Chair of Aerodynamics and Fluid Mechanics
TUM School of Engineering and Design
Technical University of Munich

Bachelor Thesis:

Enabling Access to Research Data via a Compute Cloud: A Case Study on Re-entry Flow Simulation of an Apollo-like Space Capsule

for students within **Informatics, Data Science, Engineering or similar**

🚀 Calling all students! Embark on an extraordinary Bachelor's thesis and unlock the mysteries of sharing data of re-entry simulation. Dive into the process of sharing research data from an Apollo-like space capsule re-entry simulation via the LRZ Compute Cloud. Utilize cutting-edge cloud infrastructure and the Navier-Stokes-Multiblock Solver (NSMB) program under the guidance of the Chair of Aerodynamics. Learn how to make your own CFD simulation on a supercomputer and explore seamless data availability and collaboration possibilities, charting new paths in aerospace research. Don't miss this stellar opportunity—launch your future today!

Abstract: This bachelor thesis aims to investigate the process of making research data, obtained from a simulation of the re-entry flow of an Apollo-like space capsule, available to a restricted audience without Leibniz Supercomputing Centre (LRZ) credentials. The study will focus on leveraging a compute cloud infrastructure to facilitate data access, storage, and sharing. The Navier-Stokes-Multiblock Solver program will be used to generate the simulation data. The Chair of Aerodynamics will provide the necessary grid and guidance for the computational fluid dynamics (CFD) simulation. The primary objective is to explore the implementation and configuration of a compute cloud to enable seamless data availability and collaboration.

Research Objectives / Tasks

- Conduct a comprehensive literature review on data sharing practices, cloud computing, and secure data access
- Collaborate closely with the LRZ to obtain the necessary understanding of their data sharing policies and how to mount a DSS folder in the LRZ Compute Cloud.
- Run your CFD Re-entry simulation.
- Embed a Paraview server for the visualization of the data which is wrapped in a NGINX Server.
- make your data available on the LRZ compute cloud

Requirements

- basic Linux command line skills
- Willingness to learn a server setup
- experience in Computational Fluid Dynamics (CFD) is not required
- Self-initiative and ability to work independently

Learnings

The expected outcome of this bachelor thesis is a comprehensive understanding of making research data available via a compute cloud to a restricted audience without LRZ credentials. The thesis will provide insights into the implementation of a secure data storage and sharing solution, assess the performance and security aspects, and offer recommendations for further enhancements. The findings will contribute to the broader field of data sharing and cloud computing, specifically in the context of research data accessibility and collaboration.

Contact

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