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(57) Abstract :
METHOD AND SYSTEM FOR PROVIDING QUANTUM-RESISTANT BYZANTINE FAULT TOLERANCE FOR BLOCKCHAIN NETWORKS ABSTRACT The invention discloses a method and system for achieving quantum-resistant Byzantine Fault Tolerance (qBFT) in blockchain networks. The method dynamically adjusts qBFT consensus parameters based on real-time quantum threat assessments, enhancing adaptability to emerging quantum vulnerabilities. An autonomous self-healing mechanism identifies compromised nodes and redistributes responsibilities, ensuring the integrity of the blockchain network. Machine learning algorithms, trained on historical attack data and real-time patterns, enable proactive prevention of Byzantine attacks. The system incorporates an adaptive consensus engine, utilizing decentralized quantum sensors, and a quantum-resistant key management system employing entanglement principles. The blockchain network features collaborative execution of qBFT, maintenance of a distributed ledger for quantum-resistant parameter records, and a Quantum Watchtower mechanism with multi-layered defenses. Additional novel elements include the consideration of quantum entanglement states, a Quantum-Resistant Threshold Signature Scheme, and a quantum-resistant random number generator.

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