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# High Performance Plasma Physics Simulation Output Management

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Models of physical systems simulated on HPC clusters often produce large amounts of valuable data that need to be safely managed both during the research projects ongoing activities and afterwards. To help to derive the most benefit for scientific advancement, we use results of the Horizon Europe Project EXA4MIND applying the tools to managing Particle In Cell simulation data from research conducted at the LMU physics department. We consider interoperation of HPC compute and file system with databases and object stores. We evaluate post-processing workflows for physics simulations run on supercomputing systems at LRZ (Garching b.M./DE) in collaboration with LMU Munichs Chair of Plasma and Computational Physics and Experimental Physicists from University of Jena, using the Plasma Simulation Code (Ruhl et al., Ludwig Maximilian University of Munich/DE) to produce TBs of particle movement data of set-ups that investigate the acceleration of particles in laser plasma interaction. We apply our workflow tools to post-processing and visualizing to discuss the parameter studies of simulated models.
Our focus includes improving the performance of data queries and processing steps with the chosen execution methods. We aim to build an ecosystem at the computing center where users can enjoy fast and flexible access to both raw and post-processed data by offering different storage and database systems. This includes facilitating a research data management adhering to the FAIR (findable, accessible, interoperable, reusable) principles.

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