Middleware-oriented Deployment Automation for Cloud Applications

Fully automated provisioning and deployment of applications is one of the most essential prerequisites to make use of the benefits of Cloud computing in order to reduce the costs for managing applications. A huge variety of approaches, tools, and providers are available to automate the involved processes. The DevOps community, for instance, provides tooling and reusable artifacts to implement deployment automation in an application oriented manner. Platform-as-a-Service frameworks are available for the same purpose. In this work we systematically classify and characterize available deployment approaches independently from the underlying technology used. For motivation and evaluation purposes, we choose Web applications with different technology stacks and analyze their specific deployment requirements. Afterwards, we provision these applications using each of the identified types of deployment approaches in the Cloud to perform qualitative and quantitative measurements. Finally, we discuss the evaluation results and derive recommendations to decide which deployment approach to use based on the deployment requirements of an application. Our results show that deployment approaches can also be efficiently combined if there is no ‘best fit’ for a particular application.