

REFERENCES

- [1] B. Erb, "Concurrent Programming for Scalable Web Architectures", Diploma, Institute of Distributed Systems Faculty of Engineering and Computer Science Ulm University, 2012.
- [2] "XML-RPC Specification", Xmlrpc.scripting.com, 2019. [Online]. Available: <http://xmlrpc.scripting.com/spec.html>. [Accessed: 24- Jun- 2019].
- [3] "SOAP Version 1.2 Part 1: Messaging Framework (Second Edition)", W3.org, 2019. [Online]. Available: <https://www.w3.org/TR/soap12-part1/>. [Accessed: 24- Jun- 2019].
- [4] "WSDL Specification", 2019. [Online]. Available: <https://www.w3.org/TR/2007/REC-wsdl20-20070626/>. [Accessed: 24- Jun- 2019].
- [5] "OASIS UDDI Specification TC | OASIS", Oasis-open.org, 2019. [Online]. Available:https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=uddi-spec. [Accessed: 24- Jun- 2019].
- [6] F. Royomas, "Architectural styles and the design of network-based software architectures", Ph.D. thesis, University of California, Irvine (2000)
- [7] p. Roy and S. Hafidi, Concepts, techniques and models of computer programming. New Delhi: PHI Learning Private Ltd., 2009.
- [8] B. Cantrill and J. Bonwick, "Real-world Concurrency", Queue, vol. 6, no. 5, p. 16, 2008. Available: 10.1145/1454456.1454462.
- [9] R. Arnon. Gosling, James and L. Deutsch, "Fallacies of Distributed Computing Explained", Tech. Rep., Sun Microsystems (2006)

- [10] G. Debasish, S. Justin, T. Kresten and V. Steve, “Programming language impact on the development of distributed systems”, *Journal of Internet Services and Applications* (2011), vol. Issue 2 / 2011;pp. 1–8, 10.1007/s13174-011-0042-y
- [11] I. WSO2, "Cloud Native Programming Language", *Ballerina.io*, 2019. [Online]. Available: <https://ballerina.io/>. [Accessed: 24- Jun- 2019].
- [12] K. Dan, “C10K problem”, *Tech. Rep., Kegel.com* (2006)
- [13] O. John, “Why reads are a Bad Idea (for most purposes)”, in *USENIX Winter Technical Conference*
- [14] V. Behren, R. Condit, Jeremy, B. Eric, “Why events are a bad idea (for high-concurrency servers), in: *Proceedings of the 9th conference on Hot Topics in Operating Systems - Volume 9*, USENIX Association, Berkeley, CA, USA, pp. 4–4
- [15] M. Welsh, D. Culler, and B. Eric, “SEDA: an architecture for well conditioned, scalable internet services”, in: *Proceedings of the eighteenth ACM symposium on Operating systems principles, SOSP '01*, ACM, New York, NY, USA,pp. 230–243
- [16] W. Stevens,.F. Richard, R. Bill and M. Andrew, “Unix Network Programming”, *Volume 1: e Sockets Networking API (3rd Edition)*, Addison-Wesley Professional (2003)
- [17] S. Vivek, P. Druschel, W. Zwaenepoel ,”Flash: an efficient and portable web server, in: *Proceedings of the annual conference on USENIX Annual Technical Conference*, USENIX Association, Berkeley, CA, USA, pp. 15–15
- [18] M. Welsh, “A Retrospective on SEDA, Blog Post”, <http://mattwelsh.blogspot.com/2010/07/retrospective-on-seda.html> (2010)

- [19] Lmax-exchange.github.io, 2019. [Online]. Available: <https://lmax-exchange.github.io/disruptor/files/Disruptor-1.0.pdf>. [Accessed: 24-Jun- 2019].
- [20] C. Hewitt, P. Bishop, and R. Steiger, "A universal modular ACTOR formalism for artificial intelligence, in: Proceedings of the 3rd international joint conference on Artificial intelligence, IJCAI'73, Morgan Kaufmann Publishers Inc., San Francisco, CA, USA, pp. 235–245
- [21] C. Hoare, "Communicating sequential processes". Commun. ACM (1978), vol. 21(8):pp. 666–677
- [22] M. Mazzara and B. Meyer, Present and ulterior software engineering. [s.l.]: Springer, PU, 2017.
- [23] T. Salah, J. Zemerly, C. Yeun, M. Al-Qutayri and Y. Al-Hammadi, "The evolution of distributed systems towards microservices architecture", in 11th International Conference for Internet Technology and Secured Transactions, 2016.
- [24] V. Pacheco, Microservice patterns and best practices [s.3.], PL, 2013..
- [25] A. Balalaie, A. Heydarnoori and P. Jamshidi, "Microservices Architecture Enables DevOps: Migration to a Cloud-Native Architecture", IEEE Software, vol. 33, no. 3, pp. 42-52, 2016. Available: 10.1109/ms.2016.64.
- [26] M. Villamizar, O. GarcÃa's, H. Castro, M. Verano, L. Salamanca and R.Casallas, "Evaluating the monolithic and the microservice architecture pattern to deploy web applications in the cloud", in 10th Computing Colombian Conference, 2015.

- [27] R. Heinrich et al., "Performance Engineering for Microservices: Research Challenges and Directions", in Proceedings of the 8th ACM/SPEC on International Conference on Performance Engineering Companion, 2017.
- [28] "TPC-W - Homepage", 2019. [Online]. Available: <http://www.tpc.org/tpcw/>. [Accessed: 13- Mar- 2019].
- [29] "SPECjvm2008", Spec.org, 2019. [Online]. Available: <https://www.spec.org/jvm2008/>. [Accessed: 13- Mar- 2019].
- [30] "JPetStore Demo", Jpetstore.cfapps.io, 2019. [Online]. Available: <https://jpetstore.cfapps.io/>. [Accessed: 13- Mar- 2019].
- [31] C. Aderaldo, N. Mendonca, C. Pahl and P. Jamshidi, "Benchmark Requirements for Microservices Architecture Research", in IEEE/ACM 1st International Workshop on Establishing the Community-Wide Infrastructure for Architecture-Based Software Engineering, 2017.
- [32] "Acme Air", GitHub, 2019. [Online]. Available: <https://github.com/acmeair/>. [Accessed: 13- Mar- 2019].
- [33] "Spring cloud demo apps" 2019. [Online]. Available: <https://github.com/kbastani/spring-cloudmicroservices-example>. [Accessed: 13- Mar- 2019].
- [34] "Microservices Demo: Sock Shop", Microservices-demo.github.io, 2019. [Online]. Available: <https://microservices-demo.github.io>. [Accessed:13- Mar- 2019].
- [35]"aspnet/MusicStore", GitHub, 2019. [Online]. Available:<https://github.com/aspnet/MusicStore>. [Accessed: 13- Mar- 2019].

- [36] A. Sriraman and T. Wenisch, "M Suite: A Benchmark Suite for Microservices", in IEEE International Symposium on Workload Characterization, 2018.
- [37] A. Camargo, I. Salvadori, R. Mello and F. Siqueira, "An architecture to automate performance tests on microservices", in Proceedings of the 18th International Conference on Information Integration and Web-based Applications and Services, 2016.
- [38] T. Ueda, T. Nakaike and M. Ohara, "Workload characterization for microservices", in IEEE International Symposium on Workload Characterization, 2016.
- [39] M. Amaral, J. Polo, D. Carrera, I. Mohamed, M. Unuvar and M. Steinder, "Performance Evaluation of Microservices Architectures Using Containers", in NCA '15 Proceedings of the 2015 IEEE 14th International Symposium on Network Computing and Applications (NCA), 2015.
- [40] L. Ismail, D. Hagimont, and J. Mossi'ere, "Evaluation of the mobile agents technology: Comparison with the client/server paradigm," Information Science and Technology (1ST), vol. 19, 2000.
- [41] W. A. De Vries and R. A. Fleck, "Client/server infrastructure: a case study in planning and conversion," Industrial Management & Data Systems, vol. 97, no. 6, pp. 222-232, 1997
- [42] K. Kulesza, Z. Kotulski, and K. Kulesza, "On mobile agents resistance to traffic analysis," Electronic Notes in Theoretical Computer Science, vol. 142, pp. 181-193, 2006

- [43] S. Newman, Building Microservices. " O'Reilly Media, Inc.", 2015
- [44] Wen, Y. Ma, and X. Chen, "ESB infrastructure's autonomous mechanism of SOA," in 2009 International Symposium on Intelligent Ubiquitous Computing and Education. IEEE, 2009, pp. 13 -17.
- [45] Y. Sun, S. Nanda, and T. Jaeger, "Security-as-a-service for Microservices based cloud applications," in 2015 IEEE 7th International Conference on Cloud Computing Technology and Science (Cloud Corn). IEEE, 2015, pp. 50-5 7.
- [46] 2015, pp. 50-5 7. [28] Hassan, M., Zhao, W., & Yang, J. (2010, July). Provisioning web services from resource constrained mobile devices. In Cloud Computing (CLOUD), 2010 IEEE 3rd International Conference on (pp. 490-497). IEEE.
- [47] Namiot, D., & Sneps-Sneppe, M. (2014). On Micro-services Architecture. International Journal of Open Information Technologies, 2(9), 24-27.
- [48] "Apache JMeter - Apache JMeter", JMeter.apache.org, 2019. [Online]. Available: <https://JMeter.apache.org/>. [Accessed: 13- Mar- 2019].
- [49] "Creating a pagerank analytics platform using Spring Boot microservices," <http://www.kennybastani.com/2016/01/spring-boot-graphprocessing-microservices.html>, 2016, [Online; accessed 18-January2017]
- [50] "MusicStore – steeltoeoss samples," <https://github.com/SteeltoeOSS/Samples/tree/master/MusicStore>, 2017, [Online; accessed 18-January-2017]

[51]"SPECweb 2009 Benchmark", Spec.org, 2019. [Online]. Available: <https://www.spec.org/web2009/>. [Accessed: 24- Jun- 2019].

[52]"TPC-C - Homepage", Tpc.org, 2019. [Online]. Available: <http://www.tpc.org/tpcc/>. [Accessed: 24- Jun- 2019].

[53]"SPECjEnterprise®2010", Spec.org, 2019. [Online]. Available: <https://www.spec.org/jEnterprise2010/>. [Accessed: 24- Jun- 2019].

[54] B. Schroeder, A. Wierman and M. Harchol-Balter, "Closed versus open system models and their impact on performance and scheduling", in Symposium on Networked Systems Design and Implementation (NSDI), 2006

[55] "PasinduTennage/python-latency-analysis", GitHub, 2019. [Online]. Available: <https://github.com/PasinduTennage/python-latency-analysis>. [Accessed: 24- Jun- 2019].

[56] Sun Microsystems. RPC: Remote Procedure Call Protocol Specification Version 2. Internet Network Working Group RFC1057, June 1988.

[57] Sun Microsystems, Inc. Java Remote Method Invocation. <http://java.sun.com/products/jdk/rmi/> .

[58] Apache Software Foundation. The Apache web server. [http://www. Apache.org](http://www.Apache.org)

[59]Microsoft Corporation. IIS 5.0 Overview. <http://www.microsoft.com/windows2000/library/howitworks/iis/iis5techove%rview.asp>

[60] M. Thompson, D. Gregory, M. Farley, P. Barker and A. Stewart. "Disruptor : High performance alternative to bounded queues for exchanging data between concurrent threads." (2011).

[61] "PasinduTennage/server-architectures", GitHub, 2019. [Online]. Available: <https://github.com/PasinduTennage/server-architectures/>. [Accessed: 13- Mar- 2019]

[62] Imysql.com, 2019. [Online]. Available: <http://imysql.com/wpcontent/uploads/2014/10/sysbench-manual.pdf>. [Accessed: 13-Mar2019].

[63] S. Lehrig, R. Sanders, G. Brataas, M. Cecowski, S. Ivansek and J. Polutnik, "CloudStore - towards scalability, elasticity, and efficiency benchmarking and analysis in Cloud computing", Future Generation Computer Systems, vol. 78, pp. 115-126, 2018. Available: 10.1016/j.future.2017.04.018.

[64] "PasinduTennage/GC-Performance", GitHub, 2019. [Online]. Available: <https://github.com/PasinduTennage/GC-Performance/>. [Accessed: 13- Mar- 2019].

[65] "Integration - On-Premise and in the Cloud", Wso2.com, 2019. [Online]. Available: <https://wso2.com/integration/>. [Accessed: 24- Jun- 2019].

[66] "wso2/performance-common", GitHub, 2019. [Online]. Available: <https://github.com/wso2/performance-common>. [Accessed: 13- Mar2019].

[67] "Ubuntu Manpage: sar - Collect, report, or save system activity information.", Manpages.ubuntu.com, 2019. [Online]. Available: <http://manpages.ubuntu.com/manpages/cosmic/man1/sar.sysstat.1.html>. [Accessed: 13- Mar- 2019].

[68] Man7.org. (2019). perf(1) - Linux manual page. [online] Available at: <http://man7.org/linux/man-pages/man1/perf.1.html> [Accessed 24 Jun. 2019].

[69] "Ubuntu Manpage: iftop - display bandwidth usage on an interface by host", Manpages.ubuntu.com, 2019. [Online]. Available: <http://manpages.ubuntu.com/manpages/bionic/man8/iftop.8.html>. [Accessed: 13-Mar- 2019].

[70] "Server Architecture Test Results.xlsx", Google Docs, 2019. [Online]. Available: https://drive.google.com/file/d/1PDULdT83xCCxHsMGmn5Pl_gZqW-IqYwx/view?usp=sharing. [Accessed: 24- Jun- 2019].

[71]T. Brecht, E. Arjomandi, C. Li and H. Pham, "Controlling garbage collection and heap growth to reduce the execution time of Java applications", ACM SIGPLAN Notices, vol. 36, no. 11, pp. 353-366, 2001. Available: 10.1145/504311.504308.

[72] S. Blackburn, P. Cheng and K. McKinley, "Myths and realities", ACM SIGMETRICS Performance Evaluation Review, vol. 32, no. 1, p. 25, 2004. Available: 10.1145/1012888.1005693.

[73] L. Gidra, G. Thomas, J. Sopena and M. Shapiro, "A study of the scalability of stop-the-world garbage collectors on multicores", ACM SIGPLAN Notices, vol. 48, no. 4, p. 229, 2013. Available: 10.1145/2499368.2451142.

[74] M. Carpen-Amarie, P. Marlier, P. Felber and G. Thomas, "A performance study of Java garbage collectors on multicore architectures", in . In: Proceedings of the Sixth International Workshop on Programming Models and Applications for Multicores and Manycores, 2015.

- [75] J. Thönes, "microservices," IEEE Software, Vol. 32, Issue. 1, pp. 113-116.
- [76] "Spring Projects", Spring.io, 2019. [Online]. Available: <https://spring.io/projects/spring-boot>. [Accessed: 13- Mar- 2019]
- [77] "PasinduTennage/springboot-test", GitHub, 2019. [Online]. Available: <https://github.com/PasinduTennage/springboot-test>. [Accessed: 13- Mar2019].
- [78]"microservices-demo/load-test", GitHub, 2019. [Online]. Available: <https://github.com/microservices-demo/loadtest/blob/master/locustfile.py>. [Accessed: 13- Mar- 2019].
- [79] "PasinduTennage/sockshopJMeter", GitHub, 2019. [Online]. Available: <https://github.com/PasinduTennage/sockshopJMeter>. [Accessed: 13- Mar- 2019].
- [80] "Amazon EC2 Instance Types - Amazon Web Services", Amazon Web Services, Inc., 2019. [Online]. Available: <https://aws.amazon.com/ec2/instance-types/>. [Accessed: 13- Mar2019].
- [81] "Overview - SimPy 3.0.11 documentation", Simpy.readthedocs.io, 2019. [Online]. Available: <https://simpy.readthedocs.io/en/latest/>. [Accessed: 13- Mar- 2019].
- [82] J. Li, N. Sharma, D. Ports and S. Gribble, "Tales of the Tail: Hardware, OS, and Application-level Sources of Tail Latency", in Proceedings of the ACM Symposium on Cloud Computing, 2014.

- [83] "PasinduTennage/microservices-descrete-event-simulation", GitHub, 2019. [Online]. Available:<https://github.com/PasinduTennage/microservices-descrete-eventsimulation>. [Accessed: 13- Mar- 2019].
- [84] "PasinduTennage/micro-services-tail-index-analysis-results", GitHub, 2019. [Online]. Available: <https://github.com/PasinduTennage/microservices-tail-index-analysis-results>. [Accessed: 13- Mar- 2019].
- [85] J. Hennessy and D. Patterson, Computer architecture, 6th edition, 2017
- [86] N. Gunther, Guerrilla capacity planning. Berlin: Springer, 2011.
- [87] Amazon.com, 2019. [Online]. Available: <https://www.amazon.com/Performance-Modeling-Design-Computer-Systems/dp/1107027500>. [Accessed: 24- Jun- 2019].
- [88] "What is NGINX? - NGINX", NGINX, 2019. [Online]. Available: <https://www.nginx.com/resources/glossary/nginx/>. [Accessed: 24- Jun- 2019].
- [89] P. Tennage, S. Perera, M. Jayasinghe and S. Jayasena, "An Analysis of Holistic Tail Latency Behaviors of Java Microservices," 2019 IEEE 21st International Conference on High Performance Computing and Communications; IEEE 17th International Conference on Smart City; IEEE 5th International Conference on Data Science and Systems (HPCC/SmartCity/DSS), Zhangjiajie, China, 2019, pp. 697-705, doi: 10.1109/HPCC/SmartCity/DSS.2019.00104.