# Numerical simulation of the airflow in a small computing center with air

## conditioning system by domain decomposition method

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### Abstract

The interaction between airflow field and the temperature field is a complex coupling problem and it is essential to the airflow organization of an air-conditioning system. To improve the cooling efficiency and to save energy, the airflow and temperature distribution in a small computing center are simulated numerically in this work. The governing equations are solved directly by domain decomposition method (DDM) using ADVENTURE\_sFlow, a solver for large scale flow problems based on DDM and balancing preconditioning. Numerical results are validated by comparing with the experimental data and available numerical results. The airflow characteristics, the development of temperature field and the turbulence performance in the center are analyzed. The mechanism of heat transportation is studied.

**Keywords:** Large-scale coupling; ADVENTURE\_sFlow; Airflow; Temperature field; Numerical simulation;



Figure 1. The geometry of a small computing center

### References

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