Enforcing Data Agency: Bridging the Gap Between Legal Frameworks and Technological Reality

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The rapid evolution of artificial intelligence, data-driven economies, and digital governance has exposed a fundamental gap in the legal and technological infrastructure surrounding data ownership, privacy, and agency. Well-intentioned regulatory frameworks—such as the GDPR's "Right to be Forgotten," AI risk-management mandates, and evolving global privacy laws— all fail to meet the challenge because their efforts are aimed at protecting data after it has been created and exchanged. Existing laws desired regulatory compliance is only achievable with a fundamentally new functional architecture to operationalize key principles like user sovereignty, equal access, equitable contracts, and bidirectional data asset governance. Using our proposed architecture, data becomes a fungible asset class that is immutably owned and managed by individuals and organizations who create and own the data, with ownership enforced by a new kind of digital agent working within a contractual and regulatory framework.

This paper explores the urgent need for enforceable data agency, moving beyond passive compliance to active, technology-driven governance models. We propose a transition from traditional, uncontrolled data ecosystems in which data is mined and sold to the highest bidder to structured, first-party data asset ownership. This new data asset requires technological and contractual capabilities that do not yet exist in mainstream regulatory discussions. Markets must formally recognize data as an asset class, a thing of value to its creator or owner which can be traded for like value. This value would be traded and captured using a model of data agency that embeds transactional, contractual, and representational capabilities into every data interaction. It also demands self-sovereign data management, ensuring enforceable end-to-end data lifecycles, including chain of custody, provenance, governance, and compliance automation to uphold legal and ethical obligations. Moreover, regulatory success depends upon a framework for contracts for data exchange transactions, where terms and conditions are equally enforceable as to data holders and requesters, moving away from exploitative, one-sided agreements that currently define "big data" markets. Crucially, this transformation requires the ability to enforce compliance with technology-backed governance frameworks that operationalize legal rights and regulatory mandates, ensuring compliance is not just expected but actively upheld in real-time.

We contend that without technological enforcement mechanisms, existing regulatory structures will continue to fail. The absence of automated governance tools, chain-of-custody validation, and real-time compliance enforcement renders legal protections ineffective. Instead of relying on theoretical compliance models, data sovereignty must be codified in the technology itself—enabling individuals, businesses, and regulators to establish provenance, actively manage, audit, and enforce data use terms in real-time.

By bridging the gap between law, policy, and technological enforcement, we can re-balance power in data economies—from extractive, opaque models dominated by intermediaries to equitable, enforceable, and transparent frameworks where individuals and entities act as true first-party data asset owners. This paper presents a viable technological roadmap for legal scholars, policymakers,

and industry leaders to transform regulatory aspirations into actionable, enforceable realities in the digital age.