Report of the Computing Resources Scrutiny Group

The purpose of the CRSG is to inform the decisions of the Computing Resources Review Board (C-RRB) for the LHC experiments.

The CRSG mandate consists in scrutinizing

- The resource accounting figures for the preceding year
- The use the experiments made of these resources
- The overall request for resources for every experiment for the following year and forecasts for the subsequent two years

The CRSG shall also

- Examine the match between the refereed requests and the pledges from the Institutions.
- Make recommendations concerning apparent under-funding

The CRSG is appointed by and reports to the funding agencies via the C-RRB.

Report of the Computing Resources Scrutiny Group

The WLCG project keeps an accounting of usage at http://lcg.web.cern.ch/LCG/accounts.htm.

In 2008 for Tier1's and CERN the CPU usage was roughly at the 40% level of the pledges, whereas disk and tape are at the 60% level approximately.

During the first six months of 2009 usage of the installed resources has been: 56% in CPU, 75% in disk and 62% in tape for CERN and Tier 1's.

As of June 09 the installed CPU and Disk resources actually amounted to 67% and 83% of the pledges, respectively. Tape appears to have actually surpassed the pledge.

The usage of Tier2 resources is higher in general, although extremely irregular in distribution

The rhythm of fulfilment of pledges has naturally slowed down as the date for 2009 was moved from April 1st to September 1st along with a general perception that those that are installed or planned to be installed by September 1st are already enough to deal with the 2009 data after the reduction in beam time. This perception is roughly correct as e.g. the resources in place at the Tier 2's already surpass for some experiments the ones requested after the last revisions.

Report of the Computing Resources Scrutiny Group

A few underperforming Tier 1's have been identified during the STEP09 exercise, while the performing ones well exceeded 90% efficiency. The CRSG considers it a worrisome signal that some centres appear to have difficulties in passing this type of test and encourages the respective Funding Agencies to follow the evolution of their performance closely.

The figures show an improvement of the usage of the GRID resources, increasing numbers of users are submitting jobs as the middleware is becoming progressively more mature and the commissioning of the LHC for physics runs approaches. Yet, the level of usage of the resources by the experiments of the CERN and Tier1 resources made available to them does not seem totally optimal and this is a cause of concern to some extent.

In preparation for the April 2010 C-RRB meeting the CRSG in fulfilment of its mandate is asking the experimental collaborations to provide a summary of the use of the computing resources made available to them. This report should be available by March 1st 2010.

Report of the Computing Resources Scrutiny Group

The ‘new’ schedule of the LHC 2009 and 2010 will formally constitute as a single run, with a short break over the end of 2009 period but for the purposes of WLCG procurement and availability it counts as two separate periods:

Initial schedule following the Chamonix meeting of February 2009:

- ‘2009’: From October 2009 to the end of March of 2010.
- ‘2010’: From April 1st 2010 to October 2010.

  The resources for 2009 have to be in place by September 1st 2009 and the resources for 2010 had to be in place by April 1st 2010.

Revised schedule following the circular of the DG dated June 15th:

LHC expected to be ready for beam injection in mid-November. In practice this amounts to redefining the computing years ‘2009’ and ‘2010’, with the combined total running time unchanged

This leads us to recommend that the 2010 resources should be, exceptionally for this year, in place by June 1st 2010. This would give more time to the participating institutions to fulfil their pledges and represent some relevant savings.

Report of the Computing Resources Scrutiny Group

Year	pp	AA
	Beam time (seconds/year)	Beam time (seconds/year)
2009	1.7×10^6	0
2010	4.3×10^6	5×10^5 (*)

The AA estimate (*) corresponds to, at most, one month of data taking with an assumed efficiency x availability of around 20% (our estimate). The above numbers correspond to an effective beam time that differs considerably from the ones used in the 2008 report.

Before 2008 an efficiency of 50% was assumed, although already there it was mentioned there that it was probably more realistic to assume at most a 40% efficiency. In the revised LHC schedule the efficiency factor is conservatively taken to begin at a modest 10% in 2009 and ramp up to 32% only at the end of 2010.

Report of the Computing Resources Scrutiny Group

The request for 2009 & 2010 requirements was made public on April 7th.

The experiments requests nearly saturated the 2009+2010 pre-existing pledges A number of changes in the computing models or their parameters were proposed in some cases, justifying the need for the increased resources.

The CRSG submitted a preliminary assessment to the C-RRB on April 26th.

Some experiments challenged this preliminary assessment:

- More resources needed in view of the special circumstances of the 2009+2010 run
- Fair and equal treatment to all experiments
- The pledged resources are never 100% available

The C-RRB instructed the CRSG and the experiments to seek converge.

A new common scrutiny procedure was set up for ATLAS and CMS ensuring that a coherent set of principles is applied and further iterations took place with ALICE and LHCb.

After discussions with the experiments a number of changes were accepted by the CRSG in view of the special characteristics of the run. Advice from the LHCC regarding some other modifications was sought.

Report of the Computing Resources Scrutiny Group

The CRSG was provided on July 22nd by the LHCC with a set of recommendations, addressing the previous issues. The CRSG is satisfied with the recommendations and has no further pending questions at the moment. We recommend that the present scrutiny is read in conjunction with the relevant LHCC documents.

Over the last months a fluid dialogue has been established between the CRSG and the LHCC, but both committees feel that more complete and earlier interactions are necessary. These should also include joint meetings with the experiments to avoid duplicate reviews.

The CRSG also plans to set up in advance a meeting calendar and will propose to hold joint review sessions with the experiments and the LHCC twice a year. We expect these sessions to take place in February and July.

It should however be borne in mind that the nature of the scrutiny carried out by the CRSG is different to the one implemented by the LHCC reviews.

Report of the Computing Resources Scrutiny Group

The CRSG is generally speaking satisfied with the amount and quality of the information provided by the experiments this time.

The CRSG did not have on this occasion full access to the experiments internal spreadsheets, but was able to produce their own that are able to reproduce the experiments requests. In the process a number of discrepancies were found, some were due to simple errors, while on several occasions they revealed assumptions or parameters not sufficiently documented.

For future reviews we insist that

- Requirements and respective models be frozen during the review
- All changes to the models compared to the previous review be well documented
- All documents be provided sufficiently early to allow time for the review, a deadline for the revised requirements should be agreed upon well ahead the final report deadline.
- For the upcoming April C-RRB meeting this deadline is March 1st 2010.

Report of the Computing Resources Scrutiny Group

After several interactions the scrutiny and the experiments requests show a good degree of convergence.

The recommendations contained in this scrutiny imply a visible reduction in some cases with respect the April 09 requests. This reduction is most visible in disk which is the most expensive item

Report of the Computing Resources Scrutiny Group

The current implementation of the WLCG MoU is not agile enough to respond to the changing environment we have been facing during the LHC commissioning. This has a non-negligible cost for the funding agencies.

The CRSG has always emphasized that their recommendations to the C-RRB are, within reasonably uncertainties, well adjusted to the computing models and, endorsed by the LHCC, and in particular, that there is no contingency for late delivery or failure to meet the pledges included in our estimates.

We express the worry that changes in the computing models, dictated up to some level by the uncertainties of the LHC start, together with some tendency to use the pledged/available resources, induce non-revertible changes in the models and may lead to inefficient usage of resources.

Report of the Computing Resources Scrutiny Group

It seems prudent to scrutinise the experiments' use of resources after the first months of data taking in 2009. The CRSG commits itself to provide such a report in the shortest delay which is feasible, hopefully for the April 2010 C-RRB. In order for this to happen, the CRSG will require timely resource usage reports from all the experiments no later than 1 March 2010.

We recommend that the experiments exploit the upcoming data taking period in order to determine which strategy optimizes physics output while keeping resource requirements at a reasonable level in the understanding that some of the tenets of the original computing models do not appear to be sustainable anymore.

Report of the Computing Resources Scrutiny Group

Any shortage of CERN resources implies potential disruption of data taking; therefore, we advocate for a full support of CERN resources. Resources at Tier1s and Tier2s are crucial for physics output; any shortage of non-CERN (non-custodial) resources does not impact data samples, but slows down the physics productivity of the experiments.

We recommend the experiments make maximal use of the distributed resources in the GRID, thereby avoiding as much as possible the use of CERN facilities.

In the case of CERN resources, we advocate for a very clear separation between the contributions used for calibration and first pass reconstruction and central analysis (‘express stream’ or similar), and those used to perform physics analysis by the CERN based physicists.

Report of the Computing Resources Scrutiny Group

In the process of scrutinizing the 2009 and 2010 requests of the four LHC experiments we have critically examined all possible aspects of the different computing models and their implementation.

While we still find some potentially troublesome issues, with long term implications for the sustainability of the models, our interactions with the experiments have led to a noticeable improvement and a reasonable degree of convergence have been reached.

The CRSG acknowledges the special characteristics of the combined 2009 and 2010 run.

Updates and revisions of the computing models, perhaps of some substance in some cases, will be needed. The scrutiny after the first round of real data will be of great relevance.

The CRSG believes that the different computing models have largely proven their validity and we have no doubt that they will survive their first contact with real data in 2009.

Good luck!