News on monitoring for CMS distributed computing operations

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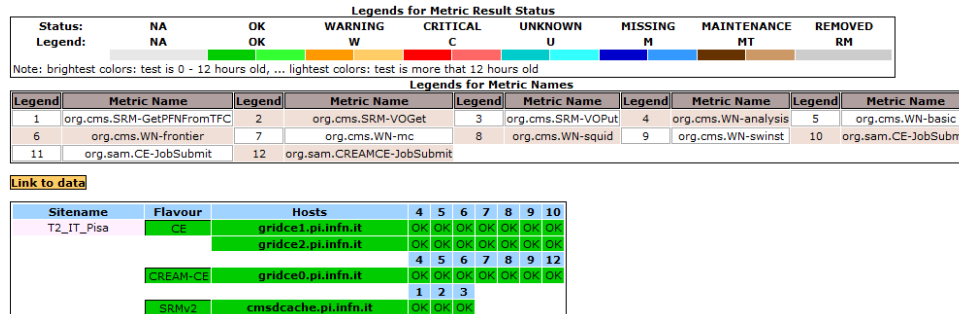
- Monitoring tools for sites
  - Tool overview: main uses and limitations
  - Recent changes
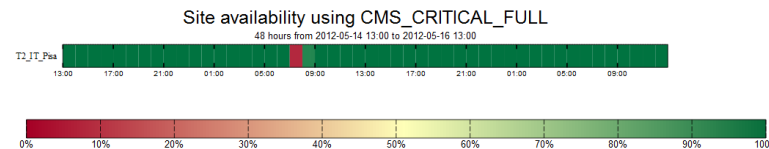- Monitoring development highlights
- Conclusions

- ## Several tools available to all sites
  - Routinely used by sites to understand what CMS is doing and how it is going
  - Often complemented by local monitoring, e.g. for the batch system and the storage

Name	Description	Developed by
SUM(*)	SAM availability and test results	CERN IT
HammerCloud(*)	Functional tests	CERN IT
Site Readiness	Site quality estimator	CMS, CERN IT
Dashboard(*)	Job monitoring	CERN IT
Site Status Board(*)	Metrics aggregator	CERN IT
PhEDEx	Transfer monitoring	CMS, CERN IT
(WLCG Global Monitor) (*)	Transfer monitoring	CERN IT
Site Status Board(*)	Metrics overview	CERN IT
PerfSONAR Dashboard(*)	Network monitoring	BNL

(*) Used also by other VOs   *3*

- **SAM** is now a completely new framework based on **Nagios** (test submission), **MSG** (test publication) and **ACE** (Availability Computation Engine[(*)])
- **SUM** is a web **interface** to SAM tests and availability
- Is the site passing the SAM tests? If not, why?
  - Sensitive to a wide spectrum of site/CMS problems
  - Sometimes site configuration "optimized" for SAM ☹

Legends for Metric Result Status

Status:	NA	OK	WARNING	CRITICAL	UNKNOWN	MISSING	MAINTENANCE	REMOVED
Legend:	NA	OK	W	C	U	M	MT	RM

Note: brightest colors: test is 0 - 12 hours old, ... lightest colors: test is more that 12 hours old

Legends for Metric Names

Legend	Metric Name	Legend	Metric Name	Legend	Metric Name	Legend	Metric Name	Legend	Metric Name
1	org.cms.SRM-GetPFNFromTFC	2	org.cms.SRM-VOGet	3	org.cms.SRM-VOPut	4	org.cms.WN-analysis	5	org.cms.WN-basic
6	org.cms.WN-frontier	7	org.cms.WN-mc	8	org.cms.WN-squid	9	org.cms.WN-swinst	10	org.sam.CE-JobSubmit
11	org.sam.CE-JobSubmit	12	org.sam.CREAMCE-JobSubmit							

Link to data

Sitename	Flavour	Hosts	4	5	6	7	8	9	10
T2_IT_Pisa	CE	gridce1.pi.infn.it	OK	OK	OK	OK	OK	OK	OK
		gridce2.pi.infn.it	OK	OK	OK	OK	OK	OK	OK

			4	5	6	7	8	9	12
	CREAM-CE	gridce0.pi.infn.it	OK	OK	OK	OK	OK	OK	OK

			1	2	3
	SRMv2	cmsdcache.pi.infn.it	OK	OK	OK

- Was the site available in the past few days? If not, why?
  - Sometimes sites become unavailable because some test does not run for > 24 h (due to priority issues) ☹

Site availability using CMS_CRITICAL_FULL
48 hours from 2012-05-14 13:00 to 2012-05-16 13:00

T2_IT_Psa

13:00 17:00 21:00 01:00 05:00 09:00 13:00 17:00 21:00 01:00 05:00 09:00

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

(*) https://twiki.cern.ch/twiki/bin/view/LCG/ACE

HammerCloud

- Can the site run analysis-like jobs? If not, why?
  - Any issues in CMMSW installation, local read access to storage, publication to BDII, batch system configuration?
  - Sensitive to EMI WMS problems ☹

Job errors summary

Select Site: --- Select Regions: --- Test ID: Template ID: Start time: April 18, 2012, 11 a.m. End time: Refresh

Site	Total jobs	Grid failed jobs (aborted)	Application failed jobs	Efficiency
T1_CH_CERN	144	8 »	0 »	0.944
T1_DE_KIT	211	32 »	0 »	0.848
T1_ES_PIC	573	1 »	0 »	0.998
T1_FR_CCIN2P3	84	0 »	0 »	1.000
T1_IT_CNAF	130	31 »	0 »	0.762
T1_TW_ASGC	129	1 »	0 »	0.992
T1_UK_RAL	102	0 »	0 »	1.000
T1_US_FNAL	353	0 »	0 »	1.000
T2_AT_Vienna	410	410 »	0 »	0.000
T2_BE_IIHE	91	11 »	0 »	0.879
T2_BE_UCL	241	6 »	0 »	0.975
T2_BR_SPRACE	71	3 »	0 »	0.958
T2_BR_UERJ	0	0 »	0 »	0.000
T2_CH_CAF	0	0 »	0 »	0.000
T2_CH_CSCS	0	0 »	0 »	0.000
T2_CN_Beijing	0	0 »	0 »	0.000
T2_DE_DESY	2	1 »	0 »	0.500
T2_DE_RWTH	549	235 »	0 »	0.572
T2_EE_Estonia	134	55 »	50 »	0.216
T2_ES_CIEMAT	38	0 »	0 »	1.000
T2_ES_IFCA	443	4 »	0 »	0.991

- Overall, does the site have any problem? If yes, where?
  - SAM, HC, data transfers, downtimes

- How is it rated? How does it compare to other sites?
  - Sites are VERY sensitive to their ranking $\Rightarrow$ strong incentive to be "READY"

Job monitoring
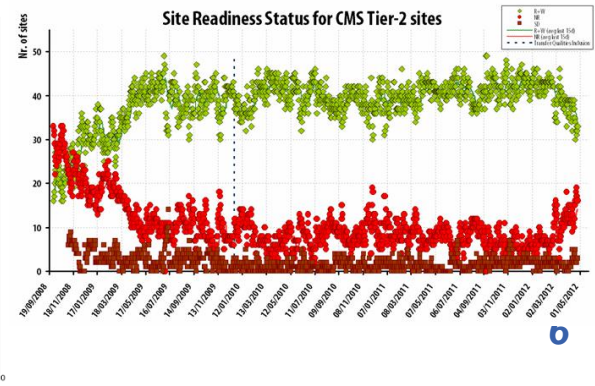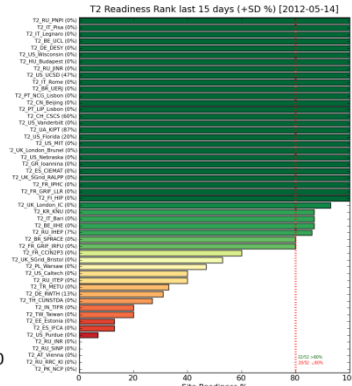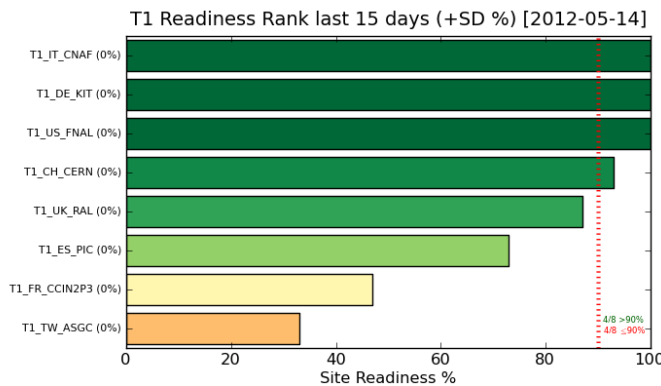
- What is running on the site? Do jobs succeed? If not, on which CE do they fail? With which error?
  - Good for overview, not so good for complex troubleshooting: only Grid failure reasons and CMSSW exit codes available ☹
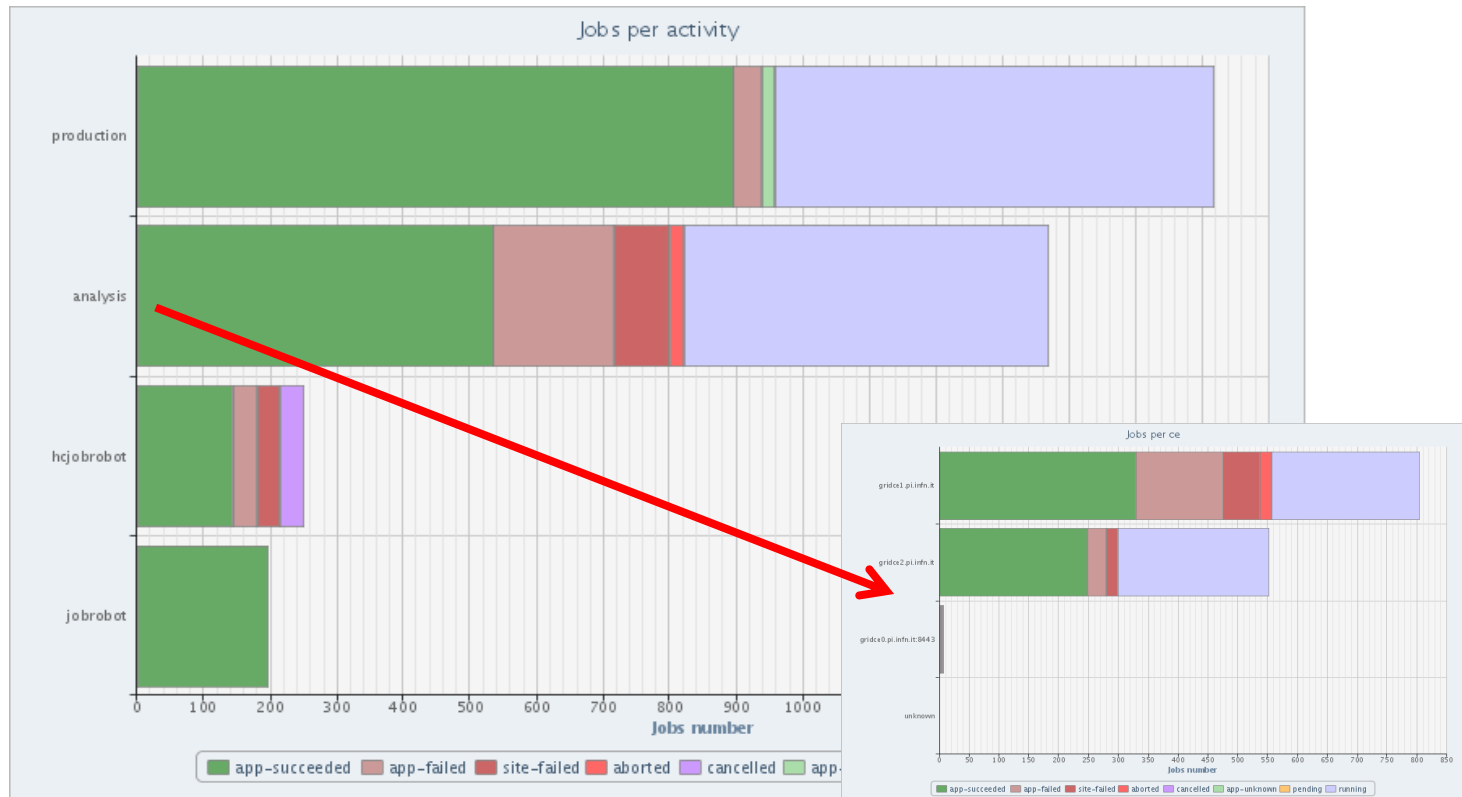
- Is used as a convenient entry point to different metrics and other monitoring
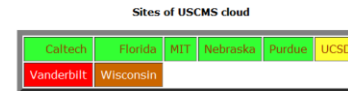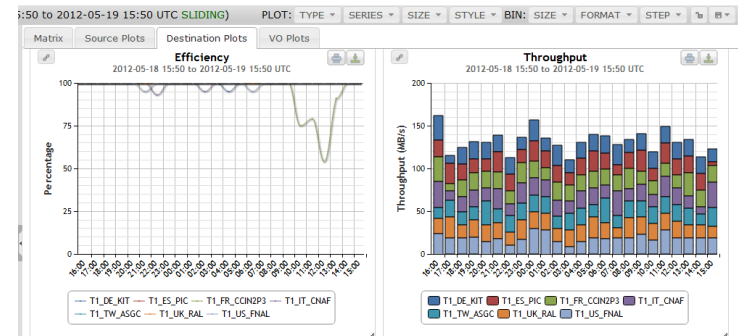

Shifter view

Site Readiness view

- ## PhEDEx monitoring
  - Shows status of transfers and links from a CMS point of view
  - Are transfers failing? Why?
  - What are the transfer rates?
- ## WLCG Transfers Dashboard
  - Based on information directly coming from FTS servers and sent to MSG system
  - VO-independent
  - Not yet in production but a working prototype exist
- ## PerfSONAR Dashboard
  - CMS US sites getting experience on it following ATLAS' example
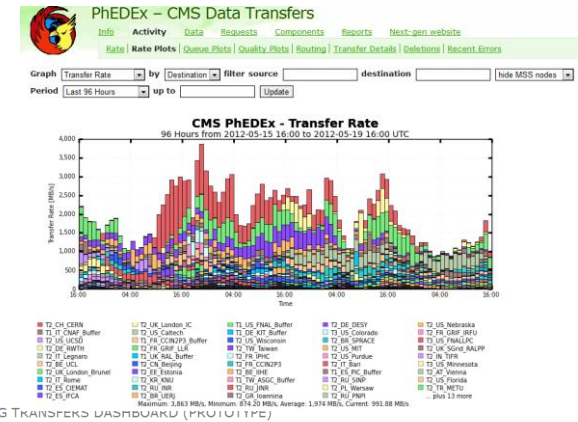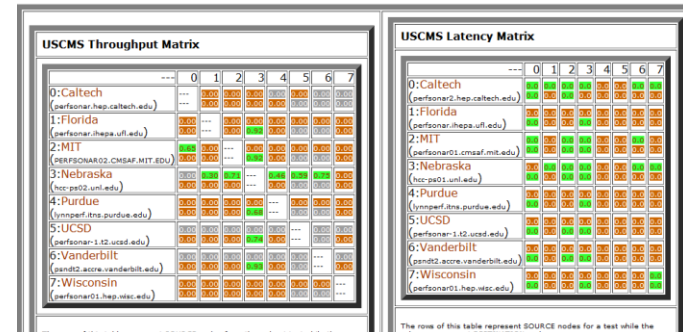
- Old SAM framework decommissioned $\Rightarrow$ new SAM framework in operation
  - Migration took a long time and a lot of work, but eventually very smooth
  - Nagios very stable, several issues in ACE and SUM found and fixed before going to production
- CMS Job Robot $\Rightarrow$ HammerCloud
  - Many more features
  - Again, several bugs found and fixed (a few remain)
  - Sites not yet very familiar with it; FAQ being collected, tutorials organized

- WLCG: revive the SiteView web page as entry point from a site perspective of the VO activities

- CMS Storage Accounting
  - Ongoing development to produce interactive summaries of the storage space utilization
    - Sources are the standard WLCG SE dumps
    - Treemap-based, interactive visualisation

- New CMS computing shift page and new CMS accounting portal
  - Will be based on the CMS Overview framework
  - Including, but not limited to, site information
  - Development just started

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- In CMS sites don't rely so much on central operations: they tend to look after themselves using common and custom tools
  - In theory, information is reasonably complete
  - in practice, see the survey results for site feedback!
- Recent convergence with ATLAS for what concerns SAM visualization and HammerCloud
- New monitoring systems being added and developed