Addendum No. 1

to the

Memorandum of Understanding

for Maintenance and Operation of the LHCb Detector

Core Computing

Preamble

(a) Whereas, in its Article 3.1, the Memorandum of Understanding for the Maintenance and Operation of the LHCb Detector[1] (hereinafter referred to as the M&O MoU) specifies that software and computing will be treated in a separate Memorandum of Understanding, it has now been decided to proceed as follows.

(b) The software development and maintenance of many products of use to more than one experiment and the provision of offline computing infrastructure are addressed by the Memorandum of Understanding for Collaboration in the Deployment and Exploitation of the LHC Computing Grid[2].

(c) The development of detector-specific software (such as that for simulation, reconstruction and analysis) and software for physics analysis is considered to be an integral part of the research activities of the scientists in the LHCb Collaboration and is therefore not subject to any Memorandum of Understanding.

(d) All other aspects of the experiment-specific Core Computing, in particular the contributions from the LHCb Collaboration to the LHCb Core Computing development, maintenance and support are addressed in the present Addendum to the M&O MoU, in recognition of the operational character of the ongoing development effort required during the life of the Collaboration.

Article 1: Annexes

1.1   All the Annexes are an integral part of this Addendum.

Article 2 : Parties to this Addendum

2.1   The Parties shall be as for the M&O MoU, namely all the Institutes of the LHCb Collaboration (as listed in the currently valid Annex 1 of that document) and their Funding Agencies, and CERN as the Host Laboratory.

2.2   The collaborating Institute(s) and the LHCb Collaboration will hereinafter be referred to as "Institute(s)" and "Collaboration", respectively.

Article 3 : The LHCb Core Computing

3.1   The scope of the Core Computing for the Collaboration is defined in Annex A1 and is hereinafter referred to as "the Activities".

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[1] CERN-RRB-2002-032
[2] CERN-C-RRB-2005-01

Article 4 : Responsibilities of the Institutes for the Activities

4.1   The Activities are described in a Work Breakdown Structure (WBS), outlined in Annex A2.

4.2   From the Institutes listed in the currently valid Annex 1 of the M&O MoU, those participating in the Activities are listed in Annex A3.   The Collaboration shall update Annex A3 annually to reflect the situation on 1 January of the current year.

4.3   Resources necessary for Software Infrastructure services items are funded by the entire Collaboration as   M&O Category A and/or on a voluntary basis through M&O Category B items.

4.4   Annex A4 shows the detailed WBS of the Category A tasks.

4.5   The Institutes listed in Annex A3 have, on a voluntary basis, committed resources towards the Activities. These WBS items, shown in Annex A5, therefore constitute M&O Category B items.

Article 5: Procedure

5.1   The sharing of responsibilities for the Activities shall be subject to the same scrutiny and approval procedure as other M&O items, as described in Article 10 of the M&O MoU.   To this end, Annex A5 shall be updated by the Collaboration annually in time for the spring meeting of the RRB.

Article 6 : Intellectual Property Rights

6.1   Rights to contribute pre-existing software: Members of the Collaboration contributing pre-existing software to the Collaboration shall ensure that they have, or that they have procured, the rights to contribute such software and that its use (which term in this article shall include any modification, enhancement, integration in other software or redistribution, but exclude use for commercial purposes) by the Members of the Collaboration in accordance with the terms of this Addendum, including the terms of this article, is in conformity with the legal provisions which apply to the use of such software .

6.2   Rights to contribute created software: Members of the Collaboration having created software in the execution of this Addendum shall ensure that they have, or that they have procured, the rights to contribute such software for use by the Members of the Collaboration for the purpose of the execution of this Addendum.

6.3   Granting of license: Each Member of the Collaboration contributing pre-existing software to the Collaboration or creating software in the execution of this Addendum ("the software") herewith grants the other Members of the Collaboration the right to use the software for their own scientific purposes,

including their participation in the LHCb Experiment, as well as the right jointly, that is, through the Collaboration, to make the software publicly available, under an open source license in accordance with the terms defined in paragraph 6.4 hereunder.

6.4   Such license:

6.4.1   shall stipulate that copyright in the software is vested in the contributing Member of the Collaboration and that it may include voluntary contributions;

6.4.2   shall permit the installation, use, reproduction, display, modification and redistribution of the software, with or without modification, it being understood that any such redistribution, shall reproduce the above copyright notice and these license conditions, and acknowledge the Collaboration in the user documentation and/or the software;

6.4.3   shall stipulate that any licensee publishing or distributing any modifications, enhancements or derivative works of the software without contemporaneously requiring users to enter into a separate written license agreement shall be deemed to have published or distributed such modifications, enhancements or derivative works under the conditions defined in this paragraph;

6.4.4   shall stipulate that the Members of the Collaboration provide no warranties or representations and accept no liability of any kind with respect to the software.

6.5   Except as provided elsewhere in this article, including in paragraphs 6.1 and 6.2 above, the Members of the Collaboration provide no warranties or representations of any kind with respect to the software to each other. They shall have no liability to each other with respect to the software, it being understood that each Member of the Collaboration shall bear the consequences of its own use of the software.

Article 7: Final Provisions

7.1   This Addendum is not binding on the Parties, it being understood however that the success of the LHCb Collaboration depends on all Collaboration members adhering to its provisions.

Annex A1 : LHCb Core Computing (the Activities)

1. In the case of LHCb, Core Computing and Software (CCS) is defined as the development and maintenance of the software framework, application integration, global reconstruction software, software infrastructure, visualisation, production and analysis tools, and management and interfacing to the Grid and LCG software. It comprises purely effort. Expenditure on materials is not envisaged. A full list of activities is given in Annex A2. Two generic areas are identified:

    o Development and maintenance of major software projects e.g. Gaudi, DIRAC, which carry long-term responsibility.

    o Contribution to generic common support tasks, e.g. webmaster, production manager, software librarian, where the commitment will be provided with individual expertise.

2. The organisation of computing within the LHCb Collaboration is shown in Figure 1. The parts of the organisation concerned with the CCS are indicated in the dashed box. The CCS is seen as the provision of the software framework; tools for distributed computing; coordination of the computing resources; organisation of the event processing of both real and simulated events, and the integration of algorithms (both global and sub-detector specific) in the software framework. The LHCb CCS also provides global reconstruction algorithms that will run in the online & offline environment, as well as the coordination of the sub-detector software. In addition to the CCS, the LHCb National Computing Board (NCB), with representatives from each collaborating country (plus CERN), advises the management of LHCb on computing issues.

3. It is hoped that the necessary manpower to meet the CCS needs of the experiment can be found by voluntary commitment of collaborating institutes or funding agencies. These contributions will be recognised in context of other contributions made to other common tasks for the experiment. In the event of a shortfall of effort, an additional call for voluntary contributions will be made. If additional voluntary contributions should prove insufficient, it may be necessary to re-categorise some of the CCS tasks as category-A M&O.

4. The LHCb computing management will annually provide a list of tasks (indicating any that will be category A M&O), each with a description and job profile, for the years under scrutiny at the following spring's RRB meeting. For the autumn Collaboration meeting, the NCB will review those tasks required for the CCS, with the associated manpower requirements; the recommendations of the NCB will be presented to the Collaboration Board. Final approval of the manpower requirements will made at the Collaboration Board meeting immediately prior to the spring RRB.
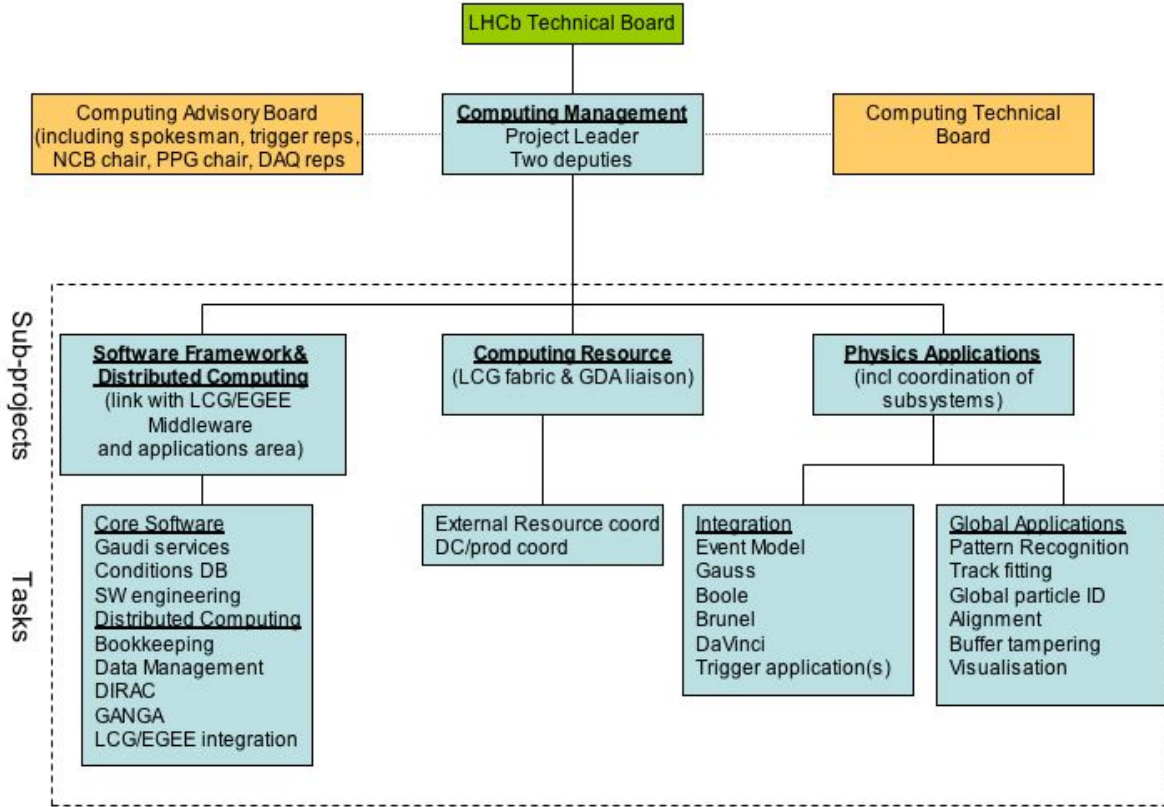
Figure1: LHCb computing organisation

Annex A2 : LHCb outline of Activities

The breakdown of LHCb CCS is described below:

Project management
Computing project leader
Deputy Computing project leader(s)

Core Software
GAUDI services
Conditions DB
Software Engineering

Distributed Computing
Bookkeeping
Data Management
DIRAC
Production tools
GANGA

Production

Integration
Event model
Simulation application
Digitisation application
Reconstruction application
Analysis applications
Trigger applications

Global Applications
Pattern Recognition
Track fitting
Global Particle ID
Global Alignment
Visualisation

Annex A3 : Institutes participating in the Activities

Country	Institute
Brazil	Universidade Federal do Rio de Janeiro (UFRJ)
CERN	CERN
France	Centre de Physique des Particules de Marseille, CNRS/IN2P3 and Université de la Méditerranée
France	LAL-Orsay, IN2P3-CNRS, Université de Paris-Sud
Germany	Max-Planck-Institut für Kernphysik (MPI) Heidelberg
Italy	Univ. of Bologna, INFN
Italy	INFN CERN fellows
Netherlands	NIKHEF
Poland	Institute of Nuclear Physics & University of Mining and Metallurgy, Krakow
Russia	Institute for Theoretical and Experimental Physics (ITEP) - Moscow
Spain	Universidad de Barcelona
Spain	Universidad de Santiago de Compostela
Switzerland	Ecole Polytechnique Féderale Lausanne
Switzerland	Universität Zürich
UK	University of Bristol
UK	University of Cambridge
UK	University of Edinburgh
UK	University of Glasgow
UK	University of Liverpool
UK	Imperial College, University of London
UK	University of Oxford
UK	Rutherford Appleton Laboratory

Annex A4 : Details of Category A tasks

LHCb currently envisages that the Core Computing will be provided through Category B M&O contributions.

Annex A5 : Details of Category B tasks

Project management
Computing project leader
Deputy Computing project leader(s)

Core Software
GAUDI services
Conditions DB
Software Engineering

Distributed Computing
Bookkeeping
Data Management
DIRAC
Production tools
GANGA

Production

Integration
Event model
Simulation application
Digitisation application
Reconstruction application
Analysis applications
Trigger applications

Global Applications
Pattern Recognition
Track fitting
Global Particle ID
Global Alignment
Visualisation

The European Organization for Nuclear Research (CERN)

and

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declare that they agree on the present Addendum to the Memorandum of Understanding for Maintenance and Operations of the LHCb Detector.

Done in Geneva   Done in _____

on_____   on_____

For CERN   For

_____   _____

   Jos Engelen
   Chief Scientific Officer

LHCb