Data Access Tools and Data Releases

A brief description

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DES Meeting @ Cambridge, December 15th

Outline

- Introduction
- DESDM
- DES Science Portal
- NOAO Data Lab
- easyaccess
- DESDM stats
- DES Labs
- JupyterHub + DESDM
- DES Github
- DES cutout services
- Integrated tools vision
- DR1 Release
- Conclusions

Introduction

- DES Survey: Gold (Data) Mine
- DESDM: Excellent job at mining the data
- DES: Consumer outside the mine
- Need to bring gold (data) outside
- Tools and interfaces
- Y3A1 is out!

DESDM @ NCSA

The Core DESDM Team at NCSA

- Donald Petravick, *Senior Project Manager and Principal Investigator*. email
- Matias Carrasco Kind, *Research Scientist*. email www
- Gregory Daues, *Research Programmer*. email
- Douglas Friedel, *Research Programmer*. email
- Margaret Gelman, *Research Scientist*. email
- Michelle Gower, *Senior Research Programmer*. email
- Robert Gruendl, *Research Scientist and Associate Research Professor of Astronomy*. email
- Michael Johnson, *Research Scientist*. email
- J.D. Maloney, *Storage Engineer*. email
- Felipe Menanteau, *Research Scientist and Associate Research Professor of Astronomy*. email www
- Eric Morganson, *Research Scientist*. email
- Francisco Paz-Chinchon, *Postdoctoral Reserach Associate*. email
- Christopher Pond, *Senior Database Administrator*. email

Data Management and operations for DES and LSST

What do we do?

- Process raw data nightly (Firstcut)
- SN, transients, Alerts (SNPipeline)
- Process and calibrate raw data (Finalcut)
- Coadd Single Epoch images (MultiEpoch)
- Serve data: Archive and catalogs (DB)
- Other services: Confluence, EUPS, Interfaces, Tools, etc.
- Many others...

DES Science Portal

desportal.cosmology.illinois.edu

- @ NCSA but managed by LIneA
- Interactive Coadd Image exploration
- Moving some services from old-portal to the Science portal
- Already with Y3A1 data

NOAO Data Lab

datalab.noao.edu

- Also a VM @ NCSA but managed by NOAO
- New initiave and release partner for DR1
- Mutual benefits
- Will keep data private until release

easyaccess

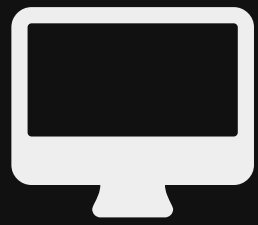
```
DARK ENERGY SURVEY
DATA MANAGEMENT

easyaccess  1.3.1. The DESDM Database shell.
* Type 'help' or '?' to list commands. *

DESDB ~>
```

Motivations

- DES DB in Oracle
- Needed upgrade from older versions (trivialaccess)
- Enhanced SQL command line interpreter
- Astronomically friendly
- Python API, web interface
- There are many other clients but needed one standard for beginners

Some cool features ☺

- History of commands
- Smart TAB auto-completion of commands, columns, users, tables and path
- Very flexible configuration
- Completely open source and written in python
- Write tables in csv, tab, fits and hdf5 formats
- Load sql queries directly from a file
- Load table directly in to DB in one step, no memory issues
- Can be imported as python module (py2/py3)
- Tables are handled and displayed using pandas
- Can run python functions inside query (beta)
- Many more...

Installation 

Making things even easier

- Clone it from github
- Using pip or easy_install
- Using EUPS @ DESDM
- Pre-installed in Docker Image (and run outside the container)
- New! Install with conda

```
conda install easyaccess -c mgckind
```

Future and Demo

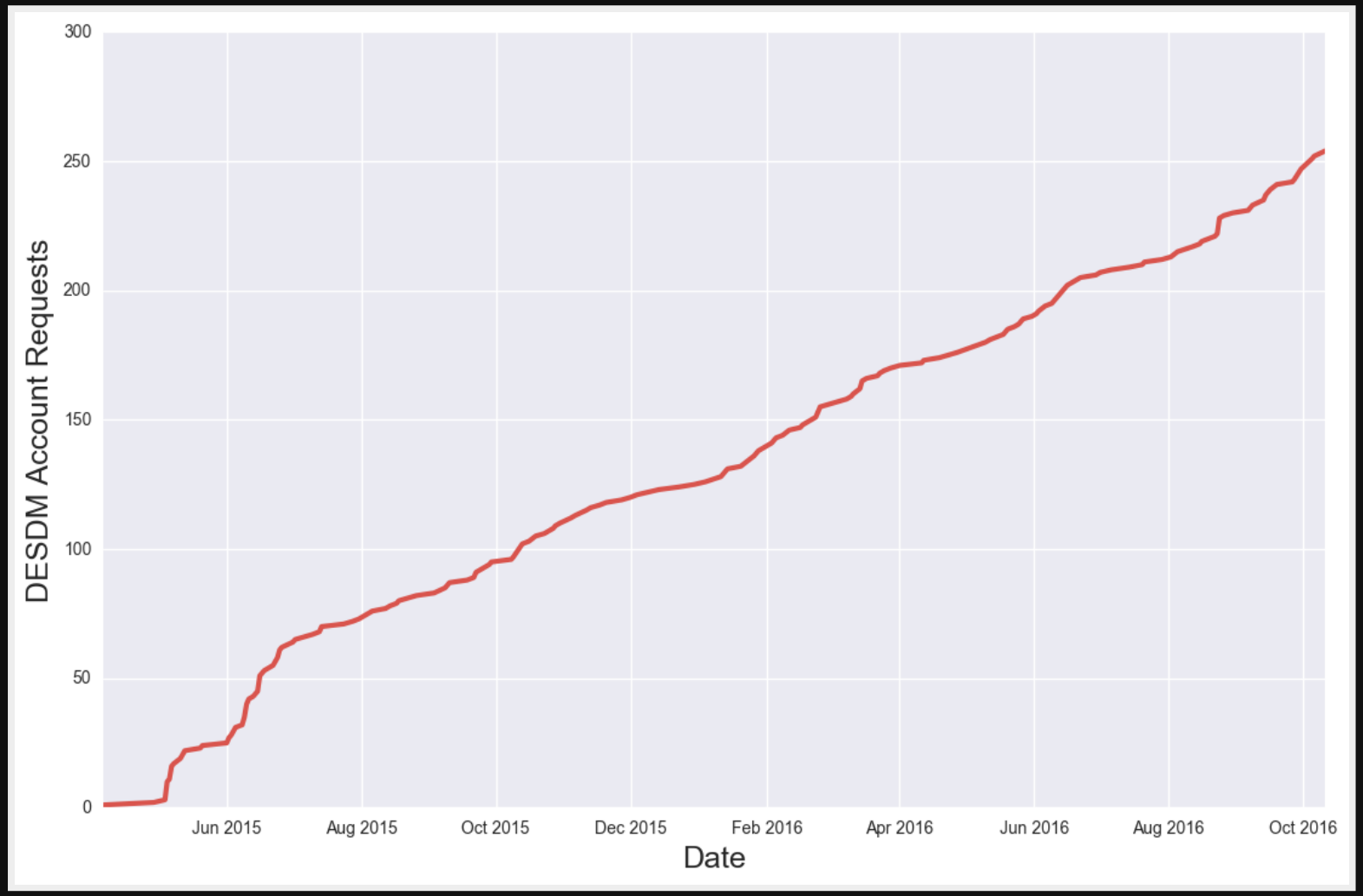
- Generalization (SQLAlchemy), in-query python functions, batch jobs, checkpoint, web, better Jupyter integration, more...
- easyacess: Enhanced SQL interpreter for astronomical surveys (Carrasco Kind+, 2016?)
- For a more detailed tutorial check Here

Live Demo!

Some DESDM statistics

(Scroll down 🡻)

DESDM New accounts

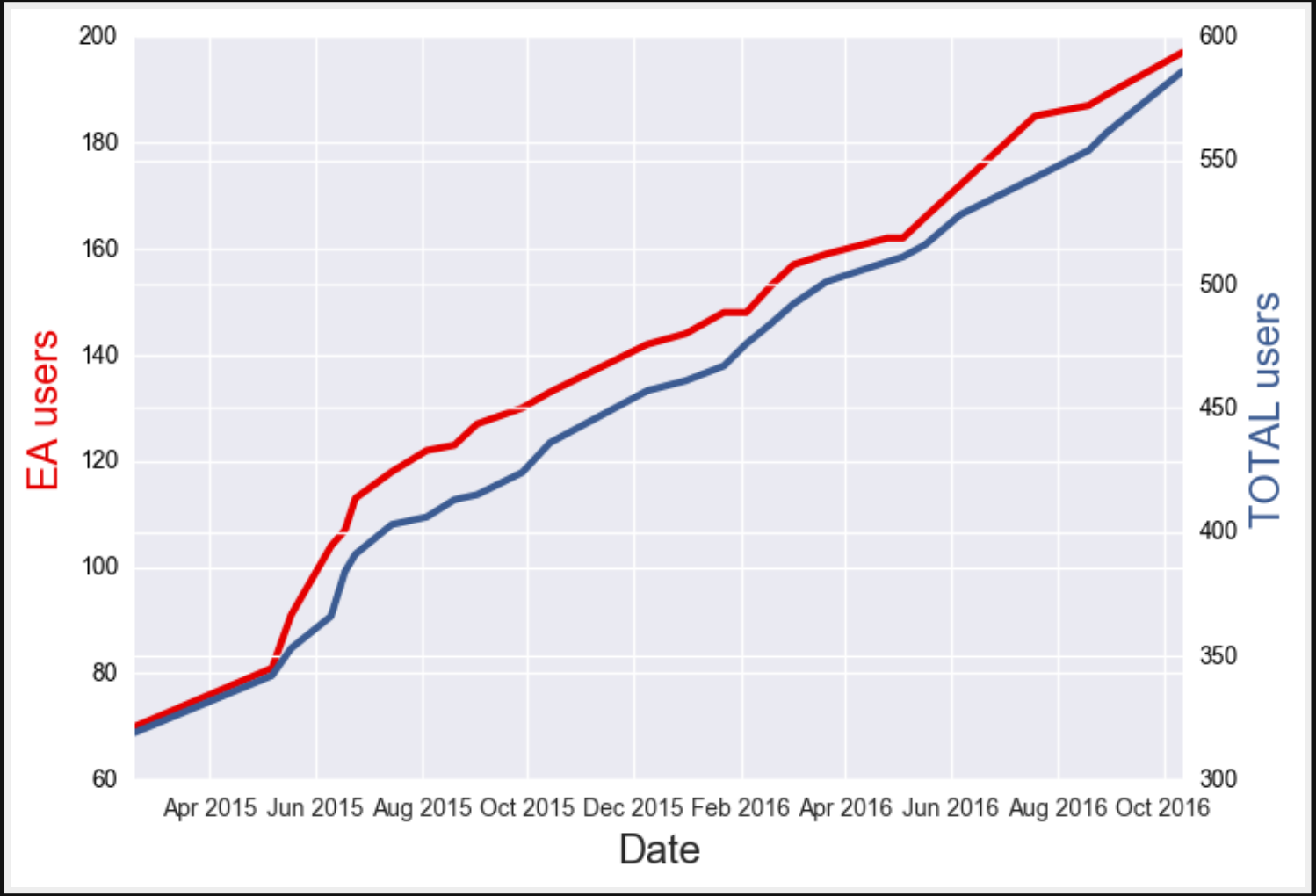


More than 250 New users since new On-boarding!

New DES Member? Check Here

Several Services: DB, Confluence, HipChat, BitBucket, Stackoverflow

DB Users



Triple the number of users since easyaccess

Almost 200 ea users with different activity levels

Feedback via github issues, stack-overflow-like questions, email list and personal inquiries

DB Quotas

Personal space actively used and constantly increasing

People create and share tables with one command

~ 4.5 TB in personal space, tables and index tables included

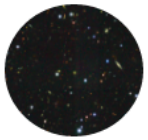
Experimental UI projects being developed (Openstack + Docker)

DES Labs

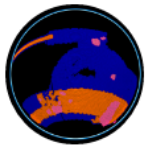
Easyaccess web

Jupyterhub + easyacces

Des maps

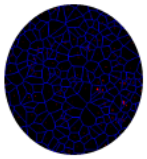


Footprint



DES cutouts

Map exploration



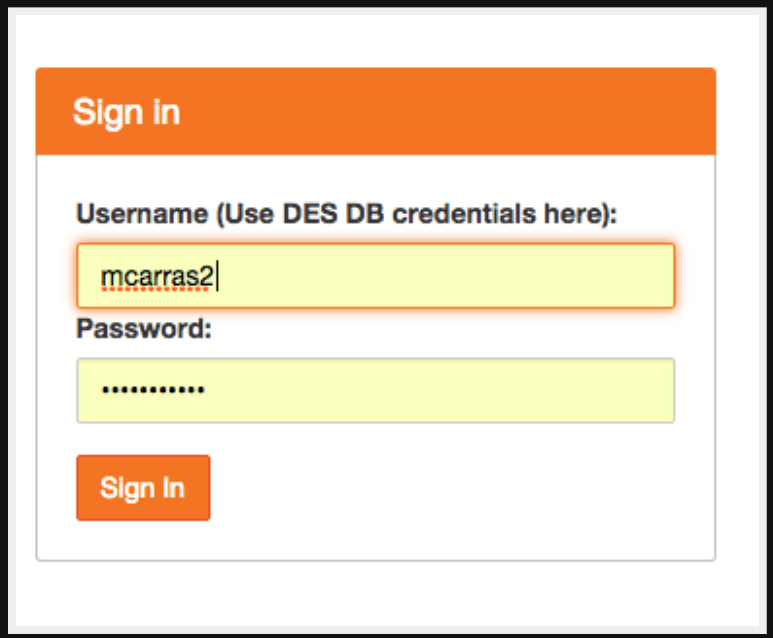
Easyaccess online

Science Server

deslabs.ncsa.illinois.edu

JupyterHub + easyaccess + JS9

jupyter + Dark Energy Survey

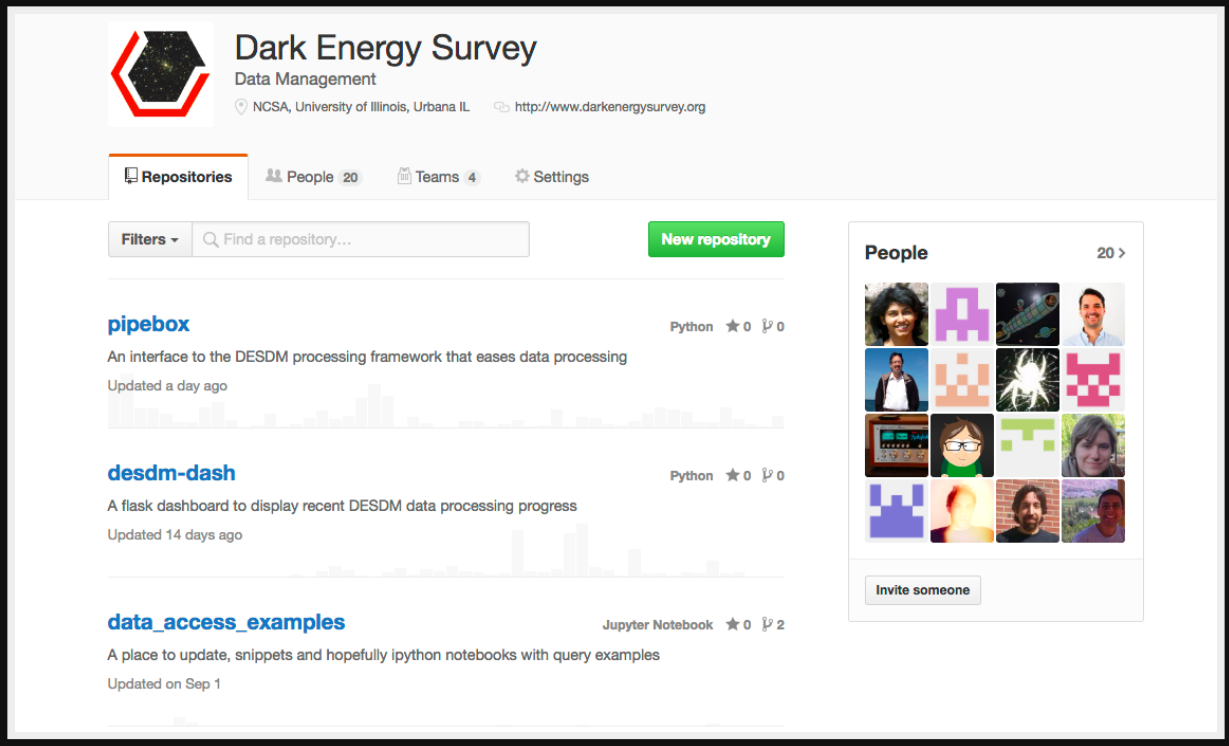


- Multi-user jupyter notebook sessions
- Access with DB credentials
- Running in OpenStack ("The Cloud")
- Easy setup (Running from Docker container)
- Easyaccess and other tools installed
- Spark Cluster in alpha stage
- Local JS9 (Next gen. DS9) integration
- Still in beta mode, planning to scale up
- Open to DES collaborators

deslabs.ncsa.illinois.edu/jupyter

Github Org

https://github.com/DarkEnergySurvey



Ask me for invite!

Online Cutout Services

descut.cosmology.illinois.edu

- Cutout Services for both: Coadd images and Single Epoch
- Nice REST API so can be also accessed from e.g. *python*
- Almost production-like services with GPFS mounted

Live demo!

Data Release 1

- A release is not only data! but interfaces, software, archive, documentation, support and commitment
- Each component is not a single unit, e.g. Documentation is not only a paper relase but also tutorials, data model, DB, software, etc...
- Content, validation and vetting done with collaboration
- Many factors/people involved, long term plan
- Internal and public release, DES DR1 December 15th, 2017

Public DR1 Plan @ DES-docdb 9410

Conclusions

- Tools being developed to make data access easier @ LIneA, NOAO and DESDM
- Easyaccess, Cutouts, Jupyter, Js9, Science Portal, etc...
- Opensource and integrated software
- Bring software to the data!
- Want to help? Want some infrastructure? Let me know!

Thanks!

Questions?

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