Dashboard for LHC experiments Overview

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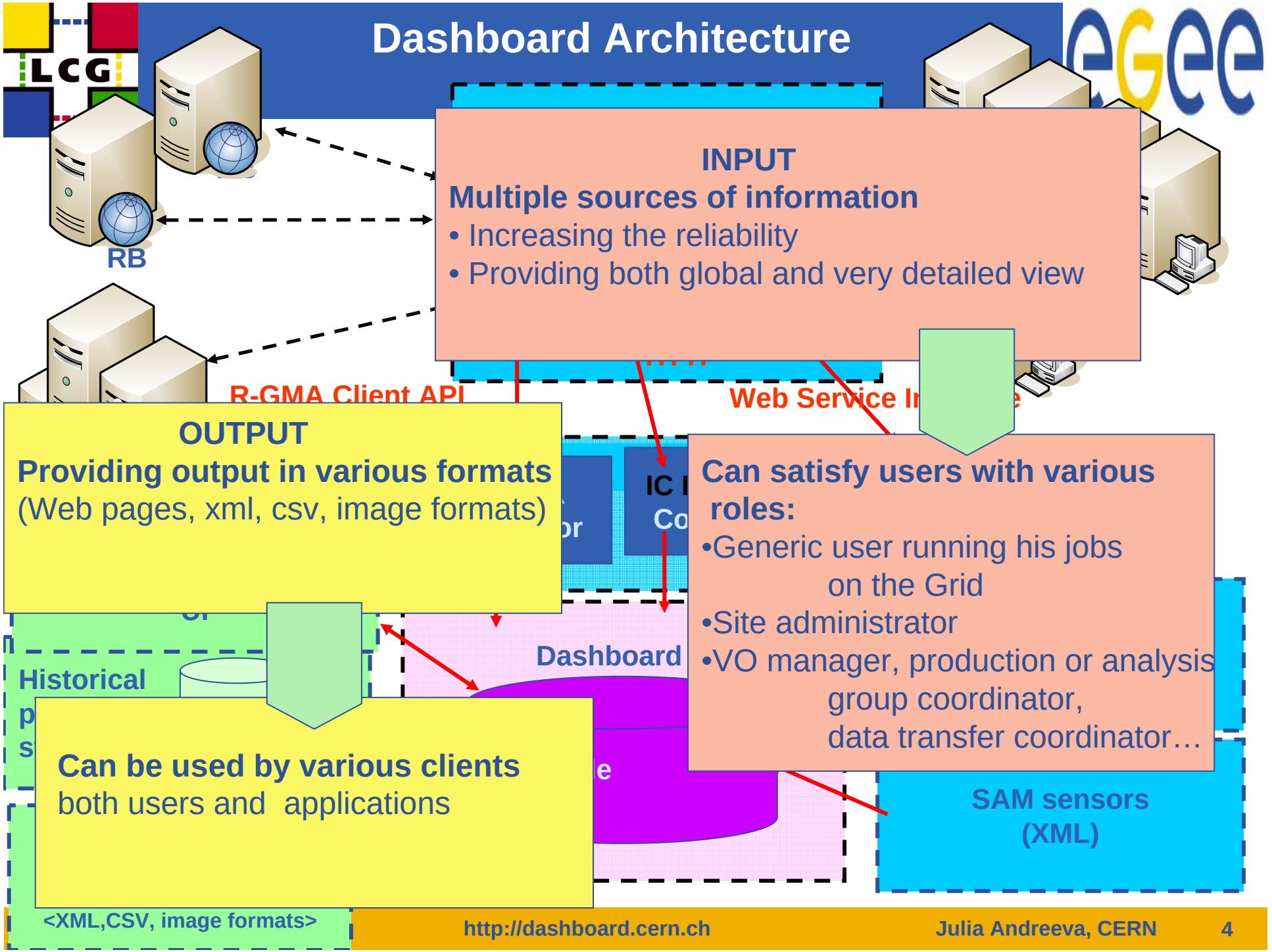
Why one more monitoring tool, what does make it different from the others?

- There are tools for monitoring individual services, set of services at the local sites, services at a given Grid middleware flavor.
- LHC experiments need a monitoring system which would provide an overall picture of the VO activities on the Grid with a single entry point to the monitoring data collected from the distributed system
  - *independent of the Grid flavor*
  - *covering different areas (job processing, data transfer, data access and publishing…)*
  - *following various aspects of the VO activities (usage/sharing of the resources, success rates, indication of problems of any origin)*
  - *combining Grid job status and service status information with the specific data of the experiment/application*
  - *reliable and flexible enough to allow rapid integration with the new requirements*

Dashboard Architecture



INPUT

Multiple sources of information

- Increasing the reliability
- Providing both global and very detailed view

OUTPUT

Providing output in various formats

(Web pages, xml, csv, image formats)

Can satisfy users with various roles:

- Generic user running his jobs on the Grid
- Site administrator
- VO manager, production or analysis group coordinator, data transfer coordinator…

Can be used by various clients

both users and applications

CMS Dashboard

- Project was started by ARDA group in collaboration with MonAlisa team on request of the CMS experiment

  in August 2005.

  First prototype was ready by the beginning of October 2005 for SC3. Main focus on job monitoring.
- Current version is in production since May 2006.
- CMS Dashboard is the most advanced one comparing to ATLAS and LHCb Dashboards regarding job monitoring , since all CMS submission tools are instrumented for the dashboard reporting.
- Following the requirements of the experiment

  CMS Dashboard is now covering other activities like

  transfer load tests, Tier-0 monitoring, IO rate monitoring

CMS Dashboard for CSA06

Widely used during CSA06.

- **During CSA06 CMS was submitting up to 65K jobs per day**

  - Using several middleware platforms (LCG, OSG, gLite)

  - Using different submission methods (LCG RB, bulk submission via gLite RB, condor-g submission)

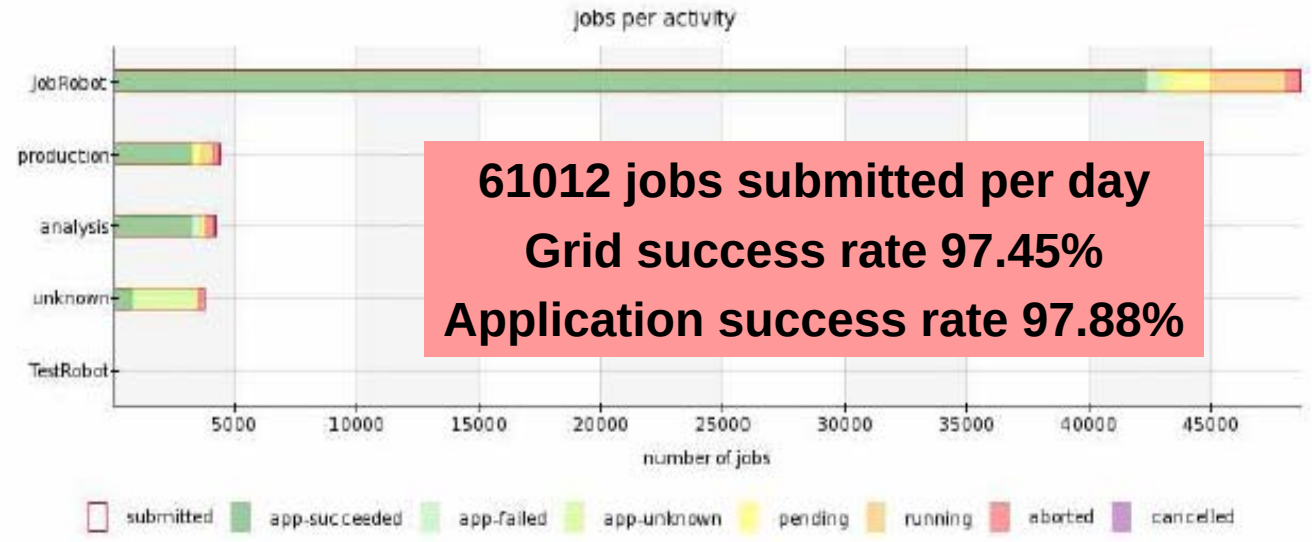
  - Only small fraction of jobs were submitted via LCG RB and could be monitored with RGMA or GridPP.

- **Dashboard is used for the monitoring of the Tier-0 activity.**

  CSA06 Tier-0 monitoring represented monitoring of the emulation-prototypes. The goal was to demonstrate that workflow and dataflow are feasible, i.e. that steady-state operation of the system with the desired throughput is possible.

Job monitoring for CSA06

any user
any site
any ce
any submissiontool
any dataset
any application
any rb
any activity
any grid
☐ unk ☐ pend ☐ run ☐ term
☐ done ☐ canc ☐ abort ☐ g-unk
☐ succ ☐ fail ☐ a-unk
☐ donesuccess
2006-11-08 19:44:55
to
2006-11-09 19:44:55
sort by activity
bars in the plot
submit



61012 jobs submitted per day
Grid success rate 97.45%
Application success rate 97.88%

	dashboard					grid					application				overall	
activity↓	Sub	Unk	Pend	Run	Term	Done	Canc	Abort	Unk	Grid%	Succ	Fail	Unk	App%	D/S	Overa
JobRobot	486980		1683	3100	439154084658			539	2472	98.7	42320547	1048		98.72	40103	91.32
TestRobot	12	0	0	0	12	0	0	0	12	0	0	12	0	0	0	0
analysis	4206	0	182	21	4003	2592	113	291	1007	89.91	3181	406	416	88.68	2178	54.41
production	4351	0	299	543	3509	1016	68	184	2241	84.67	3190	5	314	99.84	976	27.81
unknown	3745	0	9	16	3720	3425	21	238	36	93.5	767	48	2905	94.11	655	17.61
total	*610120*		*2173*	*3680*	*5515947879260*			*1252*	*5768*	*97.45*	*494581018*	*4683*		*97.98*	*4391279*	*61.61*

query took 0.78 seconds.

Note: How job status and success rate are calculated?

ATLAS Dashboard

- Started in early spring 2006
- Job monitoring part has a lot in common with CMS. This made possible to have first prototype ready by the beginning of May 2006. Still some effort required to instrument ATLAS analysis job submission tools (GANGA, PANDA) for the Dashboard reporting. Work is ongoing.
- Important part of the ATLAS Dashboard is Data Management Monitoring (Benjamin's talk later today).

LHCb and ALICE Dashboard

- Experience with the CMS and ATLAS Dashboard allowed to decouple a common core part regarding both functionality and implementation which can be reused for any VO.
- Improvement of the deployment procedure was required.
- LHCb Dashboard (job monitoring) was setup in November 2006
- Next step is setting up of the same service (job monitoring) for ALICE.

  Transfer monitoring for ALICE is available since September 2006.

http://dashboard.cern.ch/cms

http://dashboard.cern.ch/atlas

http://dashboard.cern.ch/lhcb

http://dashboard.cern.ch/alice

Job monitoring

- **What is the status of the jobs**

  -belonging to an individual user/group/VO

  -submitted to a given site or Grid flavor or via a given resource broker

  -reading a certain data sample, running a certain application…

- **If they are pending/running – for how long, where?**
- **If they are finished, whether they failed or ran properly?**
- **If they failed – why?**

Interactive interface example

JOB SUMMARY

jobsummary | waitingtime | runningtime

any user
any site
any ce
any submissionto
any dataset
any application
any rb
any activity
any grid
2006-10-08 20:48:07
to
2006-10-09 20:48:07
sort by site
submit

- High Grid failure rate on the site, no jobs are succefull from the application point of view
- Site is overloaded or has a trouble, all jobs are pending

dashboard

site	Sub	Unk	Pend	Run	T											
USCMS-FNAL-WC1	1328	0	10	23	1295	459	0	215	621	68.1	4	1289	2	0.31	1	0.08
unl.edu	961	0	9	25	927	617	0	0	310	100	896	6	25	99.33	588	63.43
hep.kbfi.ee	647	0	9	2	636	334	6	79	217	80.87	0	628	8	0	0	0
unknown	2136	0	1577	0	559	1	0	558	0	0.18	0	0	559	0	0	0
pi.infn.it	545	0	0	0	545	52	0	0								
hep.wisc.edu	543	0	11	3	529	346	0	21								
ITEP	621	0	171	11	439	0	143	0								
pic	419	0	4	21	394	170	70	4								
fnal.gov	809	0	0	417	392	0	0	0								
osg-gw-2.t2.ucsd.edu	340	0	15	5	320	228	0	0								
Taiwan-LCG2	343	0	4	23	316	83	56	31								
CIEMAT-LCG2	316	0	9	28	279	110	64	0	105	100	248	25	6	90.84	84	30.11
BEgrid-ULB-VUB	283	0	9	4	270	105	1	3	161	97.22	227	29	14	88.67	86	31.85
ultralight.org	318	0	8	41	269	174	42	0	53	100	253	4	12	98.44	172	63.94
ru-Moscow-SINP-LCG2	466	0	198	0	268	19	0	47	202	28.79	220	1	47	99.55	19	7.09
cmsaf.mit.edu	283	0	48	2	233	93	0	90	50	50.82	134	4	95	97.1	86	36.91
INFN-BARI	228	0	1	0	227	81	2	7	137	92.05	3	221	3	1.34	1	0.44
UKI-LT2-IC-HEP	282	0	54	31	197	0	0	18	179	0	179	0	18	100	0	0
BUDAPEST	179	0	2	12	165	57	3	0	105	100	154	6	5	96.25	54	32.73
INFN-LNL-2	159	0	0	0	159	47	0	0	112	100	159	0	0	100	47	29.56
IN2P3-CCLCG	155	0	0	7	148	44	32	0	72	100	136	2	10	98.55	41	27.7
JINR-LCG2	149	0	0	2	147	0	0	4	143	0	141	2	4	98.6	0	0
rcac.purdue.edu	170	0	74	3	93	25	0	42	26	37.31	60	6	27	90.91	25	26.88

- Bars and numbers are clickable
- Table is scrollable

total: 400 (seeing 50 to 100)

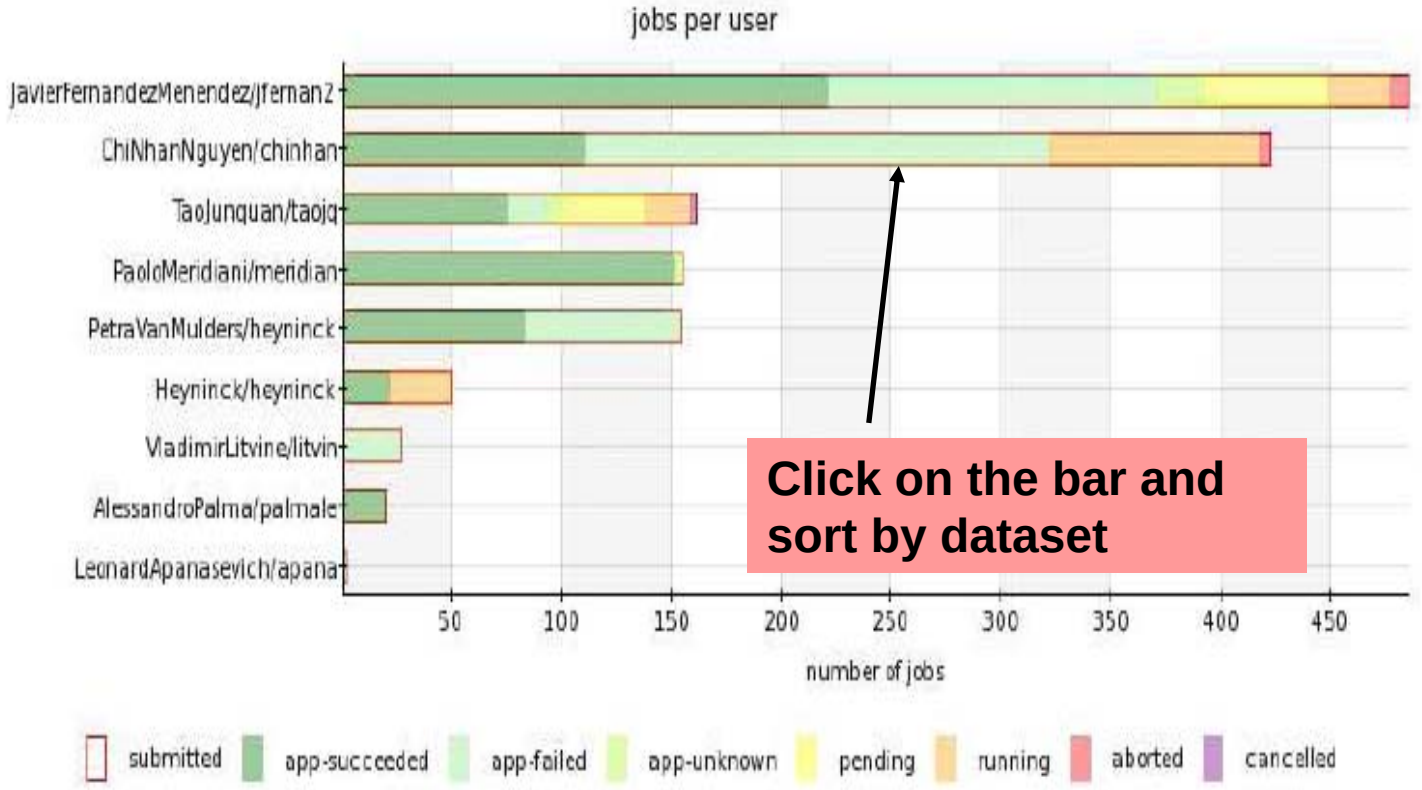
prev 50 next 50

meaning of ExitCodes

num	JobId	Site	Status	ExitCode	EvtRange	Submitted	Started	Finished	Task
50	https://egee-rb-03.cnaf.infn.it:9000/FJbhLVurm00j6IFv01R0Og	ifca.es	ABORTED	None	5	1970-01-01 00:00:00	2007-01-09 10:52:57	2007-01-09 10:54:59	pablom_crab_0_070109_11261
51	https://egee-rb-03.cnaf.infn.it:9000/U2l_sOZ599Uy7DuumKN6eA	ifca.es	ABORTED	None	2	1970-01-01 00:00:00	2007-01-09 10:52:55	2007-01-09 10:55:02	pablom_crab_0_070109_11261
52	https://egee-rb-03.cnaf.infn.it:9000/3k95sPuzqTb9y4F0pg_Lag	ifca.es	ABORTED	None	3	1970-01-01 00:00:00	2007-01-09 10:55:12	2007-01-09 10:56:34	pablom_crab_0_070109_11261
53	https://egee-rb-03.cnaf.infn.it:9000/XMrg47-yhanVs_M8CsythA	ifca.es	ABORTED	None	4	1970-01-01 00:00:00	2007-01-09 10:55:48	2007-01-09 10:57:24	pablom_crab_0_070109_11261
54	https://egee-rb-03.cnaf.infn.it:9000/hdRHZ44M90Ostf1vNnrOKg	ifca.es	ABORTED	None	1	1970-01-01 00:00:00	2007-01-09 10:52:56	2007-01-09 10:55:03	pablom_crab_0_070109_11261
55	https://rb102.cern.ch:9000/pup0twmuqjRTGQ4ORps3Hg	ifca.es	DONE (SUCCESS)	0	161	2007-01-09 15:04:21	2007-01-09 15:24:39	2007-01-09 15:38:06	pablom_crab_0_070109_15575
56	https://rb102.cern.ch:9000/Tz2eTS8eVcoCz8jGgwOlkw	ifca.es	DONE (SUCCESS)	0	77	2007-01-09 15:04:17	2007-01-09 15:12:21	2007-01-09 15:39:05	pablom_crab_0_070109_15575
57	https://rb102.cern.ch:9000/lIYejZh3YMyVc5O8cub3yg	ifca.es	DONE (SUCCESS)	0	17	2007-01-09 15:04:14	2007-01-09 15:11:31	2007-01-09 15:22:08	pablom_crab_0_070109_15575
58	https://rb102.cern.ch:9000/Elu2sn-xFZTxOpS2arGPuw	ifca.es	DONE (SUCCESS)	0	13	2007-01-09 15:04:14	2007-01-09 15:26:36	2007-01-09 15:43:14	pablom_crab_0_070109_15575
59	https://egee-rb-03.cnaf.infn.it:9000/ZK0mBGMWzQhKVFPYGDWd6w	ifca.es	CLEARED	60302	199	1970-01-01 00:00:00	2007-01-09 12:17:03	2007-01-09 12:17:47	pablom_crab_0_070109_11261
60	https://egee-rb-03.cnaf.infn.it:9000/SXYYymP--9DKjldwf0eifQ	ifca.es	CLEARED	60302	196	1970-01-01 00:00:00	2007-01-09 12:15:59	2007-01-09 12:16:43	pablom_crab_0_070109_11261

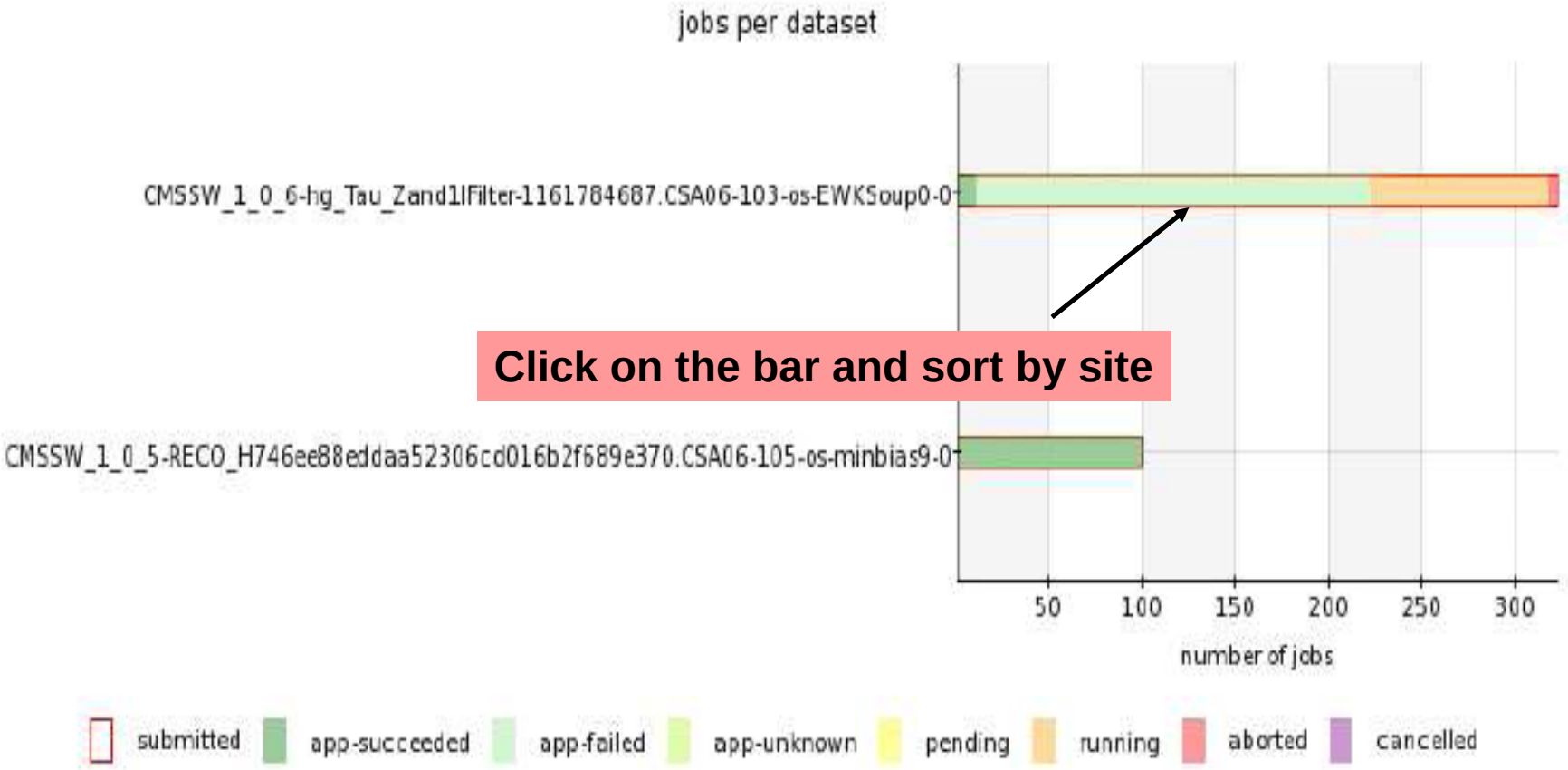
Example of user task monitoring

any user
any site
any ce
any submissiontool
any dataset
any application
any rb
analysis
any grid
unk pend run
term
done canc abort
g-unk
succ fail a-unk
donesuccess
2006-12-09 19:44:55
to
2006-12-10 19:44:55
sort by user



Click on the bar and sort by dataset

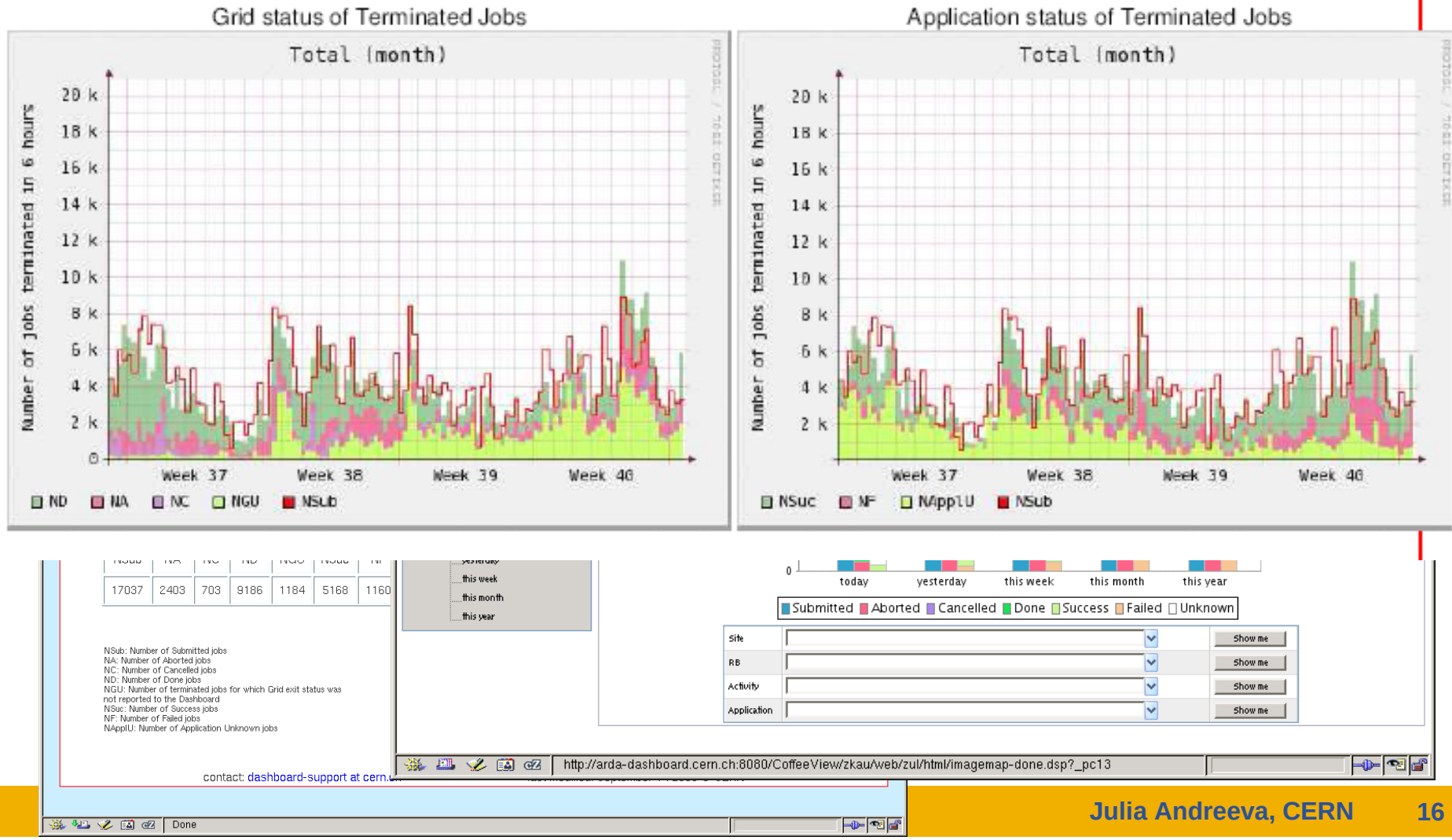
Example of user task monitoring



Example of user task monitoring

Pre-defined views

- Graphical interface as an entry point for the time history



History is available per site/rb/application/activity