



Enabling Grids for E-science

Overview of System Analysis Working Group

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- As stated in the mandate the goal is to gain understanding of application failures in the grid environment and to provide an application view of the state of the infrastructure
 - *Application view in this context means the comprehensive picture of the experiment activities on the Grid , i.e. combining Grid-related and application specific information and allowing to detect and address problems of various nature*
 - *This work is the continuation of what had been started in the Experiment Dashboard project*
 - *The view of the experiments activities on LCG can be achieved by taking into account the progress done in the monitoring area by all involved parties:*
 - developers and providers of the Grid services*
 - developers and providers of the existing monitoring tools*
 - experiments themselves, in particular developers of work load management tools and data management systems*
- Summarize experience gained by the LHC experiments in achieving this goal and provide input to grid service monitoring and management



Example of combined (Grid - application) monitoring



any user
any site
any ce
any submissiontool
any dataset
any application
any rb
analysis
any grid
<input type="checkbox"/> unk <input type="checkbox"/> pend <input type="checkbox"/> run <input type="checkbox"/> term
<input type="checkbox"/> done <input type="checkbox"/> canc <input type="checkbox"/> abort <input type="checkbox"/>
g-unk
<input type="checkbox"/> succ <input type="checkbox"/> fail <input type="checkbox"/> a-unk
<input type="checkbox"/> donesuccess
2006-12-09 19:44:55
to
2006-12-10 19:44:55
sort by user

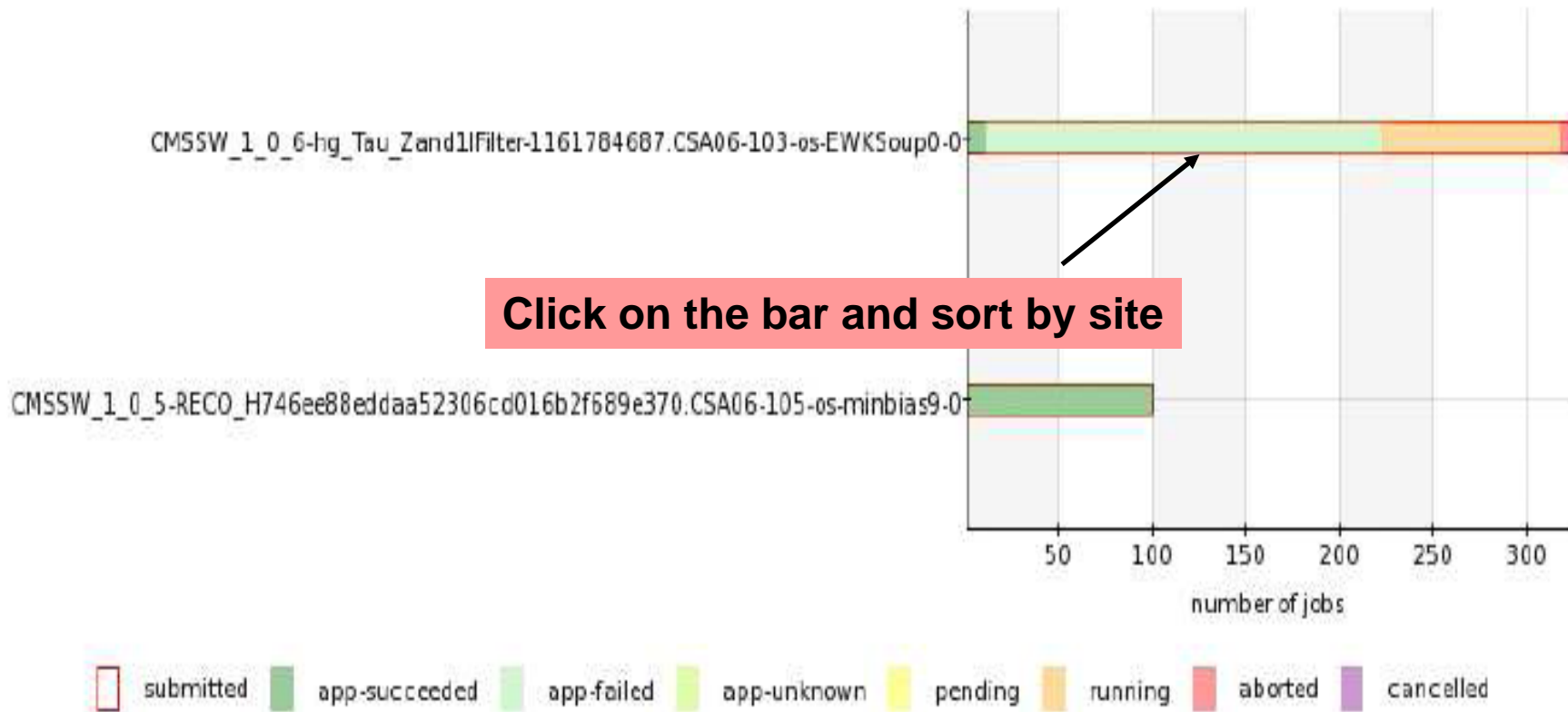




Example of combined (Grid-application) monitoring

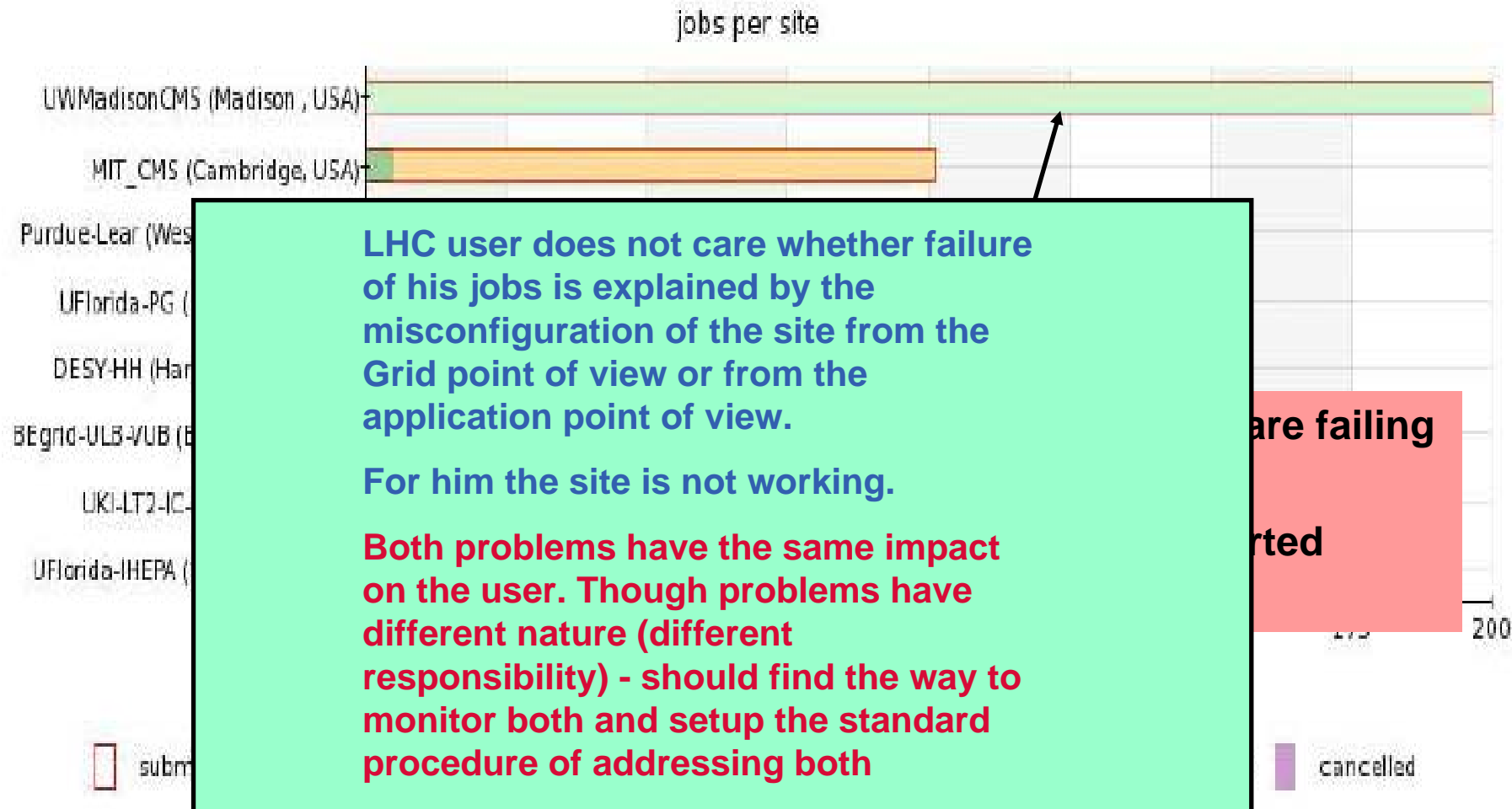


jobs per dataset





Example of combined (Grid-application) monitoring





In practical terms



- We are not planning to introduce a new monitoring system
- In close collaboration with the experiments development work aimed to provide the application view of the infrastructure had been started by the Experiment Dashboard project and dashboard development will continue following the output of the Working Group
- But the scope is wider. Overview what experiments had achieved in the area of application monitoring, define common patterns and identify common problems to address them in collaboration with two other monitoring groups



How to achieve



- Identify current experiment use cases related to main areas of activities - job processing, data management, DB replication.
- For every use case analyze present experience and requirements of four LHC experiments
- For every use case analyze the existing sources of monitoring data and understand whether they are sufficient, whether bits of information coming from various sources can be complementary to each other, how they can be correlated. Identify information holes (if any).
- Where possible identify common approach and implementation for the application monitoring (experiment dashboard, SAM tests with VO specific content)
- Provide input to the Grid Service Monitoring Working Group regarding identified problems or suggestions for the improvements of the grid service monitoring
- Based on information collected in the experiment dashboard identify VO-site related failures of the real user jobs. Coupled with SAM tests with VO-specific content. This is the area where System Analysis WG has to collaborate with two other monitoring groups. Come with the suggestion of the procedure how these problems should be followed up.



Follow job failures at the site for a given VO



V
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SiteName (click on any site)	Successful jobs	Failed jobs	Percentage
CERN-PROD	197	626	
ce106.cern.ch:2119/jobmanager-logsif-grid_cms	30	109	21.58%
ce106.cern.ch:2119/jobmanager-logsif-grid_2nh_cms	12	21	36.36%
ce105.cern.ch:2119/jobmanager-logsif-grid_2nh_cms	16	20	44.44%
ce105.cern.ch:2119/jobmanager-logsif-grid_cms	10	118	7.81%

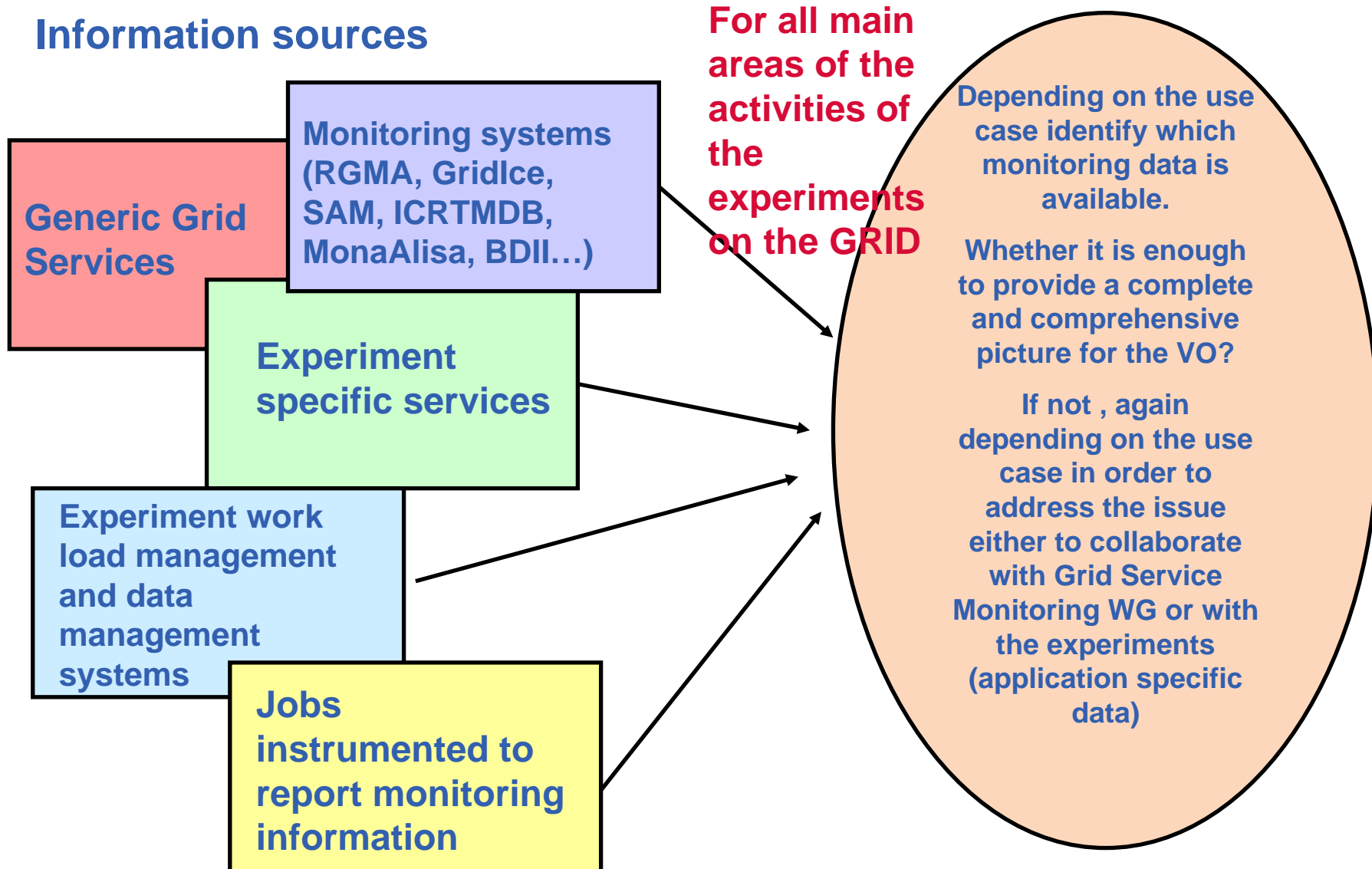
Jobs	# jobs	Successful?	Error message
See all the jobs...	1	Ignored	Job successfully submitted to Globus
See all the jobs...	56	No	Got a job held event reason: Globus error 101: the user proxy expired job is still running
See all the jobs...	18	No	cannot retrieve a job held event reason: Globus error 131: the user proxy expired job is still running
See all the jobs...	15	No	Got a job held event reason: Globus error 131: the user proxy expired job is still running
See all the jobs...	13	No	Got a job held event reason: Globus error 131: the user proxy expired job is still running
See all the jobs...	4	No	Got a job held event reason: Globus error 156: the job manager could not lock the state lock file
See all the jobs...	2	No	Cannot download file from file



Analysis of the information flow of the monitoring data



Information sources





Analysis of the current VOs experience and requirements



- Experiments have different requirements for the high level monitoring depending on the way their workload management systems and data management systems are organized :
 - *different level of centralization (example job submission)*
 - *different progress already done in the experiments regarding a given activity (example Phedex with very advanced monitoring system)*
 - *variety of the platforms used by the experiments*
 - *different technology for a similar task (example – DB replication)*
- Still a lot of common issues regarding job processing, data transfer, data access, usage of the distributed DBs.
- Nothing to enforce, but to identify where possible the ways to implement monitoring in a common way:
 - *via the experiment dashboard*
 - *using existing monitoring frameworks (SAM)*
 - *by defining common problems/requirements/suggestions to the middleware developers, providers of the monitoring tools, via Grid Service Monitoring working group (example – improving error reporting for the Grid related failures)*
- Share experience and ideas related to the application monitoring between LHC experiments
- Different activities on the Grid are very much dependent on each other (example- job processing efficiency is dependent on data distribution, data publishing, data access). Analyze these dependences in order to understand how VO monitoring data can be better presented/navigated.



Core group membership



- Chaired by

Julia Andreeva

- Group is focused on the needs of the main WLCG customers – LHC experiments. LHC experiments should be the key players in the group. One representative per experiment, plus VO experiment experts will be invited to take part the meetings on the specific subject

Dietrich Liko (ATLAS)

Latchezar Betev (ALICE)

Stefano Belforte (CMS)

To be confirmed (LHCb)

- Experiment dashboard made a good start. Output of the work of the System Analysis WG will define directions for the further dashboard development.

Benjamin Gaidioz

Pablo Saiz

Ricardo Brito Da Rocha

- MonAlisa monitoring system is widely used by several LHC experiments for the application level monitoring

Iosif Legrand

- ROC at CERN started work to follow site problems for LHC VOs

Diana Bosio

- LCG Experiment Integration Support

Roberto Santinelli

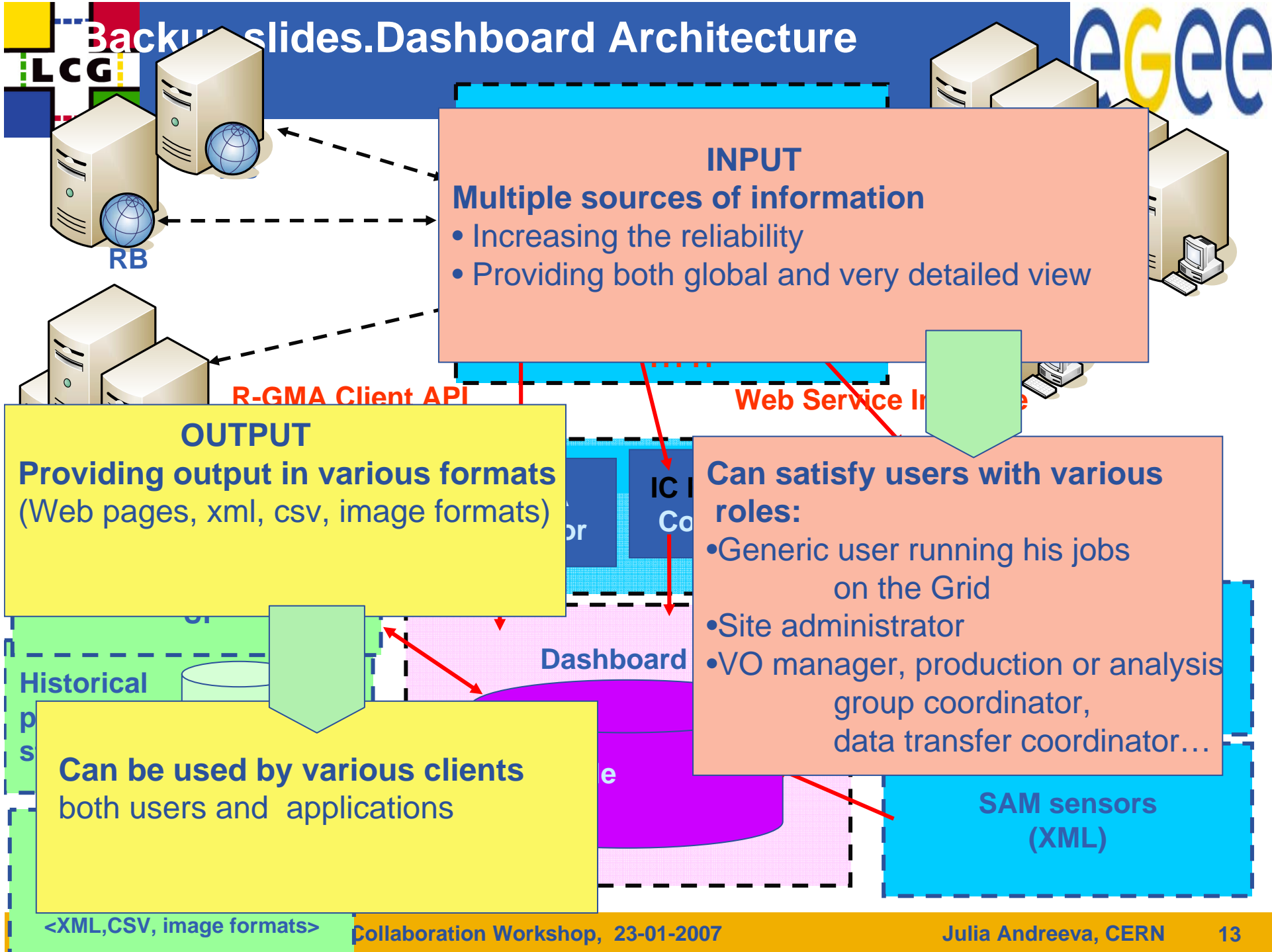
Monitoring tools developers will be invited to take part in the meetings related to a specific topic



Expected outcome of the work



- Further development/improvement of the Experiment Dashboard following the output of the working group
- Make sure that via experiment dashboard, SAM and experiment specific monitoring systems LHC experiments are provided with the monitoring framework where LHC VO user depending on his role and use case can find necessary monitoring data
- Suggest the procedure to address VO-related problems at the sites which should improve overall level of site reliability from the point of view of the LHC experiments
- Provide input for the Grid Service Monitoring Working Group for the issues/requirements related to Grid Service monitoring and collaborate with it in order to find the solution



INPUT
Multiple sources of information

- Increasing the reliability
- Providing both global and very detailed view

OUTPUT
Providing output in various formats
 (Web pages, xml, csv, image formats)

Can satisfy users with various roles:

- Generic user running his jobs on the Grid
- Site administrator
- VO manager, production or analysis group coordinator, data transfer coordinator...

Historical

Can be used by various clients
 both users and applications

SAM sensors (XML)