

High Availability PowerHA System Mirror for IBM i

IBM Power Systems

This is Power on a Smarter Planet

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CTS - Advanced Technical Skills

*#powersystems, #powerlinux, #bigdata,
#IBMWatson, #OpenPOWER*



PowerHA SystemMirror



Power Systems High Availability Solution For mission critical application availability through planned and unplanned outage events

Shared Storage Clustering Technology designed for automation and minimal IT operations.

Multi-Site Clustering for enterprise class availability

Embedded for integrated simplicity and reliability



PowerHA SystemMirror



- **Complete IBM Power Systems integrated end to end solutions for HA DR**

- Focus: 24 x 7 Application availability through planned or unplanned outage events
- Deeply integrated extension of IBM i (implemented in LIC and the OS)



- **Clustering technology**

- Provides the applications with a complete resiliency infrastructure
- Monitors and manages primary and secondary resources for HA and DR 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 (Geographic mirroring 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

PowerHA Business Value & Objectives

- **Provide IBM i Clients With Confidence & Certainly of Outcome**
 - PowerHA eliminates the classic logical replication dilemmas:
 - Have we identified all of the objects that need to be replicated ?
 - Are all of those objects in sync ? Should we or should we not failover ?

- **ROI Acquisition and Cost of Ownership**
 - PowerHA is priced per processor core / CBU reduces total number of licenses required
 - FlashCopy (save window elimination)
 - Minimize operational expense through automation

- **Enable best of breed performance and HA/DR metrics**
 - Provide HA/DR and application performance
 - Exploit and integrate modern storage technology
 - Eliminate single points of failure
 - Enable RPO of 0 and best case RTO

- **Native Embedded Technology for HA/DR Solutions**
 - PowerHA technology is an integrated extension of SLIC and IBM i

PowerHA for IBM i – HA solutions for the 21st Century



PowerHA storage based HA/DR solutions are based on shared storage configurations

Logical replication solutions

- **Complexity and time** required to manage software replication
- **Fear of failover** associated with software replication tools
- **Upgrade and maintenance \$\$\$** of software
- **Tape Backup** takes too long
- **Staffing** required to manage software replication
- **Service and Support**

PowerHA Solution

- ✓ ***Clustering technology*** implemented in SLIC *eliminates complexity uncertainty*
- ✓ ***Designed for automated*** role swap and failover operations
- ✓ ***Concurrent maintenance*** for OS upgrades, PTF applies, hardware maintenance
- ✓ ***Flashcopy*** eliminates backup by enabling save operations concurrent to production
- ✓ ***Operational simplicity*** staffing is a fraction of what is required with software replication
- ✓ ***IBM service and support***

Who are our PowerHA for IBM i customers ?



PowerHA for IBM i is installed in accounts ranging from small to very large enterprises. Virtually all of them (over 95%) moved off of logical replication solutions.

- Over 1000 are clients with fewer than four processor cores.
 - These customers typically are using PowerHA with geomirroring and internal disk
 - About 20% of these are using ihosting i with geomirroring for a full system replication solution. Although the ihosting I with geomirring is classified as a disaster recovery solution, some clients prefer it because its relatively easy to set up and doesn't require a cluster configuration where the database is separated out into an IASP.
 - The customers using PowerHA with geomirroring are represented in every industry; municipalities, retail, distribution, banking, manufacturing

- The other half of the PowerHA on IBM i customers are using IBM storage servers.
 - The DS8K implementations are LUG class customers who nearly always have at least two sites involved in the cluster and increasingly, three sites.
 - The rest of the customers are using Storwize servers ranging from the V3700 on up to the SVC or the V9000. The V7000 has been the most popular in recent years.
 - The motivation behind storage servers ranges from scalability, robustness, flash copy and the capability to support various combinations for HA and DR in a PowerHA cluster.

Scotsburn Ice Cream Company rapidly modernizes web presence using IBM i, DB2, and PHP



Wholesale Distribution

Scotsburn Ice Cream Company is a leading processor of branded and private label ice cream, novelties and frozen desserts throughout Canada.

The Need

Replace & modernize the company's web presence using their existing IBM i infrastructure.

The Solution

- 2 Power S814 Systems
- IBM i 7.1
- DB2 for IBM i
- IBM HTTP Server
- PowerHA for high availability
- Zend Server V8
- All content stored in DB2/IFS

The Results

- New web site created & deployed in six weeks
- Custom, user-driven content management solution.

"We hired an experienced developer, gave him a crash course in IBM i and managing DB2 schemas. We were able to deploy our new web interface in six weeks. It shows how easy it is to get a developer up, running, and productive with IBM i."

*- Steve Pitcher, Enterprise Systems Manager,
Scotsburn Ice Cream Company*



Mueller, Inc. deploys a disaster recovery solution that meets their data availability requirements & let's them sleep at night

Mueller, Inc. is a leading manufacturer of pre-engineered metal buildings and roofing products

The Need

- Update outdated recovery time and data loss requirements in response to rapid expansion to three manufacturing sites and 32 sales branches

Solution

- Power S824, 387GB SSD disk drives, Power 740
- IBM i 7.2, PowerHA's Geographic Mirroring asynchronous replication for backup and recovery
- Oracle's JDEdwards EnterpriseOne, OneWorld, Kronos

The Benefits

- Outage exposure reduced from days to less than an hour
- Potential for data loss reduced to minutes from 24 hours
- Solution is automated & self-managing
- Provides data replication in near real-time
- Production applications can be switched from the primary to secondary system in about 10 minutes

““Our recovery time in the event of an outage has been reduced from days to less than an hour, and our potential for data loss went from a minimum of 24 hours to only a few minutes. Plus, the solution is automated and self-managing. We couldn't be happier.”

— *Evanet Gallant, Corporate IT Manager*



IT SOLUTIONS GROUP CASE STUDY



www.i-tsgcloud.com
<http://www.i-tsgcloud.com/blog/>



CHALLENGE

- Disaster recovery for IBM i 720

WHO

- Peggy Forster, Director of Information Systems, City of St. Charles, Illinois
- Penny Lancor, Senior Systems Analyst/Programmer, City of St. Charles
- Matt Staddler IT Solutions Group
- Pete Mayhew IT Solutions Group

SOLUTION

- IBM® PowerHA® for i GeoMirror
- Second IBM i 720-E4D
- Server, IBM i software and Implementation from IT Solutions Group

While the City of St. Charles, Illinois, is a long way from hurricane Sandy's Eastern Seaboard devastation, the storm underscored how crucial disaster recovery is for municipalities. "We asked what would happen in the worst case: if our data center was destroyed by a tornado or other disaster," recalled Peggy Forster, Director of Information Systems. "The answer was unacceptable. It would have taken us at least a week to get back up. We would have had to order and install a new server and then install applications and data."

"During downtime, any transactions would need to be recorded by hand," added Penny Lancor, Senior Systems Analyst/Programmer. "Utility bills are a major source of revenue and could not be reproduced, which would affect cash flow."

Peace of Mind

How do Peggy and Penny know this solution works? By testing it regularly.

Just three weeks after going live, they switched operations over from their primary IBM i Model 720 to the second for one week.

To ensure that it remains ready when needed, they plan to switch over production between servers one week a month.

Large Bank...some actual stats

- A recent real world example email from one of the lab services guys at a large South American bank.
 - Environment: 28 cores, 560GB memory, 5.4TB SYSBAS, 38TB IASP, OS 7.1 TR9 Planned switch time (NOT including application shut down/start up): 14 minutes, 53 seconds
 - Switch makeup:
 - Vary off IASP: 6 minutes 58 seconds
- longest step: Writing changes to disk: 5 minutes 51 seconds
 - Switch related processes; 3 minutes 5 seconds
 - longest step: 2 minute delay to allow disks to report in before multipath reset (may be able to optimize)
- Vary on IASP: 4 minutes 50 seconds
 - longest step: DB xref merge: 1 minute 20 seconds (may be able to optimize)
 - next longest: authority recovery: 1 minute 9 seconds (too many profiles and AUTL)

Internal vs External Storage - considerations

- What needs to be considered to determine which type of disk storage is "right" for your IBM i environment?
 - Size of data in the enterprise – isolate or consolidate?
 - I/O performance
 - Availability and Backup requirements
 - Frequency of deploying new partitions or workloads
 - Appetite for flexibility vs. complexity
 - Cost
- Possible advantages of external storage
 - Flashcopy to offload backups
 - Elimination of hardware maintenance downtime with Live Partition Mobility
 - Other virtualization technologies such as Active Memory Sharing, Suspend/Resume
- Recent announcements simplifying external storage deployment
 - Storwize models – economical but still full function
 - Flash Storage – V9000 or V840, or Flash systems behind a SVC or Storwize
 - Native attach options

Who's Doing the Replication?

IBM i

- Technologies: Synchronous and Asynchronous Geographic Mirroring
- Storage agnostic, although predominantly used with internal storage
- Source and target could be different storage types
- System failure affects production workload and data replication

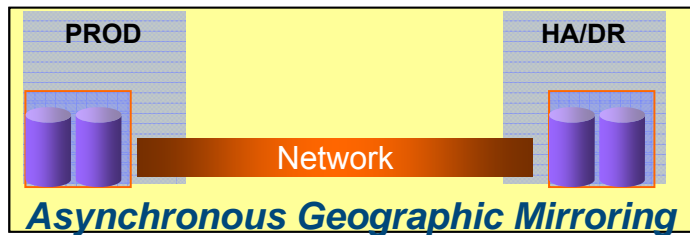
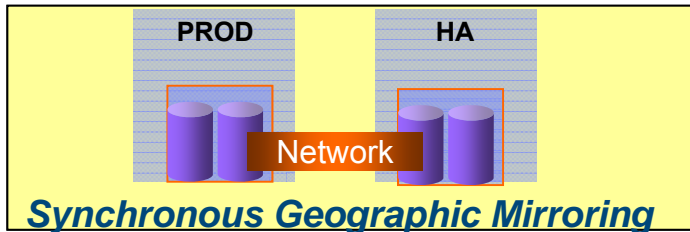
External Storage Server

- Technologies: Metro Mirror, Global Mirror, LUN switching, FlashCopy
- PowerHA supports specific external storage devices
 - DS8000, San Volume Controller (SVC), Storwize storage servers (V3700, V5000, V7000) and more recent Flash Systems (V840, V9000)
- Data replication independent of IBM i
- Replication overhead offloaded to external storage device
- Additional external storage functionality available, such as FlashCopy, Compression, Thin Provisioning and more

PowerHA SystemMirror IASP Replication Technologies



IBM i replication



**1 site
Shared Storage**

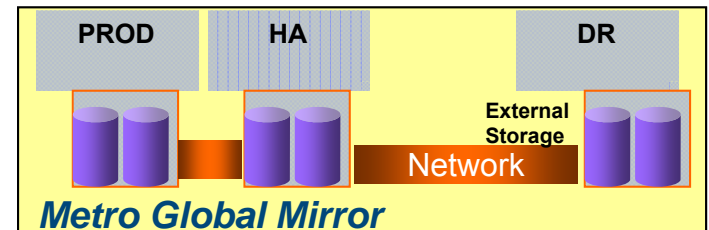
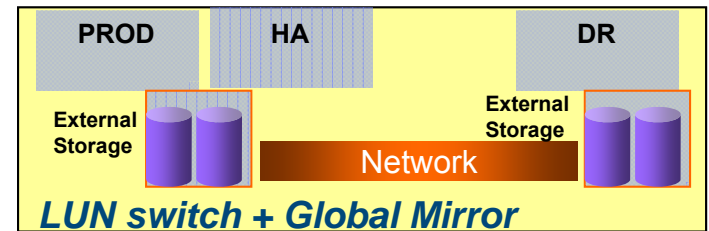
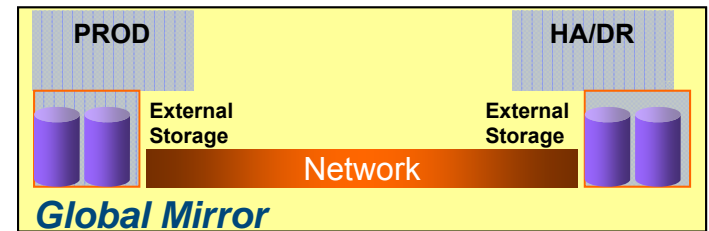
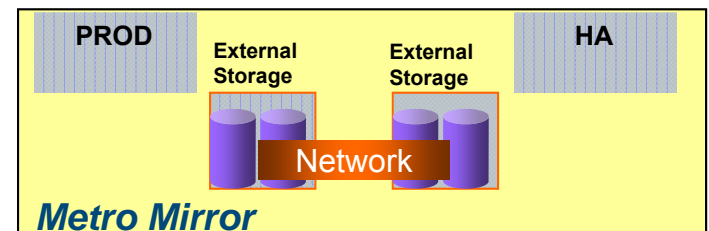
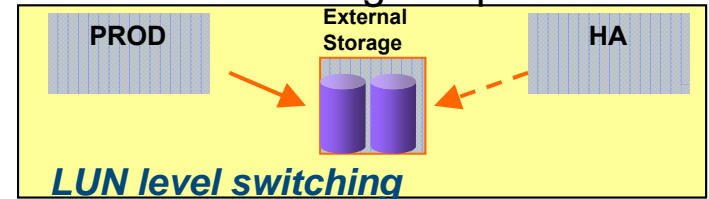
**2 site
Replication**

**2 site
Replication**

**2 site
HA + DR**

**3 site
Replication
(DS8K only)**

External Storage Replication



PowerHA Technology for Every Storage Type

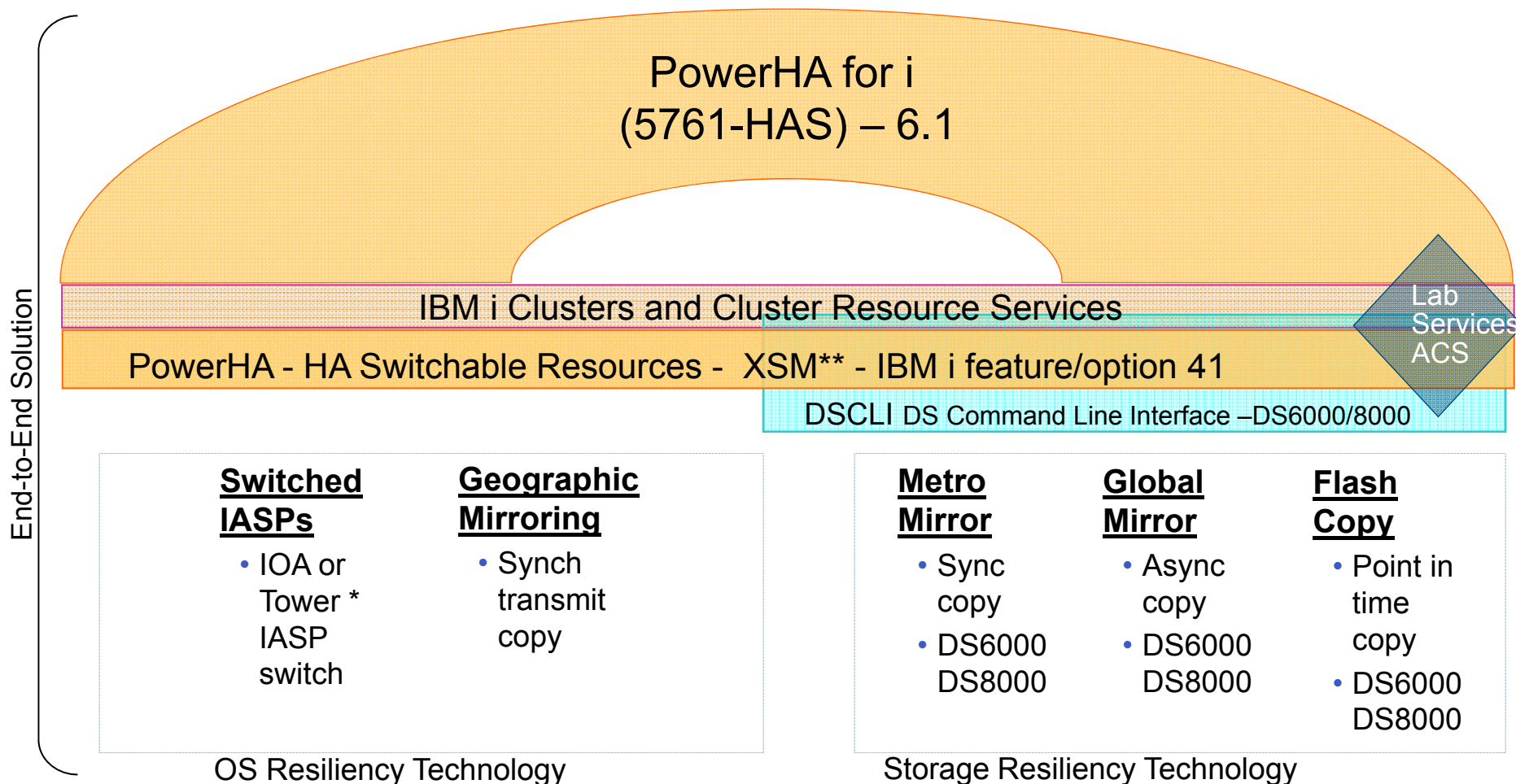


Recommend viewing IBM i POWER External Storage Support Matrix Summary – TechDoc - PRS4563
<http://www-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS4563> and
 Quick reference - Storage options for PowerHA SystemMirror for IBM i – Techdoc - TD106243
<http://www-304.ibm.com/jct03001c/support/techdocs/atmastr.nsf/WebIndex/TD106243>

	Internal SAS/SSD	DS8000	SVC Storwize V840, V9000	XIV	DS5000	Other Storage
Geographic Mirroring						
Metro Mirror						
Global Mirror						
Metro Global Mirror						
LUN switching						
FlashCopy						
HyperSwap						

IBM i 6.1 PowerHA for i

An IBM delivered, end-to-end solution for HA, DR and on-line backups



* Switchable towers is HSL based - limited to POWER6 and prior hardware – best to avoid

** Cross-site mirroring is a collective term that we use to describe several IBM i supported mirroring technologies that you can use to achieve disaster recovery and high availability.

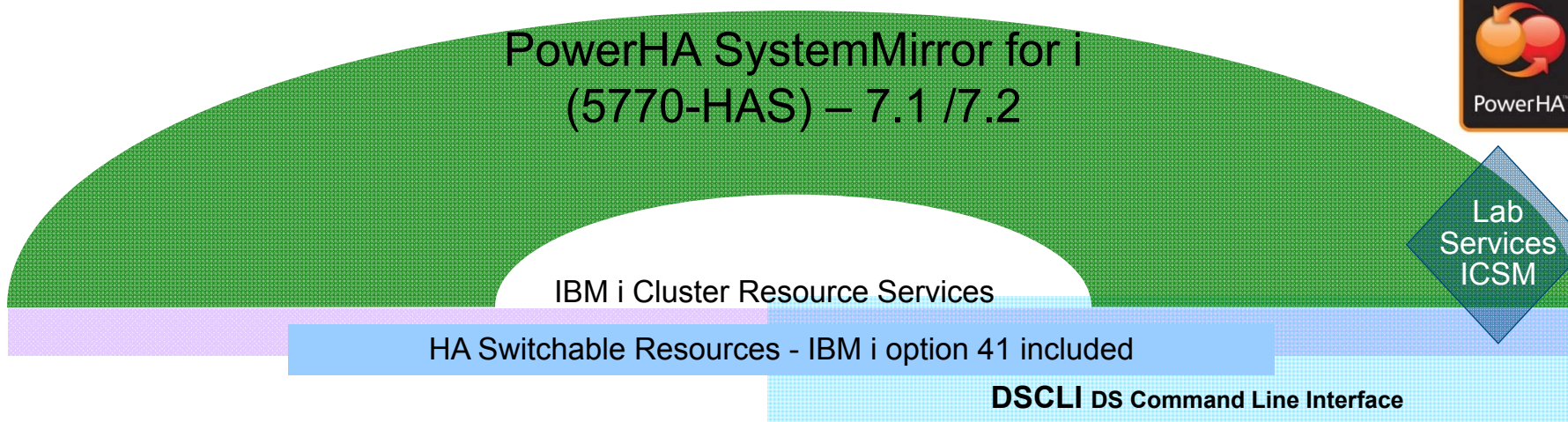


IBM i 7.1 / 7.2 PowerHA SystemMirror for i

Extended options for an IBM delivered, end-to-end solution for HA, DR and backups



End-to-End Solution



<u>Switched IASPs</u>	<u>Geographic Mirroring</u>	<u>Geographic Mirroring</u>	<u>Metro Mirror</u>	<u>Global Mirror</u>	<u>Flash Copy</u>	<u>LUN Level Switching</u>
<ul style="list-style-type: none"> • Internal or external storage • IOA 	<ul style="list-style-type: none"> • Synch • Any storage • Direct attached • SAN attached • VIOS or IBM i Hosted storage 	<ul style="list-style-type: none"> • Asynch • Any storage • Direct attach • VIOS or IBM i Hosted storage 	<ul style="list-style-type: none"> • Synch • DS8000 • SVC • V7000 • V3700 • V5000 • V840/v9000 	<ul style="list-style-type: none"> • Asynch • DS8000 • SVC • V7000 • V5000 • V3700 • V840/V9000 	<ul style="list-style-type: none"> • DS8000 • SVC • V7000 • V5000 • V3700 • Space Efficient • V840 	<ul style="list-style-type: none"> • IASP - located inside DS • DS8000 • SVC • V7000 • V5000 • V3700 • V840/V9000

NPIV and LUN Level Switching for SVC, V7000, V5000 and V3700 and

Native attach (No VIOS required) to SVC, V7000 and V3700 in 1H 2013 – V840 and V9000 7.1 TR8

IBM i Native Attach Storage and Resiliency



Recommend viewing IBM i POWER External Storage Support Matrix Summary – TechDoc PRS4563

<http://www-03.ibm.com/support/techdocs/atmastr.nsf/WebIndex/PRS4563>

<i>For PowerHA - Storage is a key part of your HA/DR solution decision</i>	Internal SAS/SSD (1)	DS5000	DS8000	SVC V7000, V5000 V3700 V840 V9000	Non-IBM SAN (ie EMC) (2)
	POWER/7/8	POWER/7/8	POWER7/8	POWER7 or 8	POWER7/8
PowerHA SystemMirror 7.1 or 7.2					
FlashCopy	No	No	Yes	Yes (3)	No (Timefinder) (2)
Metro Mirror	No	No	Yes	Yes (3)	No (SRDF) (2)
Global Mirror	No	No	Yes	Yes (3)	No (SRDF) (2)
Switched IASP	Yes	Yes	Yes	Yes	No
LUN Level Switching	No	No	Yes (7.1)	Yes	No
Geographic Mirroring	Yes	Yes	Yes	Yes	Yes
PowerHA SystemMirror 6.1 or 7.1 plus IASP Copy Services Manager (ICSM - formerly Advanced Copy Services (ACS))					
FlashCopy	No	Yes	Yes	Yes	No (Timefinder) (2)
Metro Mirror	No	Yes	Yes	Yes (3)	No (SRDF) (2)
Global Mirror	No	Yes	Yes	Yes (3)	No (SRDF) (2)
LUN Level Switching	No	No	Yes (6.1)	Yes (3)	No
Metro/Global Mirror	No	No	Yes	No	No
External Storage Full System Copy					
FlashCopy	No	Yes	Yes	Yes (3)	Yes (Timefinder)
Global Mirror	No	Yes	Yes	Yes (3)	Yes (SRDF)
Metro Mirror	No	Yes	Yes	Yes (3)	Yes (SRDF)

(1) SSD requires POWER6 or later.

(2) **EMC (DMX, VMAX) are not supported by PowerHA except with Geographic Mirror**

(3) Fabric Attach (SAN Switch) requires IBM i 7.1 TR6 + PTF's, or Direct attach (no SAN switch – 4GB adapter only)

V840 and V9000 (Flash) requires IBM i 7.1 TR8 or later (Note: 16GBs one both SVC and Storwize requires IBM i 7.1 TR10 or IBM i 7.2 TR2)

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

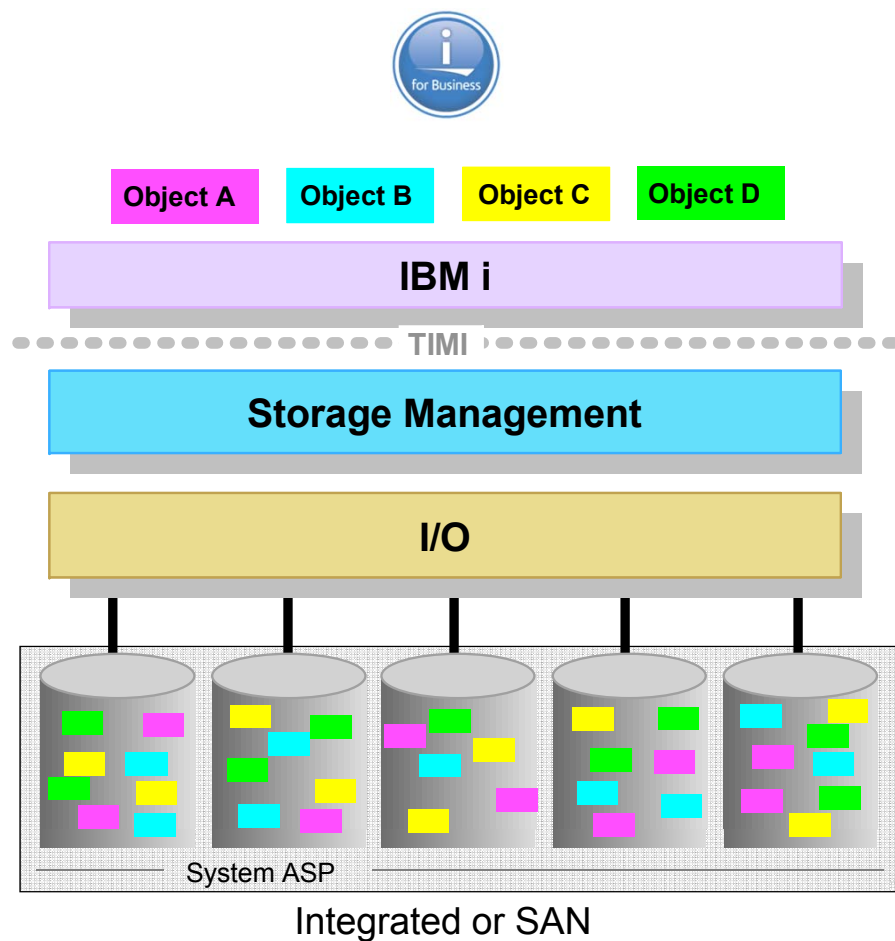
IBM i - VIOS Storage and Resiliency



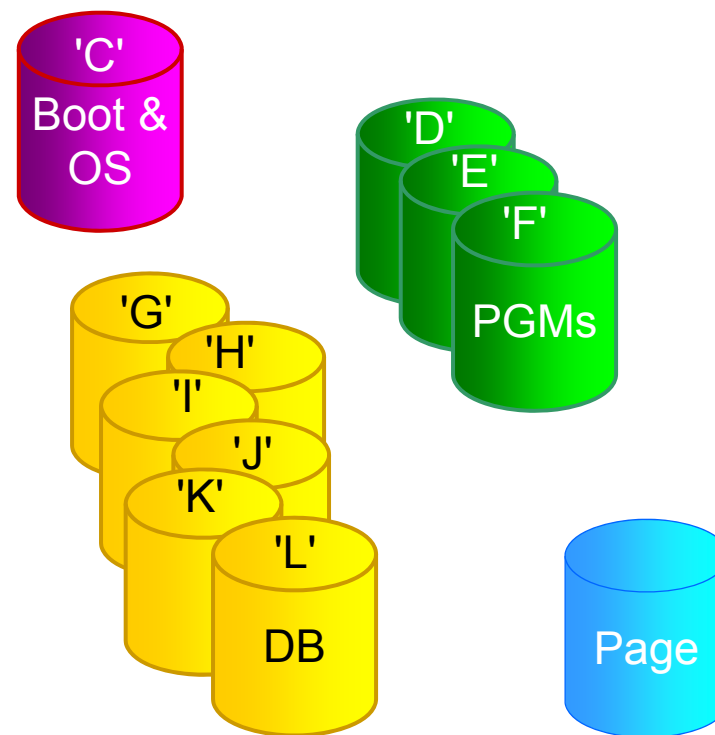
PowerHA Supported configuration options	DS5000	DS8000	XIV	SVC / V7000 V5000 V3700 V840 V9000
	POWER6/7/8 BladeCenter	POWER6/7/8 BladeCenter Pureflex	POWER6/7/8 BladeCenter Pureflex	POWER6/7/8 BladeCenter Pureflex
PowerHA SystemMirror 7.1 or 7.2				
FlashCopy	No	Yes	No	Yes 2
Metro Mirror	No	Yes	No	Yes 4
Global Mirror	No	Yes	No	Yes 4
Switched IASP	No	No	No	No
LUN Level Switch	No	Yes	No	Yes 3
Geo'mirroring	Yes	Yes	Yes	Yes 2
PowerHA SystemMirror 6.1, 7.1 or 7.2 <i>plus</i> IASP Copy Services Manager (ICSM – formerly Advanced Copy Services (ACS))				
FlashCopy	Yes 1	Yes	No	Yes
Metro Mirror	Yes 1	Yes	No	No
Global Mirror	Yes 1	Yes	No	No
LUN Level Switch	No	Yes	No	No
External Storage Full System Copy				
FlashCopy	Yes	Yes	Yes	Yes
Metro Mirror	Yes	Yes	Yes	Yes
Global Mirror	Yes	Yes	Yes	Yes

- 1 Requires NPIV capable fiber channel adapter / DS5000 NPIV support requires IBM i 7.1 TR2
- 2 SVC, V7000 requires IBM i 7.1 TR3 or later (vSCSI).
- 3 Requires NPIV capable fiber channel and IBM i 7.1 TR6 or later
- 4 V5000, V3700 support added with IBM i 7.1 TR6 and V840 / V9000 with TR8 or later

Storage Management Styles – IBM i Compared To...



Unix	Linux	Windows
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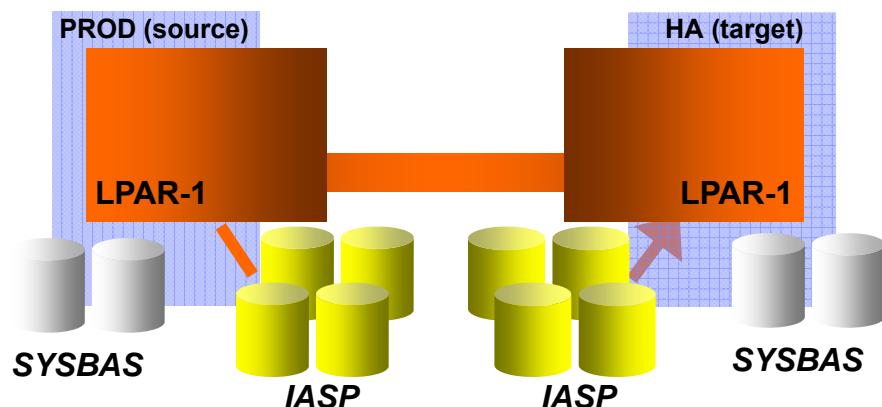
Your IBM i solution is probably already delivering an enterprise class performance solution. Your future storage design should take this into account: for tier-1 storage, **design for I/Os not capacity.**

Independent Auxiliary Storage Pool



- An IASP is:
 - A set of disk units or LUNs which contain a collection of user objects and the necessary system data (e.g. storage management directories, object ownership, and authorization information)
 - Independent of ASP1 (SYSBASE) – This enables the IASP to be taken offline or brought online independent of system activity or other ASPs
 - Provides an independent ‘Name Space’ for job and DB isolation
- Can reside on internal or external disk – or a combination of both
- Also known as – Independent Disk Pool
- Availability of the IASP is controlled through varying on / off the associated device description and “attaching” jobs / threads to the IASP
- Included in the base operating system
- IASPs can contain:
 - User defined file systems
 - User libraries – some object types not supported

PowerHA - Environment Resiliency Options



Synchronize non-IASP (SYSBAS) objects across systems in the cluster

Monitored Resources (5.4)

- User profiles (*USRPRF)
- Class (*CLS)
- Job description (*JOBDD)
- ASP device description (*ASPDEVD)
- System values (*SYSVAL)
- Network attributes (*NETA)
- Environment variables (*ENVVVAR)
- TCP/IP Attributes (*TCPA)

■ **Administration Domain** (included in PowerHA)

- Changes on one node are propagated to others
 - User profiles, System Values, Security, Key configuration data

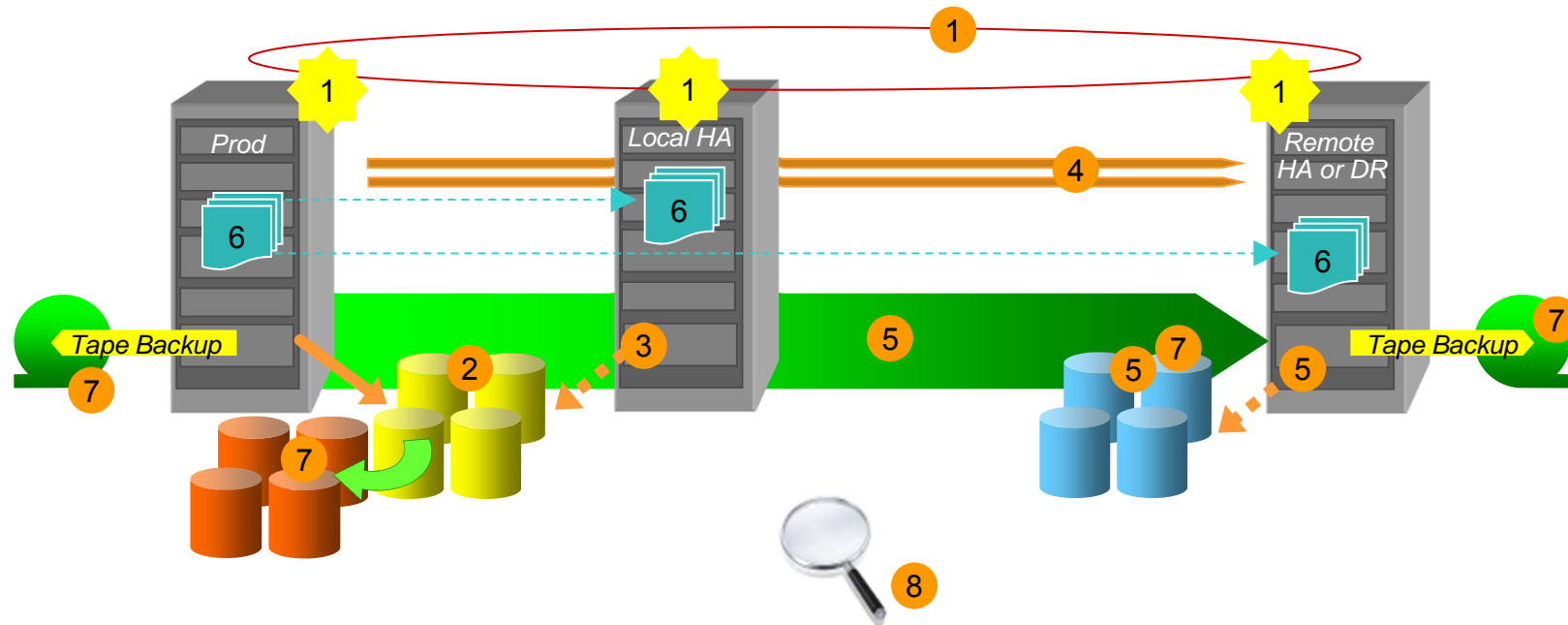
Additional Monitored Resources (6.1)

- Subsystem Descriptions (*SBSD)
- Network Server Descriptions (*NWSDD) of types *WINDOWSNT, *IXSVR, and *ISCSI.
- NWS Configurations (*NWSCFG)
- NWSH Device Descriptions (*NWSHDEV)
- NWS Storage Spaces (*NWSSTG)
- Tape Device Descriptions (*TAPDEV)
- Optical Device Descriptions (*OPTDEV)
- Ethernet Line Descriptions (*ETHLIN)
- Token-ring Line Descriptions (*TRNLIN)

Additional Monitored Resources (7.1)

- Authorization lists (*AUTL)
- Printer Device Descriptions (*PRTDEV)

Components of a Resilient IBM i Environment



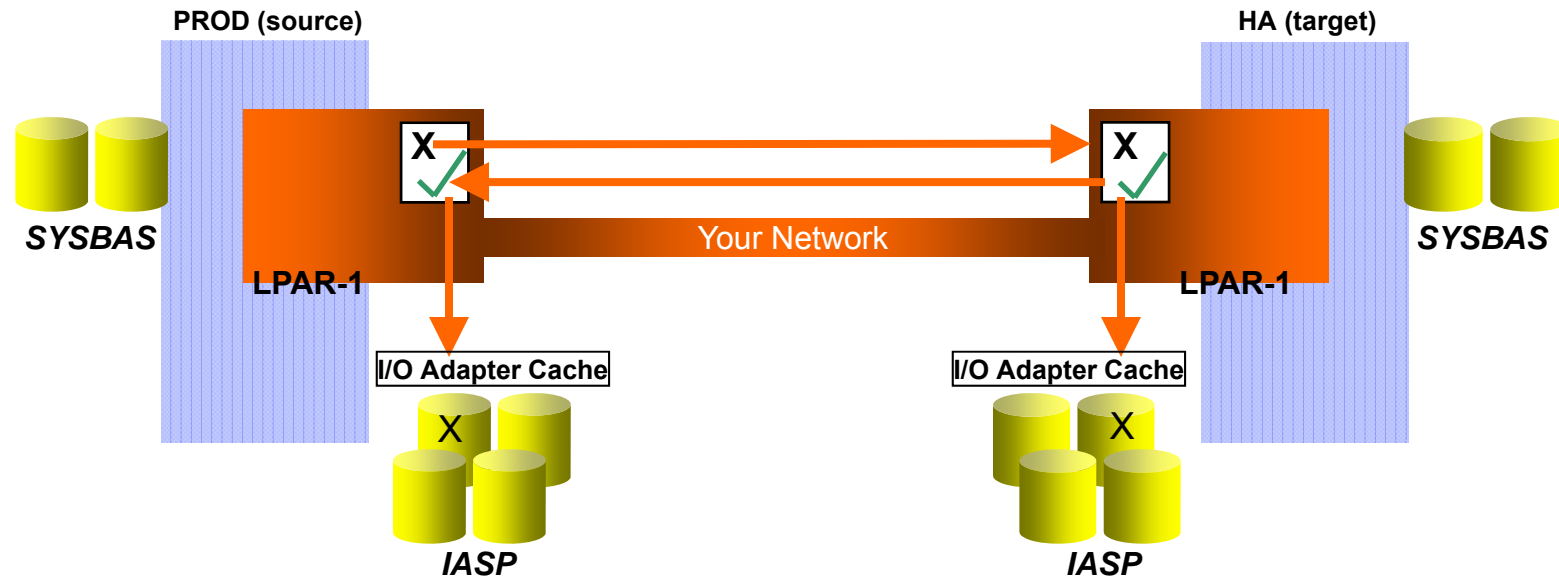
1. PowerHA - Admin Domain - Plus Clustering Technology to facilitate and manage
2. Independent Auxiliary Storage Pools (IASP)
3. IASP Switching / LUN Level switching (requires a SAN)
4. Network capacity, performance and redundancy
5. Server or storage subsystem replication of IASP
6. Application availability
7. Fast or off-line backup of data
8. Proper planning, capacity, performance and scalability

IBM i Geographic Mirroring

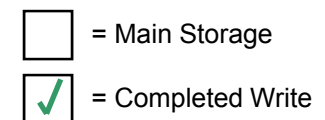


■ Synchronous Geographic Mirroring – Local HA

IBM i 6.1 and up



- Synchronous write to target copy means the change must be completed on target memory before it can complete on source
 - Write at target can be synchronous or asynchronous (show as asynchronous)
- Very good RPO – changes are confirmed on target copy before source
- Requires local LAN like network performance: little latency, plenty of capacity
- Requires proper CPU, memory, disk planning for both source and targets to ensure performance expectations are met

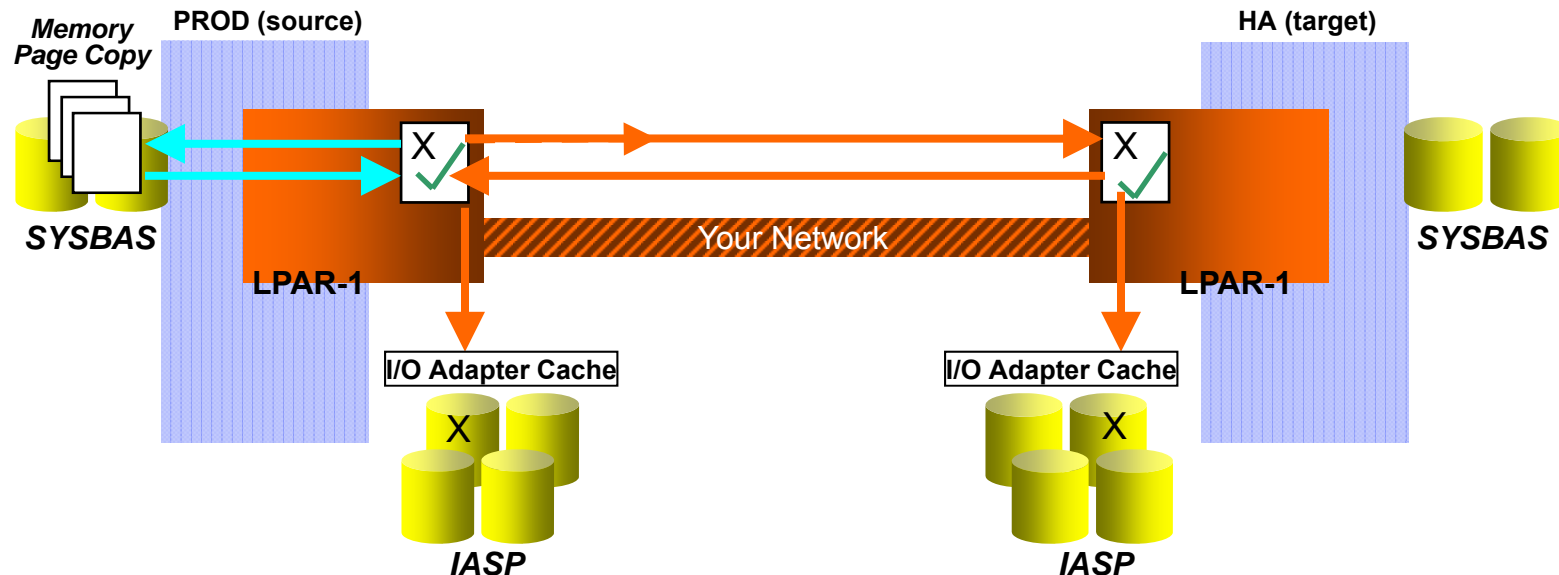


IBM i Geographic Mirroring

NEW IBM i 7.1 and up



- Asynchronous Geographic Mirroring - long distances and DR



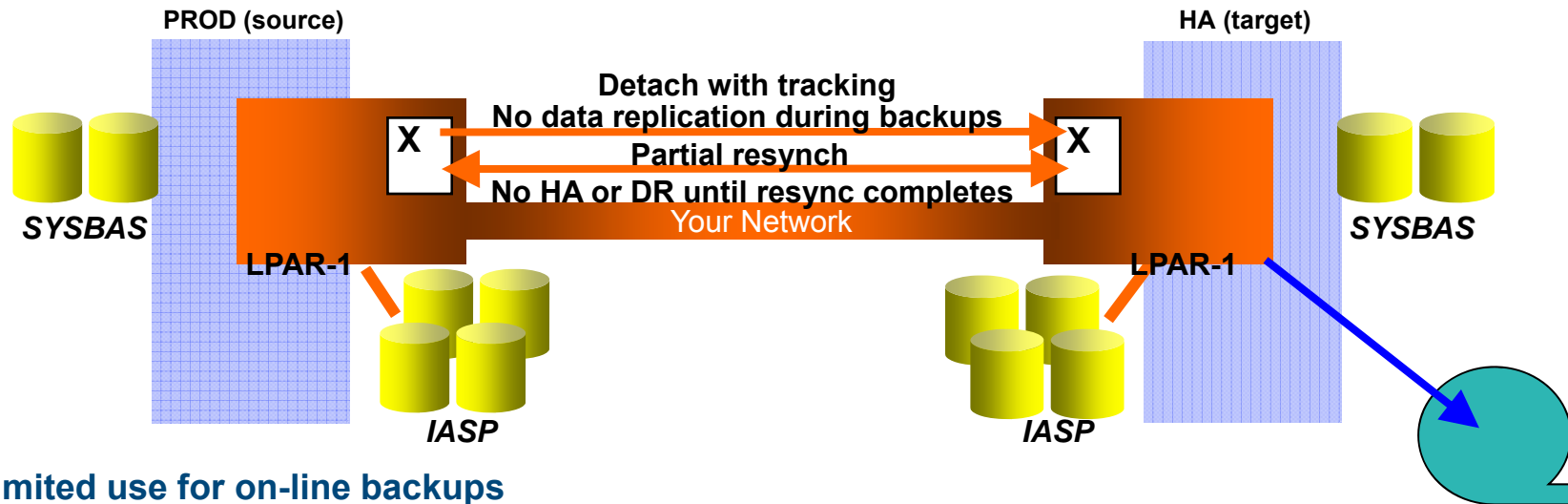
- Asynchronous write to target copy means network latency will not impact end user and job performance nearly as much as synchronous
 - If the network delays writes to target copy, source storage pages wait at source
 - Source memory pages will be paged out to disk, just as any other job in system
- Consumes additional source server CPU and memory compared to Synchronous Geographic Mirroring
- Available with PowerHA 7.1 and Enterprise Edition

= Main Storage
 = Completed Write

IBM i Geographic Mirroring



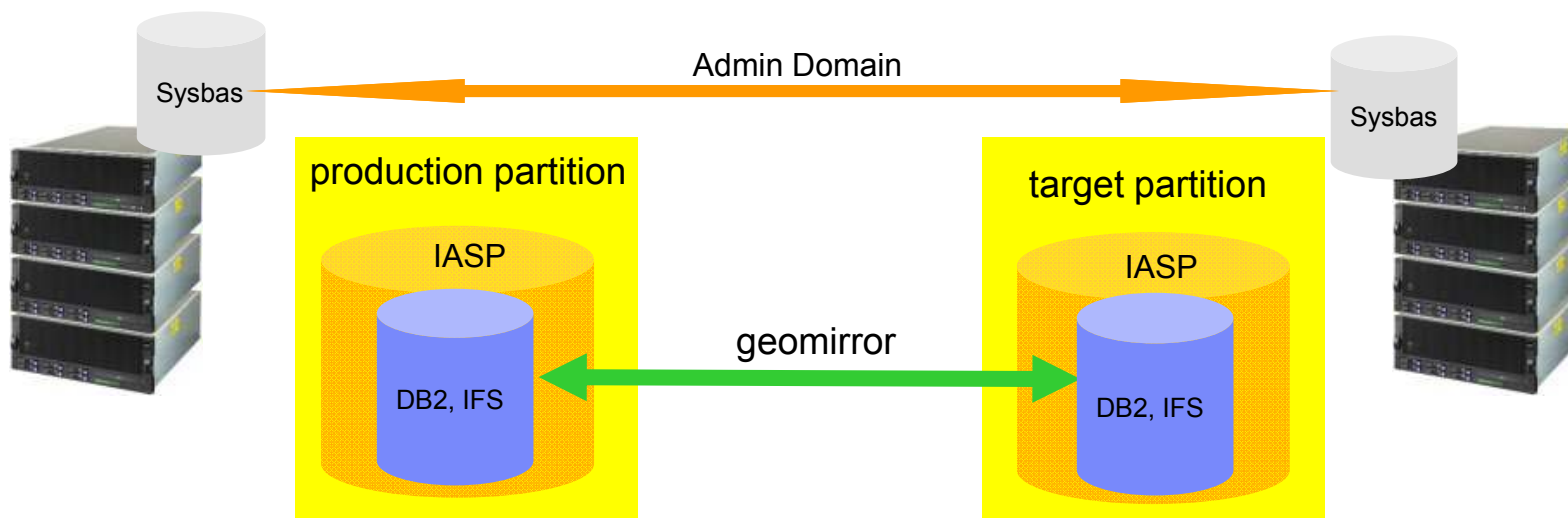
- On-line backups at target site



- **Limited use for on-line backups**

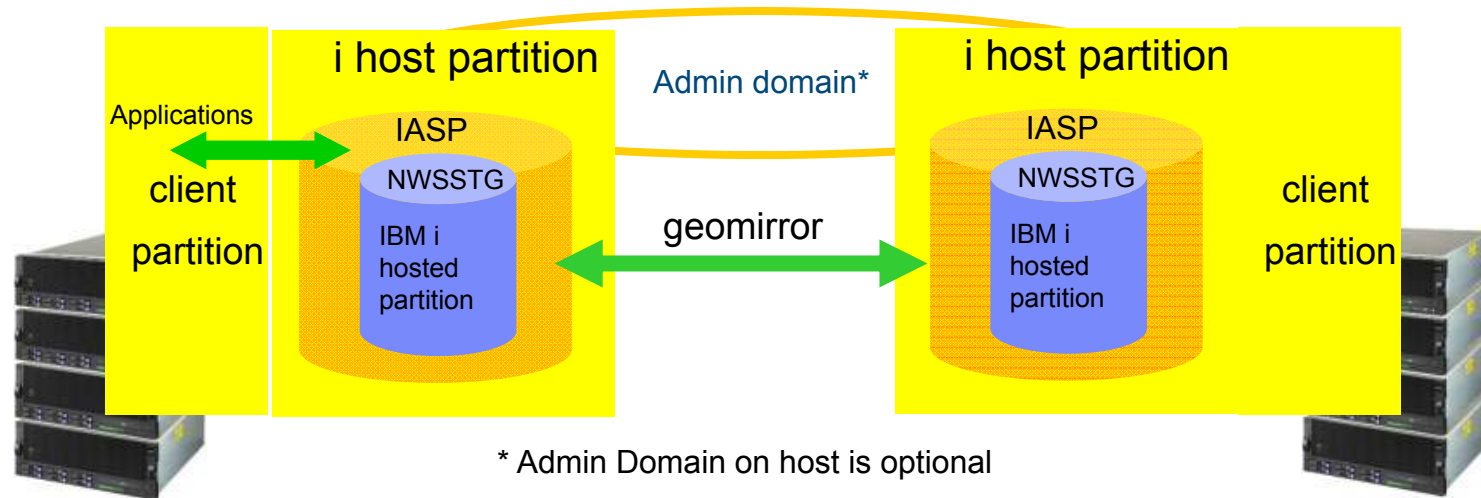
- Detach with Tracking
 - Replication from source is suspended, changes are tracked
- Requires partial resynchronization once backups are completed
 - No HA or DR failovers are possible until that re-sync has completed
 - Will this meet your business requirements?
- By itself, can be a viable on-line backup solution, if full time HA/DR is not required. Otherwise, consider the latest version of Save-While-Active

Summary - PowerHA – Geomirroring – HA/DR clustering



- PowerHA geomirror cluster (typically with internal disk and less than 4 TB)
- Complete HA/DR coverage for all outage types (hardware, middleware, operator error)
- Off line back-up followed by source side /target side tracking change resynchronization
- Synchronous mode up to 40 KM, production and target always identical
- Asynchronous mode unlimited distance, production and target ordered and consistent

Geomirror – IBM i hosting IBM i remote VM restart for DR



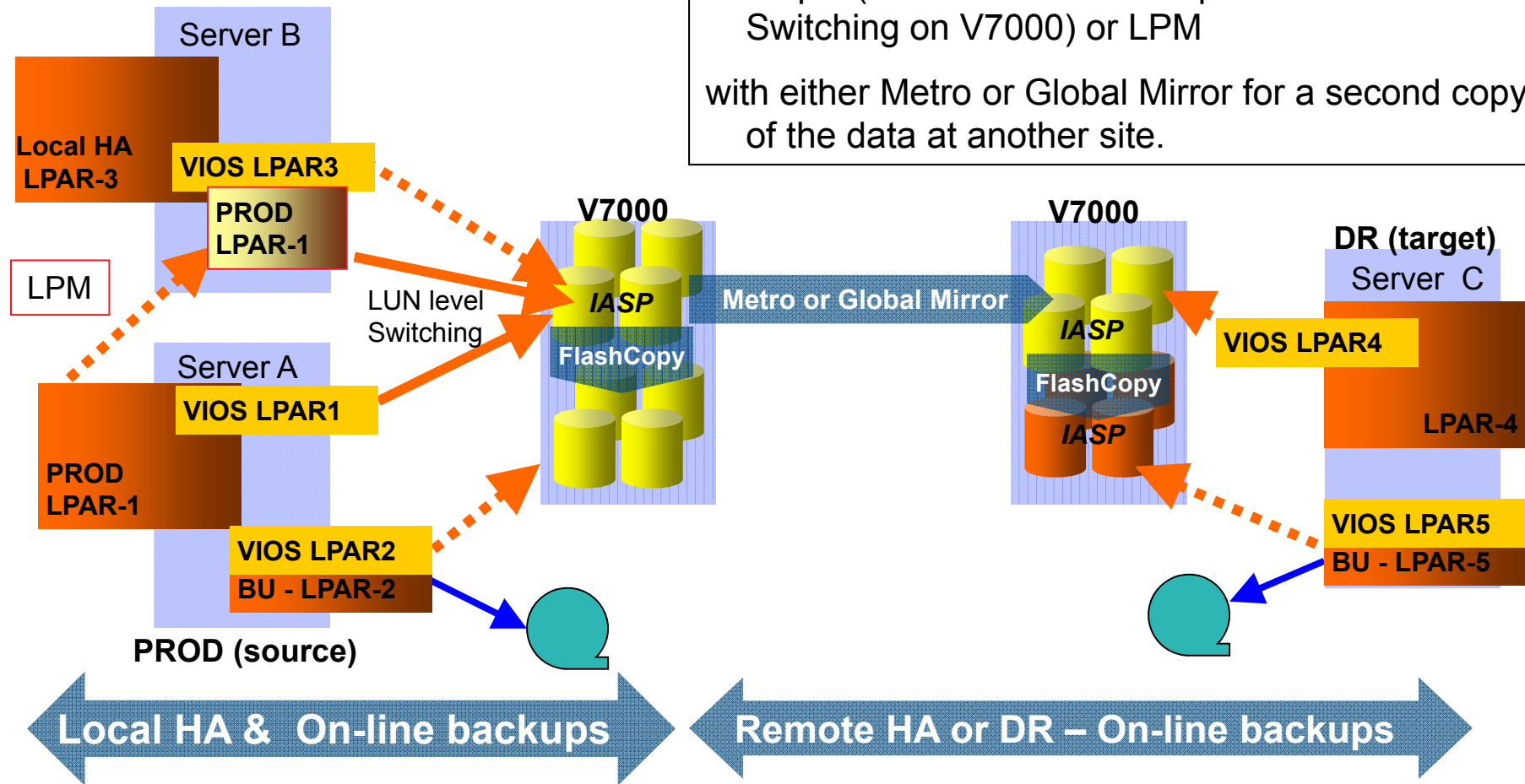
- Non-cluster PowerHA configuration - full system replication of the hosted client
- IBM client placed into a network storage space which is placed into an IASP
- Guest and hosting partition must be shut down before remote host and client can be restarted
- Benefit:
 - Easy to set up (in production world wide today)
 - Migration to IASP for the client partition is not required
- Limitation:
 - This is DR, not a true HA (PowerHA automation is not implemented at the client LPARs)
 - No heart beating at the client level.
 - Can't do concurrent OS upgrades
 - Planned role swap still requires manual activation of the client LPARs at the target.
 - Unplanned failover requires an abnormal IPL of target client partition



PowerHA SystemMirror – combining Technologies

LUN Level Switching – Local HA (for planned or unplanned) or LPM for work load balancing or planned server maintenance.

Example (NPIV Attachment required for LUN Level Switching on V7000) or LPM with either Metro or Global Mirror for a second copy of the data at another site.



■ Note: SYSBAS is not shown in this example, however, it is located inside the external storage subsystem

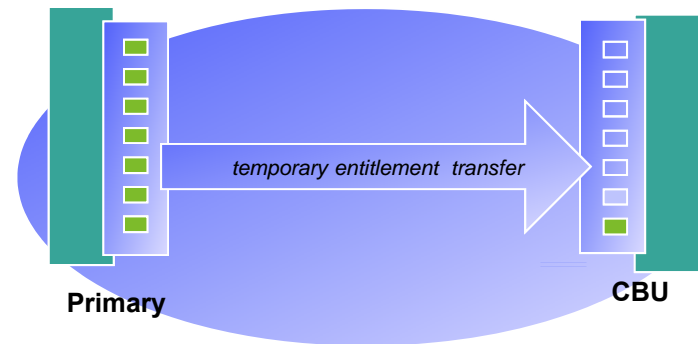
PowerHA Price



PowerHA System Mirror for AIX and IBM i			
Tier Edition	small price/core	medium price/core	large price/core
standard - data center	\$2500	\$3500	\$4500
Enterprise – multi site	\$3250	\$5000	\$6500

PowerHA System Mirror for AIX and IBM i New price table effective March 1 st 2016			
Tier Edition	small price/core	medium price/core	large price/core
standard - data center	\$2600	\$3650	\$4700
Enterprise – multi site	\$3400	\$5250	\$6800

CBU for IBM i

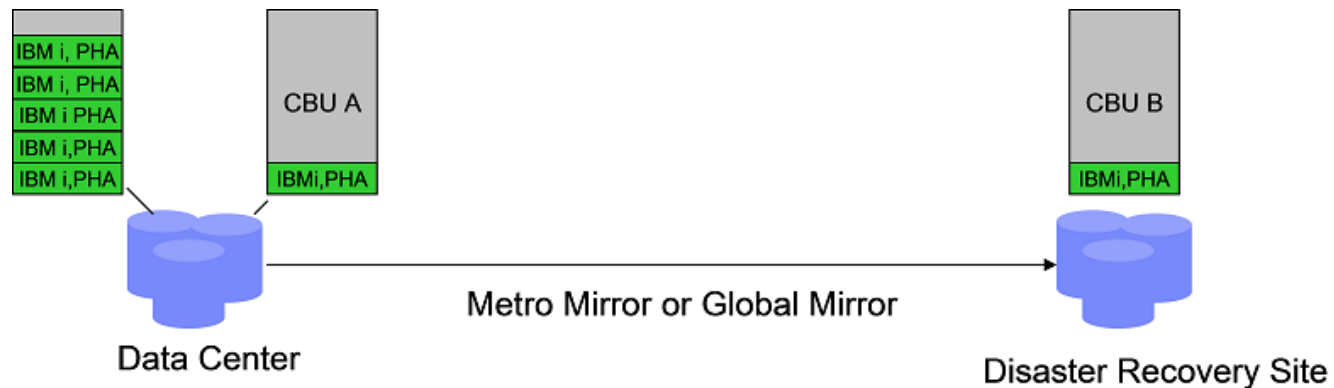


- The CBU offering is used in high availability and disaster recovery deployments
- Offering enables a customer to move workload between systems without fully redundant OS entitlements
- Two year temporary keys eliminate redundancy for eligible LPPs
- CBU designation available only upon purchase of a new box and must be registered to a qualified primary.
- If a CBU is no longer affiliated with the original registering customer, it is not recognized as a CBU.
- Registration process: client agrees to terms and conditions, CBU registration is validated, shipment is approved
- CBU agreement requires that both the primary and CBU are owned by the same enterprise
- **With PowerHA you only need ONE core licensed on the CBU ! Generally not the case with logical replication solutions. Logical replication solutions consume around 30% of CPWs ; all of those cores must be licensed with IBM i**

PowerHA Price Example...Economic Value - TCA



PowerHA SystemMirror for i		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



- PowerHA is priced per processor core used in the HA/DR cluster
- Taking advantage of the CBU topology in the example topology:
 - Assume S824 P8 Systems in the cluster:
 - 5 – IBM i OS and 5 PowerHA on production system
 - 1 – IBM i OS and 1 PowerHA on each (CBU A and CBU B) systems
 - **IBM isavings: 7 licenses instead of 15**
 - **PowerHA ...savings: 7 licenses instead of 15**
 - Temporary license keys for other IBM i LPPs on each of the CBUs

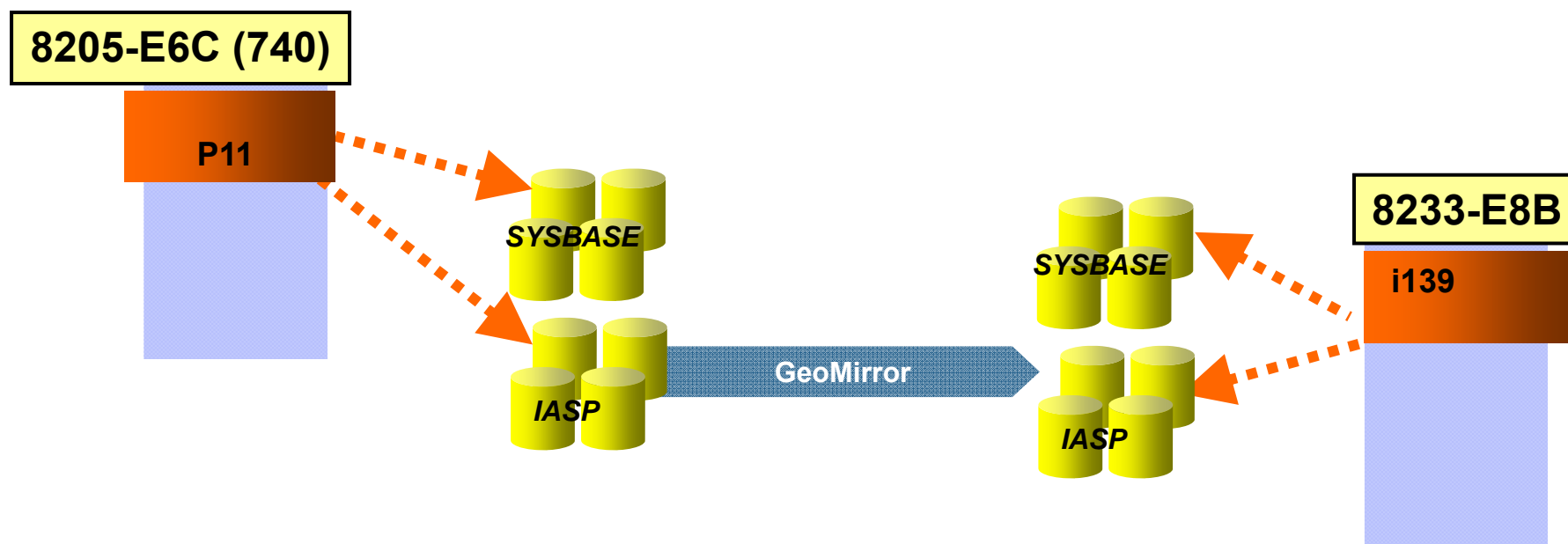


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Demo configuration

- P11 – Primary production partition running on 740
- I139 – Geographic Mirror target running on Power S824
- Application – IP address 9.5.101.112 - DNS name 'GMTAKEOVER'



Object	Name	Name
Systems	P11	I139
Cluster name	GMCLU (was P11)	GMCLU (was P11)
IASP	GMIASP	GMIASP
GeoMirror		
CRG - Cluster Resource Group	GMCRG	GMCRG
Device Domain	I don't remember?	I don't remember?
Recovery Domain	Prim	Backup
Site name		
Admin Domain	GMCAD	GMCAD
IP addresses - Cluster	9.5.101.41	9.5.101.100
Data Port	9.5.101.110	9.5.101.77
Takeover	9.5.101.112	9.5.101.112
Copy Descriptions		I don't remember?
ASP Sessions	I don't remember?	I don't remember?
Userid web user	GMPWRHA	GMPWRHA
Userid admin	PHADEMO	PHADEMO
Password	LOGIN4ME	LOGIN4ME
JOBID	QGPL/GMPWRHA	QGPL/GMPWRHA
URL TakeOver IP	http//9.5.101.112:15000/ha <u>DNSname</u> - GMTAKEOVER	http//9.5.101.112:15000/ha <u>DNSname</u> - GMTAKEOVER
Application port	15000	150000
Application name	hademo4 context root /ha	hademo4 context root /ha
DB CONNECT	MYCONN1 9.5.101.112	MYCONN1 9.5.101.112

PowerHA Tools for IBM i



- Complement and extend PowerHA and IBM Storage capabilities for HA/DR
- Helps reduce business risk and improve resiliency for critical applications
- Simplifies set up and automation of HA/DR and backup solutions
- Reduces cost of maintaining and regular testing of an HA/DR environment
- Facilitates flexible deployment options for single or multi-site protection
- Assures consistent deployment using best practices and experienced consultants



**PowerHA Tools for IBM i is a service offering
from IBM Systems Lab Services**



PowerHA Tools for IBM i

PowerHA Tools for IBM i	Capability	Benefit	DS8000	Storwize	Internal
Smart Assist for PowerHA on IBM i	Provides operator commands and scripts to supplement PowerHA installation and ongoing operations for IASP enabled applications.	Simplifies deployment and ongoing management of high availability for critical IBM i applications.	Yes	Yes	Yes
IASP Copy Services Manager (Automated recovery with faster IASP-level vary on, no system IPL)					
Flashcopy	Automates Flashcopy of IASP for daily off-line backup with seamless BRMS integration.	Increases application availability by reducing or eliminating backup window for routine daily backups.	Yes	Yes	
LUN-level Switching	Simplifies deployment and automates switching of an IASP between IBM i cluster nodes in one data center.	Enables a business continuity manager to provide a simple, single site HA solution.	Yes*		
Metro Mirror or Global Mirror	Simplifies initial deployment and automates ongoing server and storage management of two-site Metro Mirror or Global Mirror HA or DR solutions. Requires IASP enabled applications..	Enables a business continuity manager to provide seamless operation of integrated server and storage operations for two-site high availability or disaster recovery.	Yes		
Metro Global Mirror (MGM)	Extends PowerHA functionality to provide three-site server/storage replication solution combining Metro Mirror for HA with Global Mirror for DR. Requires IASP enabled applications and IBM Tivoli Productivity Center – Replication (TPC-R).	Enables a business continuity manager to further lower business risk and maximize business resilience for highly critical business applications that require three-site HA/DR protection.	Yes		
Full System Copy Services Manager (Automated recovery, requires full system IPL on target LPAR)					XIV
Flashcopy	Automates full system Flashcopy for daily off-line backup with integrated support for BRMS without IASP-enabled applications.	Increases application availability by reducing or eliminating backup window for routine daily backups. Enables an entry solution while planning IASP enablement.	Yes	Yes	Yes
Metro Mirror or Global Mirror	Simplifies initial deployment and automates ongoing server and storage management of two-site Metro Mirror or Global Mirror HA or DR solutions. without IASP-enabled applications.	Enables a business continuity manager to provide seamless operation of integrated server and storage operations for HA or DR. Enables an entry solution while planning IASP enablement.	Yes	Yes	

*DS8000 support available with PowerHA Tools for IBM i 6.1 or earlier, included in PowerHA SystemMirror 7.1

IBM Lab Services Offerings for PowerHA for IBM i

PowerHA Service Offering	Description
IBM i High Availability Architecture and Design Workshop	An experienced IBM i consultant will conduct a planning and design workshop to review solutions and alternatives to meet HA/DR and backup/recovery requirements. The consultant will provide an architecture and implementation plan to meet these requirements.
PowerHA for IBM i Bandwidth Analysis	An experienced IBM i consultant will review network bandwidth requirements for implementing storage data replication. IBM will review I/O data patterns and provide a bandwidth estimate to build into the business and project plan for clients deploying PowerHA for IBM i.
IBM i Independent Auxiliary Storage Pool (IASP) Workshop	An experienced IBM i consultant will provide jumpstart services for migrating applications into an IASP. Training includes enabling applications for IASPs, clustering techniques, plus managing PowerHA and HA/DR solution options with IASPs.
PowerHA for IBM i Implementation Services	An experienced IBM consultant will provide services to implement an HA/DR solution for IBM Power Systems servers with IBM Storage. Depending on specific business requirements, the end-to-end solution implementation may include a combination of PowerHA for IBM i and/or PowerHA Tools for IBM i, plus appropriate storage software such as Metro Mirror, Global Mirror and/or Flashcopy.

For more information on PowerHA Tools for IBM i offerings and services, contact: Mark Even even@us.ibm.com 507-253-1313

www.ibm.com/systems/services/labservices stgls@us.ibm.com



Additional resources for PowerHA IBM i

- **PowerHA Wiki**
 - www.ibm.com/developerworks/ibmi/ha/
- **Lab Services**
 - <http://www-03.ibm.com/systems/services/labservices>
- **PowerCare**
 - <http://www-03.ibm.com/systems/power/support/powercare/>
- **Redbooks at www.redbooks.ibm.com**
 - Implementing PowerHA for IBM i - SG24-7405-00 (Nov 2008)
 - IBM i 6.1 Independent ASPs - SG24-7811-00
 - PowerHA SystemMirror for IBM i Cookbook – SG24-7994-00 (Jan 2012)
 - 'IBM i and IBM Storwize Family: A Practical Guide to Usage Scenarios'. SG248197 <http://www.redbooks.ibm.com/redpieces/pdfs/sg248197.pdf>
 - New Redbook residency announced for Sept
- **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
- **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