



# PowerHA SystemMirror for i 7.1

[finnes@us.ibm.com](mailto:finnes@us.ibm.com)



# Power your Planet



**Workload-Optimizing Systems**



**AIX - The Future of UNIX**

**Total Integration with i**

**Scalable Linux ready for x86 Consolidation**



**Virtualization without Limits**

- ✓ Drive over 90% utilization
- ✓ Dynamically scale per demand



**Dynamic Energy Optimization**

- ✓ 70-90% energy cost reduction
- ✓ EnergyScale™ technologies



**Resiliency without Downtime**

- ✓ Roadmap to continuous availability
- ✓ High availability systems & scaling



**Management with Automation**

- ✓ VMControl to manage virtualization
- ✓ Automation to reduce task time

## Systems for a Smarter Planet

# PowerHA SystemMirror

## Power Systems High Availability Solution

For mission critical application availability through planned and unplanned outage events

**Editions Targeted at** data center or multi-site deployments

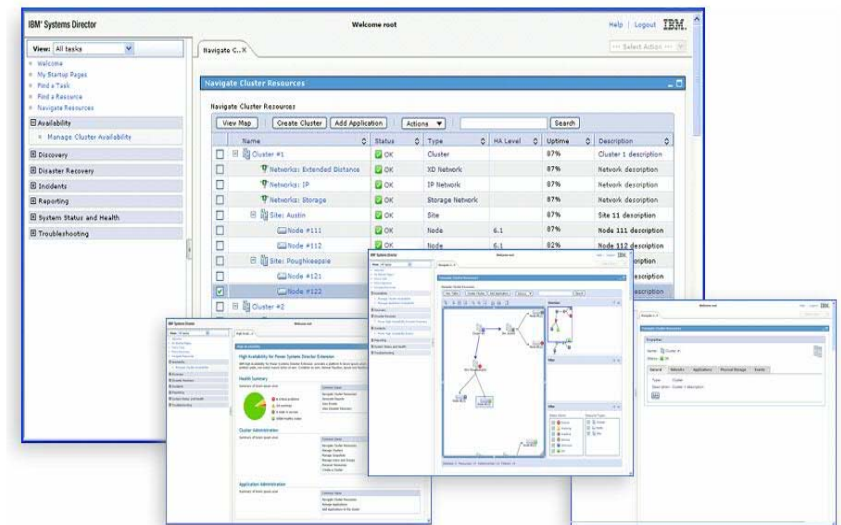
**Shared Storage Clustering Technology** Designed for automation and minimal IT operations.



# Power HA SystemMirror Strategy

## Simplification-Usability-Reliability

- **Deep Integration**
  - Cluster Aware OS
  - Kernel based event processing
  - Centralize cluster topology management
  - Cluster wide security
  
- **Ease of deployment & ease of use**
  - Systems Director based management
  - Discovery based deployment
  - Exploit virtualization
  
- **Multi-Site & Disaster Recovery**
  - Differentiate with IBM storage
  
- **Solution Package Standardization**
  - Differentiate via offering simplicity
  - Standard Edition, Enterprise Editions



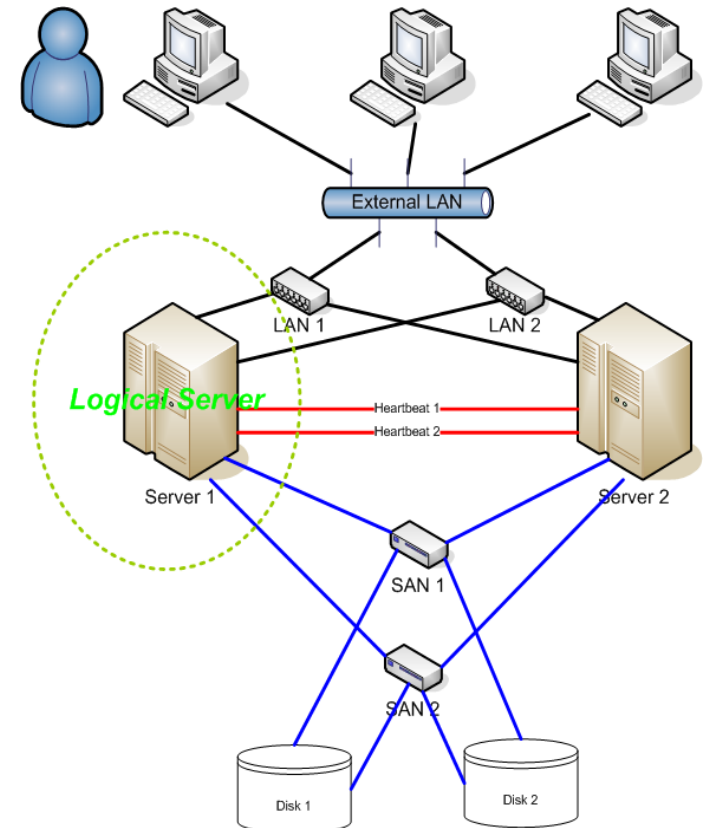
# PowerHA SystemMirror



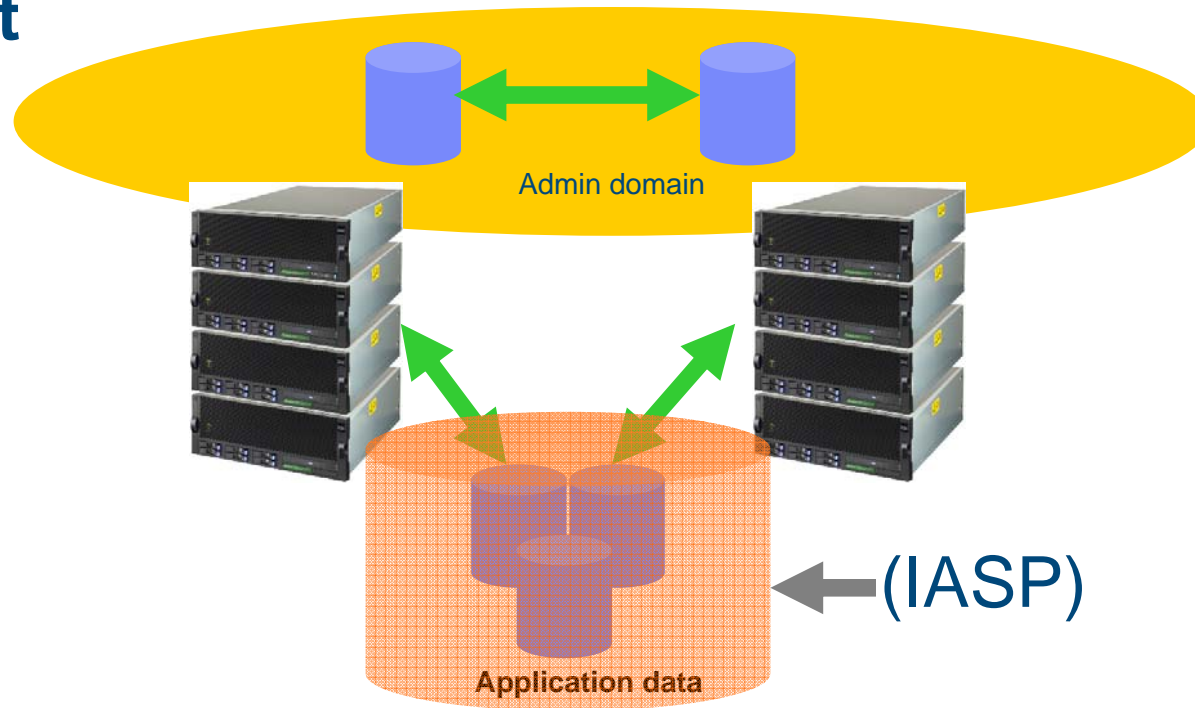
- Complete IBM Power Systems integrated end to end solutions for HA DR
  - Focus: 24x 7 Application availability through planned or unplanned outage events
  - Deeply integrated extension of AIX and IBM i (implemented in SLIC and the OS)
  
- Clustering technology
  - Clustering provides the applications a complete resiliency infrastructure
  - Cluster monitors and manages primary and secondary resources for HADR operations
  
- Storage based data resiliency
  - Data resiliency is an extension of the host system storage management architecture
  - Storage volumes are either switchable or mirrored between nodes in the cluster
  - Hardware based replication services for Multi-Site Operations
    - Host Based Replication (geomirror for IBM i, or GLVM for AIX)
    - Storage Base Replication (Metro Mirror or Global Mirror)
  
- Overall solution characteristic
  - Automation, minimal IT operations involvement
  - Data between primary and secondary nodes always in sync always ready for a failover event

# Modern HA Solutions Are Based on Clustering

- Clustering is default deployment for HA/DR in the mainframe and Unix marketplace
- Provides complete redundancy
- Provides for automated failover
- Planned and unplanned outage management

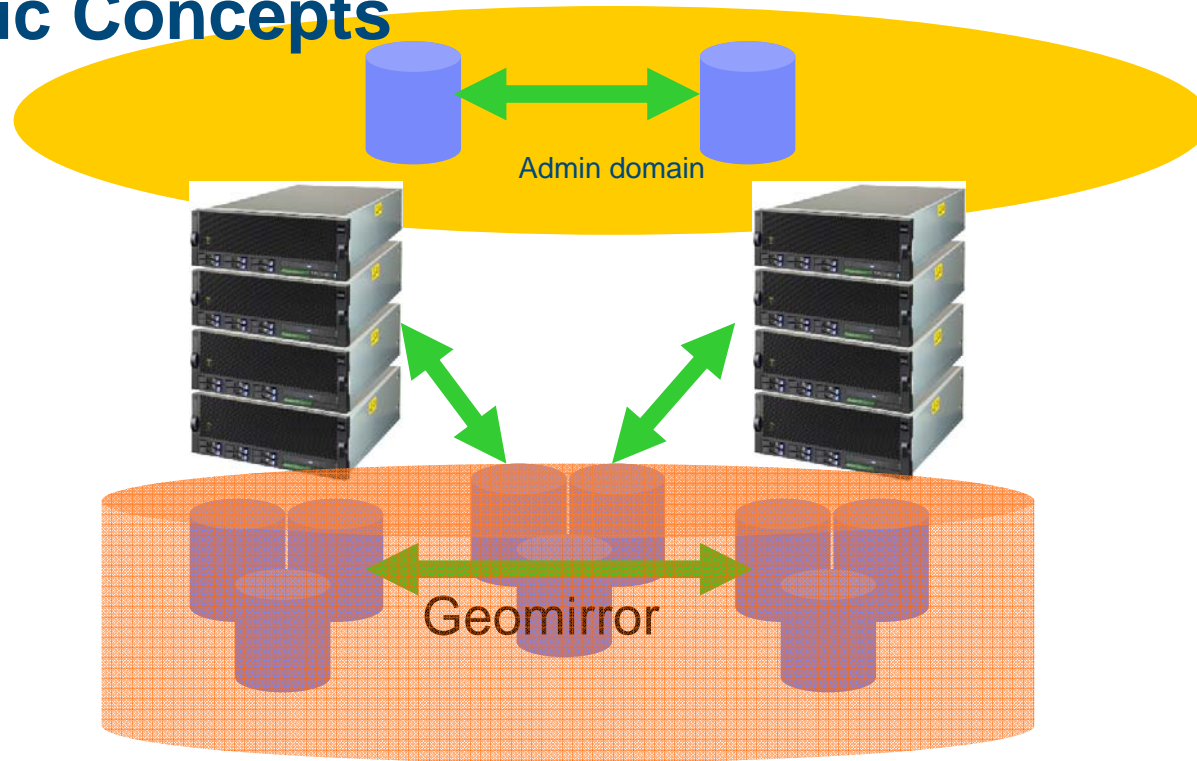


# Basic Concept



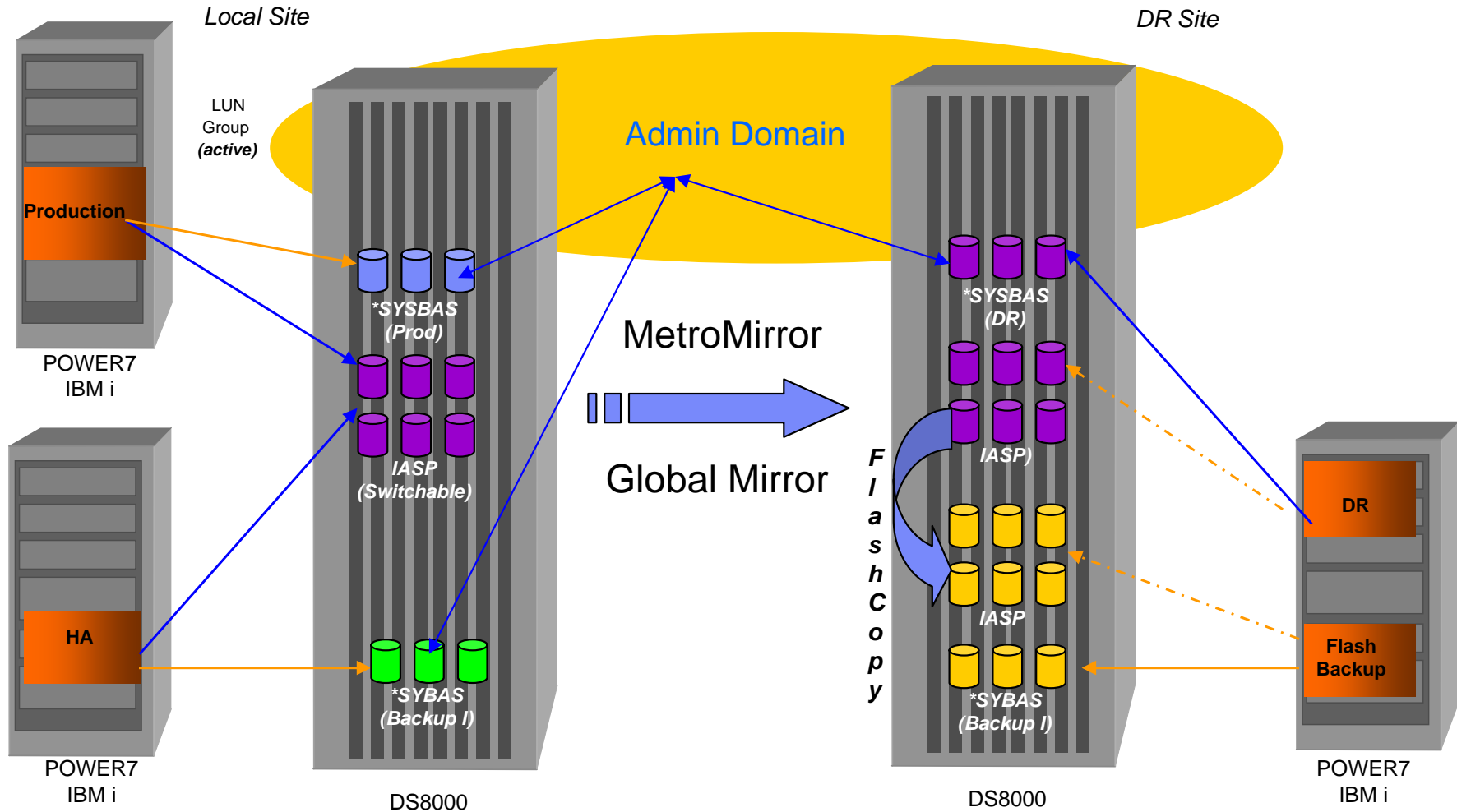
- The underlying data resiliency is *not* based on replication it is based on a pool of disk which is shared and switchable between nodes in the cluster
- PowerHA SystemMirror enables the cluster nodes to behave as resource for the applications in the event of an outage
- Admin Domain takes care of the sysbas data...(fyi...no you do not use a software replication product to replicate the Admin Domain data)

# PowerHA Basic Concepts



- Internal disk is not switchable (LUNs required), you use geomirror with internal disk configurations (or for that matter any disk configurations)
- Geomirror for configs with IASPs under 2 Tbytes

# PowerHA Advanced Concepts – With IBM DS8XX



# Client Need: High Availability – Data Center

- Requirements
  - Near continuous application service
  - Recovery Time Objective (RTO) measured in minutes
  - Recovery Point Objective (RPO) is Zero (no data loss)
  - Eliminate affects of planned outages
  
- Solution Strategy:
  - PowerHA SystemMirror **Standard Edition**



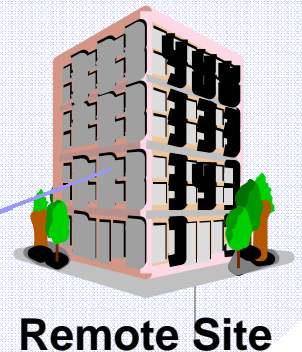
“A text message is sent out to the IT team every Saturday morning when the switch is made, and a second text is sent in the afternoon once it switches back to our primary system. CATCO has a hands-off method of regularly testing availability using PowerHA for IBM i, and that’s invaluable.”

Simplifies server maintenance enabling Svenska Handelsbanken to switch between production and backup systems in 14 minutes. Provides ease of administration without requiring downtime from the bank’s production server.



# Today's Client Need: Unified HA/DR Solution

- Requirements
  - HA/DR clustering for data center & multi-site operations
  - Automated role-swap operations
  - Readily demonstrate remote recoverability compliance
- Solution Strategy:
  - **unified clustering solution** for data center & multi-site resiliency
  - PowerHA SystemMirror **Enterprise Edition**



SK Energy is South Korea's leading oil producer. To improve system resilience and introduce a disaster recovery plan, IBM recommended and implemented a twin data center approach. The Power Systems servers are configured as a cluster using IBM PowerHA, which provides high availability and rapid failover.

# PowerHA SystemMirror Editions

## PowerHA SystemMirror Standard Edition

- **Cluster management for the data center**
  - Monitors, detects and reacts to events
  - Establishes a heartbeat between the systems
  - Enables automatic switch-over
  
- **IBM shared storage clustering**
  - Can enable near-continuous application service
  - Minimize impact of planned & unplanned outages
  - Ease of use for HA operations



## PowerHA SystemMirror Enterprise Edition

- **Cluster management for the Enterprise**
  - Multi-site cluster management
  - Includes the Standard Edition function



# PowerHA SystemMirror 7.1 for i Offering

PowerHA SystemMirror for i		Standard Edition	Enterprise Edition
Offering Focus		Data Center HA (per core)	Multi Site HA/DR (per core)
Small Tier <b>Blade &amp; Entry Power</b>	Scale	\$2,500	\$3,250
Medium Tier <b>Mid-range Power</b>		\$3,500	\$5,000
Large Tier <b>Enterprise Servers</b>		\$4,500	\$6,500

US list prices, prices vary by geo, GA April 23 2010

- Standard Edition PID 5770-HAS
- Enterprise Edition is a *feature* of 5770-HAS and is the multi site solution
- No charge upgrades from PowerHA 6.1 to 7.1 Standard Edition or Enterprise Edition
- **HASR (opt 41) is included with purchase of PowerHA SystemMirror 7.1**
- Sub capacity pricing, license only the cores in the partitions covered by PowerHA



# PowerHA SystemMirror for AIX Editions

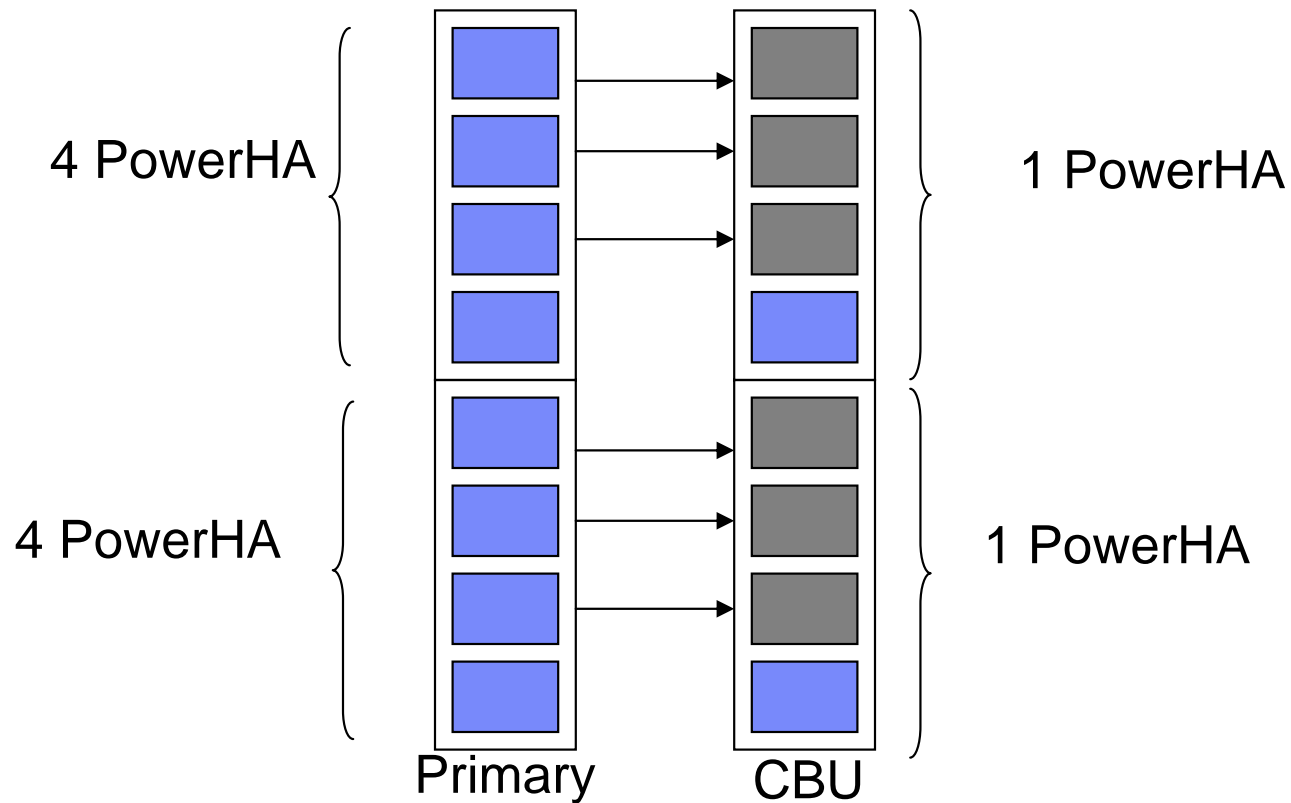
PowerHA SystemMirror for AIX		Standard Edition	Enterprise Edition
Offering Focus		Data Center HA (per core)	Multi Site HA/DR (per core)
Small Tier <b>Blade &amp; Entry Power</b>	Scale	\$2,500	\$3,250
Medium Tier <b>Mid-range Power</b>		\$3,500	\$5,000
Large Tier <b>Enterprise Servers</b>		\$4,500	\$6,500

US list prices for example only, prices vary by geo

- Standard Edition data center solution
  - PID 5765 H23 (V6.1)
  - PID 5765 H39 (V7.1)
- Enterprise Edition multi-site solution
  - PID 5765 H24 (V6.1)
- Sub capacity pricing, license only the cores in the partitions covered by PowerHA



# A PowerHA For IBM I Configuration with Multiple LPARS



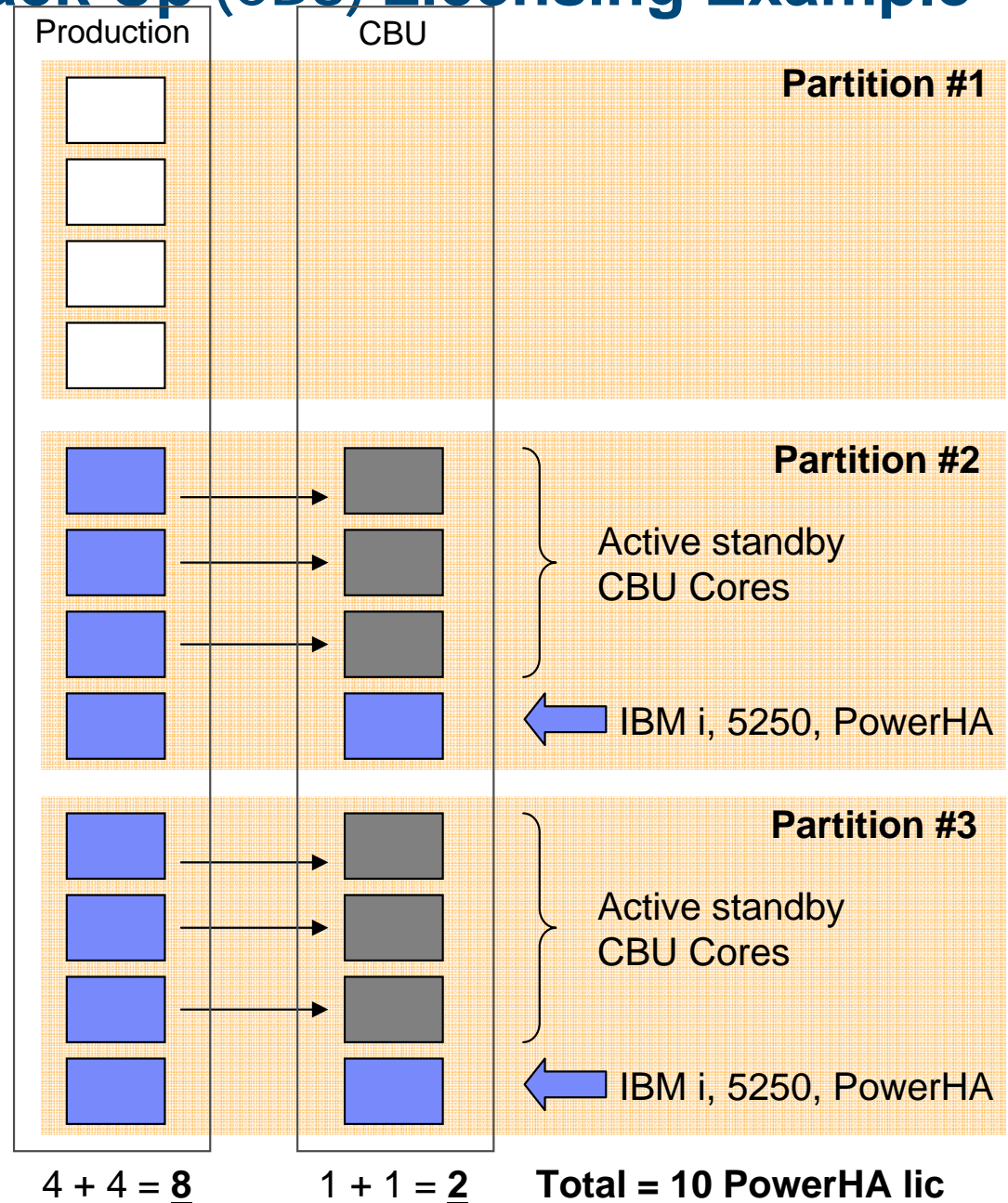
# PowerHA IBM i Capacity Back Up (CBU) Licensing Example

## Planning

- CBU allows PowerHA licenses fail-over to a target CBU
  - Only 1 licenses is required on each CBU target partition
  - Requires CBU server for target licensing fail-over
- Round up when using partial processors (core)
  - 3.5 processors = 4

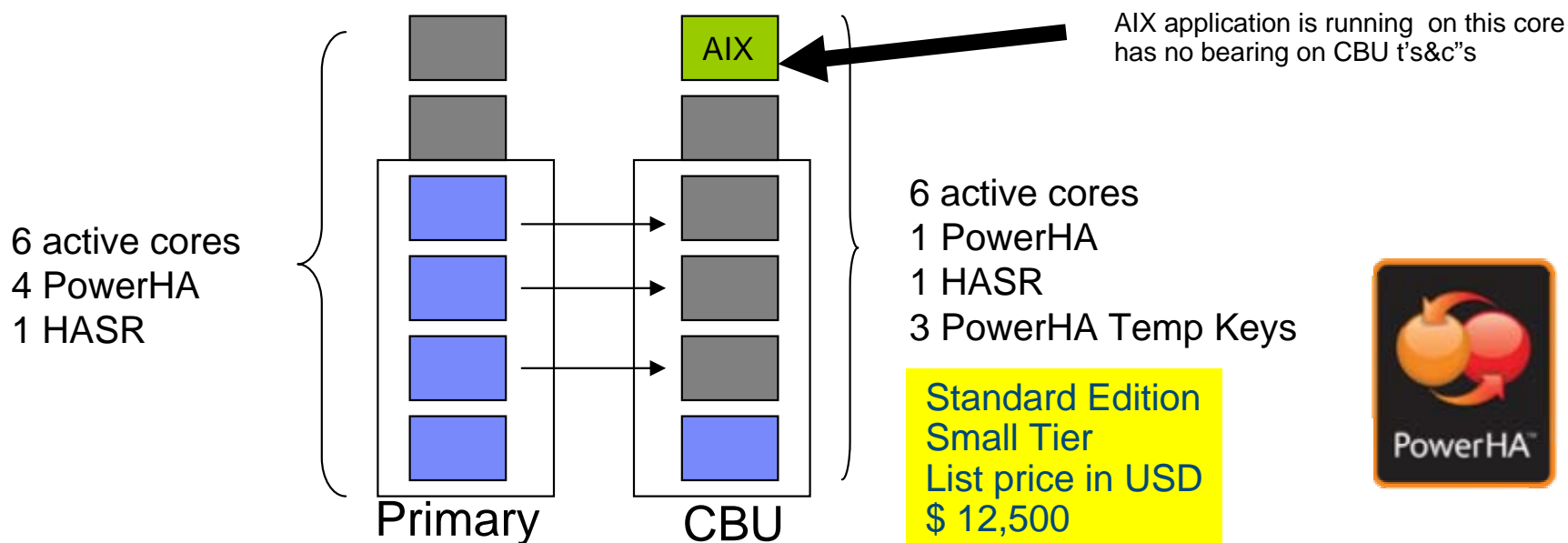
## PowerHA Licensing Example

- No HA/DR required for Partition 1
  - No PowerHA licenses
- HA required for Partition 2 and 3
  - All processors in the production server partitions 2 and 3 are licensed for PowerHA
  - A single processor is licensed for Partition 2 and 3 on the target CBU server



# PowerHA in a CBU Configuration

- IBM's server offering for i clients is the CBU for i:
  - One HASR “opt 41” required per system (no charge with the purchase PowerHA SystemMirror 7.1)
  - License only the cores in the partition's, being used for HA/DR support
  - Only one PowerHA LPP on each corresponding HA partition on your CBU box
  - Get PowerHA temp keys for the other standby cores in the HA partition(s) on your CBU box



**Resiliency without Downtime**

# Advanced Copy Services for PowerHA on i

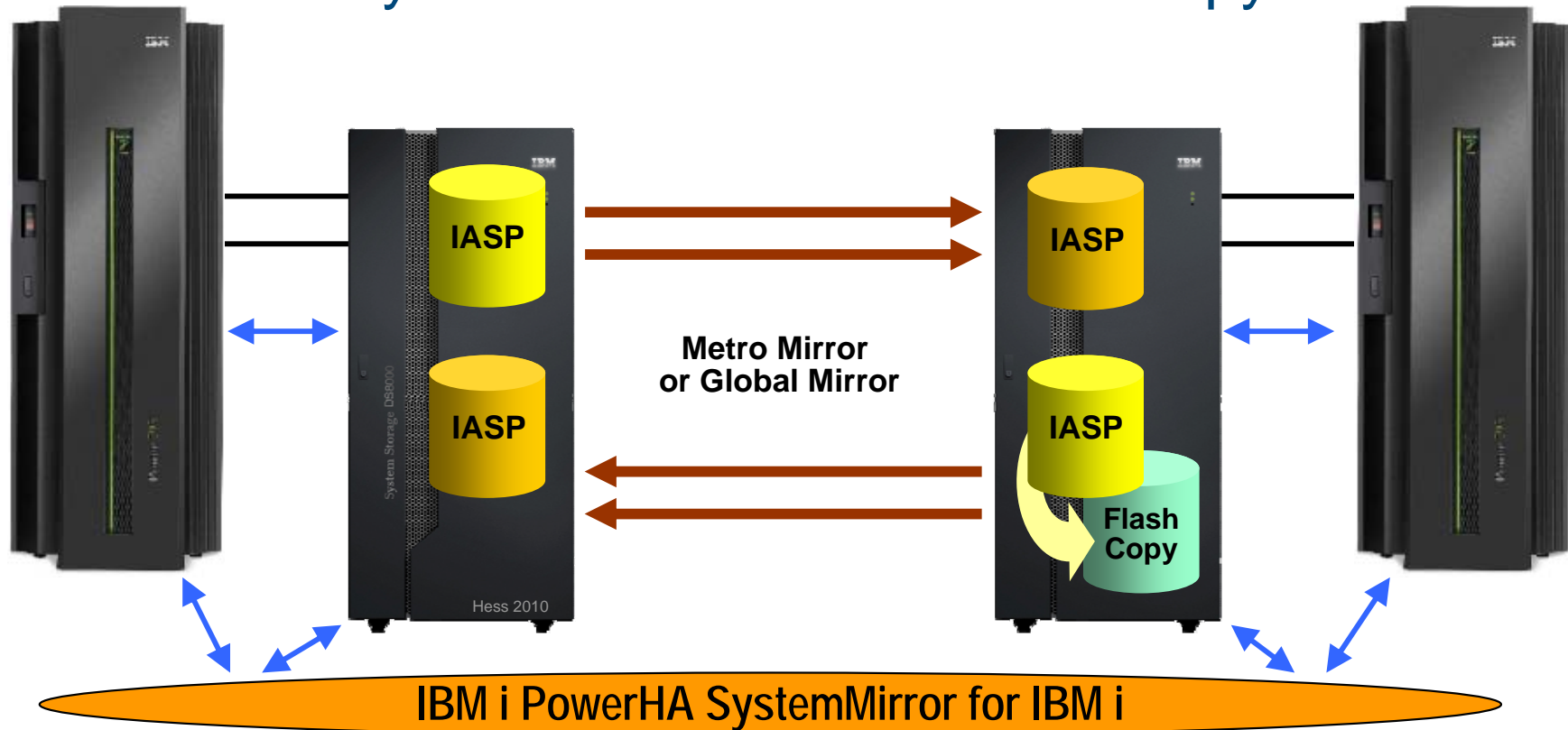
- Compliments PowerHA on i
- IBM Lab Services Expertise
- Integration, Automation & Training
- IBM i & DS8000, DS6000 Edition\*
- New: DS5000 Edition\*
- Customized HA/DR configurations
- Simple one line command operations

Advanced Copy Services for PowerHA on i	PowerHA	Advanced Copy Serv
Support for internal disk	✓	
Host based mirroring	✓	
Menu interface to manage DS environments		✓
Space efficient flash copy	✓	✓
One Command Planned switch over	✓	✓
Automated failover (HMC Quorum device)	7.1	7.1
Customized one step fail-over		✓
LUN level switching	7.1	✓
Global Mirror for DR	✓	✓
Metro Mirror for HA/DR	✓	✓
Mutli-site Metro & Global Mirror		✓



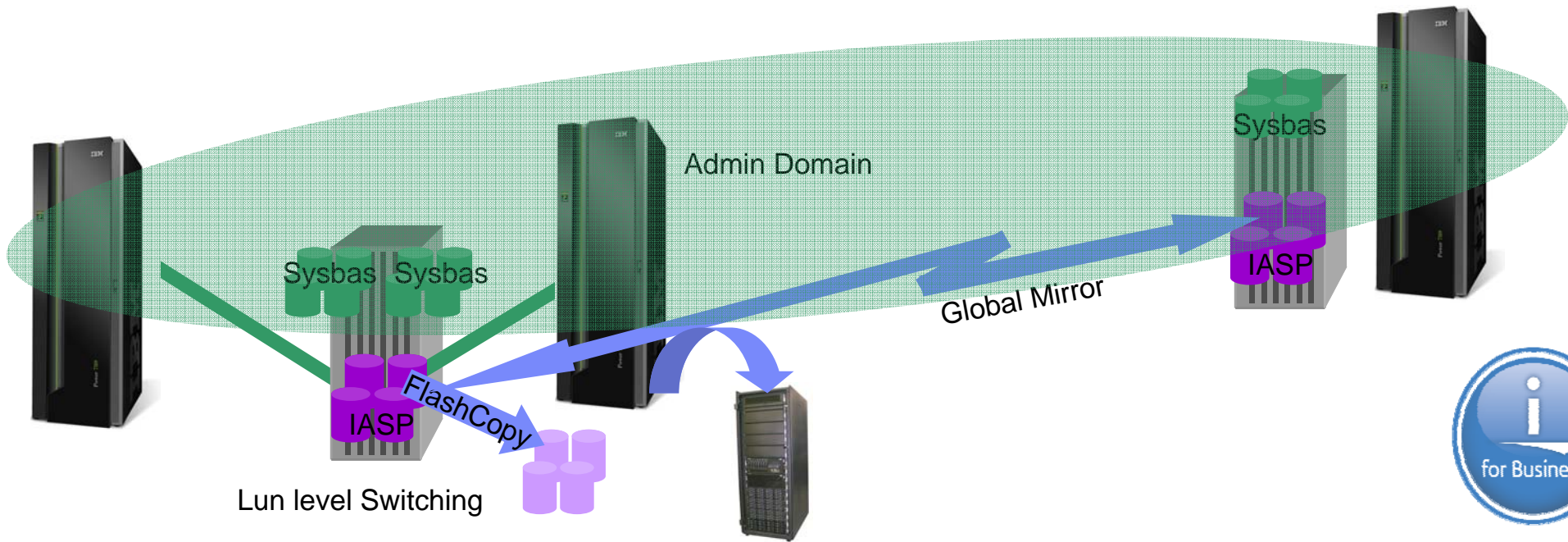
\* Note that Advanced Copy Services solution characteristics vary by DSxxxx Edition

# IBM i PowerHA SystemMirror Plus DS8000 Copy Services



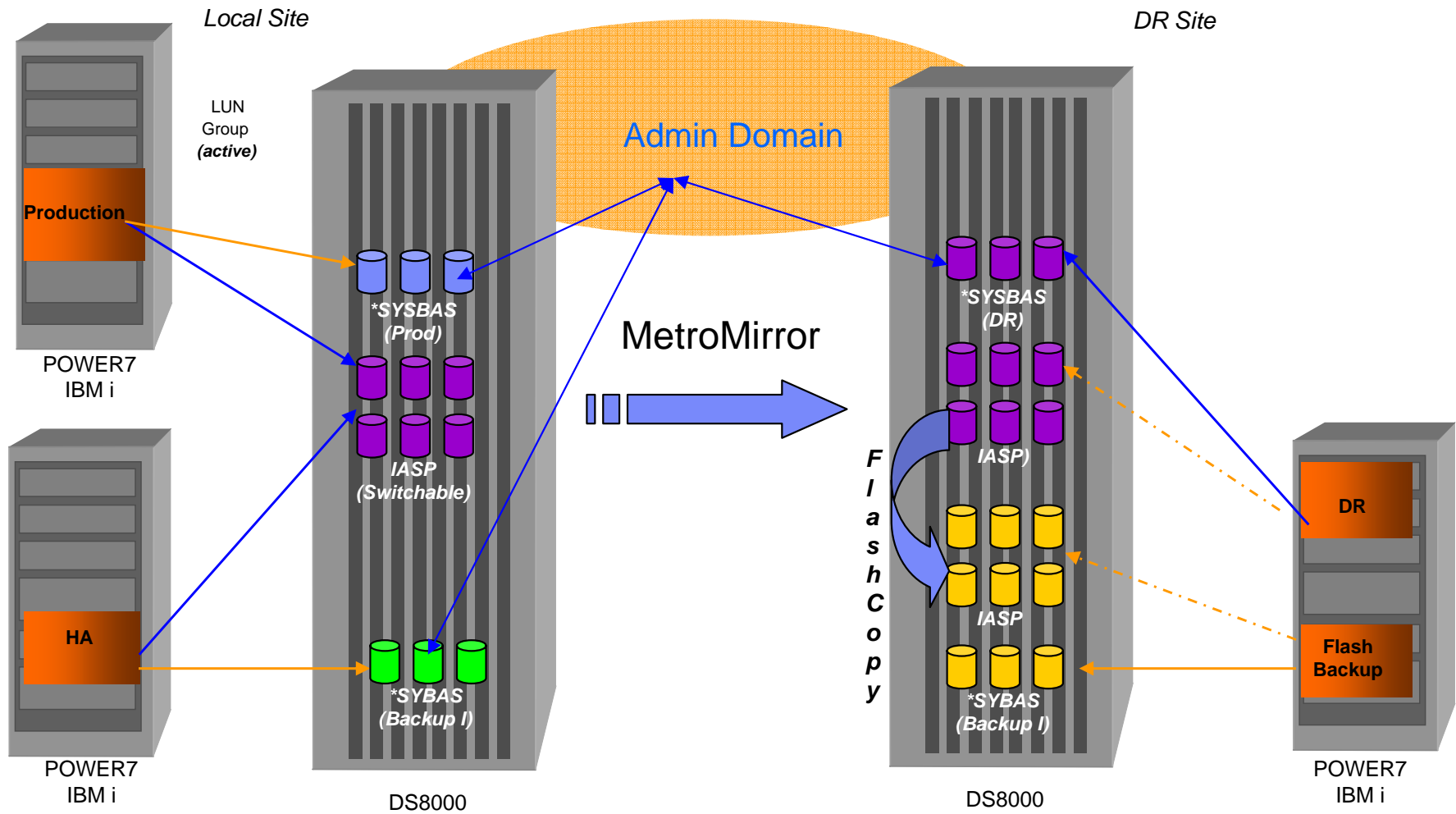
- **Global Mirror for long distance replication (asynch mode)**
  - Capable of spanning between continents
- **Metro Mirror for shorter distance replication (synch mode)**
  - Campus-city distances
- **FlashCopy for minimal disruption, off-line backups**
- **PowerHA SystemMirror for IBM i**
  - PowerHA integration with DS8000 manages replication and role swaps

# IBM Systems Storage™ & PowerHA SystemMirror With The Advanced Copy Services for PowerHA on i

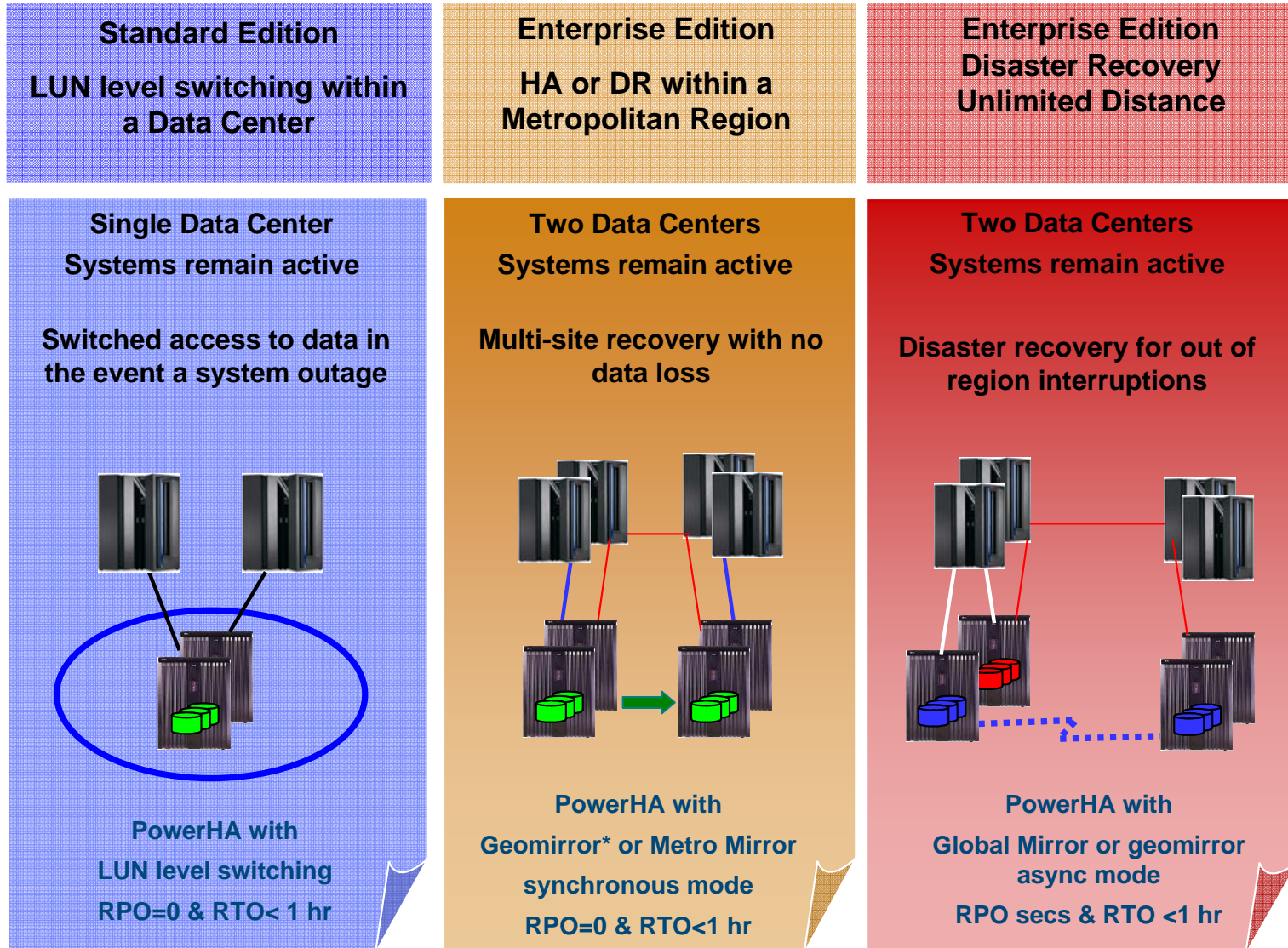


- Integrated DS8000/D6000 and PowerHA SystemMirror cluster
- Single point of control for both storage and HA/DR operations
- Space efficient FlashCopy
- Reliable on demand role swap operations





# PowerHA SystemMirror IBM i Data Resiliency Mirroring



# Smarter computing for Estes Express meant implementing a new resiliency strategy to end production interruptions

- EDPS needed to eliminate nightly backup window and satisfy business requirement for daily point-in-time backups
- Implemented Power servers and DS8000 with PowerHA, Flashcopy and Global Mirror replication
- Eliminated production interruptions and save window, with lights out operation and point-in-time data snapshot

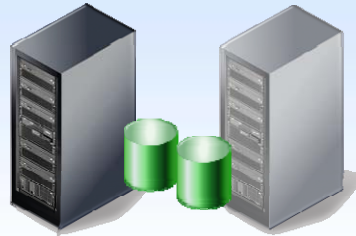
*“We now deliver the highest quality service to the business with zero production interruptions, no save window, and lights out operations.”*

Dick Cosby  
Systems Administration Director  
EDPS



# IBM PowerHA for IBM i

## Standard Edition



- Switched Disk (SAN)
- Geographic Mirroring

## Enterprise Edition

### Geographic Mirroring Cluster



- Host based replication
- "Internal disk"
- Sync mode
- Async mode

### Metro Mirror/Global Mirror Cluster



- DS8K
- Metro Mirror
- Global Mirror
- FlashCopy

- Complete end to end HA/DR solution
- Storage based replication services
- Automated operations

PowerHA SystemMirror		Standard Edition	Enterprise Edition
Offering Focus		Data Center HA (per core)	Multi Site HA/DR (per core)
Small Tier Blade & Entry Power	Scale	\$2,500	\$3,250
Medium Tier Mid-range Power		\$3,500	\$5,000
Large Tier Enterprise Servers		\$4,500	\$6,500





# IBM i Native Attach Storage and Resiliency

*Storage is a key part of your HA/DR solution decision*

	<b>Internal SAS/SSD (1)</b>	<b>DS5000</b>	<b>DS6000</b>	<b>DS8000</b>	<b>EMC (2)</b>
	POWER5/6/7	POWER6/7	POWER5/6/7	POWER5/6/7	POWER5/6/7

**PowerHA SystemMirror 6.1 or 7.1**

<b>FlashCopy</b>	No	No	<b>Yes</b>	<b>Yes</b>	No (Timefinder)
<b>Metro Mirror</b>	No	No	<b>Yes</b>	<b>Yes</b>	No (SRDF)
<b>Global Mirror</b>	No	No	<b>Yes</b>	<b>Yes</b>	No (SRDF)
<b>Switched IASP</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	No
<b>LUN Level Switching</b>	No	No	<b>Yes (7.1)</b>	<b>Yes (7.1)</b>	No
<b>Geographic Mirroring</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

**PowerHA SystemMirror 6.1 or 7.1 plus Advanced Copy Services (ACS)**

<b>FlashCopy</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	No (Timefinder)
<b>Metro Mirror</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	No (SRDF)
<b>Global Mirror</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	No (SRDF)
<b>LUN Level Switching</b>	No	No	<b>Yes (6.1)</b>	<b>Yes (6.1)</b>	No
<b>Metro/Global Mirror</b>	No	No	<b>Yes</b>	<b>Yes</b>	No

**External Storage Full System Copy (crash consistent copy and cloning)**

<b>FlashCopy</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b> (Timefinder)
<b>Global Mirror</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b> (SRDF)
<b>Metro Mirror</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b> (SRDF)

**Logical Replication Add-on Software**

<b>iCluster and others</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
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(1) SSD requires POWER6 or POWER7. (2) DMX, VMAX

Note. Native attach means the partition contains a SCSI, SAS or Fiber Channel card used to connect to the storage



# IBM i PowerVM VIOS Storage and Resiliency

	<b>DS3000</b>	<b>DS4000</b>	<b>DS5000</b>	<b>DS6000</b>	<b>DS8000</b>	<b>XIV</b>	<b>SVC / Storwize V7000</b>
	BladeCenter	POWER6/7 BladeCenter	POWER6/7 BladeCenter	POWER6/7 BladeCenter	POWER6/7 BladeCenter	POWER6/7 BladeCenter	POWER6/7 BladeCenter

**PowerHA SystemMirror 6.1 or 7.1**

<b>FlashCopy</b>	No	No	No	No	<b>Yes*</b>	No	No
<b>Metro Mirror</b>	No	No	No	No	<b>Yes*</b>	No	No
<b>Global Mirror</b>	No	No	No	No	<b>Yes*</b>	No	No
<b>Switched IASP</b>	No	No	No	No	No	No	No
<b>LUN Level Switch</b>	No	No	No	No	<b>Yes*</b>	No	No
<b>Geo'mirroring</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

**PowerHA SystemMirror 6.1 or 7.1 plus Advanced Copy Services (ACS)**

<b>FlashCopy</b>	No	No	No	No	<b>Yes*</b>	No	No
<b>Metro Mirror</b>	No	No	No	No	<b>Yes*</b>	No	No
<b>Global Mirror</b>	No	No	No	No	<b>Yes*</b>	No	No
<b>LUN Level Switch</b>	No	No	No	No	<b>Yes*</b>	No	No

**External Storage Full System Copy (crash consistent copy and cloning) \*\***

<b>FlashCopy</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Metro Mirror</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Global Mirror</b>	No	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

**Logical Replication Add-on Software**

<b>iCluster, et al</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
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# Svenska Handelsbanken

## Business challenge:

To maintain competitiveness, Svenska Handelsbanken needed to replicate its mission-critical banking applications to a second server so that it would not lose data in the event of a disaster. The bank wanted to automate replication tasks and have the ability to switch between the production and backup platforms in under an hour. Not only did the backup and production environments have to be in synch, the solution couldn't use too many CPU resources.

## Solution:

The bank deployed two IBM Power 570 servers, running the IBM i 5.4 operating system, for production and backup. Using IBM PowerVM™ Standard Edition software, the client divided the systems into independent auxiliary storage pools (IASPs), mirrored in real time using the IBM Copy Services for System i® solution and IBM System Storage™ Metro Mirror software. The Power 570 servers connect to an IBM System Storage DS8100 disk system via IBM SAN Switches.

## Benefits:

- Creates a continuously available infrastructure for mission-critical banking applications
- Allows plenty of time to perform monthly server maintenance by switching from the production server to the backup server in 14 minutes
- Provides ease of administration and does not require the production server to be brought offline

*“Using the IBM solution, we’ve been able to create a continuously available infrastructure for mission critical credit card and internet banking applications. Our customers can now make payments or withdraw cash from ATMs 24x7.”*

— Svenska Handelsbanken

## Solution components:

- IBM Power 570
- IBM PowerVM Standard Edition
- IBM SAN Switches
- IBM System Storage DS8100
- IBM Copy Services for System i
- **IBM PowerHA™ for i**

# CATCO Parts and Service

## Delivering highly available business intelligence

### Business challenge:

CATCO Parts and Service needed to provide reliable uptime for business-critical sales tools and inventory systems to help support its loyal customer base.

### Solution:

Implement high availability with IBM® PowerHA™ for IBM i geographic clustering and mirroring to enable easy switching via IP between independent auxiliary storage pools on a primary IBM Power™ 520 system and a secondary Power system

### Benefits:

- Provides for 100 percent system uptime, which helps avoid estimated losses of US\$20,000 per hour of downtime; automated weekend switchover regularly tests availability to help ensure business remains protected
- Synchronous mirroring allows the business to resume on secondary systems only 20 minutes after an unplanned outage
- Easy-to-use, hardware-based solution requires maintenance of only 10 minutes per week and no additional headcount

*“With PowerHA for IBM i, we have the flexibility to assess the nature of the outage and the ability to protect productivity by quickly resuming service.”*

— David Gerdes, Chief Operating Officer, CATCO Parts and Service

### Solution components:

- IBM® Power™ 520
- IBM PowerHA™ for IBM i V6R1



# Ostnor

## IBM solutions yield improved performance and high availability

### Business challenge:

Ostnor is the leading manufacturer of faucets, fittings, and accessories in the Nordic countries. The company needed to redesign their IT infrastructure to improve server performance and to consolidate their Lawson Movex workload. They turned to IBM and IBM Premier Business Partner Atea Sverige AB for a high availability solution.

### Solution:

Ostnor replaced their IBM® System i® 810 server and IBM i 5.4 operating system with an IBM Power™ 520 Express server and IBM i 6.1. To provide high availability, they deployed the former production system, the i810, as backup server and enabled geographic mirroring between the two servers with IBM PowerHA™ for i.

### Benefits:

- Manages risk by providing improved security and high availability while reducing IT costs and power usage
- Provides powerful server performance with built-in POWER6® processors
- Provides the right environment to support business process efficiency

*“The new IBM Power servers and upgraded IT environment give us the power, high availability, security and reliability we need while helping us reduce costs”*

*— Kerstin Resar-Hinders, IT manager, Ostnor*

### Solution components:

- IBM® Power™ 520 Express
- IBM i 6.1
- IBM PowerHA™ for i

# Summary

- PowerHA SystemMirror Offering
  - Follow-on release to PowerHA 6.1 for IBM i
  - Standardized offering structure and pricing for AIX and i customers
    - Standard Edition for the Data Center
    - Enterprise Edition for Multi-Site
    - Small, Medium, Large tiers
  
- Enhanced Capabilities
  - Geographic Mirror async mode
  - LUN level switching and space efficient flash copy
  - Architectural enhancements for ease of use
  
- Advanced Copy Services for PowerHA
  - Lab Services offering for IBM storage server based PowerHA deployments
  - Now builds on PowerHA base offering
  - DS8000 plus an option for the DS5000 Edition

# Additional Resources PowerHA for IBM i

- PowerHA Website
  - [www.ibm.com/systems/power/software/availability/](http://www.ibm.com/systems/power/software/availability/)
- **PowerHA Options for IBM i - Introduction (incl. 7.1)**
  - <http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4021>
- **PowerHA and DS8000 Storage Integration on IBM i**
  - <http://www-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS4361>
- Lab Services
  - <http://www-03.ibm.com/systems/services/labservices>
- Redbooks at [www.redbooks.ibm.com](http://www.redbooks.ibm.com)
  - Implementing PowerHA for IBM i - SG24-7405-00 (Nov 2008)
  - Clustering and IASPs for Higher Availability - SG24-5194-01
  - Independent ASPs: A Guide to Moving Applications to IASPs - SG24-6802-00
  - Independent ASP Performance Study on the IBM iSeries - REDP-3771-00
  - Implementing SAP Applications on the IBM System i with IBM i5/OS - SG24-7166-00
- IBM System Storage Solutions for IBM i
  - Course code: AS930
  - Duration: 4.0 days
  - [www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=course\\_description&courseCode=AS930](http://www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=course_description&courseCode=AS930)
- Is your ISV solution registered as ready for PowerHA ?
  - <http://www-304.ibm.com/isv/tech/validation/power/index.html>
- High Availability Clusters (Power HA) and Independent Disk Pools for IBM i
  - Course code: AS541
  - Duration: 4.0 days
  - [www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=course\\_description&courseCode=AS541](http://www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=course_description&courseCode=AS541)
- IBM System Storage Solutions for IBM i for Storage Professionals
  - Course code: SS071
  - Duration: 2.0 days
  - [www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=course\\_description&courseCode=SS071](http://www-304.ibm.com/jct03001c/services/learning/ites.wss/us/en?pageType=course_description&courseCode=SS071)

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