

Multipathing with Qlogic HBAs - failover and LUN load balancing

This is a short guide to the configuration of multipathing with QLogic HBAs for the physics database services at CERN. The key software and hardware components are: Oracle 10gR2, RAC, ASM, Linux RHEL 3, dual CPU Intel servers, SAN network, SATA disks in FC arrays (see also Reference Architecture). SAN and FC (2 Gb) infrastructure: Qlogic dual-ported HBAs (QLA2342), 2 x Qlogic SAN switches, dual-ported infortred FC arrays (A16F-S1211).

Note: tested with RHEL 3 U6, QLA2342 driver=7.05.00-RH1-f0, firmware=3.03.11, bios=1.47.
SANsurfer=2.0.30b69

Under the term multipathing, in this document, we refer to a SAN configuration for path failover redundancy and load balancing:

- redundant path to access the storage arrays
- failover at the LUN level for failed path from the server to the SAN switch (improved HA)
- load balancing at the LUN level (improved scalability and performance)

Note regarding RHEL 4: The `qla2xxx_conf` module is missing from 'RHEL 4 rpms' at least up to update 4. The module can be downloaded and compiled from the qlogic website (tested, it works). Without `qla2xxx_conf` multipathing here can not be configured on RHEL4. Device mapper multipathing can be used instead (it is a completely different implementation though, see DB installation procedure in this wiki).

OS configuration files

Multipathing for Qlogic HBAs is configured via `/etc/modules.conf`, and `/etc/qla2300.conf`. Moreover it is important to check that both `qla2300_conf` and `qla2300` kernel modules are loaded (ex: `lsmod |grep qla23`)

After LUN load balancing configuration the `/etc/modules.conf` files should contain the following entry:

```
alias scsi_hostadapter0 qla2300_conf
alias scsi_hostadapter1 qla2300
options qla2300 ConfigRequired=1 ql2xuseextopts=1 ql2xfailover=1 qlport_down_retry=1 ql2xretrycou
```

FC and SAN configuration

- Change the PID number of the storage array controllers for each array use the same PID for both controllers.
- Configure zoning in both SAN switches and make the storage arrays visible via both HBA ports of the linux servers.

Qlogic HBA configuration

The `/etc/qla2300.conf` configuration can be done using Qlogic SANsurfer for HBA (downloadable from the Qlogic website).

- install the agent of SANsurfer for HBA on the nodes you need to configure
- `modprobe qla2300` if needed
- disable autostartup of the qlogic agent
 - ◆ `chkconfig qlremote off`
 - ◆ `/etc/init.d/qlremote stop`
 - ◆ `rmmod qla2300; modprobe qla2300`

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```
/etc/init.d/qlremote stop
mv /etc/qla2300.conf /tmp/qla2300.conf.OLD
vi /etc/modules.conf -> CHANGE in the qla2300 line -> ConfigRequired=0
rmmod qla2300
rmmod qla2300_conf
modprobe qla2300
/etc/init.d/qlremote start
```

- use SANSurfer to configure qla2300 conf (load balancing will not be possible at this stage) and save the configuration (as explained above).

```
/etc/init.d/qlremote stop
vi /etc/modules.conf -> CHANGE BACK in the qla2300 line -> ConfigRequired=1
rmmod qla2300
rmmod qla2300_conf
modprobe qla2300
/etc/init.d/qlremote start
```

- use SANSurfer to configure qla2300 conf including **load balancing** and save the configuration.

```
/etc/init.d/qlremote stop
rmmod qla2300
rmmod qla2300_conf
modprobe qla2300
```

- Recreate the init ramdisk: **rm /boot/initrd-2.4.21-37.ELsmp.img; mkinitrd /boot/initrd-2.4.21-37.ELsmp.img 2.4.21-37.ELsmp**

Update qla2300_conf and qla_opts utility

- the persistent LUN configuration (multipathing) is stored in /etc/qla2300.conf, when this file is changed manually, qla_opts need to be run to update the kernel module. The same is true when the kernel version is changed/updated
- Example: **./qla_opts -w --file=/lib/modules/2.4.21-47.ELsmp/kernel/drivers/addon/qla2200/qla2300_conf.o qla2300_conf**
- RHEL3_qla_opts: qla_opts for RHEL3
- qla_opts: qla_opts, qlogic utility to update qla2xxx module. Compiled for RHEL 4

History: Version 1, Luca.Canali - AT- cern.ch, February 2006
V 1.1 Added - how to change config, Luca, May 2006
V 1.2 Added - how to update qla2300_conf, Luca, Nov 2006

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