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Advancing the Environmental Sustainability of Scientific Computing for ErUM

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Scientific computing contributes significantly to the CO2 footprint created by research conducted in ErUM. In order to advance the environmental sustainability in this area the SUSFECIT (Sustainable Federated Compute Infrastructures) research network has been proposed with the goal to contribute to developing a strategy and interlinked software ecosystems to reduce CO2 footprint and to increase the energy efficiency of distributed computing resources. The basic idea is to exploit the dispatchability of compute jobs in space and time and use the partition of a federated computing infrastructure at a place, which at a certain time, is (dominantly) powered by renewable energies such a wind and solar power plants. In order to realize this basic concept, it is foreseen to develop and optimize three interlinked ecosystems: i) for forecasting of the available energy mix, power costs and requested needs for compute power, (ii) for the orchestration of jobs on federated and locally distributed compute clusters taking into account the forecasts and (iii) for the accounting of the used CPU and GPU resources with respect to elapsed time, power consumption and CO2 footprint. A digital twin for the above set of ecosystems shall also be developed in order to optimize e.g. operation parameters. The presentation will discuss the basic concept, the content of the three ecosystems and exploratory work, which has been conducted by partners in the research network (DESY, KIT, Universities in Aachen, Bonn, Göttingen, Freiburg and Öko-Institut).

Sustainability

Sustainable ErUM research centres of the future

Ethics

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