

# Serverless Computing for Sustainability

**Código do projeto:** DC01

**Responsável:** Prof. Daniel Cordeiro

**Linha de pesquisa:** Gestão e Desenvolvimento de Sistemas

**Número de vagas:** 1

## Descrição geral

Cloud computing platforms underpin the majority of services and applications we rely on daily, including social networks, email, video games, and video streaming. They also play a crucial role in the advancement of smart city initiatives. However, these platforms have a significant energy footprint, with data centers consuming approximately 1% of the world's total electricity production. To address the associated costs and environmental impact, data centers are increasingly integrating renewable energy sources like solar farms. Yet, the intermittent nature of solar energy poses challenges in optimizing task scheduling to minimize reliance on non-renewable energy sources.

While serverless computing is commonly employed in commercial applications, its application in scientific workflows remains limited in existing literature. Leveraging AFCL (Abstract Function Choreography Language), a recent proposal for abstract workflow specification, we aim to explore the creation of distributed event-driven service compositions using native tools offered by major cloud computing platforms such as AWS. Our objective is to achieve executions that strike a balance between performance and carbon footprint optimization.

## 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., Da Costa, G., Dufossé, F., Nicod, J. M., & Rehn-Sonigo, V. (2023, May). Optimal sizing of a globally distributed low carbon cloud federation. In 2023 IEEE/ACM 23rd International Symposium on Cluster, Cloud and Internet Computing (CCGrid) (pp. 203-215). IEEE. DOI: 10.1109/CCGrid57682.2023.00028.

Vasconcelos, M. F. S., Cordeiro, D., & Dufossé, F. (2022, April). Indirect network impact on the energy consumption in multi-clouds for follow-the-renewables approaches. In 11th International Conference on Smart Cities and Green ICT Systems (pp. 44-55). SCITEPRESS-Science and Technology Publications. DOI: 10.5220/0011047000003203

Ristov, S., Pedratscher, S., & Fahringer, T. (2021). AFCL: An abstract function choreography language for serverless workflow specification. *Future Generation Computer Systems*, 114, 368-382. DOI: 10.1016/j.future.2020.08.012