Using the GOVORUN supercomputer for the NICA megaproject D.V. Belyakov¹, A.G. Dolbilov¹, A.N. Moshkin², D.V. Podgainy¹, O.V. Rogachevsky², O.I. Streltsova¹, M.I. Zuev¹

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The studies in the given direction were supported by the RFBR grants ("Megascience – NICA"), №18-02-40101 and 18-02-40102. At present, the GOVORUN supercomputer is used for both theoretical studies and event simulated data of the MPD experiment, the computing components of the GOROVUN supercomputer, i.e. Skylake (2880 computing cores) and KNL (6048 computing cores), are used; data are storage system (UDSS) under the management of the Lustre file system with a subsequent transfer to cold storages controlled by the EOS and ZFS file systems. UDSS currently has five storage servers with 12 SSD disks using the NVMe connection technology and a total capacity of 120 TB, which ensures low time of access to data and a data acquisition/output rate of 30 TB per second. In future, other MC generators are expected to be used as well.



4.3 Gev 4.3 Gev 9.6_Gev_ 11 Gev 11.5 Gev 4.7 Gev 4.7 Gev 7 Gev The DIRAC software is used for managing jobs and the process of reading out/recording/processing data from 7.7 Gev 5.6 Gev 5.6 Gev various types of storages and file systems. 11 Gev 6.4 Gev 6.4 Gev 7.7 Gev 4 Gev E_Uromd MpdRoot 7 Gev 4 Gev 7.7 Gev **UrQMD** CPU 5 Gev 4 Gev 18 cores 11.5 Gev 3FD 7 Gev Generator DCQGSM Reconstructed 40x nodes with Intel Xeon Gold 6154 7.7 Gev Ultra hot Data Data Particles 9.2 Gev 9 Gev generator Intel Xeon Phi Lustre FS 11 Gev - internal 11 Gev 61 cores PHSD LAQGSM 11.5 Gev 11.5 Gev - external 21x nodes with Intel Xeon Phi 7290 5 Gev 5 Gev 11.6 Gev EOS FS 7.7 Gev 7.7 Gev "temper 5 Gev 9 Gev Geant 3/4 By June 2019 over 75 million events for the MPD experiment have already been generated using the UrQMD generator. At A simulation toolkit NFS/ZFS FS the present time reconstructed almost 6.5 million events. The CPU component and the UDSS are used for the solution of Framework for these problems. **Distributed Computing** The implementation of different computing models for the NICA megaproject requires confirmation of the model's lapes efficiency, i.e. meeting the requirements for the time characteristics of acquiring data from detectors with their subsequent transfer to processing, analysis and storage, as well as the requirements for the efficiency of event modeling **Events** Cold and processing in the experiment. For these purposes it is necessary to carry out tests in a real software and computing reconstruction environment, which should include all the required components. At present, the GOVORUN supercomputer is such an environment; it contains the latest computing resources and a hyperconvergent ultrafast data storage system with a software-defined architecture, which allows providing a maximum flexibility of data storage system configurations.





Statistics of using all components of the supercomputer for



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