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ABSTRACT

Context

Serverless computing, particularly the Function-as-a-Service (FaaS) model, has emerged as a promising paradigm for modular and scalable execution in cloud-based applications. However, its performance benefits for data processing tasks need to be assessed in comparison with traditional server-based approaches.

Resources and Setup

We have the Netflix Movies and TV Shows dataset and a set of independent, stateless functions designed to perform filtering, cleaning, grouping, and aggregation. These functions replicate the modular nature of a serverless environment. Additionally, we have a traditional server-based monolithic execution model for comparative analysis.

Research Objective

We need to evaluate the performance advantages of serverless computing over monolithic execution. Specifically, the objective is to determine whether function-level orchestration can enhance scalability and efficiency in handling data processing tasks.

Methodology

The methodology involves simulating a serverless architecture by executing each data processing step as an independent function. The dataset undergoes filtering, cleaning, grouping, and aggregation through this function-level pipeline. Execution time is measured and compared between the serverless setup and the traditional monolithic approach.

Result

The serverless execution demonstrated a 3.3x performance improvement, reducing the total execution time from 0.30 seconds in the monolithic model to 0.09 seconds in the serverless setup.

Conclusion

This study concludes that serverless computing offers substantial performance benefits for data processing tasks. The use of function-level orchestration improves efficiency and scalability, making serverless computing a viable solution for cloud-based data pipelines and large-scale applications.