Journal of: Software: Practice and Experience

Special Issue Paper

Dynamic reconfiguration of cloud application architectures

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First published: 24 October 2016
https://doi.org/10.1002/spe.2457
Cited by: 3

Summary

Service-based cloud applications are software systems that continuously evolve to satisfy new user requirements and technological changes. This kind of applications also require elasticity, scalability, and high availability, which means that deployment of new functionalities or architectural adaptations to fulfill service level agreements (SLAs) should be performed while the application is in execution. Dynamic architectural reconfiguration is essential to minimize system disruptions while new or modified services are being integrated into existing cloud applications. Thus, cloud applications should be developed following principles that support dynamic reconfiguration of services, and also tools to automate these reconfigurations at runtime are needed. This paper presents an extension of a model-driven method for dynamic and incremental architecture reconfiguration of cloud services that allows developers to specify new services as software increments, and the tool to generate the implementation code for the services integration logic and the deployment and architectural reconfiguration scripts specific to the cloud environment in which the service will be deployed (e.g., Microsoft Azure). We also report the results of a quasi-experiment that empirically validate our method. It was conducted to evaluate their *perceived ease of use*, *perceived usefulness*, and *perceived intention to use*. The results show that the participants perceive the method to be useful, and they also expressed their intention to use the method in the future. Although further experiments must be carried out to corroborate these results, the method has proven to be a promising architectural reconfiguration process for cloud applications in the context of agile and incremental development processes. Copyright © 2016 John Wiley & Sons, Ltd.