VERA C. RUBIN OBSERVATORY

DP0 Delegate Assembly: *"DP0.1, A Half-Year in Review"*

Speaker: Melissa Graham

Fri Jan 28 2022, 9am-11am US Pacific

Presented by
the Rubin Observatory Community Engagement Team

NSF NOIR Lab AURA SLAC U.S. DEPARTMENT OF ENERGY

Data Previews: the path to Operations

DP0 is the first of three planned data previews between now and Operations.

DP0 Goals:

- enable the community to prepare for early LSST science with the RSP
- test integration of the LSST science pipelines and the RSP
- use feedback on RSP functionality to inform future development

DP0 Data Set:

- simulated LSST-like images and catalogs from the DESC's Data Challenge 2 (DC2)
- (DP1 and DP2 will be based on real data from Rubin Commissioning)

DP0's Two Phases:

DP0.1, the original-format DC2 data set, was released in the RSP on June 30 2021.
DP0.2, reprocessed with the latest LSST Science Pipelines, will be available June 30 2022.

Today we will look back at the first half-year of DP0.1, and forward to DP0.2.

A Message from the Rubin Operations Director

Thank you for your deep engagement in this critical pre-operations activity. For Rubin Operations, the data previews serve to support operations readiness for the Operations Team and LSST readiness for the community.

DP0.1 has been extremely useful from Rubin's point of view and we hope it has been worthwhile for you too.

Your feedback during and following DP0.1 has been very valuable and we have communicated it our key stakeholders. Keep it coming!

My virtual door is always open if any of you want to communicate directly to me/Rubin Leadership. You may contact me at rblum@lsst.org.

Rubin Data Production & System Performance

We represent the large team of Rubin staff who are building the Rubin Science Platform and the LSST Science Pipelines, making the DC2 data products available for DP0, and providing technical support and expertise to everyone participating in DP0.

Rubin Community Engagement Team (CET)

We look forward to continuing to interact with you during our live virtual DP0.1 seminar series and in our online Community Forum, and supporting all your DP0-related science.

Melissa Graham
University of Washington
Time-domain surveys, supernovae.

Grzegorz (Greg) Madejski
SLAC/Stanford (KIPAC)
Active galactic nuclei, lensed quasar cosmology.

James Annis
Fermilab
Cosmology, gravitational waves, astronomical surveys.

Alex Drlica-Wagner
Fermilab/UChicago
Cosmology, dark matter & energy, imaging surveys.

Jeff Carlin
AURA/Rubin Observatory
Galactic structure, stellar populations, dwarf galaxies.

Tina Adair
SLAC/Stanford
Documentation, stellar populations, planetary formation.

DP0 Delegates

“DP0 Delegates”: the scientists and students who have accounts in the Rubin Science Platform (RSP) at the Interim Data Facility (IDF) during Data Preview 0 (DP0).

The term **“delegate”** was adopted to reflect DP0 participants’ important roles of:

- representing the science community as RSP testers and providers of feedback to Rubin
- sharing what they learn about Rubin with their local groups, as teachers and colleagues

The number of DP0 delegates is limited due to the Rubin pre-operations team’s limited scope in providing support for data products, software, and services that are still in development.

Diversity was the main priority in selecting DP0 delegates.

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DP0.1 Feedback Survey 2021: the responses to this survey are incorporated into the following slides, and summaries can be found at ls.st/clo6105 and ls.st/clo6107.

A Diverse Set of DP0 Delegates

DP0.1

- advertised within and beyond the Rubin community, Jan-Apr 2021
- selection process incorporated an algorithm to promote representation from people:
  - *with different experience/expertise levels and career stages*
  - *at a variety of institution types and global locations*
  - *who identify with groups that are underrepresented in astronomy*
- initial oversubscription ~1.4; by Nov 2021 **all were invited to join** (now: ~250 delegates)
- **takeaway: assembling a diverse set of DP0 delegates is possible**

DP0.2

- a similar process will be used to identify **300 *additional* DP0 delegates** (ls.st/clo6191)
- increase representation from underserved institutes and new-to-Rubin scientists
- increase the number of "Plus Ones": 50 slots are reserved (instead of 10)
- reserve ~50 "Director's Discretionary" slots for, e.g., Rubin-related grant recipients

Details in Section 2 of ls.st/rtn-004.

Research Inclusion Strategies for DP0

1. **Broad Advertising**
   - to reach potential delegates who are not yet, e.g., Science Collaboration members
   - CET works with the Rubin Communications Team, directorate to reach out
2. **Two-Stage Application Process** (DP01. and DP0.2)
   - to include delegates who could not commit in 2021 (e.g., prior time commitments)
   - it will take time to advertise and attract a diverse set of delegates
3. **Support at All Levels**
   - beginner-friendly resources, documentation, and tools for independent learning
   - venues for Q&A with Rubin staff and delegate networking
4. **Minimal & Flexible Time Commitment**
   - minimum time suggestion is just 12-26 hours total over >1.5 years
   - all virtual meetings are recorded, and optional (except for kick-off info session)

DP0.2: A new **Research Inclusion postdoc** (NOIRLab CSDC and Rubin CET) will focus on engaging researchers, educators, and students at small and underserved US institutions in the Data Previews.

Details in Section 1 of ls.st/rtn-004.

Kick-Off Info Sessions & Account Set Up

DP0.1

- emailed all applicants to say if they were selected/waitlisted and provide instructions
- **feedback: issues reported with missing emails**
  - *ultimately, <10 selected delegates still did not participate after many contact attempts*
- held 6 live kick-off seminars over two weeks at a range of times for global access
  - *see ls.st/clo4989 for the kick-off session's slides and recording*
- kick-off sessions had very high attendance rates and positive feedback
- **feedback: the live kick-off info sessions were essential to get started with DP0**

DP0.2

- CET will again follow-up with any selected delegates who are not responding
- very similar kick-off sessions will be provided for the new DP0.2 delegates in 2022
- a separate "intro to the DP0.2 data set" kick-off session will be held
  - *current delegates will not have to re-live intro tutorials to get this info*

Documentation and Tutorials (dp0-1.lsst.io)

Documentation Contents

- Delegate's Homepage
  - 'getting started' checklist
  - assemblies: schedules, recordings
  - activities: working groups, shared code repo
  - support: venues for Q&A, bug reports
- Data Products Definitions Documentation
  - background info about DC2
  - image types, catalog schema
  - recommended query terms
- Data Access & Analysis Tools
  - RSP risks and caveats
  - step-by-step Notebook & Portal demos
  - FAQ and troubleshooting tips

Notebook Aspect Tutorials

1. Introduction to DP0 Notebooks
2. Intermediate TAP Queries
3. Image Display and Manipulation
4. Introduction to the Butler
5. Introduction to Source Detection
6. Comparing the Object and Truth Tables
8. Interactive Image/Catalog Visualization
9. Single Star Lightcurves with the Butler

Portal Aspect Tutorials

Beginner TAP Search
Advanced Demonstration

Documentation and Tutorials (dp0-1.lsst.io)

DP0.1

- lots of positive feedback about the documentation and tutorials
- **feedback: tutorial notebooks widely declared most useful resource**
- **feedback: some delegates need additional beginner materials**
  - *the community has a great depth of knowledge and experience here*
  - *new topics in the Community Forum invite delegates to share their favorite learning resources for python, SQL/ADQL, git, and github (see ls.st/clo6105)*

DP0.2

- more tutorial notebooks – and we infer a need for improved Portal demos
- we're establishing a "Best Practices" document to improve notebook development
  - *this will also help guide others to contribute to the CET tutorial set*
- we will produce updated data products documentation and new tutorials for DP0.2
- we will continue to update documentation with resolutions to common issues

Virtual Interactive Events

Delegate Assemblies

Schedule: dp0-1.lsst.io

So far, 3 delegates have presented their DP0-related work!!

Slides, written summaries, and **recordings are available**! Click on the links under "First Hour" in the table at dp0-1.lsst.io →

Date (Fridays at 9am US Pacific)	First Hour Presentation Topic	Second Hour Breakouts Topics	Chair and Presenter(s)
2021-07-16	Introduction to DP0, and to the RSP's Notebook and Portal Aspects.	General Q&A. Portal queries Q&A. Python learners. Lightcurves. Large scale structure (LSS).	The Community Engagement Team (Melissa Graham)
2021-07-30	Querying Catalogs with TAP in the Notebook and Portal Aspects.	LSS Working Group. Data visualization. General Q&A. Delegate "New Friends". Single-star lightcurves.	The Community Engagement Team (Leanne Guy)
2021-08-27	Image Query, Retrieval, and Display.	More fun with image display.	The Community Engagement Team (Jeff Carlin)
2021-09-10	Using the Butler for Data Discovery.	More fun with the Butler. General Q&A. Delegate networking.	The Community Engagement Team (Alex Drlica-Wagner)
2021-09-24	LSST Science Pipelines	Source detection and measurement. Supernovae. Resolved stellar populations. General Q&A.	Yusra AlSayyad (Rubin Algorithms and Pipelines Team)
2021-10-08	Data Visualization	Visualization packages Q&A. DP0 science topics.	Keith Bechtol (Rubin Commissioning Team)
2021-10-22	Delegate Breakouts	New-to-DP0 tutorial. Supernovae. Large scale structure. Resolved stellar populations. General Q&A.	The Community Engagement Team
2021-11-05	Delegate presenters: Louise Edwards and Kristen Larson	Resolved stellar populations. Large scale strucutre. Extinction in DP0. General Q&A.	Louise Edwards, Kristen Larson, and the CET
2021-11-19	Delegate presenter: Sylvie Dagoret-Campagne	Resolved stellar populations. Large scale strucutre.	Sylvie Dagoret-Campagne and the CET
2021-12-03	Image Processing	Source injection. Deep learning. General Q&A.	Andrew Bradshaw (Rubin Camera Subsystem Team)

Virtual Interactive Events

DP0.1

- "Delegate Assemblies" with presentations and breakouts for co-working (biweekly; 2h)
  - *3 delegate presenters and 37 "Delegate Profiles", so far*
- "Stack Club" open co-working session with Rubin staff (biweekly; 2h)
- "Third Thursdays" intended to serve Asia/Australia timezone (3 monthly sessions)
  - *was poorly attended and discontinued, but could return if there is demand*
- **feedback: some delegates find the Friday 9am Pacific time-slot impossible**
  - *CET's only possible time, but recordings are posted promptly*
  - *CET can arrange virtual meeting space and Rubin staff presence at alternative times*
- **feedback: some delegates miss the events due to lack of notifications**
  - *reminders for assemblies are now sent to the DP0-Delegates group in the Forum*
  - *see ls.st/6105 for instructions to set up email notifications*
- **feedback: live virtual hands-on demos were most popular and effective**

Virtual Interactive Events

DP0.1

- "Delegate Assemblies" with presentations and breakouts for co-working (biweekly; 2h)
  - *message Melissa to request topics or discuss volunteering to present (Feb-May)*
  - *there will always drop-in live help and breakouts*
- "Stack Club" open co-working session with Rubin staff (biweekly; 2h)
  - *to also continue during DP0.1, Feb-Jun 2022*
- "Alternate Meeting Times" available on request

DP0.2

- in July 2022, Delegate Assemblies will again have beginner-friendly presentations
  - *a separate "intro to the DP0.2 data set" kick-off session will be held*
- continue to support delegate-requested topics and delegate-lead presentations

Working Groups

CET focuses on general skills for data access and analysis to broadly serve delegates.
DP0 Working Groups are a way for delegates to learn and collaborate on *specific science topics.*

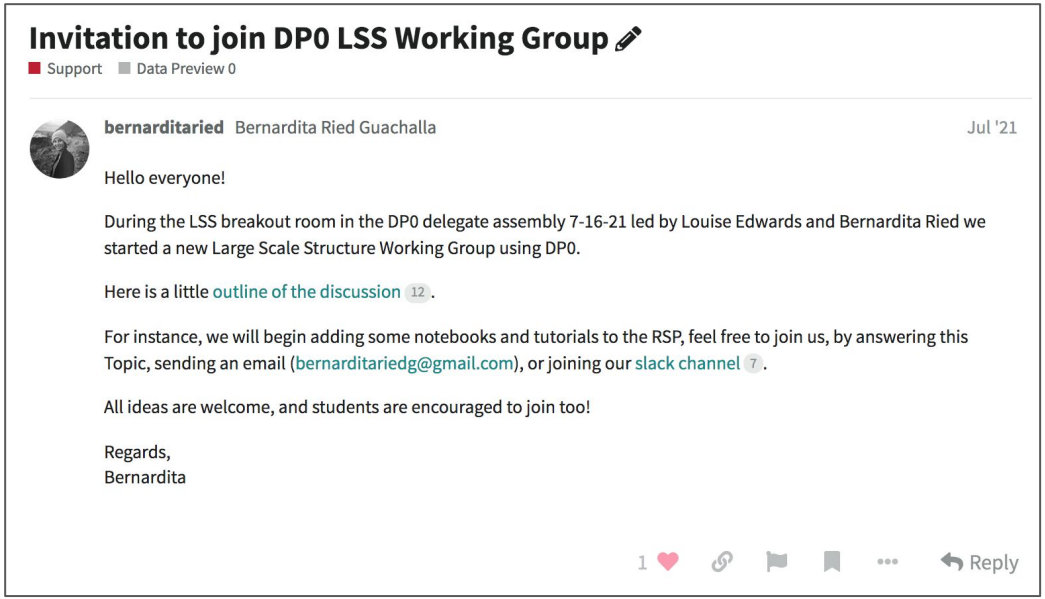
CET is not imposing the existence of DP0 WGs, but supporting grassroots formation.
The second hour of the Delegate Assemblies is intended for topical/WG breakouts.

Leading or participating in a DP0 Working Group can be as simple as:

- facilitating a breakout room during a delegate assembly
  - *inviting attendees to describe what their work, interests, or issues*
  - *can be a short 10-20 minute chat – no need to create 60 minutes of discussion*
- posting a new topic to community to stimulate conversation and research
- adding code to the shared DP0 repo: github.com/rubin-dp0/delegate-contributions-dp01

Working Groups

For example, the Large Scale Structure WG started as a post in the Community Forum. Usually someone volunteers to host the LSS breakout room during a Delegate Assembly.



Invitation to join DP0 LSS Working Group

Support | Data Preview 0

bernarditaried Bernardita Ried Guachalla — Jul '21

Hello everyone!

During the LSS breakout room in the DP0 delegate assembly 7-16-21 led by Louise Edwards and Bernardita Ried we started a new Large Scale Structure Working Group using DP0.

Here is a little outline of the discussion 12.

For instance, we will begin adding some notebooks and tutorials to the RSP, feel free to join us, by answering this Topic, sending an email (bernarditariedg@gmail.com), or joining our slack channel 7.

All ideas are welcome, and students are encouraged to join too!

Regards,
Bernardita

1 Reply

More information about Working Groups can be found in the DP0 documentation.
dp0-1.lsst.io/dp0-delegate-resources

Current working groups and their contact info:

Active DP0 Working Groups.

Working Group	Contact
Supernovae	Fabio Ragosta
Large Scale Structure	Bernardita Ried Guachalla

Working Groups

DP0.1

- two formal working groups formed: Supernovae and Large Scale Structure
  - *we frequently see 'resolved stellar populations' breakout session, too*
- **feedback: assembly breakouts for working groups were challenging to organize**
  - *more WG are happening now as delegates transition from learning to doing*
  - *Delegate Profiles were started so delegates could identify potential new colleagues*
  - *DP0 "New Friends" intended to help strengthen DP0-Science Collaborations ties*
- **feedback: some delegates are unsure what to do and need additional science demos**
  - *CET can help coordinate expertise on a topic if delegates suggest it*

DP0.2

- continue to encourage delegates to take the lead in forming working groups
- CET will add 2-3 new staff members and cover a broader range of science expertise
- "Delegate Profiles" could evolve into more of a "DP0 Show and Tell" (short presentations)

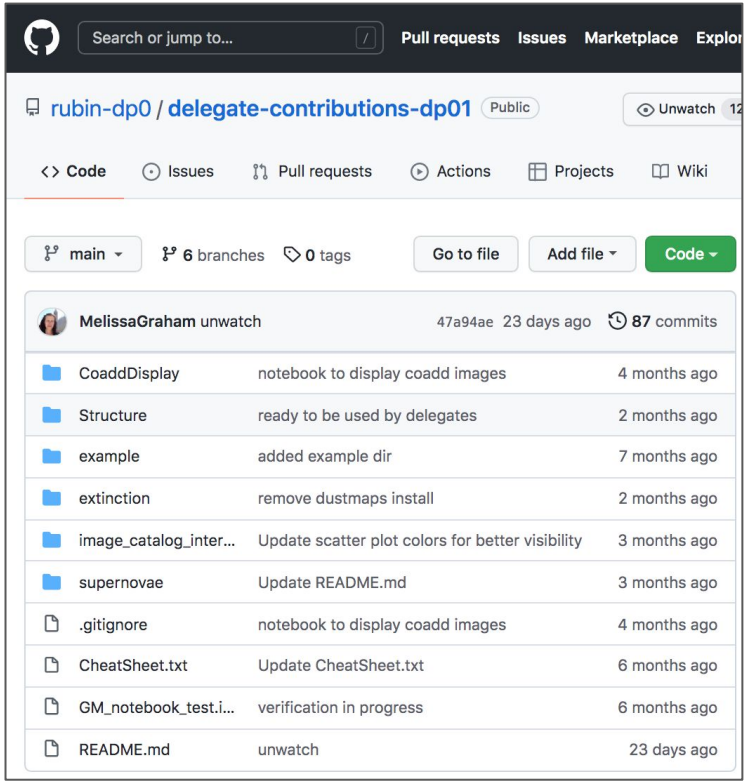
Shared GitHub Repository

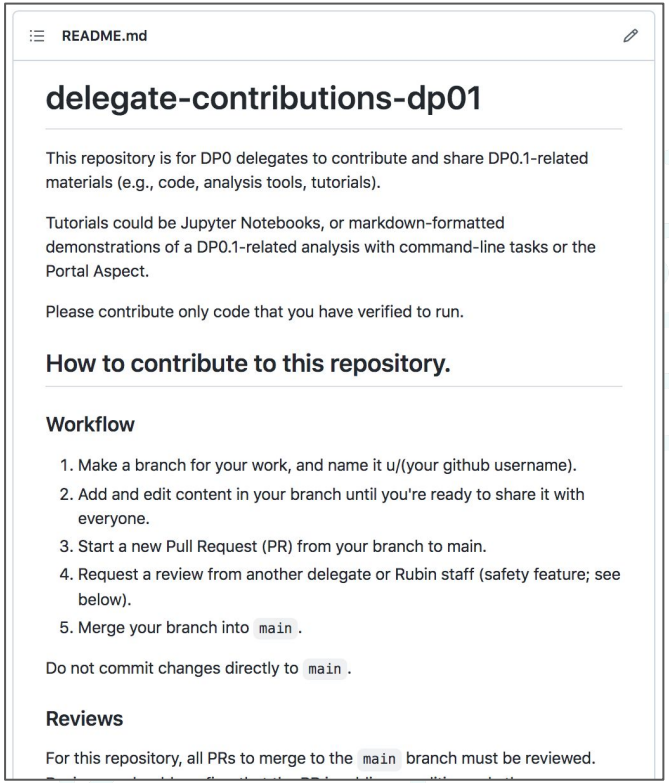
Anyone can create a new directory and add materials to the repo.

So far, delegates have created 5 topical directories!!

There are instructions in the README.md, but just reach out* if you're ever unsure.

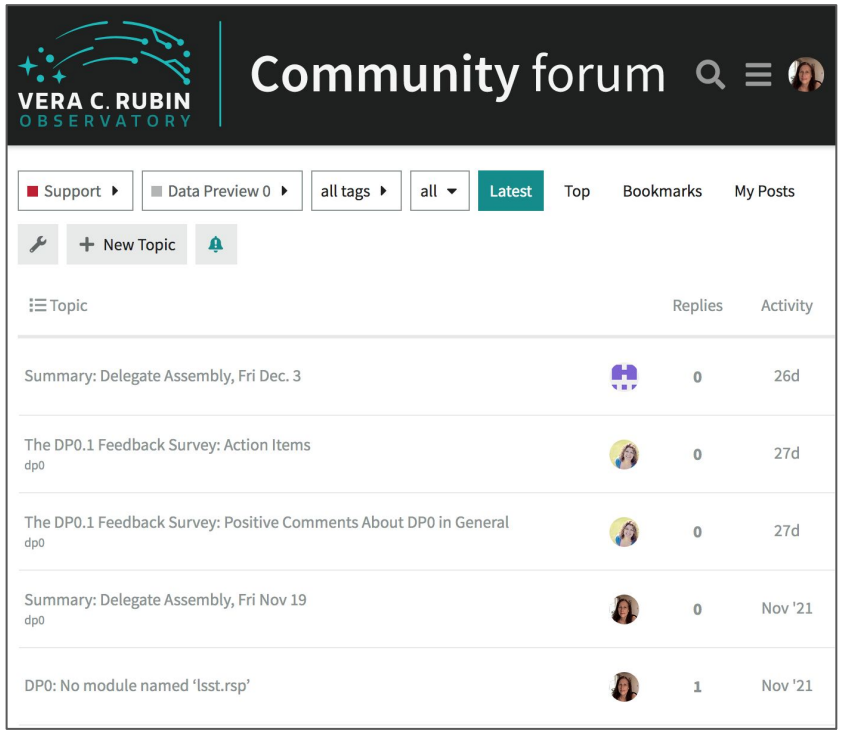
*Post a new topic in the Community Forum, or send a direct message to Melissa.



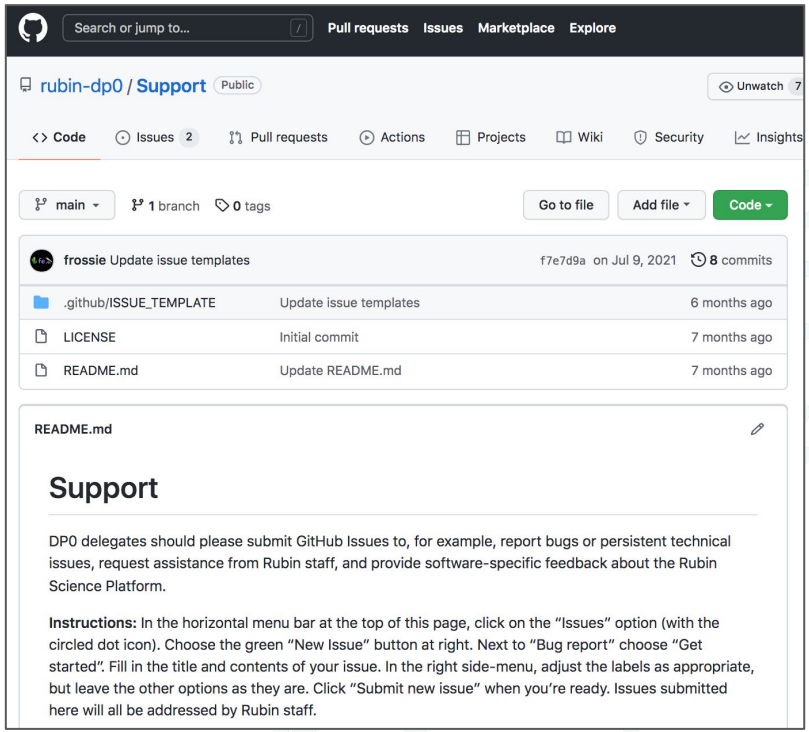


Support: Community Forum & GitHub Issues

Community.lsst.org



github.com/rubin-dp0/Support



Support: Community Forum & GitHub Issues

DP0.1

- only a few questions and issues submitted (~14 forum, ~20 github)
- many were related to git version errors when the tutorials were updated
- most answered promptly by Rubin staff, a few advanced questions took longer
- and we saw a few instances of delegates helping delegates (wonderful!)
- **feedback: support venues work well *once people get used to them***
  - *"Tour of the Community Forum" YouTube video (ls.st/clo6105)*

DP0.2

- tutorial-notebooks/ directory settings will help users avoid git errors (most common issue)
- improve forum content searchability (e.g., make better use of tags)
- continue to update documentation with resolutions to common issues
  - e.g., dp0-1.lsst.io/data-access-analysis-tools/index-nb-intro.html#troubleshooting-tips

A Sustainable, Self-Supporting Community

Building a Self-Supporting Community with Data Preview 0: A Case Study

(1) **A delegate asks a question in the forum** (ls.st/clo6081 →).

How to make a loop over tracts and patches to split the DC2 dataset

Support · Data Preview 0 · butler

sylvielsstfr DESC Member — 7d

Hello,

I would like to explore the whole DC2 dataset by using the data organisation according tracts and patches.
I mean I want to retrieve all the objects belonging to a tract and a patch from the dp01_dc2_catalogs.object table.
I am able to get from a query to the TAP service on dp01_dc2_catalogs.object table the list of tract numbers.

But then I would like to have access to the information associated to each tract and patch, ie its center, its corners (in radec). I have seen that the butler is aware of the skymap collection.

I am able to access from the butler to a skymap object

```
repo = 's3://butler-us-central1-dp01'
collection = '2.2i/runs/DP0.1'
butler = dafButler.Butler(repo,collections=collection)
skymap = butler.get('skyMap')

<lsst.skymap.ringsSkyMap.RingsSkyMap object at 0x7f370d3d4f10>

help(skymap)...
```

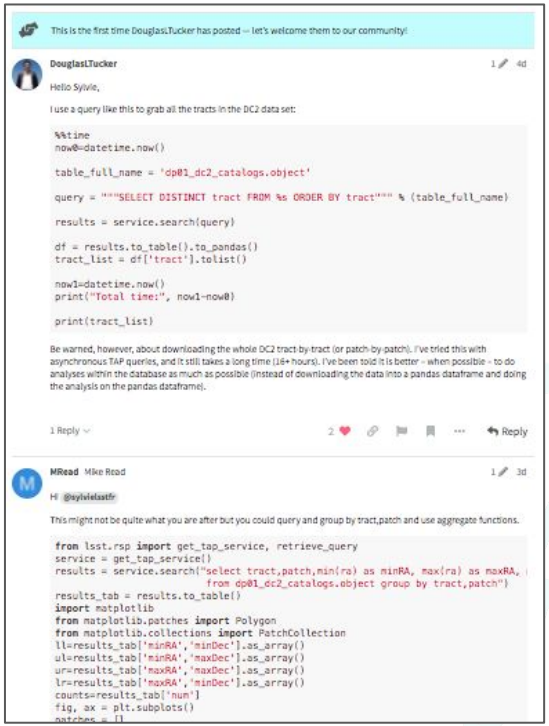
But it is not clear how to get the list of tracts and patches from skymap, because skymap methods ask for (ra,dec) argument.

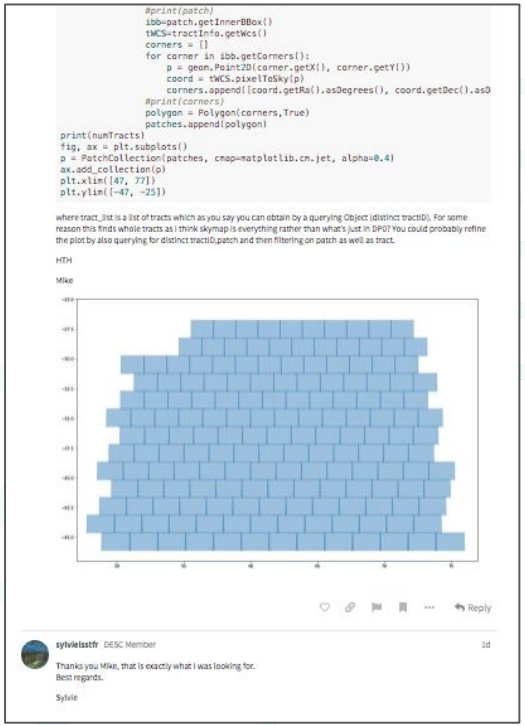
A Sustainable, Self-Supporting Community

Building a Self-Supporting Community with Data Preview 0: A Case Study

(1) A delegate asks a question in the forum (ls.st/clo6081).

(2) **Other delegates and Rubin staff help out** (excerpts →).





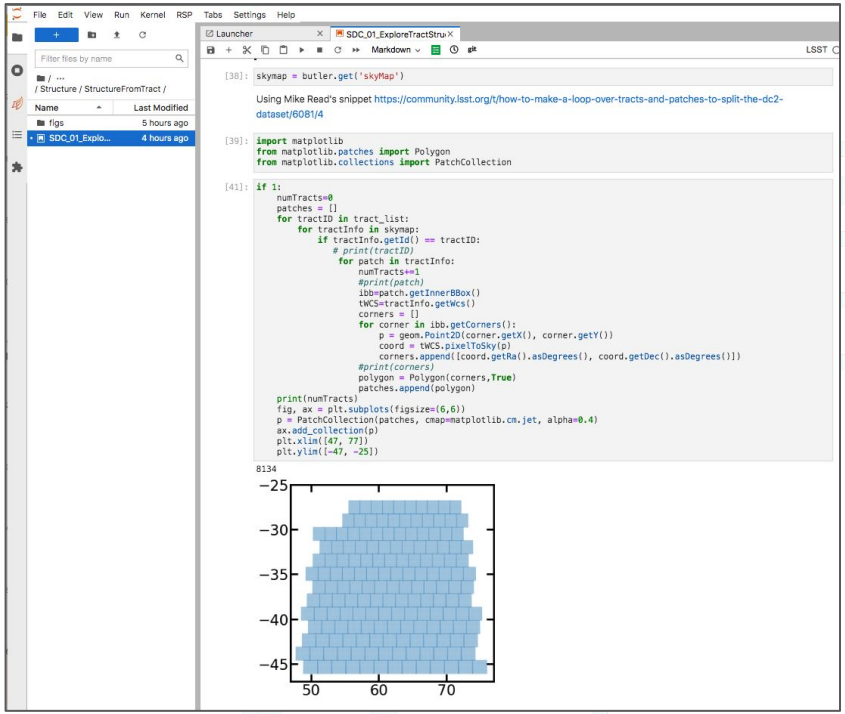
A Sustainable, Self-Supporting Community

Building a Self-Supporting Community with Data Preview 0: A Case Study

(1) A delegate asks a question in the forum (ls.st/clo6081).

(2) Other delegates and Rubin staff help out (excerpts).

(3) **Delegate incorporates responses into their DP0 work, which they present at a Delegate Assembly** (→) as a hands-on demo of an openly shared notebook *containing and crediting the help received via the Rubin Community Forum*.



A Sustainable, Self-Supporting Community

With DP0.2 we will welcome up to 300 new delegates!

We will all get the chance to help them learn what we have learned from DP0.1.

LSST Science Collaborations

Examples of the SC's connections with DP0:

- The LSST Science Collaborations instituted the "DP0 New Friends Program" (next slide)
- ~200 SC members are DP0 delegates
- DESC created the DC2 simulated data set
- The TVS-SC has a "DP0 Task Force"

All DP0 Delegates are welcomed and encouraged to join one or more Science Collaborations.

LSST Science Collaboration members are encouraged to seed DP0 Working Groups.

Transients and Variable Stars SC

Stars, Milky Way, & Local Volume

Strong Lensing SC

Active Galactic Nuclei SC

Solar System SC

Galaxies SC

Dark Energy SC

Informatics and Statistics SC

DP0 “New Friends” Program

DP0.1

- The LSST Science Collaborations instituted the “DP0 New Friends Program”
- It can be challenging for new people to figure out how to participate with the SCs
- The SCs provided “SC Rep” volunteers to be a friendly and informal point of contact to a particular SC for new-to-Rubin-SC DP0 delegates
- The CET facilitates this program.
- In DP0.1, 12 DP0 delegates were matched to 12 SC Reps.

DP0.2

- We will restart this program for DP0.2
- Delegates may sign up for the program when it is relaunched
- We will assign SC Reps.
- If signing up again, we’ll match to a different SC Rep. Think of this as networking.
- The program is meant to help people find scientific homes in the right SCs.

Rubin Observatory Users Committee

Charge to the Users Committee

- actively use the LSST data and the RSP
- solicit feedback from the community
- participate in RSP User Acceptance Testing
- report to the Rubin Observatory Director
- recommend science-driven improvements
- prioritizing equitable access and inclusive practices
- maximize the scientific productivity

Opportunities to interact with the Users Committee and contact info will be provided.

Read further in rdo-051.lsst.io.

First 12 Members, 2022-2023

Igor Andreoni
Amelia Bayo
Dominique Boutigny
Alessandra Corsi
Matthew Holman
Ni Qingling
Markus Rabus
Francisco Javier Sanchez Lopez
V. Ashley Villar
Anja von der Linden
Matthew P. Wiesner
Michael Wood-Vasey

A Message from the RSP Team

Thank you for trying out the RSP in its early form!

We have learned a lot from watching you work and helping you out, and we've made improvements when we saw something was more confusing than we expected. Thank you in particular to the users who took time to file a Github Issue describing a problem they encountered and your patience while we resolved it.

Stick with us for DP0.2 for the launch of our VO image services and ongoing user experience and performance improvements.

The RSP team will be putting out a call for a small focus group of beta-testers soon and will be looking for users of all levels! Look out for the call on community.lsst.org for an additional opportunity to contribute to our development.

Preparing for Early Science with DR1

The DP0 data set and RSP are serving us well for early preparations for LSST science.

DP0.1

- focus on learning basic functionality of Notebooks and Portal (TAP & butler queries)
  - *plus visualization techniques for LSST / large data sets (e.g., afwDisplay, holoviews, bokeh)*
- data set: processed visit images and coadded images, and sources detected in them
  - *the DP0.1 data set will continue to be available throughout DP0*

DP0.2

- new for DP0.2: difference images and sources!
  - *but no simulated alert packets; ZTF is still the best for that*
- data reprocessed with a more up-to-date version of the LSST Science Pipelines
  - *will be even more similar to the impending commissioning data products (DP1, DP2)*
- focus on basic functions for new delegates, and add advanced topics for DP0.1 delegates
  - *also expecting increased WG activity & advanced demos made by DP0.1 delegates*

Actively Participate in DP0.1 in 2022

Delegate Assemblies
- Feb 11 and Feb 25, topics TBD
- request topics or volunteer to present

Stack Club
- alternating Fridays with assemblies
- open co-working and live support

Working Groups (and assembly breakouts)
- participate or lead a breakout discussion
- connect with Science Collaborations

Community Forum
- make topic posts about your work
- ask questions, help to answer questions

Shared GitHub Repository
- make a new directory, share a notebook
- advertise your work via Community Forum
- host a breakout to demo your notebook

Alternative Meetings
- delegate-led, as needed
- serve geographic / science groups
- CET can arrange virtual space or Rubin staff

And/or, please continue to do your own thing with the DP0 data set, and respond to future calls for feedback!

Thank you so much for participating in DP0.