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Prototype of a software complex for creating digital twins of large-scale distributed computer systems for megascience projects

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Modern scientific research and megascience experiments cannot exist without large-scale computing systems that enable to store large amounts of data and process them in a relatively short time. Such systems are distributed data acquisition, storage and processing centers. Large-scale distributed computer systems have a complex structure, include many different components and provide shared access to data storage and processing resources. Such systems must continuously guarantee high-quality and efficient operation. Therefore, a digital twin is needed for the design, support and development of distributed computer systems. It should allow one to investigate system reliability, check various scaling scenarios, find the necessary amount of resources to solve specific tasks.

The Meshcheryakov Laboratory of Information Technologies (MLIT) of the Joint Institute for Nuclear Research (JINR) has developed a prototype of a software complex for creating digital twins of distributed data acquisition, storage and processing centers. The talk will present development usage examples for the computing infrastructures of the BM@N and SPD experiments of the NICA project. The examples confirm the possibility of further use of the software complex in the design and modernization of various computing infrastructures for megascience projects.

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