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LHCb Applications and Workflows

This twiki provides information about the LHCb application stack, LHCb applications and workflows used on the grid

LHCb application stack

The LHCb software stack can be divided into three layers (see Fig 1), these are

- **LHCb applications** (see below) such as simulation, reconstruction, etc
- The **LCG Applications Area software**, these are middleware packages for different kinds of purposes, developed within HEP (such as the ROOT and GAUDI frameworks, GEANT4 detector simulation, COOL Conditions Database access, CORAL relational database abstaction, etc.), Grid middleware clients (LFC, FTS, WMS, ...) and packages developed outside HEP (e.g. Boost, GSL, gcc, ...).
- The **Operating System**, at the moment these are Scientific Linux versions and Mac OSX

 Figure 1: LHCb Software Stack

The whole stack is made available on different combinations of Operating System, architecture, compiler and optimizations. These are denoted by a "platform string" such as "slc6-gcc47-x86_64-opt".

LHCb applications

LHCb applications are separate projects denoted to a specific task in the different possible workflows of LHCb data processing, these are

Name	Purpose	Description
GAUSS	Simulation	event generation and simulation of the detector response via GEANT4
BOOLE	Digitization	simulation of the detector electronics
MOORE	Trigger	trigger software and generation of RAW events
BRUNEL	Reconstruction	reconstruction of RAW events into physics objects
DAVINCI	Analysis	analysis software used by physicists and also for stripping
NOETHER	?	?

in addition there are underlying projects supporting these applications developed also within LHCb, these are

Name	Purpose	Description
LHCBDIRAC	Grid Interaction	used for all data processing and data management operations on the grid
GANGA	Analysis submission	used by physicists to submit their jobs to computing facilities
LHCB	Common software	contains the event model description and common algorithms
LHCBGRID	grid middleware	contains CMT interfaces to grid middleware clients (can overwrite LCGCMT)
LCGCMT	LCG/AA software	

		contains CMT interfaces to the LCG Applications Area software stack (maintained by CERN PH/SFT)

Runtime environment

A runtime environment for any of the above LHCb projects can be generated (after a LHCb group login) with **lb-run**

This is the simplest way to generate a runtime environment and will provide you the latest available version. lb-run has many more options, you may consult "lb-run --help" for more details.

LHCb grid workflows

This section contains descriptions of the LHCb workflows used for data processing on the distributed computing facilities.

Stripping

Stripping will use the reconstructed physics objects as input (file type FULL.DST) and select the events contained within into different physics streams (e.g. DIMUON, BHADRON, etc). The individual output files are merged in a second step into larger files of the same stream if either all events of a given run have been processed of the output of the individual files supersedes N GB of output (usually N=5).

-- StefanRoiser - 18 Feb 2014

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