ATLAS Computing Status

Richard P Mount

Eric Lançon
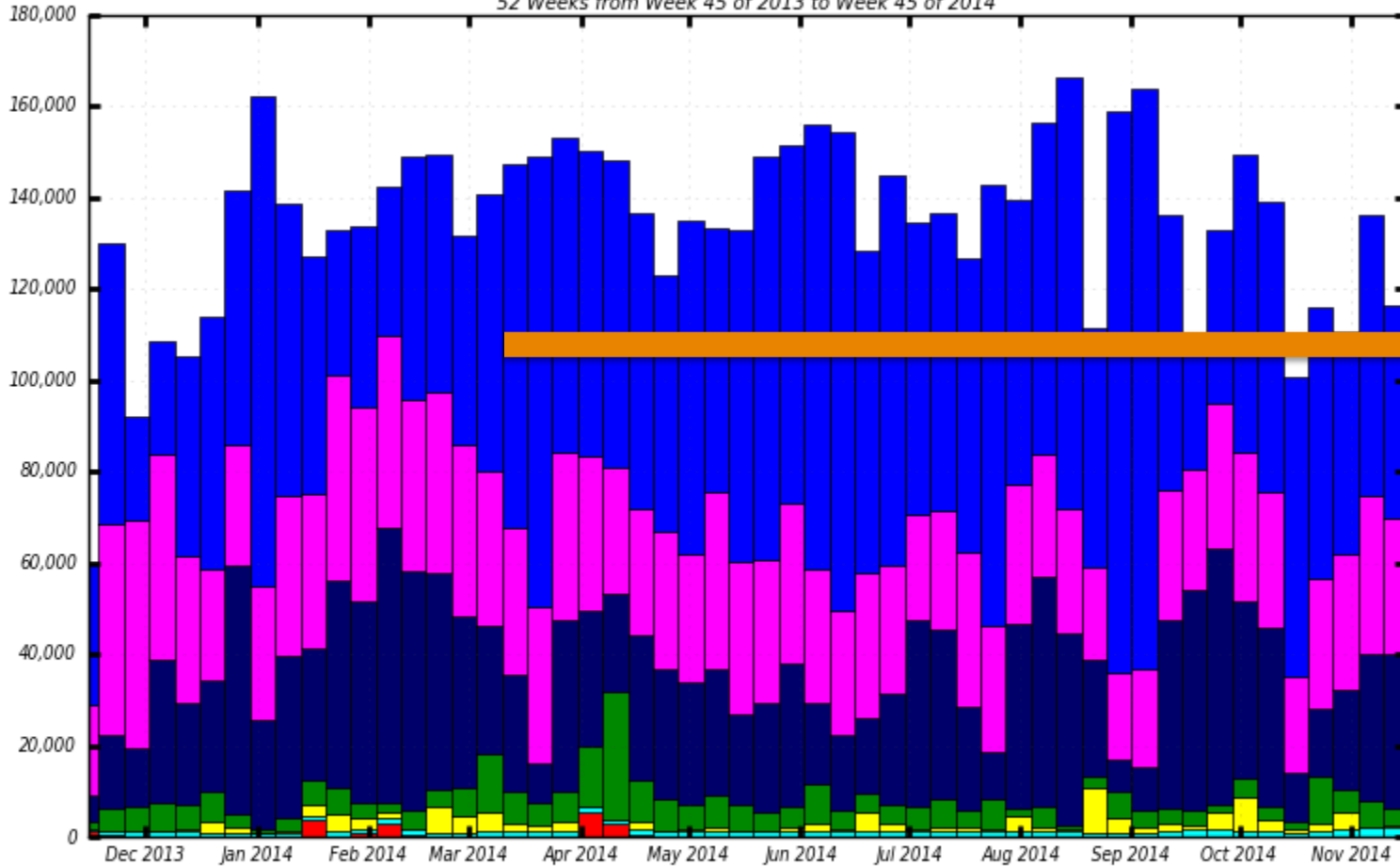
Slots of Running Jobs
52 Weeks from Week 45 of 2013 to Week 45 of 2014

Pledge

Legend:
- MC Simulation
- Analysis
- MC Reconstruction
- Group Production
- Data Processing
- Others
- Extra Production
- unknown

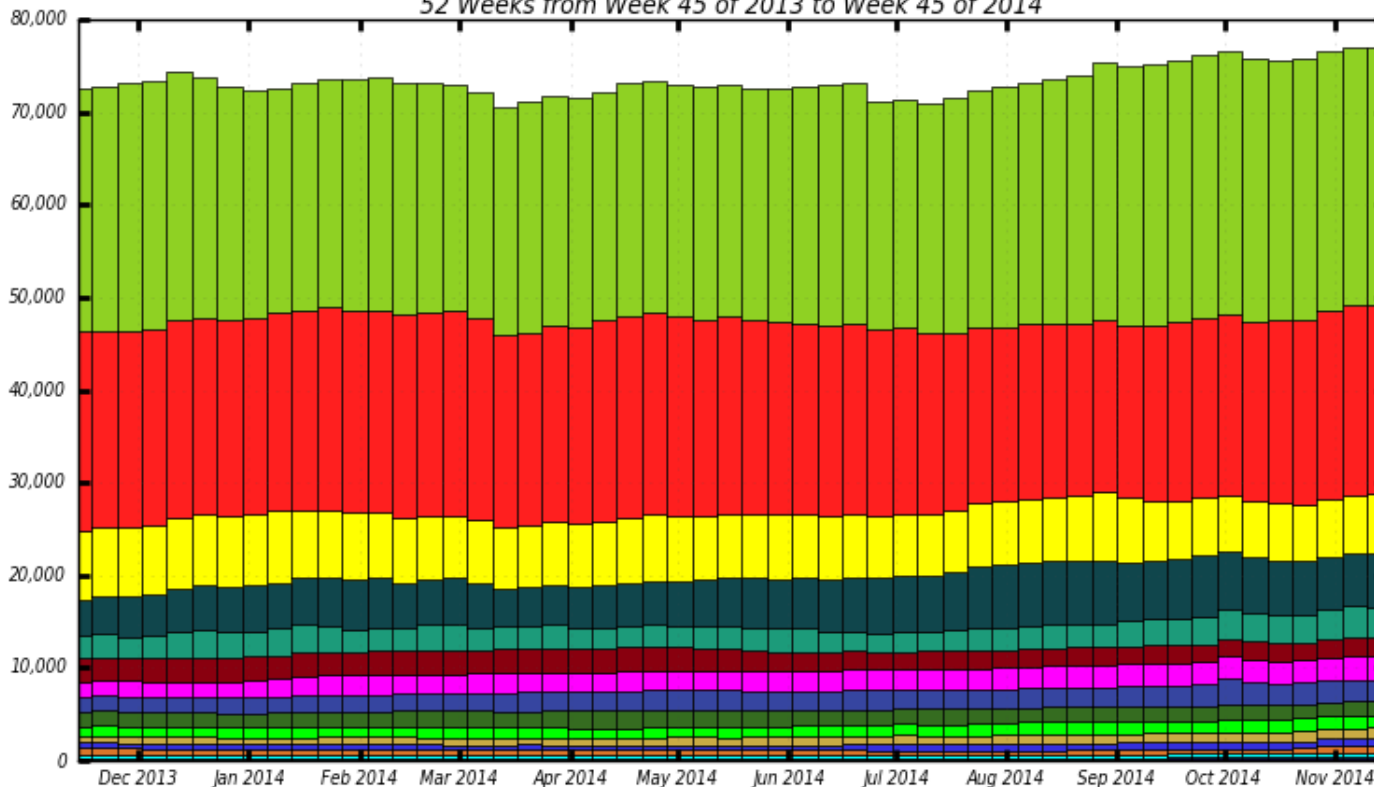# Tier 1 + Tier 2 Disk Usage in the last year (excluding production buffers)

Total Pledge T1+T2 = 90 PB

Number of Physical Bytes (in TBs)
52 Weeks from Week 45 of 2013 to Week 45 of 2014

Legend:
- ntup
- aod
- esd
- hits
- user
- desd
- evnt
- rdo
- desdm
- group
- log
- raw
- daod
- hist
- draw
- other
- d2aod
- d2aodm
- tag
- cbnt
- d2esdm
- d2esd
- txt
- dntup
- dpd

Maximum: 77,045 , Minimum: 0.00 , Average: 72,047 , Current: 76,884

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Pinned and Dynamically Managed Data

Number of Physical Bytes (in TBs)
52 Weeks from Week 45 of 2013 to Week 45 of 2014

Tier 1s

Tier 2s

Pinned Data

Current Production Input Data

Dynamically Managed Data
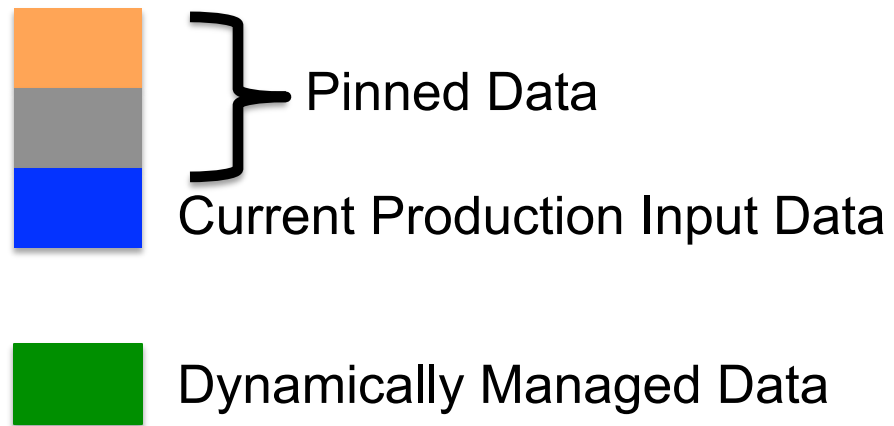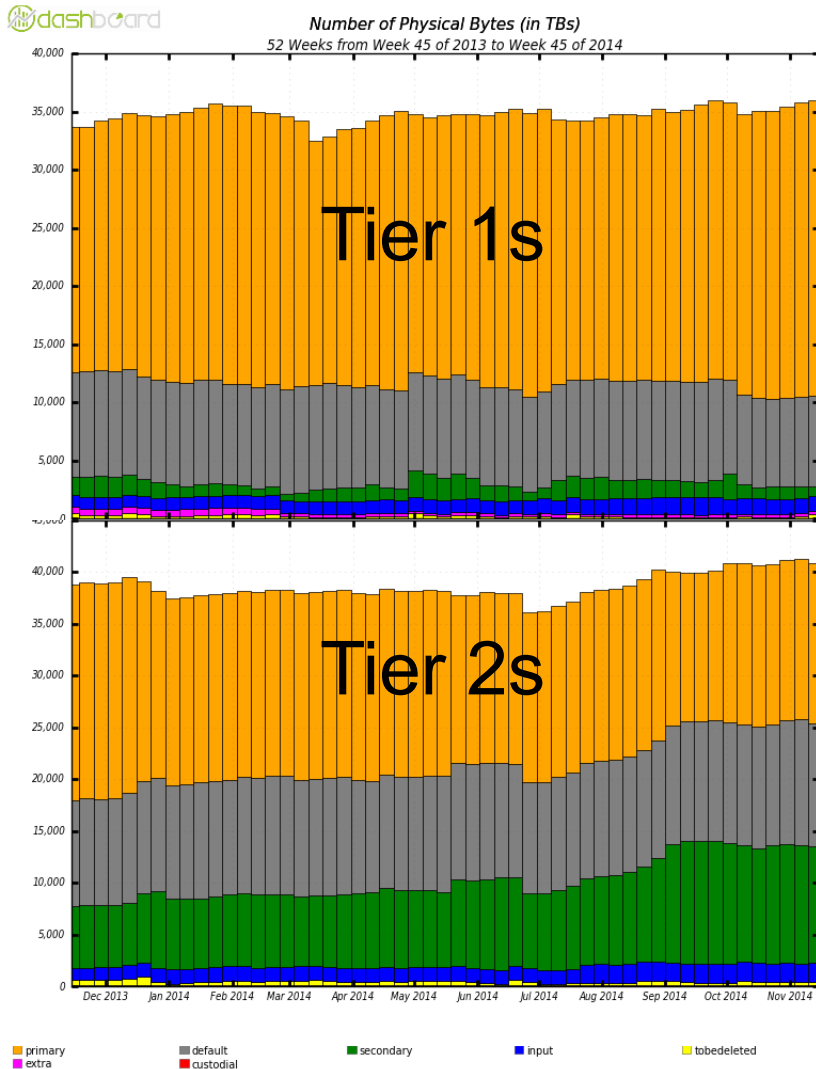
Disk-resident data with expired Lifetimes are marked as "Dynamically Managed" and will be deleted when the space is needed.

Additional replicas of popular datasets are also marked as "Dynamically Managed"

primary · default · secondary · input · tobedeleted
extra · custodial

Number of Physical Bytes (in TBs)
52 Weeks from Week 45 of 2013 to Week 45 of 2014
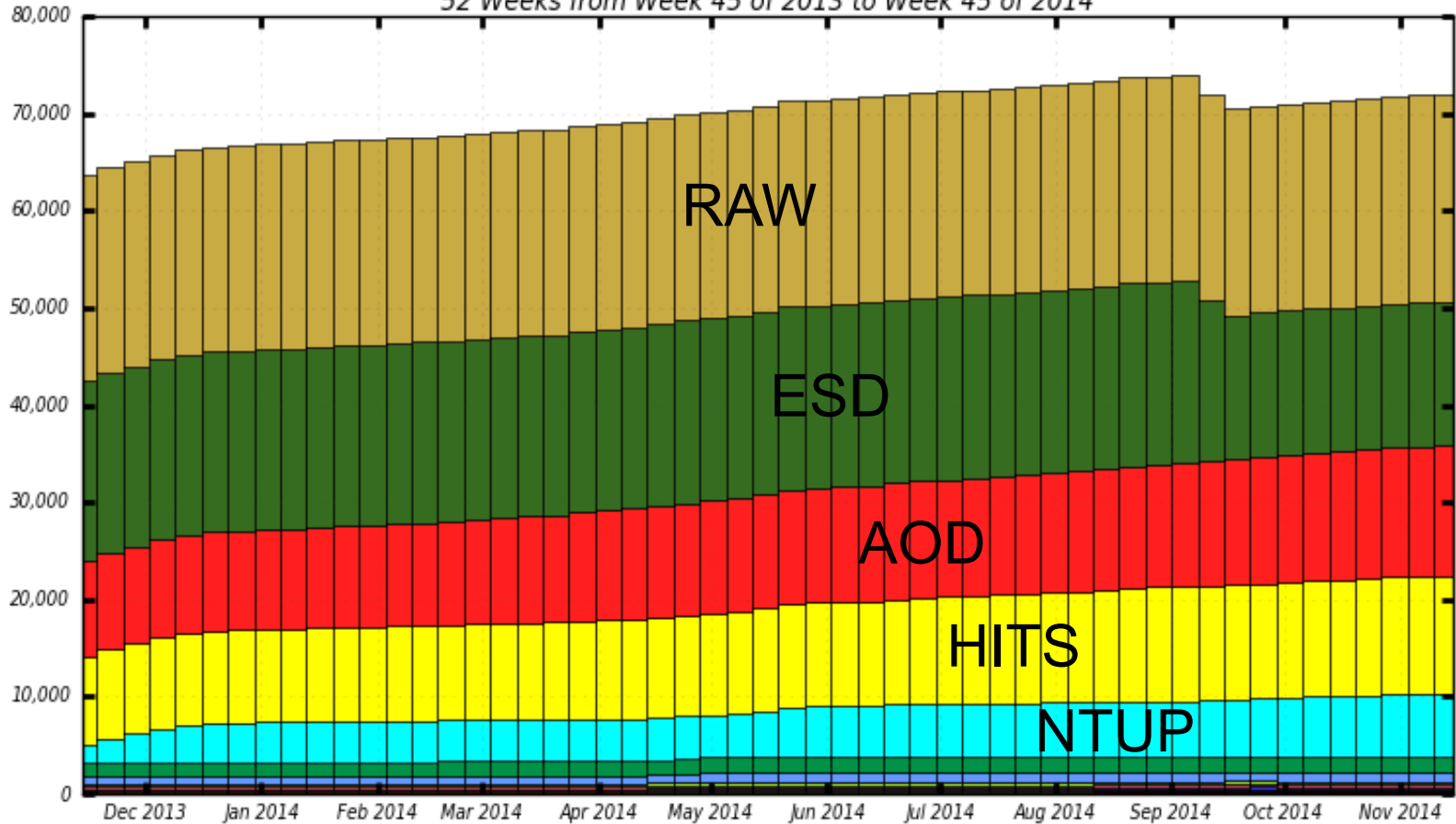
Addressing the Storage Issues (Disk and Tape)

New ATLAS Distributed Data Management Strategy

Approved by ATLAS in July

Cautious implementation in progress

1. All data to have a Lifetime. Delete from disk and tape at end of Lifetime. (ATLAS Physics has now proposed Lifetimes)

2. Disk versus tape residency to be managed algorithmically by ATLAS Distributed Computing (ADC)

MC to delete
(after applying the lifetime policy)
(older than lifetime & not touched for at least lifetime+6months)

policy	lifetime	logical size	T0 DATA DISK	T1 DATA DISK	T2_T3_ DATA DISK	T0 TAPE	T1 TAPE	GROUP DISKs
RAW	1200	0	0	0	0	0	0	0
DRAW	36	0	0	0	0	0	0	0
ESD	2	3166	1544	1042	305	0	150	287
RDO	2	1747	0	140	1329	1	322	87
HITS	12	7819	54	733	0	242	7222	6
AOD	12	2247	55	261	378	63	1933	2
DAOD	12	5	0	1	0	0	0	7
rest	12	2226	42	942	23	0	654	1109
		17210	1695	3119	2035	306	10281	1498

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DRAW	36	0	0	0	0	0	0	0
ESD	2	3166	1544	1042	305	0	150	287
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HITS	12	7819	54	733	0	242	7222	6
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ESD	2	3166	1544	1042	305	0	150	287
RDO	2	1747	0	140	1329	1	322	87
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rest	12	2226	42	942	23	0	654	1109
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Group Disks: temporary technical stay of execution

SLAC

MC to delete
(after applying the lifetime policy)
(older than lifetime & not touched for at least lifetime+6months)

policy	lifetime	logical size	T0 DATA DISK	T1 DATA DISK	T2_T3_ DATA DISK	T0 TAPE	T1 TAPE	GROUP DISKs
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DRAW	36	0	0	0	0	0	0	0
ESD	2	3166	1544	1042	305	0	150	287
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AOD	12	2247	55	261	378	63	1933	2
DAOD	12	5	0	1	0	0	0	7
rest	12	2226	42	942	23	0	654	1109
		17210	1695	3119	2035	306	10281	1498

T0,1,2 Disk: delete 7 of 50 PB

MC to delete

(after applying the lifetime policy)
(older than lifetime & not touched for at least lifetime+6months)

policy	lifetime	logical size	T0 DATA DISK	T1 DATA DISK	T2_T3_ DATA DISK	T0 TAPE	T1 TAPE	GROUP DISKs
RAW	1200	0	0	0	0	0	0	0
DRAW	36	0	0	0	0	0	0	0
ESD	2	3166	1544	1042	305	0	150	287
RDO	2	1747	0	140	1329	1	322	87
HITS	12	7819	54	733	0	242	7222	6
AOD	12	2247	55	261	378	63	1933	2
DAOD	12	5	0	1	0	0	0	7
rest	12	2226	42	942	23	0	654	1109
		17210	1695	3119	2035	306	10281	1498

T0,1 Tape: delete 11 of 27 PB

Cautious Implementation – First model the effects – Data

Data

policy	life time	logical size	T0 DATA DISK	T1 DATA DISK	T2_T3 DATA DISK	T0 TAPE	T1 TAPE	GROUP DISKs
Express_stream	4	309	0	0	0	300	1	1
ESD_ph_str	3	33	0	21	0	0	6	0
AOD_ph_str	24	25	0	3	0	20	0	0
ESD_AOD_hi	24	697	36	13	0	200	482	0
ESDAOD_sm_str1	24	414	2	2	2	367	27	16
ESDAOD_sm_str2	36	1	0	0	0	1	0	0
TAG	60	0	0	0	0	0	0	0
log_HIST	120	0	0	0	0	0	0	0
DESD_DAOD	24	850	5	227	5	530	113	19
DRAW	36	0	0	0	0	0	0	0
NTUP1	12	312	9	27	0	133	3	200
NTUP2	36	0	0	0	0	0	0	0
		2641	52	293	7	1551	632	236

Months

Data

policy	life time	logical size	T0 DATA DISK	T1 DATA DISK	T2_T3 DATA DISK	T0 TAPE	T1 TAPE	GROUP DISKs
Express_stream	4	309	0	0	0	300	1	1
ESD_ph_str	3	33	0	21	0	0	6	0
AOD_ph_str	24	25	0	3	0	20	0	0
ESD_AOD_hi	24	697	36	13	0	200	482	0
ESDAOD_sm_str1	24	414	2	2	2	367	27	16
ESDAOD_sm_str2	36	1	0	0	0	1	0	0
TAG	60	0	0	0	0	0	0	0
log_HIST	120	0	0	0	0	0	0	0
DESD_DAOD	24	850	5	227	5	530	113	19
DRAW	36	0	0	0	0	0	0	0
NTUP1	12	312	9	27	0	133	3	200
NTUP2	36	0	0	0	0	0	0	0
		2641	52	293	7	1551	632	236

Months

T0,1,2 Disk: delete 0.3 of 24 PB

Cautious Implementation – First model the effects – Data

Data

policy	life time	logical size	T0 DATA DISK	T1 DATA DISK	T2_T3 DATA DISK	T0 TAPE	T1 TAPE	GROUP DISKs
Express_stream	4	309	0	0	0	300	1	1
ESD_ph_str	3	33	0	21	0	0	6	0
AOD_ph_str	24	25	0	3	0	20	0	0
ESD_AOD_hi	24	697	36	13	0	200	482	0
ESDAOD_sm_str1	24	414	2	2	2	367	27	16
ESDAOD_sm_str2	36	1	0	0	0	1	0	0
TAG	60	0	0	0	0	0	0	0
log_HIST	120	0	0	0	0	0	0	0
DESD_DAOD	24	850	5	227	5	530	113	19
DRAW	36	0	0	0	0	0	0	0
NTUP1	12	312	9	27	0	133	3	200
NTUP2	36	0	0	0	0	0	0	0
		2641	52	293	7	1551	632	236

Months

T0,1 Tape: delete 2 of 22 non-RAW PB

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Summary of expected Lifetime-driven deletions

Disk: ~7 PB

Tape: ~13 PB

Space available at the start of Run 2:	Disk PB	Tape PB
Freed space as above	7	13
New 2015 pledged space	8	18

Run 2 (and beyond) Model

Lifetime-based Storage Model

1. Use updated version of current model to calculate CPU usage and dataset volumes

2. Keep track of creation date (quarter) of each dataset

2. Remove each dataset from disk and tape when it has exceeded its (type-specific) Lifetime.

3. Adjust total request for disk and tape to be sufficient to accommodate the requested lifetimes.

4. Assign an experience-driven fraction of the disk+tape storage to disk.

Model is now being refined

Will be used to inform the ATLAS resource request for 2016 in February 2015

Brief Software Status (1)

Reconstruction:

- Factor 3 speedup goal achieved. (old news)

New Analysis Model (more efficient and more user-friendly):

- "Dual-use" xAOD replaces separate ATHENA-readable and Root-readble formats. (in use)
- Derivation Framework (trains with carriages provided by groups) replaces incoherent "group production" (being validated)
- Analysis Framework, supporting standardized use of performance group recommendations (jet energy scale etc.) (Framework in use, performance group tools on track)

Brief Software Status (2)

Simulation:

- Integrated Simulation Framework : (in use)

Full Geant4 Simulation:

- Remains the (slow) "gold standard"
- Ongoing work to speed up the ATLAS implementation
- Geant4 version 10 (multithreaded) implementation (not for Run-2 start; timetable not clear yet)

Fast Simulation:

- New version of FastCaloSim ("good enough for taus") (development ongoing, completion of validation second half of 2015)
- Fast digitization, truth seeded reconstruction (development ongoing)

Distributed Computing Software Status

New Production System ProdSys2:

- Will replace ProdSys1 on December 1, 2014

New Distributed Data Management System Rucio:

- Will replace DQ2 on December 1, 2014

Summary

Usage

    CPU – Well above pledge level

    Disk – Tier 1s still have too much pinned data

    Disk – Tier 2s are "healthy"

    Tape – "Full", but cleanup in progress

New Distributed Data Management Strategy

- Cautious implementation is underway

Run 2 Computing Model

- Under development

Software developments

- Great progress: (all except FastSim on track for Run 2)