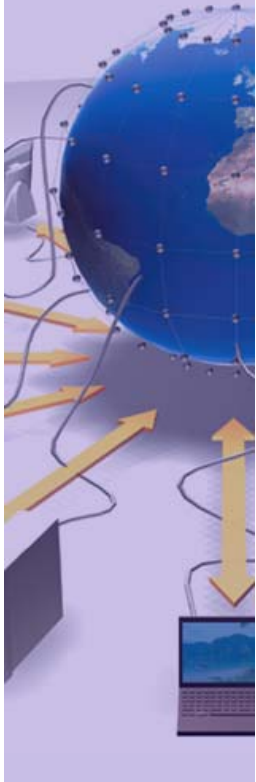


# CMS SAM Testing

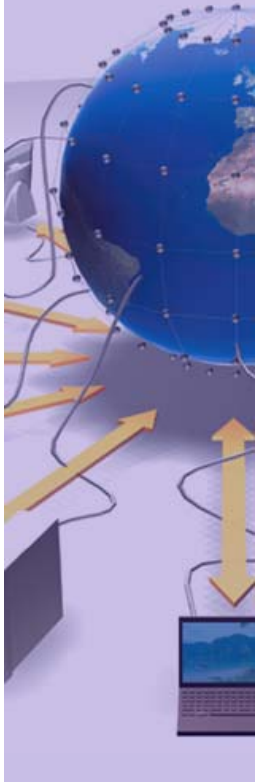
Andrea Sciabà

Grid Deployment Board  
May 14, 2008

- Description of the CMS SAM tests
  - CE
  - SRM
- Test criticality and availability calculation
  - Critical tests for WLCG
  - Critical tests for CMS
- Visualisation
  - SAM Dashboard
- Current and future applications
  - Site commissioning
  - Daily checks
- Conclusions



- Goal
  - Test the basic functionality of some Grid services
  - Verify the correctness of the CMS software installation and site configuration
  - Reproduce the operations performed by a typical Monte Carlo or analysis job
  - Avoid “false alarms”
  - Add tests as more things that can fail are discovered



- A “canonical” approach
  - Private installation of the SAM client
    - SAM Code is manually updated from time to time
    - Code of CMS tests is automatically updated
    - Running on the same UI as OPS, very soon moving to an 8-core CMS VOBOX to speed up test submission
  - Grid credentials
    - /cms/Role=lcgadmin
      - Used for most of the tests run in Grid jobs to take advantage of the higher priority
    - /cms/Role=production
      - Used for tests which simulate a MC production job
    - /cms
      - Used for tests which must resemble an operation done by a generic user

- As for OPS, these tests are run via a Grid job submitted via EDG Resource Broker
  - Need to move to the WMS, the RB is almost deprecated

Test name	Role	Meaning
CE-sft-job	lcgadmin	Fails if the job aborts
CE-cms-prod	production	Fails if the job aborts
CE-cms-basic	lcgadmin	Checks CMS sw area, CMS site local configuration, Trivial File Catalogue
CE-cms-swinst	lcgadmin	Checks correct installation of CMSSW, availability of required CMSSW versions
CE-cms-squid	lcgadmin	Checks the local site configuration for a proxy tag and that the Squid server replies without errors
CE-cms-frontier	lcgadmin	Using CMSSW, tries to download the ECAL pedestals from FroNtier and checks for errors
CE-cms-mc	production	Like a MC job, tries to stage out a file to local SRM as described in the local site config (srmcp, rfio, etc.)
CE-cms-analysis	lcgadmin	Using CMSSW, tries to read 10 events from a random file from a given dataset and checks for errors

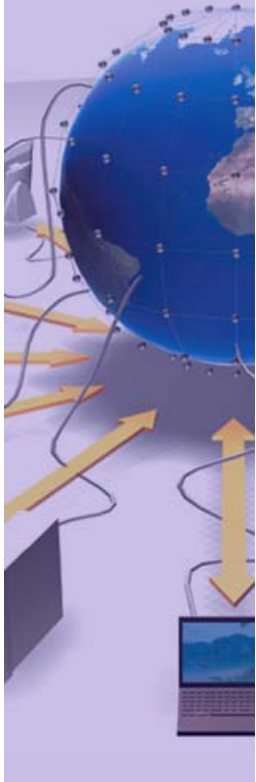
- Try to copy a file SAM UI ↔ remote SRM
- Use srmcp (dCache client)
- LFN: /store/unmerged/SAM/testSRM
- PFN: built from the Trivial File Catalogue (as done by PhEDEx)

Test name	Role	Meaning
SRM-v1-get-pfn-from-tfc	production	Look in the PhEDEx database for the LFN-to-PFN matching according to the TFC rules for the site
SRM-v1-put	production	<i>srmcp file://... &lt;PFN&gt;</i>
SRM-v1-get-metadata	production	Checks remote file size and checksum (if supported)
SRM-v1-get	production	<i>srmcp &lt;PFN&gt; file://... then diff</i>
SRM-v1-advisory-delete	production	<i>srm-advisory-delete &lt;PFN&gt;</i>

- Use lcg-util commands (*lcg-cp*, *lcg-del*, *lcg-ls*)
  - 1) *SrmPrepareToPut* + *gridftp transfer* + *SrmPutDone*
  - 2) *SrmPrepareToGet* + *gridftp*
  - 3) *SrmRm*
  - 4) *SrmLs*
- Space tokens
  - Only CMS\_DEFAULT is tested, but it is not required to work (so far)
- VO independent
  - The test code can be reused by any VO

Test name	Role	Meaning
SRMv2-get-pfn-from-tfc	production	Looks in the PhEDEx database for the LFN-to-PFN matching according to the TFC rules for the site
SRMv2-lcg-cp	production	Copies forth and back and deletes a file (1+2+3)
SRMv2-lcg-ls	production	As lcg-cp + tries to list the remote file (1+2+3+4)
SRMv2-lcg-ls-dir	production	Lists the directory with the remote file
SRMv2-lcg-gt	production	As lcg-cp + tries to get a gsiftp TURL for the remote file
SRMv2-lcg-gt-rm-gt	production	As lcg-gt + tries to get again a gsiftp TURL after file deletion to verify it was successful
SRMv2-user	-	As lcg-cp but tries to write under the logical path <i>/store/user/test</i> ( <i>/store/user</i> for user data)

- Test criticality defined in two contexts
  - WLCG
    - set in FCR, determines availability/reliability in GridView
    - Only tests whose failure is a middleware/fabric problem
      - Job submission failures, SRM, problems...
  - CMS
    - Set and taken into account in the SAM dashboard
    - Also tests specifically related to CMS
      - CMSSW installation, FroNtier, etc.
  - The algorithms are very similar





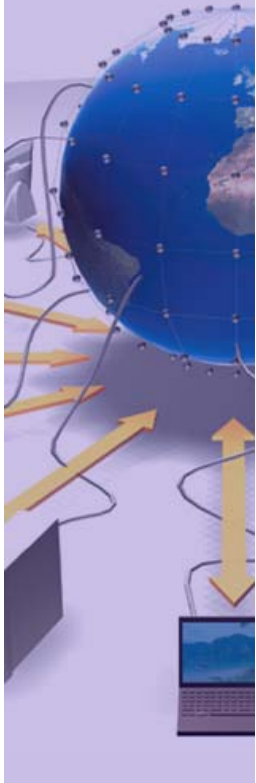
Test name	Run by
Computing Element	
CE-sft-job	CMS
CE-sft-caver	OPS
SRMv2	
SRMv2-lcg-cp	CMS

### WLCG critical tests

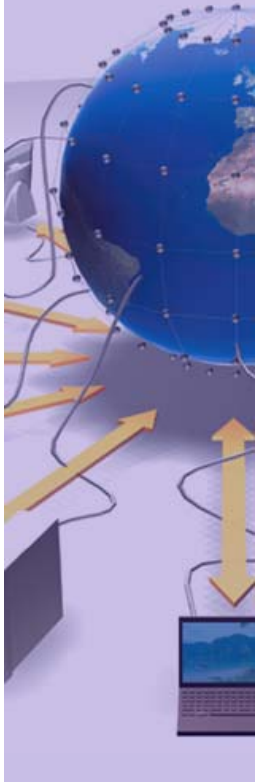
Test name	Run by
Computing Element	
CE-sft-job	CMS
CE-cms-prod	CMS
CE-cms-basic	CMS
CE-cms-swinst	CMS
CE-cms-squid	CMS
CE-cms-frontier	CMS
CE-cms-mc	CMS
CE-cms-analysis	CMS
SRMv2	
SRMv2-get-pfn-from-tfc	CMS
SRMv2-lcg-cp	CMS

### CMS critical tests

- The test development is decentralized
  - Every test is maintained by somebody who is an “expert” on the area
    - Software installation, FroNtier, SRM, MC production, etc.
  - All tests are thoroughly documented
- One coordinator to decide on test criticality, needed improvements, etc.
- Close contact with the Dashboard team for the visualisation part



- The Dashboard provides all that is needed to examine the output of the SAM tests
- Page developed following CMS requirements, soon to be adopted also by ATLAS





SAM VISUALIZATION

[Latest Results](#)
[Historical View](#)
[Feedback](#)
[Help](#)

**Sites:** Tier2s + Tier1s + Tier0  
 All Tier2s + Tier1s + Tier0  
 T0\_CH\_CERN  
 T1\_DE\_FZK  
**T1\_ES\_PIC**  
 T1\_FR\_CCIN2P3  
 T1\_IT\_CNAF  
 T1\_TW\_ASGC

**Service Types:** VO critical  
 Select all  
**CE**  
 SRMv2

**Test Types:** CMS Tests  
 Select All  
 CE-cms-analysis  
 CE-cms-basic  
 CE-cms-frontier  
 CE-cms-mc  
 CE-cms-prod  
 CE-cms-squid

**Test Exit Status:** All Exit Status  
 na  
 ok  
 down  
 degraded  
 partial  
 maint  
 error

[Show Results](#)

**Legend:** NA OK MAINTENANCE ERROR WARNING INFO NOTE CRITICAL

Note: brightest colors: test is 0 - 6 hours old, ... lightest colors: test is more that 24 hours old

Link to the table

Sitename	Service Type	Service Name	analysis	jsprod	basic	frontier	squid	mc	swinst	js	lcg-cp	get-pfn-from-tfc	
T1_ES_PIC	CE	ce05.pic.es	ok	ok	ok	ok	ok	ok	ok	ok			
		ce06.pic.es	ok	ok	ok	ok	ok	ok	ok	ok			
		ce07.pic.es	ok	ok	ok	ok	ok	ok	ok	ok			
T1_UK_RAL	SRMv2	srm-disk.pic.es									ok	ok	
		CE	lcgce01.gridpp.rl.ac.uk			ok	ok	ok	ok	warn	error		
			lcgce02.gridpp.rl.ac.uk	ok	ok	ok	ok	ok	ok	ok	ok		
T2_EE_Estonia	SRMv2	lcgce0371.gridpp.rl.ac.uk			ok	ok	ok		ok				
		srm-cms.gridpp.rl.ac.uk									ok	ok	
		CE	oberon.hep.kbfi.ee	ok	ok	ok	ok	ok	ok	ok			
T2_ES_CIAMAT	SRMv2	io.hep.kbfi.ee									ok	ok	
		CE	lcg02.ciemat.es	ok	ok	ok	ok	ok	ok	ok			
T2_ES_IFCA	SRMv2	srm.ciemat.es									ok	warn	
		CE	egeece01.ifca.es	error	ok	ok	ok	ok	ok	ok			
		SRMv2	storm.ifca.es									error	ok
T2_PT_LIP_Coimbra	SRMv2	grid006.lca.uc.pt	ok	ok	warn	ok	ok	ok	ok	ok			
		grid004.lca.uc.pt									ok	ok	
T2_PT_LIP_Lisbon	SRMv2	ce02.lip.pt	ok	ok	ok	ok	ok	ok	ok	ok			
		dcache01.lip.pt									ok	ok	
T2_UK_London_Brunel	CE	dgc-grid-40.brunel.ac.uk	ok	ok	ok	ok	ok	ok	ok	ok			





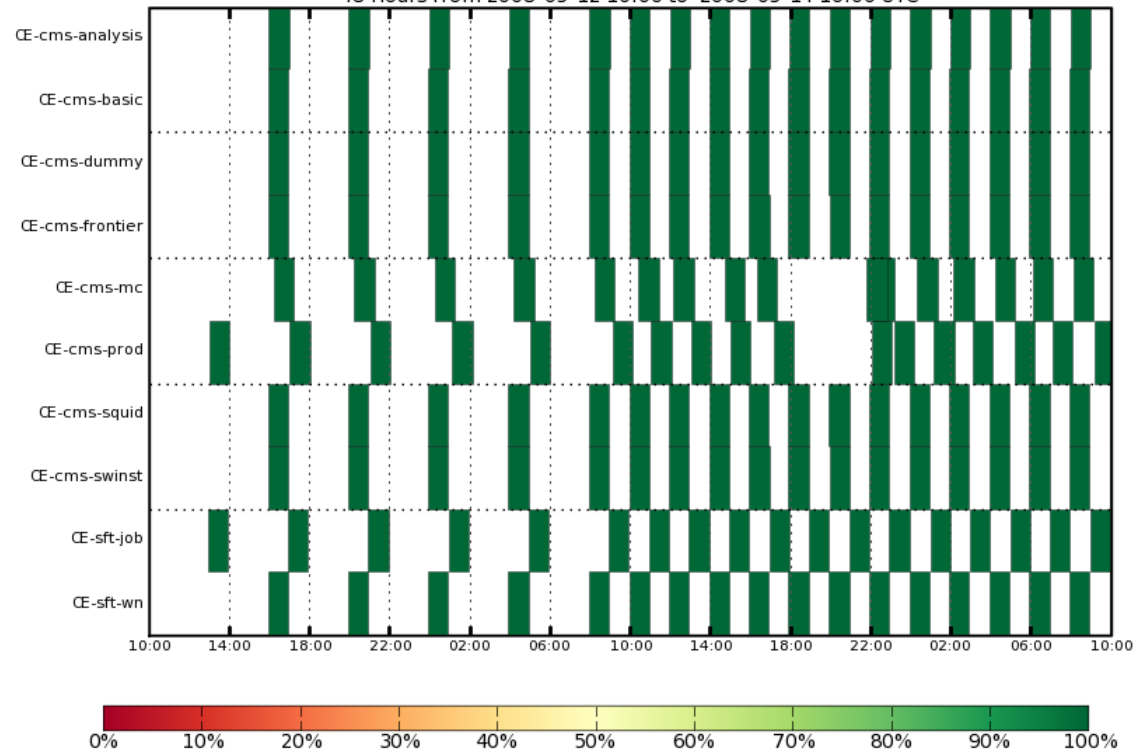
SAM VISUALIZATION

**Latest Results** **Historical View** **Feedback**

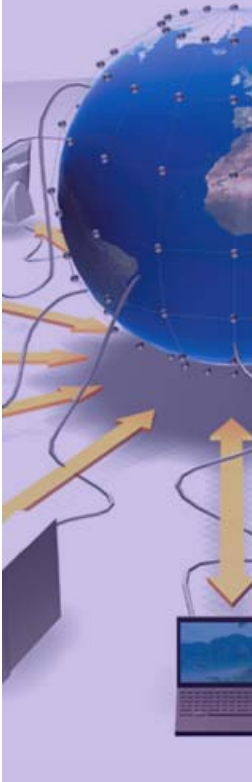
Sites	Service Types	Test Types	Test Exit Status
Tier1s + Tier0	VO critical	CMS Tests	All Exit Status
All Tier1s + Tier0	Select All		na
T0_CH_CERN	CE		ok
T1_DE_FZK	SRMv2		down
T1_ES_PIC			degraded
T1_FR_CCIN2P3			partial
T1_IT_CNAF			maint
T1_TW_ASGC			error

## Test results for ce05.pic.es

48 Hours from 2008-05-12 10:00 to 2008-05-14 10:00 UTC







Latest Results
Historical View
Feedback

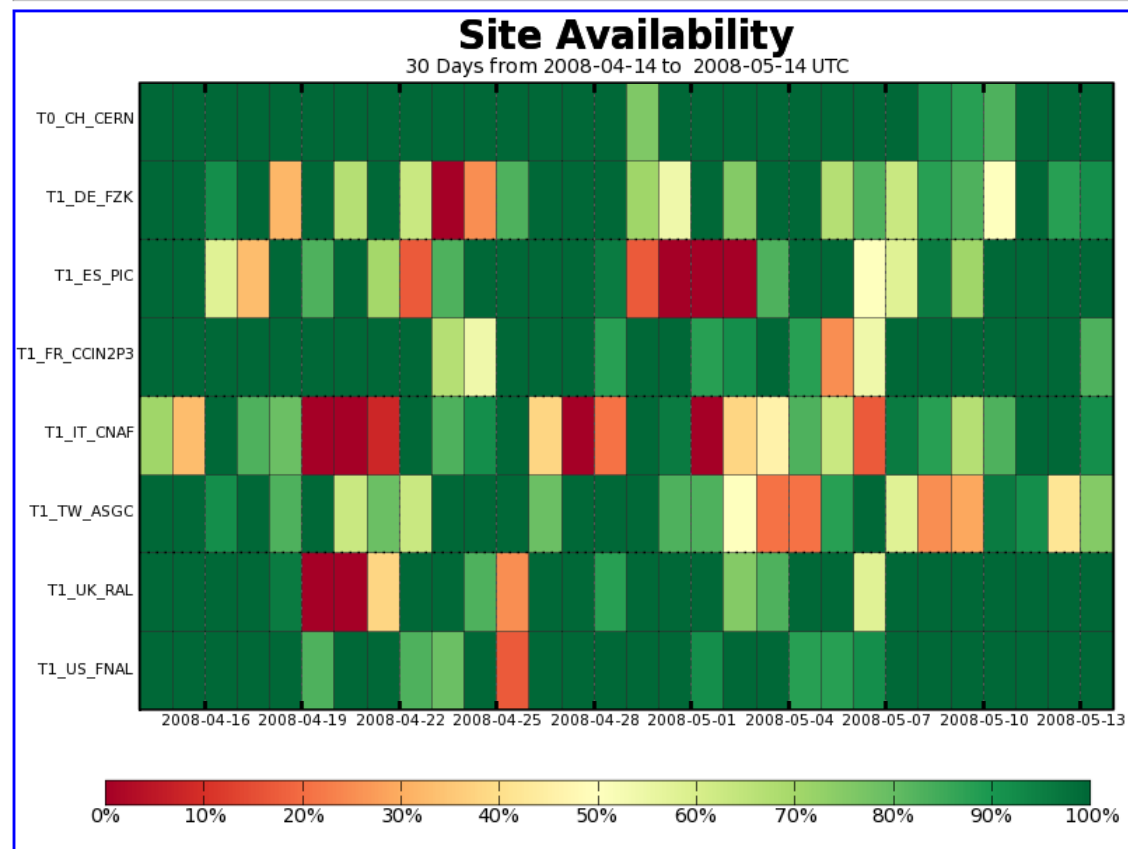
**View**      **Time Range**      **Sites**

Site Availability      Last Month      Tier1s + Tier0

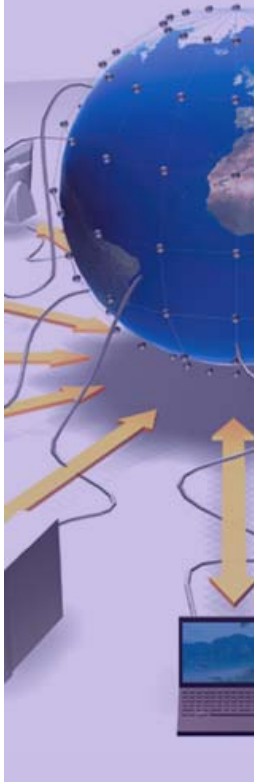
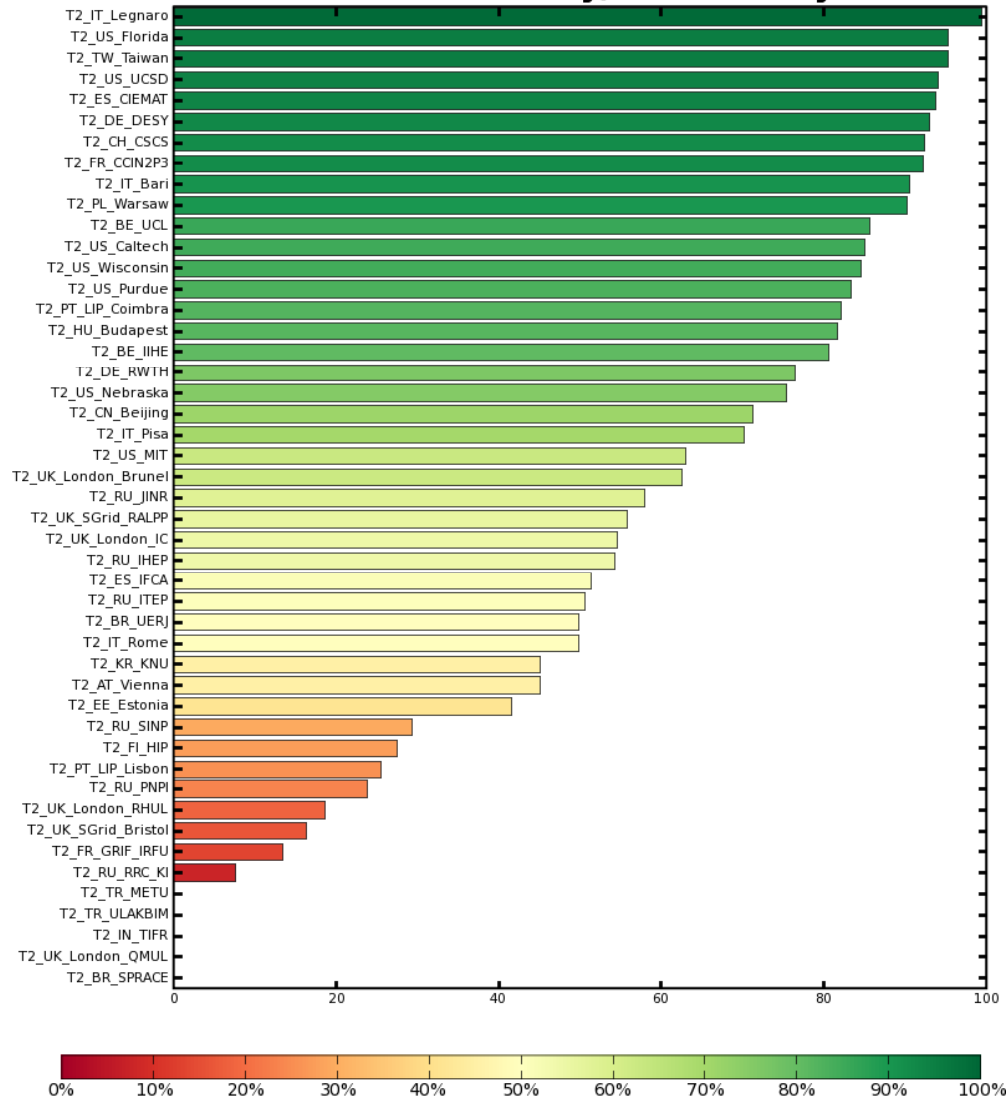
Quality Plot  
 Availability Ranking Plot

Show Results


All Tier1s + Tier0  
 T0\_CH\_CERN  
 T1\_DE\_FZK  
 T1\_ES\_PIC  
 T1\_FR\_CCIN2P3  
 T1\_IT\_CNAF  
 T1\_TW\_ASGC



Site Availability, last 31 days






SAM VISUALIZATION

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Latest Results
Historical View
Feedback

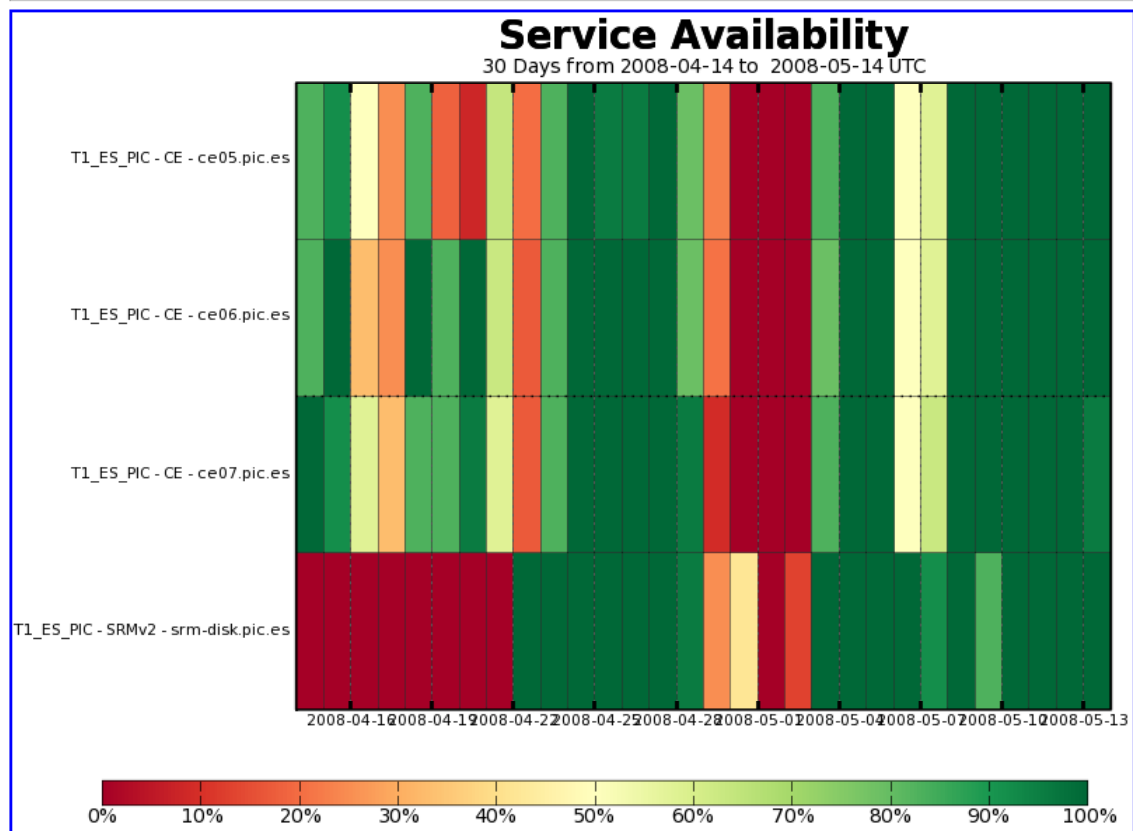
---


**View** Service Availability
**Time Range** Last Month
**Sites** Tier1s + Tier0
**Service Types** VO critical

Show Results

All Tier1s + Tier0  
 T0\_CH\_CERN  
 T1\_DE\_FZK  
**T1\_ES\_PIC**  
 T1\_FR\_CCIN2P3  
 T1\_IT\_CNAF  
 T1\_TW\_ASGC

Select all  
**CE**  
 SRMv2




SAM VISUALIZATION

Latest Results
Historical View
Feedback

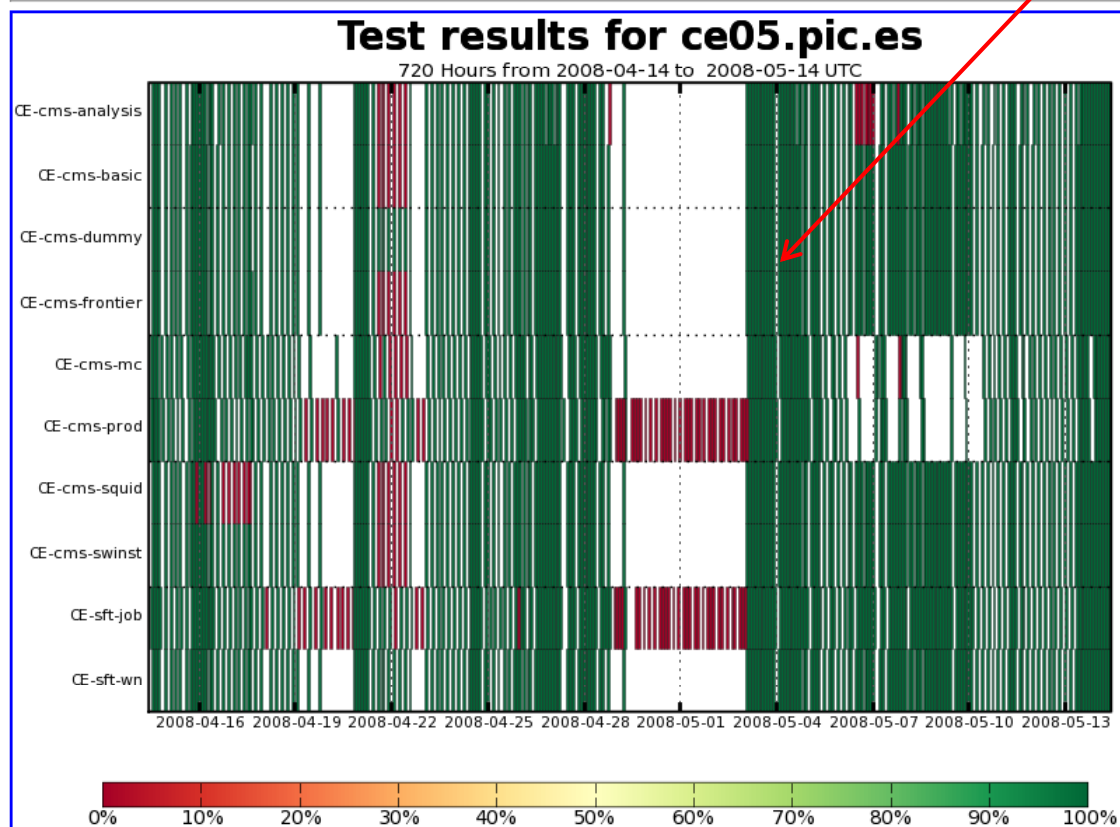
**View**    **Time Range**    **Sites**    **Service Types**    **Services Tests**

Test History    Last Month    All Sites    VO critical

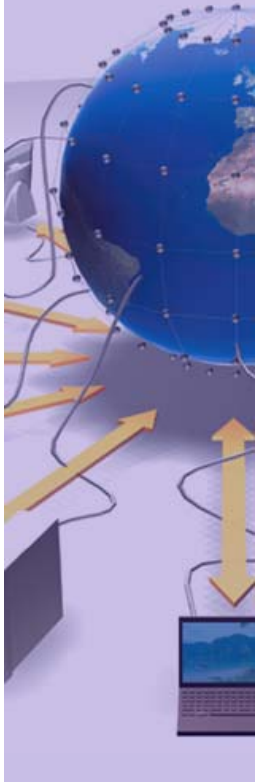
T0\_CH\_CERN  
 T1\_DE\_FZK  
**T1\_ES\_PIC**  
 T1\_FR\_CCIN2P3  
 T1\_IT\_CNAF  
 T1\_TW\_ASGC  
 T1\_UK\_RAL

Select all  
**CE**  
 SRMv2

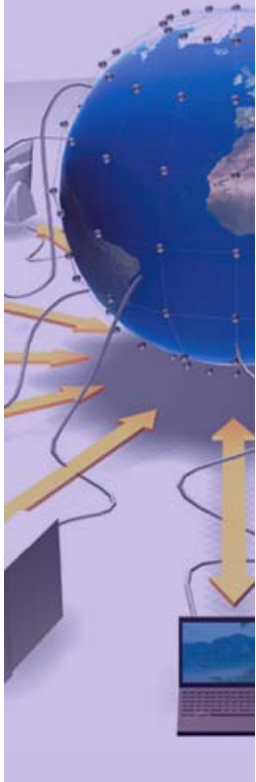
Clickable to go the test output



- What are the SAM tests used for?
  - To see if something is not working
  - To measure the site availability
  - To rank the sites by availability
- Site commissioning
  - A new activity in CMS to determine if a site is “usable” or not
  - SAM test results are among the different sources of information to rate a site
  - Commissioning criteria still to be agreed, but for sure
    - a site which looks “bad” in SAM will not be used for any “real” work (MC generation, user analysis)
      - Exception: Tier-1 sites will never be “decommissioned”



- Who should look at the SAM tests?
  - The sites! (typically the CMS site contact)
    - It takes just a glance to see if a single site has problems
    - In case there are, action can be taken immediately
  - “Backup” solution
    - A small (~6) team of people who daily look at ~1/6 of the CMS sites and act of errors according to a checklist
      - 1) Look for errors in the CMS SAM tests
      - 2) If any, do one’s best to troubleshoot (a “knowledge base” is regularly updated)
      - 3) Inform site via a Savannah ticket addressed to the local CMS site contact (as from the CMS SiteDB)
        - » File also a GGUS ticket if a Grid problem in EGEE
      - 4) Follow up on previously opened tickets



**LCG Savannah**

**Logged in as sciaba**

My Incoming Items

My Items

My Groups

My Account Conf

Logout

---

**This Page**

Clean Reload

Printer Version

Related Recipes:  
Item Privacy

---

**Search**

in **Projects**

---

**Hosted Projects**

Register New Project

Full List

Contributors Wanted

Statistics

---

**Site Help**

User Docs: Cookbook

User Docs: In Depth Guide

## CMS Computing Infrastructure Support - Support: Browse Items

**Group** Main Docs Support Source Code

(+) Display Criteria

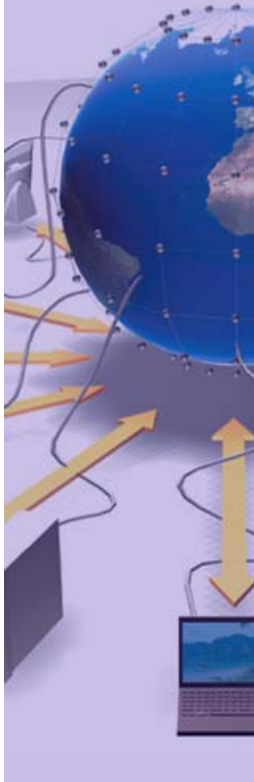
**8 matching items - Items 1 to 8**

Item ID	Summary	Submitted On	Assigned To	Submitted By
#104347	SAM SRMv2 lcg-cp test fails at T2_ES_IFCA	2008-05-14 09:08	cabrillo	sciaba
#104335	SAM CE mc test fails at T2_PT_LIP_Coimbra	2008-05-13 09:49	nalmeida	sciaba
#104166	SAM CE analysis test fails at IFCA	2008-04-25 10:24	cabrillo	sciaba
#104142	SAM CE test "mc" failing in T2_JINR	2008-04-23 12:48	kodolova	jafonso
#103993	correct SE for T2_BR_SPRACE	2008-04-11 16:09	gregores	bloom
#103775	T2_RU_PNPI status not up to data in dashboard	2008-03-26 09:40	julia	belforte
#103767	T2_CN_PKU in SiteDB but not in the T2 list for running SAM tests	2008-03-25 14:29	metson	bonacor
#103740	CE SAM test "mc" fails on 2 CE nodes at GRIF	2008-03-20 11:22	mjouvin	bonacor

**8 matching items - Items 1 to 8**

Open Items Priority Colors:

Closed Items Priority Colors:

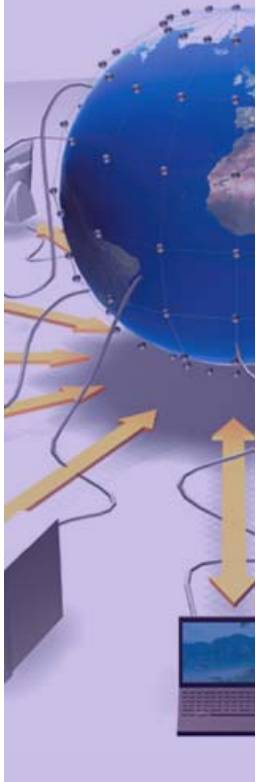


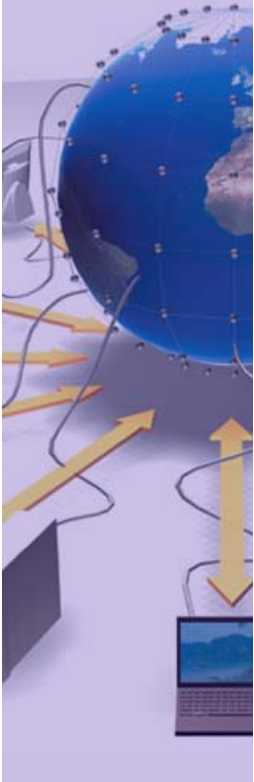
## Site Availability

24 Hours from 2008-05-13 11:00 to 2008-05-14 11:00 UTC

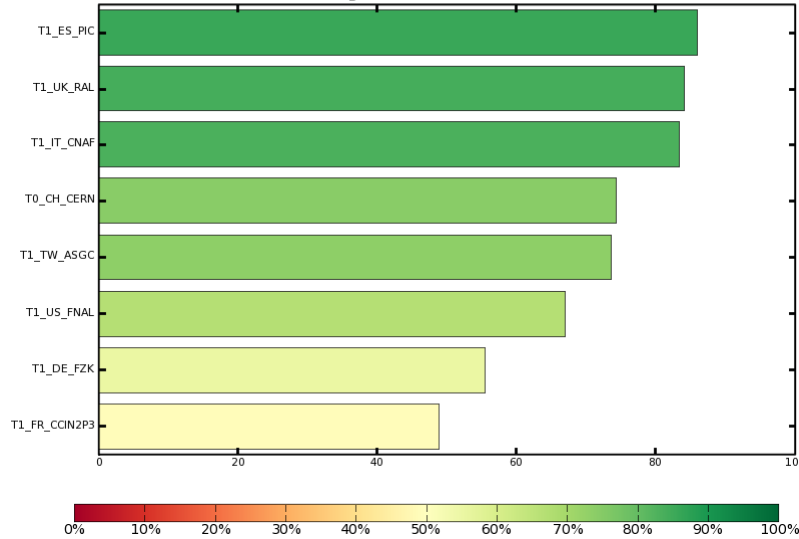


- Results of the backup solution
  - Significant improvement when the exercise started (more pronounced for Tier-1 sites)
  - Reached a “plateau” far from being satisfactory
- Alarms?
  - It is possible for a site to get alarms if it so desires
    - Only one site did it, Caltech, and using the Nagios plugin developed by the WLCG Grid Services Monitoring Working Group
    - See <https://twiki.cern.ch/twiki/bin/view/CMS/NagiosProbeForSAM>
- Conclusions
  - Significant effort required (it should really be just a “backup”)
  - Cannot go beyond a certain level
  - A more proactive attitude from the sites is needed
  - This will probably happen when sites bad in SAM will not be used

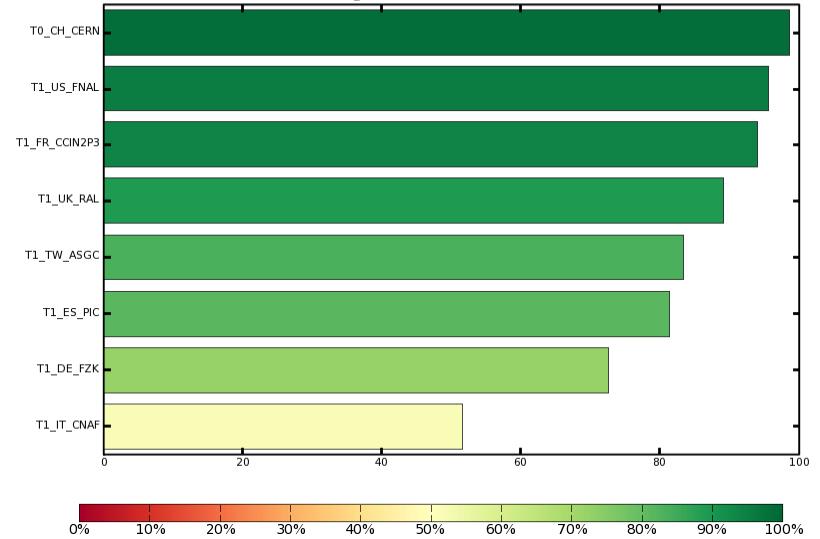




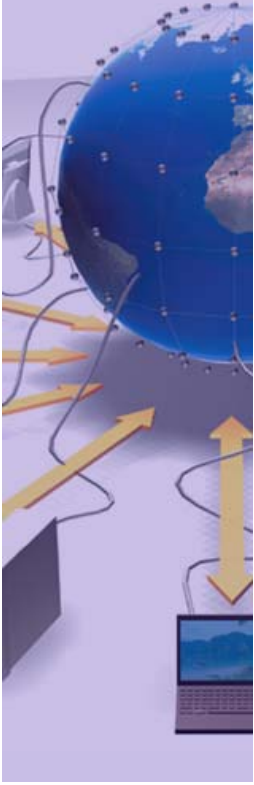
**Site Availability, 2008-02-01 - 2008-03-15**



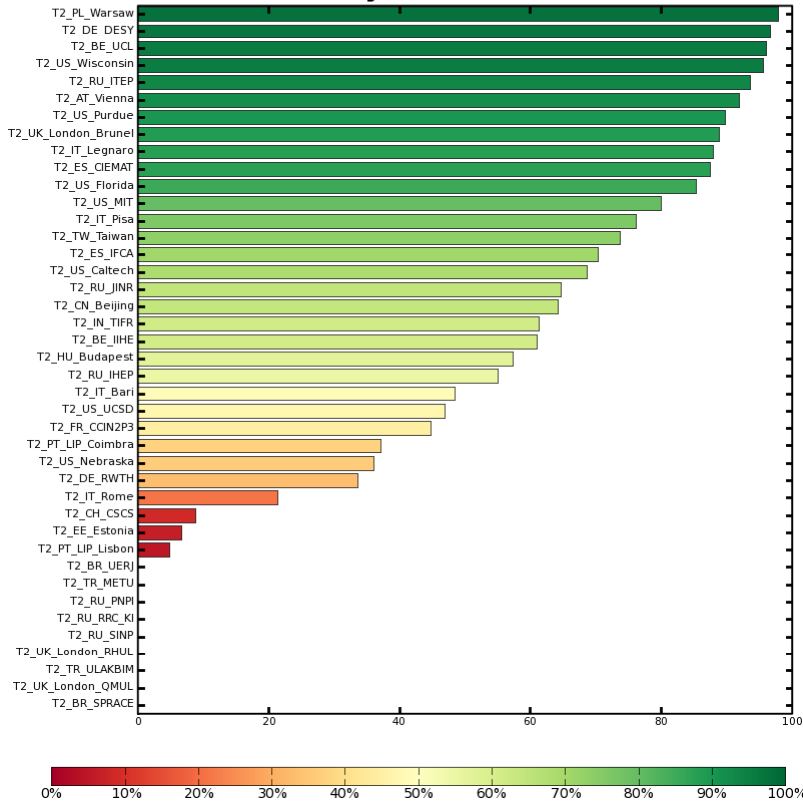
**Site Availability, 2008-04-01 - 2008-05-14**



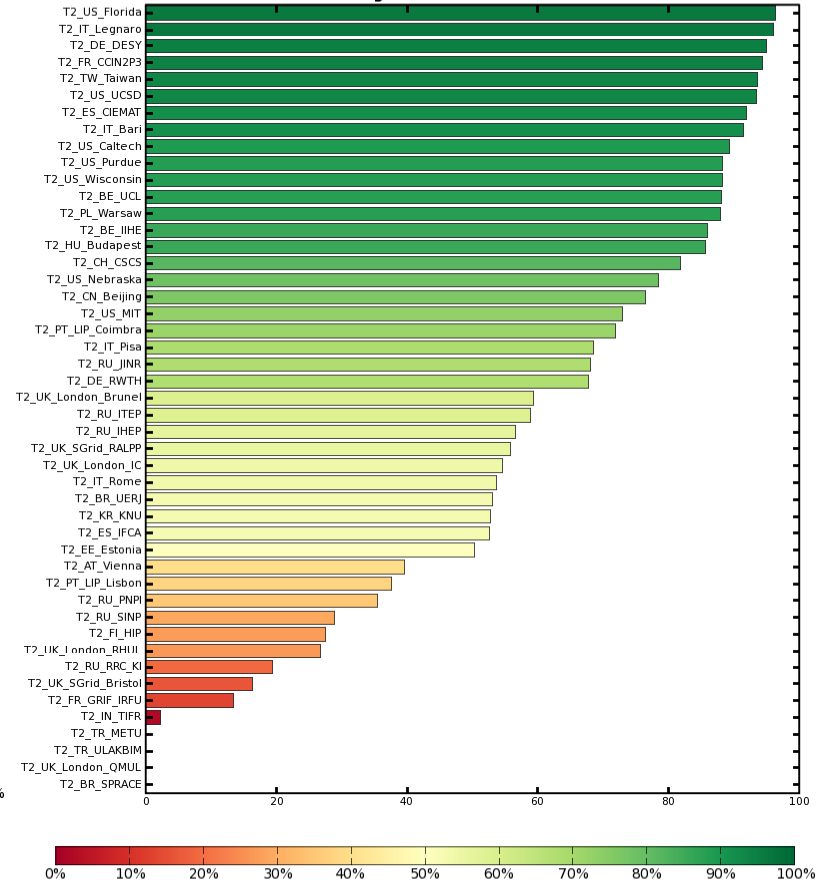




Site Availability, 2008-02-01 - 2008-03-15



Site Availability, 2008-04-01 - 2008-05-14



- CMS has a well developed SAM setup
- Many use cases covered, still expanding
- OSG and EGEE sites equally covered, ARC sites (Helsinki) soon to be added
- SAM test results should be checked both by sites (essential) and possibly also centrally (as a backup)
- SAM test results, to be useful at all, must be considered in deciding whether to run on a site

