DESDM Data Access and Code distribution

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Breaking Walls

1. Provide access to the data (Images and Catalogs) to the DES Collaboration
2. Provide access to all codes/tasks and pipelines used in production by DESDM

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What I'll try to convince you today

In the process create a community to develop the analysis tools for DES we all need!

DESDM Code Problem

Complex software systems are generally built from a hierarchy of components, and in general all of these systems are in a state of flux.

from the EUPS Manual

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a.k.a DESDM Code is too complicated, so I'll build my own version.

EUPS and DESDM

(bringing order to chaos)

- EUPS (ExtUPS)
- Organize the set of components, allowing for their natural hierarchy.
- Select which versions of components should be used, ensuring that a consistent set are chosen
- Configure the environment (PATH; environment variables) for each component.
- Provide a way to identify a chosen set of components
- Install libraries that support these versions, and to do so on a number of different platforms.

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DESDM in your laptop

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EUPS and DESDM
(bringing order to chaos)

- **DESDM EUPS Framework** has been developed by the Zurich group (FHNW/ETH) by Stefan Muller and Martin Melchior.
- **Multi-platform**: DESDM code built on Linux (RHL6, Ubuntu) and Mac OSX 10.7, 10.8 and 10.9 (eventually 10.10)
- **LSST Collaboration** uses it to distribute their software
- **DESDM EUPS Users Guide @ NCSA Wiki,**

https://deswiki.cosmology.illinois.edu/confluence/display/CMBT/EUPS+User%27s+Guide

How does it work

The impatient's guide @ NCSA wiki

https://deswiki.cosmology.illinois.edu/confluence/display/CMBT/Impatient%27s+the+Guide+to+DESDM+EUPS+installation

Download the EUPS self-install script

```
%> curl -O http://desbuild.cosmology.illinois.edu/desdm_eupsinstall.py
```

Run the self-install package

```
%> python desdm_eupsinstall.py
```

To install/build all of the astromatic codes (SExtractor, SWarp, Stiff, psfex,stiff).

```
%> eups distrib install astromatic fall2014+0
```

(be patient this will take a while....)

How does it work

Load up the DESDM astromatic suite of packages (E. Bertin's)

```
%> setup -v astromatic fall2014+0
Setting up: astromatic                  Flavor: DarwinX86  Version: fall2014+0
Setting up: |sextractor                 Flavor: DarwinX86  Version: 2.18.10+15
Setting up: |atlas_netlib               Flavor: DarwinX86  Version: 3.8.4+9
Setting up: |netlibLAPACK               Flavor: DarwinX86  Version: 3.4.1+2
Setting up: |fftw                       Flavor: DarwinX86  Version: 3.3.2+5
Setting up: |swarp                      Flavor: DarwinX86  Version: 2.36.2+2
Setting up: |stiff                      Flavor: DarwinX86  Version: 2.1.3+1
Setting up: |tiff                       Flavor: DarwinX86  Version: 4.0.3+1
Setting up: |libjpeg                    Flavor: DarwinX86  Version: 8d+0
Setting up: |scamp                      Flavor: DarwinX86  Version: 2.0b4+17
Setting up: |plplot                     Flavor: DarwinX86  Version: 5.9.9+9
Setting up: |perl                       Flavor: DarwinX86  Version: 5.18.1+5
Setting up: |numpy                      Flavor: DarwinX86  Version: 1.7.1+3
Setting up: |python                     Flavor: DarwinX86  Version: 2.7.6+1
Setting up: |sqlite                     Flavor: DarwinX86  Version: 3080002+0
Setting up: |gettext                    Flavor: DarwinX86  Version: 0.18.2+1
Setting up: |swig                       Flavor: DarwinX86  Version: 3.0.2+1
Setting up: |cmake                      Flavor: DarwinX86  Version: 2.8.12.2+0
Setting up: |pango                      Flavor: DarwinX86  Version: 1.28.4+7
Setting up: |glib                       Flavor: DarwinX86  Version: 2.29.2+8
Setting up: |pkgconfig                  Flavor: DarwinX86  Version: 0.28+1
Setting up: |cdsclient                  Flavor: DarwinX86  Version: 3.71+0
Setting up: |psfex                      Flavor: DarwinX86  Version: 3.17.0+7
```

Other examples

More than 200 packages available to distribute and ~16 Meta-packages

Examples of Meta-packages:

Python set of Core packages (numpy, scipy, matplotlib, healpy, etc.)

```
%> setup -v pythonCore fall2014+0
```

Python set of DESDM utilities

```
%> setup -v pythonDESDM fall2014+0
```

DESDM development tools

```
%> setup -v pythonCore fall2014+0
```

EUPS/DESDM Products dashboard

http://desbuild.cosmology.illinois.edu/eeups/webservice/dashboard/products

DESDM EEUPS Software Management System — Products Log Sys Doc

All — svn rev. 26720 // Oct. 21, 2014, 10:46 a.m.

Product	Latest	Rev	State	Valid	Build	Tests	Inher	Comment
APLpy	0.9.12+3	26381						
CoreUtils	1.0.1+0	26488						
DASHBOARDSERVER	v2+5	26144						INHERIT - Package depends on other package with erroneous status: ...
DESDMdevel	summer2014+1	26714						INHERIT - Package depends on other package with erroneous status: ...
DatabaseApps	1.0.0+1	25489						
EEUPS	stable+13	23582						
FWRefact	ms4+20	23583						
FWRefactDeps	ms4+10	23584						
FileMgmt	1.0.0+0	25350						
IntegrationUtils	1.0.0+0	25348						
LSSTafw	7.1.2.0+1	24715						
LSSTbase	7.1.1.0+1	24715						
LSSTboost	1.51.0+3	24747						
LSSTdafbase	7.1.1.0+1	24715						
LSSTdafpersistence	7.1.1.0+2	24715						
LSSTimmask	0.2.2+1	25432						
LSSTipisr	7.1.1.0+3	24715						

Accessing the DES data @NCSA

I) Accessing Images

Processing Campaigns (Need a DESDM wiki account):

https://deswiki.cosmology.illinois.edu/confluence/display/DO/Processing+Campaign+Summaries

Survey Year 2 Processing

Nightly Processing	Preliminary Releases	Annual Release
• **Y2N: Year 2 Nightly Processing** Nightly processing of Aug. 2014 - Feb. 2015 survey nights. Includes precal, firstcut, and supernova pipelines. *Summary page: **Y2N***		

Survey Year 1 Processing

Nightly Processing	Preliminary Releases	Annual Release
• **Y1N: Year 1 Nightly Processing** Nightly processing of Aug. 2013 - Feb. 2014 survey nights. Includes precal, firstcut, supernova single epoch, supercal, and difference imaging pipelines. *Summary page: **Y1N***	• **Y1P1: Year 1 Preliminary Release 1** First preliminary release of DES Year 1 data taken from Aug. 31, 2013 - Dec 1, 2013. Includes PSM, remap, coadd, and mangle pipelines. *Summary page: **Y1P1***	• **Y1A1: Year 1 Annual Release** First annual release of DES data taken during the Year 1 observing season. Includes supercal, finalcut, coadd, and mangle pipelines. *Summary page: **Y1A1***

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I) Accessing Images

Y2N Production Results - FirstCut

Added by Margaret Gelman, last edited by Michael Johnson on Dec 02, 2014 (view change)

Night	Request Number	Product Directories on DESDM Archive	Directory List of Tagged Exposures	Summary of Input Exposures	Observer Night Summary	Reduced Image Mosaics (pngs)	Data Quality Assessments	Astrometry Quality Plots (SCAMP)	Photometry Quality Plots (PSM)	Calibrations Applied	EUPS Software Version	Comments
20140807	r878	/archive_data /desarchive /OPS/firstcut /20140807-r878	directory list		night summary						Y2Nstack 1.0.0+0	
20140815	r879	/archive_data /desarchive /OPS/firstcut /20140815-r879	directory list		night summary						Y2Nstack 1.0.0+0	
20140816	r898	/archive_data /desarchive /OPS/firstcut /20140816-r898	directory list		night summary						Y2Nstack 1.0.0+0	
20140817	r904	/archive_data /desarchive /OPS/firstcut /20140817-r904	directory list		night summary						Y2Nstack 1.0.0+0, Y2Nstack 1.0.2+0	Exposures 349383, 349392, 349395, 349398, 349365, 349367, 349390, and 349429 failed first processing attempts d to bug in

Accessing the DES data @NCSA

2) Accessing Catalogs

a) **Interactive:** Running the DESDM Client (trivialAccess)
https://deswiki.cosmology.illinois.edu/confluence/display/ATDD/Running+the+DESDM+Client

```
>trivialAccess --s db-desoper  (for operations DB)
>trivialAccess --s db-dessci  (for science DB)

>> find_tables COADD
COADD                          COADDTILE                      COADDTILE_DEPRECATED
COADDTILE_NEW                  COADD_OBJECTS                  COADD_OBJECTS_MOLYGON
COADD_OBJECTS_UNIQUETILE       COADD_OBJECTS_XCORR            COADD_OBJECTS_XCORR_IGNORE
COADD_OBJECTS_XCORR_TEST       COADD_SRC

> describe_table COADD_OBJECTS
column_name,data_type,data_length,data_precision,data_scale,comments
ALPHAWIN_J2000_G,BINARY_DOUBLE,8,,,
ALPHAWIN_J2000_I,BINARY_DOUBLE,8,,,
ALPHAWIN_J2000_R,BINARY_DOUBLE,8,,,
ALPHAWIN_J2000_Y,BINARY_DOUBLE,8,,,
ALPHAWIN_J2000_Z,BINARY_DOUBLE,8,,,
A_IMAGE,BINARY_FLOAT,4,,,
....
```

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b) Batch Mode: Using the desdbi python DESDM API

https://deswiki.cosmology.illinois.edu/confluence/display/ATDD/Installing+and+Using+the+DESDM+API

Install the DESDM API

```
> eups distrib install despydb 2.0.0+0
> setup despydb 2.0.0+0
```

Create a database interface instance

This relies on the existence of a ".desservices.ini" file in your home directory. This file is described in more detail here.

```
import os
import despydb.desdbi as desdbi

# This assumes your services file is in your home directory
desfile = os.path.join(os.getenv("HOME"),".desservices.ini")
# This should match the section in your service file
section = "db-dessci"
dbi = desdbi.DesDbi(desfile,section)
help(dbi)
```

List all tables in the database

```
cursor = dbi.cursor()
cursor.execute("select distinct OBJECT_NAME from DBA_OBJECTS where OBJECT_TYPE = 'TABLE' and OWNER = 'DES_ADMIN'")
tables = cursor.fetchall()
print sorted(zip(*tables)[0])


# You can also look for private tables from any of the users
cursor.execute("select distinct OWNER from DBA_OBJECTS where OBJECT_TYPE = 'TABLE'")
print sorted(zip(*cursor.fetchall())[0])
```

Plans

Batch tool to retrieve images using python

Thanks