Reprocessing / ProdSys2.

Some issues arising from recent reprocessing campaigns

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Recent lost files and automatic recovery procedure

File loss iteration	Run number	Number of events according to RAW	Original lost file(s) (all four outputs are subsequently declared lost)	Replacement Files
1	259003	7,525,203	HIST.05326657._000059.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326657._004793.pool.root.1
			NTUP_MUONCALIB.05326657._000400.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326657._004794.pool.root.1
	259165	9,794,826	NTUP_MUONCALIB.05326679._004176.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326679._006035.pool.root.1
			NTUP_MUONCALIB.05326679._004613.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326679._006036.pool.root.1
	259424	6,709,377	NTUP_MUONCALIB.05326699._001820.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326699._003893.pool.root.1
	259555	7,243,353	HIST.05326703._002469.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326703._003616.pool.root.1
	259756	8,372,076	NTUP_MUONCALIB.05326725._000883.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326725._003920.pool.root.1
			NTUP_MUONCALIB.05326725._002219.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326725._003922.pool.root.1
2	259003	7,525,203	AOD.05326657._002614.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326657._004795.pool.root.1
			HIST.05326657._003160.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326657._004796.pool.root.1
			NTUP_MUONCALIB.05326657._003374.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326657._004797.pool.root.1
			HIST.05326657._004710.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326657._004798.pool.root.1
	259424	6,709,377	HIST.05326699._002186.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326699._003896.pool.root.1
	259555	7,243,353	AOD.05326703._003547.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326703._003618.pool.root.1
3	259424	6,709,377	NTUP_MUONCALIB.05326699._000447.pool.root.1	AOD/ESD/HIST/NTUP_MUONCALIB.05326699._003897.pool.root.1

> Fifteen lost reco output files, corresponding to lost inputs to merge jobs

- Three separate incidents, only a few days after file creation

> Mixture of AOD, HIST, NTUP_MUONCALIB files, details on our twiki
https://twiki.cern.ch/twiki/bin/view/Atlas/ReprocessingCampaigns2015_-_Problems_with_this_production
and in the JIRA ticket: https://its.cern.ch/jira/browse/ADCSUPPORT-4196

> Recovery of files by Tadashi; but this currently only treats reco part

> Task goes from **done** to **running** then back to **done**: Reactivates merges!

> Merged ds then get broken due to picking up the replacement files

Recent lost files and automatic recovery procedure (2)

Task Name	Request	Step	Task ID	Priority	Total Jobs	Done Jobs	Events	Status	Submit time	Timestamp	Provenance	JIRA
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331_p2331	2402	Reco	5385414	900	1	1	6709377	done	May 04 10:21	May 05 06:11	AP	199812
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331	2402	Reco	5385413	900	2	2	6709377	done	May 04 10:20	May 05 03:11	AP	199811
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331	2402	Reco	5385412	900	65	64	6709377	done	May 04 10:20	May 04 21:31	AP	199810
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2334	2402	Reco	5384872	990	635	634	6709377	done	May 04 05:50	May 04 20:31	AP	199712
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2335	2402	Reco	5384871	900	317	317	6709377	done	May 04 05:50	May 04 19:31	AP	199711
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331_p2331	2402	Reco	5382984	900	1	1	6711590	obsolete	May 03 15:31	May 04 10:11	AP	199701
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331	2402	Reco	5382983	900	2	2	6711590	obsolete	May 03 15:31	May 04 10:11	AP	199700
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331	2402	Reco	5382979	900	65	65	6711590	obsolete	May 03 15:31	May 04 10:11	AP	199699
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2334	2402	Reco	5382972	900	646	634	6700863	obsolete	May 03 15:30	May 04 05:43	AP	199695
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2335	2402	Reco	5382775	900	318	318	6711590	obsolete	May 03 14:20	May 04 05:42	AP	199689
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331_p2331	2402	Reco	5371894	900	1	1	6602841	obsolete	Apr 30 15:41	May 03 15:15	AP	199092
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331	2402	Reco	5371893	900	2	2	6602841	obsolete	Apr 30 15:41	May 03 15:15	AP	199091
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331	2402	Reco	5371892	900	82	63	6602841	obsolete	Apr 30 15:41	May 03 15:15	AP	199090
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2334	2402	Reco	5371880	900	715	635	6711540	obsolete	Apr 30 15:26	May 03 15:20	AP	199080
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2335	2402	Reco	5371802	900	334	317	6709377	obsolete	Apr 30 15:11	May 03 14:03	AP	199027
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2334	2402	Reco	5345003	900	655	634	6709377	obsolete	Apr 23 19:16	Apr 30 15:11	AP	193215
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2337	2402	Reco	5342446	900	42	0	0	aborted	Apr 23 12:12	Apr 23 16:11	AP	192663
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2335	2402	Reco	5329484	900	318	318	6711571	obsolete	Apr 21 13:45	Apr 30 14:53	AP	190511
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2334	2402	Reco	5329461	900	61	0	0	aborted	Apr 21 13:44	Apr 22 15:31	AP	190488
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331_p2331	2402	Reco	5329420	900	2	2	6711571	obsolete	Apr 21 13:42	Apr 30 15:24	AP	190457
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331_p2331	2402	Reco	5329418	900	3	3	6711571	obsolete	Apr 21 13:41	Apr 30 15:24	AP	190456
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2331	2402	Reco	5326783	900	65	65	6711571	obsolete	Apr 20 18:56	Apr 30 15:24	AP	190360
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2332	2402	Reco	5326754	900	716	635	6711571	obsolete	Apr 20 18:55	Apr 30 18:49	AP	190337
data15_cos.00259424.physics_CosmicMuons.merge.r6622_p2329	2402	Reco	5326702	900	0	0	0	aborted	Apr 20 18:52	Apr 21 15:11	AP	190306
data15_cos.00259424.physics_CosmicMuons.recon.r6622	2402	Reco	5326699	900	3897	3171	6715947	done	Apr 20 18:52	May 04 03:11	AP	190305

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> Current solution is to `obsolete` the original merge tasks and resubmit them

- In the above example the merges had to be submitted four times

> We only notice the lost inputs when we run the merges, i.e. when we use them – maybe there are more lost reco outputs? (e.g. we don't merge ESDs)

> We only realised this week that the recovery procedure is affecting the merged datasets – maybe there are other merged ds also affected?

Recent lost files and automatic recovery procedure (3)

> A possible solution would be that the child merge files created using the lost files would also be removed and remade containing the new files instead.

> Example:

  - The file `NTUP_MUONCALIB.05326725._000883.pool.root.1` is lost

  - All `AOD/ESD/HIST/NTUP_MUONCALIB.05326725._000883.pool.root.1` are declared lost and replaced by new files `AOD/ESD/HIST/NTUP_MUONCALIB.05326725._003920.pool.root.1`

  - ✔ Up to this point is what is currently done

  - The next step would be to declare **ANY** merge file that contains a `05326725._000883` file lost and replace it by a new merge file containing the new `05326725._003920` file

> Another problem here: Some lost file declarations in Rucio (specifically the formats that were not actually lost) are not propagated to AMI

  - Some progress understanding this, interplay between `declare-bad` and `detach-dids`

  - Details and example in https://its.cern.ch/jira/browse/PRODSYS-451

Containers of containers

> Problem using containers of containers in `SampleHandler/EventLoopGrid`, JIRA ticket on this: https://its.cern.ch/jira/browse/ATLASG-58

> From our side, AMI interface is identical and we create Physics Containers exactly as we did before: change is in the background

> Recent containers made, then fixed to contain datasets rather then containers
`data12_8TeV.periodAllYear.physics_Muons.PhysCont.DAOD_ZMUMU.repro17_v02`
`data12_8TeV.periodB.physics_Muons.PhysCont.AOD.repro17_v02`
(for run 204442, the unmerged AODs are added to the container due to the b-tagging issue)

> At the same time these containers were also remade with datasets
`data12_8TeV.periodAllYear.physics_Egamma.PhysCont.DAOD_ZEE.repro17_v01`
`data12_8TeV.periodB.physics_Egamma.PhysCont.AOD.repro17_v01`
`data12_8TeV.periodB.physics_JetTauEtmiss.PhysCont.AOD.repro16_v05`

> Current default is to continue to fill with containers and then ask ADC to run script to replace the containers with the datasets (tids)

> Long term plan?

Finished status of data reprocessing tasks

> Data tasks should, in principle, never go to `finished`, as we want 100% success rate. The should at least not go to `finished` automatically

> Example:

  - Reco task goes to `finished` not `done`, because last job failed after 15 attempts (e.g. not enough memory)

  - Merges start, and HIST merge goes through three steps (factor 50 each time) producing 97, 2, 1 files

  - After adding more retries, the reco then gets to `done`, so the merges pick up this extra file

  - For ESD, AOD, NTUP we "don't care", because it is just added

  - But for HIST (and TAG) we want one file, so this makes 98, 3, 2 files in each step

> Second example:

  - First HIST merge step has gone to `finished`, rather than `done`, due to a missing input.

  - The second and third steps then follow and get to `done`.

  - Missing file is then recovered: first step goes to `done`.

  - Second and third steps then re-run, again resulting in 2 files in the final merged dataset

> Current solution is to `obsolete` the final (third) merge step and resubmit to get 1 file again

> Only affected datasets are when the final merge step should contain 1 file

Finished status of data reprocessing tasks

> The issue can be solved by

1) Automatically fixing such final step merges, some "auto-re-merge" procedure

2) Stopping data reprocessing tasks going to `finished` in the first place, which is preferable, as we retain more control: we know if something is not 100% successful

- Note that neither solution fixes the duplicate files in merged datasets caused by the current recovery procedure

> Option 2) could be implemented as a new state, `tocheck` (or similar), which would need manual intervention to set it to `finished` – there are jobs we know cannot complete, so would still have some `finished` tasks

> It could also have a 10 day timeout, so that of no action is taken the task does go to `finished` to avoid jobs hanging in the system forever

> The option of not starting merges before reco is `done` is not desirable, as if we have 6000 jobs and we're merging in blocks of 5, this should start as soon as possible