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Data Loss Prevention Strategies in Cloud Computing

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Abstract: *Cloud computing offers scalable, cost-effective, and flexible computing resources, but storing sensitive data in shared third-party infrastructures introduces new risks of accidental or malicious data loss. Data Loss Prevention (DLP) is a critical discipline that ensures confidentiality, integrity, and availability of cloud data. This paper provides an extensive study of cloud data loss threats, analyzes cloud shared responsibility, and presents a multi-layered DLP framework. Preventive, detective, corrective, and compensating controls are discussed in detail, including encryption, access control, cloud-native DLP scanning, anomaly detection, zero-trust networks, immutable backups, and confidential computing. The paper concludes with emerging research trends and challenges in multi-cloud DLP, AI-driven analytics, and homomorphic encryption.*

Keywords*:* Data loss in the cloud can be due to misconfig- urations, malicious insiders, ransomware, insecure APIs, multi- cloud complexity, and supply-chain vulnerabilities

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