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IBM

IBM i 7.1 Overview – High Availability

Slide 2

IBM

Enhancement Areas

- **Product Restructuring**

- **Support for Key Environments via PowerHA™ for i**

- **High Availability Usability**

- **iASP Enablement**

Slide 3

IBM

PowerHA SystemMirror Editions

- **PowerHA SystemMirror for i 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 for i Enterprise Edition**
  - Cluster management for the Enterprise
    - Multi-site cluster management
    - Includes the Standard Edition function
    - Optimized for IBM storage
    - Geographic mirroring async mode

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IBM

PowerHA SystemMirror for IBM i Editions

- **Standard Edition targeted at datacenter HA**

- **Enterprise Edition targeted at multi-site HA/DR**

- **New tiered pricing structure lowers costs of HA/DR solutions for mid-sized businesses**

- **Advanced Copy Services for PowerHA Enterprise Edition or Standard Edition**

PowerHA

IBM i HA/DR Clustering	Standard Edition	EnterpriseEdition
Centralized cluster management	✓	✓
Cluster resource management	✓	✓
Centralized cluster configuration	✓	✓
Automated cluster validation	✓	✓
Cluster admin domain	✓	✓
Cluster device domain	✓	✓
Integrated heartbeat	✓	✓
Application monitoring	✓	✓
IBM i event/error management	✓	✓
Automated planned switch over	✓	✓
Managed unplanned fail over	✓	✓
Centralized Flash Copy	✓	✓
LUN level switching	✓	✓
Multi-Site HA/DR management		✓
DS8000/DS6000 Metro Mirror		✓
DS8000/DS6000 Global Mirror		✓
Geomirror Async mode		✓

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IBM

IBM i 7.1 PowerHA SystemMirror for i

An end-to-end solution for management of IBM i 6.1 and 7.1 and DS6000 and DS8000® resiliency and replication technologies for HA, DR and backups

PowerHA

End-to-End Solution

PowerHA SystemMirror for i (5770-HAS) – 7.1 NEW

IBM i Cluster Resource Services

HA Switchable Resources - IBM i option 41

DSCLI DS Command Line Interface

Switched IASPs	Geographic Mirroring	Geographic Mirroring NEW	Metro Mirror	Global Mirror	Flash Copy	LUN Level Switching NEW
• Internal or external storage	• Synch	• Asynch	• Synch DS6000 DS8000 only	• Asynch • DS6000 DS8000 only	• Snapshot • DS6000 DS8000 only	• IASP is located inside DS
• IOA or Tower **	• Any storage	• Any storage	• NPIV	• NPIV	• Space Efficient	• DS6000 DS8000 only
	• Direct, VIOS, IBM i Hosted storage	• Direct, VIOS, IBM i Hosted storage			• NPIV	

*** Switchable towers limited to POWER6 and prior hardware - avoid

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IBM

New Environments Supported in PowerHA 7.1

Asynchronous Geographic Mirroring
- **Provides the capability to implement our current geographic mirroring solution with greater distance between the source and target machines**
- **Intended for configurations which are more geographically dispersed where latency is an issue**
- **Disk writes on the source machine will no longer wait for the write to be received on the target machine**
- **PowerHA provides management interface and support for automatic failover**
- **Advantage: Allows hardware-based replication for internal or virtual storage over a distance**

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Asynchronous Geographic Mirroring

- **Can be configured via CHGASPSSN command or Disk Management GUI in System Director Navigator**
  - Transmission delivery field = *ASYNCH
- **Asynchronous geographic mirroring requires PowerHA for i option 1 (Enterprise edition)**

New Environments Supported in PowerHA 7.1

LUN Level Switching
- **Similar to switched disk support**
  - Instead of switching hardware between logical partitions, logical units (LUNs) are reassigned from one logical partition to another
- **LUNs must be contained in an IBM System Storage DS8000 or DS6000**
- **PowerHA provides management interface and support for automatic failover**
- **Advantage: Local HA solution which can be used in conjunction with Metro Mirror or Global Mirror**

LUN level switching configuration steps

- **Configure logical units on external storage unit, create the iASP and device CRG**
- **Use the Add ASP Copy Description (ADDASPCPYD) command**
  - Fill in appropriate ASP device, cluster resource group, cluster resource group site, IBM System Storage host, location, and logical unit name
  - Fill in appropriate cluster node names, host identifiers, and volume groups in the recovery domain field
- **Create an ASP copy description for each ASP device that is to use switchable logical units. All ASP devices in the cluster resource group must be defined by a separate ASP copy description**
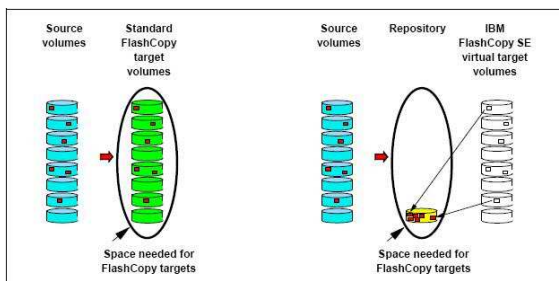
Space Efficient FlashCopy

- **Only valid for FlashCopy no-copy**
- **Storage for FlashCopy not allocated until needed**
- **May not require as much storage to do FlashCopy**
- **Configuration done when creating the LUNs**
  - When you define the volume within the extent pool, define it as Space Efficient

Space Efficient FlashCopy

New Administrative Domain Monitored Resources

Monitored Resources (5.4)
- **User profiles (*USRPRF)**
- **Class (*CLS)**
- **Job description (*JOBD)**
- **ASP device description (*ASPDEV)**
- **System values (*SYSVAL)**
- **Network attributes (*NETA)**
- **Environment variables (*ENVVAR)**
- **TCP/IP Attributes (*TCPA)**

Monitored Resources (6.1)
- **Subsystem Descriptions (*SBSD)**
- **Network Server Descriptions (*NWSD) 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)**

Monitored Resources *(7.1)*
- Authorization lists (*AUTL)
- Printer Device Descriptions (*PRTDEV)

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New Administrative Domain Monitored Resources

- **Requires PowerHA to add these resource types**
- **Can be added via GUI or command (ADDCADMRE)**
- **Printer device notes**
  - Two device classes are supported: *VRT and *LAN
  - *LCL, *RMT, and *SNPT are not supported
  - The cluster administrative domain will create a virtual controller to support the printer device description on nodes in the administrative domain when there are no existing controllers available

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High Availability Usability Enhancements

Better detection of Node Outages
- **Ability for clustering to register with HMC or IVM so that clustering is notified of partition or CEC failures**
- **Functionality is integrated within the PowerHA product but will require some extra steps to activate**
  - More information available in IBM I 7.1 Information Center under *Availability -> High Availability -> Implementing high availability -> Implementing high availability with a task-based approach -> Configuring high availability -> Configuring clusters -> Configuring for advanced node failure detection*

- **Advantage: Will reduce the cases of 'false partitions' where clustering does not detect a system failure and do an automatic failover of the node to its backup**

High Availability Usability Enhancements

Improved Geographic Mirroring Full Synchronization Performance
- **Intended to address specific performance issues with specific types of geographic mirroring data**
- **The amount of performance improvement will vary based on the type of data in the iASP**
  - iASPs with large numbers of very small objects will see more improvement
  - iASPs with large objects will also see improvement in certain cases

- **Advantage: Decrease the time required for a geographic mirroring full synchronization in certain cases**

High Availability Usability Enhancements

IPv6 Support
- **All HA-related APIs, commands, and GUIs will support IPv6 addresses**
- **Implementation: Field names have been extended to hold either an IPv4 or an IPv6 address**
  - IPv6 address should be specified in the form x:x:x:x:x:x:x:x where x is a hexadecimal number ranging from 0 thru X'FFFF'
  - :: may be used once in the IPv6 address to indicate one or more groups of 16 bits of zeros
  - Field level help provides more information on specifying IPv6 addresses

- **Advantage: IPv6 address support is fully integrated into clustering and the PowerHA for i product**

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iASP Enablement

Enhanced Encryption Support
- **Disk encryption available in IBM i 6.1**
- **In 7.1, added ability to start/stop encryption on an existing iASP**
- **For steps to follow, see IBM i 7.1 Information Center**
  - *Systems Management -> Disk management -> disk encryption*

PowerHA Versioning

- **In order to enable these enhancements, all nodes in the cluster will need to be at 7.1**
- **Both the cluster version and the PowerHA version will need to be updated**
  - Current cluster version = 7
  - Current PowerHA version = 2.0
- **CHGCLUVER CLUSTER(cluster_name) CLUVER(*UP1VER) HAVER(*UP1VER)**