# New Tape Robot for GridPP

Alastair Dewhurst

GridPP

- The GridPP project is a collaboration between UK universities and research institutes to provide the computing resources for the LHC experiments.

- GridPP started in 2001 and we are now entering the 6th funding cycle (AKA GridPP6).

  - GridPP6 will run from April 2020 to April 2024.

- RAL is the UK Tier-1 providing about 40% of the UK's CPU and Disk capacity and the entire tape archival service.

Alastair Dewhurst, 25th September 2019
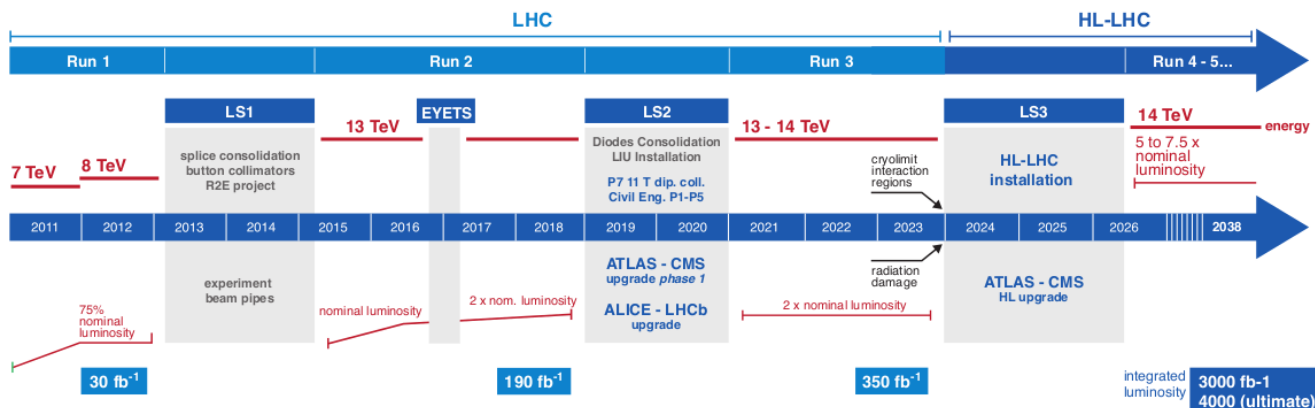
Current setup

- GridPP has funded one of the pair of Oracle SL8500 libraries currently in production.

  - 21 T10KD Drives

  - 6936 T10KD media

- We currently write approximate 1PB a month.

Tier-1 Tape Usage

Alastair Dewhurst, 25th September 2019
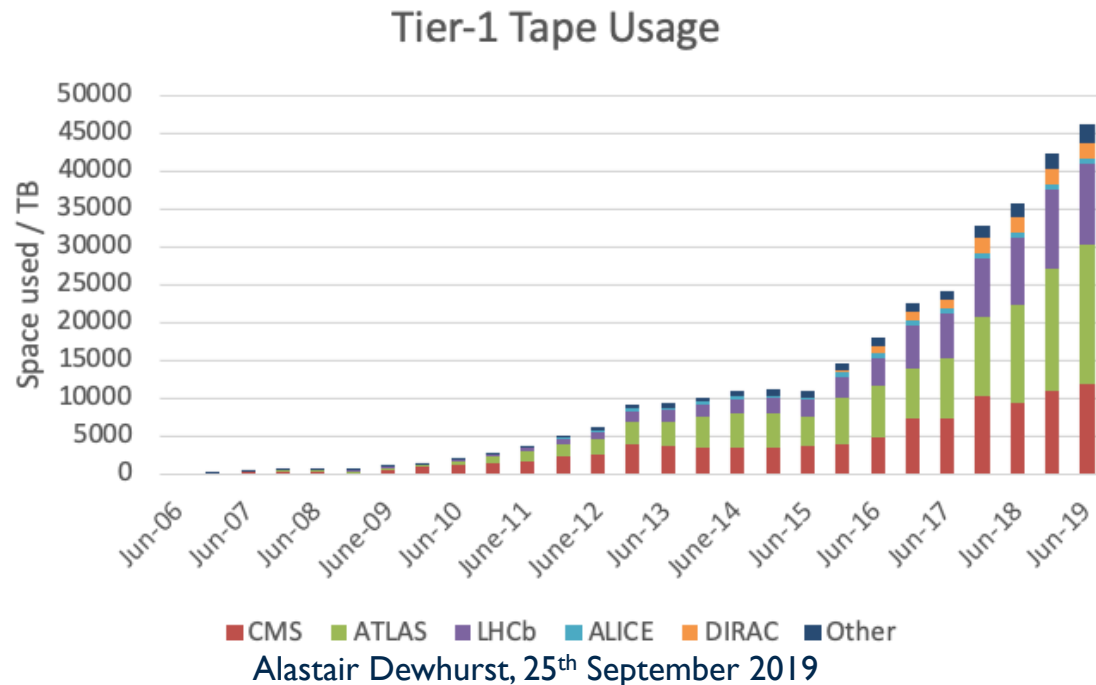
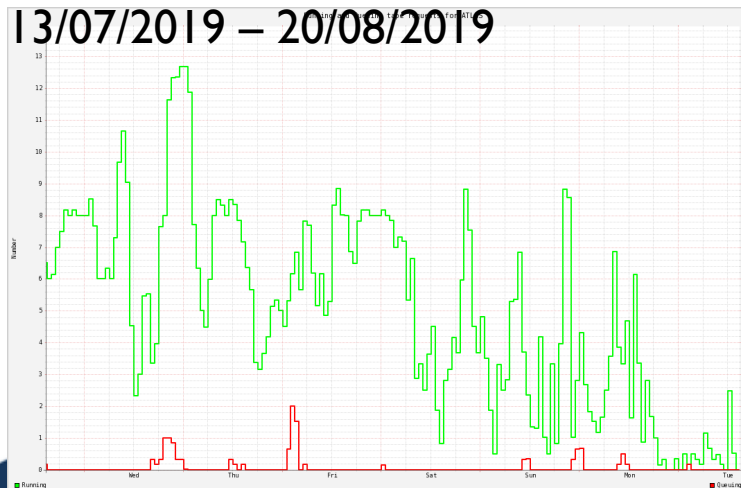# Current Performance

- On 8th August 2019, ATLAS recalled 455127 files, 1019 TB of data from Tape.

- 90% of the files were staged in 8.44 days.

  - 1.26GB/s average throughput.

  - RAL was the best performing Tier-1!

Tape drives in use
13/07/2019 – 20/08/2019

Alastair Dewhurst, 25th September 2019
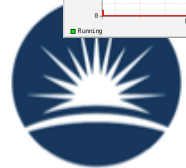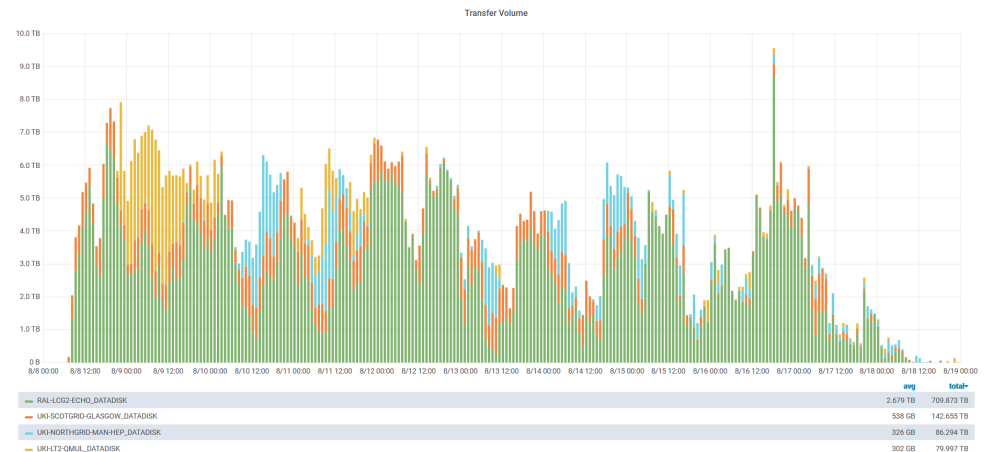
GridPP6 Planning

			2017	2018	2019	2020	2021	2022	2023	2024
Grand Total		CPU [KHS06]	242	260	283	317	434	566	688	735
		Disk [PB]	23	26	29	33	40	57	72	75
		Tape [PB]	61	66	63	68	99	140	182	191

- Table shows the capacity required to be provided in GridPP6.

- Have requested £2million spread over 4 years to fund the tape program.

- Planning to migrate data on Oracle T10KD drives to LTO-9 when it becomes available in ~2021.

Alastair Dewhurst, 25th September 2019

Funding

- No Funding is currently confirmed to buy a new tape robot.

- In November the funding for GridPP6 will be confirmed.

  - Even if funding was cut in half, we would still be buying a new tape robot as data archival is the highest priority task.

- Additional capital is likely this year, have requested up to £500k for a tape robot.

  - If additional capital is not available this year, tender will specify delivery next financial year.

  - If necessary will need to spread the cost over financial years.

- We are not allowed to launch any Tenders without having funding confirmed.

Requirements

- The new tape robot must be in production by the start of 2021 to handle data from the LHC Run 3.

- Warranty and support must last until the end of GridPP6, which is in April 2024.

    - We would want an option to upgrade to a longer warranty.

- Robot must support both IBM and LTO.

    - Initially we intend to choose a single media type.

- The initial deployment must fit in the space shown on the floor plans, which should accommodate 9 frames.

    - Future upgrades will allow up to 13 frames.

- Adding frames should require a downtime of less than 8 hours (i.e. a working day).

LTO or IBM?

- We haven't finalized our decision although leaning towards LTO.

  - Will be talking to CERN at start of October.

LTO:

- Cheaper

- Availability of LTO-8?

- Currently held data likely to go "cold" when Run 3 starts.

IBM:

- Better performance

- Denser storage

- Enterprise media has lower perceived risk.

Specification

- Initially:

  - 60PB capacity, option to upgrade further.

  - 32 tape drive slots, option to upgrade further.

  - 16 x LTO-8 drives, option to purchase more.

  - 1PB of LTO-8 media, option to purchase up to 15PB.

- Future upgrade in 2021- 2022, can assume another generation of media is available:

  - Additional 140PB capacity.

  - Additional capacity for 64 drives.

Potential Timeline

- November:

  - Any addition Capital for this FY confirmed.

  - GridPP6 funding for FY20 - FY23 confirmed.

  - CERN will announce when LHC Run 3 will start. It might be delayed if upgrades are behind schedule.

- December:

  - 2nd Launch Tape procurement tender.

  - 23rd December tender closes.

- January: Winning bid identified and purchase order submitted.

- February / March: Tape Robot delivered to R89. Initial payment made.

- April: Tape Robot commissioning complete and any additional media delivered. Final payment made.

Questions?

- Do you have any questions about my presentation?

- My questions to vendors:

  - Can you provide an indicative price comparison between IBM and LTO Media/Drives?

  - What upgrade options are better purchased upfront?

  - Any update on future generations?

Alastair Dewhurst, 25th September 2019