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## Highlights

- Delivers high availability (HA) and disaster recovery (DR) through IBM storage-based clustering
  - Provides higher utilization and performance capabilities for scale-up computing
  - Easy to use, economical and automated
  - Protects critical business applications from outages, planned or unplanned, around the world
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# IBM PowerHA SystemMirror for IBM i

*Avoid the risk and cost of downtime*

Since the first introduction of IBM® PowerHA® SystemMirror for IBM i in 2008, major global corporations have been transitioning from internal disk and logical replication to IBM storage servers and PowerHA SystemMirror for i. It's not only the large corporations who take advantage of PowerHA; clients around the world with less than a terabyte of storage have also moved from logical replication environments to PowerHA with geomirroring.

PowerHA SystemMirror for i is the IBM Power Systems™ offering for high availability and disaster recovery. It's an IBM storage-based clustering solution that is an integrated extension of the storage management architecture and the IBM i operating system. With a PowerHA cluster, you are able to deploy an HA solution that addresses both your storage requirements and high availability requirements with one integrated configuration that is both robust and easy to use.

## PowerHA Cluster

A cluster is a collection of servers with a common set of shared data and management technology that provides IT operations with a single screen and a set of commands that enable the applications and data to be readily moved between nodes in the cluster for the purpose of mitigating the complexity and downtime time that can be associated with planned or unplanned outages.

A PowerHA cluster is created by taking the database out of SYSBAS and placing it into an Independent Storage Pool (IASP) and SYSBAS objects into the administrative domain. The data in the IASP is shared between the systems in the cluster. When configured into an IBM storage server, the IASP can be switched (LUN level switching) between partitions



(nodes) in the cluster, and it can also be replicated to systems dispersed between remote locations. Replication via storage server is accomplished with Metro Mirror or Global Mirror; if one is using internal disk the technology is called geographic mirroring. The key to understanding this technology from a data resiliency perspective is that all of the data that paged out of main store to an IASP, including the local journals, is the data that is switched or replicated between nodes in the cluster. PowerHA is displacing logical replication environments worldwide because it directly addresses the problems of data synchronization, operational complexity and certainty of outcome that are the classic challenges associated with logical replication environments.

Once your PowerHA SystemMirror solution is deployed, there's minimal IT operational involvement required. Not only is this a big savings in manpower, it is also peace of mind.

### **PowerHA SystemMirror for i Express Edition**

New with IBM i 7.2 is the Express Edition. The Express Edition is designed to be the foundation for a class of HA/DR offerings based on restarting the LPAR into another LPAR on a different server for HA operations. The Express Edition differs from the Standard Edition in that the database is not placed into an IASP separate from SYSBAS. Rather, a primary LPAR is restarted or IPLd to a target LPAR on another server. With PowerHA 7.2 for i, the first stage of the Express Edition offering enables single node full system HyperSwap® with the DS8700 (and above) which provides customers with continuously available storage through either planned or unplanned storage events. With HyperSwap technologies, the act of moving between storage servers is nearly seamless.

### **PowerHA SystemMirror for i Standard Edition**

The IBM PowerHA SystemMirror for i Standard Edition helps you to protect your critical business applications from outages in the data center (single-site solution), planned or unplanned.

The Standard Edition provides reliable monitoring, failure detection, and automated recovery of business application environments. It provides the capability to monitor various event sources such as the HMC, Power Systems, and storage server for a comprehensive list of errors, from hardware and network to application or environmental (i.e. power loss); enabling automated or operator initiated actions. Starting with IBM i 7.1 PowerHA SystemMirror Standard Edition supports LUN level switching for the DS8000, SVC and Storwize V3700, V5000 and V7000 family of storage servers.



### **PowerHA SystemMirror for i Enterprise Edition**

The PowerHA SystemMirror for i Enterprise Edition includes all of the capabilities of the Standard Edition and more. The Enterprise Edition package enables you to extend your data center solution across up to three sites. PowerHA SystemMirror Enterprise Edition includes support for DS8000,

SVC, V7000, V5000 and V3700 with either Metro Mirror or Global Mirror and with 7.1 of PowerHA SystemMirror, the Enterprise Edition also includes support for geomirroring asynchronous mode. Geographic mirroring synchronous mode support is included with the PowerHA SystemMirror Standard Edition.

Geographic mirroring is the IBM i host based mirroring over IP network solution that enables small clients to set up a geographically dispersed two node PowerHA SystemMirror cluster using either internal or external disk. The geographic mirroring solution can lower your total cost of ownership in comparison to software replication options in both cost of acquisition and operational management costs. The introduction of geomirror async mode support with PowerHA SystemMirror 7.1 enables clients to extend the PowerHA SystemMirror cluster between sites with virtually unlimited distance. We recommend geomirroring to be used for IASPs under 2 Tbytes.

The Enterprise Edition manages Metro Mirror and Global Mirror with the DS8000®, the SAN Volume Controller (SVC) and the Storwize® V7000, V5000, V3700 IBM Storage Servers, enabling automatic failover for planned or unplanned events. By automating the management of Metro Mirror or Global Mirror, recovery time is minimized after an outage, regardless of whether the clustered environment is local or geographically dispersed. The Enterprise Edition, in combination with Metro Mirror or Global Mirror, manages a clustered environment to allow mirroring of critical data to be maintained at all times. FlashCopy® which, whether used with either the Standard Edition or the Enterprise Edition, enables you to create a point-in-time copy with minimal disruption to your production environment. Integrated with PowerHA and BRMS, FlashCopy enables you to backup to tape at your convenience.

Feature	Benefits
<b>Administrative domain</b>	<ul style="list-style-type: none"> <li>Keeps SYSBAS objects in sync across the nodes in a PowerHA cluster.</li> </ul>
<b>Shared (active/passive) storage clustering</b> IBM PowerHA enables high availability and disaster recovery solutions based on disk storage pools	<ul style="list-style-type: none"> <li>Storage pools (IASPs) are switched or mirrored real time between systems in a cluster. With no out-of-sync conditions and no lag time on the backup system, you're ready to role swap on demand.</li> </ul>
<b>LUN level switching</b>	<ul style="list-style-type: none"> <li>A single storage server shared by two or more Power Systems servers enables simple role swap operations for datacenter HA management and is typically a component in a multi-site topology.</li> </ul>
<b>Geographic Mirroring</b> IBM i host-based mirroring between two systems	<ul style="list-style-type: none"> <li>Inexpensive easy-to-use two node cluster for entry level operations.</li> </ul>
<b>Metro Mirror</b> Synchronous DS8000, SVC, V7000, V5000, V3700 mirroring for your PowerHA cluster	<ul style="list-style-type: none"> <li>Synchronous storage replication; the replicated data is synchronous to the application state at all times, providing an RPO of zero.</li> </ul>
<b>Metro Global Mirror (MGM)</b> A three site PowerHA cluster, two sites via Metro Mirror, third site via Global Mirror	<ul style="list-style-type: none"> <li>Provides three geographically dispersed sites within a single PowerHA cluster.</li> </ul>
<b>HyperSwap (stage 1)</b> Single partition with two mirrored DS8000's via Metro Mirror	<ul style="list-style-type: none"> <li>No DS8 K storage outages due to planned or unplanned outages, foundation for future HyperSwap capabilities.</li> </ul>
<b>Global Mirror</b> Asynchronous DS8000, SVC, V7000, V5000, V3700 mirroring for your PowerHA disaster recovery cluster	<ul style="list-style-type: none"> <li>Asynchronous storage replication, the data can be replicated for an unlimited distance with minimal data loss in the event of an unplanned outage.</li> </ul>
<b>FlashCopy</b>	<ul style="list-style-type: none"> <li>Create "instantaneous" copies of your IASP to use for offline backups to tape without disrupting your production environment. Is integrated with BRMS for complete automation.</li> </ul>

PowerHA tools for IBM i from IBM Lab Services enables a range of options and services to enhance and simplify your PowerHA cluster environment. This offering provides pre-written scripts and services for implementing and managing your IBM storage and PowerHA SystemMirror solution environment. The PowerHA tools for IBM i further simplifies your HA/DR operations including FlashCopy.

## Gaining the IBM advantage

PowerHA high availability solutions from IBM provide clients the confidence that comes from integrated design and testing. IBM PowerHA solutions are designed as an integrated extension of the operating system environment. This reduces the risk of failures resulting from combining disparate components from multiple vendors and can be a critical factor for business environments. IBM PowerHA high availability solutions provide the advantage of IBM Power Systems, the IBM AIX® and IBM i operating systems, IBM System Storage® offerings and the PowerHA SystemMirror offering. PowerHA clusters are backed by comprehensive offerings and resources that provide value at every stage of IT implementation. These include PowerHA High Availability Cluster implementation services, providing customized assistance designed to meet our customer requirements for on-demand business needs.

## For more information

To learn more about PowerHA for IBM i for Power® servers, please contact your IBM representative or IBM Business Partner, or visit the following website:  
[ibm.com/systems/power/software/availability](http://ibm.com/systems/power/software/availability)



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Produced in the United States of America  
April 2014

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