What LHCb wants from your storage.

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- 70MB/s RAW data from LHCb online system to Castor
- RAW data is replicated to 6 LHCb Tier1s
  - Split by computing share
  - Each RAW file has 1 distributed copy
- RAW reconstructed (per computing share)
  - This is done at Tier1s and CERN
  - Output (rDST) uploaded to local SE
- rDST stripped
  - Output DST to local SE
  - Replicated to 5 other T1s
    - and CERN
- DST for analysis
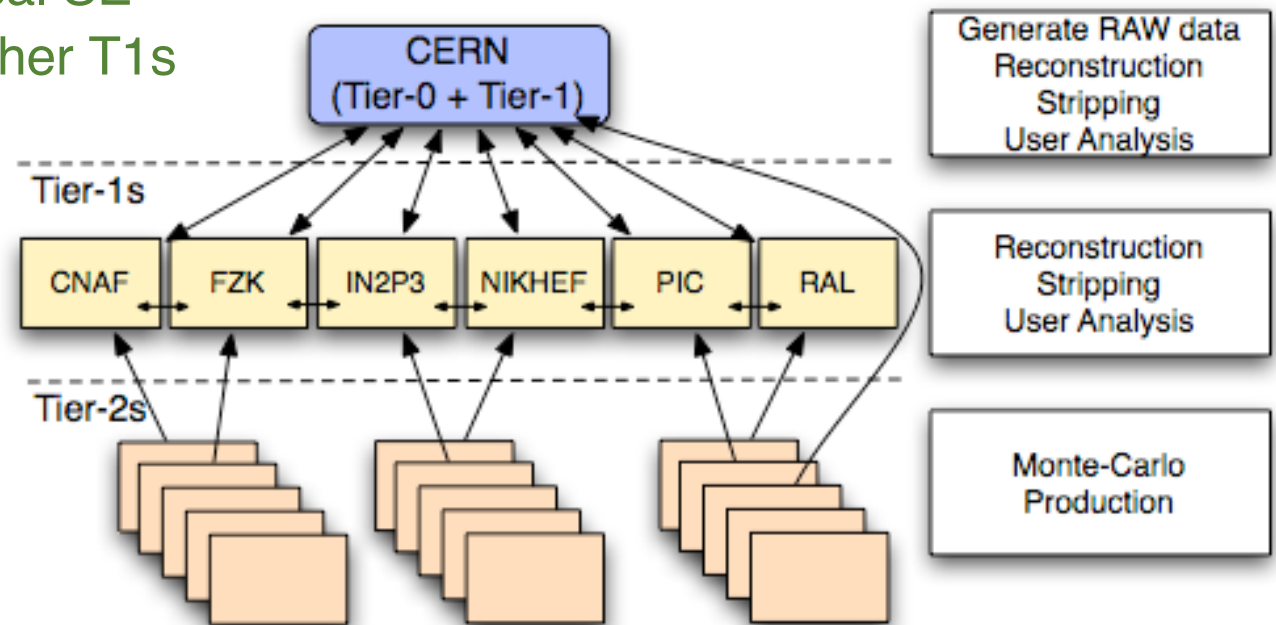
Computing Model (simulated data)

- Simulation performed at Tier2
  - Output (DST) to associated Tier1 SE
  - Replicated to another T1 and CERN
- DSTs input for analysis
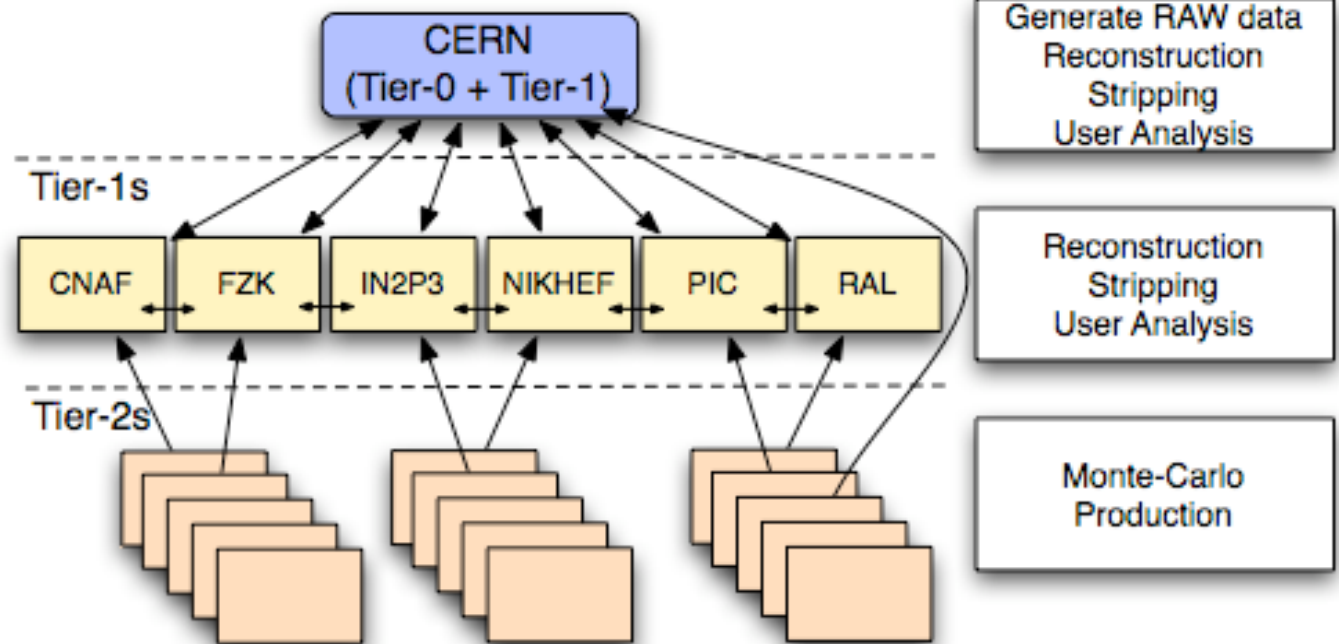
- **Real RAW transferred to 'LHCb_RAW' space**
  - CERN
    - ➤ LAN access for writing data
    - ➤ WAN access for replicating
  - Tier1s
    - ➤ WAN access for writing data
  - Read from reconstruction job
    - ➤ Get TURL from SRM
    - ➤ Data read by application using supported local protocol

- **rDST written from WN to 'LHCb_rDST' space**
  - Using lcg-utils
    - ➤ Get TURL from SRM
    - ➤ gridFTP used for transport
  - Read from stripping job (along with ancestor RAW)
    - ➤ Get TURL from SRM
    - ➤ Data read by application using supported local protocol

...the details for real data.

- **DST written from WN to 'LHCb_M_DST' space**
  - Using lcg-utils
    - ➤ Get TURL from SRM
    - ➤ gridFTP used for transport
  - Replicated to 6 Tier1s using FTS
    - ➤ WAN access for reading
  - Read from analysis jobs
    - ➤ Get TURL from SRM
    - ➤ Data read by application using supported local protocol

- **DSTs transferred from Tier1s to 'LHCb_DST' space**
  - Replicated using FTS
    - ➤ WAN access for writing
  - Read from analysis jobs
    - ➤ Get TURL from SRM
    - ➤ Data read by application using supported local protocol

- MC DST written from Tier2 WN to Tier1 'LHCb_MC_M_DST' space
  - Using lcg-utils
    - Get TURL from SRM
    - gridFTP used for transport
  - Replicated to another Tier1 using FTS
    - WAN access for reading
  - Read from analysis jobs
    - Get TURL from SRM
    - Data read by application using supported local protocol

- DSTs transferred from Tier1s to 'LHCb_MC_DST' space
  - Replicated using FTS
    - WAN access for writing
  - Read from analysis jobs
    - Get TURL from SRM
    - Data read by application using supported local protocol

- **LHCb_RAW**
  - **Tape1Disk0**
    - ➤ Local access
      - CERN for writing from pit
      - Read access from WN
    - ➤ WAN access
      - Read at CERN
      - Write at Tier1s
- **LHCb_rDST**
  - **Tape1Disk0**
    - ➤ Only Local access

- **LHCb_M_DST**
  - **Tape1Disk1**
    - ➤ WAN read access
    - ➤ Local read access

- **LHCb_DST**
  - **Tape0Disk1**
    - ➤ WAN write access
    - ➤ Local read access

- **LHCb_MC_M_DST**
  - Tape1Disk1
    - ➤ WAN read access
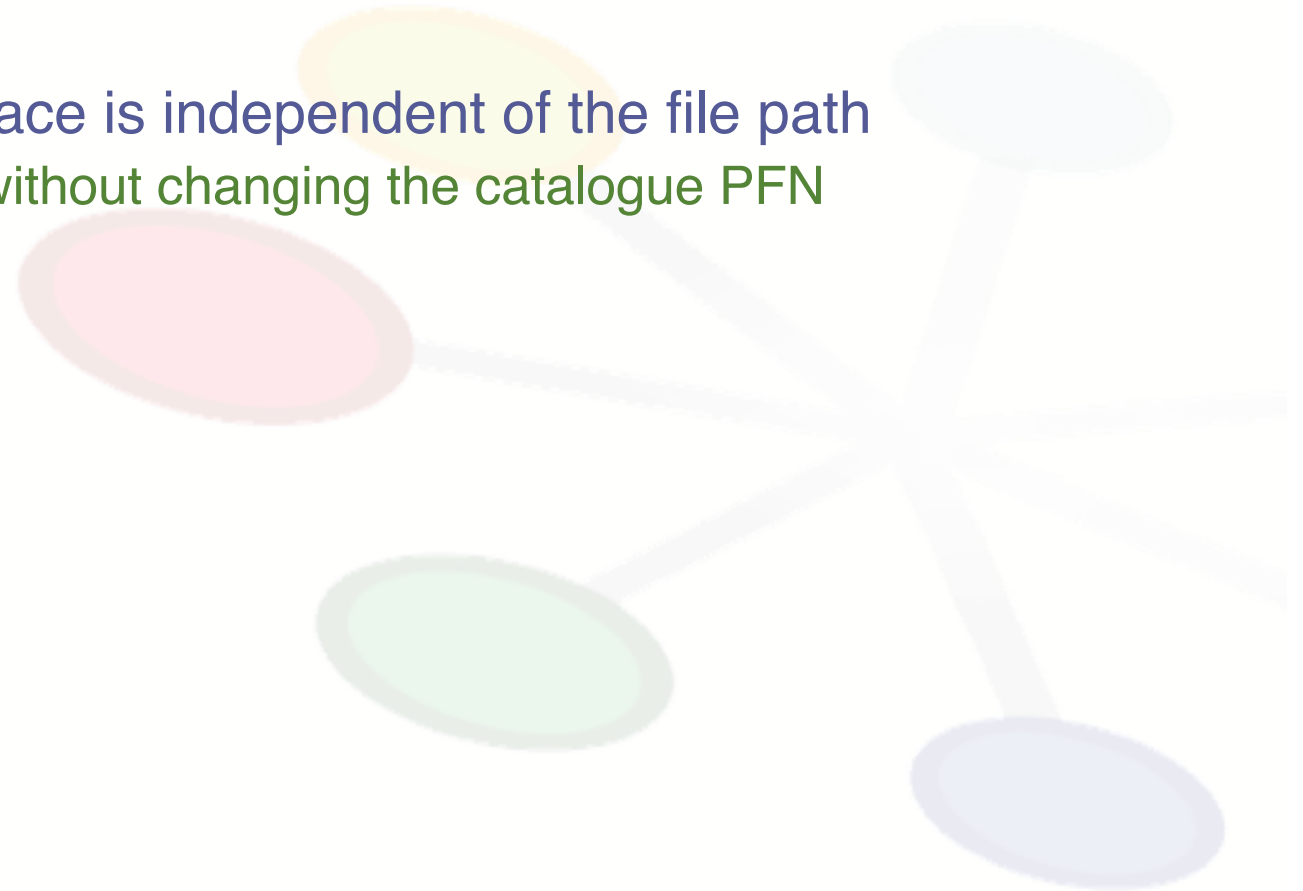   - ➤ Local access

- **LHCb_MC_DST**
  - Tape0Disk1
    - ➤ WAN write access
    - ➤ Local access

- **LHCb_USER**
  - Tape1Disk1
    - ➤ Local access

- LHCb requires space is independent of the file path
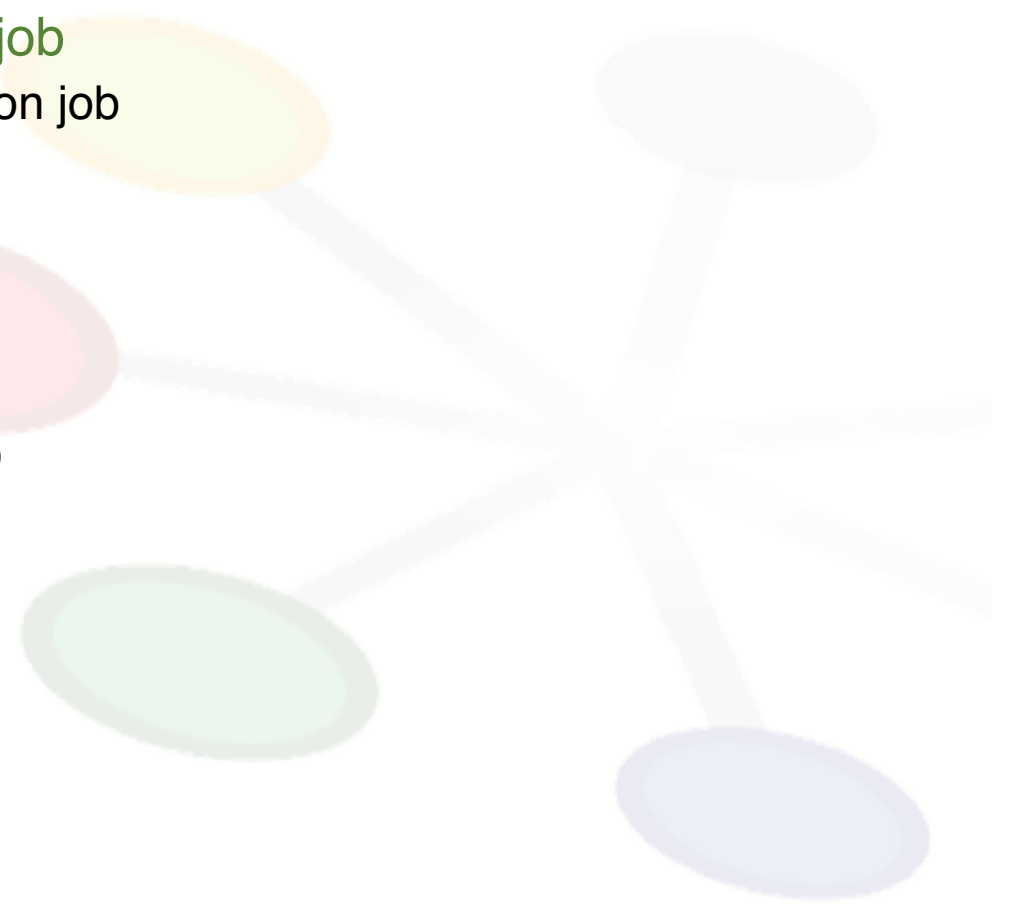 - Migrate space without changing the catalogue PFN

- **'LHCb_RAW' space**
  - Files 'pinned' at write time
  - Accessed by reconstruction job
    - ➤ Pin released by reconstruction job

- **'LHCb_rDST' space**
  - Files 'pinned' at write time
  - Accessed by stripping job
    - ➤ Pin released by stripping job

- **'LHCb_*_DST' space**
  - Files on Tape*Disk1
  - No 'pin' required

- Reprocessing (1 re-reconstruction, 2 re-stripping)
  - Requires access to Tape1Disk0 files
  - Performed three times a year
  - O(month) after initial write
  - Probably cleared from cache

- Re-reconstruction
  - Files in 'LHCb_RAW' to be 'pre-staged'

- Re-stripping
  - Files in 'LHCb_RAW' and 'LHCb_rDST' to be 'pre-staged'
  - 'LHCb_RAW' files staged for re-reconstruction reused

- The DSTs become outdated after re-processing
  - The outdated DSTs are no longer needed on disk
  - Replica copies (LHCb_DST, LHCb_MC_DST) are removed
  - Master copies (LHCb_M_DST, LHCb_MC_M_DST) kept
    - Removed from disk
    - Need to perform Tape1Disk1 -> Tape1Disk0 migration

- **LHCb_RAW**
  - WAN access required for writing data into Tier1s
  - Also local access required for processing
  - Should there be distinct pools? Local access triggers disk-to-disk copy?

- **LHCb_*_DST**
  - WAN access required to replicating files
    - LHCb_M_DST/LHCb_MC_M_DST
      - Read access for replication
    - LHCb_DST/LHCb_MC_DST
      - Write access for replication
  - Local read access required for chaotic analysis activity
  - Should there be distinct pools? Local access triggers disk-to-disk copy?

LHCb GSSD twiki:

https://twiki.cern.ch/twiki/bin/view/LCG/GSSDLHCB