



PowerHA SystemMirror for AIX v7.1 Two-Node Quick Configuration Guide

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Table of Contents

A. Introduction	3
B. Configuring the Cluster	4
Configuring VLAN 3358 for SAN heartbeat.....	8
C. Testing the Cluster.....	19
E. References	22
Appendix A – Cluster Test Tool Log.....	23

A. Introduction

The purpose of this document is to provide the steps to quickly configure a two-node hot-standby PowerHA v7.1 cluster primarily using SMIT.

My environment during the original writing was comprised of the following:

- One p260 and one p460 Power Compute Nodes with 8GB Fibre Channel Mezzanine Adapters
- Flex System Enterprise Chassis with two 10GB Ethernet Switches and two 8GB QLogic Fibre Channel Switch Modules
- V7000 Storage
- AIX 7.1, TL 1, SP 3
- PowerHA Version 7.1.1 SP3
- RSCT 3.1.2

If installing PowerHA v7.1.2 or v7.1.3 the following matrix can be referenced for base AIX level requirements.

<http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD101347>

Though the following steps are the same for both 7.1.2 and 7.1.3, there is one menu difference in v7.1.3. It is the addition of unicast for heartbeating. An updated screen shot has been added to reflect it.

B. Configuring the Cluster

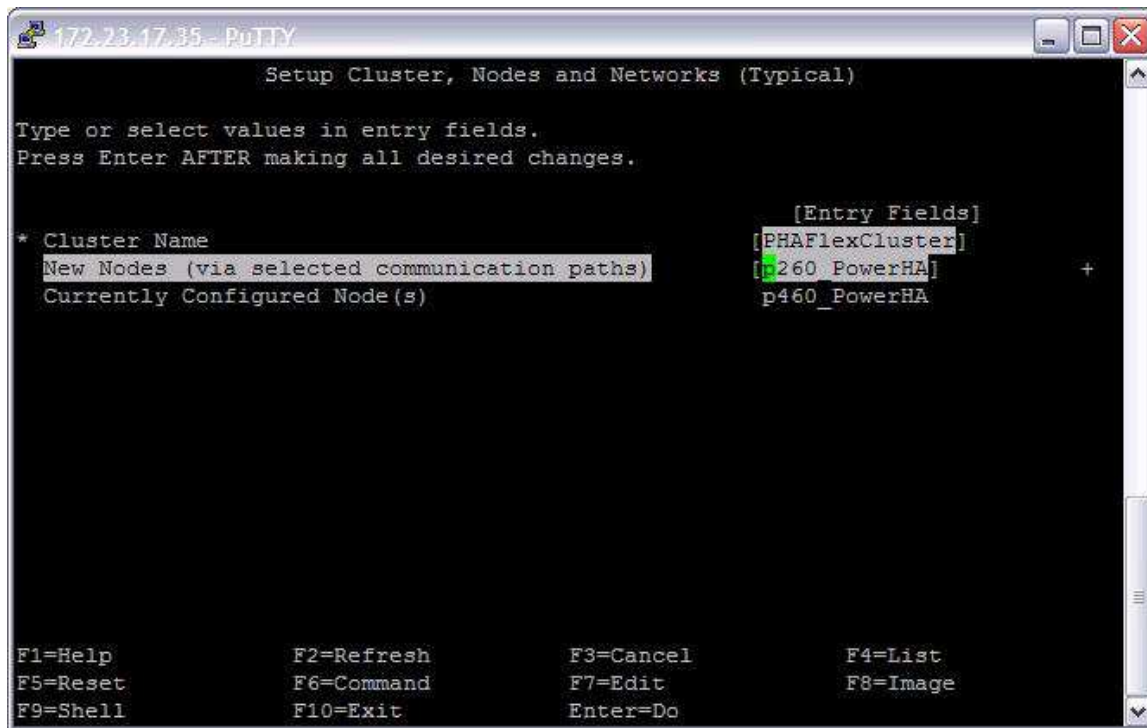
The following prerequisites are required prior to creating a new cluster.

1. CAA specific filesets *bos.cluster* and *bos.ahafs*
2. All pre-req filesets and PowerHA installed
3. clcomd daemon must be running on each node (*lssrc -ls clcomd*)
4. Boot IP addresses must be configured on each interface (*smitty chinnet*)
5. All Boot and Service IPs must be configured in */etc/hosts*.
6. Hostname IP addresses added to */etc/cluster/rhosts*
7. Application server scripts must exist on each node.
8. PVIDs of the shared disks must be known to both systems.
9. One free shared disk to be specifically used for cluster repository disk.
10. The hostname must resolve to an interface and by default will be the same as the cluster node names.
This name must contain only alpha-numeric and underscores, no dashes.
11. Multicasting must be enabled on your network. The *mping* command can be used to test if multicasting is working.

Additional details on installing and configuring PowerHA SystemMirror can be found in the [Installing PowerHA SystemMirror](#) guide.

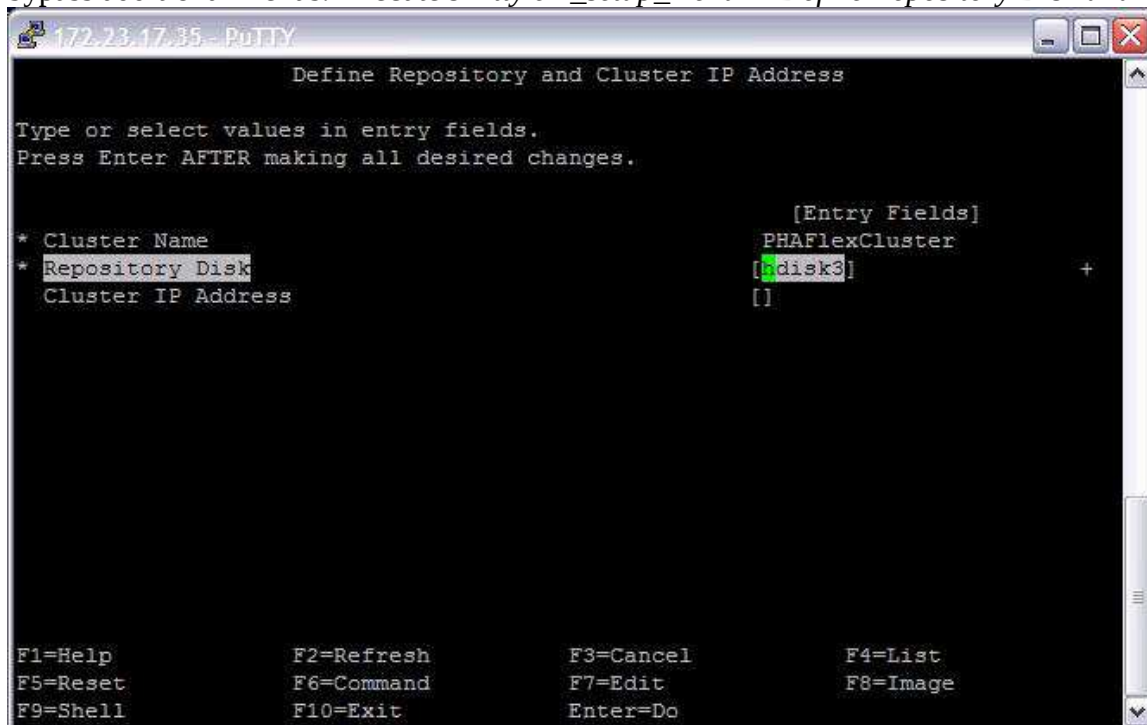
This cluster was configured utilizing standard SMIT *sysmirror* menus. There is also the option of utilizing the PowerHA Systems Director plug-in to configure, monitor and manage the cluster. More information on the Systems Director plug-in option can be found in the [PowerHA v7.1 redbook](#).

To start creating the cluster, enter *smitty sysmirror*→ *Cluster Nodes and Networks*→ *Initial Cluster Setup (Typical)* → *Setup a Cluster, Nodes and Networks*



Fill out the options as desired and press Enter. Upon execution it will perform a discovery to gather both IP and shared disk information to be used in the cluster configuration.

The next step is to define a cluster repository disk and multicast address. We can use fastpaths in SMIT to bypass additional menus. Execute *smitty cm_setup_menu* → *Define Repository Disk and Cluster IP Address*:



For the repository disk field, you can press F4 and get a pick list to choose the desired disk. This data is gathered during the discovery in the first step of creating the cluster. The available disks list is created by finding all shared disks, with PVIDs, not currently in a volume group.

In PowerHA v7.1.0-v7.1.2 the use of multicasting is required. The Cluster IP address is the multicast address. Its not required to enter one as PowerHA will choose one for you. It usually creates one by taking the last 3 octets of the hostname IP address from the node in which the cluster is being created on and replacing the first octet with 228. In our cluster, we created it on the p460 with hostname address of 172.23.17.35. The multicast address was created automatically of 228.23.17.35.

However, in v7.1.3 unicast was re-introduced making multicast optional. The v7.1.3 menu is shown below:



After these two steps it is recommended to synchronize the cluster. (Execute *smitty sysmirror*→*Cluster Nodes and Networks*→*Verify and Synchronize Cluster Configuration* and press Enter twice). The main reason being, the first time the cluster is synced the CAA cluster is created automatically. That way if a problem is encountered, it can be addressed before adding all the additional cluster components. The following shows the disk and CAA volume group information after the synchronization and CAA cluster was created successfully.

```

172.23.17.18 - PuTTY
# lspv
hdisk0          00021b8bb9754427      rootvg      active
hdisk1          00021b8bedb61d27      caavg_private active
hdisk2          00021b8bedb6c000      None
hdisk3          00021b8bede4b25b      None
hdisk4          00021b7bef728b25      None

# lsvg -l caavg_private
caavg_private:
LV NAME          TYPE      LPS      PPS      PVs  LV STATE    MOUNT POINT
caalv_private1   boot      1         1         1  closed/syncd N/A
caalv_private2   boot      1         1         1  closed/syncd N/A
caalv_private3   boot      4         4         1  open/syncd   N/A
powerha_crlv     boot      1         1         1  closed/syncd N/A
#

```

Though optional (and not used in this test configuration), its considered a best practice to also configure SAN based communications. This requires setting the appropriated FC adapter attributes on VIO servers, and adding virtual Ethernet adapters using a specific VLAN (3358) .

Other than the PowerHA 7.1.1 redbook and APAR that added this support, these steps have never been clearly documented in an officially publication. However, during the collaboration on another whitepaper involving PowerHA v7.1 and v7000 (<http://tinyurl.com/c3vk7>), we took the opportunity to document it. The following is a snippet from that whitepaper.

Login to each VIOS partition and change the fibre channel attributes using the **chdev** command. Depending on how disks are configured in the system, you may have to use the **rmdev** command to put the device in the defined state. After changing the attributes, use the **cfgdev** command to configure the device or reboot the partition.

```

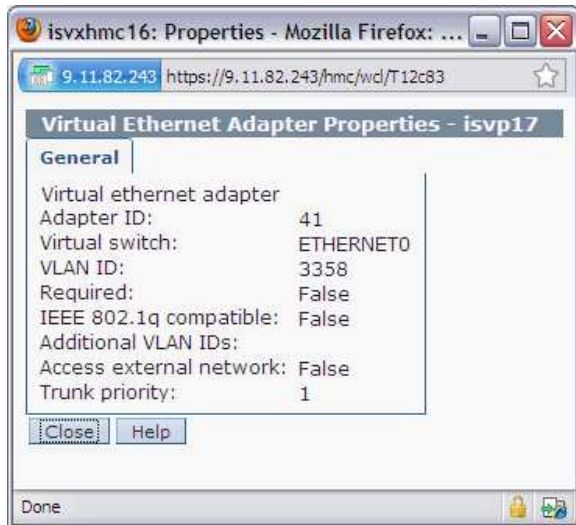
# > rmdev -dev fcs0 -ucfg -recursive
fcnet0 Defined
sfwcomm1 Defined
fscsi0 Defined
fcs0 Defined
# > chdev -dev fcs0 -perm -attr tme=yes
fcs0 changed
# > chdev -dev fscsi0 -perm -attr dyntrk=yes
fscsi0 changed
# > chdev -dev fscsi0 -perm -attr fc_err_recov=fast_fail
fscsi0 changed
# > lsdev -dev fcs0 -attr |grep tme
tme          yes          Target Mode Enabled          True
# > lsdev -dev fscsi0 -attr |grep dyntrk
dyntrk       yes          Dynamic Tracking of FC Devices True
# > lsdev -dev fscsi0 -attr |grep fc_err_recov

```

```
fc_err_recov fast_fail FC Fabric Event Error RECOVERY Policy True
# > cfgdev
```

Configuring VLAN 3358 for SAN heartbeat

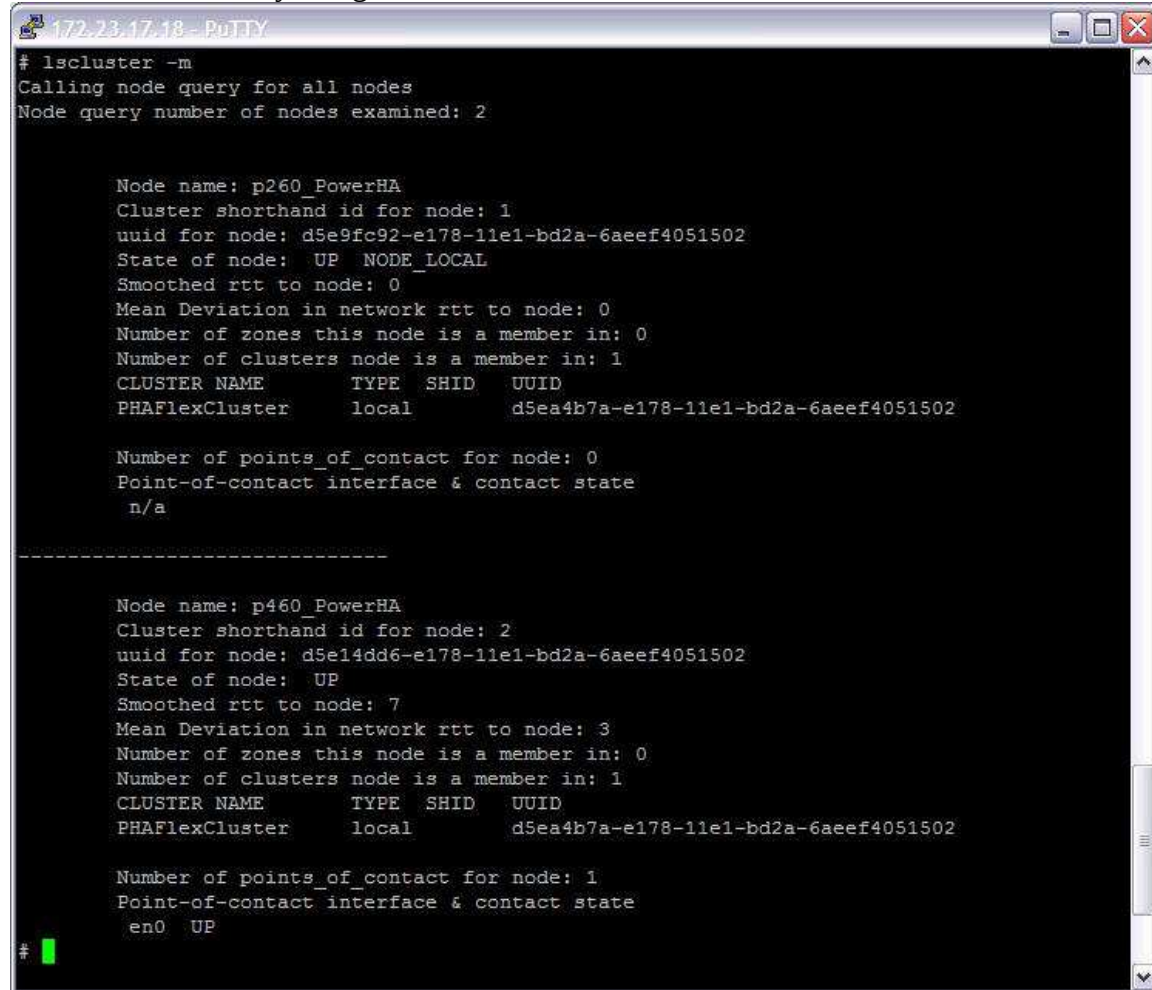
Since the fibre channel devices are not owned directly by the client LPARs, CAA uses a special VLAN to communicate the SAN heartbeat. Create a virtual ethernet adapter using the HMC with the VLAN id = 3358, on the client LPAR and each VIOS partition. Then activate the new profiles.



Another valuable source of documentation for this topic can be found at:

<http://www.ibm.com/developerworks/aix/library/au-aix-powerha-heartbeat/index.html>

Overall, you should never have to manually administer the CAA cluster. Additional information on the CAA cluster can be seen by using the *lscluster* command as follows:



```
# lscluster -m
Calling node query for all nodes
Node query number of nodes examined: 2

Node name: p260_PowerHA
Cluster shorthand id for node: 1
uuid for node: d5e9fc92-e178-11e1-bd2a-6aeef4051502
State of node: UP NODE_LOCAL
Smoothed rtt to node: 0
Mean Deviation in network rtt to node: 0
Number of zones this node is a member in: 0
Number of clusters node is a member in: 1
CLUSTER NAME      TYPE  SHID  UUID
PHAFlexCluster    local d5ea4b7a-e178-11e1-bd2a-6aeef4051502

Number of points_of_contact for node: 0
Point-of-contact interface & contact state
n/a

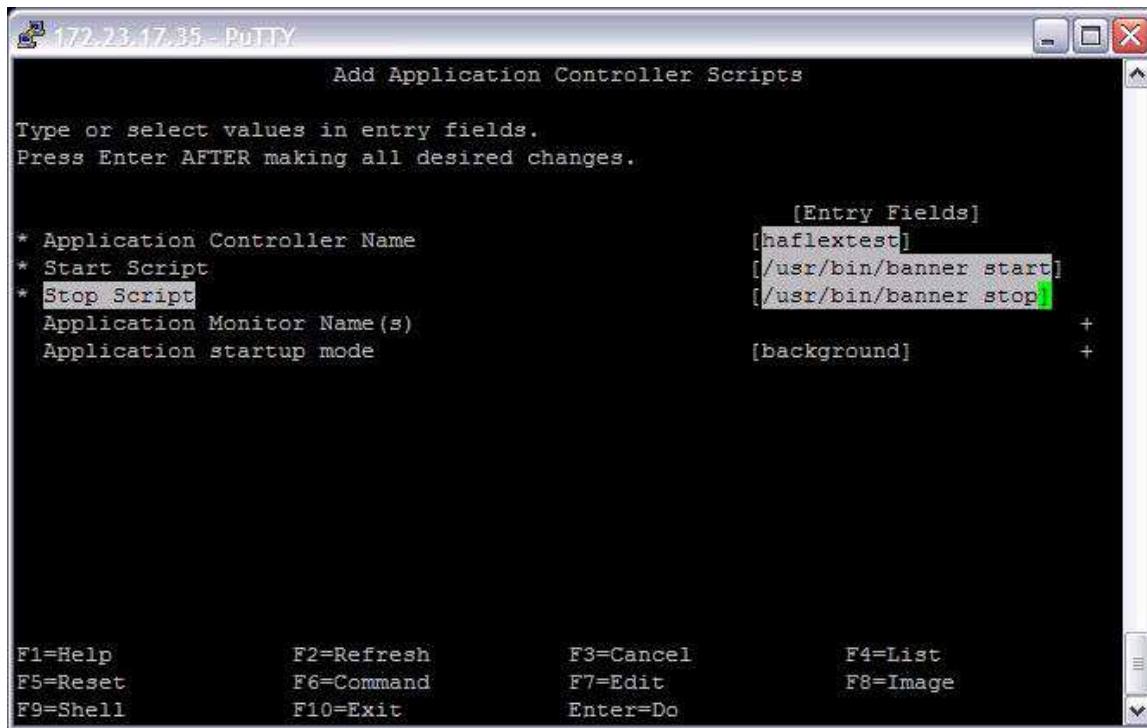
-----

Node name: p460_PowerHA
Cluster shorthand id for node: 2
uuid for node: d5e14dd6-e178-11e1-bd2a-6aeef4051502
State of node: UP
Smoothed rtt to node: 7
Mean Deviation in network rtt to node: 3
Number of zones this node is a member in: 0
Number of clusters node is a member in: 1
CLUSTER NAME      TYPE  SHID  UUID
PHAFlexCluster    local d5ea4b7a-e178-11e1-bd2a-6aeef4051502

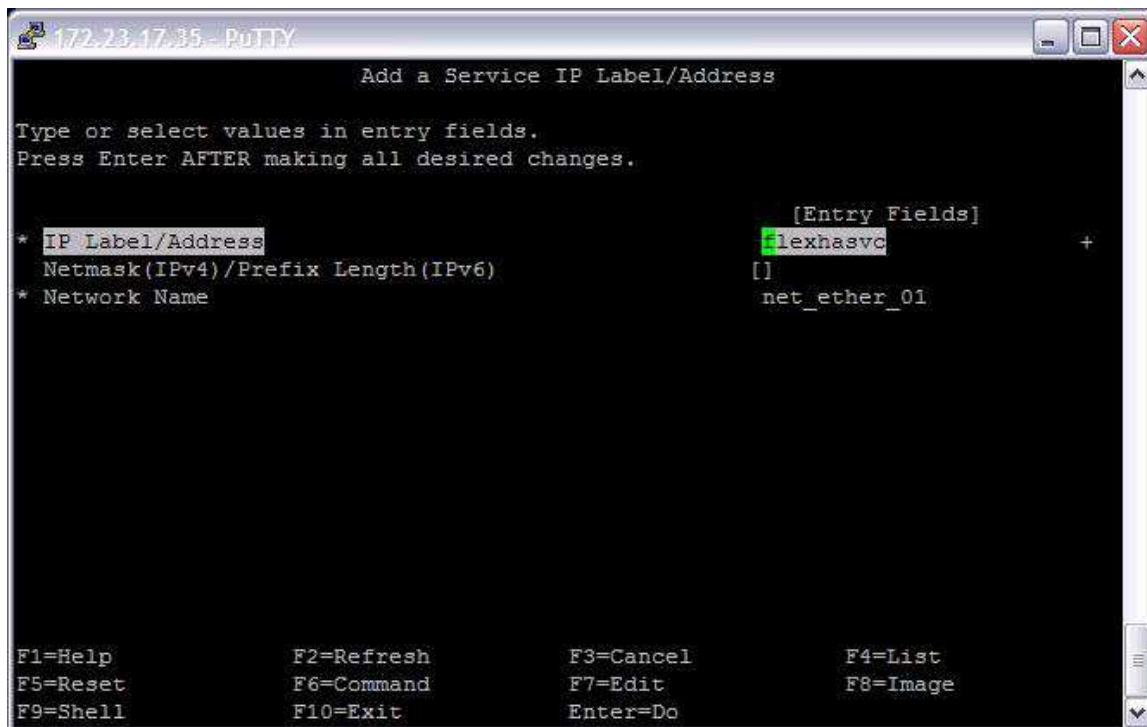
Number of points_of_contact for node: 1
Point-of-contact interface & contact state
en0 UP
```

We now need to create our resources (application controller, service address, and shared volume group) and a resource group to add them into.

In our scenario we have no real application to utilize. So we created a dummy application controller by simply having it execute a *banner* command. We can add it by executing *smitty sysmirror* → *Cluster Applications and Resources* → *Resources* → *Configure User Applications (Scripts and Monitors)* → *Application Controller Scripts*



Now we need to add a service IP address. To do so execute the fastpath of *smitty cm_resource_menu*→ *Configure Service IP Labels/Addresses*→ *Add a Service IP Label/Address* (choose *net_ether0* from pop-up)



After adding the service IP we can see it has been added to the cluster topology as shown from the *cllsif* output as follows:

```

172.23.17.18 - PuTTY
# ./clicsif
Adapter          Type      Network  Net Type  Attribute  Node      IP Address      Hardware Address Interface Name  Global Name      Netmask      Alias for HB Prefix Leng
p260_PowerHA     boot     net_ether_01 ether    public    p260_PowerHA 172.23.17.18      en0              255.255.255.0    24
flexhasvc        service  net_ether_01 ether    public    p260_PowerHA 172.23.17.110     en0              255.255.255.0    24
p460_PowerHA     boot     net_ether_01 ether    public    p460_PowerHA 172.23.17.35      en0              255.255.255.0    24
flexhasvc        service  net_ether_01 ether    public    p460_PowerHA 172.23.17.110     en0              255.255.255.0    24
#

```

Now we need to create a resource group and add these resources to it. To create a new resource group, execute the fastpath of *smitty cm_add_resource_group*.

```

172.23.17.35 - PuTTY

Add a Resource Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]
* Resource Group Name      [FlexRG]
* Participating Nodes (Default Node Priority) [p460_PowerHA p260_Pow> +
Startup Policy             Online On Home Node O> +
Fallover Policy            Fallover To Next Prio> +
Fallback Policy            Never Fallback        +

F1=Help      F2=Refresh    F3=Cancel    F4=List
F5=Reset     F6=Command    F7=Edit      F8=Image
F9=Shell     F10=Exit      Enter=Do

```

To add the resources to the resource group, execute the same fastpath of *smitty cm_resource_groups*→*Change/Show Resources and Attributes for a Resource Group* and choose the previously created resource group. Then for the fields of *Service IP Labels/Addresses* and *Application Controllers*, press F4 and a pop-up will appear with the ones previous created. Choose them, and press Enter.

The last thing to configure is the shared data volume group, logical volume(s) and filesystem(s). This can be accomplished by using the Cluster Single Point of Control facility (C-SPOC). Enter *smitty cspoc*→*Storage*→*Volume Groups*→*Create a Volume Group* (choose both nodes). Then choose the desired disk as shown below:

```
172.23.17.35 - PuTTY
Volume Groups
Move cursor to desired item and press Enter.
[TOP]
List All Volume Groups
-----
Physical Volume Names
-----
Move cursor to desired item and press F7.
ONE OR MORE items can be selected.
Press Enter AFTER making all selections.

00021b7bef728b25 ( hdisk2 on node p460_PowerHA )
00021b7bef728b25 ( hdisk4 on node p260_PowerHA )
00021b8bedb6c000 ( hdisk2 on node p260_PowerHA )
00021b8bedb6c000 ( hdisk4 on node p460_PowerHA )
> 00021b8bede4b25b ( hdisk1 on node p460_PowerHA )
> 00021b8bede4b25b ( hdisk3 on node p260_PowerHA )

[M] F1=Help          F2=Refresh          F3=Cancel
    F7=Select        F8=Image            F10=Exit
F1| Enter=Do         /=Find              n=Find Next
F9+-----
```

Then choose the desired volume group type. In most cases, and our example, a scalable volume group is appropriate.

```
172.23.17.35 - PuTTY
Volume Groups
Move cursor to desired item and press Enter.
[TOP]
List All Volume Groups
Create a Volume Group
Create a Volume Group with Data Path Devices

Set Characteristics of a Volume Group
-----
Volume Group Type
-----
Move cursor to desired item and press Enter.

Legacy
Original
Big
Scalable

[M] F1=Help          F2=Refresh          F3=Cancel
    F8=Image        F10=Exit            Enter=Do
F1| /=Find          n=Find Next
F9+-----
```

In the final menu, fill out the fields as desired. Also note that you can choose to added the volume group into the previously created resource group as shown.

```

172.23.17.35 - PuTTY
Create a Scalable Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]
Node Names                p460 PowerHA,p260_Pow>
Resource Group Name       [FlexRG] +
PVID                      00021b8bede4b25b
VOLUME GROUP name         [flexhavg]
Physical partition SIZE in megabytes 16 +
Volume group MAJOR NUMBER [35] #
Enable Fast Disk Takeover or Concurrent Access Fast Disk Takeover +
Volume Group Type         Scalable
CRITICAL volume group?    no +

Maximum Physical Partitions in units of 1024 32 +
Maximum Number of Logical Volumes            256 +

[MORE...12]

F1=Help      F2=Refresh  F3=Cancel  F4=List
F5=Reset     F6=Command  F7=Edit    F8=Image
F9=Shell     F10=Exit   Enter=Do

```

Though logical volumes and filesystems need to be created, the cluster can be synchronized at this time as the resources technically will not change.

Even when using filesystems, we always recommend creating the underlying logical volume and log logical volume in order to control the naming convention. That way it ensures the names are unique among the cluster nodes.

To create the logical volumes and filesystems we continue to utilize C-SPOC to create a new logical volume and log logical volume. Execute *smitty cspoc*→*Storage*→*Logical Volumes*→*Add a Logical Volume*

```

172.23.17.35 - PuTTY
Logical Volumes

Move cursor to desired item and press Enter.

List All Logical Volumes by Volume Group
Add a Logical Volume
Show Characteristics of a Logical Volume
Set Characteristics of a Logical Volume
Change a Logical Volume
Remove a Logical Volume

+-----+
| Select the Volume Group that will hold the new Logical Volume |
| Move cursor to desired item and press Enter. Use arrow keys to scroll. |
| #Volume Group  Resource Group  Node List |
| caavg private  <Not in a Resource Group> p460 PowerHA,p260 PowerHA |
| flexhavg       FlexRG          p460 PowerHA,p260 PowerHA |
+-----+

F1=Help      F2=Refresh  F3=Cancel  F4=List
F5=Reset     F6=Command  F7=Edit    F8=Image
F9=Shell     F10=Exit   Enter=Do

F1) /=Find   n=Find Next
F9+-----+

```

(choose previously created volume group)

```
172.23.17.35 - PuTTY
Logical Volumes

Move cursor to desired item and press Enter.

List All Logical Volumes by Volume Group
Add a Logical Volume
Show Characteristics of a Logical Volume
Set Characteristics of a Logical Volume
Change a Logical Volume
Remove a Logical Volume
-----
Physical Volume Names

Move cursor to desired item and press F7.
ONE OR MORE items can be selected.
Press Enter AFTER making all selections.

Auto-select
p460_PowerHA hdisk1

F1=Help      F2=Refresh    F3=Cancel
F7=Select    F8=Image      F10=Exit
F1| Enter=Do  /=Find        n=Find Next
F9+-----
```

Choose the desired disk to create the logical volume on as shown above. Then on the final menu, specify the desired size, name and type. In our case the type is “jfs2”

```
172.23.17.35 - PuTTY
Add a Logical Volume

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]                                [Entry Fields]
Resource Group Name                  FlexRG
VOLUME GROUP name                    flexhavg
Node List                           p460_PowerHA,p260_Pow>
Reference node                       p460_PowerHA
* Number of LOGICAL PARTITIONS       [50] #
PHYSICAL VOLUME names                hdisk1
Logical volume NAME                  [flexhavg]
Logical volume TYPE                  [jfs2] +
POSITION on physical volume          outer_middle +
RANGE of physical volumes            minimum +
MAXIMUM NUMBER of PHYSICAL VOLUMES  [] #
to use for allocation
Number of COPIES of each logical     1 +
[MORE...21]

F1=Help      F2=Refresh    F3=Cancel    F4=List
F5=Reset     F6=Command    F7=Edit      F8=Image
F9=Shell     F10=Exit      Enter=Do
```

After creation, we repeat the previous steps to create a jfs2log device. The only difference is specifying “jfs2log” in the “Logical volume Type” field as shown below.

```

172.23.17.35 - PuTTY
Add a Logical Volume

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[ TOP ]                                     [ Entry Fields ]
Resource Group Name                        FlexRG
VOLUME GROUP name                         flexhavg
Node List                                 p460_PowerHA,p260_Pow>
Reference node                             p460_PowerHA
* Number of LOGICAL PARTITIONS             [ 2 ] #
PHYSICAL VOLUME names                     hdisk1
Logical volume NAME                       [ hajfsloglv ]
Logical volume TYPE                       [ jfs2log ] +
POSITION on physical volume                outer_middle +
RANGE of physical volumes                  minimum +
MAXIMUM NUMBER of PHYSICAL VOLUMES        [ ] #
to use for allocation
Number of COPIES of each logical           1 +
[ MORE...21 ]

F1=Help      F2=Refresh      F3=Cancel      F4=List
F5=Reset     F6=Command     F7=Edit       F8=Image
F9=Shell     F10=Exit       Enter=Do

```

Lastly we will now create a JFS2 filesystem on top of our original previously created logical volume. We execute *smitty cspoc*→*Storage*→*File Systems*→*Add a File System* (choose previously created volume group)

Notice: In the volume group pop-up list the CAA specific volume group of caavg_private may appear. NEVER chose that volume group. It should be considered a bug that needs to be fixed.

Then choose the specific filesystem, in our case it is “Enhanced Journaled File System” as shown below.

```

172.23.17.35 - PuTTY
File Systems

Move cursor to desired item and press Enter.

List All File Systems by Volume Group
Add a File System
Change / Show Characteristics of a File System
Remove a File System

+-----+
|               Select the type of File System to be Added               |
+-----+
| Move cursor to desired item and press Enter.                          |
|                                                                           |
| Enhanced Journaled File System                                          |
| Standard Journaled File System                                          |
| Compressed Journaled File System                                        |
| Large File Enabled Journaled File System                               |
|                                                                           |
| F1=Help      F2=Refresh      F3=Cancel      F4=List                    |
| F5=Reset     F6=Command     F7=Edit       F8=Image                    |
| F9=Shell     F10=Exit       Enter=Do                                             |
+-----+

```

Choose the previously created logical volume as shown below.

```

172.23.17.35 - PuTTY
File Systems

Move cursor to desired item and press Enter.

List All File Systems by Volume Group
Add a File System
-----
      Select the Logical Volume to hold the new File System

Move cursor to desired item and press Enter. Use arrow keys to scroll.

# To Add a new File System to volume group flexhavg,
# you must either chose to

Create a new Logical Volume for this File System

# Or select an existing logical volume from the list below
# LV NAME          TYPE      LPs      PPs      PVs      LV STATE    MO
+-----+-----+-----+-----+-----+-----+-----+
flexhalv          jfs2        50       50       1    closed/syncd N/

F1=Help          F2=Refresh      F3=Cancel
F8=Image         F10=Exit        Enter=Do
F1| /=Find       n=Find Next
F9+-----+

```

Then complete the final menu as desired and press Enter. In this case we created a filesystem with a mountpoint of /phaflexfs.

```

172.23.17.35 - PuTTY
Add an Enhanced Journaled File System on a Previously Defined Logical Volume

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]                                [Entry Fields]
Resource Group                       FlexRG
* Node Names                         p460_PowerHA,p260_Pow>
Logical Volume name                  flexhalv
Volume Group                        flexhavg

* MOUNT POINT                        [/phaflexfs] /
PERMISSIONS                         read/write +
Mount OPTIONS                       [] +
Block Size (bytes)                  4096 +
Inline Log?                         no +
Inline Log size (MBytes)            [] #
Logical Volume for Log              [ ] +
Extended Attribute Format            Version 1 +
[MORE...2]

F1=Help          F2=Refresh      F3=Cancel      F4=List
F5=Reset         F6=Command     F7=Edit        F8=Image
F9=Shell         F10=Exit       Enter=Do

```

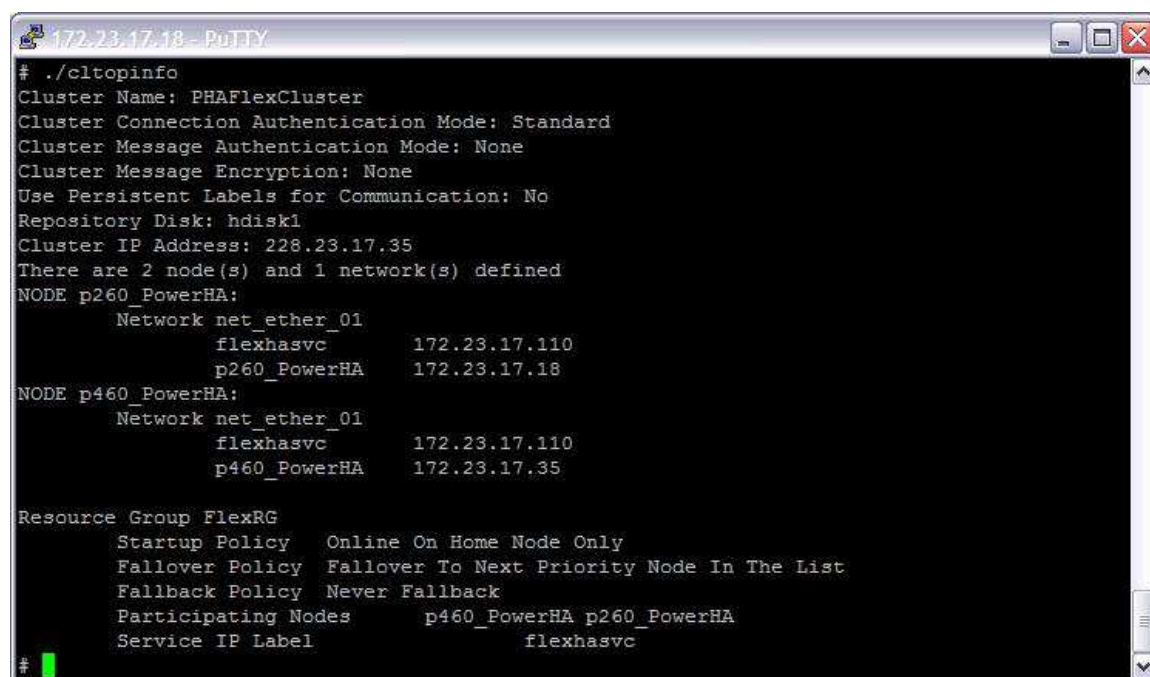
For your environment, repeat the previous steps as needed. Once completed, just to be sure, go ahead and synchronize the cluster.

We now have a two-node “hot-standby” cluster created consisting of the following:

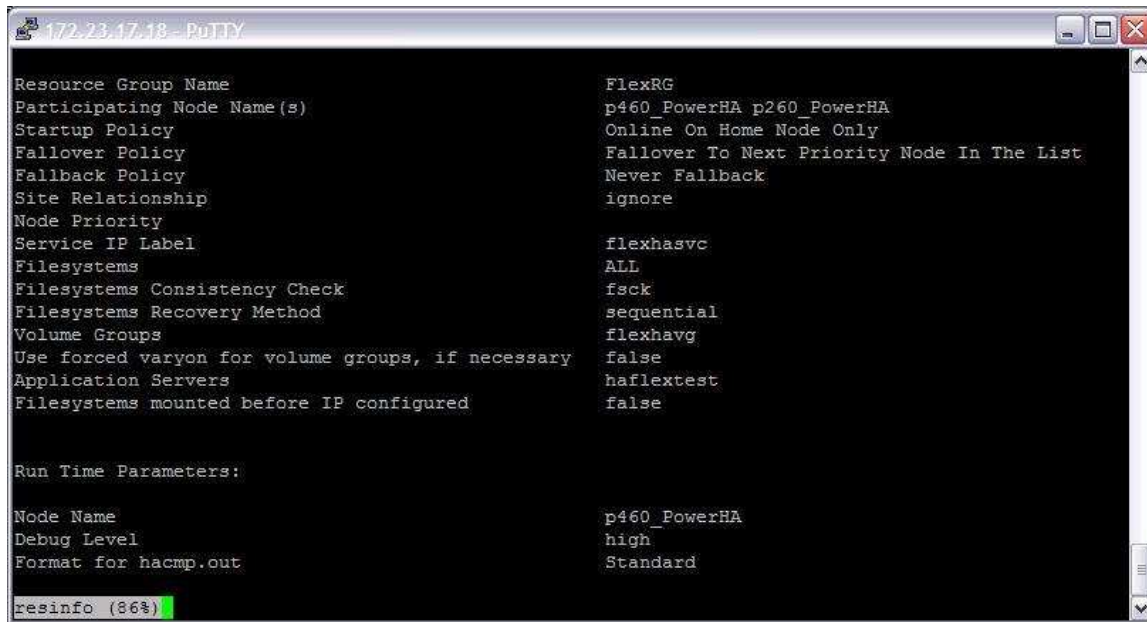
- Two nodes (nodenames are same as hostnames p260_PowerHA, p460_PowerHA)
- One IP-Network (defaults to net_ether_01)
- One repository disk
- One Resource Group (p460 is primary, p260 is backup)
- One Application Server (halextest)
- One Service Address (flexhasvc via IP Aliasing)
- One shared vg (flexhavg)

The cluster configuration details can be seen in the following screenshots:

Cluster, Nodes, Topology, and Resource Group

A screenshot of a terminal window titled "172.23.17.18 - PuTTY". The terminal displays the output of the command `./clttopinfo`. The output shows the following configuration details:
Cluster Name: PHAFlexCluster
Cluster Connection Authentication Mode: Standard
Cluster Message Authentication Mode: None
Cluster Message Encryption: None
Use Persistent Labels for Communication: No
Repository Disk: hdisk1
Cluster IP Address: 228.23.17.35
There are 2 node(s) and 1 network(s) defined
NODE p260_PowerHA:
 Network net_ether_01
 flexhasvc 172.23.17.110
 p260_PowerHA 172.23.17.18
NODE p460_PowerHA:
 Network net_ether_01
 flexhasvc 172.23.17.110
 p460_PowerHA 172.23.17.35
Resource Group FlexRG
 Startup Policy Online On Home Node Only
 Failover Policy Failover To Next Priority Node In The List
 Fallback Policy Never Fallback
 Participating Nodes p460_PowerHA p260_PowerHA
 Service IP Label flexhasvc
The terminal ends with a prompt character `#` and a green cursor.

Resource Group and Resources (edited to show only relevant resources)



A screenshot of a PuTTY terminal window titled "172.23.17.18 - PuTTY". The window displays the configuration for a resource group named "FlexRG". The configuration is presented in two sections: a main list of properties and a "Run Time Parameters:" section. The main list includes properties such as "Participating Node Name(s)", "Startup Policy", "Fallover Policy", "Fallback Policy", "Site Relationship", "Node Priority", "Service IP Label", "Filesystems", "Filesystems Consistency Check", "Filesystems Recovery Method", "Volume Groups", "Use forced varyon for volume groups, if necessary", "Application Servers", and "Filesystems mounted before IP configured". The "Run Time Parameters:" section includes "Node Name", "Debug Level", and "Format for hacmp.out". The terminal shows the output of the "resinfo" command, with the first line highlighted in green.

```
Resource Group Name                FlexRG
Participating Node Name(s)        p460_PowerHA p260_PowerHA
Startup Policy                    Online On Home Node Only
Fallover Policy                   Fallover To Next Priority Node In The List
Fallback Policy                   Never Fallback
Site Relationship                  ignore
Node Priority                     
Service IP Label                  flexhasvc
Filesystems                       ALL
Filesystems Consistency Check     fsck
Filesystems Recovery Method       sequential
Volume Groups                     flexhavg
Use forced varyon for volume groups, if necessary false
Application Servers               haflxtest
Filesystems mounted before IP configured false

Run Time Parameters:

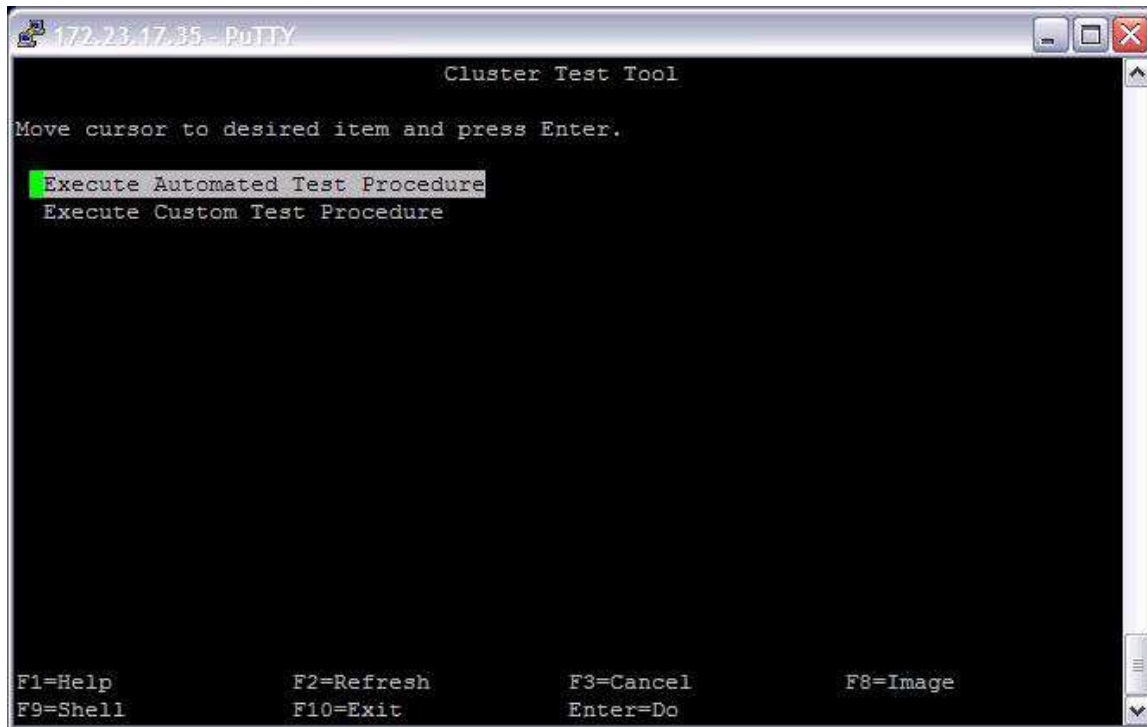
Node Name                         p460_PowerHA
Debug Level                       high
Format for hacmp.out              Standard

resinfo (86%)
```

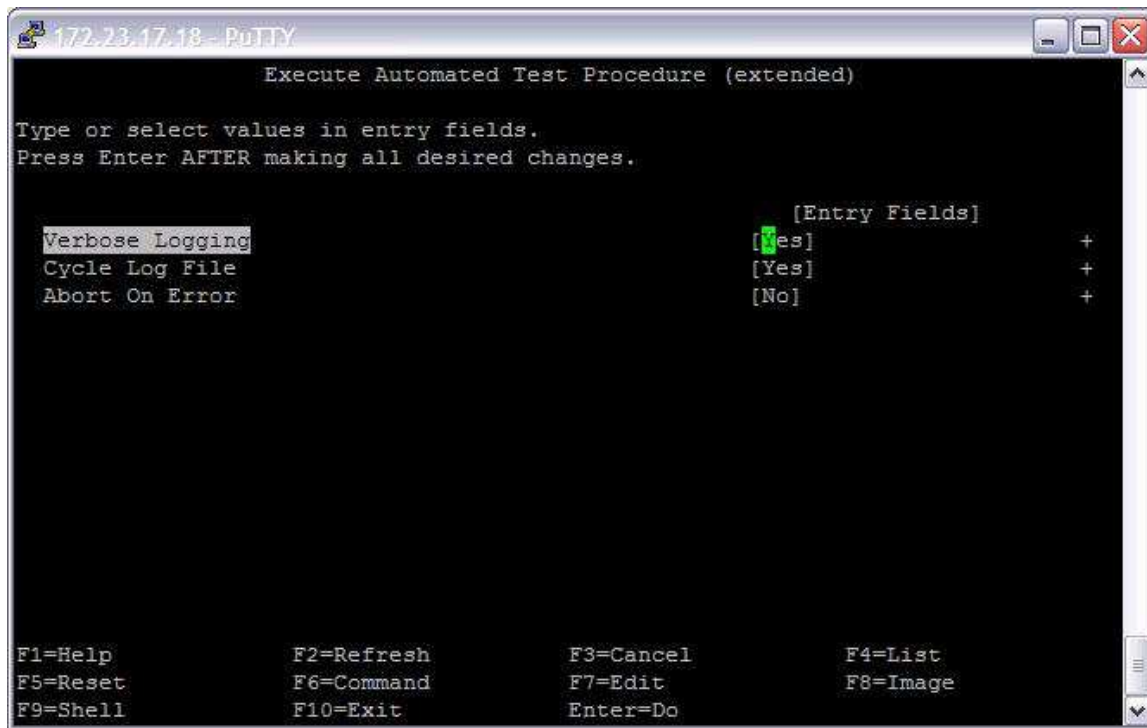
C. Testing the Cluster

Testing was completed by utilizing the Automated Procedure of the *Cluster Test Tool* as shown below. To execute this test plan the cluster nodes must not be active in the cluster.

The execute the cluster test tool, enter *smitty hacmp_testtool_menu*, then choose “Execute Automated Test Procedure” as shown below:



Once pressing enter, the final menu is displayed as shown below. The detailed results of each test are displayed in the SMIT window during execution and are also saved in */var/hacmp/log/cl_testtool.log*. Our actual test results were added into the Appendix.



The overall test time was 7 minutes and the following events were executed successfully:

1. NODE_UP -- Each node one at a time.
2. NODE_DOWN_GRACEFUL -- Same as above.
3. NODE_UP -- Same as above.
4. NODE_DOWN_TAKEOVER -- Graceful down and moves resource group from p460 to p260.
5. NODE_UP -- Restart services on previously down node (p460)
6. NODE_DOWN_FORCED -- On p460
7. NODE_UP -- Restart services on previously down node (p460)
8. VG_DOWN -- Simulates volume group loss (rg_move runs from p260 to p460)
9. CLSTRMGR_KILL -- Creates hard fallover via halt on p460

While this testing does cover the core basic functionality of the cluster, additional granular level testing via the Custom Test Procedure is often desired to include such common events as:

- FAIL_LABEL -- (Both IP and Non-IP)
- NETWORK_DOWN_LOCAL -- (Both IP and Non-IP)
- JOIN_LABEL -- (Both IP and Non-IP)
- NETWORK_UP_LOCAL -- (Both IP and Non-IP)
- SERVER_DOWN -- (nice test when application monitoring is being used)

There are several specific events related to additional configuration options within PowerHA (i.e. sites, global networks, etc). Manually creating failures for testing is also encouraged. (i.e. disabling ports, pull cables, etc).

E. References

PowerHA SystemMirror v7.1.1 for AIX www.redbooks.ibm.com/redpieces/abstracts/sg248030.html

PowerHA for AIX Version Compatibility Matrix
<http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD101347>

PowerHA for AIX Hardware Support Matrix
<http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/TD105638>

Implementing PowerHA and IBM i Cookbook <http://www.redbooks.ibm.com/abstracts/sg247405.html?Open>

PowerHA System Mirror for IBM i <http://www.redbooks.ibm.com/abstracts/sg247994.html?Open>

Appendix A – Cluster Test Tool Log

```
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Initializing Variable Table
08/08/2012_14:13:11: -----
08/08/2012_14:13:11:         Using Process Environment for Variable Table
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Reading Static Configuration Data
08/08/2012_14:13:11: -----
08/08/2012_14:13:11:         Cluster Name: PHAFlexCluster
08/08/2012_14:13:11:         Cluster Version: 13
08/08/2012_14:13:11:         Local Node Name: p260_PowerHA
08/08/2012_14:13:11:         Cluster Nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:         Found 1 Cluster Networks
08/08/2012_14:13:11:         Found 3 Cluster Interfaces/Device/Labels
08/08/2012_14:13:11:         Found 1 Cluster Resource Groups
08/08/2012_14:13:11:         Found 10 Cluster Resources
08/08/2012_14:13:11:         Event Timeout Value: 720
08/08/2012_14:13:11:         Maximum Timeout Value: 2880
08/08/2012_14:13:11:         Found 0 Cluster Sites
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Building Test Queue
08/08/2012_14:13:11: -----
08/08/2012_14:13:11:         Test Plan: /usr/es/sbin/cluster/cl_testtool/auto_topology
08/08/2012_14:13:11:         Event 1: NODE_UP: NODE_UP,ALL,Start cluster services on all
available nodes
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Validate NODE_UP
08/08/2012_14:13:11: -----
08/08/2012_14:13:11:         Event node: ALL
08/08/2012_14:13:11:         Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:         Event 2: NODE_DOWN_GRACEFUL: NODE_DOWN_GRACEFUL,node1,Stop
cluster services gracefully on a node
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Validate NODE_DOWN_GRACEFUL
08/08/2012_14:13:11: -----
08/08/2012_14:13:11:         Event node: p260_PowerHA
08/08/2012_14:13:11:         Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:         Event 3: NODE_UP: NODE_UP,node1,Restart cluster services on the
node that was stopped
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Validate NODE_UP
08/08/2012_14:13:11: -----
08/08/2012_14:13:11:         Event node: p260_PowerHA
08/08/2012_14:13:11:         Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:         Event 4: NODE_DOWN_TAKEOVER: NODE_DOWN_TAKEOVER,node2,Stop
cluster services with takeover on a node
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Validate NODE_DOWN_TAKEOVER
08/08/2012_14:13:11: -----
08/08/2012_14:13:11:         Event node: p460_PowerHA
08/08/2012_14:13:11:         Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:         Event 5: NODE_UP: NODE_UP,node2,Restart cluster services on the
node that was stopped
08/08/2012_14:13:11: -----
08/08/2012_14:13:11: | Validate NODE_UP
08/08/2012_14:13:11: -----
```

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08/08/2012_14:13:11:      Event node: p460_PowerHA
08/08/2012_14:13:11:      Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:      Event 6: NODE_DOWN_FORCED: NODE_DOWN_FORCED,node3,Stop cluster
services forced on a node
08/08/2012_14:13:11:      -----
08/08/2012_14:13:11:      | Validate NODE_DOWN_FORCED
08/08/2012_14:13:11:      -----
08/08/2012_14:13:11:      Event node: p460_PowerHA
08/08/2012_14:13:11:      Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:      Event 7: NODE_UP: NODE_UP,node3,Restart cluster services on the
node that was stopped
08/08/2012_14:13:11:      -----
08/08/2012_14:13:11:      | Validate NODE_UP
08/08/2012_14:13:11:      -----
08/08/2012_14:13:11:      Event node: p460_PowerHA
08/08/2012_14:13:11:      Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:13:11:      #####
08/08/2012_14:13:11:      ##
## Starting Cluster Test Tool: -e /usr/es/sbin/cluster/cl_testtool/auto_topology
##
08/08/2012_14:13:11:      #####
08/08/2012_14:13:11:      =====
08/08/2012_14:13:11:      ||
|| Starting Test 1 - NODE_UP,ALL,Start cluster services on all available nodes
||
08/08/2012_14:13:11:      =====
08/08/2012_14:13:12:      -----
08/08/2012_14:13:12:      | is_rational NODE_UP
08/08/2012_14:13:12:      -----
08/08/2012_14:13:12:      Checking cluster stability
08/08/2012_14:13:12:      p260_PowerHA: ST_INIT
08/08/2012_14:13:12:      p460_PowerHA: ST_INIT
08/08/2012_14:13:12:      Cluster is stable
08/08/2012_14:13:12:      Active Nodes:
08/08/2012_14:13:12:      -----
08/08/2012_14:13:12:      | Executing Command for NODE_UP
08/08/2012_14:13:12:      -----
08/08/2012_14:13:12:      /usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e NODE_UP -m execute
'p260_PowerHA,p460_PowerHA'
08/08/2012_14:13:40:      -----
08/08/2012_14:13:40:      | Entering wait_for_stable
08/08/2012_14:13:40:      -----
08/08/2012_14:13:40:      Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:14:10:      Checking Node States:
08/08/2012_14:14:10:      Node p260_PowerHA: ST_UNSTABLE
08/08/2012_14:14:10:      Node p460_PowerHA: ST_UNSTABLE
08/08/2012_14:14:10:      Cluster is not yet stable.
08/08/2012_14:14:10:      Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:14:41:      Checking Node States:
08/08/2012_14:14:41:      Node p260_PowerHA: ST_STABLE
08/08/2012_14:14:41:      Active Timers: None
08/08/2012_14:14:41:      Checking if node p260_PowerHA is active
08/08/2012_14:14:41:      prevstate = ST_UNSTABLE, curstate = ST_STABLE
08/08/2012_14:14:41:      Node p460_PowerHA: ST_STABLE
08/08/2012_14:14:41:      Active Timers: None
08/08/2012_14:14:41:      Checking if node p460_PowerHA is active
08/08/2012_14:14:41:      prevstate = ST_UNSTABLE, curstate = ST_STABLE
08/08/2012_14:14:41:      -----
08/08/2012_14:14:41:      | NODE_UP: Checking post-event status
08/08/2012_14:14:41:      -----
08/08/2012_14:14:41:      Event Nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:14:41:      pre-event online nodes:
08/08/2012_14:14:41:      post-event online nodes: p260_PowerHA p460_PowerHA

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08/08/2012_14:14:41: Checking node states
08/08/2012_14:14:41: p260_PowerHA: Preevent state: ST_INIT, Postevent state: ST_STABLE
08/08/2012_14:14:41: p460_PowerHA: Preevent state: ST_INIT, Postevent state: ST_STABLE
08/08/2012_14:14:41: Checking RG states
08/08/2012_14:14:41: Resource Group: FlexRG
08/08/2012_14:14:41: Node: p260_PowerHA Pre Event State: OFFLINE, Post Event State:
OFFLINE
08/08/2012_14:14:41: Node: p460_PowerHA Pre Event State: OFFLINE, Post Event State:
ONLINE
08/08/2012_14:14:41: Checking event history
08/08/2012_14:14:41: Begin Event History records:
08/08/2012_14:14:41: NODE: p260_PowerHA
Aug 8 14:13:57 EVENT COMPLETED: node_up p260_PowerHA 0
Aug 8 14:13:59 EVENT COMPLETED: node_up_complete p260_PowerHA 0
Aug 8 14:14:09 EVENT COMPLETED: node_up p460_PowerHA 0
Aug 8 14:14:12 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug 8 14:14:12 EVENT COMPLETED: rg_move p260_PowerHA 1 ACQUIRE 0
Aug 8 14:14:12 EVENT COMPLETED: rg_move_acquire p260_PowerHA 1 0
Aug 8 14:14:15 EVENT COMPLETED: rg_move_complete p260_PowerHA 1 0
Aug 8 14:14:17 EVENT COMPLETED: node_up_complete p460_PowerHA 0
08/08/2012_14:14:41: NODE: p460_PowerHA
Aug 8 14:14:11 EVENT COMPLETED: node_up p460_PowerHA 0
Aug 8 14:14:13 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug 8 14:14:14 EVENT COMPLETED: acquire_aconn_service en0 net_ether_01 0
Aug 8 14:14:14 EVENT COMPLETED: acquire_service_addr 0
Aug 8 14:14:15 EVENT COMPLETED: rg_move p260_PowerHA 1 ACQUIRE 0
Aug 8 14:14:15 EVENT COMPLETED: rg_move_acquire p260_PowerHA 1 0
Aug 8 14:14:16 EVENT COMPLETED: start_server haflextest 0
Aug 8 14:14:16 EVENT COMPLETED: rg_move_complete p260_PowerHA 1 0
Aug 8 14:14:18 EVENT COMPLETED: node_up_complete p460_PowerHA 0
08/08/2012_14:14:41: End Event History records
08/08/2012_14:14:41: =====
08/08/2012_14:14:41: ||
|| Test 1 Complete - NODE_UP: Start cluster services on all available nodes
||
08/08/2012_14:14:41: || Test Completion Status: PASSED
||
08/08/2012_14:14:41: =====
08/08/2012_14:14:41: =====
08/08/2012_14:14:41: ||
|| Starting Test 2 - NODE_DOWN_GRACEFUL,p260_PowerHA,Stop cluster services gracefully on a node
||
08/08/2012_14:14:41: =====
08/08/2012_14:14:42: -----
08/08/2012_14:14:42: | is_rational NODE_DOWN_GRACEFUL
08/08/2012_14:14:42: -----
08/08/2012_14:14:42: Checking cluster stability
08/08/2012_14:14:42: p260_PowerHA: ST_STABLE
08/08/2012_14:14:42: p460_PowerHA: ST_STABLE
08/08/2012_14:14:42: Cluster is stable
08/08/2012_14:14:42: Node: p260_PowerHA, State: ST_STABLE
08/08/2012_14:14:42: -----
08/08/2012_14:14:42: | Executing Command for NODE_DOWN_GRACEFUL
08/08/2012_14:14:42: -----
08/08/2012_14:14:42: /usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e NODE_DOWN_GRACEFUL
-m execute 'p260_PowerHA'
08/08/2012_14:14:52: -----
08/08/2012_14:14:52: | Entering wait_for_stable
08/08/2012_14:14:52: -----
08/08/2012_14:14:52: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:15:23: Checking Node States:
08/08/2012_14:15:23: Node p260_PowerHA: ST_INIT
08/08/2012_14:15:23: Node p460_PowerHA: ST_STABLE

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08/08/2012_14:15:23: Active Timers: None
08/08/2012_14:15:23: -----
08/08/2012_14:15:23: | NODE_DOWN_GRACEFUL: Checking post-event status
08/08/2012_14:15:23: -----
08/08/2012_14:15:23: Event Nodes: p260_PowerHA
08/08/2012_14:15:23: pre-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:15:23: post-event online nodes: p460_PowerHA
08/08/2012_14:15:23: Checking node states
08/08/2012_14:15:23: p260_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_INIT
08/08/2012_14:15:23: p460_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:15:23: Checking RG states
08/08/2012_14:15:23: Resource Group: FlexRG
08/08/2012_14:15:23: Node: p260_PowerHA Pre Event State: OFFLINE, Post Event State:
OFFLINE
08/08/2012_14:15:23: Node: p460_PowerHA Pre Event State: ONLINE, Post Event State:
ONLINE
08/08/2012_14:15:23: Checking event history
08/08/2012_14:15:23: Begin Event History records:
08/08/2012_14:15:23: NODE: p260_PowerHA
Aug 8 14:14:44 EVENT COMPLETED: node_down p260_PowerHA graceful 0
Aug 8 14:14:47 EVENT COMPLETED: node_down_complete p260_PowerHA 0
08/08/2012_14:15:23: NODE: p460_PowerHA
Aug 8 14:14:46 EVENT COMPLETED: node_down p260_PowerHA graceful 0
Aug 8 14:14:48 EVENT COMPLETED: node_down_complete p260_PowerHA 0
08/08/2012_14:15:23: End Event History records
08/08/2012_14:15:23: =====
08/08/2012_14:15:23: ||
|| Test 2 Complete - NODE_DOWN_GRACEFUL: Stop cluster services gracefully on a node
||
08/08/2012_14:15:23: || Test Completion Status: PASSED
||
08/08/2012_14:15:23: =====
08/08/2012_14:15:23: =====
08/08/2012_14:15:23: ||
|| Starting Test 3 - NODE_UP,p260_PowerHA,Restart cluster services on the node that was stopped
||
08/08/2012_14:15:23: =====
08/08/2012_14:15:24: -----
08/08/2012_14:15:24: | is_rational NODE_UP
08/08/2012_14:15:24: -----
08/08/2012_14:15:24: Checking cluster stability
08/08/2012_14:15:24: p260_PowerHA: ST_INIT
08/08/2012_14:15:24: p460_PowerHA: ST_STABLE
08/08/2012_14:15:24: Cluster is stable
08/08/2012_14:15:24: Node: p260_PowerHA, State: ST_INIT
08/08/2012_14:15:24: -----
08/08/2012_14:15:24: | Executing Command for NODE_UP
08/08/2012_14:15:24: -----
08/08/2012_14:15:24: /usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e NODE_UP -m execute
'p260_PowerHA'
08/08/2012_14:15:49: -----
08/08/2012_14:15:49: | Entering wait_for_stable
08/08/2012_14:15:49: -----
08/08/2012_14:15:49: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:16:20: Checking Node States:
08/08/2012_14:16:20: Node p260_PowerHA: ST_STABLE
08/08/2012_14:16:20: Active Timers: None
08/08/2012_14:16:20: Node p460_PowerHA: ST_STABLE
08/08/2012_14:16:20: Active Timers: None
08/08/2012_14:16:20: -----
08/08/2012_14:16:20: | NODE_UP: Checking post-event status
08/08/2012_14:16:20: -----
08/08/2012_14:16:20: Event Nodes: p260_PowerHA

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08/08/2012_14:16:20: pre-event online nodes: p460_PowerHA
08/08/2012_14:16:20: post-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:16:20: Checking node states
08/08/2012_14:16:20: p260_PowerHA: Preevent state: ST_INIT, Postevent state: ST_STABLE
08/08/2012_14:16:20: p460_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:16:20: Checking RG states
08/08/2012_14:16:20: Resource Group: FlexRG
08/08/2012_14:16:20: Node: p260_PowerHA Pre Event State: OFFLINE, Post Event State:
OFFLINE
08/08/2012_14:16:20: Node: p460_PowerHA Pre Event State: ONLINE, Post Event State:
ONLINE
08/08/2012_14:16:20: Checking event history
08/08/2012_14:16:20: Begin Event History records:
08/08/2012_14:16:20: NODE: p260_PowerHA
Aug 8 14:16:13 EVENT COMPLETED: node_up p260_PowerHA 0
Aug 8 14:16:15 EVENT COMPLETED: node_up_complete p260_PowerHA 0
08/08/2012_14:16:20: NODE: p460_PowerHA
Aug 8 14:16:14 EVENT COMPLETED: node_up p260_PowerHA
Aug 8 14:16:16 EVENT COMPLETED: node_up_complete p260_PowerHA 0
08/08/2012_14:16:20: End Event History records
08/08/2012_14:16:20: =====
08/08/2012_14:16:20: ||
|| Test 3 Complete - NODE_UP: Restart cluster services on the node that was stopped
||
08/08/2012_14:16:20: || Test Completion Status: PASSED
||
08/08/2012_14:16:20: =====
08/08/2012_14:16:20: =====
08/08/2012_14:16:20: ||
|| Starting Test 4 - NODE_DOWN_TAKEOVER, p460_PowerHA, Stop cluster services with takeover on a node
||
08/08/2012_14:16:20: =====
08/08/2012_14:16:21: -----
08/08/2012_14:16:21: | is_rational NODE_DOWN_TAKEOVER
08/08/2012_14:16:21: -----
08/08/2012_14:16:21: Checking cluster stability
08/08/2012_14:16:21: p260_PowerHA: ST_STABLE
08/08/2012_14:16:21: p460_PowerHA: ST_STABLE
08/08/2012_14:16:21: Cluster is stable
08/08/2012_14:16:21: -----
08/08/2012_14:16:21: | Executing Command for NODE_DOWN_TAKEOVER
08/08/2012_14:16:21: -----
08/08/2012_14:16:21: /usr/es/sbin/cluster/utilities/cl_rsh -n p460_PowerHA
/usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e NODE_DOWN_TAKEOVER -m execute 'p460_PowerHA'
08/08/2012_14:16:34: -----
08/08/2012_14:16:34: | Entering wait_for_stable
08/08/2012_14:16:34: -----
08/08/2012_14:16:34: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:17:04: Checking Node States:
08/08/2012_14:17:04: Node p260_PowerHA: ST_STABLE
08/08/2012_14:17:04: Active Timers: None
08/08/2012_14:17:04: Node p460_PowerHA: ST_INIT
08/08/2012_14:17:04: -----
08/08/2012_14:17:04: | NODE_DOWN_TAKEOVER: Checking post-event status
08/08/2012_14:17:04: -----
08/08/2012_14:17:05: pre-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:17:05: post-event online nodes: p260_PowerHA
08/08/2012_14:17:05: Checking node states
08/08/2012_14:17:05: p260_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:17:05: p460_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_INIT
08/08/2012_14:17:05: Checking RG states
08/08/2012_14:17:05: Resource Group: FlexRG

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08/08/2012_14:17:05:          Node: p260_PowerHA Pre Event State: OFFLINE, Post Event State:
ONLINE
08/08/2012_14:17:05:          Node: p460_PowerHA Pre Event State: ONLINE, Post Event State:
OFFLINE
08/08/2012_14:17:05: Checking event history
08/08/2012_14:17:05: Begin Event History records:
08/08/2012_14:17:05:          NODE: p260_PowerHA
Aug  8 14:16:23 EVENT COMPLETED: node_down p460_PowerHA 0
Aug  8 14:16:25 EVENT COMPLETED: rg_move p260_PowerHA 1 RELEASE 0
Aug  8 14:16:25 EVENT COMPLETED: rg_move_release p260_PowerHA 1 0
Aug  8 14:16:29 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:16:30 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:16:31 EVENT COMPLETED: acquire_takeover_addr 0
Aug  8 14:16:32 EVENT COMPLETED: rg_move p260_PowerHA 1 ACQUIRE 0
Aug  8 14:16:33 EVENT COMPLETED: rg_move_acquire p260_PowerHA 1 0
Aug  8 14:16:33 EVENT COMPLETED: start_server haflextest 0
Aug  8 14:16:33 EVENT COMPLETED: rg_move_complete p260_PowerHA 1 0
Aug  8 14:16:35 EVENT COMPLETED: node_down_complete p460_PowerHA 0
08/08/2012_14:17:05:          NODE: p460_PowerHA
Aug  8 14:16:24 EVENT COMPLETED: node_down p460_PowerHA 0
Aug  8 14:16:27 EVENT COMPLETED: stop_server haflextest 0
Aug  8 14:16:28 EVENT COMPLETED: release_service_addr 0
Aug  8 14:16:28 EVENT COMPLETED: rg_move p260_PowerHA 1 RELEASE 0
Aug  8 14:16:28 EVENT COMPLETED: rg_move_release p260_PowerHA 1 0
Aug  8 14:16:30 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:16:31 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:16:31 EVENT COMPLETED: rg_move p260_PowerHA 1 ACQUIRE 0
Aug  8 14:16:31 EVENT COMPLETED: rg_move_acquire p260_PowerHA 1 0
Aug  8 14:16:34 EVENT COMPLETED: rg_move_complete p260_PowerHA 1 0
Aug  8 14:16:36 EVENT COMPLETED: node_down_complete p460_PowerHA 0
08/08/2012_14:17:05: End Event History records
08/08/2012_14:17:05: =====
08/08/2012_14:17:05: ||
|| Test 4 Complete - NODE_DOWN_TAKEOVER: Stop cluster services with takeover on a node
||
08/08/2012_14:17:05: || Test Completion Status: PASSED
||
08/08/2012_14:17:05: =====
08/08/2012_14:17:05: =====
08/08/2012_14:17:05: ||
|| Starting Test 5 - NODE_UP,p460_PowerHA,Restart cluster services on the node that was stopped
||
08/08/2012_14:17:05: =====
08/08/2012_14:17:06: -----
08/08/2012_14:17:06: | is_rational NODE_UP
08/08/2012_14:17:06: -----
08/08/2012_14:17:06: Checking cluster stability
08/08/2012_14:17:06:          p260_PowerHA: ST_STABLE
08/08/2012_14:17:06:          p460_PowerHA: ST_INIT
08/08/2012_14:17:06: Cluster is stable
08/08/2012_14:17:06: Node: p460_PowerHA, State: ST_INIT
08/08/2012_14:17:06: -----
08/08/2012_14:17:06: | Executing Command for NODE_UP
08/08/2012_14:17:06: -----
08/08/2012_14:17:06:          /usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e NODE_UP -m execute
'p460_PowerHA'
08/08/2012_14:17:33: -----
08/08/2012_14:17:33: | Entering wait_for_stable
08/08/2012_14:17:33: -----
08/08/2012_14:17:33: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:18:03:          Checking Node States:
08/08/2012_14:18:03:          Node p260_PowerHA: ST_STABLE
08/08/2012_14:18:03:          Active Timers: None

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08/08/2012_14:18:03:          Node p460_PowerHA: ST_STABLE
08/08/2012_14:18:03:          Active Timers: None
08/08/2012_14:18:03: -----
08/08/2012_14:18:03: | NODE_UP: Checking post-event status
08/08/2012_14:18:03: -----
08/08/2012_14:18:03: Event Nodes: p460_PowerHA
08/08/2012_14:18:04: pre-event online nodes: p260_PowerHA
08/08/2012_14:18:04: post-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:18:04: Checking node states
08/08/2012_14:18:04: p260_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:18:04: p460_PowerHA: Preevent state: ST_INIT, Postevent state: ST_STABLE
08/08/2012_14:18:04: Checking RG states
08/08/2012_14:18:04: Resource Group: FlexRG
08/08/2012_14:18:04:          Node: p260_PowerHA Pre Event State: ONLINE, Post Event State:
ONLINE
08/08/2012_14:18:04:          Node: p460_PowerHA Pre Event State: OFFLINE, Post Event State:
OFFLINE
08/08/2012_14:18:04: Checking event history
08/08/2012_14:18:04: Begin Event History records:
08/08/2012_14:18:04:          NODE: p260_PowerHA
Aug  8 14:17:56 EVENT COMPLETED: node_up p460_PowerHA 0
Aug  8 14:17:59 EVENT COMPLETED: node_up_complete p460_PowerHA 0
08/08/2012_14:18:04:          NODE: p460_PowerHA
Aug  8 14:17:58 EVENT COMPLETED: node_up p460_PowerHA 0
Aug  8 14:18:00 EVENT COMPLETED: node_up_complete p460_PowerHA 0
08/08/2012_14:18:04: End Event History records
08/08/2012_14:18:04: =====
08/08/2012_14:18:04: ||
|| Test 5 Complete - NODE_UP: Restart cluster services on the node that was stopped
||
08/08/2012_14:18:04: || Test Completion Status: PASSED
||
08/08/2012_14:18:04: =====
08/08/2012_14:18:04: =====
08/08/2012_14:18:04: ||
|| Starting Test 6 - NODE_DOWN_FORCED, p460_PowerHA, Stop cluster services forced on a node
||
08/08/2012_14:18:04: =====
08/08/2012_14:18:04: -----
08/08/2012_14:18:04: | is_rational NODE_DOWN_FORCED
08/08/2012_14:18:04: -----
08/08/2012_14:18:04: Checking cluster stability
08/08/2012_14:18:04:          p260_PowerHA: ST_STABLE
08/08/2012_14:18:04:          p460_PowerHA: ST_STABLE
08/08/2012_14:18:04: Cluster is stable
08/08/2012_14:18:04:          Node: p260_PowerHA, Force Down:
08/08/2012_14:18:04:          Node: p460_PowerHA, Force Down:
08/08/2012_14:18:04: -----
08/08/2012_14:18:04: | Executing Command for NODE_DOWN_FORCED
08/08/2012_14:18:04: -----
08/08/2012_14:18:04:          /usr/es/sbin/cluster/utilities/cl_rsh -n p460_PowerHA
/usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e NODE_DOWN_FORCED -m execute 'p460_PowerHA'
08/08/2012_14:18:06: -----
08/08/2012_14:18:06: | Entering wait_for_stable
08/08/2012_14:18:06: -----
08/08/2012_14:18:06: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:18:37:          Checking Node States:
08/08/2012_14:18:37:          Node p260_PowerHA: ST_STABLE
08/08/2012_14:18:37:          Active Timers: None
08/08/2012_14:18:37:          Node p460_PowerHA: ST_STABLE
08/08/2012_14:18:37:          Active Timers: None
08/08/2012_14:18:37: -----
08/08/2012_14:18:37: | NODE_DOWN_FORCED: Checking post-event status

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08/08/2012_14:18:37: -----
08/08/2012_14:18:37: pre-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:18:37: post-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:18:37: Checking forced down node lists
08/08/2012_14:18:37:     Node: p260_PowerHA, Force Down: p460_PowerHA
08/08/2012_14:18:37: Checking node states
08/08/2012_14:18:37: p260_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:18:37: p460_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:18:37: Checking RG states
08/08/2012_14:18:37:     Resource Group: FlexRG
08/08/2012_14:18:37:     Node: p260_PowerHA Pre Event State: ONLINE, Post Event State:
ONLINE
08/08/2012_14:18:37:     Node: p460_PowerHA Pre Event State: OFFLINE, Post Event State:
OFFLINE
08/08/2012_14:18:37: Checking event history
08/08/2012_14:18:37: Begin Event History records:
08/08/2012_14:18:37:     NODE: p260_PowerHA
Aug  8 14:18:07 EVENT COMPLETED: node_down p460_PowerHA forced 0
Aug  8 14:18:09 EVENT COMPLETED: node_down_complete p460_PowerHA forced 0
08/08/2012_14:18:37:     NODE: p460_PowerHA
Aug  8 14:18:08 EVENT COMPLETED: node_down p460_PowerHA forced 0
Aug  8 14:18:10 EVENT COMPLETED: node_down_complete p460_PowerHA forced 0
08/08/2012_14:18:37: End Event History records
08/08/2012_14:18:37: =====
08/08/2012_14:18:37: ||
|| Test 6 Complete - NODE_DOWN_FORCED: Stop cluster services forced on a node
||
08/08/2012_14:18:37: || Test Completion Status: PASSED
||
08/08/2012_14:18:37: =====
08/08/2012_14:18:37: =====
08/08/2012_14:18:37: ||
|| Starting Test 7 - NODE_UP,p460_PowerHA,Restart cluster services on the node that was stopped
||
08/08/2012_14:18:37: =====
08/08/2012_14:18:38: -----
08/08/2012_14:18:38: | is_rational NODE_UP
08/08/2012_14:18:38: -----
08/08/2012_14:18:38: Checking cluster stability
08/08/2012_14:18:38:     p260_PowerHA: ST_STABLE
08/08/2012_14:18:38:     p460_PowerHA: ST_STABLE
08/08/2012_14:18:38: Cluster is stable
08/08/2012_14:18:38: Node: p460_PowerHA, State: ST_STABLE
08/08/2012_14:18:38:     Node: p260_PowerHA, Force Down: p460_PowerHA
08/08/2012_14:18:38: -----
08/08/2012_14:18:38: | Executing Command for NODE_UP
08/08/2012_14:18:38: -----
08/08/2012_14:18:38:     /usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e NODE_UP -m execute
'p460_PowerHA'
08/08/2012_14:18:49: -----
08/08/2012_14:18:49: | Entering wait_for_stable
08/08/2012_14:18:49: -----
08/08/2012_14:18:49: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:19:19:     Checking Node States:
08/08/2012_14:19:19:         Node p260_PowerHA: ST_STABLE
08/08/2012_14:19:19:         Active Timers: None
08/08/2012_14:19:19:         Node p460_PowerHA: ST_STABLE
08/08/2012_14:19:19:         Active Timers: None
08/08/2012_14:19:19: -----
08/08/2012_14:19:19: | NODE_UP: Checking post-event status
08/08/2012_14:19:19: -----
08/08/2012_14:19:19: Event Nodes: p460_PowerHA
08/08/2012_14:19:20: pre-event online nodes: p260_PowerHA p460_PowerHA

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08/08/2012_14:19:20: post-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:19:20: Checking node states
08/08/2012_14:19:20: p260_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:19:20: p460_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:19:20: Checking RG states
08/08/2012_14:19:20: Resource Group: FlexRG
08/08/2012_14:19:20: Node: p260_PowerHA Pre Event State: ONLINE, Post Event State:
ONLINE
08/08/2012_14:19:20: Node: p460_PowerHA Pre Event State: OFFLINE, Post Event State:
OFFLINE
08/08/2012_14:19:20: Checking event history
08/08/2012_14:19:20: Begin Event History records:
08/08/2012_14:19:20: NODE: p260_PowerHA
Aug 8 14:18:49 EVENT COMPLETED: node_up p460_PowerHA 0
Aug 8 14:18:51 EVENT COMPLETED: node_up_complete p460_PowerHA 0
08/08/2012_14:19:20: NODE: p460_PowerHA
Aug 8 14:18:50 EVENT COMPLETED: node_up p460_PowerHA 0
Aug 8 14:18:52 EVENT COMPLETED: node_up_complete p460_PowerHA 0
08/08/2012_14:19:20: End Event History records
08/08/2012_14:19:20: =====
08/08/2012_14:19:20: ||
|| Test 7 Complete - NODE_UP: Restart cluster services on the node that was stopped
||
08/08/2012_14:19:20: || Test Completion Status: PASSED
||
08/08/2012_14:19:20: =====
08/08/2012_14:19:20: #####
08/08/2012_14:19:20: ##
## Cluster Testing Complete: Exit Code 0
##
08/08/2012_14:19:20: #####
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: | Initializing Variable Table
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: Using Process Environment for Variable Table
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: | Reading Static Configuration Data
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: Cluster Name: PHAFlexCluster
08/08/2012_14:19:20: Cluster Version: 13
08/08/2012_14:19:20: Local Node Name: p260_PowerHA
08/08/2012_14:19:20: Cluster Nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:19:20: Found 1 Cluster Networks
08/08/2012_14:19:20: Found 3 Cluster Interfaces/Device/Labels
08/08/2012_14:19:20: Found 1 Cluster Resource Groups
08/08/2012_14:19:20: Found 10 Cluster Resources
08/08/2012_14:19:20: Event Timeout Value: 720
08/08/2012_14:19:20: Maximum Timeout Value: 2880
08/08/2012_14:19:20: Found 0 Cluster Sites
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: | Building Test Queue
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: Test Plan: /usr/es/sbin/cluster/cl_testtool/auto_vg
08/08/2012_14:19:20: Event 1: VG_DOWN: VG_DOWN,vg1,ANY,Bring down volume group
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: | Validate VG_DOWN
08/08/2012_14:19:20: -----
08/08/2012_14:19:20: Event node: ANY
08/08/2012_14:19:20: Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:19:20: VG: flexhavg, RG Name: FlexRG
08/08/2012_14:19:20: #####
08/08/2012_14:19:20: ##
## Starting Cluster Test Tool: -c -e /usr/es/sbin/cluster/cl_testtool/auto_vg

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##
08/08/2012_14:19:20: #####
08/08/2012_14:19:20: =====
08/08/2012_14:19:20: ||
|| Starting Test 1 - VG_DOWN,ANY,flexhavg
||
08/08/2012_14:19:20: =====
08/08/2012_14:19:21: -----
08/08/2012_14:19:21: | is_rational VG_DOWN
08/08/2012_14:19:21: -----
08/08/2012_14:19:21: Checking cluster stability
08/08/2012_14:19:21:         p260_PowerHA: ST_STABLE
08/08/2012_14:19:21:         p460_PowerHA: ST_STABLE
08/08/2012_14:19:21: Cluster is stable
08/08/2012_14:19:21: VG: flexhavg, RG: FlexRG, ONLINE NODES: p260_PowerHA
08/08/2012_14:19:21: -----
08/08/2012_14:19:21: | Executing Command for VG_DOWN
08/08/2012_14:19:21: -----
08/08/2012_14:19:21:         /usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e VG_DOWN -m execute
'flexhavg'
08/08/2012_14:19:22: -----
08/08/2012_14:19:22: | Entering wait_for_stable
08/08/2012_14:19:22: -----
08/08/2012_14:19:22: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:19:52:         Checking Node States:
08/08/2012_14:19:52:             Node p260_PowerHA: ST_STABLE
08/08/2012_14:19:52:             Active Timers: None
08/08/2012_14:19:52:             Node p460_PowerHA: ST_STABLE
08/08/2012_14:19:52:             Active Timers: None
08/08/2012_14:19:52: -----
08/08/2012_14:19:52: | VG_DOWN: Checking post-event status
08/08/2012_14:19:52: -----
08/08/2012_14:19:53: RESID: 2, RG: FlexRG, RGID: 1, TYPE: 0
08/08/2012_14:19:53: Checking node states
08/08/2012_14:19:53: p260_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:19:53: p460_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:19:53: Volume Group: flexhavg Failure Action: fallover
08/08/2012_14:19:53: Checking RG states
08/08/2012_14:19:53: Resource Group: FlexRG
08/08/2012_14:19:53:         Node: p260_PowerHA Pre Event State: ONLINE, Post Event State:
OFFLINE
08/08/2012_14:19:53:         Node: p460_PowerHA Pre Event State: OFFLINE, Post Event State:
ONLINE
08/08/2012_14:19:53: Checking event history
08/08/2012_14:19:53: Begin Event History records:
08/08/2012_14:19:53:         NODE: p260_PowerHA
Aug  8 14:19:22 EVENT COMPLETED: resource_state_change p260_PowerHA 0
Aug  8 14:19:23 EVENT COMPLETED: stop_server haflextest 0
Aug  8 14:19:25 EVENT COMPLETED: release_takeover_addr 0
Aug  8 14:19:25 EVENT COMPLETED: rg_move p260_PowerHA 1 RELEASE 0
Aug  8 14:19:25 EVENT COMPLETED: rg_move_release p260_PowerHA 1 0
Aug  8 14:19:27 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:19:28 EVENT COMPLETED: rg_move_fence p260_PowerHA 1
Aug  8 14:19:28 EVENT COMPLETED: rg_move p260_PowerHA 1 ACQUIRE 0
Aug  8 14:19:28 EVENT COMPLETED: rg_move_acquire p260_PowerHA 1 0
Aug  8 14:19:30 EVENT COMPLETED: rg_move_complete p260_PowerHA 1 0
Aug  8 14:19:33 EVENT COMPLETED: resource_state_change_complete p260_PowerHA 0
08/08/2012_14:19:53:         NODE: p460_PowerHA
Aug  8 14:19:23 EVENT COMPLETED: resource_state_change p260_PowerHA 0
Aug  8 14:19:24 EVENT COMPLETED: rg_move p260_PowerHA 1 RELEASE 0
Aug  8 14:19:24 EVENT COMPLETED: rg_move_release p260_PowerHA 1 0
Aug  8 14:19:28 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:19:29 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0

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Aug  8 14:19:30 EVENT COMPLETED: acquire_aconn_service en0 net_ether_01 0
Aug  8 14:19:30 EVENT COMPLETED: acquire_service_addr 0
Aug  8 14:19:31 EVENT COMPLETED: rg_move p260_PowerHA 1 ACQUIRE 0
Aug  8 14:19:31 EVENT COMPLETED: rg_move_acquire p260_PowerHA 1 0
Aug  8 14:19:32 EVENT COMPLETED: start_server haflextest 0
Aug  8 14:19:32 EVENT COMPLETED: rg_move_complete p260_PowerHA 1 0
Aug  8 14:19:34 EVENT COMPLETED: resource_state_change_complete p260_PowerHA 0
08/08/2012_14:19:53: End Event History records
08/08/2012_14:19:53: =====
08/08/2012_14:19:53: ||
|| Test 1 Complete - VG_DOWN: Bring down volume group
||
08/08/2012_14:19:53: || Test Completion Status: PASSED
||
08/08/2012_14:19:53: =====
08/08/2012_14:19:53: #####
08/08/2012_14:19:53: ##
## Cluster Testing Complete: Exit Code 0
##
08/08/2012_14:19:53: #####
08/08/2012_14:19:53: -----
08/08/2012_14:19:53: | Initializing Variable Table
08/08/2012_14:19:53: -----
08/08/2012_14:19:53:         Using Process Environment for Variable Table
08/08/2012_14:19:53: -----
08/08/2012_14:19:53: | Reading Static Configuration Data
08/08/2012_14:19:53: -----
08/08/2012_14:19:53:         Cluster Name: PHAFlexCluster
08/08/2012_14:19:53:         Cluster Version: 13
08/08/2012_14:19:53:         Local Node Name: p260_PowerHA
08/08/2012_14:19:53:         Cluster Nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:19:53:         Found 1 Cluster Networks
08/08/2012_14:19:53:         Found 3 Cluster Interfaces/Device/Labels
08/08/2012_14:19:53:         Found 1 Cluster Resource Groups
08/08/2012_14:19:53:         Found 10 Cluster Resources
08/08/2012_14:19:53:         Event Timeout Value: 720
08/08/2012_14:19:53:         Maximum Timeout Value: 2880
08/08/2012_14:19:53:         Found 0 Cluster Sites
08/08/2012_14:19:53: -----
08/08/2012_14:19:53: | Building Test Queue
08/08/2012_14:19:53: -----
08/08/2012_14:19:53:         Test Plan: /usr/es/sbin/cluster/cl_testtool/auto_cluster_kill
08/08/2012_14:19:53:         Event 1: CLSTRMGR_KILL: CLSTRMGR_KILL,node1,Kill the cluster
manager on a node
08/08/2012_14:19:53: -----
08/08/2012_14:19:53: | Validate CLSTRMGR_KILL
08/08/2012_14:19:53: -----
08/08/2012_14:19:53:         Event node: p460_PowerHA
08/08/2012_14:19:53:         Configured nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:19:53: #####
08/08/2012_14:19:53: ##
## Starting Cluster Test Tool: -c -e /usr/es/sbin/cluster/cl_testtool/auto_cluster_kill
##
08/08/2012_14:19:53: #####
08/08/2012_14:19:53: =====
08/08/2012_14:19:53: ||
|| Starting Test 1 - CLSTRMGR_KILL,p460_PowerHA,Kill the cluster manager on a node
||
08/08/2012_14:19:53: =====
08/08/2012_14:19:54: -----
08/08/2012_14:19:54: | is_rational CLSTRMGR_KILL
08/08/2012_14:19:54: -----
08/08/2012_14:19:54: Checking cluster stability

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08/08/2012_14:19:54:      p260_PowerHA: ST_STABLE
08/08/2012_14:19:54:      p460_PowerHA: ST_STABLE
08/08/2012_14:19:54: Cluster is stable
08/08/2012_14:19:54: -----
08/08/2012_14:19:54: | Executing Command for CLSTRMGR_KILL
08/08/2012_14:19:54: -----
08/08/2012_14:19:54:      /usr/es/sbin/cluster/utilities/cl_rsh -n p460_PowerHA
/usr/es/sbin/cluster/cl_testtool/cl_testtool_ctrl -e CLSTRMGR_KILL -m execute 'p460_PowerHA'
08/08/2012_14:19:55: -----
08/08/2012_14:19:55: | Entering wait_for_stable
08/08/2012_14:19:55: -----
08/08/2012_14:19:55: Waiting 30 seconds for cluster to stabilize.
08/08/2012_14:20:31:      Checking Node States:
08/08/2012_14:20:31:      Node p260_PowerHA: ST_STABLE
08/08/2012_14:20:31:      Active Timers: None
08/08/2012_14:20:31:      Node p460_PowerHA:
08/08/2012_14:20:31: -----
08/08/2012_14:20:31: | CLSTRMGR_KILL: Checking post-event status
08/08/2012_14:20:31: -----
08/08/2012_14:20:38: pre-event online nodes: p260_PowerHA p460_PowerHA
08/08/2012_14:20:38: post-event online nodes: p260_PowerHA
08/08/2012_14:20:38: Checking node states
08/08/2012_14:20:38: p260_PowerHA: Preevent state: ST_STABLE, Postevent state: ST_STABLE
08/08/2012_14:20:38: p460_PowerHA: Preevent state: ST_STABLE, Postevent state:
08/08/2012_14:20:38: Checking RG states
08/08/2012_14:20:38:      Resource Group: FlexRG
08/08/2012_14:20:38:      Node: p260_PowerHA Pre Event State: OFFLINE, Post Event State:
ONLINE
08/08/2012_14:20:38:      Node: p460_PowerHA Pre Event State: ONLINE, Post Event State:
OFFLINE
08/08/2012_14:20:38: Checking event history
08/08/2012_14:20:38: Begin Event History records:
08/08/2012_14:20:38:      NODE: p260_PowerHA
Aug  8 14:19:55 EVENT COMPLETED: node_down p460_PowerHA 0
Aug  8 14:19:55 EVENT COMPLETED: rg_move p260_PowerHA 1 RELEASE 0
Aug  8 14:19:55 EVENT COMPLETED: rg_move_release p260_PowerHA 1 0
Aug  8 14:19:55 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:19:57 EVENT COMPLETED: rg_move_fence p260_PowerHA 1 0
Aug  8 14:19:59 EVENT COMPLETED: acquire_takeover_addr 0
Aug  8 14:20:03 EVENT COMPLETED: rg_move p260_PowerHA 1 ACQUIRE 0
Aug  8 14:20:03 EVENT COMPLETED: rg_move_acquire p260_PowerHA 1 0
Aug  8 14:20:03 EVENT COMPLETED: start_server haflextest 0Aug  8 14:20:03 EVENT COMPLETED:
rg_move_complete p260_PowerHA 1 0
Aug  8 14:20:05 EVENT COMPLETED: node_down_complete p460_PowerHA 0
08/08/2012_14:20:38: End Event History records
08/08/2012_14:20:38: =====
08/08/2012_14:20:38: ||
|| Test 1 Complete - CLSTRMGR_KILL: Kill the cluster manager on a node
||
08/08/2012_14:20:38: || Test Completion Status: PASSED
||
08/08/2012_14:20:38: =====
08/08/2012_14:20:38: #####
08/08/2012_14:20:38: ##
## Cluster Testing Complete: Exit Code 0
##
08/08/2012_14:20:38: #####

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