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HPC and Cloud Resources for Running Mathematical Simulations Efficiently

Complex simulations that require large amounts of computational resources have typically run in dedicated supercomputers. However some parts of these simulations don´t perform well in these computers or don´t need these highly costs resources and can be executed on cheaper hardware. Moving some parts of these simulations out of the supercomputers and running them in smaller clusters or cloud resources can improve the time to results and reduce the costs of the simulations, providing also higher flexibility and ease of usage. Both HPC and Cloud resources benefit and empower users who need to perform complex simulations that normally only take advantage of the capabilities of one of these infrastructures. We propose the combined usage of these platforms by using an orchestrator to coordinate the exploitation of these systems and container technology to enable interoperability between them. Such solution provides simulations as a service in a transparent way for end-users and software developers, as well as improves the efficiency in HPC resources usage. It has been proven to work with different HPC and Cloud providers, including EOSC Hub.

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