

CPD - Práctica 4

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Creación de máquinas virtual con Vagrant y despliegue de almacenamiento redundante con GlusterFS.

- (obligatorio): A partir del apartado relacionado con GlusterFS realizar diversas capturas de pantalla correspondiente al proceso de cada apartado (y varias capturas del apartado de comprobación). En la captura debe aparecer algún elemento que personalice dicha captura (ej, si estamos en un escritorio y accedemos por ssh se ve la ventana de ssh y se ve parte del fondo de escritorio de forma que cada estudiante muestre su propia captura).
- (opcional): En el ejercicio 2 del apartado I puede comprobar como incluir procesos automáticos SHELL en la creación de la máquina virtual (Provisionamiento Vagrant). Modifique el fichero Vagrant de forma que se instale automáticamente el GlusterFS en cada nodo servidor. Puede utilizar otros modos de aprovisionamiento: https://www.vagrantup.com/docs/provisioning/basic_usage.html
<https://www.vagrantup.com/docs/provisioning/>

Ejercicio 1.

Crear una máquina virtual basada en Ubuntu bionic64 (Ubuntu 18.04)

```
elena@elena-X555LDB:~/Escritorio/CPD/Practica 4/var1$ sudo vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'ubuntu/bionic64' could not be found. Attempting to find and install...
    default: Box Provider: virtualbox
    default: Box Version: >= 0
==> default: Loading metadata for box 'ubuntu/bionic64'
    default: URL: https://vagrantcloud.com/ubuntu/bionic64
==> default: Adding box 'ubuntu/bionic64' (v20191021.0.0) for provider: virtualbox
    default: Downloading: https://vagrantcloud.com/ubuntu/boxes/bionic64/versions/20191021.0.0/pro
==> default: Successfully added box 'ubuntu/bionic64' (v20191021.0.0) for 'virtualbox'!
==> default: Importing base box 'ubuntu/bionic64'...
==> default: Matching MAC address for NAT networking...
```

```
elena@elena-X555LDB:~/Escritorio/CPD/Practica 4/var1$ sudo vagrant ssh
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 4.15.0-66-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 System information as of Wed Oct 23 16:05:16 UTC 2019

 System load:  0.41           Processes:      98
 Usage of /:   10.0% of 9.63GB  Users logged in:  0
 Memory usage: 12%            IP address for enp0s3: 10.0.2.15
 Swap usage:   0%

 0 packages can be updated.
 0 updates are security updates.

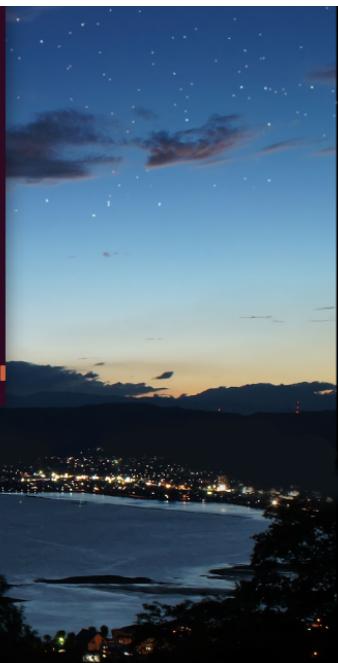
vagrant@ubuntu-bionic:~$ █
```

Ejercicio 2.

Instalación de las máquinas virtuales CentOS y Ubuntu.

```
elena@elena-X555LDB:~/Escritorio/CPD/Practica 4/var3$ sudo vagrant up
Bringing machine 'centos' up with 'virtualbox' provider...
Bringing machine 'ubuntu' up with 'virtualbox' provider...
==> centos: Importing base box 'centos/7'...
==> centos: Matching MAC address for NAT networking...
==> centos: Checking if box 'centos/7' is up to date...
==> centos: Setting the name of the VM: centos
==> centos: Fixed port collision for 22 => 2222. Now on port 2203.
==> centos: Clearing any previously set network interfaces...
==> centos: Preparing network interfaces based on configuration...
    centos: Adapter 1: nat
    centos: Adapter 2: hostonly
==> centos: Forwarding ports...
    centos: 22 (guest) => 2203 (host) (adapter 1)
==> centos: Running 'pre-boot' VM customizations...
==> centos: Booting VM...
==> centos: Waiting for machine to boot. This may take a few minutes...
    centos: SSH address: 127.0.0.1:2203
    centos: SSH username: vagrant
    centos: SSH auth method: private key
    centos: Vagrant insecure key detected. Vagrant will automatically replace

```

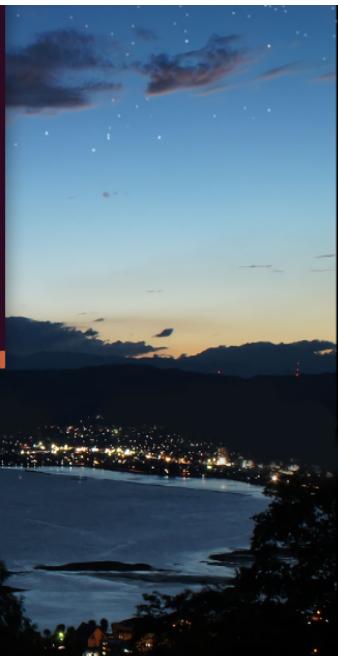


GlusterFS

III) Instalación del plugin vagrant

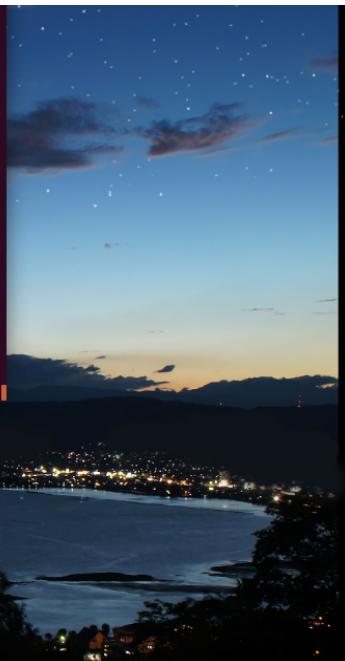
```
root@elena-X555LDB:~/Escritorio/CPD/Practica 4/cpd5# dpkg -i vagrant_2.0.3_x86_64.deb
(Leyendo la base de datos ... 367013 ficheros o directorios instalados actualmente.)
Preparando para desempaquetar vagrant_2.0.3_x86_64.deb ...
Desempaquetando vagrant (1:2.0.3) sobre (2.0.2+dfsg-2ubuntu8) ...
Configurando vagrant (1:2.0.3) ...
Procesando disparadores para man-db (2.8.3-2ubuntu0.1) ...
root@elena-X555LDB:~/Escritorio/CPD/Practica 4/cpd5# vagrant plugin install vagrant-hostmanager
==> vagrant: A new version of Vagrant is available: 2.2.6!
==> vagrant: To upgrade visit: https://www.vagrantup.com/downloads.html

Installing the 'vagrant-hostmanager' plugin. This can take a few minutes...
Fetching: vagrant-hostmanager-1.8.9.gem (100%)
Installed the plugin 'vagrant-hostmanager (1.8.9)'!
root@elena-X555LDB:~/Escritorio/CPD/Practica 4/cpd5#
```

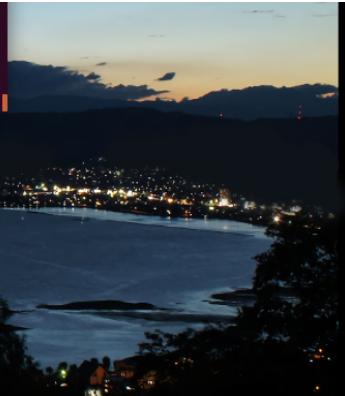


IV) Creación de las máquinas

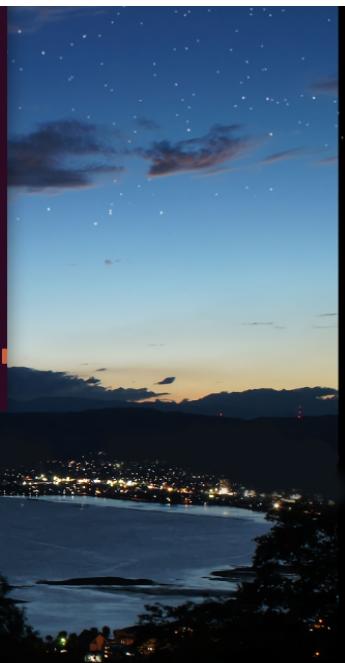
```
root@elena-X555LDB:~/Escritorio/CPD/Practica 4/cpd5# vagrant up
Bringing machine 'centos1' up with 'virtualbox' provider...
Bringing machine 'centos2' up with 'virtualbox' provider...
Bringing machine 'centos3' up with 'virtualbox' provider...
==> centos1: Importing base box 'centos/7'...
==> centos1: Matching MAC address for NAT networking...
==> centos1: Checking if box 'centos/7' is up to date...
==> centos1: Setting the name of the VM: centos1
==> centos1: Clearing any previously set network interfaces...
==> centos1: Preparing network interfaces based on configuration...
    centos1: Adapter 1: nat
    centos1: Adapter 2: hostonly
==> centos1: Forwarding ports...
    centos1: 22 (guest) => 2222 (host) (adapter 1)
==> centos1: Running 'pre-boot' VM customizations...
==> centos1: Booting VM...
==> centos1: Waiting for machine to boot. This may take a few minutes...
    centos1: SSH address: 127.0.0.1:2222
    centos1: SSH username: vagrant
    centos1: SSH auth method: private key
```



```
04git.el7
  centos3:
  centos3: Complete!
root@elena-X555LDB:~/Escritorio/CPD/Practica 4/cpd5# vagrant ssh centos1
[vagrant@centos1 ~]$
```



```
[vagrant@centos1 ~]$ yum search centos-release-gluster
Failed to set locale, defaulting to C
Loaded plugins: fastestmirror
Determining fastest mirrors
epel/x86_64/metalink                                         | 30 kB   00:00
* base: mirror.gadix.com
* epel: mirror.uv.es
* extras: mirror.airenetworks.es
* updates: mirror.gadix.com
epel                                                               | 5.3 kB   00:00
(1/3): epel/x86_64/group_gz                                     | 90 kB   00:00
(2/3): epel/x86_64/updateinfo                                    | 1.0 MB   00:00
(3/3): epel/x86_64/primary_db                                     | 6.9 MB   00:03
=====
===== N/S matched: centos-release-gluster =====
centos-release-gluster-legacy.noarch : Disable unmaintained Gluster repositories
                                      : from the CentOS Storage SIG
centos-release-gluster40.x86_64 : Gluster 4.0 (Short Term Stable) packages from
                                      : the CentOS Storage SIG repository
centos-release-gluster41.noarch : Gluster 4.1 (Long Term Stable) packages from
                                      : the CentOS Storage SIG repository
centos-release-gluster5.noarch : Gluster 5 packages from the CentOS Storage SIG
                                      : repository
```



```
[vagrant@centos1 ~]$ sudo yum -y install centos-release-gluster6.noarch
Failed to set locale, defaulting to C
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
 * base: ftp.uma.es
 * epel: pkg.adfinis-sygroup.ch
 * extras: ftp.rediris.es
 * updates: mirror.uv.es
Resolving Dependencies
--> Running transaction check
--> Package centos-release-gluster6.noarch 0:1.0-1.el7.centos will be installed
--> Processing Dependency: centos-release-storage-common for package: centos-release-gluster6-1.0-1.el7.centos.noarch
--> Running transaction check
--> Package centos-release-storage-common.noarch 0:2-2.el7.centos will be installed
--> Finished Dependency Resolution

Dependencies Resolved
```

Package	Arch	Version	Repository
---------	------	---------	------------



```
[vagrant@centos1 ~]$ sudo yum -y install glusterfs glusterfs-cli glusterfslibs
glusterfs-server
Complementos cargados:fastestmirror
Loading mirror speeds from cached hostfile
 * base: ftp.uma.es
 * centos-gluster6: ftp.rediris.es
 * epel: pkg.adfinis-sygroup.ch
 * extras: ftp.rediris.es
 * updates: mirror.uv.es
Resolviendo dependencias
--> Ejecutando prueba de transacción
--> Paquete glusterfs.x86_64 0:6.5-1.el7 debe ser instalado
--> Paquete glusterfs-cli.x86_64 0:6.5-1.el7 debe ser instalado
--> Paquete glusterfs-libs.x86_64 0:6.5-1.el7 debe ser instalado
--> Paquete glusterfs-server.x86_64 0:6.5-1.el7 debe ser instalado
--> Procesando dependencias: glusterfs-fuse = 6.5-1.el7 para el paquete: glusterfs-server-6.5-1.el7.x86_64
--> Procesando dependencias: glusterfs-client-xlators = 6.5-1.el7 para el paquete: glusterfs-server-6.5-1.el7.x86_64
```



VI) Iniciamos el servicio

```
[vagrant@centos2 ~]$ sudo su
[root@centos2 vagrant]# systemctl enable glusterd.service
Created symlink from /etc/systemd/system/multi-user.target.wants/glusterd.service to /usr/lib/systemd/system/glusterd.service.
[root@centos2 vagrant]# systemctl start glusterd.service
[root@centos2 vagrant]#
```



```
[root@centos1 vagrant]# gluster peer probe centos2
peer probe: success.
[root@centos1 vagrant]#
```



VII) Creación de los bricks

Creamos una partición en /dev/sdb del tipo Linux LVM

```
[vagrant@centos1 ~]$ sudo fdisk /dev/sdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0x52be2605.

Orden (m para obtener ayuda): n
Partition type:
  p  primary (0 primary, 0 extended, 4 free)
  e  extended
Select (default p): p
Número de partición (1-4, default 1): 1
Primer sector (2048-20971519, valor predeterminado 2048)
Last sector, +sectors or +size{K,M,G} (2048-20971519, valor predeterminado 2097151
9): 20971519
Partition 1 of type Linux and of size 10 GiB is set

Orden (m para obtener ayuda): t
Selected partition 1
Hex code (type L to list all codes): 8e
Changed type of partition 'Linux' to 'Linux LVM'

Orden (m para obtener ayuda): w
;Se ha modificado la tabla de particiones!
```



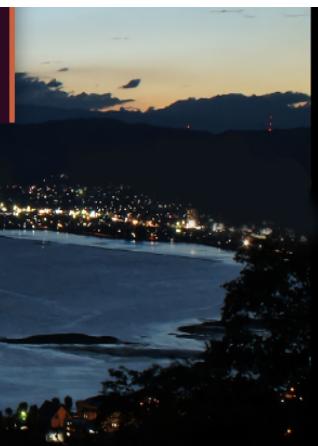
Actualizamos las particiones del SO y creamos los volúmenes físicos, lógicos y la partición XFS

```
[vagrant@centos1 ~]$ partprobe  
[vagrant@centos1 ~]$ sudo pvcreate /dev/sdb1  
Physical volume "/dev/sdb1" successfully created.  
[vagrant@centos1 ~]$ sudo vgcreate vg01 /dev/sdb1  
Volume group "vg01" successfully created  
[vagrant@centos1 ~]$ sudo lvcreate -l 100%FREE -n lv01 vg01  
Logical volume "lv01" created.  
[vagrant@centos1 ~]$ mkfs.xfs /dev/mapper/vg01-lv01  
mkfs.xfs: cannot open /dev/mapper/vg01-lv01: Permiso denegado  
[vagrant@centos1 ~]$ sudo mkfs.xfs /dev/mapper/vg01-lv01  
meta-data=/dev/mapper/vg01-lv01 isize=512    agcount=4, agsize=655104 blks  
          =                      sectsz=512  attr=2, projid32bit=1  
          =                      crc=1    finobt=0, sparse=0  
data     =                      bsize=4096   blocks=2620416, imaxpct=25  
          =                      sunit=0    swidth=0 blks  
naming   =version 2           bsize=4096   ascii-ci=0 ftype=1  
log      =internal log        bsize=4096   blocks=2560, version=2  
          =                      sectsz=512  sunit=0 blks, lazy-count=1  
realtime =none                extsz=4096   blocks=0, rtextents=0  
[vagrant@centos1 ~]$
```



Creamos el punto de montaje, editamos /etc/fstab y montamos todas las particiones

```
[vagrant@centos1 ~]$ sudo mkdir -p /gluster/bricks/brick1  
[vagrant@centos1 ~]$ vi /etc/fstab  
[vagrant@centos1 ~]$ sudo vi /etc/fstab  
[vagrant@centos1 ~]$ sudo mount -a  
[vagrant@centos1 ~]$
```

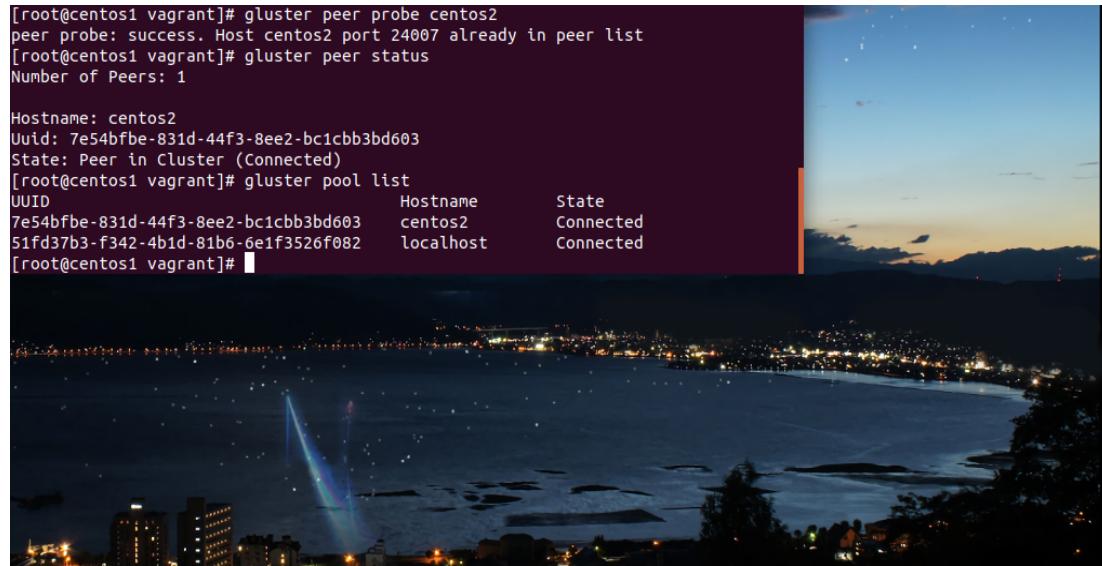


VIII) Creamos el FS

Probamos la conexión

```
[root@centos1 vagrant]# gluster peer probe centos2
peer probe: success. Host centos2 port 24007 already in peer list
[root@centos1 vagrant]# gluster peer status
Number of Peers: 1

Hostname: centos2
Uuid: 7e54bfbe-831d-44f3-8ee2-bc1cbb3bd603
State: Peer in Cluster (Connected)
[root@centos1 vagrant]# gluster pool list
UUID                Hostname      State
7e54bfbe-831d-44f3-8ee2-bc1cbb3bd603  centos2    Connected
51fd37b3-f342-4b1d-81b6-6e1f3526f082  localhost   Connected
[root@centos1 vagrant]#
```



Creamos el directorio vol1 en centos1 y centos2, creamos los sistemas de ficheros en las unidades /dev/sdb y mostramos la información del volumen creado

```
[root@centos1 vagrant]# gluster volume create glustervol1 replica 2 transport tc
p centos1:/gluster/bricks/brick1/vol1 centos2:/gluster/bricks/brick1/vol1
Replica 2 volumes are prone to split-brain. Use Arbiter or Replica 3 to avoid th
is. See: http://docs.gluster.org/en/latest/Administrator%20Guide/Split%20brain%2
0and%20ways%20to%20deal%20with%20it/.
Do you still want to continue?
(y/n) y
volume create: glustervol1: success: please start the volume to access data
[root@centos1 vagrant]# gluster volume info glustervol1

Volume Name: glustervol1
Type: Replicate
Volume ID: 645182c9-95a8-4093-b48f-ab0d3df0bf7c
Status: Created
Snapshot Count: 0
Number of Bricks: 1 x 2 = 2
Transport-type: tcp
Bricks:
Brick1: centos1:/gluster/bricks/brick1/vol1
Brick2: centos2:/gluster/bricks/brick1/vol1
Options Reconfigured:
transport.address-family: inet
nfs.disable: on
performance.client-io-threads: off
[root@centos1 vagrant]#
```

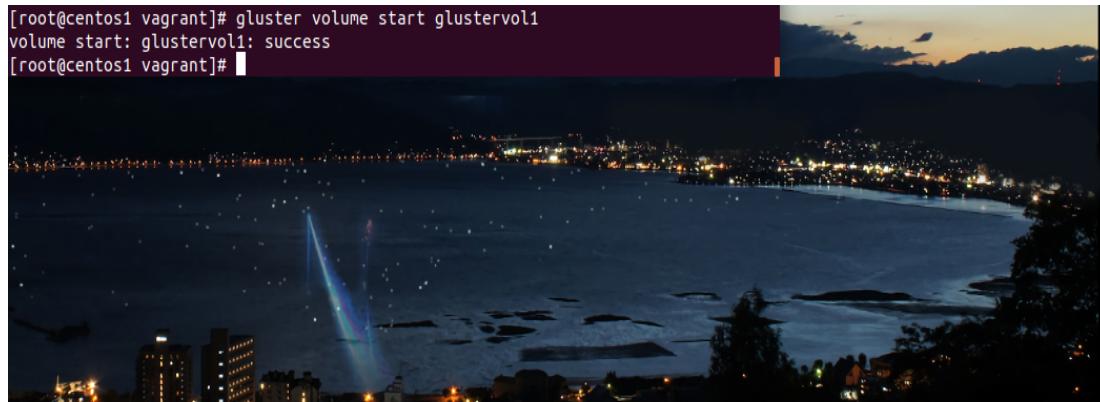


Creamos los sistemas de ficheros en las unidades /dev/sdb

```
[root@centos2 vagrant]# gluster volume create glustervol1 replica 2 transport tc
p centos1:/gluster/bricks/brick1/vol1 centos2:/gluster/bricks/brick1/vol1
Replica 2 volumes are prone to split-brain. Use Arbiter or Replica 3 to avoid th
is. See: http://docs.gluster.org/en/latest/Administrator%20Guide/Split%20brain%2
0and%20ways%20to%20deal%20with%20it/.
Do you still want to continue?
(y/n) y
volume create: glustervol1: success: please start the volume to access data
```



```
[root@centos1 vagrant]# gluster volume start glustervol1
volume start: glustervol1: success
[root@centos1 vagrant]#
```



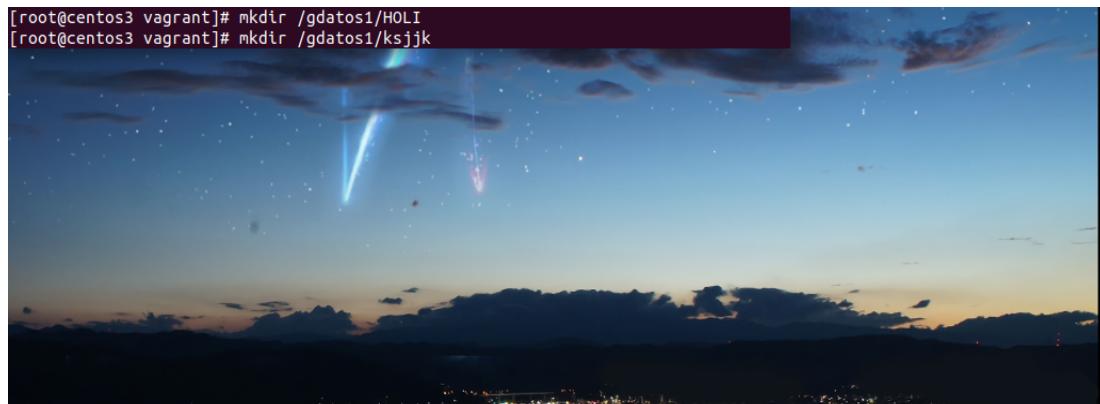
Mostramos la información del volumen creado

```
[root@centos1 vagrant]#gluster volume info glustervol1
Volume Name: glustervol1
Type: Replicate
Volume ID: 0a2cae71-af51-4444-9b36-f940867a3072
Status: Started
Snapshot Count: 0
Number of Bricks: 1 x 2 = 2
Transport-type: tcp
Bricks:
Brick1: centos1:/gluster/bricks/brick1/vol1
Brick2: centos2:/gluster/bricks/brick1/vol1
Options Reconfigured:
transport.address-family: inet
nfs.disable: on
performance.client-io-threads: off
[root@centos1 vagrant]#
```



IX) Instalación del cliente en centos3

```
[root@centos3 vagrant]# mkdir /gdatos1/HOLI
[root@centos3 vagrant]# mkdir /gdatos1/ksjjk
```



Para la creación del primer directorio teníamos todos los nodos activos y por lo tanto se ha creado bien. Sin embargo, para la creación del segundo directorio he hecho un shutdown del nodo 1. Al hacer esto, como se nos decía en el guión, tras unos segundos, detecta el fallo del nodo 1 y continua funcionando sólo con el nodo 2.