

Master's Thesis

Service Level Guarantees for Serverless Applications

Serverless applications are Internet-centric applications that promise high cost-efficiency by heavily relying on third-party cloud infrastructure services (CISs) to realize the application back-end. CIS providers solely provision CIS on-demand for the execution time of an application request that is typically executed in a composition of multiple CIS functions that are coordinated by an orchestration engine.

While serverless architectures promise high cost-efficiency, application clients can observe high performance volatility caused by outliers in single serverless functions [1].

Up to the present day, approaches are missing that allow to guarantee service levels for serverless applications, thus, significantly limiting their adoption in multiple application scenarios.

In this thesis, you will work on lifting this prevailing restriction by proposing a novel method for enforcing performance service levels for serverless applications.

As an evaluation, you will implement your method in a software prototype in the context of AWS, i.e., serverless functions based on AWS Lambda and the orchestration engine AWS Step Functions. An experiment will allow you to assess to which degree the guarantee of performance service levels compromises cost-efficiency - one of the initial major value propositions of serverless applications.



[1] S. Hendrickson, S. Sturdevant, T. Harter, V. Venkataramani, A. C. Arpaci-Dusseau, and R. H. Arpaci-Dusseau, "Serverless Computation with OpenLambda," in 8th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud 16), 2016.

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Our Mission:

Our lectures cover fundamental methods and techniques in the areas of service computing, cloud computing, and enterprise computing. We like to engage students in hands-on building of distributed information systems and to take an interdisciplinary approach to evaluating such systems. Through a close mentoring of students, especially in our seminars, we aim to introduce students to our ongoing research and to excite them to do future studies and research with us.