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Computational Fluid Dynamics Foresight and sustainabil- ity along the entire data centre life cycle

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Computational Fluid Dynamics (CFD) is a powerful tool to optimize data centres in both the design and the operational phase. It helps to reduce costs, to mitigate risks through preventive analysis and to quantify the benefits of future-proof decisions. The result: continuous improvement of availability, capacity, and efficiency of your data centres. Read this white paper to learn how CFD can literally give you foresight through 3D visualization based on reliable data. Find practical examples, calculations and advice on implementation and get an outlook on the possible concrete effects.

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Executive Summary

New technologies and applications such as 5G, machine learning, digital twins and the rapidly growing use of video conferencing and e-commerce are increasing the dynamics in the IT sector. The challenge for data centre professionals: Requirements for high availability and cost efficiency are on the rise, while energy efficiency is more than a cost factor. It is a basic future prerequisite to fulfil the growing demand for ecologically sustainable operation. IT professionals need foresight and reliable calculation when building up ever more complex data centres or increasing the density of existing data centres during operation.

This Whitepaper illustrates how CFD can be used a powerful tool to optimize data centres in both the design and the operational phase. CFD explores and optimizes even highly complex designs with customized engineering concepts, both indoor and outdoor. CFD proves and realistically visualizes the performance of a potential layout and the impact of changes in the cooling system design already in the planning phase. Such proof of system redundancy and performance helps to optimize the number of cooling units, their capacity and layout, thus reducing capital expenditure (CAPEX). The performance can be enhanced during system commissioning by appropriate calibration of the model along with the unit test results. Thus, an intelligent high-fidelity virtual facility for further cooling and performance testing can be created. CFD support goals of data centre optimization such as reduction of operating expenses (OPEX), risks mitigation, and providing measurable answers before investing in performance improvements. The result: Sustainable data centres with continuous improvements of availability, capacity, and efficiency.

But what are the benefits for you in day-to-day operations and how can CFD analysis be applied in practice?

Read on in the full whitepaper.