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Zero Trust and DevSecOps in Cloud-Native Environments with Security Frameworks and Best Practices

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Abstract: *The Security issues become more complicated as a result of organizations using cloud-native architectures since cyberattacks are becoming more frequent and sophisticated. This research investigates Zero Trust Security integration together with DevSecOps application to reach higher security levels for cloud-native environments. The proposed study uses an improved security architecture that applies the core security principles of Zero Trust least privilege access and ongoing authentication, and dynamic policy enforcement across the DevSecOps pipeline to current agile development lifecycles. The analysis identifies security challenges of cloud-native environments that stem from microservices and containers, as well as orchestration systems using Kubernetes, while providing recommended solutions for all development periods. Continuous monitoring combined with automated vulnerability assessments and adaptive security measures forms the basis for this paper, which insists on implementing security measures right from application inception. This research presents complete guidelines for organizations that implement Zero Trust together with DevSecOps to guarantee that security becomes a core component of their cloud-native infrastructure.*

Keywords*:* Zero Trust Security (ZTS), DevSecOps, Cloud-Native Environments, Cybersecurity Framework, Shift-Left Security, Microservices Security

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