# ATLAS Plan for Tape Challenge '22 (preliminary discussion)

As an important part of ATLAS tape commissioning for Run3, Tape Challenge 22' provides an excellent opportunity to stress test and validate all the tape related components in the ATLAS workflow, for the upcoming Run3, In this document we collect the detailed plan from all relevant entities, including Tier0 and Tier1s and DDM, FTS and monitoring services.

Previous exercises

- [2021 Tape Challenge](#)
- 2021 T0 scaling test [[doc1](#)] [[doc2](#)]
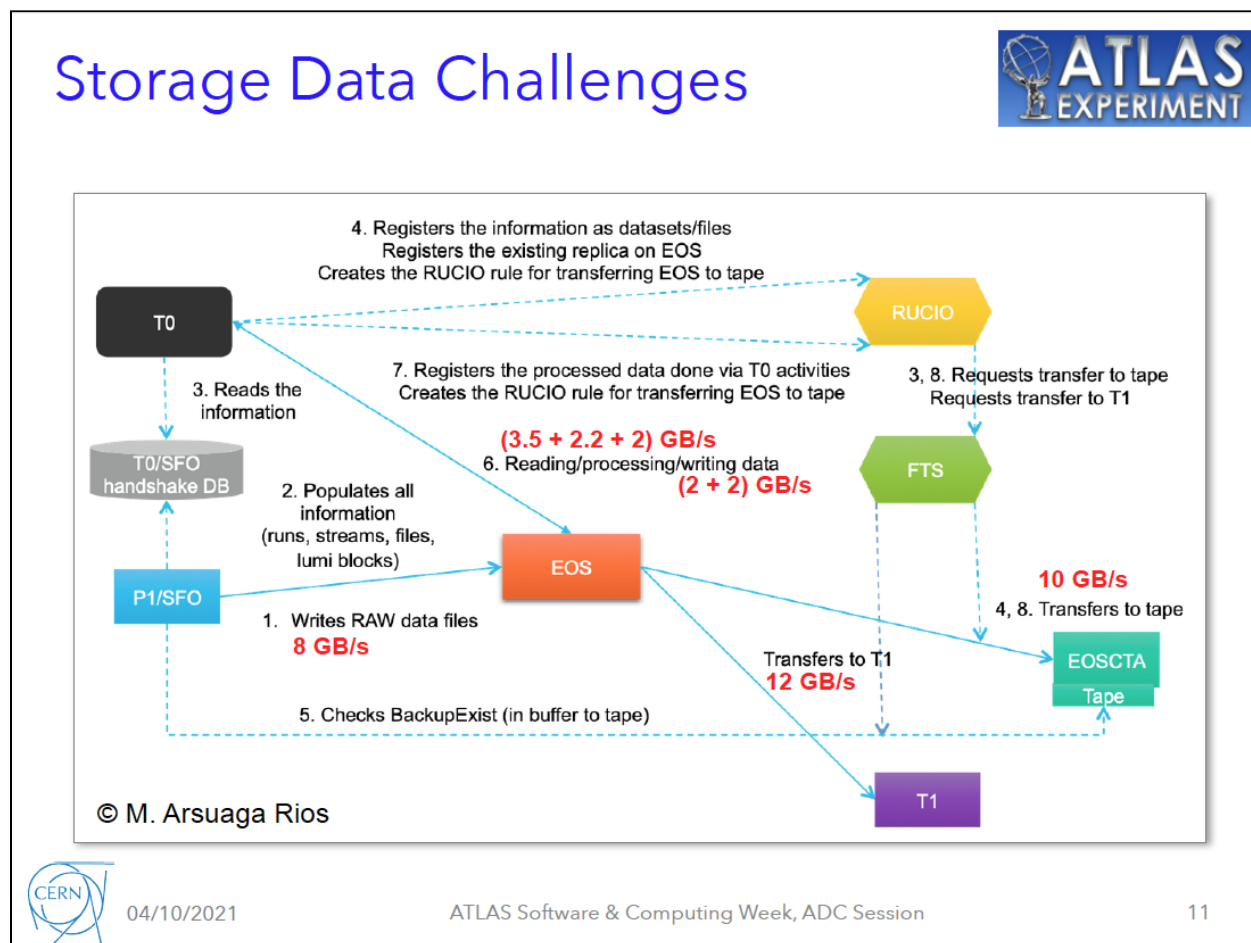
Target date

Tentatively end of February to beginning of March (~2 weeks), again together with other LHC experiments.

Constraints from ATLAS DAQ, only apply to data-generation phase:
- TDAQ Technical Run 21: February 7th-11th
- Milestone Week 11: February 21st - 25th
- TDAQ Technical Run 22: March 7th-11th
- Milestone Week 12: March 21st - April 3d
- Other dates to be discussed with ATLAS RC

Tentative target date for the tape challenge : first two weeks of March. To be coordinated with WLCG and other VOs.

Target tape throughputs for Run3

More details are in the previous exercise doc

Overall CERN objectives for RUN3:

Indicate in this table, the bandwidths required for CERN for reads and writes during data taking (DT) and right after data taking(A-DT).

VO	Reads (DT) GB/s	Writes (DT) GB/s	Reads (A-DT) GB/s	Writes (A-DT) GB/s
ALICE	0	5	2	10
ATLAS	0	10	12	0
CMS	TBD	10	12	TBD
LHCb		5.5	4.24	
Total		30.5	30.24	10

Overall T1s objectives for RUN3:

Indicate in this table, the bandwidths required for all T1s for reads and writes during data taking (DT) and right after data taking(A-DT).

VO	Reads (DT)	Writes (DT)	Reads (A-DT)	Writes (A-DT)

	GB/s	GB/s	GB/s	GB/s
ALICE	0	2.8	1.1	2.8
ATLAS	2.5	9.6	8.4	5.1
CMS	0.8	7.6	12.3	1.1
LHCb		11	3.38	
Total	3.3	31	25.18	9.0

What will be different this time, compared to the previous exercises ?

- T0 + T1 together, T0 with the hardware for Run3
- More realistic model for T0 RAW export to T1s
- Fake and large (5GB+) files coming out of SFO/T0 ops, using its own (new) scope in Rucio
- srm+https (T1 tape endpoints)
- Hardware update from T1s (migration to new tape library, etc)
- ……

Plan and readiness of each entities

DAQ/SFO

Summary of parameters:
- Output data rate: 8 GB/s
- Main file size: 5 GB
- Run duration: 12 to 15 hours per run, 48 hours of data generation in total

This will generate around 1.4 PB of data.

For these tests the stream list and relative throughput distribution is the following:

```
        physics_bulk            42.31%
        physics_dihiggs             15.00%
        physics_bphys               12.51%
        physics_vbf                  7.46%
        physics_ttbar                4.98%
        physics_tla_mjets            3.87%
        physics_delayed_zerobias 3.49%
```

```
physics_tla_jets              3.14%
physics_tla_bjets             1.96%
calibration_costmonitoring    1.24%
calibration_l1topo      0.99%
physics_background      0.59%
physics_zerobias              0.50%
express_express               0.47%
calibration_pixelbeam         0.40%
calibration_l1calo            0.37%
physics_standby               0.26%
physics_cosmicid              0.16%
physics_tauoverlay      0.16%
physics_cosmiccalo      0.16%
```

Tiero operations

Ready in principal
- need more EOS space for the expected DT data rate
- Will exercise the data processing part and generate derived data at 2GB/s

CERN IT storage (EOS, CTA, FTS)

CTA

- Write to RSE with the following prefix: /eos/ctaatlas/archivetest/data_test/
  - please cleanup data (reaper) from previous data challenge tests (there is still 1.86PB left there and we need to get these tapes back for this test)
- Total amount of data written to T0 tape? At 10GB/s required volume is around 1PB/day

FTS

- Will provide document on FTS parameter tuning for the tape challenge
- # of FTS jobs limit increased to 5k, with longer waiting time (30m now) for constructing one FTS job. Will monitoring the # of FTS jobs (for staging requests) during the tape challenge and tune the parameter if needed.

DDM/Rucio

- New RAW data export model for Run3 (JIRA ticket to follow up)
- How about export of derived data from T0 to T1s ?
- Reuse the machinery from last tape challenge for generating the continuous tape write of MC output to T1s throughout the year (both DT and A-DT modes)

Tier1s

- Get updates from T1s on their newly deployed tape/buffer resources
- Give T1s the number of expected tape throughputs

Validation of main tape scenarios for Run3

- Data-taking mode (DT)
  - Tape write to T0/T1 tapes
    - Plan for 48h DT period. In which there will be several periodic (12h) peak rate of RAW data out of SFO at 8GB/s, on top of a background tape write of MC outputs to T1s.
  - Tape read from T1 tapes
- After data-taking mode (ADT)
  - Tape write to T1 tapes
  - Tape read from T0/T1 tapes

Test of failover scenarios

- Case 1 : network cutoff between T0 and a T1
- ……