

LABO B2 RAID - FINI

Machine Utilise

- PFSENSE FIREWALL
 - DEBIAN TRAINING SERVER
 - DEBIAN TRAINING DMZ
-

STOP 1 :

- fdisk /dev/sd* : pour creer les partitions
 - n → p → [ENTER] → w
 - fdisk /dev/sd* : pour mettre les partitions en "Linux Raid Autodetect"
 - t → fd → w
 - fdisk -l or ls /dev/sd* :
 - pour check les disk
-

STOP 2 :

- Creation module :
 - modprobe raid1

```
root@www:~# modprobe raid1
root@www:~#
```

- Installer paquet mdadm
 - apt-get install mdadm

```
root@www:~# systemctl status mdadm
• mdadm.service
   Loaded: masked (Reason: Unit mdadm.service is masked.)
   Active: inactive (dead)
root@www:~#
```

- Creation agregat

- mdadm --create /dev/md0 --level=1 --raid-device=2 -spare-device=1 --assume-clean /dev/sdb1 /dev/sdc1 /dev/sdd1

```
root@www:~# mdadm --create /dev/md0 --level=1 --raid-device=2 --spare-device=1 --assume-clean /dev/sdb1 /dev/sdc1 /dev/sdd1
mdadm: Note: this array has metadata at the start and
may not be suitable as a boot device.  If you plan to
store /boot' on this device please ensure that
your boot-loader understands md/v1.x metadata, or use
--metadata=0.90
Continue creating array? y
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md0 started.
root@www:~# _
```

- Observer agregat

- mdadm --detail /dev/md0

```
root@www:~# mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
    Creation Time : Tue Nov 29 14:33:24 2022
    Raid Level : raid1
    Array Size : 1046528 (1022.00 MiB 1071.64 MB)
    Used Dev Size : 1046528 (1022.00 MiB 1071.64 MB)
    Raid Devices : 2
    Total Devices : 3
    Persistence : Superblock is persistent

    Update Time : Tue Nov 29 14:33:24 2022
    State : clean
    Active Devices : 2
    Working Devices : 3
    Failed Devices : 0
    Spare Devices : 1

Consistency Policy : resync

    Name : www:0 (local to host www)
    UUID : 002b9e2f:b159dcf0:edc768f5:e0e5fb8e
    Events : 0

    Number Major Minor RaidDevice State
    0        8      17        0    active sync  /dev/sdb1
    1        8      33        1    active sync  /dev/sdc1
    2        8      49        -    spare       /dev/sdd1
```

- Formatage aggregat

- mkfs.ext4 /dev/md0

```

root@www:~# mkfs.ext4 /dev/md0
mke2fs 1.46.2 (28-Feb-2021)
Creating filesystem with 261632 4k blocks and 65408 inodes
Filesystem UUID: fa72371c-95d9-4224-801b-d90c628e8a03
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

```

- Montage aggregat

- mkdir /raid1/
- mount /dev/md0 /raid1/

```

root@www:~# mkdir /raid1/
root@www:~# mount /dev/md0 /raid1/

```

- Taille de l'agregat

- df -h | grep md0

```

root@www:~# df -h | grep md0
/dev/md0          988M      24K   921M    1% /raid1

```

- Remplissage de l'agregat

- ls /raid1/

```

root@www:~# ls /raid1/
lost+found

```

- cp -R /usr/bin/* /raid1/

```

root@www:~# cp -R /usr/bin/* /raid1/
root@www:~#

```

- Simulation de panne

- mdadm /dev/md0 --fail /dev/sdb1

```

root@www:~# mdadm /dev/md0 --fail /dev/sdb1
[ 2456.892422] md/raid1:md0: Disk failure on sdb1, disabling device.
[ 2456.892422] md/raid1:md0: Operation continuing on 1 devices.
mdadm: set /dev/sdb1 faulty in /dev/md0

```

- mdadm —detail /dev/md0

```

root@www:~# mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
  Creation Time : Tue Nov 29 14:33:24 2022
    Raid Level : raid1
    Array Size : 1046528 (1022.00 MiB 1071.64 MB)
  Used Dev Size : 1046528 (1022.00 MiB 1071.64 MB)
    Raid Devices : 2
  Total Devices : 3
 Persistence : Superblock is persistent

    Update Time : Tue Nov 29 15:31:23 2022
      State : clean
  Active Devices : 2
 Working Devices : 2
 Failed Devices : 1
  Spare Devices : 0

Consistency Policy : resync

        Name : www:0 (local to host www)
        UUID : 002b9e2f:b159dcf0:edc768f5:e0e5fb8e
        Events : 21

   Number   Major   Minor   RaidDevice State
     2         8        49         0   active sync   /dev/sdd1
     1         8        33         1   active sync   /dev/sdc1
     0         8        17        -   faulty        /dev/sdb1

```

- Monitoring de l'aggregat :

- cat /proc/mdstat

```

root@www:~# cat /proc/mdstat
Personalities : [raid1]
md0 : active raid1 sdd1[2] sdc1[1] sdb1[0](F)
      1046528 blocks super 1.2 [2/2] [UU]

unused devices: <none>

```

- Simulation d'une seconde panne :

- mdadm /dev/md0 —fail /dev/sdc1

```
root@www:~# mdadm /dev/md0 --fail /dev/sdc1
[ 2636.433291] md/raid1:md0: Disk failure on sdc1, disabling device.
[ 2636.433291] md/raid1:md0: Operation continuing on 1 devices.
mdadm: set /dev/sdc1 faulty in /dev/md0
```

- Simulation de remplacement :
 - mdadm /dev/md0 --remove /dev/sdb1
 - mdadm /dev/md0 --remove /dev/sdc1

```
root@www:~# mdadm /dev/md0 --remove /dev/sdb1
mdadm: hot removed /dev/sdb1 from /dev/md0
root@www:~# mdadm /dev/md0 --remove /dev/sdc1
mdadm: hot removed /dev/sdc1 from /dev/md0
```

- mdadm /dev/md0 --add /dev/sdb1
- mdadm /dev/md0 --add /dev/sdc1

```
root@www:~# mdadm /dev/md0 --add /dev/sdc1
mdadm: added /dev/sdc1
root@www:~# mdadm /dev/md0 --add /dev/sdb1
mdadm: added /dev/sdb1
```

- mdadm --detail /dev/md0

```

root@www:~# mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
    Creation Time : Tue Nov 29 14:33:24 2022
    Raid Level : raid1
    Array Size : 1046528 (1022.00 MiB 1071.64 MB)
    Used Dev Size : 1046528 (1022.00 MiB 1071.64 MB)
    Raid Devices : 2
    Total Devices : 3
    Persistence : Superblock is persistent

    Update Time : Tue Nov 29 15:37:05 2022
    State : clean
    Active Devices : 2
    Working Devices : 3
    Failed Devices : 0
    Spare Devices : 1

    Consistency Policy : resync

    Name : www:0 (local to host www)
    UUID : 002b9e2f:b159dcf0:edc768f5:e0e5fb8e
    Events : 46

    Number Major Minor RaidDevice State
       2     8     49        0  active sync  /dev/sdd1
       3     8     33        1  active sync  /dev/sdc1
       4     8     17        -   spare        /dev/sdb1

```

```

/dev/md0: UUID="fa72371c-95d9-4224-801b-d90c628e8a03" BLOCK_SIZE="4096" TYPE="ext4"

```

- Monter l'aggregat au démarrage

```

GNU nano 5.4 /etc/fstab *
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# systemd generates mount units based on this file, see systemd.mount(5).
# Please run 'systemctl daemon-reload' after making changes here.
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=132039ec-9c6c-40bf-8fc5-c82ac3383d63 / ext4 errors=remount-ro 0 1
# swap was on /dev/sda5 during installation
UUID=94410148-3a89-440b-aa9e-845dde1dbb93 none swap sw 0 0
/dev/sr0 /media/cdrom0 udf,iso9660 user,noauto 0 0
#md0
UUID="fa72371c-95d9-4224-801b-d90c628e8a03" /raid1/ ext4 defaults 0 1

```

- Verification : `ls /etc/raid1 | grep lost`

Stop 3 :

- Creation module :
 - modprobe raid456

```
root@www:~# modprobe raid456
root@www:~#
```

- Install paquet mdadm
 - apt-get install mdadm —fix-missing

```
root@www:~# systemctl status mdadm
• mdadm.service
  Loaded: masked (Reason: Unit mdadm.service is masked.)
  Active: inactive (dead)
root@www:~# _
```

- Creation aggregat
 - mdadm —create /dev/md1 —level=5 —raid-device=5 -spare-device=1 —
assume-clean /dev/sde1 /dev/sdf1 /dev/sdg1 /dev/sdh1 /dev/sdi1 /dev/sdj1

```
root@www:~# mdadm --create /dev/md1 --level=5 --raid-device=5 --spare-device=1 --assume-clean /dev/s
de1 /dev/sdf1 /dev/sdg1 /dev/sdh1 /dev/sdi1 /dev/sdj1
mdadm: partition table exists on /dev/sdg1
mdadm: partition table exists on /dev/sdg1 but will be lost or
meaningless after creating array
Continue creating array? y
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md1 started.
root@www:~#
```

- Verification aggregat
 - mdadm —detail /dev/md1

```

root@www:~# mdadm --detail /dev/md1
/dev/md1:
    Version : 1.2
    Creation Time : Mon Dec 12 14:53:39 2022
    Raid Level : raid5
    Array Size : 4182016 (3.99 GiB 4.28 GB)
    Used Dev Size : 1045504 (1021.00 MiB 1070.60 MB)
    Raid Devices : 5
    Total Devices : 6
    Persistence : Superblock is persistent

    Update Time : Mon Dec 12 14:53:39 2022
    State : clean
    Active Devices : 5
    Working Devices : 6
    Failed Devices : 0
    Spare Devices : 1


    Layout : left-symmetric
    Chunk Size : 512K

Consistency Policy : resync


    Name : www:1 (local to host www)
    UUID : 57a8aaee:060e7fdf:7ecb097a:f7bd6519
    Events : 0

   Number   Major   Minor   RaidDevice State
     0         8       65         0   active sync  /dev/sde1
     1         8       81         1   active sync  /dev/sdf1
     2         8       97         2   active sync  /dev/sdg1
     3         8      113         3   active sync  /dev/sdh1
     4         8      129         4   active sync  /dev/sdi1

     5         8      145         -   spare        /dev/sdj1
root@www:~#

```

- Formatage aggregat
 - mkfs.ext /dev/md1

```

root@www:~# mkfs.ext4 /dev/md1
mke2fs 1.46.2 (28-Feb-2021)
Creating filesystem with 1045504 4k blocks and 261632 inodes
Filesystem UUID: 8b04d077-1505-4503-890b-7ec24fe5c73e
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Creating journal (16384 blocks): done
Writing superblocks and filesystem accounting information: done

root@www:~# _

```


- Montage aggregat

- mkdir /raid5/
- mount /dev/md1 /raid5/

```
root@www:~# mkdir /raid5/
root@www:~# mount /dev/md1 /raid5/
root@www:~#
```

- Taille aggregat

```
root@www:~# df -h | grep md1
/dev/md1          3,9G      24K    3,7G    1% /raid5
root@www:~# _
```

- Remplissage aggregat

- ls /raid5/

```
root@www:~# ls /raid5/
lost+found
root@www:~#
```

- cp -R /usr/bin/* /raid5/

```
root@www:~# cp -R /usr/bin/* /raid5/
root@www:~# _
```

- Simulation panne

- mdadm /dev/md1 --fail /dev/sde1/

```
root@www:~# mdadm /dev/md1 --fail /dev/sde1
[ 3633.929399] md/raid:md1: Disk failure on sde1, disabling device.
[ 3633.929399] md/raid:md1: Operation continuing on 4 devices.
mdadm: set /dev/sde1 faulty in /dev/md1
root@www:~#
```

- mdadm --detail /dev/md1

```

root@www:~# mdadm --detail /dev/md1
/dev/md1:
    Version : 1.2
    Creation Time : Mon Dec 12 14:53:39 2022
    Raid Level : raid5
    Array Size : 4182016 (3.99 GiB 4.28 GB)
    Used Dev Size : 1045504 (1021.00 MiB 1070.60 MB)
    Raid Devices : 5
    Total Devices : 6
    Persistence : Superblock is persistent

    Update Time : Mon Dec 12 15:03:14 2022
    State : clean
    Active Devices : 5
    Working Devices : 5
    Failed Devices : 1
    Spare Devices : 0

    Layout : left-symmetric
    Chunk Size : 512K

Consistency Policy : resync

    Name : www:1 (local to host www)
    UUID : 57a8aaee:060e7fdf:7ecb097a:f7bd6519
    Events : 21

    Number Major Minor RaidDevice State
    5        8    145        0    active sync  /dev/sdj1
    1        8     81        1    active sync  /dev/sdf1
    2        8     97        2    active sync  /dev/sdg1
    3        8    113        3    active sync  /dev/sdh1
    4        8    129        4    active sync  /dev/sdi1

    0        8     65        -    faulty      /dev/sde1
root@www:~#

```

- 2dn panne
 - mdadm /dev/md1 —fail /dev/sdi1/
 - mdadm —detail /dev/md1

```

root@www:~# mdadm --detail /dev/md1
/dev/md1:
    Version : 1.2
    Creation Time : Mon Dec 12 14:53:39 2022
    Raid Level : raid5
    Array Size : 4182016 (3.99 GiB 4.28 GB)
    Used Dev Size : 1045504 (1021.00 MiB 1070.60 MB)
    Raid Devices : 5
    Total Devices : 6
    Persistence : Superblock is persistent

    Update Time : Mon Dec 12 15:05:10 2022
    State : clean, degraded
    Active Devices : 4
    Working Devices : 4
    Failed Devices : 2
    Spare Devices : 0


    Layout : left-symmetric
    Chunk Size : 512K

Consistency Policy : resync


    Name : www:1 (local to host www)
    UUID : 57a8aaee:060e7fdf:7ecb097a:f7bd6519
    Events : 23

   Number   Major   Minor   RaidDevice State
     5         8     145         0   active sync   /dev/sdj1
     1         8      81         1   active sync   /dev/sdf1
     2         8      97         2   active sync   /dev/sdg1
     3         8     113         3   active sync   /dev/sdh1
     -         0         0         4   removed

     0         8      65         -   faulty   /dev/sde1
     4         8     129         -   faulty   /dev/sdi1
root@www:~#

```

- Remplacement disque
 - mdadm /dev/md1 —remove /dev/sde1
 - mdadm /dev/md1 —remove /dev/sdi1

```

root@www:~# mdadm /dev/md1 --remove /dev/sde1
mdadm: hot removed /dev/sde1 from /dev/md1
root@www:~# mdadm /dev/md1 --remove /dev/sdi1
mdadm: hot removed /dev/sdi1 from /dev/md1
root@www:~#

```

- mdadm /dev/md1 —add /dev/sde1
- mdadm /dev/md1 —add /dev/sdi1

```

root@www:~# mdadm /dev/md1 --add /dev/sde1
mdadm: added /dev/sde1
root@www:~# mdadm /dev/md1 --add /dev/sdi1
mdadm: added /dev/sdi1
root@www:~# _

```

- verification :

```

root@www:~# mdadm --detail /dev/md1
/dev/md1:
    Version : 1.2
    Creation Time : Mon Dec 12 14:53:39 2022
    Raid Level : raid5
    Array Size : 4182016 (3.99 GiB 4.28 GB)
    Used Dev Size : 1045504 (1021.00 MiB 1070.60 MB)
    Raid Devices : 5
    Total Devices : 6
    Persistence : Superblock is persistent

    Update Time : Mon Dec 12 15:09:16 2022
    State : clean
    Active Devices : 5
    Working Devices : 6
    Failed Devices : 0
    Spare Devices : 1


    Layout : left-symmetric
    Chunk Size : 512K

Consistency Policy : resync

    Name : www:1 (local to host www)
    UUID : 57a8aaee:060e7fdf:7ecb097a:f7bd6519
    Events : 46

   Number   Major   Minor   RaidDevice State
     5         8       145         0   active sync  /dev/sdj1
     1         8        81         1   active sync  /dev/sdf1
     2         8        97         2   active sync  /dev/sdg1
     3         8       113         3   active sync  /dev/sdh1
     6         8        65         4   active sync  /dev/sde1

     7         8       129         -   spare        /dev/sdi1
root@www:~# _

```

- Montage aggregat boot
 - blkid

```

/dev/md1: UUID="8b04d077-1505-4503-890b-7ec24fe5c73e" BLOCK_SIZE="4096" TYPE="ext4"

```

- nano /etc/fstab

```

GNU nano 5.4 /etc/fstab
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# systemd generates mount units based on this file, see systemd.mount(5).
# Please run 'systemctl daemon-reload' after making changes here.
#
# <file system> <mount point> <type> <options> <dump> <pass>
# / was on /dev/sda1 during installation
UUID=132039ec-9c6c-40bf-8fc5-c82ac3383d63 / ext4 errors=remount-ro 0 1
# swap was on /dev/sda5 during installation
UUID=94410148-3a89-440b-aa9e-845dde1dbb93 none swap sw 0 0
/dev/sr0 /media/cdrom0 udf,iso9660 user,noauto 0 0
#md1
UUID="8b04d077-1505-4503-890b-7ec24fe5c73e" /raid5/ ext4 defaults 0 1

```

Verification : `ls /raid5/ | grep lost`