



# DM DOCUMENTATION

How to follow & interact with DM & Platforms you can use in your own teams

**Jonathan Sick**

LSST/AURA, Data Management, SQuaRE Team

**LSST2016** PROJECT AND COMMUNITY  
**WORKSHOP**

AUGUST 15-19, 2016 | TUCSON, ARIZONA

# Relevant DM Design Documents

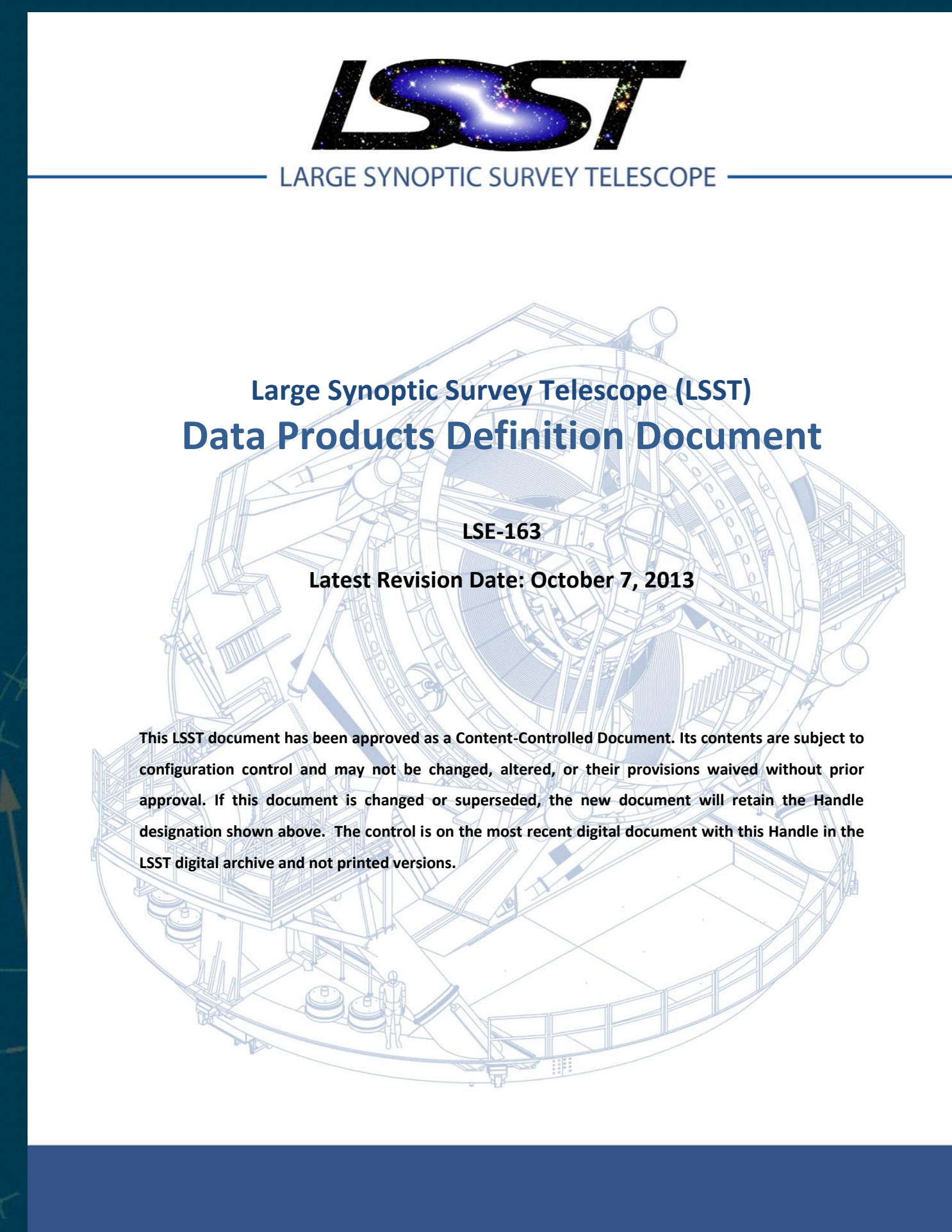
- **DM Applications Design**

[ls.st/ldm-151](http://ls.st/ldm-151)

Look out for an up-coming refresh.

- **Data Products Definition Document**

[ls.st/dpdd](http://ls.st/dpdd)



# LSST Community forum

community.lsst.org

One year old.

280 registered members.

680 topics.

3702 posts.

... and growing.

Topic	Category	Users	Replies	Views	Activity
Requirements & design for composite datasets in butler <sup>2</sup> butler	Data Management		2	17	26m
Handling deblended objects in catalogs	Data Management		8	39	15h
How to run the DM stack on simulated FITS images <sup>7</sup>	Support		30	389	17h
EPO Monthly Status Report for July • new epo-monthly-report	EPO		0	11	1d
Upcoming Simulations Telecon Demos	Simulations		0	509	1d
Verification Datasets Meeting 2016-07-27 Minutes <sup>1</sup> verificationdataset	Data Management		6	74	1d
Deployment technologies sharing in Infrastructure meeting	Data Management		7	112	4d
Modular web-based astronomy widgets fits, visualization, web	EPO		16	169	4d
NCSA Account Changes - August 18, 2016 lsst-dev, ncsa, password, username, account	DM Notifications		0	32	4d
First Hack Day projects! hackday	DSFP		1	12	4d
Current Infrastructure Call (Deployment / Containers) dm-infrastructure	DM Notifications		0	32	5d
DM Highlights 2016-07-27 to 2016-08-02 dm-highlights	DM Notifications		0	26	6d
DM Highlights 2016-07-20 to 2016-07-26 dm-highlights	DM Notifications		0	52	6d
HTM reference catalogs, a few tips dm-dev	Data Management		1	41	7d

# LSST Community forum

community.lsst.org

One year old.

280 registered users.

680 topics.

3702 posts.

... and growing.

The screenshot shows the LSST Community forum interface. At the top, there's a navigation bar with 'Sign Up' and 'Log In' buttons. Below that, there are filters for 'all categories', 'all tags', and 'Latest'. A red arrow points to the 'Categories' link. The main content area displays a list of forum topics with columns for Category, Users, Replies, Views, and Activity. A second red arrow points to the 'Categories' column header.

Category	Users	Replies	Views	Activity
Meta	2	1.0k	Aug '15	
Data Management	2	17	35m	
Data Management	8	39	15h	
Support	30	389	17h	
EPO	0	11	1d	
Simulations	0	509	1d	
Data Management	6	74	1d	
Camera-DM Visualization	0	26	3d	
Data Management	7	112	4d	
EPO	16	169	4d	
DM Notifications	0	32	4d	
DM Notifications	0	32	5d	
DM Notifications	0	26	6d	

# Support category

community.lsst.org/c/support

A place to get help with LSST software from Data Management and Simulations.

Resolved posts have checkmarks.

The screenshot shows the LSST Community website with a support forum. The main post is titled "Library loading error in an ipython notebook" and is marked as "Solved" with a green checkmark. A red arrow points to the "Solved" status. The post content includes instructions on how to upgrade eups using git and make. The user "timj" (Tim Jenness) is credited with solving the issue. The post has 8 replies, 586 views, 3 users, 2 likes, and 7 links. A sidebar on the right shows a list of other posts with their respective statistics.

Topic	Users	Replies	Views	Activity
About the Support category		0	229	Jan 11
Library loading error in an ipython notebook	3	8	586	17h
		6	109	14d
		6	71	14d
		12	161	25d
		7	79	28d
		1	79	28d
		23	330	29d
		4	147	Jul 5
		11	165	Jun 30
		6	141	Jun 29
		3	132	Jun 29
		14	256	Jun 24

Data Management category  
community.lsst.org/c/dm

DM openly collaborates in the  
'Data Management' category.

Follow our progress;  
give us feedback.

'DM Notifications' sub-category has  
mini-announcements.

Topic	Category	Users	Replies	Views	Activity
<p>📌 Listing of available DM Technote technote</p> <p>In November 2015 we started a new technote series in Data Management. Although the platform is still an MVP, we're seeing great early adoption. One of the next steps for the platform is a highly usable index/landing pa... <a href="#">read more</a></p>	Data Management		1	620	Jan 21
<p>📌 About the Data Management category</p> <p>Discussions with LSST Data Management developers about LSST Stack development. Posts made here will be forwarded to the dm-devel mailing list via our Community Mailbot tool. New to community.lsst.org? We've put toge... <a href="#">read more</a></p>	Data Management		0	305	Jan 11
Requirements & design for composite datasets in butler butler	Data Management		2	17	1h
Handling deblended objects in catalogs	Data Management		8	39	15h
Verification Datasets Meeting 2016-07-27 Minutes verificationdataset	Data Management		6	74	1d
Deployment technologies sharing in Infrastructure meeting	Data Management		7	112	4d
NCSA Account Changes - August 18, 2016 lsst-dev, ncsa, password, username, account	DM Notifications		0	32	4d
Current Infrastructure Call (Deployment / Containers) dm-infrastructure	DM Notifications		0	32	5d
DM Highlights 2016-07-27 to 2016-08-02 dm-highlights	DM Notifications		0	27	6d
DM Highlights 2016-07-20 to 2016-07-26 dm-highlights	DM Notifications		0	52	6d

# DM Highlights tag

[community.lsst.org/tags/dm-highlights](http://community.lsst.org/tags/dm-highlights)

Posts tagged 'dm-highlights' are weekly summaries of shipped features, new documentation, and decision making (RFCs)

Topic	Category	Users	Replies	Views	Activity
DM Highlights 2016-07-27 to 2016-08-02 dm-highlights	DM Notifications		0	27	6d
DM Highlights 2016-07-20 to 2016-07-26 dm-highlights	DM Notifications		0	52	6d
DM Highlights 2016-07-13 to 2016-07-19 dm-highlights	DM Notifications		0	61	20d
DM Monthly Status Report for May dm-highlights	DM Notifications		0	134	20d
DM Monthly Status Report for February dm-highlights	DM Notifications		0	267	20d
DM Monthly Status Report for March dm-highlights	DM Notifications		0	173	20d
DM Monthly Status Report for June dm-highlights	DM Notifications		0	70	20d
DM Highlights 2016-07-06 to 2016-07-12 dm-highlights	DM Notifications		4	94	26d
DM Highlights 2016-06-29 to 2016-07-05 dm-highlights	DM Notifications		0	87	Jul 7
DM Highlights 2016-06-22 to 2016-06-28 dm-highlights	DM Notifications		0	97	Jun 29
DM Highlights 2016-06-15 to 2016-06-21 dm-highlights	DM Notifications		0	110	Jun 22

# Simulations category

community.lsst.org/c/sims

Open collaboration category for the Simulations team.

Relevant for scientists interested in using Simulations software and defining the observing cadence!

Topic	Category	Users	Replies	Views	Activity
<p><b>About the Simulations category</b></p> <p>Discussions related to LSST Simulations. New to community.lsst.org? We've put together a series of help documents to get you started. Browse the 'forum-howto' tag. Useful topics include: How to format posts, includ... <a href="#">read more</a></p>	Simulations		0	244	Jan 11
Upcoming Simulations Telecon Demos	Simulations		0	509	1d
Testing the lsst_sims stack square, lsst_sims	Simulations		7	136	Jun 23
Candidate Reference Run, minion_1016 opsim, referencerun	Simulations		0	100	Jun 21
Deep drilling whitepapers opsim, special-surveys	Simulations		3	316	May 26
Listing of available Sims Technotes technote	Simulations		2	297	May 24
SMTN-005: Cloud Statistics via All-Sky Camera	Sims Announcements		3	240	May 24
Viewing the configuration files for a particular opsim run opsim	Simulations		0	183	May 4
OpSim seeing+depth distributions at points	Simulations		2	201	May 3
Installing/Running conda sims stack + replacing a package with the git repo version gitrepos, stack-install	Simulations		1	307	Apr 26
Running a conda installation and an eups distrib installation, + a git					



# Science category

[community.lsst.org/c/science](http://community.lsst.org/c/science)

You might have posted Workshop breakout suggestions here.

Science category is new, let's see where it goes!

Topic	Users	Replies	Views	Activity
Observing Strategy breakout(s) at the Tucson 2016 PCW observingstrategy, science		15	608	25d
Transient Brokers and characterization of variables aided by XSim classification, transients, variables		17	546	Jul 7
Measurements on blended objects as a topic suggestion for 2016 Project & Community Workshop		11	430	Jun 27
Breakout Session on Deep-Drilling Fields and Other Ancillary Time Projects observingstrategy		8	367	Jun 22
Maximum Likelihood Source Detection Breakout Session		2	148	Jun 22
About the 2016 Project & Community Workshop category		2	266	Jun 22
Breakout Session on Atmospheric Modeling and Data		10	285	Jun 21
Breakout Session on Web Technologies epo		3	223	Jun 20
Breakout session for End-to-End GalSim simulations for LSST		3	290	Jun 19
Docs & LSST the Docs Hack/Help Session		1	159	Jun 16
Breakout Session on the LSST Extragalactic Roadmap		3	186	Jun 15
Breakout session on LSST Basics		5	371	Jun 15

# LSST Community forum

community.lsst.org

You can browse without an account, but LSST Community forum is better if you **sign-up**:

- create and reply to posts
- follow categories to get notifications

LSST Community

all categories ▾ all tags ▾ Latest Categories

Sign Up Log In

Topic	Category	Users	Replies	Views	Activity
<p>🔒 Welcome to community.lsst.org</p> <p>community.lsst.org is a place for the astronomy community to discuss the Large Synoptic Survey Telescope's ongoing development and get help with using LSST's software today. What's here Community members can read, pos... <a href="#">read more</a></p>	Meta		2	1.0k	Aug '15
How to run the DM stack on simulated FITS images	Support		32	392	15m
Requirements & design for composite datasets in butler butler	Data Management		2	17	2h
Handling deblended objects in catalogs	Data Management		8	40	16h
EPO Monthly Status Report for July epo-monthly-report	EPO		0	11	1d
Upcoming Simulations Telecon Demos	Simulations		0	509	1d
Verification Datasets Meeting 2016-07-27 Minutes verificationdataset	Data Management		6	74	1d
5 August Visualization meeting	Camera-DM Visualization		0	26	3d
Deployment technologies sharing in Infrastructure meeting	Data Management		7	112	4d

Community 🔍 ☰ 👤

Data Management DM Notifications all tags Latest
Bookmarks Unread (4) My Posts + New Topic ●

---

☰ Topic

NCSA Account Changes - August 18, 2016  
lsst-dev, ncsa, password, username, account

Current Infrastructure Call (Deployment / Containers)  
dm-infrastructure

DM Highlights 2016-07-27 to 2016-08-02  
dm-highlights

DM Highlights 2016-07-20 to 2016-07-26  
dm-highlights

LSST the Docs (lsst.io) now provides courtesy directory redirects  
doc-dev

Builds are now optimised by default  
scons, dm-dev

Jenkins maintenance 2016-07-26 @ 18:00  
ci, jenkins

Current-Infrastructure Meeting 7/22/16 1PM PST  
dm-infrastructure

**Watching**  
You will automatically watch all topics in these categories. You will be notified of every new post in every topic, and a count of new replies will be shown.

**Tracking**  
You will automatically track all topics in these categories. You will be notified if someone mentions your @name or replies to you, and a count of new replies will be shown.

**Watching First Post**  
You will only be notified of the first post in each new topic in these categories.

**Normal**  
You will be notified if someone mentions your @name or replies to you.

**Muted**  
You will never be notified of anything about new topics in these categories, and they will not appear in latest.



# Subscribe to categories & tags

**LSST Community**

**Email** Include previous replies at the bottom of emails  
 never

Include an excerpt of replied to post in emails  
 Send me an email when someone messages me  
 Send me an email when someone quotes me, replies to my post, mentions my @username, or invites me  
 Send me email notifications even when I am active on the site

**Activity Summary**  When I don't visit here, send me an email summary of popular topics and replies  
 daily

Include content from new users in summary emails

**Mailing list mode**  Enable mailing list mode  
 This setting overrides the activity summary.  
 Muted topics and categories are not included in these emails.

**Desktop Notifications**  Disable Notifications  
 Note: You have to change this setting on every browser you use.

**Other** Consider topics new when  
 created in the last 2 days

Automatically track topics I enter  
 after 1 minute

Notify when liked  
 First time a post is liked and daily

Open all external links in a new tab  
 Enable quote reply for highlighted text  
 Show new / updated topic count on browser icon

**jsick** Preferences

- timj Handling deblended objects in catalogs
- Earned 'Anniversary'
- natelust LSST the Docs (lsst.io) now provides courtesy directory redirects
- Earned 'Nice Share'
- ljones Conda channels in new documentation
- parejkoj LSST the Docs (lsst.io) now provides courtesy directory redirects
- swinbank LSST the Docs (lsst.io) now provides courtesy directory redirects
- ljones Conda channels in new documentation
- heather999 Conda channels in new documentation
- timj How does one transition to underscore naming while still using other packages?
- timj How does one transition to underscore naming while still using other packages?
- mwv How does one transition to underscore naming while still using other packages?
- bsouter Assistant Research Scientist at SciServer, Johns Hopkins University

view older notifications...  
 Log Out

<https://community.lsst.org/users/jsick/preferences>

# Settings, like email frequency

# DM Technical Notes



Listing: <http://ls.st/nre>

## DMTN-006: False Positive Rates in the LSST Image Differencing Pipeline

latest

Introduction

Data and Pipeline Processing

Direct Image Noise Analysis

Noise in Difference Images

Detections near Bright Stars

Model of Excess Detections

Conclusions

Appendix A: Data used in this work

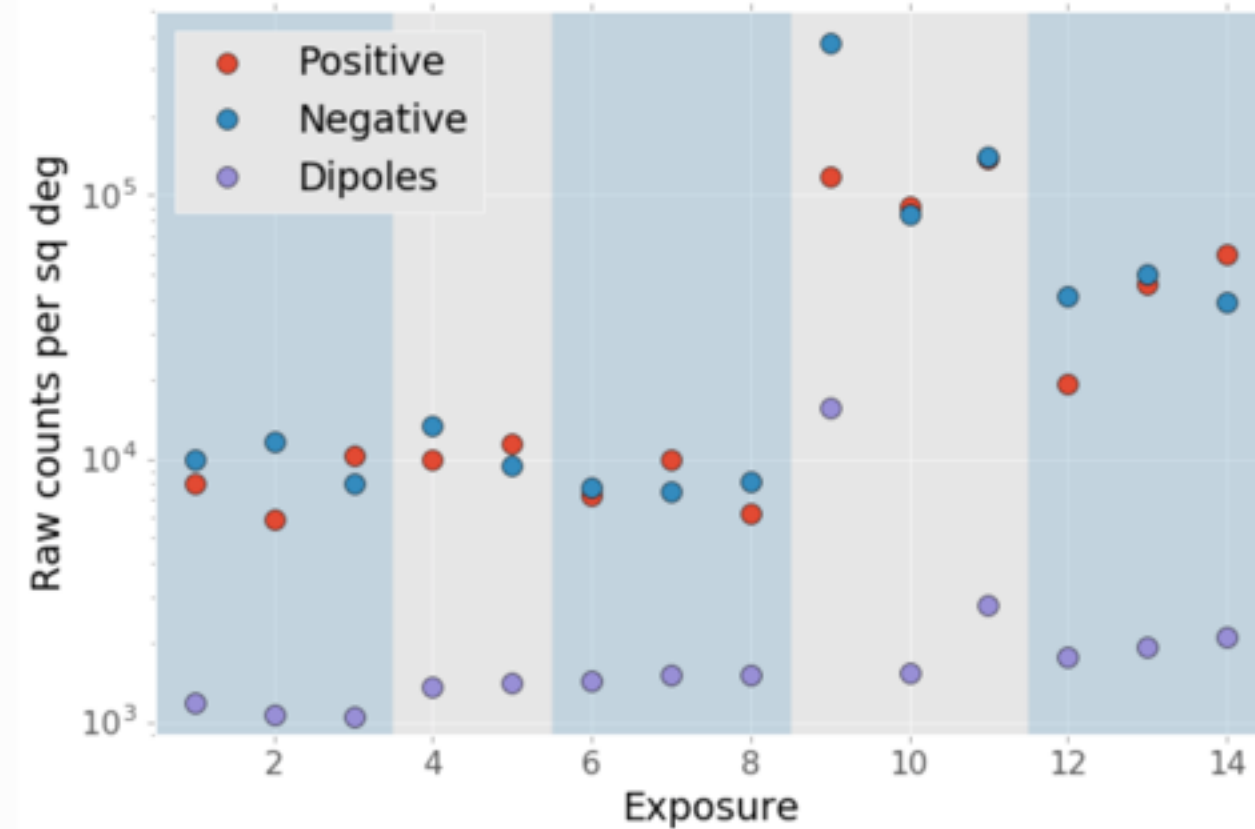


Figure 2 Raw density of DIA sources per square degree, without any filtering, for all exposures in this work. The exposures are arbitrarily numbered and cover several different nights. Each shaded region corresponds to a different target field.

[1] We tested the processing both with and without the astrometric distortion terms provided by the Community Pipeline and did not see a significant difference in the numbers of Dia source detections.

### Direct Image Noise Analysis

One check on the pipeline noise estimates can be made by taking two overlapping exposures, crossmatching the detected sources in each, and comparing the difference in the fluxes measured each time with the reported uncertainties on those fluxes. This test is independent of any of image differencing. The reported uncertainties are derived from each exposure's variance plane, which is also used for computing the uncertainties on the difference images.

Figure 3 shows this analysis performed for a pair of well-behaved fields at high latitude. The scatter in the measured fluxes is about 15% wider than the pipeline

- Complement our 'change-controlled' documentation and software user docs.
- Help us communicate ideas faster:
  - Data/algorithm experiments
  - Design proposals
  - Implementation overviews
- Published as websites from GitHub
- Soon, will be **registered on NASA/SAO ADS**, making them easy to cite in your papers.

# DM Technical Notes

- [dmtn-001.lsst.io](http://dmtn-001.lsst.io) — Porting the Stack to OS X El Capitan
- [dmtn-002.lsst.io](http://dmtn-002.lsst.io) — SuperTask and Activator Notes
- [dmtn-003.lsst.io](http://dmtn-003.lsst.io) — Description of v1.0 of the Alert Production Simulator
- [dmtn-004.lsst.io](http://dmtn-004.lsst.io) — Debugging in Docker Containers
- [dmtn-005.lsst.io](http://dmtn-005.lsst.io) — Current LSST Stack WCS Usage
- [dmtn-006.lsst.io](http://dmtn-006.lsst.io) — False Positive Rates in the LSST Image Differencing Pipeline
- [dmtn-007.lsst.io](http://dmtn-007.lsst.io) — Dipole Characterization for image differencing
- [dmtn-008.lsst.io](http://dmtn-008.lsst.io) — Introducing `validate_drp`: Validate an output repository against SRD Key Performance Metrics

# DM Technical Notes

- [dmtn-009.lsst.io](http://dmtn-009.lsst.io) — Vertical-partition Join Performance in MySQL
- [dmtn-010.lsst.io](http://dmtn-010.lsst.io) — WCS and Distortion Requirements and Existing Options
- [dmtn-011.lsst.io](http://dmtn-011.lsst.io) — StarFast: A Fast Simulation Building Tool for Testing Algorithms
- [dmtn-013.lsst.io](http://dmtn-013.lsst.io) — Wrapping C++ with Cython
- [dmtn-014.lsst.io](http://dmtn-014.lsst.io) — Wrapping C++ with Pybind11
- [dmtn-015.lsst.io](http://dmtn-015.lsst.io) — Flavors of Coadds
- [dmtn-016.lsst.io](http://dmtn-016.lsst.io) — Towards LSE-63 and Beyond: A technical roadmap from QA to Level 3
- [dmtn-017.lsst.io](http://dmtn-017.lsst.io) — Differential Chromatic Refraction: Literature Overview

# DM Technical Notes

- [dmtn-018.lsst.io](http://dmtn-018.lsst.io) — Re-visiting L1 Database Design
- [dmtn-019.lsst.io](http://dmtn-019.lsst.io) — Dipoles in difference imaging from DCR
- [dmtn-020.lsst.io](http://dmtn-020.lsst.io) — Project Management Guide
- [dmtn-021.lsst.io](http://dmtn-021.lsst.io) — Implementation of Image Difference Decorrelation
- [dmtn-023.lsst.io](http://dmtn-023.lsst.io) — Pipeline Command-line Drivers
- [sqr-000.lsst.io](http://sqr-000.lsst.io) — The LSST DM Technical Note Publishing Platform
- [sqr-001.lsst.io](http://sqr-001.lsst.io) — Git LFS Architecture Note
- [sqr-002.lsst.io](http://sqr-002.lsst.io) — Binary Pipeline Software Distribution
- [sqr-005.lsst.io](http://sqr-005.lsst.io) — Publication Board JIRA Project



# DM Technical Notes

- [sqr-006.lsst.io](http://sqr-006.lsst.io) — The LSST the Docs Platform for Continuous Documentation Delivery
- [sqr-008.lsst.io](http://sqr-008.lsst.io) — SQuaRE QA Database
- [sqr-009.lsst.io](http://sqr-009.lsst.io) — SQUASH Dashboard Prototype
- [sqr-011.lsst.io](http://sqr-011.lsst.io) — DM Communication & Publication Platforms
- [sqr-012.lsst.io](http://sqr-012.lsst.io) — Migrating LSST Tests to py.test
- And more technotes from Simulations: <http://ls.st/t12>

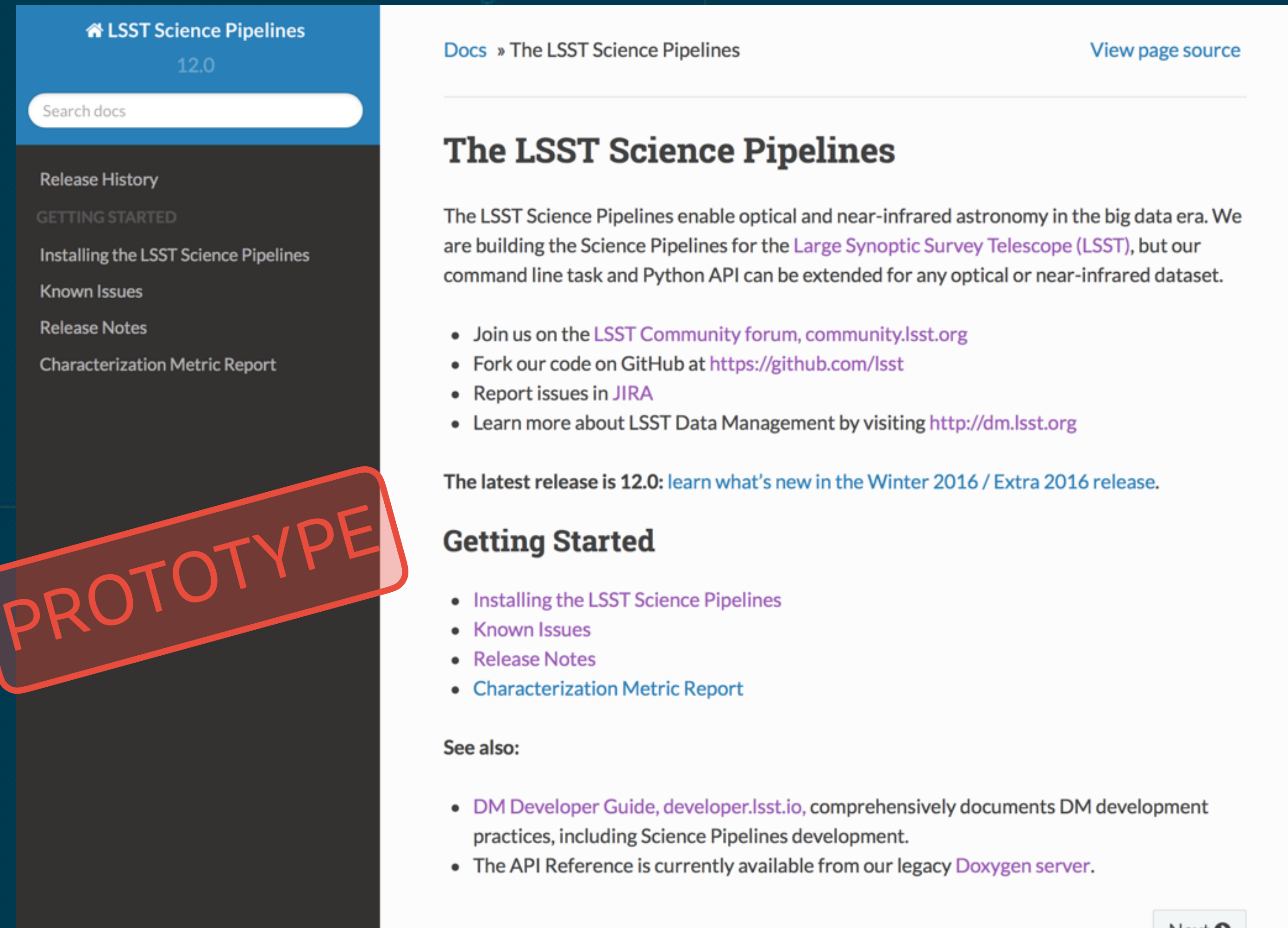
# Science Pipelines Docs

pipelines.lsst.io

*In progress, a guide to LSST's  
Stack, which you'll use in Level 3:*

- tutorials
- user guides
- programming references

Also look for Qserv DB and Firefly  
documentation sites.



LSST Science Pipelines  
12.0

Search docs

Release History

GETTING STARTED

Installing the LSST Science Pipelines

Known Issues

Release Notes

Characterization Metric Report

Docs » The LSST Science Pipelines [View page source](#)

## The LSST Science Pipelines

The LSST Science Pipelines enable optical and near-infrared astronomy in the big data era. We are building the Science Pipelines for the [Large Synoptic Survey Telescope \(LSST\)](#), but our command line task and Python API can be extended for any optical or near-infrared dataset.

- Join us on the [LSST Community forum, community.lsst.org](#)
- Fork our code on GitHub at <https://github.com/lsst>
- Report issues in [JIRA](#)
- Learn more about LSST Data Management by visiting <http://dm.lsst.org>

The latest release is **12.0**: [learn what's new in the Winter 2016 / Extra 2016 release.](#)

### Getting Started

- [Installing the LSST Science Pipelines](#)
- [Known Issues](#)
- [Release Notes](#)
- [Characterization Metric Report](#)

See also:

- [DM Developer Guide, developer.lsst.io](#), comprehensively documents DM development practices, including Science Pipelines development.
- The API Reference is currently available from our legacy [Doxygen server](#).

Next

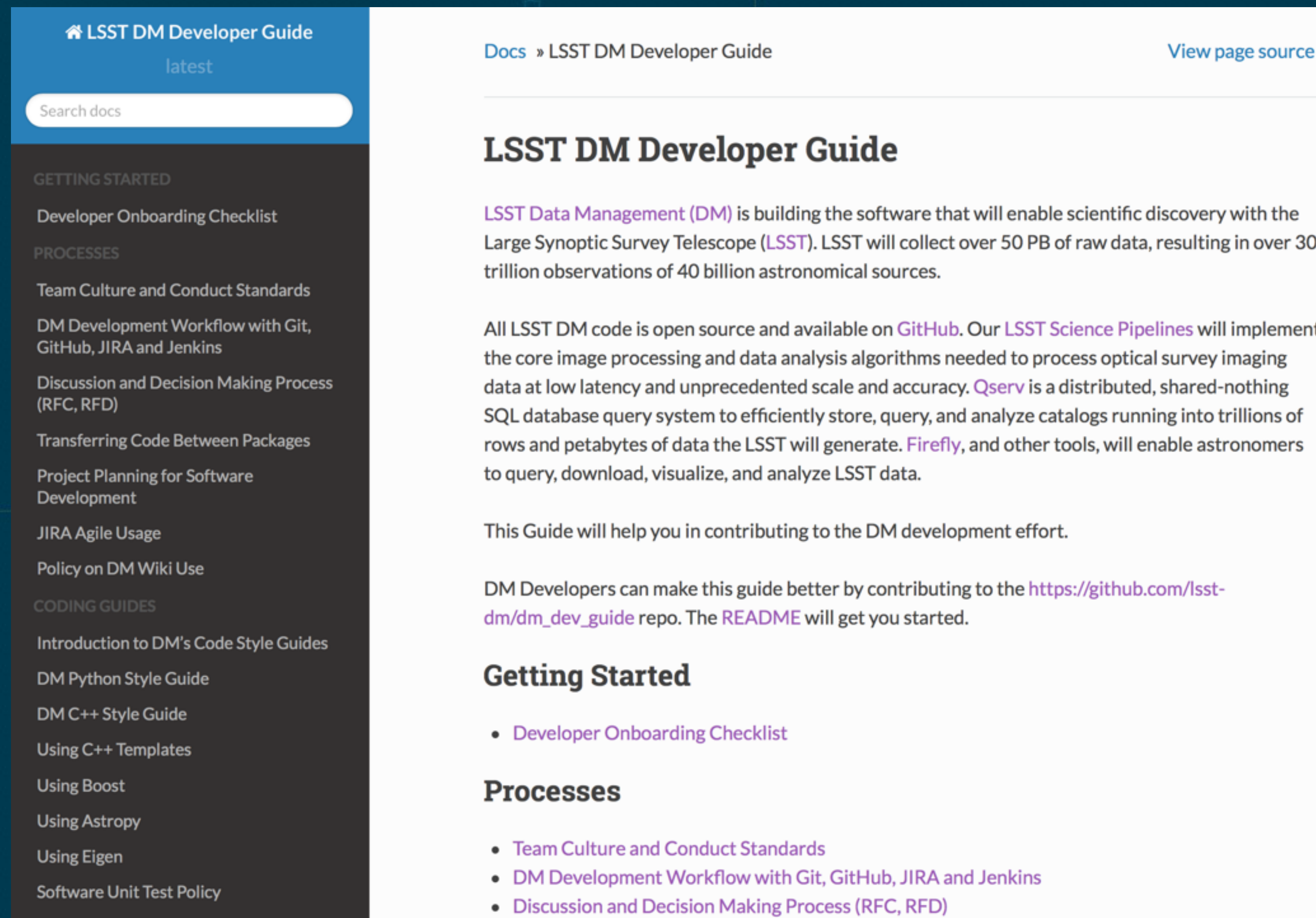
**PROTOTYPE**

# DM Developer Guide

developer.lsst.io

## How DM works:

- collaboration processes
- coding style guides
- developer tips
- doc writing practices



The screenshot shows the LSST DM Developer Guide website. The left sidebar contains a navigation menu with sections: GETTING STARTED (Developer Onboarding Checklist), PROCESSES (Team Culture and Conduct Standards, DM Development Workflow with Git, GitHub, JIRA and Jenkins, Discussion and Decision Making Process (RFC, RFD), Transferring Code Between Packages, Project Planning for Software Development, JIRA Agile Usage, Policy on DM Wiki Use), and CODING GUIDES (Introduction to DM's Code Style Guides, DM Python Style Guide, DM C++ Style Guide, Using C++ Templates, Using Boost, Using Astropy, Using Eigen, Software Unit Test Policy). The main content area has a breadcrumb trail 'Docs » LSST DM Developer Guide' and a 'View page source' link. The title is 'LSST DM Developer Guide'. The text explains that LSST Data Management (DM) is building software for the Large Synoptic Survey Telescope (LSST), which will collect over 50 PB of raw data. It mentions that all LSST DM code is open source on GitHub and that the guide will help with contributing to the DM development effort. A link to the GitHub repository is provided. The 'Getting Started' section lists the 'Developer Onboarding Checklist'. The 'Processes' section lists 'Team Culture and Conduct Standards', 'DM Development Workflow with Git, GitHub, JIRA and Jenkins', and 'Discussion and Decision Making Process (RFC, RFD)'.

# DM Tools for your team

We build communication tools and services for DM, but **LSST sub-systems** and **Science Collaborations** are welcome to use these services.

Ideas:

1. Set up public/private categories on **Community**
2. Publish versioned documentation sites with **LSST the Docs**

# Community forum categories for your team

**Public categories** to host community science discussions and make announcements.

**Private categories** to have team discussions.

# Why use Community forum? (Discourse)

*It's better than email lists for groups.*

## Parameters

### Fitted

- Mapping from Pixel to Tangent plane polynomial, it's coefficients sh
- $X_c$ ,  $Y_c$  and  $\theta_c$  are only explicit of  $M_\gamma$  in jointcal.
- Star positions on the sky:

## ● Rich formatting

- Markdown
- Rendered LaTeX math
- Inline images, also attachment

## ● Browsable archive

New team members can get up-to-speed more easily

## ● Quoting that works

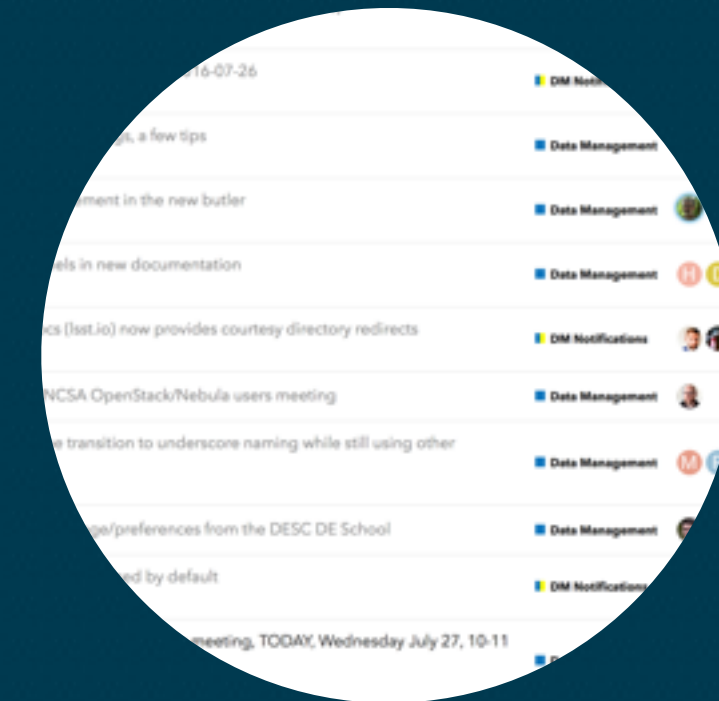
- Quotes link to original context
- Link *between* topic threads

## ● Tag conversations, '@' mentions

Works well with notifications

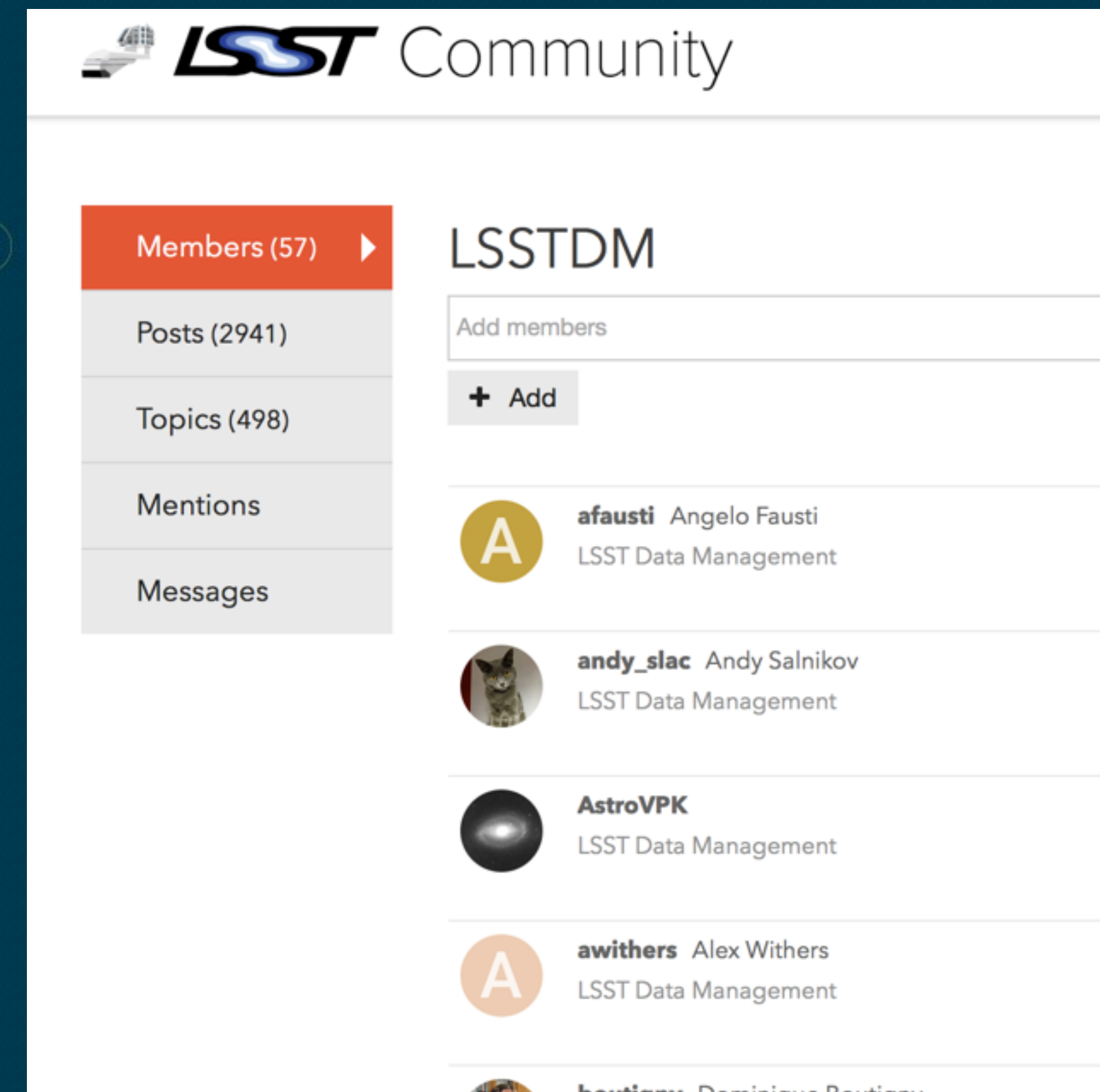
## ● On-site search

## ● Link to public posts from Twitter, Facebook, ...



# Setting up a private category: how it works.

1. Get in contact, [jsick@lsst.org](mailto:jsick@lsst.org)
2. We'll create a category
3. We'll create a group with permissions to use the category
4. The team's leader(s) can maintain the group's membership.



# Community Mailbot

- Service that forwards content of new posts to an email address
- Message includes a link to the topic on the Community forum
- Great for transitioning your team to the Community forum without leaving mailing list subscribers behind.



# LSST the Docs

A platform for publishing  
**versioned documentation**  
(static web sites)

**\*.lsst.io**

→ **\*.lsst.io/v/1.0**

→ **\*.lsst.io/v/my-branch**

Background: <https://sqr-006.lsst.io>

```
git tag -a 1.0  
git push --tags
```

```
git checkout -b my-branch  
git push
```

## Links:

- LSST Community forum: [community.lsst.org](http://community.lsst.org)
- Data Management Technotes: [ls.st/nre](http://ls.st/nre)
- Developer Guide: [developer.lsst.io](http://developer.lsst.io)
- LSST Science Pipelines Documentation: [pipelines.lsst.io](http://pipelines.lsst.io) (in development)

- DM Applications Design: [ls.st/lm-151](http://ls.st/lm-151)
- Data Products Definition Document: [ls.st/dpdd](http://ls.st/dpdd)

## In the works:

- **Slack** for LSST Project & Science Collaborations

Talk to me or email  
[jsick@lsst.org](mailto:jsick@lsst.org)

- Adopt LSST Community forum for your group.
- Publish with LSST the Docs.
- Collaborate on open source documentation tools.