

High Availability Cluster Multiprocessing for AIX on IBM @server pSeries



Two IBM @server pSeries 690 servers managed by HACMP

Highlights

■ **Combines the leading UNIX[®]-based clustering solution with advanced server technology for 24x7 system availability, scalability and ease of management**

■ **Provides ongoing access to database resources for exceptional flexibility, reliability and application execution**

■ **Significantly reduces unplanned outages; allows cluster upgrades and reconfiguration without interrupting operations**

Need for high availability

Today's globally networked economy demands powerful information systems that are available to customers, business partners and employees around the clock and around the world. When a company's system is down, the business costs can be enormous in lost productivity, sales and profits, poor customer service and decreased customer loyalty. Wherever advanced systems availability and productivity are critical for competitiveness, clustered multiprocessing offers essential help for growing e-businesses.

The IBM HA clustering solution

Clustering is the linking of two or more computers or nodes into a single, unified resource. High availability clusters are designed to provide continuous access to business-critical data and applications through component redundancy and application failover. IBM has a compelling answer to high availability requirements: High Availability Cluster Multiprocessing (HACMP) for AIX[®], one of the highest-rated UNIX-based clustering solutions in the industry.

HACMP links IBM @server pSeries[™] servers or logical partitions (LPARs) of pSeries servers into high availability clusters. These servers or LPARs can also be part of an IBM @server Cluster 1600, which can simplify multisystem management and help to reduce cost of ownership.

HACMP provides concurrent access to IT resources and the fault resilience required for business-critical applications. It is designed to automatically detect system or network failures and eliminates a single point-of-failure by managing failover to a recovery processor with a minimal loss of end-user time.

The current release of HACMP can detect and react to software failures severe enough to cause a system crash and network or adapter failures. The Enhanced Scalability capabilities of HACMP offer additional availability benefits through the use of the Reliable Scalable Cluster Technology function of AIX. The Concurrent Resource Manager of HACMP provides concurrent access to shared disks in a highly available cluster, allowing tailored actions to be taken during takeover to suit business needs.

HACMP can also detect software problems that are not severe enough to interrupt proper operation of the system, such as process failure or exhaustion of system resources. HACMP monitors, detects and reacts to such failure events, allowing the system to stay available during random, unexpected software problems. HACMP can be configured to react to hundreds of system events.

HACMP makes use of redundant hardware configured in the cluster to keep an application running, restarting it on a backup processor if necessary. This minimizes expensive downtime for both planned and unplanned outages and provides flexibility to accommodate changing business needs. Up to 32 pSeries

or IBM RS/6000® servers can participate in an HACMP cluster—ideal for an environment requiring horizontal growth with rock-solid reliability.

Using HACMP can virtually eliminate planned outages, since users, applications and data can be moved to backup systems during scheduled system maintenance. Such advanced features as Cluster Single Point of Control and Dynamic Reconfiguration allow the automatic addition of users, files, hardware and security functions without stopping mission-critical jobs.

HACMP clusters can be configured to meet complex and varied application availability and recovery needs. Configurations can include mutual takeover or idle standby recovery processes. With an HACMP mutual takeover configuration, applications and their workloads are assigned to specific servers, thus maximizing application throughput and leveraging investments in hardware and software. In an idle standby configuration, an extra node is added to the cluster to back up any of the other nodes in the cluster.

Benefits of HACMP

HACMP takes advantage of AIX®—the high-performance UNIX operating system from IBM—widely recognized as state of the art in systems

and network management. The latest release—AIX 5L™ Version 5.1, one of the world's most open UNIX operating system—adds new functionality to further improve security and system availability. This includes improved availability of mirrored data and enhancements to Workload Manager that help solve problems of mixed workloads by dynamically providing resource availability to critical applications. Used with the IBM @server pSeries, HACMP can provide both horizontal and vertical scalability without downtime.

High availability cluster enhancements

HACMP Version 4.5.0 requires AIX 5L Version 5.1 and additional hardware support for Cluster 1600, pSeries and RS/6000 customers with mission-critical applications. New functions include:

- *Reduced failover time*
- *Support for multiple applications on each network adapter*
- *Streamlined configuration with automated discovery*
- *New application availability analysis tool*
- *Improved security for cluster administration*
- *Monitoring and recovery from loss of volume group quorum*
- *Enhanced WAN and X.25 support*
- *Persistent IP address support for applications such as Tivoli®*

Feature	Benefits
Horizontal scalability	<ul style="list-style-type: none"> • Boosts overall performance and capacity by sharing disk resources of clustered systems, thereby spreading applications across pSeries and RS/6000 servers • Provides scalable growth with reduced investment and increased system availability • Enables mix of multiprocessor nodes for application performance and disk sharing
Support for multiple availability configurations	<ul style="list-style-type: none"> • Allows tailoring for a flexible solution that can change with your business • Allows growth for availability in either standby or mutual takeover modes in 2- to 32-node clusters
Breadth of platform support	<ul style="list-style-type: none"> • Runs across the IBM @server pSeries and RS/6000 product lines • Supports the IBM @server Cluster 1600 offerings
Reliable scalable cluster technology	<ul style="list-style-type: none"> • Detects and reacts to hundreds of system events to protect the software infrastructure • Provides unrivaled levels of availability using standard components • Allows determination of the best node to take over after a failure • Further enhances availability through application monitoring and user-defined events • Allows applications to better integrate with HACMP
Support for cluster management SMIT facilities	<ul style="list-style-type: none"> • Provides common interfaces to install and configure highly available cluster systems as well as maintain them on the network • Provides comprehensive, highly available monitoring utilities to manage and tune clusters • Enables visualization of relationships between cluster hardware and software resources • Allows management of clusters within an enterprise environment
Compatibility with previous HACMP versions	<ul style="list-style-type: none"> • Reuses configurations to take advantage of current customer failover control scenarios to provide node-at-a-time upgrades • Makes transition easier, removing the necessity to reinstall or reconfigure clusters when upgrading

Complementary cluster software

IBM also offers a broad range of additional tools to aid in efficiently building, managing and expanding high availability clusters in AIX environments.

These include:

- *General Parallel File System (GPFS) for AIX, a cluster-wide file system that allows users shared access to files that span multiple disk drives and multiple nodes*

- *Workload Manager for AIX, which provides resource balancing between applications*
- *High Availability Geographic Cluster (HAGEO) for AIX to provide disaster recovery*

Business continuity

Two additional IBM high availability products provide disaster recovery protection for remote cluster nodes. Geographic Remote Mirror (GeoRM)

provides remote data mirroring to back up as many as seven regional locations to a single centralized server or between two geographically separate servers. For even higher application and data resilience, High Availability Geographic (HAGEO) Cluster supports up to eight IBM UNIX servers and provides the same functionality as GeoRM, plus automated failover, recovery and reintegration between geographically separate locations.

The High Availability Cluster Implementation for RS/6000 (a services offering from IBM Global Services) is focused on a specific pSeries or RS/6000 HACMP cluster implementation. This offering helps a customer plan, establish, tune, maintain, upgrade and reconfigure the HACMP cluster environment for that particular group of pSeries and RS/6000 systems.

New generation of e-business servers

HACMP runs on IBM **@server** pSeries, the server platform of choice for UNIX-based e-business applications. pSeries is a high-performance line of servers with the availability, scalability and range of performance demanded by today's growing e-businesses. It combines the benefits of high-performance copper chip and RISC technology with AIX for reliable handling of mission-critical core applications.

pSeries is part of the IBM **@server** product line, a new generation of servers featuring innovative technology, logical partitioning, outstanding scalability and availability, broad support of open standards for application flexibility, and a full range of new tools to manage e-business.

Gaining the IBM advantage

The IBM **@server** product line is backed by a comprehensive suite of offerings and resources that provide value at every stage of IT implementation. This includes "Availability Advantage" which takes a broad view of high availability needs from a customer's day-to-day business perspective by examining business processes, existing IT resources used to support them, and the impact of having those resources restricted or unavailable.

Based on an assessment of a complete system environment, IBM availability experts can design a custom solution to meet the target availability level for a company's business. The solution can include emergency recovery facilities throughout the world, world-class hardware and software testing laboratories, and support for both IBM and other leading vendors' hardware and software. All this is backed by the unmatched technical expertise, experience and resources of IBM.

For more information

To learn more about HACMP for AIX on IBM **@server** pSeries servers, contact your IBM marketing representative or IBM Business Partner or visit the following Web sites:

ibm.com/servers/eserver/pseries

ibm.com/servers/eserver/pseries/solutions/ha

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