CMS usage of SAM in EGEE and OSG

Andrea Sciabà
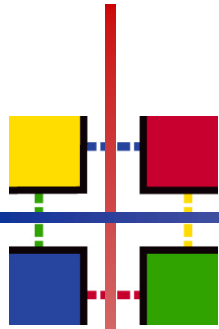
Grid Operations Workshop
13-15 June, 2007
Stockholm

Outline

- SAM for CMS
- CMS SAM tests
- Using SAM with OSG sites
- Using SAM for the commissioning of the CMS computing system
- Problems found
- Future developments
- Conclusions

SAM for CMS

- **Why SAM?**
  - SAM is explicitly developed to run periodic sanity checks on Grid (and experiment) services
- **How can it be used?**
  - Relying on ops test results
    - The easiest option, done for years
  - Running some standard tests under the CMS VO
    - e.g. to spot problems occurring only with VOs other than ops
  - Running custom CMS tests
    - The most effective option
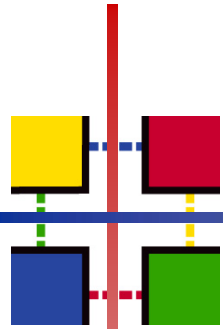
Using ops tests as critical tests

- CMS uses since a long time some ops tests as critical tests
  - Job submission
  - CA certs version
  - csh test
  - VO tag management: checks that the CE experiment tags can be read
- The failure of any of this tests is definitely a serious problem!
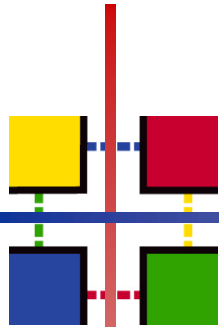
Using CMS custom tests in SAM

- **A CMS instance of the SAM client is installed at CERN**
  - Tests are submitted every two hours to "real" CMS sites
- **The SAM framework allows to easily plug in new tests for existing sensors**
  - Added to "testjob" sensor $\Rightarrow$ run on the <u>worker node</u>

Test name	What it does
basic	Checks that the CMS software area is defined and exists, and the CMS site local configuration file is correct
swinst	Checks that the required versions of the CMS software are correctly installed
Monte Carlo	Checks that the stage out of a file from the WN to the local SE is working correctly
Squid	Discovers from the local site configuration file the name of the Squid server and makes a simple query through it
FroNtier	Reads calibration data using CMSSW via the local Squid server

SAM and VOMS roles

- **Different tests may need different VOMS roles**
  - The `/cms/Role=lcgadmin` role is preferred because
    - It allows to write in the experiment software area
    - It has a higher priority at sites
  - However the `/cms/Role=production` role is needed for the "Monte Carlo" test
    - To take advantage of any write access privileges granted only to that role
  - Solution
    - It is necessary to submit two jobs for every CE instead of one
    - First problem: clearly does not scale if the number of required VOMS groups/roles increases
      - Fortunately it is not expected to increase
    - Second problem: due to a limitation of the LCG RB, it is necessary to use two different certificates
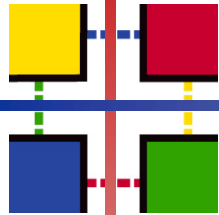   - It should be solved by the gLite WMS
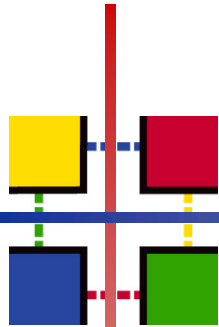
EGEE and OSG

- The job submission is done using the LCG Resource Broker for both EGEE and OSG
  - For EGEE sites is must work by definition
  - For OSG sites it requires some effort
    - The site must be in the central EGEE BDII to be in the SAM database
    - The CA certs and CRLs must be kept up to date
    - The lcgadmin and production roles must be supported
    - The middleware installed in the OSG WN's must be "friendly" to the LCG job wrapper
    - The effort was successful: over 16 CMS OSG CE's pass the job submission test!
- Submission via gLite WMS should work as well
  - Tested OK with latest 3.1 WMS job wrapper on develxx.cnaf.infn.it
 - To be re-checked when the gLite 3.1 WMS will be in production

Snapshot for OSG

No	RegionName	SiteName	NodeName	Status	cms					
					js	squid	swinst	basic	mc	frontier
1	Unknown	cit_cms_t2	cit-gatekeeper.ultralight.org	INFO	ok	ok	ok	ok	error	ok
2	Unknown	hepgrid_uerj	osgce.hepgrid.uerj.br	INFO	error	ok	ok	ok	ok	ok
3	Unknown	mit_cms	ce01.cmsaf.mit.edu	INFO	ok	ok	ok	ok	ok	ok
4	Unknown	nebraska	red.unl.edu	INFO	ok	ok	ok	ok	ok	ok
5	Unknown	purdue-lear	lepton.rcac.purdue.edu	INFO	ok	ok	ok	ok	ok	ok
6	Unknown	purdue-rcac	osg.rcac.purdue.edu	INFO	ok	ok	ok	ok	ok	ok
7	Unknown	sprace	spgrid.if.usp.br	INFO	ok	ok	ok	ok	ok	ok
8	Unknown	ttu-antaeus	antaeus.hpcc.ttu.edu	INFO	ok	error	ok	ok	ok	error
9	Unknown	ucr-hep	top.ucr.edu	INFO	error	ok	ok	ok	ok	ok
10	Unknown	ucsdt2	osg-gw-2.t2.ucsd.edu	INFO	ok	ok	ok	ok	ok	ok
11	Unknown	uflorida-hpc	iogw1.hpc.ufl.edu	INFO	ok	ok	ok	ok	ok	ok
12	Unknown	uflorida-ihepa	hg.ihepa.ufl.edu	INFO	ok	ok	ok	ok	ok	ok
13	Unknown	uflorida-pg	pg.ihepa.ufl.edu	INFO	ok	ok	ok	ok	ok	ok
14	Unknown	uwmadisoncms	cmsgrid02.hep.wisc.edu	INFO	ok	ok	ok	ok	ok	ok

SAM and the commissioning of the computing system

- **Success in running SAM tests is an important prerequisite for CMS sites**

- **Sites are required to monitor the status of SAM tests**
  - All failures should be understood and fixed
  - In many cases sites are doing that and improvements over time are visible

- **Example: in May a first batch of sites to host analysis datasets was selected based on how well they ran the CMS tests**
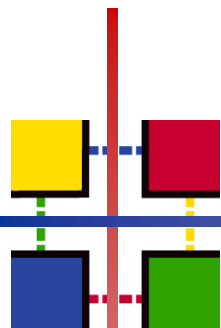
Site availability/reliability

- **Definitions**
  - Availability = running time / total time
  - Reliability = running time / (total time - scheduled downtime)
- **For now CMS measures only availability**
  - Scheduled downtime information not yet automatically available for OSG
- **The daily availability of a site is the fraction of hours for which no CMS test failed in at least one CE**

SAM Site Quality
30 Days from 2007-05-06 to 2007-06-05 UTC
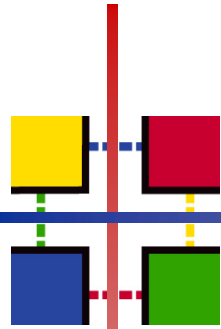
SAM Site Availability, last 31 days
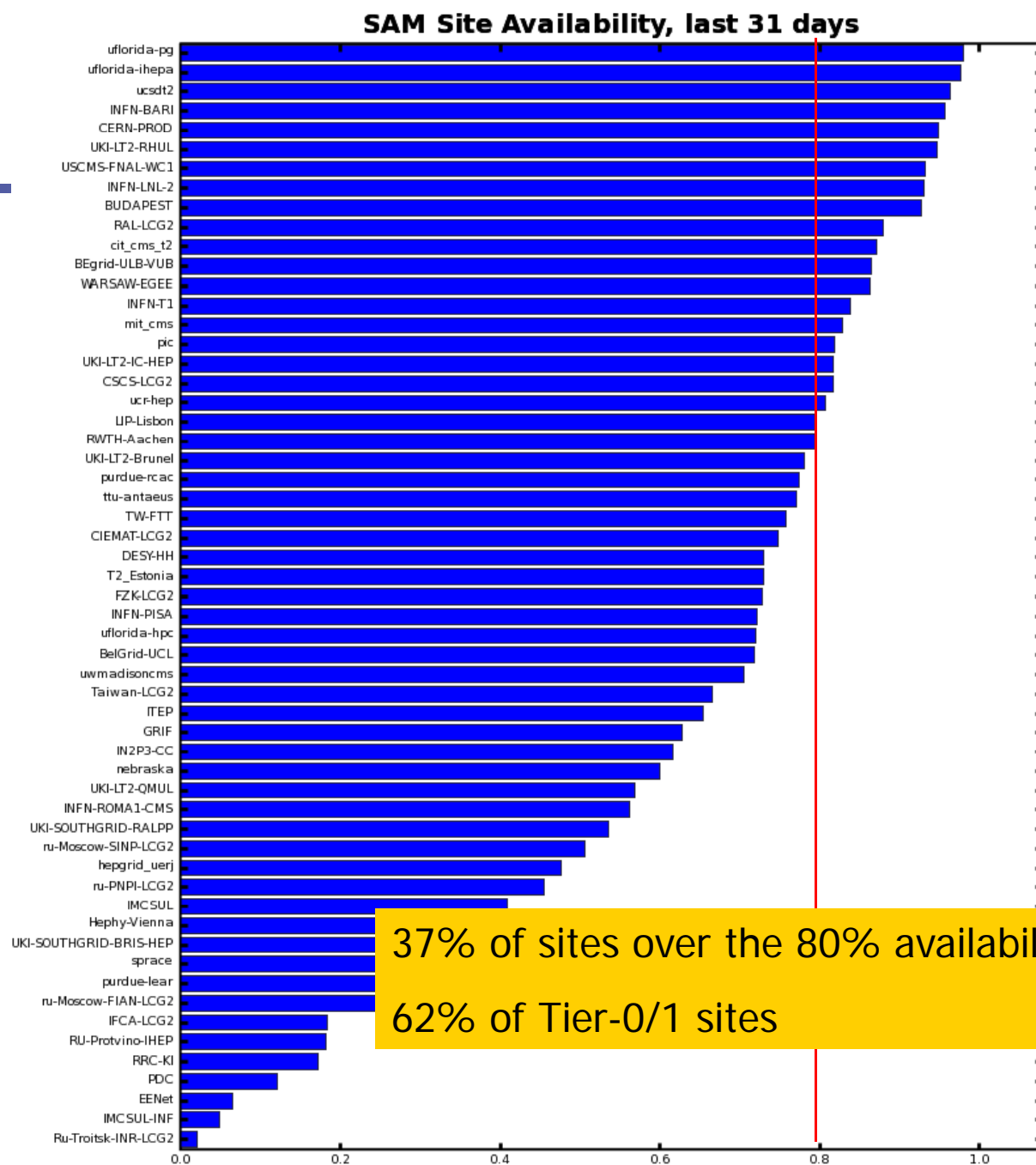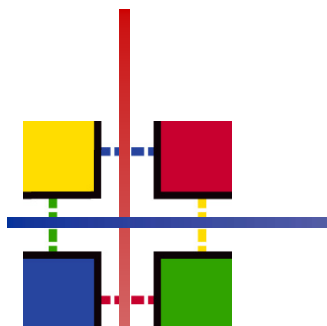
37% of sites over the 80% availability mark

62% of Tier-0/1 sites
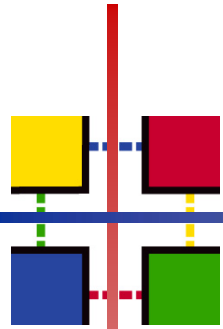
Typical problems

- Site local configuration problems
- CMS software missing or corrupted
- Wrong version of Squid

} CMS problems

- User mapping problems in CE or SE
- Expired CA certificates or CRLs
- Firewall problems
- DNS problems

} Site problems

- SAM database downtimes

} SAM problems

Problem solving

- Debugging can be a very time consuming process involving
  - CMS SAM "experts"
  - CMS site contacts
  - Site managers
- Currently it is not foreseen to ask the Grid operations to autonomously monitor and act on failures of CMS tests
  - But sites are probably interested to know how they perform from the CMS point of view!

Future developments

- **Tests for SRM v1 and v2**
  - Get endpoints and LFN → SURL translation rules from a central CMS DB (the same used by PhEDEx) } CMS specific
  - Push file from UI to remote SE
  - Get metadata of remote file
  - Pull file from remote SE
  - Delete file from remote SE (advisory-delete) } generic
  - v1 tests ready to be put in production, v2 tests in development
- **Using SAM for automatic software installation**
- **Visualization in the ARDA dashboard**
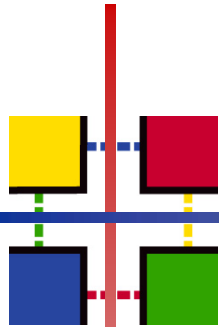
Conclusions

- **SAM tests are very effective in helping sites to become ready for the CMS computing activities**
    - They were even a boost to improve interoperability with OSG
    - Work still in progress: sites do improve, but "always green" sites are not yet so many
- **Using the SAM framework is rather easy**
    - Easy to plug in new tests for existing sensors
    - Easy to query the SAM DB using the programmatic interface
        - When new queries were needed, they were promptly implemented
- **The support from the SAM team is excellent**