Master Internship — 5 to 6 months, starting between Feb. and Apr. 2025

ENACloud - ENergy efficiency through Architectural tactics for CLOUD systems

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Keywords Energy-efficiency, Self-Adaptation, Cloud Systems, Architectural tactics.

Context. Energy efficiency has already been considered for many years at the hardware level. However, powerful and cheaper computing resources have led to less resource optimization in software. Considering the planet resource limits and the increasing role of software in society, there is an urgent need to design software with energy awareness as a requirement. In practice, this means to consider energy-efficiency in software quality attributes at design time and then to implement architectural tactics enforcing them. Moreover, usage conditions varying a lot at run-time, software evolution would enable additional energy savings.

Cloud-based services and applications can evolve through various configurations of cloud software and provisions of hardware resources Such a behavior offers the foundation for achieving elasticity in a modern cloud computing paradigm. In this context, qualities of service such as response time, resource utilisation were explored. However, energy efficiency has been neglected so far [1].

Internship objectives. The **objective** of this internship is to take into account energy efficiency as quality attribute in the design of cloud-based software products and to provide recommendations to software engineers for **developing and evolving** software with low environmental impact.

Concretely the tasks that will be carried out by the selected candidate :

1. Study the software-based power meters that can be used for monitoring energy consumption of cloud-based applications [5, 6].
2. Study the architectural tactics for cloud-based applications [1, 2, 3, 4]
3. Conceive an approach based on architectural tactics that recommend software developers how to build and evolve cloud based systems to improve their energy efficiency.
4. Run experimental studies for validating the proposed solutions.

This subject is part of the research works of the DiSSEM group concerning Distributed Systems, Software Engineering and Middleware, in the ACMES team of the SAMOVAR lab.

Références

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