

# Making permissions on EMC PowerPath devices persistent for CRS on Enterprise Linux

## PowerPath Device Permissions

It is possible to set permissions for EMC PowerPath devices to be persistent across server reboots and EMC PowerPath restarts.

This can be achieved through UDEV Rules.

For Oracle Cluster Ready Services (CRS) the permissions on devices supporting the OCR and Voting disk are essential for CRS to function.

Edit the `/etc/udev/rules.d/50-udev.rules` file and add the text below (where "emcpowerb" is the Voting disk and "emcpowerc" is the OCR)

```
# emc block devices
# Voting
SUBSYSTEM=="block", KERNEL=="emcpowerb", GROUP="oinstall",
OWNER="oracle", MODE="0640"

# OCR
SUBSYSTEM=="block", KERNEL=="emcpowerc", GROUP="oinstall",
OWNER="root", MODE="0640"
```

The voting disk is a partition that Oracle Clusterware uses to verify cluster node membership and status.

The voting disk must be owned by the oracle user, must be in the dba or oinstall group, and must have permissions set to 644

The location of the Voting disk may be found by executing the following command as root user:

```
<CRS_HOME>/bin/crsctl query css votedisk
```

E.g.

```
/u01/app/oracle/product/11.1.0/crs/bin/crsctl query css votedisk
```

The OCR disk supports the Oracle Clusterware Registry, which holds the complete configuration of the cluster.

This includes metadata for nodeapps, ASM instances, database instances, database listeners, databases etc.

The OCR location may be found in `/etc/oracle/ocr.loc`

emcpower\* devices are pseudo device names created by EMC PowerPath.

It is also possible to add the following text to `/etc/init.d/init.crs` file to enable persistence.

```
chown root:oinstall /dev/emcpowerc
chown oracle:oinstall /dev/emcpowerb
```

However, `root.sh` will overwrite this file when performing a CRS upgrade. Therefore the `/etc/init.d/init.crs` file should not be modified.

## Pseudo Device Name Persistence

It is essential that EMC PowerPath pseudo device names are consistent between nodes in a cluster. Also the name must be persistent across server reboots. Below are commands with example output that help to illustrate the ease of device management from the Linux command line.

The following EMC PowerPath Management command displays the state of all the HBAs configured for PowerPath:

```
[root@#####01A ~]# powermt display dev=all
Pseudo name=emcpowerrh
Symmetrix ID=000290104687
Logical device ID=04C5
state=alive; policy=SymmOpt; priority=0; queued-IOS=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-IOS Errors
=====
      2 lpfc          sdd      FA 3cB  active  alive    0    0
      0 lpfc          sdm      FA 14cB active  alive    0    0

Pseudo name=emcpowerg
Symmetrix ID=000290104687
Logical device ID=04CD
state=alive; policy=SymmOpt; priority=0; queued-IOS=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-IOS Errors
=====
      2 lpfc          sde      FA 3cB  active  alive    0    0
      0 lpfc          sdn      FA 14cB active  alive    0    0

Pseudo name=emcpowerf
Symmetrix ID=000290104687
Logical device ID=04D5
state=alive; policy=SymmOpt; priority=0; queued-IOS=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-IOS Errors
=====
      2 lpfc          sdf      FA 3cB  active  alive    0    0
      0 lpfc          sdo      FA 14cB active  alive    0    0

Pseudo name=emcpowerc
Symmetrix ID=000290104687
Logical device ID=04DD
state=alive; policy=SymmOpt; priority=0; queued-IOS=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-IOS Errors
=====
      2 lpfc          sdg      FA 3cB  active  alive    0    0
      0 lpfc          sdp      FA 14cB active  alive    0    0

Pseudo name=emcpowerb
Symmetrix ID=000290104687
```

```

Logical device ID=04E5
state=alive; policy=SymmOpt; priority=0; queued-I/Os=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-I/Os Errors
=====
      2 lpfc          sdh        FA 3cB  active  alive    0    0
      0 lpfc          sdq        FA 14cB active  alive    0    0

```

```

Pseudo name=emcpowera
Symmetrix ID=000290104687
Logical device ID=04ED
state=alive; policy=SymmOpt; priority=0; queued-I/Os=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-I/Os Errors
=====
      2 lpfc          sdi        FA 3cB  active  alive    0    0
      0 lpfc          sdr        FA 14cB active  alive    0    0

```

```

Pseudo name=emcpowere
Symmetrix ID=000290104687
Logical device ID=05FD
state=alive; policy=SymmOpt; priority=0; queued-I/Os=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-I/Os Errors
=====
      2 lpfc          sdb        FA 3cB  active  alive    0    0
      0 lpfc          sdk        FA 14cB active  alive    0    0

```

```

Pseudo name=emcpowerd
Symmetrix ID=000290104687
Logical device ID=05FE
state=alive; policy=SymmOpt; priority=0; queued-I/Os=0
=====
----- Host ----- - Stor - -- I/O Path - -- Stats ---
### HW Path          I/O Paths  Interf.  Mode  State  Q-I/Os Errors
=====
      2 lpfc          sdc        FA 3cB  active  alive    0    0
      0 lpfc          sdl        FA 14cB active  alive    0    0

```

The following command lists all used PowerPath pseudo device names:

```
[root@#####01A ~]# emcpadm getusedpseudos
```

PowerPath pseudo device names in use:

```

Pseudo Device Name      Major# Minor#
      emcpowera          120    0
      emcpowerb          120    16
      emcpowerc          120    32
      emcpowerd          120    48
      emcpowere          120    64
      emcpoweref         120    80
      emcpowerg          120    96
      emcpowereh         120   112

```

The following command lists available PowerPath pseudo device names:

```
[root@#####01A ~]# emcpadm getfreepseudos
```

Next free pseudo device name(s) from emcpowera are:

```

Pseudo Device Name      Major# Minor#
      emcpoweri          120   128

```

On Linux, EMC PowerPath configuration settings are stored in config file  
`/etc/powermt.custom`

To rename an existing PowerPath pseudo device name to an available pseudo device name, issue the following command with source and target names.

```
[root@#####01A ~]# emcpadm renamepseudo -s emcpowerg -t emcpoweri
```

To save changes made issue the following command:

```
[root@#####01A ~]# powermt save
```

By default, `powermt save` saves the PowerPath settings in the file `powermt.custom`