

Applications of scheduling theory to optimize green energy usage in cloud computing platforms

Código do projeto: DC02

Responsável: Prof. Daniel Cordeiro

Linha de pesquisa: Gestão e Desenvolvimento de Sistemas

Número de vagas: 1

Descrição geral

Cloud computing platforms support most services and applications that we use every day, such as social networks, e-mail, video games, and video streaming, and is a key element for the development of smart cities. However, cloud computing platforms consume a massive amount of electricity: the data centers that host these platforms consume 1% of the of the power generated globally. In order to reduce the costs and environmental impact resulting from this energy consumption, data centers are installing renewable energy sources such as solar farms in their facilities. The availability of solar energy is not constant, resulting in challenges in scheduling tasks to reduce nonrenewable energy consumption. Some data centers have batteries that can store renewable energy, but they self-discharge and lose their capacity as time goes on, which characterizes another challenge: deciding when to store or use battery power. In this project, we will study how to use scheduling theory to reduce brown energy consumption and costs for data center operators. In order to tackle the scientific and technological challenges to solve this problem, we will develop a multi-objective scheduling algorithm for virtual machines that are submitted to geographically distributed cloud computing platforms, considering that they have batteries and variable (intermittent) renewable energy supply such as energy from wind and solar farms.

Perfil desejado

Having a strong undergraduate background in information systems/computer science, including C/C++ programming, is highly recommended for applicants.

Referências

Vasconcelos, M.; Cordeiro, D. and Dufossé, F. (2022). Indirect Network Impact on the Energy Consumption in Multi-clouds for Follow-the-renewables Approaches. In Proceedings of the 11th International Conference on Smart Cities and Green ICT Systems - SMARTGREENS, ISBN 978-989-758-572-2; ISSN 2184-4968, pages 44-55. DOI: 10.5220/0011047000003203

VASCONCELOS, Miguel F. S.; CORDEIRO, Daniel. Levantamento sobre Técnicas de Escalonamento para Computação Verde em Nuvem. In: ESCOLA REGIONAL DE ALTO DESEMPENHO DE SÃO PAULO (ERAD-SP), 11. , 2020, Evento Online. Anais [...]. Porto Alegre: Sociedade Brasileira de Computação, 2020. p. 110-113. DOI: <https://doi.org/10.5753/eradsp.2020.16899>.