

# Message oriented framework with low overhead for efficient high-performance MC simulations

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In the recent years Bulgaria acquired a substantial amount of HPC resources of various types. The biggest procurement has been the BlueGene/P supercomputer at SAITC with 8192 CPU cores, while the Bulgarian Academy of Sciences has now two HPC clusters with Intel CPUs and Infiniband interconnection, which total more than 1000 logical cores. In addition some servers equipped with powerful GPU are available for applications that can take advantage of them. The coordinated use of such resources by one application faces significant challenges due to the heterogeneity of the resources and the networking and security constraints.

In order to facilitate the coordinated use of all these resources where each resource is used for the parts of the application where it is most efficient, we have developed a framework that allows the researcher to interconnect resources of the above types with minimal overhead. In this paper we describe the architecture of the system and demonstrate its effectiveness for a semiconductor modeling application, showing numerical and timing results.