**From:** Jos van Wezel
**To:** Jamie Shiers;
**cc:** ida-dadm@scc.kit.edu;
Andreas Heiss;
**Subject:** FZK update on tape access
**Date:** Wednesday, June 10, 2009 00:15:21

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Dear Jamie,

for the WLCG operations report

Groet

jos

A few days before start of STEP09 FZK decided that too many instabilities in its dcache to tape connection existed to partition successfully in the tests. After the update of the software that manages SAN connections to tape drives on behalf of the TSM system, tape drives became partly and randomly inaccessible which was diagnosed as rooted in the storage area network. Stepwise testing took many days without improvement. [28/5]

In order to get at least the recalls working a second SAN was installed [29/5] using spare hardware to connect 12 drives and 8 tape movers/servers. An overlooked parameter setting was corrected. The new setup was working as expected [3/6] (we had to deal with a broken library twice during the weekend). Recalls for all disk pools are now forwarded to 4 hosts (2 for ATLAS, 2 for CMS) that do the actual staging. A new version of the interface to tape was installed which masks TSM errors and can be restarted transparently.

ATLAS kicked in (they just tried on good luck) as did CMS and they managed to recall 8 TB [4/6 till 6/6]. Traffic ramped up but many of the files did not arrive on the worker nodes because they were marked by dcache as suspended: the recall had failed because many disk pools of the stager hosts ran into memory problems and needed restarting. The ATLAS DDM throttled the input for new recalls probably because it saw jobs failing. The

suspended
transfers were set to retry [6/6] and ATLAS and CMS were able to catch up most of the
backlog. The memory problems are not gone (we just react faster) Additional memory
on order.

Other fixes and changes: max open files, max number of SRM sessions, max movers on
dcache pools max memory on gridftp dcache door. [8/6]

ATLAS recalls entered the system again [8/6 and 9/6] and CMS will also start recalls
after disks are cleaned.

FZK has 12 LTO4 drives with access to data sets ATLAS and CMS use for STEP09 repro. Expected recall rate (everything stable) is 150-250 MB/s. Writing is done with another set of 20 tape drives which allows for a combined write rate of 500-600 MB/s. FZK is committed to offer a reliable mass storage system that full fills the requirement of all LHC experiments.

Recap
- some configuration files with errors fixed (TSM, dcache)
- reconfig of SAN
- recalls consolidated to a limited number of hosts
- new version of the dcache to TSM interface
- Combined ATLAS and CMS read from tape expect 150-250 MB/s

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Below are the tape access statistics of the first week and of the second
starting when the first new recalls from ATLAS arrived [8/6]

```
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  Start time: 3 June, 00:00:11
  End time:   7 June, 21:28:10
-----------------------------
========================
     VO: cms
      R:  5408 files, 298 volumes ( 18 files/volume),  966 tape mounts,   7318 GB
      W: 10277 files,  83 volumes (123 files/volume), 1580 tape mounts,  29742
GB
  Total: 15685 files, 374 volumes ( 41 files/volume), 2546 tape mounts,  37061
GB
======|============================|
```

```
========================|====================|
==================
Date  | 1. Total Data Rate (MB/s) | 2. Avg. File Size (MB) | 3. Tape Repeat Mnt |
4. MB xferred/mnt
      |    Read      |      Write |    Read     |    Write |    Read   |  Write |    Read
|  Write
======|===============+============|=============
+==========|============+========|==========
+=======
              17          70         1353       2894       3.24    19.04       7576
18824

========================
    VO: atlas
     R:  7724 files,  73 volumes (105 files/volume),  805 tape mounts,  14174 GB
     W: 17401 files,  52 volumes (334 files/volume), 1633 tape mounts,  14462
GB
  Total: 25125 files, 123 volumes (204 files/volume), 2438 tape mounts,  28636
GB
======|============================|
========================|====================|
==================
Date  | 1. Total Data Rate (MB/s) | 2. Avg. File Size (MB) | 3. Tape Repeat Mnt |
4. MB xferred/mnt
      |    Read      |      Write |    Read     |    Write |    Read   |  Write |    Read
|  Write
======|===============+============|=============
+==========|============+========|==========
+=======
              34          34         1835       831       11.03    31.40      17608
8856


-----------------------------
  Start time: 8 June, 17:00:20
  End time:   10 June, 00:05:24
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========================
    VO: cms
     R:   369 files, 102 volumes (  3 files/volume),  313 tape mounts,    968 GB,
36 peak rate
     W:  4236 files,  38 volumes (111 files/volume),  443 tape mounts,  11560
GB, 50 peak rate
  Total:  4605 files, 140 volumes ( 32 files/volume),  756 tape mounts,  12528 GB
```

```
======|============================|
========================|====================|
===================
Date  | 1. Total Data Rate (MB/s) | 2. Avg. File Size (MB) | 3. Tape Repeat Mnt |
4. MB xferred/mnt
      |    Read      |      Write |    Read     |    Write |    Read   |  Write |    Read
|  Write
======|===============+============|=============
+==========|============+========|==========
+=======
               9         103         2625       2729       3.07    11.66       3094
26096

========================
    VO: lhcb
     R:   610 files,   9 volumes ( 67 files/volume),   19 tape mounts,   1141 GB,
47 peak rate
     W:    37 files,   5 volumes (  7 files/volume),   16 tape mounts,     37 GB, 20
peak rate
  Total:   647 files,  12 volumes ( 53 files/volume),   35 tape mounts,   1179 GB
======|============================|
========================|====================|
===================
Date  | 1. Total Data Rate (MB/s) | 2. Avg. File Size (MB) | 3. Tape Repeat Mnt |
4. MB xferred/mnt
      |    Read      |      Write |    Read     |    Write |    Read   |  Write |    Read
|  Write
======|===============+============|=============
+==========|============+========|==========
+=======
              10           0         1872       1020       2.11     3.20      60100
2359

========================
    VO: atlas
     R:  5224 files,  71 volumes ( 73 files/volume),  468 tape mounts,   9788 GB,
27 peak rate
     W:  7484 files,  16 volumes (467 files/volume),  425 tape mounts,   2487
GB, 56 peak rate
  Total: 12708 files,  86 volumes (147 files/volume),  893 tape mounts,  12275
GB
======|============================|
========================|====================|
===================
```

```
Date  | 1. Total Data Rate (MB/s) | 2. Avg. File Size (MB) | 3. Tape Repeat Mnt |
4. MB xferred/mnt
      |    Read      |      Write |    Read     |    Write |    Read   |  Write |    Read
|  Write
======|===============+=============|==============
+==========|============+========|==========
+=======
              87          22         1874       332       6.59    26.56      20915
5854
```