



Background

In a data center, the electrical energy supplied is almost completely converted into heat and released into the environment. Currently, in most cases this waste heat source is not utilized. In order to gain a better understanding of the quantity and quality of the waste heat generated, a test bench for servers was set up at the IER. A central component of the method is a powerful thermographic camera in combination with additional measurement technology. Benchmarks are used to specifically load the server components to be examined (in this case, the main processor (CPU)).

Scope of the tasks

In previous work, a server test bench was constructed, set up and optimised. In addition, the individual components of the measurement setup and concept were put into operation and tested. All subsystems are fully automated and can be controlled remotely using Python. In the course of this work, a validation of the developed method will be carried out on another server. This is to check the extent to which the results already obtained are transferable. For this purpose, the previous automation and measurement technology must be adapted to the new server and, above all, CPU.

For this purpose, the following **questions** are to be addressed:

- Can the test results also be reproduced on another server?
- What influence does a variation in the cooling strategy have on the quantity and quality of waste heat?
- Analysing and processing the measurement data using machine learning to create a waste heat model.

A background in the following areas is desirable

- Python
- Machine Learning

Student research
project/Master's thesis

**Method validation for
thermoenergetic
characterization of server
components considering
the cooling strategy**

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