

Requirements and Design Hierarchy

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Change Control

All LPM- and LSE- prefix documents are managed by the LSST Change Control Board using the change control process described in [LPM-19](#). All LDM- prefix documents are managed by the DM Technical Control Team using the [DM Discussion and Decision Making Process](#) (in particular noting section 3).

If small issues (problems) relevant to DM are noted in any of these documents, JIRA tickets may be filed against the "Requirements Documents" or "Design Documents" components in the DM project. If larger changes to the documents are thought to be necessary, a JIRA ticket should be filed in the RFC project (with component "DM"); this can be escalated to an LSST Change Request (LCR) if need be.

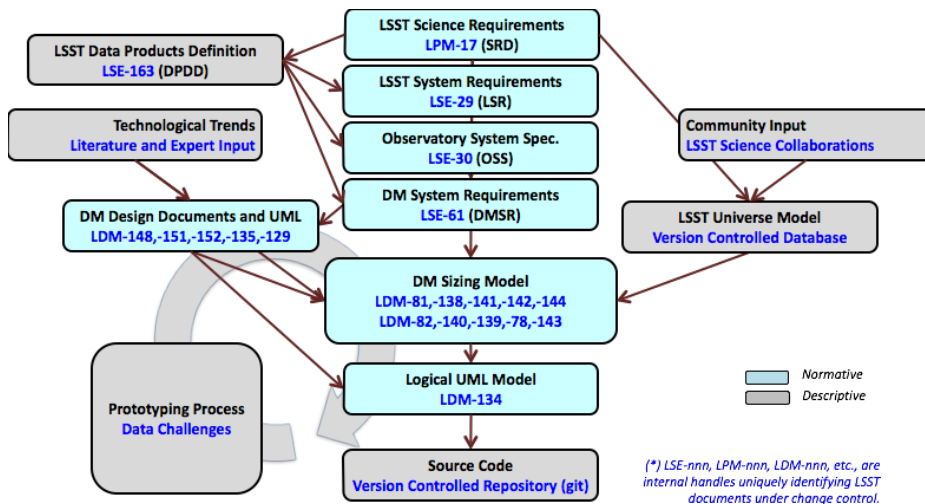
Some documents are under active development. Links to relevant work areas are provided below.



Revisions to DMSR, DPDD, DM Applications Design

In particular, the DM System Requirements (DMSR, LSE-61), Data Products Definition Document (DPDD, LSE-163), and DM Applications Design (LDM-151) are in the process of a coordinated revision in 2016-2017. See the links below.

Requirements Hierarchy



These documents are written in scientific language with embedded specifications.

Document	Title	Notes
LPM-17	Science Requirements Document	The fundamental, overall science goals of the project
LSE-163	LSST Data Products Definition Document	The data products that are the end deliverables to scientists 2016-2017 revision: <ul style="list-style-type: none">• Source: https://github.com/lsst/LSE-163/tree/dmsr-refresh• Latest materialized document: https://lse-163.lsst.io/v/dmsr-refresh/dpdd.pdf

These documents are more formal. They are written in requirements language with source in Enterprise Architect (EA) and traceability matrices.

Document	Title	Notes
LSE-29	LSST Systems Requirements	The top-level formal system requirements
LSE-30	Observatory System Specification	Requirements and budgets based on the high-level design
LSE-61	Data Management System Requirements	Flowed-down requirements for the Data Management subsystem 2016-2017 revision: <ul style="list-style-type: none">• The source is in the LSST SysML model (currently in transition from EA to MagicDraw)• A draft is available at the top of the Docushare history

High-Level Operations Plans

These documents describe in prose how various aspects of operating the system will work, including some implicit requirements on the behavior of the system.

Document	Title	Notes
	Operations Concept Document	In work in EA, not yet published
LSE-79	Commissioning Plan	
calibration-appendixB.pdf	Calibration Plan	In work, not yet fully published. Appendix B documenting expected raw calibration exposures is available at the given link.
Document-5373	Data Access White Paper	A very old document laying out data access policies that has never been formally accepted nor superseded. It informs much of the system design but is not authoritative in any way. Work is ongoing to update this by David Ciardi.

Interface Control Documents and Support Documents ([Collection-5201](#))

These documents are intended to comply with [LSE-151](#), the Interface Control & Compliance Management Process. The control documents are written in requirements language with source in EA. The support documents, marked with "(S)", tend to be written in prose.

(The full set of LSST system-level ICDs, not just those involving DM, should be available at [Collection-2807](#).)

Document	Title	Notes
LSE-69	Interface between the Camera and Data Management	Camera events and telemetry
LSE-68	Camera Data Acquisition Interface	Camera image data
LSE-130 (S)	Support-Data Exchanges between Data Management and Camera	Camera as-built information provided to DM
LSE-75	Control System Interfaces between the Telescope & Data Management	Pointing and WCS feedback to the telescope
LSE-76	Infrastructure Interfaces between the Summit Facility and Data Management	Minimal, mostly networking now
LSE-77	Infrastructure Interfaces Between Data Management and the Base Facility	Base site (Deprecated and in the process of being formally withdrawn. Replaced by LSE-239.)
LSE-239 (S)	Base Facility Data Center Design Requirements	Specifications prepared for design/build contractor (Not technically an ICD.)
LSE-78 (S)	LSST Observatory Network Design	Summit and Base LANs and WAN
LSE-140	Auxiliary Instrumentation Interface between Data Management and Telescope	Calibration spectrometer, dome screen, etc.

LSE-72	OCS - Data Management Software Communication Interface	DM OCS-visible devices/components and EFD archiving
LSE-70 (S)	LSST Observatory Control System Communication Architecture and Protocol	OCS middleware communications
LSE-209	Software Component to OCS Interface Control Document	States and commands for OCS-visible devices/components
LSE-74 (S)	System Dictionary and Telemetry Streams	
LSE-131	Interface between Data Management and EPO	

DM Design Baseline ([Collection-2511](#))

These documents describe the baseline design of the DM subsystem at a high level. They are written in prose.

Document	Title	Notes
LDM-148	Data Management System Design	
LDM-132	Data Management WBS Dictionary	The descriptions in this document tend to be very general; the boundaries are not necessarily clearly drawn. See also the UML use cases below.

These documents describe the baseline design of the major components of the DM subsystem. They are also written in prose. Some of these are in the process of being converted from Word to reStructured Text managed through GitHub and published through readthedocs.org in more-easily linkable form – although note that the official baseline version will always be in DocuShare.

Document	Title	Notes
LDM-151	Data Management Applications Design	LaTeX source 2016-2017 revision: <ul style="list-style-type: none"> Source: https://github.com/lsst/LDM-151/tree/draft Latest materialized document: https://ldm-151.lsst.io/v/draft/LDM-151.pdf Remaining open tickets: LDM-151 action items
LDM-152	Data Management Middleware Design	Design at the application isolation and control level reST source , Web version
LDM-135	Data Management Database Design	Design of the distributed and non-distributed databases containing data products and internal management data reST source , Web version
LDM-153	Data Management Database Baseline Schema	Notional schemas for the various databases
LDM-129	Data Management Infrastructure Design	Design at the hardware and system services level reST source , Web version
LDM-130	LSST SUI Requirements	In work, current published draft is obsolete
LDM-131	Data Management SUI Conceptual Design	
LDM-156	Moving Object Pipeline System Design	Probably should not be change-controlled

Detailed DM Operations Documents ([Collection-2511](#))

The following prose document outlines how various components within the DM subsystem are expected to work in operations, especially in conjunction with other parts of the LSST system. This has also been converted to reStructured Text. A more comprehensive document developed by the NCSA team is expected to replace this one soon.

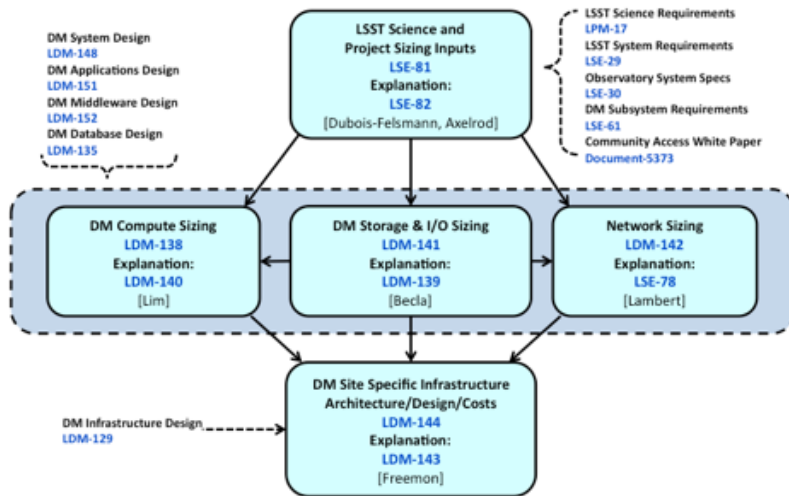
Document	Title	Notes
LDM-230	Automated Operation of the LSST Data Management System	reST source , Web version

Detailed DM Design Documents

Most of these documents are in Confluence [here](#). Some are still in [Trac](#). One, [LDM-156](#) Moving Object Pipeline System Design, is in DocuShare and change-controlled although it probably should not be.

DM Sizing Model ([Collection-2511](#))

These Excel spreadsheets and accompanying prose explanatory documents model the structure, capabilities, capacities, and costs of the DM system.



Document	Title	Notes
LSE-81	LSST Science and Project Sizing Inputs	Requirements from the project level and science-based models
LSE-82	LSST Science and Project Sizing Inputs Explanation	
LDM-138	Data Management Compute Sizing Model	Derives computing cycles needed based on models of algorithmic processing and estimates based on prototypes
LDM-140	Data Management Compute Sizing Explanation	
LDM-141	Data Management Storage Sizing and I/O Model	Derives terabytes and gigabytes per second needed based on models of data product storage and retrieval and estimates based on prototypes
LDM-139	Data Management Storage Sizing and I/O Explanation	
LDM-142	Network Sizing Model	
LDM-144	Site Specific Infrastructure Estimation Model	Derives machine details and costs based on compute and storage and network requirements derived in the above spreadsheets
LDM-143	Site Specific Infrastructure Estimation Explanation	

DM UML Use Cases ([Collection-2511](#))

These documents, with source in EA, were used for doing initial cost estimates of the DM system and components. They have not been updated as responsibilities have moved between WBS items or as functions have been reallocated, but they do still represent activities that will occur and may help provide some understanding about what different WBS elements are expected to do.

Document	Title	Notes
LDM-133	Data Management UML Domain Model	
LDM-134	Data Management Applications UML Use Case and Activity Model	
LDM-146	Data Management Middleware UML Use Case and Activity Model	
LDM-244	Data Management Science User Interface UML Use Case Model	