S. Becker, I. Bogicevic, G. Herzwurm, S. Wagner (Hrsg.): SE/SWM 2019,
Lecture Notes in Informatics (LNI), Gesellschaft für Informatik, Bonn 2019 101

Experience with Microservices for Legacy Software Modernization

Holger Knoche[1] Wilhelm Hasselbring[2]

Abstract: Microservices are known as an architecture for building scalable applications running in the cloud. However, they also promise high maintainability due to smaller code bases and strong component separation, making them an interesting option for software modernization. We present a migration process to decompose an existing application into microservices, and report on experiences from applying this process in an ongoing legacy modernization project.

Keywords: Microservices; Software Modernization

Microservices are an architectural style for software which currently receives a lot of attention in both industry and academia [Ha18]. In addition to scalability [Ha16], microservices may furthermore enable both agility and reliability [HS17]. As a consequence, many companies are currently considering whether microservices are a viable option for their software systems [KH19]. Microservices are also used for modular research software [Jo16].

A particularly interesting aspect of microservices is that several authors consider them as a viable means for modernizing existing, monolithic software applications [BHJ16]. For instance, the software visualization tool ExplorViz [FKH17; FRH15] has been restructured into microservices [ZKH18]. Furthermore, there are experience reports of several companies who have successfully replaced (parts of) their existing software by microservices, or are in the process of doing so.

Based on experience from an ongoing industrial legacy modernization project, we recommend an incremental approach for migration towards microservices consisting of five steps [KH18]. The project's main goals are to improve the maintainability of a legacy system by breaking it into strictly isolated components based on the bounded contexts of the underlying domain, and to incrementally migrate the system from Cobol to Java. Microservices are a suitable architecture for achieving these goals due to their organization around business capabilities, high evolvability, strong component separation, and focus on cross-platform interaction.

Our approach aims at isolating – and subsequently replacing – microservice candidates inside the monolith using well-defined, platform independent interfaces, while ensuring

[1] Kiel University, Software Engineering Group, Kiel, hkn@informatik.uni-kiel.de
[2] Kiel University, Software Engineering Group, Kiel, hasselbring@email.uni-kiel.de

doi:10.18420/se2019-29

that the functional requirements of the surrounding monolith are still met. As legacy modernization projects are both risky and costly and can take a long time to complete, the approach is designed to improve the structure of the monolith even before all steps are completed.

Literatur

[BHJ16] Balalaie, A.; Heydarnoori, A.; Jamshidi, P.: Microservices Architecture Enables DevOps: Migration to a Cloud-Native Architecture. IEEE Software 33/3, S. 42–52, 2016.

[FKH17] Fittkau, F.; Krause, A.; Hasselbring, W.: Software Landscape and Application Visualization for System Comprehension with ExplorViz. Information and Software Technology 87/, S. 259–277, Juli 2017.

[FRH15] Fittkau, F.; Roth, S.; Hasselbring, W.: ExplorViz: Visual Runtime Behavior Analysis of Enterprise Application Landscapes. In: 23rd European Conference on Information Systems (ECIS 2015). S. 1–13, Mai 2015.

[Ha16] Hasselbring, W.: Microservices for Scalability: Keynote Talk Abstract. In: Proceedings of the 7th ACM/SPEC International Conference on Performance Engineering (ICPE). ACM, S. 133–134, 2016.

[Ha18] Hasselbring, W.: Software Architecture: Past, Present, Future. In: The Essence of Software Engineering. Springer, S. 169–184, 2018, URL: https://doi.org/10.1007/978-3-319-73897-0_10.

[HS17] Hasselbring, W.; Steinacker, G.: Microservice Architectures for Scalability, Agility and Reliability in E-Commerce. In: Proceedings of the 2017 IEEE International Conference on Software Architecture Workshops (ICSAW). IEEE, S. 243–246, 2017.

[Jo16] Johanson, A.; Flögel, S.; Dullo, C.; Hasselbring, W.: OceanTEA: Exploring Ocean-Derived Climate Data Using Microservices. In: Proceedings of the Sixth International Workshop on Climate Informatics (CI 2016). S. 25–28, 2016.

[KH18] Knoche, H.; Hasselbring, W.: Using Microservices for Legacy Software Modernization. IEEE Software 35/3, S. 44–49, 2018.

[KH19] Knoche, H.; Hasselbring, W.: Drivers and Barriers for Microservice Adoption – A Survey among Professionals in Germany. Enterprise Modelling and Information Systems Architectures (EMISAJ) 14/, (in press), 2019.

[ZKH18] Zirkelbach, C.; Krause, A.; Hasselbring, W.: On the Modernization of ExplorViz towards a Microservice Architecture. In: Combined Proceedings of the Workshops of the German Software Engineering Conference 2018. Bd. Vol-2066, CEUR Workshop Proceedings, 2018, URL: http://ceur-ws.org/Vol-2066/.