

# Software Product Lines for Multi-Cloud Microservices Configuration

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## Abstract

Multi-cloud computing [2] and microservices architecture [1] are current trends in the development of cloud applications. Multiple clouds can be used to reduce provider dependence, comply with constraints and regulations, or optimize costs and quality of service. Microservices architecture improves resource usage and scalability by decomposing applications into small highly decoupled services that may be developed, deployed and scaled independently.

However, setting up a multi-cloud environment to deploy and run these applications is very complex. Developers must consider the many different available cloud providers' offers to select a set of providers, and configure them accordingly to deploy each of the application services. Microservices may be developed by different teams, using different technologies, and therefore may require different features from cloud providers. Moreover, as the cloud market evolves, providers' features may be introduced or retired, requiring configuration changes.

Taking all these factors into account to setup a multi-cloud environment to deploy and run a microservices application is an error-prone and time consuming task, which calls for supporting tools.

In this workshop, we will present our approach to automate the setup of multi-cloud environments [4]. Our approach employs software product lines [3] principles and ontology reasoning to get from a high-level description of multi-cloud requirements to a selection of cloud providers and their configurations. In addition, we will highlight current challenges and ongoing work to build self-adaptive multi-cloud environments, capable of identifying optimization opportunities as application requirements and cloud market evolve.

## References

1. J. Lewis and M. Fowler. Microservices: a definition of this new architectural term, Mars 2014.
2. D. Petcu. Multi-cloud: Expectations and current approaches. In *Proc. Int. Workshop on Multi-cloud Applications and Federated Clouds*, pages 1–6, Prague, Czech Republic, 2013.
3. K. Pohl, G. Bckle, and F. J. van der Linden. *Software Product Line Engineering: Foundations, Principles and Techniques*. Springer Publishing Company, 2010.
4. G. Sousa, W. Rudamektin, and L. Duchien. Automated setup of multi-cloud environments for microservices applications. In *Proc. IEEE Int. Conf. on Cloud Computing*, pages 327–334, San Francisco, United States, June 2016.