RHEL 2-Node High-Availability Clusters for Apache Web Servers

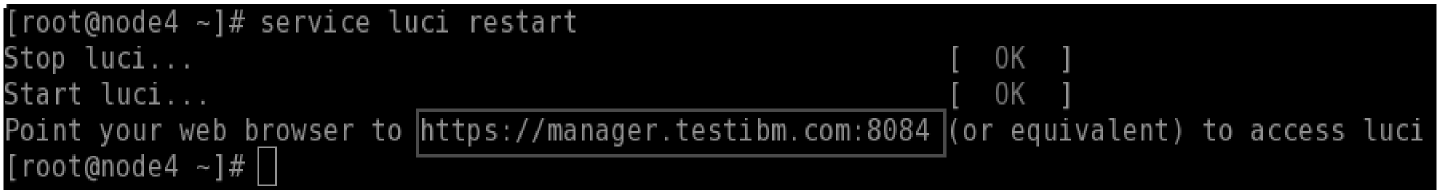
We are configuring 2 node cluster hosting apache webservices.

Node1 & node2 are the clustered node which hosts webservices and belong to a domain called testibm.com

manager node provides storage and also help for the management mode of access for cluster.

Install luci package on the management node, which is used to manage cluster.

Yum install luci ; chkconfig luci on ; service luci restart



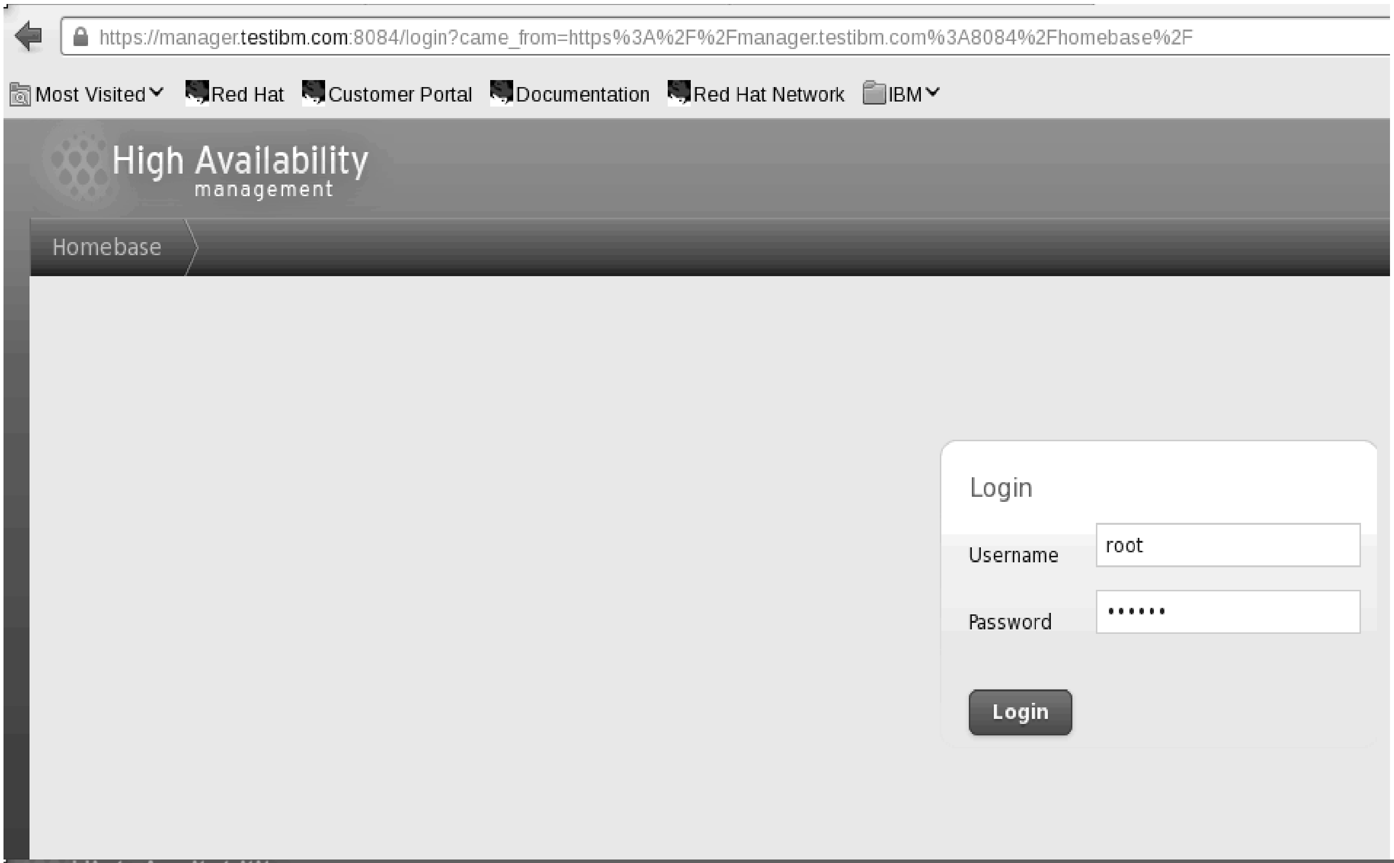
```
[root@node4 ~]# service luci restart
Stop luci...                                               [  OK  ]
Start luci...                                              [  OK  ]
Point your web browser to https://manager.testibm.com:8084 (or equivalent) to access luci
[root@node4 ~]# 
```

On node1 & 2 ricci and luci will be installed.

#yum install -y ricci ; service ricci start ; chkconfig ricci on

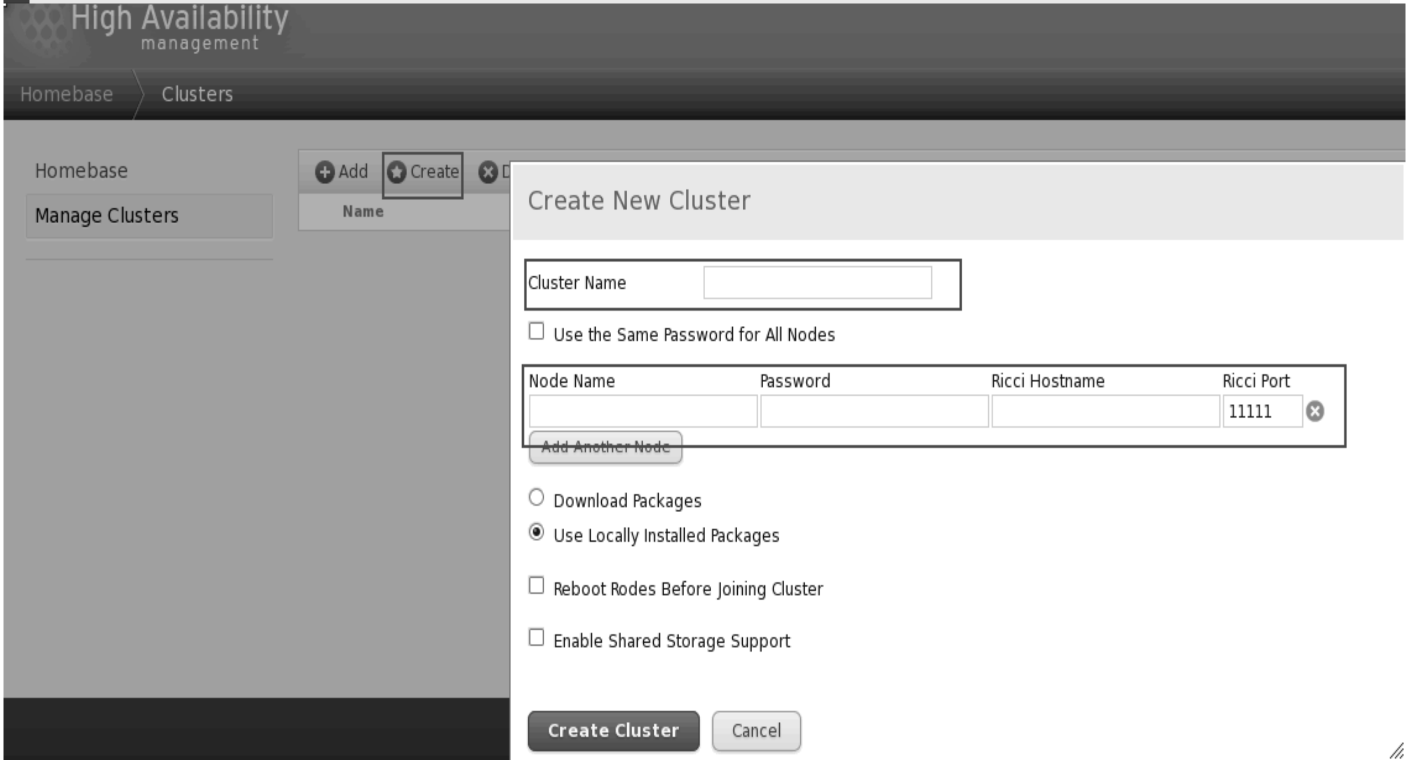
set password for ricci same in all the nodes.

Access management console for the clusters



Username: root

Password: ••••••



Create New Cluster

Cluster Name

□ Use the Same Password for All Nodes

Node Name	Password	Ricci Hostname	Ricci Port
			11111

○ Download Packages

● Use Locally Installed Packages

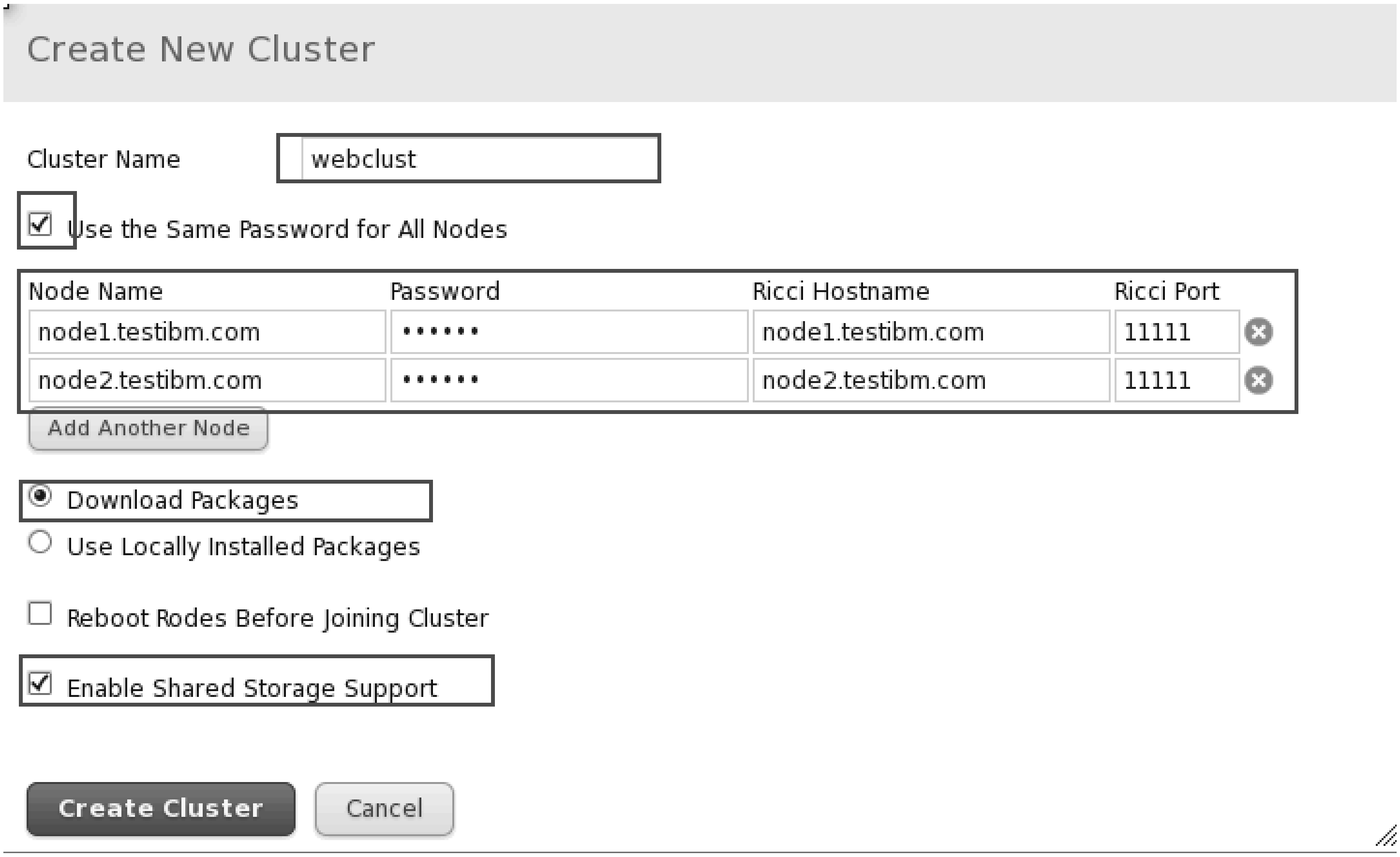
□ Reboot Rodes Before Joining Cluster

□ Enable Shared Storage Support

Create cluster once logged on to luci web interface.

We'll get Create New Cluster called webcluster.

Fill all the mandatory fields as below:



Create New Cluster

Cluster Name: webclust

☑ Use the Same Password for All Nodes

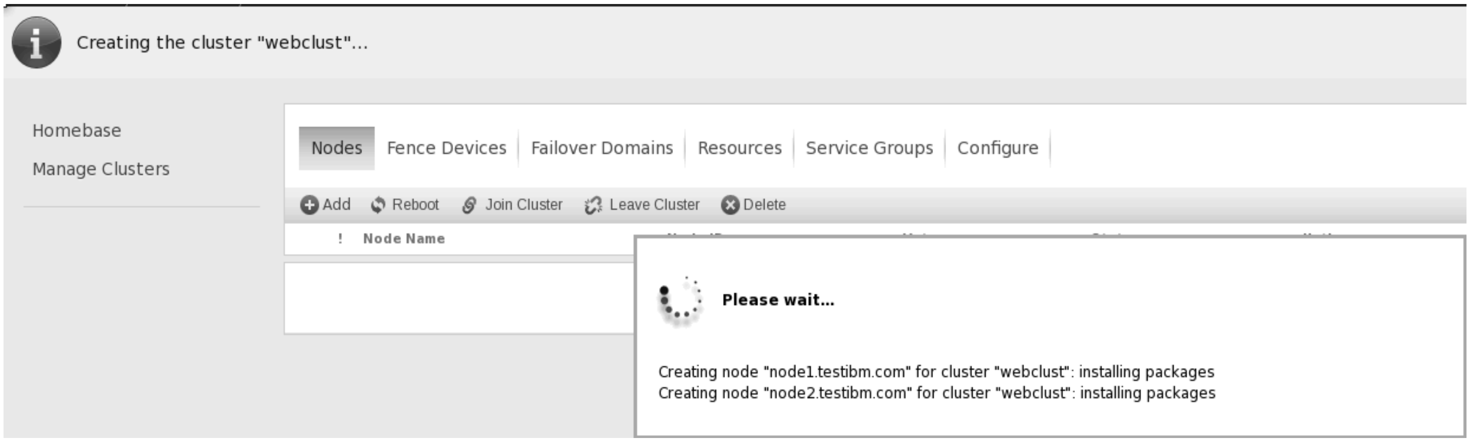
Node Name	Password	Ricci Hostname	Ricci Port
node1.testibm.com	••••••	node1.testibm.com	11111
node2.testibm.com	••••••	node2.testibm.com	11111

● Download Packages
○ Use Locally Installed Packages

□ Reboot Rodes Before Joining Cluster

☑ Enable Shared Storage Support

Install all the required packages for cluster nodes.

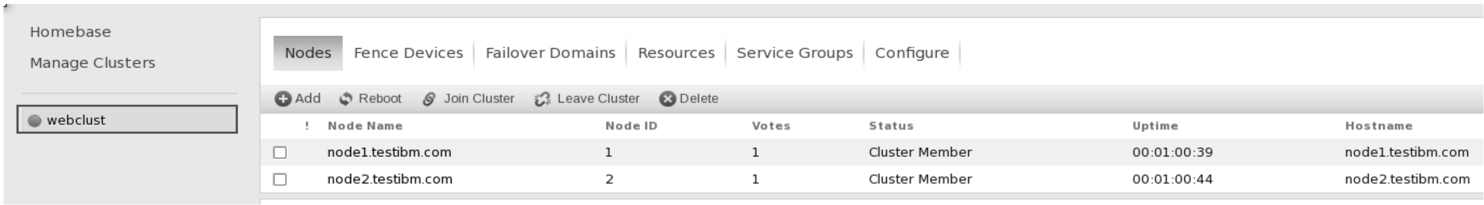


Creating the cluster "webclust"...

Please wait...

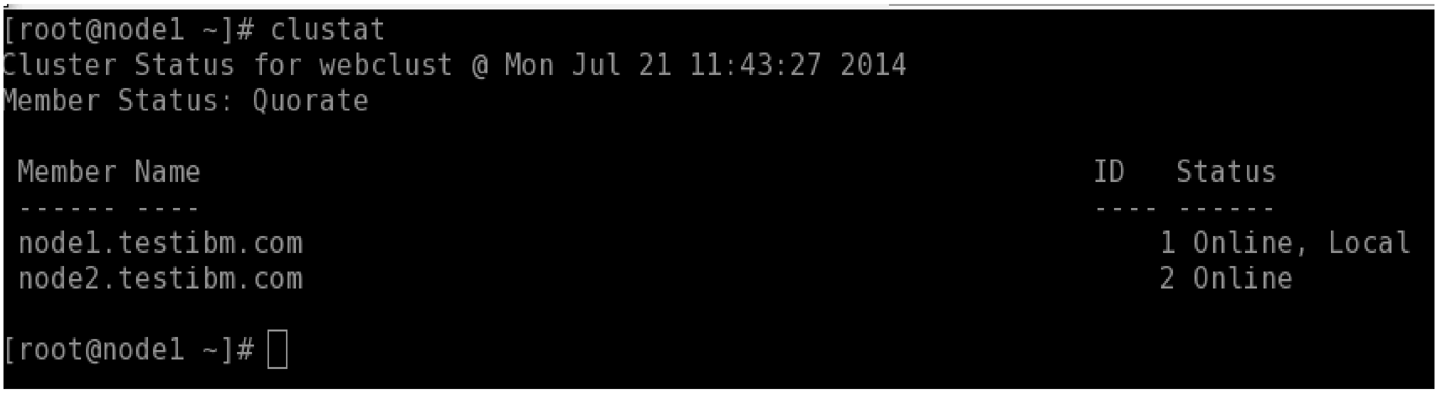
Creating node "node1.testibm.com" for cluster "webclust": installing packages
Creating node "node2.testibm.com" for cluster "webclust": installing packages

After Packages are installed and Cluster status can be seen as given below.



	!	Node Name	Node ID	Votes	Status	Uptime	Hostname
□		node1.testibm.com	1	1	Cluster Member	00:01:00:39	node1.testibm.com
□		node2.testibm.com	2	1	Cluster Member	00:01:00:44	node2.testibm.com

From a cluster node execute clustat which shows the cluster status.

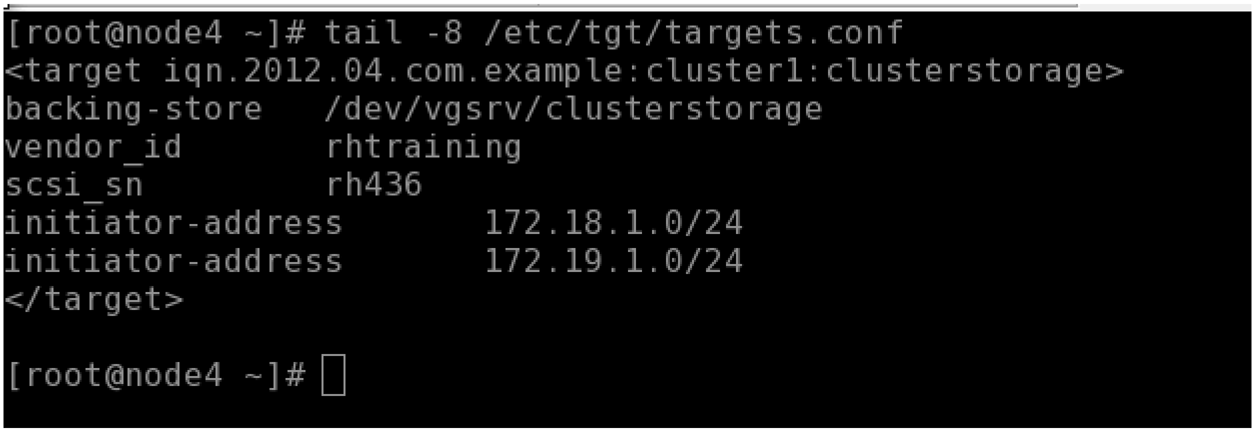


```
[root@node1 ~]# clustat
Cluster Status for webclust @ Mon Jul 21 11:43:27 2014
Member Status: Quorate

 Member Name                                                  ID   Status
 ------ ----                                                  ---- ------
 node1.testibm.com                                                1 Online, Local
 node2.testibm.com                                                2 Online

[root@node1 ~]# 
```

Cluster is up and running, web services has to be hosted on it.

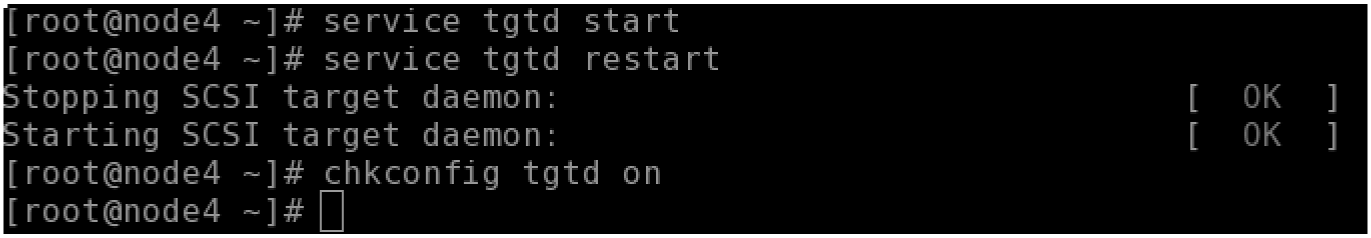
On management node create a storage target which can cat as shareds storage pool.

Create an LVM of 4GB and install a package called scsi-target utils. Also modify the /etc/tgt.target.conf file which should look like given below where in we're using two different network to provide the storage high availablity 172.18.1.0 & 172.19.1.0 so that clients access the storage on both the networks.



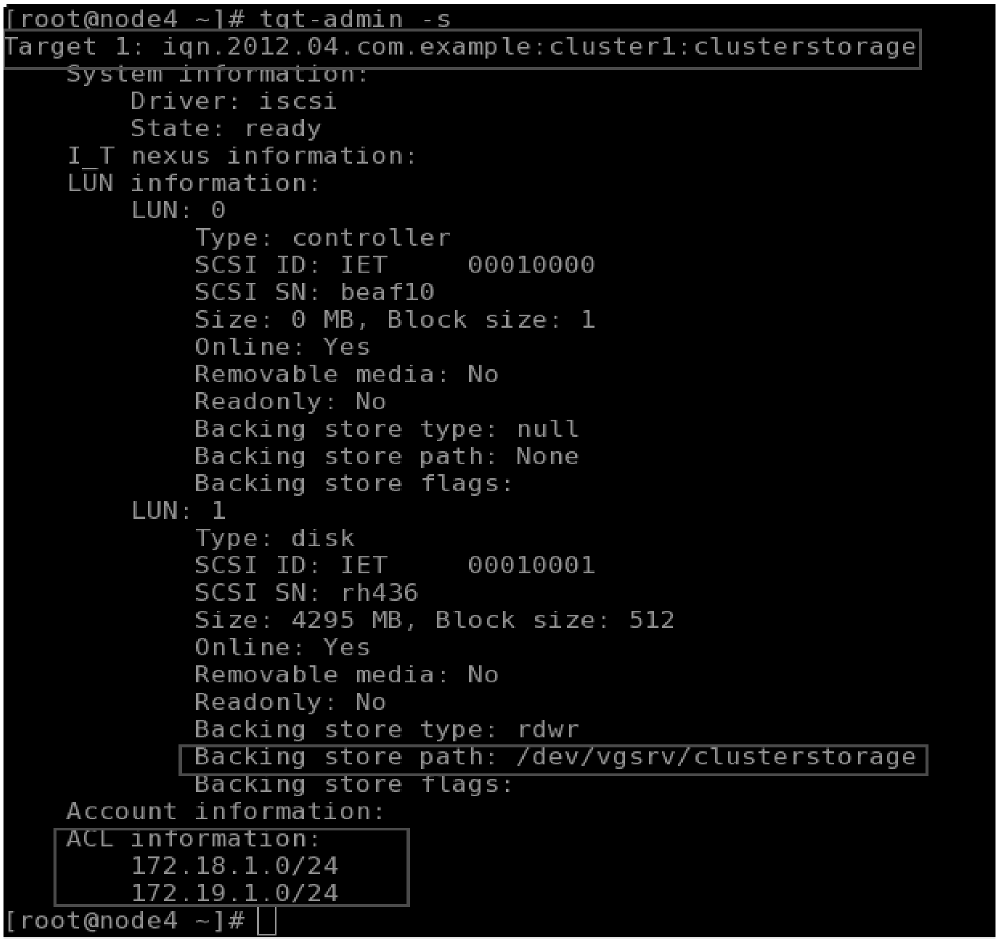
```
[root@node4 ~]# tail -8 /etc/tgt/targets.conf
<target iqn.2012.04.com.example:cluster1:clusterstorage>
backing-store   /dev/vgsrv/clusterstorage
vendor_id       rhtraining
scsi_sn         rh436
initiator-address       172.18.1.0/24
initiator-address       172.19.1.0/24
</target>

[root@node4 ~]# 
```

After modifying the target.conf restart/start tdtd daemon and make sure daemon is started after every reboot.



```
[root@node4 ~]# service tgtd start
[root@node4 ~]# service tgtd restart
Stopping SCSI target daemon:                                [  OK  ]
Starting SCSI target daemon:                                [  OK  ]
[root@node4 ~]# chkconfig tgtd on
[root@node4 ~]# 
```

Execute tgt-admin -s to see the status.



```
[root@node4 ~]# tgt-admin -s
Target 1: iqn.2012.04.com.example:cluster1:clusterstorage
    System information:
        Driver: iscsi
        State: ready
    I_T nexus information:
    LUN information:
        LUN: 0
            Type: controller
            SCSI ID: IET     00010000
            SCSI SN: beaf10
            Size: 0 MB, Block size: 1
            Online: Yes
            Removable media: No
            Readonly: No
            Backing store type: null
            Backing store path: None
            Backing store flags:
        LUN: 1
            Type: disk
            SCSI ID: IET     00010001
            SCSI SN: rh436
            Size: 4295 MB, Block size: 512
            Online: Yes
            Removable media: No
            Readonly: No
            Backing store type: rdwr
            Backing store path: /dev/vgsrv/clusterstorage
            Backing store flags:
    Account information:
    ACL information:
        172.18.1.0/24
        172.19.1.0/24
[root@node4 ~]# 
```

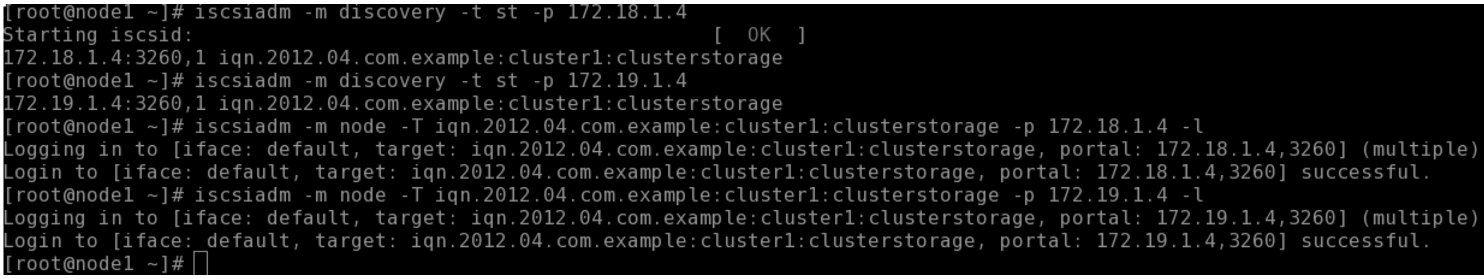
No iscsi target is configured.

Below are the configuration for initiator to make use of shared storage.

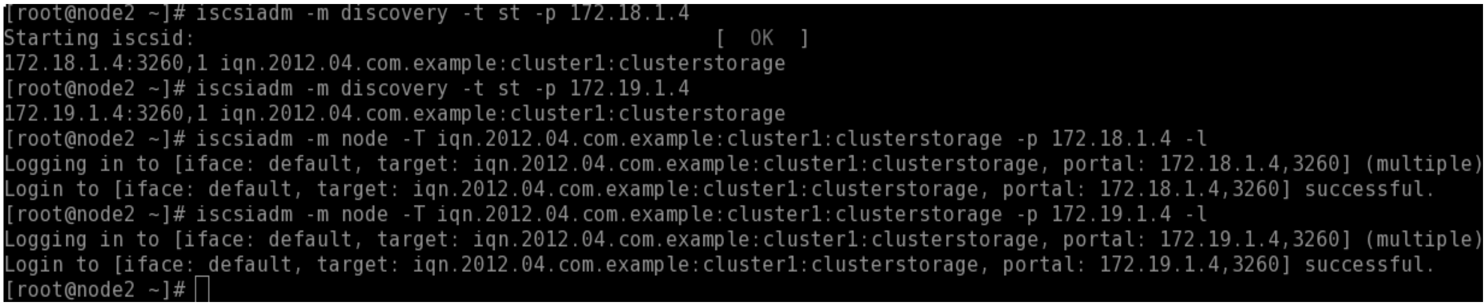
Install initiator package on both the nodes:

yum install -y iscsi initiator-utils

Discover & login to the storage on both the nodes as beow:



```
[root@node1 ~]# iscsiadm -m discovery -t st -p 172.18.1.4
Starting iscsid:                                           [  OK  ]
172.18.1.4:3260,1 iqn.2012.04.com.example:cluster1:clusterstorage
[root@node1 ~]# iscsiadm -m discovery -t st -p 172.19.1.4
172.19.1.4:3260,1 iqn.2012.04.com.example:cluster1:clusterstorage
[root@node1 ~]# iscsiadm -m node -T iqn.2012.04.com.example:cluster1:clusterstorage -p 172.18.1.4 -l
Logging in to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.18.1.4,3260] (multiple)
Login to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.18.1.4,3260] successful.
[root@node1 ~]# iscsiadm -m node -T iqn.2012.04.com.example:cluster1:clusterstorage -p 172.19.1.4 -l
Logging in to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.19.1.4,3260] (multiple)
Login to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.19.1.4,3260] successful.
[root@node1 ~]# 
```



```
[root@node2 ~]# iscsiadm -m discovery -t st -p 172.18.1.4
Starting iscsid:                                           [  OK  ]
172.18.1.4:3260,1 iqn.2012.04.com.example:cluster1:clusterstorage
[root@node2 ~]# iscsiadm -m discovery -t st -p 172.19.1.4
172.19.1.4:3260,1 iqn.2012.04.com.example:cluster1:clusterstorage
[root@node2 ~]# iscsiadm -m node -T iqn.2012.04.com.example:cluster1:clusterstorage -p 172.18.1.4 -l
Logging in to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.18.1.4,3260] (multiple)
Login to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.18.1.4,3260] successful.
[root@node2 ~]# iscsiadm -m node -T iqn.2012.04.com.example:cluster1:clusterstorage -p 172.19.1.4 -l
Logging in to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.19.1.4,3260] (multiple)
Login to [iface: default, target: iqn.2012.04.com.example:cluster1:clusterstorage, portal: 172.19.1.4,3260] successful.
[root@node2 ~]# 
```

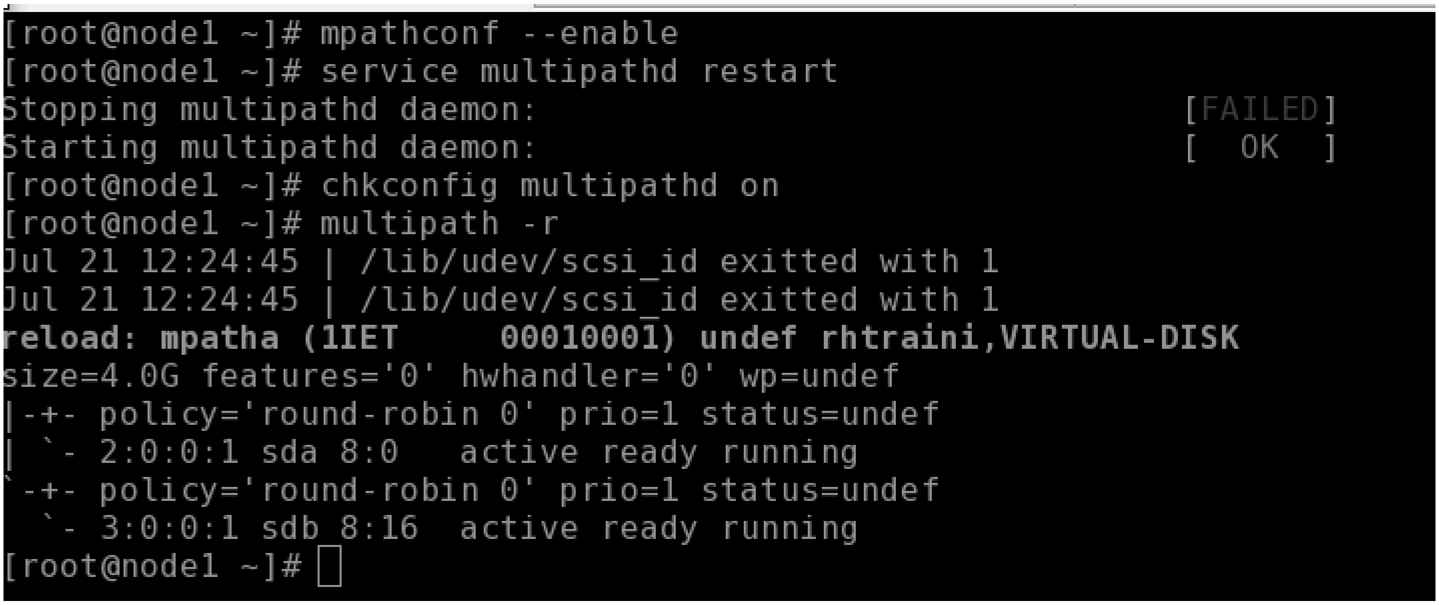
Enable multipath.

On both the nodes make sure device-mapper-multipath package is installed.

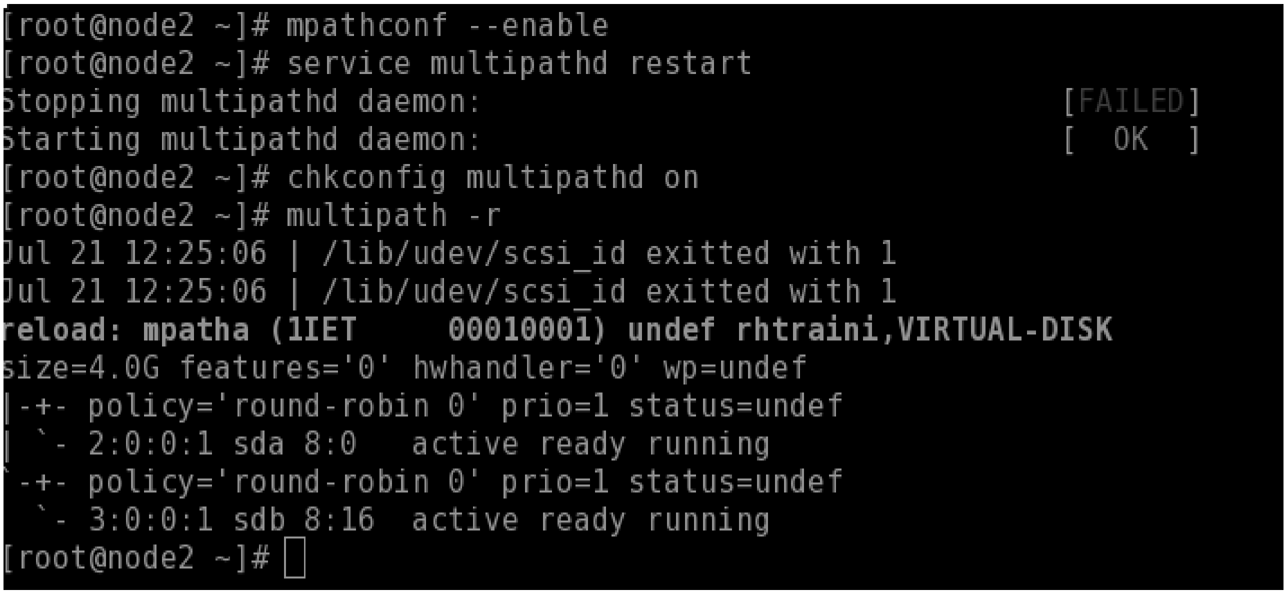
Yum list device-mapper-multipath

If not please install the package using “yum install -y device-mapper-multipath”

Enable , start and ensure that multipathd is started after every reboot.



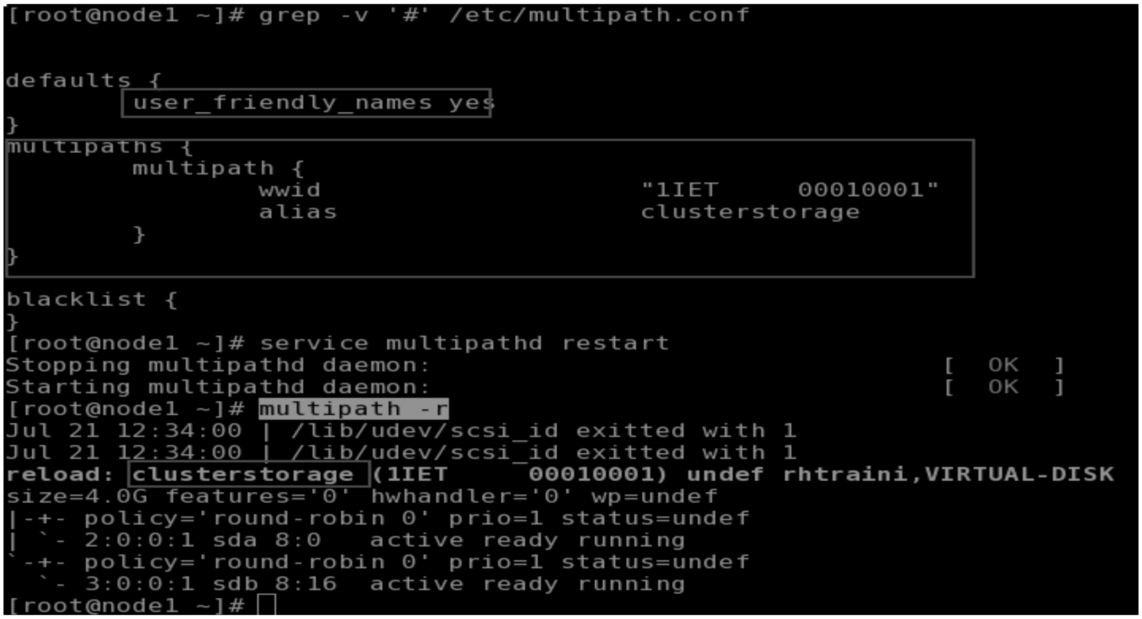
```
[root@node1 ~]# mpathconf --enable
[root@node1 ~]# service multipathd restart
Stopping multipathd daemon:                                [FAILED]
Starting multipathd daemon:                                [  OK  ]
[root@node1 ~]# chkconfig multipathd on
[root@node1 ~]# multipath -r
Jul 21 12:24:45 | /lib/udev/scsi_id exitted with 1
Jul 21 12:24:45 | /lib/udev/scsi_id exitted with 1
reload: mpatha (1IET     00010001) undef rhtraini,VIRTUAL-DISK
size=4.0G features='0' hwhandler='0' wp=undef
|-+- policy='round-robin 0' prio=1 status=undef
| `- 2:0:0:1 sda 8:0   active ready running
`-+- policy='round-robin 0' prio=1 status=undef
  `- 3:0:0:1 sdb 8:16  active ready running
[root@node1 ~]# 
```



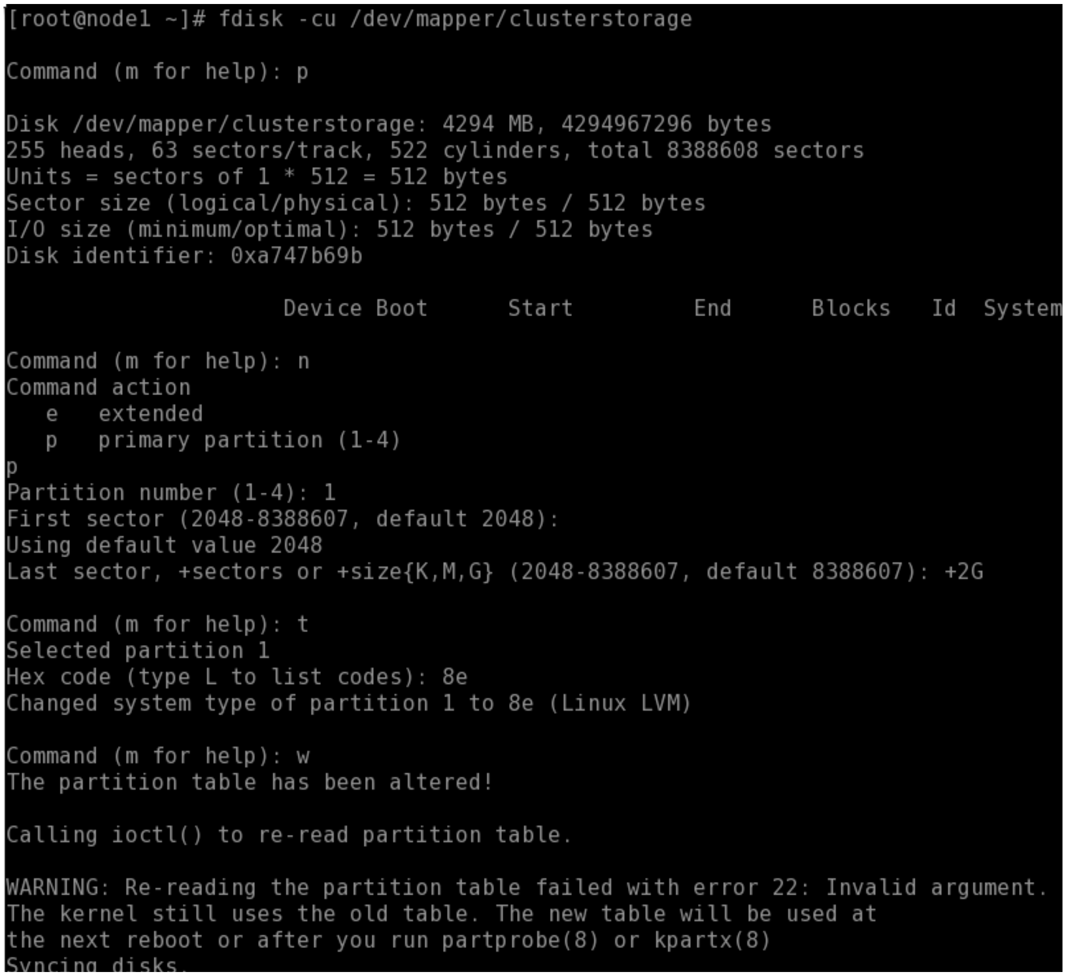
```
[root@node2 ~]# mpathconf --enable
[root@node2 ~]# service multipathd restart
Stopping multipathd daemon:                                [FAILED]
Starting multipathd daemon:                                [  OK  ]
[root@node2 ~]# chkconfig multipathd on
[root@node2 ~]# multipath -r
Jul 21 12:25:06 | /lib/udev/scsi_id exitted with 1
Jul 21 12:25:06 | /lib/udev/scsi_id exitted with 1
reload: mpatha (1IET     00010001) undef rhtraini,VIRTUAL-DISK
size=4.0G features='0' hwhandler='0' wp=undef
|-+- policy='round-robin 0' prio=1 status=undef
| `- 2:0:0:1 sda 8:0   active ready running
`-+- policy='round-robin 0' prio=1 status=undef
  `- 3:0:0:1 sdb 8:16  active ready running
[root@node2 ~]# 
```

From above multipath device is mpatha however we want to give user friendly name or an alias so that it can easily identify which storage we''re using for cluster storage.

Make the same changes to both the nodes in multipath.conf. And restart the multipathd daemon.



```
[root@node1 ~]# grep -v '#' /etc/multipath.conf


defaults {
        user_friendly_names yes
}
multipaths {
        multipath {
                wwid                    "1IET     00010001"
                alias                   clusterstorage
        }
}

blacklist {
}
[root@node1 ~]# service multipathd restart
Stopping multipathd daemon:                                [  OK  ]
Starting multipathd daemon:                                [  OK  ]
[root@node1 ~]# multipath -r
Jul 21 12:34:00 | /lib/udev/scsi_id exitted with 1
Jul 21 12:34:00 | /lib/udev/scsi_id exitted with 1
reload: clusterstorage (1IET     00010001) undef rhtraini,VIRTUAL-DISK
size=4.0G features='0' hwhandler='0' wp=undef
|-+- policy='round-robin 0' prio=1 status=undef
| `- 2:0:0:1 sda 8:0   active ready running
`-+- policy='round-robin 0' prio=1 status=undef
  `- 3:0:0:1 sdb 8:16  active ready running
[root@node1 ~]#
```

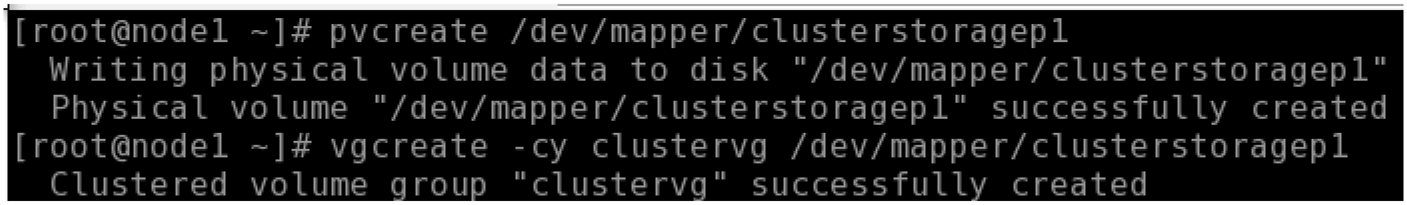


```
[root@node1 ~]# fdisk -cu /dev/mapper/clusterstorage

Command (m for help): p

Disk /dev/mapper/clusterstorage: 4294 MB, 4294967296 bytes
255 heads, 63 sectors/track, 522 cylinders, total 8388608 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0xa747b69b

                     Device Boot      Start         End      Blocks   Id  System

Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 1
First sector (2048-8388607, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-8388607, default 8388607): +2G

Command (m for help): t
Selected partition 1
Hex code (type L to list codes): 8e
Changed system type of partition 1 to 8e (Linux LVM)

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 22: Invalid argument.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
```

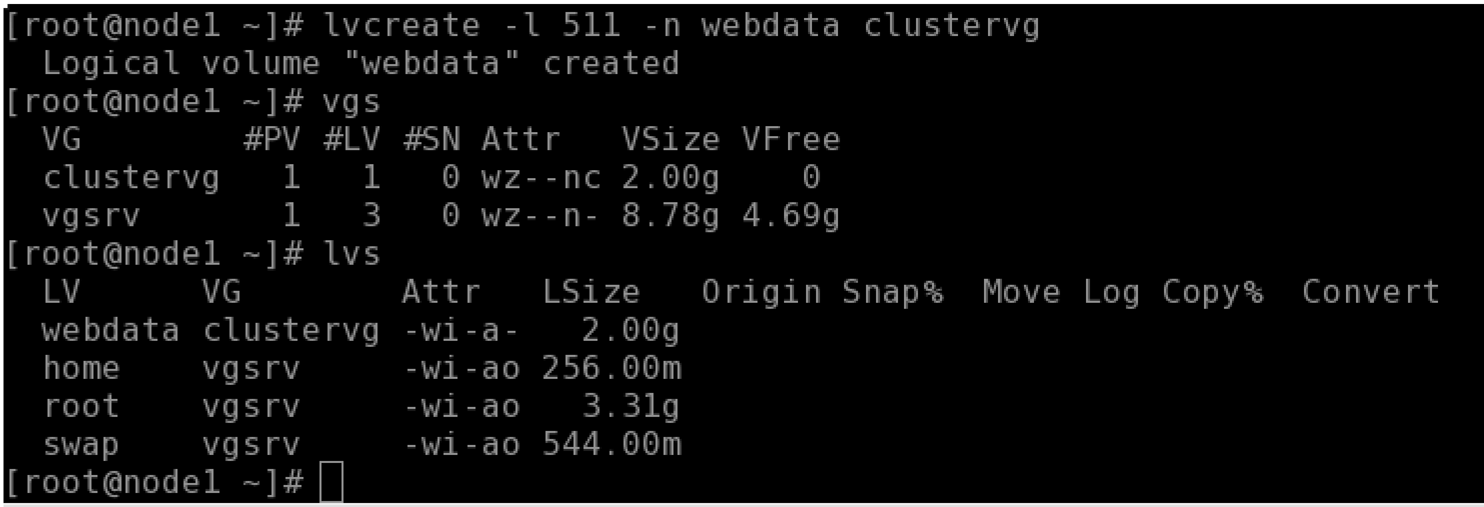
Execute partprobe or kpartx on both the nodes so that partition is reflected on both the nodes

Make sure locking_type = 3 is reflected on all the cluster nodes.

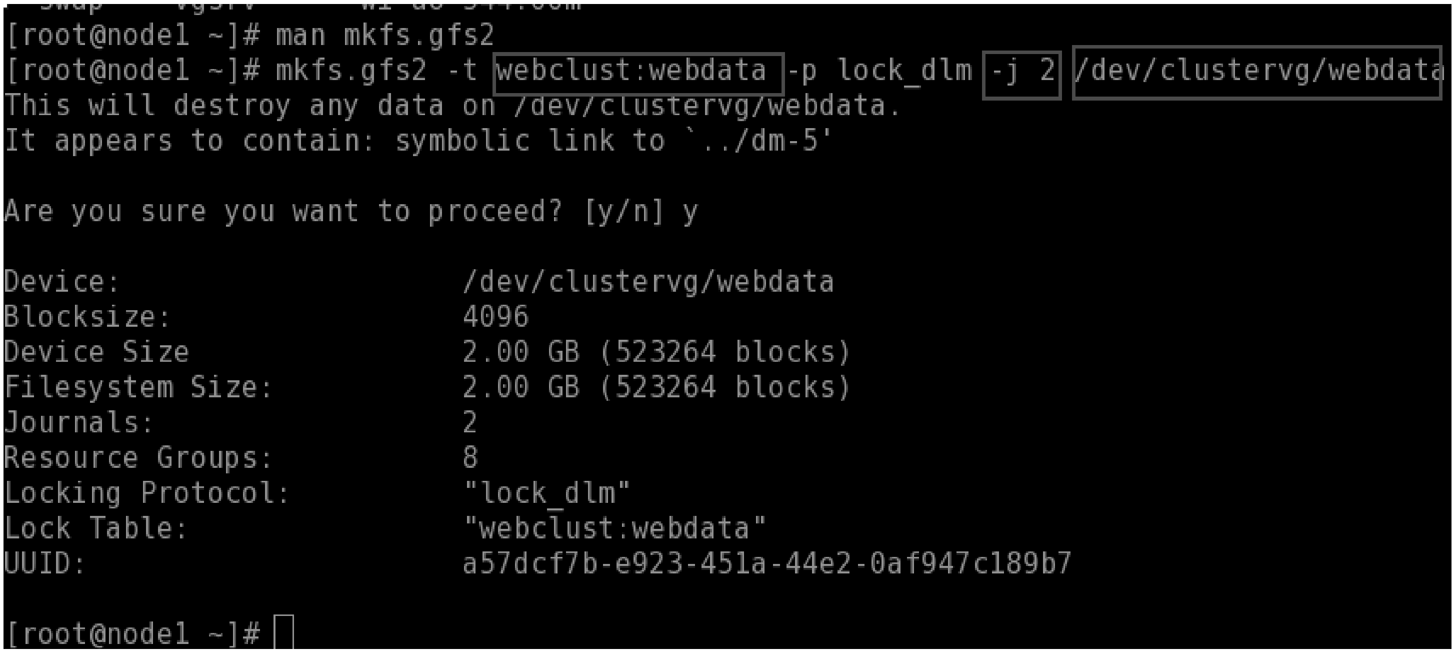
Now create new clusteredvg & lv named as webdata on new partition & format with gfs2 Filesystem on any of the cluster node.



```
[root@node1 ~]# pvcreate /dev/mapper/clusterstoragep1
  Writing physical volume data to disk "/dev/mapper/clusterstoragep1"
  Physical volume "/dev/mapper/clusterstoragep1" successfully created
[root@node1 ~]# vgcreate -cy clustervg /dev/mapper/clusterstoragep1
  Clustered volume group "clustervg" successfully created
```

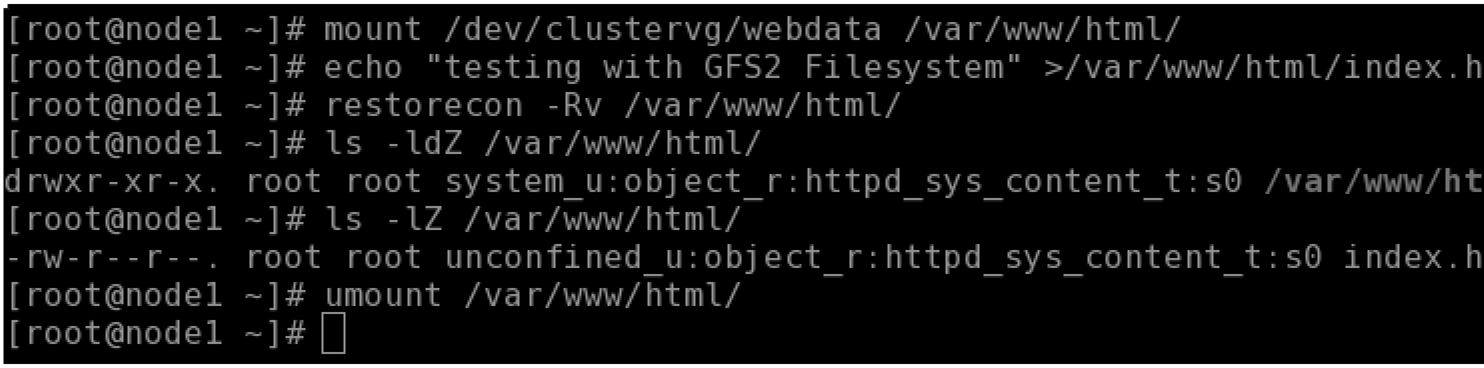


```
[root@node1 ~]# lvcreate -l 511 -n webdata clustervg
  Logical volume "webdata" created
[root@node1 ~]# vgs
  VG        #PV #LV #SN Attr   VSize VFree
  clustervg   1   1   0 wz--nc 2.00g    0
  vgsrv       1   3   0 wz--n- 8.78g 4.69g
[root@node1 ~]# lvs
  LV      VG        Attr   LSize   Origin Snap%  Move Log Copy%  Convert
  webdata clustervg -wi-a-   2.00g
  home    vgsrv     -wi-ao 256.00m
  root    vgsrv     -wi-ao   3.31g
  swap    vgsrv     -wi-ao 544.00m
[root@node1 ~]# 
```



```
  swap    vgsrv     -wi-ao 544.00m
[root@node1 ~]# man mkfs.gfs2
[root@node1 ~]# mkfs.gfs2 -t webclust:webdata -p lock_dlm -j 2 /dev/clustervg/webdata
This will destroy any data on /dev/clustervg/webdata.
It appears to contain: symbolic link to `../dm-5'

Are you sure you want to proceed? [y/n] y

Device:                    /dev/clustervg/webdata
Blocksize:                 4096
Device Size                2.00 GB (523264 blocks)
Filesystem Size:           2.00 GB (523264 blocks)
Journals:                  2
Resource Groups:           8
Locking Protocol:          "lock_dlm"
Lock Table:                "webclust:webdata"
UUID:                      a57dcf7b-e923-451a-44e2-0af947c189b7

[root@node1 ~]# 
```

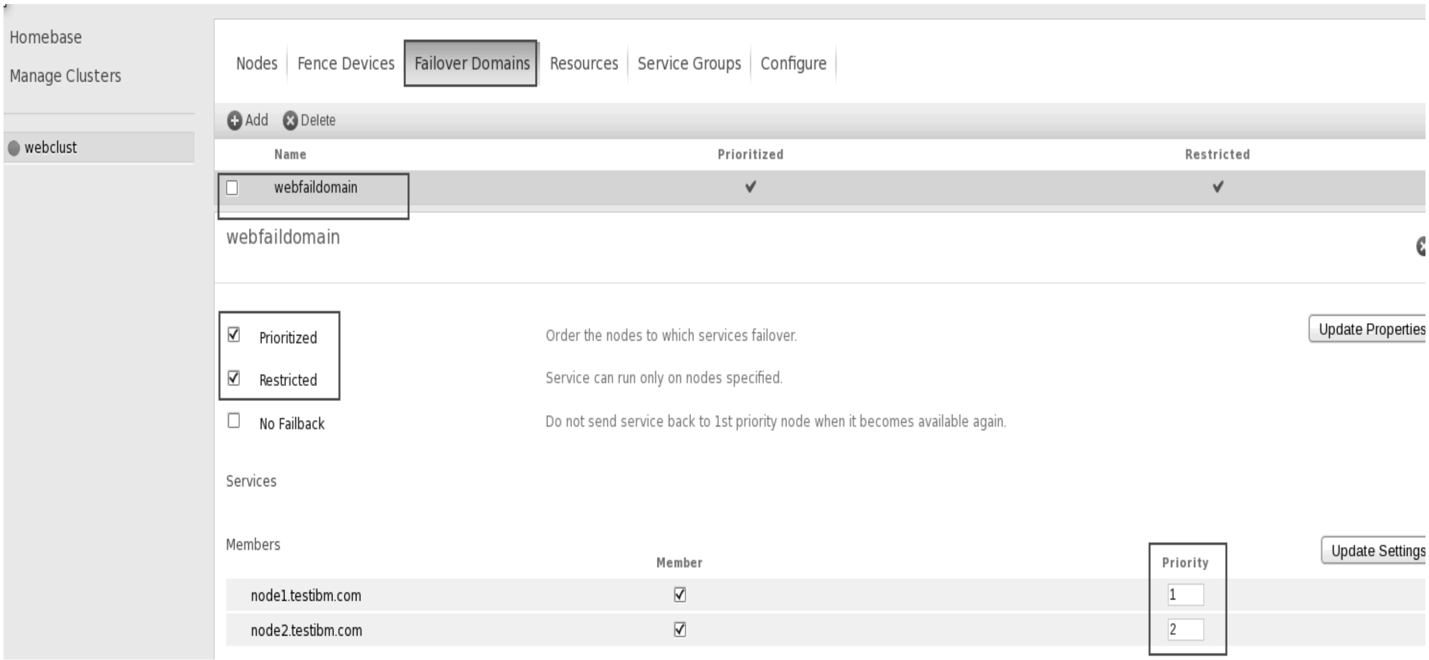
Now that we've GFS2 Filesystem available we're mounting it temporary in any of the node in our case we're mounting it on node1. Copying/Creating the index.html file under /var/www/html and setting the selinux context as selinux is enforcing in our case.



```
[root@node1 ~]# mount /dev/clustervg/webdata /var/www/html/
[root@node1 ~]# echo "testing with GFS2 Filesystem" >/var/www/html/index.h
[root@node1 ~]# restorecon -Rv /var/www/html/
[root@node1 ~]# ls -ldZ /var/www/html/
drwxr-xr-x. root root system_u:object_r:httpd_sys_content_t:s0 /var/www/ht
[root@node1 ~]# ls -lZ /var/www/html/
-rw-r--r--. root root unconfined_u:object_r:httpd_sys_content_t:s0 index.h
[root@node1 ~]# umount /var/www/html/
[root@node1 ~]# 
```

Now our FS is ready which has the data/index.html which we're using to publish our website.

Crate a Failover domain:



Name	Prioritized	Restricted
□ webfaildomain	✓	✓

webfaildomain

☑ Prioritized — Order the nodes to which services failover.

☑ Restricted — Service can run only on nodes specified.

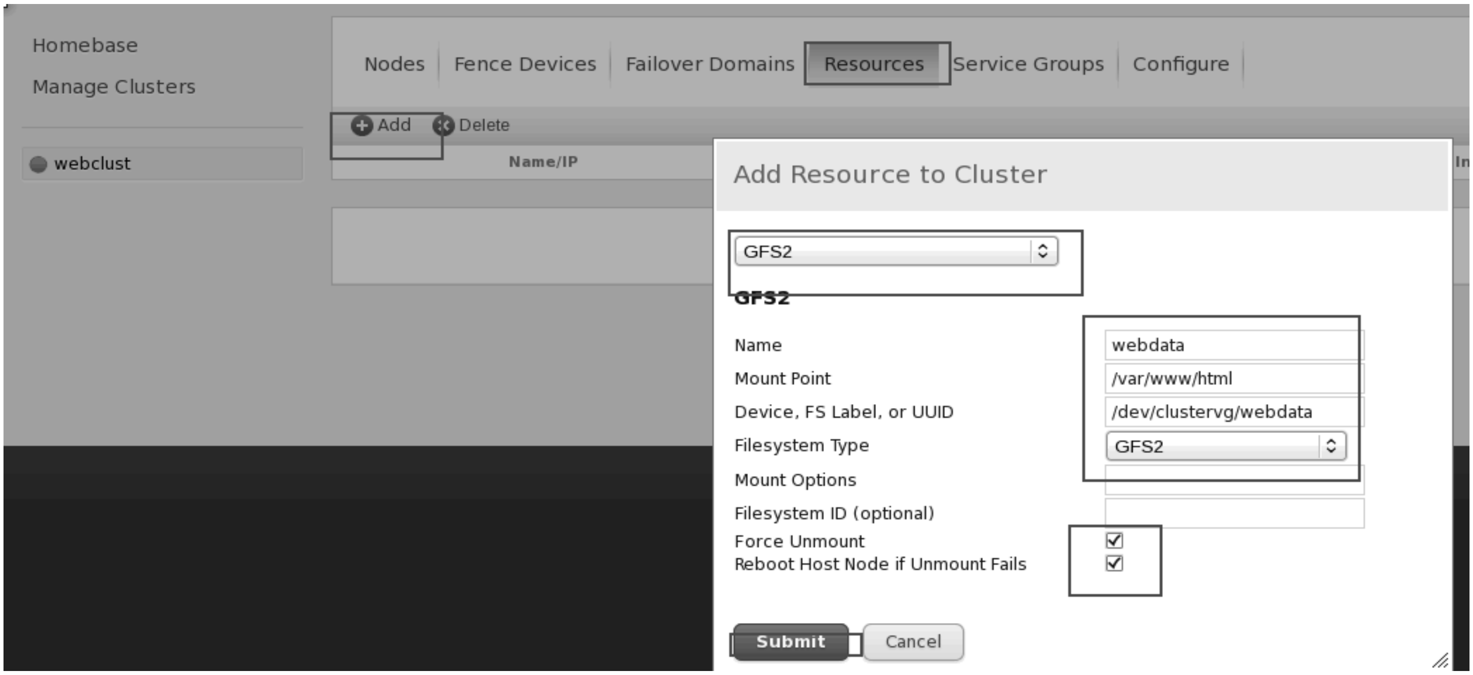
□ No Failback — Do not send service back to 1st priority node when it becomes available again.

Services

Members

	Member	Priority
node1.testibm.com	☑	1
node2.testibm.com	☑	2

Click on Resources tab and create new resources:



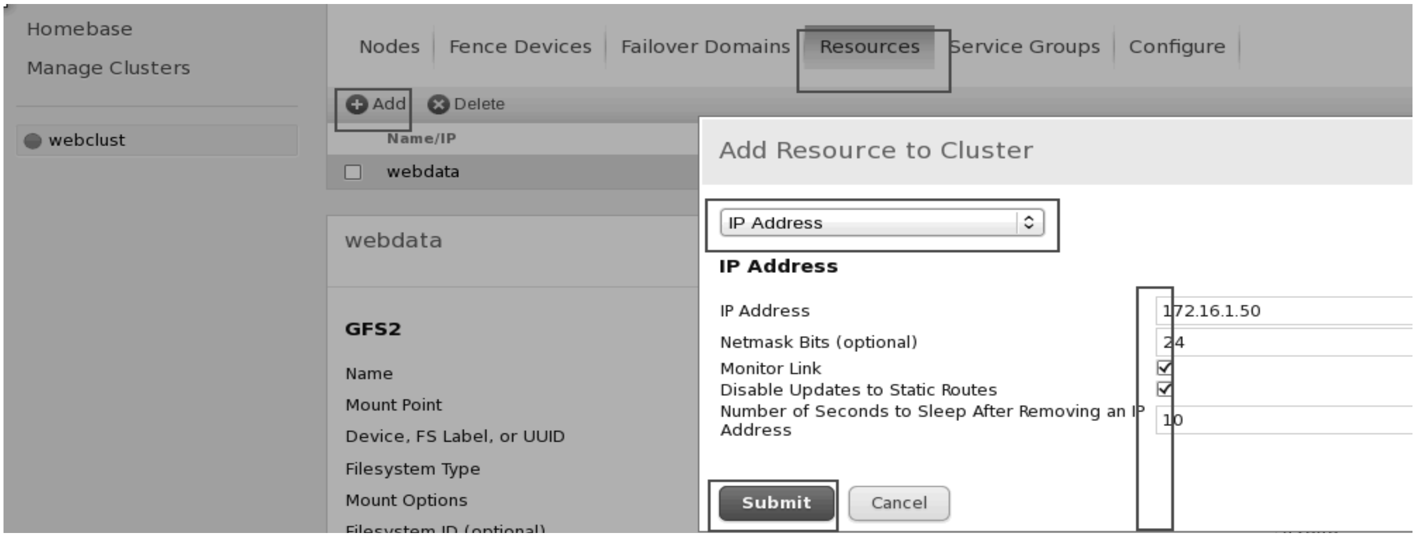
Add Resource to Cluster

GFS2

GFS2

Name	webdata
Mount Point	/var/www/html
Device, FS Label, or UUID	/dev/clustervg/webdata
Filesystem Type	GFS2
Mount Options	
Filesystem ID (optional)	
Force Unmount	☑
Reboot Host Node if Unmount Fails	☑

Now Create the IP resource



webdata

GFS2

Name
Mount Point
Device, FS Label, or UUID
Filesystem Type
Mount Options
Filesystem ID (optional)

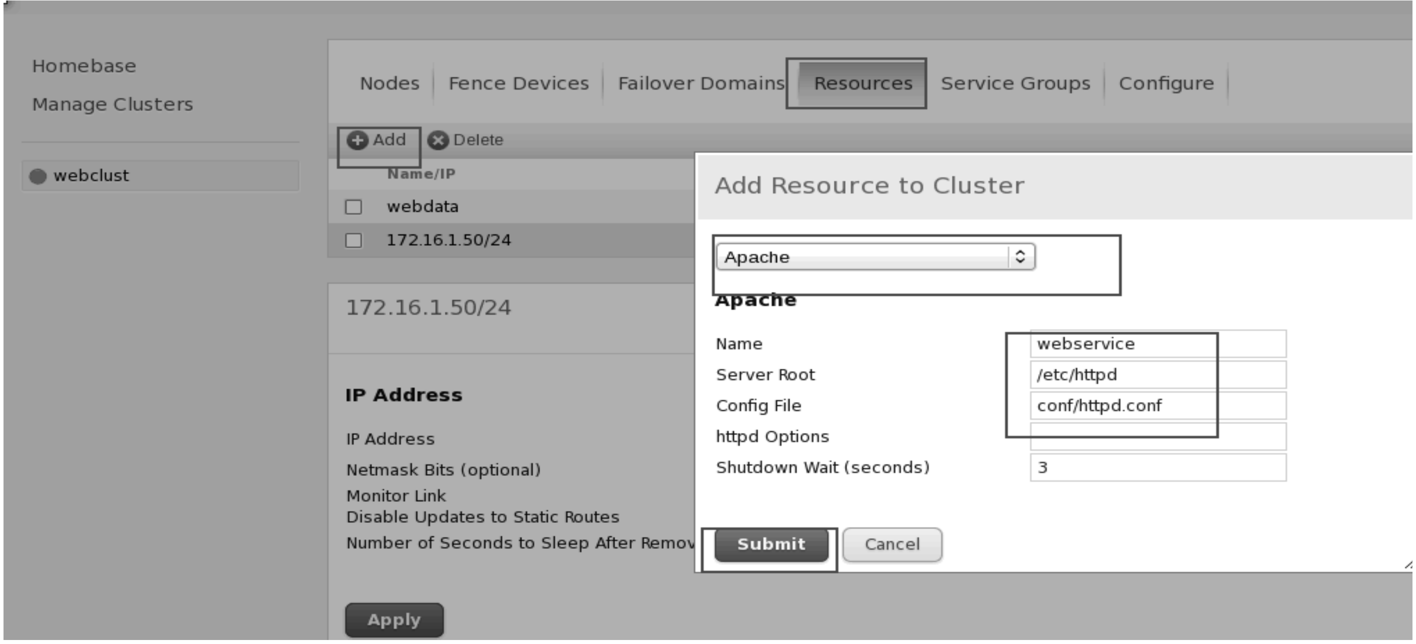
Add Resource to Cluster

IP Address

IP Address

IP Address: 172.16.1.50
Netmask Bits (optional): 24
Monitor Link: ☑
Disable Updates to Static Routes: ☑
Number of Seconds to Sleep After Removing an IP Address: 10

Creating apache resource



172.16.1.50/24

IP Address

IP Address
Netmask Bits (optional)
Monitor Link
Disable Updates to Static Routes
Number of Seconds to Sleep After Remov

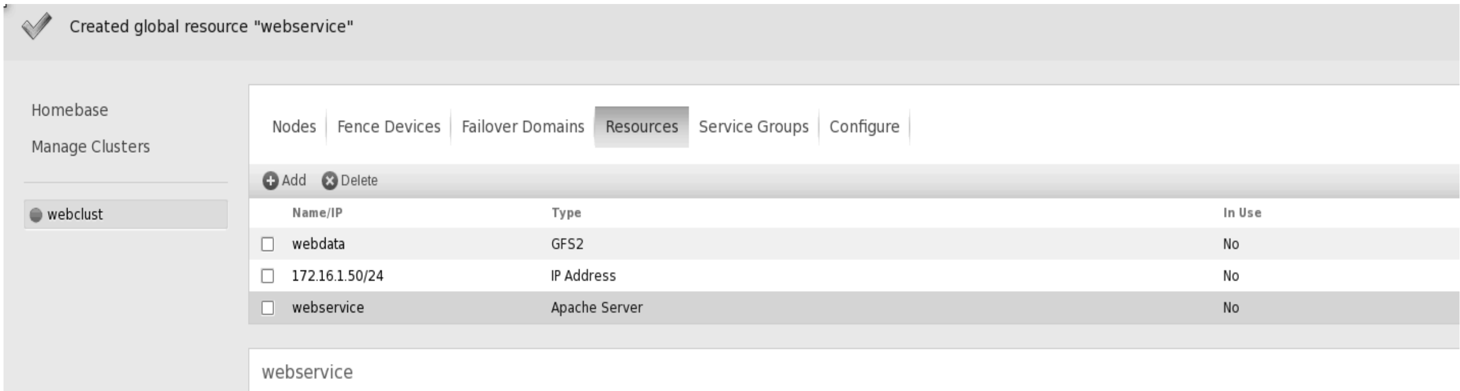
Add Resource to Cluster

Apache

Apache

Name: webservice
Server Root: /etc/httpd
Config File: conf/httpd.conf
httpd Options:
Shutdown Wait (seconds): 3

All three resources are created.

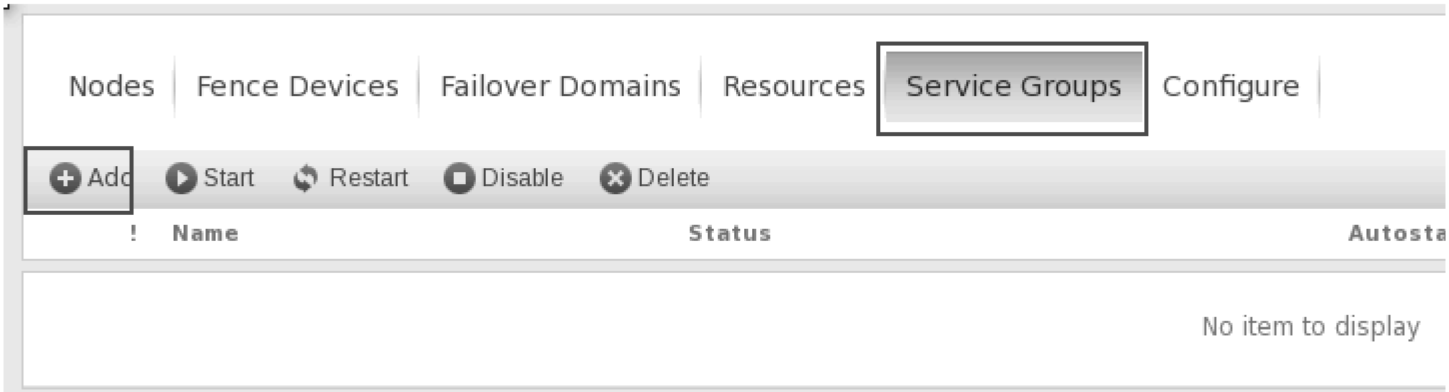

Created global resource "webservice"

	Name/IP	Type	In Use
□	webdata	GFS2	No
□	172.16.1.50/24	IP Address	No
□	webservice	Apache Server	No

webservice

Next step is to create a Service group.

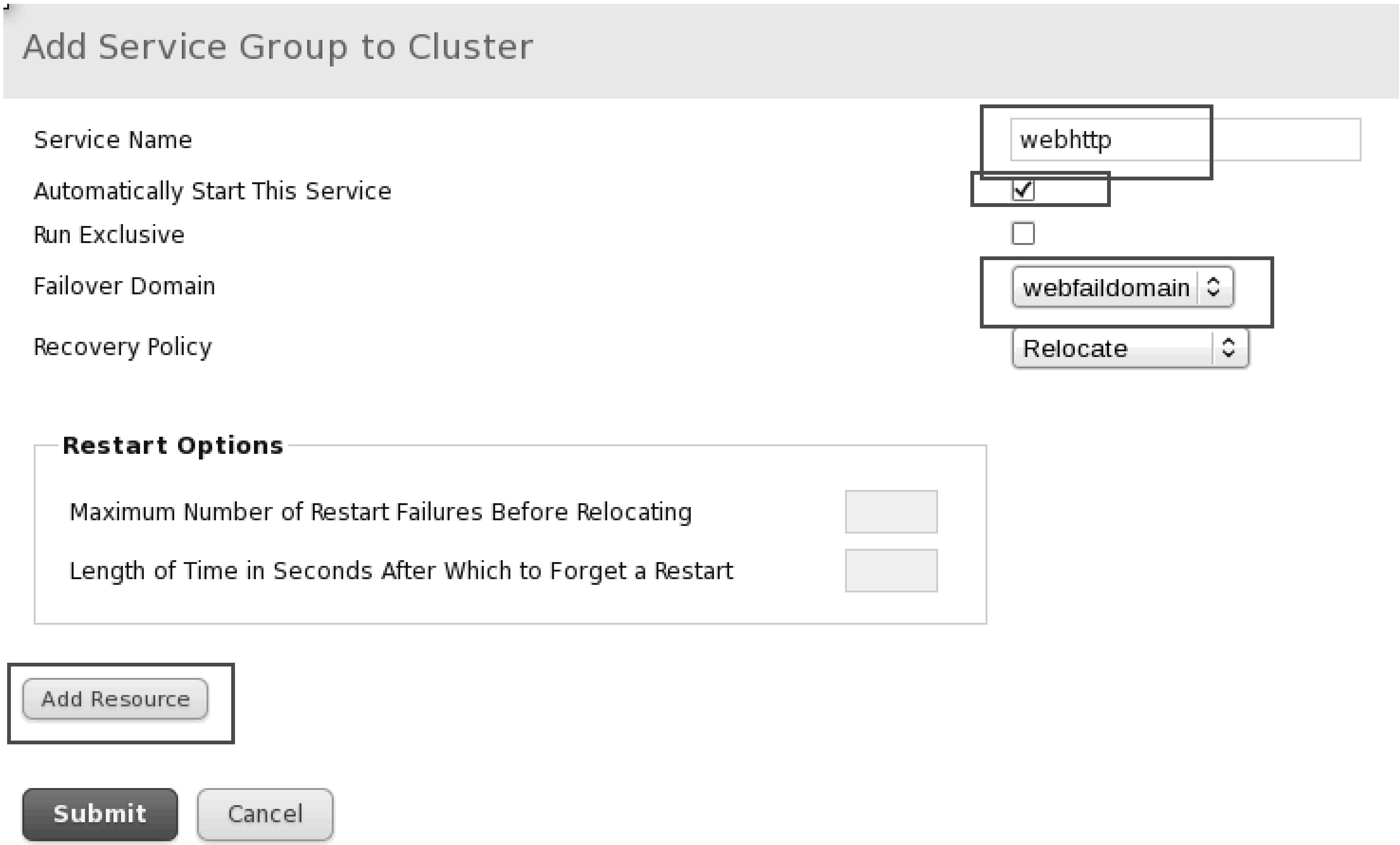
Click on Service group Tab



!	Name	Status	Autosta

No item to display

Follow the same steps to add the resources in the webhttp service (IP, Filesystem, and web resource /apache)



Add Service Group to Cluster

Service Name: webhttp

Automatically Start This Service: ☑

Run Exclusive: □

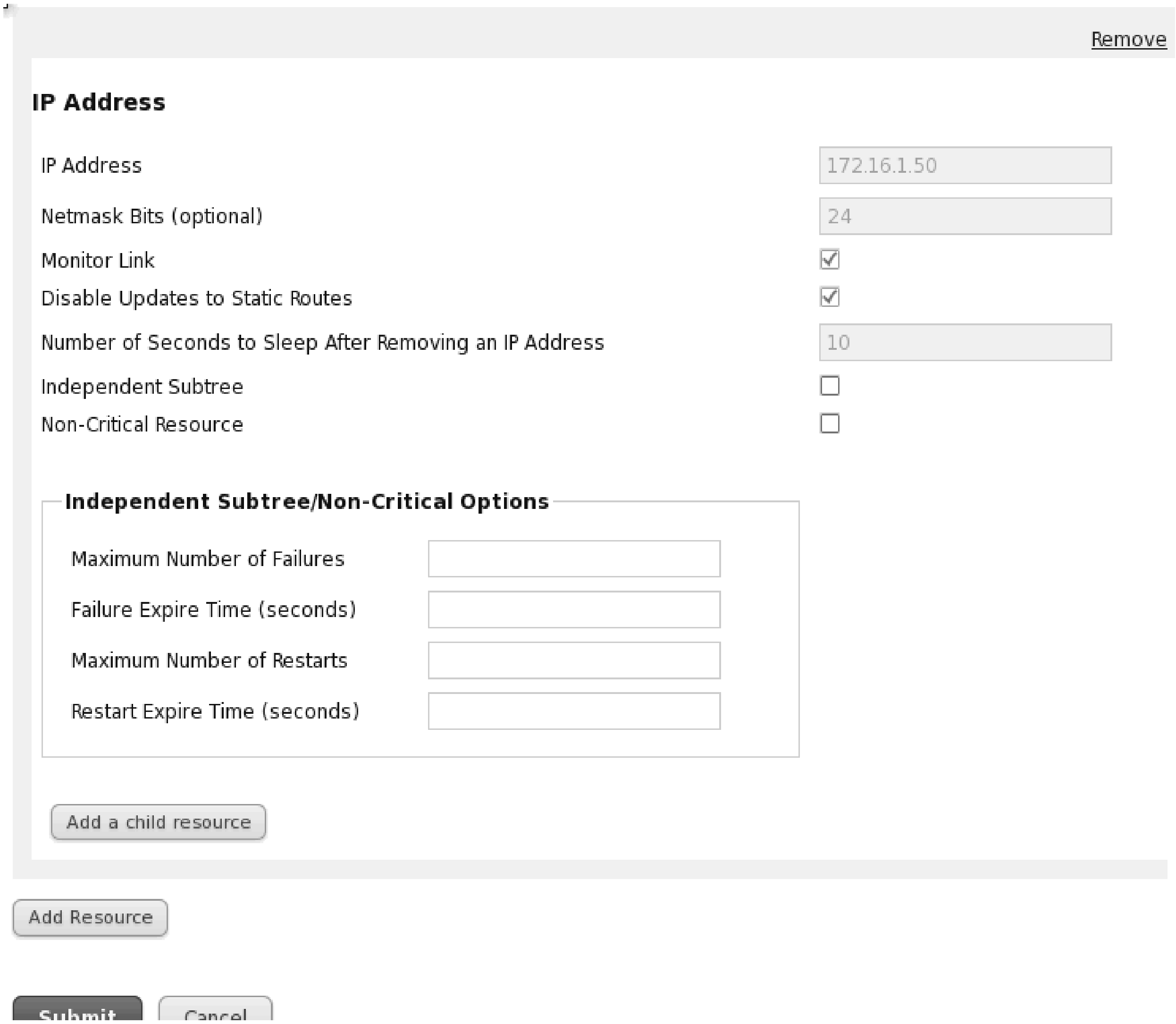
Failover Domain: webfaildomain

Recovery Policy: Relocate

Restart Options

Maximum Number of Restart Failures Before Relocating:

Length of Time in Seconds After Which to Forget a Restart:

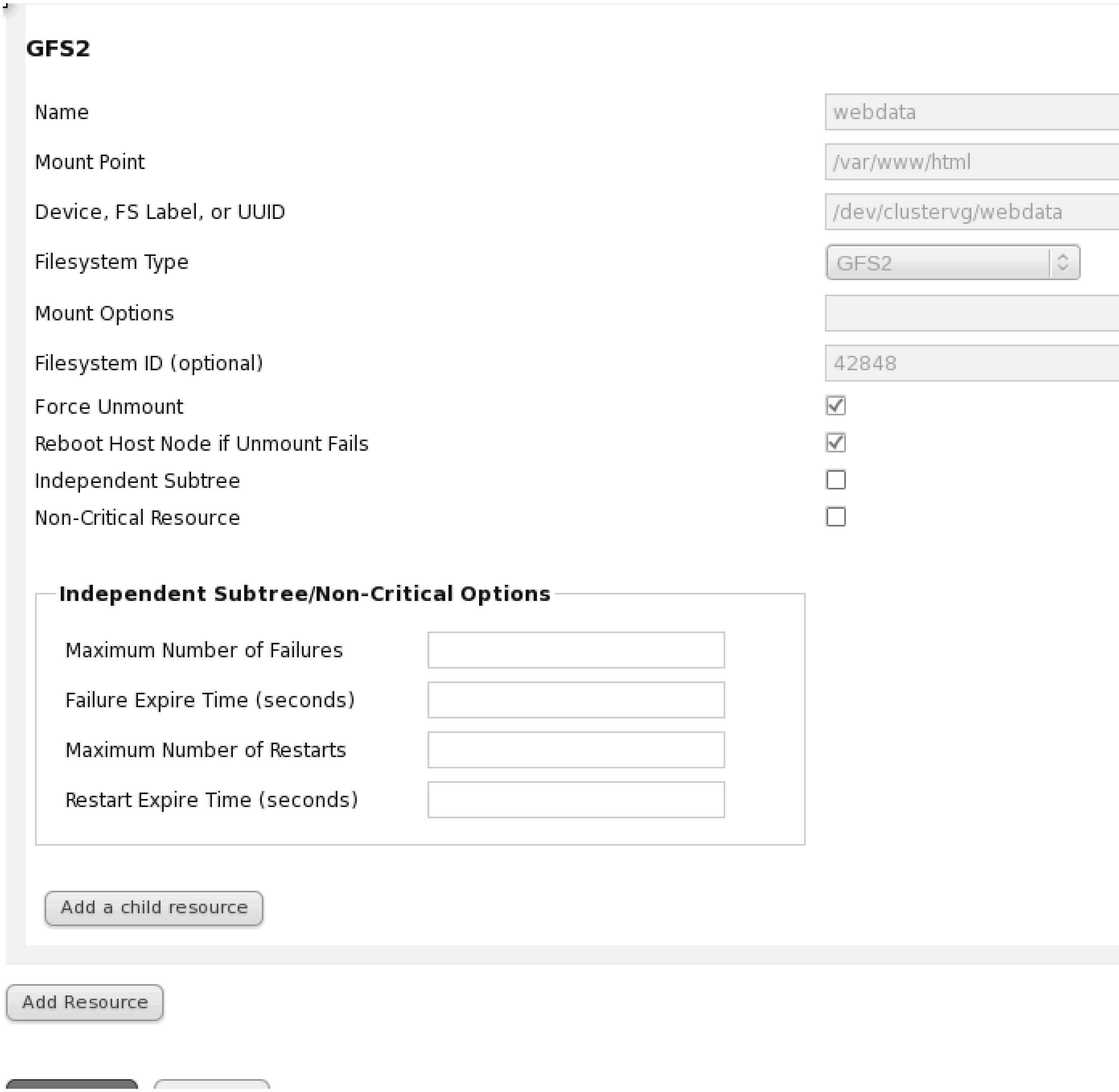


IP Address

IP Address	172.16.1.50
Netmask Bits (optional)	24
Monitor Link	☑
Disable Updates to Static Routes	☑
Number of Seconds to Sleep After Removing an IP Address	10
Independent Subtree	☐
Non-Critical Resource	☐

Independent Subtree/Non-Critical Options

Maximum Number of Failures	
Failure Expire Time (seconds)	
Maximum Number of Restarts	
Restart Expire Time (seconds)	



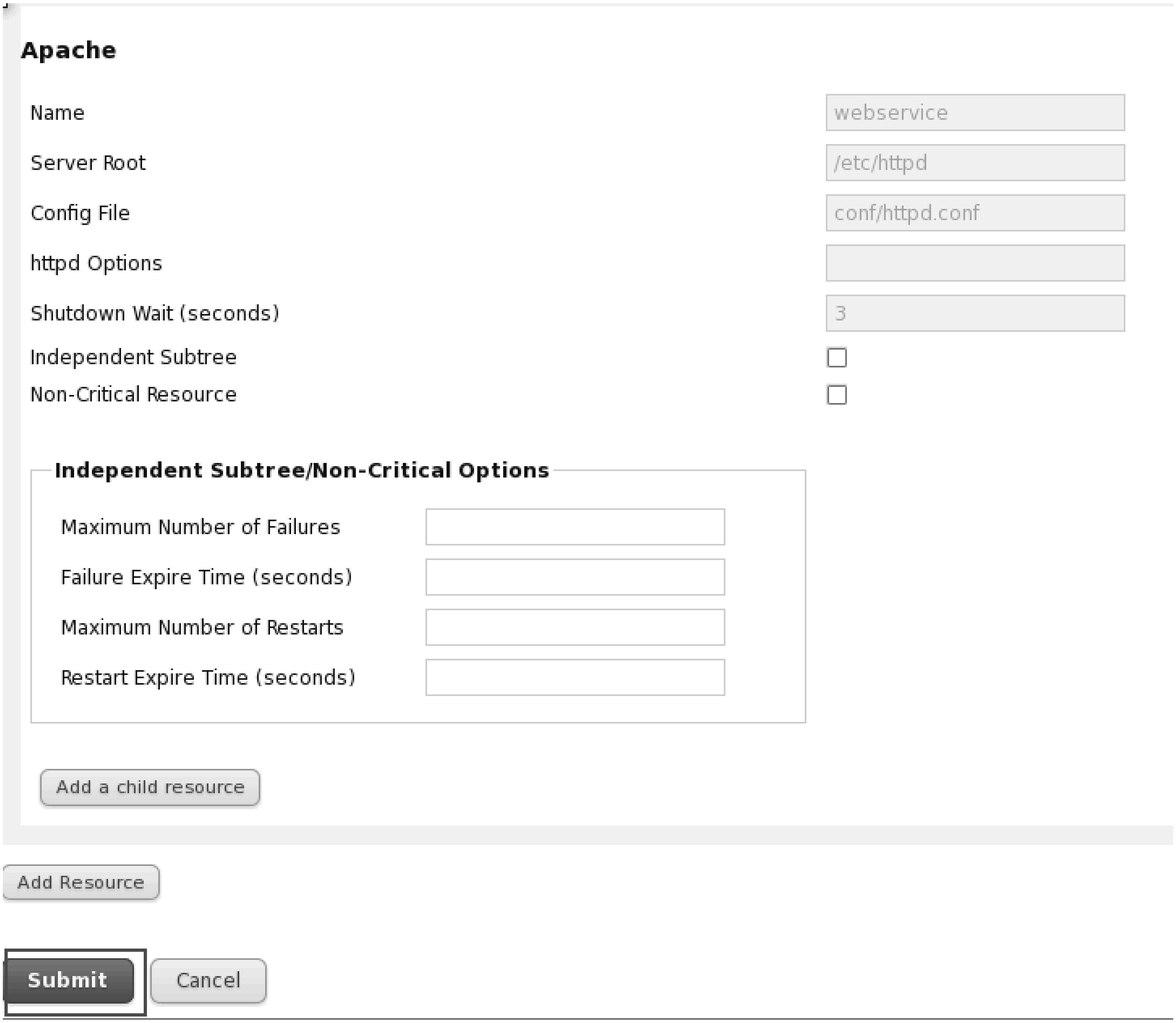
GFS2

Name	webdata
Mount Point	/var/www/html
Device, FS Label, or UUID	/dev/clustervg/webdata
Filesystem Type	GFS2
Mount Options	
Filesystem ID (optional)	42848
Force Unmount	☑
Reboot Host Node if Unmount Fails	☑
Independent Subtree	□
Non-Critical Resource	□

Independent Subtree/Non-Critical Options

Maximum Number of Failures	
Failure Expire Time (seconds)	
Maximum Number of Restarts	
Restart Expire Time (seconds)	

Once all the resources are added click on submit.



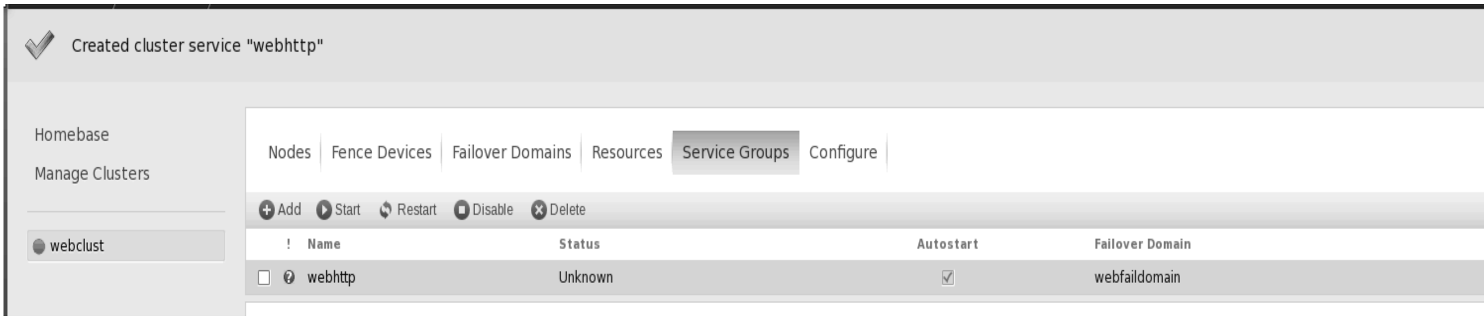
Apache

Name	webservice
Server Root	/etc/httpd
Config File	conf/httpd.conf
httpd Options	
Shutdown Wait (seconds)	3
Independent Subtree	□
Non-Critical Resource	□

Independent Subtree/Non-Critical Options

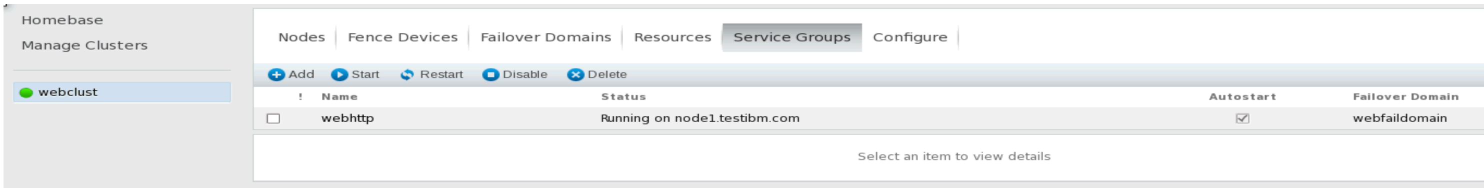
Maximum Number of Failures	
Failure Expire Time (seconds)	
Maximum Number of Restarts	
Restart Expire Time (seconds)	

Click on submit.



✓ Created cluster service "webhttp"

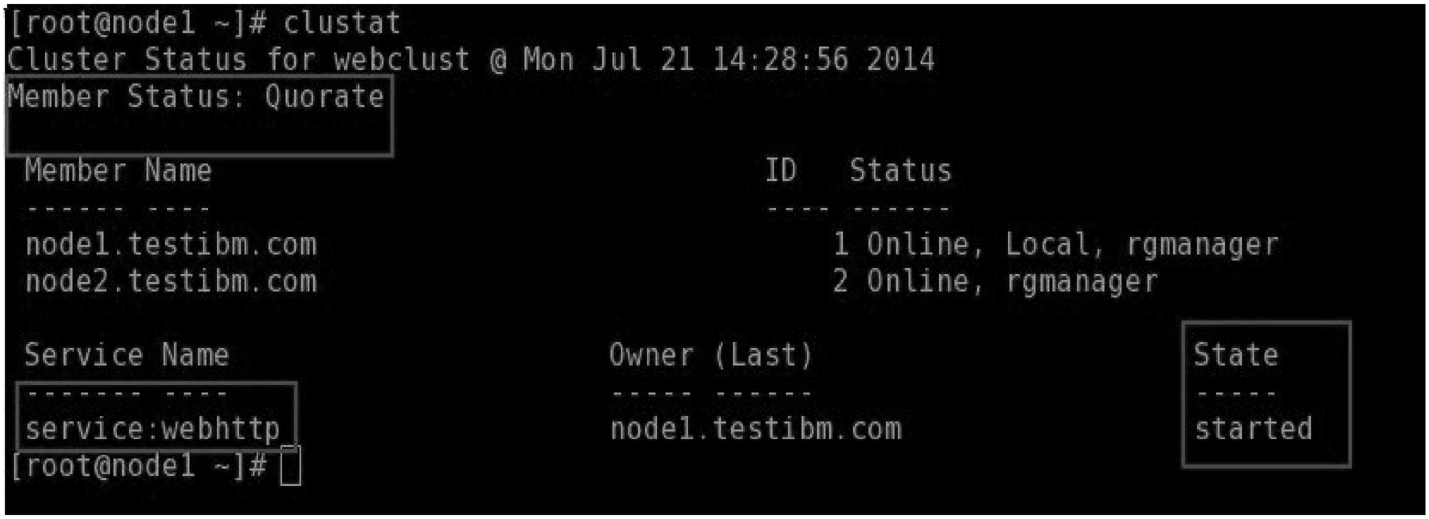
	!	Name	Status	Autostart	Failover Domain
□	?	webhttp	Unknown	☑	webfaildomain



	!	Name	Status	Autostart	Failover Domain
□		webhttp	Running on node1.testibm.com	☑	webfaildomain

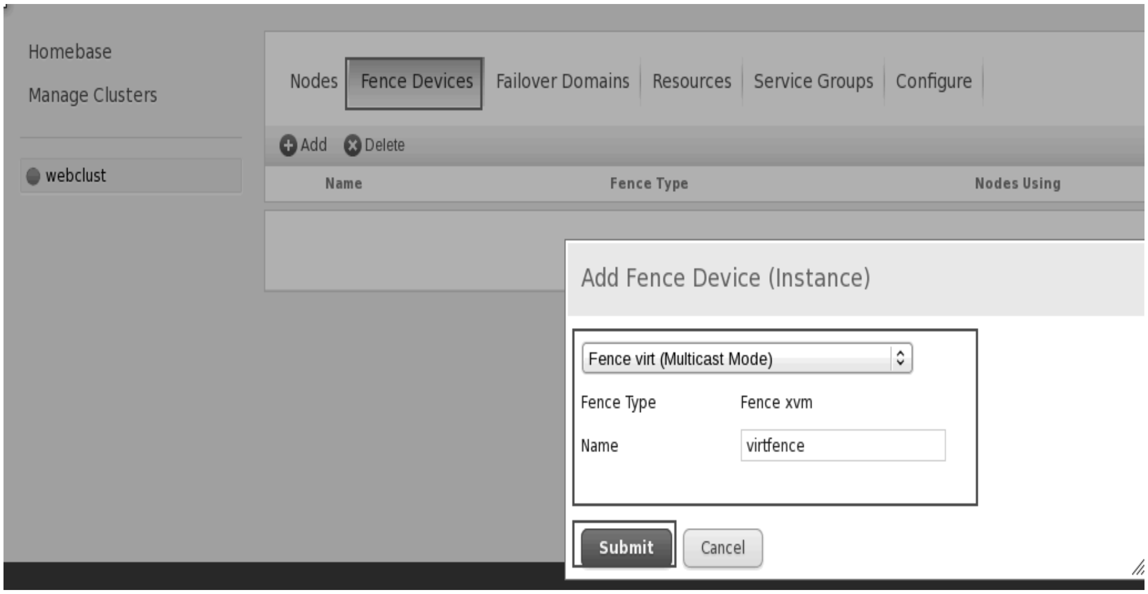
Select an item to view details

clustat output:



```
[root@node1 ~]# clustat
Cluster Status for webclust @ Mon Jul 21 14:28:56 2014
Member Status: Quorate

 Member Name                                ID   Status
 ------ ----                                ---- ------
 node1.testibm.com                              1 Online, Local, rgmanager
 node2.testibm.com                              2 Online, rgmanager

 Service Name                     Owner (Last)                     State
 ------- ----                     ----- ------                     -----
 service:webhttp                  node1.testibm.com                started
[root@node1 ~]#
```

Creating fencing Device Select “Fence Virt (Multicast mode)” .



Add Fence Device (Instance)

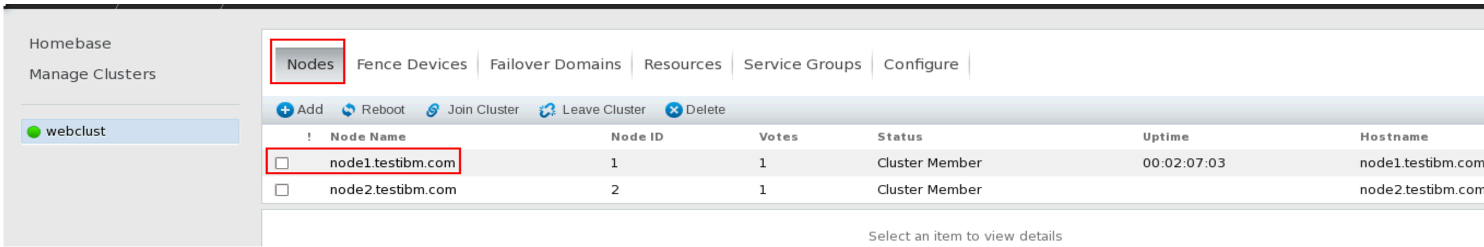
Fence virt (Multicast Mode)

Fence Type Fence xvm

Name virtfence

Now add the instance for fencing.

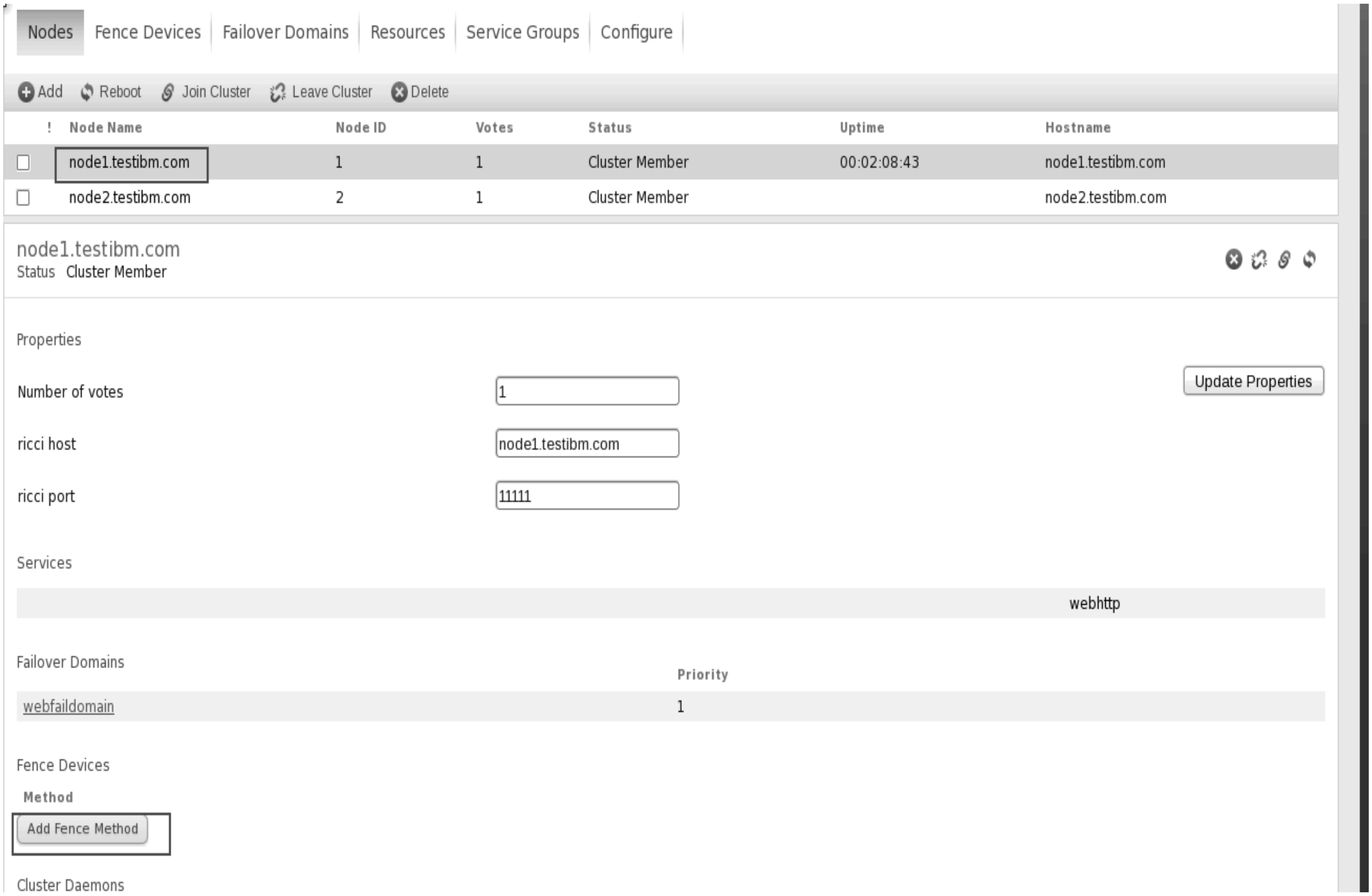
Click on node tab



	!	Node Name	Node ID	Votes	Status	Uptime	Hostname
□		node1.testibm.com	1	1	Cluster Member	00:02:07:03	node1.testibm.com
□		node2.testibm.com	2	1	Cluster Member		node2.testibm.com

Select an item to view details

then click on node1.testibm.com



	!	Node Name	Node ID	Votes	Status	Uptime	Hostname
□		node1.testibm.com	1	1	Cluster Member	00:02:08:43	node1.testibm.com
□		node2.testibm.com	2	1	Cluster Member		node2.testibm.com

node1.testibm.com
Status Cluster Member

Properties

Number of votes: 1

ricci host: node1.testibm.com

ricci port: 11111

Services

webhttp

Failover Domains

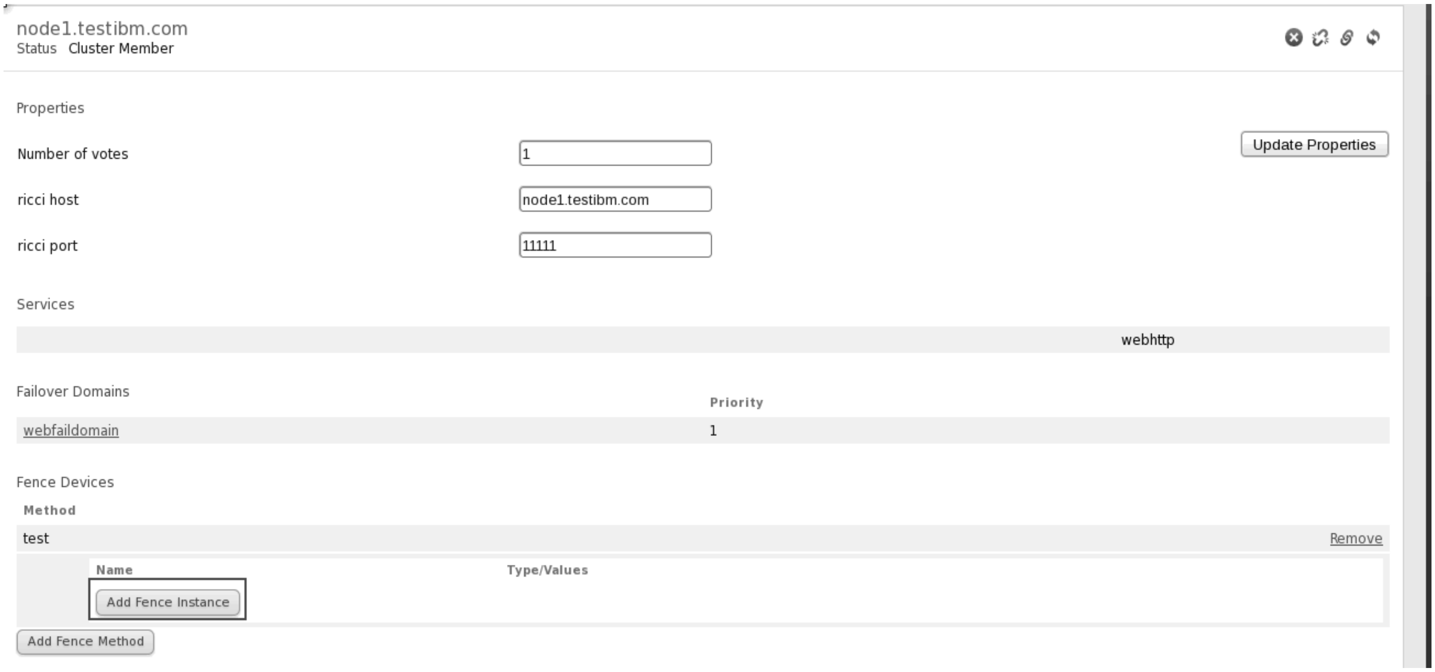
	Priority
webfaildomain	1

Fence Devices

Method

Cluster Daemons

Add Fence Method and given any name.



node1.testibm.com
Status Cluster Member

Properties

Number of votes: 1
ricci host: node1.testibm.com
ricci port: 11111

Services
webhttp

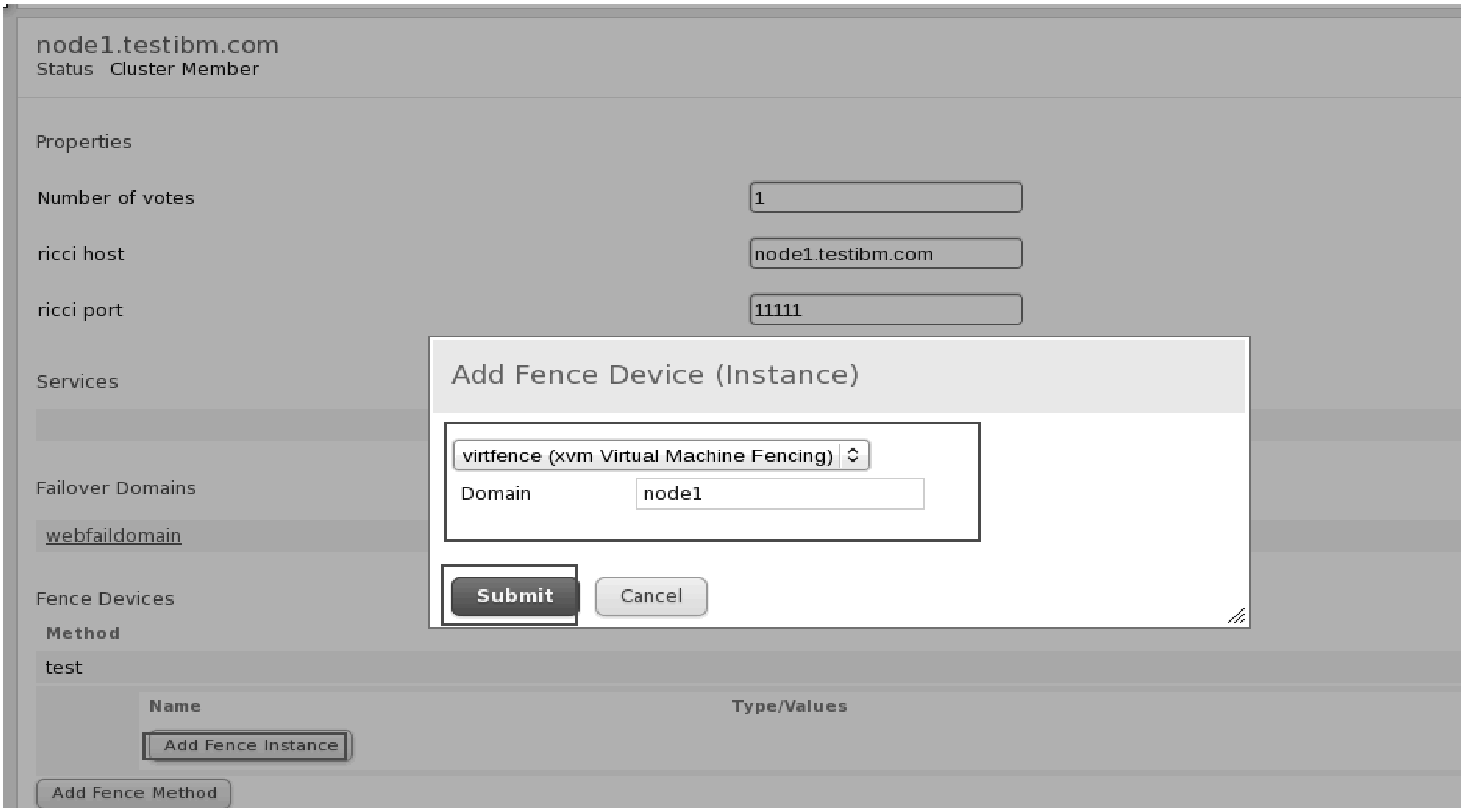
Failover Domains

	Priority
webfaildomain	1

Fence Devices

Method
test

Name	Type/Values



node1.testibm.com
Status Cluster Member

Properties

Number of votes: 1
ricci host: node1.testibm.com
ricci port: 11111

Services

Failover Domains
webfaildomain

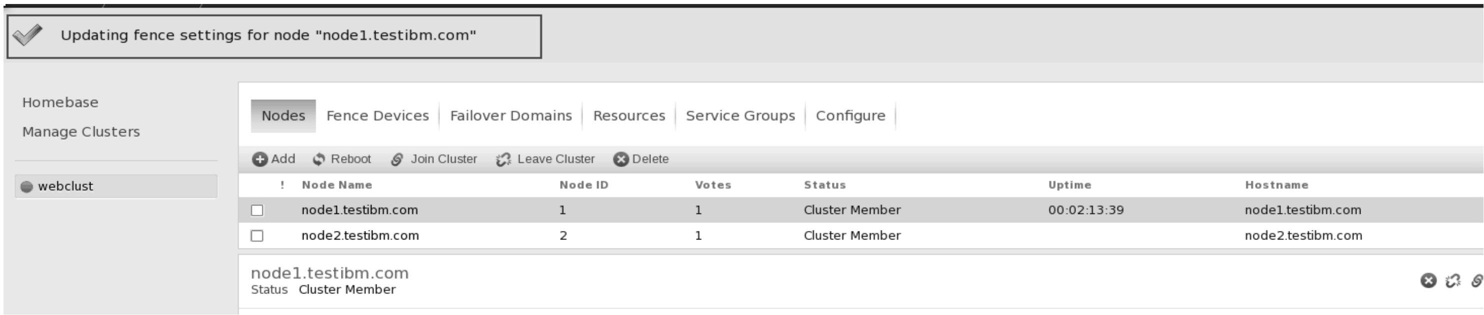
Fence Devices
Method
test
Name Type/Values

Add Fence Device (Instance)

virtfence (xvm Virtual Machine Fencing)
Domain: node1

Select the Virtfence which we created and Domain “node1” or UUID of the VM (It depends what name is given to the VM in our case it's node1)

Click on submit.



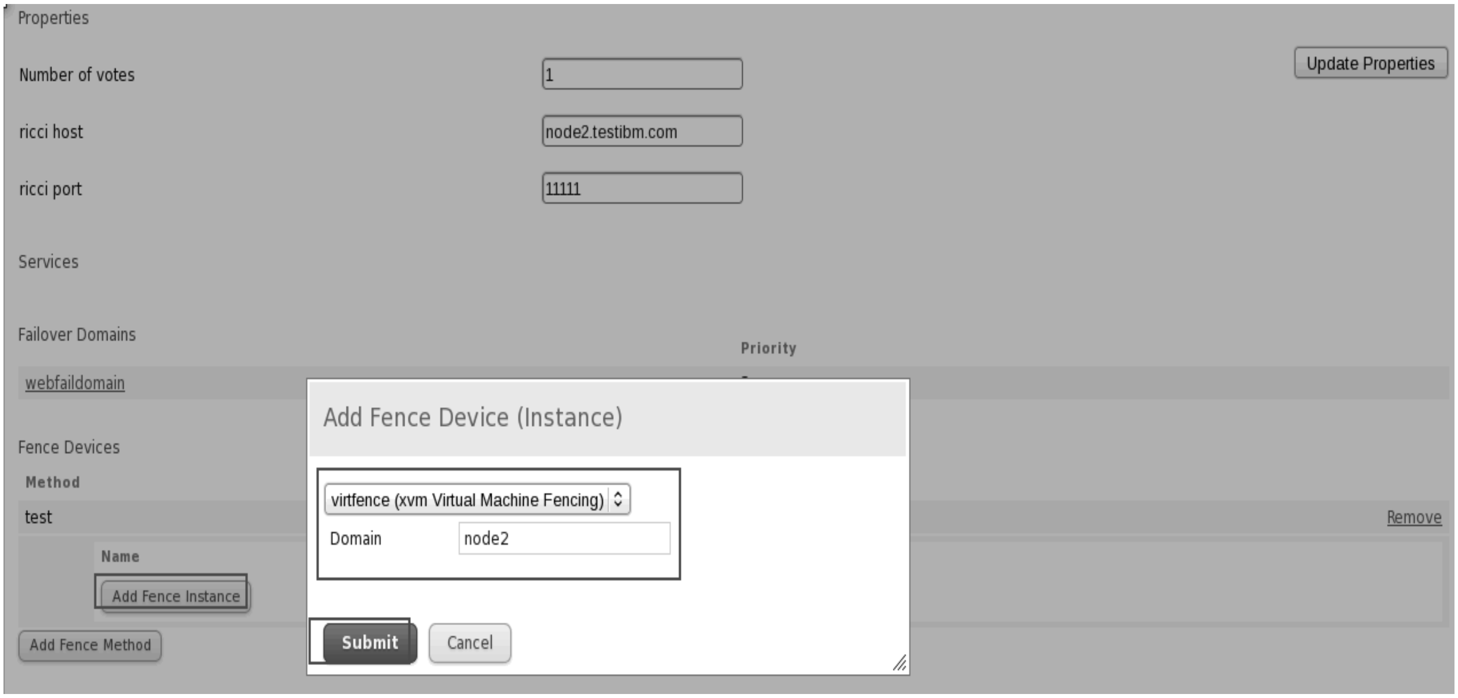
Updating fence settings for node "node1.testibm.com"

	!	Node Name	Node ID	Votes	Status	Uptime	Hostname
□		node1.testibm.com	1	1	Cluster Member	00:02:13:39	node1.testibm.com
□		node2.testibm.com	2	1	Cluster Member		node2.testibm.com

node1.testibm.com
Status Cluster Member

Once added you'll see message as given above.

Same setps to be carried on node2.



Properties

Number of votes: 1

ricci host: node2.testibm.com

ricci port: 11111

Services

Failover Domains

Priority

webfaildomain

Fence Devices

Method

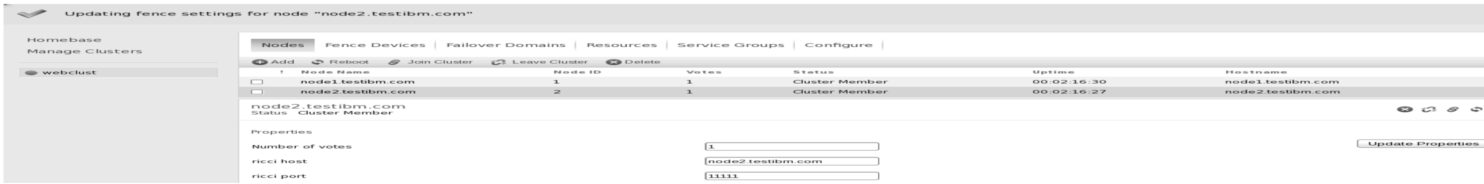
test

Name

Add Fence Device (Instance)

virtfence (xvm Virtual Machine Fencing)

Domain: node2



Updating fence settings for node "node2.testibm.com"

	!	Node Name	Node ID	Votes	Status	Uptime	Hostname
□		node1.testibm.com	1	1	Cluster Member	00:02:16:30	node1.testibm.com
□		node2.testibm.com	2	1	Cluster Member	00:02:16:27	node2.testibm.com

node2.testibm.com
Status Cluster Member

Properties

Number of votes: 1

ricci host: node2.testibm.com

ricci port: 11111

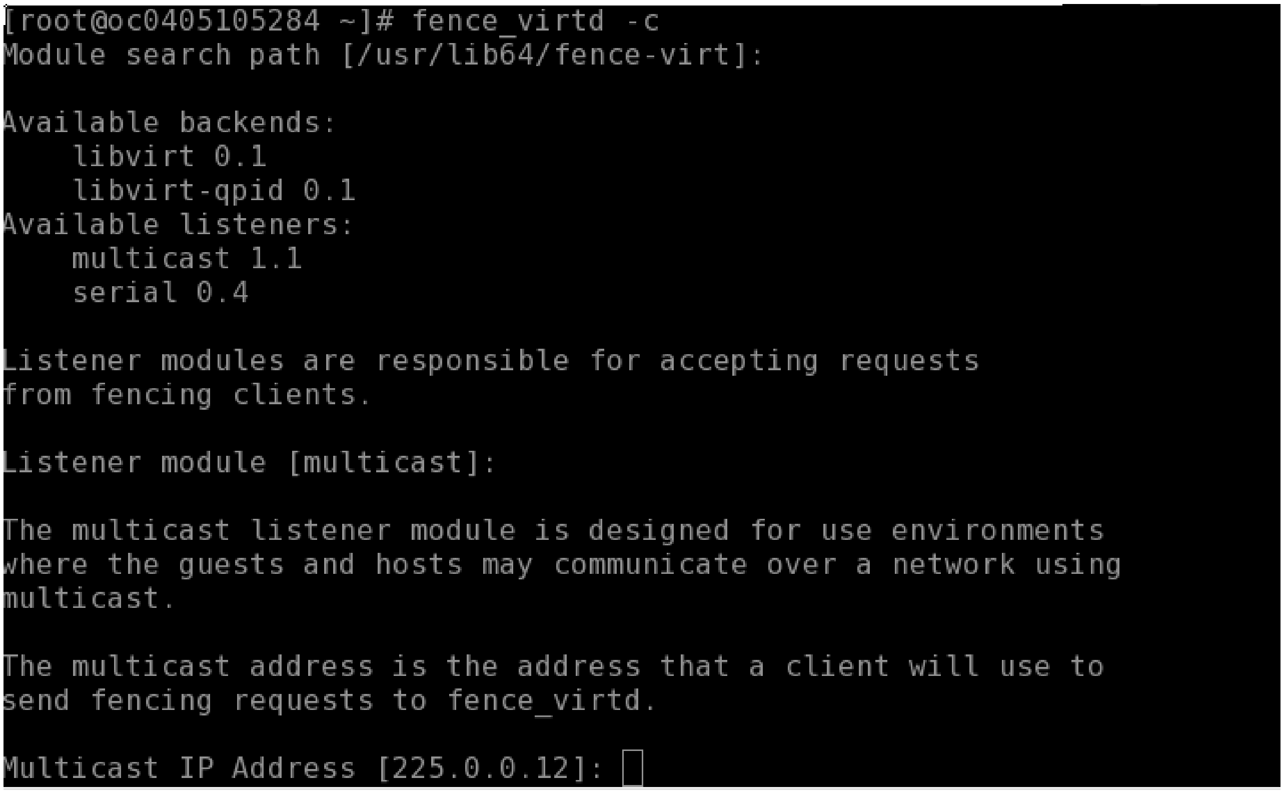
On the base machine install the fencing package.

Yum install fence-virtd fence-virtd-libvirt fence-virtd-multicast

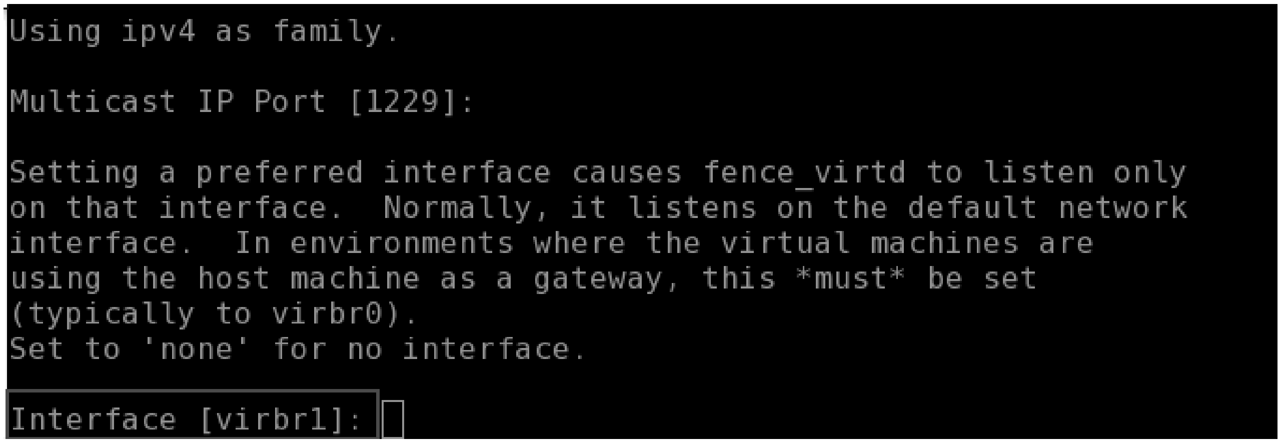
Create a fence key as below:

#dd if=/dev/urandom of=/etc/cluster/fence_xvm.key bs=4 count=1

fence_virtd -c

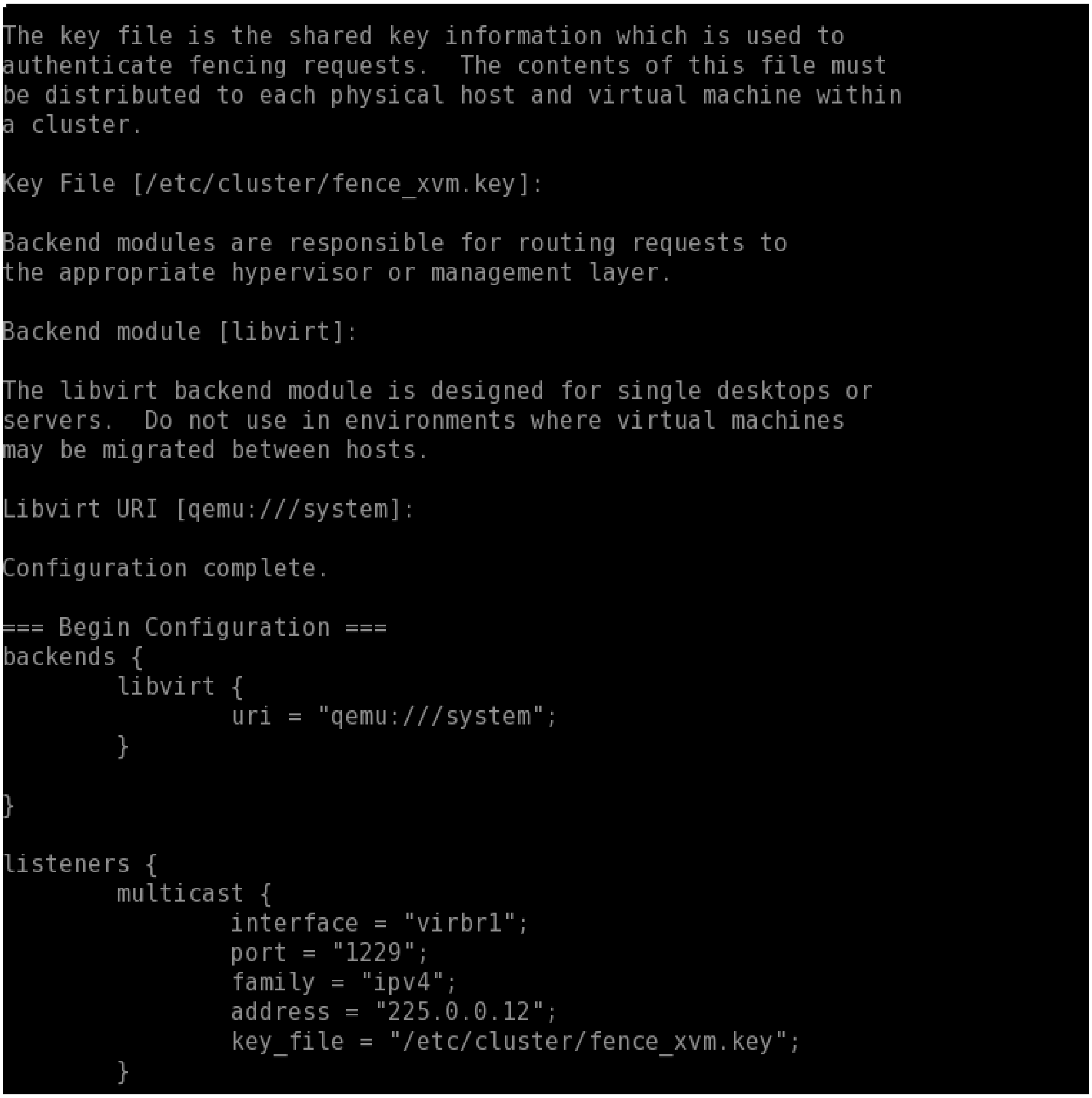


```
[root@oc0405105284 ~]# fence_virtd -c
Module search path [/usr/lib64/fence-virt]:

Available backends:
    libvirt 0.1
    libvirt-qpid 0.1
Available listeners:
    multicast 1.1
    serial 0.4

Listener modules are responsible for accepting requests
from fencing clients.

Listener module [multicast]:

The multicast listener module is designed for use environments
where the guests and hosts may communicate over a network using
multicast.

The multicast address is the address that a client will use to
send fencing requests to fence_virtd.

Multicast IP Address [225.0.0.12]:
```

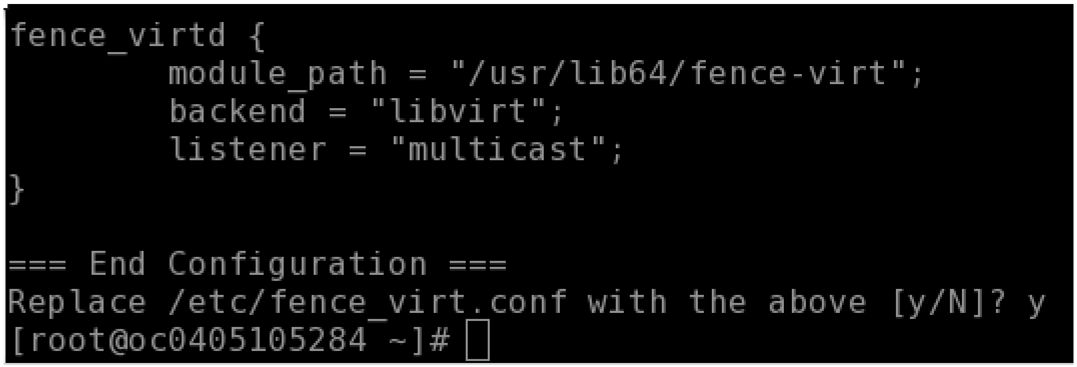


```
Using ipv4 as family.

Multicast IP Port [1229]:

Setting a preferred interface causes fence_virtd to listen only
on that interface.  Normally, it listens on the default network
interface.  In environments where the virtual machines are
using the host machine as a gateway, this *must* be set
(typically to virbr0).
Set to 'none' for no interface.

Interface [virbr1]:
```

Specify the Interface which is being used to communicate to the VMs from the (physical) base machine.



```
The key file is the shared key information which is used to
authenticate fencing requests.  The contents of this file must
be distributed to each physical host and virtual machine within
a cluster.

Key File [/etc/cluster/fence_xvm.key]:

Backend modules are responsible for routing requests to
the appropriate hypervisor or management layer.

Backend module [libvirt]:

The libvirt backend module is designed for single desktops or
servers.  Do not use in environments where virtual machines
may be migrated between hosts.

Libvirt URI [qemu:///system]:

Configuration complete.

=== Begin Configuration ===
backends {
        libvirt {
                uri = "qemu:///system";
        }

}

listeners {
        multicast {
                interface = "virbr1";
                port = "1229";
                family = "ipv4";
                address = "225.0.0.12";
                key_file = "/etc/cluster/fence_xvm.key";
        }
```



```
fence_virtd {
        module_path = "/usr/lib64/fence-virt";
        backend = "libvirt";
        listener = "multicast";
}

=== End Configuration ===
Replace /etc/fence_virt.conf with the above [y/N]? y
[root@oc0405105284 ~]#
```

now copy the /etc/cluster/fence_xvm.key to all the cluster nodes.

Make sure fence_virtd daemon is running on base machine.

 /etc/init.d/fence_virtd status

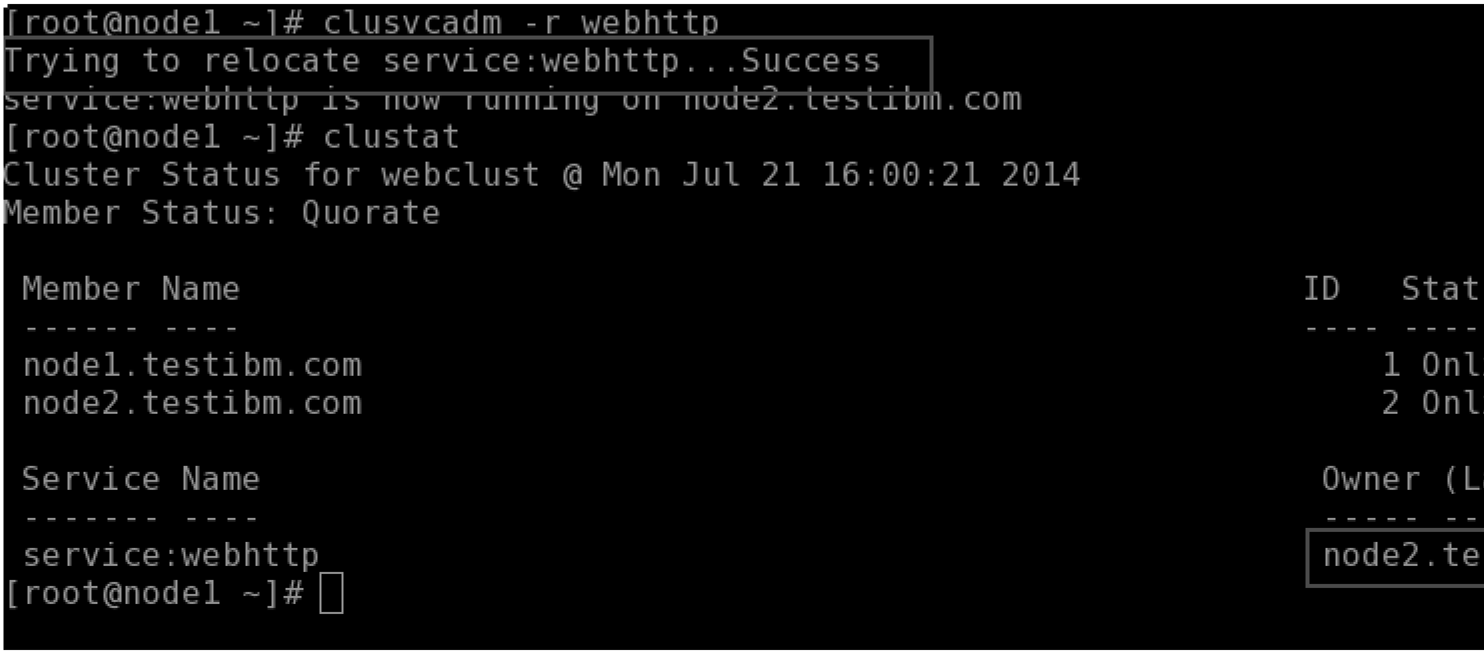
fence_virtd (pid 11575) is running...

Then login to cluster node and test it.

Below command can be used to see fencing is working or not.

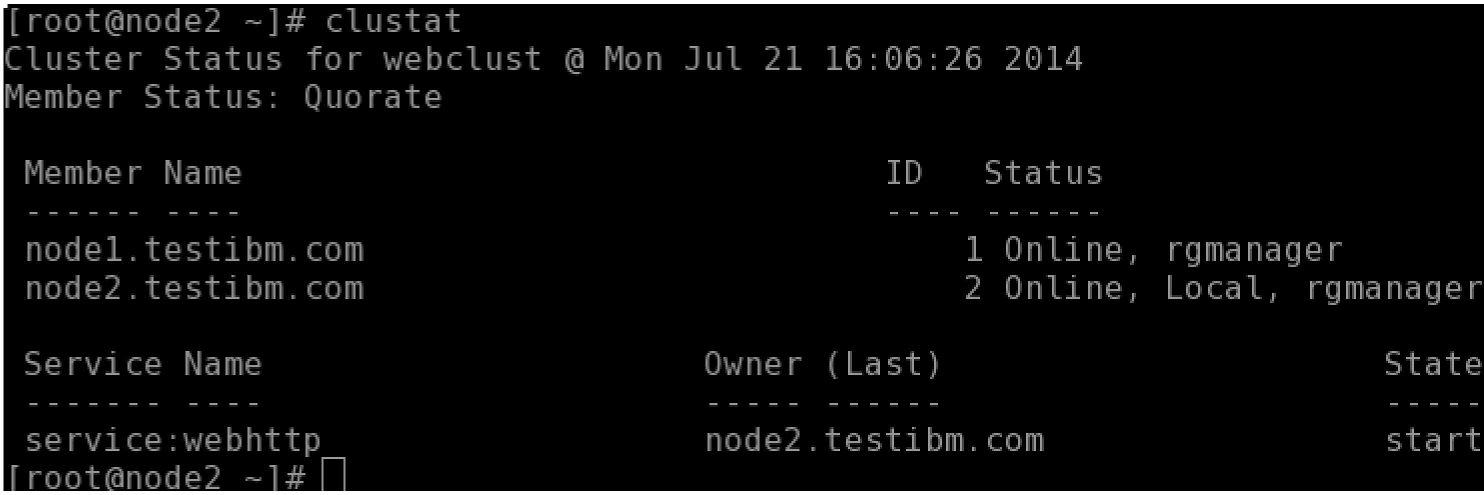
fence_xvm -o list

To check if service is getting failover as expected :



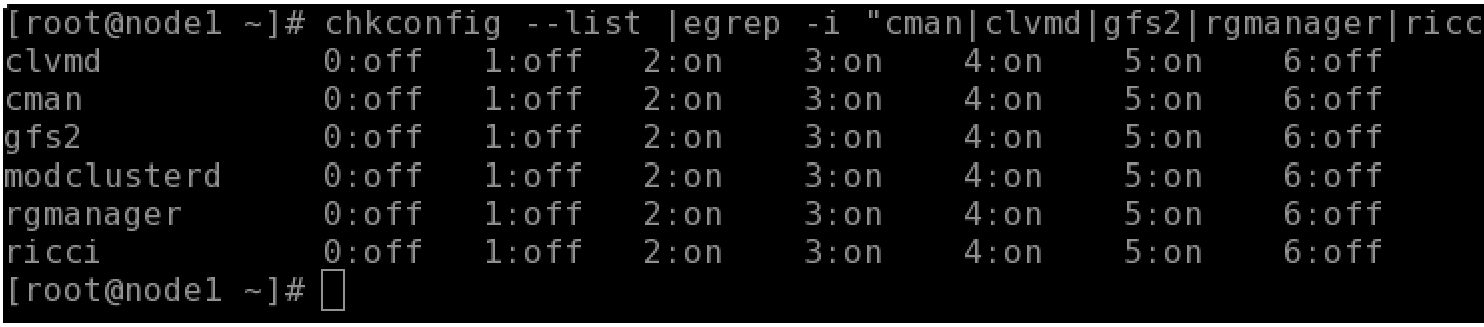
```
[root@node1 ~]# clusvcadm -r webhttp
Trying to relocate service:webhttp...Success
service:webhttp is now running on node2.testibm.com
[root@node1 ~]# clustat
Cluster Status for webclust @ Mon Jul 21 16:00:21 2014
Member Status: Quorate

 Member Name                                                      ID   Stat
 ------ ----                                                      ---- ----
 node1.testibm.com                                                    1 Onl
 node2.testibm.com                                                    2 Onl

 Service Name                                                      Owner (L
 ------- ----                                                      ----- --
 service:webhttp                                                   node2.te
[root@node1 ~]# 
```

Service has been started on node2.

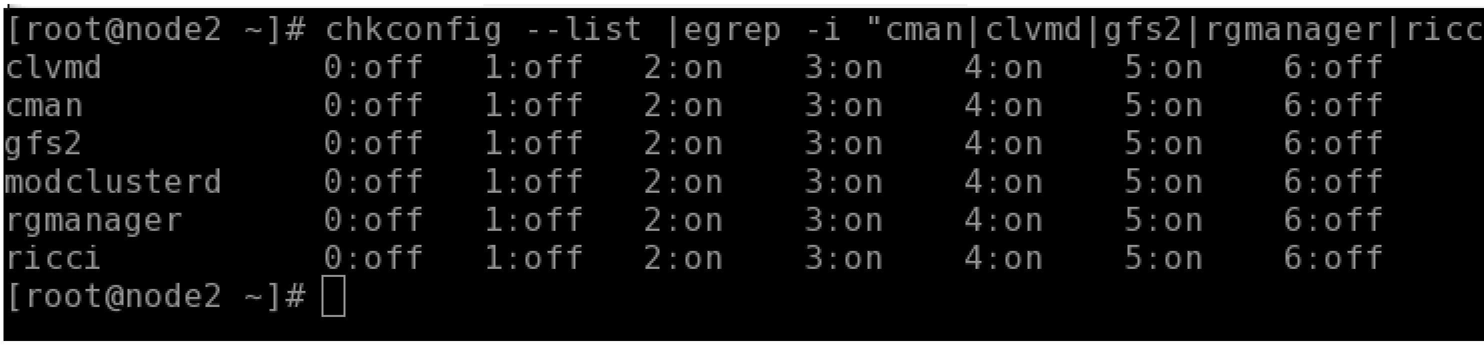


```
[root@node2 ~]# clustat
Cluster Status for webclust @ Mon Jul 21 16:06:26 2014
Member Status: Quorate

 Member Name                                ID   Status
 ------ ----                                ---- ------
 node1.testibm.com                              1 Online, rgmanager
 node2.testibm.com                              2 Online, Local, rgmanager

 Service Name                      Owner (Last)                      State
 ------- ----                      ----- ------                      -----
 service:webhttp                   node2.testibm.com                 start
[root@node2 ~]#
```

Make sure if all the services are on at startup so it starts after reboot.

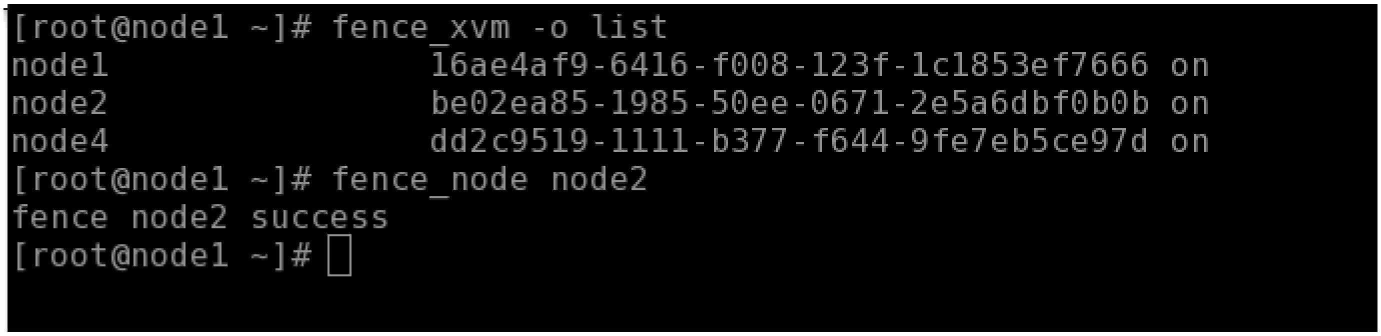


```
[root@node1 ~]# chkconfig --list |egrep -i "cman|clvmd|gfs2|rgmanager|ricc
clvmd           0:off   1:off   2:on    3:on    4:on    5:on    6:off
cman            0:off   1:off   2:on    3:on    4:on    5:on    6:off
gfs2            0:off   1:off   2:on    3:on    4:on    5:on    6:off
modclusterd     0:off   1:off   2:on    3:on    4:on    5:on    6:off
rgmanager       0:off   1:off   2:on    3:on    4:on    5:on    6:off
ricci           0:off   1:off   2:on    3:on    4:on    5:on    6:off
[root@node1 ~]#
```

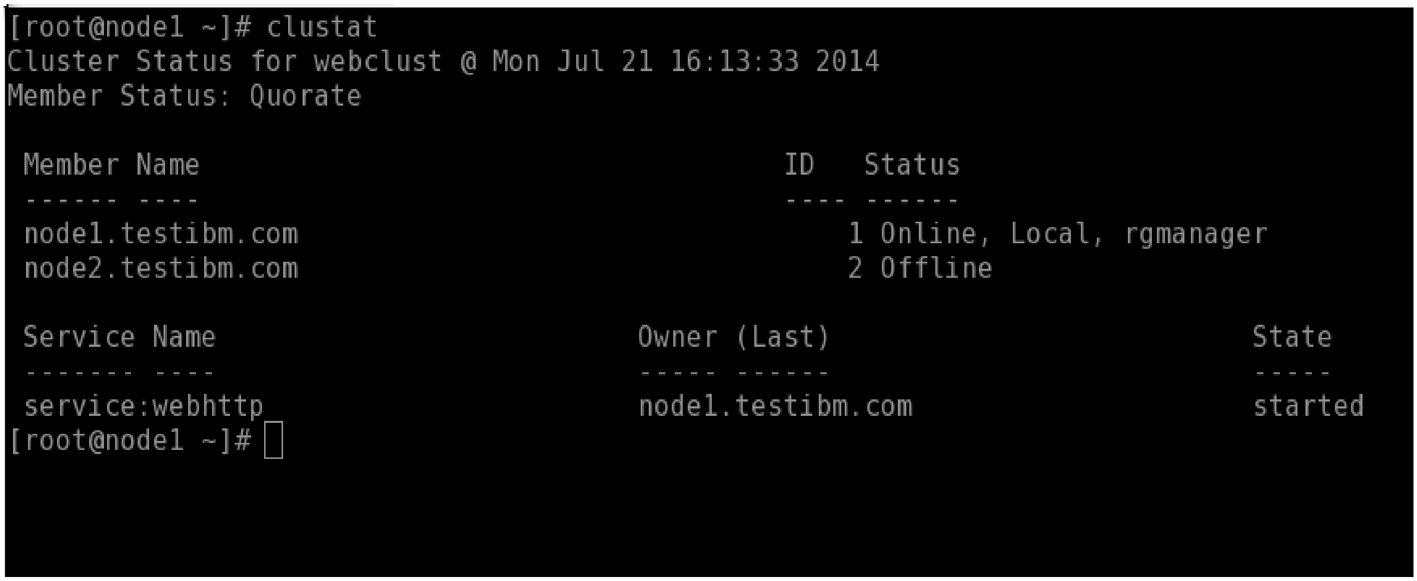


```
[root@node2 ~]# chkconfig --list |egrep -i "cman|clvmd|gfs2|rgmanager|ricc
clvmd           0:off   1:off   2:on    3:on    4:on    5:on    6:off
cman            0:off   1:off   2:on    3:on    4:on    5:on    6:off
gfs2            0:off   1:off   2:on    3:on    4:on    5:on    6:off
modclusterd     0:off   1:off   2:on    3:on    4:on    5:on    6:off
rgmanager       0:off   1:off   2:on    3:on    4:on    5:on    6:off
ricci           0:off   1:off   2:on    3:on    4:on    5:on    6:off
[root@node2 ~]#
```

Testing fencing as we'll failover.



```
[root@node1 ~]# fence_xvm -o list
node1                16ae4af9-6416-f008-123f-1c1853ef7666 on
node2                be02ea85-1985-50ee-0671-2e5a6dbf0b0b on
node4                dd2c9519-1111-b377-f644-9fe7eb5ce97d on
[root@node1 ~]# fence_node node2
fence node2 success
[root@node1 ~]#
```



```
[root@node1 ~]# clustat
Cluster Status for webclust @ Mon Jul 21 16:13:33 2014
Member Status: Quorate

 Member Name                                    ID   Status
 ------ ----                                    ---- ------
 node1.testibm.com                                  1 Online, Local, rgmanager
 node2.testibm.com                                  2 Offline

 Service Name                          Owner (Last)                          State
 ------- ----                          ----- ------                          -----
 service:webhttp                       node1.testibm.com                     started
[root@node1 ~]# 
```