

The 8th International Conference "Distributed Computing and  
Grid-technologies in Science and Education" (GRID 2018)



Contribution ID: 298

Type: **Sectional reports**

## THE SERVICE FOR PARALLEL APPLICATIONS BASED ON THE JINR CLOUD AND HYBRILIT RESOURCES

*Thursday, 13 September 2018 16:00 (15 minutes)*

Cloud computing became a routine tool for scientists in many domains. The JINR cloud infrastructure provides JINR users computational resources for performing various scientific calculations. In order to speed up achievements of scientific results the JINR cloud service for parallel applications was developed. It is an application-specific web-interface. It consists of several components and implements a flexible and modular architecture which allows to utilize both more applications and various types of resources, as computational backends. Besides this architecture increases the utilization of cloud idle resources. This service allows scientist to focus on his research domain by interacting with the service in a convenient way via browser and abstracting away from underlying infrastructure as well as its maintenance. A user just set a required values for his job via web-interface and specify a location for uploading a result. The computational workload are done on the VMs deployed in the JINR cloud infrastructure. But It is planned in the nearest future to add a HybriLIT heterogeneous cluster as one more computational back-end of the JINR SaaS service.

An example of using the Cloud&HybriLIT resources in the scientific computing is the study of superconducting processes in the stacked long Josephson junctions (LJJ). LJJ systems are undergone the intensive research because of a perspective of practical applications in nano-electronics and quantum computing. Respective mathematical model is described by a system of the sine-Gordon type partial differential equations where the spatial derivatives are approximated with help of standard finite difference formulas and the resulting system of ODEs is numerically solved by means of the 4th order Runge-Kutta procedure. Parallel MPI-implementation of the numerical algorithm was developed.

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**Session Classification:** 6. Cloud computing, Virtualization

**Track Classification:** 6. Cloud computing, Virtualization