ALICE O^2 data model proposal

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1 Introduction

The ALICE online-offline (O^2) computing system [1, 2] is a computing facility and a software framework designed for the processing of the ALICE data in the upcoming LHC Run 3. The design aims at high data throughput and parallelism using a multiprocess model. It does not, however, exclude the use of multithreading and other forms of concurrent processing inside of individual processes.

The data exchange between processes running within the O^2 system (called O^2 devices) is taken care of by the ALICE-FAIR (Alfa) framework [3]. Since this is the only communication mechanism foreseen for data exchange, it effectively serves the role of an API between devices. The Alfa framework provides data transport and synchronisation primitives via the FairMQ message queue library. FairMQ messages consist of raw memory buffers which are asynchronously queued and atomically delivered.

The

2 Vectored IO

Vectored IO is an important feature when dealing with multiple data buffers as it allows, in principle, to avoid data copies associated with constructing a single IO buffer. Vectored IO in FairMQ is provided in the form of multi-part messages consisting of multiple buffers which are delivered atomically while preserving the initial ordering.

3 Message structure

4 Metadata format

5 Data formats

6 Interfaces

References

[1] Buncic P. and The ALICE Collaboration. *Technical Design Report for the Upgrade of the Online-Offline Computing System.* Tech. rep. ALICE-TDR-019 CERN-LHCC-2015-006. 2015.

[2] *The Alice O2 software.* URL: `https://github.com/AliceO2Group`.

[3] M. Al-Turany et al. "ALFA: The new ALICE-FAIR software framework". In: *Journal of Physics: Conference Series* 664.7 (2015), p. 072001. URL: `http://stacks.iop.org/1742-6596/664/i=7/a=072001`.