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Performance Analysis of Self-Adaptive Software Services for Requirements Validation at Design-Time

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Self-adaptation allows continuously running software services to operate in changing and uncertain contexts while meeting their requirements in a broad range of contexts, e.g., from low to high load situations. As a consequence, requirements for self-adaptive software services are more complex than requirements for static software services as they have to explicitly address properties of the self-adaptation layer. While approaches exist in the literature to capture this new type of requirements formally, their achievement cannot be analyzed in early design phases yet.

In this talk, we demonstrate how we apply the RELAX requirement language to formally specify non-functional requirements for self-adaptive software services. We apply our model-based *SimuLizar* approach for a semi-automatic analysis to test whether the self-adaptation layer ensures that these nonfunctional requirements are met. We show the results of the evaluation of our approach on the design of a proof-of-concept load balancer system. As this evaluation demonstrates, we can iteratively improve our system design by improving unsatisfactory self-adaption rules.