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Database architecture for the calibration of ATLAS Monitored Drift Tube Chambers

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The calibration of the 375000 ATLAS Monitored Drift Tubes will be a highly challenging task: a dedicated set of data
will be extracted from the second level trigger of the experiment and streamlined to three remote Tier-2 Calibration
Centres.
This presentation reviews the complex chain of databases envisaged to support
the MDT Calibration and describes the actual status of the implementation and
the tests that are being performed to ensure a smooth operation at the LHC start-up.

Summary

The size and complexity of LHC experiments raise unprecedented
challenges not only in terms of detector design, construction and
operation, but also in terms of software models and data persistency.
One of the more challenging tasks is the calibration of the 375000
Monitored Drift Tubes, that will be used as precision tracking detectors in the
Muon Spectrometer of the ATLAS experiment. A high rate of muon tracks is
required to determine the tube position/time (or Rt) calibration constants in
order to reach the design average resolution of 80 microns.
In this context, data suitable for MDT calibration will be extracted from
the second level trigger and then streamed to three remote Tier-2 Calibration
Centres. The Calibration sites will also need the ATLAS conditions data that
are relevant for the calculation of MDT calibrations: part of the Conditions
DataBase will thus be replicated at the remote sites via ORACLE streams.
At each centre, the computation of the actual calibration constants will be
performed in several steps, including severe validation and data quality
checks. All information produced at every stage of the calibration procedure will be
stored in local ORACLE Calibration databases that will be replicated to a
central database located at CERN using ORACLE streams: this will allow each
Calibration site to access the data produced by the others and to eventually provide
back-up should one site become unavailable for any reason. The validated calibration
constants will be extracted from the CERN Calibration DB and stored into the ATLAS
Conditions database for subsequent use in reconstruction and data analysis.
This presentation reviews the complex chain of databases envisaged to support
the MDT Calibration and describes the actual status of the implementation and
the tests that are being performed to ensure a smooth operation at the LHC start-up at
the end of this year.

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