

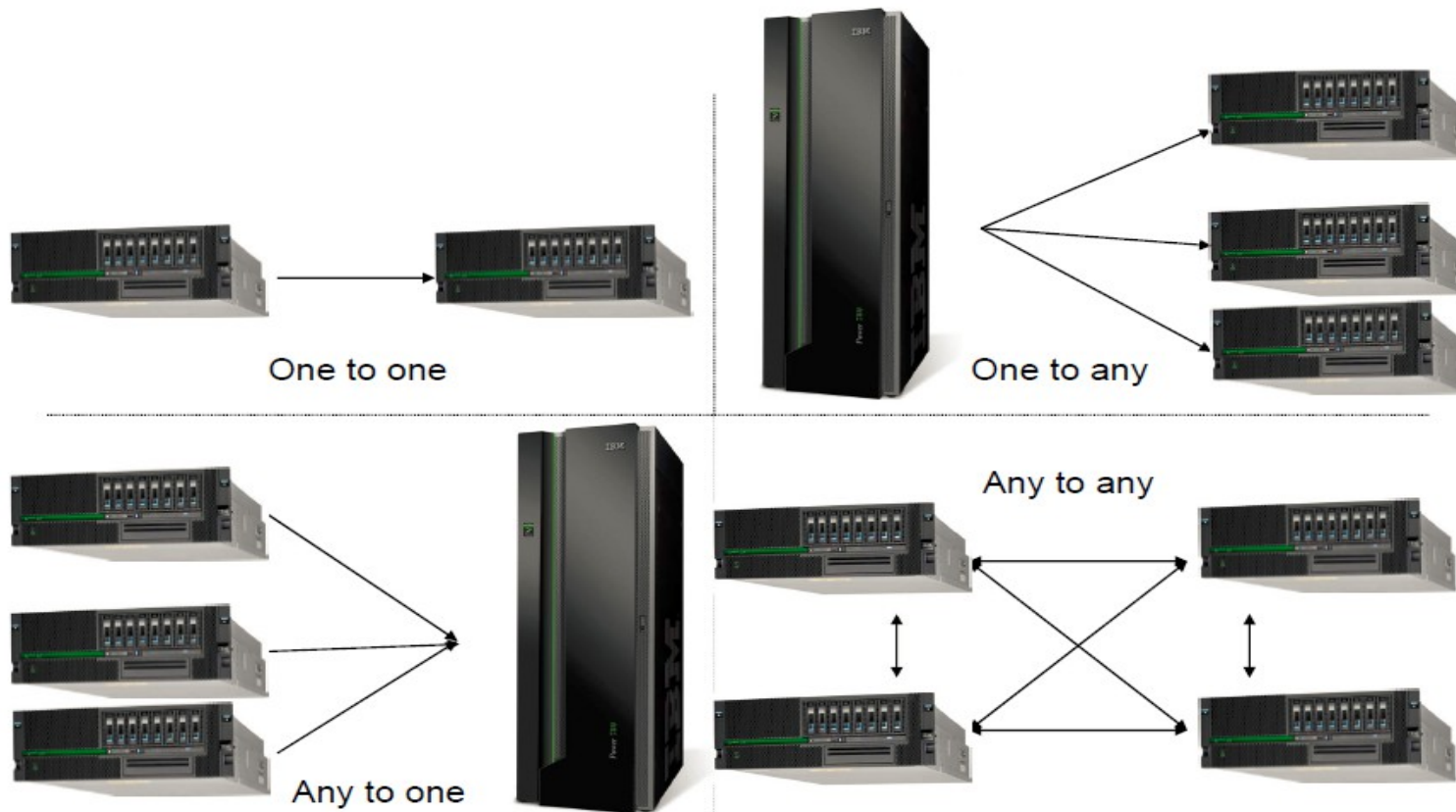
IBM Power Systems



30 mn

PowerHA SystemMirror

Un cluster ? Oui mais quelle architecture ?



Besoin client : Data Center

- Exigences demandées :
 - Application en service “*presque*” continu
 - Recovery Time Objective (RTO) mesuré en minutes
 - Recovery Point Objective (RPO) égal à zéro (pas de données perdues)
 - Elimine les effets d’arrêts planifiés

- Solution :
 - PowerHA SystemMirror **Standard Edition**



Besoin client aujourd'hui : Solution unifiée HA/DR

- Exigences demandées:
 - Cluster HA/DR pour Data Center et opération multi site
 - Opérations de bascule automatisé
 - Capacité à démontrer la conformité d'une reprise distante
- Solution :
 - Solution de Cluster unifiée pour Data Center et de résilience multi site
 - PowerHA SystemMirror **Enterprise Edition**



Data Center

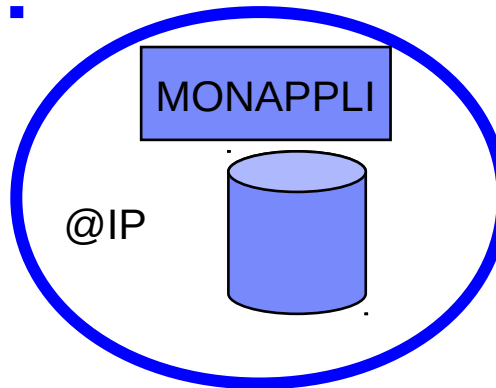


Remote Site

Le principe de base de PowerHA

- PowerHA est en charge de la haute disponibilité d'un groupe de ressource
- Un groupe de ressource comprend au minimum :
 - Un espace partagé (disque, groupe de volume, système de fichier)
 - Une adresse de service connu aussi sous le nom de VIP (virtual IP),
 - Une application avec ses scripts de démarrage, d'arrêt et de surveillance

Un groupe
de ressource



PowerHA SystemMirror existe en deux éditions licenciées au coeur :

- Standard Edition
- Enterprise Edition

Versions

6.1 : disponible depuis le 20 octobre 2009
sortie de support standard depuis 30 avril 2015

7.1 : disponible depuis le 9 novembre 2012
support jusqu'au 30 avril 2018

7.2 : disponible depuis le 4 décembre 2015
pas de date annoncée

PowerHA : Annonce (réf ZS17-0016) du 9 mai pour une disponibilité au 23 juin 2017

Le SP1 de PowerHA SystemMirror, V7.2.1 pour AIX apporte les nouveautés suivantes :

- Un outil facile pour effectuer simplement et automatiquement les mises à jour sur un ou plusieurs noeuds dans un cluster en utilisation les mises à jour depuis un serveur NIM ou un système de fichier, local*
- le support pour des communications RESTful comme un complément pour permettre à PowerHA de communiquer avec une HMC pour de fonctions de gestion comme Resource Optimized High Availability (ROHA) et Active Node Halt Policy (ANHP)*
- Un tableau de bord graphique pour les version 7.1.3 et 7.2, déjà disponible pour PowerHA 7.2.1*

https://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/5/877/ENUSZP17-0315/index.html&lang=en&request_locale=en

PowerHA SystemMirror 7.2 (2015 Release): Feature Summary

	Feature	Description
1	ROHA (Resource Optimized High Availability)	<ul style="list-style-type: none">• Flexible Capacity management across various Power pools• Enterprise Pool Integration• Manipulate Shared Processor Pool Sizes• New HMC Integration Tunables
2	Non-Disruptive Upgrade Support (PowerHA code)	<ul style="list-style-type: none">• Ability to upgrade HA to 7.2 from 7.1.3 without requiring a Rolling Upgrade or interruption of service
3	Automatic Repository Disk Replacement	<ul style="list-style-type: none">• Define multiple repository disks & auto replacement behavior with AIX 7.2
4	AIX Live Update Support & LPM Support Enhancements	<ul style="list-style-type: none">• (optional) Validation of a number of new checks including AIX Expert Settings
5	Cluster Detailed Verification Checks	<ul style="list-style-type: none">• (optional) Validation of a number of new checks including AIX Runtime Expert Settings
6	Quarantine Policies (Critical RG)	Split handling protections <ul style="list-style-type: none">• HMC Node Halt Policy• SCSI3 Node Fence Policy
7	NFS Backed Tie Breaker Disk support	<ul style="list-style-type: none">• New support flexibility to avoid the need of a NAS backed device when using Tie Breaker Disk function

PowerHA SystemMirror 7.2 (2015 Release): Important Links

PowerHA 7.2 Release Notes	https://ibm.biz/BdHaRM
PowerHA 7.2 Images (download)	<p>ESS website. Look for 5765-H39, feature 2322 https://www-304.ibm.com/servers/eserver/ess/ProtectedServlet.wss Service Pack 1: SP1: http://www-933.ibm.com/support/fixcentral/swg/selectFixes?parent=Cluster%2Bsoftware&product=ibm/Other+software/PowerHAClusterManager&release=7.2.0&platform=All&function=all</p>
PowerHA 7.2 Redbook	http://www.redbooks.ibm.com/Redbooks.nsf/RedpieceAbstracts/sg248278.html?Open
PowerHA 7.2 Video Demos	
Non-disruptive upgrade from 713 to 72	https://www.youtube.com/watch?v=1Kzm7I2mRyE
ROHA: Flexible Capacity Management	https://www.youtube.com/watch?v=G-zefev-XYU
Automated Repository Replacement	https://www.youtube.com/watch?v=HJZZDCXLwTk
AIX Live update (PowerHA node)	https://www.youtube.com/watch?v=BJAnpN-6Sno
Rootvg Failure monitoring	https://www.youtube.com/watch?v=OZcrhVGvkBg
PowerHA 7.2 Articles	
Split Handling: Active Node Halt Policy using HMC	https://www.ibm.com/developerworks/community/wikis/home?lang=en_us#!/wiki/61ad9cf2-c6a3-4d2c-b779-61ff0266d32a/page/Blogs%20%26%20Articles
Split Handling: Disk Fencing (SCSI3)	https://www.ibm.com/support/knowledgecenter/en/SSPHQG_7.1.0/com.ibm.powerha.admngd/ha_admin_mergesplit_policy.htm

IBM Design Thinking

- Un des quatre piliers de la stratégie 'digitale' d'IBM
- Co-création : clients et IBM
- Premières concrétisations :
 - PowerHA 7.2.1
 - PowerSC 1.1.5
- en cours ... Power Enterprise Pool ...



<https://www.ibm.com/design/thinking/>

PowerHA

- Point de surveillance centralisé de toutes les VM AIX sous PowerHA,
- Surveillance du statut de tous les clusters, sites, noeuds et groupes de ressource dans votre environnement,
- Scrute les résumés des événements et affiche une description détaillée pour chaque événement. Si un événement survient à cause d'une erreur dans l'environnement, des suggestions pour corriger sont proposées,
- Recherche et comparaison de fichiers journaux,
- Affiche toutes les propriétés d'un cluster.

IBM PowerHA SystemMirror for AIX

User name

Password

Log In

IBM AIX 7 with Technology Level 3 with Service Pack 7, or later
IBM AIX 7 with Technology Level 4 with Service Pack 2, or later
IBM AIX Version 7.2 with Service Pack 2, or later
IBM AIX 7.2 with Technology Level 1 with Service Pack 1, or later

PowerHA

Installation

- ✓ via smit

Installation

- ✓ finalisation

- ✓ Démarrage

- ✓ Arrêt

- ✓ Fichiers journaux

uiagent

```
cluster.es.smui.agent 7.2.1.0 USR APPLY SUCCESS
cluster.es.smui.agent 7.2.1.0 ROOT APPLY SUCCESS
```

uiserver

Installation Summary

```
-----
Name                      Level      Part      Event      Result
-----
cluster.es.smui.server    7.2.1.0    USR        APPLY       SUCCESS
cluster.es.smui.server    7.2.1.0    ROOT       APPLY       SUCCESS
```

```
#####
##
## The IBM PowerHA SystemMirror for AIX graphical user interface
## (GUI) server was installed successfully. To complete the
## installation process, you must install additional files. These
## additional files were not included in the server fileset because
## they are licensed under the General Public License (GPL). However,
## you can automatically download the required files by running the
## following script:
##
## /usr/es/sbin/cluster/ui/server/bin/smuiinst.ksh
##
#####
```

uiagent
et
uiserver

```
powerha2b : /> lssrc -g smui
Subsystem      Group      PID      Status
uiserver       smui       5046762   active
uiagent        smui       7274966   active
```

uiagent
et
uiserver

```
powerha2b : /usr/es/sbin/cluster/ui> ls server/logs agent/logs
agent/logs:
agent_deploy.log      notify-event.log      uiagent.log
agent_distribution.log smui-agent.log        uiagent.log.1

server/logs:
smui-server.log  uiserver.log
```

PowerHA

- Vue centralisé globale
- navigation facile
- Interface réactive
- recherche 'immédiate'
- vue rapide d'un cluster en particulier

IBM PowerHA SystemMirror for AIX

Navigation icons: Home, Search, Filter, View all events summaries, and a green checkmark icon circled in blue.

All Events Summaries

Last update: 2:45:40 PM

1 Cluster

Critical	Warning	Maintenance
0	0	0

2 Nodes

Critical	Warning	Maintenance
0	0	0

2 Resource groups

Critical	Warning	Maintenance
0	0	0

Filter: [Critical] [Warning] [Maintenance] [Stable] [Search Events]

0 events

March 2017

4	5	6	7	8	9	10

View all events summaries

- powerha721_cluster Stable
- powerha1b Normal
 - rg1 Online
 - rg2 Offline
- powerha2b Normal
 - rg1 Offline
 - rg2 Online

powerha721_cluster

Last update: 2:58:28 PM

Events summaries | Logs | General | Network

2 Nodes

Critical	Warning	Maintenance
0	0	0

2 Resource groups

Critical	Warning	Maintenance
0	0	0

Filter: [Critical] [Warning] [Maintenance] [Stable] [Search Events]

0 events

Reset

March 2017

4	5	6	7	8	9	10

Navigation: +, -, <, >

PowerHA

Vue générale Résumé pour un cluster

The screenshot displays the IBM PowerHA SystemMirror for AIX web interface. The top navigation bar includes the title "IBM PowerHA SystemMirror for AIX", a user profile "Hello root", and a search icon. The left sidebar contains a "Minimize menu" button and a "View all events summaries" link. The main content area shows the "powerha721_cluster" status as "Stable" with a green checkmark. Below this, there are tabs for "Events summaries", "Logs", "General", and "Network". The "Events summaries" tab is active, showing a summary of 2 Nodes and 2 Resource groups. Each node and resource group has three status indicators: Critical (0), Warning (0), and Maintenance (0). At the bottom, there is a "Filter" section with icons for Critical (red exclamation mark), Warning (yellow triangle), Maintenance (green wrench), and Stable (green checkmark). A search bar labeled "Search Events" is also present.

IBM PowerHA SystemMirror for AIX

Minimize menu

View all events summaries

powerha721_cluster Stable

powerha1b Normal

rg1 Online

rg2 Online

powerha2b

powerha721_cluster

Last update: 4:22:52 PM

Events summaries Logs General Network

2 Nodes

2 Resource groups

0 Critical 0 Warning 0 Maintenance

0 Critical 0 Warning 0 Maintenance

Filter

Search Events

PowerHA

Accès en un seul
endroit de tous les
fichiers journaux
avec possibilité de
recherche de mot clé

error < > fail < > could not < > preamble < > X

start_server ac1 < > X

Search logs < > X

Open terminal

Logs

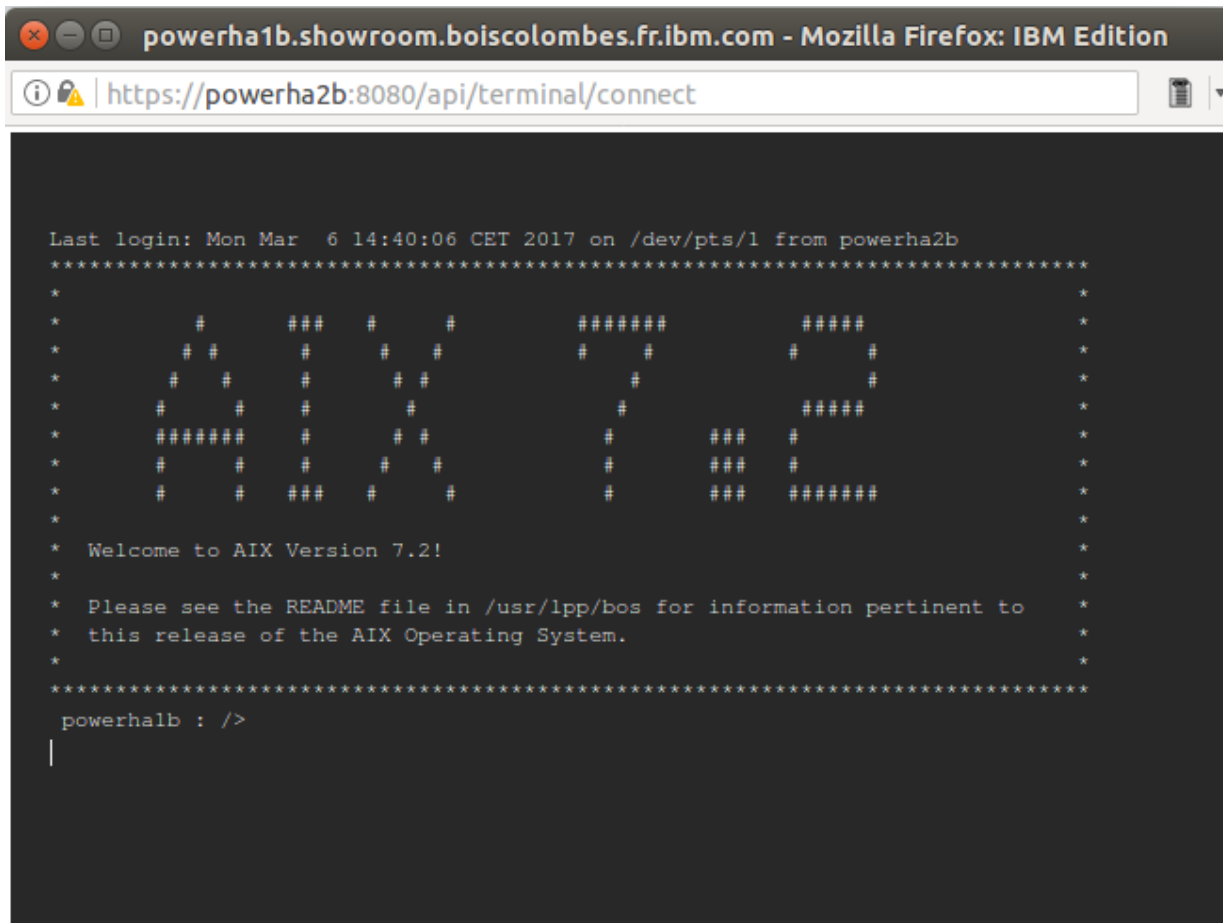
- Events log
hacmp.out
- powerha1b
- powerha2b
- AIX system error log
errpt
- Cluster utility log
clutils.log
- Cluster aware log
- Cluster verification log
clverify.log
- Automatic cluster verification log
autoverify.log
- Cluster manager log
clstrmgr.debug
- Cluster log
cluster.log

powerha1b Events log (hacmp.out)

```
Mar 6 2017 10:48:26 GMT 01:00 EVENT COMPLETED: rg_move_fence powerha1b 1
Mar 6 2017 10:48:29 GMT 01:00 EVENT START: rg_move_fence powerha1b 1
Mar 6 2017 10:48:30 GMT 01:00 EVENT COMPLETED: rg_move_fence powerha1b 1
Mar 6 2017 10:48:32 GMT 01:00 EVENT START: rg_move_acquire powerha1b 1
Mar 6 2017 10:48:34 GMT 01:00 EVENT START: rg_move powerha1b 1 ACQUIRE
Mar 6 2017 10:48:36 GMT 01:00 EVENT START: acquire_service_addr
Mar 6 2017 10:48:37 GMT 01:00 EVENT COMPLETED: acquire_service_addr 0
Mar 6 2017 10:48:38 GMT 01:00 EVENT COMPLETED: rg_move powerha1b 1 ACQUIR
Mar 6 2017 10:48:39 GMT 01:00 EVENT COMPLETED: rg_move_acquire powerha1b
Mar 6 2017 10:48:40 GMT 01:00 EVENT START: rg_move_complete powerha1b 1
Mar 6 2017 10:48:45 GMT 01:00 EVENT START: start_server ac1
Mar 6 2017 10:48:47 GMT 01:00 EVENT COMPLETED: start_server ac1 0
Mar 6 2017 10:48:49 GMT 01:00 EVENT COMPLETED: rg_move_complete powerha1b
HACMP Event Preamble
Mar 6 2017 10:48:54 GMT 01:00 EVENT START: external_resource_state_change
Mar 6 2017 10:48:55 GMT 01:00 EVENT COMPLETED: external_resource_state_ch
HACMP Event Preamble
Mar 6 2017 14:42:40 GMT 01:00 EVENT START: external_resource_state_change
Mar 6 2017 14:42:41 GMT 01:00 EVENT COMPLETED: external_resource_state ch
```

Host name or IP address powerha1b.showroom.boiscolor Authentication method SSH password SSH user ID (root access required) root SSH password

Ouverture d'une console depuis le navigateur



The screenshot shows a Mozilla Firefox browser window with the title "powerha1b.showroom.boiscolombes.fr.ibm.com - Mozilla Firefox: IBM Edition". The address bar displays the URL "https://powerha2b:8080/api/terminal/connect". The main content area shows a terminal window with a dark background and white text. The terminal output includes a login message, a welcome message for AIX Version 7.2, and a prompt for the user "powerhalb".

```
Last login: Mon Mar  6 14:40:06 CET 2017 on /dev/pts/1 from powerha2b
*****
*                                     *
*      #   ##  #   #       #####       #### *
*      #  #   #   #   #       #  #       #  # *
*      #  #   #   #   #       #          #  # *
*      #  #   #   #   #       #          ##### *
*      #####  #   #   #       #   ##  #  # *
*      #   #   #   #   #       #   ##  #  # *
*      #   #   ##  #   #       #   ##  ##### *
*                                     *
* Welcome to AIX Version 7.2! *
*                                     *
* Please see the README file in /usr/lpp/bos for information pertinent to *
* this release of the AIX Operating System. *
*                                     *
*****
powerhalb : />
|
```


PowerHA

Affichage
condensée

[Events summaries](#)[Logs](#)[General](#)[Network](#)

Captured on 03/06/2017 11:56:14 AM

[+](#) Open all

[-](#) Close all

[Open terminal](#)



[+](#) **General:**

[+](#) **Security:**

[+](#) **Tuning:**

[+](#) **Split/Merge policies:**

[+](#) **Verification:**

[+](#) **Repository disks ( 0  2)**

[+](#) **2 File collections**

[-](#) **0 Custom cluster events**

Affichage
étendue

Information
générale

Sécurité
Tuning
Split/Merge Policies
Verification

Repository disks

File collections

Events summaries

Logs

General

Network

Captured on 03/06/2017 3:08:34 PM

+

 Open all

-

 Close all

Open terminal

General:

Cluster name: powerha721_cluster

Version: 7.2.1.0

Type: Nonsite

Edition: STANDARD

Synchronization: Synchronized

Heartbeat type: UNICAST

Heartbeat frequency: 30

Nodes: powerha1b (powerha1b.showroom.boiscolombes.fr.ibm.com), powerha2b (powerha2b.showroom.boiscolombes.fr.ibm.com)

Controlling node: powerha2b (powerha2b.showroom.boiscolombes.fr.ibm.com)

Security:

Level: DISABLED

Algorithm:

Refresh:

Mechanism:

Certificate:

Private key:

Tuning:

Heartbeat frequency: 30

Grace period: 10

Site heartbeat cycle: 0

Site grace period: 0

Sync file collections: 10

Event timeout: 180 seconds

Auto verify cluster config: Enabled

Config_Too_Long time limit: 360 seconds

Split/Merge policies:

Split policy: none

Merge policy: majority

Action plan: reboot

Tie breaker:

Notify method:

Notify interval:

Maximum notifications:

Default surviving site:

Apply to PPRC takeover: no

Verification:

Auto daily verification: Enabled

Verification node: Default

Verification hour: 0

Verification debugging: Enabled

Custom verification method:

2 Repository disks

	Name	Site	Active	Size	PVID	UUID
✓	hdisk1		no	20480 MB	00f6a8bcd44a747c	0a3afd1c-be61-0582-bb8a-7e76a06c97e0
✓	hdisk2		no	20480 MB	00f6a8bcd44a9fbc	d1f00415-fb2a-8fcf-396b-62a51a9240b6

2 File collections

+

 Open all files or directories

-

 Close all files or directories

Name	Description	Propagate files during sync	Propagate files when changed	Files or directories
Configuration_Files	AIX and PowerHA SystemMirror configuration files	no	no	10 files or directories

Affichage des réseaux

← Minimize menu

🔍

👁 View all events summaries

✓ powerha721_cluster
Stable

▼

✓ powerha1b
Normal

▼

✓ rg1
Online

✓ rg2
Offline

✓ powerha2b
Normal

▼

✓ rg1
Offline

✓ rg2
Online

✓ powerha721_cluster

Events summaries Logs General **Network**

Captured on 03/06/2017 3:06:13 PM

Open terminal

1 Network and 10 Interfaces

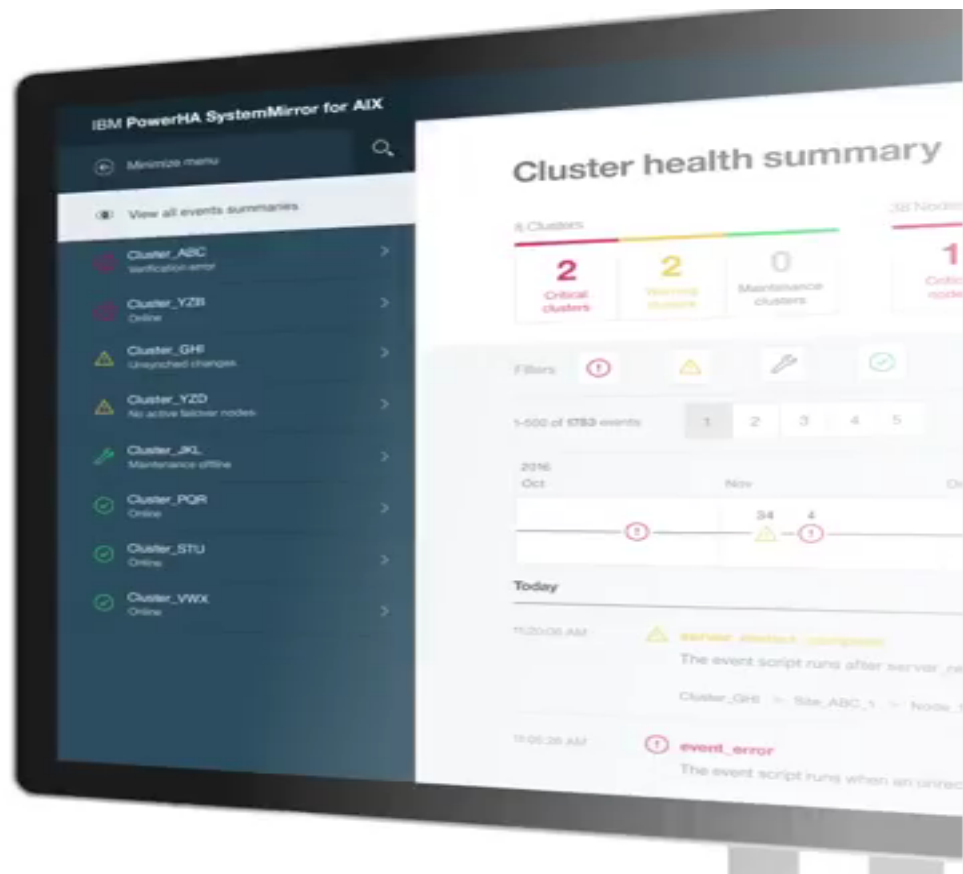
⊕ Open all networks

⊖ Close all networks

⌵	Network/IP label ⌵	IP address ⌵	Interface type ⌵	Node ⌵	Interface ⌵	Netmask ⌵
⊖	net_ether_01					
	ipsvc4	10.101.0.4	service			255.255.255.0
✓	ipbase3B	10.100.3.2	boot	powerha2b	en3	255.255.255.0
✓	ipbase3A	10.100.3.1	boot	powerha1b	en3	255.255.255.0
✓	ipsvc3	10.101.0.3	service	powerha1b	en2	255.255.255.0
✓	gpfsv4d-gpfs	10.100.5.4	boot	powerha2b	en2	255.255.255.0
✓	gpfsv4c-gpfs	10.100.5.3	boot	powerha1b	en2	255.255.255.0

Introducing PowerHA SystemMirror for AIX

Identify problems and resolutions faster than ever before



https://www.youtube.com/watch?v=d_QVvh2dcCM&feature=share

M E R C I !



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