Vera C. Rubin Observatory
Data Management

LDM-503-11b: Science Pipelines Fall 2019 Release Test Plan and Report

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DMTR-192

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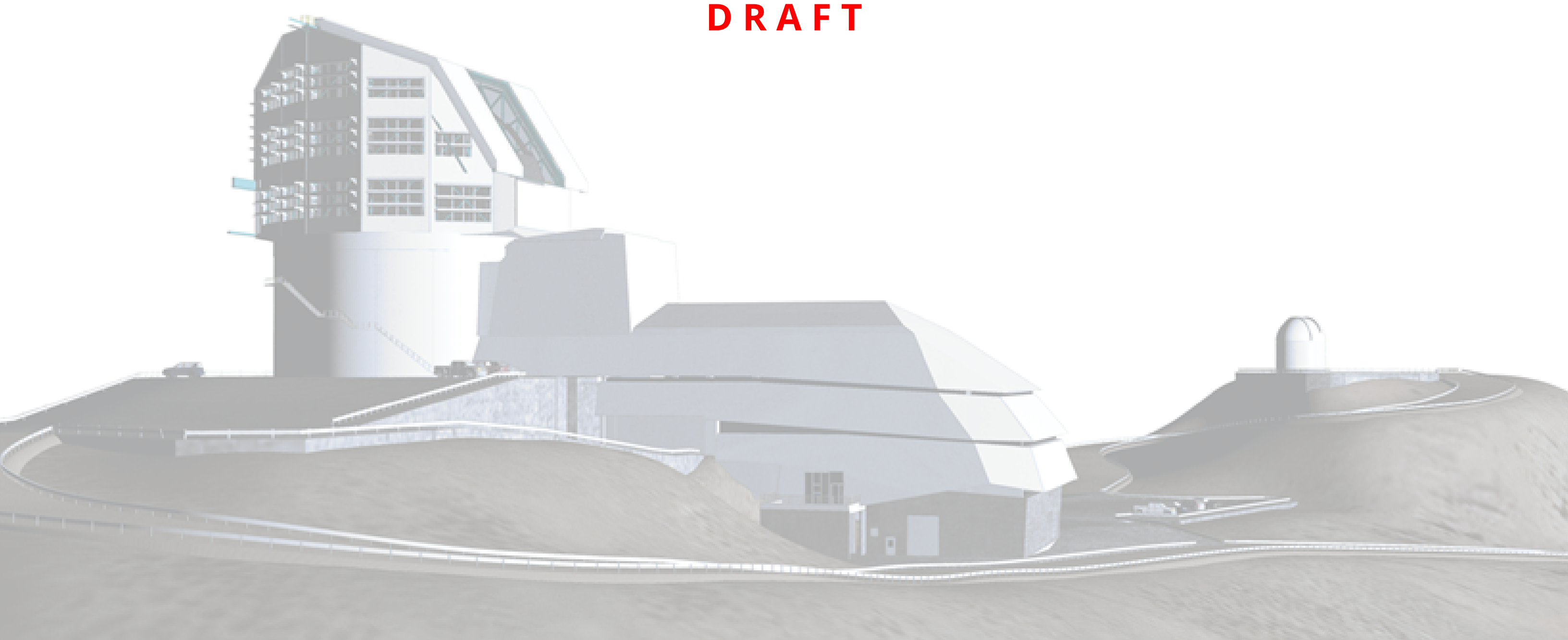

Abstract

This is the test plan and report for **Science Pipelines Fall 2019 Release** (LDM-503-11b), an LSST milestone pertaining to the Data Management Subsystem.

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Change Record

Version	Date	Description	Owner name
	2019-11-21	First Draft	John Swinbank
1.0	2020-08-20	Test plan completed. DM-16197	John Swinbank
2.0	2020-09-17	Test campaign completed and approved. DM-16126	John Swinbank

Document curator: John Swinbank
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Version from source repository: 0d6b89f

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Contents

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LDM-503-11b: Science Pipelines Fall 2019 Release Test Plan and Report

1 Introduction

1.1 Objectives

This test plan checks for the successful release of the Fall 2019 release of the LSST Science Pipelines (Pipelines release version 19.0.0).

It will demonstrate that:

- The release has been tagged, built and made available through standard distribution channels;
- Release documentation, including release notes and a characterization report, are available on the LSST Pipelines documentation website (https://pipelines.lsst.io/);
- An end-user can follow standard instructions to install the release onto some representative system;
- The release is installed into the “shared stack” on the lsst-dev shared developer systems and the Verification Cluster at the LSST Data Facility;
- The lsst_dm_stack_demo test package executes successfully in the context of the release.

This test plan does not, in itself, verify the scientific integrity or algorithmic correctness of the release, beyond checking that defined procedures for checking basic correctness and characterizing algorithmic performance have been followed.

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1.2 Scope

The overall strategy for testing and verification within LSST Data Management is described in LDM-503.
This test plan specifically verifies successful completion of milestone LDM-503-11b, which refers to the Fall 2019 release of the LSST Science Pipelines.

1.3 System Overview

The LSST Science Pipelines comprise the scientific algorithms that will be used to process LSST data, arranged into executable pipelines by means of the LSST "task" framework. They also include execution middleware that is common across execution environments (for example, the "Data Butler" I/O abstraction is included, but schedulers or workflow management for specific clusters is not), and "camera packages", which adapt and configure the algorithms for use with specific instrumentation.

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1.4 Applicable Documents

LDM-503 Data Management Test Plan
LDM-151 Data Management Science Pipelines Design
LSE-61 Data Management System Requirements

1.5 Document Overview

This document was generated from Jira, obtaining the relevant information from the LVV-P62 Jira Test Plan and related Test Cycles (LVV-C113).

Section 1 provides an overview of the test campaign, the system under test (Science Pipelines SW), 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-P62 in Jira is **Completed** .

1.6 References

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[1] **[LSE-61]**, Dubois-Felsmann, G., Jenness, T., 2018, *LSST Data Management Subsystem Requirements*, LSE-61, URL `https://ls.st/LSE-61`

[2] **[LDM-503]**, O'Mullane, W., Swinbank, J., Jurić, M., Economou, F., 2018, *Data Management Test Plan*, LDM-503, URL `https://ls.st/LDM-503`

[3] **[LDM-151]**, Swinbank, J.D., et al., 2017, *Data Management Science Pipelines Design*, LDM-151, URL `https://ls.st/LDM-151`

2 Test Plan Details

2.1 Data Collection

Observing is not required for this test campaign.

2.2 Verification Environment

Several of the tests described in this plan are agnostic of environment: they involve checking that certain content has been properly published. This can be performed from any internet-connected system with a web browser, and will, in this case, likely be executed from the tester's laptop.

Where tests require installation or execution of specific Science Pipelines components, this will be carried out on the "lsst-dev" shared developer infrastructure at the LSST Data Facility. This infrastructure provides a number of powerful (high core count, high RAM) systems accessible to LSST developers. At time of writing, they are running CentOS 7.6.1810; in practice, any version of CentOS (or a similar operating system) is appropriate for this test plan, as long as it complies with the published installation prerequisites of the LSST Science Pipelines.

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2.3 Related Documentation

No additional documentation provided.

2.4 PMCS Activity

Primavera milestones related to the test campaign:

- LDM-503-11b

3 Personnel

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

	T. Plan LVV-P62 owner:	**John Swinbank**	
	T. Cycle LVV-C113 owner:	**John Swinbank**	
Test Cases	**Assigned to**	**Executed by**	**Additional Test Personnel**
LVV-T362	John Swinbank	John Swinbank	
LVV-T1601	John Swinbank	John Swinbank	
LVV-T363	John Swinbank	John Swinbank	

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4 Test Campaign Overview

4.1 Summary

T. Plan LVV-P62:		**LDM-503-11b: Science Pipelines Fall 2019 Release**		Completed
T. Cycle LVV-C113:		**LDM-503-11b: Science Pipelines Fall 2019 Release**		Done
Test Cases	**Ver.**	**Status**	**Comment**	**Issues**
LVV-T362	1	Pass w/ Deviation	Test completed with deviation; see linked issue.	DM-26471
LVV-T1601	1	Pass	Test completed successfully.	
LVV-T363	1	Pass	Test completed successfully.	

Table 2: Test Campaign Summary

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4.2 Overall Assessment

The bulk of the tests described in this plan were completed successfully, with almost no problems encountered.

The one issue seen was in the documentation in the lsst_dm_stack_demo package not properly matching the on-disk files: documentation refers to a bin/compare.py file which is executed using Python, whereas in fact the package provides a bin/compare file which must be executed using bash.

Note, however, that this package is obsolete and will be removed from future releases (issue DM-22578). This is therefore a minor issue. Nevertheless, issue DM-26471 has been filed to resolve this problem.

4.3 Recommended Improvements

The lsst_dm_stack_demo documentation its documentation should be updated to reflect the available functionality.

5 Detailed Test Results

5.1 Test Cycle LVV-C113

Open test cycle *LDM-503-11b: Science Pipelines Fall 2019 Release* in Jira.

Test Cycle name: LDM-503-11b: Science Pipelines Fall 2019 Release
Status: Done

This test cycle describes tests performed on the Science Pipelines Fall 2019 (v19.0.0) release, ensuring that the release is properly identified, documented, distributed, installable and tested.

5.1.1 Software Version/Baseline

A web browser is required for inspecting release artifacts published to the web.

Testing the software installation procedures, and demonstrating that the release's integration tests can be executed successfully, require a supported operating system with the documented prerequisites of the release installed. This will be carried out on the ”lsst-dev” shared developer systems at the LSST Data Facility.

At time of writing, Data Facility systems run CentOS Linux release 7.6.1810, and it is anticipated that this will be a supported platform for the Science Pipelines release.

Science Pipelines prerequisites are documented at pipelines.lsst.io; all of these must be installed.

It is possible that the software release will involve a reorganization of documentation describing prerequisites; in this case, the documentation corresponding to the new release must be consulted.

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5.1.2 Configuration

No specific configuration is required beyond the availability of test systems with the prerequisite software, described above, installed.

5.1.3 Test Cases in LVV-C113 Test Cycle

5.1.3.1 LVV-T362 - Installation of the LSST Science Pipelines Payloads

Version **1**. Open *LVV-T362* test case in Jira.

This test will check that:

- The Alert Production Pipeline payload is available for installation from documented channels;
- The Data Release Production Pipeline payload is available for installation from documented channels;
- The Calibration Products Production Pipeline payload is available for installation from documented channels;
- These payloads can be installed on systems at the LSST Data Facility following available documentation;
- The installed pipeline payloads are capable of successfully executing basic integration tests.

Note that this test assumes a 2018-era packaging of the Science Pipelines software, in which all the above payloads are represented by a single “meta-package”, lsst_distrib.

Preconditions:

Execution status: **Pass w/ Deviation**

Final comment:
Test completed with deviation; see linked issue.

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Issues found during the execution of LVV-T362 test case:

- DM-26471 README for lsst_dm_stack_demo is incorrect

Detailed steps results:

Step	Step Details
1	Description The LSST Science Pipelines, described by the lsst_distrib meta-package, should be installed following the documentation available at https://pipelines.lsst.io/. The suggested Conda environment will be used to ensure that a supported execution environment is available. Expected Result Detailed output will depend on the installation method chosen, but will confirm the successful installation of the Science Pipelines. Actual Result The Science Pipelines were installed using the Docker image 7-stack-lsst_distrib-v19_0_0, using the procedure described at https://pipelines.lsst.io/install/docker.html#quick-start. The command executed was: docker run -ti docker.io/lsstsqre/centos:7-stack-lsst_distrib-v19_0_0 After a few moments, a shel inside the Docker container was available. Status: **Pass**
2	Description The lsst_distrib top-level metapackage will be enabled. Assuming that the software has been installed at ${LSST_DIR}: source ${LSST_DIR}/loadLSST.bash setup lsst_distrib Expected Result

Nothing is printed. The command

```
eups list -s lsst_distrib
```

may be used to confirm that the correct version of the codebase has been installed.

Actual Result

```
[lsst@cdc991ebdb1d stack]$ source /opt/lsst/software/stack/loadLSST.bash
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d stack]$ setup lsst_distrib
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d stack]$ eups list -s lsst_distrib
19.0.0+2 current v19_0_0 setup
```

Status: **Pass**

3

Description

The "LSST Stack Demo" package will be downloaded onto the test system from https://github.com/lsst/lsst_dm_stack_demo/releases. The version corresponding to to the version of the Science Pipelines under test should be chosen.

Expected Result

Depends on the tool selected by the user for downloading.

Actual Result

```
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d ~]$ wget https://github.com/lsst/lsst_dm_stack_demo/archive/19.0.0.tar.gz
–2020-08-25 21:40:27– https://github.com/lsst/lsst_dm_stack_demo/archive/19.0.0.tar.gz
Resolving github.com (github.com)... 192.30.255.112
Connecting to github.com (github.com)|192.30.255.112|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://codeload.github.com/lsst/lsst_dm_stack_demo/tar.gz/19.0.0 [following]
–2020-08-25 21:40:27– https://codeload.github.com/lsst/lsst_dm_stack_demo/tar.gz/19.0.0
Resolving codeload.github.com (codeload.github.com)... 192.30.255.121
Connecting to codeload.github.com (codeload.github.com)|192.30.255.121|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [application/x-gzip]
Saving to: '19.0.0.tar.gz'


[ <=> ] 34,556,522 6.23MB/s in 6.5s


2020-08-25 21:40:34 (5.07 MB/s) - '19.0.0.tar.gz' saved [34556522]
```

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Status: **Pass**

4 Description

The stack demo package is uncompressed into a directory ${DEMO_DIR}.

Expected Result

Depends on options given to the tar command. Should confirm the availability of the stack demo source.

Actual Result

```
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d ~]$ tar zxf 19.0.0.tar.gz
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d ~]$
```

Status: **Pass**

5 Description

The demo package will be executed by following the instructions in its README file.

Expected Result

Successful execution will result in the string “Ok” being returned.

Actual Result

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```
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d lsst_dm_stack_demo-19.0.0]$ setup -r .
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d lsst_dm_stack_demo-19.0.0]$ ./bin/demo.sh
```

(many lines of output, elided for clarity)

```
processCcd.calibrate.photoCal INFO: Magnitude zero point: 26.068660 +/- 0.001258 from 63 stars
processCcd.calibrate INFO: Photometric zero-point: 26.068660
Loading exposure registry from /home/lsst/lsst_dm_stack_demo-19.0.0/input/registry.sqlite3
```

```
Processing completed successfully. The results are in detected-sources.txt.
```

```
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d lsst_dm_stack_demo-19.0.0]$ python bin/compare.py detected-sources.txt
python: can't open file 'bin/compare.py': [Errno 2] No such file or directory
```

```
(lsst-scipipe-4d7b902) [lsst@cdc991ebdb1d lsst_dm_stack_demo-19.0.0]$ ./bin/compare detected-sources.txt
Ok.
```

Note that the documented bin/compare.py command was NOT functional, but an obvious equivalent was available.

Status: **Pass w/ Deviation**

5.1.3.2 LVV-T1601 - Science Pipelines available on developer hardware

Version **1**. Open *LVV-T1601* test case in Jira.

This test will check that a given release of the LSST Science Pipelines is available for use in a "shared stack" on developer infrastructure.

Preconditions:

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Execution status: **Pass**

Final comment:
Test completed successfully.

Detailed steps results:

Step	Step Details
1	Description Consult the LSST Developer Guide (http://developer.lsst.io/) to establish: • An appropriate hostname and login instructions for the shared developer infrastructure at the LSST Data Facility; • Instructions for initializing the shared stack on the developer infrastructure. Expected Result The Developer Guide clearly presents information about connecting to and using shared infrastructure. Actual Result • Instructions for connecting to shared hardware are available at https://developer.lsst.io/services/lsst-login.html • Instructions for initializing the shared stack, along with a range of other software, are available at https://developer.lsst.io/services/software.html Status: **Pass**
2	Description Connect to the shared infrastructure following the Developer Guide instructions. Expected Result A shell prompt on a shared machine. Actual Result Login successful. A prompt is available. Status: **Pass**
3	Description Initialize the LSST environment following the Developer Guide instructions. Example Code source /software/lsstsw/stack/loadLSST.bash Expected Result

No errors are shown.

Actual Result

The shared stack for the 19.0.0 release is available in /software/lsstsw/stack_20191101. The command executed was:

```
source software/lsstsw/stack_20191101/loadLSST.bash
```

Status: **Pass**

4 Description

List available software products using EUPS, and check that the release under test is available.

Example Code

```
eups list lsst_distrib | grep vXX_XX_XX # replace XX_XX_XX with the version number of the release under test
```

Expected Result

The provided version number should be available in the shared stack.

Actual Result

```
[swinbank@lsst-login01 ~]$ eups list lsst_distrib | grep 19_0_0
19.0.0+2 current v19_0_0
```

Status: **Pass**

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5.1.3.3 LVV-T363 - Science Pipelines Release Documentation

Version **1**. Open *LVV-T363* test case in Jira.

This test will check:

- That a particular Science Pipelines release is adequately described by documentation at the https://pipelines.lsst.io/ site;
- That the Science Pipelines release is accompanied by a characterization report which describes its scientific performance.

Preconditions:

Execution status: **Pass**

Final comment:
Test completed successfully.

Detailed steps results:

Step	Step Details
1	Description Load the Science Pipelines website at https://pipelines.lsst.io/. Expected Result The website is displayed. Actual Result Website is displayed. Status: **Pass**
2	Description Identify documentation for the release under test. This should be clearly labelled on the documentation site. If the latest release is being tested, the default page loaded when visiting https://pipelines.lsst.io/ should be the documentation required. If this test is for another release, the site should present clear instructions for changing the edition (or version) of the documentation being examined, and documentation for the release under test should be available. Expected Result The documentation for the release under test is displayed. Actual Result Documentation for the release under test, v19_0_0, is clearly displayed at https://pipelines.lsst.io/v/v19_0_0/index.html. Status: **Pass**
3	Description

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Inspect the documentation to ensure that it refers to the release under test, and that it provides:

- Release notes, describing changes in this release relative to the previous;
- Installation instructions, together with a list of supported platforms and prerequisites;
- Getting started information.

Expected Result

The user is satisfied that the required information is available.

Actual Result

- Release notes: https://pipelines.lsst.io/v/v19_0_0/releases/notes.html#release-v19-0-0
- Installation instructions: https://pipelines.lsst.io/v/v19_0_0/index.html#installation
- Getting started information: https://pipelines.lsst.io/v/v19_0_0/index.html#getting-started

Status: **Pass**

4 Description

Locate the Characterization Metric Report corresponding to this release. It should be linked from the main release documentation.

Expected Result

The user is satisfied that the report is available.

Actual Result

Characterization metric report for this release is DMTR-191. It is clearly linked from https://pipelines.lsst.io/v/v19_0_0/metrics.html#characterization-metric-reports.

Status: **Pass**

5 Description

Verify that the characterization metric report describes the scientific performance of the release in terms of a selection of performance metrics drawn from high-level requirements documentation (the Science Requirements Document, LPM-17; the LSST System Requirements, LSE-29; and/or the Observatory System Specifications, LSE-30).

Expected Result

Metric values describing the performance of the release, for example as computed by validate_drp, are described in the report.

Actual Result

The characterization metric report has been inspected and seen to contain appropriate metrics.

Status: **Pass**

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A Acronyms used in this document

Acronym	Description
DM	Data Management
DMS	Data Management Subsystem
DMS-REQ	Data Management System Requirements prefix
DMTR	DM Test Report
EUPS	Extended Unix Product System
HTTP	HyperText Transfer Protocol
LDM	LSST Data Management (Document Handle)
LPM	LSST Project Management (Document Handle)
LSE	LSST Systems Engineering (Document Handle)
LSST	Legacy Survey of Space and Time (formerly Large Synoptic Survey Telescope)
MB	MegaByte
PMCS	Project Management Controls System
RAM	Random Access Memory
VE	vendor estimate
arcmin	arcminute minute of arc (unit of angle)

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