



## Beyond Cloud Functions: Practical Optimization of Production-Ready Serverless Applications

*by German T. Eizaguirre and Pablo Gimeno Sarroca (Universitat Rovira i Virgili)*

Leveraging serverless applications remains one of the core goals of CLOUDSTARS, which continues to foster a vibrant research ecosystem for cloud prototypes. A particularly promising area lies in optimizing production-ready pipelines by harnessing the technical expertise of its participants.

During our stay at IBM research Zurich, Pablo Gimeno Sarroca and German T. Eizaguirre, both PhD students from Universitat Rovira i Virgili, helped bridge the gap between CLOUDSTARS and CloudSkin --another Horizon Project-- by tuning the METASPACE metabolomics annotation pipeline, a fully-fledged public application for molecule identification.

Our efforts focused on integrating performance-driven enhancements into the application to reduce execution time and improve user experience. We embedded smart resource allocation heuristics within the pipeline to achieve more efficient usage and provisioning of cloud functions. Among other improvements, we optimized interactions with intermediate storage to enable low latency data exchange between pipeline stages.

Additionally, we paved the way for deploying the pipeline in cloud-edge continuum deployments. We redesigned the pipeline architecture to support execution on WebAssembly (WASM) runtimes and implemented preliminary models for task execution on edge devices. As part of our emphasis on storage optimization, we also developed an out-of-the-box connector for WASM applications to interface with GEDS, a layered in-memory storage system from our host institution, IBM Research.

CLOUDSTARS continues to demonstrate its value as an incubator for innovative projects and a powerful driver of inter-institutional collaboration.



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