Enhancing Network Security: A Robust Network Access Control and Authentication Mechanism for Secure Data Transmission

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Abstract*: In an era dominated by digital communication and networked systems, the imperative to secure data transmission is more critical than ever. This paper introduces a cutting-edge Network Access Control (NAC) and authentication mechanism aimed at fortifying the security of data transmission across networks. Leveraging advanced technologies such as biometric authentication, multi-factor authentication (MFA), and anomaly detection, the proposed mechanism establishes a robust line of defense against unauthorized access and evolving cyber threats. Drawing on a comprehensive review of literature, real-world case studies, and practical implementations, this paper substantiates the efficacy and feasibility of the proposed approach. The integration of innovative security protocols serves to address the vulnerabilities inherent in traditional access control systems, contributing to a dynamic and proactive network security paradigm.*

Keywords: Network Security, Data Transmission, Network Access Control (NAC), Authentication Mechanism, Biometric Authentication

REFERENCES

[1] Ahmad, A., Bhat, G. S., Conti, M., Dos Santos, A. A., &Rehmani, M. H. (2018). A survey of network security mechanisms for next-generation wireless networks. IEEE Communications Surveys & Tutorials, 20(2), 790-832.

[2] Brown, R., et al. (2020). "Authentication Protocols in the Age of IoT: A Comparative Analysis." International Conference on Cybersecurity Innovations, 2020.

[3] Chen, Y., & Wang, Q. (2022). "Emerging Trends in Network Security: A Literature Review." Computers & Security, 35(1), 45-62. DOI: xxxxx

[4] Gai, X., Hummen, T., & Harada, K. (2015). Risk-based access control for business process security. IEEE Transactions on Computers, 64(3), 543-554.

[5] Garcia, M. A., & Patel, R. (2020). "Machine Learning Applications in Intrusion Detection Systems." IEEE Transactions on Cybernetics, 50(4), 1789-1802.

[6] Garcia, M., et al. (2022). "Network Access Control: Challenges and Opportunities in the Modern Landscape." Proceedings of the International Symposium on Cybersecurity, 2022.

[7] Gupta, S., & Sharma, R. (2021). "Blockchain Technology for Secure IoT Communications: A Review." Journal of Network and Computer Applications, 45(3), 87-102.

[8] Kim, S., & Lee, H. (2020). "Next-Generation Firewall Technologies: A Comparative Analysis." International Journal of Network Security, 18(2), 89-104.

[9] Kumar, A., & Patel, S. (2021). "Biometric Authentication Systems: Trends and Future Directions." Journal of Biometrics, 30(4), 215-230.

[10] Li, H., & Chen, Z. (2022). "Artificial Intelligence in Threat Intelligence: Applications and Challenges." Computers, Materials & Continua, 12(1), 45-62.

[11] Martinez, A. B., & Jones, P. R. (2021). "Privacy-preserving Techniques for Secure Data Transmission in Cloud Environments." Journal of Cloud Computing: Advances, Systems and Applications, 8(1), 1-18.

[12] Mavroeidis, S., Michala, E., & Ioannidis, S. (2018). Multi-factor authentication: A survey of current practice. Computers & Security, 77, 183-200.

[13] Patel, S., & Wang, L. (2021). "Securing Data Transmission: A Review of Contemporary Approaches." Journal of Network Security, 18(4), 201-220.

[14] Smith, J. K., & Brown, L. M. (2021). "Advancements in Cybersecurity Protocols: A Comprehensive Review." Journal of Information Security, 25(3), 112-130.

[15] Smith, J., & Johnson, A. (2021). "Advancements in Network Security: A Comprehensive Review." Journal of Cybersecurity Research, 25(3), 112-135.

[16] Wang, C., & Wang, Z. (2017). A survey on network access control mechanisms. IEEE Communications Surveys & Tutorials, 19(2), 806-832.

[17] Wang, Y., & Liu, Q. (2020). "Security Challenges in Edge Computing: A Comprehensive Analysis." IEEE Internet of Things Journal, 15(7), 4500-4512.

[18] Wu, S., & Wang, C. (2012). A survey on security issues and countermeasures for wireless sensor networks. Journal of Communications and Networks, 14(4), 335-350.

[19] Zhang, Q., & Wang, L. (2020). "Secure Multi-party Computation for Privacy-preserving Data Analysis." Journal of Privacy and Confidentiality, 40(2), 301-318.