SAM and availability for CMS

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Outline

- **SAM test description**
  - CE tests
  - SRM tests
- **Availability calculation**
  - WLCG availability
  - CMS availability
  - FCR
- **Visualization tools**
  - ARDA dashboard
- **Future plans**

Goal of the SAM tests

- **SAM is used in CMS to test the basic functionalities which are used by the CMS workflows**
  - Monte Carlo production
  - Analysis
- **The SAM tests are used to test both EGEE and OSG sites**
  - The submission in all cases is through the LCG Resource Broker
- **Two sensors are used so far: the CE and the SRM sensor**
- **The tests are run only at specific sites, essentially all CMS Tier-N plus a few others**

Computing Element tests

- CMS submits custom tests for the CE since the beginning of 2007
  - Tests are submitted every two hours
- All tests are run with the *lcgadmin* role, but the MC test which is run with the *production* role
 - $\Rightarrow$ the test jobs are submitted twice for each CE

Test name	What it does
job submission	Submits a job to the CE
basic	Checks that the CMS local site configuration is OK
swinst	Checks that the CMSSW installation are OK and all versions needed for the MC production are there
Monte Carlo	Checks that it is possible to stage out a file from the worker node to the local storage
Squid	Checks that the local Squid server works
FroNtier	Reads calibration data using CMSSW via the local Squid server

SRM tests
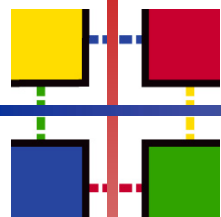
- Since June 2007, CMS uses custom tests for SRM v1
  - File transfer is done via *srmcp*
  - The *production* role is used
  - They have a dependency on the PhEDEx database
- Tests for SRM v2 are in development
- <u>There are no tests for the SE</u>
 - no reason to use both the SE and the SRM sensor in SAM

| Test name	What it does
get-pfn-from-tfc	Finds the LFN-to-PFN translation rule for that SRM in the PhEDEx database
put	Copies a local file to the remote SRM via srmcp
Get-metadata	Queries the file metadata from SRM
get	Copies back the remote file and compares it with the original one
advisory-delete	Tells the SRM that it can delete the test file
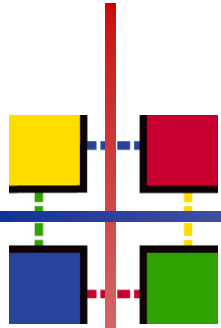
WLCG availability

- **It is determined by the choice of the critical tests**
  - CE
    - **Job submission** $\Rightarrow$ the CE is unavailable if it cannot run a CMS job via RB [run by cms]
    - **CA certs** $\Rightarrow$ the CE is unavailable if it has not the correct CA certificates [run by ops]
    - **VO tag management** $\Rightarrow$ the CE is unavailable if the publication of experiment tags does not work [run by ops]
  - SRM
    - **put** $\Rightarrow$ the SRM is unavailable if it is not possible to copy a file on it via srmcp [since 10/12/07]
  - SE, FTS, RB, etc.
    - No critical tests defined

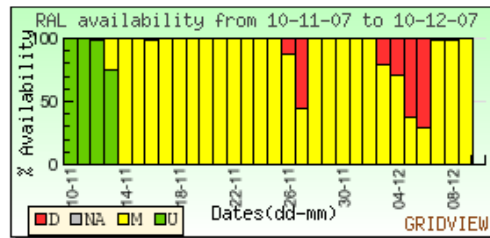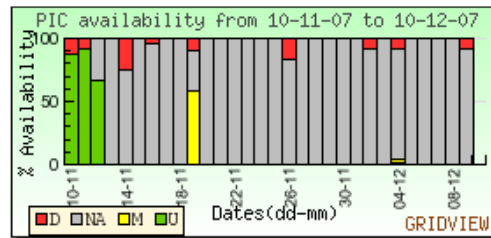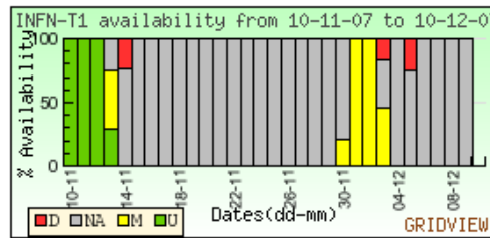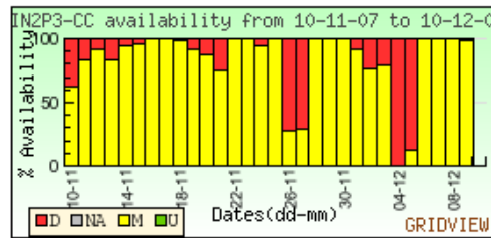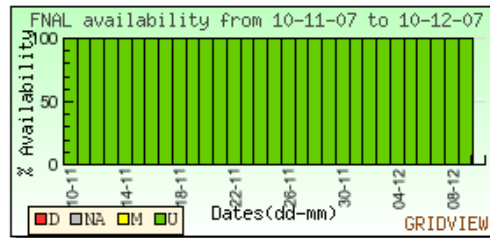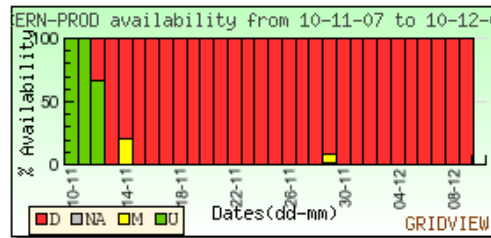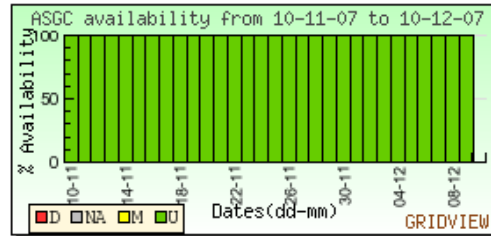# Problems with WLCG availability (I)
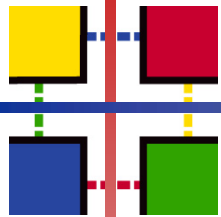
- The availability calculation in GridView is wrong (bug #31233)
  - if a service type stops having critical tests, all its instances will have status UNKNOWN but the combined service status is not updated any more
    - This is very serious: CMS stopped having critical tests for the SE on 13/11, and since then the SE status is frozen to what it was immediately before
    - This propagates to the site availability
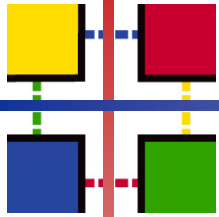
Problems with WLCG availability (II)
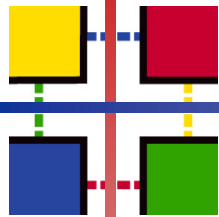
- Impact for the Tier-1 global availability is "random"
  - ASGC: SE always available, no impact
  - CERN-PROD: SE always unavailable, serious impact (always red)
  - FNAL: SE status UNKNOWN, no impact
  - FZK: SE status UNKNOWN, serious impact (always grey)
  - IN2P3: SE always on maintenance (not for real!), serious impact (always yellow)
  - INFN-T1: same as FZK
  - PIC: same as FZK
  - RAL: same as IN2P3
- In other words, the Tier-1 WLCG availability for CMS is wrong since ~ 1 month

# CMS Tier-1 availability in GridView
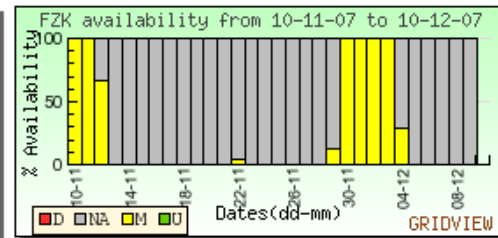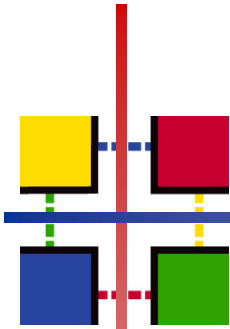
Problems with WLCG availability (III)

- There is also a problem in the new WLCG availability algorithm (bug #31233)
  - If a service has no critical tests defined, the status is UNKNOWN, <u>but</u>
  - If a VO says that no test is critical for a service type, it means that that service is always available for them (unless it is on maintenance of course)
  - Therefore, if e.g. the SE has no critical tests, all SEs should be always OK

Problems with WLCG availability (IV)
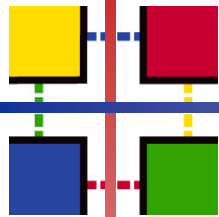
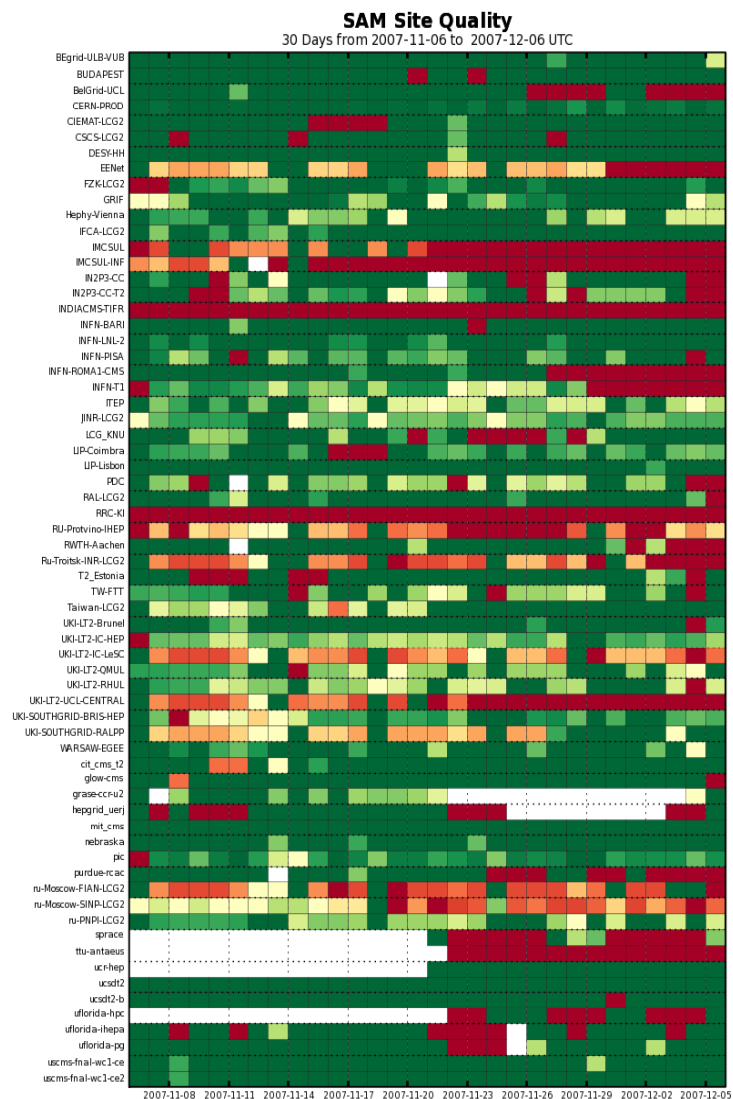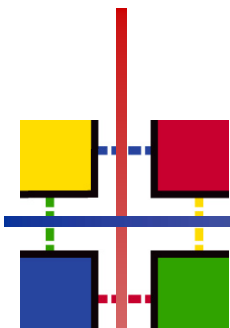- **BDII inconsistencies**
  - FNAL publishes its resources on different "GLUE" sites
    - USCMS-FNAL-WC1: contains the SE and the SRM
      - the only one known to GridView!
    - uscms-fnal-wc1-ce: contains one CE
    - uscms-fnal-wc1-ce2: contains another CE
  - Effect: the FNAL WLCG availability ignores the status of the CE $\Rightarrow$ possible overestimation of the availability if the CE is down
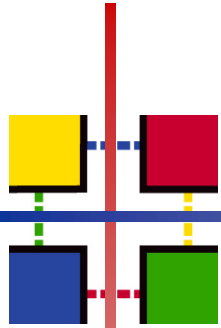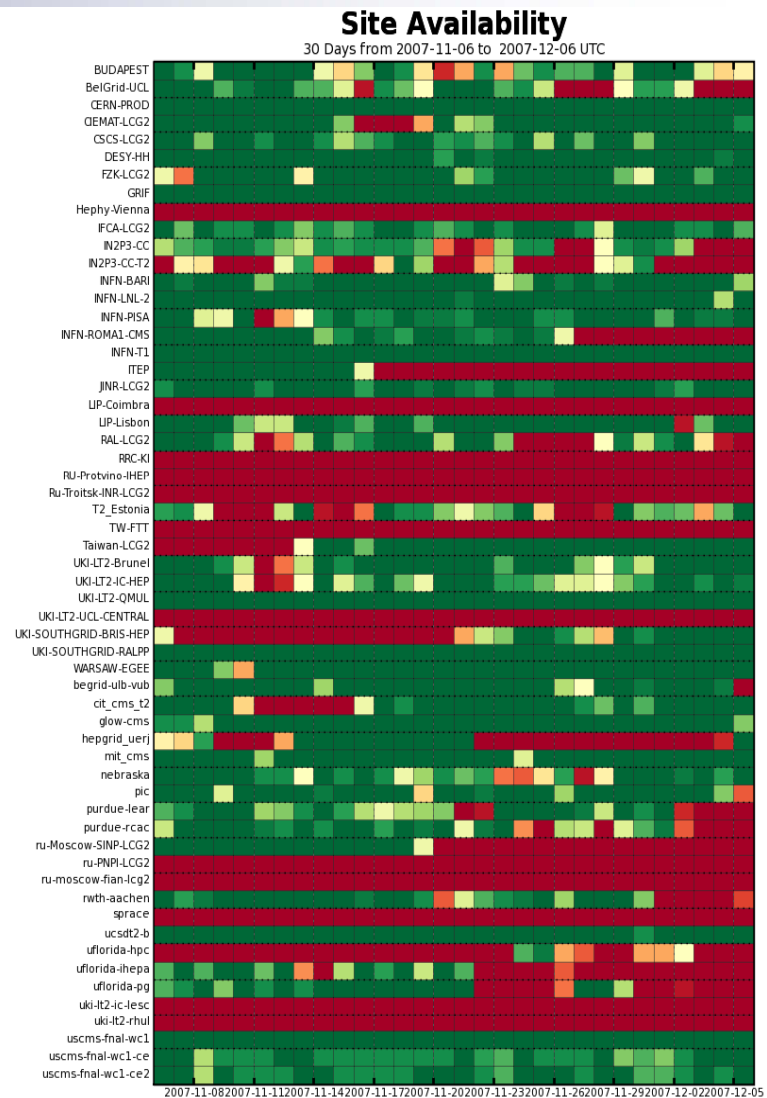
CMS availability

- CMS has been using a custom definition of availability for internal use
  - Calculated as the daily fraction of CMS SAM tests for the CE which were successful
    - No test is really "critical", every failure just degrades a bit the estimation
    - The SRM tests are not included in the calculation
  - It is calculated by a script run by hand
- A new calculation more WLCG-like has been implemented in the ARDA dashboard
  - The algorithm very similar to the WLCG one
  - All CMS tests are taken as critical, for now

CMS availability

SAM Site Quality
30 Days from 2007-11-06 to 2007-12-06 UTC

Site Availability
30 Days from 2007-11-06 to 2007-12-06 UTC

Old algorithm

New algorithm

CMS availability rank

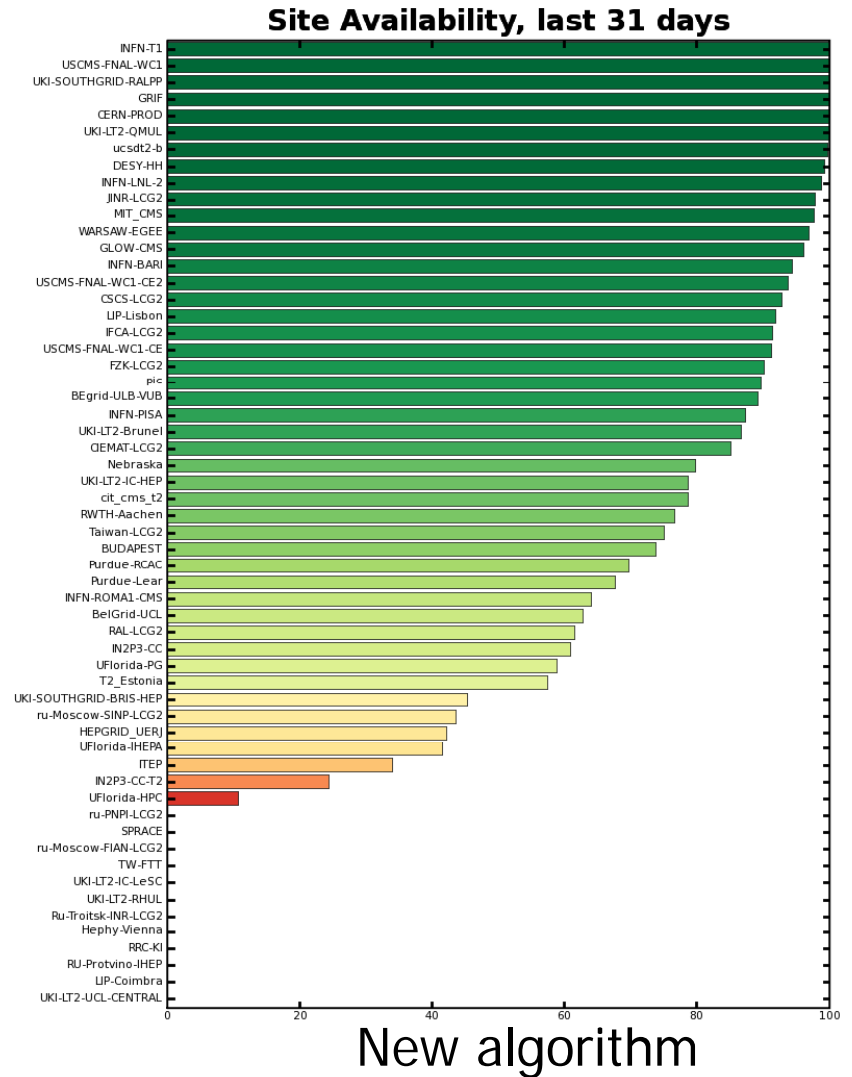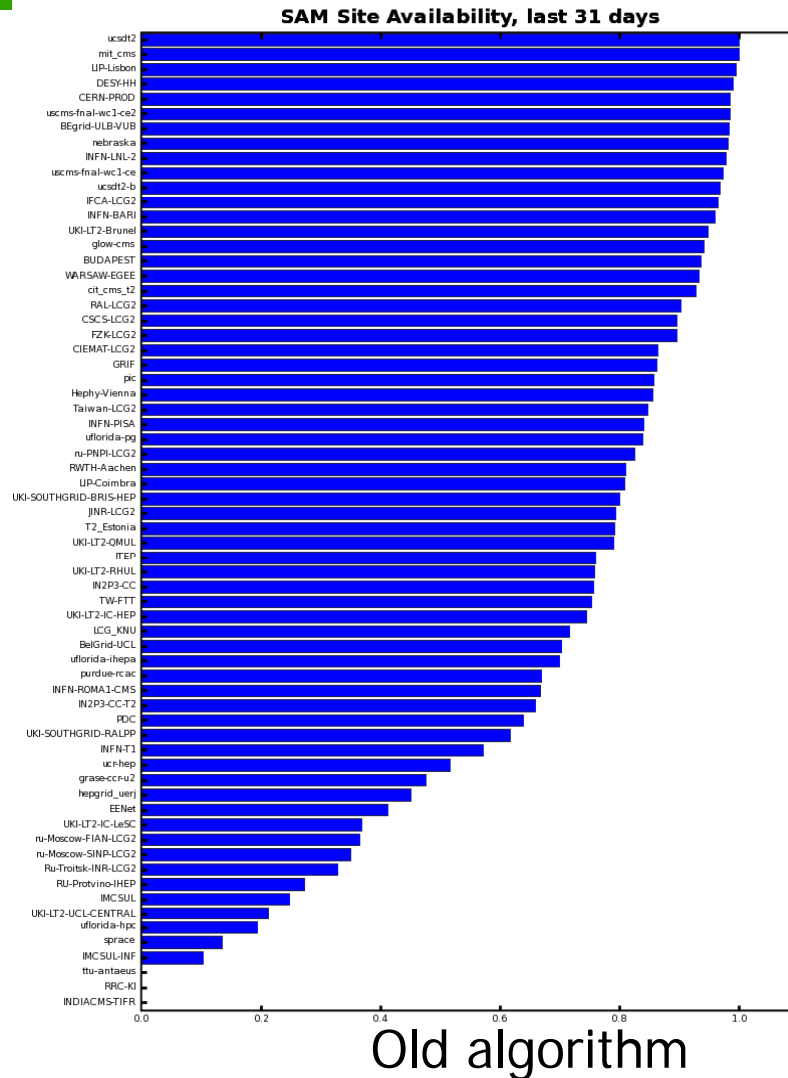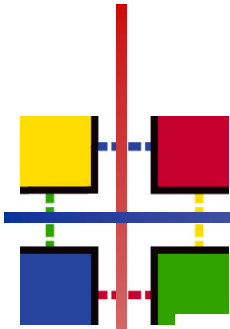SAM Site Availability, last 31 days

Site Availability, last 31 days

Old algorithm

New algorithm

Differences and similarities

- **Differences**
  - The choice of critical tests for WLCG is constrained by the fact that if a CE fails a critical test it is also removed from the BDII by FCR
    - ⇒ the choice must be careful and conservative
  - For CMS, a test might be critical if its failure prevents some high level workflow from working
    - ⇒ the choice can include other tests
    - e.g. jobs run, MC is OK, access to calibration DB fail
  - Some details to be sorted out
    - e.g. for CMS the test results never become obsolete, they do for WLCG
- **Similarities**
  - The algorithm is (now) very similar

Freedom of Choice for Resources

- **The only tool to**
  - set the critical tests
  - Whitelist or blacklist specific istances
- **Two problems**
  - OSG sites are not included
    - But they were some time ago
  - The only service types supported are CE and SE
    - But not SRM

Visualization tools

- The standard SAM web interface is inadequate and basically frozen since several months
  - It does not show EGEE sites and OSG sites together
  - It does not allow to show only "real" CMS sites
  - It has some bugs in the history view
- CMS has turned to the ARDA dashboard team to have a better graphical interface
  - Very easy to have new features in place
  - The work can be easily reused by other VOs

Future plans

- **Add more tests**
  - **"Analysis" test including**
    - Read access to local data
    - Stageout to remote storage
- **Feed back the CMS availability into SAM as another SAM test for easy viewing**
- **Plug in the CMS SAM tests in the site monitoring**
  - Tools in development in SAM group at CERN