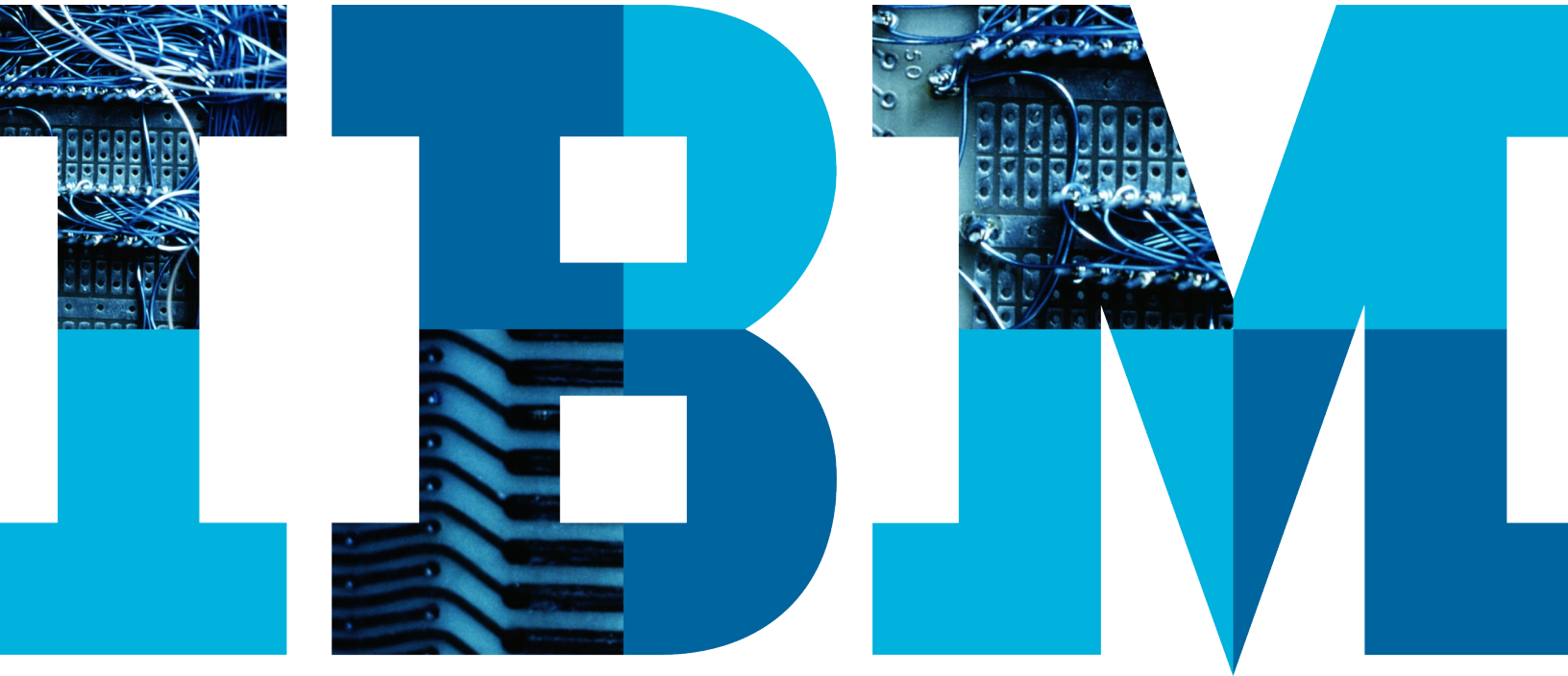


External Storage Integration and Business Continuity for IBM i

Avoid downtime due to planned and unplanned outages



Highlights

- Reduce the risk of downtime and avoid the negative consequences of a prolonged disruption in IT services
- Enable enhanced backup and business continuity
- Provide external storage-based backup, high availability (HA) and/or disaster recovery (DR)
- Leverage reliable, hardware-based storage copy and replication services managed and controlled from a familiar IBM i command line interface

Availability in an on demand world

To compete effectively a business can tolerate little downtime. From a planned outage for upgrade or maintenance to an unplanned disruption caused by human error, hardware failure or a natural disaster, all can adversely affect performance in a global marketplace. Many companies lack a robust business continuity plan to facilitate the quick recovery of their IT infrastructure; some even rely on manual processes to keep operations running until systems are restored. The integration of IBM® System Storage® and IBM i in combination with state-of-the-art software is designed to help your business reduce downtime, support high availability and improve disaster recovery for mission-critical applications.

Cost of downtime

For a typical IBM i computing infrastructure, disruption in normal service can be costly and significant, resulting in possible loss of revenue, fines or penalties, poor customer satisfaction and loss of brand image. Even modest improvement in availability can justify the costs of deploying a business continuity solution.

IBM Systems Lab Services and Training has developed the following offerings to address these issues:

- Advanced Copy Services for PowerHA on IBM i
- Full System FlashCopy for IBM i
- DS Storage Management for IBM i
- Advanced Copy Services for Power HA on IBM i - User Managed Storage Edition

Each utility has a unique design point to address varied customer requirements and can be installed as stand-alone solutions or in various combinations to support more complex environments.

Advanced Copy Services for PowerHA on IBM i

Use simple menus and commands to configure the environment and automate the server and storage operations required to copy or replicate the database. The characteristics of a solution that would benefit most from these utilities are IASP enabled applications, IBM i clustering, IBM external storage and hardware-based copy and replication services.

Prerequisites are:

- IBM i V5R4 or later release
- IBM i Option 41 (HA Switchable Resources)
- PowerHA for i (if running IBM i 6.1 or later release)
- IBM DS6000™ or IBM DS8000® storage units
- Copy Services (FlashCopy, Metro Mirror, Global Mirror)
- Dedicated Fiber Channel IOA(s) for the IASP volumes
- IASP-enabled application

Full System FlashCopy for IBM i

This powerful, flexible toolkit provides a set of commands to create a “point-in-time” copy of a full system. Running from a controlling or managing IBM i partition, it fully automates the process of powering off or “quiescing” the production system, making the FlashCopy within the external storage unit, returning the production system to its active state and then powering on the backup IBM i partition for save operations. It also provides integration with IBM Backup and Recovery Media Services (BRMS). The requirements to deploy this solution are:

- IBM i V5R4 or later release
- Sysbase volumes (including Load Source Unit) hosted on external storage
- IBM DS6000 or IBM DS8000 storage units
- Copy Services (FlashCopy)
- Controlling or managing IBM i partition

DS Storage Management for IBM i

A collection of utilities to simplify the integration of external storage and IBM i by providing functions like the ability to display external storage messages in QSYSOPR message queue (SNMP trap support), view and manage host connections and associated volumes, save configuration data for future reference, create a new host connection when replacing a defective fiber channel IOA and verify external storage volumes and ASP relationships. The DS Storage Management for IBM i is supported on IBM i V5R4M5 and later releases.

Advanced Copy Services for PowerHA on IBM i - User Managed Storage Edition

Storage models such as the IBM DS5000 series support attachment to IBM i, but lack a programmable interface on IBM i to automate storage functions from the host server. Instead they rely on user-friendly GUI interfaces to interact with the storage device. For these environments the Advanced Copy Services for IBM i - User Managed Storage Edition can manage the copy/switch process by performing the IBM i actions, then prompting the user to perform the required storage function. IBM i messages display progress and instruct the user to take action at the appropriate time.

Reduce downtime for save operations

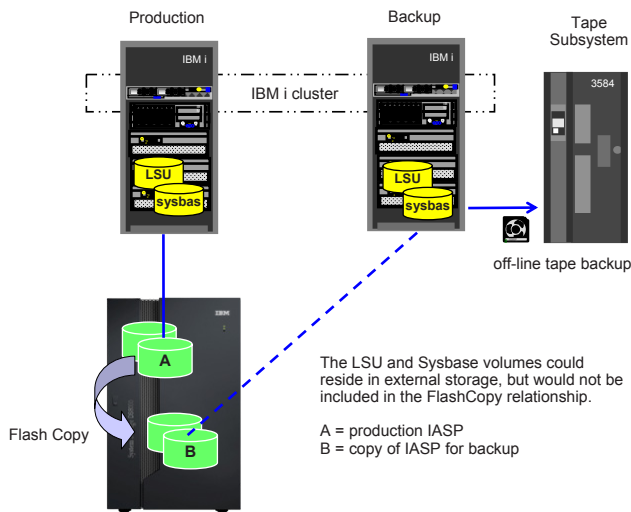
A big challenge to administering an IBM i environment is finding adequate time on a busy IT schedule to backup critical business data. Copy Services FlashCopy technology alleviates the problem by creating a copy of a logical volume at a specific point in time (and it takes just seconds.) The copy is then attached to a second IBM i partition, allowing for saves to be performed on the backup system while the production system continues against the primary copy of the data with minimal or no disruption.

Advanced Copy Services for PowerHA on IBM i supports a backup solution for applications deployed in an IASP by way of the following interfaces:

- QSYSOPR message queue (to confirm/cancel the operation)
- IASP resource (vary off/on or quiesce)
- IBM i clustering
- DSCLI scripts (to manage the FlashCopy function)
- IBM i disk unit resources (release/reset)

A single command (STRFLASH) automates the process of making a copy of the IASP available to the backup server. A second command (ENDFLASH) removes the FlashCopy and prepares the backup server to accept the next operation.

Figure 1 (IASP FlashCopy)

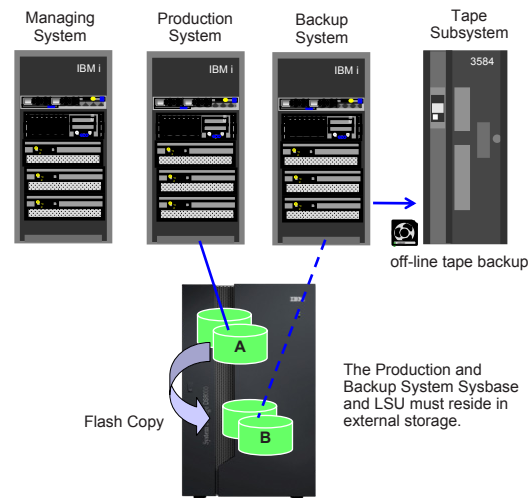


The Full System FlashCopy toolkit supports a backup solution for a copy of the entire system, but requires all disk units, including the Load Source Unit (LSU), reside on external storage. The capability to attach and boot a LSU via a fiber channel adapter was introduced in IBM i V5R3M5 providing an opportunity to take advantage of the FlashCopy technology across all volumes on the system.

Because the production partition may be powered down during the procedure and because the backup partition is not available until the FlashCopy relationship is established, a third managing IBM i partition is required to control the overall process. The toolkit, installed on the managing partition, communicates with the production and backup partitions, their respective HMCs, and the external storage unit to create the system clone and initiate the save operation. Additional capabilities include:

- Ethernet configuration (to provide network connectivity for the backup server)
- Tape configuration (to identify the save device)
- Custom startup program
- BRMS integration, including consistency of QUSRBRM library
- Support for quiescent function (requires IBM i 6.1 or later releases)

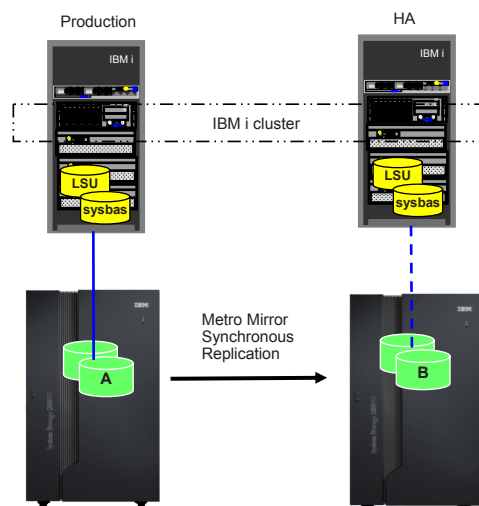
Figure 2 (Full System FlashCopy)



HA/DR using storage-based replication

Leverage Copy Services functions like Metro Mirror and Global Mirror to develop, operate and maintain HA and DR solutions that meet business continuity requirements. Metro Mirror provides real-time replication of logical volumes between two IBM external storage units. This synchronous copy solution is designed to confirm write operations are completed on both copies (local and remote site) and typically used for applications that can't suffer data loss in the event of a failure.

Figure 3 (IASP Metro Mirror)

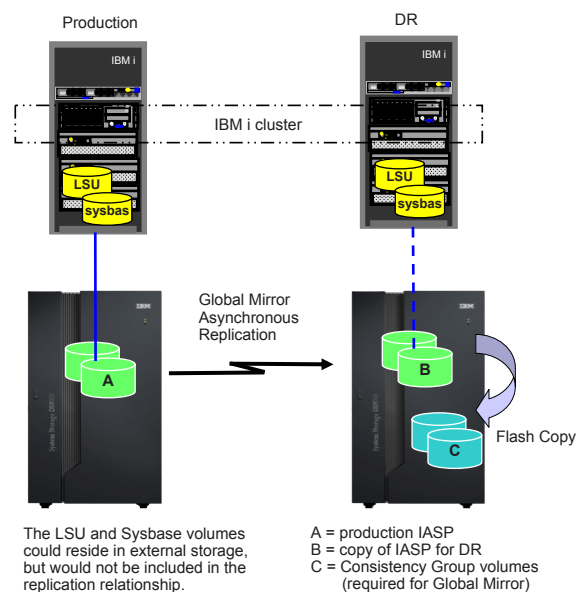


The LSU and Sysbase volumes could reside in external storage, but would not be included in the replication relationship.

A = production IASP
B = copy of IASP for HA

Replicating data over distances beyond 300km, or over networks with limited bandwidth, requires an asynchronous approach to reduce the impact on application performance. Global Mirror provides such capability and ensures data consistency at the remote disaster recovery location. With sufficient bandwidth and resources, as little as 3-5 seconds of data loss can be achieved during periods of normal workload activity.

Figure 4 (IASP Global Mirror)



The LSU and Sysbase volumes could reside in external storage, but would not be included in the replication relationship.

A = production IASP
B = copy of IASP for DR
C = Consistency Group volumes (required for Global Mirror)

Metro/Global Mirror (MGM) is a three-site, multi-purpose replication solution combining Metro Mirror for HA and Global Mirror for DR. Advanced Copy Services for PowerHA on IBM i provides automation and management of this environment using IBM Tivoli® Storage Productivity Center for Replication (TPC-R). An integration layer from the IBM i operating system leverages the capabilities of TPC-R to manage this more complex solution.

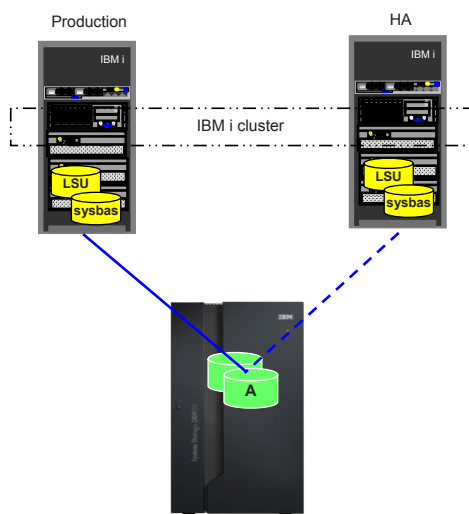
Advanced Copy Services for PowerHA on IBM i is a software utility that facilitates the integration of external storage replication technologies attached to IBM i. It simplifies the process of switching data to an alternate location by automating functions and performing activities on the host. The switch process is invoked via a single command (SWPPRC) and accomplished through the same interfaces used to manage the FlashCopy function:

- QSYSOPR message queue (to confirm/cancel the operation)
- IASP resource (vary off/on or quiesce)
- IBM i clustering
- DSCLI scripts (to manage Metro Mirror or Global Mirror functions)
- TPC-R (to manage MGM functions)
- IBM i disk unit resources (release/reset)

LUN level switching

IBM i servers configured with high speed link/remote I/O (HSL/RIO) bus topology support a “switched disk” concept where an independent disk pool can be switched between IBM i nodes in a cluster. With the advent of 12X bus topology, this is no longer available, but a solution can be created using LUN level switching. In this technique, an independent disk pool residing on external storage volumes can be readily switched between IBM i cluster nodes. LUN level switching can be deployed as a stand-alone solution or combined with a hardware-based replication to provide additional redundancy at a remote disaster recovery site.

Figure 5 (IASP LUN Level Switching)



The LSU and Sysbase volumes could reside in external storage, but would not be included in the LUN Level Switch relationship.

A = IASP (attached to either Production or HA)

IBM Business Continuity solutions

The portfolio of IBM i Copy Services offerings is intended to address key factors that can help improve IT operations and form the basis of a sound business resilience plan. This includes frequent saves, high availability, disaster recovery and delivery of solutions that meet the Recovery Time Objective (RTO) and Recovery Point Objective (RPO) of the business. The utilities are designed to help simplify operations, reduce human error and protect mission-critical applications and data.

How are these offerings acquired?

The utilities described here are offerings provided by IBM Systems Lab Services and Training and are packaged as part of a consulting services engagement. The offering consists of the software license and software maintenance, as well as planning, design and implementation services.

Pricing

To obtain this service, contact one of our opportunity managers to confirm requirements, define the scope of work, develop a services proposal and determine pricing.

IBM Systems Lab Services and Training

Our team offers expertise in all aspects of managing IBM Power Systems™ environments. We can provide services in installation, migration, porting, platform management, consulting and training. With skills from the IBM development labs, Lab Services possesses up-to-date knowledge of the products and solutions for virtualization, high availability, high performance computing and server consolidation.

For more information

Learn more about External Storage Integration and Business Continuity for IBM i high availability solutions and related services. Contact stgls@us.ibm.com or visit:

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