



LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST) LSST Science Platform Design Review Charge

Leanne .P. Guy

LDM-652

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Abstract

This document provides the charge to the review committee for the LSST Science Platform (LSP) Design Review. The review will be a formal and internal review of the planned LSP capabilities in the LSST operations era.

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LSST Science Platform Design Review Charge

1 Introduction

1.1 Objectives

The LSST Science Platform is a unified set of web applications and services made available to the scientific community to access, visualize, and perform 'next-to-the-data' analysis of the LSST data. The platform exposes the LSST data and services to the user through three primary user facing aspects: the web Portal, the JupyterLab analysis environment, and a machine-accessible Web API interface, each providing different ways to access the data and analysis services provided by the LSST Data Access Centers (DACs)

Although primarily conceived as a platform for scientific analysis of the LSST data in the operations-era, the LSP will also be the major platform for integration and test activities during LSST commissioning, and as such, the relevant stakeholders comprise not only members of the scientific community but also the LSST Camera and Commissioning teams.

The objective of this review is to evaluate the vision and design of the LSP against the LSST science requirements and to verify both the current implementation as well as the design for future planned operations-era aspects of the system. LSST Data management want to explore how the LSP can best meet the needs of the LSST science user community by identifying issues now before committing to further implementation or reprioritization already planned work.

1.2 Scope of the Review

This is a design review of the LSST Science Platform (LSP), as defined and described in LSE-319: LSST Science Platform Vision Document. The LSST Data Management Science User Interface team (SUIT) is requested to demonstrate the detailed product design to be realized as well as the realization process. The services provided by the LSP can be decomposed into three different aspects:

- A web Portal designed to provide essential data access and visualization services through a simple-to-use website.

- A JupyterLab environment, that will provide a Jupyter Notebook-like interface enabling next-to-the-data analysis.
- An extensive set of Web APIs that the users will be able to use to remotely examine the LSST data with set familiar tools.

Science use cases addressing all four of the LSST key science themes - probing dark energy and dark matter, taking an inventory of the Solar System, exploring the transient optical sky, and mapping the Milky Way should be addressed. These use cases should cover database-oriented data access, data access for large-scale analytics (possibly non-database), and user interfaces. A representative group of LSST stakeholders will be asked to provide science-oriented feedback and recommendations on the design of LSST Science Platform.

1.3 Review Materials

Materials to be presented for each aspect of the LSP will include:

- Design documents covering requirements, architecture and interfaces.
- Current status of development including technical progress.
- Test specifications, verification and validation plans.
- Description of future development plans and milestones to completion and their relationship to major project milestones though commissioning.
- Risk and mitigation plans.

All relevant documentation should be provided to the review committee no later than 2 weeks prior to the date of the review.

1.4 Applicable Documents

| | |
|---------|----------------------------------------------|
| LSE-319 | LSST Science Platform Vision Document |
| LDM-554 | LSST Science Platform Requirements |
| LDM-542 | LSST Science Platform Design |
| LSE-163 | LSST Data Products Definition Document |
| LPM-17 | LSST Science Requirements Document (SRD) |
| LSE-61 | LSST DM Subsystem Requirements (DMSR) |
| LDM-148 | LSST Data Management System Design |
| LSE-30 | LSST Observatory System Specifications (OSS) |

1.5 References

- [1] **[LSE-30]**, Claver, C.F., The LSST Systems Engineering Integrated Project Team, 2018, *Observatory System Specifications (OSS)*, LSE-30, URL <https://ls.st/LSE-30>
- [2] **[LSE-61]**, Dubois-Felsmann, G., Jenness, T., 2018, *LSST Data Management Subsystem Requirements*, LSE-61, URL <https://ls.st/LSE-61>
- [3] **[LDM-542]**, Dubois-Felsmann, G., Lim, K.T., Wu, X., et al., 2017, *LSST Science Platform Design*, LDM-542, URL <https://ls.st/LDM-542>
- [4] **[LDM-554]**, Dubois-Felsmann, G., Ciardi, D., Mueller, F., Economou, F., 2018, *Science Platform Requirements*, LDM-554, URL <https://ls.st/LDM-554>
- [5] **[LPM-17]**, Ivezić, Ž., The LSST Science Collaboration, 2018, *LSST Science Requirements Document*, LPM-17, URL <https://ls.st/LPM-17>
- [6] **[LSE-319]**, Jurić, M., Ciardi, D., Dubois-Felsmann, G., 2017, *LSST Science Platform Vision Document*, LSE-319, URL <https://ls.st/LSE-319>
- [7] **[LSE-163]**, Jurić, M., et al., 2017, *LSST Data Products Definition Document*, LSE-163, URL <https://ls.st/LSE-163>
- [8] **[LDM-148]**, Lim, K.T., Bosch, J., Dubois-Felsmann, G., et al., 2018, *Data Management System Design*, LDM-148, URL <https://ls.st/LDM-148>

1.6 Acronyms

| Acronym | Description |
|---------|--------------------------------------------|
| DM | Data Management |
| DMSR | DM System Requirements |
| LDM | LSST Data Management |
| LPM | LSST Project Management (Document Handle) |
| LSE | LSST Systems Engineering (Document Handle) |
| LSP | LSST Science Platform |
| LSST | Large Synoptic Survey Telescope |
| OSS | Observatory System Specifications |
| SRD | Software Requirements Document |
| STS | System Test Specification |
| SUIT | Science User Interface and Tools |
| s | second; SI unit of time |

2 Charge to the review committee

The review committee is asked to assess the following items based on the material presented and made available.

1. Is the traceability of requirements from higher design documents, e.g LPM-17: LSST Science Requirements Document to LDM-554:LSST Science Platform Requirements complete and will it ensure coverage of the four key LSST science themes?
2. Are the stakeholders clearly identified and understood? Have the requirements been prioritized and communicated to the stakeholders.
3. Does the design presented in LDM-542 capture the requirements for the LSP as detailed in LDM-554.
4. Are the verification, validation and software quality assurance plans adequate?
5. Does the performance of the current system and development status inspire confidence that both the interim and operations-era functionality can be met?
6. How does the design of the LSP compare with that of other contemporary astronomical data archives and interfaces, or, more generally, other scientific data analysis environments? How well does the design and current version reflect trends in software engineering? Do the current design and technology choices give confidence that the LSP can evolve over time with the needs of 21st century astronomy?
7. Are there items of significance that have not been addressed in the design that would limit the science harvest of LSST?
8. Are the risks associated with the design of the LSST Science Platform understood and adequately captured? Are there any overlooked areas of risk?
9. If cuts had to be made, what areas could be de-scoped with minimal implications for LSST science? What is the scope for use of third party-tooling in place of in-house development? (Alternative if DM-10 is approved) In light of the recent implementation of de-scope item DM10: Eliminate the Portal Aspect of the Science Platform, are the the remaining two aspects of the LSP sufficient to ensure LSST science harvest covering the four key science themes? What, if any, third party-tooling could be substituted for the Portal aspect to ensure that the LSP can deliver the science promise of LSST?

In addition, the committee is asked to provide advice and guidance on addressing any issues raised during the course of the review

3 Review Committee Composition

The review committee shall be composed of persons external to LSST Data Management and who are representative of the LSST DM stakeholders and principal users of the LSST Science Platform

4 Committee report

At the conclusion of the review, the committee is requested to provide a written report to the LSST Project Scientist within 2 weeks detailing their major recommendations. The report should contain the consensus of the committee's findings, comments and recommendations. The committee is also requested to provide a verbal exit briefing based around a closeout presentation on the last day to convey actions and comments. This closeout briefing need not necessarily be final and it is understood that the committee can revise their findings prior to presentation in the final written report.

5 Proposed Agenda

We propose a full 2-day review, possibly with one full day and two half days either side in Spring 2019, possibly in March or April. The review committee are requested to be present for the full duration.

(Draft) Proposed Review Agenda:

Wednesday 2019-02-20

9:00 - 12:30 Review

12:30 - 13:30 Lunch

13:30 - 17:00 Review

Thursday 2019-02-21



9:00 - 12:30 Review

12:30 - 13:30 Lunch

13:30 - 17:00 Review

Friday 2019-02-22

9:00 - 12:30 Review

13:30 - 16:00 Committee private session

16:00- 17:00 Closeout session

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