Parallel Computing and I/O

Containerizing a user-space storage framework for reproducibility

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Container solutions are becoming increasingly popular in the High Performance Computing (HPC) field. They support points such as reproducibility and mobility in the form that complete system environments can be reproduced and executed on other systems. In this thesis, JULEA, a flexible user-space storage system, is used to show how such a container solution can look like for such an application. Different container engines like Docker, Podman and Singularity are introduced and a concrete implementation approach for each is shown. Besides concrete solutions, the planning and design of workflow plays an important role. With the help of GitHub Actions, a completely automated workflow is designed, which is responsible for the image creation. In addition, an evaluation of the implementation problems will be presented and a comparison between existing and new container solutions will be shown.