

Workload-dependent Power Efficiency Optimization

Advisor: **Hannes Weissteiner**

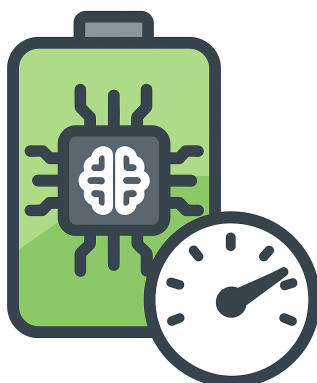
Motivation

Modern computers have different power profiles, that adjust parameters like CPU frequency, scheduler settings, and other parameters to optimize for performance or power efficiency. However, these profiles are usually static and do not adapt to the workload.

The goal of this project is to create a tool that can determine the optimal parameters for a given workload, to optimize efficiency (as in: executed work per energy). This can be useful for battery-powered devices, e.g., to finish as many compilation tasks as possible before the battery runs out.

Goals and Tasks

-  Review existing power profiles and power management techniques.
-  Define and measure metrics to determine the current efficiency of a workload.
-  Implement a prototype that can determine the optimal parameters for a given workload.
-  Implement a service that can dynamically adjust the parameters based on the current workload.



Literature

- > [W. Zhang, H. Zhang, and J. Lach](#)
Dynamic core scaling: Trading off performance and energy beyond DVFS
[International Conference on Computer Design \(ICCD\)](#)
- > [J. Phung, Y. C. Lee, and A. Y. Zomaya](#)
Modeling System-Level Power Consumption Profiles Using RAPL
[NCA](#)

Courses & Deliverables

- ☒ **Introduction to Scientific Working**
Short report on background
Short presentation
- ☒ **Bachelor Project**
Project code and documentation
- ☒ **Bachelor's Thesis**
Project code
Thesis
Final presentation

Recommended if you're studying

☒ CS ☒ ICE ☒ SEM

Prerequisites

- > Basic operating systems knowledge
- > Programming experience (Python, C/C++)
- > Interest in systems engineering

Advisor Contact

hannes.weissteiner@tugraz.at