



# Data Distribution

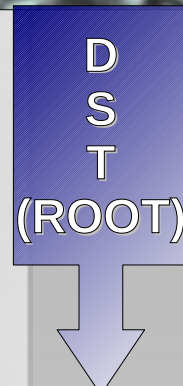
0.6 million CPU hours  $\Rightarrow$   $\sim$ 280 slots needed constantly for three months



- Simulation +
- Reconstruction +
- Tape storage



clashps:: prod. account on ifarm





$\sim$ 13 TB of output  
Expected for the  
Mock  
Data Challenge


*DSTs are produced as part of the reconstruction process.*

Transfers accomplished using  $\rightarrow$  passwordless transfers from JLAB clashps account to hpdatsrv account on SLAC transfer machine using ssh keys.

Transfer machine:  
bbr-xfer14



30 TB disk:  
/nfs/slac/g/hps3



# JLAB HPS Production Spaces

- /u/home/clashps has 2GB, backed up
  - /u/group/hps has 20GB (backed up) and is visible from **ifarm** and **jlabl** machines
- } For production releases and scripts.
- /work/clas/clashps: 1TB of permanent (but not backed up)
    - export buffer
  - /volatile/clas/clashps: 1TB for data staging
    - Note: This is 1TB reserved and 5 TB quota

*These two above are only visible from ifarm machines.*

Management of this space is typically done through FX.

```
scp -p clas12run@clonusr3:/misc/work/hps/hps_\*dat /volatile/clas/clashps/data/
```



HPS raw data (EVIO)  
first arrives here

# Access to JLAB production account (clashps)

```
ifarm1102> getent group clashps  
clashps:*:936:weygand,clashps,desnault,fxgirod,ngra  
f,mgraham,homer,sarahp,omoreno,tvm,stepanya,boi  
arino,holtrop,hovanes,ungaro,uemura,mskolnik,gcha  
rles
```

*Our contact, FX, at JLAB is in charge of managing the clashps group.*

# Passwordless scp transfer of data to SLAC transfer server:

```
scp -v -q -p  
/volatile/clas/clashps/data/<slcio file of reconstruction output>  
hpdatsrv@bbr-xfer14.slac.stanford.edu:/hps/data/MDC/recon/
```

```
scp -v -q -p  
/volatile/clas/clashps/data/<root file of DST output>  
hpdatsrv@bbr-xfer14.slac.stanford.edu:/hps/data/MDC/DST/
```

An example script exists:

```
~clashps/exporthpsreclcio.sh
```

Simple adjustments needed for use for MDC and executed as a cron job.

Any new production output would be transferred to SLAC automatically.

- /hps/data/MDC/ is a staging area for data imports.
- By default, new files written there are staged out to HPSS (tape silo). Accessible through xrootd using:  
`xrdcp root://sccs02//hps/data/...`
- Files there have to be copied to the HPS data disk storage area:  
`/nfs/slac/g/hps3`

**Note:** *I believe that I am the only ~HPS person that currently has access to the hpdatsrv account. Please contact Grace Tsai to adjust this. The SLAC expert assisting with this is Wilko Kroeger.*

# Data Access

- In the SLAC SRS Data Catalog system:

## ***HPS Data Catalog***

- A system for seeing what data is available with facilities for:
  - ➔ adding&viewing metadata
  - ➔ indicating quality
  - ➔ downloading data directly or making lists of paths to the data

# HPS Data Catalog Entry Insertion

```
ifarm1102> ssh homer@noric34.slac.stanford.edu "~srs/datacat/prod/datacat registerDataset --group  
HPS --define nEvt=500212 --site SLAC slcio demo/DST/simulation  
/nfs/slac/g/hps3/data/testrun/runs/recon_new/hps_001351_recon.slcio"
```

homer@noric34.slac.stanford.edu's password:

Adding files to Data Catalog:

Site Name Type Location

SLAC hps\_001351\_recon slcio /nfs/slac/g/hps3/data/testrun/runs/recon\_new/hps\_001351\_recon.slcio

INFO: 1 dataset registerd.

*Note: An account with passwordless access will be needed for this. The hpdatsrv account can not be used for this.*

The screenshot shows the HPS Data Catalog web interface. The browser address bar is `srs.slac.stanford.edu/DataCatalog/?experiment=HPS`. The page title is "HPS Data Catalog" and the version is 1.10. The user is logged in as "homer". The project is "CDMS | CTA | EXO | SID | HPS | LSST-CAMERA | LSST-DESC | SCA | SRS | SSRL". The mode is "Prod". The view is "Tree". The left sidebar shows a folder tree with "demo" expanded to "DST" to "simulation" to "HPS". The main content area shows a search for "HPS" in the "demo/DST/simulation" folder, resulting in one item found:

Name	Type	Format	Run Min	Run Max	Events	Size	Status	Created (UTC)
hps_001351_recon	SLCIO	slcio	0	0	0	0 B	MISSING	01-Jan-1970 00:00:00

The screenshot shows the HPS Data Catalog web interface displaying the details of the dataset "hps\_001351\_recon". The browser address bar is `srs.slac.stanford.edu/DataCatalog/?experiment=HPS`. The page title is "HPS Data Catalog" and the version is 1.10. The user is logged in as "homer". The project is "CDMS | CTA | EXO | SID | HPS | LSST-CAMERA | LSST-DESC | SCA | SRS | SSRL". The mode is "Prod". The view is "Tree". The left sidebar shows a folder tree with "demo" expanded to "DST" to "simulation" to "HPS". The main content area shows the details of the dataset:

Run Min:	0
Run Max:	0
Events:	0
Size:	0 B
Format:	slcio
Type:	SLCIO
Source:	LINEMODE CLIENT
Task:	
Links:	Download History

Meta-data

Name	Value	Type
nEM	500212	NUMBER

Location

Site	Status	Checked (UTC)	Location
SLAC	MISSING	16-Jan-2014 00:51:02	/nfs/slac/g/hps3/data/testrun/runs/recon_new/hps_001351_recon.slcio

# HPS Data Catalog

Version: 1.10

User: homer . (Switch|Logout)

Project: CDMS | CTA | EXO | SiD | HPS | LSST-CAMERA | LSST-DESC | SCA | SRS | SSR

Mode: [ Prod | Dev ]

View: [ Tree . Data Types . File Formats . Messages . Admin . Problems ]

## Folders

- CTA
- DetMC
- DetMC\_data
- ILC
- demo
  - DST
    - simulation
      - HPS

Run Min  Max  Status: not OKMET Start  Stop 

Filter Clear

## Folder /demo/DST/simulation Group HPS

One item found.

1

	Name	Type	Format	Run Min	Run Max	Events	Size	Status	Created (UTC)
<input type="checkbox"/>	hps_001351_recon	SLCIO	slcio	0	0	0	0 B	MISSING	01-Jan-1970 00:00:00

Select all . Deselect all . Toggle Selection . Download Selected Files

FoxyProxy: Disabled

# HPS Data Catalog

Version: 1.10

User: homer . (Switch|Logout)

Project: CDMS | CTA | EXO | SiD | HPS | LSST-CAMERA | LSST-DESC | SCA | SRS | SSR

Mode: [ Prod | Dev ]

View: [ Tree . Data Types . File Formats . Messages . Admin . Problems ]

## Folders

- CTA
- DetMC
- DetMC\_data
- ILC
- demo
  - DST
    - simulation
      - HPS

Run Min: 0

Run Max: 0

Events: 0

Size: 0 B

Format: slcio

Type: SLCIO

Source: LINEMODE CLIENT

Task:

Links [Download History](#)

## Meta-data

Name	Value	Type
nEvt	500212	NUMBER

## Location

Site	Status	Checked (UTC)	Location
SLAC	MISSING	16-Jan-2014 00:51:02	/nfs/slac/g/hps3/data/testrun/runs/recon_new/hps_001351_recon.slcio

FoxyProxy: Disabled



# HPS Data Catalog & the Crawler

```
ifarm1102> whoami
clashps
ifarm1102> ssh homer@noric34.slac.stanford.edu "~srs/datacat/prod/datacat registerDataset --group HPS --site SLAC
slcio demo/DST/simulation /nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_0_recon.slcio"
homer@noric34.slac.stanford.edu's password:
Adding files to Data Catalog:
Site Name Type Location
SLAC hps_001362_evio_0_recon slcio /nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_0_recon.slcio
INFO: 1 dataset registerd.
```

```
ifarm1102> ssh homer@noric34.slac.stanford.edu "~srs/datacat/prod/datacat registerDataset --group HPS --site SLAC
slcio demo/DST/simulation /nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_1_recon.slcio"
homer@noric34.slac.stanford.edu's password:
Adding files to Data Catalog:
Site Name Type Location
SLAC hps_001362_evio_1_recon slcio /nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_1_recon.slcio
INFO: 1 dataset registerd
```

```
ifarm1102> ssh homer@noric34.slac.stanford.edu "~srs/datacat/prod/datacat registerDataset --group HPS --site SLAC
slcio demo/DST/simulation /nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_2_recon.slcio"
homer@noric34.slac.stanford.edu's password:
Adding files to Data Catalog:
Site Name Type Location
SLAC hps_001362_evio_2_recon slcio /nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_2_recon.slcio
INFO: 1 dataset registerd.
```

# HPS Data Catalog & the Crawler

Version: 1.10  
User: homer . (Switch|Logout)  
Project: CDMS | CTA | EXO | SID | HPS | LSST-CAMERA | LSST-DESC | SCA | SRS | SSR  
Mode: [ Prod | Dev ]  
View: [ Tree . Data Types . File Formats . Messages . Admin . Problems ]

6 items found, displaying all items.

Name	Type	Format	Run Min	Run Max	Events	Size	Status	Created (UTC)
<input type="checkbox"/> hps_001362_evio_2_recon	SLCIO	slcio	0	0	0	0 B	UNSCANNED	
<input type="checkbox"/> hps_001362_evio_1_recon	SLCIO	slcio	0	0	0	0 B	UNSCANNED	
<input type="checkbox"/> hps_001362_evio_0_recon	SLCIO	slcio	0	0	0	8.6 GB	OK	18-Apr-2013 21:42:27
<input type="checkbox"/> hps_001352_recon	SLCIO	slcio	0	0	0	0 B	MISSING	01-Jan-1970 00:00:00
<input type="checkbox"/> hps_001351_recon	SLCIO	slcio	0	0	0	0 B	MISSING	01-Jan-1970 00:00:00
<input type="checkbox"/> hps_001351_evio_0_recon	SLCIO	slcio	0	0	0	5.5 GB	OK	18-Apr-2013 22:05:11

Select all . Deselect all . Toggle Selection . Download Selected Files

Version: 1.10  
User: homer . (Switch|Logout)  
Project: CDMS | CTA | EXO | SID | HPS | LSST-CAMERA | LSST-DESC | SCA | SRS | SSR  
Mode: [ Prod | Dev ]  
View: [ Tree . Data Types . File Formats . Messages . Admin . Problems ]

Run Min  Max  Status: OK  
MET Start  Stop   
Filter Clear

Folder /demo/DST/simulation Group HPS

4 items found, displaying all items.

Name	Type	Format	Run Min	Run Max	Events	Size	Status	Created (UTC)
<input type="checkbox"/> hps_001362_evio_2_recon	SLCIO	slcio	0	0	0	7.6 GB	OK	18-Apr-2013 21:32:44
<input type="checkbox"/> hps_001362_evio_1_recon	SLCIO	slcio	0	0	0	8.6 GB	OK	18-Apr-2013 21:35:48
<input type="checkbox"/> hps_001362_evio_0_recon	SLCIO	slcio	0	0	0	8.6 GB	OK	18-Apr-2013 21:42:27
<input type="checkbox"/> hps_001351_evio_0_recon	SLCIO	slcio	0	0	0	5.5 GB	OK	18-Apr-2013 22:05:11

Select all . Deselect all . Toggle Selection . Download Selected Files

The Crawler will check if the file exists and report to the catalog if the file was found and its size and creation date.

# HPS Data Catalog

Version: 1.10

User: homer . (Switch|Logout)

Project: [CDMS](#) | [CTA](#) | [EXO](#) | [SiD](#) | [HPS](#) | [LSST-CAMERA](#) | [LSST-DESC](#) | [SCA](#) | [SRS](#) | [SSRL](#)

Mode: [ [Prod](#) | [Dev](#) ]

View: [ [Tree](#) . [Data Types](#) . [File Formats](#) . [Messages](#) . [Admin](#) . [Problems](#) ]

## Folders

- CTA
- DetMC
- DetMC\_data
- ILC
- demo
  - DST
    - simulation
      - HPS

6 items found, displaying all items.

	Name	Type	Format	Run Min	Run Max	Events	Size	Status	Created (UTC)
<input type="checkbox"/>	<a href="#">hps_001362_evio_2_recon</a>	SLCIO	slcio	0	0	0	0 B	UNSCANNED	
<input type="checkbox"/>	<a href="#">hps_001362_evio_1_recon</a>	SLCIO	slcio	0	0	0	0 B	UNSCANNED	
<input type="checkbox"/>	<a href="#">hps_001362_evio_0_recon</a>	SLCIO	slcio	0	0	0	8.6 GB	OK	18-Apr-2013 21:42:27
<input type="checkbox"/>	<a href="#">hps_001352_recon</a>	SLCIO	slcio	0	0	0	0 B	MISSING	01-Jan-1970 00:00:00
<input type="checkbox"/>	<a href="#">hps_001351_recon</a>	SLCIO	slcio	0	0	0	0 B	MISSING	01-Jan-1970 00:00:00
<input type="checkbox"/>	<a href="#">hps_001351_evio_0_recon</a>	SLCIO	slcio	0	0	0	5.5 GB	OK	18-Apr-2013 22:05:11

[Select all](#) [Deselect all](#) [Toggle Selection](#) [Download Selected Files](#)

I had just inserted these entries.

# HPS Data Catalog

Version: 1.10

User: homer . (Switch|Logout)

Project: [CDMS](#) | [CTA](#) | [EXO](#) | [SiD](#) | [HPS](#) | [LSST-CAMERA](#) | [LSST-DESC](#) | [SCA](#) | [SRS](#) | [SSRL](#)

Mode: [ [Prod](#) | [Dev](#) ]

View: [ [Tree](#) . [Data Types](#) . [File Formats](#) . [Messages](#) . [Admin](#) . [Problems](#) ]

## Folders

- CTA
- DetMC
- DetMC\_data
- ILC
- demo
  - DST
    - simulation
      - HPS

Run Min  Max  Status:

MET Start  Stop

## Folder /demo/DST/simulation Group HPS

4 items found, displaying all items.

	Name	Type	Format	Run Min	Run Max	Events	Size	Status	Created (UTC)
<input type="checkbox"/>	<a href="#">hps_001362_evio_2_recon</a>	SLCIO	slcio	0	0	0	7.6 GB	OK	18-Apr-2013 21:32:44
<input type="checkbox"/>	<a href="#">hps_001362_evio_1_recon</a>	SLCIO	slcio	0	0	0	8.6 GB	OK	18-Apr-2013 21:35:48
<input type="checkbox"/>	<a href="#">hps_001362_evio_0_recon</a>	SLCIO	slcio	0	0	0	8.6 GB	OK	18-Apr-2013 21:42:27
<input type="checkbox"/>	<a href="#">hps_001351_evio_0_recon</a>	SLCIO	slcio	0	0	0	5.5 GB	OK	18-Apr-2013 22:05:11

[Select all](#) [Deselect all](#) [Toggle Selection](#) [Download Selected Files](#)

List only OK files.

← files found

# HPS Data Catalog File Listing

Applications Raccourcis Système -1 °C 17:58

HPS Data Catalog - HPS Data Catalog - Mozilla Firefox

File Edit View History Bookmarks Tools Help

HPS Data Catalog - HPS Data Ca...

srs.slac.stanford.edu/DataCatalog/?experiment=HPS

Most Visited Home Getting Started - LSS... CCS preliminary de... LSST Trac Récents - Google Dr... The BaBar Homepage Heavy Photon Search...

## HPS Data Catalog

Version: 1.10  
User: homer . (Switch|Logout)

Project: [CDMS](#) | [CTA](#) | [EXO](#) | [SID](#) | [HPS](#) | [LSST-CAMERA](#) | [LSST-DESC](#) | [SCA](#) | [SRS](#) | [SSRL](#)

Mode: [ [Prod](#) | [Dev](#) ]

View: [ [Tree](#) . [Data Types](#) . [File Formats](#) . [Messages](#) . [Admin](#) . [Problems](#) ]

### Folders

- CTA
- DetMC
- DetMC\_data
- ILC
- demo
  - DST
    - simulation
      - HPS

### Folder /demo/DST/simulation Group HPS

```
/nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001351_evio_0_recon.slcio  
/nfs/slac/g/hps3/data/testrun/runs/recon_new/hps_001351_recon.slcio  
/nfs/slac/g/hps3/data/testrun/runs/recon_new/hps_001352_recon.slcio  
/nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_0_recon.slcio  
/nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_1_recon.slcio  
/nfs/slac/g/hps3/data/testrun/runs/dcat/hps_001362_evio_2_recon.slcio
```

FoxyProxy: Disabled

Fref... Gno... HPS ... Dém...

# Access to SLAC Computing Resources

The screenshot shows a Confluence page titled "Obtaining a SLAC account" within the "Heavy Photon Search Group" space. The page provides instructions for users to register for SLAC resources and obtain a Unix account. It includes a navigation sidebar, a main content area with text and links, and a detailed form titled "SLAC Computer Account Form".

**Search/Navigation:**

- Physics
- HPS Collaboration
- Operations
  - JLAB registration and obtaining a JLAB account
  - Obtaining a SLAC account
  - HPS Test Run
- HPS Detector
- Computing and Software
- Project Management

**Related:**

- SLAC/PPA
- Jefferson Lab/Hall B

### Obtaining a SLAC account

3 Added by Homer Neal, last edited by Homer Neal on Jan 23, 2014 (view change)

**For access to the SLAC resources, you will need to register with SLAC and obtain at least a unix account.**

**To do that, please do the following steps:**

- Register in the SLAC user information system.
- Obtain a SLAC unix account. (The czars are currently Matt Graham and Homer Neal. Please send the form to either of them for their signature and contact them for any questions.)

Ex:

---

#### SLUO New User Form

**Page 1: Information form for new SLAC USERS and c working on a SLAC Research Activity.**

The following information will help us determine what additional information you need to add to the SLAC user information system. Please contact the SLAC user information system if you have any questions or problems.

#### INITIAL INFORMATION

Name Last (Family)

Are you a SLAC EMPLOYEE who is becoming a SLAC USER  Yes  No

While at SLAC will you be a student or employee of  Institution/School/University  Private Industry  SLAC

Your employment classification

Your work type

#### SLAC Computer Account Form

To request new computing accounts or request changes or cancellation of department computer czar's authorizing signature. **Completed forms** c office located in the Computing Building (050), Room 107. Please provide your signature. \*\*\* Note: Account requests not signed by a computer czar cannot be processed.

**Applicant Information:**

Name (Last, First, Mid Init)

SLAC Location: Building:  Room:  Phone:

Off-site Location: (Off-site users only)

Institution:  Street:

State/Prov:  Zip:  Tele:

New Account Type:  Windows  Unix  Exchange E-mail

SLAC e-mailbox (one only)  MS Exchange  Unix

Existing account change requests:

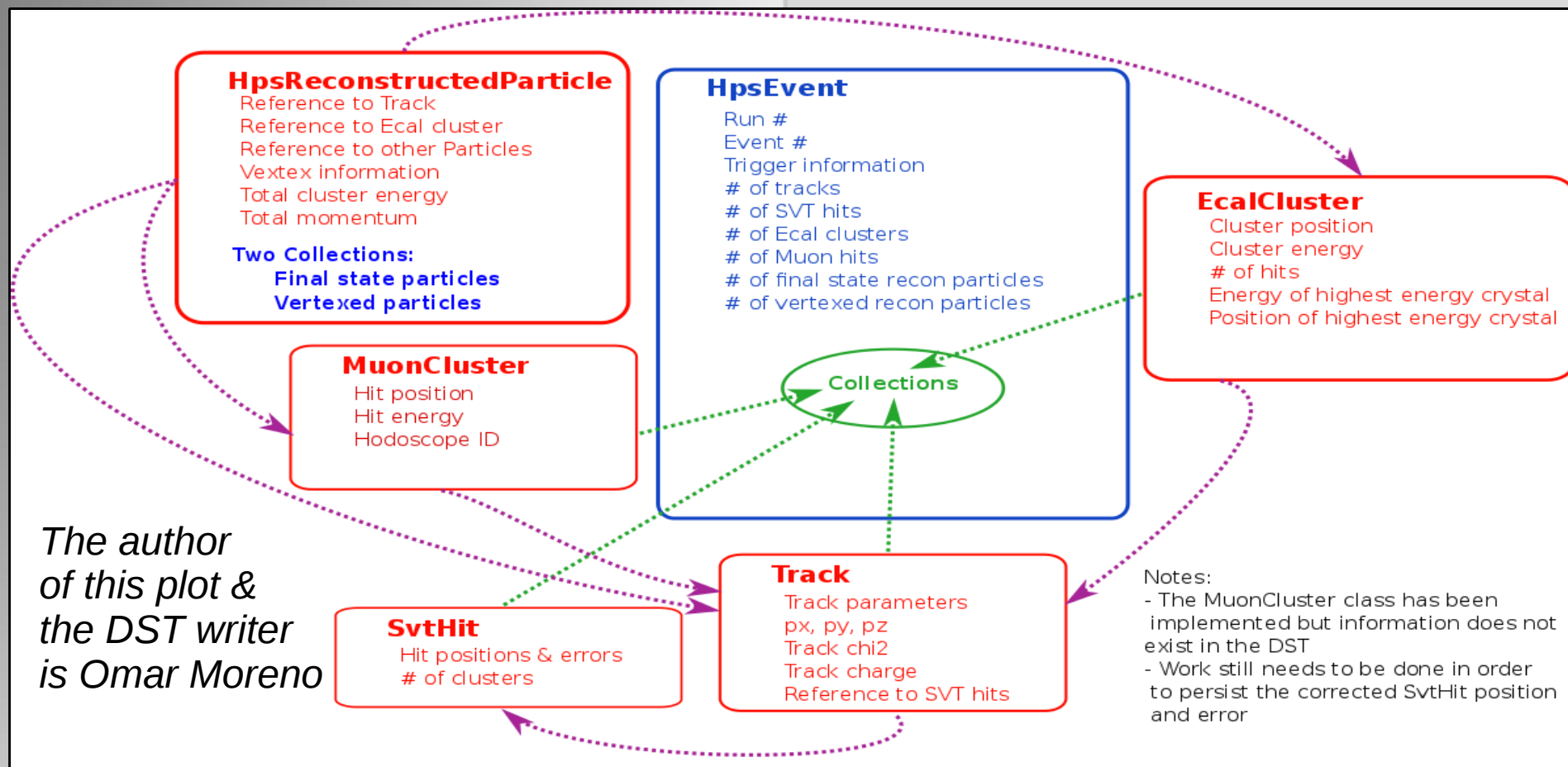
Addl acct        Cancel

Transfer owner - From       To

Requested User ID (3 to 8 characters long)

Powered by Atlassian Confluence 4.3.7, the Enterprise Wiki · Report a bug · Atlassian News

# The HPS DST Format

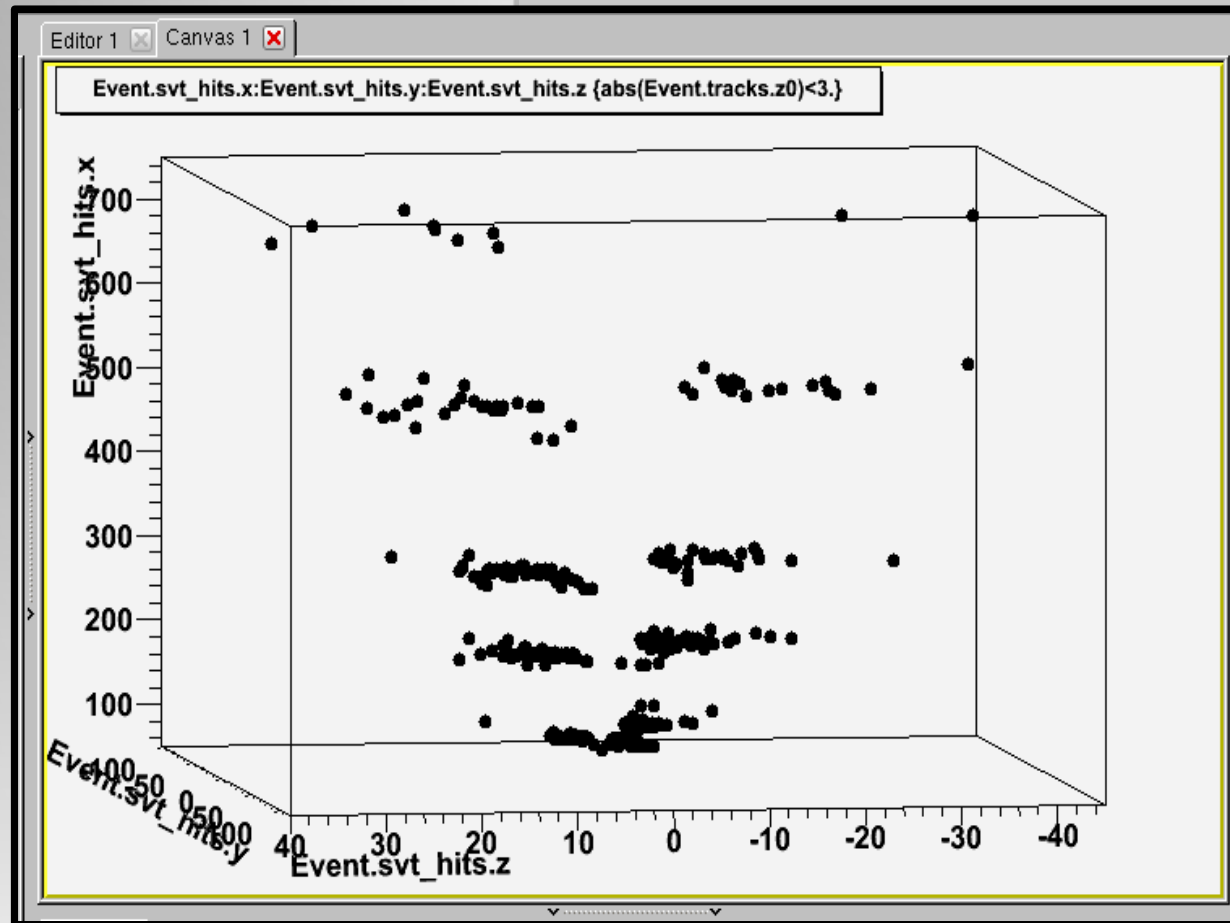


For a guide on how to use it see Omar's page at:  
<https://confluence.slac.stanford.edu/display/hpsg/HPS+Data+Summary+Tapes>

The following are some interactive examples ...

# Making a quick plot using the HPS DST

```
root [47] HPS_Event->SetMarkerStyle(20);  
root [48] HPS_Event->Draw("Event.svt_hits.x:Event.svt_hits.y:Event.svt_hits.z","abs(Event.tracks.z0)<3.");
```



# Real Analysis with the DSTs

- Basic analysis examples are available on the following confluence page:  
<https://confluence.slac.stanford.edu/display/hpsg/HPS+Data+Summary+Tapes>
- This is a good starting point for analyses.



# Summary

- Resources available at JLAB and SLAC for the MDC
- A minor amount of script work needed to auto transfer the slcio and DST files and update the HPS catalog
- DST will be available in ROOT format and are easy to use. See examples provided by Omar to get started.



# Browsing the HPS DST

Using the TBrowse command from ROOT to see the structure:

The image displays two screenshots of the ROOT Object Browser interface. The left screenshot shows the tree structure of an HPS Event, with the 'Event' object expanded to show its members: TObject, tracks, svt\_hits, ecal\_clusters, muon\_clusters, fs\_recon\_particles, vtx\_recon\_particles, event\_number, run\_number, n\_tracks, n\_hits, n\_ecal\_clusters, n\_muon\_clusters, n\_fs\_recon\_particles, n\_vtx\_recon\_particles, and trigger\_bits. The right screenshot shows the same tree structure, but with the 'tracks' object expanded to show its members: fUniqueID, fBits, svt\_hits, n\_hits, px, py, pz, dD, phi, omega, tan\_lambda, z0, chi\_squared, and charge. A histogram titled 'Event.tracks.tan\_lambda' is displayed in the right panel, showing the distribution of the tan\_lambda variable. The histogram has a mean of 0.001726 and an RMS of 0.03865. The x-axis is labeled 'Event.tracks.tan\_lambda' and ranges from -0.15 to 0.1. The y-axis ranges from 0 to 25. A statistics box in the top right corner of the histogram displays the following information:

htemp	
Entries	613
Mean	0.001726
RMS	0.03865

# Scanning values in the HPS DST

```
root [31] HPS_Event->Scan
("Event.tracks.z0:Event.tracks.tan_lambda","Event.tracks.z0>10.");
*****
*   Row   * Instance * Event.tra * Event.tra *
*****
*      8  *      0 * 10.089396 * -0.033867 *
*     29  *      0 * 23.519870 * -0.100035 *
*     50  *      0 * 11.912596 * 0.0091170 *
*     52  *      4 * 12.507448 * -0.027359 *
*     52  *      5 * 16.199352 * -0.045461 *
*     61  *      0 * 30.311225 * -0.129605 *
*     65  *     11 * 10.305232 * -0.028102 *
*     67  *      1 * 22.503559 * -0.074096 *
*     75  *      1 * 10.275684 * -0.033444 *
*     79  *      3 * 12.408655 * -0.052596 *
*     79  *      4 * 17.865940 * -0.047133 *
*     88  *      2 * 13.836064 * -0.053875 *
*     88  *      3 * 11.295079 * -0.081828 *
*     92  *      0 * 10.116567 * -0.059614 *
*    113  *      1 * 10.647219 * 0.0365686 *
*    118  *      0 * 10.838727 * -0.081098 *
*    134  *      0 * 31.822881 * -0.112879 *
*    140  *      4 * 17.993574 * -0.079575 *
*    140  *      6 * 16.415493 * -0.053416 *
*    158  *      4 * 10.280500 * -0.043641 *
*    168  *      5 * 14.319632 * -0.055593 *
*    170  *      1 * 23.455913 * -0.089834 *
*    185  *      5 * 25.864082 * -0.061572 *
*    188  *      8 * 11.057923 * -0.021803 *
*    192  *      0 * 24.503961 * -0.039328 *
```