7 November 2013

Minutes of the 24th LHC Computing Resources Review Board Meeting
(CERN, Geneva, 29th October 2013)

Present:

G. Taylor (University of Melbourne, Australia)
J. Lemonne (FWO, Belgium)
P. Marage (FNRS, Belgium)
A.K. Maciel (RENAFAE, Brazil)
S. Novaes (UNESP, Sao Paulo, Brazil)
I. Blain (National Research Council, NSERC, Canada)
R. McPherson (National Research Council, NSERC, Canada)
Y. Zhang (National Natural Science Foundation, China)
N. Fejksova (Ministry of Education, Youth and Sports, , Czech Republic)
D. Adamova (Institute of Physics AS CR, Czech Republic)
M. Lokajicek (Institute of Physics AS CR, Czech Republic)
J. Aysto (Helsinki Institute of Physics, University of Helsinki, Finland)
N. Alamanos (CEA/IRFU, France)
U. Bassler (CEA/IRFU, France)
L. Serin (CNRS/IN2P3, France)
F. Malek (CNRS/IN2P3, France)
H. Prasse (Federal Ministry of Education and Research, BMBF, Germany)
R. Feldmann (Federal Ministry of Education and Research, BMBF, Germany)
K. Ehret (BMBF/PT-DESY, Germany)
V. Guelzow (PT-DESY, Germany)
A. Heiss (BMBF/Karlsruhe Institute of Technology, Germany)
E. Gazis (National Technical University of Athens, Greece)
G. Vesztergombi (Wigner RCP, RMKI, Hungary)
T. Csörgö (Wigner RCP, RMKI, Hungary)
K.A.P. Sinha (Department of Atomic Energy, DAE, India)
E. Rabinovici (Hebrew University, Israel)
A. Zoccoli (INFN, Italy)
F. Bedeschi (INFN, Italy)
A. Di Ciaccio (University of Roma Tor Vergata, Italy)
Y. Ishida (KEK, Japan)
T. Kawamoto (University of Tokyo, ICEPP, Japan)
B. Lee (Sogang University, Korea)
A. Van Rijn (NIKHEF, Netherlands)
B. Jacobsen (Research Council, Norway)
F. Ould-Saada (University of Oslo, Norway)
J. Królikowski (Ministry of Science and Higher Education, Poland)
G. Barreira (LIP, Portugal)
J. Varela (LIP, Portugal)
F.D. Buzatu (Institute of Atomic Physics, Romania)

M. Dulea (IFIN-HH, Romania)
V. Matveev (Institute for Nuclear Research, Russian Academy of Sciences, Russia)
V. Savrin (Institute of Nuclear Physics, Moscow State University, Russia)
V. Shevchenko (National Research Centre, Kurchatov Institute, Russia)
Z. Hlavacikova (Ministry of Education, Science, Research and Sports, Slovakia)
D. Bruncko (Institute of Experimental Physics, SAS, Slovakia)
F. Del Aguila (Ministry of Economy and Competitiveness, Spain)
N. Colino (CIEMAT, Spain)
P. Karlsson (Swedish Research Council, Sweden)
C. Grab (ETH Zurich, Switzerland)
S. Lee (Academia Sinica, Taiwan)
G. Zinovjev (Bogolyubov Institute for Theoretical Physics, National Academy of Sciences, Ukraine)
G. Blair (STFC, United Kingdom)
A. Medland (STFC, United Kingdom)
J. Butler (Fermilab/Department of Energy, United States of America)
J. Cochran (Iowa State University, United States of America)
S. Gonzalez (National Science Foundation, United States of America)
P. McBride (Fermilab, United States of America)
S. Rajagopalan (Brookhaven National Laboratory, United States of America)
J. Sowinski (Department of Energy, United States of America)

WLCG
I. Bird, S. Foffano

CERN
S. Bertolucci, F. Hemmer, T. Lagrange, J. Salicio-Diez, E. Tsesmelis, E. van Herwijnen, E. Van Hove

Computing Resources Scrutiny Group
J. Flynn, D. Lucchesi

Resources Scrutiny Group
C. Touramanis, E. Iacopini

ALICE: P. Buncic, P. Giubellino, Y. Schutz
ATLAS: D. Charlton, T. Wengler
CMS: I. Fisk, M. Girone, J. Incandela, P. Kreuzer
LHCb: P. Charpentier

Excused
R. Heuer (CERN), S. Lettow (CERN), S. Bethke (Max-Planck Institut fuer Physik, Germany), F. Linde (NIKHEF, Netherlands)

Documents can be found in the RRB indico pages; accessible via the LHC-RRB home page
http://cern.ch/committees/all/welcomeLHCRRB.html

1. Introduction S. Bertolucci, Director of Research and Scientific Computing.

S. Bertolucci welcomes delegates to the meeting and invites I. Bird to present the status of the WLCG Project.

2. Approval of the minutes of the last meeting S. Bertolucci, Director of Research and Scientific Computing CERN-RRB-2013-065.

The minutes of the last Computing CERN-RRB are approved without comments.

3. Status of the WLCG Project and Financial Status Report I. Bird, WLCG Project Leader. CERN-RRB-2013-089 (Report), CERN-RRB-2013-090 (Slides).

I. Bird informs delegates about the status of WLCG MoU signatures since the last meeting with new Tier-2 signatures from Greece, Thailand and Latin America. The revised financial situation shows improvement with respect to that shown in April taking the latest experiment requirements into account. WLCG progress is reported including data transfers and tape usage statistics however activities have slowed down since the conference season due to LS1.

Use of the HLT farms by the experiments during LS1, experiment workload use and main shutdown activities are shown. The Computing model update work requested by the LHCC to optimise resource use and reduce costs is presented, the final version should be available by December 2013.

Concerning the future, significant effort is required from the HEP community to make use of new technology trends such as multi-core CPUs and parallelism and opportunistic resources such as commercial clouds, HPC and clusters. The assumptions for resource needs and the evolution of requirements is presented including an expected 20% annual CPU growth and 15% annual disk growth. The expectation for run 3 is around 100 PB per year of data, and for HL-LHC several 100 PB per year of data forcing the need to reflect on the most cost effective way to deploy computing to benefit from economies of scale and collaborate with other sciences such as big-data and e-infrastructures.

H. Prasse comments on the future challenges described and questions how they will be financed. If any additional funding for computing becomes necessary it would require significant warning very early for financial planning purposes. I. Bird confirms only the immediate future can be looked at with some certainty assuming constant funding, however firm data for the longer term beyond three years does not yet exist. S. Bertolucci reinforces the assumption of constant funding for the immediate future with discussions necessary to define the requirements beyond the next three years, keeping a tight connection with the Funding Agencies and the evolution of technology and computing models.

A. Zoccoli expresses his appreciation of the strategy described to prepare for the future. Finalisation of the computing models is needed for a full understanding of the budget required and the Funding Agency contribution. Hardware replacement costs need to be assessed and the notion of flat budget needs to be defined; he questions the starting point and costs included - CPU, disk and tape only, or also networking and power costs? I. Bird

confirms the written paper contains all considerations, the 25% replacement figure is intended as an average corresponding to Moore's law and there are certain assumptions concerning networking. Each site needs to manage their own costs and have a model of how they will evolve. F. Hemmer adds power costs vary significantly between countries therefore a general equation is difficult to propose.

T. Medland comments on the impressive achievements concerning the grid infrastructure and resource utilisation and questions how CERN and the experiments are going to drive the resource optimization forward. I. Bird points out the repurposing of the Tier 1's and Tier 2's is on-going; each country must choose the most cost effective way of providing the service. For the next three years there will be no real significant change apart from better use of the Tier-2's. For the future, input is needed from the Funding Agencies about the constraints to help define the strategy on a timescale of 5-10 years.

T. Medland enquires if there are investigations into alternative sources of funding for the future? I. Bird mentions the CERN-EIRO group vision for e-infrastructure currently being discussed with other sciences represented by the EIRO labs. It is not yet clear how well it matches the Horizon 2020 Programme of Work and the various calls. S. Bertolucci adds the problem of big data addresses a wider community than HEP. We can leverage using our experience and know how, which is recognized by the EU, but it is not yet clear what their plans are.

A. van Rijn remarks that a decade ago the HEP community already promised to deliver a generic computing infrastructure and was not particularly successful in this respect. He questions what the HEP community will do differently this time to succeed in creating a big data handling infrastructure that other sciences will use? S. Bertolucci replies in the past other sciences did not need such an infrastructure, however they do now which should motivate them to use it.

4. LHCC Deliberations E. Tsesmelis, LHCC Scientific Secretary. CERN-RRB-2013-091 (Report)

E. Tsesmelis confirms the report from the LHCC committee is consistent with what has been presented by the WLCG project leader, and on behalf of the LHCC congratulates the WLCG collaboration.

5. Status of Common Projects accounts T. Lagrange, CERN Finance and Procurement Department. CERN-RRB-2013-092 (Report)

T. Lagrange confirms he has nothing to add to the written report.

6. Report from the Computing Resources Scrutiny Group. J- Flynn, C-RSG Chair. CERN-RRB-2013-094 (Report), CERN-RRB-2013-095 (Slides)

J. Flynn presents the intensive use of WLCG resources, current resource optimization efforts, successful use of HLT farms by ATLAS, CMS and LHCb and the benefit of non-WLCG resources. Based on assumed resource growth and full exploitation of the LHC and experiments physics potential, significant resource increases will be required from 2015.

A detailed summary of resource use in 2013 is shown for CERN, the Tier-1's, Tier-2's and each of the experiments with ALICE showing good CPU efficiency, reduced tape use, beyond pledge use at Tier-1's and below pledge use at the Tier-0 and storage not fully used at sites with poor connectivity. ATLAS showed very successful use of resources beyond pledges and their HLT, tape issues with certain Tier-1's were observed and resolved. CMS showed low use at the Tier-0 in the first half of 2013 and successful use of their HLT farm, however full efficiency requires more network bandwidth to CERN EOS storage. LHCb had a successful restripping campaign with large-scale recall from tape and extensive use of the HLT for simulation.

The result of the scrutiny for 2014 and 2015 is shown with individual assessments and comments for each of the experiments. The following global comments and recommendations are made:

- Since the spring scrutiny the Run 2 requests have become more definite, with the assumption of a flat budget (not inflation-adjusted);

- ALICE and LHCb's scrutinised requests not always fully met at the Tier-1's; the CRSG urges Funding Agencies and Experiments to address this;

- The CRSG scrutiny is not well matched to the pledge cycle. A proposed change is made for RRB approval to better match the request/review/pledge cycle;

- Improving software efficiency is essential to constrain a growth in requests with the resulting gains already assumed. The CRSG strongly supports this and recommends that sufficient effort is funded;

- Effectiveness of disk use is only partly captured by occupancy. The CRSG welcomes the experiments' efforts to purge obsolete or unused data but continues to encourage this. In addition the CRSG would welcome a disk-use metric taking account of frequency of access.

- Good networking between/within tiers has been exploited to reduce disk use and move processing between tiers. This highlights the potential danger that poorly-networked sites will be underused. The cost implications of providing network capacity should be noted.

Concerning the proposed operational change to the CRSG scrutiny schedule, the CRSG proposes in the Spring performing a review of resource use in the previous calendar year, a final scrutiny of the requests for the following year, and a look beyond. In the Autumn requests for the future (year n+2 and beyond) should be looked at and if necessary, either on specific experiment request or if the LHC planning has changed significantly, the following year requests could be reviewed. To enable this the experiments should submit documentation on 1st February and 1st August respectively.

J. Flynn presents comments on flat budget growth with request predictions up to 2017 included in the computing model update. Starting at 2013 there are jumps above flat budget

for 2014 to 2015 with subsequent growth within flat budget after the jump. J. Flynn comments on the difficulty this will represent comparing it to survival as opposed to luxury.

The CRSG membership is shown with a change of representative from Spain, Netherlands and Nordic countries since the last RRB meeting. In conclusion on behalf of the CRSG J. Flynn thanks the experiments for their open dialogue and the CERN management for its support.

T. Medland comments on the proposed change of scrutiny schedule which seems a sensible and pragmatic approach to get things as aligned as possible to the Funding Agency planning. He adds the scrutinised requests not being fully met for certain experiments highlights a problem, as the computing models are evolving with more inter-changeability perhaps the funding models need changing. I. Bird comments on the Tier-1 and Tier-2 resource allocation which is not entirely clear in some countries adding it would be useful to get feedback from the Funding Agencies on the algorithms and how they are implemented within the individual countries, and why in some cases the funding source within a country for the Tier-1 is different to the Tier-2.

7. Summary. S. Bertolucci, Director of Research and Scientific Computing.

S. Bertolucci remarks on the high level of interest and discussion as always provoked by computing and its funding. He welcomes the Scrutiny Group proposal for a change in its operation including a longer outlook, and declares it accepted. Finally the importance of understanding the evolution of computing technologies and reflection on the long-term strategy is highlighted. S. Bertolucci thanks the delegates and closes the meeting.