



# WLCG Monitoring Roadmap

*Julia Andreeva , CERN*

*25.04.2008, WLCG workshop, CERN*



## Too many monitoring tools or not enough?



- **How do I find what I need?**

**Improve publishing of the monitoring data aiming to satisfy users with various roles and different level of expertise**

- **Whether I can trust what I found?**

**Improve reliability and completeness of the provided monitoring information**

- **How long does it take to be notified about the problem I am supposed to fix ?**

**Decrease the problem response time and provide max relevant information to resolve the problem**

- **And finally if we can give positive answers to all these questions – how much does it cost to provide this functionality?**

**Decrease effort for supporting of the existing monitoring applications and for development of the new ones**



# Regarding the near future



- The European model for operating of the infrastructure is moving towards the distributed system with significantly less effort.

The strategy for WLCG monitoring should consider these factors and contribute effectively to the task of operating of the infrastructure

*Accent to Site monitoring*

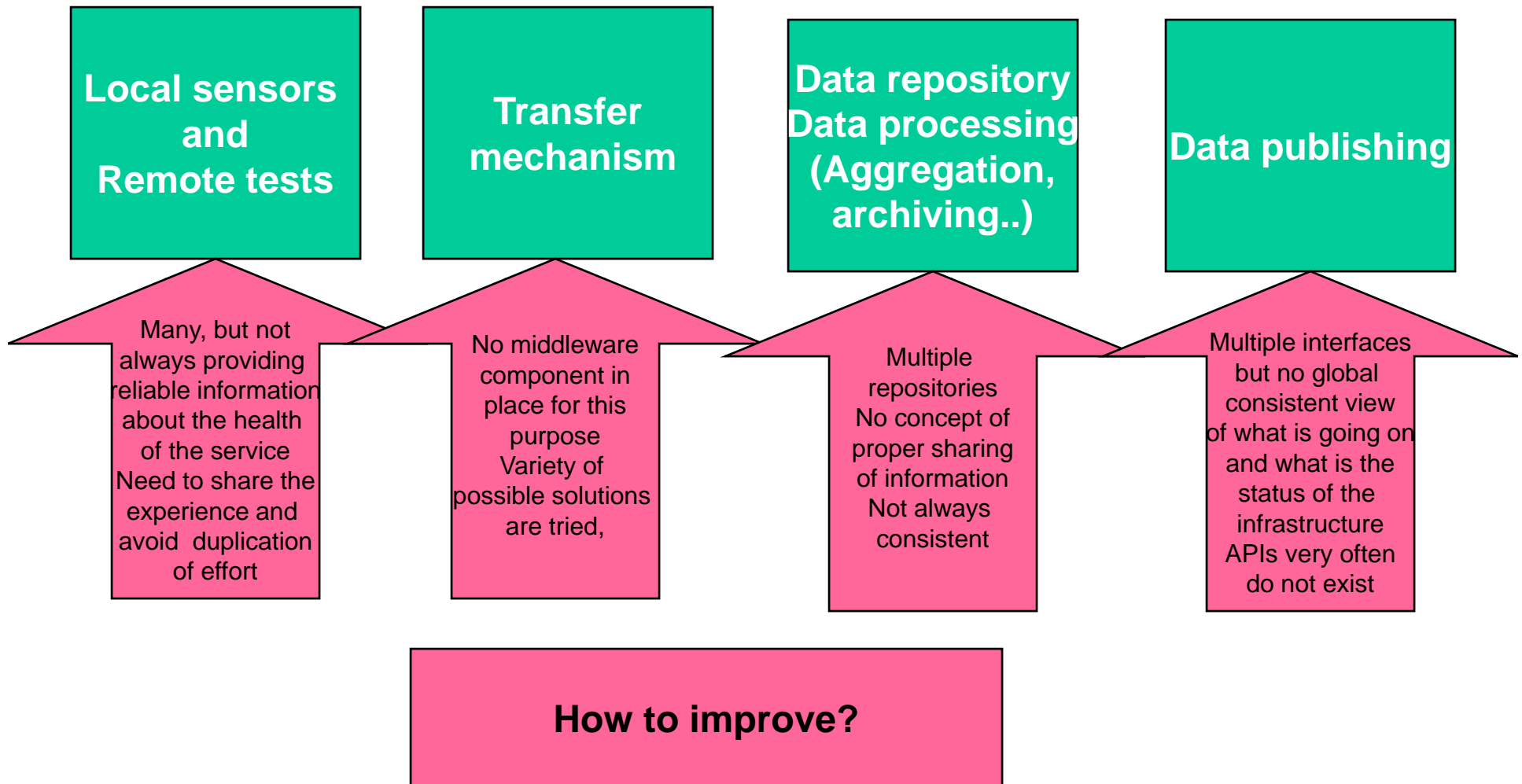
- **Data taking!**

Good monitoring is one of the vital conditions for providing of the reliable service where data will be processed

*LHC VOs rely on the VO Monitoring Systems. Publish information collected there in a consistent way for all 4 VOs, making it available for the LHC community outside particular VO.*

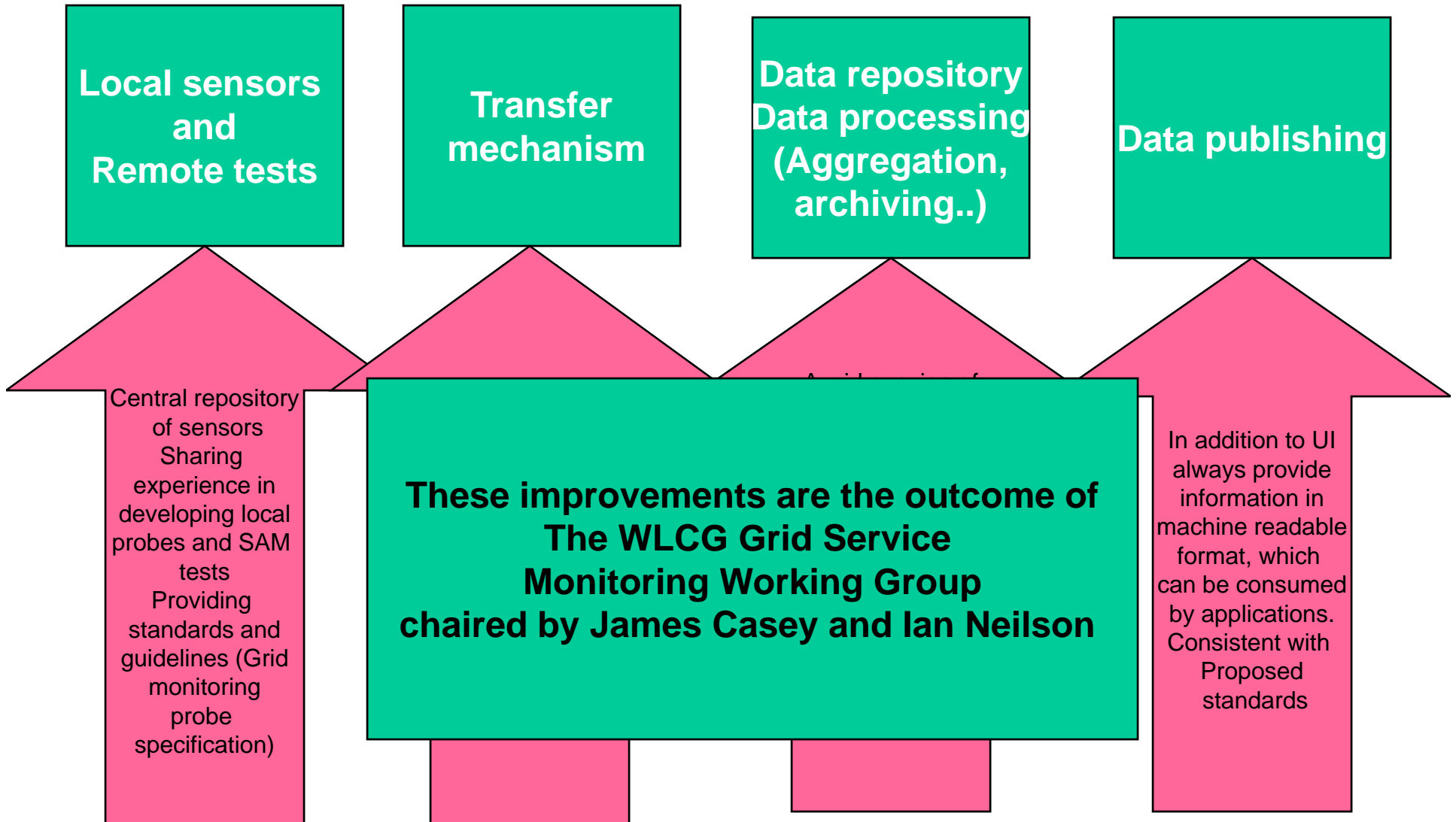


# Main components of monitoring system



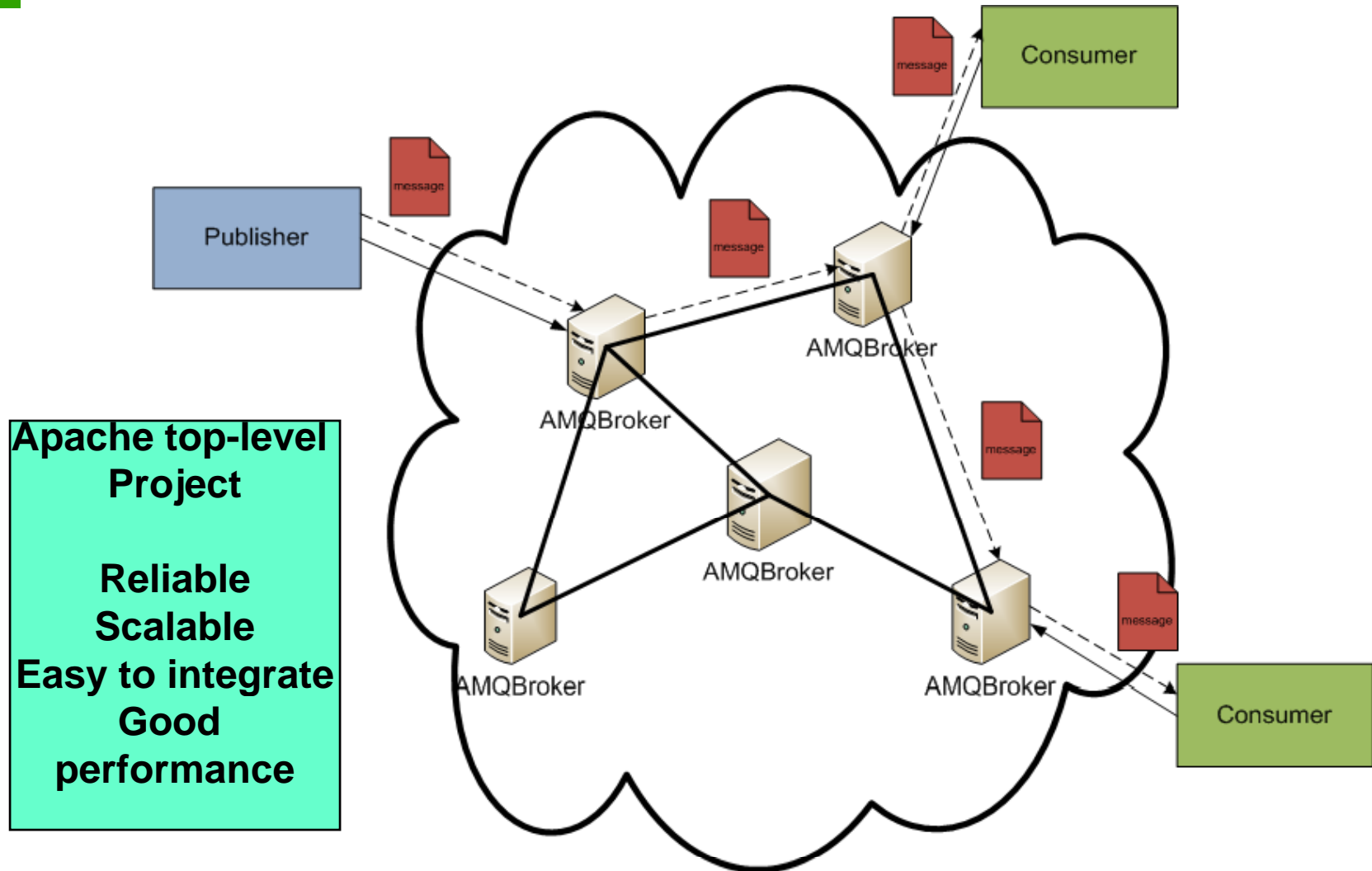


# Main components of monitoring system





# ActiveMQ



**Apache top-level Project**

**Reliable**  
**Scalable**  
**Easy to integrate**  
**Good performance**

*James Casey*



# Test Summary



- **Results summary:**
  - Running for 6 weeks with no crashes
  - 50 Million messages of various sizes (0 to 10 kB) forwarded to consumers
  - 12 Million incoming messages from producers
  - Up to 40 Producers and 80 Consumers connected at the same time
  - Stable under highly irregular test pattern:
    - Number of clients change
    - Frequent client process kills
    - Daily number of tests vary

*James Casey*





# In Production - OSG RSV to SAM



## RSV - Resource and Service Validation

The common design pattern:

**Message oriented monitoring system**

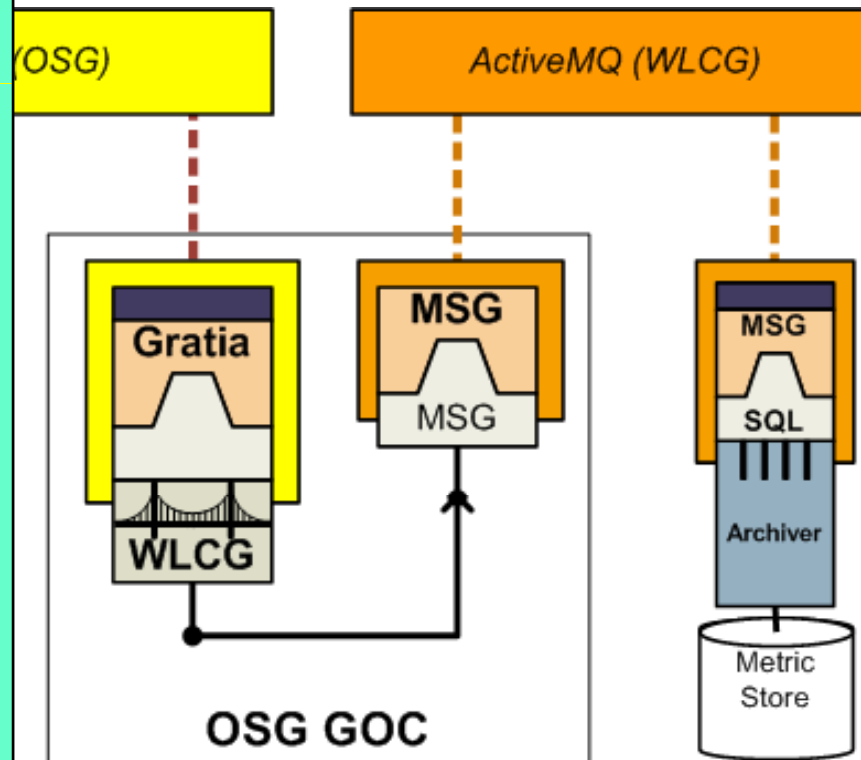
Other use cases:

Reporting usage information (jobs, transfer) to central usage repository or to Experiment Dashboards

Reporting information from Experiment specific Monitoring systems to central metrics store  
.....

Other clients can subscribe to a particular topic

... transport  
... provide a bridge to SAM



*James Casey*





## Publishing monitoring info to the site fabric monitoring



- The goal is to **decrease the time needed for detecting and fixing of the problems at the site** and not to force site admin to look in multiple monitoring pages in order to understand the situation with Grid services at his own site.
- Results of SAM tests are published into local fabric monitoring system ( Nagios ). Can be experiment specific tests (Caltech for CMS).
- Based on these results alarm can be raised
- The prototype is put in place and was tried by several sites
- For more details see yesterday monitoring tutorial:

<http://indico.cern.ch/sessionDisplay.py?sessionId=3&slotId=0&confId=6552#2008-04-24>



## Increasing reliability of the provided information



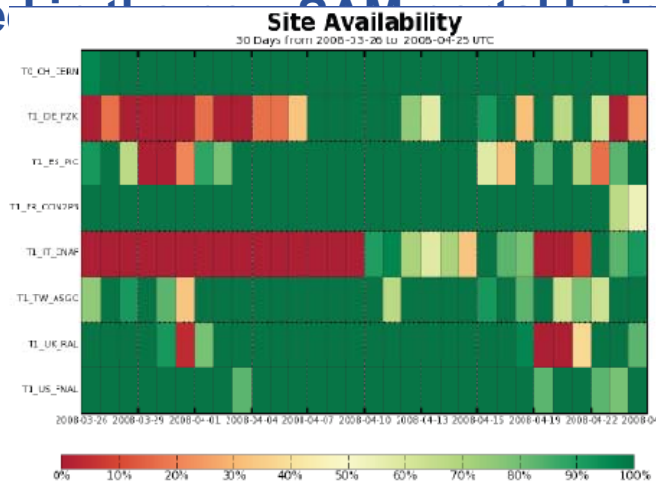
- Should be addressed in various directions. One of the examples is job reliability information.
- Big room for improvement
- Using of the Grid messaging system should improve reliability of job monitoring information.
- Currently jobs submitted via condor\_g (bypassing RB) are not taken into account by the monitoring systems, except Experiment Dashboard. Condor\_g submitter is instrumented to report job status changes to any monitoring system keeping track of jobs (Gratia, GridView, Dashboard...). Various transport protocols including Grid messaging system can be used.



# Using common patterns, tools, frameworks



- Where possible decrease number of implementations of the monitoring applications and use common solutions.
- The Experiment Dashboard framework is a good example of the framework which was successfully adopted by other systems, like ATLAS Data Management. Currently couple of new applications external to the Dashboard monitoring system are being developed in the Dashboard framework : the interface for administration of the FTS channels, FTS monitoring for Tier0.
- Another good example is “Brian’s” library, the graphical library which was developed by Brian Bockelman for CMS Phedex system. Had been integrated with Dashboard and widely used there. Most probably will be used in the Dashboard framework.



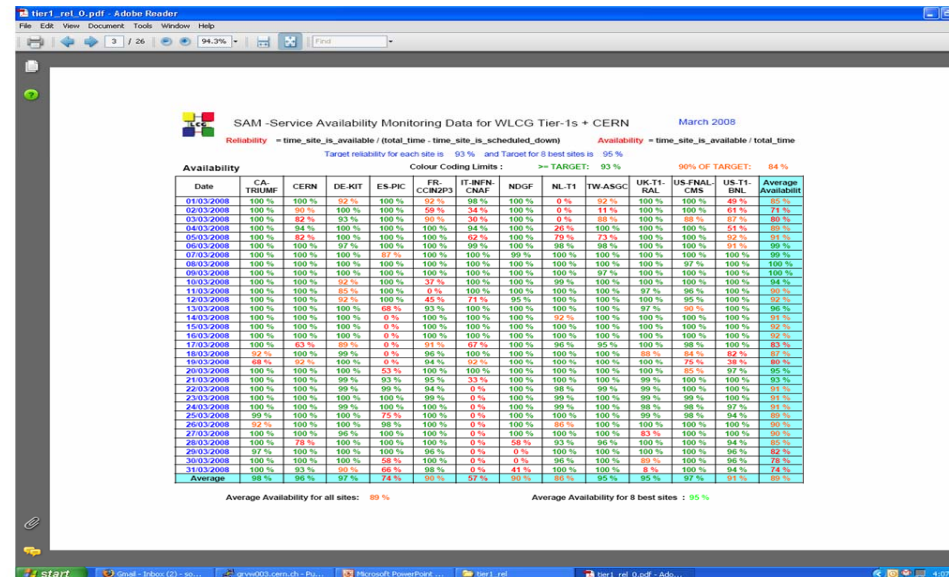
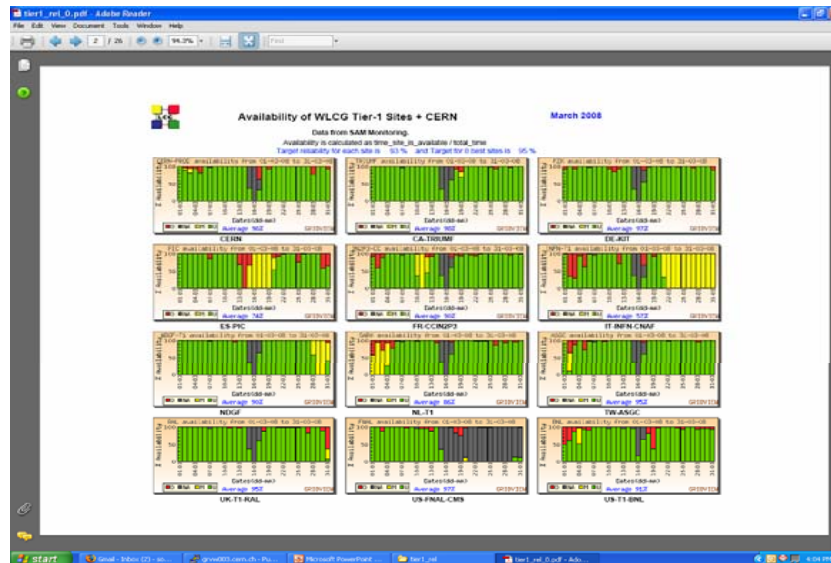




# Automatic report generation for WLCG/EGEE management and operations



- Developed by GridView
- Using JasperReport , popular open source report generation tool
- Supports various formats like pdf, rtf, xls, csv, html etc
- Simple web portal available so all can generate relevant reports





## Gridmap for monitoring of the services defined as critical by the LHC VOs



- Gridmap visualization tool developed by Max Boehm provides the global view with the possibility to drill down for detail.
- For CCRC08 put in place prototype to monitor services defined as critical by the LHC VOs.
- First step is to make sure that every box of the map has monitoring behind (SAM test, lemon sensor , etc...)
- Second step is to make sure that monitoring is reliable (service is really in a prefect health when it is green on the map)
- Currently information sources which are used are SAM or SLS (Panda can be added?)
- Working group of people having experience in monitoring field representing all LHC VOs chaired by Andrea Sciaba

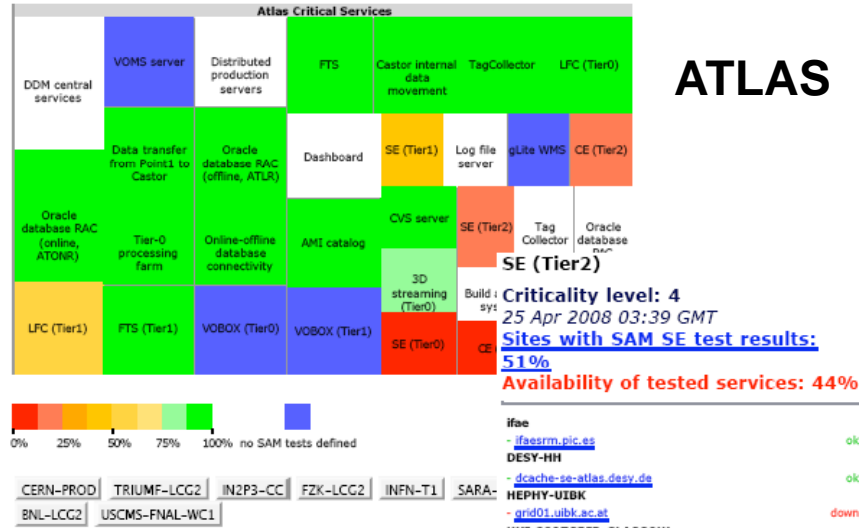


# Gridmap for monitoring of the services defined as critical by the LHC VOs



ALICE

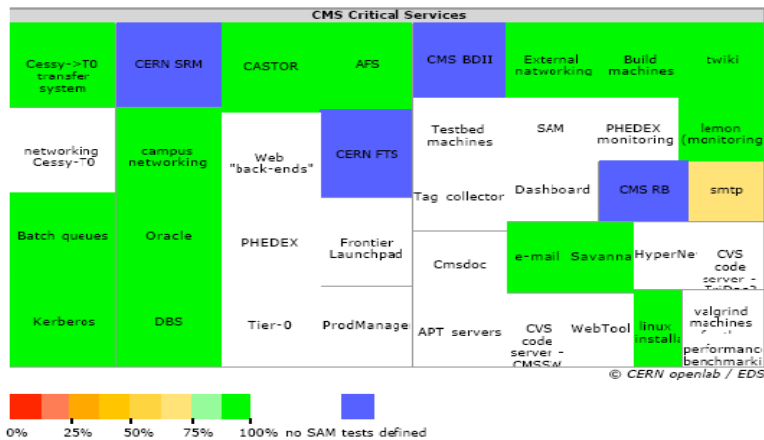
Test Status (live data)



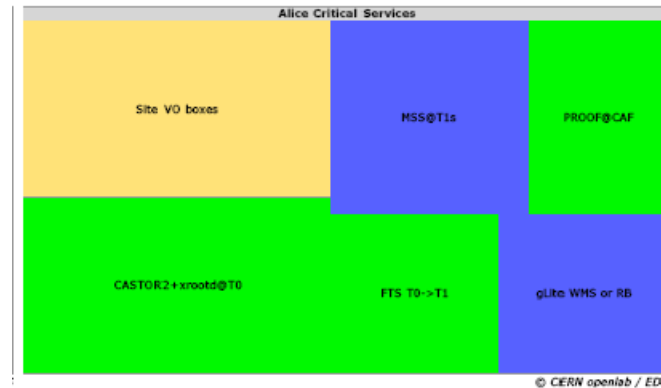
ATLAS

CMS

Test Status (live data)

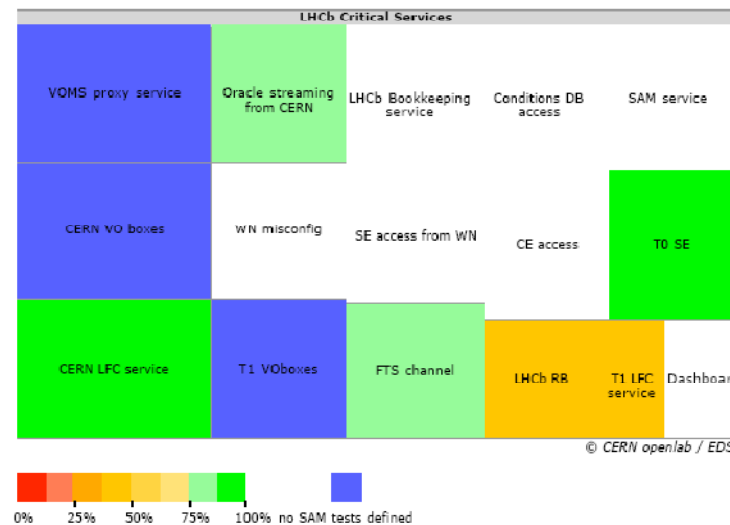


Test Status (live data)



LHCb

Test Status (live data)





## Gridmap for monitoring of the workflows of the Experiments



- The goal is to show whether the targets of the experiments for the functional blocks are met.
- This information is available in the monitoring systems of the experiments and currently is not being published anywhere in the consistent way.
- The most complicated part is how to define the status (colour) for every functional block. The targets are not defined for every item ( for example not necessary for every T1-T2 link), the target can change from one day to another.
- But for data taking we will have more stable workflow, this won't be a problem any more





# Gridmap for monitoring of the workflows of the Experiments



**Experiment Workflow Test Page**

**Tier 0**

- Data archiving at Tier0 (OK)
- Data Processing at Tier0 (OK)
- Data transfer from (OK)

**Tier 1**

- Data archiving at Tier1 (Maintenance)
- Data Processing at Tier1 (Degraded) - **Click on the box corresponding to the distributed service Get another map For a given activity at all Sites of T1**
- Analysis at Tier1 (OK)

**Tier 2**

- MC at Tier2 (OK)

**Data Processing at Tier1**  
22 Apr 2008 15:22 GMT  
Status=degraded

	Value	Target
Number of jobs running in parallel	300 jobs	500
Average number of jobs running in parallel over last 24 hours	444 jobs	500
Max number of jobs running in parallel over last 24 hours	200 jobs	500
Success rate over last hour	85 %	80
Number of jobs running in parallel	0 jobs	500

© CERN openlab / EDS

Legend: OK (Green), Degraded (Yellow), Down (Red), Maintenance (Brown)



# Gridmap for monitoring of the workflows of the Experiments



GridMap - Windows Internet Explorer provided by CERN

http://lxvm0241.cern.ch/vo/workflow-test.html

File Edit View Favorites Tools Help

CERN\andreeva Administrators

Google G Go Bookmarks 2 blocked Check AutoLink AutoFill Send to Settings

### Experiment Workflow Test Page

Tier 0		
Data archiving at Tier0	Data Processing at Tier0	Data transfer fr
Data archiving at Tier1	Data	Data Processing at Tier1
	T1_US_FNAL	T1_FR_IN2P3
MC at Tier2	T1_IT_CN	T1_DE_FZK
	T1_US_FNAL	T1_US_FNAL

**T1\_US\_FNAL**  
Status=degraded

Value	Target
210 jobs	500
Average number of jobs running in parallel over last 24h	5000 jobs

[Dashboard: Current status of production jobs at the site](#)  
[Dashboard: Distribution of number of parallel production jobs by time](#)

© CERN openlab / LUS

OK Degraded Down Maintenance

Done Local intranet 100%

start Local Disk (C:) 5 Microsoft Office P... 7 Internet Explorer EN 100% 6:21 AM

Click on the link to navigate to other monitoring tool, Dashboard for more details



# Gridmap for monitoring of the workflows of the Experiments



Job summary - Windows Internet Explorer provided by CERN

http://lxarda09.cern.ch/dashboard/request.py/jobsummary?activity=production&site=USCMS-FNAL-WC1-CE2%20(Batavia)

File Edit View Favorites Tools Help

CERN\andreeva Administrators

Google

Go

Bookmarks 2 blocked Check AutoLink AutoFill Send to Settings

Job summary

[You found a bug? You have a suggestion?](#)

jobsummary waitingtime runningtime

any user  
USCMS-FNAL-WC1-CE2 (Ba  
any ce  
any submissiontool  
any dataset  
any application  
any rb  
production  
any grid

unk  pend  run  term  
 done  canc  abort  g-unk  
 succ  fail  a-unk  
 donesuccess

2008-04-24 06:26:16 to  
2008-04-25 06:26:16

all jobs regardless submission time

sort by user

bars in the plot

ProdAgent\_RelVal-RelVal  
ProdAgent\_relval-TestCSA08G  
ProdAgent\_RelVal-RelValQCD-Pt-80-120-1208941983\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch  
ProdAgent\_relval-TestCSA08JetET110-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_relval-TestCSA08MuonPT5-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_relval-TestCSA08JetET80-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_relval-TestCSA08HCallsoTracks30-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_RelVal-RelValSingleMuPt10-1208515072\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch  
ProdAgent\_RelVal-RelValSinglePi0E10-1208883819\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch  
ProdAgent\_RelVal-RelValQCD-Pt-120-170-1208883819\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch  
ProdAgent\_relval-TestCSA08Jpsi-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_relval-TestCSA08HCallsoTracks50-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_relval-TestCSA08JetET30-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_relval-TestCSA08JetET20-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_relval-TestCSA08MinBias-TESTESTEST-204\_dataops-fnalcmssrv60@cmssrv60.fnal.gov  
ProdAgent\_RelVal-RelValBJets-Pt-50-120-1208941983\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch  
ProdAgent\_RelVal-RelValTTbar-1208941983\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch  
ProdAgent\_RelVal-RelValSinglePiPt10-1208883819\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch  
ProdAgent\_RelVal-RelValHiggsChargedTausM200-1208941983\_ProdAgent\_relval\_0\_9\_0@vocms37.cern.ch

Shows current status of production jobs running at FNAL

Local intranet 100%

start Local Disk (C:) 5 Microsoft Office P... 7 Internet Explorer EN 100% 6:26 AM



# Gridmap for monitoring of the workflows of the Experiments



- The way the map is created is very flexible and easily configurable.
- Any other combinations are possible:
  - Combining in one map functional blocks of all experiments served by a given site
  - Clicking on a functional block get the list of services involved ...
  - Multiple possibilities for drilling in and guiding user who can be not at all familiar with monitoring tools specific to the VO



# E-logger and GGUS



- During the first phase of CCRC08 one E-logger for observations and another one for MoU targets had been used.
- Proved to be very helpful
- However, there is a common feeling that there is an overlapping between e-logger and GGUS , people should not submit multiple bug-reports, there should be a single system in place. In fact it was an overlap by design to understand requirements and pass them to GGUS development team
- GGUS functionality will be extended to cover the MoU targets but not for May. Foresee using E-log for May run
- The first version of RSS exists as well, keeps the track of tickets which had been opened last 24 hours

Please, try link and send your feedback:

[http://gus.fzk.de/rss\\_test.php](http://gus.fzk.de/rss_test.php)



# Define metrics



- During the discussion at the workshop there was a suggestion to reduce 3 'metrics' we are currently using for CCRC08 :

Critical services,

Functional blocks and Scaling factors,

MoU targets

by just

Functional blocks with Critical services as drill down

We might need to get more experience with the new tools and to understand better correlations between the functional blocks and services in a real challenge environment to decide which metrics would give us better idea of how well we are performing.



# Summary



- **Monitoring is one of the core conditions for improving of reliability of the infrastructure and for reducing operational effort**
- **As an outcome of the work done by the WLCG Monitoring Working Groups the main strategy for organization of the monitoring infrastructure had been defined. Now Monitoring WG is over, need to implement and deliver what had been defined**
- **We have a lot of tools in place, now need to tie them together**
- **There is still a lot to do and we have to use the CCRC08 challenge to check whether the monitoring system can provide the required functionality**