (including Storwize V7000 Unified) from a single management panel.

## **IBM Tivoli Storage FlashCopy Manager**

IBM Tivoli Storage FlashCopy Manager can help deliver the highest levels of protection for mission-critical IBM DB2®, SAP, Oracle, Microsoft Exchange, and Microsoft SQL Server applications by using integrated application-aware snapshot backup and restore capabilities. It uses advanced IBM storage hardware snapshot technology to create a high performance, low impact application data protection solution. With custom application support, FlashCopy Manager capabilities can be extended to any application or file system on the supported platforms.

## **IBM Tivoli Storage Manager**

Storwize V7000 Unified has specific exploitation and integration with IBM Tivoli Storage Manager to provide efficient and fast backup and restore processes, in addition to file movement to external disk or tape.

## **IBM Tivoli Storage Productivity Center for Disk Midrange Edition**

For organizations that are looking to improve the operational efficiency of storage specialists, IBM Tivoli Storage Productivity Center provides a storage area network (SAN)-wide perspective of storage health, I/O path performance analytics, and capacity use for Storwize V7000 Unified and the surrounding storage infrastructure.

## **IBM Tivoli Storage Productivity Center for Replication**

Tivoli Storage Productivity Center for Replication helps administrators to manage Storwize V7000 block level Copy Services. It also applies Storwize V7000, IBM XIV®, IBM DS8000®, and SAN Volume Controller in the same environment.

Tivoli Storage Productivity Center for Replication simplifies management of Copy Services in the following ways:

- Automates administration and configuration of Copy Services functions with wizard-based sessions and copy set definitions
- Provides simple operational control of Copy Services tasks, which includes starting, suspending, and resuming Copy Services Tasks
- With the optional high availability feature, continues replication management even when one Tivoli Storage Productivity Center for Replication server goes down

Tivoli Storage Productivity Center for Replication provides management of the following Storwize V7000 functions:

- FlashCopy
- Synchronous mirrors, known as *Metro Mirror*
- Asynchronous mirrors, known as *Global Mirror*

## **Metro Mirror and Global Mirror**

An effective data replication solution provides both local failover and remote data center recovery. With multiple copies of data available, the reliance on traditional backup and restore solutions can be reduced. The Storwize V7000 provides remote copy capabilities by using Metro Mirror and Global Mirror functions that operate between the disk systems to create copies of data for local failover and remote recovery:

- Metro Mirror maintains a fully synchronized copy at “metropolitan” distances, up to 300 km.
- Global Mirror operates asynchronously for maintaining a copy at greater distances, up to 8,000 km.

By using these replication services, you can set up a relationship between two volumes so that updates made by an application to one volume are mirrored on the other volume. The volumes can be in the same Storwize V7000 system or on two different Storwize V7000 systems at local or remote locations. Both functions support Microsoft Exchange 2010 environments to ensure high availability and help speed disaster recovery. IBM storage-based replication services deliver flexible and robust high availability and disaster recovery solutions as alternatives to the server-based replication services of Microsoft Exchange. Current users of Metro Mirror and Global Mirror functions can consolidate and streamline data replication efforts with the Storwize V7000, while removing the load from network and server resources.

## **External Virtualization**

*External storage virtualization* is the ability of the Storwize V7000 Unified system to manage capacity in other disk systems. When Storwize V7000 Unified virtualizes a disk system, its capacity becomes part of the Storwize V7000 Unified system and is managed in the same way as capacity on internal drives within Storwize V7000 Unified.

## **Solutions, solution briefs, and client solutions**

Several solutions are available with the IBM Storwize V7000 Unified Disk System.

### **IBM PureSystems: A new family of expert integrated systems solutions**

IBM PureSystems™ offerings are optimized for performance and virtualized for efficiency. These IBM offerings have a no-compromise design with system-level upgradability. They are also built for cloud computing with flexibility and simplicity. The IBM PureFlex Systems are one of the first PureSystems family members.

### **IBM PureFlex Systems: Integrated with the Storwize V7000 Unified System**

The PureFlex Systems combine compute, storage, networking, virtualization, and management into an expert single infrastructure system that senses and anticipates resource needs to optimize your infrastructure.

PureFlex Systems expert computing systems integrate server, storage, networking, and management systems for Power Systems and System x architectures. IBM Storwize V7000 storage systems, integrated into PureFlex Systems, are easy to use and enable rapid deployment. At the heart of the PureFlex System, Storwize V7000 can become part of your highly efficient, highly capable, next-generation information infrastructure. It offers the following features:

- Integration by design. A single user interface manages and virtualizes internal and third-party storage that can improve storage utilization up to 30 percent.
- Built-in expertise. Built-in tiering and advanced replication functions improve performance and availability without constant administration.
- Simplified experience. A single user interface simplifies storage administration so that your experts can focus on innovation.

To learn more about the IBM PureSystems product family, see IBM PureSystems at:

[http://www.ibm.com/ibm/puresystems/us/en/?cm\\_sp=MTE22353#tab:overview/subtab:default](http://www.ibm.com/ibm/puresystems/us/en/?cm_sp=MTE22353#tab:overview/subtab:default)

### **IBM Storwize V7000 Unified with VMware vSphere : Powerful, unified file and block storage for your cloud and virtual infrastructures solution brief**

Tight integration between the Storwize V7000 Unified Disk System and VMware allows for simple configuration and consolidated management in addition to increased performance and improved efficiency. It also allows for for block data, interoperating with VMware vCenter, VMotion, VMware Site Recovery Manager, and VMware APIs for Array Integration (VAAI). With this integration, you can benefit from more centralized management for IT administrators by using VMware management solutions with the Storwize V7000 Unified storage system. You can manage actions, from snapshot creation to virtual machine migration across hosts to disaster recovery, by using VMware solutions, and you can physically start them with the Storwize V7000 Unified system.

For more information about creating a smarter storage infrastructure for virtualized and cloud deployments, see IBM Storwize V7000 Unified with VMware vSphere, an IBM Systems and Technology Solutions Brief, at:

<http://public.dhe.ibm.com/common/ssi/ecm/en/tss03097usen/TSS03097USEN.PDF>

### **Virtual storage with virtual systems client solution**

A financial services client experienced high member growth that triggered an explosion of client data. It needed to modernize its information management system to cope with increasing data volumes and continue providing an excellent quality of service to its expanding customer-base. The client already had virtual servers so the next logical step was to virtualize the storage. IBM worked closely with the client to implement an IBM Storwize V7000 virtualized data storage solution, using thin provisioning to maximize efficiency savings and reduce future IT expenditure. In addition to centralizing and simplifying the management of its storage and being able to reuse existing storage hardware, the client improved utilization by 30 percent.

Figure 2 illustrates the advantages of thin provisioning in terms of storage allocation.

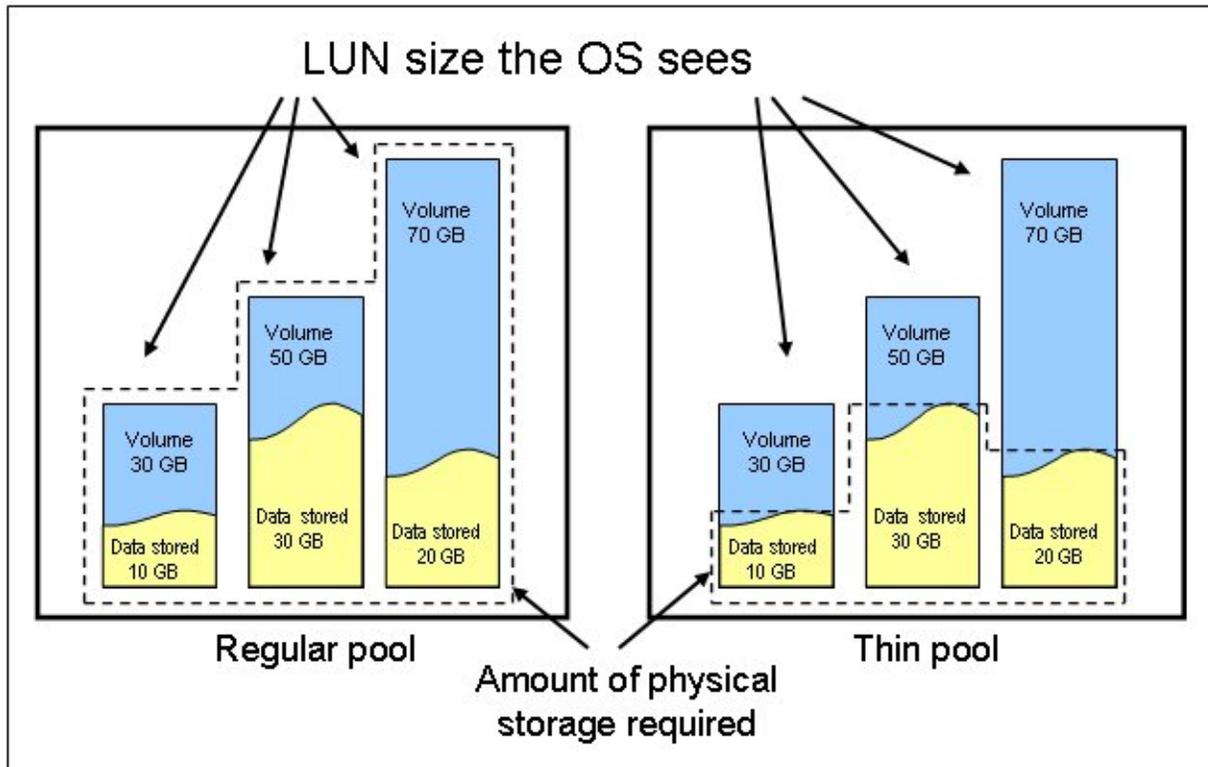


Figure 2 Example of how thin provisioning makes unused storage available for other projects

### IBM Tivoli Storage Manager and Storwize V 7000 client solution

A computer services client was using various backup processes and products for its clients. Storage administration became difficult and time consuming to keep track of all the client requirements and the tape locations for all the backups. Data was stored on Linux, IBM AIX®, and Microsoft Windows with various backup windows based on the type of data. The client needed a way to streamline their backups into one solution that automated the requirements through policies and meet the service agreements for backup windows and restore times. One of the requirements was to store the backup data at the backup location several kilometers away.

The client chose IBM to provide the backup solution, which included backup software and storage. IBM Tivoli Storage Manager gave them the ability to back up their heterogenous systems data and meet the backup and restore requirements of their clients by using policies. The Storwize V7000 was selected to hold the storage pools for IBM Tivoli Storage Manager at the offsite location. The production data of the client is backed up directly to the Storwize V7000 at the backup location several kilometers away, over 10 Gb fiber connections. The incremental backups provided by Tivoli Storage Manager reduced the amount of data that was backed up and transferred to the backup location and shortened the time to back up the data. The V7000 disk system contained three tiers (SSDs, Fibre Channel disk, and SATA disk) to provide the appropriate price performance for each environment. Depending on the policies, the data can move down the hierarchy to IBM TS1120 tape drives from the Storwize V7000.

Figure 3 shows the high-level architecture view of the remote backup solution using Tivoli Storage Manager, Storwize V7000, and TS1120 Tape Drives.

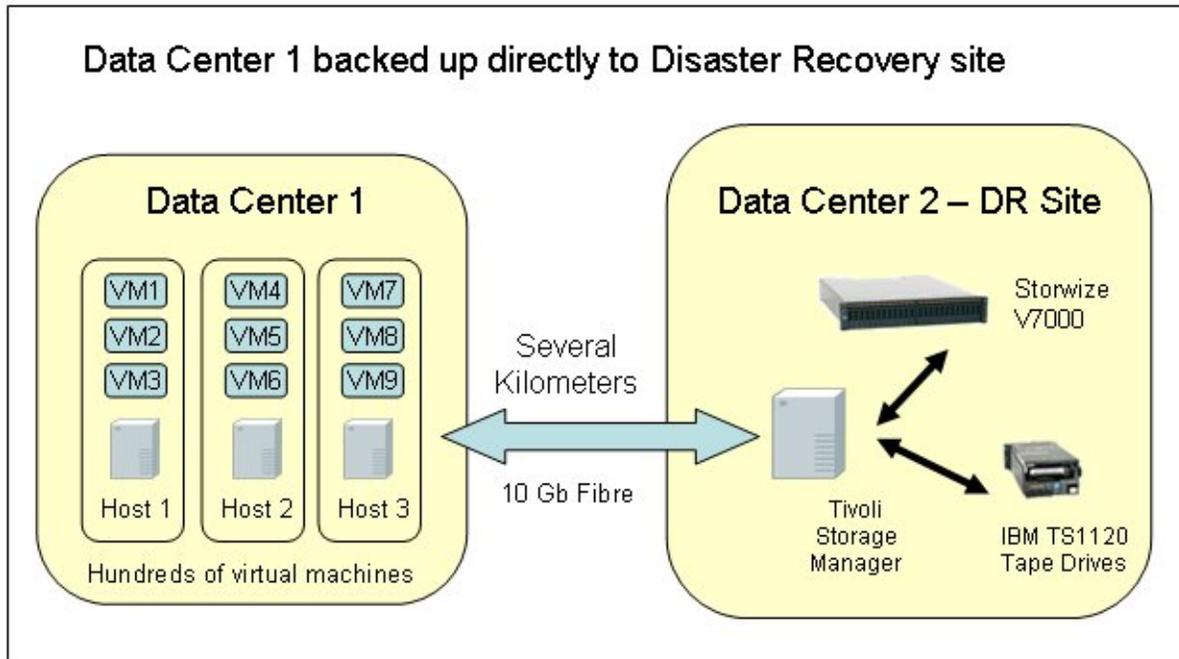


Figure 3 Remote backup solution using Tivoli Storage Manager, Storwize V7000, and TS1120 Tape Drives

The client now has a unified backup solution that uses backup policies for different clients to meet diverse regulatory requirements. The client also reduced administrative overhead by 75% by implementing the Tivoli Storage Manager and the Storwize V7000 backup solution.

### Storwize V7000 solution for data growth, reliability, availability, and performance of mission-critical data

A professional services company needed to expand its storage infrastructure with a solution that offered enterprise-class capacity, performance, and reliability at an affordable price. The company was running out of storage. Across its two data centers, it had a 200 terabyte storage environment. It was also interested in moving from a tape-based backup solution to a disk-to-disk backup solution, which increased the need for more storage. The company chose two Storwize V7000s with 43 terabytes each, one for each data center. The two IBM Storwize V7000 units were integrated into an existing heterogeneous storage infrastructure, providing the flexibility to expand capacity and virtualize the SAN. The IBM solution improves storage performance, availability, and reliability; reduces storage costs compared to the previous solution; and provides advanced features to increase storage efficiencies.

Figure 4 shows how the Storwize V7000 units virtualized the company's SAN and gave the storage administrator control of all of the disk storage.

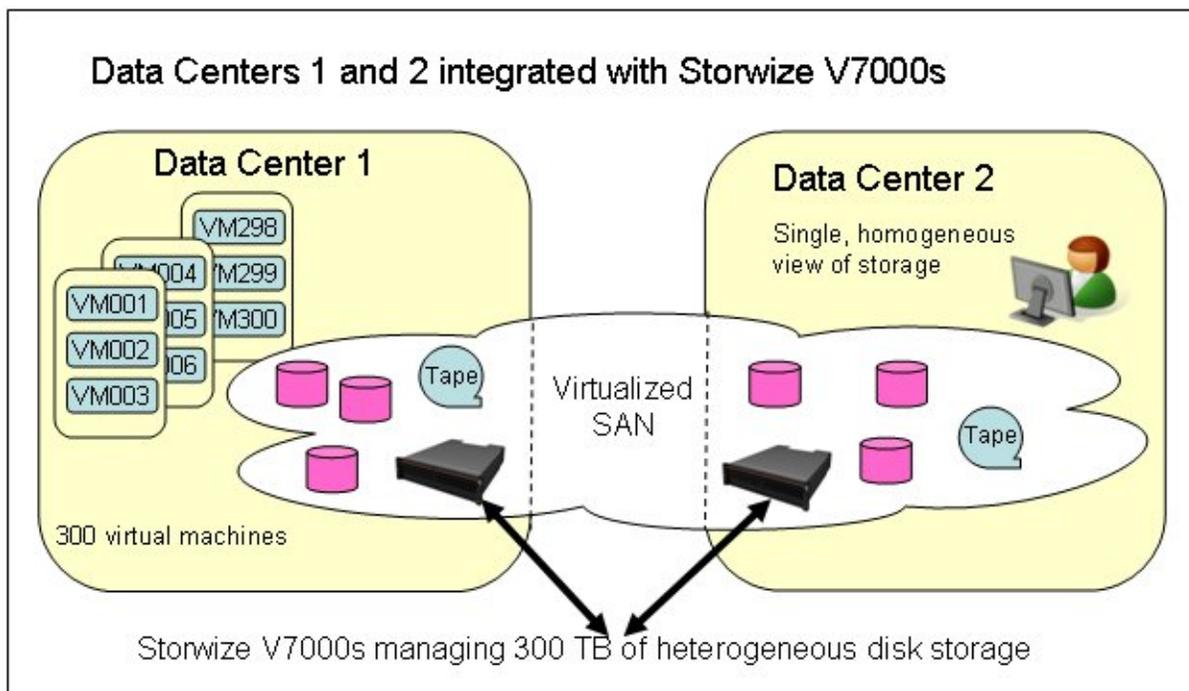


Figure 4 Storage administrators now have single homogeneous view of all their disk storage

## What the analysts say

The Enterprise Strategy Group (ESG) analyzed the IBM Storwize V7000 Unified in depth and describes how it fits into the ESG virtualization maturity model. For more information, see the ESG white paper "IBM Storwize V7000 Unified Unleashes the Power of Server Virtualization" at:

<http://public.dhe.ibm.com/common/ssi/ecm/en/tsw03120usen/TSW03120USEN.PDF>

ESG also published a Lab Validation Report, called "IBM Storwize V7000 Real-world Mixed Workload Performance in VMware Environments". This report documents the performance capabilities of IBM Storwize V7000 storage systems running a mix of real-world applications in a virtual server environment that is enabled by VMware vSphere and powered by a pair of IBM x3850 X5 servers. For more information, see the "IBM Storwize V7000 Real-world Mixed Workload Performance in VMware Environments" report at:

<http://public.dhe.ibm.com/common/ssi/ecm/en/tsl03028usen/TSL03028USEN.PDF>

The Taneja Group describes how core next generation storage solutions from IBM for open systems support the Microsoft Exchange storage infrastructure. For more information, see the report, called "Three critical questions for the selection of Microsoft Exchange Storage Infrastructure," which includes the Storwize V7000, at:

<http://public.dhe.ibm.com/common/ssi/ecm/en/tsw03119usen/TSW03119USEN.PDF>

Stratecast (a division of FROST & SULLIVAN) explains how storage virtualization can help maximize utilization of your storage capacity. For more information, see the technical brief "Hidden Gold: Maximize Your Existing Storage," which highlights the IBM Storwize V7000, at:

<http://public.dhe.ibm.com/common/ssi/ecm/en/tsl03045usen/TSL03045USEN.PDF>

## Physical characteristics of the Storwize V 7000

The IBM Storwize V7000 has the following physical characteristics:

- 2U rack-mountable control enclosure
- Twenty-four 2.5-inch drive bays (model x24) or twelve 3.5-inch drive bays (model x12)
- Up to 36 TB of physical storage per enclosure, using 3 TB near-line SAS disk drive modules, or up to 21.6 TB physical storage per enclosure, using 900 GB SAS disk drive modules
- SAS disk drives, near-line SAS disk drives, and SSDs
- Redundant dual-active intelligent RAID controllers
- 16 GB cache memory per control enclosure (8 GB per internal RAID controller) as a base feature
- For each control enclosure, eight 8 Gbps Fibre Channel host ports (four 8 Gbps FC ports per RAID controller) and four 1 Gbps or optionally four 10 Gbps iSCSI host ports (two 1 Gbps and optionally two 10 Gbps iSCSI host ports per RAID controller)
- Support for RAID controller attachment of up to nine storage expansion units with configurations up to 360 TB physical storage capacities (720 TB in clustered systems)

## Physical characteristics of the Storwize V 7000 Unified

The Storwize V7000 Unified includes the hardware configuration of the Storwize V7000 plus two 2U rack-mountable File Module enclosures. File Modules are always deployed in pairs for redundancy. Each enclosure contains the following features:

- Two drive bays with 500 GB NL SAS drives
- Dual-port Fibre Channel host bus adapter (HBA)
- Dual-port 10 GbE Ethernet network interface card (NIC) with SFP+ Connectors
- Dual power supplies
- Redundant cooling
- Rack mounting rails
- IBM File Module Software Version 1.3, or later (preloaded on the server)

## Specifications

Table 1 outlines the specifications of Storwize V7000 Unified and Storwize V7000.

Table 1 (part 1 of 2) Storwize V7000 Unified and Storwize V7000 specifications

Specifications	Descriptions
Host interface	<ul style="list-style-type: none"> <li>• SAN-attached 8 Gbps Fibre Channel (FC) host connectivity, 1 Gbps iSCSI and optional 10 Gbps iSCSI</li> <li>• NAS-attached 1 Gbps and 10 Gbps Ethernet (Storwize V7000 Unified)</li> </ul>
User interface	Graphical user interface (GUI)
Supported drives	<p>3.5-inch disk drives:</p> <ul style="list-style-type: none"> <li>• 2 TB, 3 TB 3.5 in. 7.2k Near-Line SAS disk</li> </ul> <p>2.5-inch disk drives:</p> <ul style="list-style-type: none"> <li>• 146 GB, 300 GB 2.5-inch 15k SAS disk</li> <li>• 300 GB, 450 GB, 600 GB, 900 GB 2.5 in.10k SAS disk</li> <li>• 200 GB, 300 GB, 400 GB 2.5-inch E-MLC (enterprise-grade multilevel cell) SSD</li> <li>• 1 TB 2.5 in. 7.2k Near-Line SAS disk</li> </ul>
RAID levels	RAID 0, 1, 5, 6, and 10
Maximum drives supported	240 per control enclosure; 480 per clustered system
Fans and power supplies	Fully redundant, hot swappable
Rack support	Standard 19 inch
Management software	Storwize V7000 and Storwize V7000 Unified software
Cache per controller/control enclosure/clustered system	8 GB, 16 GB, or 32 GB
Advanced features included with each system	<ul style="list-style-type: none"> <li>• System Storage Easy Tier</li> <li>• FlashCopy</li> <li>• Thin provisioning</li> </ul>
Additional available advanced features	<ul style="list-style-type: none"> <li>• Remote mirroring</li> <li>• External virtualization</li> <li>• IBM Tivoli Storage FlashCopy Manager</li> <li>• IBM Tivoli Storage Productivity Center for Disk Midrange Edition</li> <li>• Tivoli Storage Manager</li> <li>• IBM Tivoli Storage Manager FastBack®</li> <li>• IBM Systems Director</li> <li>• IBM Active Cloud Engine (Storwize V7000 Unified)</li> </ul>
Warranty	<p>Hardware:</p> <ul style="list-style-type: none"> <li>• 3-year limited warranty</li> <li>• Customer replaceable units</li> <li>• Onsite service</li> <li>• Next business day, 9x5</li> <li>• Service upgrades available</li> </ul> <p>Software:</p> <ul style="list-style-type: none"> <li>• Software Maintenance Agreement available</li> </ul>

Table 1 (part 2 of 2) Storwize V7000 Unified and Storwize V7000 specifications

Specifications	Descriptions
Replication services	<ul style="list-style-type: none"> <li>● FlashCopy</li> <li>● Tivoli Storage FlashCopy Manager</li> <li>● Tivoli Storage Productivity Center for Replication</li> <li>● Metro Mirror (synchronous)</li> <li>● Global Mirror (asynchronous)</li> <li>● Local and asynchronous remote file-based replication (Storwize V7000 Unified)</li> </ul>
Dimensions	<p>Control and expansion enclosures</p> <ul style="list-style-type: none"> <li>● Width: 483 mm (19.0 in.)</li> <li>● Depth: 630 mm (24.8 in.)</li> <li>● Height: 87.9 mm (3.46 in.)</li> </ul> <p>File Modules (Storwize V7000 Unified)</p> <ul style="list-style-type: none"> <li>● Width: 443 mm (17.5 in.)</li> <li>● Depth: 698 mm (27.5 in.)</li> <li>● Height: 85 mm (3.36 in.)</li> </ul>
Weight	<p>12-bay enclosures:</p> <ul style="list-style-type: none"> <li>● Drive-ready (without drive modules installed): 17.7 kg (37.6 lb)</li> <li>● Fully configured (12 drive modules installed): 27.2 kg (59.8 lb)</li> </ul> <p>24-bay enclosures:</p> <ul style="list-style-type: none"> <li>● Drive-ready (without drive modules installed): 17.7 kg (37.6 lb)</li> <li>● Fully configured (24 drive modules installed): 25.2 kg (55.4 lb)</li> </ul> <p>File Modules (Storwize V7000 Unified)</p> <ul style="list-style-type: none"> <li>● Maximum configuration: 29.6 kg (65 lb)</li> </ul>
Supported systems	<p>For a list of currently supported servers, operating systems, Storwize V7000 and Storwize V7000 Unified software levels, HBAs, clustering applications, and SAN switches and directors, see the System Storage Interoperation Center at:  <a href="http://www.ibm.com/systems/support/storage/ssic/interoperability.wss">http://www.ibm.com/systems/support/storage/ssic/interoperability.wss</a></p> <p>For more information about the supported hardware, device driver, firmware, and recommended software levels, see IBM Storwize V7000 and Storwize V7000 Unified Disk Systems at:  <a href="http://www.ibm.com/systems/storage/disk/storwize_v7000/interop.html">http://www.ibm.com/systems/storage/disk/storwize_v7000/interop.html</a></p>
ISV solutions	<p>For a list of high-quality solutions with IBM partner independent software vendors (ISVs), including access to solution briefs and white papers, see the ISV Solutions Resource Library at:  <a href="http://www.ibm.com/systems/storage/solutions/isv/index.html">http://www.ibm.com/systems/storage/solutions/isv/index.html</a></p>

Figure 5 shows a Storwize V7000 Unified system that includes the Storwize V7000 controller, two file modules, and nine disk expansion enclosures, each with twenty-four 2.5-inch drives.



Figure 5 Storwize V7000 Unified with nine disk expansion enclosures, each with twenty-four 2.5-inch drives

## Why IBM

The performance and availability of your storage environment can either enhance or hamper your business processes, which is where IBM comes in. As a market leader in the storage industry, IBM can help you handle the challenges, whether you are a small to midsize company or a large enterprise.

Innovative technology, open standards, excellent performance, a broad portfolio of proven storage software, hardware, and solutions offerings, all backed by IBM with its recognized industry leadership, are just a few of the reasons to consider storage solutions from IBM, including Storwize V7000 Unified.

With IBM, you get some of the best storage products, technologies, services, and solutions in the industry without the complexity of dealing with different hardware and software vendors and system integrators.

## Warranty

The IBM Storwize V7000 Unified includes world-renowned IBM service and support. This service and support includes a standard three-year service agreement, with next-business-day replacement, software fixes, and telephone support.

## Related publications and videos

- IBM PureFlex System Announcement Letter (11 April 2012)  
<http://ibm.co/RMHjLW>
- IBM Storwize V7000 Disk System Announcement Letter (7 October 2010)  
<http://ibm.co/MXVjUg>
- IBM Storwize V7000 introduces new disk drive and solid-state drive options Announcement Letter (11 October 2011)  
<http://ibm.co/NimuEI>
- IBM Storwize V7000 Unified: A feature-rich environment for VMware vSphere 5.0 by the IBM Systems and Technology Group ISV Enablement (January 2012)  
<http://ibm.co/MvFkva>
- IBM Storwize V7000 Unified adds file storage capability to IBM Storwize V7000 Announcement Letter (11 October 2011)  
<http://ibm.co/R0QFUL>
- IBM Storwize V7000 Unified V1.3.0 offers file storage Software Announcement Letter (11 October 2011)  
<http://ibm.co/MXVO0x>
- IBM Storwize V7000 Midrange Disk System Overview  
[http://www.ibm.com/systems/storage/disk/storwize\\_v7000/index.html](http://www.ibm.com/systems/storage/disk/storwize_v7000/index.html)
- IBM Storwize V7000 Information Center  
<http://publib.boulder.ibm.com/infocenter/storwize/ic/index.jsp>
- IBM Storwize V7000 Unified Information Center  
[http://publib.boulder.ibm.com/infocenter/storwize/unified\\_ic/index.jsp](http://publib.boulder.ibm.com/infocenter/storwize/unified_ic/index.jsp)

- *Implementing the IBM Storwize V7000*, SG24-7938  
<http://www.redbooks.ibm.com/abstracts/sg247938.html?Open>
- *Implementing the IBM System Storage SAN Volume Controller V6.3*, SG24-7933  
<http://www.redbooks.ibm.com/abstracts/sg247933.html?Open>
- IBM Storwize V7000 Business Advantage Calculator  
[https://roianalyst.alinean.com/ibm\\_stg/AutoLogin.do?d=432494161287811817](https://roianalyst.alinean.com/ibm_stg/AutoLogin.do?d=432494161287811817)
- The Clipper Group Navigator: IBM Brings Enterprise Functionality to Mid-Range Storage  
<http://ibm.co/aJCKv8>
- IBM Storwize V7000 GUI Animation  
[http://www.youtube.com/watch?v=QZGBP4XuUg&hl=en\\_US&fs=1&](http://www.youtube.com/watch?v=QZGBP4XuUg&hl=en_US&fs=1&)
- Five essential storage technologies  
[http://www.youtube.com/watch?v=PP5xK5N-o\\_M&hl=en\\_US&fs=1&](http://www.youtube.com/watch?v=PP5xK5N-o_M&hl=en_US&fs=1&)

# Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service. IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

*IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785 U.S.A.*

**The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:** INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you. This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk. IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you. Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products. This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

## COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

**© Copyright International Business Machines Corporation 2012. All rights reserved.**

Note to U.S. Government Users Restricted Rights -- Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

This document was created or updated on August 14, 2012.

Send us your comments in one of the following ways:

- Use the online **Contact us** review form found at:  
[ibm.com/redbooks](http://ibm.com/redbooks)
- Send your comments in an e-mail to:  
[redbook@us.ibm.com](mailto:redbook@us.ibm.com)
- Mail your comments to:  
IBM Corporation, International Technical Support Organization  
Dept. HYTD Mail Station P099  
2455 South Road  
Poughkeepsie, NY 12601-5400 U.S.A.

This document is available online at <http://www.ibm.com/redbooks/abstracts/tips0837.html> .

## Trademarks

IBM, the IBM logo, and [ibm.com](http://ibm.com) are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. These and other IBM trademarked terms are marked on their first occurrence in this information with the appropriate symbol (® or ™), indicating US registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at <http://www.ibm.com/legal/copytrade.shtml>

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

Active Cloud Engine™  
AIX®  
BladeCenter®  
DB2®  
DS8000®  
Easy Tier®  
FlashCopy®  
IBM®  
Power Systems™  
PowerVM®  
PureFlex™  
PureSystems™  
Redbooks®  
Redpaper™  
Redbooks (logo)®  
Storwize®  
System Storage®  
System x®  
Tivoli Storage Manager FastBack®  
Tivoli®  
XIV®

The following terms are trademarks of other companies:

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Other company, product, or service names may be trademarks or service marks of others.