Contribution ID: **1262** Type: **Oral**

Development of the Online Data Processing System for the BM@N experiment at NICA

Wednesday 1 November 2023 14:50 (15 minutes)

A huge amount of experimental data should be collected, stored and processed in large modern high-energy physics experiments, including the experiments of the NICA project at the Joint Institute for Nuclear Research. In this regard, corresponding performance requirements are put forward for existing online systems. The Online Data Processing System developing for the BM@N experiment of the NICA project is based on a distributed architecture that allows it to meet high performance requirements due to the possibility of scaling and parallel computing. The purpose of the online system is selective data processing (event digitizing and fast reconstruction) and data monitoring of the ongoing experiment. To achieve this goal, the FairMQ package developed by the FAIR collaboration (GSI Institute, Germany) has been chosen to communicate distributed processes executed on the nodes of the computing infrastructure with each other through the exchange of messages. One of the issues in developing and using such systems is the problem of the distributed run and control of the processes. The task is solved by using the FAIR DDS (Dynamic Deployment System) toolkit. The BM@N online system should start the predefined software tasks in the required sequence and allows managing them during sessions, including the transmission of messages between tasks and the update of some properties. The report presents the purposes and architecture of the developing Online Data Processing System for the BM@N experiment and features of the current implementation.

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Session Classification: Information Technology

Track Classification: Information Technology