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(57) Abstract :

A data integrity verification system for distributed storage includes an object registry (101), a verification scheduler (102), a node interrogation controller (103), distributed storage nodes (104), a metadata graph engine (105), a proof generation and comparison module (106), an inconsistency analysis engine (107), and a recovery orchestrator (108). The system correlates fragment evidence with canonical object topology, validates proofs against registered commitments, classifies mismatch conditions, and executes corrective recovery using verified sources. The arrangement improves detection of corruption, metadata drift, and replica inconsistency while reducing verification overhead and supporting audit ready storage governance.

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