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## Multy-level monitoring system for Multifunctional Information and Computing Complex at JINR

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Multifunctional Information and Computing Complex(MICC) is one of the basic scientific facilities of Joint Institute for Nuclear Research. It provides a 24×7 implementation of a vast range of competitive research conducted at JINR at a global level. MICC consists of for major components: grid-infrastructure, central computing complex, JINR private cloud and high performance heterogeneous cluster HybriLIT. All major components rely on network and engineering infrastructure. It is important to supervise all of the components on three levels: hardware level, network level, and service level.

Currently there are many monitoring systems built on different technologies which are used by different user groups and administrators. All monitoring systems are mostly independent despite the fact that some systems collect the same monitoring data. Their independence makes it difficult to see the whole picture of effectiveness and bottle-necks of MICC because the data are scattered among many systems. The role of multy-level monitoring system for MICC is to unite existing systems and solve that problem: provide high level information about the whole computing complex and its services. All MICC current monitoring systems, approaches and methods are described and analyzed in this work: monitoring platforms, data collection methods, data storage, visualization, notification and analytics.

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