Using Cloud Native Technologies to Understand the Performance of Cloud Native Technologies

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ABSTRACT

The ambition of this talk is to seed discussions around how cloud native technologies can help research on performance engineering, but also what are the interesting performance engineering challenges to solve with cloud native technologies.

Cloud native technologies are building blocks for creating a modern environment for hosting containerized applications. Amongst others, great focus is placed on observability, which allows engineers to collect and analyze massive amounts of performance data in near real-time. Take as an example service meshes, which are a layer 7 network platform for containerized applications. Service meshes not only allow traffic engineering, but also add observability on top of a microservice application. Amongst other, this allows understanding traffic patterns between microservices, including upstream-downstream relationships, request rate, etc. without writing a single line of code.

This talk discusses how cloud native technologies may help researchers in performance engineering. The benefits are threefold. They allow researchers – e.g., PhD students – to be more productive, by getting the mechanism of collecting performance data out of the way. They improve collaboration because the effects of changing a parameter can be visualized in near real time. Finally, experiments are based on proven technologies with skills more widely available, which helps reproducibility.

These benefits are illustrated through our research on adaptive service meshes. Indeed, service meshes have many parameters which impact performance. Discussions with practitioners revealed a gap in understanding on how to effectively choose these parameters. We therefore proposed an adaptive controller that configures a service mesh so as to maintain a target tail response time.

CCS CONCEPTS

• **General and reference** → *Experimentation*; • **Computer systems organization** → **Cloud computing**; • **Software and its engineering** → **Software performance**; • **Networks** → **Cloud computing**; **Traffic engineering algorithms**.

KEYWORDS

experimentation, microservices, cloud native, traffic management

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BIOGRAPHY

Cristian Klein is a cloud architect at Elastisys and an adjunct lecturer at Umeå University. His role involves looking at data protection regulations and security best practices to make architectural decisions. He gathered over 18 years of experience in operating IT systems. He acted variously as researcher, teacher, consultant and practitioner. His research interests include cloud native technologies, information security and service meshes.

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