LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST)

Data Management Software Releases

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LDM-564

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Abstract

This document describes release management at a high level and specific features for upcomming releases.

Change Record

Version	Date	Description	Owner name
1.0	2017-08-09	Initial version.	W. O'Mullane

Document source location: `https://github.com/lsst/LDM-564`

1 Introduction

1.1 Scope

This document covers releases of software from the Data Management Subsystem of LSST. It discusses the delineation between the Data Facility as an operational entity and DM producing and testing software.

2 Release Management

This section outlines the current understanding of the release management process. Complete definition is pending the appointment of the DM Release Manager.

2.1 Preparation of Releases

DM develops code in GitHub following it's developer guidelines and coding standards [1]. This includes automated testing and continuous integration. Tested releases are tagged by SQuaRE weekly and major releases are made each Cycle (six months).

There are specific packages and systems deployed together to form the high level components of DM as depicted in Figure 1. The orchestration of deployments on multiple machines is facilitated by the use of contains and a machine readable configurations. DM prepares docker containers and puppet configurations for deploying these systems on Kubernetes enabled cluster. These configurations are also tagged in the release.

In addition specific releases with features required to support the [2] test milestones will be tagged and released in advanced of each verification test. The initial feature lists for these releases are defined in Section **??**.

2.2 Deployment of Releases

Although we provide ready to install products these will be further tested before being deployed to the productions system. Hence eat NCSA a release will be taken, installed on a test

[1] https://developer.lsst.io/

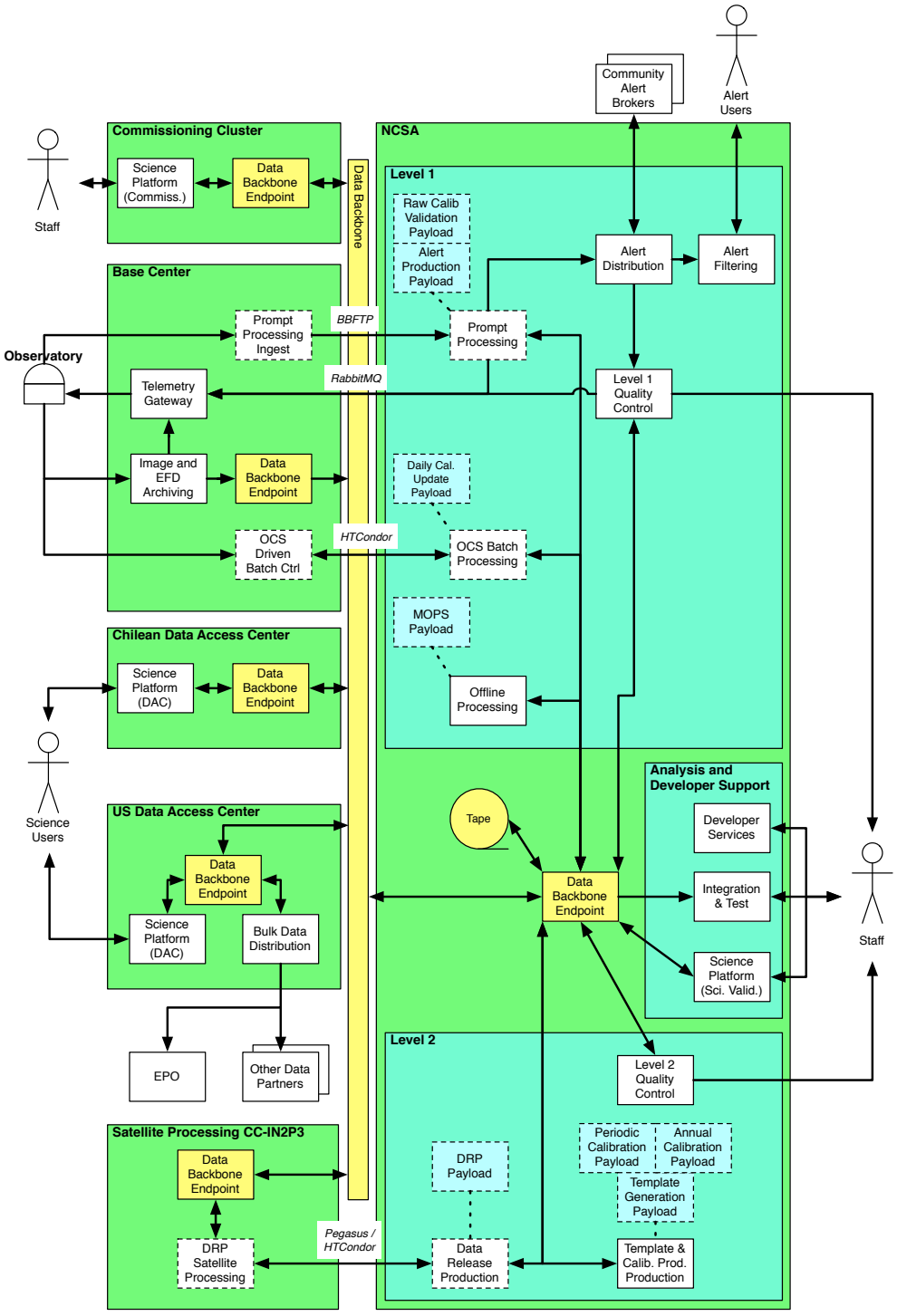

FIGURE 1: DM components as deployed during Operations. Where components are deployed in multiple locations, the connections between them are labeled with the relevant communication protocols. Science payloads are shown in blue. For details, refer to LDM-148.

system for smoke testing. This may be seen as operational validation of the release before it is made available int he production environment.

Once smoke tested the docker containers will be available in the NCSA docker repository. Using this secure internal repository operators may spin up specific containers for specific releases in the operational environment.

2.2.1 Levels of operational validation

Certain containers will be used to provide kernels for the JupyterLab environment. These containers could be deployed more quickly since they would be for use by choice in the notebook (i.e. slightly fixed version of stack but the old one is still available).

Containers being made available on the dev cluster for experimentation should be available quickly hence with minimum security checking and validation.

Similarly during commissioning availability of containers on the commissioning cluster should be on the order of hours (not days). The level of smoke testing and the time to availability of a container may need to be compressed in commissioning.

Containers to be used for batch processing on the other hand should be rigorously validated.

3 Functionality in future DM releases

This is currently not an exhaustive feature list but gives an indication at a high level of the features in each release which will be verified by the corresponding verification test campaign. As the test plans are written this will become a list of requirements to be tested for that release and thus begin o fill out the verification control database (currently to be in Jira).

In the feature lists below the internal milestone for that feature is given in parenthesis)

Each section here is a test milestone from LDM-503 - the same labels are used. The timeline is in the DM schedule using the same labels and depicted in Figure 2

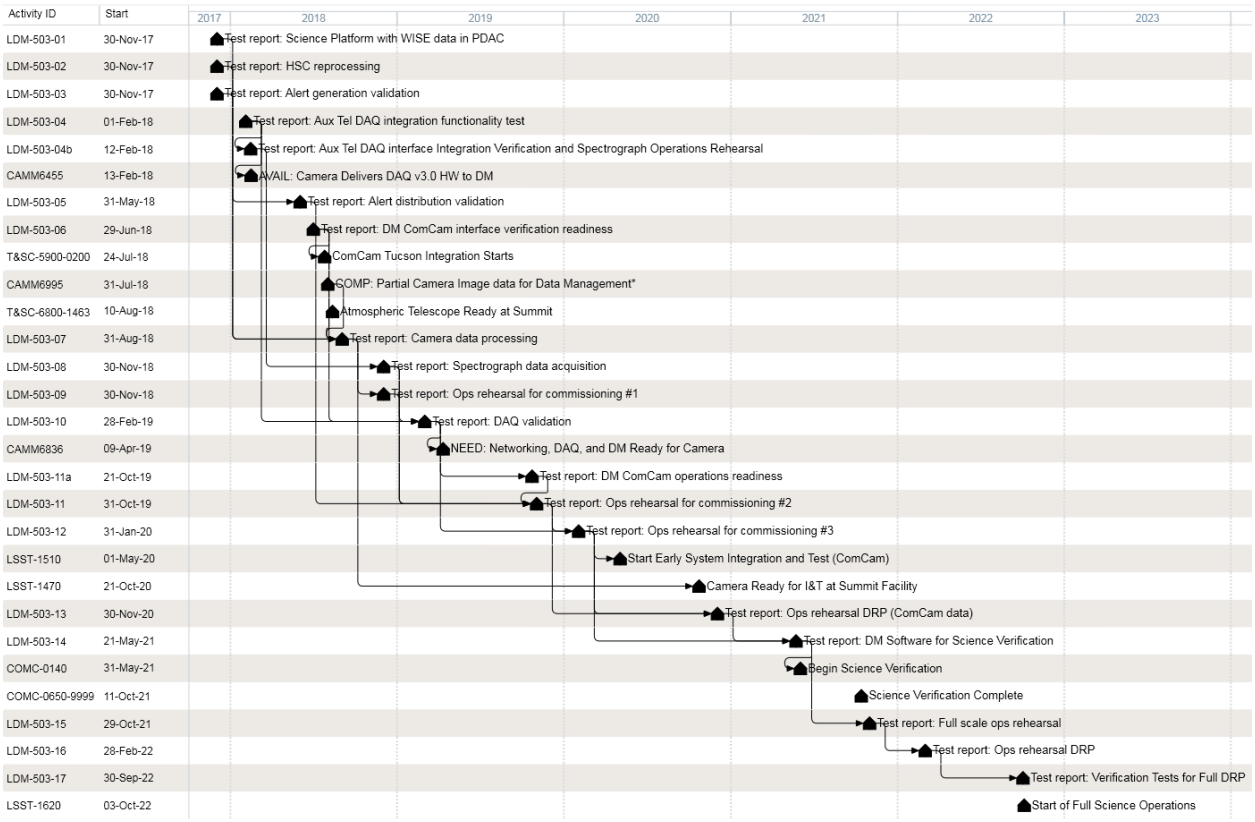

FIGURE 2: DM major milestones (LDM-503-x) in the LSST schedule.

3.1 LDM-503-1: Science Platform with WISE data in PDAC

- WISE data ingest to PDAC (DM-DAX-1)
- dbserv V1 API (TAP, w/ async. requests) (DM-DAX-2)
- imgserv V1 API (SODA) (DM-DAX-3)
- metaserv V1 API (SIAv2) (DM-DAX-4)
- Search and display WISE sources (objects) in PDAC (DM-SUIT-1)
- Search WISE coaded data single exposure images in PDAC (the images are from IRSA at IPAC, not NCSA) (DM-SUIT-2)
- Time series analysis tool for WISE data (DM-SUIT-3)
- Multiple data traces in chart space (DM-SUIT-4)
- Project internal Jupyter notebook service (DM-SQRE-1)

3.2 LDM-503-2: HSC Reprocessing

- SFM1 (DM-AP-1)
- Database ingest in support of HSC reprocessing (ie, large catalog ingest) (DM-DAX-5)
- DRP-MS-INT-1 (DM-DRP-1)
- DRP-MS-QA-1 (DM-DRP-2)
- Provide regular reprocessing service for HSC data (DM-NCSA-1)
- Provide access to results of regular reprocessing (NB the form this takes depends upon available DAX functionality) (DM-NCSA-2)
- Provide database for metadata, provenance, location and demonstrate ingest at small scale (DM-NCSA-3)
- Search and display processed HSC data (DM-SUIT-5)

3.3 LDM-503-3: Alert Generation Validation

- SFM1 (DM-AP-1)
- DIFF1 (DM-AP-2)
- DIFFMEAS1 (DM-AP-3)
- DIASource association (DM-AP-4)
- DIAObject generation (DM-AP-5)
- Prototype level 1 database (DM-DAX-6)

3.4 LDM-503-4: AuxTel DAQ integration functionality test

- Butler interface to retrieve images from data backbone (DM-DAX-7)
- Minimal support for the small operational schema including file metadata and provenance for every file, and record of ingest (DM-NCSA-4)

3.5 LDM-503-4b: Aux Tel DAQ Interface Integration Verification and Spectrograph Operations Rehearsal

- Level 1 archiving system able to acquire pixel data from the Aux Tel DAQ, header metadata via OCS, assemble FITS image, deposit in cache (DM-NCSA-5)
- Ability to transfer files originating from Tucson to NCSA and ingest files at NCSA, including metadata and provenance (DM-NCSA-6)
- Capability to paint displays for Tucson and NCSA (DM-NCSA-7)
- AuxTel DAQ integration functionality test (LDM-503-4)

3.6 LDM-503-5: Alert Distribution Validation

- ALERTDIST1 (DM-AP-6)
- Test instance of feeds to LSST mini broker in online (live stream) and offline (replaying from files) modes (DM-NCSA-8)

- Test instance of alert distribution hosting service and L1 database in Development & Integration Enclave (DM-NCSA-9)
- Alert Generation Validation (LDM-503-3)

3.7 LDM-503-6: ComCam Interface Verificaton

- ISR1 (DM-AP-7)
- DRP-MS-COADD-1 (DM-DRP-3)
- DRP-MS-CPP-6 (DM-DRP-4)
- Sustained archiving service that is OCS commandable (DM-NCSA-10)
- Verified acquisition of raw and crosstalk-corrected exposures at raft scale, incl. correct metadata (DM-NCSA-11)
- Interface Verification: Single Visit (LSST-1200)

3.8 LDM-503-7: Camera Data Processing

- DRP-MS-CPP-3 (DM-DRP-5)
- LSSTCam data display and visualization (DM-SUIT-6)
- Mapping between SUIT systems & NCSA auth system (DM-SUIT-7)
- Integrate SUIT portal with workspace (DM-SUIT-8)
- ComCam Interface Verificaton (LDM-503-6)
- HSC Reprocessing (LDM-503-2)
- Science Platform with WISE data in PDAC (LDM-503-1)

3.9 LDM-503-8: Spectrograph Data Acquisition

- ISR1 (DM-AP-7)
- DRP-MS-CPP-1 (DM-DRP-6)

- DRP-MS-CPP-4 (DM-DRP-7)
- DRP-MS-CPP-5 (DM-DRP-8)
- DRP-MS-CPP-9 (DM-DRP-9)
- EFD ETL Service (DM-NCSA-12)
- Spectrograph Archiving Service (DM-NCSA-13)
- Data Backbone endpoints in Chile for ingestion and access, distribution over WAN, ingest at NCSA into custodial file store (DM-NCSA-14)
- Batch Processing Service for offline spectrograph data processing (DM-NCSA-15)
- DLP-561 Mountain - Base Network Functional 2 x 100 Gbps (DM-NET-2)
- T&SC-2600-1250 Initial Network Ready (Summit) (NB actually a T&S milestone?!) (DM-NET-3)
- Base LAN installed (DM-NET-4)
- Spectral data display (DM-SUIT-9)
- Aux Tel DAQ Interface Integration Verification and Spectrograph Operations Rehearsal (LDM-503-4b)

3.10 LDM-503-9: Verification Tests in Advance of Pre-Ops Rehearsal for Commissioning

- ISR2 (DM-AP-8)
- Jointcal at a functional (but not necessarily algorithmically complete) level. (DM-AP-9)
- DRP-MS-CPP-8 (DM-DRP-10)
- DRP-MS-OBJCHAR-8 (DM-DRP-11)
- DRP-MS-IMCHAR-6 (DM-DRP-12)
- DRP-MS-IMCHAR-2 (DM-DRP-13)
- DRP-MS-OBJCHAR-9 (DM-DRP-14)

- DRP-MS-COADD-3 (DM-DRP-15)
- DRP-MS-IMCHAR-1 (DM-DRP-16)
- DRP-MS-IMCHAR-4 (DM-DRP-17)
- DRP-MS-DET-1 (DM-DRP-18)
- DRP-MS-QA-2 (DM-DRP-19)
- Perform ISR processing on ComCam-scale data. (DM-NCSA-16)
- QA on WCS, PSF, etc returned to Observatory using JupyterLab (DM-NCSA-17)
- Validated disaster repsonse recovery for data and calibration products (DM-NCSA-18)
- 8x7 incident response system (DM-NCSA-19)
- Supertask-based system capable of efficient processing across a full focal plane. (DM-DAX-8)
- Provenance system, details TBD. (DM-DAX-9)
- Commissioning notebooks running on the commissioning cluster (DM-SQRE-2)
- Camera Data Processing (LDM-503-7)
- DRP-MS-COADD-2 (DM-DRP-37)

3.11 LDM-503-10: DAQ Validation

- AuxTel DAQ integration functionality test (LDM-503-4)
- ComCam Interface Verificaton (LDM-503-6)

3.12 LDM-503-11a: ComCam Operations Readiness

- SFM2 (DM-AP-10)
- DIFF1 (DM-AP-2)
- DIFFMEAS1 (DM-AP-3)

- ALERTDIST1 (DM-AP-6)
- DLP-531 Base - Archive Network Functional 100 Gbps (DM-NET-5)
- DAQ Validation (LDM-503-10)
- ComCam Archiving Service (DM-NCSA-20)
- L1 Offline Processing Service, Raft Scale, ComCam (DM-NCSA-21)
- Information in consolidated database available to QA portal (DM-NCSA-22)
- SUIT deployment procedure (DM-SUIT-10)

3.13 LDM-503-11: Verification Tests in Advance of Pre-Ops Rehearsal for Commissioning #2

- ComCam Operations Readiness (LDM-503-11a)
- DRP-MS-IMCHAR-5 (DM-DRP-21)
- DRP-MS-COADD-4 (DM-DRP-22)
- DRP-MS-CPP-10 (DM-DRP-23)
- DRP-MS-DET-3 (DM-DRP-26)
- Middleware support for multifit (DM-DAX-10)
- ComCam data search, display, and visualization (DM-SUIT-11)
- (DM-SUIT-12)
- Alert subscription (beta) (DM-SUIT-13)
- ”All-sky” visualization (DM-SUIT-14)
- DIFF2 (DM-AP-11)
- Alert Distribution Validation (LDM-503-5)
- Spectrograph Data Acquisition (LDM-503-8)

3.14 LDM-503-12: Verification Tests in Advance of Pre-Ops Rehearsal for Commissioning #3

- DRP-MS-DET-2 (DM-DRP-27)
- DRP-MS-COADD-5 (DM-DRP-28)
- DRP-MS-OBJCHAR-3 (DM-DRP-29)
- DRP-MS-OBJCHAR-2 (DM-DRP-30)
- Hardened Jupyter deployment on Commissioning Cluster (DM-SQRE-3)
- DRP-MS-IMCHAR-3 (DM-DRP-24)
- DRP-MS-CPP-7 (DM-DRP-20)

3.15 LDM-503-13: Ops Rehearsal for Data Release Processing with ComCam Data

- DIFF3 (DM-AP-12)
- DIFFMEAS2 (DM-AP-13)
- ALERTDIST2 (DM-AP-14)
- DRP-MS-OBJCHAR-6 (DM-DRP-32)
- DRP-MS-COADD-6 (DM-DRP-33)
- DRP-MS-OBJCHAR-5 (DM-DRP-34)
- DRP-MS-DET-4 (DM-DRP-35)
- Operational processes for preparing for & producing a data release defined and tested (DM-NCSA-23)
- Alert subscription (DM-SUIT-15)
- Commissioning DAC (DM-SUIT-16)
- DRP-MS-OBJCHAR-1 (DM-DRP-25)

3.16 LDM-503-14: DM Software for Science Verification

- INTEGRATION1: Integration done to the level that the alert distribution system can be fully integrated. This excludes integration of the precovery and forced photometry pipeline and MOPS since the alert distribution system does not depend on them directly. (DM-AP-15)
- Commissioning DAC (DM-SUIT-16)
- Notebook service ready for verification & validation (DM-SQRE-4)
- DRP-MS-COADD-6 (DM-DRP-33)

3.17 LDM-503-15: Verification tests in advance of full scale Ops Rehearsal

- INTEGRATION2: This is full integration of the alert production system within the production environment. This includes single frame processing, alert generation, alert distribution, and precovery and forced photometry. MOPS is a separate system and thus has its own milestone. (DM-AP-16)
- MOPS (DM-AP-17)
- DRP-MS-OBJCHAR-4 (DM-DRP-36)
- Production batch service for data release processing (DM-NCSA-24)
- Demonstrate operational coordination with and processing at satellite CC-IN2P3 satellite computing facility (DM-NCSA-25)
- Notebook service ready for general science users (DM-SQRE-5)
- DRP-MS-OBJCHAR-7 (DM-DRP-31)

3.18 LDM-503-16: Ops rehearsal DRP

- Demonstrate full delivery of Data Facility ConOps (DM-NCSA-26)

4 References

[1] **[LDM-148]**, Lim, K.T., Bosch, J., Dubois-Felsmann, G., et al., 2017, *Data Management System Design*, LDM-148, URL https://ls.st/LDM-148

[2] **[LDM-503]**, O'Mullane, W., Jurić, M., Economou, F., 2017, *Data Management Test Plan*, LDM-503, URL https://ls.st/LDM-503

5 Acronyms

Acronym	Description
DAQ	Data AcQuisition (system)
DM	Data Management
DRP	Data Release Production
LSST	Large Synoptic Survey Telescope
NCSA	National Center for Supercomputing Applications
PDAC	Prototype Data Access Center
SQuaRE	Science Quality and Reliability Engineering
WISE	Wide-field Survey Explorer