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Development of Information Systems' Infrastructure for BM@N Data Processing

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The BM@N experiment, as part of the NICA complex, produces a substantial quantity of physics data, necessitating the implementation of a sophisticated infrastructure for the efficient storage, processing, and management of the data. In order to address these challenges, a comprehensive set of information systems has been developed. The complex includes an information system representing the Unified Condition Database (UniConDa) that stores necessary parameters of experiment systems; the Configuration Information System (CIS) for managing detector settings and a sequence of software tasks to be used in online; the Geometry Database for operating with information on geometric models of detectors; the Event Metadata System (EMS) for indexing and searching physics events for analysis; and an electronic logbook (e-Log platform) to record information on experiment runs during sessions; and many others. In addition, the BM@N uses various collaboration services, which have been already developed, such as the official website, collaboration forum, document server (Wiki). Security Policy is ensured through the Keycloak, authentication and authorization system, which centralizes access control to BM@N software systems. The report also covers the description of deployed infrastructure on a cluster platform managed by the Proxmox system, which oversees virtualization and containerization of the infrastructure components. An integrated gateway ensures centralized secure access to all software systems of the experiment, while its multi-tier architecture including web interfaces, REST APIs, and backend provides modularity and simplifies component updating. As a result, the developed infrastructure of the information systems and software services ensures the management of information being necessary for physics analysis of experiment data within the BM@N experiment.

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