S&C Report

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June 23, 2009

Outline

Ongoing Operations Activities

- Opportunities to participate and earn service credit

Scale Testing of the Experimental Program (STEP-09)

- International CMS testing

Analysis Activities

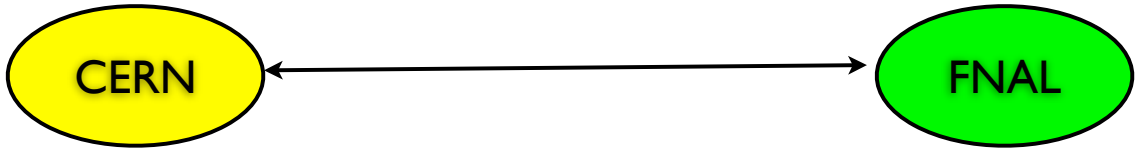
- Activities During Step
- Use of the resources
- Tier-3s

Software Activities

Operations Opportunities (1/2)

CMS Data Operations

- Be the very first to see the data. Easy to work at CERN and FNAL.
- CMS has utilized a two team model for almost 2 years
  - Potential remote opportunities as well



- Hand off at the end of the CERN day. Both teams use all resources
  - Both teams have leads from US-CMS
  - Transitioning from Lothar Bauerdick and Christoph Paus
  - To Oliver Gutsche and Markus Klute

Data Operations Tasks

- Validate all CMSSW releases
- Reprocess Data/MC at T1s
- Coordinate central data transfers
- Operate T0 for data taking
- Produce MC at the T2s

Operations Opportunities (2/2)

Complete CSP Shifts (Computing Shift Persons)

- An easy job to be trained and take some shifts. Work through a defined check list.
- Currently scheduled for FNAL and CERN, but depending on the CMS running these can be done from a home institution
  - https://twiki.cern.ch/twiki/bin/view/CMS/ComputingShifts
  - To sign up use the link below

http://cmsonline.cern.ch/portal/page/portal/CMS%20online%20system/Shiftlist/ShiftSelection?month=7&shift_type=25&year=2009&_piref815_525408_815_492858_492869.submit=Show&_piref815_525406_815_492858_525203.submit=Show

Analysis Operations

- A new Computing Level 2 led by Frank Wuerthwein and Stefano Belforte
  - Service credit opportunities
  - Help improve the efficiency of analysis and become expert in the distributed computing systems

Recent Computing Activities: STEP-09

Scale Testing of the Experimental Program (STEP-09) Just Finished

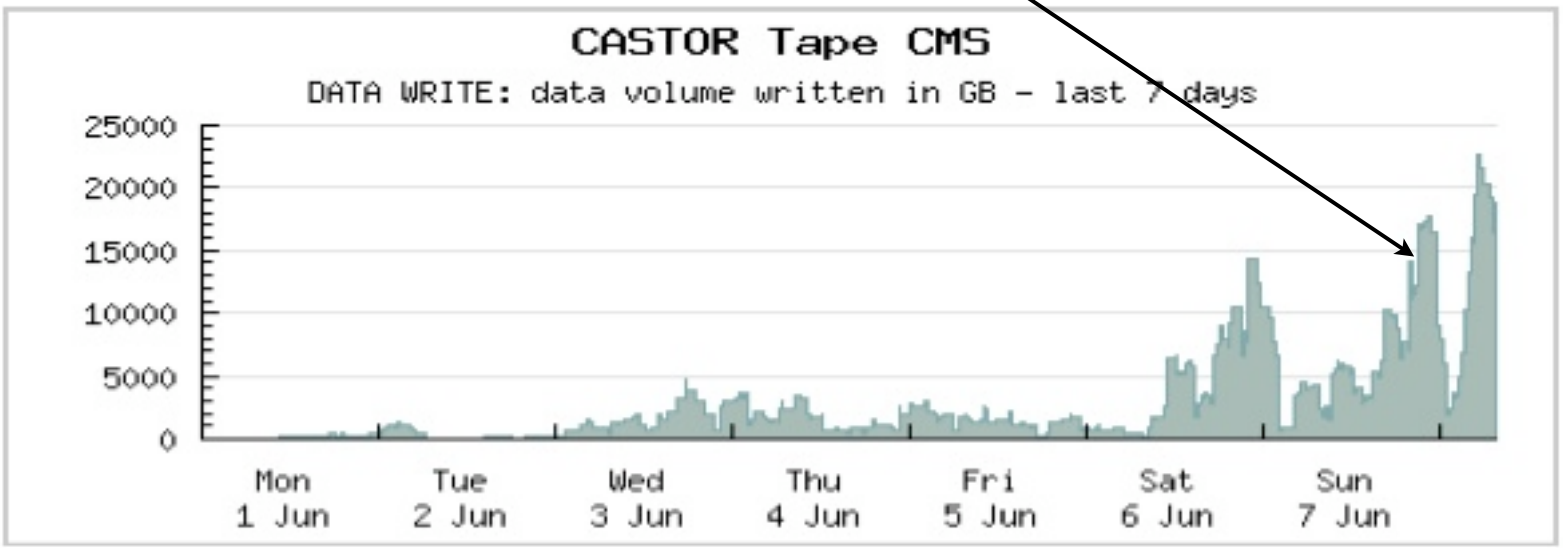
- Organized by Oliver Gutsche and Daniele Bonacorsi
- Overlapped with ATLAS between June 2nd and June 12
- Concentrating on testing services that haven't been exercised or haven't been tested with interference from other VOs
- At CERN
  - Concentrating on mass storage writing
  - Priority to cosmic running
- At Tier-1s
  - Writing and reading from Tape
  - Tier-1 to Tier-1 transfers
  - Utilizing the processing resources available
- At Tier-2s
  - Utilizing half of the resources for analysis

Tier-0

CASTOR at CERN has been performing well during the test

- Not clear we're only using the CMS share of the available drives
  - But reached goals while overlapping with ATLAS
- But the rate to and from tape is very good.
- CMS Goal was 600MB/s to tape, which has been exceeded for bursts

1.5GB/s to tape



Tier-1s

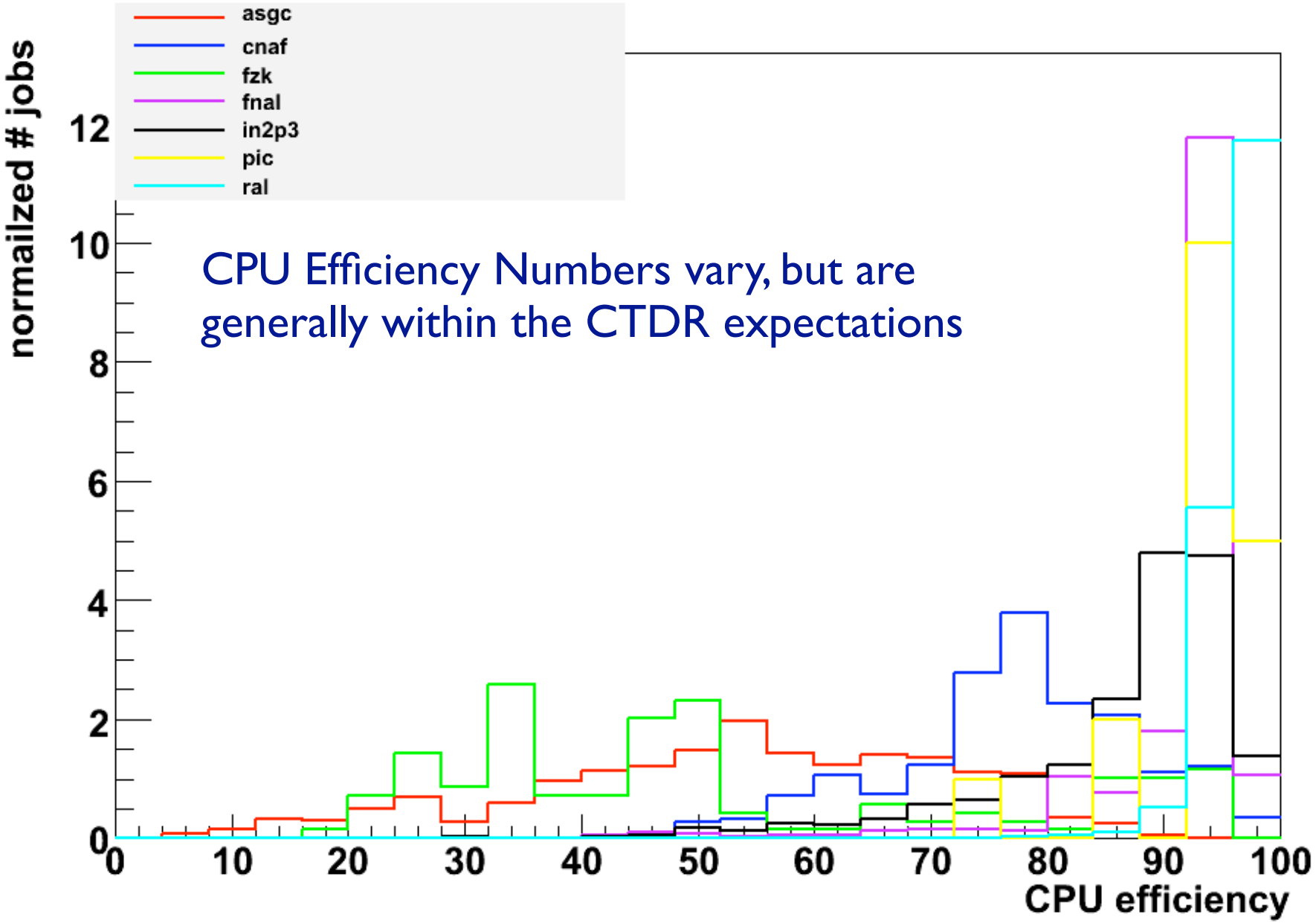
All the Tier-1s Participated in the challenge

- One of the major Tier-1 goals was recovery of data from tape.
- Reassuring that after some effort most sites hit the targets.

FZK	Done (?)	~140 MB/s, peak 240 MB/s	Aggregated over all CMS activities
PIC	Done	120 MB/s	
CCIN2P3	Done	103 MB/s	
CNAF	Done	240 MB/s	
ASGC	Done	220 MB/s	Two samples staged in (12 TB)
RAL	Done	180 MB/s	
FNAL	Done	400 MB/s	

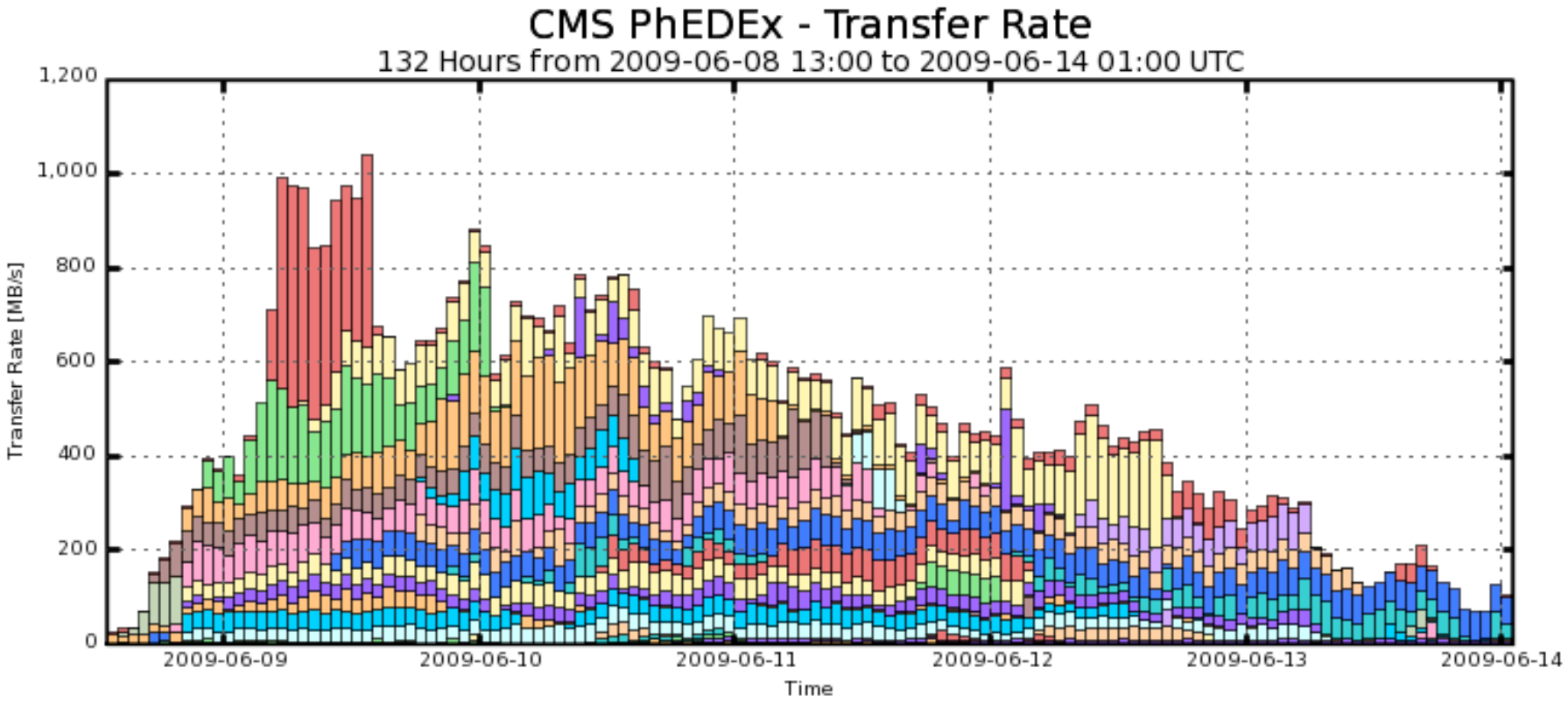
- Also goal to use all the batch slots for Reconstruction

CPU Efficiency



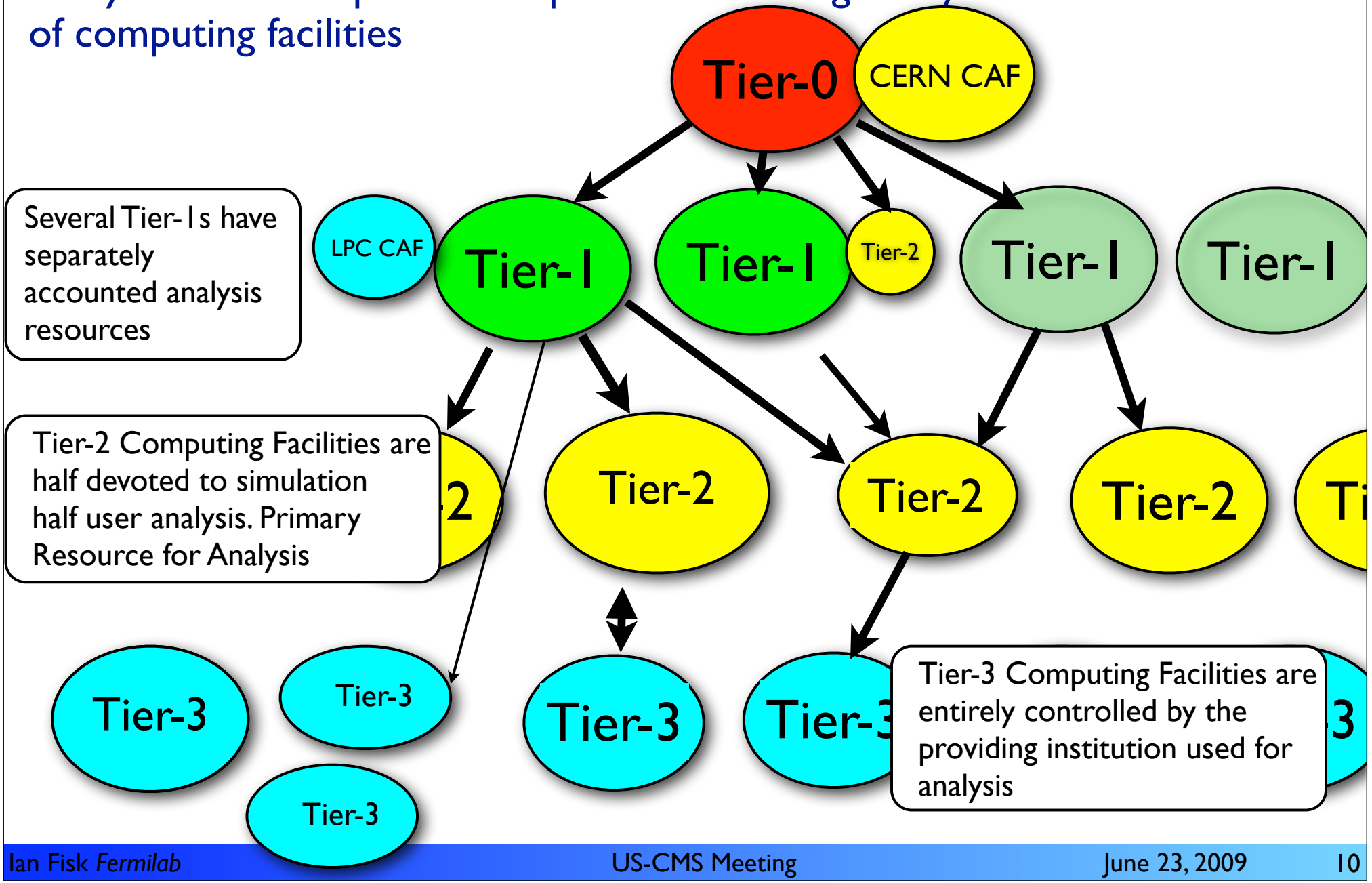
CPU Efficiency Numbers vary, but are generally within the CTDR expectations

FNAL Exports During STEP



Analysis Model in CMS (1/3)

Analysis in CMS is performed performed on a globally distributed collection of computing facilities



Analysis Model in CMS (2/3)

In CMS jobs go to the data.

- A nominal Tier-2 has 200TB of disk

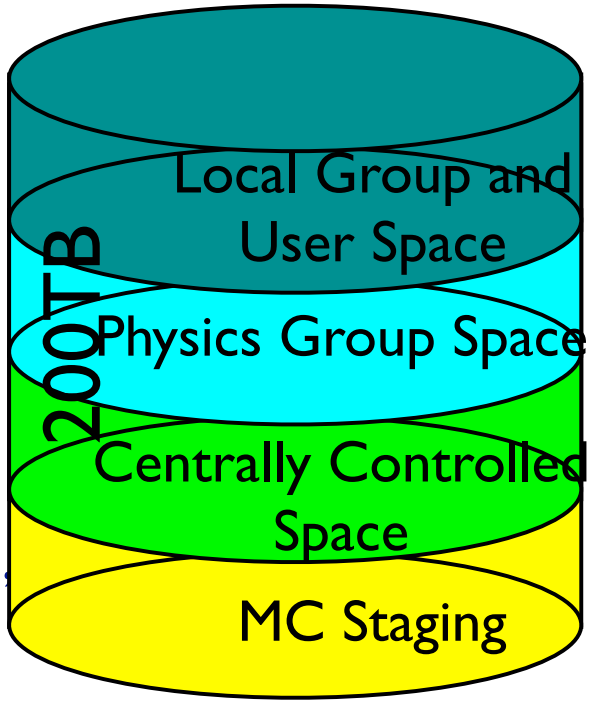
30 TB of space at each site is identified for DataOps

- We expect to be able to host most of the RECO data used in the first year

30TB is identified for use by the local group

- Local community controlled space

20TB is identified for storing user produced files and making them grid accessible



Remaining space was divided into analysis group "slots"

- The largest a nominal Tier-2 supports is 3 groups
- 17 groups in CMS
- Between the 7 US Tier-2s we support all groups

Analysis Model in CMS (3/3)

The US has a good balance of analysis group support

- In general CMS is concentrating on the groups responsible for commissioning and validation in the first year

Level of space usage varies, but activity is ramping up

Data Ops uses 406TB at Tier2s for central space. (2.7PB at Accounted at Tier-1s)

- B-Phys 7.5TB
- B-Tagging 42TB
- E-gamma 49TB
- EWK 256TB
- Exotica 47TB
- Forward 27TB
- Higgs 51TB
- Jets 31TB
- Muon 306TB
- QCD 32TB
- SUSY 82TB
- Tau/pflow 57TB
- Top 127TB
- Tracker 168TB
- Trigger 46TB

T2_US_UCSD Group Usage

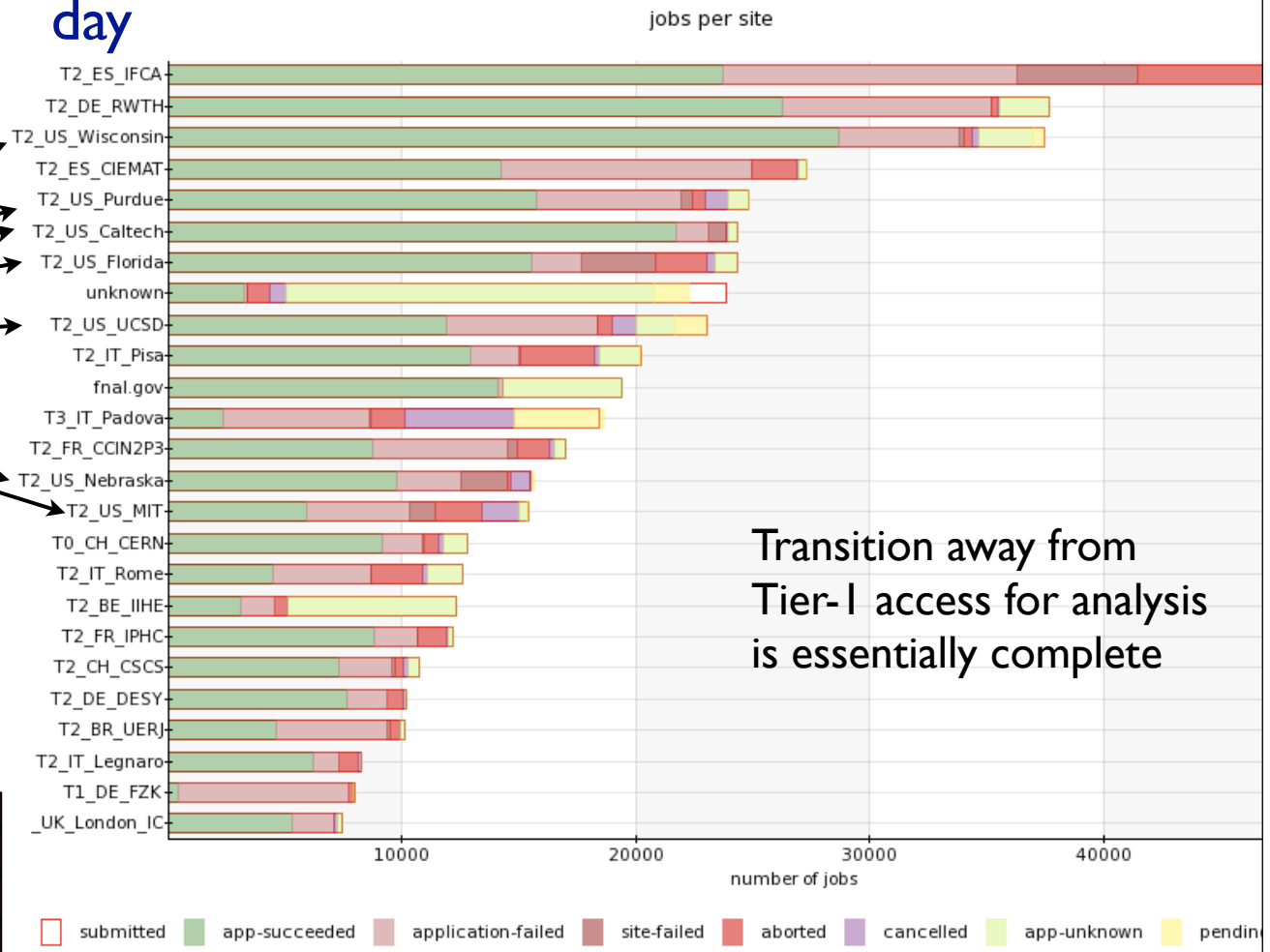
Group	Subscribed	Resident
DataOps	2.08 TB	2.08 TB
e-gamma	50.15 GB	50.15 GB
ewk	71.87 TB	71.58 TB
higgs	4.45 TB	4.45 TB
susy	2.84 TB	2.84 TB
top	16.11 TB	16.08 TB
tracker	3.93 TB	3.93 TB
undefined	14.17 TB	14.04 TB
	115.51 TB	115.06 TB

Usage of Tier-2s for Analysis During STEP

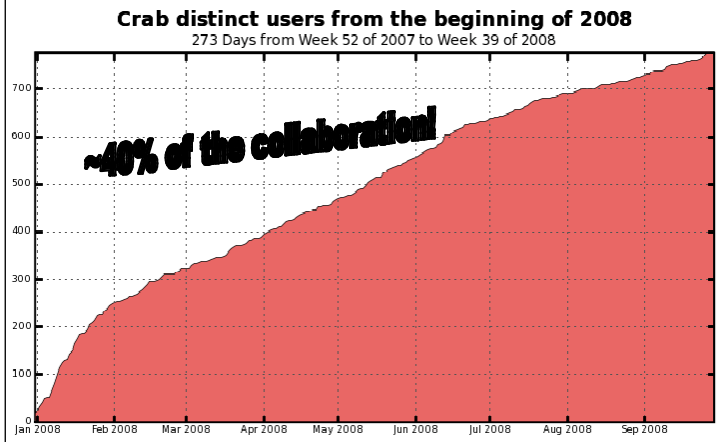
CMS is currently seeing about 40- 50k jobs per day

Analysis
Jobs Submitted in the last Month
Top 25 Sites

US Tier-2 Site



Transition away from Tier-1 access for analysis is essentially complete



Over 800 users have submitted a CRAB job to the international resources

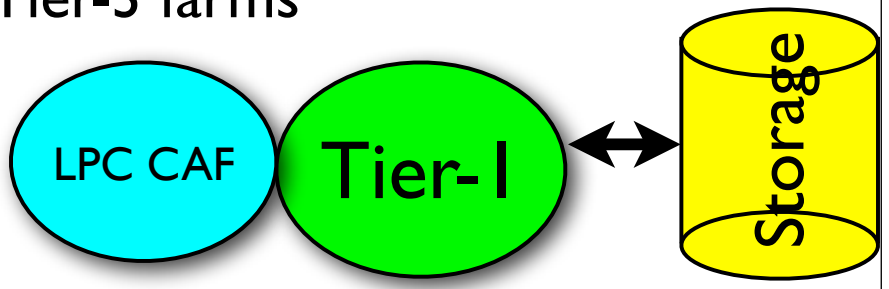
LPC CAF

You are all welcome to get an account on the LPC CAF

- http://www.uscms.org/uscms_at_work/physics/computing/getstarted/getaccount_fermilab.shtml

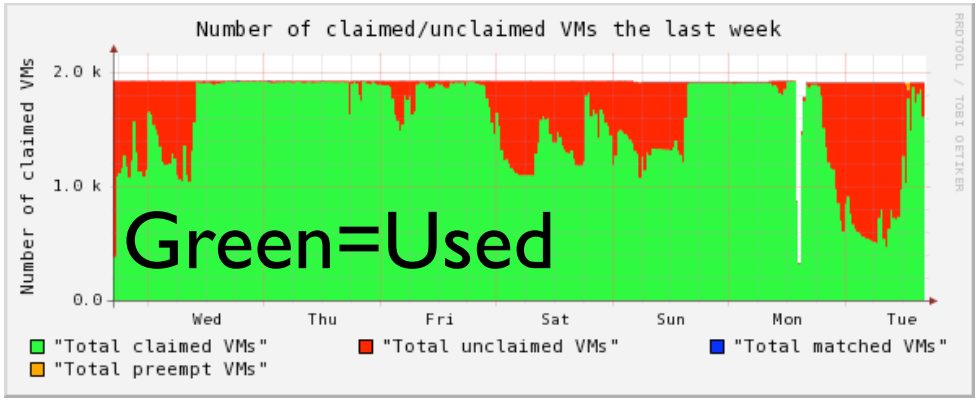
Small interactive farm and 2000 batch slots

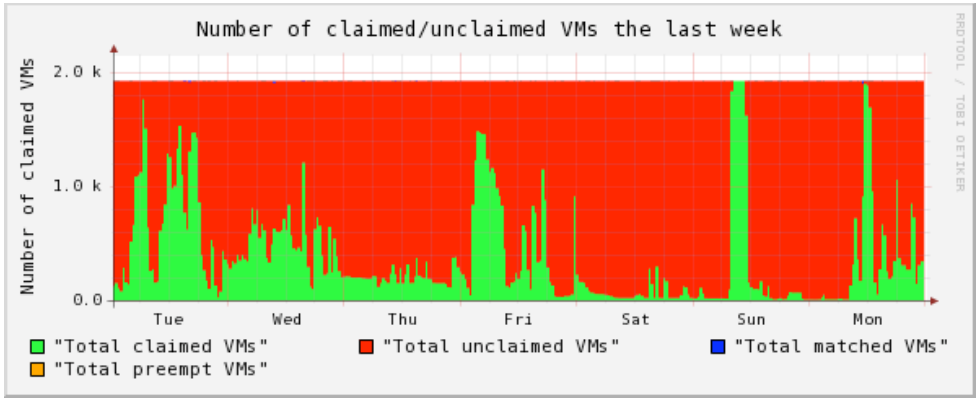
- Not a replacement for using the Tier-2s for analysis
- Nor is is a replacement for dedicated Tier-3 farms
- Broad access to data on the FNAL T1



Reasonable utilization of resources. Still observe dip on the weekend

- Good utilization of user storage with quotas





Tier-3s

The Tier-3s are important analysis resources

- Entirely controlled by the community that provides them
- Minimum to be a registered Tier-3 is a PhEDEx instance for data transfers

A number of DOE Supported institutes responded to the Request for Supplemental Proposals in response to the American Recovery and Reinvestment Act (ARRA) of 2009 to develop Tier-3 facilities

- Tier-3s are an area of growth in CMS. 38 Registered in CMS with 17 in the US

The Project provided some guidance for a "nominal" Tier-3

- Suggested an ~$100k configuration
  - 16 worker nodes
  - 3 server systems
  - 25TB of space
- Intention was 4-8 people supported

Tier-3s

About half the of US Tier-3s have registered with Open Science Grid

- Provides a convenient way to get the Storage Element interface for incoming files
- The Computing element interface can allow incoming grid jobs to access the local data
  - Also gives computing an interface to install the CMS software centrally
  - Would be an interface to support opportunistic production of MC

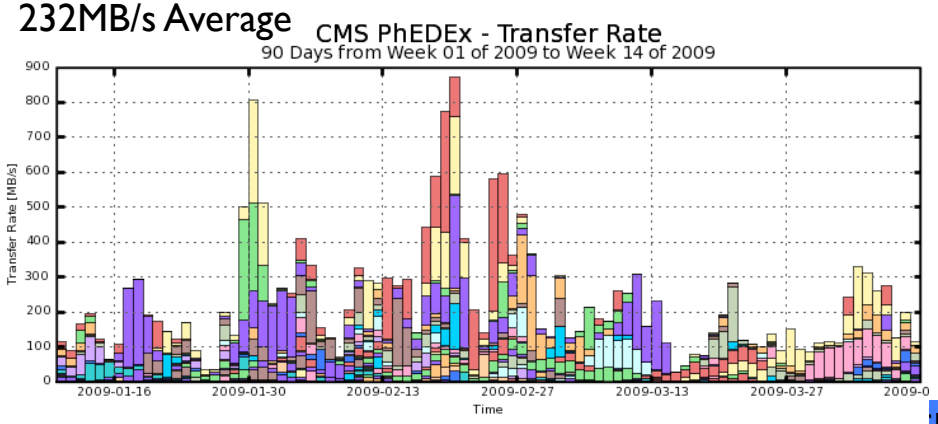
Currently the Tier-3s can receive data from anywhere

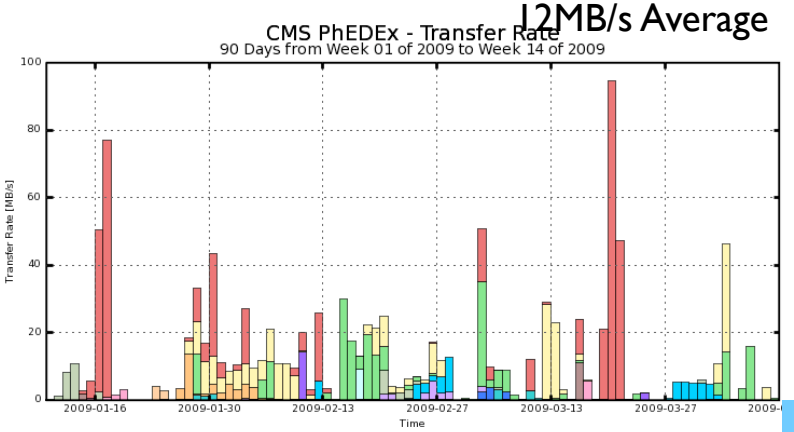
- Assumes they remain a low impact on the total system

Tier-1 -> Tier-2:
40 Tier-2 Destinations
872MB/s Max
232MB/s Average

Transfer Rate from T1
for the last quarter

Tier-1 -> Tier-3:
18 Tier-3 Destinations
95MB/s Max
12MB/s Average





Software Activities

US-CMS is heavily involved in a number of core software areas

- Framework
- Visualization
- Calibration and Geometry
- Looking forward to the release of CMSSW_3_1_0 soon

Also heavily involved in Data Management WorkFlow Management (DMWM)

- Includes on contributions to Workflow efforts (ProdAgent and CRAB)
- Data Management work in the Dataset Bookkeeping System (DBS)
- A couple interesting cases of incorporating student effort
  - Workflow and DBS have both used interested students
    - Helpful for us and good training