HK 49: Instrumentierung IX

Zeit: Donnerstag 14:00–15:45 Raum: HG IX

HK 49.1 Do 14:00 HG IX

Data Acquisition Backbone Core DABC release v1.0 — Jörn Adamczewski-Musch, Hans G. Essel, Nikolaus Kurz, and •Sergey Linev — GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt

The new experiments at FAIR require new concepts of data acquisition systems for the distribution of self-triggered, time stamped data streams over high performance networks for event building. The Data Acquisition Backbone Core (DABC) is a general purpose software framework developed for the implementation of such data acquisition systems. A DABC application consists of functional components like data input, combiner, scheduler, event builder, filter, analysis and storage which can be configured at runtime. Application specific code including the support of all kinds of data channels (front-end systems) is implemented by C++ program plug-ins. DABC is also well suited as environment for various detector and readout components test beds.

A set of DABC plug-ins has been developed for the FAIR experiment CBM (Compressed Baryonic Matter) at GSI. This DABC application is used as DAQ system for test beamtimes. Front-end boards equipped with n-XYTER ASICs and ADCs are connected to read-out controller boards (ROC). From there the data is sent over Ethernet (UDP), or over optics and PCIe interface cards into Linux PCs. DABC does the controlling, event building, archiving and data serving.

The first release of DABC was published in 2009 and is available under GPL license. The development of key components was supported by the FutureDAQ project of the European Union (RP6 I3HP JRA1).

HK 49.2 Do 14:15 HG IX

The Upgrade of the HADES Data Acquisition System* — •Jan Michel[1,2], Ingo Fröhlich[1], Kathrin Göbel[1,2], Christian Müntz[1], Marek Palka[1], Joachim Stroth[1], Attilio Tarantola[1], Michael Traxler[2], and Sergey Yurevich[2] for the HADES-Collaboration — [1]Institut für Kernphysik, Goethe-Universität Frankfurt am Main — [2]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt

The main goal of the HADES upgrade is increasing the event rate capability up to 20 kHz for heavy ion collisions. This results in a data rate of about 250 MByte/s for heavy collision systems and an event rate of 100 kHz for light systems.

During this upgrade, most parts of the data acquisition system have been replaced. The new electronics is based on the latest FPGA architectures to gain highest data rates combined with low latency and high flexibility to adapt to front-end electronics. Data is now mainly transported through optical fibres to minimize the amount of noise introduced in analog signals. The monitoring and controlling capabilities have been increased by employing a unified network setup throughout all subsystems.

In this talk, an overview of the new DAQ system and the technologies involved will be given. The current status of the upgrade including first performance measurements gathered during the commissioning will be shown.

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HK 49.3 Do 14:30 HG IX

Entwicklung wiederverwendbarer Simulationsmodule in SystemC zur einfachen Modelierung ATCA basierender Datenerfassungssysteme — •Florian Goslich, Igor Konorov, Alexander Mann und Stephan Paul — Technische Universität München, Physik Department E18, 85748 Garching

Um für die Simulation eines Datenerfassungssystems (DAQ) eine logische Strukturierung und Wiederverwendbarkeit zu erreichen, können dessen Komponenten auf Puffer, Multiplexer, Links, Daten-Quellen und -Senken abstrahiert werden. Für die Modelierung der Bausteine wird die Hardware-Simulations-Bibliothek SystemC verwendet.

In den hier betrachteten DAQ-Systemen werden ATCA Crates (Advanced Telecom Computing Architecture) eingesetzt. Innerhalb eines solchen Crates können mehrere Hardware Komponenten über serielle Punkt zu Punkt Verbindungen mit mehreren Gbit/s miteinander kommunizieren. Diese ATCA Crates sowie deren Verbindungen untereinander werden mit Hilfe der Simulationskomponenten modeliert, wobei unterschiedliche Raten und Signalverzögerungen berücksichtigt werden. Durch den modularen Aufbau können verschiedene Datenflussstrukturen evaluiert, optimale Puffergrößen ermittelt und abschließend eine maximale Triggerrate für einen gegebenen Aufbau ermittelt werden. Anwendungsgebiete sind das COMPASS Experiment am CERN und das PANDA Experiment an der GSI.

Diese Arbeit wird unterstützt durch das BMBF, das Maier-Leibnitz-Laboratorium Garching und dem Exzellenz-Cluster "Origin and Structure of the Universe".

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Data transport and Event Building in the Upgrade of the HADES DAQ — •Sergey Yurevich for the HADES-Collaboration — GSI Helmholtzzentrum für Schwerionenforschung GmbH , Darmstadt, Germany

The HADES experiment relies on an efficient Data Acquisition system to reach the trigger rates from 20 kHz for heavy ion reactions up to 100 kHz for light collision systems. The main components of the DAQ system are designed to be capable of a total sustained throughput of 250 MB/s and a peak throughput of 500 MB/s. To achieve efficient transmission of large amounts of data we deploy Gigabit Ethernet using optical fibers as physical medium directly from the frontend at the detector.

Implementation and performance of the readout software, Gigabit Ethernet as well as parallel event building, mass storage strategy and run control are discussed.

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HK 49.5 Do 15:00 HG IX

Die erste Bewährungsprobe für das ALICE Tier2 bei GSI — •Kilian Schwarz und Peter Malzacher — GSI, Planckstr. 1, 64291 Darmstadt

Bei GSI wird ein Tier2-Zentrum für das ALICE-Experiment betrieben. Die wichtigsten Komponenten sind eine Batch-Farm mit derzeit 2400 CPU-Kernen, ein 700 TB großes Lustre-Dateisystem, welches von allen Worker-Nodes aus direkt ansprechbar ist, sowie ein 300 TB großes xroot-basiertes Grid-Storage-Element. Die Computing-Ressourcen werden der Kollaboration über die Grid-Middleware AliEn zur Verfügung gestellt. Schnelle Ergebnisse werden mit Hilfe von dynamisch erzeugten individuellen PROOF-Clustern gewonnen, wofür bei GSI ein Softwarepaket "PROOF on Demand" entwickelt wurde.

Durch den im Herbst erfolgten LHC-Start musste die aufgebaute Computing-Infrastruktur eine erste Bewährungsprobe bestehen. Die Hauptaufgaben des Tier2 sind Monte-Carlo-Simulation und individuelle Datenanalysen. In der Anfangsphase des LHC wurden bei GSI auch Eich- und Kalibrierungsläufe für die Detektorkomponenten TPC und TRD durchgeführt. Die Rohdaten wurden in Echtzeit zur GSI transferiert, die Ergebnisse umgehend in die zentrale Kalibrierungsdatenbank gespeichert.

HK 49.6 Do 15:15 HG IX

PandaGrid - a Tool for Physics — •Kilian Schwarz[1], Paul Bühler[2], and Dan Protopopescu[3] for the PANDA-Collaboration — [1]GSI, Planckstr. 1, 64291 Darmstadt, Germany — [2]SMI, Boltzmanngasse 3, 1090 Wien, Austria — [3]University of Glasgow, Glasgow, G12 8QQ, Scotland, UK

PANDA is one of the main experiments at the new FAIR facility and will investigate the properties of hadrons in the charm quark mass region produced in antiproton annihilation reactions. The PANDA experiment will produce a large amount of data (1 PB/year) and the analysis will require the continuous use of several hundred CPUs. To accomplish this Grid Computing (distributed analysis/storage of data) is needed.

AliEn based PandaGrid, though, provides the physicist not only with computing resources but with a complete suite of tools and services, freeing the user from the overhead of software installation, configuration, data storage, and job management.

The functionality has been tested in three large data challenges. Currently the most room for optimisation lies in improving distributed data storage and data access. Therefore various parameters for optimising xrootd based Storage Elements have been investigated and the effects on inter site transfer as well as local data access is being studied.

HK 49.7 Do 15:30 HG IX

Monitoring the software quality in FairRoot — •Florian Uhlig and Mohammad Al-Turany — GSI, Plankstrasse 1, 64291 Darmstadt

Up-to-date informations about a software project helps to find problems as early as possible. This includes for example information if a software project can be build on all supported platforms without errors or if specified tests can be executed and deliver the correct results.

We will present the scheme which is used within the FairRoot framework to continuously monitor the status of the project. The tools used for these tasks are based on the open source tools CMake and CDash. CMake is used to generate standard build files for the different operating systems/compiler out of simple configuration files and to steer the build and test processes. The generated information is send to a central CDash server. From the generated web pages information about the status of the project at any given time can be obtained.