S17B HSC PDR1 reprocessing

Summary

This page collects notes about the HSC reprocessing in cycle S17B, including processing the RC dataset and processing the full PDR1 dataset. Descriptions about the PDR1 dataset and the RC dataset are summarized, along with the software stack and pipelines used in the processing.

A stack based on **w_2017_17** was used. The output repositories are available to DM team members at:

> **/datasets/hsc/repo/rerun/DM-10404/UDEEP/**
> **/datasets/hsc/repo/rerun/DM-10404/DEEP/**
> **/datasets/hsc/repo/rerun/DM-10404/WIDE/**

Goals

A description of the aims and organization of this project is available here.

The input dataset: HSC Strategic Survey Program (SSP) Public Data Release 1 (PDR1)

The PDR1 dataset has been transferred to the LSST GPFS storage /datasets by

DM-9683 - Jira project doesn't exist or you don't have permission to view it.

and the butler repo is available at /datasets/hsc/repo

It includes 5654 visits in 7 bands: HSC-G, HSC-R, HSC-I, HSC-Y, HSC-Z, NB0816, NB0921. Their visit IDs are visitId-SSPPDR1.txt. The official release site is at https://hsc-release.mtk.nao.ac.jp/

The survey has three layers and includes 8 fields.

- **UDEEP**: SSP_UDEEP_SXDS, SSP_UDEEP_COSMOS
- **DEEP**: SSP_DEEP_ELAIS_N1, SSP_DEEP_DEEP2_3, SSP_DEEP_XMM(S)_LSS, SSP_DEEP_COSMOS
- **WIDE**: SSP_WIDE, SSP_AEGIS

		HSC-G	HSC-R	HSC-I	HSC-Z	HSC-Y	NB0921	NB0816	
Layer	**Field Name ("OBJECT")**	Number of visits							**Tract IDs (from https://hsc-release.mtk.nao.ac.jp/doc/index.php/database/)**
DEEP	**SSP_DEEP_ELAIS_N1**	32	24	28	51	24	20	0	16984, 16985, 17129, 17130, 17131, 17270, 17271, 17272, 17406, 17407
	SSP_DEEP_DEEP2_3	32	31	32	44	32	23	17	9220, 9221, 9462, 9463, 9464, 9465, 9706, 9707, 9708
	SSP_DEEP_XMM_LSS, SSP_DEEP_XMMS_LSS	25	27	18	21	25	0	0	8282, 8283, 8284, 8523, 8524, 8525, 8765, 8766, 8767
	SSP_DEEP_COSMOS	20	20	40	48	16	18	0	9569, 9570, 9571, ~~9572~~, 9812, 9813, 9814, 10054, 10055, 10056
UDEEP	**SSP_UDEEP_SXDS**	18	18	31	43	46	21	19	8523, 8524, 8765, 8766
	SSP_UDEEP_COSMOS	19	19	35	33	55	29	0	9570, 9571, 9812, 9813, 9814, 10054, 10055
WIDE	**SSP_AEGIS**	8	5	7	7	7	0	0	16821,16822, 16972, 16973
	SSP_WIDE	913	818	916	991	928	0	0	XMM: 8279-8285, 8520-8526, 8762-8768 GAMA09H: 9314-9318, 9557-9562, 9800-9805 WIDE12H: 9346-9349, 9589-9592 GAMA15H: 9370-9375, 9613-9618 HECTOMAP: 15830-15833, 16008-16011 VVDS: 9450-9456, 9693-9699, 9935-9941

Plots of tracts/patches: https://hsc-release.mtk.nao.ac.jp/doc/index.php/data/

Note: tract 9572 is listed on HSC PDR1 website for DEEP_COSMOS but no data actually overlap it; PDR1 does not have it either.

Note: In S17B, more tracts than listed were processed. See below.

Release Candidate ("RC") dataset

The RC dataset was originally defined in https://hsc-jira.astro.princeton.edu/jira/browse/HSC-1361 for hscPipe 3.9.0.

The RC dataset is public and available at /datasets/. 62 visits of them were not included in PDR1 (

⚠ DM-10128 - Jira project doesn't exist or you don't have permission to view it.

): two of SSP_WIDE and 60 of SSP_UDEEP_COSMOS; their visit IDs are 274 276 278 280 282 284 286 288 290 292 294 296 298 300 302 306 308 310 312 314 316 320 334 342 364 366 368 370 1236 1858 1860 1862 1878 9864 9890 11742 28354 28356 28358 28360 28362 28364 28366 28368 28370 28372 28374 28376 28378 28380 28382 28384 28386 28388 28390 28392 28394 28396 28398 28400 28402 29352 (also see here).

The RC dataset includes (a) 237 visits of SSP_UDEEP_COSMOS and (b) 83 visits of SSP_WIDE, in 6 bands:

(a) Cosmos to full depth: (part of SSP_UDEEP_COSMOS) (tract=9813)

- **HSC-G** 11690..11712:2^29324^29326^29336^29340^29350^29352
- **HSC-R** 1202..1220:2^23692^23694^23704^23706^23716^23718
- **HSC-I** 1228..1232:2^1236..1248:2^19658^19660^19662^19680^19682^19684^19694^19696^19698^19708^19710^19712^30482..30504:2
- **HSC-Y** 274..302:2^306..334:2^342..370:2^1858..1862:2^1868..1882:2^11718..11742:2^22602..22608:2^22626..22632:2^22642..22648:2^22658..22664:2
- **HSC-Z** 1166..1194:2^17900..17908:2^17926..17934:2^17944..17952:2^17962^28354..28402:2
- **NB0921** 23038..23056:2^23594..23606:2^24298..24310:2^25810..25816:2

(b) Two tracts of wide: (part of SSP_WIDE) (tract=8766^8767)

- **HSC-G** 9852^9856^9860^9864^9868^9870^9888^9890^9898^9900^9904^9906^9912^11568^11572^11576^11582^11588^11590^11596^11598
- **HSC-R** 11442^11446^11450^11470^11476^11478^11506^11508^11532^11534
- **HSC-I** 7300^7304^7308^7318^7322^7338^7340^7344^7348^7358^7360^7374^7384^7386^19468^19470^19482^19484^19486
- **HSC-Y** 6478^6482^6486^6496^6498^6522^6524^6528^6532^6544^6546^6568^13152^13154
- **HSC-Z** 9708^9712^9716^9724^9726^9730^9732^9736^9740^9750^9752^9764^9772^9774^17738^17740^17750^17752^17754

Software Stack Version / Pipeline Steps / Config

The LSST software stack is used; its Getting Started documentation is at https://pipelines.lsst.io

Stack version: **w_2017_17** (published on 26-Apr-2017) + master meas_mosaic/obs_subaru/ctrl_pool of 7-May-2017 built with w_2017_17 (i.e. w_2017_17 + DM-10315 + DM-10449 + DM-10430).

Unless otherwise noted, the HSC default config in the stack is used (task defaults + obs_subaru overrides).
That implies the PS1 reference catalog "ps1_pv3_3pi_20170110" in the LSST format (HTM indexed) is used (/datasets/refcats/htm/ps1_pv3_3pi_20170110/).

The calibration dataset is the 20170105 version from Paul Price; the calibration repo is located at /datasets/hsc/calib/20170105

from DM-9978 - Jira project doesn't exist or you don't have permission to view it. .

The externally provided bright object masks (butler type "brightObjectMask") of version "Arcturus" (DM-10436 - Jira project doesn't exist or you don't have permission to view it.) are added to the repo and applied in coaddDriver.assembleCoadd.

Pipeline steps and configs:

1. **makeSkyMap.py**
2. **singleFrameDriver.py** Ignore ccd=9 which has bad amps and results not trustworthy even if processCcd passes
3. **mosaic.py**
4. **coaddDriver.py** Make config.assembleCoadd.subregionSize small enough so a full stack of images can fit into memory at once; a trade-off between memory and i/o but doesn't matter scientifically, as the pixels are independent.
5. **multiBandDriver.py**
6. **forcedPhotCcd.py** Note: it was added late and hence was not run in the RC processing

Operational configurations, such as logging configurations in ctrl_pool, different from the tagged stack may be used (e.g. DM-10430).

In the full PDR1 reprocessing, everything was run with the same stack version and config. Reproducible failures are noted below, but no reprocessing is done with a newer software version.

This stack version had a known science problem about bad ellipticity residuals as reported in

DM-10482 - Jira project doesn't exist or you don't have permission to view it. ; the bug fix

DM-10688 - Jira project doesn't exist or you don't have permission to view it. was merged to the stack on May 30 and hence was not applied in this reprocessing campaign.

General hints and tips for processing

coaddDriver:

- To lower the memory when there's a LOT of inputs, decrease the subregion size in making coadds e.g. config.assembleCoadd.subregionSize = [10000, 50]
- To avoid trashing a cluster filesystem, do not use more than 20 or so cores and do not use multiple nodes.

multiband: typically want to use one core per patch; so the upper limit of usefulness is the number of patches multiplied by the number of filters

Units of independent execution

These pipelines will be run no smaller than these units:

1. **makeSkyMap.py** One SkyMap for everything
2. **singleFrameDriver.py** ccd (typically run per visit)
3. **mosaic.py** tract x filter, including all visits overlapping that tract in that filter.
4. **coaddDriver.py** patch x filter, including all visits overlapping that patch in that filter. (typically run per tract)
5. **multiBandDriver.py** patch, including all filters. (typically run per tract)
6. **forcedPhotCcd.py** ccd

Data of different layers (DEEP/UDEEP/WIDE) are processed separately.

Example commands for processing

1. **makeSkyMap.py** makeSkyMap.py /datasets/hsc/repo --rerun private/username/path
2. **singleFrameDriver.py** singleFrameDriver.py /datasets/hsc/repo --rerun private/username/path/sfm --batch-type slurm --mpiexec='-bind-to socket' --cores 24 --time 600 --job jobName2 --id ccd=0..8^10..103 visit=444
3. **mosaic.py** mosaic.py /datasets/hsc/repo --rerun private/username/path/sfm:private/username/path/mosaic --numCoresForRead=12 --id ccd=0..8^10..103 visit=444^446^454^456 tract=9856 --diagnostics --diagDir=/path/to/mosaic/diag/dir/
4. **coaddDriver.py** coaddDriver.py /datasets/hsc/repo --rerun private/username/path/mosaic:private/username/path/coadd --batch-type=slurm --mpiexec='-bind-to socket' --job jobName4 --time 600 --nodes 1 --procs 12 --id tract=9856 filter=HSC-Y --selectId ccd=0..8^10..103 visit=444^446^454^456
5. **multiBandDriver.py** multiBandDriver.py /datasets/hsc/repo --rerun private/username/path/coadd:private/username/path/multiband --batch-type=slurm --mpiexec='-bind-to socket' --job jobName5 --time 5000 --nodes 1 --procs 12 --id tract=9856 filter=HSC-Y^HSC-I
6. **forcedPhotCcd.py** forcedPhotCcd.py /datasets/hsc/repo --rerun private/username/path/multiband:private/username/path/forced -j 12 --id ccd=0..8^10..103 visit=444

Example commands used in RC processing: exampleRcProcessing.sh A pipe_drivers documentation from 2016 is at https://dmtn-023.lsst.io

The output data products of each step, their butler dataset types and butler policy templates are summarized at S17B Output dataset types of pipe_drivers tasks for HSC for the w_2017_17 stack.

Processing the RC dataset

JIRA ticket: DM-10129 - Jira project doesn't exist or you don't have permission to view it. It used the w_2017_17 stack and meas_mosaic ecfbc9d built with w_2017_17

singleFrameDriver: Reproducible failures in 46 ccds from 23 visits. The failed visit/ccds are the same as those in the w_2017_14 stack (DM-10084 - Jira project doesn't exist or you don't have permission to view it.). Their data IDs are:

> --id visit=278 ccd=95 --id visit=280 ccd=22^69 --id visit=284 ccd=61 --id visit=1206 ccd=77 --id visit=6478 ccd=99 --id visit=6528 ccd=24^67 --id visit=7344 ccd=67 --id visit=9736 ccd=67 --id visit=9868 ccd=76 --id visit=17738 ccd=69 --id visit=17750 ccd=58 --id visit=19468 ccd=69 --id visit=24308 ccd=29 --id visit=28376 ccd=69 --id visit=28380 ccd=0 --id visit=28382 ccd=101 --id visit=28392 ccd=102 --id visit=28394 ccd=93 --id visit=28396 ccd=102 --id visit=28398 ccd=95^101 --id visit=28400 ccd=5^10^15^23^26^40^53^55^61^68^77^84^89^92^93^94^95^99^100^101^102 --id visit=29324 ccd=99 --id visit=29326 ccd=47

WIDE: The coadd products have all 81 patches in both tracts (8766, 8767) in 5 filters, except that there is no coadd in tract 8767 patch 1,8 in HSC-R (nothing passed the PSF quality selection there); the multiband products of all 162 patches are generated.

COSMOS: The coadd products have 77 patches in tract 9813 in HSC-G, 74 in HSC-R, 79 in HSC-I, 79 in HSC-Y, 79 in HSC-Z, and 76 in NB0921; the multiband products of 79 patches are generated.

"brightObjectMask" were not applied; but they should not affect.

forcedPhotCcd.py was not run in the RC processing.

Processing the SSP PDR1

JIRA ticket: ⚠ DM-10404 - Jira project doesn't exist or you don't have permission to view it.

All processing were done with the same stack setup (i.e. without DM-10451). Data of the three layers (UDEEP, DEEP, WIDE) were processed separately.

The output repositories are at:

> **/datasets/hsc/repo/rerun/DM-10404/UDEEP/**
> **/datasets/hsc/repo/rerun/DM-10404/DEEP/**
> **/datasets/hsc/repo/rerun/DM-10404/WIDE/**

All logs are at **/datasets/hsc/repo/rerun/DM-10404/logs/**

While unnecessary, some edge tracts outside of the PDR1 coverage were attempted in the processing this time. Those data outputs are kept in the repos as well. In other words, there are more tracts in the above output repositories than listed in the tract IDs in the table on top of this page; the additional data can be ignored.

Reproducible Failures

In singleFrameDriver/processCcd, there were reproducible failures in 78 CCDs from 74 visits. Their data IDs are:

> --id visit=1206 ccd=77 --id visit=6342 ccd=11 --id visit=6478 ccd=99 --id visit=6528 ccd=24^67 --id visit=6542 ccd=96 --id visit=7344 ccd=67 --id visit=7356 ccd=96 --id visit=7372 ccd=29 --id visit=9736 ccd=67 --id visit=9748 ccd=96 --id visit=9838 ccd=101 --id visit=9868 ccd=76 --id visit=11414 ccd=66 --id visit=13166 ccd=20 --id visit=13178 ccd=91 --id visit=13198 ccd=84 --id visit=13288 ccd=84 --id visit=15096 ccd=47^54 --id visit=15206 ccd=100 --id visit=16064 ccd=101 --id visit=17670 ccd=24 --id visit=17672 ccd=24 --id visit=17692 ccd=8 --id visit=17736 ccd=63 --id visit=17738 ccd=69 --id visit=17750 ccd=58 --id visit=19468 ccd=69 --id visit=23680 ccd=77 --id visit=23798 ccd=76 --id visit=24308 ccd=29 --id visit=25894 ccd=68 --id visit=29324 ccd=99 --id visit=29326 ccd=47 --id visit=29936 ccd=66 --id visit=29942 ccd=96 --id visit=29966 ccd=103 --id visit=30004 ccd=95 --id visit=30704 ccd=101 --id visit=32506 ccd=8 --id visit=33862 ccd=8 --id visit=33890 ccd=61 --id visit=33934 ccd=95 --id visit=33964 ccd=101 --id visit=34332 ccd=61 --id visit=34334 ccd=61 --id visit=34412 ccd=78 --id visit=34634 ccd=61 --id visit=34636 ccd=61 --id visit=34928 ccd=61 --id visit=34930 ccd=61 --id visit=34934 ccd=101 --id visit=34936 ccd=50 --id visit=34938 ccd=95 --id visit=35852 ccd=8 --id visit=35862 ccd=61 --id visit=35916 ccd=50 --id visit=35932 ccd=95 --id visit=36640 ccd=68 --id visit=37342 ccd=78 --id visit=37538 ccd=100 --id visit=37590 ccd=85 --id visit=37988 ccd=33 --id visit=38316 ccd=11 --id visit=38328 ccd=91 --id visit=38494 ccd=6^54 --id visit=42454 ccd=24 --id visit=42510 ccd=77 --id visit=42546 ccd=93 --id visit=44060 ccd=31 --id visit=44090 ccd=27^103 --id visit=44094 ccd=101 --id visit=44162 ccd=61 --id visit=46892 ccd=64 --id visit=47004 ccd=101

Out of the 78 failures:

- 36 failed with: "Unable to match sources"
- 13 failed with: "No objects passed our cuts for consideration as psf stars"
- 7 failed with: "No sources remaining in match list after magnitude limit cuts"
- 3 failed with: "No input matches"
- 3 failed with: "Unable to measure aperture correction for required algorithm 'modelfit_CModel_exp': only 1 sources, but require at least 2."
- 1 failed with: "All matches rejected in iteration 2"
- 15 failed with: "PSF star selector found [123] candidates"

A rerun log of these failures is attached as singleFrameFailures.log.

In multiBandDriver, two patches of WIDE (tract=9934 patch=0,0 and tract=9938 patch=0,0) failed with AssertionError as reported in ⚠ DM-10574 - Jira project doesn't exist or you don't have permission to view it. . I excluded the failed patches from the multiBandDriver commands, and then jobs were able to complete and process all other patches.

The multiBandDriver job of WIDE tract=9457 could not finish unless patch=1,8 is excluded. However tract 9457 is actually outside of the PDR1 coverage.

In forcedPhotCcd, fatal errors were seen about the reference of a patch does not exist; therefore some forced_src were not generated. A JIRA ticket has been filed: DM-10755 - Jira project doesn't exist or you don't have permission to view it.

Low-level processing details

This section includes low-level details that may only be of interest to the operation team.

The first singleFrame job started on May 8, the last multiband job was May 22, and the last forcedPhotCcd job was on Jun 1. The processing was done using the Verification Cluster and the GPFS space mounted on it. The NCSA team was responsible of shepherding the run and resolving non-pipeline issues, with close communications with and support from the DRP team regarding the science pipelines. The "ctrl_pool" style drivers were run on the slurm cluster.

The processing tasks/drivers were run as a total of 8792 slurm jobs:

- 514 singleFrame slurm jobs (slurm job IDs: jobids_sfm.txt)
- 1555 mosaic slurm jobs (slurm job IDs: jobids_mosaic.txt)
- 1555 coadd slurm jobs (slurm job IDs: jobids_coadd.txt)
- 362 multiband slurm jobs (slurm job IDs: jobids_multiband_deepUdeep.txt jobids_multiband_wide.txt)
- 4806 forcedPhotCcd slurm jobs (slurm job IDs: jobids_forc.txt)

For single frame processing, every 11 visits (an arbitrary choice) were grouped into one singleFrameDriver.py command, therefore 5654/11 = 514 jobs in total, and submitted each job to one worker node. Data of the three layers (DEEP, UDEEP, WIDE) were handled completely separately beginning with the mosaic pipeline step. skymap.findTractPatchList was used to check through each calexp, find out what tract/patch the ccd overlaps, and write into sqlite3. There are 1555 tract x filter combinations for all three layers. For each tract x filter, all overlapping visits and a template (e.g. mosaic_template.sh) were used to make a slurm job file (such as the .sl file as in https://developer.lsst.io/services/verification.html#verification-slurm). Similarly for coadd making, each tract x filter was a slurm job, but jobs were submitted using coaddDriver.py. The multiband processing jobs were submitted for each tract, using multiBandDriver.py.   All numbers here included tracts that were not actually necessary (outside the PDR1 coverage). For forcedPhotCcd, the CmdLineTask command is written into slurm job files for submission, similar to running mosaic. 21 visits (an arbitrary choice) were grouped in each slurm job in the first batch of submissions; the rest had one visit in each slurm job. In this campaign, at most 24 cores were used on one node at a time and sometimes even fewer.   Hsin-Fang Chiang was aware she did not always run things in the optimal way, and they are to be improved in the coming cycles.

In general, when jobs failed, little effort was spent into investigation as long as the reruns were successful. There were a few transient hardware/file system issues. For example, once a known GPFS hiccup failed two jobs; we happened to know because admins happened to notice it and we happened to match up the timing within a few minutes, but issues like that could easily happen without being noticed. Other examples of other non-science-pipeline failures are as below.

Failures like the "black hole node" phenomenon were seen a few times. Sometimes many jobs were queued in slurm, and next morning all jobs larger than a job ID were found to be failed without any log being written. The appearance is that Slurm scheduled numerous jobs in succession, one after another, to a faulty node with a GPFS problem, resulting in a set of failed jobs.   Jobs that started running before that failure point were able to continue as normal. Resubmissions of the same failed jobs were also good.   The observation of a succession of jobs all going to the same problematic node and failing over and over again in a short amount of time motivates an examination of the controller configuration, as there may be Slurm settings that would distribute job and avoid the scenario.

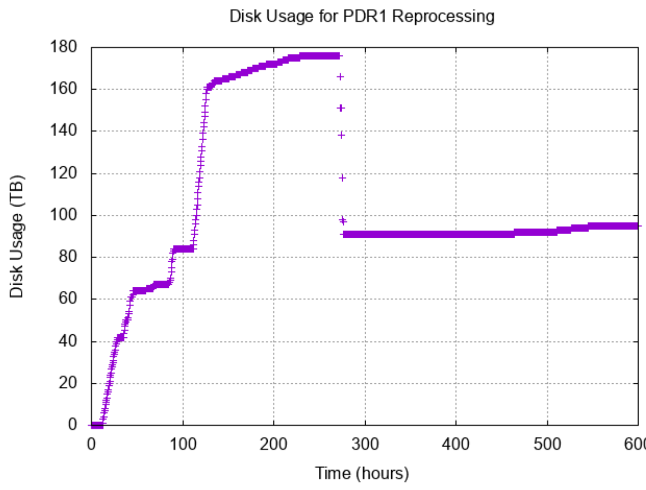
There was an instance that seemed to be a butler repo race condition. When running mosaic processing, multiple jobs seemed to be doing IO with repositoryCfg.yaml and failed at File "/software/lsstsw/stack/Linux64/daf_persistence/13.0-8-gba0f85f/python/lsst/daf/persistence/posixStorage.py", line 189, in putRepositoryCfg and then lsst/daf/persistence/safeFileIo.py", line 84, in FileForWriteOnceCompareSame. Multiple files like "repositoryCfg.yamlGXfgIy" were left in the repo, and they are all the same. Two possible ways to avoid this: (1) always do a pre-run, or (2) do not let jobs write into the same output repos.

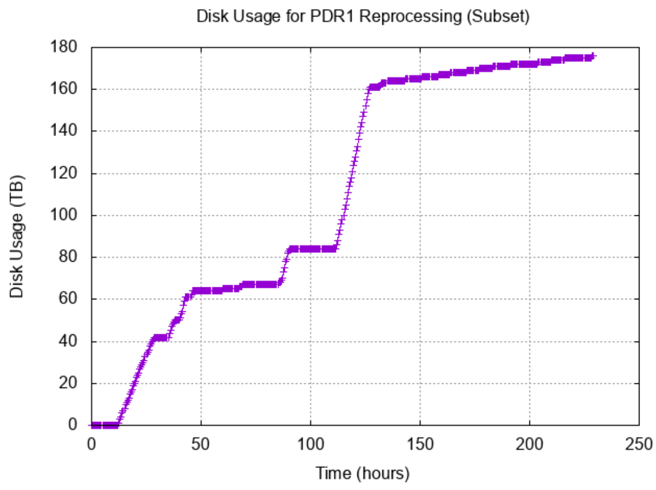
Although large time limits were deliberately used in the slurm jobs, several jobs were timed out and cancelled by slurm, mostly multiband jobs. For new runs, Hsin-Fang Chiang chose to start over with a new output repo rather than letting the driver reuse the existing data. Manual butler repo manipulation was needed to clean up bad executions or combine results.

The pipe_drivers submission could take a while (minutes).

For S17B, the pipeline outputs were written to a production scratch space. The rerun repos were cleaned up and failures were resolved there. Then the repos were transferred to the archived space at /datasets. For transferring, this script was helpful: https://wiki.ncsa.illinois.edu/display/~wglick/2013/11/01/Parallel+Rsync

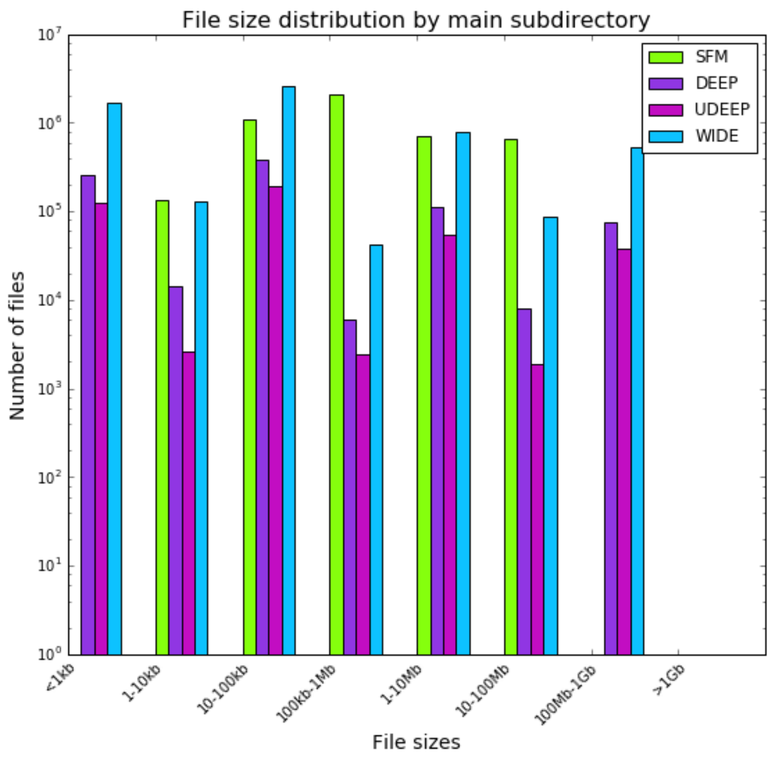
Disk Usage throughout the S17B reprocessing



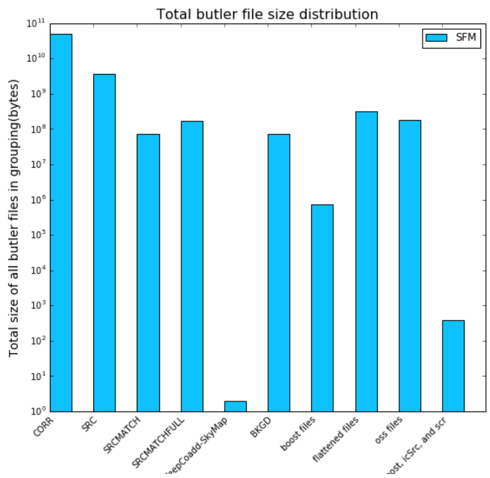


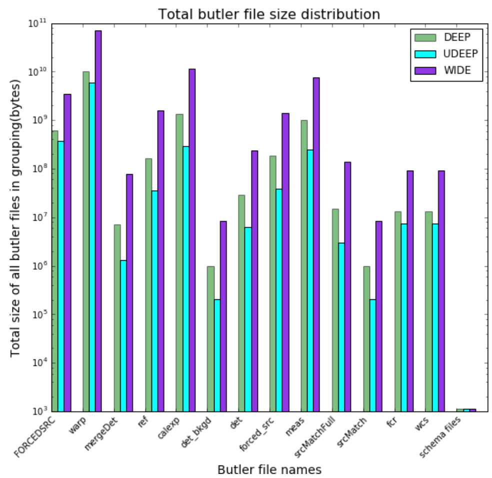
The figures above show the disk usage in the production scratch space, which was reserved purely for this S17B campaign use. Tests and failed runs wrote to this space as well. At hour ~275, removal of some older data in this scratch space was performed so the drop should be ignored.

The resultant data products are archived in 4 folders at /datasets/hsc/repo/rerun/DM-10404/. In total there are 11594219 files. The large files are typically hundreds of MBs. The average size is ~14MB. The file size distribution is as the plot below:



In terms of butler dataset types, the plots below show the distributions for SFM products and others. All plots are in log scale.





More details can be found at https://jira.lsstcorp.org/browse/DM-10904

Computing Usage of the S17B reprocessing

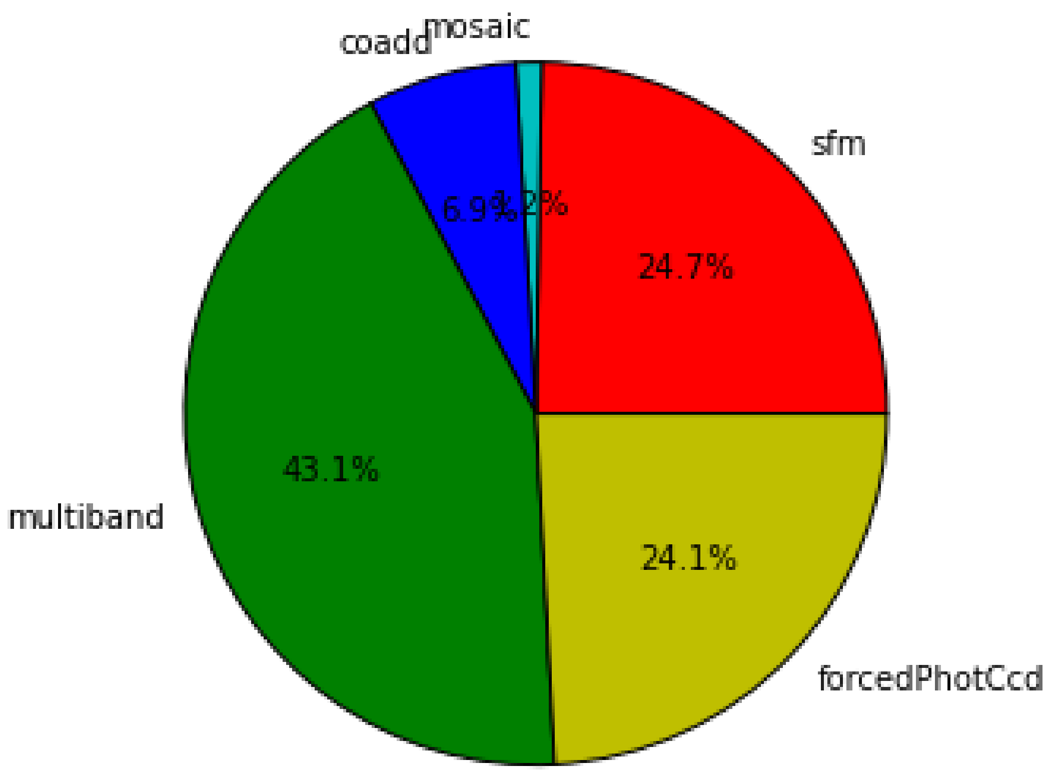
Total CPU = 79246 core-hours ~471.7 core-weeks

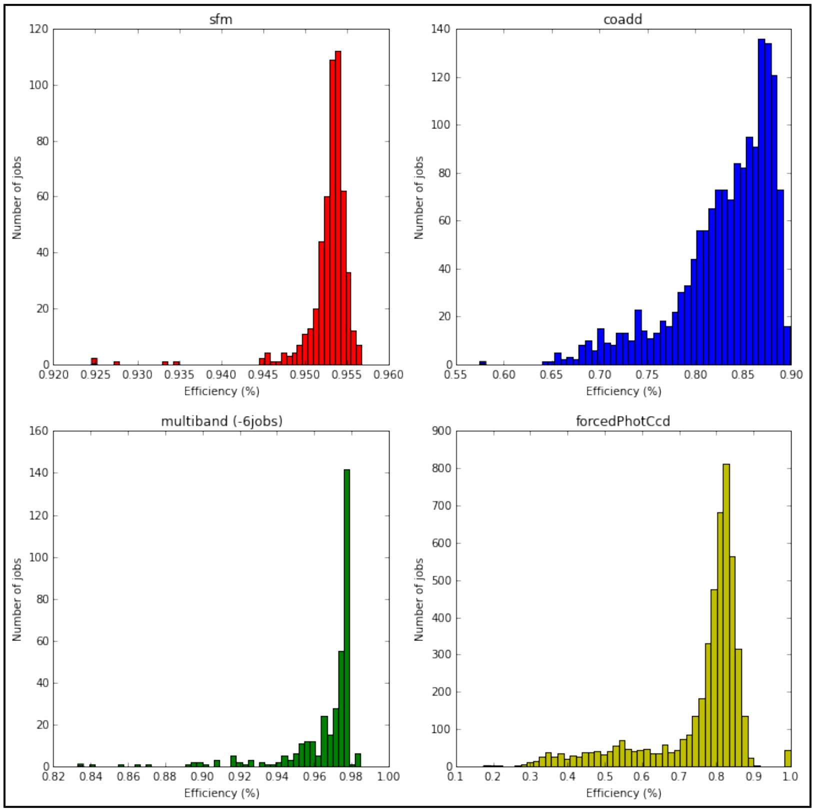
Total User CPU = 76246 core-hours ~453.8 core-weeks

The core-hours spent at each pipeline step are:

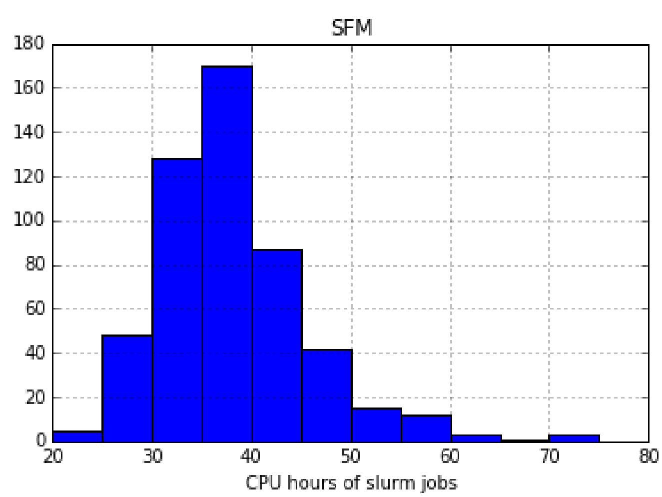
- sfm: 19596.9
- mosaic: 943.2
- coadd: 5444.9
- multiband: 34127.2
- forcedPhotCcd: 19133.9

The figure below shows the "efficiency", calculated by dividing the total cpu time by wall elapsed time * number of cores, for each pipeline.

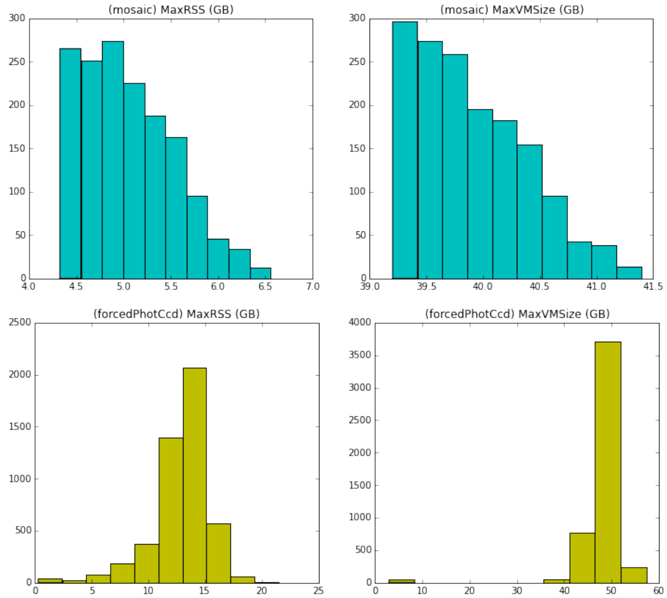




- A general feature of the plots is that the efficiency is observed to be bounded/limited by the fact that with ctrl_pool/mpi the MPI root process is mostly idle and occupies one core. This correlates with an upper bound for SFM of 23/24 ~0.958 , for coadd processing of 11/12 ~ 0.916, etc.
- sfm: Every 11 visits are grouped into one job, and each visit has 103 ccds. Thus, 1133 ccds were processed in a job, divided amongst 24 cores. Each ccd took around 2 minutes in average; in other words, roughly 90 min of wall clock elapsed time and 36 hr of accumulated CPU time per job. Efficiency is uniformly good. SingleFrameDriverTask is a ctrl_pool BatchParallelTask. The histogram below shows the CPU time of the SFM slurm jobs. The job IDs of the longest running jobs are: 51245, 51320, 51371, 51483, 51496, 51497, 51525, 51533, 51534, 51536, 51546, 51547, 51548, 51549, 51550, 51582, 51587, 51602, 51603



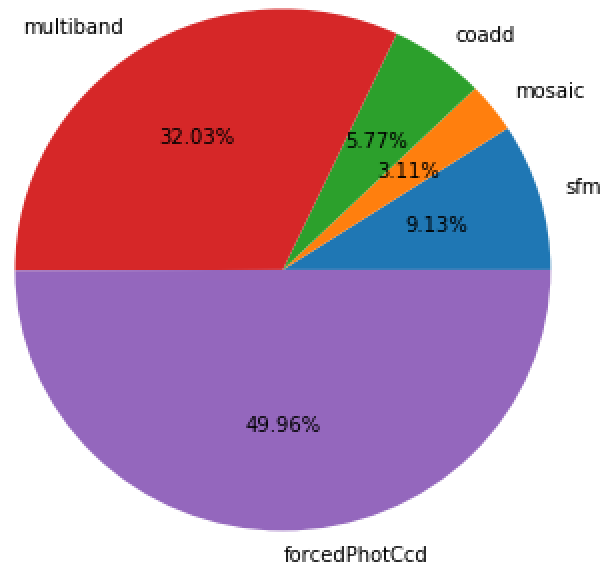
- mosaic: The unit of processing is each tract x filter on a node for each layer. Mosaic jobs used 12 cores for reading source catalogs, via Python multiprocessing, but 1 core for other parts of the task; therefore we did not calculate the efficiency as it would be misleading. MosaicTask does not use ctrl_pool.
- coadd: coadd jobs are chosen to process a tract on a node. One tract has 9*9=81 patches. CoaddDriverTask is a ctrl_pool BatchPoolTask. In most cases the patches are processed “12 wide” using ctrl_pool, distributing the work to 12 cores on a node. Using mpi based ctrl_pool in this context leads to one mostly idle MPI root process and 11 workers. As Verification nodes have 128 GB RAM, this gives on average ~ 11 GB of memory per patch, with the aggregate able to use the 128 GB.
- MultiBandDriver is a ctrl_pool BatchPoolTask.

- Six multiband jobs (9476-mbWIDE9219, 59482-mbWIDE9737,59484-mbWIDE10050, 59485-mbWIDE10188,59486-mbWIDE16003, 59316-mbUDEEP8522) were excluded from this figure; their elapsed times were very short and had very bad efficiencies but they are from tracks outside of the survey coverage.
- Some of the forcedPhotCcd jobs run as only one task on one node had very high efficiency but this gave bad throughput.
- Below are the histograms of the maximum resident set size and the virtual memory size for mosaic and forcedPhotCcd. Memory Memory monitoring of ctrl_pool driver jobs (singleFrameDriver, coaddDriver, multiBandDriver) was problematic and we do not believe in the numbers collected, so we do not plot them.
- 

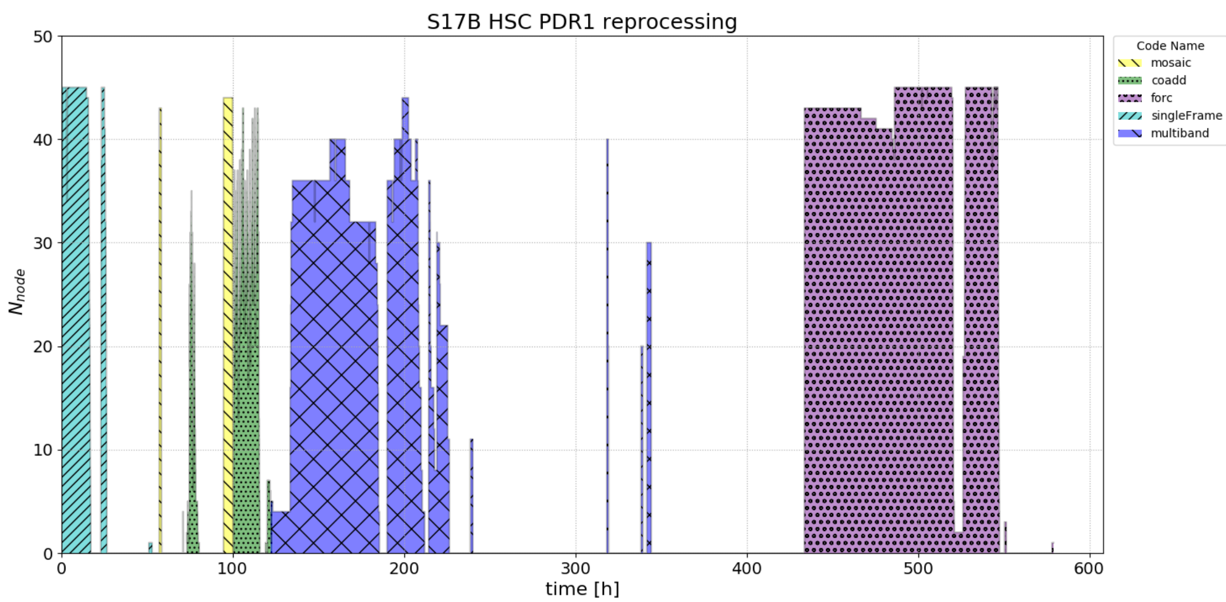
Node Utilization of the S17B reprocessing on the Verification Cluster

The Verification Cluster in its optimal state has 48 compute nodes with 24 physical cores, 256 GB RAM on each node. For the duration of the S17B reprocessing there was a peak of 45 compute nodes available. The total number of node-hours used was 9383.43. The node-hours spent for each code were as follows:

- singleFrameDriver: 856.96
- mosaic: 291.46
- coaddDriver 541.00
- multibandDriver: 3005.92
- forcedPhotCcd: 4688.09



The plot below does not include failed jobs or test attempts, of which the generated data do not contribute to the final results directly.



A lightly modified version of this report has been turned into DMTR-31, part of the DM Test Reports collection on DocuShare.

Other tickets of possible interest:

⚠ DM-10782 - Jira project doesn't exist or you don't have permission to view it.

⚠ DM-10761 - Jira project doesn't exist or you don't have permission to view it.

⚠ DM-10624 - Jira project doesn't exist or you don't have permission to view it.

⚠ DM-10413 - Jira project doesn't exist or you don't have permission to view it.

⚠ DM-11171 - Jira project doesn't exist or you don't have permission to view it.

Questions? For LSST-DM HSC-reprocessing effort we have a slack channel #dm-hsc-reprocessing