DAFTAR PUSTAKA

[1] Hyperledger Foundation, "Hyperledger caliper documentation," https://hyperledger.github.io/caliper/, 2024, accessed: 2025-01-20.

[2] W. Choi and J. W.-K. Hong, "Performance evaluation of ethereum private and consortium blockchain: Poa vs. pos," in *Proceedings of NOMS 2020 - 2020 IEEE/IFIP Network Operations and Management Symposium*. IEEE, 2020, pp. 1–6.

[3] G. A. F. Rebello, G. F. Camilo, L. C. B. Guimaraes, and F. L. Koch, "Performance evaluation of proof-of-authority and proof-of-stake consensus algorithms in private ethereum networks," in *Proceedings of the IEEE International Conference on Blockchain (Blockchain)*. IEEE, 2020, pp. 1–8.

[4] C. Arslan, S. Sipahioğlu, E. Şafak, and M. Gözütok, "Comparative analysis and modern applications of consensus algorithms in blockchain networks," *IEEE Access*, vol. 8, pp. 105 507–105 520, 2020.

[5] R. Li, "Comparative analysis and future directions of blockchain consensus algorithms: Pow, pos, bft, and dag," in *Proceedings of the 2021 International Conference on Computing, Communication, and Security (ICCCS)*. IEEE, 2021, pp. 35–39.

[6] D. K. K, D. N. Duraimutharasan, S. H. J. Shahana, and S. S. Kumar, "Performance evaluation of blockchain using hyperledger caliper," in *Proceedings of the 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS)*. IEEE, 2020, pp. 1–6.

[7] R. K. Kaushal and N. Kumar, "Exploring hyperledger caliper for performance benchmarking of blockchain," in *Proceedings of the 2020 International Conference on Computing for Sustainable Global Development (INDIACom)*. IEEE, 2020, pp. 1052–1056.

[8] R. Sharma, A. Bansal, and S. Bansal, "Performance analysis of private ethereum blockchain using consensus algorithms," *Procedia Computer Science*, vol. 173, pp. 341–350, 2020.

[9] S. Ali, M. I. Aslam, and M. Aslam, "Evaluation of blockchain consensus algorithms for performance and scalability," in *Proceedings of the 2020 International Conference on Computing, Networking and Communications (ICNC)*. IEEE, 2020, pp. 1–6.

[10] S. Gaikwad and K. Patel, "Blockchain based academic certificate verification system," in *Proceedings of the 2019 3rd International Conference on Computing Methodologies and Communication (ICCMC)*. IEEE, 2019, pp. 1216–1220.

[11] A. Singh and P. Chatterjee, "Securing academic records using blockchain technology," in *Proceedings of the 2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT)*. IEEE, 2019, pp. 1–6.

[12] P. Wicaksono, P. Hatta, and Y. H. Aristyagama, "Comparative analysis of pos and poa consensus in ethereum environment for blockchain-based academic transcript

systems," *Bulletin of Electrical Engineering and Informatics*, vol. 14, no. 3, pp. 2380–2392, June 2025.

[13] S. Dong, K. Abbas, M. Li, and J. Kamruzzaman, "Blockchain technology and application: an overview," *PeerJ Computer Science*, vol. 9, p. e1705, 2023.

[14] M. Krichen, M. Ammi, A. Mihoub, and M. Almutiq, "Blockchain for modern applications: A survey," *Sensors (Basel, Switzerland)*, vol. 22, no. 14, p. 5274, 2022.

[15] M. Niranjanamurthy, B. Nithya, and S. Jagannatha, "Analysis of blockchain technology: pros, cons and swot," *Cluster Computing*, vol. 22, no. 6, pp. 14 743–14 757, 2018.

[16] H. Guo and X. Yu, "A survey on blockchain technology and its security," *Blockchain: Research and Applications*, vol. 3, no. 2, p. 100067, 2022.

[17] T. Ahram, A. Sargolzaei, S. Sargolzaei, J. Daniels, and B. Amaba, "Blockchain technology innovations," in *Proceedings of the 2017 IEEE Technology & Engineering Management Conference (TEMSCON)*. IEEE, 2017, pp. 137–141.

[18] J. Moosavi, L. Naeni, A. Fathollahi-Fard, and U. Fiore, "Blockchain in supply chain management: A review, bibliometric, and network analysis," *Environmental Science and Pollution Research*, pp. 1–15, 2021.

[19] J. Jaoude and R. Saadé, "Blockchain applications – usage in different domains," *IEEE Access*, vol. 7, pp. 45 360–45 381, 2019.

[20] G. Habib, S. Sharma, S. Ibrahim, I. Ahmed, S. Qureshi, and M. Ishfaq, "Blockchain technology: Benefits, challenges, applications, and integration of blockchain technology with cloud computing," *Future Internet*, vol. 14, no. 11, p. 341, 2022.

[21] J. Al-Jaroodi and N. Mohamed, "Blockchain in industries: A survey," *IEEE Access*, vol. 7, pp. 36 500–36 515, 2019.

[22] N. Raddatz, J. Coyne, P. Menard, and R. Crossler, "Becoming a blockchain user: Understanding consumers' benefits realisation to use blockchain-based applications," *European Journal of Information Systems*, vol. 32, no. 2, pp. 287–314, 2021.

[23] D. Mahmudnia, M. Arashpour, and R. Yang, "Blockchain in construction management: Applications, advantages and limitations," *Automation in Construction*, vol. 141, p. 104379, 2022.

[24] A. Mukherjee, R. Singh, R. Mishra, and S. Bag, "Application of blockchain technology for sustainability development in agricultural supply chain: Justification framework," *Operations Management Research*, vol. 15, pp. 46–61, 2021.

[25] E. Tijan, S. Aksentijević, K. Ivanić, and M. Jardas, "Blockchain technology implementation in logistics," *Sustainability*, vol. 11, no. 4, p. 1185, 2019.

[26] A. Saari, J. Vimpari, and S. Junnila, "Blockchain in real estate: Recent developments and empirical applications," *Land Use Policy*, vol. 114, p. 106334, 2022.

[27] G. Chen, B. Xu, M. Lu, and N. Chen, "Exploring blockchain technology and its potential applications for education," *Smart Learning Environments*, vol. 5, no. 1, p. 1, 2018.

[28] W. Wang, D. T. Hoang, P. Hu, Z. Xiong, D. Niyato, P. Wang, Y. Wen, and D. I. Kim, "A survey on consensus mechanisms and mining strategy management in blockchain networks," *IEEE Access*, vol. 7, pp. 22 328–22 370, 2018.

[29] Y. Xiao, N. Zhang, W. Lou, and Y. Hou, "A survey of distributed consensus protocols for blockchain networks," *IEEE Communications Surveys & Tutorials*, vol. 22, no. 2, pp. 1432–1465, 2019.

[30] S. Zhang and J. Lee, "Analysis of the main consensus protocols of blockchain," *ICT Express*, vol. 6, no. 2, pp. 93–97, 2020.

[31] C. Nguyen, J. Kim, J. Park, and Y. Ye, "Proof-of-stake consensus mechanisms for future blockchain networks: Fundamentals, applications and opportunities," *IEEE Access*, vol. 7, pp. 85 727–85 745, 2019.

[32] B. Lashkari and P. Musilek, "A comprehensive review of blockchain consensus mechanisms," *IEEE Access*, vol. 9, pp. 43 620–43 652, 2021.

[33] J. Xu, C. Wang, and X. Jia, "A survey of blockchain consensus protocols," *ACM Computing Surveys*, vol. 55, no. 1, pp. 1–35, 2023.

[34] W. Yao, F. Deek, R. Murimi, and G. Wang, "Sok: A taxonomy for critical analysis of consensus mechanisms in consortium blockchain," *IEEE Access*, vol. 11, pp. 79 572–79 587, 2021.

[35] R. Huang, X. Yang, and P. Ajay, "Consensus mechanism for software-defined blockchain in internet of things," *Internet of Things and Cyber-Physical Systems*, vol. 2, pp. 1–9, 2022.

[36] A. Yadav, R. Singh, P. Sharma, S. Sharma, and S. Agarwal, "A comparative study on consensus mechanism with security threats and future scopes: Blockchain," *Computer Communications*, vol. 201, pp. 102–115, 2023.

[37] X. Liu and W. Yu, "A review of research on blockchain consensus mechanisms and algorithms," in *Proceedings of the 2024 9th International Conference on Intelligent Informatics and Biomedical Sciences (ICIIBMS)*. IEEE, 2024, pp. 1–10.

[38] A. Judmayer, N. Stifter, P. Schindler, and E. Weippl, "Blockchain: Basics," in *Business Transformation through Blockchain*. Springer, 2018, pp. 193–214.

[39] G. Tripathi, M. Ahad, and G. Casalino, "A comprehensive review of blockchain technology: Underlying principles and historical background with future challenges," *Decision Analytics Journal*, vol. 6, p. 100344, 2023.

[40] A. Monrat, O. Schelén, and K. Andersson, "A survey of blockchain from the perspectives of applications, challenges, and opportunities," *IEEE Access*, vol. 7, pp. 117 134–117 151, 2019.

[41] K. C., "An overview of blockchain technology," *International Research Journal of Electronics and Computer Engineering*, vol. 4, no. 4, pp. 1–6, 2018.

[42] M. Bhutta, F. Khwaja, M. Umar, S. Naqvi, M. Humayun, and A. Ullah, "A survey on blockchain technology: Evolution, architecture and security," *IEEE Access*, vol. 9, pp. 61 048–61 073, 2021.

[43] J. Yli-Huumo, D. Ko, S. Choi, S. Park, and K. Smolander, "Where is current research on blockchain technology?—a systematic review," *PLOS ONE*, vol. 11, no. 10, p. e0163477, 2016.

[44] Z. Zheng, S. Xie, H. Dai, X. Chen, and H. Wang, "Blockchain challenges and opportunities: A survey," *International Journal of Web and Grid Services*, vol. 14, no. 4, pp. 352–375, 2018.

[45] Y. Yuan and F. Wang, "Blockchain and cryptocurrencies: Model, techniques, and applications," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 48, no. 9, pp. 1421–1438, 2018.

[46] F. Casino, T. Dasaklis, and C. Patsakis, "A systematic literature review of blockchain-based applications: Current status, classification and open issues," *Telematics and Informatics*, vol. 36, pp. 55–81, 2019.

[47] K. Salah, M. Rehman, N. Nizamuddin, and A. Al-Fuqaha, "Blockchain for ai: Review and open research challenges," *IEEE Access*, vol. 7, pp. 10 127–10 149, 2019.

[48] N. Deepa, P. Pham, R. Babu, and et al., "A survey on blockchain for big data: Approaches, opportunities, and future directions," *Future Generation Computer Systems*, vol. 131, pp. 209–226, 2022.

[49] P. Dutta, T. Choi, S. Somani, and R. Butala, "Blockchain technology in supply chain operations: Applications, challenges and research opportunities," *Transportation Research Part E: Logistics and Transportation Review*, vol. 142, p. 102067, 2020.

[50] S. Wang, L. Ouyang, Y. Yuan, X. Ni, X. Han, and F. Wang, "Blockchain-enabled smart contracts: Architecture, applications, and future trends," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 49, no. 11, pp. 2266–2277, 2019.

[51] F. Sunny and et al., "A systematic review of blockchain applications," *IEEE Access*, pp. 1–1, 2022.

[52] A. Gad, D. Mosa, L. Abualigah, and A. Abohany, "Emerging trends in blockchain technology and applications: A review and outlook," *Journal of King Saud University - Computer and Information Sciences*, vol. 34, no. 10, pp. 6719–6742, 2022.

[53] A. Abdelmaboud and et al., "Blockchain for iot applications: Taxonomy, platforms, recent advances, challenges and future research directions," *Electronics*, vol. 11, no. 4, p. 630, 2022.

[54] B. Bhushan, P. Sinha, K. Sagayam, and A. J, "Untangling blockchain technology: A survey on state of the art, security threats, privacy services, applications and future research directions," *Computers and Electrical Engineering*, vol. 91, p. 106897, 2020.

[55] I. Rao, M. Kiah, M. Hameed, and Z. Memon, "Scalability of blockchain: A comprehensive review and future research direction," *Cluster Computing*, vol. 27, no. 2, pp. 5547–5570, 2024.

[56] J. Kolb, M. Abdelbaky, R. Katz, and D. Culler, "Core concepts, challenges, and future directions in blockchain," *ACM Computing Surveys*, vol. 53, no. 1, pp. 1–39, 2020.

[57] B. Mohanta, D. Jena, S. Panda, and S. Sobhanayak, "Blockchain technology: A survey on applications and security privacy challenges," *Internet of Things*, vol. 8, p. 100107, 2019.

[58] B. Cao and et al., "Blockchain systems, technologies, and applications: A methodology perspective," *IEEE Communications Surveys & Tutorials*, vol. 25, no. 1, pp. 353–385, 2021.

[59] X. Li and et al., "A quantitative and qualitative review of blockchain research from 2015 to 2021," *Sustainability*, vol. 15, no. 6, p. 5067, 2023.

[60] S. Lin, L. Zhang, J. Li, L. Ji, and Y. Sun, "A survey of application research based on blockchain smart contract," *Wireless Networks*, vol. 28, pp. 635–690, 2022.

[61] S. Johar, N. Ahmad, W. Asher, H. Cruickshank, and A. Durrani, "Research and applied perspective to blockchain technology: A comprehensive survey," *Applied Sciences*, vol. 11, no. 14, p. 6252, 2021.

[62] K. Agrawal and et al., "An extensive blockchain based applications survey: Tools, frameworks, opportunities, challenges and solutions," *IEEE Access*, vol. 10, pp. 116 858–116 906, 2022.

[63] S. Ahmed, "Enhancing data security and transparency: The role of blockchain in decentralized systems," *International Journal of Advanced Engineering and Management Sciences*, vol. 11, no. 1, 2025.

[64] S. Akhtar, M. Taimoor, G. Fatima, and H. Islam, "Blockchain technology for secure transactions: A decentralized approach to data integrity and trust," *Critical Review of Social Science Studies*, vol. 1, 2025.

[65] M. Mayani, "Blockchain technology: Revolutionizing data security and decentralized applications," *International Scientific Journal of Engineering and Management*, vol. 1, no. 1, 2025.

[66] A. Walia, "Blockchain for secure transaction," *International Journal of Scientific Research in Engineering and Management*, vol. 1, no. 1, 2025.

[67] E. Paul-Emeka, P. George, E. George, and A. Ige, "Blockchain technology in financial services: Enhancing security, transparency, and efficiency in transactions and services," *Open Access Research Journal of Multidisciplinary Studies*, vol. 8, no. 1, 2024.

[68] B. Hardas, "Blockchain security in financial transactions: A decentralized approach," *Computer Fraud and Security*, vol. 71, no. 1, 2024.

[69] J. Bernabe, J. Cánovas, J. Hernández-Ramos, R. Moreno, and A. Skarmeta, "Privacy-preserving solutions for blockchain: Review and challenges," *IEEE Access*, vol. 7, pp. 164 908–164 940, 2019.

[70] D. Deepak and et al., "Exploring the potential of blockchain technology in an iot-enabled environment: A review," *IEEE Access*, vol. 12, pp. 31 197–31 227, 2024.

[71] I. Khan, Y. Majib, R. Ullah, and O. Rana, "Blockchain applications for internet of things—a survey," *Internet of Things*, vol. 27, p. 101254, 2024.

[72] P. Alhat, "Blockchain technology," *International Journal of Scientific Research in Engineering and Management*, vol. 1, no. 1, 2024.

[73] G. Kakashvili, "The role of blockchain in the development of the digital ecosystem," *Tavdacva da Mecniereba*, vol. 3, 2024.

[74] Z. Vallejo and E. Paredes, "Exploring blockchain technology: Applications and insights across multiple fields," *AUIQ Technology and Engineering Science*, vol. 1, 2024.

[75] A. Pakseresht, S. Kaliji, and K. Hakelius, "Blockchain technology characteristics essential for the agri-food sector: A systematic review," *Food Control*, vol. 156, p. 110661, 2024.

[76] J. Sedlmeir, J. Lautenschlager, G. Fridgen, and N. Urbach, "The transparency challenge of blockchain in organizations," *Electronic Markets*, vol. 32, no. 4, pp. 1779–1794, 2022.

[77] I. Reshi and S. Sholla, "Ibf network: enhancing network privacy with iot, blockchain, and fog computing on different consensus mechanisms," *Cluster Computing*, vol. 28, p. 208, 2025.

[78] S. Joshi, "Feasibility of proof of authority as a consensus protocol model," arXiv preprint arXiv:2109.02480, 2021.

[79] U. Chikezie, T. Karacolak, and J. Prado, "Examining the applicability of blockchain to the smart grid using proof-of-authority consensus," in *Proc. 2021 IEEE 9th Int. Conf. Smart Energy Grid Eng. (SEGE)*, 2021, pp. 19–25.

[80] R. Sytnyk and V. Hnatushenko, "Study of consensus algorithms in blockchain networks in the design of information systems," in *Int. Sci. Tech. Conf. Inf. Technol. Metall. Mach. Build.*, 2024.

[81] X. Qiu, Z. Qin, W. Wan, J. Zhang, J. Guo, S. Zhang, and J. Xia, "A dynamic reputation-based consensus mechanism for blockchain," *Computer Modeling in Continuum Mechanics*, vol. 73, no. 1, pp. 1309–1327, 2022.

[82] Z. Zhang, "The application of proof of stake: Advantages, challenges and future development," in *ITM Web of Conferences*, vol. 73, 2025, p. 03013.

[83] X. Feng, J. Miao, Y. Liu, and K. Choo, "Regulatable and hardware-based proof of stake to approach nothing at stake and long range attacks," *IEEE Transactions on Services Computing*, vol. 16, no. 4, pp. 2114–2125, 2023.

[84] M. Wendl, M. Doan, and R. Sassen, "The environmental impact of cryptocurrencies using proof of work and proof of stake consensus algorithms: A systematic review," *Journal of Environmental Management*, vol. 326, p. 116530, 2022.

[85] S. Mandal, "Blockchain technology and its effect on environment: A comparative study between proof-of-work and proof-of-stake," *International Journal of Rural Development, Environment and Health Research*, vol. 7, no. 2, pp. 1–6, 2023.

[86] L. Ge, J. Wang, and G. Zhang, "Survey of consensus algorithms for proof of stake in blockchain," *Security and Communication Networks*, vol. 2022, pp. 1–14, 2022.

[87] A. Li, X. Wei, and Z. He, "Robust proof of stake: A new consensus protocol for sustainable blockchain systems," *Sustainability*, vol. 12, no. 7, p. 2824, 2020.

[88] K. John, T. Rivera, and F. Saleh, "Proof-of-work versus proof-of-stake: A comparative economic analysis," *Review of Financial Studies*, vol. 38, no. 1, pp. 101–132, 2025.

[89] W. Zhao, "On nxt proof of stake algorithm: A simulation study," *IEEE Transactions on Dependable and Secure Computing*, vol. 20, pp. 3546–3557, 2023.

[90] E. Deirmentzoglou, G. Papakyriakopoulos, and C. Patsakis, "A survey on long-range attacks for proof of stake protocols," *IEEE Access*, vol. 7, pp. 28 712–28 725, 2019.

[91] P. Szilágyi, "Eip-225: Clique proof-of-authority consensus protocol," https://eips.ethereum.org/EIPS/eip-225, 2017, accessed: 2025-01-20.

[92] V. Buterin, D. Hernandez, T. Kamphefner, K. Pham, Z. Qiao, D. Ryan, J. Sin, Y. Wang, and X. Zhang, "Combining ghost and casper," *arXiv preprint arXiv:2003.03052*, 2020.

[93] M. Saltini, "The consumption of reliability: A throughput-first approach to blockchain design," *IEEE Transactions on Network and Service Management*, 2021.

[94] C. Fan, S. Ghaemi, H. Khazaei, and P. Musilek, "Performance evaluation of blockchain systems: A systematic survey," *IEEE Access*, vol. 8, pp. 126 927–126 950, 2020.

[95] T. Dinh, R. Liu, M. Zhang, G. Chen, B. Ooi, and J. Wang, "Blockbench: A framework for analyzing private blockchains," in *Proc. 2017 ACM Int. Conf. Management of Data (SIGMOD)*, 2017, pp. 1085–1100.

[96] P. Thakkar, S. Nathan, and B. Viswanathan, "Performance benchmarking and optimizing hyperledger fabric blockchain platform," in *2018 IEEE International Symposium on Modeling, Analysis and Simulation of Computer and Telecommunication Systems (MASCOTS)*, 2018, pp. 264–276.

[97] B. Nasrulin, M. Vos, G. Ishmaev, and J. Pouwelse, "Gromit: Benchmarking the performance and scalability of blockchain systems," in *2022 IEEE International Conference on Decentralized Applications and Infrastructures (DAPPS)*, 2022, pp. 56–63.

[98] V. Gramoli, G. Pallez, J. Yu, L. Wang, J. Li, and D. Mazieres, "Diablo: A benchmark suite for blockchains," in *Proc. 18th European Conference on Computer Systems (EuroSys)*, 2023, pp. 1–17.

[99] J. Sedlmeir, P. Ross, A. Luckow, J. Lockl, D. Miehle, and G. Fridgen, "The dlps: A new framework for benchmarking blockchains," in *Proceedings of the 54th Hawaii International Conference on System Sciences (HICSS)*, 2021, pp. 1–10.

[100] K. Ren, M. Chen, X. Li, Y. Tang, P. Wang, and F. Zhou, "Bbsf: Blockchain benchmarking standardized framework," in *Proc. 1st Workshop on Verifiable Database Systems (VDBS)*, 2023, pp. 1–7.

[101] D. Y. Nasir, R. A. Rashid, and M. A. Sarijari, "Performance analysis of hyperledger besu on azure kubernetes service," *IEEE Access*, vol. 10, pp. 108 745–108 759, 2022.

[102] C. Picco, S. Consolazione, F. Palhano, N. Ziviani, and E. S. de Oliveira, "Observability: A systematic mapping study," *IEEE Access*, vol. 9, pp. 129 760–129 777, 2021.

[103] Prometheus Authors, "Prometheus documentation," https://prometheus.io/docs/introduction/overview/, 2024, accessed: 2025-01-20.

[104] A. Chakravarthy, A. K. Gupta, and G. S. Roshini, "Monitoring and analytics for blockchain systems," in *Proceedings of the 2019 IEEE International Conference on Blockchain*. IEEE, 2019.

[105] D. Bernstein, "Containers and cloud: From lxc to docker to kubernetes," *IEEE Cloud Computing*, vol. 1, no. 3, pp. 81–84, 2014.

[106] Rancher Labs, "K3s: Lightweight kubernetes," https://k3s.io/, 2024, accessed: 2025-01-20.

[107] S. K. Singh, P. K. Singh, and B. Pradhan, "Blockchain on kubernetes: A review," in *2020 IEEE International Conference on Cloud Computing in Emerging Markets (CCEM)*, 2020, pp. 49–54.

[108] A. Avritzer, D. S. Menasché, and W. M. G. van der Aalst, "Scalability assessment of microservices architecture," in *Proceedings of the 2020 ACM/SPEC International Conference on Performance Engineering (ICPE '20)*, 2020.

[109] B. Gregg, *Systems Performance: Enterprise and the Cloud*, 2nd ed. Addison-Wesley Professional, 2020.

[110] R. Jain, *The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling*. Wiley, 1991.

[111] SPEC Research Group, "Peer-to-peer and blockchain performance," https://research.spec.org/working-groups/p2p-blockchain-performance/, 2021, accessed: 2025-01-20.

[112] G. M. Amdahl, "Validity of the single processor approach to achieving large scale computing capabilities," in *Proceedings of the April 18-20, 1967, spring joint computer conference*, 1967, pp. 483–485.

[113] M. Kaur, A. Gupta, S. Tanwar, and N. Kumar, "Mbcp: Performance analysis of large scale mainstream blockchain consensus protocols," *IEEE Access*, vol. 9, pp. 80 931–80 944, 2021.

[114] Y. Hao, Y. Li, X. Dong, L. Fang, and P. Chen, "Performance analysis of consensus algorithm in private blockchain," in *Proc. IEEE Intelligent Vehicles Symposium (IV)*, 2018, pp. 280–285.

[115] Y. Shahsavari, K. Zhang, and C. Talhi, "A theoretical model for block propagation analysis in bitcoin network," *IEEE Transactions on Engineering Management*, vol. 69, no. 4, pp. 1459–1476, 2022.

[116] X. Xu, H. Li, Z. Chen, and L. Gao, "Latency performance modeling and analysis for hyperledger fabric blockchain network," *Information Processing and Management*, vol. 58, p. 102436, 2021.

[117] J. Göbel and A. Krzesinski, "Increased block size and bitcoin blockchain dynamics," in *Proc. IEEE ITNAC*, 2017, pp. 1–6.

[118] Y. Ucbas, M. Kaya, E. Yildirim, and A. Sen, "Performance and scalability analysis of ethereum and hyperledger fabric," *IEEE Access*, vol. 11, pp. 67 156–67 167, 2023.

[119] P. Gaba, M. Singh, and R. Kapoor, "Impact of block data components on the performance of blockchain-based vanet implemented on hyperledger fabric," *IEEE Access*, vol. 10, pp. 71 003–71 018, 2022.

[120] X. Zheng, Y. Zhu, and X. Si, "A survey on challenges and progresses in blockchain technologies: A performance and security perspective," *Applied Sciences*, vol. 9, no. 22, p. 4731, 2019.

[121] C. Wu, Y. Wang, D. Zhao, and F. Zhang, "Flexchain: An elastic disaggregated blockchain," *Proceedings of the VLDB Endowment*, vol. 16, no. 1, pp. 23–36, 2022.

[122] M. Dabbagh, K. Choo, A. Beheshti, M. Tahir, and N. Safa, "A survey of empirical performance evaluation of permissioned blockchain platforms: Challenges and opportunities," *Computers & Security*, vol. 100, p. 102078, 2021.

[123] S. Bamakan, A. Motavali, and A. Bondarti, "A survey of blockchain consensus algorithms performance evaluation criteria," *Expert Systems with Applications*, vol. 154, p. 113385, 2020.

[124] Z. Zhou, R. Li, Y. Cao, L. Zheng, and H. Xiao, "Dynamic performance evaluation of blockchain technologies," *IEEE Access*, vol. 8, pp. 217 762–217 772, 2020.

[125] D. Huang, X. Huang, and S. Zhang, "Performance analysis of the raft consensus algorithm for private blockchains," *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 50, no. 1, pp. 172–181, 2018.

[126] M. Esmaili and K. Christensen, "Performance modeling of public permissionless blockchains: A survey," *ACM Computing Surveys*, vol. 57, no. 5, pp. 1–35, 2024.

[127] A. Abreu, E. Coutinho, and C. Bezerra, "Performance evaluation of data transactions in blockchain," *IEEE Latin America Transactions*, vol. 20, no. 3, pp. 409–416, 2022.

[128] S. Misra, P. Mukherjee, R. Roy, and V. Agarwal, "Blockchain at the edge: Performance of resource-constrained iot networks," *IEEE Transactions on Parallel and Distributed Systems*, vol. 32, no. 1, pp. 174–183, 2021.

[129] P. Wicaksono and I. Palguno, "Performance evaluation of ethereum private network using proof-of-authority and proof-of-stake consensus mechanisms," in *Journal of Physics: Conference Series*, vol. 1869, no. 1, 2021, p. 012089.

[130] J. Rico-Peña, R. Arguedas-Sanz, and C. López-Martín, "Models used to characterise blockchain features: A systematic literature review and bibliometric analysis," *Technovation*, 2023.

[131] M. Bellucci, D. Bianchi, and G. Manetti, "Blockchain in accounting practice and research: Systematic literature review," *Meditari Accountancy Research*, 2022.

[132] P. Wicaksono, A. Palguno, and R. Wibowo, "Performance analysis of ethereum consensus: Proof-of-authority vs proof-of-stake," in *Proceedings of the 2022 International Conference on Information Technology Systems and Innovation (ICITSI)*, 2022, pp. 170–176.

[133] D. Beyer, S. Löwe, and P. Wendler, "Reliable benchmarking: Requirements and solutions," *International Journal on Software Tools for Technology Transfer*, vol. 21, no. 1, pp. 1–29, 2017.

[134] M. Martínez, J. Ruiz, N. Antunes, D. D. Andrés, and M. Vieira, "A multi-criteria analysis of benchmark results with expert support for security tools," *IEEE Transactions on Dependable and Secure Computing*, vol. 19, no. 5, pp. 2151–2164, 2022.

[135] D. Beyer, P. Chien, and M. Jankola, "Benchcloud: A platform for scalable performance benchmarking," in *Proceedings of the 39th IEEE/ACM ASE*, 2024, pp. 2386–2389.

[136] N. Quetschlich, L. Burgholzer, and R. Wille, "Mqt bench: Benchmarking software and design automation tools for quantum computing," *Quantum*, vol. 7, p. 1062, 2022.

[137] M. Touloupou, K. Christodoulou, and M. Themistocleous, "Validating the blockchain benchmarking framework through controlled deployments of xrpl and ethereum," *IEEE Access*, vol. 12, pp. 22 264–22 277, 2024.

[138] D. Saingre, T. Ledoux, and J. Menaud, "Bctmark: A framework for benchmarking blockchain technologies," in *Proc. 2020 IEEE/ACS 17th Int. Conf. on Computer Systems and Applications (AICCSA)*, 2020, pp. 1–8.

[139] M. Rasolroveicy, W. Haouari, and M. Fokaefs, "Blockcompass: A benchmarking platform for blockchain performance," *IEEE Transactions on Computers*, vol. 73, no. 9, pp. 2111–2122, 2024.

[140] A. Lebedev and V. Gramoli, "Evaluating performance and dependability of blockchain protocols with diablo," in *Proc. 54th IEEE/IFIP Int. Conf. on Dependable Systems and Networks - Supplemental Volume (DSN-S)*, 2024, pp. 69–70.

[141] N. Pradhan *et al.*, "A novel blockchain-based healthcare system design and performance benchmarking on a multi-hosted testbed," *Sensors*, vol. 22, no. 9, p. 3499, 2022.

[142] B. Li, G. Cheng, H. Gao, X. Yan, and S. Deng, "Scenarios analysis and performance assessment of blockchain integrated in 6g scenarios," *Science China Information Sciences*, vol. 67, no. 6, p. 4054, 2024.

[143] J. Chacko, R. Mayer, A. Fekete, V. Gramoli, and H. Jacobsen, "A comprehensive study on benchmarking permissioned blockchains," in *Proc. Int. Conf. on Blockchain Research and Applications for Innovative Networks and Services (BRAINS)*, 2023, pp. 18–33.

[144] X. Chen, K. Nguyen, and H. Sekiya, "An experimental study on performance of private blockchain in iot applications," *Peer-to-Peer Networking and Applications*, vol. 14, no. 6, pp. 3075–3091, 2021.

[145] F. Longo, L. Nicoletti, A. Padovano, G. D'Atri, and M. Forte, "Blockchain-enabled supply chain: An experimental study," *Computers and Industrial Engineering*, vol. 137, p. 106024, 2019.

[146] A. Purusottama, T. Simatupang, and Y. Sunitiyoso, "An experimental design of the blockchain business model using a soft system dynamics modeling approach," *Journal of Systems and Information Technology*, vol. 26, no. 5, pp. 614–640, 2024.

[147] T. Kuo *et al.*, "Benchmarking blockchain-based gene-drug interaction data sharing methods: A case study from the idash 2019 secure genome analysis competition blockchain track," *International Journal of Medical Informatics*, vol. 154, p. 104559, 2021.

[148] M. Kuzlu, M. Pipattanasomporn, L. Gurses, and S. Rahman, "Performance analysis of a hyperledger fabric blockchain framework: Throughput, latency and scalability," in *2019 IEEE International Conference on Blockchain (Blockchain)*, 2019, pp. 536–540.

[149] D. Schwartz *et al.*, "Methodology for blockchain performance benchmarking," SPEC Research Group, Tech. Rep., 2019.

[150] N. Ioini and C. Pahl, "A review of distributed ledger technology for smart manufacturing," *Cloud Computing and Services Science*, pp. 245–263, 2020.

[151] B. Spillner *et al.*, "Performance engineering for blockchain systems," SPEC, Tech. Rep., 2019.

[152] S. Pongnumkul, C. Siripanpornchana, and S. Thajchayapong, "Performance analysis of private blockchain platforms in varying workloads," in *2017 26th International Conference on Computer Communication and Networks (ICCCN)*. IEEE, 2017, pp. 1–6.

[153] H. Sukhwani, N. Wang, K. S. Trivedi, and R. Rindos, "Performance modeling of pbft-consensus blockchains for iot applications," *IEEE Internet of Things Journal*, vol. 7, no. 1, pp. 120–130, 2020.

[154] K. Huffman *et al.*, "Blockchain performance benchmarking: Challenges and methodologies," *IEEE Access*, 2020.

[155] *IEEE Standard for Software and System Test Documentation*, IEEE Std. 829-2008, 2008.

[156] A. Avizienis *et al.*, "Basic concepts and taxonomy of dependable and secure computing," *IEEE Transactions on Dependable and Secure Computing*, 2004.

[157] S. Rouhani and R. Deters, "Security, performance, and applications of smart contracts," in *IEEE Access*, vol. 7. IEEE, 2019, pp. 50 759–50 779.

[158] G. A. Pierro and H. Rocha, "The influence of state retention on smart contract scalability," in *2019 IEEE International Workshop on Blockchain (IWOB)*. IEEE, 2019, pp. 1–7.

[159] P. J. Rousseeuw and C. Croux, "Alternatives to the median absolute deviation," *Journal of the American Statistical Association*, vol. 88, no. 424, pp. 1273–1283, 1993.

[160] M. Saltini and D. Hyland-Wood, "Ibft 2.0: A safe and liveness-guaranteed byzantine fault tolerant consensus protocol for blockchains," *arXiv preprint arXiv:1909.10194*, 2019.

[161] T. Roughgarden, "Transaction fee mechanism design for the ethereum blockchain: An economic analysis of eip-1559," *arXiv preprint arXiv:2012.00854*, 2020.

[162] M. A. Anggorokasih, "Manual pembangkitan jaringan poa geth," https://github.com/Skripsi-Maulana-Anjari/DChain-PoA-Geth, 2025, accessed: January 5, 2026.

[163] ——, "Deployment jaringan poa pada kubernetes," https://github.com/Skripsi-Maulana-Anjari/DChain-PoA-Deployer, 2025, accessed: January 5, 2026.

[164] ——, "Pembangkitan jaringan pos geth-prysm," https://github.com/Skripsi-Maulana-Anjari/DChain-PoS-Geth, 2025, accessed: January 5, 2026.

[165] ——, "Stack monitoring prometheus-grafana blockchain," https://github.com/Skripsi-Maulana-Anjari/monitoring-tools, 2025, accessed: January 5, 2026.

[166] M. Nygard, *Release It!: Design and Deploy Production-Ready Software*. Pragmatic Bookshelf, 2018.

[167] M. A. Anggorokasih, "Pipeline benchmarking hyperledger caliper," https://github.com/Skripsi-Maulana-Anjari/caliper-benchmark-workspace, 2025, accessed: January 5, 2026.

[168] B. Beyer, C. Jones, J. Petoff, and N. R. Murphy, *Site Reliability Engineering: How Google Runs Production Systems*. O'Reilly Media, Inc., 2016.