Vera C. Rubin Observatory
Data Management

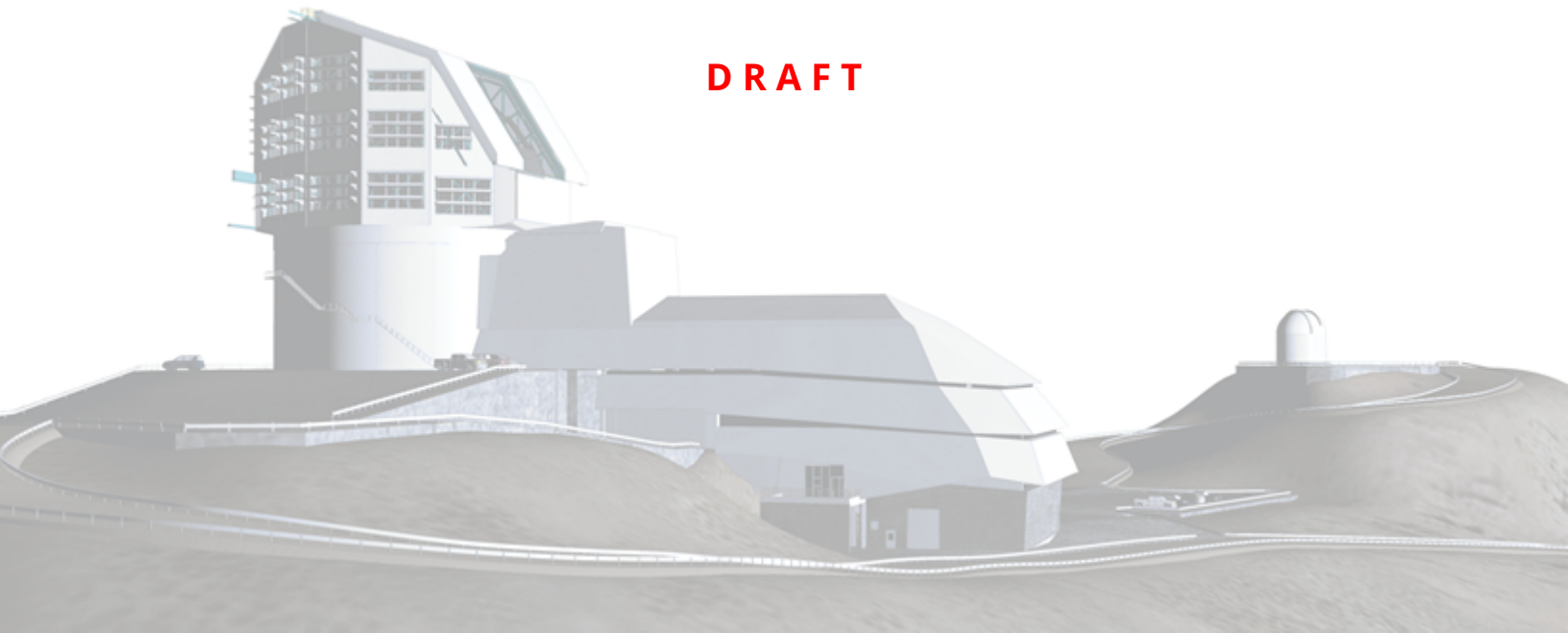
LVV-P117: LDM-503-19a (All P1a DM requirements verified) Test Plan and Report

Jeffrey Carlin

DMTR-412

Latest Revision: 2025-08-22

DRAFT



Abstract

This is the test plan and report for **LDM-503-19a (All P1a DM requirements verified)**, an LSST milestone pertaining to the Data Management Subsystem.
This document is based on content automatically extracted from the Jira test database on 2025-08-22 . The most recent change to the document repository was on 2025-08-22.

Change Record

Version	Date	Description	Owner name
	2023-08-18	First draft	Leanne Guy

Document curator: Leanne Guy
Document source location: `https://github.com/lsst-dm/DMTR-412`
Version from source repository: 78eaa25

Contents

1 Introduction **1**
1.1 Objectives . . . 1
1.2 System Overview . . . 1
1.3 Document Overview . . . 1
1.4 References . . . 2

2 Test Plan Details **4**
2.1 Data Collection . . . 4
2.2 Verification Environment . . . 4
2.3 Entry Criteria . . . 4
2.4 Exit Criteria . . . 4
2.5 Related Documentation . . . 4
2.6 PMCS Activity . . . 4

3 Personnel **5**

4 Test Campaign Overview **7**
4.1 Summary . . . 7
4.2 Overall Assessment . . . 14
4.3 Recommended Improvements . . . 14

5 Detailed Test Results **15**
5.1 Test Cycle LVV-R275 . . . 15
5.1.1 Software Version/Baseline . . . 15
5.1.2 Configuration . . . 15
5.1.3 Test Cases in LVV-R275 Test Cycle . . . 15
5.1.3.1 LVV-T83 - Verify implementation of Bad Pixel Map . . . 15
5.1.3.2 LVV-T85 - Verify implementation of Crosstalk Correction Matrix 17
5.1.3.3 LVV-T2303 - Verify Image Archive . . . 19
5.1.3.4 LVV-T33 - Verify implementation of Raw Science Image Metadata 25

5.1.3.5 LVV-T38 - Verify implementation of Processed Visit Images . . . 33
5.1.3.6 LVV-T103 - Verify implementation of Generate Data Quality Report Within Specified Time . . . 35
5.1.3.7 LVV-T45 - Verify implementation of Prompt Processing Data Quality Report Definition . . . 35
5.1.3.8 LVV-T47 - Verify implementation of Prompt Processing Calibration Report Definition . . . 38
5.1.3.9 LVV-T153 - Verify implementation of Engineering and Facility Database Archive . . . 38
5.1.3.10 LVV-T88 - Verify implementation of Calibration Data Products . 42
5.1.3.11 LVV-T89 - Verify implementation of Calibration Image Provenance . . . 44
5.1.3.12 LVV-T189 - Verify implementation of Summit Facility Infrastructure . . . 47
5.1.3.13 LVV-T197 - Verify implementation of Archive Center . . . 50
5.1.3.14 LVV-T198 - Verify implementation of Archive Center Disaster Recovery . . . 51
5.1.3.15 LVV-T34 - Verify implementation of Guider Calibration Data Acquisition . . . 52
5.1.3.16 LVV-T48 - Verify implementation of Exposure Catalog . . . 52
5.1.3.17 LVV-T1862 - Verify determining effectiveness of dark current frame . . . 54
5.1.3.18 LVV-T115 - Verify implementation of Calibration Production Processing . . . 56
5.1.3.19 LVV-T98 - Verify implementation of Selection of Datasets . . . 58
5.1.3.20 LVV-T2693 - Verify implementation of Image Provenance Access 63
5.1.3.21 LVV-T2699 - Verify implementation of Catalog Provenance Access . . . 66
5.1.3.22 LVV-T154 - Verify implementation of Raw Data Archiving Reliability . . . 69

5.1.3.23 LVV-T1250 - Verify implementation of minimum number of simultaneous DM EFD query users 69
5.1.3.24 LVV-T1251 - Verify implementation of maximum time to retrieve DM EFD query results 69
5.1.3.25 LVV-T1847 - Verify calculation of sensor fraction with unusable pixels 70
5.1.3.26 LVV-T377 - Verify Calculation of Photometric Performance Metrics 73
5.1.3.27 LVV-T1846 - Verify calculation of band-to-band color zero-point accuracy including u-band 73
5.1.3.28 LVV-T1843 - Verify calculation of significance of imperfect crosstalk corrections 74
5.1.3.29 LVV-T1757 - Verify calculation of photometric repeatability in gri filters 76
5.1.3.30 LVV-T1842 - Verify calculation of zeropoint error fraction exceeding the outlier limit 79
5.1.3.31 LVV-T1841 - Verify calculation of scientifically unusable pixel fraction 79
5.1.3.32 LVV-T1840 - Verify calculation of sky brightness precision 81
5.1.3.33 LVV-T1839 - Verify calculation of RMS width of photometric zeropoint 84
5.1.3.34 LVV-T1838 - Verify calculation of image fraction affected by ghosts 84
5.1.3.35 LVV-T1837 - Verify calculation of band-to-band color zero-point accuracy 86
5.1.3.36 LVV-T1836 - Verify calculation of resolved-to-unresolved flux ratio errors 87
5.1.3.37 LVV-T1746 - Verify calculation of fraction of relative astrometric measurement error on 5 arcminute scales exceeding outlier limit 90

5.1.3.38 LVV-T1749 - Verify calculation of fraction of relative astrometric measurement error on 20 arcminute scales exceeding outlier limit . . . 94
5.1.3.39 LVV-T1750 - Verify calculation of separations relative to r-band exceeding color difference outlier limit . . . 98
5.1.3.40 LVV-T1753 - Verify calculation of RMS difference of separations relative to r-band . . . 101
5.1.3.41 LVV-T1831 - Verify Implementation of Data Management Nightly Reporting . . . 105
5.1.3.42 LVV-T129 - Verify implementation of Provide Calibrated Photometry . . . 106
5.1.3.43 LVV-T30 - Verify implementation of Wavefront Sensor Data Acquisition . . . 109
5.1.3.44 LVV-T29 - Verify implementation of Raw Science Image Data Acquisition . . . 110
5.1.3.45 LVV-T2297 - Verify implementation of Science Data Archive . . . 112
5.1.3.46 LVV-T1612 - Verify Summit - Base Network Integration (System Level) . . . 118
5.1.3.47 LVV-T1168 - Verify Summit - Base Network Integration . . . 120
5.1.3.48 LVV-T1097 - Verify Summit Facility Network Implementation . . . 122
5.1.3.49 LVV-T192 - Verify implementation of Base Wireless LAN (WiFi) . . . 125
5.1.3.50 LVV-T1751 - Verify calculation of median relative astrometric measurement error on 200 arcminute scales . . . 126
5.1.3.51 LVV-T1752 - Verify calculation of fraction of relative astrometric measurement error on 200 arcminute scales exceeding outlier limit . . . 130
5.1.3.52 LVV-T3073 - Verify implementation of L1 Data Product pixel embargo . . . 133
5.1.3.53 LVV-T3074 - Verify implementation of Level 1 Data Product embargo time . . . 136

5.1.3.54 LVV-T191 - Verify implementation of Commissioning Cluster . . 136
5.1.3.55 LVV-T3155 - Verify Engineering and Facility Database Availability 149

A Documentation **152**

B Acronyms used in this document **152**

LVV-P117: LDM-503-19a (All P1a DM requirements verified) Test Plan and Report

1 Introduction

1.1 Objectives

This DM acceptance test campaign will verify all DM priority 1a requirements that have not been verified as part of prior testing and milestones.

1.2 System Overview

This test campaign is intended to verify that the DM system satisfies all of the priority 1a requirements outlined in the Data Management System Requirements (DMSR; LSE-61), ensuring that we are progressing toward readiness for LSSTCam on-sky observing. Additional DMSR requirements (priorities 1b, 2, and 3) will be verified in later Acceptance Test Campaigns.

Applicable Documents:
LSE-61: Data Management System (DMS) Requirements
LDM-503 Data Management Test Plan
LDM-639: Data Management Acceptance Test Specification

Tests in this campaign will use data products and artifacts from Data Preview 0.2, which consists of DESC Data Challenge 2 (DC2) simulated data reprocessed using the LSST Science Pipelines, on-sky data from auxTel imaging campaigns, precursor data from Subaru+HyperSuprime-Cam (HSC), and camera test-stand data, when appropriate.

1.3 Document Overview

This document was generated from Jira, obtaining the relevant information from the LVV-P117 Jira Test Plan and related Test Cycles (LVV-R275).

Section 1 provides an overview of the test campaign, the system under test (Acceptance), the applicable documentation, and explains how this document is organized. Section 2 provides

additional information about the test plan, like for example the configuration used for this test or related documentation. Section 3 describes the necessary roles and lists the individuals assigned to them.

Section 4 provides a summary of the test results, including an overview in Table 2, an overall assessment statement and suggestions for possible improvements. Section 5 provides detailed results for each step in each test case.

The current status of test plan LVV-P117 in Jira is **Approved** .

1.4 References

[1] **[DMTN-140]**, Comoretto, G., 2021, *Documentation Automation for the Verification and Validation of Rubin Observatory Software*, Data Management Technical Note DMTN-140, NSF-DOE Vera C. Rubin Observatory, URL https://dmtn-140.lsst.io/

[2] **[DMTN-178]**, Comoretto, G., 2021, *Docsteady Usecases for Rubin Observatory Constructions*, Data Management Technical Note DMTN-178, NSF-DOE Vera C. Rubin Observatory, URL https://dmtn-178.lsst.io/

[3] **[LSE-61]**, Dubois-Felsmann, G., Jenness, T., 2019, *Data Management System (DMS) Requirements*, Systems Engineering Controlled Document LSE-61, NSF-DOE Vera C. Rubin Observatory, URL https://lse-61.lsst.io/

[4] **[LDM-639]**, Guy, L., Wood-Vasey, W., Bellm, E., et al., 2022, *LSST Data Management Acceptance Test Specification*, Data Management Controlled Document LDM-639, NSF-DOE Vera C. Rubin Observatory, URL https://ldm-639.lsst.io/

[5] **[LDM-142]**, Kantor, J., 2017, *Network Sizing Model*, Data Management Controlled Document LDM-142, NSF-DOE Vera C. Rubin Observatory, URL https://ls.st/LDM-142

[6] **[LDM-503]**, O'Mullane, W., Swinbank, J., Juric, M., et al., 2023, *Data Management Test Plan*, Data Management Controlled Document LDM-503, NSF-DOE Vera C. Rubin Observatory, URL https://ldm-503.lsst.io/

[7] **[LSE-160]**, Selvy, B., 2013, *Verification and Validation Process*, Systems Engineering Con-

trolled Document LSE-160, NSF-DOE Vera C. Rubin Observatory, URL https://ls.st/LSE-160

2 Test Plan Details

2.1 Data Collection

Observing is not required for this test campaign.

2.2 Verification Environment

Most testing will be performed using the Rubin Science Platform (RSP) and the development cluster at the USDF. All tests will use the most recent available version of the Pipelines.

2.3 Entry Criteria

None

2.4 Exit Criteria

None

2.5 Related Documentation

Docushare collection where additional relevant documentation can be found:

- None

2.6 PMCS Activity

Primavera milestones related to the test campaign: None

3 Personnel

The personnel involved in the test campaign is shown in the following table.

	T. Plan LVV-P117 owner:	**Jeffrey Carlin**	
	T. Cycle LVV-R275 owner:	**Jeffrey Carlin**	
Test Cases	**Assigned to**	**Executed by**	**Additional Test Personnel**
LVV-T83	Jim Bosch	Jeffrey Carlin	b″
LVV-T85	Robert Lupton	Jeffrey Carlin	b″
LVV-T2303	Leanne Guy	Jeffrey Carlin	b″
LVV-T33	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T38	Eric Bellm	Jeffrey Carlin	b″
LVV-T103	Leanne Guy	Undefined	b″
LVV-T45	Eric Bellm	Jeffrey Carlin	b″
LVV-T47	Leanne Guy	Undefined	b″
LVV-T153	Leanne Guy	Jeffrey Carlin	b″
LVV-T88	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T89	Eli Rykoff	Jeffrey Carlin	b″
LVV-T189	Leanne Guy	Leanne Guy	b″
LVV-T197	Leanne Guy	Jeffrey Carlin	b″
LVV-T198	Leanne Guy	Undefined	b″
LVV-T34	Leanne Guy	Undefined	b″
LVV-T48	Jim Bosch	Jeffrey Carlin	b″
LVV-T1862	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T115	Kian-Tat Lim	Jeffrey Carlin	b″
LVV-T98	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T2693	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T2699	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T154	Leanne Guy	Undefined	b″
LVV-T1250	Jeffrey Carlin	Undefined	b″
LVV-T1251	Jeffrey Carlin	Undefined	b″
LVV-T1847	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T377	Jeffrey Carlin	Undefined	b″
LVV-T1846	Jeffrey Carlin	Undefined	b″
LVV-T1843	Jeffrey Carlin	Jeffrey Carlin	b″
LVV-T1757	Jeffrey Carlin	Jeffrey Carlin	b″

LVV-T1842	Jeffrey Carlin	Undefined	b”
LVV-T1841	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1840	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1839	Jeffrey Carlin	Undefined	b”
LVV-T1838	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1837	Jeffrey Carlin	Undefined	b”
LVV-T1836	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1746	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1749	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1750	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1753	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1831	Leanne Guy	Undefined	b”
LVV-T129	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T30	Leanne Guy	Leanne Guy	b”
LVV-T29	Kian-Tat Lim	Jeffrey Carlin	b”
LVV-T2297	Leanne Guy	Jeffrey Carlin	b”
LVV-T1612	Leanne Guy	Cristián Silva	Ron Lambert (LSST), Greg Thayer (SLAC)
LVV-T1168	Leanne Guy	Cristián Silva	Ron Lambert (LSST), Albert Astudillo (REUNA), Mauricio Rojas (CTIO/CISS), Raylex, Coriant, Telefonica contractors
LVV-T1097	Leanne Guy	Cristián Silva	Ron Lambert (Rubin Observatory), Kian-Tat Lim (Rubin Observatory), Matt Kollross (NCSA), Tony Johnson (SLAC), Gregg Thayer (SLAC)
LVV-T192	Leanne Guy	Leanne Guy	Leanne Guy
LVV-T1751	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T1752	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T3073	Jeffrey Carlin	Jeffrey Carlin	b”
LVV-T3074	Jeffrey Carlin	Undefined	b”
LVV-T191	Leanne Guy	Leanne Guy	Leanne Guy
LVV-T3155	Leanne Guy	Jeffrey Carlin	b”

4 Test Campaign Overview

4.1 Summary

T. Plan LVV-P117:	**LDM-503-19a (All P1a DM requirements verified)**			Approved
T. Cycle LVV-R275:	**LDM-503-19a (All P1a DM requirements verified)**			In Progress
Test Cases	**Ver.**	**Status**	**Comment**	**Issues**
LVV-T83				
Execution	LVV-E3502	Initial Pass	Executed at the USDF using the DP1 butler repository and pipelines version w_2025_27. The notebook containing the test execution is attached to the Test Report repository as "test_LVV-T83.ipynb".	
LVV-T85				
Execution	LVV-E3503	Pass	Test executed using ComCam data as processed by pipelines version w_2025_10. The results are shown in the notebook test_LVV-T85.ipynb attached to this document's repository. Additional verification of the effectiveness of the crosstalk correction can be found on the higher-level (OSS and LSR) tests pertaining to the following Verification Elements: • LVV-1624 • LVV-1621 • LVV-1642 • LVV-1633 • LVV-1634 • LVV-9802	
LVV-T2303				
Execution	LVV-E3504	Pass	Will be verified using DP1 data at /repo/dp1.	
LVV-T33				
Execution	LVV-E3505	Pass	The python script to execute this test is attached to the Test Report github repository in scripts/test_LVV-T33.py.	
LVV-T38				
Execution	LVV-E3506	Pass	Executed at the USDF with pipelines version w_2025_29, using LSSTComCam data from DP1. The resulting notebook is attached to the Test Report repository as "test_LVV-T38.ipynb".	
LVV-T103				

Execution	LVV-E3507	Not Executed	None
LVV-T45			
Execution	LVV-E3508	Pass	It was noted during this testing that a mechanism for exporting the report to PDF would be useful. It is unclear whether such functionality makes sense within Times Square, but we recommend that it either be implemented there, or that a capability should be developed elsewhere to make it straightforward to export a static artifact from the underlying notebook.
LVV-T47			
Execution	LVV-E3509	Not Executed	None
LVV-T153			
Execution	LVV-E3510	Pass	Test executed with science pipelines version w_2025_24 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T153.ipynb."
LVV-T88			
Execution	LVV-E3511	Initial Pass	Test executed in the RSP at the USDF using pipelines version w_2025_33.
LVV-T89			
Execution	LVV-E3512	Pass	Tests performed using ComCam on-sky data at the USDF, using w_2025_10 of the science pipelines. See the attached notebook, "test_LVV-T89.ipynb", for details.
LVV-T189			
Execution	LVV-E3519	Pass	None
LVV-T197			
Execution	LVV-E3520	Pass	None
LVV-T198			
Execution	LVV-E3521	Not Executed	None
LVV-T34			
Execution	LVV-E3522	Not Executed	None
LVV-T48			

	Execution	LVV-E3523	Pass	Test executed with science pipelines version w_2025_09 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T48.ipynb."
LVV-T1862				
	Execution	LVV-E3524	Pass	Test executed using ComCam data as processed by pipelines version w_2025_10. The results are shown in the notebook test_LVV-T1862.ipynb attached to this document's repository.
LVV-T115				
	Execution	LVV-E3525	Pass	Executed at the USDF using pipelines version w_2025_19, the ci_cpp package, and the "testdata_latiss_cpp" dataset.
LVV-T98				
	Execution	LVV-E3528	Pass	Test executed at the USDF (from both the command line and the RSP) using pipelines version w_2025_33. For this test, we demonstrate that these logical groupings can be applied in butler queries via the "where" clause. These same query constraints can be passed to pipetasks to apply the selections for processing of data.
LVV-T2693				
	Execution	LVV-E3530	Pass	Executed at the USDF using LSSTComCam data processed with pipelines version 'w_2025_16'. See the attached notebook, "test_LVV-T2693.ipynb", for details.
LVV-T2699				
	Execution	LVV-E3531	Pass	Executed at the USDF using LSSTComCam data processed with pipelines version 'w_2025_16'. See the attached notebook, "test_LVV-T2699.ipynb", for details.
LVV-T154				
	Execution	LVV-E3532	Not Executed	None
LVV-T1250				
	Execution	LVV-E3535	Not Executed	None
LVV-T1251				
	Execution	LVV-E3536	Not Executed	None
LVV-T1847				

	Execution	LVV-E3537	Pass	Test executed with science pipelines version w_2025_27 in the RSP Notebook aspect at the USDF. Because this test concerns a threshold calculated in LVV-T1841, the two tests were executed together. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1841_1847.ipynb."
LVV-T377				
	Execution	LVV-E3538	Not Executed	None
LVV-T1846				
	Execution	LVV-E3539	Not Executed	None
LVV-T1843				
	Execution	LVV-E3540	Pass	Tests performed using ComCam on-sky data at the USDF, using w_2025_10 of the science pipelines. See the attached notebook, "test_LVV-T1843.ipynb", for details.
LVV-T1757				
	Execution	LVV-E3541	Pass	Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1757.ipynb."
LVV-T1842				
	Execution	LVV-E3542	Not Executed	None
LVV-T1841				
	Execution	LVV-E3543	Pass	Test executed with science pipelines version w_2025_27 in the RSP Notebook aspect at the USDF. Because this test concerns a threshold for LVV-T1847, the two tests were executed together. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1841_1847.ipynb."
LVV-T1840				
	Execution	LVV-E3544	Pass w/ Deviation	Executed at the USDF with pipelines version w_2025_28, using LSSTComCam data from DP1. The resulting notebook is attached to the Test Report repository as "test_LVV-T1840.ipynb".

LVV-T1839			
	Execution	LVV-E3545	Not Executed	None
LVV-T1838			
	Execution	LVV-E3546	Pass	Test executed at the USDF RSP, using w_2025_33. The resulting notebook is attached to this test repository as "test_LVV-T1838.ipynb".
LVV-T1837			
	Execution	LVV-E3547	Not Executed	None
LVV-T1836			
	Execution	LVV-E3548	Pass	Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1836.ipynb." To allow for some flexibility in changing the method of calculating this metric, it has not yet been implemented within 'analysis_tools'. Before future large-scale data processing campaigns, this metric will be incorporated into the 'analysis_tools' tasks and pipelines that are executed as part of data release processing.
LVV-T1746			
	Execution	LVV-E3550	Pass	Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1746.ipynb."
LVV-T1749			
	Execution	LVV-E3551	Pass	Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1749.ipynb."
LVV-T1750			

	Execution	LVV-E3552	Pass	Test executed with science pipelines version w_2024_37 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1750_1753.ipynb."
LVV-T1753				
	Execution	LVV-E3555	Pass	Test executed with science pipelines version w_2024_37 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1750_1753.ipynb."
LVV-T1831				
	Execution	LVV-E3556	Not Executed	None
LVV-T129				
	Execution	LVV-E3558	Pass	Test performed in the RSP using public Data Preview 1 (DP1) data products, which are based on on-sky LSSTComCam data. The notebook is attached to this test repository as "test_LVV-T129.ipynb".
LVV-T30				
	Execution	LVV-E3559	Pass	None
LVV-T29				
	Execution	LVV-E3560	Pass	Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T29.ipynb."
LVV-T2297				
	Execution	LVV-E3561	Pass	None
LVV-T1612				
	Execution	LVV-E3647	Pass	None
LVV-T1168				
	Execution	LVV-E3648	Pass	None
LVV-T1097				
	Execution	LVV-E3649	Pass	None
LVV-T192				
	Execution	LVV-E3651	Pass	None

LVV-T1751			
Execution	LVV-E3734	Pass	Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1751_AM1_AM2.ipynb."
LVV-T1752			
Execution	LVV-E3735	Pass	Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF. The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1752_AF1_AF2.ipynb."
LVV-T3073			
Execution	LVV-E3743	Pass	This test was executed at the USDF with science pipelines version w_2024_43.
LVV-T3074			
Execution	LVV-E3744	Not Executed	None
LVV-T191			
Execution	LVV-E3750	Pass	The cluster was moved to the summit facility from the base and is currently in use in commissioning. There is no specification on what should be installed but to provide a useful system, we have ensured that the science pipelines are in stalled and condor as a batch system is available. The verification submits a batch job to run step#1 of nightly validation on some early ComCam images The batch submission was successful. Aspects of the processing failed and were correctly reported by the batch system as failures. This test does not test the processing, only the batch system on the commissioning cluster
LVV-T3155			

			Test executed with science pipelines version w_2025_24 in the RSP Notebook aspect at the USDF.
Execution	LVV-E4013	Pass	The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T3155.ipynb."

Table 2: Test Campaign Summary

4.2 Overall Assessment

None

4.3 Recommended Improvements

None

5 Detailed Test Results

5.1 Test Cycle LVV-R275

Open test cycle *LDM-503-19a (All P1a DM requirements verified)* in Jira.

Test Cycle name: LDM-503-19a (All P1a DM requirements verified)
Status: In Progress

Test campaign supporting milestone LDM-503-19a -- all P1a requirements verified.

5.1.1 Software Version/Baseline

b”

5.1.2 Configuration

b”

5.1.3 Test Cases in LVV-R275 Test Cycle

5.1.3.1 LVV-T83 - Verify implementation of Bad Pixel Map

Version **1.0(d)**. Status **Defined**. Open *LVV-T83* test case in Jira.

Verify that the DMS can produce a map of detector pixels that suffer from pathologies, and that these pathologies are encoded in at least 32-bit values.

Preconditions:
None

Execution status: **Initial Pass**
Final comment:
Executed at the USDF using the DP1 butler repository and pipelines version w_2025_27. The

notebook containing the test execution is attached to the Test Report repository as ”test_LVV-T83.ipynb”.

Detailed steps results LVV-R275-LVV-E3502-1243142026:

Step LVV-E3502-1 Step Execution Status: **Pass**

Description

Interrogate the calibRegistry for the metadata associated with a bad pixel map, where the validity range contains the date of interest.

Test Data

None

Expected Result

A bad pixel map for the requested date has been returned.

Actual Result

The following code was used to query for defect masks (the name for the bad pixel mask datasets), and select the first result:

```
# Query for all defects datasets in the collection:
defects_refs = butler.query_datasets('defects')

# Select the first from the list:
defects0 = butler.get('defects', dataId=defects_refs[0].dataId)
```

Step LVV-E3502-2 Step Execution Status: **Initial Pass**

Description

Check that the bad pixel pathologies are encoded as at least 32-bit values, and that the various pathologies are represented by different encoding.

Test Data

None

Expected Result

Bad pixel values can be decoded to determine their pathologies using their 32-bit values.

Actual Result

In the attached notebook, it was demonstrated that the pixels flagged as ”BAD” can be determined from the ‘defects‘ dataset. However, the encoding is a simple boolean (True/False) for ”BAD”, rather than the required 32-bit encoding of different pathologies. We grant this test an ”Initial Pass” status, pending the improvement of the bad pixel masks to encode more detailed status about each bad pixel.

5.1.3.2 LVV-T85 - Verify implementation of Crosstalk Correction Matrix

Version **1.0(d)**. Status **Defined**. Open *LVV-T85* test case in Jira.

Verify that the DMS can generate a cross-talk correction matrix from appropriate calibration data.
Verify that the DMS can measure the effectiveness of the cross-talk correction matrix.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed using ComCam data as processed by pipelines version w_2025_10. The results are shown in the notebook test_LVV-T85.ipynb attached to this document’s repository. Additional verification of the effectiveness of the crosstalk correction can be found on the higher-level (OSS and LSR) tests pertaining to the following Verification Elements:

- LVV-1624
- LVV-1621
- LVV-1642
- LVV-1633
- LVV-1634
- LVV-9802

Detailed steps results LVV-R275-LVV-E3503-1243142027:

Step LVV-E3503-1 Step Execution Status: **Pass**

Description

Identify an appropriate calibration dataset that can be used to derive the crosstalk correction matrix.

Test Data

None

Expected Result

Actual Result

We use the crosstalk coefficients that were measured by the camera team in the lab and ingested as a calibration data product into the butler. The creation and ingestion of the ComCam crosstalk curated calibrations was done on Jira ticket DM-45614.

In the attached notebook, we retrieve a crosstalk dataset from the butler via the following:

```
INSTRUMENT = ”LSSTComCam”
COLLECTION = ”LSSTComCam/runs/DRP/DP1/w_2025_10/DM-49359”
butler = Butler(”/repo/main”)
query = butler.query_datasets(’postISRCCD’, collections=COLLECTION)

# Select the first image and its crosstalk object:
postisrccd = butler.get(query[1])
crosstalk = butler.get(”crosstalk”, collections=COLLECTION, dataId=query[1].dataId)
```

Step LVV-E3503-2 Step Execution Status: **Pass**

Description

Confirm that the crosstalk correction matrix is produced and persisted.

Test Data

None

Expected Result

A correction matrix quantifying what fraction of the signal detected in any given amplifier on each sensor in the focal plane appears in any other amplifier.

Actual Result

As seen in the attached notebook, we retrieved the crosstalk object and plotted its values.

Step LVV-E3503-3 Step Execution Status: **Pass**

Description

Apply the crosstalk correction to images, and confirm that the correction is performing as expected.

Test Data

None

Expected Result

A noticeable difference between images before and after applying the correction.

Actual Result

The attached notebook demonstrates applying the crosstalk correction to an image, then comparing the image before and after correction. The correction has a noticeable effect, and the expected behavior where a bright star's correction appears in adjacent amplifiers is observed.

This test has achieved a PASS via demonstration of well-formed crosstalk calibration objects that achieve their goal when applied to images.

5.1.3.3 LVV-T2303 - Verify Image Archive

Version **1.0(d)**. Status **Approved**. Open *LVV-T2303* test case in Jira.

Verify that all image Data Products produced by the DMS (Processed Science Exposures, Calibration Exposures, Coadded Exposures) are either archived, or be capable of being recreated on-demand from inputs and processing provenance.

Preconditions:
None

Execution status: **Pass**
Final comment:
Will be verified using DP1 data at /repo/dp1.

Detailed steps results LVV-R275-LVV-E3504-1243142028:

Step LVV-E3504-1 Step Execution Status: **Pass**

Description
By listing calibration objects and ancillary files (e.g., reference catalogs), demonstrate that they have been retained. Examine some examples from the various types, and confirm that they are well-formed.

Test Data
None

Expected Result
Demonstration that calibration and ancillary data products have been retained and are available for use.

Actual Result
DP1 data are archived at the USDF in repository /repo/dp1, collection LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260. Here we will demonstrate via queries that the datasets are present in this repo.

Raw images:

```
(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$
 butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260 raw | wc
  16129  161270 2402925
```

Reference catalog (The Monster):

```
(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$
 butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260 the_monster_20250219
--limit 1000000 | wc
 131076  524296 13500624
```

Photon transfer curve (ptc):

```
(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 ptc --limit 1000000 | wc
    22     100    2682
```

Bias:

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 bias --limit 1000000 | wc
31 145 3917

Darks:

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 dark --limit 1000000 | wc
31 145 3917

Examine some of the files to confirm they're well-formed. First open an ipython session in a terminal, then:

In [1]: from lsst.daf.butler import Butler
In [**2**]: butler = Butler('/repo/dp1', collections=['LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260'])
In [**3**]: refs = butler.query_datasets('bias')
In [**4**]: bias = butler.get(refs[0])
In [**5**]: bias
Out[**5**]: <lsst.afw.image._exposure.ExposureF at 0x7f9898f98830>
In [**6**]: bias.getBBox()
Out[**6**]: Box2I(corner=Point2I(0, 0), dimensions=Extent2I(4072, 4000))
In [7]: import numpy as np
In [**8**]: np.nanmedian(bias.image.array)
Out[**8**]: np.float32(-0.030564716)
In [**9**]: np.nanstd(bias.image.array)
Out[**9**]: np.float32(51.034676)

We see that the bias has an ExposureF object containing a 4072x4000 image, with median pixel value of roughly zero, as expected for a bias.

In [**10**]: refs = butler.query_datasets('ptc')
In [**11**]: ptc = butler.get(refs[0])
In [**12**]: ptc
Out[**12**]: <lsst.ip.isr.ptcDataset.PhotonTransferCurveDataset at 0x7f98835e7b60>
In [**16**]: ptc.ampNames
Out[**16**]:
['C10',
'C11',
'C12',
'C13',
'C14',
'C15',
'C16',
'C17',
'C07',
'C06',

'C05',
'C04',
'C03',
'C02',
'C01',
'C00']
In [**18**]: ptc.rawMeans['C00']
Out[**18**]:
array([477.57498519, 501.49237042, 524.90948954, 573.17176074,
596.76702405, 644.59139216, 668.02285215, 716.23392347,
763.24476975, 811.23738884, 859.54939063, 906.64399373,
955.51931685, 1002.10624225, 1073.70054479, 1145.25495219,
1217.23845867, 1288.23956527, 1359.81858928, 1431.82314398,
1526.58121014, 1598.74978101, 1694.24779853, 1813.49611823,
1909.33584092, 2027.05957533, 2147.44780151, 2266.2842281 ,
2410.70133852, 2552.78638784, 2719.77980282, 2864.07477037,
3055.03274106, 3220.66074203, 3409.42372835, 3627.26838956,
3843.16076696, 4054.48361054, 4317.80036862, 4557.32071885,
4841.25384465, 5126.05976276, 5440.94992003, 5748.07510771,
6103.33323664, 6460.96708419, 6841.90397705, 7252.25422254,
7678.92116404, 8134.10338573, 8632.14541315, 9135.05460446,
9679.13393687, 10260.602575 , 10875.75470457, 11522.94852991,
12216.72837329, 12927.88795107, 13719.11391032, 14531.25388077,
15377.98879657, 16321.97483095, 17287.47766898, 18323.39558752,
19421.33133832, 20556.0394046 , 21768.06500356, 23100.1279195 ,
24474.0624525 , 25943.35062 , 27460.23492076, 29080.34980963,
30847.10709202, 32669.31365131, 34646.53475428, 36684.81383157,
38878.02287999, 41209.17659742, 43672.70153375, 46254.6859343 ,
49013.94299117, 51927.32674726, 55029.64463467, 58275.2070528 ,
61765.78259758, 65461.33012346, 69356.02744116, 73410.62451029,
77697.41695487, 82098.44878214, 85549.37710251, 87751.70902655,
88826.46248014, 89393.47497459, 89481.88443297, 89659.39305075,
89740.31328478, 89770.10853101, 89759.45925516, 89816.45895709])

Step LVV-E3504-2 Step Execution Status: **Pass**

Description

List 'visit_image' and 'deep_coadd' exposures to demonstrate that they have been retained. Examine some examples, and confirm that they are well-formed.

Test Data

None

Expected Result

□□emonstration that □□isit and coadd images are present in the archive.

Actual Result

visit_images:

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 visit_image --limit 1000000 | wc
15976 143766 2731556

deep_coadds:

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 deep_coadd --limit 1000000 | wc
2648 18522 362504

Open an ipython terminal and inspect sample images:

In [1]: from lsst.daf.butler import Butler
In [2]: butler = Butler('/repo/dp1', collections=['LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260'])
In [**3**]: refs = butler.query_datasets('visit_image')
In [**5**]: vis_im = butler.get(refs[0])
In [**6**]: vis_im
Out[**6**]: <lsst.afw.image._exposure.ExposureF at 0x7f2816f392f0>

In [**7**]: vis_im.getBBox()
Out[**7**]: Box2I(corner=Point2I(0, 0), dimensions=Extent2I(4072, 4000))

In [8]: import numpy as np

In [**9**]: np.nanmedian(vis_im.image.array)
Out[**9**]: np.float32(3.851969)

In [**10**]: np.nanstd(vis_im.image.array)
Out[**10**]: np.float32(218.97614)

In [**11**]: refs = butler.query_datasets('deep_coadd')
In [**12**]: deepcoadd_im = butler.get(refs[0])
In [**13**]: deepcoadd_im
Out[**13**]: <lsst.afw.image._exposure.ExposureF at 0x7f27de353830>

In [**14**]: deepcoadd_im.getWcs()
Out[**14**]:
FITS standard SkyWcs:
Sky Origin: (94.0540540541, -24.5454545455)

Pixel Origin: (14999, 14999)
Pixel Scale: 0.2 arcsec/pixel

In [**15**]: deepcoadd_im.getBBox()
Out[**15**]: Box2I(corner=Point2I(-200, 5800), dimensions=Extent2I(3400, 3400))

In [**16**]: np.nanmedian(deepcoadd_im.image.array)
Out[**16**]: np.float32(2.913166)

In [**17**]: np.nanstd(deepcoadd_im.image.array)
Out[**17**]: np.float32(1393.8081)

The sample images seem to be well-formed, with metadata such as a bounding box and WCS, and have reasonable pixel values.

Step LVV-E3504-3 Step Execution Status: **Pass**

Description

For an intermediate data product that is not retained for data releases (e.g., 'preliminary_visit_image'), identify appropriate inputs, and run pipeline tasks to recreate that data product.

Test Data

None

Expected Result

Image data products resulting from the executed processing are present and well-formed.

Actual Result

Because the archived DP1 data products are in a read-only butler (at /repo/dp1), we demonstrate this capability based on the DP1 processing that is in /repo/main. The initial ISR processing steps to go from raw images to 'preliminary_visit_image's (which are not retained in DP1, and thus must be reproduced) can be run as follows:

pipetask run -j 12 -b /repo/main -i LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 -p $DRP_PIPE_DIR/pipelines/LSSTComCam/D
v2.yaml#step1a-single-visit-detectors -o u/jcarlin/dp1_repro_pvi --instrument lsst.obs.lsst.LsstComCam --register-
dataset-types -d "skymap='lsst_cells_v1' AND visit IN (2024121100609, 2024121100610, 2024121100611)" 2>&1 |
tee dp1_repro_pvi_test.log

After that pipeline task has successfully executed, one can open ipython, then execute the following to load the 'preliminary_visit_image' and examine it:

from lsst.daf.butler import Butler

butler = Butler('/repo/main', collections=['u/jcarlin/dp1_repro_pvi'])

% load dataset references from the output collection containing the data that was just processed:
In [**12**]: refs = butler.query_datasets('preliminary_visit_image', collections=['u/jcarlin/dp1_repro_pvi/20250715T193639Z'])

In [**13**]: len(refs)
Out[**13**]: 27

% There are 27 datasets because we processed 3 visits, each of which contains 9 detectors.

In [**14**]: pvi = butler.get(refs[13])

In [**15**]: pvi
Out[**15**]: <lsst.afw.image._exposure.ExposureF at 0x7f58baa81930>

In [**18**]: pvi.getBBox()
Out[**18**]: Box2I(corner=Point2I(0, 0), dimensions=Extent2I(4072, 4000))

We see that the image is an ExposureF object with the expected extent, and thus conclude that the processing recreated the expected intermediate data products.

5.1.3.4 LVV-T33 - Verify implementation of Raw Science Image Metadata

Version **1.0(d)**. Status **Approved**. Open *LVV-T33* test case in Jira.

Verify successful ingestion of raw data and that image metadata is present and queryable.

Preconditions:
None

Execution status: **Pass**
Final comment:
The python script to execute this test is attached to the Test Report github repository in scripts/test_LVV-T33.py.

Detailed steps results LVV-R275-LVV-E3505-1243142029:

Step LVV-E3505-1 Step Execution Status: **Pass**

Description

Identify (or gather) a dataset of raw science images.

Test Data

None

Expected Result

Actual Result

For this test, we use weekly Science Pipelines version ‘w_2025_33‘ at the USDF, examining recently gathered LSSTCam imaging data.

In particular, these data are at ‘/repo/embargo‘, in collection ‘LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202‘.

In the attached script, we instantiate a butler pointing to that repo/collection:

```
from lsst.daf.butler import Butler

repo = '/repo/embargo'
collection = 'LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202'
butler = Butler(repo, collections=collection)
```

The attached script queries the butler for datasetRefs of raw images:
query = butler.query_datasets('raw', collections=COLLECTION, with_dimension_records=True)

It then retrieves a selected raw image via the following:

```
raw_img = butler.get(query[0])
```

Step LVV-E3505-2 Step Execution Status: **Pass**

Description

Verify that time of exposure start/end, site metadata, telescope metadata, and camera metadata are stored in DMS system.

Test Data

None

Expected Result

Raw image data contain the required metadata.

Actual Result

The attached script also extracts the metadata attached to the image. The following code extracts the metadata and prints each entry to the screen:

```
md_dict = md.toDict()
for item in md_dict.items():
    print(item)
```

```
('SIMPLE', True)
('EXTEND', True)
('BINX', 1)
('BINY', 1)
('CCDGAIN', 1.0)
('CCDNOISE', 10.0)
('DETSIZE', '[1:4096,1:4004]')
('DATE', '2025-07-05T05:19:01.890')
('MJD', 60861.22154965252)
('IMGTYPE', 'OBJECT')
('DATE-OBS', '2025-07-05T05:18:30.962')
('MJD-OBS', 60861.221191691235)
('DATE-TRG', '2025-07-05T05:19:01.883')
('MJD-TRG', 60861.221549576614)
('OBSID', 'MC_O_20250704_000488')
('DATE-BEG', '2025-07-05T05:18:30.962')
('MJD-BEG', 60861.221191691235)
('DATE-END', '2025-07-05T05:19:01.892')
('MJD-END', 60861.22154967161)
('BUNIT', 'adu')
('TIMESYS', 'TAI')
('GROUPID', '2025-07-05T05:15:40.802')
('INSTRUME', 'lsstCam')
('TELESCOP', 'Simonyi Survey Telescope')
```

```
('OBS-LONG', -70.749417)
('OBS-LAT', -30.244639)
('OBS-ELEV', 2663.0)
('OBSGEO-X', 1818938.94)
('OBSGEO-Y', -5208470.95)
('OBSGEO-Z', -3195172.08)
('RA', 318.40614409975007)
('DEC', -14.460390741638887)
('RASTART', 318.40704480633815)
('DECSTART', -14.460507389707633)
('RAEND', 318.4070442159996)
('DECEND', -14.460504916972123)
('ROTPA', 77.99440026788089)
('ROTCOORD', 'sky')
('HASTART', -1.7716292227853014)
('ELSTART', 60.8718332734214)
('AZSTART', 62.8679456532809)
('AMSTART', 1.1444389967944493)
('HAEND', -1.7629832636372795)
('ELEND', 60.9712437867589)
('AZEND', 62.7105607584743)
('AMEND', 1.143336566822946)
('TRACKSYS', 'RADEC')
('RADESYS', 'ICRS')
('FOCUSZ', -3.202469781193729)
('OBJECT', 'lowdust')
('VIGNETTE', 'NO')
('VIGN_MIN', 'NO')
('TESTTYPE', 'OBJECT')
('CAMCODE', 'MC')
('CONTRLLR', 'O')
('DAYOBS', '20250704')
('SEQNUM', 488)
('PROGRAM', 'BLOCK-365')
('REASON', 'pairs_zy_33.0')
('CURINDEX', 1)
('MAXINDEX', 1)
('TSTAND', 'TMAMCv1_SUM')
('IMAGETAG', 'd4cb3a7a4bce57ea')
('OBSANNOT', 'pair_33, zy, b')
('CCD_MANU', 'E2V')
('CCD_TYPE', 'CCD250')
('CCDSLOT', 'S21')
('RAFTBAY', 'R12')
```

```
('FIRMWARE', '3139500e')
('PLATFORM', 'lsstcam')
('CONTNUM', '18edfb51')
('DAQVERS', 'R5-V13.4 2025-03-20T16:46:35Z (811f588b)')
('DAQPART', 'camera')
('DAQFOLD', 'raw')
('SEQFILE', 'FP_E2V_3s_cp_v1.seq')
('SEQNAME', 'FP_E2V_3s_cp_v1.seq')
('SEQCKSUM', '810001961')
('LSST_NUM', 'E2V-CCD250-287')
('CCD_SERN', '15483-17-04')
('REBNAME', 'LCA-13574-068')
('RAFTNAME', 'LCA-11021_RTM-009')
('FPVERS', '1.3.1-SNAPSHOT')
('IHVERS', '1.1.11')
('FILTBAND', 'z')
('FILTER', 'z_20')
('FILTPOS', 194.0)
('FILTSLOT', 4)
('EXPTIME', 30.0)
('DARKTIME', 30.9295)
('SHUTTIME', 30.000145196914673)
('AIRTEMP', 11.699999809265137)
('PRESSURE', 74405.0)
('HUMIDITY', 11.975000381469727)
('WINDSPD', 9.257399559020996)
('WINDDIR', 18.144826889038086)
('SEEING', 0.97889244556427)
('HEADVER', 2)
('FILENAME', 'MC_O_20250704_000488_R12_S21.fits')
('STUTTER ROWS', 0)
('STUTTER DELAY', 0.0)
('STUTTER NSHIFTS', 0)
('XTENSION', 'BINTABLE')
('BITPIX', 8)
('NAXIS', 2)
('NAXIS1', 0)
('NAXIS2', 0)
('PCOUNT', 0)
('GCOUNT', 1)
('TFIELDS', 0)
('COMMENT', '---- Checksums ----')
('CHECKSUM', 'iGXHjDVGiDVGiDVG')
('EXTNAME', 'REB_COND')
```

```
('TEMP1', 3.0625)
('TEMP2', 3.4375)
('TEMP3', -10.9375)
('TEMP4', -7.125)
('TEMP5', -8.3125)
('TEMP6', -7.0)
('TEMP7', -9.875)
('TEMP8', -7.125)
('TEMP9', -8.4375)
('TEMP10', -6.9375)
('ATEMPU', -20.8918)
('ATEMPL', -18.276)
('CCDTEMP', -100.862)
('RTDTEMP', -106.682)
('TEMPAVG', -6.94886)
('DIGPS_V', 5.55)
('DIGPS_I', 713.75)
('ANAPS_V', 7.975)
('ANAPS_I', 554.5)
('CLKHPS_V', 15.4)
('CLKHPS_I', 103.167)
('CLKLPS_V', 13.725)
('CLKLPS_I', 54.5)
('ODPS_V', 38.925)
('ODPS_I', 72.5833)
('HTRPS_V', 2.47346)
('HTRPS_W', 0.405001)
('PCKU_V', 2.04396)
('PCKL_V', -6.0)
('SCKU_V', 3.55311)
('SCKL_V', -5.75092)
('RGU_V', 4.99634)
('RGL_V', -4.98168)
('ODV', 22.2686)
('OGV', -3.67033)
('RDV', 10.5031)
('GDV', 26.0024)
('GDP', 26.0)
('RDP', 10.5)
('OGP', -3.75)
('ODP', 22.3)
('CSGATEP', 1.0)
('SCK_LOWP', -5.75)
('SCK_HIP', 3.55)
```

('PCK_LOWP', -6.0)
('PCK_HIP', 2.0)
('RG_LOWP', -4.99)
('RG_HIP', 5.01)
('AP0_RC', 2)
('AP1_RC', 2)
('AP0_GAIN', 0)
('AP1_GAIN', 0)
('AP0_CLMP', 0)
('AP1_CLMP', 0)
('AP0_AF1', 0)
('AP1_AF1', 0)
('AP0_TM', 0)
('AP1_TM', 0)
('HVBIAS', 'ON')
('POWER', 15.5266)
('DIGVB', 6.35)
('DIGIB', 738.92)
('DIGVA', 6.07904)
('DIGIA', 737.273)
('DIGVS', 6.04205)
('ANAVB', 9.025)
('ANAIB', 543.79)
('ANAVA', 8.27552)
('ANAIA', 559.116)
('ANAIS', 8.4363)
('ODVB', 40.5)
('ODIB', 77.8466)
('ODVA', 39.1194)
('ODVA2', 39.025)
('ODIA', 75.1178)
('ODVS', 38.9134)
('CKHVB', 16.225)
('CKHIB', 96.854)
('CKHVA', 15.386)
('CKHIA', 41.82)
('CKHVS', 15.492)
('CKLVB', 14.35)
('CKLIB', 40.25)
('CKLVA', 0.60192)
('CKLV2', 13.7481)
('CKLIA', 39.75)
('CKLVS', 13.9615)
('HTRVB', 12.325)

```
('HTRIB', 122.924)
('HTRVA', 11.7851)
('HTRIA', 105.549)
('HTRVAS', 11.778)
('BSSVBS', 50.1)
('BSSIBS', 0.077559)
('DATASUM', '0')
('HIERARCH ASTRO METADATA FIX MODIFIED', False)
('HIERARCH ASTRO METADATA FIX DATE', '2025-08-19T00:19:32.967981')
```

By examination of this metadata, we determine that the correct information has been included. This includes the start/end times of the exposure (referenced to TAI), site information including observatory location, seeing, etc., telescope metadata regarding its pointing, sensor readings, and camera and program metadata.

Step LVV-E3505-3 Step Execution Status: **Pass**

Description

Verify that images from the wavefront sensors and guiders are available, and that the shutter motion profiles can be retrieved.

Test Data

None

Expected Result

Actual Result

In the attached notebook, it is demonstrated that both guider and wavefront sensor images can be retrieved, as well as the shutter motion profile.

Guider image:
Image Download Error
Wavefront sensor image:
Image Download Error
Finally, we extract the shutter motion profile. The following shows the position of the shutter with time for one exposure:
Image Download Error

5.1.3.5 LVV-T38 - Verify implementation of Processed Visit Images

Version **1.0(d)**. Status **Approved**. Open *LVV-T38* test case in Jira.

Verify that the DMS
1. Successfully produces Processed Visit Images, where the instrument signature has been removed.
2. Successfully combines images obtained during a standard visit.

The verification should include confirming that the images have been trimmed of the overscan, and that correction of the instrumental signature (including crosstalk) has been applied properly.

Preconditions:
None

Execution status: **Pass**
Final comment:
Executed at the USDF with pipelines version w_2025_29, using LSSTComCam data from DP1. The resulting notebook is attached to the Test Report repository as ”test_LVV-T38.ipynb”.

Detailed steps results LVV-R275-LVV-E3506-1243142030:

Step LVV-E3506-1	Step Execution Status: **Pass**

Description
Identify suitable precursor datasets containing unprocessed raw images.

Test Data
None

Expected Result

Actual Result

Use the LSSTComCam data that became Data Preview 1 (DP1), as processed with v29 Science Pipelines.

Step LVV-E3506-2 Step Execution Status: **Pass**

Description

Identify the path to the data repository, which we will refer to as 'DATA/path', then execute the following:

Test Data

None

Expected Result

Butler repo available for reading.

Actual Result

```
from lsst.daf.butler import Butler
collection = "LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260"
repo = "/repo/dp1"
butler = Butler.from_config(repo, collections=collection)
```

Step LVV-E3506-3 Step Execution Status: **Pass**

Description

Run the initial steps (including instrument signature removal and calibration) of Data Release (or Prompt) Processing on these data. Verify that Processed Visit Images are generated at the correct size and with significant instrumental artifacts removed.

Test Data

None

Expected Result

Raw precursor dataset images have been processed into Processed Visit Images, with instrumental artifacts corrected.

Actual Result

In the attached notebook, we examine a 'visit_image', comparing it to the 'raw' frame of the same observation to

confirm that it has been transformed via instrument signature removal. We further explore the image to show that it contains a WCS, PSF, and mask and variance planes. The image is well-formed and contains all expected data.

We have thus confirmed that the PVIs are being created as expected in the Science Pipelines. We note that the requirement mentions a ”standard visit”, which was originally expected to contain 2x15s ”snaps” that would be combined. Commissioning data from LSSTComCam showed that this is likely unnecessary, and the standard visit is likely to be redefined as a single 30s exposure. If instead the 2x15s snaps are retained, this test should be re-executed demonstrating the combination of snaps.

5.1.3.6 LVV-T103 - Verify implementation of Generate Data Quality Report Within Specified Time

Version **1.0(d)**. Status **Defined**. Open *LVV-T103* test case in Jira.

Verify that the DMS can generate a nightly L1 Data Quality Report within **dqReportComplTime = 4[hour]**, in both human- and machine-readable formats.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.7 LVV-T45 - Verify implementation of Prompt Processing Data Quality Report Definition

Version **1.0(d)**. Status **Approved**. Open *LVV-T45* test case in Jira.

Verify that the DMS produces a Prompt Processing Data Quality Report. Specifically check absolute value and temporal variation of
1. Photometric zeropoint

2. Sky brightness
3. Seeing
4. PSF
5. Detection efficiency

Preconditions:
None

Execution status: **Pass**
Final comment:
It was noted during this testing that a mechanism for exporting the report to PDF would be useful. It is unclear whether such functionality makes sense within Times Square, but we recommend that it either be implemented there, or that a capability should be developed elsewhere to make it straightforward to export a static artifact from the underlying notebook.

Detailed steps results LVV-R275-LVV-E3508-1243142032:

Step LVV-E3508-1 Step Execution Status: **Pass**

Description
Identify a dataset that has been processed with the Alert Production pipeline. To generate the report, you will need the observation date and instrument.

Test Data
None

Expected Result

Actual Result
By default, the report will display data from LATISS for 2024-09-04.

Step LVV-E3508-2 Step Execution Status: **Pass**

Description
Visit the url for the "AP Data Quality Report" on Times Square, update the date and instrument, then click "Update" to (re-)generate the report. (A default report will likely appear when you first reach the site.)

Test Data
None

Expected Result
A data quality report showing plots that summarize the data taken on the requested observing night.

Actual Result
The url for the AP Data Quality Report is `https://usdf-rsp-dev.slac.stanford.edu/times-square/github/lsst-dm/ap-times-square-notebooks/AP_Data_Quality_Report`. Below we display the report for LATISS data from 2024-09-04, obtained by entering the date and instrument into the boxes at the left. The following screenshot shows the top of the report, as well as the interface (on the left side) for changing the configuration of the report:
Image Download Error

Step LVV-E3508-3 Step Execution Status: **Pass**

Description
Observe that a dynamically updated Data Quality Report has become available at the relevant UI.

Test Data
None

Expected Result
A Prompt Processing QC report is available via a UI, and contains information about the photometric zeropoint, sky brightness, seeing, PSF, and detection efficiency, and possibly other relevant quantities.

Actual Result
The report is available, and displays the following (sets of) plots:

- Photometric Zeropoint vs. Time, by Filter
- Sky Brightness vs. Time, by Filter
- Seeing vs. Time, by Filter
- PSF Parameters vs. Time, by Filter

The detection efficiency for point sources, as requested in the requirement, is not currently available. To generate this would require injecting synthetic sources into the data, which may be beyond the scope of Prompt Processing.

In the future, we may instead include the limiting magnitude for each image as a proxy for the detection efficiency, as these two quantities are intimately related.

Because the definition exists within the Times Square framework, we deem this test a "**Pass".** However, this test should be repeated at a later date to confirm that (a) the detection efficiency (or a proxy for it) is reported, and (b) any additional necessary explanatory text or figures is included. We expect the included information to evolve as the survey proceeds.

5.1.3.8 LVV-T47 - Verify implementation of Prompt Processing Calibration Report Definition

Version **1.0(d)**. Status **Defined**. Open *LVV-T47* test case in Jira.

Verify that the DMS produces a Prompt Processing Calibration Report. Specifically check that this report is capable of identifying when aspects of the telescope or camera are changing with time.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.9 LVV-T153 - Verify implementation of Engineering and Facility Database Archive

Version **1.0(d)**. Status **Approved**. Open *LVV-T153* test case in Jira.

Demonstrate Engineering and Facilities Data (images, associated metadata, and observatory environment and control data) are archived.

Preconditions:

None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2025_24 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T153.ipynb."

Detailed steps results LVV-R275-LVV-E3510-1243142034:

Step LVV-E3510-1 Step Execution Status: **Pass**

Description
Access the EFD archive at the US Data Facility (USDF).

Test Data
None

Expected Result
Active connection with the EFD client at the USDF.

Actual Result
The USDF archive of the EFD was accessed from a notebook in the USDF RSP via the following lines;

```
from lsst_efd_client import EfdClient
client = EfdClient('usdf_efd')
```

This instantiates the service for queries.

Step LVV-E3510-2 Step Execution Status: **Pass**

Description
Query some EFD telemetry topics for a night at least 1 month ago during which on-sky observing took place. Query topics that are typically populated during on-sky observing, and confirm that they return results.

Test Data

None

Expected Result

Populated EFD telemetry for topics related to the various aspects of the telescope, camera, and facility.

Actual Result

In the attached notebook, we have demonstrated that telemetry from a wide variety (over 3000) topics is available in the archived EFD. The EFD contains topics pertaining to AuxTel (AT*), the Simonyi Telescope (”MainTel” -- denoted MT*), including the telescope mount (MTMount), the dome (MTDome), the AOS system (MTAOS), the HVAC system, and LSSTCam (MTCamera), among others. We also note that topics include commands, logevents, and telemetry from sensors.

We extracted data from the EFD for a half-hour period of LSSTCam observing on May 5, 2025 and printed some columns to the screen. The following is a subset of the outputs:

```
*** Retrieving lsst.sal.MTMount.azimuth ***

                index               actualPosition  actualPositionTimestamp
------------------------------ ---------------- ----------------------
2025-05-05 03:00:00.017759+00:00 16.6336992840165        1746414036.88586
2025-05-05 03:00:00.118609+00:00 16.6328785412205        1746414036.98565
2025-05-05 03:00:00.183883+00:00 16.6324684927823        1746414037.03552

*** Retrieving lsst.sal.MTMount.elevation ***

                index               actualPosition  actualPositionTimestamp
------------------------------ ---------------- ----------------------
2025-05-05 03:00:00.018120+00:00 60.4935636867039        1746414036.91525
2025-05-05 03:00:00.119741+00:00 60.4936641347571        1746414037.01558
2025-05-05 03:00:00.184244+00:00  60.493717586413        1746414037.06586

*** Retrieving lsst.sal.ESS.temperature ***

                index                     sensorName        temperatureItem0
------------------------------ ---------------------- -----------------
2025-05-05 03:00:00.265538+00:00 MTCameraAssembly-ESS01 9.816399574279785
2025-05-05 03:00:00.423640+00:00           AuxTel-ESS01                 --
2025-05-05 03:00:00.476175+00:00           Camera-ESS01              11.75
```

```
*** Retrieving lsst.sal.MTAOS.logevent_wavefrontError ***

                index                 nollZernikeValues7   ... sensorId
------------------------------ ---------------------- ... --------
2025-05-05 03:08:29.520446+00:00     0.1901925802230835 ...      191
2025-05-05 03:08:29.626493+00:00   0.056604646146297455 ...      195
2025-05-05 03:16:40.393737+00:00 -0.0055709718726575375 ...      191

*** Retrieving lsst.sal.MTM1M3.accelerometerData ***

                index                  accelerometer0   ...     timestamp
------------------------------ ------------------- ... ------------------
2025-05-05 03:00:00.008773+00:00 0.03544413298368454 ... 1746414037.0084796
2025-05-05 03:00:00.029285+00:00 0.03568815067410469 ... 1746414037.0284805
2025-05-05 03:00:00.049199+00:00 0.03679560497403145 ... 1746414037.0484805


*** Retrieving lsst.sal.MTRotator.logevent_lowFrequencyVibration ***

                index               frequency
------------------------------ ---------
2025-05-05 03:29:15.264806+00:00      0.33

*** Retrieving lsst.sal.MTCamera.command_takeImages ***

                index               expTime numImages shutter
------------------------------ ------- --------- -------
2025-05-05 03:07:24.192381+00:00      30         1    True
2025-05-05 03:08:01.361480+00:00      30         1    True
2025-05-05 03:11:13.485308+00:00      15         1    True

*** Retrieving lsst.sal.MTCamera.logevent_startIntegration ***

                index               exposureTime ... imageNumber
------------------------------ ------------ ... -----------
2025-05-05 03:07:24.311131+00:00           30 ...         336
2025-05-05 03:08:01.462359+00:00           30 ...         337
2025-05-05 03:11:13.607377+00:00           15 ...         338
```

We have thus demonstrated that the EFD is archived at the USDF, and that the data it contains are intact, accessible, and well-formed.

5.1.3.10 LVV-T88 - Verify implementation of Calibration Data Products

Version **1.0(d)**. Status **Defined**. Open *LVV-T88* test case in Jira.

Verify that the DMS can produce and archive the required Calibration Data Products: cross talk correction, bias, dark, monochromatic dome flats, broad-band flats, fringe correction, and illumination corrections.

Preconditions:
None

Execution status: **Initial Pass**
Final comment:
Test executed in the RSP at the USDF using pipelines version w_2025_33.

Detailed steps results LVV-R275-LVV-E3511-1243142035:

Step LVV-E3511-1 Step Execution Status: **Pass**

Description
Identify a suitable set of calibration frames, including biases, dark frames, and flat-field frames.

Test Data
None

Expected Result

Actual Result
For this test, we use the most recent LSSTCam on-sky data processing. The butler initialization is as follows:

butler = Butler('/repo/embargo', collections="LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202")

Note that this chains in the 'LSSTCam/calib' collection, which contains all the approved calibrations for LSSTCam.

Step LVV-E3511-2 Step Execution Status: **Pass**

Description

Execute the Calibration Products Production payload. The payload uses raw calibration images and information from the Transformed EFD to generate a subset of Master Calibration Images and Calibration Database entries in the Data Backbone.

Test Data

None

Expected Result

Actual Result

The creation of the most recent set of calibrations is documented on the TAXICAB-43 Jira ticket.

Step LVV-E3511-3 Step Execution Status: **Pass**

Description

Confirm that the expected Master Calibration images and Calibration Database entries are present and well-formed.

Test Data

None

Expected Result

Actual Result

The following steps (executed in the attached notebook test_LVV-T88.ipynb) demonstrate that these calibration products are present and queryable in the database.

Step LVV-E3511-4 Step Execution Status: **Initial Pass**

Description

Confirm that the expected data products are created, and that they have the expected properties.

Test Data
None

Expected Result
A full set of calibration data products has been created, and they are well-formed.

Actual Result
The attached notebook retrieves brighter-fatter kernel (bfk), defects mask, photon transfer curve (ptc), crosstalk object, bias, dark, and flat-field datasets, and demonstrates that they are well-formed and contain the expected information. We have demonstrated that the processing produces these calibration data products, and confirmed that they are well-formed.

However, we are not yet capable (mostly due to hardware limitations) of creating the monochromatic flats, synthetic broad-band flats, or fringe and illumination corrections, and thus deem the results of this test an ”initial pass”. This test will be executed again once the additional capabilities have been finalized.

Step LVV-E3511-5 Step Execution Status: **Pass**

Description
Test that the calibration products are archived, and can readily be applied to science data to produce the desired corrections.

Test Data
None

Expected Result
Confirmation that application of the calibration products to processed data has the desired effects.

Actual Result
This has been demonstrated in test case executions focused on each of the different calibration datasets separately. For example, LVV-T84 verified the biases, LVV-T85 and LVV-T1843 confirmed the effectiveness of the crosstalk corrections, and LVV-T90 verified the dark current corrections.

5.1.3.11 LVV-T89 - Verify implementation of Calibration Image Provenance

Version **1.0(d)**. Status **Approved**. Open *LVV-T89* test case in Jira.

Verify that the DMS records the required provenance information for the Calibration Data Products.

Preconditions:
None

Execution status: **Pass**
Final comment:
Tests performed using ComCam on-sky data at the USDF, using w_2025_10 of the science pipelines. See the attached notebook, "test_LVV-T89.ipynb", for details.

Detailed steps results LVV-R275-LVV-E3512-1243142036:

Step LVV-E3512-1 Step Execution Status: **Pass**

Description
Ingest an appropriate precursor calibration dataset into a Butler repo.

Test Data
None

Expected Result

Actual Result
This test uses calibration frames from the ComCam on-sky campaign in late 2024. The images were obtained during daily observing, and transferred to the USDF and ingested into the main shared Butler as part of routine observing practice.

Step LVV-E3512-2 Step Execution Status: **Pass**

Description
Execute the Calibration Products Production payload. The payload uses raw calibration images and information from the Transformed EFD to generate a subset of Master Calibration Images and Calibration Database entries in the Data Backbone.

Test Data
None

Expected Result

Actual Result
We use the calibrations that were produced as described in the TAXICAB ticket TAXICAB-23.

In the attached notebook, we retrieve calibration datasets from the butler via the following:

```
INSTRUMENT = ”LSSTComCam”
COLLECTION = ”LSSTComCam/runs/DRP/DP1/w_2025_10/DM-49359”
butler = Butler(”/repo/main”)

# Select the first bias image and its metadata:
query = butler.query_datasets('bias', collections=COLLECTION)
bias = butler.get(query[0])
bias_metadata = bias.getMetadata()
```

Step LVV-E3512-3 Step Execution Status: **Pass**

Description
Confirm that the expected Master Calibration images and Calibration Database entries are present and well-formed.

Test Data
None

Expected Result

Actual Result
The images were retrieved successfully, and the following steps serve as a demonstration that they were well-formed, and contain all the required metadata and provenance information.

Step LVV-E3512-4 Step Execution Status: **Pass**

Description
Load the relevant database/Butler data product, and observe that all provenance information has been retained.

Test Data
None

Expected Result
A dataset consisting of calibration images, with provenance information recorded and properly associated with the calibration images.

Actual Result
In the attached notebook ("test_LVV-T89.ipynb") we have demonstrated the retrieval of complete provenance information associated with calibration images (and their associated Butler RUN collections), including (among other things) the list of input exposures and the range of dates over which they were obtained; the processing parameters; the calibration products used to derive the images; and a set of metadata attributes including the date of creation; the calibration image type (e.g. dome flat, superflat, bias, etc); the provenance of the processing software; and the instrument configuration including the filter in use, where applicable. We thus deem the status of this test a PASS.

5.1.3.12 LVV-T189 - Verify implementation of Summit Facility Infrastructure

Version **1.0(d)**. Status **Draft**. Open *LVV-T189* test case in Jira.

Verify that the Summit Facility provides sufficient computing, storage, and network infrastructure to support buffering and forwarding of all raw image data to the Archive Facility, and compute facilities to support Commissioning activities.

Preconditions:
Summit facility in place

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3519-1243142038:

Step LVV-E3519-1 Step Execution Status: **Pass**

Description

Inspect the Computing Infrastructure document https://ittn-014.ls for details of the deployed infrastructure at the summit, section 1.2 Cerro Pachon. Ensure they are sufficient to support planned activities

Test Data

None

Expected Result

Compute for the Summit cluster sufficient to support operations

Actual Result

ITTN-014 describes the compute infrastructure on Cerro Pachon (summit).

Logging on to one of the summit nodes (azar)
$ kubectl exec -it rook-ceph-tools-5887567898-4p7qj -n rook-ceph -- /bin/bash
bash-5.1$ ceph df
--- RAW STORAGE ---
CLASS SIZE AVAIL USED RAW USED %RAW USED
nvme 4.5 PiB 4.5 PiB 16 TiB 16 TiB 0.34
TOTAL 4.5 PiB 4.5 PiB 16 TiB 16 TiB 0.34

There is a total of 4.5 PB of storage available. Nightly (24hr cycle) data volume is expected to be ~20TB. 20 nights of storage on the summit is ~ 0.5PB.An internal buffer of about 3 nights data is planned of the camera. This shows there is more than enough storage at the summit buffering and forwarding of data to the Archive during commissioning and operations.

Step LVV-E3519-2 Step Execution Status: **Pass**

Description

Inspect services running on summit systems that support commissioning and operations

Test Data

None

Expected Result

Services running and supporting commissioning

Actual Result

The compute infrastructure includes the commissioning cluster at the summit. This supports pipelines and runs bps jobs as shown in test LVV-T191 (1.0) / LVV-E3750. Additionally, the Rubin Science Platform runs at the summit, the Telescope control system, LOVE (love01/02.cp.lsst.org), RubinTV

Connect to the summit RSP from a laptop at the base runimg openVPN
> % curl -sL summit-lsp.lsst.codes | sed -n 's/.*<meta property="og:title" content="\([^"]*\)".*/\1/p'
Rubin Science Platform @ Summit

Step LVV-E3519-3 Step Execution Status: **Pass**

Description

Inspect network bandwidth from Summit to USDF

Expected Result

Network bandwidth sufficient for predicted data volumes and rates

Actual Result

Network summit to base is 600Gb/s. The base to USDF has 2 links. 1x100Gb/s exclusively for Rubin use and another 1x100Gb/s shared with other regional programs, with a guarantee of 40Gbit/sec minimum for Rubin.

Step LVV-E3519-4 Step Execution Status: **Not Executed**

Description

Measure transfer rates for some test datasets

Test Data

ComCam data

Expected Result

Actual Result

5.1.3.13 LVV-T197 - Verify implementation of Archive Center

Version **1.0(d)**. Status **Draft**. Open *LVV-T197* test case in Jira.

Verify that the Archive Center is sufficiently provisioned to support prompt processing, DRP, and data access needs.

Preconditions:
None

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3520-1243142039:

Step LVV-E3520-1 Step Execution Status: **Pass**

Description
Analyze design and sizing model

Test Data
None

Expected Result

Actual Result
The archive center is set up to execute numerous processing streams nearly continuously. These include (1) nightly (Prompt) processing, including Solar System association, on reserved nodes, and (2) ongoing/regular DRP processing.

Nightly/prompt processing:
This is executed in Kubernetes environments, configured via the
prompt processing config that is managed by Phalanx.

The following portion of the prompt processing configuration in Phalanx demonstrates the setup of pipelines to be executed, among other things.
Image Download Error This is followed by execution of the AP pipelines, including:

- `${PROMPT_PROCESSING_DIR}/pipelines/LSSTCam/ApPipe-noForced.yaml`
- `$PROMPT_PROCESSING_DIR/pipelines/LSSTCam/ApPipe.yaml`
- `$AP_PIPE_DIR/pipelines/LSSTCam/ApPipe.yaml`
- `$AP_PIPE_DIR/pipelines/_ingredients/ApPipeWithIsrTaskLSST.yaml`
- `$AP_PIPE_DIR/pipelines/_ingredients/ApPipe.yaml`

There is also consistently a DRP processing run being executed. The configuration, logs, and submission scripts are archived on the Jira ticket for each processing run. An example is DM-50260 (from the DP1 processing), which includes a summary that looks like the following:
Image Download Error
The storage and archiving provisions have been demonstrated on the Test Case for DMS-REQ-0003. The sizing model (`https://dmtn-135.lsst.io/`) details plans to accommodate future processing and storage needs.

These simultaneous and ongoing processing streams, plus additional processing, analysis, and data access activities by Pipelines and other teams, demonstrate a functioning Archive Center.

5.1.3.14 LVV-T198 - Verify implementation of Archive Center Disaster Recovery

Version **1.0(d)**. Status **Draft**. Open *LVV-T198* test case in Jira.

Verify disaster recovery plan for Archive Center.

Preconditions:
None

Execution status: **Not Executed**
Final comment:

None

5.1.3.15 LVV-T34 - Verify implementation of Guider Calibration Data Acquisition

Version **1.0(d)**. Status **Defined**. Open *LVV-T34* test case in Jira.

Verify successful
1. Ingestion of calibration frames
2. Execution of CPP payloads
3. Availability of observed guider calibration products

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.16 LVV-T48 - Verify implementation of Exposure Catalog

Version **1.0(d)**. Status **Approved**. Open *LVV-T48* test case in Jira.

Verify that the DMS creates an Exposure Catalog that includes
1. Observation datetime, exposure time
2. Filter
3. Dome, telescope orientation and status
4. Calibration status
5. Airmass and zenith
6. Environmental information
7. Per-sensor information

Preconditions:

None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2025_09 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T48.ipynb."

Detailed steps results LVV-R275-LVV-E3523-1243142042:

Step LVV-E3523-1 Step Execution Status: **Pass**

Description
Verify that Exposure Catalogs contain the required elements. At present, the form of the exposure catalog is not defined. This information can be found for a given Butler repo from the metadata, but will ultimately be aggregated into a database/table summarizing available exposures.

Test Data
None

Expected Result
A list of the required metadata for a set of exposures is returned and both human- and machine-readable.

Actual Result
In the attached notebook, we have demonstrated that an exposure log of ComCam on-sky data is accessible via the consolidated database (ConsDB).
We show that the ConsDB contains information taken directly from image headers, transformed data from the Engineering Facilities Database (EFD), and derived data based on image processing.
As required, these data include information about each exposure, include the telescope and instrument configuration, telemetry from the telescope, environmental and pointing information, and details about the camera.

In some examples shown, columns that exist in the database are not yet populated. Nonetheless, this test is deemed to *PASS* because we have demonstrated the existence of a database (ConsDB) keyed on day_obs, which can take inputs from a variety of sources, all of which can be configured (see the code for configuring and populating ConsDB at this github link).

5.1.3.17 LVV-T1862 - Verify determining effectiveness of dark current frame

Version **1.0(d)**. Status **Draft**. Open *LVV-T1862* test case in Jira.

Verify that the DMS can determine the effectiveness of a dark correction and determine how often it should be updated.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed using ComCam data as processed by pipelines version w_2025_10. The results are shown in the notebook test_LVV-T1862.ipynb attached to this document's repository.

Detailed steps results LVV-R275-LVV-E3524-1243142043:

Step LVV-E3524-1 Step Execution Status: **Pass**

Description
Identify the path to a dataset containing dark frames (i.e., exposures taken with the shutter closed).

Test Data
None

Expected Result

Actual Result
We use the dark correction images for ComCam on-sky data that were created and ingested as part of TAXICAB-23.

In the attached notebook, we retrieve a crosstalk dataset from the butler via the following:

INSTRUMENT = "LSSTComCam"
COLLECTION = "LSSTComCam/runs/DRP/DP1/w_2025_10/DM-49359"

```
butler = Butler("/repo/main")
query = butler.query_datasets('postISRCCD', collections=COLLECTION)

# Select an image and its dark object:
postisrccd = butler.get(query[1])
crosstalk = butler.get("dark", collections=COLLECTION, dataId=query[1].dataId)
```

Step LVV-E3524-2 Step Execution Status: **Pass**

Description

Execute the Calibration Products Production payload. The payload uses raw calibration images and information from the Transformed EFD to generate a subset of Master Calibration Images and Calibration Database entries in the Data Backbone.

Test Data

None

Expected Result

Actual Result

As noted in the previous step, we used the calibrations created for the "intermittent cumulative DRP" processing of ComCam data with 'w_2025_10'. The processing used the "cpDark.yaml" pipeline to create the combined dark frames, and the "verifyDark.yaml" pipeline to create the verification data that is reported to the TAXICAB for formal approval of calibration products.

Step LVV-E3524-3 Step Execution Status: **Pass**

Description

Confirm that the expected Master Calibration images and Calibration Database entries are present and well-formed.

Test Data

None

Expected Result

Actual Result
In the attached notebook, the dark image was displayed, and its metadata examined. All looks well-formed.

Step LVV-E3524-4 Step Execution Status: **Pass**

Description
Determining whether the dark correction is being done properly will require on-sky science data. The dark correction can be applied to these frames and the results inspected to ensure that the correction was correctly measured and applied.

Test Data
None

Expected Result
Applying the dark correction to a dataset produces noticeable differences between the original frame(s) and the corrected outputs.

Actual Result
In the attached notebook, we applied the dark correction to an input 'postISRCCD' image, and confirmed that the resulting image was as expected.

5.1.3.18 LVV-T115 - Verify implementation of Calibration Production Processing

Version **1.0(d)**. Status **Approved**. Open *LVV-T115* test case in Jira.

Execute CPP on a variety of representative cadences, and verify that the calibration pipeline correctly produces necessary calibration products.

Preconditions:
None

Execution status: **Pass**
Final comment:
Executed at the USDF using pipelines version w_2025_19, the ci_cpp package, and the "test-

data_latiss_cpp" dataset.

Detailed steps results LVV-R275-LVV-E3525-1243142044:

Step LVV-E3525-1 Step Execution Status: **Pass**

Description

Identify a suitable set of calibration frames, including biases, dark frames, and flat-field frames.

Test Data

None

Expected Result

Actual Result

This test uses the testdata_latiss_cpp dataset, a curated dataset used for regular testing of calibration products production.

Step LVV-E3525-2 Step Execution Status: **Pass**

Description

Execute the Calibration Products Production payload. The payload uses raw calibration images and information from the Transformed EFD to generate a subset of Master Calibration Images and Calibration Database entries in the Data Backbone.

Test Data

None

Expected Result

Actual Result

After setting up the 'ci_cpp_gen3' package, we executed the command "scons -j 8" (from the ci_cpp_gen3 package root directory), which runs a scons script that executes a full CPP payload. The full script that is executed can be seen at this link.

Step LVV-E3525-3 Step Execution Status: **Pass**

Description

Confirm that the expected Master Calibration images and Calibration Database entries are present and well-formed.

Test Data

None

Expected Result

Actual Result

In the attached notebook ("test_LVV-T115.ipynb"), we demonstrate querying the butler repository and confirming that the calibrations collections and datasets have been created.

Step LVV-E3525-4 Step Execution Status: **Pass**

Description

Confirm that the expected data products are created, and that they have the expected properties.

Test Data

None

Expected Result

Repos containing valid calibration products that are well-formed and ready to be applied to processed datasets.

Actual Result

The attached notebook retrieves brighter-fatter kernel (bfk), photon transfer curve (ptc), bias, dark, and flat-field datasets, and demonstrates that they are well-formed and contain the expected information. We have demonstrated that the processing script produces the calibration data products, and confirmed that they are well-formed, and thus deem the results of this test a pass.

5.1.3.19 LVV-T98 - Verify implementation of Selection of Datasets

Version **1.0(d)**. Status **Defined**. Open *LVV-T98* test case in Jira.

Verify that the DMS can identify and retrieve datasets consisting of logical groupings of Exposures, metadata, provenance, etc., or other groupings that are processed or produced as a logical unit.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed at the USDF (from both the command line and the RSP) using pipelines version w_2025_33.

For this test, we demonstrate that these logical groupings can be applied in butler queries via the ”where” clause. These same query constraints can be passed to pipetasks to apply the selections for processing of data.

Detailed steps results LVV-R275-LVV-E3528-1243142047:

Step LVV-E3528-1 Step Execution Status: **Pass**

Description
Execute a Butler query with constraints on observation time.

Test Data
None

Expected Result
List of datasets observed within the requested time period (and meeting any additional constraints that were applied).

Actual Result
From the command line, we issue a butler query to identify ‘visit_image‘ datasets from LSSTCam observing that were observed after a time of ”2025-06-01 12:20:33”. To demonstrate additional constraints that can be specified, we further limit it to g-band observations, and only detectors in raft R10.

butler query-datasets /repo/main visit_image --collections "LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933" --where "instrument='LSSTCam' AND skymap='lsst_cells_v1' AND band='g' AND visit.timespan.begin > T'2025-06-01 12:20:33' AND detector.raft='R10'"

type run id instrument detector visit band day_obs physical_filter
---------- -- ---------- ---------- ---------- ---- ----- ---------------
visit_image LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250810T233354Z 28e36348-8b46-4449-8aa2-7632ee096bb5 LSSTCam 28 2025060100605 g 20250601 g_6
visit_image LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250810T233354Z 58bddcc6-42b8-42ee-b6e5-f1189330e464 LSSTCam 29 2025060100605 g 20250601 g_6
visit_image LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250810T233354Z 6fc1a870-759d-4dcc-a99f-17991c315291 LSSTCam 30 2025060100605 g 20250601 g_6
visit_image LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250810T233354Z 5d0baa86-f992-4b55-9ace-0c8aa3eaff32 LSSTCam 31 2025060100605 g 20250601 g_6
visit_image LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250810T233354Z 367391ed-3e38-4908-8842-a2f8f2826c1b LSSTCam 32 2025060100605 g 20250601 g_6
visit_image LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250810T233354Z 9bc34df8-0d3e-4e39-a708-819ca91109cb LSSTCam 33 2025060100605 g 20250601 g_6
visit_image LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250810T233354Z bb94ad6b-20d1-413e-97b3-2126d644017a LSSTCam 35 2025060100605 g 20250601 g_6
visit_image

The results above (truncated) show that the query successfully identified a set of images meeting the constraint.

Step LVV-E3528-2 Step Execution Status: **Pass**

Description

Execute a Butler query that uses mathematical expressions to sub-select among the results (e.g., to select even-numbered patches).

Test Data

None

Expected Result

List of datasets satisfying the requested constraints.

Actual Result

From the command line, we issue a butler query to identify 'deep_coadd' datasets from LSSTCam observing. The queries below demonstrate applying mathematical constraints to (1) select even-numbered patches (by applying

a "patch % 2 = 0" constraint), and (2) select patches with ids less than 43 (i.e., "patch < 43"). In each case, the input query only requests patches 41-44, so the results should return only 2 patches.

$ butler query-datasets /repo/main deep_coadd --collections "LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933" --where "instrument='LSSTCam' AND skymap='lsst_cells_v1' AND tract=3725 AND band='g' AND patch in (41, 42, 43, 44) AND patch % 2 = 0"

type run id band skymap tract patch
---------- ---------- ---------- ---- ---------- ----- -----
deep_coadd LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250806T010818Z d91731aa-e9b4-4101-a6bf-3df72ad677ca g lsst_cells_v1 3725 42
deep_coadd LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250806T010818Z 0cc4af67-e488-435a-b50c-cd860b8931ee g lsst_cells_v1 3725 44

$ butler query-datasets /repo/main deep_coadd --collections "LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933" --where "instrument='LSSTCam' AND skymap='lsst_cells_v1' AND tract=3725 AND band='g' AND patch in (41, 42, 43, 44) AND patch < 43"

type run id band skymap tract patch
---------- ---------- ---------- ---- ---------- ----- -----
deep_coadd LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250806T010818Z 30f19e04-e625-487b-b45e-7515b25cefa5 g lsst_cells_v1 3725 41
deep_coadd LSSTCam/runs/DRP/20250501_20250609/w_2025_30/DM-51933/20250806T010818Z d91731aa-e9b4-4101-a6bf-3df72ad677ca g lsst_cells_v1 3725 42

We see that the constraints were successfully applied in each case, demonstrating that mathematical/numerical groupings can be applied.

Step LVV-E3528-3 Step Execution Status: **Pass**

Description

Query the Consolidated Database (ConsDB) to identify visits meeting some constraints on environmental conditions (e.g., seeing, wind speed or direction, temperature). Then use the returned list of visits to constrain a Butler query.

Test Data

None

Expected Result

List of datasets taken in the requested conditions.

Actual Result

In a Jupyter notebook on the USDF RSP, we execute the following code, which queries the ConsDB for visits taken between 20250721-20250730, when the dimm seeing was between 1.3-1.5 arcsec, and the air temperature was < 7 C.

```
import os
import numpy as np
import pandas as pd
import requests
from lsst.summit.utils import ConsDbClient

# Parameters
day_obs = "2025-07-30"
instrument = "lsstcam"

URL = "http://consdb-pq.consdb:8080/consdb"
os.environ["no_proxy"] += ",.consdb"
access_token = os.getenv("ACCESS_TOKEN")
headers = {"Authorization": f"Bearer {access_token}"}

client = ConsDbClient(URL)
print(client)

day_obs_int = int(day_obs.replace("-", ""))
print(f'Date: {day_obs_int}')

visit_query1 = f"""
   SELECT * FROM cdb_{instrument}.visit1
  where day_obs <= {day_obs_int} AND day_obs > {day_obs_int-9}
  AND science_program='BLOCK-365' AND dimm_seeing < 1.5 AND dimm_seeing > 1.3
   AND air_temp < 7.0
"""

visits = client.query(visit_query1).to_pandas()

print(visits['visit_id'].to_list())
```

The query prints the following list of 7 visits to the screen:

```
[2025072300523,
 2025072300533,
 2025072300534,
 2025072300540,
```

```
2025072300550,
2025072300551,
2025072300576]
```

This list of visits can be passed to the butler query interface to retrieve their dataset references as follows:

$ butler query-datasets /repo/embargo preliminary_visit_image --collections "LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202" --where "instrument='LSSTCam' AND skymap='lsst_cells_v1' AND visit IN (2025072300523, 2025072300533, 2025072300534, 2025072300540, 2025072300550, 2025072300551, 2025072300576) AND detector=34"

type run id instrument detector visit band day_obs physical_filter
---------------------- --- ------------------------------------ ---------- -------- ------------- ---- -------- ---------------
preliminary_visit_image LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202/20250816T023854Z e980c8a9-6eb1-451d-b6d6-071156293cc6 LSSTCam 34 2025072300523 g 20250723 g_6
preliminary_visit_image LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202/20250816T023854Z 875130bd-ae7b-4835-8bae-103f0618e33f LSSTCam 34 2025072300533 g 20250723 g_6
preliminary_visit_image LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202/20250816T023854Z d1ae421f-ae03-4431-8b64-9e358dc4647e LSSTCam 34 2025072300534 g 20250723 g_6
preliminary_visit_image LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202/20250816T023854Z 6330df8d-0c53-4eca-a840-1e145933a23c LSSTCam 34 2025072300540 g 20250723 g_6
preliminary_visit_image LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202/20250816T023854Z e378692f-10a9-4d97-a7ca-e5550c04ff20 LSSTCam 34 2025072300550 r 20250723 r_57
preliminary_visit_image LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202/20250816T023854Z cb6ab6c1-d102-443c-9df2-fdf997cedcc5 LSSTCam 34 2025072300551 r 20250723 r_57
preliminary_visit_image LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202/20250816T023854Z ea0420f3-8cb9-4235-bc01-b188b3806e33 LSSTCam 34 2025072300576 r 20250723 r_57

We have thus demonstrated that constraints on observing conditions can be applied to select groupings of datasets for processing.

5.1.3.20 LVV-T2693 - Verify implementation of Image Provenance Access

Version **1.0(d)**. Status **Approved**. Open *LVV-T2693* test case in Jira.

Verify that available image data products' provenance information can be listed and retrieved.

Preconditions:

None

Execution status: **Pass**
Final comment:
Executed at the USDF using LSSTComCam data processed with pipelines version ‘w_2025_16‘.
See the attached notebook, ”test_LVV-T2693.ipynb”, for details.

Detailed steps results LVV-R275-LVV-E3530-1243142049:

Step LVV-E3530-1 Step Execution Status: **Pass**

Description
Identify the path to the data repository, which we will refer to as ‘DATA/path‘, then execute the following:

Test Data
None

Expected Result
Butler repo available for reading.

Actual Result
Working in a notebook entitled ”test_LVV-T2693.ipynb” on the U.S. Data Facility:

```
from lsst.daf.butler import Butler

collection = ”LSSTComCam/runs/DRP/DP1/w_2025_16/DM-50344”
butler = Butler(”/repo/main”, collections=[collection])
```

Step LVV-E3530-2 Step Execution Status: **Pass**

Description
Using ‘Butler.get()‘, retrieve a ‘visit_image‘ using a known dataId.

Test Data
None

Expected Result

Actual Result

# Define the data dimensions for dataId creation:
tract = 5063
patch = 24
visit = 2024110800246
detector = 4

# Retrieve an image:
vis_im = butler.get('visit_image', dataId={'visit':visit, 'detector': detector})

Step LVV-E3530-3 Step Execution Status: **Pass**

Description

Use the 'DatasetProvenance' class from 'lsst.daf.butler' to extract the provenance of the image, and display the provenance information to the screen.

Test Data

None

Expected Result

A 'DatasetProvenance' object containing information about the input datasets to the inspected image is displayed to the screen.

Actual Result

# Extract the provenance and print to the screen:
vis_im_prov = DatasetProvenance.from_flat_dict(vis_im.metadata, butler)
vis_im_prov[0]

OUTPUT:

```
DatasetProvenance(inputs=[SerializedDatasetRef(id=UUID('b97a5838-24a4-4d83-9e14-c2c7fdd17afd'), datasetType=SerializedDat
```

Step LVV-E3530-4 Step Execution Status: **Pass**

Description

Repeat steps 2 and 3 for difference images and coadd images.

Test Data

None

Expected Result

Actual Result

See the attached notebook, wherein we repeated the above steps for many different image datasets.

5.1.3.21 LVV-T2699 - Verify implementation of Catalog Provenance Access

Version **1.0(d)**. Status **Approved**. Open *LVV-T2699* test case in Jira.

Verify that available catalog data products' provenance can be listed and retrieved.

Preconditions:

None

Execution status: **Pass**

Final comment:

Executed at the USDF using LSSTComCam data processed with pipelines version 'w_2025_16'.
See the attached notebook, "test_LVV-T2699.ipynb", for details.

Detailed steps results LVV-R275-LVV-E3531-1243142050:

Step LVV-E3531-1 Step Execution Status: **Pass**

Description

Identify the path to the data repository, which we will refer to as 'DATA/path', then execute the following:

Test Data
None

Expected Result
Butler repo available for reading.

Actual Result
Working in a notebook entitled "test_LVV-T2699.ipynb" on the U.S. Data Facility:

```
from lsst.daf.butler import Butler

collection = "LSSTComCam/runs/DRP/DP1/w_2025_16/DM-50344"
butler = Butler("/repo/main", collections=[collection])
```

Step LVV-E3531-2 Step Execution Status: **Pass**

Description
Using 'Butler.get()', retrieve a 'source' catalog using a known dataId.

Test Data
None

Expected Result

Actual Result
```
# Define the data dimensions for dataId creation:
tract = 5063
patch = 24
visit = 2024110800246
detector = 4

# Retrieve a catalog:
src_unstd = butler.get('source_unstandardized', dataId={'visit':visit, 'detector': detector})
```

Step LVV-E3531-3 Step Execution Status: **Pass**

Description

Use the ‘DatasetProvenance‘ class from ‘lsst.daf.butler‘ to extract the provenance of the catalog, and display the provenance information to the screen.

Test Data
None

Expected Result

Actual Result
# Extract the provenance and print to the screen:
src_unstd_prov = DatasetProvenance.from_flat_dict(src_unstd.meta, butler)
src_unstd_prov[0]

OUTPUT:

```
DatasetProvenance(inputs=[SerializedDatasetRef(id=UUID('b97a5838-24a4-4d83-9e14-c2c7fdd17afd'), datasetType=SerializedDat
```

Step LVV-E3531-4 Step Execution Status: **Pass**

Description
Repeat steps 2 and 3 for catalogs from coadd images.

Test Data
None

Expected Result

Actual Result
See the attached notebook, wherein we repeated the above steps for many different catalog datasets.

5.1.3.22 LVV-T154 - Verify implementation of Raw Data Archiving Reliability

Version **1.0(d)**. Status **Draft**. Open *LVV-T154* test case in Jira.

Verify that raw images are reliably archived.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.23 LVV-T1250 - Verify implementation of minimum number of simultaneous DM EFD query users

Version **1.0(d)**. Status **Draft**. Open *LVV-T1250* test case in Jira.

Verify that the DM EFD can support **dmEfdQueryUsers = 5** simultaneous queries. The additional requirement that each query must last no more than **dmEfdQueryTime = 10 seconds** will be verified separately in LVV-T1251, but these must be satisfied together.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.24 LVV-T1251 - Verify implementation of maximum time to retrieve DM EFD query results

Version **1.0(d)**. Status **Draft**. Open *LVV-T1251* test case in Jira.

Verify that the DM EFD can support **dmEfdQueryUsers = 5** simultaneous queries, with each query must executing in no more than **dmEfdQueryTime = 10 seconds.** The requirement on at least 5 simultaneous queries will be verified separately in LVV-T1250, but these must be satisfied together.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.25 LVV-T1847 - Verify calculation of sensor fraction with unusable pixels

Version **1.0(d)**. Status **Draft**. Open *LVV-T1847* test case in Jira.

Verify that the DM system provides software to assess whether the maximum allowable fraction of sensors with **PixFrac > 1** percent scientifically unusable pixels is less than **SensorFraction = 15 percent.**

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2025_27 in the RSP Notebook aspect at the USDF. Because this test concerns a threshold calculated in LVV-T1841, the two tests were executed together.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1841_1847.ipynb."

Detailed steps results LVV-R275-LVV-E3537-1243142055:

Step LVV-E3537-1 Step Execution Status: **Pass**

Description

Identify the path to a dataset containing LSSTCam images.

Test Data

None

Expected Result

Actual Result

# PARAMETERS:
# Instrument to consider for analysis:
INSTRUMENT = ”LSSTCam”
# Repository containing our data.
REPO = ”/repo/main”
# Collection containing processed exposures to use for metadata scan.
collection = ”LSSTCam/calib”

Step LVV-E3537-2 Step Execution Status: **Pass**

Description

Retrieve the ‘camera‘ object associated with the images. This will be used to extract datasets corresponding to each detector.

Test Data

None

Expected Result

A ‘camera‘ datasetType, with information about the camera’s detectors.

Actual Result

Using the parameters defined in Step 1, the butler was initialized and the camera object retrieved as follows:

```
butler = Butler(REPO)
camera = butler.get("camera", instrument=INSTRUMENT,
collections=f"{INSTRUMENT}/calib")
```

Step LVV-E3537-3 Step Execution Status: **Pass**

Description

For each detector, load the 'defects' dataset, and calculate the percentage of pixels that are labeled as defective.

Test Data

None

Expected Result

A table containing the percentage of pixels known to be defective for each detector.

Actual Result

In the attached notebook, we loop over all the detectors in the camera object. For each detector, we retrieve the 'defects' dataset, and calculate the percentage of pixels that are flagged as defective.

Step LVV-E3537-4 Step Execution Status: **Pass**

Description

Calculate the percentage of detectors that do not meet the **PixFrac** threshold, **SensorFraction**.

Test Data

None

Expected Result

Confirm that less than **SensorFraction=15%** of detectors have **PixFrac>1%** of defective pixels.

Actual Result

Using the tabulated **PixFrac** values from the previous step, we show (in the attached notebook) that 4% of the sensors exceed the **PixFrac=1%** threshold. This is well below the required value of **SensorFraction<15%;** thus, the requirement is met, and this test has a result of **PASS**.

5.1.3.26 LVV-T377 - Verify Calculation of Photometric Performance Metrics

Version **1.0(d)**. Status **Approved**. Open *LVV-T377* test case in Jira.

Verify that the DMS system provides software to calculate photometric performance metrics, and that the algorithms are properly calculating the desired quantities. Note that because the DMS requirement is that the software shall be provided (and not on the actual measured values of the metrics), we verify all of the requirements via a single test case.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.27 LVV-T1846 - Verify calculation of band-to-band color zero-point accuracy including u-band

Version **1.0(d)**. Status **Draft**. Open *LVV-T1846* test case in Jira.

Verify that the DM system provides software to assess whether the accuracy of absolute band-to-band color zero-points for all colors constructed from any filter pair, including the u-band, is less than **PA5u = 10 millimagnitudes**.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.28 LVV-T1843 - Verify calculation of significance of imperfect crosstalk corrections

Version **1.0(d)**. Status **Approved**. Open *LVV-T1843* test case in Jira.

Verify that the DM system provides software to assess whether the maximum local significance integrated over the PSF of imperfect crosstalk corrections is less than **Xtalk = 3 sigma**.

Preconditions:
None

Execution status: **Pass**
Final comment:
Tests performed using ComCam on-sky data at the USDF, using w_2025_10 of the science pipelines. See the attached notebook, "test_LVV-T1843.ipynb", for details.

Detailed steps results LVV-R275-LVV-E3540-1243142058:

Step LVV-E3540-1 Step Execution Status: **Pass**

Description
Identify datasets containing observations of bright stars.

Test Data
None

Expected Result
One or more dataIds of 'calexp' images with stars brighter than ~8th magnitude.

Actual Result
The areas overlapped by four fields (ECDFS, EDFS, Rubin_SV_95_-25, and Rubin_SV_38_7) from the w_2025_10 processing of the ComCam on-sky data were queried to find sources from Gaia DR3 brighter than 8th magnitude (in Gaia G-band). This resulted in 5 bright stars with ComCam observations.

Step LVV-E3540-2 Step Execution Status: **Pass**

Description

Make lists of the (x, y) positions of the bright star observations in the 'calexp' images, then identify the corresponding positions in other amplifiers on each detector where crosstalk artifacts are expected to appear.

Test Data

None

Expected Result

A list of expected crosstalk image positions in all 16 amplifiers of each detector containing a bright star observation.

Actual Result

The butler was queried to identify 'calexp' images overlapping these bright stars, then their datasetRefs were looped over to extract the actual (x, y) positions of the bright stars in the images.

A function to calculate the corresponding expected crosstalk positions was applied to each observation, and a list was made of all expected crosstalk artifact positions.

Step LVV-E3540-3 Step Execution Status: **Pass**

Description

Measure forced photometry at the expected positions of crosstalk artifacts, and confirm that their signal-to-noise is less than 3.

Test Data

None

Expected Result

An ensemble of forced photometry measurements, with none of them exceeding 3-sigma excess.

Actual Result

Forced photometry was performed at the positions of expected crosstalk, and the following plot of signal-to-noise vs. amplifier (indexed as amplifier number relative to the midline of the detector) was generated. (See details in the attached notebook.)

Image Download Error

The vast majority of points lie beneath the required Xtalk < 3 sigma line, but a handful of points exceed this value.

We spot-checked the images at many of these positions, and determined that in all cases there were stars at the expected crosstalk artifact positions, which resulted in large flux measurements unrelated to crosstalk.

The residual flux significance at the positions of all crosstalk corrections (excluding those that overlap obvious stars/galaxies) is less than the required Xtalk = 3 sigma limit. We thus deem this test a Pass.

5.1.3.29 LVV-T1757 - Verify calculation of photometric repeatability in gri filters

Version **1.0(d)**. Status **Approved**. Open *LVV-T1757* test case in Jira.

Verify that the DM system has provided the code to calculate the RMS photometric repeatability of bright non-saturated unresolved point sources in the g, r, and i filters, and assess whether it meets the requirement that it shall be less than **PA1gri = 5.0 millimagnitudes**.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1757.ipynb."

Detailed steps results LVV-R275-LVV-E3541-1243142059:

Step LVV-E3541-1 Step Execution Status: **Pass**

Description
Identify a dataset containing at least one field in each of the g, r, and i filters with multiple overlapping visits.

Test Data
None

Expected Result

A dataset that has been ingested into a Butler repository.

Actual Result

For this test we use the most recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with the w_2024_34 pipelines.

Step LVV-E3541-2 Step Execution Status: **Pass**

Description

Execute 'analysis_tools' on a repository containing processed data. Identify the path to the data, which we will call 'DATA/path', then execute something similar to the following (with paths, datasets, and flags replaced or additionally specified as needed):

Test Data

None

Expected Result

The output collection (in this case, "u/username/atools_metrics") containing metric measurements and any associated extras and metadata is available via the butler.

Actual Result

```
The processed RC2 data products are accessed via the Butler using the following commands:

from lsst.daf.butler import Butler


# Initialize the butler repo pointing to the DM-45857 (w_2024_34) collection
repo = '/repo/main'
collection = 'HSC/runs/RC2/w_2024_34/DM-45857'

butler = Butler(repo, collections=collection)
```

Step LVV-E3541-3 Step Execution Status: **Pass**

Description

Confirm that the metric PA1gri has been calculated, and that its values are reasonable.

Test Data

None

Expected Result

A JSON file (and/or a report generated from that JSON file) demonstrating that PA1gri has been calculated.

Actual Result

In the attached notebook, the metrics were retrieved and printed to the screen, resulting in the following output:

```
Tract 9615:

g_stellarPhotRepeatStdev = 7.36 mmag
r_stellarPhotRepeatStdev = 7.31 mmag
i_stellarPhotRepeatStdev = 7.68 mmag

Tract 9697:

g_stellarPhotRepeatStdev = 7.57 mmag
r_stellarPhotRepeatStdev = 7.31 mmag
i_stellarPhotRepeatStdev = 8.46 mmag

Tract 9813:

g_stellarPhotRepeatStdev = 8.24 mmag
r_stellarPhotRepeatStdev = 8.99 mmag
i_stellarPhotRepeatStdev = 8.03 mmag
```

The quantities "{band}_stellarPhotRepeatStdev" correspond to the photometric repeatability metric **PA1**.

In the attached notebook, we also demonstrated the retrieval of plots generated by 'analysis_tools' showing the distribution of repeatability values from which PA1 was calculated.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1757.ipynb."

5.1.3.30 LVV-T1842 - Verify calculation of zeropoint error fraction exceeding the outlier limit

Version **1.0(d)**. Status **Draft**. Open *LVV-T1842* test case in Jira.

Verify that the DM system provides software to calculate the fraction of zeropoint errors that exceed the zero point error outlier limit, and confirm that it is less than **PF2 = 10 percent.**

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.31 LVV-T1841 - Verify calculation of scientifically unusable pixel fraction

Version **1.0(d)**. Status **Approved**. Open *LVV-T1841* test case in Jira.

Verify that the DM system provides software to assess whether the maximum fraction of pixels scientifically unusable per sensor out of the total allowable fraction of sensors meeting this performance is less than **PixFrac = 1 percent**.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2025_27 in the RSP Notebook aspect at the USDF. Because this test concerns a threshold for LVV-T1847, the two tests were executed together.

The executed notebook was saved in the repository associated with this campaign's test re-

port as “notebooks/test_LVV-T1841_1847.ipynb.”

Detailed steps results LVV-R275-LVV-E3543-1243142061:

Step LVV-E3543-1 Step Execution Status: **Pass**

Description

Identify the path to a dataset containing LSSTCam images.

Test Data

None

Expected Result

Actual Result

# PARAMETERS:
# Instrument to consider for analysis:
INSTRUMENT = ”LSSTCam”
# Repository containing our data.
REPO = ”/repo/main”
# Collection containing processed exposures to use for metadata scan.
collection = ”LSSTCam/calib”

Step LVV-E3543-2 Step Execution Status: **Pass**

Description

Retrieve the ‘camera‘ object associated with the images. This will be used to extract datasets corresponding to each detector.

Test Data

None

Expected Result

A ‘camera‘ datasetType, with information about the camera’s detectors.

Actual Result
Using the parameters defined in Step 1, the butler was initialized and the camera object retrieved as follows:

butler = Butler(REPO)
camera = butler.get("camera", instrument=INSTRUMENT,
collections=f"{INSTRUMENT}/calib")

Step LVV-E3543-3 Step Execution Status: **Pass**

Description
For each detector, load the 'defects' dataset, and calculate the percentage of pixels that are labeled as defective.

Test Data
None

Expected Result
A table containing the percentage of pixels known to be defective for each detector. Most should be less than PixFrac=1%.

Actual Result
In the attached notebook (test_LVV-T1841_1847.ipynb), we loop over all the detectors in the camera object. For each detector, we retrieve the 'defects' dataset, and calculate the percentage of pixels that are flagged as defective.

The related Test Case, LVV-T1847, uses these tabulated **PixFrac** values to assess whether the **SensorFraction** requirement is met.

5.1.3.32 LVV-T1840 - Verify calculation of sky brightness precision

Version **1.0(d)**. Status **Approved**. Open *LVV-T1840* test case in Jira.

Verify that the DM system provides software to assess whether the maximum error in the precision of the sky brightness determination is less than **SBPrec = 1 percent.**

Preconditions:
None

Execution status: **Pass w/ Deviation**
Final comment:
Executed at the USDF with pipelines version w_2025_28, using LSSTComCam data from DP1.
The resulting notebook is attached to the Test Report repository as ”test_LVV-T1840.ipynb”.

Detailed steps results LVV-R275-LVV-E3544-1243142062:

Step LVV-E3544-1 Step Execution Status: **Pass**

Description
Identify an appropriate processed precursor dataset containing process visit images.

Test Data
None

Expected Result

Actual Result
Use the LSSTComCam data that became Data Preview 1 (DP1), as processed with v29 Science Pipelines:

collection = ”LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260”
repo = ”/repo/dp1”
butler = Butler.from_config(repo, collections=collection)

Step LVV-E3544-2 Step Execution Status: **Pass**

Description
For each visit-level image, calculate the 1-sigma standard deviation of the flux level measured via ”sky sources” (9-pixel aperture fluxes, well separated from detected sources).

Test Data
None

Expected Result
A set of sky standard deviations, one for each visit.

Actual Result

In the attached notebook, g-band 'visit_images' are loaded in succession, calculating the clipped standard deviation of the background using a defined function called "deriveBgNoise". In addition, the standard deviation of "sky sources" as measured in the associated 'source' table is calculated via a function called "deriveSkySourceNoise". These two methods should produce similar results, but may differ, as the sky sources are 9-pixel apertures placed in "empty" regions of the image, while the image-based method uses all pixels that are not part of a detected source.

Step LVV-E3544-3 Step Execution Status: **Pass**

Description

Compare the standard deviation of sky fluxes from the previous step to the sky pedestal value that has been subtracted from the image to estimate the fractional error in the determination of the sky background for each visit.

Test Data

None

Expected Result

Estimation of the precision of the sky background measurement for a set of visits.

Actual Result

The std deviation measurements from the previous step are compared to the background level that has been subtracted from each image, producing the following figure for the fractional error in the determination of the sky background:

Image Download Error

Step LVV-E3544-4 Step Execution Status: **Pass w/ Deviation**

Description

□□ind the maximum value of the fractional errors estimated in the previous step, and compare it to the SBPrec threshold.

Test Data

None

Expected Result

Comparison of the maximum sky background precision to the threshold **SBPrec**.

Actual Result

None of the examined visits meet the SBPrec threshold of 0.01 (1%), so this test should technically **Fail.** However, as detailed in the notebook, this is unsurprising, as the measurement essentially captures a signal-to-noise ratio, and its floor is set by the Poisson statistics of the initial sky brightness. We thus do not expect to be able to reach SBPrec < 1% consistently, and propose an alternate metric for tracking surface brightness limits.

The proposed metric is the limiting surface brightness, as defined by
Roman et al. (2020, A&A, 644, 42), using sky sources for a given visit and detector. This is defined as 3x the standard deviation of the background flux distribution, averaged over 10" x 10" scales. A version of this metric is being implemented in 'analysis_tools' on DM-51537, and will be regularly monitored in future processing. For the sample of images used in this test, the limiting surface brightness is measured to be typically around 27.5-28 mag per square arcsecond, as seen in the following figure:
Image Download Error

5.1.3.33 LVV-T1839 - Verify calculation of RMS width of photometric zeropoint

Version **1.0(d)**. Status **Draft**. Open *LVV-T1839* test case in Jira.

Verify that the DM system provides code to assess whether the RMS width of the internal photometric zero-point (precision of system uniformity across the sky) for all bands except u-band is less than **PA3 = 10 millimagnitudes**.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.34 LVV-T1838 - Verify calculation of image fraction affected by ghosts

Version **1.0(d)**. Status **Approved**. Open *LVV-T1838* test case in Jira.

Verify that the DM system provides code to assess whether the percentage of image area that has ghosts with surface brightness gradient amplitude of more than 1/3 of the sky noise over 1 arcsec is less than **GhostAF = 1 percent**.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed at the USDF RSP, using w_2025_33. The resulting notebook is attached to this test repository as "test_LVV-T1838.ipynb".

Detailed steps results LVV-R275-LVV-E3546-1243142064:

Step LVV-E3546-1 Step Execution Status: **Pass**

Description
Identify the path to the data repository, which we will refer to as 'DATA/path', then execute the following:

Test Data
None

Expected Result
Butler repo available for reading.

Actual Result
For this test we used LSSTCam on-sky data processed with pipelines version w_2025_33. The butler was initialized as follows:

butler = Butler('/repo/embargo', collections="LSSTCam/runs/DRP/20250604_20250814/w_2025_33/DM-52202")

Step LVV-E3546-2 Step Execution Status: **Pass**

Description
Examine a large number of warped visit images, confirming that less than 1% of their pixels have been masked due to ghosts.

Test Data
None

Expected Result
A table or histogram of percentages of pixels flagged as ghosts in a large number of images (to constitute a representative sample).

Actual Result
In the attached notebook, we looped over 5000 'compare_warp_artifact_mask' datasets, extracting for each one the percentage of pixels that were flagged as CLIPPED during the masking. The resulting histogram, shown below, demonstrates that we are meeting the requirement that less than 1% of pixels are affected by ghosts.

We note that the artifact rejection code identifies all anomalous pixels, and not just those that are due to ghosts. Thus the statistics we have measured represent an upper limit on the fraction of pixels affected by ghosts, as other features such as asteroids contribute to the CLIPPED mask plane as well.

Image Download Error

5.1.3.35 LVV-T1837 - Verify calculation of band-to-band color zero-point accuracy

Version **1.0(d)**. Status **Draft**. Open *LVV-T1837* test case in Jira.

Verify that the DM system provides code to assess whether the accuracy of absolute band-to-band color zero-points for all colors constructed from any filter pair, excluding the u-band, is less than **PA5 = 5 millimagnitudes**.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.36 LVV-T1836 - Verify calculation of resolved-to-unresolved flux ratio errors

Version **1.0(d)**. Status **Defined**. Open *LVV-T1836* test case in Jira.

Verify that the DM system has provided code to assess whether the maximum RMS of the ratio of the error in integrated flux measurement between bright, isolated, resolved sources less than 10 arcsec in diameter and bright, isolated unresolved point sources is less than **ResSource = 2**.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1836.ipynb."

To allow for some flexibility in changing the method of calculating this metric, it has not yet been implemented within 'analysis_tools'. Before future large-scale data processing campaigns, this metric will be incorporated into the 'analysis_tools' tasks and pipelines that are executed as part of data release processing.

Detailed steps results LVV-R275-LVV-E3548-1243142066:

Step LVV-E3548-1 Step Execution Status: **Pass**

Description
Identify a dataset containing at least one tract that has been processed through coaddition to create an objectTable.

Test Data
None

Expected Result

A dataset that has been ingested into a Butler repository.

Actual Result

For this test we use a recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with the w_2024_34 pipelines.

Step LVV-E3548-2 Step Execution Status: **Pass**

Description

The 'path' that you will use depends on where you are running the science pipelines. Options:

- local (newinstall.sh - based install):[path_to_installation]/loadLSST.bash
- development cluster ("lsst-dev"): /software/lsstsw/stack/loadLSST.bash
- LSP Notebook aspect (from a terminal): /opt/lsst/software/stack/loadLSST.bash

From the command line, execute the commands below in the example code:

Test Data

None

Expected Result

Science pipeline software is available for use. If additional packages are needed (for example, 'obs' packages such as 'obs_subaru'), then additional 'setup' commands will be necessary.

To check versions in use, type:
eups list -s

Actual Result

The pipelines were set up with w_2024_34.

Step LVV-E3548-3 Step Execution Status: **Pass**

Description
Identify the path to the data repository, which we will refer to as 'DATA/path', then execute the following:

Test Data
None

Expected Result
Butler repo available for reading.

Actual Result

```
The processed RC2 data products are accessed via the Butler using the following commands:

from lsst.daf.butler import Butler


# Initialize the butler repo pointing to the DM-45857 (w_2024_34) collection
repo = '/repo/main'
collection = 'HSC/runs/RC2/w_2024_34/DM-45857'

butler = Butler(repo, collections=collection)
```

Step LVV-E3548-4 Step Execution Status: **Pass**

Description
On an 'objectTable_tract' table, execute the following steps:

- Apply a signal-to-noise (SNR) cut to select only bright sources. (Default: SNR > 100)
- Select isolated objects based on the "detect_isIsolated" flag.
- Select galaxies and stars based on their "refSizeExtendedness" values.
- Select only galaxies with diameters less than 10 arcsec (based on their moments-based trace sizes).
- Bin the flux error values for (separately) selected bright, isolated stars and galaxies into magnitude bins.
- Calculate the ratio of the median flux errors in each bin for resolved sources (galaxies) vs. unresolved (stars).
- Report summary statistics aggregating the magnitude-binned ratios, and return these statistics (mean, median, stdev, etc. over all magnitude bins for the patch).

Test Data

None

Expected Result

Summary values of the median ratio of resolved to unresolved flux errors for bright, isolated sources in the objectTable.

Actual Result

In the attached notebook, this calculation is demonstrated for the three tracts of data contained in RC2. The values of **ResSource** are represented by the ”mean values” in the following output:

```
Mean values, stdev for each RC2 tract
-------------------------------------

tract 9615: mean=1.386, std=0.020
tract 9697: mean=1.438, std=0.071
tract 9813: mean=1.261, std=0.086
```

The attached notebook also includes some plots illustrating how the metric was calculated in detail.

We see that the values are well below the threshold (**ResSource < 2**) defined in the requirement, and thus this test passes.

5.1.3.37 LVV-T1746 - Verify calculation of fraction of relative astrometric measurement error on 5 arcminute scales exceeding outlier limit

Version **1.0(d)**. Status **Approved**. Open *LVV-T1746* test case in Jira.

Verify that the DM system has provided the code to calculate the maximum fraction of relative astrometric measurements on 5 arcminute scales that exceed the 5 arcminute outlier limit **AD1 = 20 milliarcseconds**, and assess whether it meets the requirement that it shall be less than **AF1 = 10 percent.**

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1746.ipynb."

Detailed steps results LVV-R275-LVV-E3550-1243142068:

Step LVV-E3550-1 Step Execution Status: **Pass**

Description
Identify a dataset containing at least one field with multiple overlapping visits.

Test Data
None

Expected Result
A dataset that has been ingested into a Butler repository.

Actual Result
For this test we use the most recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with the w_2024_34 pipelines.

Step LVV-E3550-2 Step Execution Status: **Pass**

Description
The 'path' that you will use depends on where you are running the science pipelines. Options:

- local (newinstall.sh - based install):[path_to_installation]/loadLSST.bash
- development cluster ("lsst-dev"): /software/lsstsw/stack/loadLSST.bash

- LSP Notebook aspect (from a terminal): /opt/lsst/software/stack/loadLSST.bash

From the command line, execute the commands below in the example code:

Test Data
None

Expected Result
Science pipeline software is available for use. If additional packages are needed (for example, 'obs' packages such as 'obs_subaru'), then additional 'setup' commands will be necessary.

To check versions in use, type:
eups list -s

Actual Result
The pipelines were set up with w_2024_34.

Step LVV-E3550-3 Step Execution Status: **Pass**

Description
Execute 'analysis_tools' on a repository containing processed data. Identify the path to the data, which we will call 'DATA/path', then execute something similar to the following (with paths, datasets, and flags replaced or additionally specified as needed):

Test Data
None

Expected Result
The output collection (in this case, "u/username/atools_metrics") containing metric measurements and any associated extras and metadata is available via the butler.

Actual Result

```
The processed RC2 data products are accessed via the Butler using the following commands:

from lsst.daf.butler import Butler


# Initialize the butler repo pointing to the DM-45857 (w_2024_34) collection
repo = '/repo/main'
collection = 'HSC/runs/RC2/w_2024_34/DM-45857'

butler = Butler(repo, collections=collection)
```

Step LVV-E3550-4 Step Execution Status: **Pass**

Description

Confirm that the metric AF1 has been calculated using the outlier limit AD1, and that its values are reasonable.

Test Data

None

Expected Result

A JSON file (and/or a report generated from that JSON file) demonstrating that AF1 has been calculated (and used the limit AD1).

Actual Result

In the attached notebook, the metrics were retrieved and printed to the screen, resulting in the following output:

```
Tract 9615:

g_AF1 = 0.07 %
r_AF1 = 0.07 %
i_AF1 = 0.52 %

Tract 9697:

g_AF1 = 1.97 %
r_AF1 = 1.09 %
i_AF1 = 0.07 %
```

```
Tract 9813:

g_AF1 = 0.59 %
r_AF1 = 1.42 %
i_AF1 = 1.25 %
```

In the attached notebook, we also demonstrated the retrieval of plots generated by 'analysis_tools' showing the distribution of source separations from which **AF1** was calculated.

Finally, we confirmed via inspection of the relevant code that the AD1 threshold is set to 20 mas by default, as required.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1746.ipynb."

5.1.3.38 LVV-T1749 - Verify calculation of fraction of relative astrometric measurement error on 20 arcminute scales exceeding outlier limit

Version **1.0(d)**. Status **Approved**. Open *LVV-T1749* test case in Jira.

Verify that the DM system has provided the code to calculate the maximum fraction of relative astrometric measurements on 20 arcminute scales that exceed the 20 arcminute outlier limit **AD2 = 20 milliarcseconds**, and assess whether it meets the requirement that it shall be less than **AF2 = 10 percent.**

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1749.ipynb."

Detailed steps results LVV-R275-LVV-E3551-1243142069:

Step LVV-E3551-1 Step Execution Status: **Pass**

Description

Identify a dataset containing at least one field with multiple overlapping visits.

Test Data

None

Expected Result

A dataset that has been ingested into a Butler repository.

Actual Result

For this test we use the most recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with the w_2024_34 pipelines.

Step LVV-E3551-2 Step Execution Status: **Pass**

Description

The 'path' that you will use depends on where you are running the science pipelines. Options:

- local (newinstall.sh - based install):[path_to_installation]/loadLSST.bash
- development cluster ("lsst-dev"): /software/lsstsw/stack/loadLSST.bash
- LSP Notebook aspect (from a terminal): /opt/lsst/software/stack/loadLSST.bash

From the command line, execute the commands below in the example code:

Test Data

None

Expected Result

Science pipeline software is available for use. If additional packages are needed (for example, 'obs' packages such as 'obs_subaru'), then additional 'setup' commands will be necessary.

To check versions in use, type:
eups list -s

Actual Result
The pipelines were set up with w_2024_34.

Step LVV-E3551-3 Step Execution Status: **Pass**

Description
Execute 'analysis_tools' on a repository containing processed data. Identify the path to the data, which we will call 'DATA/path', then execute something similar to the following (with paths, datasets, and flags replaced or additionally specified as needed):

Test Data
None

Expected Result
The output collection (in this case, "u/username/atools_metrics") containing metric measurements and any associated extras and metadata is available via the butler.

Actual Result

```
The processed RC2 data products are accessed via the Butler using the following commands:

from lsst.daf.butler import Butler


# Initialize the butler repo pointing to the DM-45857 (w_2024_34) collection
repo = '/repo/main'
collection = 'HSC/runs/RC2/w_2024_34/DM-45857'

butler = Butler(repo, collections=collection)
```

Step LVV-E3551-4 Step Execution Status: **Pass**

Description
Confirm that the metric AF2 has been calculated using the outlier limit AD2, and that its values are reasonable.

Test Data
None

Expected Result
A JSON file (and/or a report generated from that JSON file) demonstrating that AF2 has been calculated (and used the limit AD2).

Actual Result
In the attached notebook, the metrics were retrieved and printed to the screen, resulting in the following output:

```
Tract 9615:

g_AF2 = 0.06 %
r_AF2 = 0.05 %
i_AF2 = 0.45 %

Tract 9697:

g_AF2 = 2.01 %
r_AF2 = 1.08 %
i_AF2 = 0.06 %

Tract 9813:

g_AF2 = 0.70 %
r_AF2 = 1.35 %
i_AF2 = 1.33 %
```

In the attached notebook, we also demonstrated the retrieval of plots generated by 'analysis_tools' showing the distribution of source separations from which **AF2** was calculated.

Finally, we confirmed via inspection of the relevant code that the AD2 threshold is set to 20 mas by default, as required.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1749.ipynb."

5.1.3.39 LVV-T1750 - Verify calculation of separations relative to r-band exceeding color difference outlier limit

Version **1.0(d)**. Status **Approved**. Open *LVV-T1750* test case in Jira.

Verify that the DM system has provided the code to calculate the separations measured relative to the r-band that exceed the color difference outlier limit **AB2 = 20 milliarcseconds**, and assess whether it meets the requirement that it shall be less than **ABF1 = 10 percent.**

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_37 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1750_1753.ipynb."

Detailed steps results LVV-R275-LVV-E3552-1243142070:

Step LVV-E3552-1 Step Execution Status: **Pass**

Description
Identify a dataset containing at least one field with multiple overlapping visits, and including at least one visit in r-band.

Test Data
None

Expected Result
A dataset that has been ingested into a Butler repository.

Actual Result
For this test we use the most recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with the w_2024_34 pipelines.

Step LVV-E3552-2 Step Execution Status: **Pass**

Description
The 'path' that you will use depends on where you are running the science pipelines. Options:

- local (newinstall.sh - based install):[path_to_installation]/loadLSST.bash
- development cluster ("lsst-dev"): /software/lsstsw/stack/loadLSST.bash
- LSP Notebook aspect (from a terminal): /opt/lsst/software/stack/loadLSST.bash

From the command line, execute the commands below in the example code:

Test Data
None

Expected Result
Science pipeline software is available for use. If additional packages are needed (for example, 'obs' packages such as 'obs_subaru'), then additional 'setup' commands will be necessary.

To check versions in use, type:
eups list -s

Actual Result
The pipelines were set up with w_2024_37.

Step LVV-E3552-3 Step Execution Status: **Pass**

Description

Execute ‘analysis_tools‘ on a repository containing processed data. Identify the path to the data, which we will call ’DATA/path’, then execute something similar to the following (with paths, datasets, and flags replaced or additionally specified as needed):

Test Data

None

Expected Result

The output collection (in this case, ”u/username/atools_metrics”) containing metric measurements and any associated extras and metadata is available via the butler.

Actual Result

Because the relevant ‘analysis_tools‘ tasks are not executed in the default pipeline, we executed them manually by entering the following on the command line:

pipetask run -b /repo/main -i HSC/runs/RC2/w_2024_34/DM-45857 -p ./visitQualityCore.yaml -o u/jcarlin/atools_visitQualityCore_AB1
--instrument lsst.obs.subaru.HyperSuprimeCam --register-dataset-types -d ”skymap=’hsc_rings_v1’ AND instrument=’HSC’
AND visit IN (26044,26046,26048,26050,26058,23884,23886,23888,23890,23898,1302,1306,1308,1310,1314,23250,23256,23258,270
-j 6 2>&1 | tee atools_visitQualityCore_AB1_gri_test.log

The list of visits contains 5 visits in each of the griz bands.

A butler with results from the processing is initialized using the following commands:

```
repo = '/repo/main'
collection = 'u/jcarlin/atools_visitQualityCore_AB1'

butler = Butler(repo, collections=collection)
```

Step LVV-E3552-4 Step Execution Status: **Pass**

Description

Confirm that the metric ABF1 has been calculated using the outlier limit AB2, and that its values are reasonable.

Test Data

None

Expected Result

A JSON file (and/or a report generated from that JSON file) demonstrating that ABF1 has been calculated (and used the limit AB2).

Actual Result

In the attached notebook, the metrics were retrieved and printed to the screen, resulting in the following output for the mean values of ABF1:

```
g
abf1_ra = 0.02 %
abf1_dec = 0.08 %
abf1_tot = 0.12 %

i
abf1_ra = 2.72 %
abf1_dec = 3.67 %
abf1_tot = 5.78 %

z
abf1_ra = 0.38 %
abf1_dec = 0.67 %
abf1_tot = 1.47 %
```

In the attached notebook, we also demonstrated the retrieval of plots generated by 'analysis_tools' showing the distribution of source separations from which **ABF1** was calculated.

Finally, we confirmed via inspection of the relevant code that the AB2 threshold is set to 20 mas by default, as required.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1750_1753.ipynb."

5.1.3.40 LVV-T1753 - Verify calculation of RMS difference of separations relative to r-band

Version **1.0(d)**. Status **Approved**. Open *LVV-T1753* test case in Jira.

Verify that the DM system has provided the code to calculate the separations measured relative to the r-band, and assess whether it meets the requirement that it shall be less than **AB1 = 10 milliarcseconds.**

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_37 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1750_1753.ipynb."

Detailed steps results LVV-R275-LVV-E3555-1243142073:

Step LVV-E3555-1 Step Execution Status: **Pass**

Description
Identify a dataset containing at least one field with multiple overlapping visits, and including at least one visit in r-band.

Test Data
None

Expected Result
A dataset that has been ingested into a Butler repository.

Actual Result
For this test we use the most recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with

the w_2024_34 pipelines.

Step LVV-E3555-2 Step Execution Status: **Pass**

Description

The 'path' that you will use depends on where you are running the science pipelines. Options:

- local (newinstall.sh - based install):[path_to_installation]/loadLSST.bash
- development cluster ("lsst-dev"): /software/lsstsw/stack/loadLSST.bash
- LSP Notebook aspect (from a terminal): /opt/lsst/software/stack/loadLSST.bash

From the command line, execute the commands below in the example code:

Test Data

None

Expected Result

Science pipeline software is available for use. If additional packages are needed (for example, 'obs' packages such as 'obs_subaru'), then additional 'setup' commands will be necessary.

To check versions in use, type:
eups list -s

Actual Result

The pipelines were set up with w_2024_37.

Step LVV-E3555-3 Step Execution Status: **Pass**

Description

Execute 'analysis_tools' on a repository containing processed data. Identify the path to the data, which we will call 'DATA/path', then execute something similar to the following (with paths, datasets, and flags replaced or additionally specified as needed):

Test Data

None

Expected Result

The output collection (in this case, "u/username/atools_metrics") containing metric measurements and any associated extras and metadata is available via the butler.

Actual Result

Because the relevant 'analysis_tools' tasks are not executed in the default pipeline, we executed them manually by entering the following on the command line:

pipetask run -b /repo/main -i HSC/runs/RC2/w_2024_34/DM-45857 -p ./visitQualityCore.yaml -o u/jcarlin/atools_visitQualityCore_AB1
--instrument lsst.obs.subaru.HyperSuprimeCam --register-dataset-types -d "skymap='hsc_rings_v1' AND instrument='HSC'
AND visit IN (26044,26046,26048,26050,26058,23884,23886,23888,23890,23898,1302,1306,1308,1310,1314,23250,23256,23258,270
-j 6 2>&1 | tee atools_visitQualityCore_AB1_gri_test.log

The list of visits contains 5 visits in each of the griz bands.

A butler with results from the processing is initialized using the following commands:

```
repo = '/repo/main'
collection = 'u/jcarlin/atools_visitQualityCore_AB1'

butler = Butler(repo, collections=collection)
```

Step LVV-E3555-4 Step Execution Status: **Pass**

Description

Confirm that the metric AB1 has been calculated, and that its values are reasonable.

Test Data

None

Expected Result

A JSON file (and/or a report generated from that JSON file) demonstrating that AB1 has been calculated.

Actual Result

In the attached notebook, the metrics were retrieved and printed to the screen, resulting in the following output for the mean values of AB1:

```
g
ab1_ra = 3.67 mas
ab1_dec = 4.40 mas
ab1_tot = 5.78 mas

i
ab1_ra = 8.62 mas
ab1_dec = 10.73 mas
ab1_tot = 11.62 mas

z
ab1_ra = 12.32 mas
ab1_dec = 11.27 mas
ab1_tot = 17.60 mas
```

In the attached notebook, we also demonstrated the retrieval of plots generated by 'analysis_tools' showing the distribution of source separations from which **AB1** was calculated.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1750_1753.ipynb."

5.1.3.41 LVV-T1831 - Verify Implementation of Data Management Nightly Reporting

Version **1.0(d)**. Status **Draft**. Open *LVV-T1831* test case in Jira.

Verify that the LSST Data Management subsystem produces a searchable - interactive nightly report(s), from information published in the EFD by each subsystem, summarizing performance and behavior over a user defined period of time (e.g. the previous 24 hours).

Preconditions:
None

Execution status: **Not Executed**

Final comment:
None

5.1.3.42 LVV-T129 - Verify implementation of Provide Calibrated Photometry

Version **1.0(d)**. Status **Approved**. Open *LVV-T129* test case in Jira.

Verify that the DMS provides photometry calibrated in AB mags and fluxes (in nJy) for all measured objects and sources. Must be tested for both DRP and AP products.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test performed in the RSP using public Data Preview 1 (DP1) data products, which are based on on-sky LSSTComCam data. The notebook is attached to this test repository as ”test_LVV-T129.ipynb”.

Detailed steps results LVV-R275-LVV-E3558-1243142076:

Step LVV-E3558-1 Step Execution Status: **Pass**

Description
Identify the path to the data repository, which we will refer to as ‘DATA/path’, then execute the following:

Test Data
None

Expected Result
Butler repo available for reading.

Actual Result

Rather than the Butler, we used the public Qserv tables served via TAP with DP1. In this way we ensure that we are verifying against public-facing data products.

Step LVV-E3558-2 Step Execution Status: **Pass**

Description

Ingest the data products from an appropriate DRP-processed dataset.

Test Data

None

Expected Result

Actual Result

In the attached notebook, we check each of the Object, Source, DiaObject, DiaSource, ForcedSource, and ForcedSourceOnDiaObject tables, by executing a spatial query of the DP1 dataset over a small area. Here is an example query:

results = service.search("SELECT coord_ra, coord_dec, g_psfFlux, r_cModelFlux FROM dp1.Object as obj WHERE CONTAINS(POINT('ICRS', coord_ra, coord_dec), CIRCLE('ICRS', 53.13, -28.10, 0.05)) = 1").to_table()

Step LVV-E3558-3 Step Execution Status: **Pass**

Description

Confirm that AB-calibrated magnitudes and fluxes are available for all measured Sources and Objects. [An enhanced verification could include matching the sources to an external source catalog and comparing the magnitudes to show that they are well-calibrated.]

Test Data

None

Expected Result

Calibrated fluxes and magnitudes are available for all sources, as well as tools to convert measured fluxes to magnitudes (and vice-versa).

Actual Result

In the attached notebook, each table is checked to confirm that its units are calibrated to (and specified as) nJy.

The units are reported as being in nJy for all columns containing flux measurements.

We further checked that the fluxes converted to magnitudes produce reasonable outputs. The following plot illustrates this for two flux/mag measurements from the Object table:
Image Download Error

Step LVV-E3558-4 Step Execution Status: **Pass**

Description
Ingest the data products from an appropriate AP processing dataset.

Test Data
None

Expected Result

Actual Result
See step 2, where this was already performed.

Step LVV-E3558-5 Step Execution Status: **Pass**

Description
Confirm that AB-calibrated magnitudes and fluxes are available for all measured Sources, DIASources, and Objects. [An enhanced verification could include matching the sources to an external source catalog and comparing the magnitudes to show that they are well-calibrated.]

Test Data
None

Expected Result
Calibrated fluxes and magnitudes are available for all Sources, DIASources, and Objects, as well as tools to convert measured fluxes to magnitudes (and vice-versa).

Actual Result
In the attached notebook, each table is checked to confirm that its units are calibrated to (and specified as) nJy. The units are reported as being in nJy for all columns containing flux measurements, with the exception of the

'dipoleMeanFlux' column from the DiaSource table.

We confirmed that the units on the 'dipoleMeanFlux' column are simply listed incorrectly in the table schema. A ticket has been filed to fix this: DM-51812: "DP1 dipole flux description inconsistencies". The error is simply a mistake in moving the schema from its location in the Science Pipelines codebase to the DP1 repository.

We further checked that the 'dipoleMeanFluxes' converted to magnitudes produce reasonable outputs. The following plot illustrates this for the dipole fluxes with and without their errors added:
Image Download Error
We have thus confirmed that all fluxes are provided as calibrated values in nJy, with the single exception of one column in the DiaSource table, which is being fixed. The result of this test is thus a Pass.

5.1.3.43 LVV-T30 - Verify implementation of Wavefront Sensor Data Acquisition

Version **1.0(d)**. Status **Defined**. Open *LVV-T30* test case in Jira.

Verify successful ingestion of wavefront sensor data from LSSTCam

Preconditions:
None

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3559-1243142077:

Step LVV-E3559-1 Step Execution Status: **Pass**

Description
Execute the test script DMTR-412/notebooks/test_LVV-T30.ipynb in https://github.com/lsst-dm/DMTR-412/tree/main

Test Data
None

Expected Result

Actual Result

Notebook ran successfully on all LSSTCam commissioning data taken from the date of first photon until mid August.

Step LVV-E3559-2 Step Execution Status: **Pass**

Description

Look at the statistics reported, check that we have acquired the data

Test Data

None

Expected Result

Well-formed wavefront sensor image data with appropriate associated metadata.

Actual Result

```
From 2025-04-15 through 2025-08-16  172728 wavefront sensor (ccd) images have been recorded  in a total of 21591 unique science
The exposures are stored in files at the USDF. The files were read in and the images inspected
All exposures have the full 8 wavefront sensor images, as expected. None are missing ccd images.

For a random selection of 3 exposures, thhe wavefront sensor images are inspected and show well formed images with donuts.
This notebook that the DMS can acquire raw, full-frame exposures from the camera wavefront sensors.
```

5.1.3.44 LVV-T29 - Verify implementation of Raw Science Image Data Acquisition

Version **1.0(d)**. Status **Approved**. Open *LVV-T29* test case in Jira.

Verify acquisition of raw data from an LSST camera in all modes.

Preconditions:

None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T29.ipynb."

Detailed steps results LVV-R275-LVV-E3560-1243142078:

Step LVV-E3560-1 Step Execution Status: **Pass**

Description
Obtain images from a camera (either real or simulated) in each observing mode.

Test Data
None

Expected Result
CCD images ingested into the Data Backbone.

Actual Result
For this test we use images from a recent Auxtel imaging night. To access these images in the USDF RSP, we execute the following:

```
from lsst.daf.butler import Butler

# Initialize the butler repo pointing to the LATISS/raw/all collection
repo = '/repo/embargo_new'
collection = 'LATISS/raw/all'

butler = Butler(repo, collections=[collection])
```

Step LVV-E3560-2 Step Execution Status: **Pass**

Description
Observe that the images and their metadata are present and queryable in the Data Backbone.

Test Data
None

Expected Result
Well-formed image data with appropriate associated metadata.

Actual Result
In the attached notebook, we demonstrate that the raw LATISS images can be queried as follows:

flats = butler.query_datasets('raw', where="day_obs=20240807 AND instrument='LATISS' AND band in ('g','r','i','z','y') AND exposure.observation_type='flat'")

Example images are then examined, including confirming that metadata and objects made up of translated versions of those metadata are available. We also displayed the images, confirming that they are well-formed and look as expected for raw images.

Finally, the attached notebook looks at the LSST Science Pipelines "obs" packages in some detail. For more information about these, see lsst.obs_base for the base class, lsst.obs_lsst for implementations of various LSST cameras, and this guidance about how to set up an obs package.

We have demonstrated that raw images can be obtained with an LSST camera, and that the interfaces exist to transform them as needed and ingest them into the Butler. The result of this test is a **Pass**.

5.1.3.45 LVV-T2297 - Verify implementation of Science Data Archive

Version **1.0(d)**. Status **Approved**. Open *LVV-T2297* test case in Jira.

Verify that a Science Data Archive has been created and that all LSST public data products have been archived together with the raw data necessary to reproduce them. Verify that the archive is scalable to the data from the full survey and all Data Releases.

This requirement will be verified by analysis. Verification must demonstrate that we have a written plan for how data will be archived and that the storage systems needed exist. The

plan should include details on recovery. This is needed before commissioning to support commissioning data taking.

Preconditions:
None

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3561-1243142079:

Step LVV-E3561-1 Step Execution Status: **Pass**

Description
Check that all LSST public data products have been archived at the Science Data Archive

Test Data
None

Expected Result

Actual Result
DP1 data are archived at the USDF in repository /repo/dp1, collection LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260. Here we will demonstrate via queries that the datasets are present in this repo.

butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260 raw | wc
16129 161270 2402925

butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260 visit_image | wc
15976 143766 2731556

butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v29_0_0/DM-50260 difference_image | wc
15976 143766 2811426

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 dia_source | wc
29 135 3404

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 deep_coadd | wc
2648 18522 362504
(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ butler query-datasets /repo/dp1 --collections LSSTComCam/runs/DRP/DP1/v
50260 object | wc
33 155 3784

Now confirm that the same numbers of each dataset type are present in the repository at /repo/main:

butler query-datasets /repo/main --collections LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 object | wc
33 155 3908
butler query-datasets /repo/main --collections LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 deep_coadd
| wc 2648 18522 373088
butler query-datasets /repo/main --collections LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 difference_image
| wc
15976 143766 2875322
butler query-datasets /repo/main --collections LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 dia_source |
wc
29 135 3512
butler query-datasets /repo/main --collections LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 visit_image |
wc
15976 143766 2795452
butler query-datasets /repo/main --collections LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 preliminary_visit_image
| wc
16129 145143 3015751
butler query-datasets /repo/main --collections LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 raw | wc
16129 161270 2402925

We see that the number of datasets agrees, suggesting that the full DP1 dataset has indeed been archived at /repo/dp1.

Furthermore, the raw images that contributed to DP1 are archived separately. Examine the file tree to confirm that the files are there.

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ ls /sdf/data/rubin/lsstdata/offline/instrument/LSSTCom-Cam/
20240801/ 20241024/ 20241031/ 20241107/ 20241114/ 20241121/ 20241128/ 20241205/ gen2repo/ log/ reingest_log_20201111.txt
20240806/ 20241025/ 20241101/ 20241108/ 20241115/ 20241122/ 20241129/ 20241206/ gen2repo_20200716/
reingest_day.sh* reingest_log_20201130.txt
20240807/ 20241026/ 20241102/ 20241109/ 20241116/ 20241123/ 20241130/ 20241207/ gen2repo_20200721/

reingest_log_20200716.txt **remake_gen2repo.sh*** 20240808/ 20241027/ 20241103/ 20241110/ 20241117/ 20241124/ 20241201/ 20241208/ gen2repo_20200727/ reingest_log_20200721.txt **remake_gen3repo.sh*** 20241021/ 20241028/ 20241104/ 20241111/ 20241118/ 20241125/ 20241202/ 20241209/ gen3repo/ reingest_log_20200727.txt storage/ 20241022/ 20241029/ 20241105/ 20241112/ 20241119/ 20241126/ 20241203/ 20241210/ gen3repo_20201111/ reingest_log_20201022.txt tempfilelist_single 20241023/ 20241030/ 20241106/ 20241113/ 20241120/ 20241127/ 20241204/ 20241211/ gen3repo_20201130/ reingest_log_20201109.txt

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ ls /sdf/data/rubin/lsstdata/offline/instrument/LSSTCom-Cam/20241024/
CC_O_20241024_000001/ CC_O_20241024_000033/ CC_O_20241024_000065/ CC_O_20241024_000097/ CC_O_20241024_000129/ CC_O_20241024_000161/ CC_O_20241024_000193/
CC_O_20241024_000002/ CC_O_20241024_000034/ CC_O_20241024_000066/ CC_O_20241024_000098/ CC_O_20241024_000130/ CC_O_20241024_000162/ CC_O_20241024_000194/
CC_O_20241024_000003/ CC_O_20241024_000035/ CC_O_20241024_000067/ CC_O_20241024_000099/ CC_O_20241024_000131/ CC_O_20241024_000163/ CC_O_20241024_000195/
CC_O_20241024_000004/ CC_O_20241024_000036/ CC_O_20241024_000068/ CC_O_20241024_000100/ CC_O_20241024_000132/ CC_O_20241024_000164/ CC_O_20241024_000196/
CC_O_20241024_000005/ CC_O_20241024_000037/ CC_O_20241024_000069/ CC_O_20241024_000101/ CC_O_20241024_000133/ CC_O_20241024_000165/ CC_O_20241024_000197/
CC_O_20241024_000006/ CC_O_20241024_000038/ CC_O_20241024_000070/ CC_O_20241024_000102/ CC_O_20241024_000134/ CC_O_20241024_000166/ CC_O_20241024_000198/
CC_O_20241024_000007/ CC_O_20241024_000039/ CC_O_20241024_000071/ CC_O_20241024_000103/ CC_O_20241024_000135/ CC_O_20241024_000167/ CC_O_20241024_000199/
CC_O_20241024_000008/ CC_O_20241024_000040/ CC_O_20241024_000072/ CC_O_20241024_000104/ CC_O_20241024_000136/ CC_O_20241024_000168/ CC_O_20241024_000200/
CC_O_20241024_000009/ CC_O_20241024_000041/ CC_O_20241024_000073/ CC_O_20241024_000105/ CC_O_20241024_000137/ CC_O_20241024_000169/ CC_O_20241024_000201/
CC_O_20241024_000010/ CC_O_20241024_000042/ CC_O_20241024_000074/ CC_O_20241024_000106/ CC_O_20241024_000138/ CC_O_20241024_000170/ CC_O_20241024_000202/
CC_O_20241024_000011/ CC_O_20241024_000043/ CC_O_20241024_000075/ CC_O_20241024_000107/ CC_O_20241024_000139/ CC_O_20241024_000171/ CC_O_20241024_000203/
CC_O_20241024_000012/ CC_O_20241024_000044/ CC_O_20241024_000076/ CC_O_20241024_000108/ CC_O_20241024_000140/ CC_O_20241024_000172/ CC_O_20241024_000204/
CC_O_20241024_000013/ CC_O_20241024_000045/ CC_O_20241024_000077/ CC_O_20241024_000109/ CC_O_20241024_000141/ CC_O_20241024_000173/ CC_O_20241024_000205/
CC_O_20241024_000014/ CC_O_20241024_000046/ CC_O_20241024_000078/ CC_O_20241024_000110/ CC_O_20241024_000142/ CC_O_20241024_000174/ CC_O_20241024_000206/
CC_O_20241024_000015/ CC_O_20241024_000047/ CC_O_20241024_000079/ CC_O_20241024_000111/ CC_O_20241024_000143/ CC_O_20241024_000175/ CC_O_20241024_000207/
CC_O_20241024_000016/ CC_O_20241024_000048/ CC_O_20241024_000080/ CC_O_20241024_000112/ CC_O_20241024_000144/ CC_O_20241024_000176/ CC_O_20241024_000208/

CC_O_20241024_000017/ CC_O_20241024_000049/ CC_O_20241024_000081/ CC_O_20241024_000113/ CC_O_20241024_000145/ CC_O_20241024_000177/ CC_O_20241024_000209/
CC_O_20241024_000018/ CC_O_20241024_000050/ CC_O_20241024_000082/ CC_O_20241024_000114/ CC_O_20241024_000146/ CC_O_20241024_000178/ CC_O_20241024_000210/
CC_O_20241024_000019/ CC_O_20241024_000051/ CC_O_20241024_000083/ CC_O_20241024_000115/ CC_O_20241024_000147/ CC_O_20241024_000179/ CC_O_20241024_000211/
CC_O_20241024_000020/ CC_O_20241024_000052/ CC_O_20241024_000084/ CC_O_20241024_000116/ CC_O_20241024_000148/ CC_O_20241024_000180/ CC_O_20241024_000212/
CC_O_20241024_000021/ CC_O_20241024_000053/ CC_O_20241024_000085/ CC_O_20241024_000117/ CC_O_20241024_000149/ CC_O_20241024_000181/ CC_O_20241024_000213/
CC_O_20241024_000022/ CC_O_20241024_000054/ CC_O_20241024_000086/ CC_O_20241024_000118/ CC_O_20241024_000150/ CC_O_20241024_000182/ CC_O_20241024_000214/
CC_O_20241024_000023/ CC_O_20241024_000055/ CC_O_20241024_000087/ CC_O_20241024_000119/ CC_O_20241024_000151/ CC_O_20241024_000183/ CC_O_20241024_000215/
CC_O_20241024_000024/ CC_O_20241024_000056/ CC_O_20241024_000088/ CC_O_20241024_000120/ CC_O_20241024_000152/ CC_O_20241024_000184/ CC_O_20241024_000216/
CC_O_20241024_000025/ CC_O_20241024_000057/ CC_O_20241024_000089/ CC_O_20241024_000121/ CC_O_20241024_000153/ CC_O_20241024_000185/ CC_O_20241024_000217/
CC_O_20241024_000026/ CC_O_20241024_000058/ CC_O_20241024_000090/ CC_O_20241024_000122/ CC_O_20241024_000154/ CC_O_20241024_000186/ CC_O_20241024_000218/
CC_O_20241024_000027/ CC_O_20241024_000059/ CC_O_20241024_000091/ CC_O_20241024_000123/ CC_O_20241024_000155/ CC_O_20241024_000187/ CC_O_20241024_000219/
CC_O_20241024_000028/ CC_O_20241024_000060/ CC_O_20241024_000092/ CC_O_20241024_000124/ CC_O_20241024_000156/ CC_O_20241024_000188/
CC_O_20241024_000029/ CC_O_20241024_000061/ CC_O_20241024_000093/ CC_O_20241024_000125/ CC_O_20241024_000157/ CC_O_20241024_000189/
CC_O_20241024_000030/ CC_O_20241024_000062/ CC_O_20241024_000094/ CC_O_20241024_000126/ CC_O_20241024_000158/ CC_O_20241024_000190/
CC_O_20241024_000031/ CC_O_20241024_000063/ CC_O_20241024_000095/ CC_O_20241024_000127/ CC_O_20241024_000159/ CC_O_20241024_000191/
CC_O_20241024_000032/ CC_O_20241024_000064/ CC_O_20241024_000096/ CC_O_20241024_000128/ CC_O_20241024_000160/ CC_O_20241024_000192/

(lsst-scipipe-10.0.0) [jcarlin@sdfiana032 archive_tests]$ ls /sdf/data/rubin/lsstdata/offline/instrument/LSSTCom-Cam/20241024/CC_O_20241024_000125/
CC_O_20241024_000125_R22_S00.fits CC_O_20241024_000125_R22_S02.json CC_O_20241024_000125_R22_S12.fits CC_O_202410
CC_O_20241024_000125_R22_S00.json CC_O_20241024_000125_R22_S10.fits CC_O_20241024_000125_R22_S12.json CC_O_20241
CC_O_20241024_000125_R22_S01.fits CC_O_20241024_000125_R22_S10.json CC_O_20241024_000125_R22_S20.fits CC_O_202410
CC_O_20241024_000125_R22_S01.json CC_O_20241024_000125_R22_S11.fits CC_O_20241024_000125_R22_S20.json
CC_O_20241024_000125_R22_S02.fits CC_O_20241024_000125_R22_S11.json CC_O_20241024_000125_R22_S21.fits

We note also that Prompt data products will be in /sdf/data/rubin/repo/prompt/.

We have demonstrated that the DP1 data products are archived.

Step LVV-E3561-2 Step Execution Status: **Pass**

Description

Test that the public data products can be reproduced from the raw data stored at the archive.

Test Data

None

Expected Result

Actual Result

Because the archived DP1 data products are in a read-only butler (at /repo/dp1), we demonstrate this capability based on the DP1 processing that is in /repo/main. The initial ISR processing steps to go from raw images to 'preliminary_visit_image's (which are not retained in DP1, and thus must be reproduced) can be run as follows:

pipetask run -j 12 -b /repo/main -i LSSTComCam/runs/DRP/DP1/v29_0_0_rc6/DM-50098 -p $DRP_PIPE_DIR/pipelines/LSSTComCam/D
v2.yaml#step1a-single-visit-detectors -o u/jcarlin/dp1_repro_pvi --instrument lsst.obs.lsst.LsstComCam --register-
dataset-types -d "skymap='lsst_cells_v1' AND visit IN (2024121100609, 2024121100610, 2024121100611)" 2>&1 |
tee dp1_repro_pvi_test.log

After that pipeline task has successfully executed, one can open ipython, then execute the following to load the 'preliminary_visit_image' and examine it:

from lsst.daf.butler import Butler
butler = Butler('/repo/main', collections=['u/jcarlin/dp1_repro_pvi'])

% load dataset references from the output collection containing the data that was just processed:
In [**12**]: refs = butler.query_datasets('preliminary_visit_image', collections=['u/jcarlin/dp1_repro_pvi/20250715T193639Z'])

In [**13**]: len(refs)
Out[**13**]: 27

% There are 27 datasets because we processed 3 visits, each of which contains 9 detectors.

In [**14**]: pvi = butler.get(refs[13])

In [**15**]: pvi
Out[**15**]: <lsst.afw.image._exposure.ExposureF at 0x7f58baa81930>

In [**18**]: pvi.getBBox()

Out[**18**]: Box2I(corner=Point2I(0, 0), dimensions=Extent2I(4072, 4000))

We see that the image is an ExposureF object with the expected extent, and thus conclude that the processing recreated the expected intermediate data products.

Step LVV-E3561-3 Step Execution Status: **Pass**

Description

Test that the archive is scalable to the full survey data volume.

Test Data

None

Expected Result

Actual Result

All raws, data releases, and prompt data products will be accessible via Weka S3 object store (as they are currently at the SDF). Weka is scalable storage, so the archive is easily scalable to the full survey data volume.

5.1.3.46 LVV-T1612 - Verify Summit - Base Network Integration (System Level)

Version **1.0(d)**. Status **Approved**. Open *LVV-T1612* test case in Jira.

Verify ISO Layer 3 full (22 x 10 Gbps ethernet ports on DAQ side with test data from DAQ test stand, AURA, Camera DAQ team do test). Demonstrate transfer of data at or exceeding rates specified in LDM-142.

Preconditions:

1. PMCS DMTC-7400-2400 COMPLETE
2. LVV-T1168 Passed
3. EITHER: Full Camera DAQ installed on summit and loaded with data OR: high-quality DAQ

application-level simulators that match the form, volume, file paths, compressibility, and cadence of the expected instrument data, running on end node computers that are the production hardware or equivalent to it. Scientific validity of the data content is not essential.

4. Archiver/forwarders installed at Base running on end node computers that are the production hardware or equivalent to it.
5. As-built documentation for all of the above is available.

NOTE: This test will be repeated at increasing data volumes as additional observatory capabilities (e.g. ComCAM, FullCam) become available. Final verification will be tested at full operational volume.After the initial test, the corresponding verification elements will be flagged as “Requires Monitoring” such that those requirements will be closed out as having been verified but will continue to be monitored throughout commissioning to ensure they do not drop out of compliance. This will also be monitored for end to end Summit - Data Facility transfers during Commissioning.

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3647-1243142145:

Step LVV-E3647-1 Step Execution Status: **Pass**

Description
Verify Pre-conditions are satisfied.

Test Data
NA

Expected Result
Pre-conditions are satisfied.

Actual Result
Pre-conditions are met, T1168 is passed

Step LVV-E3647-2 Step Execution Status: **Pass**

Description

Transfer data between summit and base over uninterrupted 1 day period. Monitor transfer of data at or exceeding rates specified in LDM-142.

Test Data

DAQ pre-loaded data

Expected Result

Data transfers at or exceeding rates specified in LDM-142.

Actual Result

Summit - Base links are operational. It has been used many times during night runs. The link is 6x100 and 2x100
Image Download Error

5.1.3.47 LVV-T1168 - Verify Summit - Base Network Integration

Version **1.0(d)**. Status **Approved**. Open *LVV-T1168* test case in Jira.

Verify the integration of the summit to base network by demonstrating a sustained and uninterrupted transfer of data between summit and base over 1 day period at or exceeding rates specified in LDM-142. Done in 3 phases in collaboration with equipment/installation vendors (see test procedure).

Preconditions:
PMCS DMTC-7400-2330 COMPLETE
By phase:

1. Posts from Cerro Pachon to AURA Gatehouse repaired/improved. Fiber installed on posts from Cerro Pachon to AURA Gatehouse. Fiber installed from AURA Gatehouse to AURA compound in La Serena. OTDR purchased.
2. AURA DWDM installed in caseta on Cerro Pachon and in existing computer room in La Serena. DTN installed in La Serena. DTN loaded with software and test data staged.

3. Base Data Center (BDC) ready for installation of LSST DWDM. Fiber connecting existing computer room to BDC. LSST DWDM equipment installed in Summit Computer Room and BDC.

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3648-1243142146:

Step LVV-E3648-1 Step Execution Status: **Pass**

Description
Test optical fiber with OTDR:
Installation of fiber optic cables and Optical Time Domain Reflector (OTDR) fiber testing (completed 20170602 REUNA deliverable RD10)

Test Data
OTDR generated optical data

Expected Result
Fiber tested to within acceptable Db.

Actual Result
Completed ad per document indicated and in section "Annex1: OTDR Measures"

Step LVV-E3648-2 Step Execution Status: **Pass**

Description
Test AURA DWDM:
Installation of AURA DWDM and Data Transfer Node (DTN) (completed 20171218 DMTR-82)

Test Data
DTN perfSonar generated data

Expected Result
Summit - Base bandwidth and latency within specifications

Actual Result
Completed and DTN reachable at dnt01.ls.lsst.org

Step LVV-E3648-3 Step Execution Status: **Pass**

Description
Test LSST DWDM:
Installation of LSST DWDM and Bit Error Rate Tester (BERT) data (completed 20190505 collection-7743, 20191108 DAQ DWDM Connection Tests)

Test Data
BERT generated data

Expected Result
Summit - Base bandwidth, latency, bit error rate within specifications

Actual Result
Completed as per documents

5.1.3.48 LVV-T1097 - Verify Summit Facility Network Implementation

Version **1.0(d)**. Status **Approved**. Open *LVV-T1097* test case in Jira.

Verify that data acquired by a AuxTel DAQ can be transferred to Summit DWDM and loaded in the EFD without problems.

Preconditions:

1. Summit Control Network and Camera Data Backbone installed and operating properly.
2. Summit - Base Network installed and operating properly.

3. EITHER: AuxTel hardware and control systems are functional with LATISS. AuxTel TCS, AuxTel EFD, AuxTel CCS, AuxTel DAQ are connected via Control Network on Summit to Rubin Observatory DWDM (with at least 2 x 10 Gbps ethernet port client cards) OR: high-quality DAQ application-level simulators that match the form, volume, file paths, compressibility, and cadence of the expected instrument data, running on end node computers that are the production hardware or equivalent to it. Scientific validity of the data content is not essential.
4. AuxTel Archiver/forwarders installed in Summit and operating properly running on end node computers that are the production hardware or equivalent to it.
5. As-built documentation for all of the above is available.

NOTE: This test will be repeated at increasing data volumes as additional observatory capabilities (e.g. ComCAM, LSSTCam) become available. Final verification will be tested at full operational volume. After the initial test, the corresponding verification elements will be flagged as "Requires Monitoring" such that those requirements will be closed out as having been verified but will continue to be monitored throughout commissioning to ensure they do not drop out of compliance. This will also be monitored for end to end Summit - Data Facility transfers during Commissioning.

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3649-1243142147:

Step LVV-E3649-1 Step Execution Status: **Pass**

Description
Verify the pre-conditions have been satisfied

Test Data
NA

Expected Result
Pre-conditions are satisfied.

Actual Result

Pre-conditions are met. ComCam was on sky, we used it instead of Auxtel

Step LVV-E3649-2 Step Execution Status: **Pass**

Description

Control the AuxTel through a night of Observing. While observing, read out LATISS data and transfer to Rubin Observatory Summit DWDM while monitoring latency.

Test Data

LATISS images and metadata

Expected Result

Data is fed to DWDM without delays or errors.

Actual Result

From Nightlog, ComCam didnt have any problems observing during the night, data was transfer to USDF, the following link is a plot the night transfer
https://usdf-rsp-dev.slac.stanford.edu/times-square/github/lsst-dm/image-transfers-info/ImageLatency-Summit-USDF?day=20241

Step LVV-E3649-3 Step Execution Status: **Pass**

Description

Verify that data acquired by a AuxTel DAQ can be transferred and loaded in EFD without problems.

Test Data

LATISS images and metadata

Expected Result

Examine the EFD to ensure that the data has been loaded properly.

Actual Result

ComCam data was feed into EFD and visible by Chronograf
https://summit-lsp.lsst.codes/chronograf/sources/1/dashboards/53?refresh=Paused&lower=2024-12-02T17%3A49%3A00.000Z&u
12-03T17%3A49%3A00.000Z

5.1.3.49 LVV-T192 - Verify implementation of Base Wireless LAN (WiFi)

Version **1.0(d)**. Status **Approved**. Open *LVV-T192* test case in Jira.

Verify as-built wireless network at the Base Facility supports minBaseWiFi bandwidth (1000 Mbs).

Preconditions:

1. Base Wireless LAN is installed/configured and Test Personnel have accounts for email, internet access.
2. As-built documentation for all of the above is available.

Execution status: **Pass**
Final comment:
None

Detailed steps results LVV-R275-LVV-E3651-1244810980:

Step LVV-E3651-1 Step Execution Status: **Pass**

Description
Connect to Rubin Base wireless network RubinObs-Guest by scanning the QR code

Test Data
None

Expected Result
Connection to network is successful

Actual Result
Connection successful with full strength showing **Image Download Error**

Step LVV-E3651-2 Step Execution Status: **Pass**

Description

Disconnect from Rubin Base wireless and connect again using the provided SSID/pasaswd combination

Test Data

None

Expected Result

Connection to Network is successful

Actual Result

Successful connection

Step LVV-E3651-3 Step Execution Status: **Pass**

Description

Execute script scripts/LVV_T192.sh that tests connection to external sites, file download and runs a network speed test

Test Data

None

Expected Result

Verify as-built wireless network at the Base Facility supports regular work activities. Verify wireless signal strength meets or exceeds typical, and average and peak bandwidths and that web browsing, download and connection to external sites is possible

Actual Result

Successful connection to external sites and download if a file. Network speed reported as
Download Speed: 282.29 Mbit/s
Upload Speed: 268.29 Mbit/s
Ping Time: 14.934 ms

5.1.3.50 LVV-T1751 - Verify calculation of median relative astrometric measurement error on 200 arcminute scales

Version **1.0(d)**. Status **Approved**. Open *LVV-T1751* test case in Jira.

Verify that the DM system has provided the code to calculate the median relative astrometric measurement error on 200 arcminute scales and assess whether it meets the requirement that it shall be no more than AM3 = 15 milliarcseconds.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1751_AM1_AM2.ipynb."

Detailed steps results LVV-R275-LVV-E3734-1288390608:

Step LVV-E3734-1 Step Execution Status: **Pass**

Description
Identify a dataset containing at least one field with multiple overlapping visits, and that has previously gone through Data Release Processing, including calculation of data quality metrics.

Test Data
None

Expected Result
A dataset that has been ingested into a Butler repository.

Actual Result
For this test we use a recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with the

w_2024_34 pipelines.

Step LVV-E3734-2 Step Execution Status: **Pass**

Description

Retrieve the AM1 and AM2 metrics calculated for this dataset to demonstrate that they have been measured and are well-formed.

Test Data

None

Expected Result

AM1 and AM2 metrics for the dataset.

Actual Result

In the attached notebook, we demonstrate the retrieval of these metrics. The results are as follows:

```
Tract 9615:

g_AM1 = 3.8231023494070002 mas
r_AM1 = 3.228288002351153 mas
i_AM1 = 3.728593216447628 mas


g_AM2 = 3.7467052200092983 mas
r_AM2 = 3.132794128702427 mas
i_AM2 = 3.6810483122240245 mas

Tract 9697:

g_AM1 = 6.658043997359657 mas
r_AM1 = 6.140262782686699 mas
i_AM1 = 3.5977059787241354 mas


g_AM2 = 6.993080826381683 mas
r_AM2 = 6.28257099305163 mas
i_AM2 = 3.497105717983318 mas
```

```
Tract 9813:

g_AM1 = 4.994415732783283 mas
r_AM1 = 4.472256088715839 mas
i_AM1 = 4.839994490987725 mas


g_AM2 = 5.155219088191533 mas
r_AM2 = 4.512034918398069 mas
i_AM2 = 4.957150406798739 mas
```

Step LVV-E3734-3 Step Execution Status: **Pass**

Description

The same pipelines tasks that produce AM1 and AM2 can be reconfigured to calculate the metric at any spatial scale. Demonstrate via inspection of the relevant code that this is the case.

Test Data

None

Expected Result

Code snippets that show the configurability of the size scale for AMx metrics.

Actual Result

The task to calculate the AMx (i.e., AM1, AM2, AM3) metrics begins with the following configuration options:

```
class AstrometricRelativeRepeatability(AnalysisTool):
"""Calculate the AMx, ADx, AFx metrics and make histograms showing the data
used to compute the metrics.
"""

fluxType = Field[str](doc="Flux type to calculate repeatability with", default="psfFlux")
xValue = Field[int](doc="Metric suffix corresponding to annulus size (1, 2, or 3)", default=1)
```

The pipeline that calls this task is where the annulus size for calculation is specified. Here are the relevant lines from the pipeline YAML configuration for AM1, AM2, and AM3:

atools.stellarAstrometricRepeatability1: AstrometricRelativeRepeatability
atools.stellarAstrometricRepeatability1.xValue: 1
atools.stellarAstrometricRepeatability1.process.calculateActions.rms.annulus: 5
atools.stellarAstrometricRepeatability2: AstrometricRelativeRepeatability
atools.stellarAstrometricRepeatability2.xValue: 2
atools.stellarAstrometricRepeatability2.process.calculateActions.rms.annulus: 20
atools.stellarAstrometricRepeatability3: AstrometricRelativeRepeatability
atools.stellarAstrometricRepeatability3.xValue: 3
atools.stellarAstrometricRepeatability3.process.calculateActions.rms.annulus: 200

We have thus demonstrated that the pipelines contain the code to calculate AM3 once we have datasets that are sufficient for the purpose.

5.1.3.51 LVV-T1752 - Verify calculation of fraction of relative astrometric measurement error on 200 arcminute scales exceeding outlier limit

Version **1.0(d)**. Status **Approved**. Open *LVV-T1752* test case in Jira.

Verify that the DM system has provided the code to calculate the maximum fraction of relative astrometric measurements on 200 arcminute scales that exceed the 200 arcminute outlier limit **AD3 = 30 milliarcseconds**, and assess whether it meets the requirement that it shall be less than **AF3 = 10 percent.**

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2024_34 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T1752_AF1_AF2.ipynb."

Detailed steps results LVV-R275-LVV-E3735-1288458853:

Step LVV-E3735-1 Step Execution Status: **Pass**

Description

Identify a dataset containing at least one field with multiple overlapping visits, and that has previously gone through Data Release Processing, including calculation of data quality metrics.

Test Data

None

Expected Result

A dataset that has been ingested into a Butler repository.

Actual Result

For this test we use a recent reprocessing of the Subaru+HSC RC2 dataset. The data were processed with the w_2024_34 pipelines.

Step LVV-E3735-2 Step Execution Status: **Pass**

Description

Retrieve the AF1 and AF2 metrics calculated for this dataset to demonstrate that they have been measured and are well-formed.

Test Data

None

Expected Result

AF1 and AF2 metrics for the dataset.

Actual Result

In the attached notebook, we demonstrate the retrieval of these metrics. The results are as follows:

```
Tract 9615:

g_AF1 = 0.06679791871747996 %
```

```
r_AF1 = 0.06546091100993683 %
i_AF1 = 0.519371635336687 %

g_AF2 = 0.056792018419033 %
r_AF2 = 0.04708780063749638 %
i_AF2 = 0.44838105038773934 %

Tract 9697:

g_AF1 = 1.9712959844317206 %
r_AF1 = 1.0932507987220448 %
i_AF1 = 0.07248196921310417 %

g_AF2 = 2.0060957760060614 %
r_AF2 = 1.081161689594751 %
i_AF2 = 0.05548913674036633 %

Tract 9813:

g_AF1 = 0.5892173229892959 %
r_AF1 = 1.425046176579239 %
i_AF1 = 1.2487806237632042 %

g_AF2 = 0.7005543674105357 %
r_AF2 = 1.3457338124427536 %
i_AF2 = 1.3252626295841194 %
```


Step LVV-E3735-3 Step Execution Status: **Pass**

Description

The same pipelines tasks that produce AF1 and AF2 can be reconfigured to calculate the metric at any spatial scale. Demonstrate via inspection of the relevant code that this is the case.

Test Data

None

Expected Result

Code snippets that show the configurability of the size scale for AFx metrics and the associated threshold ADx.

Actual Result

The task to calculate the AMx (i.e., AM1, AM2, AM3) metrics begins with the following configuration options:

class AstrometricRelativeRepeatability(AnalysisTool):
"""Calculate the AMx, ADx, AFx metrics and make histograms showing the data
used to compute the metrics.
"""

fluxType = Field[str](doc="Flux type to calculate repeatability with", default="psfFlux")
xValue = Field[int](doc="Metric suffix corresponding to annulus size (1, 2, or 3)", default=1)

The pipeline that calls this task is where the annulus size for calculation is specified. Here are the relevant lines from the pipeline YAML configuration for AM1, AM2, and AM3:

atools.stellarAstrometricRepeatability1: AstrometricRelativeRepeatability
atools.stellarAstrometricRepeatability1.xValue: 1
atools.stellarAstrometricRepeatability1.process.calculateActions.rms.annulus: 5
atools.stellarAstrometricRepeatability2: AstrometricRelativeRepeatability
atools.stellarAstrometricRepeatability2.xValue: 2
atools.stellarAstrometricRepeatability2.process.calculateActions.rms.annulus: 20
atools.stellarAstrometricRepeatability3: AstrometricRelativeRepeatability
atools.stellarAstrometricRepeatability3.xValue: 3
atools.stellarAstrometricRepeatability3.process.calculateActions.rms.annulus: 200
atools.stellarAstrometricRepeatability3.process.calculateActions.rms.threshAD: 30

Note the final line, which sets the "AD3" threshold to 30 mas for the AF3 calculation. This configuration is by default set to 20 mas, the required value for AD1 and AD2.

We have thus demonstrated that the pipelines contain the code to calculate AF3, and apply its threshold AD3, once we have datasets that are sufficient for the purpose.

5.1.3.52 LVV-T3073 - Verify implementation of L1 Data Product pixel embargo

Version **1.0(d)**. Status **Approved**. Open *LVV-T3073* test case in Jira.

Verify that Rubin Observatory pixel data is held in a secure location and not released prior to **L1CommissioningEmbargoT=30 days** after data acquisition during the Commissioning phase.

Preconditions:
None

Execution status: **Pass**
Final comment:
This test was executed at the USDF with science pipelines version w_2024_43.

Detailed steps results LVV-R275-LVV-E3743-1290916404:

Step LVV-E3743-1 Step Execution Status: **Pass**

Description
Identify a butler repository in the ”embargo rack (e.g., /repo/embargo)” containing on-sky datasets that have been obtained within the past week. Then execute a butler query similar the example code to identify datasets.

Test Data
None

Expected Result
A long list of datasets.

Actual Result
We will query for ”raw” exposures from recent ComCam on-sky imaging (using ”day_obs > 20241022” to select images observed on or after 22 Oct 2024).

butler query-datasets /repo/embargo raw --where ”detector IN (0..9) AND instrument=’LSSTComCam’ AND day_obs > 20241022” --collections ”*’ | less

The first few lines of output look like the following:

```
type     run                  id                                   instrument detector   exposure    band  day_obs        group        physical_filter
---- ------------------ ------------------------------------ ---------- -------- ------------ ------- -------- -------------------------- ---------------
 raw LSSTComCam/raw/all 21a65a59-447c-51e2-8568-382e64b060a8 LSSTComCam        0 2024102300001        r 20241023   BT220_O_20241023_000001          r_03
 raw LSSTComCam/raw/all 27edf641-28f4-5fce-b631-103cf87a94b1 LSSTComCam        1 2024102300001        r 20241023   BT220_O_20241023_000001          r_03
 raw LSSTComCam/raw/all 627d5780-83ce-58eb-99d5-da4a5a9ae9e6 LSSTComCam        2 2024102300001        r 20241023   BT220_O_20241023_000001          r_03
 raw LSSTComCam/raw/all ef7f8d7d-7502-5fe5-affa-6e6b5f291534 LSSTComCam        3 2024102300001        r
```

20241023 BT220_O_20241023_000001 r_03
raw LSSTComCam/raw/all f490fcb1-471b-5134-99db-e5328c26a916 LSSTComCam 4 2024102300001 r
20241023 BT220_O_20241023_000001 r_03
raw LSSTComCam/raw/all d96d6efa-be1e-5cd5-91a8-f504ddd60bf2 LSSTComCam 5 2024102300001 r
20241023 BT220_O_20241023_000001 r_03
raw LSSTComCam/raw/all ed9842a3-638d-5739-8aee-cd3dd5e979a7 LSSTComCam 6 2024102300001 r
20241023 BT220_O_20241023_000001 r_03
raw LSSTComCam/raw/all e0ea2df1-b4d3-5b4f-8561-94bd6c69abaf LSSTComCam 7 2024102300001 r
20241023 BT220_O_20241023_000001 r_03
raw LSSTComCam/raw/all 154d1ba6-af36-5bef-a617-c8a06dba9609 LSSTComCam 8 2024102300001 r
20241023 BT220_O_20241023_000001 r_03
raw LSSTComCam/raw/all 5e2e8cbe-6693-52e6-9492-91474f65ae50 LSSTComCam 0 2024102300002 r
20241023 BT220_O_20241023_000001 r_03
raw LSSTComCam/raw/all 9da0d4be-49ed-5f43-a074-bdc895235753 LSSTComCam 1 2024102300002 r 20241023 BT220_O_20241023_000001 r_03

To count the number of results, change the command to:
butler query-datasets /repo/embargo raw --where ”detector IN (0..9) AND instrument='LSSTComCam' AND day_obs > 20241022” --collections ”*” > embargo_query_results.txt

Executing ”wc embargo_query_results.txt” yields:
10498 104960 1616386 embargo_query_results.txt

Not counting the first two lines, which are header rows, the query has returned 10496 raw images.

Step LVV-E3743-2 Step Execution Status: **Pass**

Description

Execute the same query against ”/repo/main”, which should only contain data that are no longer under embargo. Observe that the query returns no results.

Test Data

None

Expected Result

An empty query result, confirming that the datasets are not in the public repository.

Actual Result

Execute the following query, which is identical to the one in the previous step, but with ”/repo/embargo” replaced

with ”/repo/main”:

butler query-datasets /repo/main raw --where ”detector IN (0..9) AND instrument=’LSSTComCam’ AND day_obs > 20241022” --collections ”*” > main_query_results.txt

wc main_query_results.txt
1 0 1 main_query_results.txt

The query returned no results, confirming that the images have not been copied to the ”public” repository ”/repo/main.” We have thus verified that a system is in place to hold images until the embargo period has passed.

5.1.3.53 LVV-T3074 - Verify implementation of Level 1 Data Product embargo time

Version **1.0(d)**. Status **Draft**. Open *LVV-T3074* test case in Jira.

Verify that Rubin Observatory visit image data is not released in any form other than the contents of the public alert stream prior to **L1EmbargoTMin = 80[hour]** after acquisition of the raw image.

Preconditions:
None

Execution status: **Not Executed**
Final comment:
None

5.1.3.54 LVV-T191 - Verify implementation of Commissioning Cluster

Version **1.0(d)**. Status **Approved**. Open *LVV-T191* test case in Jira.

Verify that the Commissioning Cluster has sufficient Compute/Storage/LAN at the Base Facility to support Commissioning.

Preconditions:

None

Execution status: **Pass**
Final comment:
The cluster was moved to the summit facility from the base and is currently in use in commissioning. There is no specification on what should be installed but to provide a useful system, we have ensured that the science pipelines are in stalled and condor as a batch system is available. The verification submits a batch job to run step#1 of nightly validation on some early ComCam images

The batch submission was successful. Aspects of the processing failed and were correctly reported by the batch system as failures.

This test does not test the processing, only the batch system on the commissioning cluster

Detailed steps results LVV-R275-LVV-E3750-1306416784:

Step LVV-E3750-1 Step Execution Status: **Pass**

Description
The Rubin commissioning cluster is described in the ”Computing Infrastructure” technote at ittn-014.lsst.io under the section ”’Cerro Pachon”. Yagan is the commissioning cluster, it contains 20 nodes, 2200 cores + ~7TB RAM

Test Data
None

Expected Result
Technote exists

Actual Result
ittn-014.lsst.io describes the commissioning cluster on Cerro Pachon

---

Step LVV-E3750-2 Step Execution Status: **Pass**

Description
Connect to openvpn

Test Data
None

Expected Result
Successful connection to openvpn

Actual Result

Step LVV-E3750-3 Step Execution Status: **Pass**

Description
Connect to commissioning cluster head node htcondor.cp.lsst.org

Test Data
None

Expected Result

Actual Result
Sucessfully connected

Step LVV-E3750-4 Step Execution Status: **Pass**

Description
Set up the LSST stack

source /project/stack/loadLSST.sh
setup lsst_distrib
eups list -s | grep lsst_distrib

Test Data
None

Expected Result

Stack set up and a valid result returned, e.g.

> lsst_distrib gc7ba34d93f+b61867af9c current w_2024_43 setup

Actual Result

(Weekly 43 set up

lsst-scipipe-9.0.0) [lguy@htcondor test_LVV-T191]$ eups list -s | grep lsst_distrib

lsst_distrib gc7ba34d93f+b61867af9c current w_2024_43 setup

Step LVV-E3750-5 Step Execution Status: **Pass**

Description

Check condor is alive and well

> condor_status

Test Data

None

Expected Result

Status returned

Actual Result

(lsst-scipipe-9.0.0) [lguy@htcondor test_LVV-T191]$ condor_status

Name OpSys Arch State Activity LoadAv Mem ActvtyTime

slot1@htcondor-worker-5b7cf78857-h5fwn LINUX X86_64 Unclaimed Idle 0.000 515101 8+21:44:52
slot1@htcondor-worker-5b7cf78857-wwblw LINUX X86_64 Unclaimed Idle 0.000 515101 8+21:44:51
slot1@htcondor-worker-5b7cf78857-zdfw4 LINUX X86_64 Unclaimed Idle 0.000 515101 8+21:45:08

Total Owner Claimed Unclaimed Matched Preempting Drain Backfill BkIdle

X86_64/LINUX 3 0 0 3 0 0 0 0 0

Total 3 0 0 3 0 0 0 0 0

Step LVV-E3750-6 Step Execution Status: **Pass**

Description

Submit the bps batch job defined in ./scripts/test_LVV-T191/LVV-T191.yaml
with

> bps submit LVV-T191.yaml

Test Data

None

Expected Result

Actual Result

Job submitted and valid RunId and RubName returned

(lsst-scipipe-9.0.0) [lguy@htcondor test_LVV-T191]$ bps submit LVV-T191.yaml
lsst.ctrl.bps.drivers INFO: DISCLAIMER: All values regarding memory consumption reported below are approximate and may not accurately reflect actual memory usage by the bps process.
lsst.ctrl.bps.drivers INFO: The workflow is submitted to the local Data Facility.
lsst.ctrl.bps.drivers INFO: Starting submission process
lsst.ctrl.bps.drivers INFO: Initializing execution environment
Submit dir: /home/lguy/repos/dmtr-412/scripts/test_LVV-T191/submit/u/lguy/LVV-T191/20241029T010847Z
lsst.ctrl.bps.drivers INFO: Initializing execution environment completed: Took 6.7785 seconds; current memory usage: 0.199 Gibyte, delta: 0.012 Gibyte, peak delta: 0.017 Gibyte
lsst.ctrl.bps.drivers INFO: Peak memory usage for bps process 0.204 Gibyte (main), 0.000 Gibyte (largest child process)
lsst.ctrl.bps.drivers INFO: Starting acquire stage (generating and/or reading quantum graph)
lsst.ctrl.bps.pre_transform INFO: Creating quantum graph
lsst.ctrl.bps.pre_transform INFO: /project/stack/conda/envs/lsst-scipipe-9.0.0/share/eups/Linux64/ctrl_mpexec/g3abcffb608+e4b6b
--long-log --log-level=VERBOSE qgra
ph --butler-config /repo/LSSTComCam -i LSSTComCam/defaults -o u/lguy/LVV-T191 --output-run u/lguy/LVV-T191/20241029T010847
--pipeline /project/stack/conda/envs/lsst-scipipe-9.0.0/s
hare/eups/Linux64/drp_pipe/g406d2130e7+9fa41d294b/pipelines/LSSTComCam/nightly-validation.yaml#step1 -
-save-qgraph /home/lguy/repos/dmtr-412/scripts/test_LVV-T191/submit/u/lguy/LVV-
T191/20241029T010847Z/u_lguy_LVV-T191_20241029T010847Z.qgraph --qgraph-datastore-records -d "exposure.day_obs=202410
and instrument='LSSTComCam' and exposure.observation_type IN (
'science', 'acq')"
lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:03.706+00:00 lsst.pipe.base.quantum_graph_builder ()(quantum_graph_builder.py:344) - Processing pipeline subgraph 1 of 1 with

5 task(s).

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:03.706+00:00 lsst.pipe.base.quantum_graph_builder
()(quantum_graph_builder.py:350) - Subgraph tasks: [isr, characterizeIma
ge, calibrate, writePreSourceTable, transformPreSourceTable]

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:03.708+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:495) - Querying for data IDs
with arguments:

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:03.708+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:496) - dimensions=['band',
'instrument', 'day_obs', 'detector', 'group', 'physical_filter', 'exposure', 'visit'],

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:03.709+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:497) - dataId={'instrument'
: 'LSSTComCam'},

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:03.709+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:499) - where="exposure.day_
obs=20241027 and instrument='LSSTComCam' and exposure.observation_type IN ('science', 'acq')",

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:03.709+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:501) - datasets=['raw'],

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:03.709+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:503) - collections=['LSSTCo
mCam/raw/all', 'LSSTComCam/calib/DM-46360/isrTaskLSST/flat-i.20240926a', 'LSSTComCam/calib/DM-46360/isrTaskLSST/flat-
r.20240926a', 'LSSTComCam/calib/DM-46360/isrTaskLSST/flat-g.2024
0926a', 'LSSTComCam/calib/DM-46360/isrTaskLSST/dark.20240926a', 'LSSTComCam/calib/DM-46360/isrTaskLSST/bias.20240926a',
'LSSTComCam/calib/DM-46360/isrTaskLSST/bfk.20240926a', 'LSSTC
omCam/calib/DM-46360/isrTaskLSST/ptc.20240926a', 'LSSTComCam/calib/DM-46360/isrTaskLSST/linearizer.20240926a',
'LSSTComCam/calib/DM-46360/isrTaskLSST/defects.20240926a', 'LSSTComCam
/calib/DM-45877', 'LSSTComCam/calib/DM-45877/unbounded', 'refcats'],

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:03.935+00:00 lsst.pipe.base.quantum_graph_builder ()(all_dimensions_qu
- Iterating over query resu
lts to associate quanta with datasets.

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:04.008+00:00 lsst.pipe.base.quantum_graph_builder ()(all_dimensions_qu
- Initial bipartite graph h
as 810 quanta, 3900 dataset nodes, and 4860 edges from 162 query row(s).

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.048+00:00 lsst.pipe.base.quantum_graph_builder

()(all_dimensions_quantum_graph_builder.py:242) - Found 162 overall-inpu
t dataset(s) of type 'raw'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.100+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'defects' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.143+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'crosstalk' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.185+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'bias' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.226+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'dark' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.289+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'camera' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.371+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'bfk' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.412+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'ptc' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.473+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 162 prerequisite
input edge(s) from dataset type 'linearizer' to task 'isr'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.591+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 454 prerequisite
input edge(s) from dataset type 'the_monster_20240904' to task 'calibrate'.

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:04.685+00:00 lsst.pipe.base.quantum_graph_builder
()(all_dimensions_quantum_graph_builder.py:367) - Added 454 prerequisite
input edge(s) from dataset type 'the_monster_20240904' to task 'calibrate'.

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:04.755+00:00 lsst.pipe.base.quantum_graph_builder ()(quan-

tum_graph_builder.py:572) - Generated 162 quanta for task isr.

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:04.785+00:00 lsst.pipe.base.quantum_graph_builder ()(quantum_graph_builder.py:572) - Generated 162 quanta for task characteri
zeImage.

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:04.837+00:00 lsst.pipe.base.quantum_graph_builder ()(quantum_graph_builder.py:572) - Generated 162 quanta for task calibrate.

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:04.858+00:00 lsst.pipe.base.quantum_graph_builder ()(quantum_graph_builder.py:572) - Generated 162 quanta for task writePreSo
urceTable.

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:04.879+00:00 lsst.pipe.base.quantum_graph_builder ()(quantum_graph_builder.py:572) - Generated 162 quanta for task transformP
reSourceTable.

lsst.ctrl.bps.pre_transform INFO: INFO 2024-10-29T01:09:11.244+00:00 lsst.ctrl.mpexec.cmdLineFwk ()(cmdLineFwk.py:909) - QuantumGraph contains 810 quanta for 5 tasks, graph ID: '173
0164151.1788852-957876'
Quanta Tasks
------ ----------------------
162 isr
162 characterizeImage
162 calibrate
162 writePreSourceTable
162 transformPreSourceTable

lsst.ctrl.bps.pre_transform INFO: VERBOSE 2024-10-29T01:09:11.244+00:00 lsst.ctrl.mpexec.cmdLineFwk ()(cmdLineFwk.py:694) - Writing QuantumGraph to '/home/lguy/repos/dmtr-412/script
s/test_LVV-T191/submit/u/lguy/LVV-T191/20241029T010847Z/u_lguy_LVV-T191_20241029T010847Z.qgraph'.

lsst.ctrl.bps.pre_transform INFO: Completed creating quantum graph: Took 19.2857 seconds
lsst.ctrl.bps.pre_transform INFO: Reading quantum graph from '/home/lguy/repos/dmtr-412/scripts/test_LVV-T191/submit/u/lguy/LV
T191/20241029T010847Z/u_lguy_LVV-T191_20241029T010847
Z.qgraph'
lsst.ctrl.bps.pre_transform INFO: Completed reading quantum graph: Took 6.2427 seconds
lsst.ctrl.bps.drivers INFO: Acquire stage completed: Took 25.5348 seconds; current memory usage: 0.452 Gibyte, delta: 0.253 Gibyte, peak delta: 0.247 Gibyte
lsst.ctrl.bps.drivers INFO: Peak memory usage for bps process 0.452 Gibyte (main), 0.482 Gibyte (largest child process)
lsst.ctrl.bps.drivers INFO: Starting cluster stage (grouping quanta into jobs)
lsst.ctrl.bps.drivers INFO: Cluster stage completed: Took 0.0314 seconds; current memory usage: 0.452 Gibyte, delta: 0.000 Gibyte, peak delta: 0.000 Gibyte

lsst.ctrl.bps.drivers INFO: Peak memory usage for bps process 0.452 Gibyte (main), 0.482 Gibyte (largest child process)
lsst.ctrl.bps.drivers INFO: ClusteredQuantumGraph contains 810 cluster(s)
lsst.ctrl.bps.drivers INFO: Starting transform stage (creating generic workflow)
lsst.ctrl.bps.drivers INFO: Generic workflow name 'u_lguy_LVV-T191_20241029T010847Z'
lsst.ctrl.bps.drivers INFO: Transform stage completed: Took 0.1669 seconds; current memory usage: 0.453 Gibyte, delta: 0.001 Gibyte, peak delta: 0.001 Gibyte
lsst.ctrl.bps.drivers INFO: Peak memory usage for bps process 0.453 Gibyte (main), 0.482 Gibyte (largest child process)
lsst.ctrl.bps.drivers INFO: GenericWorkflow contains 812 job(s) (including final)
lsst.ctrl.bps.drivers INFO: Starting prepare stage (creating specific implementation of workflow)
lsst.ctrl.bps.htcondor.htcondor_service INFO: Completed HTCondor workflow creation: Took 0.0546 seconds
lsst.ctrl.bps.htcondor.htcondor_service INFO: Completed writing out HTCondor workflow: Took 0.8290 seconds
lsst.ctrl.bps.drivers INFO: Prepare stage completed: Took 0.8908 seconds; current memory usage: 0.457 Gibyte, delta: 0.004 Gibyte, peak delta: 0.004 Gibyte
lsst.ctrl.bps.drivers INFO: Peak memory usage for bps process 0.457 Gibyte (main), 0.482 Gibyte (largest child process)
lsst.ctrl.bps.drivers INFO: Starting submit stage
lsst.ctrl.bps.submit INFO: Submitting run to a workflow management system for execution
lsst.ctrl.bps.htcondor.htcondor_service INFO: Submitting from directory: /home/lguy/repos/dmtr-412/scripts/test_LVV-T191/submit/u/lguy/LVV-T191/20241029T010847Z
lsst.ctrl.bps.submit INFO: Completed submitting to a workflow management system: Took 0.2570 seconds
lsst.ctrl.bps.drivers INFO: Run 'u_lguy_LVV-T191_20241029T010847Z' submitted for execution with id '1873.0'
lsst.ctrl.bps.drivers INFO: Completed submit stage: Took 0.2633 seconds; current memory usage: 0.458 Gibyte, delta: 0.001 Gibyte, peak delta: 0.001 Gibyte
lsst.ctrl.bps.drivers INFO: Completed entire submission process: Took 33.7108 seconds; current memory usage: 0.458 Gibyte, delta: 0.271 Gibyte, peak delta: 0.271 Gibyte
lsst.ctrl.bps.drivers INFO: Peak memory usage for bps process 0.458 Gibyte (main), 0.482 Gibyte (largest child process)
Run Id: 1873.0
Run Name: u_lguy_LVV-T191_20241029T010847Z

Step LVV-E3750-7 Step Execution Status: **Pass**

Description

Get a report on the job status
> bps report --id <id or path>

Test Data

None

Expected Result

Valid report returned

Actual Result

```
(lsst-scipipe-9.0.0) [lguy@htcondor test_LVV-T191]$ bps report --id 1873.0
X STATE %S ID OPERATOR PROJECT CAMPAIGN PAYLOAD RUN
--- -------- --- ------ --------- -------- --------- --------- --------------------------------
F RUNNING 4 1873.0 lguy LVV-T191 u_lguy_LVV-T191_20241029T010847Z


Path: /home/lguy/repos/dmtr-412/scripts/test_LVV-T191/submit/u/lguy/LVV-T191/20241029T010847Z
Global job id: htcondor.cp.lsst.org#1873.0#1730164161

                    UNKNOWN MISFIT UNREADY READY PENDING RUNNING DELETED HELD SUCCEEDED FAILED PRUNED
EXPECTED
------------------------ -------- ------ -------- ------ -------- -------- -------- ---- ---------- ------ ------ ---------
TOTAL                         0     0    634    0      0    139      0   0      38     1    0    812
------------------------ -------- ------ -------- ------ -------- -------- -------- ---- ---------- ------ ------ ---------
pipetaskInit                  0     0      0    0      0      0      0   0       1     0    0      1
isr                       0     0      0    0      0    126      0   0      36     0    0    162
characterizeImage             0     0    148    0      0     12      0   0       1     1    0    162
calibrate                 0     0    161    0      0      1      0   0       0     0    0    162
writePreSourceTable           0     0    162    0      0      0      0   0       0     0    0    162
transformPreSourceTable       0     0    162    0      0      0      0   0       0     0    0    162
```

Step LVV-E3750-8 Step Execution Status: **Pass**

Description

When the job is complete, inspect the full job report

Test Data

None

Expected Result

Valid job report accessible listing successes and failures

Actual Result

(lsst-scipipe-9.0.0) [lguy@htcondor test_LVV-T191]$ bps report --id 1873.0
X STATE %S ID OPERATOR PROJECT CAMPAIGN PAYLOAD RUN
--- ------ --- ------ -------- ------- -------- -------- --------------------------------
FAILED 63 1873.0 lguy LVV-T191 u_lguy_LVV-T191_20241029T010847Z

Path: /home/lguy/repos/dmtr-412/scripts/test_LVV-T191/submit/u/lguy/LVV-T191/20241029T010847Z
Global job id: htcondor.cp.lsst.org#1873.0#1730164161

UNKNOWN MISFIT UNREADY READY PENDING RUNNING DELETED HELD SUCCEEDED FAILED PRUNED EXPECTED
---------------------- ------- ------ ------- ----- ------- ------- ------- ---- --------- ------ ------ --------
TOTAL 0 0 0 0 0 0 0 0 512 75 225 812
---------------------- ------- ------ ------- ----- ------- ------- ------- ---- --------- ------ ------ --------
pipetaskInit 0 0 0 0 0 0 0 0 1 0 0 1
isr 0 0 0 0 0 0 0 0 162 0 0 162
characterizeImage 0 0 0 0 0 0 0 0 87 75 0 162
calibrate 0 0 0 0 0 0 0 0 87 0 75 162
writePreSourceTable 0 0 0 0 0 0 0 0 87 0 75 162
transformPreSourceTable 0 0 0 0 0 0 0 0 87 0 75 162
finalJob 0 0 0 0 0 0 0 0 1 0 0 1

This bps job completed successfully. The pipetaskInit and isr tasks were successful but there were processing failures in characterizeImage and onwards. This is a failure in processing, not the batch system . The batch system correctly reported processing failures.

Inspect the detailed output in
> ls submit/u/lguy/LVV-T191/20241029T010847Z/jobs

In this case, the cause was no objects passing cuts for consideration as psf stars.
File ”/project/stack/conda/envs/lsst-scipipe-9.0.0/share/eups/Linux64/meas_algorithms/ga1f12eb575+e479d44c40/python/lsst/m
line 408, in selectSources
raise RuntimeError(”No objects passed our cuts for consideration as psf stars”)
RuntimeError: No objects passed our cuts for consideration as psf stars

Step LVV-E3750-9 Step Execution Status: **Pass**

Description

Inspect the data products and runs via the Butler

Test Data

None

Expected Result

□□utler collections accessible

Actual Result

> butler query-collections /repo/LSSTComCam *lguy*

(lsst-scipipe-9.0.0) [lguy@htcondor jobs]$ butler query-collections /repo/LSSTComCam *LVV-T191*

Name	Type
u/lguy/LVV-T191	CHAINED
u/lguy/LVV-T191/20241029T010847Z	RUN
LSSTComCam/raw/all	RUN
LSSTComCam/calib/DM-46360/isrTaskLSST/flat-i.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/flat-r.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/flat-g.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/dark.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/bias.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/bfk.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/ptc.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/linearizer.20240926a	CALIBRATION
LSSTComCam/calib/DM-46360/isrTaskLSST/defects.20240926a	CALIBRATION
LSSTComCam/calib/DM-45877	CALIBRATION
LSSTComCam/calib/DM-45877/unbounded	RUN
refcats	RUN
u/lguy/LVV-T191/20241029T010847Z	RUN

We see that data products clear
for the successful ISR task are available

> (lsst-scipipe-9.0.0) [lguy@htcondor jobs]$ butler query-dataset-types /repo/LSSTComCam --collections *LVV-T191*

name
atlas_refcat2_20220201
bfk
bias
calexp
calexpBackground
calexpSummary_metrics

calibrate_config
calibrate_log
calibrate_metadata
camera
characterizeImage_config
characterizeImage_log
characterizeImage_metadata
crosstalk
dark
defects
flat
gaia_dr2_20200414
icExp
icExpBackground
icSrc
icSrc_schema
isrStatistics
isr_config
isr_log
isr_metadata
linearizer
packages
postISRCCD
preSource
preSourceTable
ps1_pv3_3pi_20170110
ptc
raw
sdss_dr9_fink_v5b
src
srcMatch
srcMatchFull
src_schema
the_monster_20240904
transformPreSourceTable_config
transformPreSourceTable_log
transformPreSourceTable_metadata
transmission_filter
transmission_optics
transmission_sensor
writePreSourceTable_config
writePreSourceTable_log
writePreSourceTable_metadata

> butler query-datasets /repo/LSSTComCam --collections *LVV-T191*

5.1.3.55 LVV-T3155 - Verify Engineering and Facility Database Availability

Version **1.0(d)**. Status **Approved**. Open *LVV-T3155* test case in Jira.

Demonstrate Engineering and Facilities Data are available for public access within **L1PublicT (24 hours)**.

Preconditions:
None

Execution status: **Pass**
Final comment:
Test executed with science pipelines version w_2025_24 in the RSP Notebook aspect at the USDF.

The executed notebook was saved in the repository associated with this campaign's test report as "notebooks/test_LVV-T3155.ipynb."

Detailed steps results LVV-R275-LVV-E4013-1650631565:

Step LVV-E4013-1 Step Execution Status: **Pass**

Description
Execute on-sky observing, ingesting OCS commands, image headers, and transformed EFD quantities into the Consolidated Database (ConsDB).

Test Data
None

Expected Result

Actual Result

The test was executed during observing with LSSTCam at Cerro Pachon.

Step LVV-E4013-2 Step Execution Status: **Pass**

Description

While observing is ongoing (or at least within **L1PublicT=24** hours), access the ConsDB and confirm that the data products are present.

Test Data

None

Expected Result

Actual Result

In the attached notebook, we have demonstrated that the ConsDB contains information taken directly from image headers, transformed data from the Engineering Facilities Database (EFD), and derived data based on image processing. As required, these data include information about each exposure, include the telescope and instrument configuration, telemetry from the telescope, environmental and pointing information, and details about the camera.

We have furthermore demonstrated that the ConsDB records are populated well before the L1PublicT=24 hours requirement.

Step LVV-E4013-3 Step Execution Status: **Pass**

Description

From the public access portal to the EFD (ConsDB), execute a query and demonstrate that the data are publicly available.

Test Data

None

Expected Result

A query at the public interface to the EFD successfully executes and returns EFD data.

Actual Result

See the steps above, and the attached notebook. We have demonstrated that ConsDB is populated in nearly real-time, and that it contains the required telemetry and derived quantities.

While the ConsDB accessed via TAP service is not yet publicly available, this test was performed with the architecture and access mechanisms that will be available to users in DP2, and thus demonstrates that the capability is in place.

A Documentation

The verification process is defined in LSE-160. The use of Docsteady to format Jira information in various test and planing documents is described in DMTN-140 and practical commands are given in DMTN-178.

B Acronyms used in this document

Acronym	Description
AOS	Active Optics System
AP	Alert Production
AT	Auxiliary Telescope
AURA	Association of Universities for Research in Astronomy
BDC	Base Data Center
CC	Change Control
CCD	Charge-Coupled Device
CCS	Camera Control System
CPP	Calibration Production Processing
CTIO	Cerro Tololo Inter-American Observatory
DAQ	Data Acquisition System
DC2	Data Challenge 2 (DESC)
DEC	Declination
DESC	Dark Energy Science Collaboration
DM	Data Management
DMS	Data Management Subsystem
DMS-REQ	Data Management System Requirements prefix
DMSR	DM System Requirements; LSE-61
DMTN	DM Technical Note
DMTR	DM Test Report
DP1	Data Preview 1
DP2	Data Preview 2
DR3	Data Release 3
DRP	Data Release Processing
DTN	Data Transfer Node

DWDM	Dense Wave Division Multiplex
Db	Decibel
E2V	Teledyne
ECDFS	Extended Chandra Deep Field-South Survey
EDFS	Euclid Deep Field South
EFD	Engineering and Facility Database
ESS	Environmental Sensors Support
FITS	Flexible Image Transport System
HSC	Hyper Suprime-Cam
HVAC	Heating, Ventilation, and Air Conditioning
ICRS	International Celestial Reference Frame
ISO	Information Security Officer
ISR	Instrument Signal Removal
ITTN	IT Technote
JSON	JavaScript Object Notation
L1	Lens 1
LAN	Local Area Network
LATISS	LSST Atmospheric Transmission Imager and Slitless Spectrograph
LCA	Document handle LSST camera subsystem controlled documents
LDM	LSST Data Management (Document Handle)
LOVE	LSST Operators Visualization Environment
LSE	LSST Systems Engineering (Document Handle)
LSP	LSST Science Platform (now Rubin Science Platform)
LSR	LSST System Requirements; LSE-29
LSST	Legacy Survey of Space and Time (formerly Large Synoptic Survey Telescope)
LSSTC	LSST Discovery Alliance (formerly LSST Corporation)
LSSTCam	LSST Science Camera
LSSTComCam	Rubin Commissioning Camera
LVV	LSST Verification and Validation
MC	Monte-Carlo (simulation/process)
MJD	Modified Julian Date (to be avoided; see also JD)
MT	Main Telescope
MTAOS	Main Telescope Active Optics System

MTCamera	Main Telescope Camera
MTM1M3	Main Telescope M1M3
MTMount	Main Telescope Mount
NCSA	National Center for Supercomputing Applications
OBS	Organisation Breakdown Structure
OCS	Observatory Control System
OSS	Observatory System Specifications; LSE-30
PB	PetaByte
PDF	Portable Document Format
PMCS	Project Management Controls System
PSF	Point Spread Function
QC	Quality Control
RA	Rapid Analysis
RAM	Random Access Memory
RDP	Rubin Data Production (Obsolete use RDM)
REB	Readout Electronics Board
REUNA	Red Universitaria Nacional
RMS	Root-Mean-Square
RSP	Rubin Science Platform
S3	(Amazon) Simple Storage Service
SLAC	SLAC National Accelerator Laboratory
SNR	Signal to Noise Ratio
SSID	Service Set Identifier
TAI	International Atomic Time
TAP	Table Access Protocol (IVOA standard)
TAXICAB	Telescope and Auxiliary Instrumentation Calibration Acceptance Board
TCS	Telescope Control System
UI	User Interface
URL	Universal Resource Locator
US	United States
USDF	United States Data Facility
WCS	World Coordinate System
YAML	Yet Another Markup Language
bps	bit(s) per second