

IBM System Storage DS8000 and DS6000 Advanced Copy and Mirroring Functions



The challenges of a changing world

Maintaining competitiveness in today's changing, global marketplace presents companies with significant opportunities and challenges. Today's enterprises are pursuing new markets and collaborative business models, which put greater requirements on their ability to share information with trusted parties while protecting it from those intending to misuse it. Effective data protection and disaster recovery have never been more vital in helping companies thrive in today's business climate.

To address the unique requirements of this dynamic online world, the IBM System Storage DS8000™ series and DS6000™ series disk systems provide innovative solutions for data protection and disaster recovery to support business and information growth. The high performance, scalability and resiliency of the DS8000 are the hallmarks of a robust information infrastructure, and optional advanced copy

Highlights

- *IBM FlashCopy® point-in-time copy function is designed to help reduce application downtime by enabling near-instantaneous internal local copies of data*
- *IBM FlashCopy SE point-in-time copy function enables space efficient local copies for short-term backup or testing needs*
- *IBM System Storage Global Mirror, Metro Mirror and Metro/Global Mirror are designed to provide real-time remote mirroring for disaster recovery and backup for IBM z/OS, IBM i5/OS® and a wide variety of UNIX®, Linux®, VMware, Microsoft® Windows® and other server environments*
- *IBM System Storage™ z/OS® Global Mirror offers a solution for real-time mirroring at extended distances for z/OS servers*

services make the DS8000 series an optimal choice for today's most demanding customers. Clients and industry observers alike have praised the DS8000 for its innovative system and data resiliency, which build on IBM's legendary reputation for providing the highest levels of availability to support the most demanding business environments.

Resiliency Family for business continuity

The IBM System Storage DS6000 series, DS8000 series and IBM TotalStorage® Enterprise Storage Server® (ESS) all offer a number of advanced copy and mirroring functions. These are enterprise-level, leading-edge functions designed to address an organization's need for high availability, disaster recovery, data duplication and data migration.

- *IBM FlashCopy and FlashCopy SE*
- *IBM System Storage Metro Mirror, Global Mirror and Metro/Global Mirror*
- *IBM System Storage z/OS Global Mirror (XRC)*
- *IBM System Storage Global Copy*

Point-in-time data copies

Planned and unplanned outages can make critical business applications unavailable for a significant amount of time. IBM FlashCopy and FlashCopy SE point-in-time copy services are designed to help reduce or eliminate such outages, so customers can keep their businesses online.

FlashCopy

FlashCopy offers an advanced internal disk system replication facility that can help significantly reduce application outages that are often associated with other backup and copy applications. It is designed to provide point-in-time copy capability for logical volumes on the DS8000 series, as well as the DS6000 series and ESS, and it can allow access to both the source and copy data virtually instantaneously. FlashCopy is designed to enable source data to be copied to an equivalently-sized target volume. These full volume copies can help enable data recovery in the event of loss of the original source data. Since data replication occurs as a

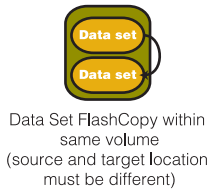
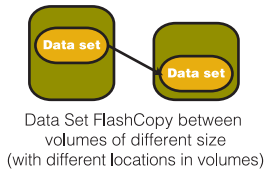
background service, both the source data and its copy are available for use almost immediately by any application requiring access to the data. The benefit is little to no application downtime.

FlashCopy SE

FlashCopy SE offers a space efficient point-in-time copy capability that can greatly reduce the storage capacity associated with full volume point-in-time copies. Rather than allocating space on the target volume equal to that of the source volume—a requirement with basic FlashCopy—only the capacity needed for pre-change images of the source data is allocated in the target repository. This enables more space efficient utilization, and less capacity translates to fewer disk drives and lower power and cooling requirements. As such, FlashCopy SE can help optimize storage environments and reduce operational costs and complexity. FlashCopy SE can be especially useful in the creation of temporary copies for tape backup, online application checkpoints or copies for disaster recovery testing.

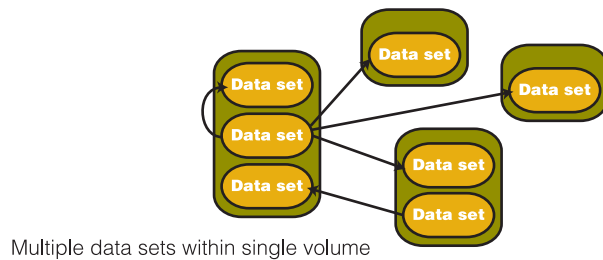
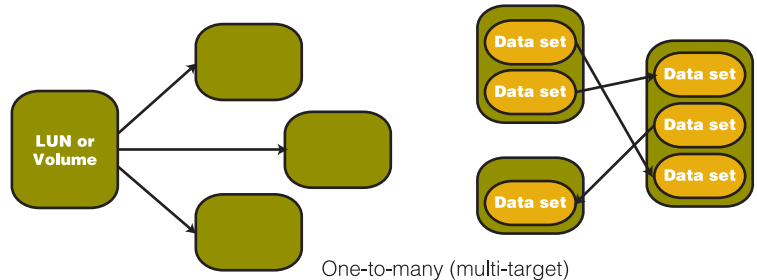
FlashCopy NOCOPY option

The efficient copy-on-write NOCOPY option within FlashCopy is designed to allow flexible reuse of disk capacity that would otherwise be dedicated to copy operations. This option is designed to provide a unique optimization for operations with short-term copy requirements, such as backup to tape. With the NOCOPY option, rather than a physical byte-for-byte copy of the source volume, the only data copied to the target is that which is about to be changed or overlaid by the application. This option can be used to copy most or all of the data directly from the source to tape, without the need to copy all of the physical data to an intermediate backup copy first. This helps minimize the impact of internal replication on other work.



Data Set FlashCopy

This feature offers a new level of granularity for the z/OS environment, allowing more efficient use of the disk system capacity. It can help reduce background copy completion times because FlashCopy no longer needs to be performed at the volume level when only a data set copy is required. Data Set FlashCopy allows the source and target copy to be different sizes and allows the copied data to reside at a different location in the target volume than in the source volume (see Figure 1).

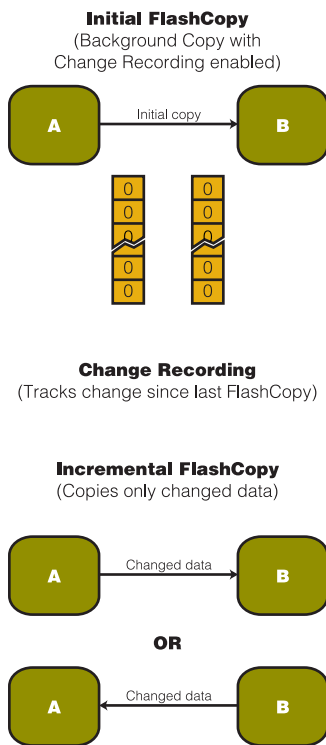


Multiple Relationship FlashCopy

This feature offers increased flexibility and improved capacity management and utilization. Instead of limiting a volume to a one-on-one relationship between FlashCopy sources and targets, this function is designed to allow a volume to participate in multiple FlashCopy relationships (up to 12 simultaneous relationships) so that multiple copies of the same data can be made for testing, backup and other applications (see Figure 2).

Incremental FlashCopy

This feature offers the ability to track and record changes that are made to the source and target volumes after the establishment of FlashCopy relationships. This provides the capability to refresh a LUN or volume to the point-in-time content of the source or target using only the changed data (see Figure 3). The refresh can occur in either direction.



Consistency Groups

This feature supports the ease of use and application-level implementation of FlashCopy. It is designed to avoid host impact when creating a consistent point-in-time copy for an application that uses data which spans multiple volumes or even multiple DS6000, DS8000 or ESS systems. The Consistency Groups feature is designed to prevent initiation or completion of write I/O to the source volumes until FlashCopy completes copying the data for all volumes in a group. No operator intervention is required, which can help improve business efficiency.

Additional features

FlashCopy is designed to copy data from one volume to another nearly instantaneously (one second or less). Applications that can only tolerate a minimal pause in availability for initialization time are good candidates for FlashCopy. In addition, FlashCopy provides the ability for the source data and its copy to reside in different Logical Storage Subsystems (LSSs) within the same DS6000 series system, DS8000 series system or ESS.

Remote Mirroring

Many businesses cannot tolerate even the slightest downtime in today's on demand business climate. IBM System Storage Remote Mirroring and Copy functions can help reduce the impact of downtime by allowing businesses to replicate data to a remote site. These functions support the ability to keep local and remote copies of application data synchronized and ready for quick switch-over should any type of disruption or disaster occur.

IBM Metro Mirror (Synchronous) is a remote data-mirroring technique designed to maintain a constantly updated copy of application data at a remote site within a metropolitan area (typically up to 300 km away). As a two-site synchronous mirroring solution, Metro Mirror is ideal for protecting data against a storage system outage or complete site failure. When combined with application server high availability, Metro Mirror can enable a robust

business continuity solution to support even the most critical business applications. Metro Mirror supports both z/OS and distributed server platforms.

IBM Global Copy is a non-synchronous, remote copy function designed to complete write operations on the primary storage system before they are received by the secondary storage system. This capability is designed to prevent primary performance from being affected by wait-time from writes on the secondary system. Therefore, the primary and secondary copies can be separated by long distances. This function is appropriate for remote data migration, offsite backups and transmission of inactive database logs at virtually unlimited distances. IBM Global Copy supports both z/OS and distributed server platforms.

IBM Global Mirror (Asynchronous) is a two-site remote data mirroring function designed to maintain a complete and consistent remote mirror of data asynchronously at virtually unlimited

distances with virtually no degradation of application response time. Separating data centers by longer distances helps provide protection from regional outages. This asynchronous technique can help achieve better performance for unlimited distances by allowing the secondary site to trail in data currency a few seconds behind the primary site. With Global Mirror, currency can be configured to be as little as three to five seconds with respect to host I/O. Global Mirror consistency groups support a mix of mainframe and open data and can be created across up to eight DS8000 series systems, DS6000 series systems or Enterprise Storage Systems, allowing scalability for customer application growth. This two-site data mirroring function is designed to provide a high-performance, cost-effective global distance data replication and disaster recovery solution. IBM Global Mirror supports both z/OS and distributed server platforms.

IBM Metro/Global Mirror (3-site Asynchronous) is designed to enable disk mirroring for the DS8000 (and ESS via RPQ) that combines Metro Mirror with Global Mirror for long-distance data replication and disaster recovery/backup solutions. This function is designed to enable a three-site, global-distance data mirroring solution, with a complete and consistent copy of data at the remote site. Metro/Global Mirror uses Metro Mirror to synchronously mirror data to a second site within the metropolitan area and then uses Global Mirror to asynchronously mirror the data to a remote site that can be across the globe from the second site. This configuration can also be flexibly used in a two-site configuration using synchronous Metro Mirror, with primary and intermediate copies within the same local Enterprise Storage Server, and asynchronous Global Mirror out to the remote site. IBM Metro/Global Mirror supports both z/OS and distributed server platforms.

IBM Metro/Global Copy

(Asynchronous cascading)

designed to provide a three-site disk mirroring function for DS8000, DS6000 and ESS that combines high availability Metro Mirror with Global Copy for a long-distance data replication/backup solution. This configuration is often used by existing Metro Mirror customers as a non-disruptive data migration solution. It includes Metro Mirror, a two-site high availability data mirroring solution, combined with Global Copy, a low-overhead method of replicating a copy of that data at periodic intervals to a third set of disk subsystems at a remote site (see Figure 4). This configuration is ideal for doing data migration while simultaneously keeping the Metro Mirror data protection active. It can also be flexibly used in a two-site configuration. It uses synchronous Metro Mirror, with primary and intermediate copies within the same local disk subsystem and non-synchronous Global Copy to the remote site. IBM Metro/Global Copy supports both z/OS and distributed server platforms.

IBM z/OS Global Mirror (XRC)

is designed to deliver synchronous data replication to a secondary site with the highest levels of throughput and data integrity and a subsequent asynchronous copy of data to a remote location. z/OS Global Mirror is available for the z/OS and IBM OS/390® operating systems and sets the standard for mainframe high availability solutions. In addition, z/OS Global Mirror is ideally suited for workload movement and data migration. z/OS is offered on the DS8000 series and the ESS Model 800.

z/OS Metro/Global Mirror is a three-site multi-target configuration that combines Metro Mirror and Global Mirror with the same z/OS volume. With this implementation, z/OS data is replicated with Metro Mirror to a secondary site within the metropolitan area, while z/OS Global Mirror replicates the same data to a separate disaster recovery site outside of the metropolitan area. This three-site implementation is designed to deliver an advanced z/OS business

continuity solution for even greater protection from unplanned outages. This configuration is ideal for an existing z/OS Global Mirror user who wants to add local high availability with Metro Mirror. Likewise, it is also an excellent solution for existing Metro Mirror customers who want to add out-of-region high availability and scalability for their z/OS environments.

z/OS Metro/Global Mirror

Incremental Resync is a new feature that can minimize the resynchronization time from hours to minutes when an outage hits the primary DS8000 system in a System z Geographically Dispersed Parallel Sysplex™ (GDPS®) environment. Instead of having to send and resynchronize the entire volume or volumes of data from the local failover storage system to a third remote failover system, Incremental Resync only needs to send the data that was “in flight” when the outage occurred. Prior to this, the entire volume, or volumes, of data that was mirrored from the primary storage system to the

secondary storage system would have to be replicated and synchronized from the secondary system to the remote system, which could take hours. Not only can Incremental Resync greatly reduce the resynchronization time and bandwidth requirements after a Hyperswap, it can quickly establish data consistency between long distance sites to help reduce vulnerability to recurring disruptions (as in the case of rolling power outages).

System Storage Resiliency Automation

IBM also offers a number of solutions for managing and automating information high availability and disaster recovery for various operating system and application environments. Some examples include:

IBM GDPS solution for

IBM System z

The business continuance capabilities of the IBM disk storage products are further integrated with System z GDPS environments. GDPS is one of the leading availability solutions for IBM System z server installations. It is a

multi-site solution designed to provide the capability to manage the storage and server remote copy configurations to help enable near transparent disaster recovery and continuous operations. The GDPS Open LUN Management capability can provide a cross-platform disaster recovery capability across both mainframe and open systems data. GDPS is an IBM Global Services offering.

IBM Geographically Dispersed Open Clusters (GDOC) solution for heterogeneous open systems

GDOC offers a full-function, end-to-end business continuity solution for large multi-platform Windows, UNIX (including IBM AIX®, HP and Solaris) and Linux environments. GDOC is especially applicable when the client needs a common business continuity solution for applications running on multiple open systems platforms. GDOC is an IBM Global Services offering and is uses VERITAS Cluster Server (VCS) and VERITAS Global Cluster Manager.

IBM HACMP/XD for IBM System p® Servers

The HACMP™/XD Extended Distance is an optional feature of IBM High Availability Cluster Multi-Processing (HACMP) for IBM AIX 5L™, Version 5.1.0. It supports automatic failover of disks that are Metro Mirror pairs and creates a powerful disaster recovery solution for IBM AIX customers. HACMP/XD is designed to automate the management of Metro Mirror in an AIX environment, help reduce recovery time after an outage, and monitor AIX-clustered environments to help maintain continuous mirroring of critical data.

IBM TotalStorage Productivity Center for Replication

Available separately, IBM TotalStorage Productivity Center for Replication (TPC-R) is designed to provide a powerful management, automation and monitoring tool for FlashCopy, Metro Mirror, Global Mirror and Metro/Global Mirror remote replication functions. Productivity Center for Replication can be installed on z/OS, AIX, Linux and



Windows platforms and provides an easy-to-understand and powerful interface to simplify the complicated tasks necessary to implement and control a copy services environment for both mainframe and open systems data.

A comprehensive disaster recovery solution from IBM

Although storage components are important to a coordinated disaster recovery plan, a complete solution includes servers, storage, software, automation, networking and integration services. The IBM System Storage portfolio of offerings can help provide customers with the highest levels of reliable information availability. Building on this information infrastructure, IBM can help customers design and implement cost-effective business resiliency solutions tailored to their unique requirements.

For more information

To learn more about IBM System Storage, contact your IBM marketing representative or IBM Business Partner, or visit:

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