

HTCondor @ IAC



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Outline

1. Introduction to **HTCondor**
2. HTCondor @ **IAC**: our problems & solutions
3. **ConGUSTo**, our monitoring tool

IAC

The “Instituto de Astrofísica de Canarias (IAC)” is an internationalized Spanish research centre.



It has headquarters and observatories in two islands (Tenerife and La Palma), with over 25 different telescopes, including the biggest optical-infrared telescope in the world at the present time. They are set in an environment of excellent astronomical quality, constituting the European Northern Observatory (ENO)

Condor (HTCondor)

- **HTCondor: HTC (High Throughput Computing) vs HPC (High Performance Computing):** “FlopM”, “FlopY” vs Flops
- HTCondor: **open source** (Apache License, Version 2.0) specialized workload management system for compute-intensive jobs (“**job scheduler**”) developed by the University of Wisconsin-Madison, USA
- Institutions using HTCondor: NASA, CERN, Dreamworks, FermiLab, many Universities and research centers all around the world.
- It can be installed on different OS, hardware, etc: linux, MS Windows, OS X, Solaris... 32/64 bits...



Condor (HTCondor)

- It makes possible to execute codes in a wide set of different and heterogeneous resources: local PCs, Clusters, Supercomputers, Grids, **Clouds**, etc.
- **HTCondor-G**: Mostly for **Grid** and Cloud: pre-WS and WS Globus, Nordugrid ARC, UNICORE and Amazon EC2 (also with other batch systems, like Torque/PBS and LSF). Ex.: LHC Experiment at CERN
- Resources are divided per **slot** (cores): memory, disk, etc. Each slot can execute a job submitted by other users

Condor (HTCondor)

- Advantages also in normal “computers”, like better use of our resources: it makes possible to run your applications in other computers when they are **idle** (also hibernate/suspend and WOL)
- Most programs does not need any modification (or very trivial ones)
- **Queue system**: submit file specifying program, arguments, inputs and outputs... and wait for results!
- New versions 8.4.x (Sept 2015) have simplified the syntax with new and powerful commands

Condor: How does it work?

- Pool of slots: 
- Job submission. Queue of jobs: 
- Matching (according to the requirements, status, *universes*):
classAds: slots (~150 attr.) | jobs (~100 attr.)
- Copy: exec+inputs | remote execution | copy “back”: results

Installation and configuration

- Download from <http://research.cs.wisc.edu/htcondor/>
 - Odd: Development Release (last 8.5.0, Oct 2015)
 - Even: Current Stable Release (last 8.4.2, Nov 2015)
 - Source code, native packages, **stripped/unstripped tarballs**
- **Highly configurable:**
 - There is a **knob** almost for everything
 - v7.x: Huge config file (~ 3000 lines)
 - v8.x: Precompiled defaults, small config file (~100 lines)
 - **Specific** setup: Auth method, security, paths and domains, policies, ...
 - Machine **roles**: **Central Manager** (collector & negotiator), **Submit**, **Execute**, Checkpoint server. **Daemons** → total: 20+, in use: 5-7
 - Common config file and specific ones depending on roles

HTCondor: Useful shell commands

Total: ~ 100 shell commands, but users mostly use a few of them (3 - 10)

- **condor_status** (-avail, -run, -master, -server, -state, -total, -sort, -long, -constraint, -submitters, -format, ...)
- **condor_submit** <submit_file> (-append, ...)
- **condor_q** (-global, -hold, -analyze, -run, ...)
- condor_tail, condor_ssh_to_job
- condor_hold, condor_release, condor_rm
- condor_history (-userlog, -long, -constraint, ...)
- condor_version, condor_userprio, condor_logview, condor_prio, ...

HTCondor: Useful shell commands

- `condor_status`

Name	OpSys	Arch	<u>STATE</u>	<u>ACTIVITY</u>	LoadAv	Mem	ActvtyTime
slot1@machine1	LINUX	X86_64	Owner	Idle	0.050	1976	0+00:10:04
slot2@machine2	LINUX	X86_64	Unclaimed	Idle	0.100	2132	0+00:11:14
slot4@machine3	LINUX	X86_64	Claimed	Busy	0.050	4022	0+00:05:51
slot5@machine3	LINUX	X86_64	Claimed	Suspended	0.300	4022	0+00:15:35

	Total	Owner	Claimed	Unclaimed	Matched	Preempting	Backfill
Total	770	307	397	66	0	0	0

- `condor_q`

(jobID: Cluster.Process)

-- Schedd: machine.ll.iac.es : <161.72.216.99:9618?sock=20661_61b6_4>

ID	OWNER	SUBMITTED	RUN_TIME	<u>ST</u>	PRI	SIZE	CMD
418.0	jsmith	3/13 17:00	0+00:37:32	I	0	317.4	myprogram -c 0
418.1	jsmith	3/13 17:00	0+00:30:25	<	0	488.3	myprogram -c 2
418.2	jsmith	3/13 17:00	0+00:31:10	R	0	231.4	myprogram -c 4
418.3	jsmith	3/13 17:00	0+00:23:25	S	0	134.4	myprogram -c 6
418.4	jsmith	3/13 17:00	0+00:42:17	>	0	623.1	myprogram -c 8
418.5	jsmith	3/13 17:00	0+00:26:52	H	0	432.6	myprogram -c 10

I: idle

>: transferring output

<: transferring input

H: on hold

R: running

C: completed

S: suspended

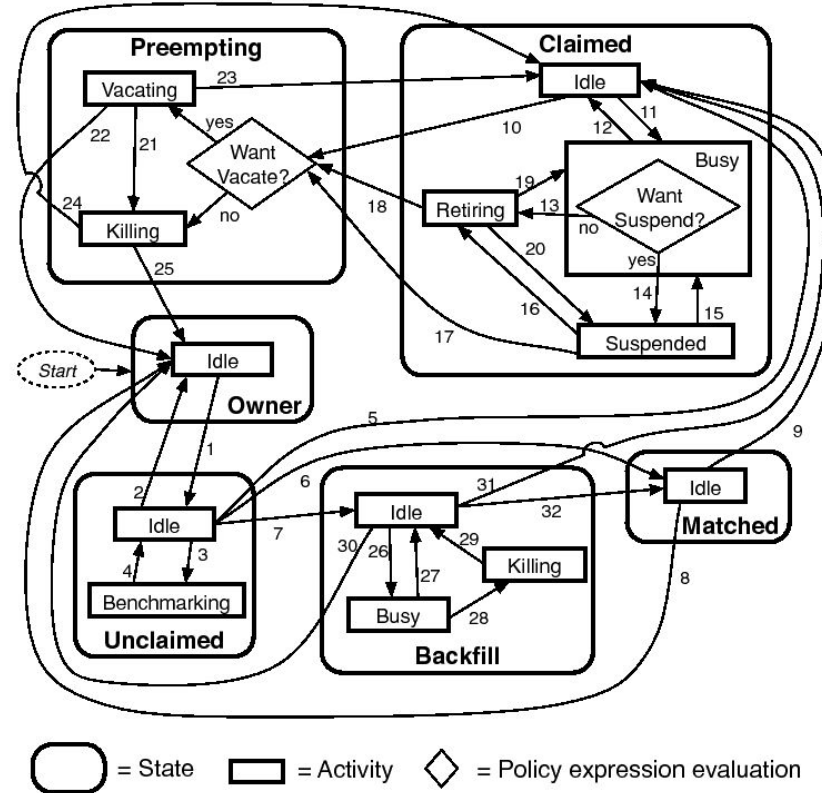
X: removed

HTCondor: States and Activities

- **STATES:** Owner, Unclaimed, Claimed, Matched, Preempting, Backfill

- **ACTIVITIES:**

- Idle
- Busy
- Suspended
- Benchmarking
- Checkpointing
- Vacating
- Retiring
- Killing



HTCondor: Priorities

- **Jobs Priority:** `priority = ..., condor_userprio`
- **Users' Priority:** `condor_userprio`
 - **Real priority** depends on consumed time and number of slots
 - **Best priority: 0.5** (initial), then it tries to “slowly” “chase” the number of slots that are being used at any time
 - **Effective priority** = Real priority * Priority Factor (1000 by def.)
 - **Assignment of slots:** inversely proportional to effective priority
 - **Preemption policy**
 - `nice_user`

HTCondor Universes (runtimes)

- **Vanilla**
- **Scheduler**
- **Grid**
- **Java**
- **Docker**
- **Standard**
- **Local**
- **Parallel**
- **VM**

HTCondor: Commands in Submit files

- Total: ~ 200 commands and attributes, but most times we only need to specify 10-15 (sometimes up to 20)
- Basically, we need to specify:
 - Executable and its arguments
 - Inputs
 - Outputs
 - Send to the queue

Condor: Example

```
#####  
# HTCondor Example  
#####
```

```
N      = 5  
ID     = $(Cluster).$(Process)  
FNAME = condor_example  
  
output  = $(FNAME).$(ID).out  
error   = $(FNAME).$(ID).err  
log     = $(FNAME).$(Cluster).log
```

```
should_transfer_files    = YES  
when_to_transfer_output = ON_EXIT  
transfer_input_files     = data$(Process)/  
transfer_output_files    = data.out  
transfer_output_remaps   = "data.out=data$(Process).out"
```

```
executable = operate.py  
arguments  = input$(Process).dat
```

```
queue $(N)
```

Condor: Predefined functions and macros

- Evaluate expressions: `eval()`, ...
- Flow control: `ifThenElse()`, ...
- Manipulate strings: `strcat()`, `substr()`, `strcmp()`, `size()` ...
- Manipulate lists: `stringListSize()`, `stringListSum()`, ...
- Manipulate numbers: `round()`, `floor()`, `ceiling()`, `pow()`, ...
- Check and modify types: `isReal()`, `isError()`, `int()`, ...
- Working with times: `time()`, `formatTime()`, `interval()`, ...
- Random: `random()`, `$RANDOM_CHOICE()`, `$RANDOM_INTEGER()`, ...

Condor: Monitoring jobs

- `condor_tail, condor_ssh_to_job <id>`
- `condor_history -userlog, condor_logview, ...`
- `condor_history -long XXX.YYY | grep LastRemoteHost`
- `condor_hold -constraint, ..., condor_realese`
- `requirements = ... rank = ...`
- `noop_job = !stringListMember ("$(Process)", "X,Y,...")`
- `on_exit_hold/on_exit_remove`
- `concurrency_limits = XXX:N (DEFAULT_LIMIT: 1000, N = 1000/LIM)`

Condor: More useful commands

- `priority=...`, `condor_prio`: higher values will be executed earlier (also `nice_user = True`) → `condor_userprio -allusers`
- `deferral_time`, `deferral_window`, `cron_hour`, `cron_minute`, ...
- `idlvms_with_condor.sh`: Executing IDL programs with IDL VM
- `condor_submit_dag`: dependencies, **DAG** (Directed Acyclic Graph)
- `condor_compile`: Condor Standalone Checkpointing Mechanism

Condor: SCM (checkpointing)

condor_compile: Standard Universe, but also SCM (Standalone Checkpointing Mechanism). Stop and restart programs* written in **fortran**, **C**, **C++**...

1. **condor_compile** gcc myprogram.c -o myprogram *(Compile it)*
2. **strip** myprogram *(Remove extra info, optional)*
3. **setarch x86_64 -R ./myprogram** *(Run it!)*
Condor: Notice: Will checkpoint to myprogram.ckpt
Condor: Notice: Remote system calls disabled.
4. **ps aux | grep myprogram** *(Get the Process ID)*

adorta	24795	100	0.0	2596	520 pts/13	R+	15:44	1:02	myprogram
adorta	25014	0.0	0.0	114704	960 pts/14	S+	15:45	0:00	grep --color=auto myprogram
5. **kill -USR2 24795** *(Write a checkpoint)*
kill -TSTP 24795 (or **Ctrl+Z**) *(Write a checkpoint and quit)*
6. **setarch x86_64 -R ./myprogram -_condor_restart myprogram.ckpt** *(Restart!)*

1. *there are some limitations (system calls, etc). Static libraries!!

More info in FAQs!!!

New versions...

- Avoid problems with firewalls, outgoing connections
- Improve support to GPUs
- Static slots → Partitionable and dynamic slots... Fragmentation!!

HTCondor: Documentation

- Condor at Wisconsin University (official): <http://research.cs.wisc.edu/htcondor/>
- **Condor at SIEpedia:** <http://www.iac.es/sieinvens/siepedia> (HOWTOs → Condor)
Based on our experience with IAC's users. Constantly updated!!!
 1. Introduction
 2. Useful Commands
 3. FAQs
 4. Submit files
 5. Condor and IDL

IAC

Good scenario for HTCCondor: each night of observations produces a huge amount of raw data (images, spectra, calibration files, etc.) to be processed:

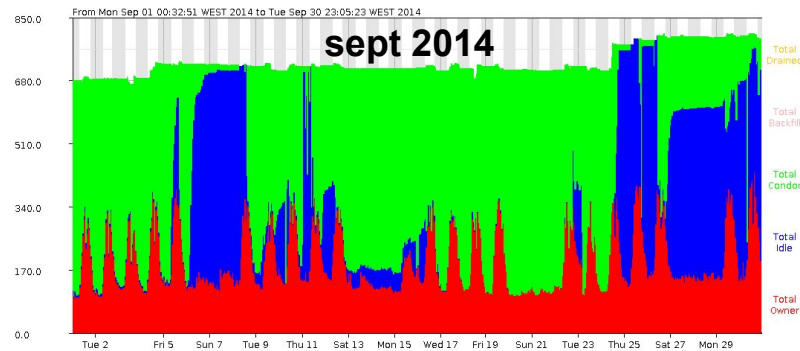
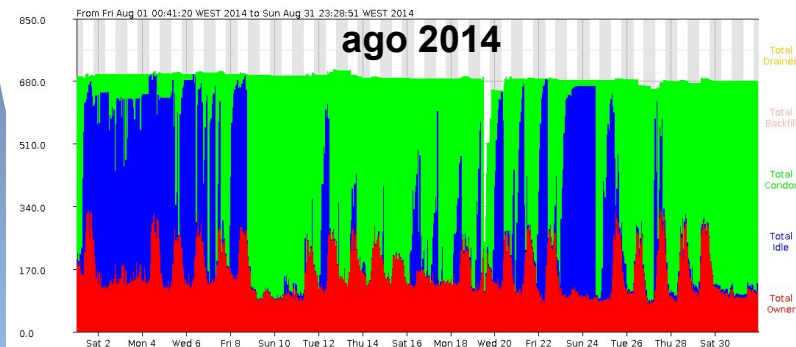
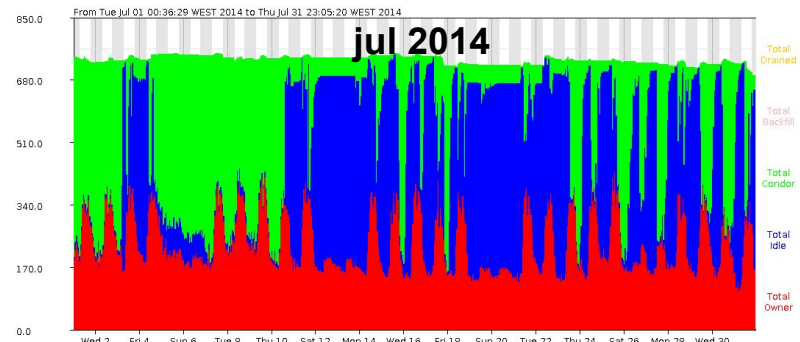
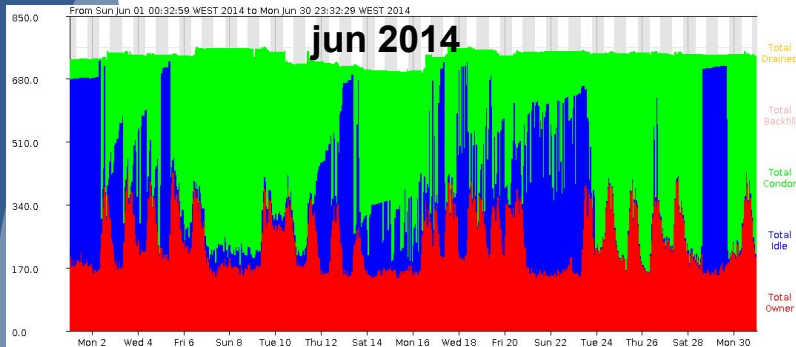
- Imaging data reduction
- Spectral analysis
- Characterizations of stars, galaxies, ...
- Numerical simulations
- Massive photometric reductions
- Models testing and evaluation
- ...

HTCondor @ IAC

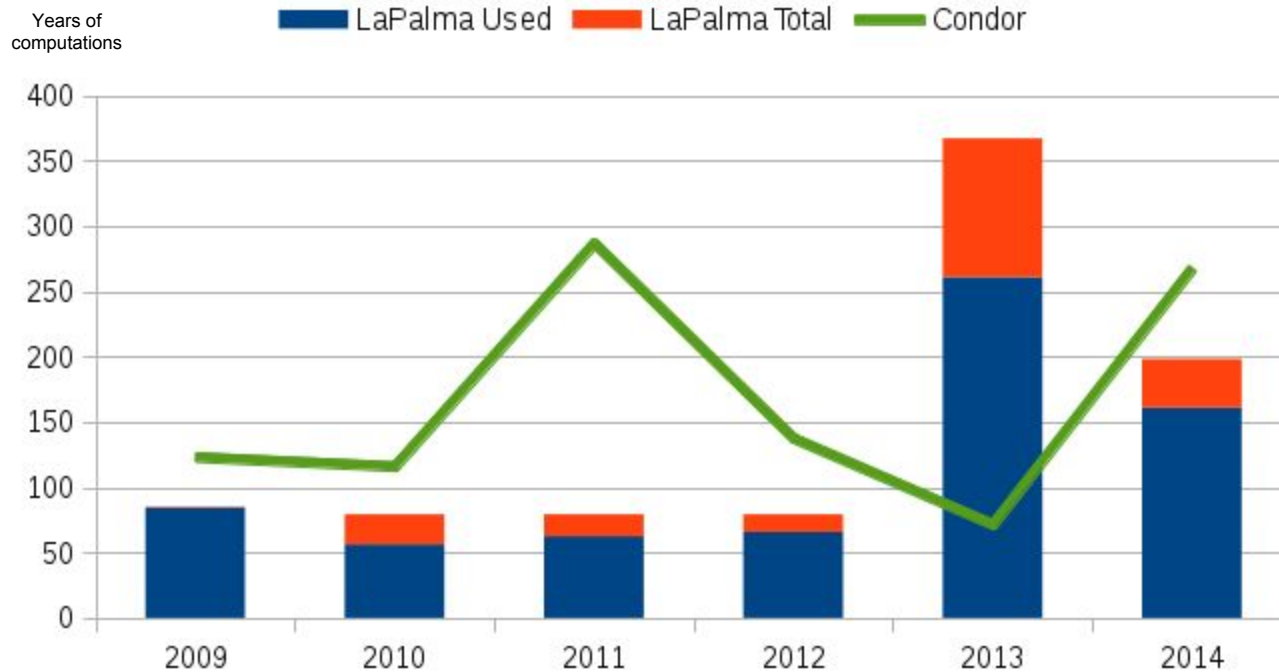
- Working since 2004, one of our Supercomputing resources
- Currently (2015):
 - Pool mainly formed by our researchers' desktops
 - ~225 machines, ~950 slots
 - Heterogeneous hardware, homogenous software
 - ~200 researches, 60+ active HTCondor users
 - ~2.400.000 CPU hours in 2014
 - We have recently obtained FEDER funds to expand and modernize our HTCondor pool

HTCondor: 2014

(<http://nectarino>)



Some stats: LaPalma - Condor @ IAC



Problems and our solutions

- Programs that require a simple “click” to begin (ex: IDL VM)

We have developed a simple script to “simulate” the click using `xvfb` (X virtual framebuffer) in order to create a virtual X11 server and `xautomation`: “Control X from the command line for scripts, and do “visual scraping” to find things on the screen.”

- Licenses & massive access to shared disks

Master: `CONCURRENCY_LIMIT_DEFAULT = 1000` [N = 1000 / MAX]

Submission script: `concurrency_limits = user$(Cluster):20,user_total:10,global=5`

- Noise in offices → `condor_time_restrict`

Problems and our solutions

[...] \$ **condor_time_restrict**

-h, --help (or no arguments) : Print this help

<machine> : Print time restrictions for the given machine

-l, --listall : List restrictions for all machines

--set_restriction <machine> <time_ini> <time_end> [--days <day_ini> <day_end>] [-f] [--noreconfig]

: Add or modify a time restriction.

Time should be specify in 24h format (HH:MM)

--days: By default, restrictions are set from Monday to Friday, you can change days range using [--days <D1> <D2>], where days= 0:Sunday, 1:Monday, ..., 6:Saturday

-f, --force: do not ask for confirmation

--noreconfig: do not apply changes immediately (they will be applied in next reconfiguration)

--remove_restriction <machine> [-f] [--noreconfig]

: Remove a restriction on the given machine

-f, --force: do not ask for confirmation

--noreconfig: do not apply changes immediately

--disable <machine> [-f] [--noreconfig]

: Disable a machine (it will never execute HTCondor jobs)

-f, --force: do not ask for confirmation

--noreconfig: do not apply changes immediately

Problems and our solutions

- Guarantee minimum disk space available

```
SUBMIT_EXPRS = MachineTotalDiskString
MIN_FREE_DISK_FOR_REMOVE = ( MATCH_TotalDisk - $(MIN_FREE_DISK_KB) )
SYSTEM_PERIODIC_REMOVE = MATCH_EXP_MachineTotalDisk != UNDEFINED && (DiskUsage > $(MIN_FREE_DISK_FOR_REMOVE))
```

- Problems with firewalls → **shared_port**
- Problems detecting user's activity → `kbbd`, `condor_usb_fix`
- Hibernation of idle machines, wake up them when needed
- Nested loops, specific numeric format for input/outputs, ...

Problems and our solutions

- Master/Slaves applications
- Checking and controlling jobs that are completed in too short or long time / held jobs... “black holes”
- Waiting for input data → deferral Time
- Benchmarks, maintenance operations, backfill
- HTCondor, the scapegoat → **ConGUSTo**

ConGUSTo

- **ConGUSTo: HTCondor Graphical Unified Supervising Tool**
<http://arxiv.org/abs/1412.5847>
- Main objective: Make HTCondor “transparent” so that users are able to check when their machines are being used or were used. Also make the administration tasks easier.
- Web-based tool: use any browser to get graphical view of all jobs executed in a specific machine, with more detailed info about each of them. Friendly and intuitive way to display data.
- Panoramic view of all machines and slots to see the current HTCondor status in a glance. Panoramic view is highly configurable with a wide range of options and filters.

ConGUSTo

- Easy installation: ConGUSTo only needs to be installed on one machine (typically the web server). No data base is required: the data, stored in plain text with a format similar to CSV, are generated by just one of the machines in the pool.
- Developed before Condor used GANGLIA!!
- Fully compatible with previous versions of HTCondor. It shows data that at the present moment Ganglia cannot supply, such as information per slot, time restrictions, last time a machine executed a HTCondor job, and much more.
- Adding new pieces of information to show is easy.

ConGUSTo (index)

Condor Stats by Machine

<< prev day Date: 06/05/2014 Machine: ... Choose a machine ... View: 1 day (Summary) next day >>

Please, contact us if you find any error in the list

- bien.ll.iac.es
- boda.ll.iac.es
- bogart.ll.iac.es
- bota.ll.iac.es
- brando.ll.iac.es
- cabal.ll.iac.es
- caldo.ll.iac.es
- calle.ll.iac.es
- calma.ll.iac.es
- cameron.ll.iac.es

If your machine is not in the list or the information is incorrect, please, contact us: sinfin@iac.es.
Values are approximate, calculated from the last 24 hours (approx.) since 28/03/2014.

More statistics about Condor are available at <http://hectarino>.
Info and documentation about Condor at IAC are available at the Wikipedia and the Supercomputing section.



SERVICIOS INFORMÁTICOS
ESPECÍFICOS
Investigación y Enseñanza
Instituto de Astrofísica de Canarias



Condor
High Throughput Computing

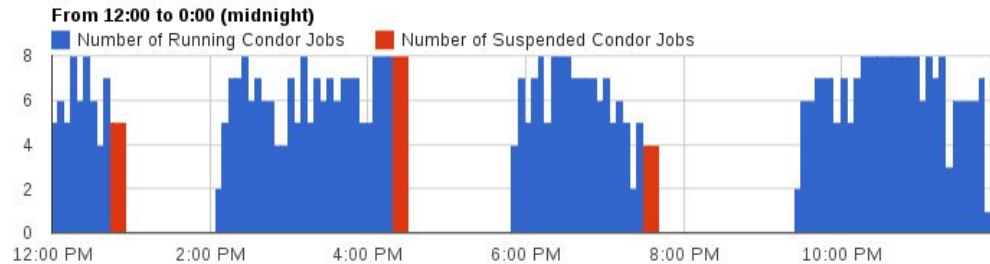
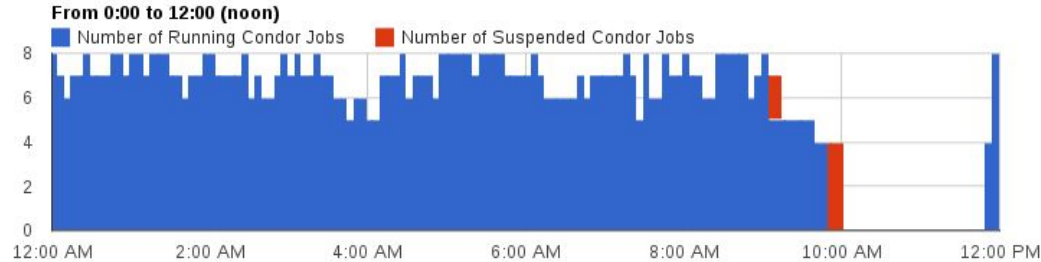


ConGUSTo (summarized daily view)

Condor Stats by Machine

<< prev day Date: 06/06/2014 Machine: epico.ll.iac.es View: 1 day (Summary) next day >>

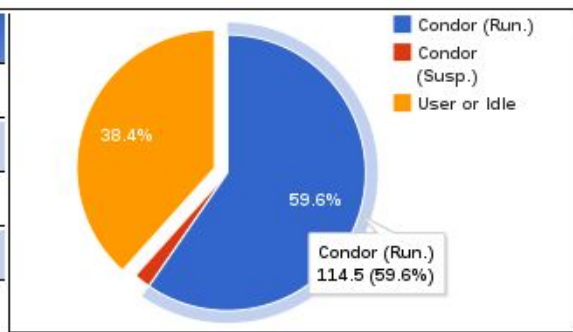
Stats for epico.ll.iac.es on Fri, June 06, 2014 (summary)



ConGUSTo (summarized daily view)

Stats summary

epico.ll.iac.es (slots: 8)	Perc.	Total (all slots)		Average per slot	
Max. available time	100.00%	192.00 h.	8.00 d.	24.00 h.	1.00 d.
User / Idle time	38.37%	73.67 h.	3.07 d.	9.21 h.	0.38 d.
Condor total time	61.63%	118.33 h.	4.93 d.	14.79 h.	0.62 d.
Condor (Run. Jobs: 96.76%)	59.64%	114.50 h.	4.77 d.	14.31 h.	0.60 d.
Condor (Susp. Jobs: 3.24%)	2.00%	3.83 h.	0.16 d.	0.48 h.	0.02 d.



ConGUSTo (detailed daily view)

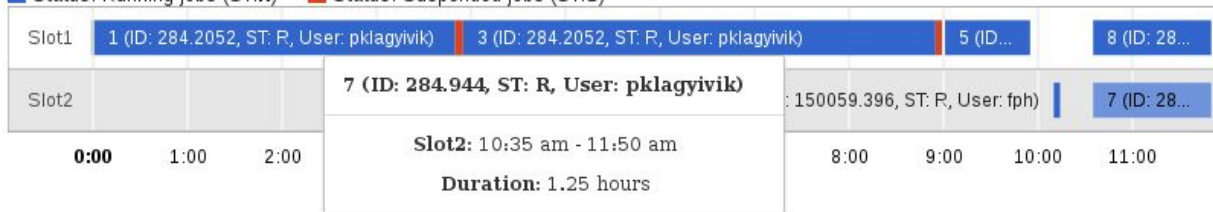
Condor Stats by Machine

<< prev day Date: 29/05/2014 Machine: vial.ll.iac.es View: 1 day (Details) next day >>

Stats for vial.ll.iac.es on Thu, May 29, 2014 (details)

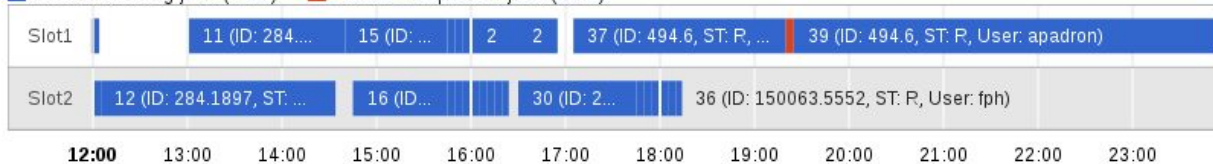
Stats from 0:00 to 12:00 (noon)

■ Status: Running jobs (ST:R) ■ Status: Suspended jobs (ST:S)



Stats from 12:00 to 0:00 (midnight)

■ Status: Running jobs (ST:R) ■ Status: Suspended jobs (ST:S)



Place your mouse over a job to display the following data: # (Job's ID, Job's Status [R: running, S: suspended], Job's Owner)
Job's ID could be used to get more info if the job is still in the queue (it has not finished yet). Use: condor_q -global <JobID>

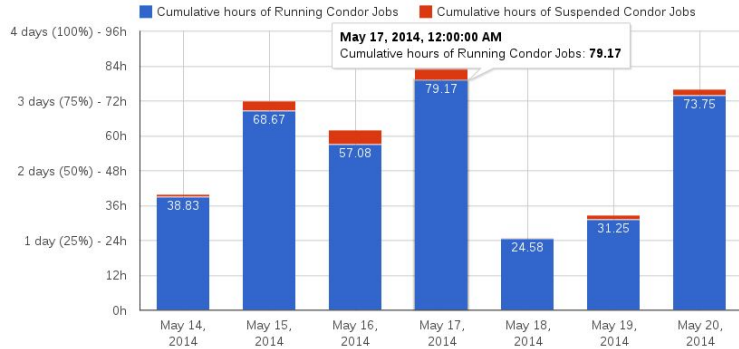
ConGUSTo (weekly and monthly views)

Condor Stats by Machine

<< prev week Date: 14/05/2014 Machine: renta.ll.iac.es View: 1 week since date next week >>

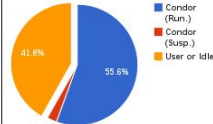
Stats for renta.ll.iac.es for week from Wed, 14/05/2014 to Tue, 20/05/2014

This machine has 4 slots (cores). Total hours per day is 96 h. (4 days). Average Condor use per day is 55.86 h. (58.18%)



Stats summary

renta.ll.iac.es (slots: 4)	Perc.	Total (all days & slots)	Average per day	Avg.(d/slot)
Max. available time (7 days)	100.00%	672.00 h. 28.00 d.	168.00 h. 4.00 d.	24 h.
User / Idle time	41.82%	281.01 h. 11.71 d.	40.14 h. 1.67 d.	10.04 h.
Condor total time	58.18%	390.99 h. 16.29 d.	55.86 h. 2.33 d.	13.96 h.
Condor (Run. Jobs: 95.48%)	55.56%	373.33 h. 15.56 d.	53.33 h. 2.22 d.	13.33 h.
Condor (Susp. Jobs: 4.52%)	2.63%	17.66 h. 0.74 d.	4.42 h. 0.18 d.	0.63 h.

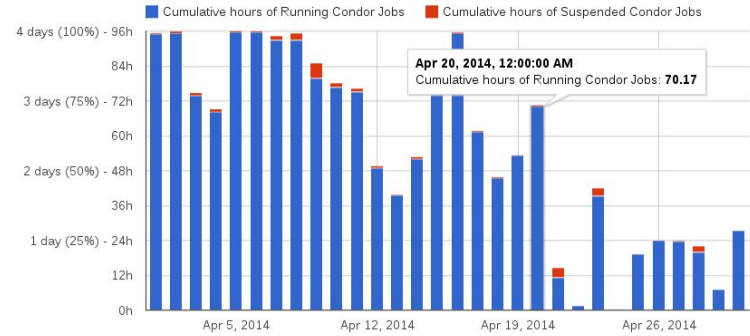


Condor Stats by Machine

<< prev month Date: 01/04/2014 Machine: renta.ll.iac.es View: 1 month since date next month >>

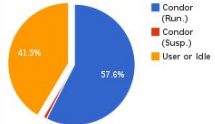
Stats for renta.ll.iac.es for month from Tue, 01/04/2014 to Wed, 30/04/2014

This machine has 4 slots (cores). Total hours per day is 96 h. (4 days). Average Condor use per day is 56.20 h. (58.54%)



Stats summary

renta.ll.iac.es (slots: 4)	Perc.	Total (all days & slots)	Average per day	Avg.(d/slot)
Max. available time (30 days)	100.00%	2880.00 h. 120.00 d.	720.00 h. 4.00 d.	24 h.
User / Idle time	41.46%	1193.98 h. 49.75 d.	39.80 h. 1.66 d.	9.95 h.
Condor total time	58.54%	1686.02 h. 70.25 d.	56.20 h. 2.34 d.	14.05 h.
Condor (Run. Jobs: 98.34%)	57.57%	1658.10 h. 69.09 d.	55.27 h. 2.30 d.	13.82 h.
Condor (Susp. Jobs: 1.66%)	0.97%	27.92 h. 1.16 d.	6.98 h. 0.29 d.	0.23 h.



ConGUSTo (status)

Condor Status

SUMMARY SLOTS UP: 668 | Owner: 160 Condor: 474 Idle: 34 Other: 0 || Total JOBS: 1054 | Running: 535 Queued: 493 On hold: 26



Configuration



Some machines may not be shown if you are using filters. Please, check configuration...

Last update 02/12/2014 14:10:03 (autorefresh: Never). [Refresh now!](#)

Check also the [Condor Stats by Machine](#)

aitana.ll.iac.es ERROR	asteroide.ll.iac.es 1 2	ayosa.ll.iac.es ERROR	backup80.ll.iac.es 1 2	bala.ll.iac.es 1 2	base.ll.iac.es 1 2	basinger.ll.iac.es ERROR	beso.ll.iac.es 1 2	beta.ll.iac.es 1 2
bien.ll.iac.es ERROR	boda.ll.iac.es 1 2	bogart.ll.iac.es 1 2	bota.ll.iac.es 1 2	brando.ll.iac.es 1 2	cabal.ll.iac.es 1 2 3 4	caldo.ll.iac.es 1 2 3 4	calle.ll.iac.es 1 2	calma.ll.iac.es 1 2
cameron.ll.iac.es ERROR	canao.ll.iac.es 1 2	canto.ll.iac.es 1 2	caoba.ll.iac.es 1 2 3 4	capo.ll.iac.es 1 2 3 4	cariz.ll.iac.es 1 2 3 4	carne.ll.iac.es 1 2 3 4	casco.ll.iac.es 1 2	catar.ll.iac.es 1 2 3 4 5 6
causa.ll.iac.es 1 2	cebo.ll.iac.es 1 2	cela.ll.iac.es ERROR	cerca.ll.iac.es 1 2 3 4	chapa.ll.iac.es 1 2	chaplin.ll.iac.es ERROR	chile.ll.iac.es 1 2 3 4 5 6	china.ll.iac.es ERROR	cielo.ll.iac.es 1 2 3 4
circo.ll.iac.es 1 2	claro.ll.iac.es 1 2	clase.ll.iac.es 1 2	clavo.ll.iac.es 1 2 3 4	clima.ll.iac.es 1 2 3 4	cobre.ll.iac.es 1 2 3 4	comer.ll.iac.es 1 2 3 4 5 6	cometa.ll.iac.es ERROR	comun.iac.es ERROR
cooper.ll.iac.es ERROR	cosner.ll.iac.es ERROR	cruise.ll.iac.es ERROR	cuero.ll.iac.es 1 2	curro.ll.iac.es 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	dardo.ll.iac.es 1 2 3 4 5 6 7 8	deber.ll.iac.es 1 2 3 4 5 6 7 8	debil.ll.iac.es 1 2 3 4 5 6 7 8	decir.ll.iac.es ERROR
dedal.ll.iac.es 1 2 3 4 5 6 7 8	dejar.ll.iac.es 1 2 3 4 5 6 7 8	delta.ll.iac.es 1 2 3 4 5 6 7 8	dicho.ll.iac.es 1 2 3 4 5 6 7 8	dieta.ll.iac.es 1 2 3 4	diodo.ll.iac.es ERROR	diosa.ll.iac.es 1 2 3 4 5 6 7 8	edad.ll.iac.es ERROR	eden.ll.iac.es ERROR
edil.ll.iac.es 1 2	editar.ll.iac.es 1 2 3 4	egipto.ll.iac.es 1 2 3 4	elche.ll.iac.es 1 2 3 4 5 6 7 8	elegir.ll.iac.es 1 2	elixir.ll.iac.es ERROR	ella.ll.iac.es 1 2 3 4	elogio.ll.iac.es 1 2 3 4	elpino.ll.iac.es 1 2
eludir.ll.iac.es 1 2 3 4	emanar.ll.iac.es 1 2 3 4	embate.ll.iac.es 1 2 3 4	emir.ll.iac.es 1 2	encaje.ll.iac.es ERROR	encima.ll.iac.es 1 2	encina.ll.iac.es 1 2 3 4	eneldo.ll.iac.es 1 2 3 4	enigma.ll.iac.es 1 2 3 4
enlace.ll.iac.es 1 2	enorme.ll.iac.es 1 2	ensayo.ll.iac.es 1 2	entera.ll.iac.es 1 2 3 4	entre.ll.iac.es 1 2 3 4	enviar.ll.iac.es 1 2 3 4 5 6 7 8	eolico.ll.iac.es ERROR	epico.ll.iac.es 1 2 3 4 5 6 7 8	eral.ll.iac.es 1 2
erial.ll.iac.es 1 2	erizar.ll.iac.es 1 2 3 4	error.ll.iac.es 1 2 3 4	escape.ll.iac.es 1 2 3 4	escoba.ll.iac.es 1 2	espia.ll.iac.es 1 2	esqui.ll.iac.es 1 2 3 4	esta.ll.iac.es 1 2 3 4	etapa.ll.iac.es 1 2
etico.ll.iac.es 1 2 3 4	euro.ll.iac.es ERROR	exito.ll.iac.es 1 2	facil.ll.iac.es 1 2	favor.ll.iac.es 1 2	feliz.iac.es ERROR	flavia.ll.iac.es 1 2	fonda.iac.es ERROR	garbo.ll.iac.es ERROR
gere.ll.iac.es ERROR	golfo.ll.iac.es 1 2	gongo.ll.iac.es 1 2	greco.ll.iac.es ERROR	iberia.ll.iac.es 1 2	ibero.ll.iac.es 1 2	ibis.ll.iac.es 1 2 3 4	idea.ll.iac.es 1 2 3 4	ideal.ll.iac.es 1 2 3 4
idilio.ll.iac.es 1 2	idioma.ll.iac.es ERROR	idolo.ll.iac.es 1 2	idoneo.ll.iac.es 1 2	ignoto.ll.iac.es ERROR	igual.ll.iac.es 1 2 3 4	illo.ll.iac.es 1 2	imitar.ll.iac.es 1 2	impar.ll.iac.es 1 2

ConGUSTo (configuration)

Condor Status

SUMMARY SLOTS UP: 668 | Owner: 160 Condor: 474 Idle: 34 Other: 0 || Total JOBS: 1054 | Running: 535 Queued: 493 On hold: 26

Configuration ▲ Some machines may not be shown if you are using filters. Please, check configuration...

General options: Show info about machines Show info about Condor queue Show graphs

Display machine info:
 Name Disk,Mem,OS (total) disk,mem,n (per slot) Average Load Slots
 Time restriction (SLOW!!) Last exec. (SLOW!!) Tooltip on names Tooltip on slots

Order machines by: Name ASC **Autorefresh:** Never

Connection with Condor: UP DOWN **Filtered slots:** Ignore machines if all slots have be

Machine OS: Fedora17 Fedora19 Fedora20

Slot status: Owner Idle Condor (running) Condor (suspended) Condor (Idle) Other

HIDE slots running jobs from User: apadron mdalfaro_ext nice-user.mdalfaro_ext paulc_ext

Filter machines...		Filter slots...	
Show <input type="button" value="v"/> Total Memory (MB)	≥ <input type="text"/> and ≤ <input type="text"/>	Show <input type="button" value="v"/> Memory (MB)	≥ <input type="text"/> and ≤ <input type="text"/>
Show <input type="button" value="v"/> Avail. Disk (MB)	≥ <input type="text"/> and ≤ <input type="text"/>	Show <input type="button" value="v"/> Avail. Disk (MB)	≥ <input type="text"/> and ≤ <input type="text"/>
Show <input type="button" value="v"/> Total Avg. Load	≥ <input type="text"/> and ≤ <input type="text"/>	Show <input type="button" value="v"/> Total Avg. Load	≥ <input type="text"/> and ≤ <input type="text"/>
Show <input type="button" value="v"/> Condor Avg. Load	≥ <input type="text"/> and ≤ <input type="text"/>	Show <input type="button" value="v"/> Condor Avg. Load	≥ <input type="text"/> and ≤ <input type="text"/>
Show <input type="button" value="v"/> Number of slots	≥ <input type="text"/> and ≤ <input type="text"/>	Show <input type="button" value="v"/> Time in state (secs.)	≥ <input type="text"/> and ≤ <input type="text"/>

Display graphs:
 Total Available Disk (GB) Available Disk per slot (GB) Total Memory (GB) Memory per slot (GB)
 Total Load Condor Load Operative System State
 Machines Up/Down Slots Up/Down Jobs per state Total Jobs per user
 Running jobs per user Queued jobs per user Held jobs per user

Keep config. open

Other states: They are normally temporary states related to internal Condor operations, like preempting, vacating, matching, benchmarking, etc.

ConGUSTo (General and display options)

cruise .ll.iac.es 1 2 3 4	cuero .ll.iac.es 1 2	curro .ll.iac.es =====	dardo .ll.iac.es 1 2 3 4 5 6 7 8	deber .ll.iac.es 1 2 3 4 5 6 7 8
delta .ll.iac.es 1 2 3 4 5 6 7 8	dicho .ll.iac.es 1 2 3 4 5 6 7 8	dieta .ll.iac.es 1 2 3 4	diodo .ll.iac.es =====	diosa .ll.iac.es 1 2 3 4 5 6 7 8
egipto .ll.iac.es 1 2 3 4	elche .ll.iac.es 1 2 3 4 5 6	elegir .ll.iac.es 1 2	elixir .ll.iac.es 1 2	ella .ll.iac.es 1 2 3 4

General options:

 ON

Show info about machines

 ON

Show info about Condor queue

 ON

Show graphs

Display machine info:

 ON

Name

 OFF

Disk,Mem,OS (total)

 OFF

disk,mem,n (per slot)

 OFF

Average Load

 ON

Slots

 OFF

Time restriction (SLOW!!)

 OFF

Last exec. (SLOW!!)

 OFF

Tooltip on names

 ON

Tooltip on slots

veraz .ll.iac.es D:5.7Gb M:126Gb Fed19 d:184Mb m:3.9Gb n:32 LoadAvg: 0.92 (C: 0.00) TimeR: 8:00-21:30 Fr-Fr Last: 2014-12-02 11:35:01 =====	verbo .ll.iac.es D:283Gb M:3.9Gb Fed19 d:142Gb m:1.9Gb n:2 LoadAvg: 4.51 (C: 0.00) TimeR: None Last: 2014-11-26 19:30:02 1 2	veta .ll.iac.es D:399Gb M:7.8Gb Fed19 d:100Gb m:1.9Gb n:4 LoadAvg: 1.23 (C: 1.23) TimeR: None Last: 2014-12-02 Now! 1 2 3 4
--	---	--

ConGUSTo (tooltips)

gere.ll.iac.es 	golfo.ll.iac.es 	gongo.ll.iac.es 	greco.ll.iac.es 	iberia.ll.iac.es
idilio.ll.iac.es 	<div style="border: 1px solid black; padding: 5px;"> Name: indico.ll.iac.es Num slots: 2. OS: Fedora19 [Mach] Disk: 25GB, Mem: 3.9GB [Slot] Disk: 12GB, Mem: 1.9GB Load Avg: 0.00 (Condor: 0.00) </div>		idoneo.ll.iac.es 	ignoto.ll.iac.es <div style="border: 1px solid black; padding: 2px;">ERROR</div>
imitar.ll.iac.es 	indico.ll.iac.es 	indigo.ll.iac.es 	inca.ll.iac.es 	inciso.ll.iac.es
indice.ll.iac.es 	indio.ll.iac.es 	inflar.ll.iac.es 	intuir.ll.iac.es 	iridio.ll.iac.es
iris.ll.iac.es 	islote.ll.iac.es 	italia.ll.iac.es 	...	

Last: 2014-11-28 16:55:02 	Last: Never! (since 2014-03-28) <div style="border: 1px solid black; padding: 2px;">ERROR</div>	Last: 2014-11-20 20:30:01 	Last: 2014-11-22 Now!
veraz.ll.iac.es D:5.7Gb M:126Gb Fed19 d:184Mb m:3.9Gb n:32 LoadAvg: 0.92 (C: 0.00) TimerR: 8:00-21:30 Fr-Fr Last: 2014-12-02 11:35:01 *****	verbo.ll.iac.es D:283Gb M:3.9Gb Fed19 d:142Gb m:1.9Gb n:2 LoadAvg: 4.51 (C: 0.00) TimerR: None Last: 2014-11-26 19:30:02	slot3@veta.ll.iac.es Load Avg: 0.52 (Condor: 0.52) State: Claimed (Busy) for 41s. Job: 1077.9 (adorta from erizar)	veto.ll.iac.es D:1.1Gb M:7.8Gb d:1.1Gb m:1.1Gb n:1 LoadAvg: 0.1 TimerR: 1

ConGUSTo (Filters)

tallo.ll.iac.es
D:144KB M:7.8GB Fed19
d:36KB m:1.9GB n:4
LoadAvg: 0.00 (C: 0.00)
TimeR: None
Last: 2014-11-04 10:35:01

1 2 3 4

Order machines by: Name ASC

Connection with Condor: UP DOWN

Machine OS: Fedora12 Fedora19 Fedora20

Slot status: Owner Idle Condor (running) Condor (suspended) Condor (Idle) Other

HIDE slots running jobs from User: tsh

- Name
- Number of slots
- Total available disk
- Total memory
- Available disk per slot
- Memory per slot
- Operative System
- Total Average Load
- Condor Average Load
- Last execution (SLOW!!)

Order machines by: Name	ASC	Alert if free Disk < 5 GB	Autorefresh: Never
Connection with Condor: <input checked="" type="checkbox"/> UP <input checked="" type="checkbox"/> DOWN	Filtered slots: <input type="checkbox"/> ignore machines if all slots have been filtered		
Machine OS: <input checked="" type="checkbox"/> Fedora12 <input checked="" type="checkbox"/> Fedora19 <input checked="" type="checkbox"/> Fedora20			
Slot status: <input checked="" type="checkbox"/> Owner <input checked="" type="checkbox"/> Idle <input checked="" type="checkbox"/> Condor (running) <input checked="" type="checkbox"/> Condor (suspended) <input checked="" type="checkbox"/> Condor (Idle) <input checked="" type="checkbox"/> Other			
HIDE slots running jobs from User: <input type="checkbox"/> tsh			
Filter machines...		Filter slots...	
Show Total Memory (MB) \geq <input type="text"/> and \leq <input type="text"/>	Show Memory (MB) \geq <input type="text"/> and \leq <input type="text"/>		
Show Free Disk (GB) \geq <input type="text"/> and \leq <input type="text"/>	Show Free Disk (GB) \geq <input type="text"/> and \leq <input type="text"/>		
Show Total Avg. Load \geq <input type="text"/> and \leq <input type="text"/>	Show Total Avg. Load \geq <input type="text"/> and \leq <input type="text"/>		
Show Condor Avg. Load \geq <input type="text"/> and \leq <input type="text"/>	Show Condor Avg. Load \geq <input type="text"/> and \leq <input type="text"/>		
Show Number of slots \geq <input type="text"/> and \leq <input type="text"/>	Show Time in state (secs.) \geq <input type="text"/> and \leq <input type="text"/>		

ConGUSTo (Graphs)

Display graphs:

- | | | | |
|--|---|--|--|
| <input checked="" type="checkbox"/> Total Free Disk (GB) | <input checked="" type="checkbox"/> Free Disk per slot (GB) | <input type="checkbox"/> Total Memory (GB) | <input checked="" type="checkbox"/> Memory per slot (GB) |
| <input checked="" type="checkbox"/> Total Load | <input type="checkbox"/> Condor Load | <input checked="" type="checkbox"/> Operative System | <input checked="" type="checkbox"/> State |
| <input type="checkbox"/> Machines Up/Down | <input checked="" type="checkbox"/> Slots Up/Down | <input type="checkbox"/> Jobs per state | <input type="checkbox"/> Total Jobs per user |
| <input type="checkbox"/> Running jobs per user | <input checked="" type="checkbox"/> Queued jobs per user | <input checked="" type="checkbox"/> Held jobs per user | |

APPLY

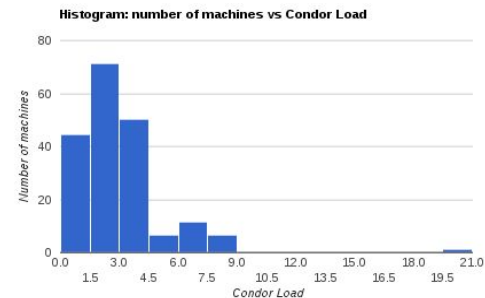
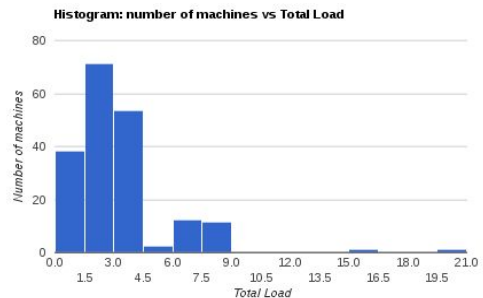
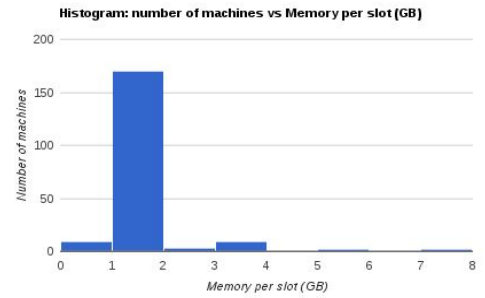
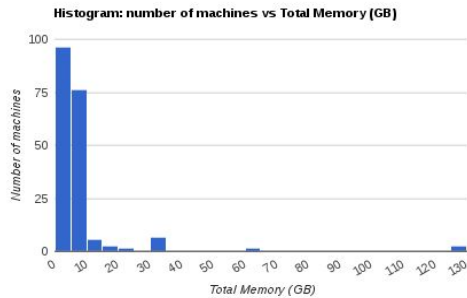
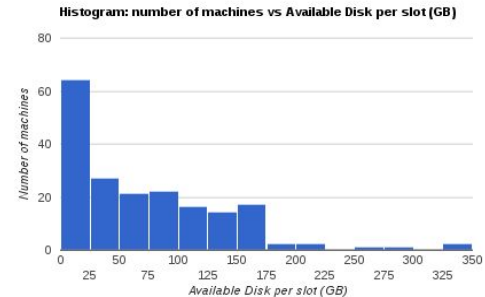
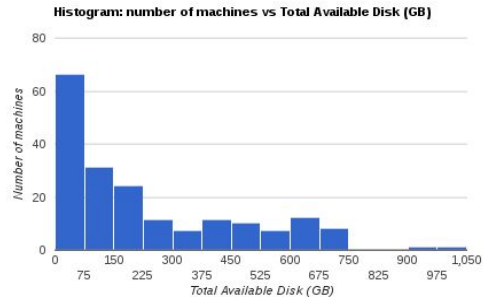
Undo changes

Load default config.

Close

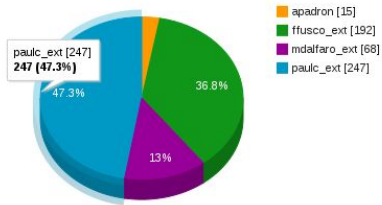
Keep config. open

ConGUSTo (Graphs)

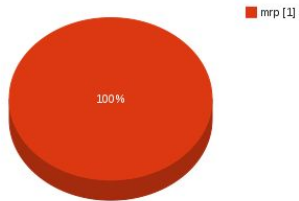


ConGUSTo (Graphs)

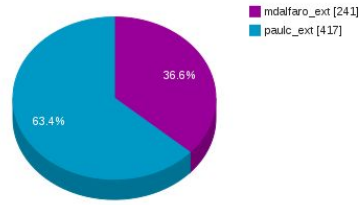
Running jobs per user



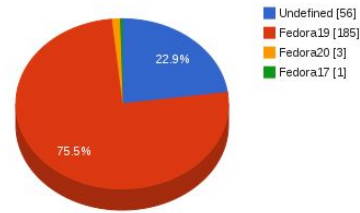
Held jobs per user



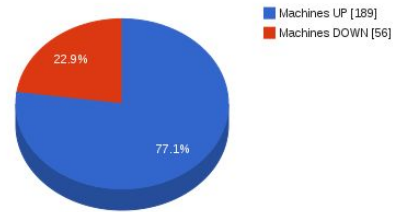
Queued jobs per user



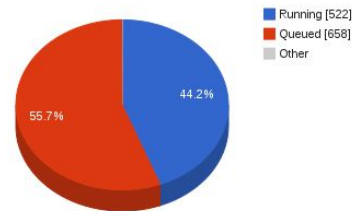
Operative System



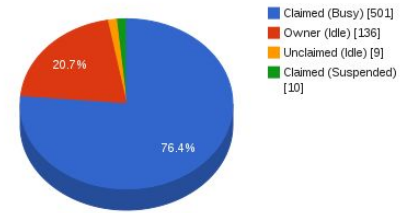
Machines Up/Down



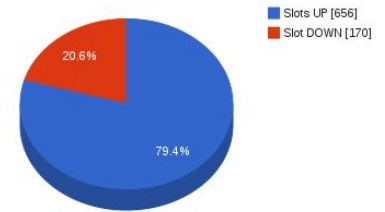
Jobs per state



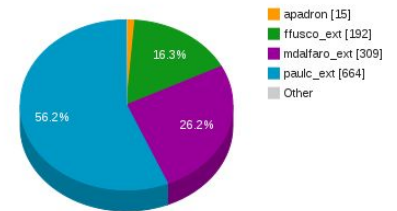
State



Slots Up/Down



Total Jobs per user



ConGUSTo (queue and pool status)

Results after filters (Filters may affect in some graphs)

MACHINES: 245 (Up: 189, Down: 56) of 245.

SLOTS: 826 (Up: 656, Down: 170) of 826.

Condor queue (condor_status -submitters)

User	Total	Running	Queued	On hold
apastor	0	0	0	0
mrp	1	0	0	1
apadron	15	15	0	0
ffusco_ext	192	192	0	0
mdalfaro_ext	309	68	241	0
paulc_ext	664	247	417	0
TOTALS	1181	522	658	1

ConGUSTo

ConGUSTo was presented at the HTCondor Pool Administrators Workshop (CERN. Geneva, Switzerland. December 8th-11th, 2014)

Some Institutions that have obtained ConGUSTo:

- Aston Institute of Photonic Technologies, UK
- National Research Council, Canada
- BrainLab AG, Germany
- Institut des sciences chimiques de Rennes (Univ. Rennes), France
- Commonwealth Scientific Industrial and Research Organisation, Australia
- Medical University of Vienna, Austria.
- LIneA (Laboratório Interinstitucional: Observatório Nacional, Laboratório Nacional de Computação Científica, e Rede Nacional de Ensino e Pesquisa), Brazil <https://soiga.linea.gov.br/congusto/>

HTCondor @ IAC



Thanks!



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