

## DRAGNET Cluster Support Info

- The DRAGNET cluster was delivered on Thu+Fri 9+10 July 2015.
- We have 4 years support on the complete system.

⇒ DRAGNET cluster support ends in July 2019.

### Failing Components

After initial post-delivery replacements, hard drives fail the most often (as expected). As of writing (Aug 2017), we have been through 3 replacement calls (only a few drives each time) + 1 upcoming.

Our vendor wants defective hard drives to be reported via their support site (instead of by e-mail). This applies to up to 20(?) drives per event. For drives the site asks you to enter some info (serial nr, etc), among them a failure report. You can use a failing S.M.A.R.T. copy-paste report.

Other defective components can be reported via the support site or by e-mail. Please also provide some "proof" that it is defective, or discuss with them how to do that (possibly after reading their FAQ on how to do that).

### Hard Drives

The smartd service has been set up on all DRAGNET nodes to auto-report S.M.A.R.T. (self-monitoring for hard drives) failures (actually counters exceeding certain thresholds) by e-mail to dragnet[AT]astron[DOT]nl.

*Note 1:* By definition you cannot fully (or at all) count on such predictive failure analysis.

*Note 2:* To avoid endless spam, only 1 e-mail is sent. Another one for every new extended test failure or threshold exceeded.

To dump all S.M.A.R.T. information for a drive to a .log file, run (as root or via sudo):

```
$ smartctl --all /dev/XXX >> smartctl-xxx.log
```

On drgXX nodes, XXX is one of: sda, sdb, sdc, sdd.

On the dragnet head node, XXX is one of sg1, sg2 (requires kernel module sg loaded, but this is the case by default).

Note that the dragproc node has a RAID controller that needs some magic:

```
$ for i in 10 11 9 8 12 13 15 14; do echo "Device ID=$i" && sudo smartctl --all -d megaraid,$i /dev/sda; done >> smartctl-xxx.log
```

These numbers correspond to the RAID controller's connected drive IDs. In case you want to check or if it changed, you can display these IDs with a special tool called storcli; see Alexander's shell log at the end of this wiki page.

To start an extended S.M.A.R.T. check, run (as root or via sudo):

```
$ smartctl --test=long /dev/XXX
```

(XXX as well as dragproc magic described above apply here too.)

You may continue working, send the same command to the next drive, or even reboot. The drive will continue when no other requests are there. An extended test may take many hours. Afterwards, you can show the S.M.A.R.T. information again to see the result, but if a failure threshold was exceeded, our smartd service also sends an e-mail.

## Upon Drive Failure

*Tip 1:* when drives fail, first:

**1.** remount the covering partition read-only:

```
$ sudo mount -o remount,ro /dev/mdX # where mdX is the software RAID  
partition that covers your suspicious drive. You can find X using the  
'lsblk' command.
```

The system may protest if files are open in read-write mode. It depends on the situation what to do (ask, kill, wait), but you can find the offending process using the `lsof` command (typically as root; Note: long output!).

**2.** backup data elsewhere (duh)

*Tip 2:* when 1 drive fails, run an extended S.M.A.R.T. check on all drives on the cluster to minimize the number of support requests and data center visits.

*Important:* All drives have a Device Model nr and a Serial Number, etc. Ensure you (Cpt. obvious):

- first report the right IDs + copy-paste the S.M.A.R.T. logs from the right drive
- then replace the right drive in the data center(!) (ask Mike Sipior how to flash the right drive lights, etc)
- then return ship the drive(s) with the reported ID(s)!

Then you need to:

- restore the broken RAID (on drgXX) (ask Mike Sipior, or use the `mdadm` command (display of healthy state shown below), then instruct kernel to reload partition tables using the `partprobe` command)
- remount the partition (/dev/mdX to /data[12])
- copy back the backed up data
- once you're sure the backup is no longer needed, delete it

## Shipping and Return

If accepted, our vendor generally sends a replacement within 1 working day, provided they have replacements in stock. They also send a UPS label for easy return shipping of the defective component (to their return address in Amsterdam).

## Data Center Visit

For disk replacement, one person is enough. If the node has to be opened up, 2 persons are needed (sliding rails issue + node weight + limited space in data center).

## Overview Examples of mdadm and lsblk

How it should look on drgXX nodes, example on drg22 from Aug 2017):

```
[amesfoort@drg22 ~]$ sudo mdadm --detail /dev/md1 /dev/md2
/dev/md1:
    Version : 1.2
  Creation Time : Thu Jul 16 12:13:52 2015
    Raid Level : raid0
    Array Size : 7729802240 (7371.71 GiB 7915.32 GB)
    Raid Devices : 2
    Total Devices : 2
    Persistence : Superblock is persistent

    Update Time : Thu Jul 16 12:13:52 2015
      State : clean
    Active Devices : 2
    Working Devices : 2
    Failed Devices : 0
    Spare Devices : 0

    Chunk Size : 512K

    Name : drg22.control.lofar:1
    UUID : 071ef430:bfc588c7:8cd42a51:8c53c707
    Events : 0

   Number   Major   Minor   RaidDevice State
     0         8         4         0     active sync   /dev/sda4
     1         8        18         1     active sync   /dev/sdb2
/dev/md2:
    Version : 1.2
  Creation Time : Thu Jul 16 12:13:39 2015
    Raid Level : raid0
    Array Size : 7729802240 (7371.71 GiB 7915.32 GB)
    Raid Devices : 2
    Total Devices : 2
    Persistence : Superblock is persistent

    Update Time : Thu Jul 16 12:13:39 2015
      State : clean
    Active Devices : 2
    Working Devices : 2
    Failed Devices : 0
```

Spare Devices : 0

Chunk Size : 512K

Name : drg22.control.lofar:2

UUID : 5690cb47:8d7ff4d4:72cb3108:6857324f

Events : 0

Number	Major	Minor	RaidDevice	State	
0	8	36	0	active sync	/dev/sdc4
1	8	50	1	active sync	/dev/sdd2

```
[amesfoort@drg22 ~]$ lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE  MOUNTPOINT
sda          8:0    0   3.7T  0 disk
├─sda1       8:1    0    1M  0 part
├─sda2       8:2    0  48.8G  0 part
├─└md0       9:0    0  48.8G  0 raid1 /
├─sda3       8:3    0  15.6G  0 part [SWAP]
├─sda4       8:4    0   3.6T  0 part
├─└md1       9:1    0   7.2T  0 raid0 /data1
sdb          8:16   0   3.7T  0 disk
├─sdb1       8:17   0  15.6G  0 part [SWAP]
├─sdb2       8:18   0   3.6T  0 part
├─└md1       9:1    0   7.2T  0 raid0 /data1
sdc          8:32   0   3.7T  0 disk
├─sdc1       8:33   0    1M  0 part
├─sdc2       8:34   0  48.8G  0 part
├─└md0       9:0    0  48.8G  0 raid1 /
├─sdc3       8:35   0  15.6G  0 part [SWAP]
├─sdc4       8:36   0   3.6T  0 part
├─└md2       9:2    0   7.2T  0 raid0 /data2
sdd          8:48   0   3.7T  0 disk
├─sdd1       8:49   0  15.6G  0 part [SWAP]
├─sdd2       8:50   0   3.6T  0 part
├─└md2       9:2    0   7.2T  0 raid0 /data2
sr0         11:0    1 1024M  0 rom
```

## Using storcli to find RAID controller DIDs

The storcli (and storcli64) utils are from the RAID controller vendor LSI. I used this command to find the Device IDs (DID column) on dragproc for the smartctl command listed earlier on this page.

```
[amesfoort@dragproc storcli]$ pwd
/home/amesfoort/pkg/storcli_all_os/Linux/opt/MegaRAID/storcli
[amesfoort@dragproc storcli]$ sudo ./storcli64 /c0 /eall /sall show
[sudo] password for amesfoort:
Controller = 0
```

Status = Success  
Description = Show Drive Information Succeeded.

Drive Information :  
=====

EID:Slt	DID	State	DG	Size	Intf	Med	SED	PI	SeSz	Model	Sp
252:0	10	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U
252:1	11	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U
252:2	9	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U
252:3	8	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U
252:4	12	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U
252:5	13	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U
252:6	15	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U
252:7	14	Onln	0	3.637 TB	SATA	HDD	N	N	512B	TOSHIBA MC04ACA400E	U

EID-Enclosure Device ID|Slt-Slot No.|DID-Device ID|DG-DriveGroup  
DHS-Dedicated Hot Spare|UGood-Unconfigured Good|GHS-Global Hotspare  
UBad-Unconfigured Bad|Onln-Online|Offln-Offline|Intf-Interface  
Med-Media Type|SED-Self Encryptive Drive|PI-Protection Info  
SeSz-Sector Size|Sp-Spun|U-Up|D-Down|T-Transition|F-Foreign  
UGUnsp-Unsupported|UGShld-UnConfigured shielded|HSPShld-Hotspare shielded  
CFShld-Configured shielded|Cpybck-CopyBack|CBShld-Copyback Shielded

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