

IMPORTANT NOTE

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IBM POWERHA 7.1 BRIEF OVERVIEW

Please read the complete PowerHA 7 system mirror redbook for Theoretical / Conceptual Knowledge. I am just covering the steps required to configure PowerHA 7.1 with Smart Assist. Following is some of the brief information .

Before we start the configuration Let us understand what is PowerHA7 and CAA.

Before PowerHA 7 RSCT Play the main role for controlling / Managing PowerHA i.e I mean to say RSCT had main components Like Topology Services, Group Services, RMC and Resource Manager.

PowerHA Communicate to Group Services then To Topology Services and then back To PowerHA

But In recent version of PowerHA i.e PowerHA 7.1 and earlier Topology Services is removed from RSCT and integrated into CAA itself. CAA will take care of all PowerHA Topology Services, Group services still lives in RSCT. CAA is built up in AIX kernel itself so PowerHA deals directly with Kernel through CAA.

Topology Services

This component provides node and network failure detection.

Group Services

This component provides cross-node or process coordination on some cluster configurations

CAA

Cluster Aware AIX (CAA) Provides the basic clustering capabilities integrated into AIX itself. CAA includes creation/ deletion of nodes, provides monitoring capabilities for node failures. CAA doesn't provide any resource group failover/fallback capabilities which is being taken care by PowerHA itself.

You can also create Two Node cluster between Two VIOS running with AIX 6 TL6 minimum on background. I have not tested this, but its possible to create cluster between Two VIOS.

CAA uses Shared San Disk acting as central repository for storing PowerHA configuration

PowerHA uses CAA for Topology services like Heartbeating, configuration information, Live notification events.

Multicasting

PowerHA uses all configured IP address in AIX for communication using multicasting. A multicasting is new concept in this version of PowerHA for heartbeating. Whenever you create a cluster all available configured IP address in AIX will get discovered by PowerHA, you can remove this network from PowerHA if you don't want it for application usage.

In below screen shots you will find how to check multicasting is enable or not.

Please Note - Before you begin with configuration ask your network administrator to enable multicasting on all adapters which is connected to network switches. Without this your CAA cluster will fail. Main reason for the failure in creation of CAA cluster would be multicasting communication is not happening properly.

Now Lets Begin with configuration parts.

Concept is same but menus are changed in PowerHA7, you can use CLI also to create cluster using clmgr utility/command.

PRE-REQUISTE FOR CONFIGURING POWERHA 7

- » Update Latest available fix pack (Mandatory)
- » No thumb rules for Boot / Service IP in different subnet as we do in earlier version of PowerHA. Boot IP, Service IP can be in same range/network also. We are using same range of boot IP and Service IP. (Optional)
- » Multicasting to enable on Network adapter configured in host (Mandatory)
- » Please verify /etc/snmp.conf and snmpv3.conf exist and accessible. This is mandatory since PowerHA 7 uses snmp service for its communication and multicasting. (Mandatory)
- » PowerHA uses AIX hostname as node name which is mandatory. In previous version of PowerHA you can specify your own Node Name while adding nodes, but PowerHA7 uses AIX hostname as node name. So application bounding with hostname/database should not be there. Use different IP label for service IP / Floating IP/ Live IP/ Virtual IP, as shown below. 10.9.50.205 is Live IP, 10.9.50.203 is Boot IP. Boot IP label should be nothing than the machine Hostname, its mandatory.

At many customer places you will find customer is using Hostname for there database or application configuration this older concept had to flushed out from customer mind before you begin. We have tested many application/database is working successfully without actual machine hostname,.

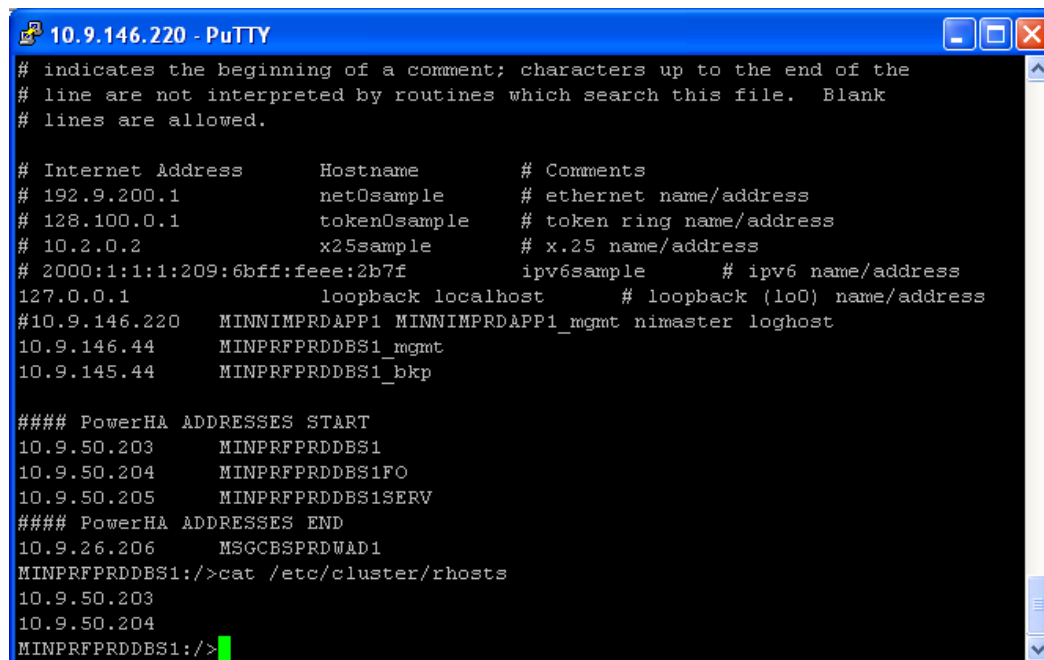
Following screen shot is the example of Oracle database working with all failover/fallback capabilities.

Beginning with Hacmp 7.1 configuration with Smart Assist

Step 1) Populate proper entries in /etc/host as shown below for all nodes that would be the part of PowerHA

For Example - MINPRFPRDDBS1 - is My Active Node

MINPRFPRDDBS1FO - is My Standby/Failover Node



```
10.9.146.220 - PuTTY
# indicates the beginning of a comment; characters up to the end of the
# line are not interpreted by routines which search this file.  Blank
# lines are allowed.

# Internet Address      Hostname      # Comments
# 192.9.200.1           net0sample   # ethernet name/address
# 128.100.0.1           token0sample # token ring name/address
# 10.2.0.2              x25sample    # x.25 name/address
# 2000:1:1:1:209:6bff:feee:2b7f  ipv6sample   # ipv6 name/address
127.0.0.1              loopback localhost # loopback (lo0) name/address
#10.9.146.220          MINNIMPRDAPP1 MINNIMPRDAPP1_mgmt nimaster loghost
10.9.146.44            MINPRFPRDDBS1_mgmt
10.9.145.44            MINPRFPRDDBS1_bkp

#### PowerHA ADDRESSES START
10.9.50.203            MINPRFPRDDBS1
10.9.50.204            MINPRFPRDDBS1FO
10.9.50.205            MINPRFPRDDBS1SERV
#### PowerHA ADDRESSES END
10.9.26.206            MSGCBSPRDWAD1
MINPRFPRDDBS1:/>cat /etc/cluster/rhosts
10.9.50.203
10.9.50.204
MINPRFPRDDBS1:/>
```

```
10.9.146.220 - PuTTY
# Items are separated by any number of blanks and/or tabs. A '#'
# indicates the beginning of a comment; characters up to the end of the
# line are not interpreted by routines which search this file. Blank
# lines are allowed.

# Internet Address      Hostname      # Comments
# 192.9.200.1           net0sample   # ethernet name/address
# 128.100.0.1           token0sample # token ring name/address
# 10.2.0.2              x25sample    # x.25 name/address
# 2000:1:1:1:209:6bff:feee:2b7f  ipv6sample   # ipv6 name/address
127.0.0.1              loopback localhost # loopback (lo0) name/address
#10.9.146.220          MINNIMPRDAPP1 MINNIMPRDAPP1_mgmt nimaster loghost
10.9.146.70            MINPRFPRDDBS1FO_mgmt
10.9.145.70            MINPRFPRDDBS1FO_bkp

#### PowerHA ADDRESSES START
10.9.50.203            MINPRFPRDDBS1
10.9.50.204            MINPRFPRDDBS1FO
10.9.50.205            MINPRFPRDDBS1SERV
#### PowerHA ADDRESSES END
root@MINPRFPRDDBS1FO >cat /etc/cluster/rhosts
10.9.50.203
10.9.50.204
root@MINPRFPRDDBS1FO >
```

STEP 2) Populate Boot IP label / IPs into /etc/cluster/rhosts on Both Nodes, This is mandatory entry.

STEP 3) Test Multicasting as shown below from both nodes using mping command, you can use the same IP as below . You can specify your own IP also but better to use below logic for multicast IP

Suppose your Boot IP is 10.168.101.43 replacing the first octet of IP with 228 it would look like 228.168.101.43, PowerHA uses the same concept it replaces the first octet by 228 and keep remaining IP part same.

Use the below command to test, -v is for verbose mode,

-s is for sender

-r for receiver

-c for count to execute.

```
10.9.146.220 - PuTTY
Discarding sender packet

--- mping statistics ---
5 packets transmitted, 0 packets received
round-trip min/avg/max = NA/NA/NA ms
MINPRFPRDDBS1:/>mping -v -s -c 5 -a 228.168.101.43
mping version 1.1
Localhost is MINPRFPRDDBS1, 10.9.50.203
mpinging 228.168.101.43/4098 with ttl=32:

Discarding sender packet
Discarding sender packet
32 bytes from 10.9.50.204: seqno=2 ttl=32 time=0.333 ms
Discarding sender packet
32 bytes from 10.9.50.204: seqno=3 ttl=32 time=0.803 ms
Discarding sender packet
32 bytes from 10.9.50.204: seqno=4 ttl=32 time=0.316 ms
Discarding sender packet
32 bytes from 10.9.50.204: seqno=5 ttl=32 time=0.315 ms

--- mping statistics ---
5 packets transmitted, 4 packets received
round-trip min/avg/max = 0.315/0.442/0.803 ms
MINPRFPRDDBS1:/>
```

```
10.9.146.220 - PuTTY

ck_mping: Called

ck_mping: Running 'mping -v -r -c 5 -a 228.168.101.43' on node MINPRFPRDDBS1

ck_mping: Running 'mping -v -s -c 5 -a 228.168.101.43' on the local node

root@MINPRFPRDDBS1FO >cd
root@MINPRFPRDDBS1FO >mping -v -r -c 5 -a 228.168.101.43
mping version 1.1
Localhost is MINPRFPRDDBS1FO, 10.9.50.204
Listening on 228.168.101.43/4098:

Replying to mping from 10.9.50.203 bytes=32 seqno=1 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.203 bytes=32 seqno=2 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.203 bytes=32 seqno=3 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.203 bytes=32 seqno=4 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.203 bytes=32 seqno=5 ttl=32
Discarding receiver packet
root@MINPRFPRDDBS1FO >
```

FROM FAILOVER TO ACTIVE NODE

```
10.9.146.220 - PuTTY
Discarding receiver packet
Replying to mping from 10.9.50.203 bytes=32 seqno=4 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.203 bytes=32 seqno=5 ttl=32
Discarding receiver packet
root@MINPRFPRDDBS1FO >mping -v -s -c 5 -a 228.168.101.43
mping version 1.1
Localhost is MINPRFPRDDBS1FO, 10.9.50.204
mpinging 228.168.101.43/4098 with ttl=32:

Discarding sender packet
Discarding sender packet
32 bytes from 10.9.50.203: seqno=2 ttl=32 time=0.321 ms
Discarding sender packet
32 bytes from 10.9.50.203: seqno=3 ttl=32 time=0.331 ms
Discarding sender packet
32 bytes from 10.9.50.203: seqno=4 ttl=32 time=0.303 ms
Discarding sender packet
32 bytes from 10.9.50.203: seqno=5 ttl=32 time=0.675 ms

--- mping statistics ---
5 packets transmitted, 4 packets received
round-trip min/avg/max = 0.303/0.408/0.675 ms
root@MINPRFPRDDBS1FO >
```

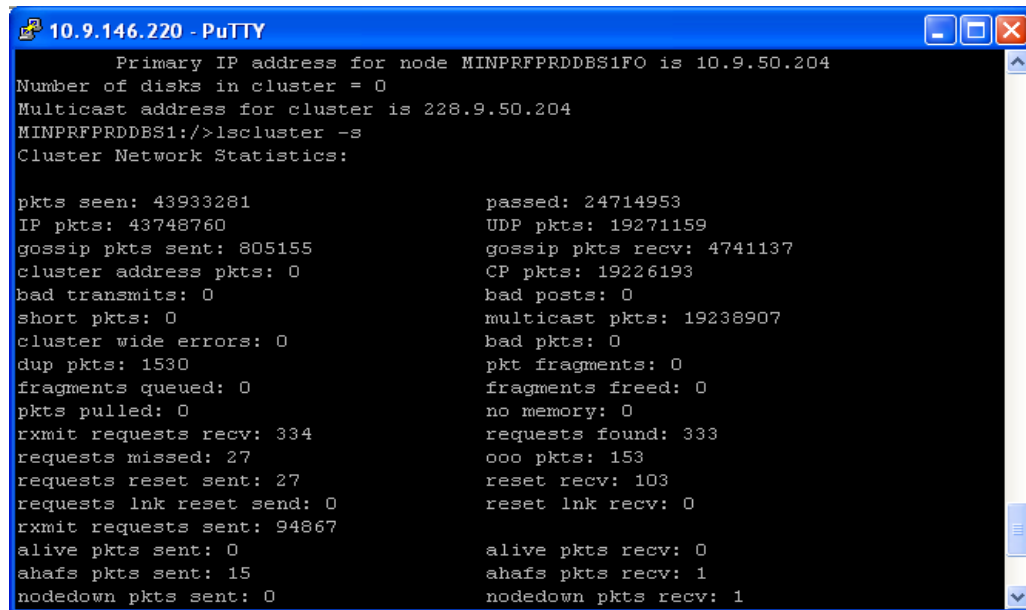
```
10.9.146.220 - PuTTY
Discarding sender packet
32 bytes from 10.9.50.204: seqno=4 ttl=32 time=0.316 ms
Discarding sender packet
32 bytes from 10.9.50.204: seqno=5 ttl=32 time=0.315 ms

--- mping statistics ---
5 packets transmitted, 4 packets received
round-trip min/avg/max = 0.315/0.442/0.803 ms
MINPRFPRDDBS1:/>mping -v -r -c 5 -a 228.168.101.43
mping version 1.1
Localhost is MINPRFPRDDBS1, 10.9.50.203
Listening on 228.168.101.43/4098:

Replying to mping from 10.9.50.204 bytes=32 seqno=1 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.204 bytes=32 seqno=2 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.204 bytes=32 seqno=3 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.204 bytes=32 seqno=4 ttl=32
Discarding receiver packet
Replying to mping from 10.9.50.204 bytes=32 seqno=5 ttl=32
Discarding receiver packet
MINPRFPRDDBS1:/>
```

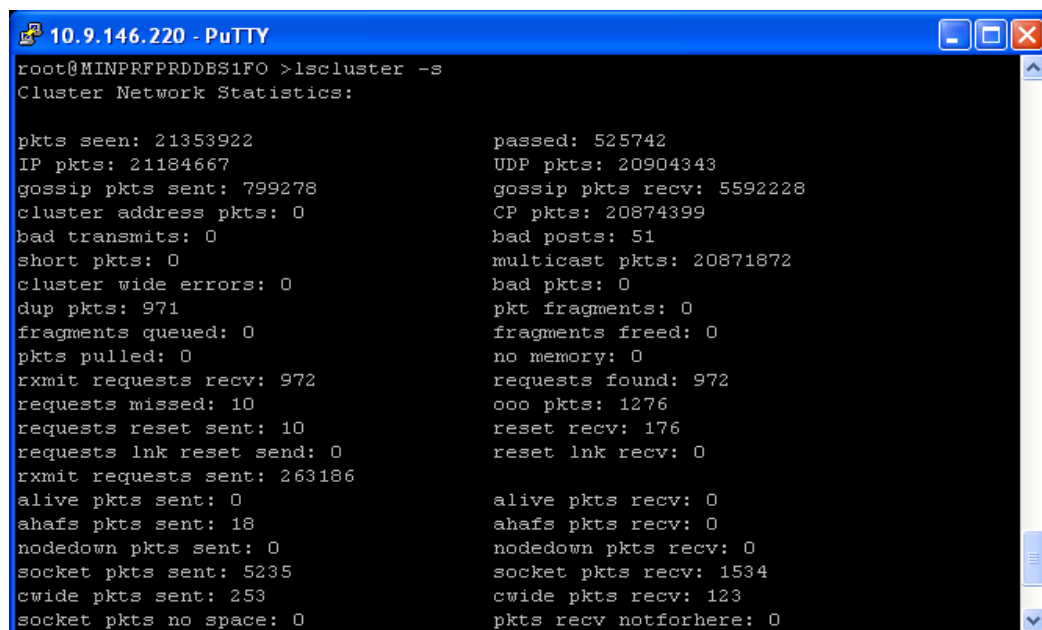
Execute below command will list the network statistics. If you get more number of packets discarded in above test execute below command to check the multicasting is working or not.

If your gossip_pkts_sent and gossip_pkts_rcv as shown below is increasing it means multicasting is working properly.



```
10.9.146.220 - PuTTY
Primary IP address for node MINPRFPRDDBS1FO is 10.9.50.204
Number of disks in cluster = 0
Multicast address for cluster is 228.9.50.204
MINPRFPRDDBS1:/>lscluster -s
Cluster Network Statistics:

pkts seen: 43933281                passed: 24714953
IP pkts: 43748760                  UDP pkts: 19271159
gossip pkts sent: 805155            gossip pkts rcv: 4741137
cluster address pkts: 0             CP pkts: 19226193
bad transmits: 0                    bad posts: 0
short pkts: 0                       multicast pkts: 19238907
cluster wide errors: 0              bad pkts: 0
dup pkts: 1530                      pkt fragments: 0
fragments queued: 0                 fragments freed: 0
pkts pulled: 0                      no memory: 0
rxmit requests rcv: 334              requests found: 333
requests missed: 27                  ooo pkts: 153
requests reset sent: 27              reset rcv: 103
requests lnk reset send: 0           reset lnk rcv: 0
rxmit requests sent: 94867
alive pkts sent: 0                   alive pkts rcv: 0
ahafs pkts sent: 15                  ahafs pkts rcv: 1
nodedown pkts sent: 0                nodedown pkts rcv: 1
```

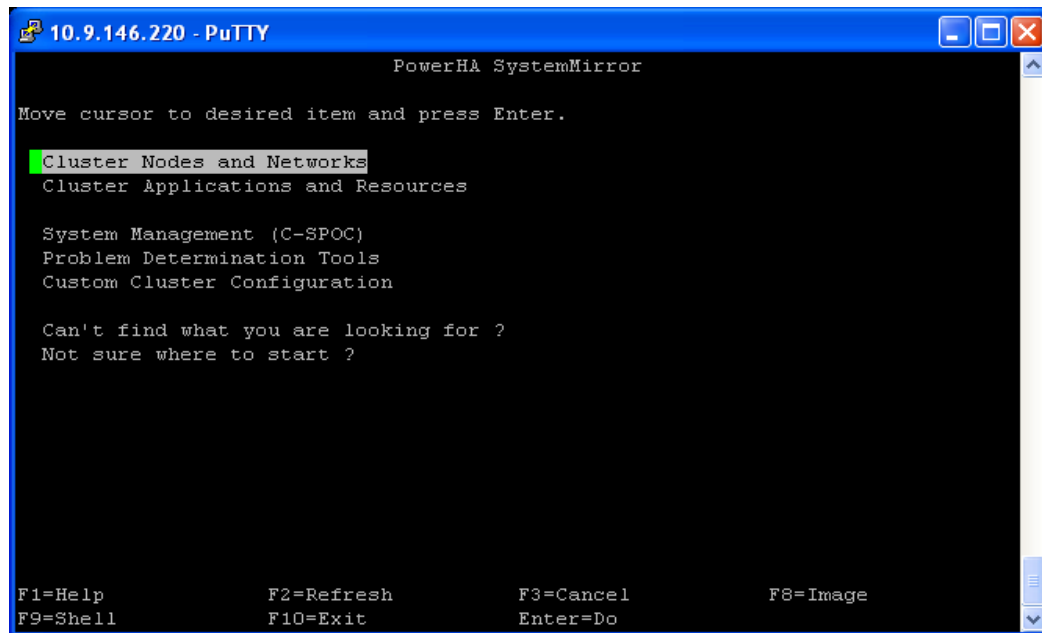


```
10.9.146.220 - PuTTY
root@MINPRFPRDDBS1FO >lscluster -s
Cluster Network Statistics:

pkts seen: 21353922                passed: 525742
IP pkts: 21184667                  UDP pkts: 20904343
gossip pkts sent: 799278            gossip pkts rcv: 5592228
cluster address pkts: 0             CP pkts: 20874399
bad transmits: 0                    bad posts: 51
short pkts: 0                       multicast pkts: 20871872
cluster wide errors: 0              bad pkts: 0
dup pkts: 971                       pkt fragments: 0
fragments queued: 0                 fragments freed: 0
pkts pulled: 0                      no memory: 0
rxmit requests rcv: 972              requests found: 972
requests missed: 10                  ooo pkts: 1276
requests reset sent: 10              reset rcv: 176
requests lnk reset send: 0           reset lnk rcv: 0
rxmit requests sent: 263186
alive pkts sent: 0                   alive pkts rcv: 0
ahafs pkts sent: 18                  ahafs pkts rcv: 0
nodedown pkts sent: 0                nodedown pkts rcv: 0
socket pkts sent: 5235               socket pkts rcv: 1534
cwide pkts sent: 253                 cwide pkts rcv: 123
socket pkts no space: 0              pkts rcv notforhere: 0
```

STEP 4) After completing basic test of network configuration parts begin.

STEP 5) Create Cluster, smitty hacmp or smitty sysmirror, follow the screen shot step by step.



10.9.146.220 - PuTTY

PowerHA SystemMirror

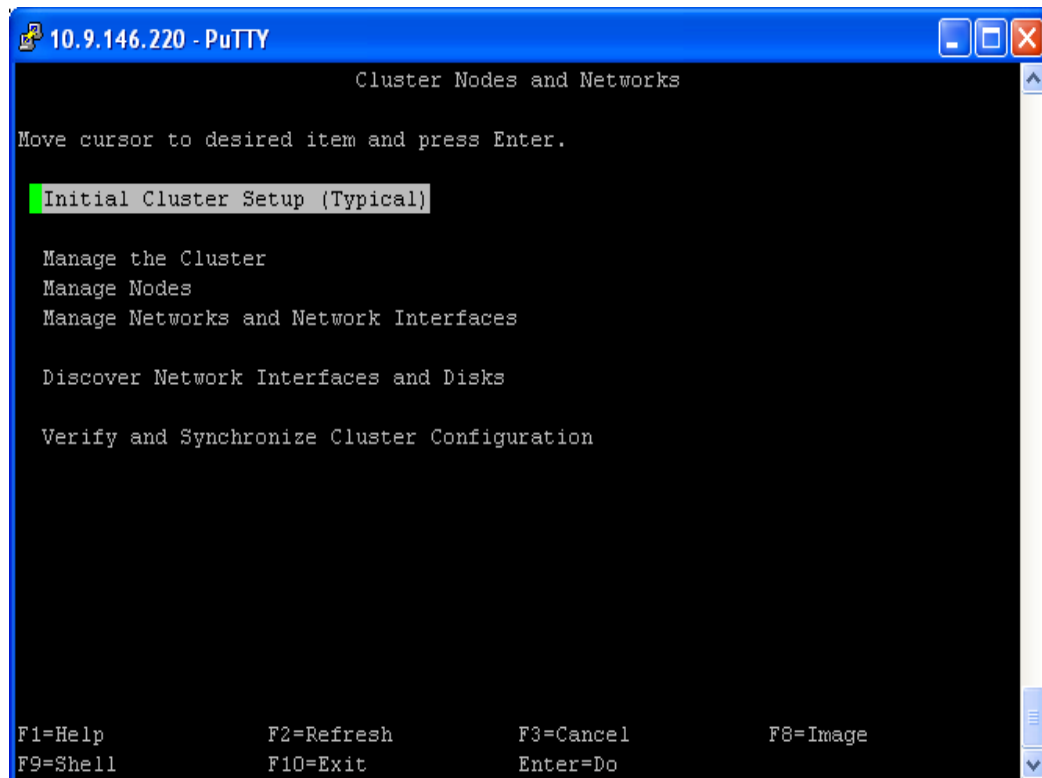
Move cursor to desired item and press Enter.

- Cluster Nodes and Networks
- Cluster Applications and Resources
- System Management (C-SPOC)
- Problem Determination Tools
- Custom Cluster Configuration

Can't find what you are looking for ?
Not sure where to start ?

F1=Help F2=Refresh F3=Cancel F8=Image
F9=Shell F10=Exit Enter=Do

This screenshot shows the main menu of the PowerHA SystemMirror utility. The window title is '10.9.146.220 - PuTTY'. The menu lists several options, with 'Cluster Nodes and Networks' currently selected and highlighted. Below the menu, there are instructions and a list of function key shortcuts.



10.9.146.220 - PuTTY

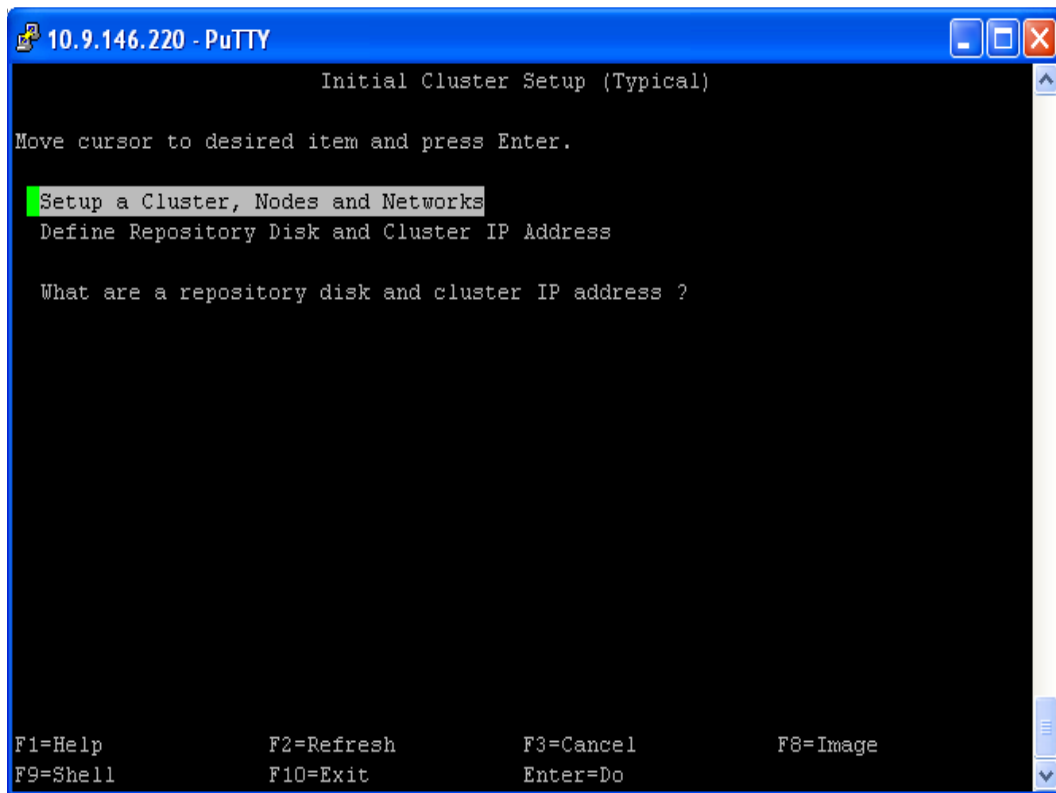
Cluster Nodes and Networks

Move cursor to desired item and press Enter.

- Initial Cluster Setup (Typical)
- Manage the Cluster
- Manage Nodes
- Manage Networks and Network Interfaces
- Discover Network Interfaces and Disks
- Verify and Synchronize Cluster Configuration

F1=Help F2=Refresh F3=Cancel F8=Image
F9=Shell F10=Exit Enter=Do

This screenshot shows the 'Cluster Nodes and Networks' sub-menu. The window title remains '10.9.146.220 - PuTTY'. The menu lists options for initial setup and management, with 'Initial Cluster Setup (Typical)' currently selected and highlighted. The same function key shortcuts are displayed at the bottom.



STEP 6) This node from which you create cluster will automatically get detected by powerHA and get populated into Currently configured Node, You just need to specify your failover/secondary node in New Nodes, Just do F4 or Esc4 to select the BootIP.

See screenshot show below -

```

10.9.146.220 - PuTTY
Setup Cluster, Nodes and Networks (Typical)

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

* Cluster Name
New Nodes (via selected communication paths)
Currently Configured Node(s)
MINPRFPRDDBS1FO

[Entry Fields]
[MINPRFPRDDBS1_CLS]
[1]

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

```

Selecting my secondary node **MINPRFPRDDBS1**

```

10.9.146.220 - PuTTY
Setup Cluster, Nodes and Networks (Typical)

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

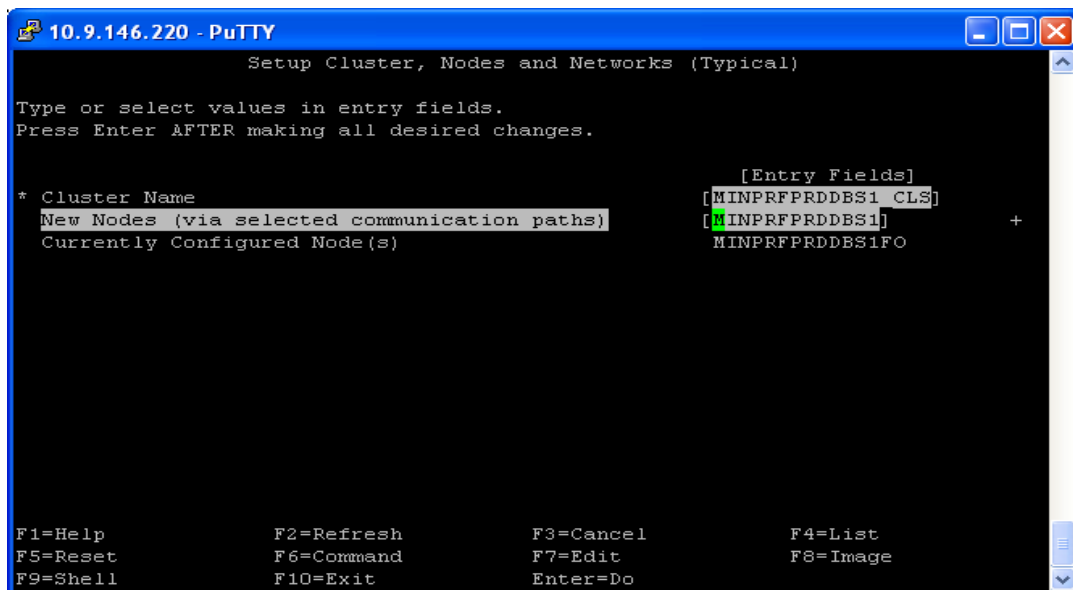
[Entry Fields]

* +-----+
|               New Nodes (via selected communication paths)               |
| Move cursor to desired item and press F7.                               |
| ONE OR MORE items can be selected.                                       |
| Press Enter AFTER making all selections.                                  |
|                                                                            |
| MINNIMPRDAPP1 (10.9.146.220)                                              |
| MINPRFPRDDBS1FO mgmt (10.9.146.70)                                       |
| MINPRFPRDDBS1FO bkp (10.9.145.70)                                        |
| MINPRFPRDDBS1 (10.9.50.203)                                              |
| MINPRFPRDDBS1FO (10.9.50.204)                                            |
| MINPRFPRDDBS1SERV (10.9.50.205)                                          |
|                                                                            |
| F1=Help      F2=Refresh    F3=Cancel     F4=List
F1| F7=Select   F8=Image     F10=Exit      F8=Image
F5| Enter=Do    /=Find      n=Find Next
F9+-----+

```

So overall you don't need to create cluster name separately, adding node separately and executing discovery separately, all this step get executed in one single step in PowerHA7.

Below step do creating cluster, Adding Node and running discovery for you. See how intelligent it is.



```
10.9.146.220 - PuTTY
Setup Cluster, Nodes and Networks (Typical)

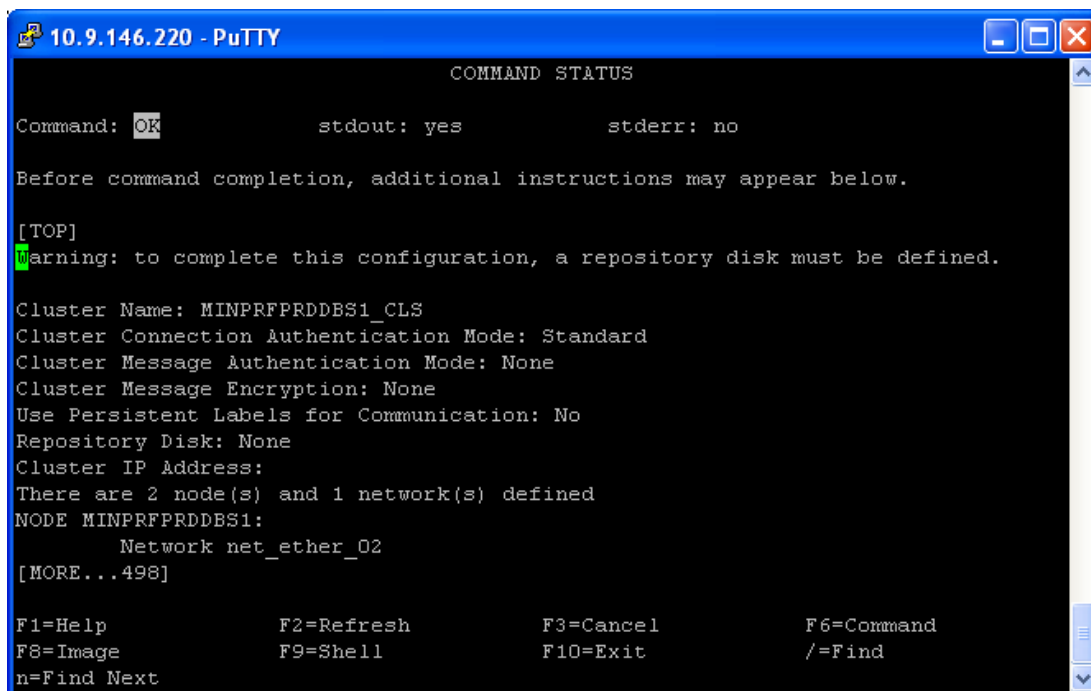
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* Cluster Name
New Nodes (via selected communication paths)
Currently Configured Node(s)

[Entry Fields]
[MINPRFPRDDBS1_CLS]
[MINPRFPRDDBS1] +
MINPRFPRDDBS1FO

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

After pressing enter, Discovery is done by PowerHA 7.



```
10.9.146.220 - PuTTY
COMMAND STATUS

Command: OK      stdout: yes      stderr: no

Before command completion, additional instructions may appear below.

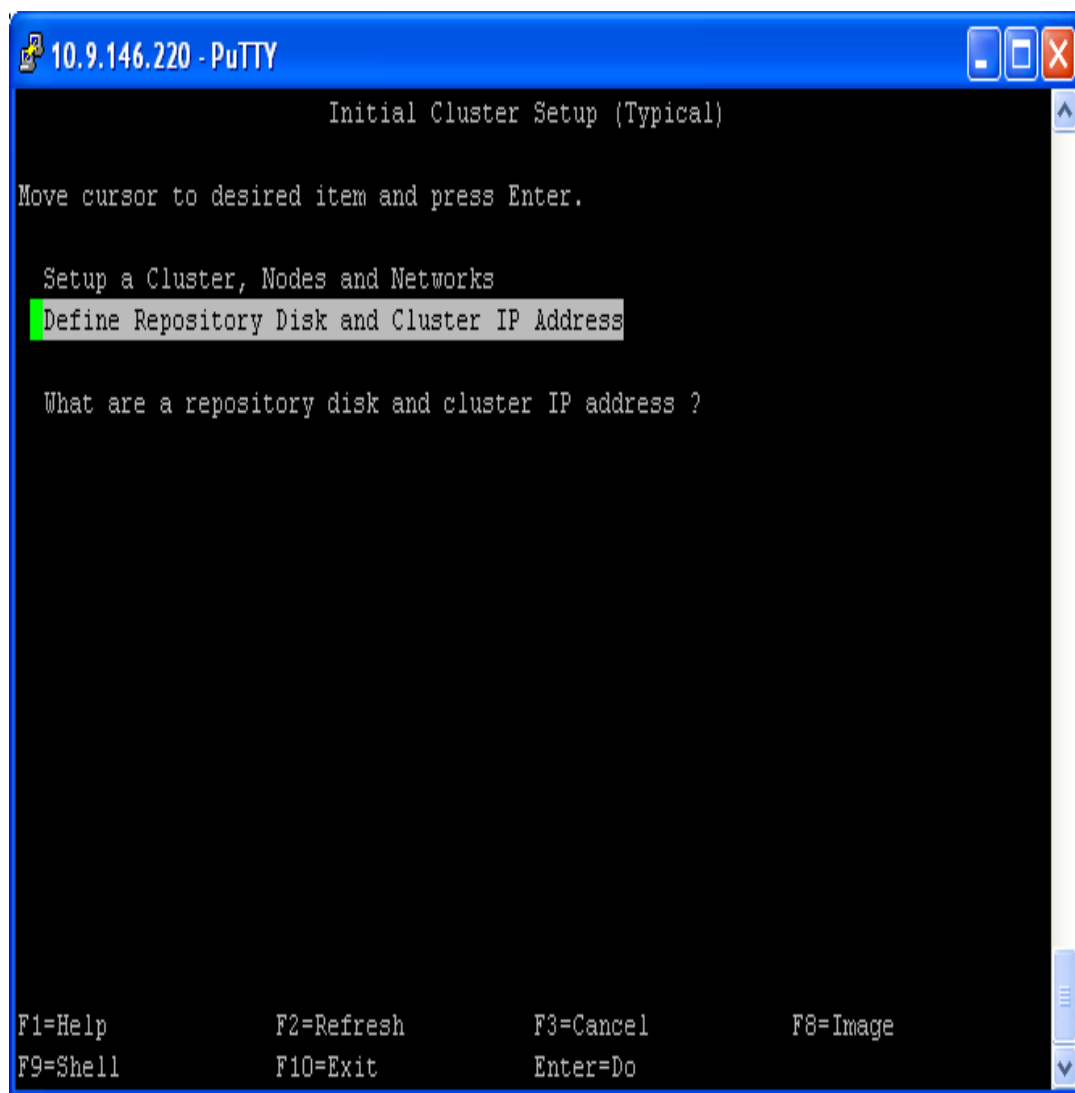
[TOP]
Warning: to complete this configuration, a repository disk must be defined.

Cluster Name: MINPRFPRDDBS1_CLS
Cluster Connection Authentication Mode: Standard
Cluster Message Authentication Mode: None
Cluster Message Encryption: None
Use Persistent Labels for Communication: No
Repository Disk: None
Cluster IP Address:
There are 2 node(s) and 1 network(s) defined
NODE MINPRFPRDDBS1:
    Network net_ether_02
[MORE...498]

F1=Help      F2=Refresh    F3=Cancel     F6=Command
F8=Image     F9=Shell     F10=Exit     /=Find
n=Find Next
```

STEP 7) As I have mentioned in beginning that PowerHA7 uses Repository disk for storing PowerHA configuration without this your PowerHA, CAA cluster will not be created.

This step is mandatory otherwise your CAA cluster will not be created.



>> Specify the share disk name, if you are having Disk number mismatch on both node i.e sometime if you map single lun to both nodes it happen disk number on both nodes would be different but PVID is same. In that case just select the hdisk number of the node from where you are creating cluster.

10.9.146.220 - PuTTY

Define Repository and Cluster IP Address

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

	[Entry Fields]	
* Cluster Name	MINPRFPRDDBS1_CLS	
* Repository Disk	[None]	+
Cluster IP Address	[]	

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

10.9.146.220 - PuTTY

Define Repository and Cluster IP Address

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

	[Entry Fields]	
* Cluster Name	MINPRFPRDDBS1_CLS	
* Repository Disk	[hdisk22]	+
Cluster IP Address	[]	

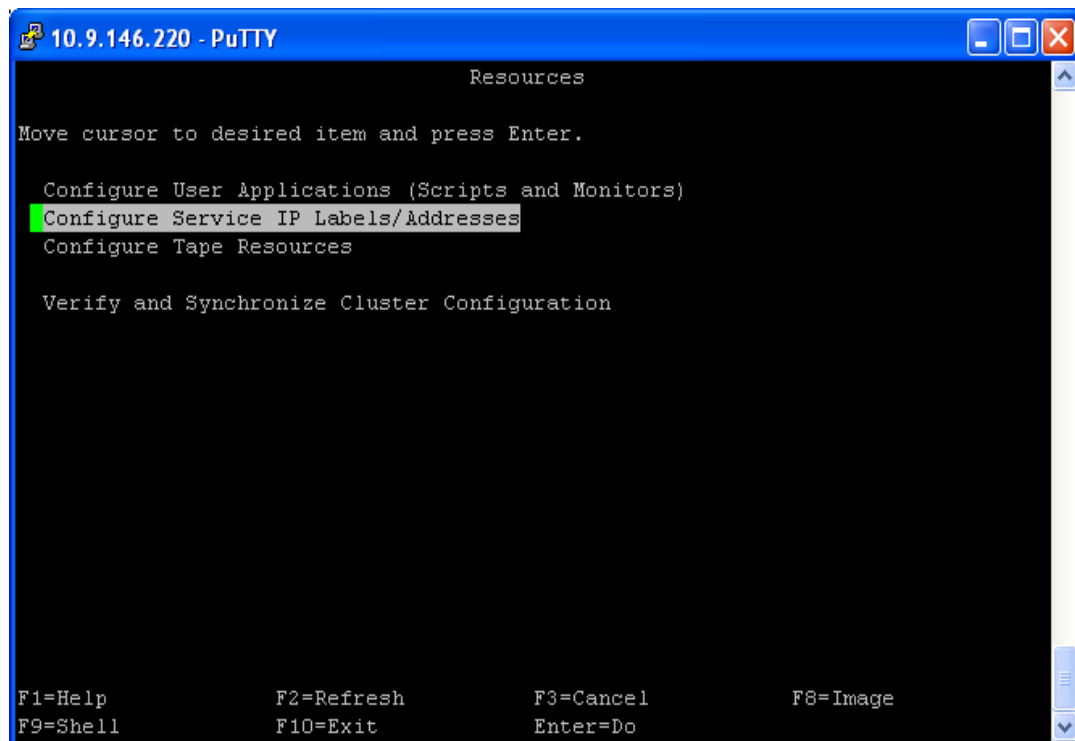
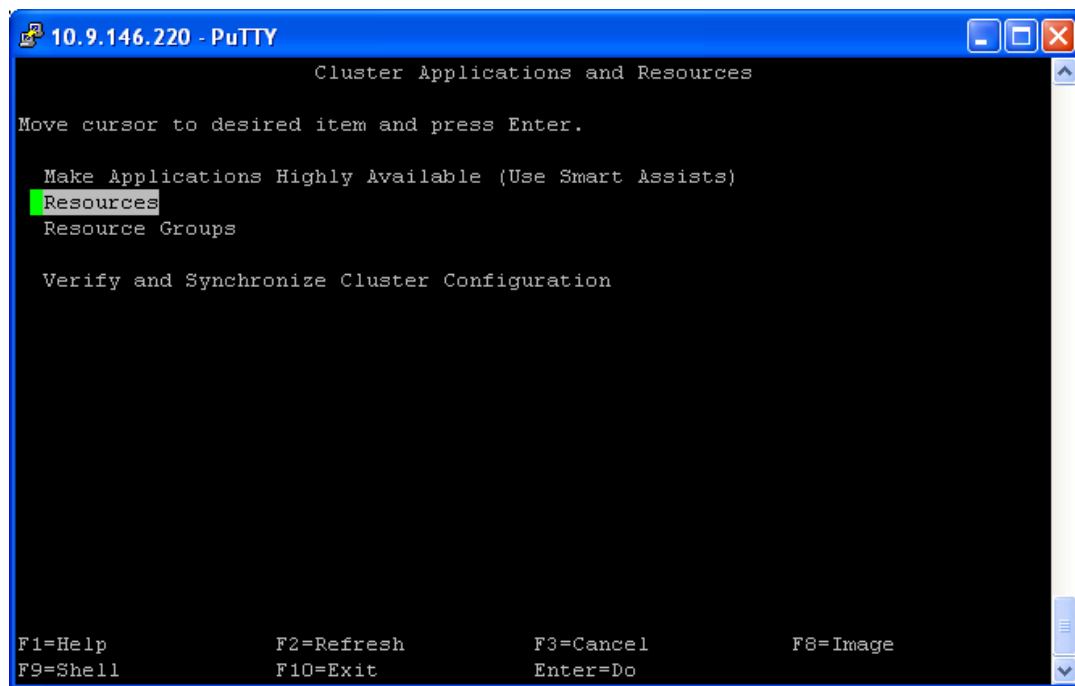
F1=Help F2=Refresh F3=Cancel F4=List
F5=Reset F6=Command F7=Edit F8=Image
F9=Shell F10=Exit Enter=Do

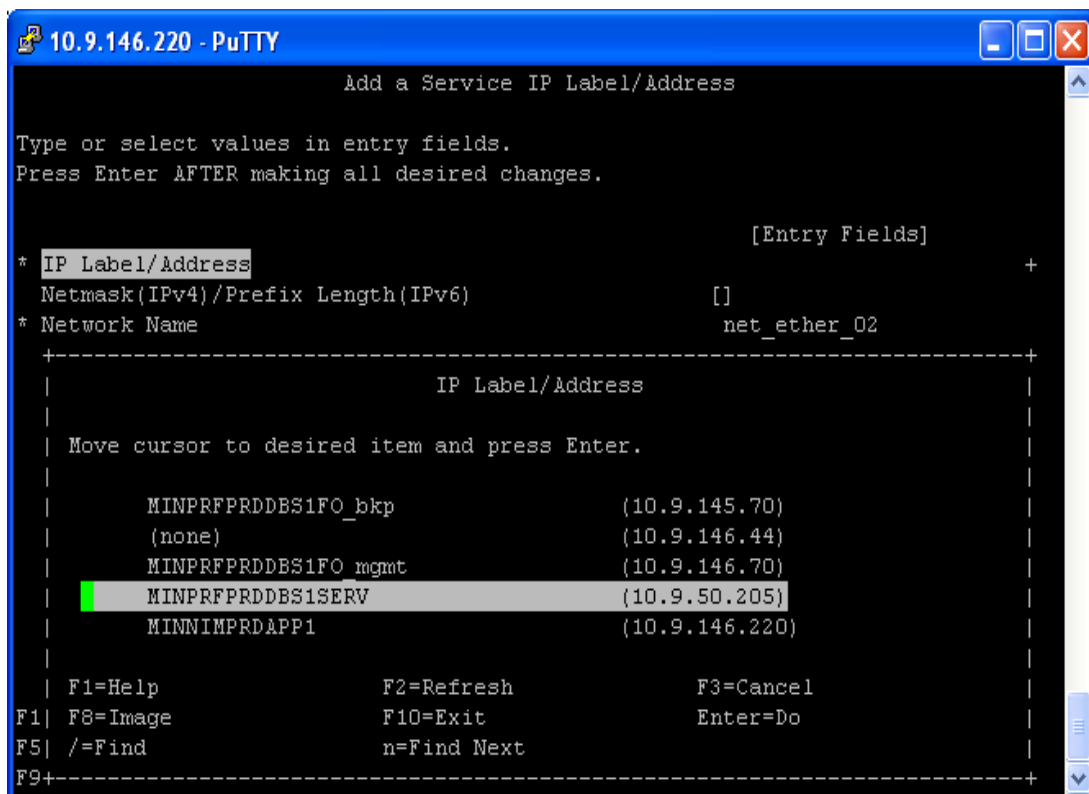
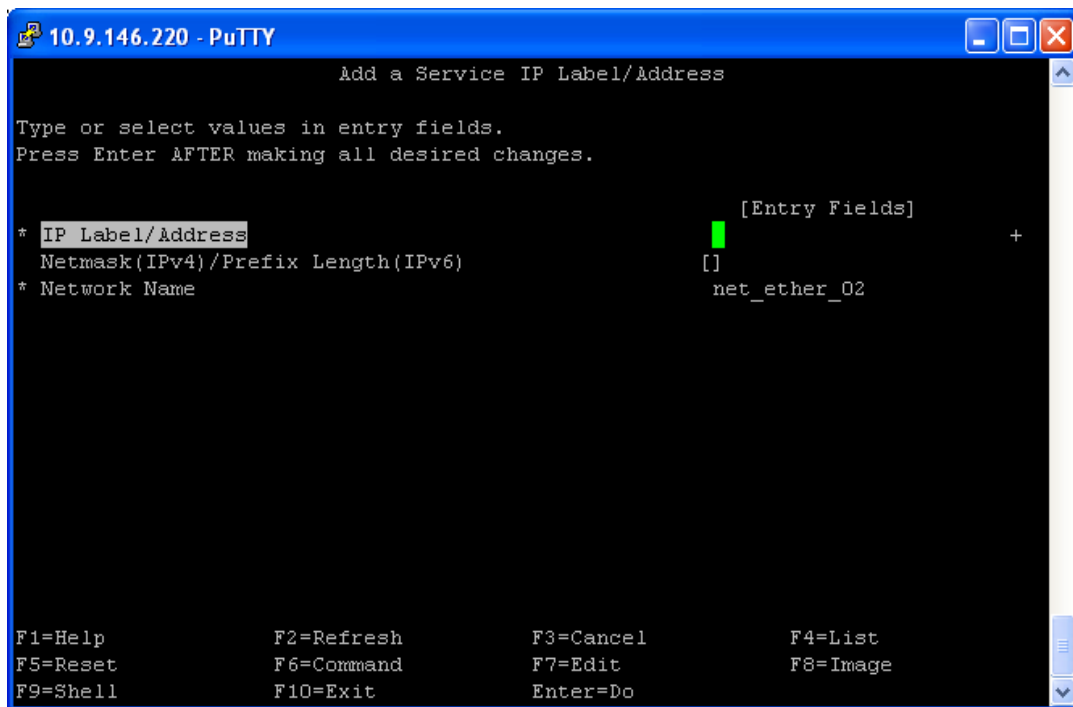
```
10.9.146.220 - PuTTY
COMMAND STATUS
Command: OK          stdout: yes          stderr: no
Before command completion, additional instructions may appear below.
[TOP]
Cluster Name: MINPRFPRDDBS1_CLS
Cluster Connection Authentication Mode: Standard
Cluster Message Authentication Mode: None
Cluster Message Encryption: None
Use Persistent Labels for Communication: No
Repository Disk: hdisk22
Cluster IP Address:
There are 2 node(s) and 1 network(s) defined
NODE MINPRFPRDDBS1:
    Network net_ether_02
    MINPRFPRDDBS1 10.9.50.203
NODE MINPRFPRDDBS1FO:
[MORE...9]
F1=Help      F2=Refresh   F3=Cancel    F6=Command
F8=Image     F9=Shell     F10=Exit     /=Find
n=Find Next
```

» Your cluster is ready, now you just need to add your service IP, Application scripts if any and Resource group

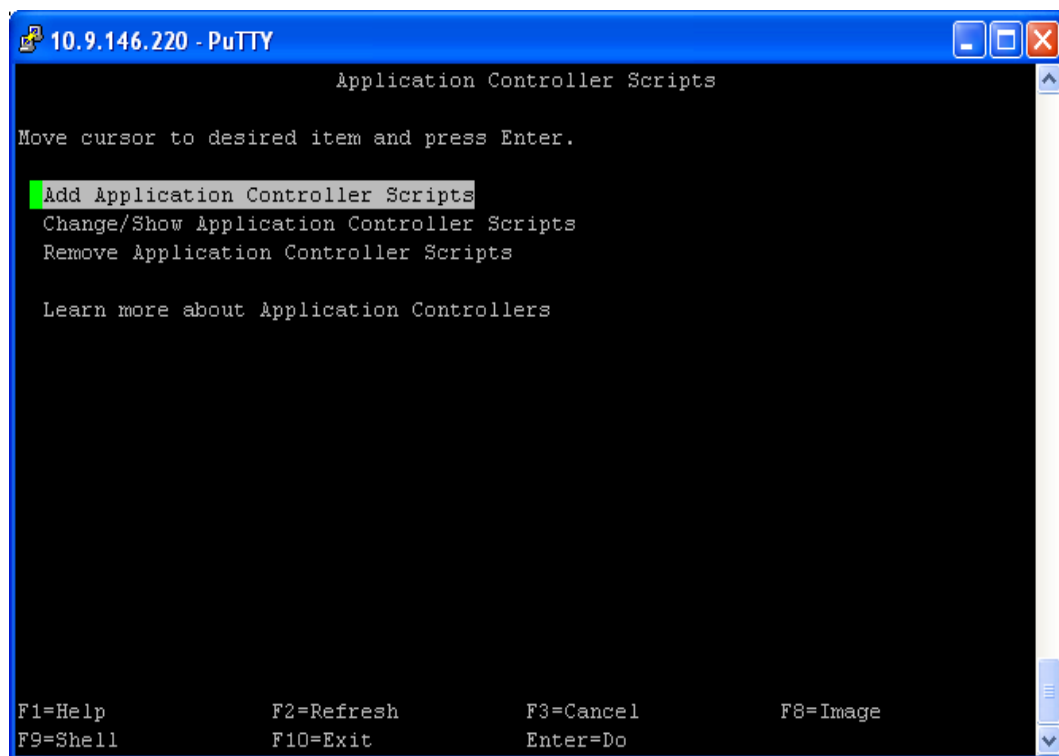
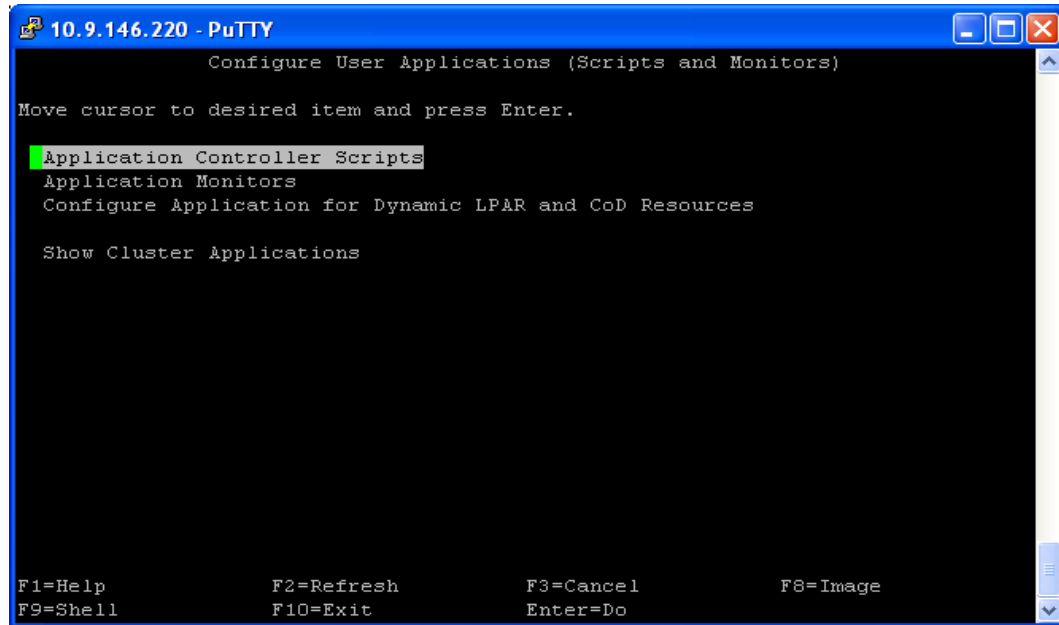
```
10.9.146.220 - PuTTY
PowerHA SystemMirror
Move cursor to desired item and press Enter.
Cluster Nodes and Networks
Cluster Applications and Resources
System Management (C-SPOC)
Problem Determination Tools
Custom Cluster Configuration
Can't find what you are looking for ?
Not sure where to start ?
F1=Help      F2=Refresh   F3=Cancel    F8=Image
F9=Shell     F10=Exit    Enter=Do
```

STEP 8) Add service IP to PowerHA for application High availability.





STEP 9) Configure Application start/Stop script here.



```
10.9.146.220 - PuTTY

Add Application Controller Scripts

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

* Application Controller Name
* Start Script
* Stop Script
Application Monitor Name(s)
Application startup mode

[Entry Fields]
[prfdbs_db]
[/home/ora_scripts/dbs>
[/home/ora_scripts/dbs>
[background]

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

STEP 10) Create Resource group

```
10.9.146.220 - PuTTY

Cluster Applications and Resources

Move cursor to desired item and press Enter.

Make Applications Highly Available (Use Smart Assists)
Resources
Resource Groups
Verify and Synchronize Cluster Configuration

F1=Help      F2=Refresh   F3=Cancel    F8=Image
F9=Shell     F10=Exit     Enter=Do
```

```
10.9.146.220 - PuTTY

Resource Groups

Move cursor to desired item and press Enter.

Add a Resource Group
Change/Show Nodes and Policies for a Resource Group
Change/Show Resources and Attributes for a Resource Group
Remove a Resource Group
Configure Resource Group Run-Time Policies
Show All Resources by Node or Resource Group

Verify and Synchronize Cluster Configuration

Learn more about Resource Groups

F1=Help      F2=Refresh   F3=Cancel    F8=Image
F9=Shell     F10=Exit    Enter=Do
```

```
10.9.146.220 - PuTTY

Add a Resource Group

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

[Entry Fields]
* Resource Group Name      [prf_rg]
* Participating Nodes (Default Node Priority) [MINPRFPRDDBS1 MINPRFP] +

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
```

```
10.9.146.220 - PuTTY
Resource Groups

Move cursor to desired item and press Enter.

Add a Resource Group
Change/Show Nodes and Policies for a Resource Group
Change/Show Resources and Attributes for a Resource Group
Remove a Resource Group
Configure Resource Group Run-Time Policies
Show All Resources by Node or Resource Group

Verify and Synchronize Cluster Configuration

Learn more about Resource Groups

F1=Help      F2=Refresh    F3=Cancel     F8=Image
F9=Shell     F10=Exit      Enter=Do
```

» Modified resource group same as previous release of PowerHA.

```
10.9.146.220 - PuTTY
Resource Groups

Move cursor to desired item and press Enter.

Add a Resource Group
Change/Show Nodes and Policies for a Resource Group
Change/Show Resources and Attributes for a Resource Group
Remove a Resource Group
Configure Resource Group Run-Time Policies
Show All Resources by Node or Resource Group

Verify and Synchronize Cluster Configuration

+-----+
| Change/Show Resources and Attributes for a Resource Group |
| Move cursor to desired item and press Enter.             |
| prf rg                                                    |
| F1=Help      F2=Refresh    F3=Cancel     F8=Image        |
| F9=Shell     F10=Exit      Enter=Do      n=Find Next     |
F1| /=Find
F9+-----+
```

```
10.9.146.220 - PuTTY
Change/Show All Resources and Attributes for a Custom Resource Group

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

[TOP]                                [Entry Fields]
Resource Group Name                  prf_rg
Participating Nodes (Default Node Priority) MINPRFPRDDBS1 MINPRFP>

Startup Policy                      Online On Home Node O>
Failover Policy                     Fallover To Next Prio>
Fallback Policy                     Never Fallback

Service IP Labels/Addresses          [MINPRFPRDDBS1SERV] +
Application Controllers              [prfdbb db] +

Volume Groups                       [prfdbsvg prfdbbarchvg] +
Use forced varyon of volume groups, if necessary false +
Automatically Import Volume Groups false +

[MORE...21]

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

STEP 11) After all execute verify and sync. You have to wait for 2 to 10 minute during synchronization because at this stage it will create CAA cluster for you.

```
10.9.146.220 - PuTTY
Manage Nodes

Move cursor to desired item and press Enter.

Show Topology Information by Node
Add a Node
Change/Show a Node
Remove Nodes
Configure Persistent Node IP Label/Addresses
Verify and Synchronize Cluster Configuration

F1=Help      F2=Refresh      F3=Cancel      F8=Image
F9=Shell     F10=Exit       Enter=Do
```

```
10.9.146.220 - PuTTY

COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

[TOP]
█
Verification to be performed on the following:
    Cluster Topology
    Cluster Resources

Verification will interactively correct verification errors.

Retrieving data from available cluster nodes.  This could take a few minutes.

    Start data collection on node MINPRFPRDDBS1
    Start data collection on node MINPRFPRDDBS1FO
[MORE...102]

F1=Help          F2=Refresh          F3=Cancel          F6=Command
F8=Image          F9=Shell            F10=Exit           /=Find
n=Find Next
```

STEP 12) See its creating CAA cluster as shown below

```
10.9.146.220 - PuTTY

COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

[MORE...102]
Remember to redo automatic error notification if configuration has changed.
Committing any changes, as required, to all available nodes...
Adding any necessary PowerHA SystemMirror for AIX entries to /etc/inittab and /e
tc/rc.net for IP Address Takeover on node MINPRFPRDDBS1FO.

cldare: Configuring a 2 node cluster in AIX may take upto 2 minutes, Please wait
.
Adding any necessary PowerHA SystemMirror for AIX entries to /etc/inittab and /e
tc/rc.net for IP Address Takeover on node MINPRFPRDDBS1.

Verification has completed normally.
█
[BOTTOM]

F1=Help          F2=Refresh          F3=Cancel          F6=Command
F8=Image          F9=Shell            F10=Exit           /=Find
n=Find Next
```


>> you will get new vg as caavg_private on all nodes this is called as CAA repository disk.

```
10.9.146.220 - PuTTY
hdisk0      00cffc865b841897      rootvg      active
hdisk1      00cffc865b84195e      rootvg      active
hdisk2      00cffc868d39c646      swapvg      active
hdisk3      00cffc868d39c6b5      swapvg      active
hdisk4      00c94ec67a7ce1ca      prfbsvg
hdisk5      00c94ec67a7ce23a      prfbsvg
hdisk6      00c94ec67a7ced25      prfbsarchvg
hdisk7      00c94ec67a7ceee1      prfbsarchvg
hdisk8      00c94ec67a7cf8e5      prfbsdbvg
hdisk9      00c94ec67a7cfae8      prfbsdbvg
hdisk10     00c94ec67a7ced92      prfbsarchvg
hdisk11     00c94ec67a7cef5b      prfbsarchvg
hdisk12     00c94ec67a7cf966      prfbsdbvg
hdisk13     00c94ec67a7cfb5b      prfbsdbvg
hdisk14     00c94ec67a7cee70      prfbsarchvg
hdisk15     00c94ec67a7cf047      prfbsarchvg
hdisk16     00c94ec67a7cfa4a      prfbsdbvg
hdisk17     00c94ec67a7cfe01      prfbsdbvg
hdisk18     00c94ec67a7cedff      prfbsarchvg
hdisk19     00c94ec67a7cefd5      prfbsarchvg
hdisk20     00c94ec67a7cf9d9      prfbsdbvg
hdisk21     00c94ec67a7cfc27      prfbsdbvg
hdisk22     00cffc867ca070b7      caavg_private  active
root@MINPRFPRDDBS1FO >
```

```
10.9.146.220 - PuTTY
hdisk0      00c94ec65b814081      rootvg      active
hdisk1      00c94ec65b814243      rootvg      active
hdisk2      00c94ec68d38fad7      swapvg      active
hdisk3      00c94ec67a7ce1ca      prfbsvg
hdisk4      00c94ec68d38fa6b      swapvg      active
hdisk5      00c94ec67a7ce23a      prfbsvg
hdisk6      00c94ec67a7ced25      prfbsarchvg
hdisk7      00c94ec67a7ceee1      prfbsarchvg
hdisk8      00c94ec67a7cf8e5      prfbsdbvg
hdisk9      00c94ec67a7cfae8      prfbsdbvg
hdisk10     00c94ec67a7ced92      prfbsarchvg
hdisk11     00c94ec67a7cef5b      prfbsarchvg
hdisk12     00c94ec67a7cf966      prfbsdbvg
hdisk13     00c94ec67a7cfb5b      prfbsdbvg
hdisk14     00c94ec67a7cee70      prfbsarchvg
hdisk15     00c94ec67a7cf047      prfbsarchvg
hdisk16     00c94ec67a7cfa4a      prfbsdbvg
hdisk17     00c94ec67a7cfe01      prfbsdbvg
hdisk18     00c94ec67a7cedff      prfbsarchvg
hdisk19     00c94ec67a7cefd5      prfbsarchvg
hdisk20     00c94ec67a7cf9d9      prfbsdbvg
hdisk21     00c94ec67a7cfc27      prfbsdbvg
hdisk22     00cffc867ca070b7      caavg_private  active
MINPRFPRDDBS1:/>
```

Step 13) During verify and sync as you execute above, you can do tail to /var/adm/ras/syslog.caa for checking CAA cluster

```
10.9.146.220 - PuTTY
hdisk22      00cffc867ca070b7      caavg_private  active
MINPRFPRDDBS1:> tail
tail -f /var/adm/ras/syslog.caa
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk8
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk12
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk20
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk16
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk9
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk13
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk21
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk17
Sep  5 14:18:27 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk3
Sep  5 14:18:27 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk5
MINPRFPRDDBS1:>
```

STEP 14) hacmp.out is at same path, /aha filesystem created when CAA cluster get created.

```
10.9.146.220 - PuTTY
/dev/hd2      6.00      3.02      50%      61353      8% /usr
/dev/hd9var   2.00      1.50      25%      9810      3% /var
/dev/hd3      2.00      1.90      6%       590      1% /tmp
/dev/hd1      2.00      1.90      5%       60      1% /home
/dev/hd11admin 0.12      0.12      1%       11      1% /admin
/proc        -          -          -          -          - /proc
/dev/hd10opt  0.50      0.32      37%      7049      9% /opt
/dev/livedump 0.25      0.25      1%       5      1% /var/adm/ras/livedump
/dev/nmon_lv  5.00      4.30      14%      204      1% /nmon_data
/dev/fslv00   1.00      0.85      15%      9      1% /audit
/aha         -          -          -          61      1% /aha
root@MINPRFPRDDBS1FO >tail -f /var/hacmp/log/hacmp.out
Sep  5 14:17:02 EVENT COMPLETED: node_up_complete MINPRFPRDDBS1FO 0

:check_for_site_up_complete[+57] [[ high = high ]]
:check_for_site_up_complete[+57] version=%I% $Source: 61haes_r711 43haes/usr/sbi
n/cluster/events/check_for_site_up_complete.sh 1$
:check_for_site_up_complete[+58] :check_for_site_up_complete[+58] cl_get_path
HA_DIR=es
:check_for_site_up_complete[+60] STATUS=0
:check_for_site_up_complete[+62] set +u
:check_for_site_up_complete[+64] [ ]
:check_for_site_up_complete[+75] exit 0
```

STEP 15) Test your fallback / failover policy.

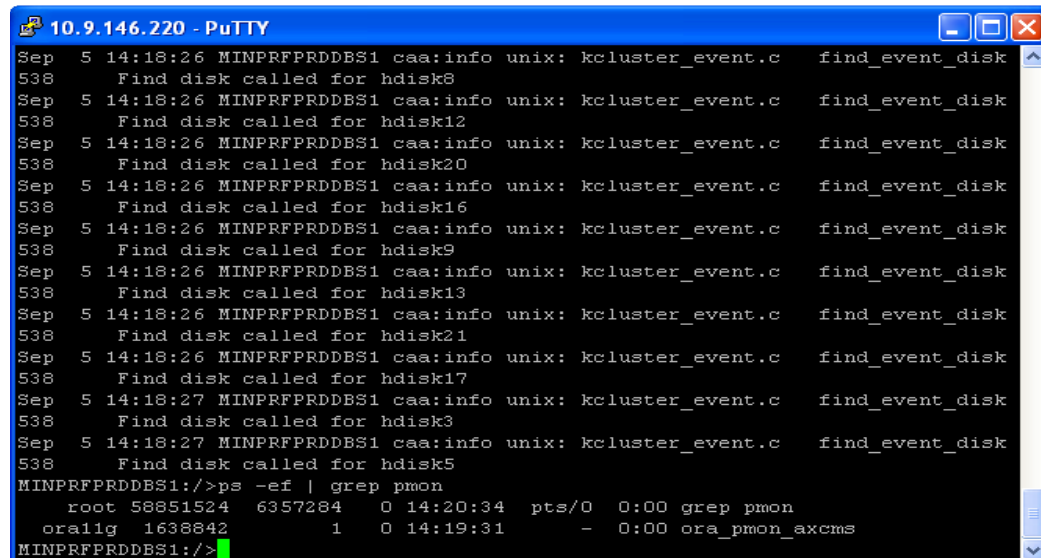
STEP 16) Working with PowerHA 7 smart assist capability, using smart assist you don't need to create oracle/SAP/DB2 start/stop script. Smart assist will do it for you. Over here I have just tested Oracle database with smart assist. IBM PowerHA support smart assist for many application, please check out the IBM website for complete list.

When you use Smart assist, you don't need to add service IP, create resource group, adding Volume group to resource group or many, all this steps get done with single menu of smart assist. I will show you below

Before you work with smart assist,

- » start Your cluster service on both nodes with basic configuration.
- » Varyonvg and mount all filesystem which had oracle db files and home Directory
- » Oracle should be installed and configured on both nodes
- » Start Oracle and Listener
- » Export oracle SID and Oracle Home directory, if not exported earlier.

STEP 16 - a) Please request DBA to start Oracle, oracle is running now.



```
10.9.146.220 - PuTTY
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk8
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk12
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk20
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk16
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk9
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk13
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk21
Sep  5 14:18:26 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk17
Sep  5 14:18:27 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk3
Sep  5 14:18:27 MINPRFPRDDBS1 caa:info unix: kcluster_event.c  find_event_disk
538      Find disk called for hdisk5
MINPRFPRDDBS1: /> ps -ef | grep pmon
  root 58851524  6357284  0 14:20:34  pts/0  0:00 grep pmon
  orallg 1638842  1  0 14:19:31  -  0:00 ora_pmon_axcms
MINPRFPRDDBS1: />
```

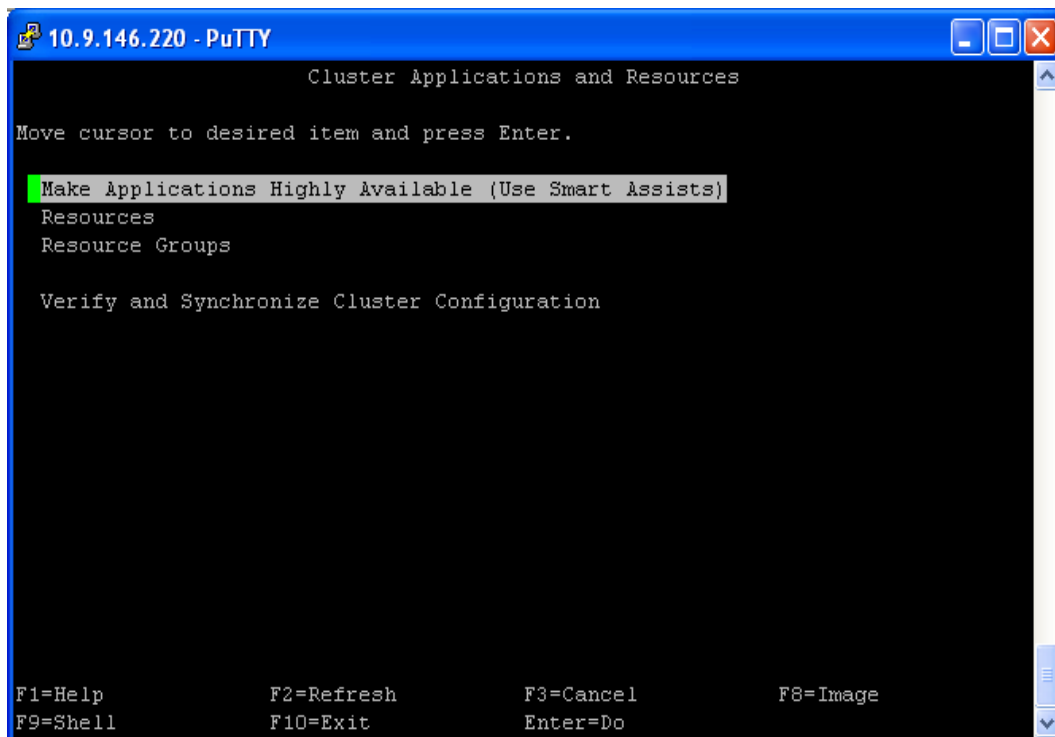
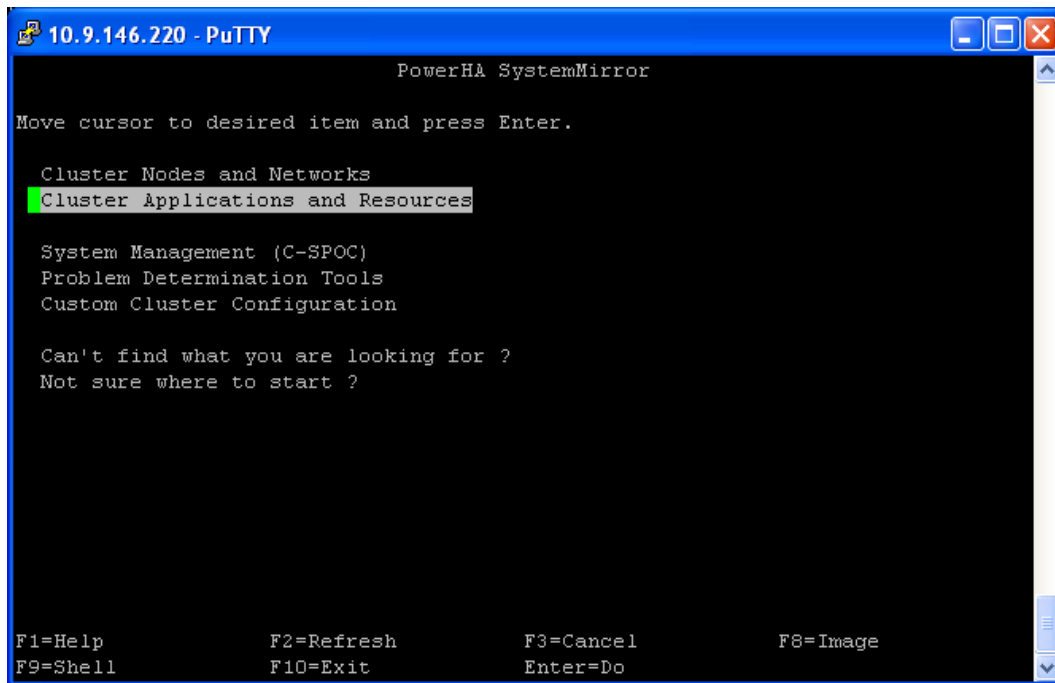
```
10.9.146.220 - PuTTY
-rwxr----- 1 orallg oinstall 762 Aug 2 11:24 .profile
MINPRFPRDDBS1:/oracle/orallg>cat .profile
umask 022
ORACLE_BASE=/oracle/orallg/11.2
export ORACLE_BASE
ORACLE_HOME=$ORACLE_BASE/DB
export ORACLE_HOME
export PATH=$ORACLE_HOME/bin:/usr/sbin:/oracle/orallg/11.2/DB/OPatch:/usr/bin:/u
sr/ccs/bin:/usr/ucb:$PATH:/usr/java6_64/jre/bin:/usr/java6_64/bin:$PATH:.
export LD_LIBRARY_PATH_64=$ORACLE_HOME/lib:/usr/lib:$ORACLE_HOME/jdbc/lib
export LIBPATH=$ORACLE_HOME/lib:/usr/lib:$ORACLE_HOME/jdbc/lib
export ORACLE_SID=axcms
export ORACLE_UNQNAME=axcms
set -o vi
B=`tput bold`;export B
b=`tput sgr0`; export b
#PS1=$(hostname):$B'$ORACLE_SID':$b'$PWD>'
export ORACLE_PATH=$ORACLE_HOME/bin:/usr/bin
export ORA_NLS10=$ORACLE_HOME/nls/data
alias l='ls -lrt'
alias al='tail -f /oracle/orallg/11.2/diag/rdbms/axcms/axcms/trace/alert_axcms.l
og'
cd /oracle/orallg/TMHOME
MINPRFPRDDBS1:/oracle/orallg>
```

Export variables as shown below, ask DBA to do it for you.

```
MINPRFPRDDBS1:/>ps -ef | grep pmon
  orallg  7733252      1  0   Sep 05   -   0:18 ora_pmon_axcms
    root   8782384 16515174    0 17:02:07 pts/0    0:00 grep pmon
MINPRFPRDDBS1:/>ORACLE_BASE=/oracle/orallg/11.2
MINPRFPRDDBS1:/>export ORACLE_BASE
MINPRFPRDDBS1:/>ORACLE_HOME=$ORACLE_BASE/DB
MINPRFPRDDBS1:/>export ORACLE_HOME
MINPRFPRDDBS1:/>export ORACLE_SID=axcms
```

STEP 16 - b) Now start up with smart assist menu for creating Oracle start/stop script for you.

Follow the screenshot pasted below.
smitty hacmp or smitty sysmirror



```
10.9.146.220 - PuTTY
Make Applications Highly Available (Use Smart Assists)

Move cursor to desired item and press Enter.

Add an Application to the PowerHA SystemMirror Configuration
Change/Show an Application's PowerHA SystemMirror Configuration
Remove an Application from the PowerHA SystemMirror Configuration

Manage Your Applications
Change/Show the Resources Associated with Your Application
SAP liveCache Hot Standby Configuration Wizard

Test Your Application for Availability

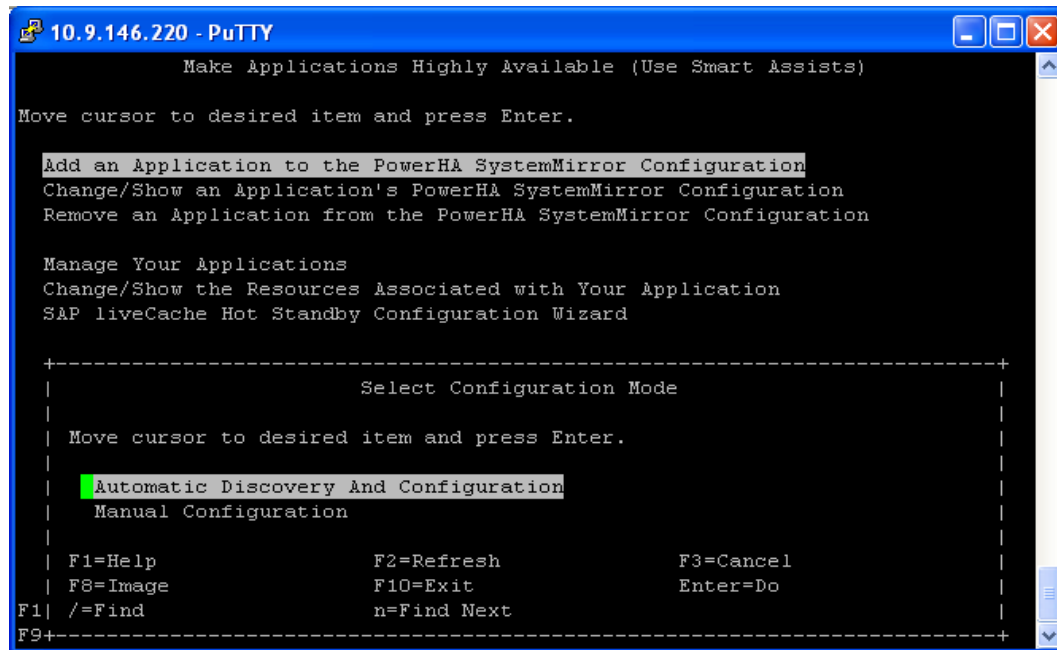
F1=Help      F2=Refresh    F3=Cancel     F8=Image
F9=Shell     F10=Exit      Enter=Do
```

STEP 16 - c) Select the Application, I am using oracle database. You can select SAP, Lotus notes, DB2 or so on if you had installed.

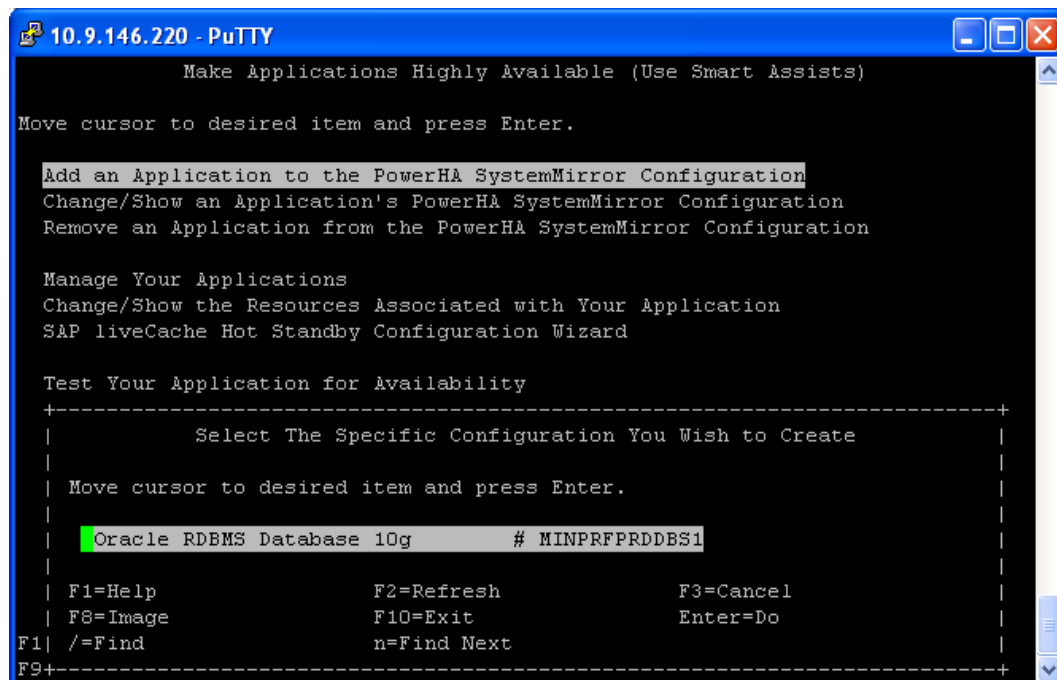
```
10.9.146.220 - PuTTY
Make Applications Highly Available (Use Smart Assists)

Mo+-----+
|          Select a Smart Assist From the List of Available Smart Assists          |
|                                                                                   |
| Move cursor to desired item and press Enter.                                   |
|                                                                                   |
| [TOP]                                                                           |
| DB2 UDB non-DPF Smart Assist      # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| DHCP Smart Assist                 # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| DNS Smart Assist                  # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| Lotus Domino Smart assist         # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| FileNet P8 Smart Assist           # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| IBM HTTP Server Smart Assist      # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| SAP MaxDB Smart Assist            # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| Oracle Database Smart Assist      # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| Oracle Application Server Smart Assist # MINPRFPRDDBS1 MINPRFPRDDBS1FO          |
| Print Subsystem Smart Assist      # MINPRFPRDDBS1 MINPRFPRDDBS1FO              |
| [MORE...7]                                                                   |
|                                                                                   |
| F1=Help      F2=Refresh    F3=Cancel     F8=Image                          |
| F9=Shell     F10=Exit      Enter=Do      |
F1| /=Find     n=Find Next
F9+-----+
```

STEP 16 - d) Select Automatic discovery only



STEP 16 - e) PowerHA smart assist will search your database and SID for you.



```

10.9.146.220 - PuTTY
Make Applications Highly Available (Use Smart Assists)

Move cursor to desired item and press Enter.

Add an Application to the PowerHA SystemMirror Configuration
Change/Show an Application's PowerHA SystemMirror Configuration
Remove an Application from the PowerHA SystemMirror Configuration
-----+
|                                     |
|                               Select RDBMS Instance                               |
|                                     |
| Move cursor to desired item and press Enter. Use arrow keys to scroll.           |
|                                     |
| /usr/es/sbin/cluster/sa/oracle/sbin/cl_osa_discover[815]: osaListDBs[5         |
| #                                                                              |
| # WARNING: Database is not running. Volume groups where                       |
| # logs, control files, and tablespaces, reside will be missing                |
| #                                                                              |
| axcms                                                                         |
|                                     |
| F1=Help          F2=Refresh          F3=Cancel                               |
| F8=Image         F10=Exit            Enter=Do                               |
F1| /=Find          n=Find Next
F9+-----+

```

- STEP 16 -f) Here is the single menu which do following things for you
- >> Create Oracle Database start / stop script for you.
 - >> Create Resource Group for you.
 - >> Add Service IP, Volume group, Application script into Resource group.

```

10.9.146.220 - PuTTY
Add an Oracle RDBMS Instance

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

* Oracle Instance Name      [Entry Fields]
                             axcms
* Application Name          [axcms]
* Primary Node              MINPRFPRDDBS1 +
* Takeover Node(s)         MINPRFPRDDBS1FC +
Service IP Label           [MINPRFPRDDBS1] +
Netmask(IPv4)/Prefix Length(IPv6) [ ]
* Shared Volume Group(s)   [prfdbsvg prfdbsearchvg] +

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

```


Step 17) Smart Assist will take long time will search all dbf files required for oracle to Start/stop. In my case it had taken more than 3 Hours to complete discovery.

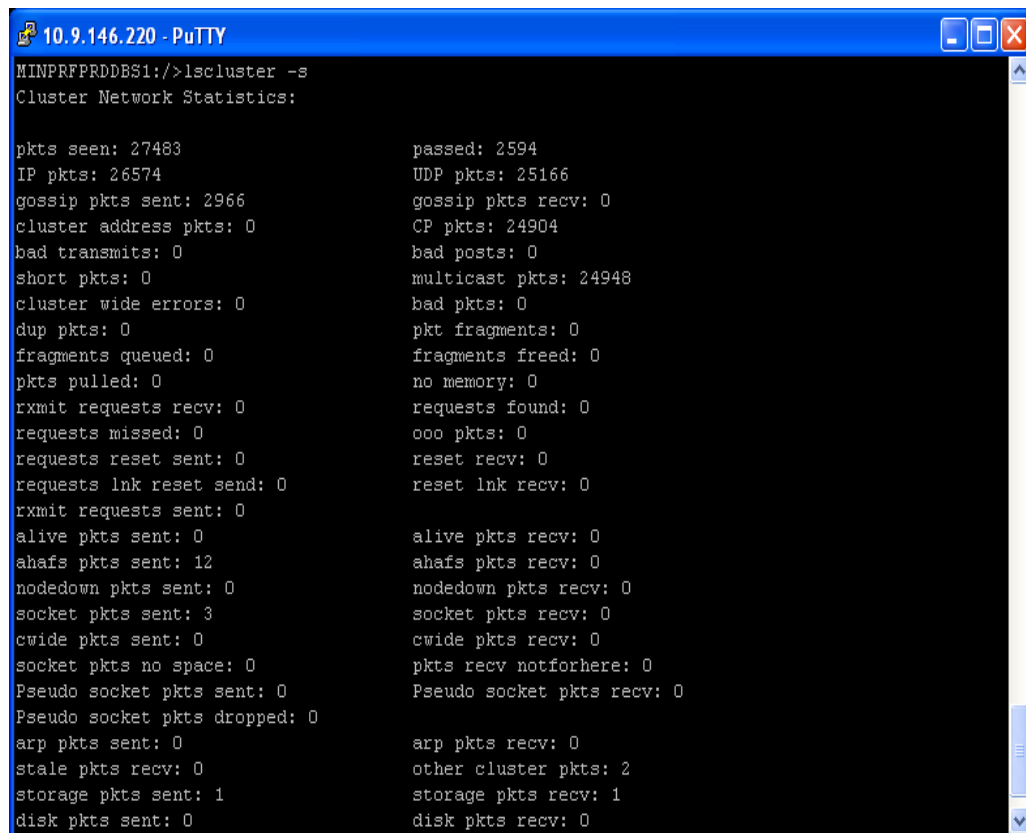
Step 18) Now the configuration of PowerHA 7 is completed, Please do the failover/fallback test.

Please feel free to contact for any assistance.

Official Mail ID

vinodm@in.ibm.com, titty.john@in.ibm.com
amrsandh@in.ibm.com
amrik06@gmail.com (Personal)
IBM India Pvt. Ltd

Additional Command for your reference, Please read out the man pages otherwise this document will become very big and boring.



```
10.9.146.220 - PuTTY
MINPRFPRDDBS1:/>lscluster -s
Cluster Network Statistics:

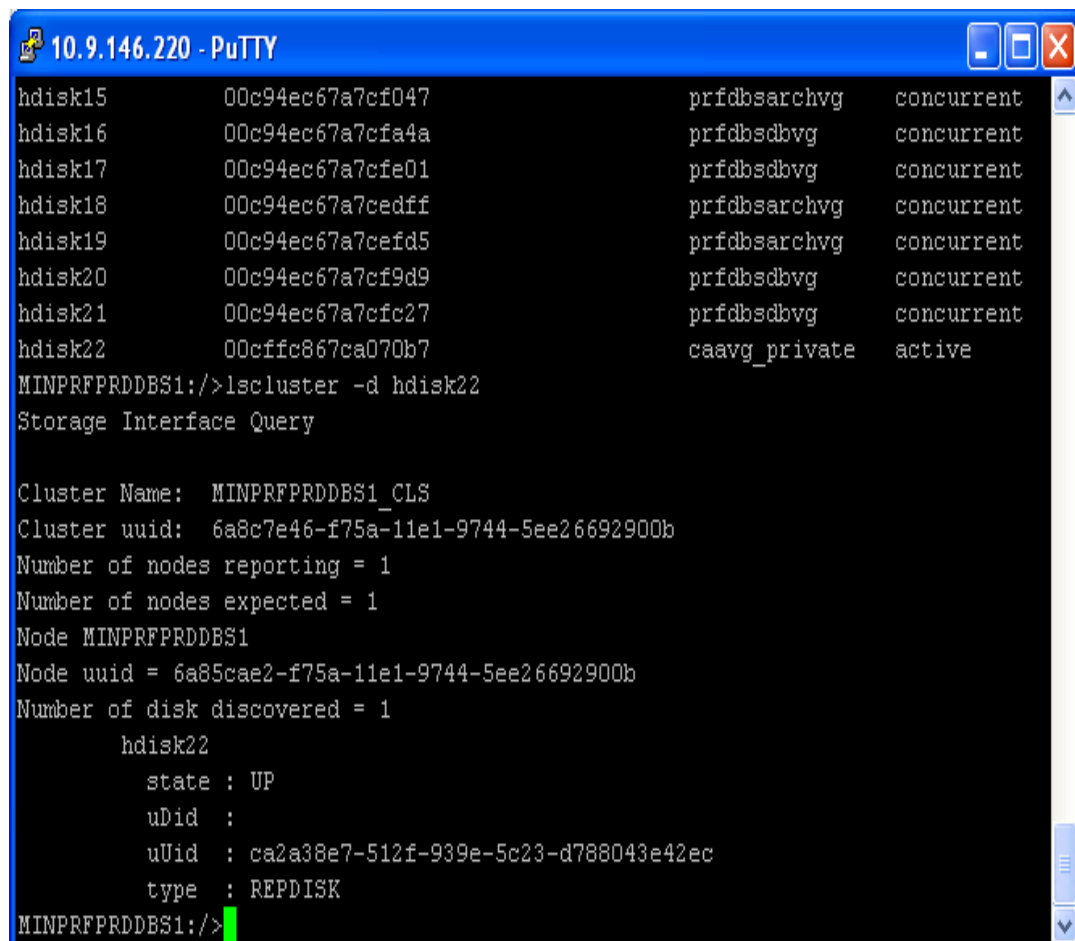
pkts seen: 27483                passed: 2594
IP pkts: 26574                 UDP pkts: 25166
gossip pkts sent: 2966         gossip pkts rcv: 0
cluster address pkts: 0        CP pkts: 24904
bad transmits: 0               bad posts: 0
short pkts: 0                 multicast pkts: 24948
cluster wide errors: 0         bad pkts: 0
dup pkts: 0                    pkt fragments: 0
fragments queued: 0            fragments freed: 0
pkts pulled: 0                 no memory: 0
rxmit requests rcv: 0          requests found: 0
requests missed: 0             ooo pkts: 0
requests reset sent: 0         reset rcv: 0
requests lnk reset send: 0     reset lnk rcv: 0
rxmit requests sent: 0         alive pkts rcv: 0
alive pkts sent: 0             ahafs pkts rcv: 0
ahafs pkts sent: 12            nodedown pkts rcv: 0
nodedown pkts sent: 0          socket pkts rcv: 0
socket pkts sent: 3            cwide pkts rcv: 0
cwide pkts sent: 0             pkts rcv notforhere: 0
socket pkts no space: 0        Pseudo socket pkts rcv: 0
Pseudo socket pkts sent: 0
Pseudo socket pkts dropped: 0
arp pkts sent: 0               arp pkts rcv: 0
stale pkts rcv: 0              other cluster pkts: 2
storage pkts sent: 1           storage pkts rcv: 1
disk pkts sent: 0              disk pkts rcv: 0
```

```
10.9.146.220 - PuTTY
MINPRFPRDDBS1: /> lscluster -c
Cluster query for cluster MINPRFPRDDBS1_CLS returns:
Cluster uuid: 6a8c7e46-f75a-11e1-9744-5ee26692900b
Number of nodes in cluster = 2
    Cluster id for node MINPRFPRDDBS1 is 1
    Primary IP address for node MINPRFPRDDBS1 is 10.9.50.203
    Cluster id for node MINPRFPRDDBS1FO is 2
    Primary IP address for node MINPRFPRDDBS1FO is 10.9.50.204
Number of disks in cluster = 0
Multicast address for cluster is 228.9.50.204
MINPRFPRDDBS1: />
```

```
10.9.146.220 - PuTTY
MINPRFPRDDBS1: /> lssrc -a | grep cluster
clstrmgrES      cluster      4915282      active
clevmgrdES     cluster      7077946      active
MINPRFPRDDBS1: /> lssrc -ls clstrmgrES
Current state: ST_STABLE
sccsid = "0(#)36      1.135.7.2 src/43haes/usr/sbin/cluster/hacmprd/main.C,      hacm
p.pe, 61haes_r711, 1225A_hacmp711 5/22/12 11:46:10"
build = "Jul 19 2012 17:10:52 1225C_hacmp711"
i_local_nodeid 0, i_local_siteid -1, my_handle 1
ml_idx[1]=0
There are 0 events on the Ibcast queue
There are 0 events on the RM Ibcast queue
CLversion: 13
local node vrmf is 7113
cluster fix level is "3"
The following timer(s) are currently active:
Current DNP values
DNP Values for NodeId - 1  NodeName - MINPRFPRDDBS1
    PgSpFree = 4185825  PvPctBusy = 0  PctTotalTimeIdle = 85.459148
DNP Values for NodeId - 0  NodeName - MINPRFPRDDBS1FO
    PgSpFree = 0  PvPctBusy = 0  PctTotalTimeIdle = 0.000000
trcOn 0, kTraceOn 0, stopTraceOnExit 0, cdNodeOn 0
Last event run was JOIN_NODE_CO on node 1
MINPRFPRDDBS1: />
```

```
MINPRFPRDDBS1:/>lsattr -El cluster0
clvdisk    ca2a38e7-512f-939e-5c23-d788043e42ec Cluster repository disk identifier True
node_uuid  6a85cae2-f75a-11e1-9744-5ee26692900b OS image identifier           True
MINPRFPRDDBS1:/>
```

```
root@MINPRFPRDDBS1FO >lsattr -El cluster0
clvdisk    ca2a38e7-512f-939e-5c23-d788043e42ec Cluster repository disk identifier True
node_uuid  6a85d320-f75a-11e1-9744-5ee26692900b OS image identifier           True
```



The screenshot shows a PuTTY terminal window titled "10.9.146.220 - PuTTY". The terminal output displays a list of disks and their associated volumes, followed by a cluster status query.

hdisk	UUID	Volume	State
hdisk15	00c94ec67a7cf047	prfdbsarchvg	concurrent
hdisk16	00c94ec67a7cfa4a	prfdbsdvbg	concurrent
hdisk17	00c94ec67a7cfe01	prfdbsdvbg	concurrent
hdisk18	00c94ec67a7cedff	prfdbsarchvg	concurrent
hdisk19	00c94ec67a7cefd5	prfdbsarchvg	concurrent
hdisk20	00c94ec67a7cf9d9	prfdbsdvbg	concurrent
hdisk21	00c94ec67a7cfc27	prfdbsdvbg	concurrent
hdisk22	00cffc867ca070b7	caavg_private	active

MINPRFPRDDBS1:/>lscluster -d hdisk22
Storage Interface Query

Cluster Name: MINPRFPRDDBS1_CLS
Cluster uuid: 6a8c7e46-f75a-11e1-9744-5ee26692900b
Number of nodes reporting = 1
Number of nodes expected = 1
Node MINPRFPRDDBS1
Node uuid = 6a85cae2-f75a-11e1-9744-5ee26692900b
Number of disk discovered = 1

- hdisk22
 - state : UP
 - uDid :
 - uUid : ca2a38e7-512f-939e-5c23-d788043e42ec
 - type : REPDISK

MINPRFPRDDBS1:/>

```
10.9.146.220 - PuTTY
hdisk15      00c94ec67a7cf047      prfdfsarchvg
hdisk16      00c94ec67a7cfa4a      prfdfsdbvg
hdisk17      00c94ec67a7cfe01      prfdfsdbvg
hdisk18      00c94ec67a7cedff      prfdfsarchvg
hdisk19      00c94ec67a7cefd5      prfdfsarchvg
hdisk20      00c94ec67a7cf9d9      prfdfsdbvg
hdisk21      00c94ec67a7cfc27      prfdfsdbvg
hdisk22      00c94ec67a7cfc27      prfdfsdbvg
              00c94ec67a7cfc27      caavg_private    active
root@MINPRFPRDDBS1FO > lscluster -d hdisk22
Storage Interface Query

Cluster Name: MINPRFPRDDBS1_CLS
Cluster uuid: 6a8c7e46-f75a-11e1-9744-5ee26692900b
Number of nodes reporting = 1
Number of nodes expected = 1
Node MINPRFPRDDBS1FO
Node uuid = 6a85d320-f75a-11e1-9744-5ee26692900b
Number of disk discovered = 1
    hdisk22
        state : UP
        uDid :
        uUuid : ca2a38e7-512f-939e-5c23-d788043e42ec
        type : REPDISK
root@MINPRFPRDDBS1FO >
```

```
MINPRFPRDDBS1:/> lscluster -r
Calling node query for all nodes
Node query number of nodes examined: 2

Node name: MINPRFPRDDBS1
Cluster shorthand id for node: 1
uuid for node: 6a05cae2-f75a-11e1-9744-5ee26692900b
State of node: UP NODE_LOCAL
Smoothed rtt to node: 0
Mean Deviation in network rtt to node: 0
Number of clusters node is a member in: 1
CLUSTER NAME      TYPE  SHID      UUID
MINPRFPRDDBS1_CLS  local      6a8c7e46-f75a-11e1-9744-5ee26692900b

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

-----

Node name: MINPRFPRDDBS1FO
Cluster shorthand id for node: 2
uuid for node: 6a85d320-f75a-11e1-9744-5ee26692900b
State of node: UP
Smoothed rtt to node: 7
Mean Deviation in network rtt to node: 3
Number of clusters node is a member in: 1
CLUSTER NAME      TYPE  SHID      UUID
MINPRFPRDDBS1_CLS  local      6a8c7e46-f75a-11e1-9744-5ee26692900b

Number of points_of_contact for node: 3
Point-of-contact interface & contact state
dpcom DOWN RESTRICTED
en2 UP
en0 UP
MINPRFPRDDBS1:/>
```

```

root@MINPRFPRDDBS1FO >lscluster -m
Calling node query for all nodes
Node query number of nodes examined: 2

Node name: MINPRFPRDDBS1
Cluster shorthand id for node: 1
uuid for node: 6a85cae2-f75a-11e1-9744-5ee26692900b
State of node: UP
Smoothed rtt to node: 7
Mean Deviation in network rtt to node: 3
Number of clusters node is a member in: 1
CLUSTER NAME      TYPE  SHID  UUID
MINPRFPRDDBS1_CLS local      6a8c7e46-f75a-11e1-9744-5ee26692900b

Number of points_of_contact for node: 4
Point-of-contact interface & contact state
dpcom DOWN RESTRICTED
en2 UP
en0 UP
en1 UP

-----

Node name: MINPRFPRDDBS1FO
Cluster shorthand id for node: 2
uuid for node: 6a85d320-f75a-11e1-9744-5ee26692900b
State of node: UP NODE_LOCAL
Smoothed rtt to node: 0
Mean Deviation in network rtt to node: 0
Number of clusters node is a member in: 1
CLUSTER NAME      TYPE  SHID  UUID
MINPRFPRDDBS1_CLS local      6a8c7e46-f75a-11e1-9744-5ee26692900b

Number of points_of_contact for node: 0
Point-of-contact interface & contact state
n/a
root@MINPRFPRDDBS1FO >

```

WORKING THROUGH POWERHA CLI USING GREAT clmgr UTILITY

Hope you have fulfilled all pre-requisite that is required to build cluster

IBM had provided great Utility called as clmgr in PowerHA6.1 and PowerHA7.1 for creating cluster through CLI. A command used for creating cluster uses very simple English which is Easy to understand and remember also.

1) Create Cluster

```
#clmgr add cluster MINPRFPRDDBS1_CLS repository=hdisk22 nodes=MINPRFPRDDBS1, MINPRFPRDDBSFO
```

Explanation

Create cluster name as MINPRFPRDDBS1_CLS with Two nodes as given above having common shared repository Disk hdisk22.

Check the configuration now

```
#cltopinfo
```

- 2) Add Persistent IP for each node, You don't need this now in PowerHA 7.1 because you can use PowerHA 7.1 gives the flexibility of keeping Bootip and Service IP in same network range. So this means your bootip is accessible from outside. You can still have an option to use the traditional way of Network configuration like keeping Boot and Service in different network. If you are doing so then you need to have this persistent configure on system for administration work.

```
#clmgr a pe 10.9.50.121 network=net_ether_01 node=MINPRFPRDDBS1
```

```
#clmgr a pe 10.9.50.122 network=net_ether_01 node=MINPRFPRDDBS1FO
```

Explanation

Add persistent IP on both nodes.

Query your persistent IP

```
#clmgr -v q pe
```

- 3) Now add up Service IP for application usage or failover.

```
#clmgr a se MINPRFPRDDBS_SVC network=net_ether_01
```

Explanation

I am using only one service IP that's why I have not allocated Service IP on second node. If you are working active active PowerHA configuration then add one more service IP for secondary node also.

Note:- Please don't allocate any service IP to secondary node if its just active as passive/standby node. This is security concern.

Query Service IP configuration

```
#clmgr -v q se
```

- 3) Add up Application controller scripts, if applicable, create scripts test it manually on both Nodes then add up in PowerHA cluster.

```
#clmgr a ac ORACLE_SCRIPTS startscript=/home/ora_scripts_dbstartup.sh  
stopscript=/home/ora_scripts_dbshutdown.sh
```

Query Application controller configuration

```
#clmgr -v q ac
```

- 4) Define resource group

```
#clmgr add resource_group rsg_MINPRFPRDDBS1 nodes= MINPRFPRDDBS1,  
MINPRFPRDDBS1FO startup=OHN fallover=FNPN fallback=NFB  
service_label= MINPRFPRDDBS_SVC applications= ORACLE_SCRIPTS  
volume_group=prfdbsvg,prfarchvg,prfdbsdvg
```

Explanation

Its simple, just over policy name mention in short form instead of full form like

OHN = Online on Home Node only

FNPN = fallover to next priority node

NFB= Never fallback

Query Cluster configuration

```
#cltopinfo
```

- 5) Its all over, just sync cluster

```
#clmgr sync cluster
```

Wait for command execution.

- 6) Start Cluster

```
#clmgr start cluster
```

Explanation

Will start cluster on local node only, Execute on second node also.

- 7) Checking status of network, cluster, resource group

```
#clmgr -a state query cluster
```

```
#clmgr -a state q cluster
```

Query resource group state

```
#clmgr -cv -a name,state,current_node q rg
```

Now r and d on moving resources here and there

7) Move resource group to secondary node.

```
#clmgr mv rg rsg_MINPRFPRDDBS1 node=MINPRFPRDDBS1FO
```

Wait to get stabilize

Or

Stopping cluster services on Primary node with move resource group option

```
#clmgr stop node MINPRFPRDDB1 manage_move
```

Query the state

```
#clmgr-cv -a name,state,raw_state q node
```

Or

```
#clmgr-cv -a name,state,current_node q rg
```

Move resource back to Primary node

```
#clmgr mv rg rsg_MINPRFPRDDBS1 node=MINPRFPRDDBS1
```

ITS DONE, ENJOY WORKING WITH clmgr INSTEAD OF WINDOWS STYLE MENUS.

THANKING YOU
AMRIK SINGH