

GridKa Service Incident Report

Description

Probably due to a temporary hardware malfunction in our GRAU ITL-XL tape library, we have permanently lost two files archived on tape by LHCb. This incident was reported by LHCb on GGUS ([#75922](#)).

Impact

Two files of LHCb archived on tape are lost permanently. However, LHCb was able to reimport the lost files from CERN.

Time line of the incident

(all times are in UTC)

Malfunction of the GRAU ITL-XL tape library on Friday, 2011-08-11 from 7:00 to 7:15, partly fixed on Monday 2011-08-11 at 10:00, finally fixed on Tuesday 2011-10-19 at 14:00.

Analysis

(all timestamps are in local time (UTC +1))

These are the files which got lost:

1. `/pnfs/gridka.de/lhcb/data/2011/RAW/FULL/LHCb/COLLISION11/98298/098298_0000000077.raw`
Internal to our SE, this file is known as `0011000000000000FC717D0`.
2. `/pnfs/gridka.de/lhcb/data/2011/RAW/FULL/LHCb/COLLISION11/98325/098325_0000000004.raw`
Internal to our SE, this file is known as `0011000000000000FC80B10`.

Files not readable from tape volumes

- `0011000000000000FC717D0` on UQ1164L4
- `0011000000000000FC80B10` on UQ1285L4 and UQ0719L4

Because three different tape cartridges are involved we conclude that no tape was broken. Also, all the other files of these tapes could get copied over to different tapes without problems.

The library management software states the following *timestamps for (successful) archival*:

- 11.08.2011 07:00:36 `0011000000000000FC717D0` 3.072.040 KB
- 11.08.2011 07:16:36 `0011000000000000FC80B10` 3.072.008 KB

Our software agent responsible for migrating data to tape logged different timestamps for the process:

- Aug 11 08:02:31 `0011000000000000FC717D0` migrated, 3145768992 bytes
- Aug 11 08:25:45 `0011000000000000FC80B10` migrated, 3145737188 bytes

Timestamps for other archive tasks before and after these two files do match and the files are also readable from their respective tape cartridges.

We have collected bits of information from the tape library's management software logs and send them over to the vendor, asking for clarification and support. There is no conclusion to this call, since the issue cannot be reconstructed. It is assumed that this incident is likely caused by the frequently failing hardware of the GRAU ITL-XL tape library.

Some more details about that: We experienced issues with a SCSI-to-FC Bridge (Atto-Bridge) on the controller of the GRAU ITL-XL tape library on 11th of August 2011. The issues were seemingly resolved by restarting the affected tape management partitions in our tape library software. However, this intervention was needed far too often, so we asked for technical support and we then identified above mentioned Atto-Bridge to be troublesome. Ultimately, the library controller needed to be rebooted on 19th of October 2011, since maintenance work on it made the Atto-Bridge become unresponsive. Ever since then, we have not seen similar issues with either the Atto-Bridge, the tape library or the tape partitions.

Follow up actions

We have set the GRAU ITL-XL tape library “read-only”. We are working on getting a full replacement for it.

Verification that all data which was written between the 11.08.2011 to 19.10.2011 is not damaged, i.e. is readable from tape, is ongoing. This takes a lot of time because we do not want to constrain production (we use only one tape drive).

Summary

We had problems with a tape management partition in which the affected tapes (UQ1285L4 und UQ1164L4) were mounted on 11th of August. Unfortunately we were not able to identify the cause, and restarted the library manager process. The same issues reoccurred frequently, until we called for technical support on 19th of October. Then we identified a SCSI-to-FC Bridge (Atto Bridge) in the controlling computer of the affected library to be malfunctional. Ultimately, the library controller needed to be rebooted and we have not seen these issues since then anymore. We were not aware of corrupted data until LHCb tried to restore two files from tape:

1. /pnfs/gridka.de/lhcb/data/2011/RAW/FULL/LHCb/COLLISION11/98298/098298_0000000077.raw
Internal to our SE, this file is known as 0011000000000000FC717D0.
2. /pnfs/gridka.de/lhcb/data/2011/RAW/FULL/LHCb/COLLISION11/98325/098325_0000000004.raw
Internal to our SE, this file is known as 0011000000000000FC80B10.

This is not possible anymore by any means and we have to declare the local copies of these files as lost. Fortunately, LHCb was able to reimport these files from CERN again.

In order to assure that we did not lose any more data, we are currently performing read operations on all files archived in our GRAU tape library since 11th of August. So far we have not spotted any more conflicts.