

Simulation Update

- OSG Production Image Content/Generators/Resources
- CLAS12 @ OSG Computing Resources, Priorities
- OSG Issues
- CLAS12 Tags 5.0: Hipo Output

OSG CLAS12 Container Contents

Docker Container tagged: 4.4.1, "production"

OS: CentoOS8

- > CCDB version: 1.07.00
- > CLHEP version: 2.4.1.3
- > **GEANT4** **version: 4.10.06.p02**
- > QT using system installation
- > XERCESC version: 3.2.3
- > EVIO version: 5.1
- > MLIBRARY version: 1.4
- > SCONS version: 1.9
- > **CLAS12Tag:** version **4.4.1**
- > CLAS12 **MCGEN** Generators (upcoming: versions, currently @1.2)

Available Configurations:





- **rga_spring2018:** RGA spring 2018
- **rga_fall2018:** RGA fall 2018
- **rgk_fall2018_FTOn:** RGA fall 2018, with FT On
- **rgk_fall2018_FTOff:** RGK fall 2018, with FT Off
- **rgb_spring2019:** RGB spring 2019
- **rga_spring2019:** RGA spring 2019

images are tagged @ JLAB docker hub

[clas12software/docker-hub](https://hub.docker.com/r/clas12software/docker-hub)

portal, software development.
clas12tags 5.0 soon

current production

TAG	OS	PULLED	PUSHED
devel		26 minutes ago	3 days ago
production		42 minutes ago	2 months ago
4.4.1		42 minutes ago	2 months ago
4.4.0		3 months ago	5 months ago

Version 4.4.1 (production)

Software versions

- Gemc and clas12 geometry: 4.4.1
- Coatjava (from CVMFS):
 - 6.5.9 (rgb)
 - 6.5.6.1 (rga and rgk)

Release Notes

- gcard configuration change: z limits on tracking changed to 9m from 8m
- new generator: twpoeg
- new requirement for generators: seed option `--seed <integer>` sets a random number that the event generator can use to set the random seed

tags, releases kept
for future reproducibility

CLAS12-MCGEN

a repository that collects (via git submodules) CLAS12 generators git repositories

name	summary description	maintainer	email
clasdis	clas SIDIS MC based on PEPSI LUND MC	Harut Avakian	avakian@jlab.org
claspyth	SIDIS full event generator based on PYTHIA	Harut Avakian	avakian@jlab.org
dvcsген	DVCS/pi0/eta generator based on GPD and PDF parameterizations	Harut Avakian	avakian@jlab.org
genKYandOnePion	KY, pi0P and pi+N	Valerii Klimenko	valerii@jlab.org
inclusive-dis-rad	generates inclusive electron and optionally radiative photon using PDFs	Harut Avakian	avakian@jlab.org
tcsgen	Timelike Compton Scattering	Rafayel Paremuzyan	rafopar@jlab.org
jpsigen	J/Psi	Rafayel Paremuzyan	rafopar@jlab.org
twopeg	pi+pi- electroproduction off protons	Iuliia Skorodumina	skorodum@jlab.org
clas12-elspectro	General electroproduction final states	Derek Glazier	derek.glazier@glasgow.ac.uk

Upcoming (MIT + UCONN): aao_rad aao_norad for single pion electro-production

CLAS12-MCGEN Release Policy Proposals

each tag refers to fixed generator set of tags

clas12-mcgen release 1.9:

JPsiGen@1.1

TCSGen@1.4

clas12-elSpectro@1.2

clasdis@1.0

dvcs-gen@1.3

claspyth@1.0

genKYandOnePion@1.2

inclusive-dis-rad twopeg@3.1

twpeg@1.1

1. Only clas12-mcgen tags to be used
in next OSG container release

2. Proposed clas12-mcgen release
cycle could be 1 month

individual generators

1. Generator authors make a new release whenever they think it's appropriate.
2. The release should contain written documentation on what was changed in the code.
3. The authors communicate the new tag release to the CLAS12 Discourse / clas12_software mailing list.
4. Ideally the authors have some additional tests that mitigate bugs.

[clas12-mcgen repository](#)

OSG Production Image CVMFS Resources

CVMFS Tagged Software and Data

> Coatjava:

- **6.5.9 (rgb)**
- **6.5.6.1 (rga and rgk)**

> CCDB **sqlite** tagged file 4.4.1

> Magnetic **Fields Maps**

> **ROOT**

> **clas12-mcgen**

long term plan:

move c++ libraries
(geant4, gemc, etc) to
CVMFS

100% "module"
environment

(this is also a long term
plan supported by EPSCI)

To use:

modules environment files on [/cvmfs/oasis.opensciencegrid.org/jlab/hallb](https://cvmfs/oasis.opensciencegrid.org/jlab/hallb)

```
module load coatjava/6.5.9
```

```
module load jdk/1.8.0_31
```

```
module load root
```

```
module load mcgen
```

OSG Production Image Resources

XROOTD: Background Merging Files

Server: <xroot://sci-xrootd.jlab.org//osgpool/hallb/>

Files are organized under: `clas12/backgroundfiles/`

`rga_fall2018`

`rga_spring2018`

`tor-1.00_sol-1.00`

`45nA_10604MeV/`

`10k/`

`50nA_10604MeV/`

`55nA_10604MeV/`

`tor+1.00_sol-1.00`

`tor+1.01_sol-1.00`

`rga_spring2019`

`rgb_spring2019`

`rgk_fall2018_FTOff`

`rgk_fall2018_FTOn`

- tree path selectable by drop down menu on portal
- drop down many generated based on directory structure

Accessible interactively

```
bgMerginFilename.sh rga_fall2018 tor-1.00_sol-1.00 45nA_10604MeV
```

will pick a random background file (among 100) to load onto the node and use to be merged

docker / singularity use

Docker can be used to run simulations on a decent laptop / desktop.

Need Docker App and CVMFS installed.

```
docker run -it --rm -v /cvmfs:/cvmfs jeffersonlab/clas12software:production bash
```

Singularity can be used on a local laptop or on the JLAB interactive nodes.

Since the JLAB nodes are very powerful, one can use the singularity images to run simulations and to test / develop software

```
singularity shell --home ${PWD}:/srv --pwd /srv --bind /cvmfs --contain \  
-ipc --pid /cvmfs/singularity.opensciencegrid.org/jeffersonlab/clas12software:production
```

[clas12SoftwarePage](#)

for more details

Offsite Dedicated Resources

OSG Name	Country/Institution	Number of Nodes
INFN-T1	Istituto Nazionale di Fisica Nucleare, Italy	500
UKI-SCOTGRID-GLASGOW	Glasgow University, Scotland	700
GRIF	Grille au service de la Recherche en Ile-de-France, France	500
MIT	Massachusetts Institute of Technology, USA	500
Upcoming: LAMAR	Lamar University, USA	1-200

The process of adding a resource:

- is straightforward
- done mostly by OSG Staff
- minimal requirements:
 - CVMFS, Singularity, Network Access

Easier Options

1. Make it "dedicated" to CLAS12
2. Make it "high priority", but not limited to, CLAS12
3. Make it available to OSG in general

Please contact me if you're interested in adding your institution resources to the CLAS12 project

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MIT	Massachusetts Institute of Technology, USA	500
Upcoming: LAMAR	Lamar University, USA	1-200

We need to make sure that the dedicate resources are fully utilized: their availability and expansion are problematic if they are "idle" most of the times

Current Status:

Testing Flags passed to OSG to prioritize offsite farms

Various OSG problems, unrelated to priorities but affecting them

Offsite High Priority and Opportunistic Resources

OSG Name	Country/Institution	Number of Nodes
UCONN	University of Connecticut, USA	0-2,000
SU	Syracuse University	0-10,000
JLAB	Jefferson Lab, USA	0-1000
OSG	OSG Opportunistic	0-4000



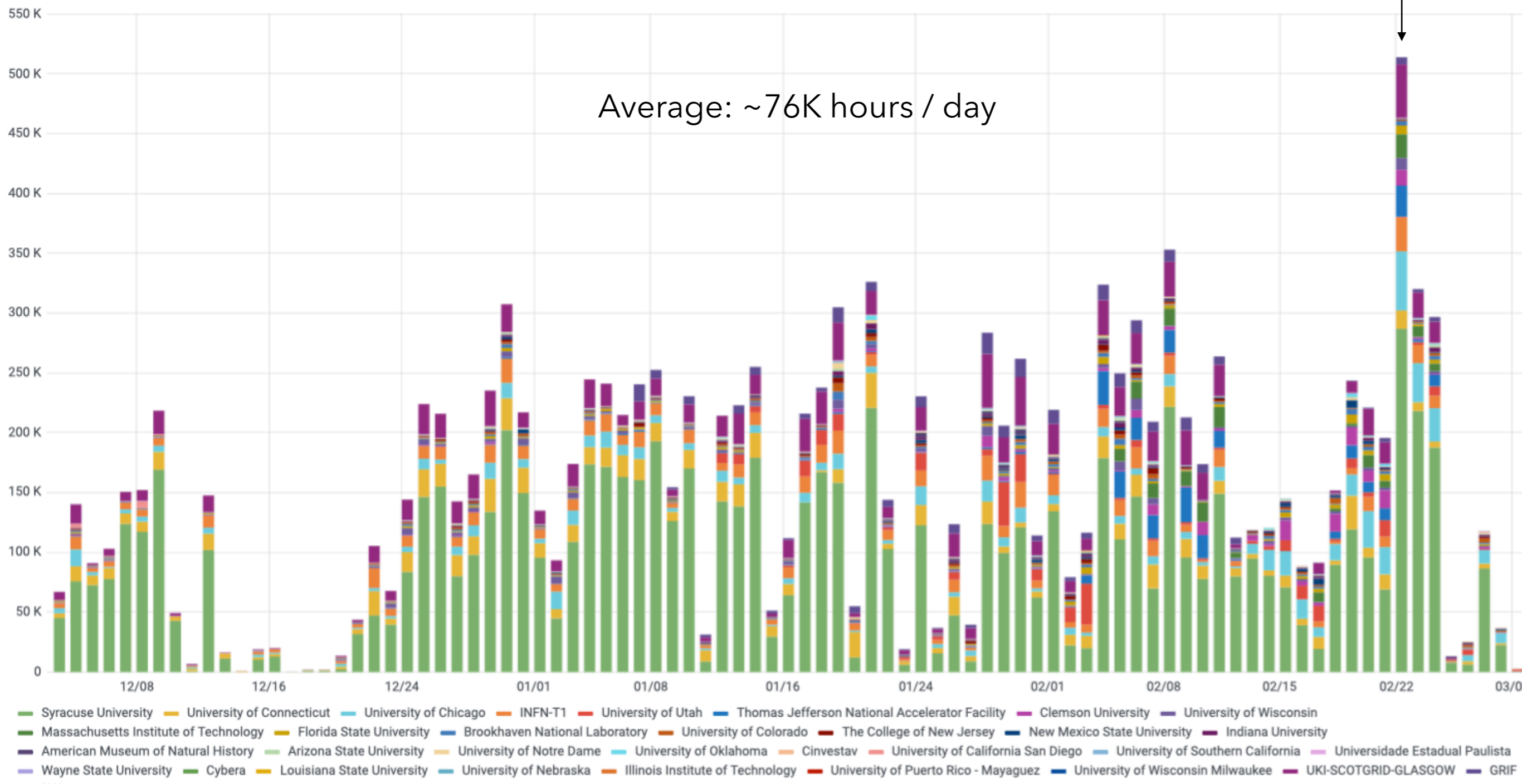
Not dedicated but CLAS12 has high priority on these

Last 90 days usage (March 2021)

Core Hours by Site per 1d

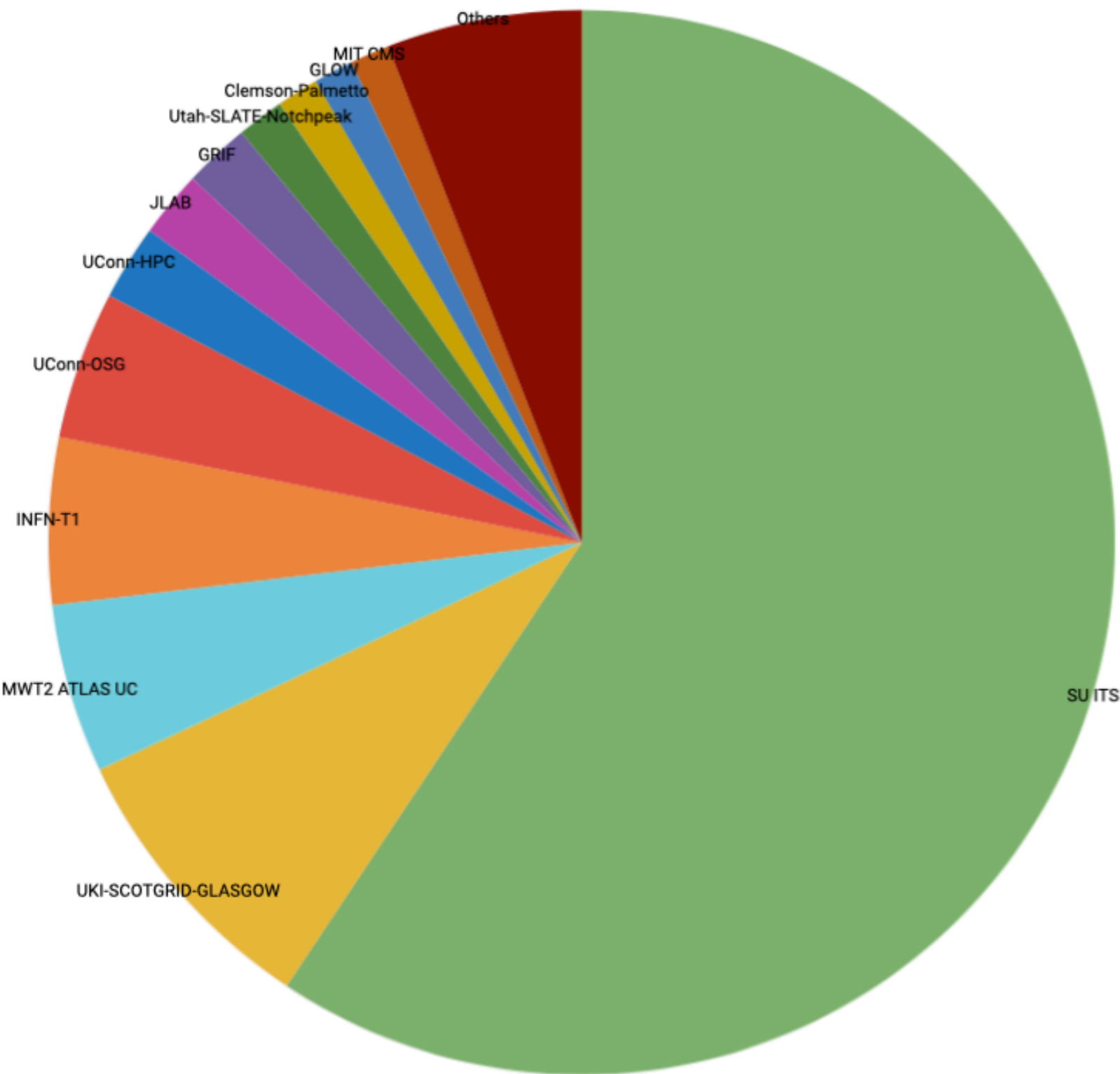
best day: 520K

Average: ~76K hours / day



- Syracuse University
- University of Connecticut
- University of Chicago
- INFN-T1
- University of Utah
- Thomas Jefferson National Accelerator Facility
- Clemson University
- University of Wisconsin
- Massachusetts Institute of Technology
- Florida State University
- Brookhaven National Laboratory
- University of Colorado
- The College of New Jersey
- New Mexico State University
- Indiana University
- American Museum of Natural History
- Arizona State University
- University of Notre Dame
- University of Oklahoma
- Cinvestav
- University of California San Diego
- University of Southern California
- Universidade Estadual Paulista
- Wayne State University
- Cybera
- Louisiana State University
- University of Nebraska
- Illinois Institute of Technology
- University of Puerto Rico - Mayaguez
- University of Wisconsin Milwaukee
- UKI-SCOTGRID-GLASGOW
- GRIF

Last 90 days usage (March 2021)



2021-02-22 00:00:00

Syracuse University:	287 K
University of Connecticut:	15.3 K
University of Chicago:	49.4 K
INFN-T1:	28.3 K
University of Utah:	635
Thomas Jefferson National Accelerator Facility:	25.9 K
Clemson University:	13.3 K
University of Wisconsin:	9.85 K
Massachusetts Institute of Technology:	19.8 K
Florida State University:	7.33 K
Brookhaven National Laboratory:	3.59 K
University of Colorado:	1.17 K
The College of New Jersey:	0
New Mexico State University:	458
Indiana University:	664
American Museum of Natural History:	0
Arizona State University:	0
University of Notre Dame:	162
University of Oklahoma:	0
Cinvestav:	88.9
University of California San Diego:	0
University of Southern California:	35.8
Universidade Estadual Paulista:	197
Wayne State University:	0
Cybera:	76.2
Louisiana State University:	0
University of Nebraska:	0
Illinois Institute of Technology:	11.4
University of Puerto Rico - Mayaguez:	0
University of Wisconsin Milwaukee:	0
UKI-SCOTGRID-GLASGOW:	44.6 K
GRIF:	5.89 K

OSG CLAS12 Users Priority

Priority generally working well:

gangel: 5:1 ration of running jobs to other users

when scosg16 is sluggish the 5:1 ratio may vary quite a bit, we use condor to set priorities

Analysis groups can submit the [Priority Permission Increase Form](#) to increase an account priority.

OSG CLAS12: Portal Issues

Development in collaboration with MIT Group

- Current version of portal being worked on in parallel of a re-write, that will allow CI and better debugging / maintenance
- FAQ added to "About" page
- Wrong LUND address stopped jobs from being submitted (fixed)
- No immediate feedback on jobs submitted. Solution being worked on: adding content in "details" portion (bottom of the page)

Details of current OSG Jobs

user	job id	submitted	total	done	run	idle	hold	osg id
gangel	2454	02/27 09:13	10000	9976	24	0	0	3286370
matthewn	2452	02/26 11:33	1000	999	1	0	0	3286359
gangel	2448	02/26 09:58	10000	9998	2	0	0	3286313

Total for all users: 14598 jobs; 0 completed, 0 removed, 12378 idle, 1903 running, 317 held, 0 suspended



Also, need to fix summary

OSG CLAS12: Portal Issues

Development in collaboration with MIT Group

- Ability to cancel jobs (logged in user only)
- Ability to delete directories (logged in user only)
- Add Exit Codes: unique identifiers for job failures.
 - CVMFS not found (current leading cause of failure)
- Provide feedback on portal/software execution problems
- Testing mitigation of 40K jobs overload on scosg16 with dedicated condor flag (mixed results so far)
- Missing “alarm system” that monitor key quantities to identify possible problems. Currently this is done by observing running jobs and our MYSQL database as often as possible

OSG CLAS12: OSG/JLab Issues

- CVMFS not found on nodes: job failure. Currently using script using submission output logs to identify the nodes and report to OSG. Need a better mechanism. Also, this should never happen but it seems to happen 5-10% of the times.
- Servers failures at JLab or on other sites. This causes:
 - ▶ huge fluctuations in running jobs
 - ▶ no jobs going to dedicated resources
 - ▶ job failures
- Disks failures at JLab: cause jobs not to start (LUND) or not to finish (return disk not available)

Often it is hard to diagnose these problems.

In general, we need help on this. Plan to ask CC.

Clas12Tags: 5.0

In development. ETA sometimes in April

Numbering scheme changes: hipo4 breaks backward compatibility. So this release is "major". Also, from now on we go to two numbers only.

5.0:

- Hipo 4 output. Requires "module load hipo". Detector banks completed, currently working on true information (also relevant for truth matching, see next talk).
- Field information in hipo RUN::config
- Added star "*" to INTEGRATEDDRAW option: -INTEGRATEDDRAW="*" will activate the true info for all sensitive detectors
- pcal and ec hitprocesses merged into one: ecal
- debug informations (controlled by verbosity) for track steps

Questions/Feedback

[CLAS12 Portal](#)

[clas12SoftwarePage](#)

[clas12Tags repository](#)

[clas12-mcgen repository](#)

[clas12 discourse simulation](#)

- Please continue to provide precious feedback/feature requests on the OSG. We will try to address all problems/request as fast as we can.