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Hybrid MapReduce and MPI Approach for Solving Oil Extraction Problems

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Abstract. Focus of this study is the organization of high performance processing of oil field data, as well as the development of high performance algorithms for oil extraction problems. As a result, a hybrid approach of distributed parallel computing using MapReduce and MPI is suggested. This approach has been applied to solve the problem of fluid dynamics in anisotropic elastic porous medium.

In this study we proposed three approaches of organization distributed computing for solving scientific problems: Hadoop Mapreduce, Hadoop Mapreduce and MPI combined together, Hadoop Mapreduce and MPI combined together using memory-mapped files as a method of exchanging necessary for computations data between Hadoop and MPI computing environments [1-3]. The comparison of these three approaches are measured and analyzed in terms of their performance characteristics with different cluster settings.

Keywords. Oil extraction problems, MapReduce, Hadoop platform, Hybrid MapReduce and MPI approach, Memory-mapped files.

References

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