

IBM PowerHA SystemMirror for AIX 7.1.3 Enhancements

IBM Redbooks Solution Guide

IBM® PowerHA® SystemMirror® for AIX® 7 represents a new generation of clustering solutions for high availability and disaster recovery. Based on Cluster Aware AIX (CAA), the PowerHA SystemMirror Standard Edition and the PowerHA SystemMirror Enterprise Edition offerings represent a major shift in the traditional architectural concepts of building and managing clusters for high availability and disaster recovery. Cluster Aware AIX shifts key aspects of clustering technology into the IBM AIX kernel, helping to enable simpler, more robust cluster formation and management. Cluster Aware AIX features near real-time inter-node messaging and synchronization, clusterwide health management, and multichannel redundancy. With Technology level (TL) 3, Standard Edition can be configured with unicast (the default option) or multicast communications.

The PowerHA SystemMirror V7.1 offering introduces new capabilities that include stretched clusters and linked clusters, both of which enable kernel level communications between geographically dispersed nodes for more robust configurations. The linked cluster topology has an independent cluster repository at the primary and secondary sites, which enables clients to have two data centers that are linked by unicasting. A stretched cluster configuration has a single repository and supports multicasting and multichannel communications and unicast communications with TL 3.

Figure 1 shows the IBM PowerHA SystemMirror V7.1 topology.

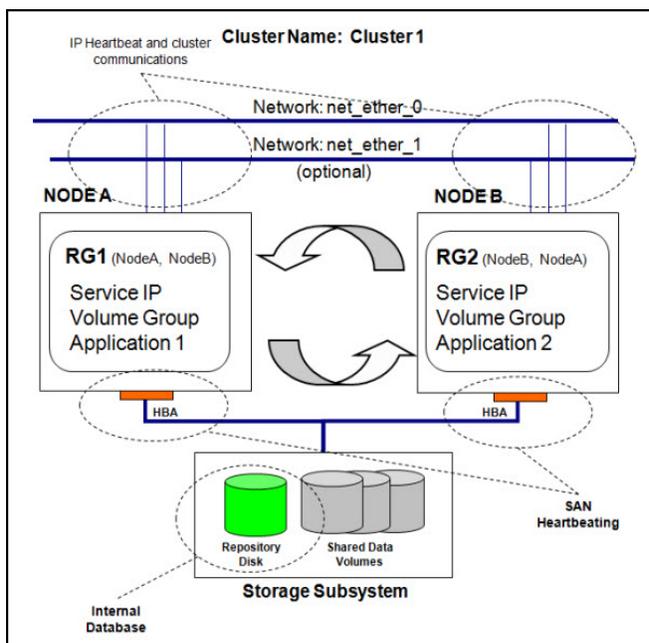


Figure 1. IBM PowerHA SystemMirror V7.1 topology

Did you know?

Version 7 of the clustering technology enables PowerHA SystemMirror V7.1 Enterprise Edition to support IBM HyperSwap® with the IBM System Storage® DS8800 or IBM System Storage DS8870 and Metro Mirror replication. HyperSwap technology enables PowerHA Enterprise Edition clients to deploy two IBM Power Systems™ servers and two DS8870 storage units between sites in a cross-coupled configuration that provides continuity through a storage failure. With this announcement, Version 7.1 TL3 enables an active-active HyperSwap configuration that supports active-active workloads on both sites. Active-active site configuration can provide for a powerful deployment model where the loss of compute nodes, storage systems, or even the site, might not result in any disruption to the business, which can happen with the traditional failover-based HA model. PowerHA SystemMirror V7.1.3 also supports HyperSwap configuration for a single server. This configuration enables a client to have redundant and geographically dispersed storage servers in a HyperSwap configuration. HyperSwap technology allows nondisruptive switching between storage servers.

Business value

The objective behind a high availability solution is to provide near-continuous application availability for both planned and unplanned outages. Business-critical applications are configured into a cluster, which typically involves at least two systems (or nodes); the cluster monitors the critical resources for changes that might indicate a failure, a pending failure, or a possible configuration change. The cluster is monitored for health and for configuration changes that must be made consistent across the cluster. A cluster can also be configured for disaster recovery (DR) by providing clustering capabilities across geographically dispersed locations. As a preferred practice, data centers conduct periodic disaster recovery tests to demonstrate compliance with corporate policies. Compliance tests can be both operationally expensive (tying up critical resources during the test) and cause business impact. Many companies simply cannot afford to have their IT operations unavailable for an extended DR test and therefore implement a cluster to simplify and shorten the test.

All high availability products provide the same basic functions for monitoring and recovery of mission-critical applications. The strength of PowerHA for AIX lies in its tight integration with AIX and Power Systems hardware. General-purpose solutions that run on many different hardware platforms and operating systems can offer only the least common denominator set of features. No other product can provide the features, performance, and reliability of PowerHA on IBM System p® servers and AIX.

PowerHA SystemMirror Standard Edition and PowerHA SystemMirror Enterprise Edition with Cluster Aware AIX (CAA), kernel-based health management, Graphical Management, HyperSwap, and other integrated features, provide a robust high availability disaster recovery (HADR) environment that is focused on ease of implementation and ease of use.

Solution overview

PowerHA SystemMirror for AIX 7.1.3 enhances and adds capabilities, including the following key features:

- HyperSwap for active-active two-site configurations
- HyperSwap for single-node clusters
- Support for clustering with unicast communications
- Capability to dynamically modify the host name of a clustered node
- Operator-managed manual failover policy for multisite linked clusters
- Graphical Cluster Simulator
- Enhanced and flexible high availability management support for SAP

PowerHA SystemMirror for AIX Standard Edition is the IBM Power Systems data center solution that helps protect critical business applications from outages, whether planned or unplanned. PowerHA SystemMirror for AIX Enterprise Edition includes the Standard Edition, plus advanced capabilities such as failover to back up resources at remote locations.

Solution architecture

In addition to the integration with Cluster Aware AIX, PowerHA SystemMirror V7.1 Standard Edition includes the following features:

- Centralized cluster repository for cluster-wide name space management and internode synchronization.
- PowerHA SystemMirror kernel-based, low-latency event communication.
- Smart Assist technology, enabling immediate availability support for popular applications and a new intuitive user interface. The Smart Assist portfolio supports IBM DB2®, IBM WebSphere®, IBM WebSphere MQ, Oracle, SAP, SAP MaxDB, Enterprise Content Manager, IBM Tivoli® Storage Manager, IBM Domino® Server, IBM LDAP, IBM HTTP printers, and FileNet®. PowerHA SystemMirror also includes Smart Assists to deploy and manage the SAP liveCache Hot Standby Solution. PowerHA SystemMirror TL03 enhances the support for SAP HA management. The customer can now deploy SAP global file systems to be within the PowerHA clusters or outside the cluster. Additionally, multiple instances of SAP deployment can be managed through the SAP Smart Assist that is provided by PowerHA. Many customization-related configuration parameters are allowed that enable the SAP field practitioners to activate HA management for many varied SAP deployments.
- IPv6 is supported for both internal and external cluster communications.
- The IBM Systems Director based PowerHA SystemMirror management interface provides for an easy-to-use graphical interface to deploy and manage the PowerHA SystemMirror clusters. A set of wizards guides customers through creation of cluster and resource groups. A sophisticated management interface allows the customer to manage various clusters in their environment. Using this interface, administrators can generate reports, examine topology, and be notified of status changes to resources and clusters.
- PowerHA SystemMirror V7.1 Standard Edition and Enterprise Edition include the IBM Systems Director plug-in at no charge, which can be installed and used to deploy and manage PowerHA SystemMirror clusters. The plug-in consists of the IBM Systems Director server component and also the agent that is deployed on individual nodes in the PowerHA SystemMirror clusters. The IBM Systems Director Server component of the PowerHA plug-in can also be downloaded and installed by the customer.
- PowerHA V7.1 TL3 includes a cluster simulator option that allows you to configure a simulated cluster topology and experiment with different configurations options. The configuration of such a cluster can be saved in a file and later deployed as a cluster (if the configuration matches with the hardware in place). A cluster can be deployed by using the configuration file after the hardware and the software components are in place.

PowerHA SystemMirror V7.1 Enterprise Edition includes the following features:

- PowerHA SystemMirror V7.1 Enterprise Edition.
- Support for HyperSwap with the DS8800.
- With TL3, support for active-active HyperSwap and single-server HyperSwap.
- Linked cluster technology for multisite unicast communications with independent cluster repositories.
- Stretched cluster technology for multisite multicast communications with a shared cluster repository.

- TL3 supports clustering through unicast (default) communications or multicast communications for Standard Edition configurations, enabling flexibility regarding the network setup. The Enterprise Edition using linked clusters supports unicast-based clustering. Multiple sites using stretched clusters can also use unicast communication.
- PowerHA SystemMirror provides for centralized administration of the stretched and linked cluster topology's critical management capabilities in storage, network, and security areas. The IBM Systems Director based graphical interface provides a sophisticated dashboard for managing all the clusters in the enterprise environment from a single interface.
- A multisite configuration wizard for a simplified setup of the PowerHA multisite cluster.

Usage scenarios

PowerHA HyperSwap provides for continuous availability against storage errors. The solution uses storage-based synchronous replication, thus enabling the host to transparently switch an applications I/O operation to the secondary volumes if physical connectivity exists between the host and the auxiliary storage subsystem.

The encapsulated architecture allows for the following situations:

- Independent deployment without a base PowerHA configuration.
- Tight integration with the AIX storage framework for:
 - o Better administrative control
 - o AIX to work closely with PowerHA HyperSwap kernel extension to:
 - Inform the HyperSwap kernel about I/O errors
 - Allow in-line processing to decide and execute the swap
 - Allow handling of application policies that are supported by Power Systems

Figure 2 shows the architectural overview of PowerHA HyperSwap and the interaction between the components.

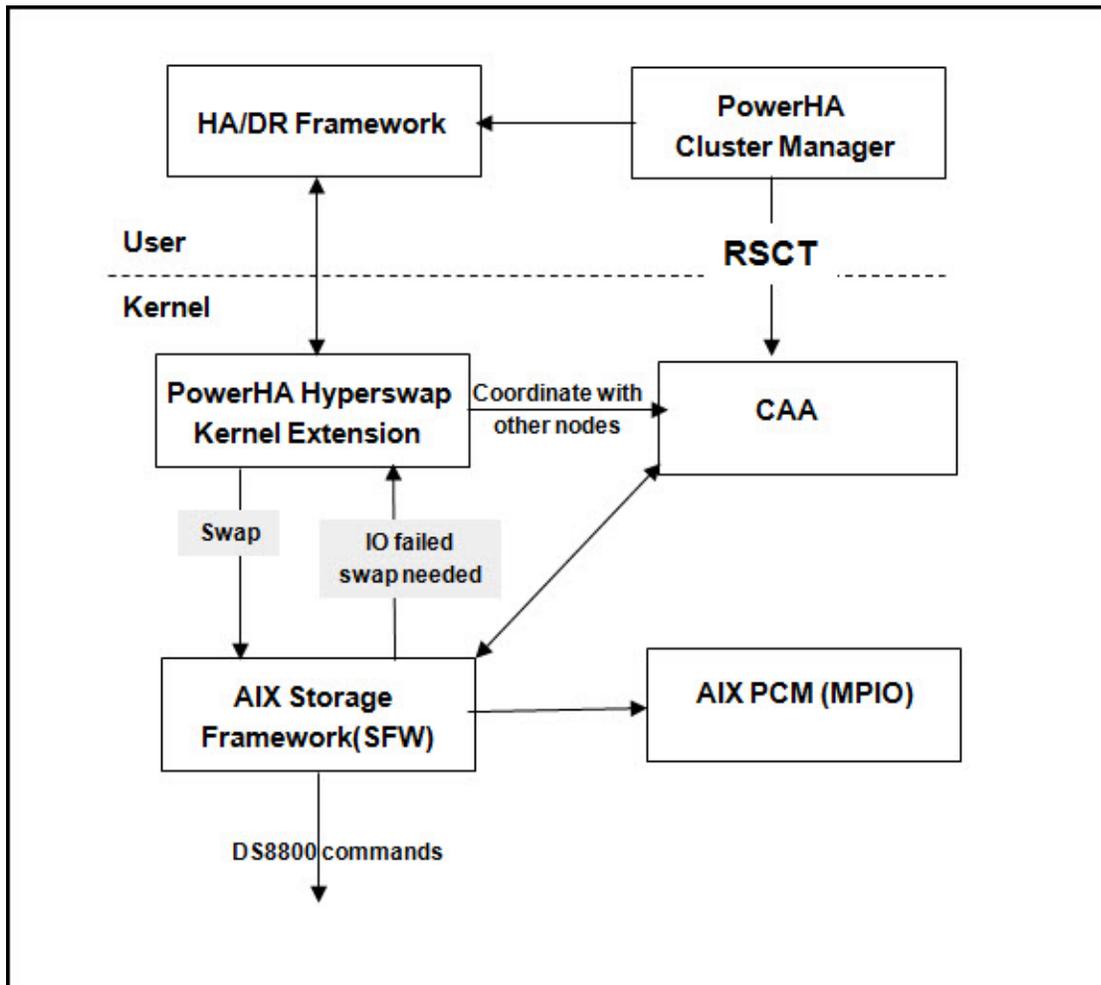


Figure 2. Architectural overview

Integration

The PowerHA SystemMirror 7.1 Enterprise Edition also supports the following items:

- IBM Storage Systems DS8800, IBM SAN Volume Controller, IBM Storwize V7000, and IBM XIV with either Metro Mirror or Global Mirror, enabling automatic failover between geographically dispersed data centers.
- Specified Hitachi and EMC storage replication services.
- Failover policy may be set to manual mode. In this mode, the operator decides whether to fail over to the remote location.

Several new features of PowerHA V7.1.3 are integrated with IBM Systems Director:

- Flexibility is improved for snapshot handling.
- Cluster split and merge management is now available.
- Demonstrations are easier and more attractive.

- Visual planning can now be performed.
- Deployment of planning XML configurations are possible.

Supported platforms

PowerHA SystemMirror V7 is supported on the AIX 6.1 and AIX 7.1 operating systems. Here are the specific software requirements for PowerHA SystemMirror V7.1.3:

- Operating system (one of the following):
 - AIX 6.1 Technology Level 9 with Service Pack 1
 - AIX 7.1 Technology Level 3 with Service Pack 1

Ordering information

For ordering, contact your IBM sales representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: RE001).

Ordering information is shown in Table 1.

Table 1. Ordering program name, program number, and version

Program name	Program number	Version
IBM PowerHA SystemMirror Enterprise Edition	5765-H37	7.1
IBM PowerHA SystemMirror Standard Edition	5765-H39	7.1

Related information

For more information, see the following documents:

- *IBM PowerHA SystemMirror 7.1.2 Enterprise Edition for AIX*, SG24-8106
<http://www.redbooks.ibm.com/abstracts/sg248106.html>
- *IBM PowerHA SystemMirror 7.1.x for AIX Best Practices, Reference Architectures (Standard and Enterprise Editions)*, SG24-8167
<http://www.redbooks.ibm.com/abstracts/sg248106.html>
- IBM PowerHA SystemMirror for AIX product page
<http://www-03.ibm.com/systems/power/software/availability/aix/>
- IBM PowerHA SystemMirror for AIX 7.1.3 adds enhancement announcement letter
http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/6/897/ENUS213-416/index.html&lang=en&request_locale=en
- IBM Offering Information page (announcement letters and sales manuals):
http://www.ibm.com/common/ssi/index.wss?request_locale=en

On this page, enter IBM PowerHA SystemMirror for AIX offers solutions for high availability and disaster recovery for clusters, select the information type, and then click **Search**. On the next page, narrow your search results by geography and language.

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