7 REFERENCES

- N. Alshuqayran, N. Ali, and R. Evans, "A Systematic Mapping Study in Microservice Architecture," 2016 IEEE 9th International Conference on Service-Oriented Computing and Applications (SOCA), 2016.
- [2] J. Soldani, D. A. Tamburri, and W.-J. V. D. Heuvel, "The pains and gains of microservices: A Systematic grey literature review," *Journal of Systems and Software*, vol. 146, pp. 215–232, 2018.
- [3] R. R. Sambasivan, I. Shafer, J. Mace, B. H. Sigelman, R. Fonseca, and G. R. Ganger, "Principled workflow-centric tracing of distributed systems," *Proceedings of the Seventh ACM Symposium on Cloud Computing*, May 2016.
- [4] B. Mayer and R. Weinreich, "An Approach to Extract the Architecture of Microservice-Based Software Systems," 2018 IEEE Symposium on Service-Oriented System Engineering (SOSE), 2018.
- [5] S.-P. Ma, C.-Y. Fan, Y. Chuang, I.-H. Liu, and C.-W. Lan, "Graph-based and scenario-driven microservice analysis, retrieval, and testing," *Future Generation Computer Systems*, vol. 100, pp. 724–735, 2019.
- [6] N. Dragoni, S. Giallorenzo, A. L. Lafuente, M. Mazzara, F. Montesi, R. Mustafin, and L. Safina, "Microservices: Yesterday, Today, and Tomorrow," *Present and Ulterior Software Engineering*, pp. 195–216, 2017.
- [7] "Microservices," *martinfowler.com*. [Online]. Available: https://martinfowler.com/articles/microservices.html. [Accessed: 21-May-2020].
- [8] D. Taibi, V. Lenarduzzi, and C. Pahl, "Microservices Anti-patterns: A Taxonomy," *Microservices*, pp. 111–128, Dec. 2019.
- [9] D. Taibi, V. Lenarduzzi, and C. Pahl, "Processes, Motivations, and Issues for Migrating to Microservices Architectures: An Empirical Investigation," *IEEE Cloud Computing*, vol. 4, no. 5, pp. 22–32, 2017.

- [10] A. Rotem-Gal-Oz, *SOA Patterns*. Manning Publications, 2012.
- [11] F. Palma and N. Mohay, "A study on the taxonomy of service antipatterns," 2015 IEEE 2nd International Workshop on Patterns Promotion and Anti-patterns Prevention (PPAP), 2015.
- [12] D. Taibi and V. Lenarduzzi, "On the Definition of Microservice Bad Smells," *IEEE Software*, vol. 35, no. 3, pp. 56–62, 2018.
- [13] D. Hoyos, "Interactive Visualizations For Supporting The Analysis Of Distributed Services Utilization". M.Sc. Technical University of Munich, 2018.
- [14] Sigelman, B. H., Barroso, L. A., Burrows, M., Stephenson, P., Plakal, M., Beaver, D., Jaspan, S., and Shanbhag, C. (2010). Dapper, a large-scale distributed systems tracing infrastructure. *Technical report, Google, Inc.*
- [15] "Digraphs.," Princeton University. [Online]. Available: https://algs4.cs.princeton.edu/42digraph/. [Accessed: 21-May-2020].
- [16] S. G. Shrinivas, S. Vetrivel, and N. M. Elango, "APPLICATIONS OF GRAPH THEORY IN COMPUTER SCIENCE AN OVERVIEW," *International Journal of Engineering Science and Technology*, vol. 2, pp. 4610–4621, Sep. 2010.
- [17] "Network Science by Albert-László Barabási," *BarabásiLab*. [Online]. Available: http://networksciencebook.com/. [Accessed: 21-May-2020].
- [18] S.-P. Ma, C.-Y. Fan, Y. Chuang, W.-T. Lee, S.-J. Lee, and N.-L. Hsueh, "Using Service Dependency Graph to Analyze and Test Microservices," *2018 IEEE 42nd Annual Computer Software and Applications Conference (COMPSAC)*, 2018.
- [19] R. Tarjan, "Depth-first search and linear graph algorithms," *12th Annual Symposium on Switching and Automata Theory (swat 1971)*, 1971.
- [20] Rahman, M. I., Panichella, S., & Taibi, D. (2019). A curated dataset of microservices-based systems. *In SSSME-2019: Joint Proceedings of the Inforte*

Summer School on Software Maintenance and Evolution (CEUR Workshop Proceedings; Vol. 2520). CEUR-WS.

- [21] Neo4j Database. (2020, April 23). Retrieved May 23, 2020, from https://neo4j.com/neo4j-graph-database/
- [22] Needham, M., & Hodler, A. E. (2019). *Graph algorithms: Practical examples in Apache Spark and Neo4j*. Beijing: O'Reilly.
- [23] Jing Han, E Haihong, Guan Le, and Jian Du. Survey on nosql database. In Pervasive computing and applications (ICPCA), 2011 6th international conference on, pages 363{366. IEEE, 2011.
- [24] Singh, M., Kaur, K.: Sql2neo: Moving health-care data from relational to graph databases. In: 2015 IEEE International on Advance Computing Conference (IACC), pp. 721–725. IEEE (2015)
- [25] R. kumar Kaliyar, "Graph databases: A survey," in Computing, Communication & Automation (ICCCA), 2015 International Conference on. IEEE, 2015, pp. 785–790.
- [26] Mark Graves, Ellen R Bergeman, and Charles B Lawrence. Graph database systems. *IEEE Engineering in Medicine and Biology Magazine*, 14(6):737{745, 1995.
- [27] De Virgilio, R., Maccioni, A., Torlone, R.: Model-driven design of graph databases. In: Yu, E., Dobbie, G., Jarke, M., Purao, S. (eds.) ER 2014. LNCS, vol. 8824, pp. 172–185. Springer, Heidelberg (2014)
- [28] Huang H, Dong Z (2013) Research on architecture and query performance based on distributed graph database neo4j. *In: Consumer Electronics, Communications and Networks (CECNet), 2013 3rd International Conference On. IEEE, Xianning*, China. pp 533–536

- [29] G. Jaiswal and A.P. Agrawal, "Comparative Analysis of Relational and Graph Databases," In IOSR Journal of Engineering (IOSRJEN) e-ISSN: 2250-3021, p-ISSN: 2278-8719 Vol. 3, Issue 8 (August. 2013), ||V2|| PP 25-27
- [30] Mario Villamizar, Oscar Garces, Harold Castro, Mauricio Verano, ' Lorena Salamanca, Rubby Casallas, and Santiago Gil. Evaluating the monolithic and the microservice architecture pattern to deploy web applications in the cloud. *In Computing Colombian Conference (10CCC), 2015 10th*, pages 583–590. IEEE, 2015.
- [31] Hasselbring, W., Steinacker, G.: Microservice architectures for scalability, agility and reliability in e-commerce. *In: 2017 IEEE International Conference on Software Architecture Workshops (ICSAW)*, pp. 243–246 (2017)
- [32] Granchelli, G., Cardarelli, M., Francesco, P.D., Malavolta, I., Iovino, L., Salle, A.D.: Towards recovering the software architecture of microservice-based systems. *In: 2017 IEEE International Conference on Software ArchitectureWorkshops* (ICSAW), pp. 46–53 (2017)
- [33] Bogner, J., Wagner, S., Zimmermann, A.: Towards a practical maintainability quality model for service-and microservice-based systems. *In: Proceedings of the 11th European Conference on Software Architecture: Companion Proceedings, ECSA* 2017, pp. 195–198. ACM, New York (2017)
- [34] Pei Breivold, H., Crnkovic, I., Eriksson, P. J.: Analyzing Software Evolvability. *Accepted at 32nd COMPSAC.* (2008)
- [35] Kalske, M., Mkitalo, N., Mikkonen, T.: Challenges when moving from monolith to microservice architecture. *In: Current Trends in Web Engineering, pp. 32–47. Springer, Cham* (2017)
- [36] Richardson, C.: Microservices—Pattern: Microservice Architecture, March 2014. http://microservices.io/patterns/microservices.html
- [37] N. Moha, F. Palma, M. Nayrolles, B. J. Conseil, Y.-G. Gueh´ eneuc, ´B. Baudry, and J.-M. Jez´ equel, "Specification and detection of soa antipatterns" *in Service-Oriented Computing*. Springer, 2012, pp. 1–16.

- [38] B. Shim, S. Choue, S. Kim, S. Park. "A Design Quality Model for Service-Oriented Architecture." In: 2008 15th Asia-Pacific Software Engineering Conference. IEEE, 2008.
- [39] T. Senivongse, A. Puapolthep. "A Maintainability Assessment Model for Service-Oriented Systems." *In: Proceedings of the World Congress on Engineering and Computer Science. San Francisco, CA, USA: Newswood Limited*, 2015.
- [40] N. M. Nik Daud, W. M.N. Wan Kadir. "Static and dynamic classifications for SOA structural attributes metrics." *In: 2014 8th. Malaysian Software Engineering Conference (MySEC). Langkawi, Malaysia: IEEE*, Sept. 2014.
- [41] T. Engel, M. Langermeier, B. Bauer, A. Hofmann. "Evaluation of Microservice Architectures: A Metric and Tool-Based Approach." Cham: Springer International Publishing, 2018.
- [42] D. Taibi, K. Systä. "From Monolithic Systems to Microservices: A Decomposition Framework based on Process Mining." In: Proceedings of the 9th International Conference on Cloud Computing and Services Science. SCITEPRESS -Science and Technology Publications, 2019.
- [43] Akoglu, L., Tong, H., Koutra, D.: Graph based anomaly detection and description: a survey. *Data Min. Knowl. Disc.* **29**(3), 626–688 (2014).
- [44] F. Palma, L. An, F. Khomh, N. Moha, Y.-G. Gueheneuc. "Investigating the Change-Proneness of Service Patterns and Antipatterns." In: 2014 IEEE 7th International Conference on Service-Oriented Computing and Applications. IEEE, Nov. 2014