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Zero Trust Architecture: A Comprehensive Framework for Modern Data Security

Lakshmi Narayana Gupta Koralla
Acharya Nagarjuna University, India

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Abstract: *This article comprehensively analyzes Zero Trust Architecture (ZTA) as a strategic framework for data security in modern distributed computing environments. Moving beyond traditional perimeter-based security models, Zero Trust Architecture implements the principle of "never trust, always verify" through continuous authentication, granular access controls, and comprehensive monitoring. The article examines Zero Trust concepts' theoretical foundations and historical development before exploring key implementation components, including identity management, least privilege access enforcement, data classification, encryption strategies, and continuous security analytics. The article's examination of successful implementations across diverse sectors identifies measurable security improvements, including reduced breach impact, faster threat detection, and strengthened resistance to credential-based attacks. The article explores organizational implementation considerations, including maturity models, integration strategies, and common resistance factors, providing practical guidance for security practitioners. The article examines emerging trends, including integration with cloud-native architectures, AI-driven security automation, evolving regulatory requirements, and adaptations for the Internet of Things and edge computing environments. This comprehensive article framework provides security professionals with both theoretical understanding and practical approaches for implementing Zero Trust principles to protect organizational data assets in increasingly complex and distributed computing landscapes*

Keywords: Zero Trust Architecture, Least Privilege Access, Multi-factor Authentication, Micro-segmentation, Continuous Verification

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