

Reeblink: Operating System for Building Decentralized Networks of Ownership of Physical Assets

Abstract

This paper presents a conceptual model of an operating system for building decentralized networks of ownership of physical assets. The study is based on institutional, legal, and architectural analysis of the Reeblink model, in which assets such as real estate are included in the network through DAO LLCs, managed by smart contracts, and connected to digital ownership interfaces (NFTs). It is shown that such an architecture provides legal legitimation, protocol liquidity, and automated distribution of rights without the need for centralized intermediaries. The proposed model forms the foundation for programmable ownership of real assets and scalable management of distributed property.

1. Introduction

The development of Web3 and blockchain technologies has led to the emergence of new forms of ownership, digital identification of assets, and protocol-based governance. However, most solutions in this field are limited to the tokenization of digital or liquid assets, while physical objects—particularly real estate—remain within the legal and operational realm of centralized structures. The Reeblink project, which represents an architectural model, describes a decentralized network in which each real estate object becomes an active element governed by a protocol, legally validated, and accessible for ownership and leasing through a unified token economy. The purpose of this paper is to present and analyze the functional logic of such a network. This work is conceptual and architecturally applied in nature. Its aim is to propose a viable model of a decentralized network of ownership of physical assets, combining the legal validity of DAO LLCs, technical implementation of NFT interfaces, and the economic logic of a network token. The study is based on regulatory and institutional analysis as well as the design of an operational structure. As a key result, the architecture of Reeblink is presented—an operating system implementing a new paradigm of ownership of physical assets through a protocol.

2. General Profile of a Networked Real Asset

For a real asset to become the foundation of a decentralized network, it must meet a number of fundamental conditions that ensure both economic stability and compatibility with protocol governance. An ideal networked asset: - Is intuitively understandable—its essence is clear without the need for technical interpretation; - Is widely used—it is embedded in everyday economic and social practice; - Possesses universal value—it symbolizes wealth, stability, or social status; - Has a natural mechanism of capitalization—it tends to increase in value over time; - Generates regular income—it provides a predictable, algorithmizable cash flow. Additionally, it must meet two critical structural conditions: - Be registered in an official legal registry, which ensures legal certainty, verifiability, and the possibility of alienation; - Possess a discrete and economically divisible unit of measurement suitable for objective market valuation (for example, square meters, kilowatt-hours). As of today, real estate is the only asset class that fully meets all these criteria. Its institutional maturity, legal formalization, universal comprehensibility, and income-generating capability make it the optimal category for building the first decentralized network of real assets. This is due not only to its scale, but also to its structural compatibility with digital protocols. In the future, other asset classes may also be considered—such as energy infrastructure, agricultural land, water resources, or vehicles. However, their integration will require additional legal mechanisms, technical interfaces, and adaptation of governance logic to achieve a comparable level of automation and verifiability. Thus, real estate remains the foundational asset class for the implementation of the first decentralized ownership architecture, combining institutional resilience with technological applicability. In the Reeblink architecture, real estate is used as the base asset type.

3. Literature Framework

The proposed Reeblink architecture is based on three interrelated disciplinary directions, each forming a separate aspect of the conceptual and practical model of a decentralized ownership network. First, the concept of distributed governance and collective ownership is represented in the classical works of Elinor Ostrom (1990), which emphasize the importance of self-organizing systems capable of managing resources without centralized control. This logic is embodied in the protocol structure of Reeblink DAO, where the right to manage the asset is secured by a decentralized network of validators and participants, rather than by a centralized agent. Second, the model is based on the principle of institutionalizing capital as a key condition for transforming it into an asset suitable for exchange and collateral. As Hernando de Soto (2000) noted, it is precisely the presence of a legal title that enables property to participate in economic circulation. The use of DAO LLCs—registered legal wrappers—in Reeblink provides such a title, acting as a bridge between digital mechanisms and the formal legal system. Third, Reeblink relies on the principles of programmable ownership and smart governance, as formulated in the works of Vitalik Buterin (2021) and later literature on DAOs. Here, ownership exists not merely as a legal fact but as code: the NFT representing the asset simultaneously becomes the governance interface for the DAO and triggers tokenization processes through smart contracts. Alongside the foundational sources, this work considers current research in the legal nature of DAOs and digital ownership. Joshua Fairfield (2015) interprets the token as a new form of digital property requiring adaptation of the existing legal field. The studies by Wright & De Filippi (2018) propose the concept of *lex cryptographia*—a legal order implemented through code, which underlies the Reeblink architecture. Reyes (2020) and other authors raise issues of normative uncertainty and transnational recognition of DAOs as legal subjects.

4. Logic of Functioning of a Decentralized Real Estate Network

The Reeblink model proposes considering real estate not as an entity external to the network, but as a node within a distributed protocol that possesses legal status, a digital governance interface, and built-in liquidity. Below is a step-by-step logic of how the network operates, illustrating the process of including a real estate object, its network governance, and user participation.

Initial Level: Physical Asset

The entry point is a physical real estate object—a building, apartment, or plot of land—with a confirmed legal title and a certain market value. This asset exists within the traditional legal framework until it is digitally integrated into the network.

Activation via Network (Network Entry)

The activation process includes several sequential steps that transform the asset into a network unit: - Creation of DAO LLC: a legal wrapper with limited liability is created, having the legal capacity to own a real estate object, registered in a jurisdiction that legally supports DAOs (currently, the leader is the state of Wyoming, USA); - Title Transfer: the asset is re-registered to the created DAO LLC; - NFT Issuance: a unique token (NFT) is minted, containing metadata about the real estate object: title, area, location, valuation, rental parameters. This is not a digital ownership right to the real estate, but a key to owning and managing the DAO LLC; - NFT Locking in the Protocol: the NFT is sent to the network's smart contract and becomes non-withdrawable, activating the network's internal processes; - Validator Review: the network conducts decentralized validation—valuation assessment, document verification, legal clarity, and geographic compliance; - Binding of Service Companies: service providers (management, cleaning, insurance) are assigned to the real estate object, and can be replaced in the future based on the network regulations.

Network Processing: Economic and Legal Integration

Once the real estate object is included in the network, the ReebLink protocol performs a series of internal operations: - REBL Token Issuance: based on the appraised value of the real estate asset, network tokens (REBL) are issued and put into circulation. The REBL issuance algorithm accounts for variations in asset value, releasing a proportional amount of REBL tokens. - Fixation of Protocol Conditions: smart contracts define terms for rent, buyout, revaluation, and automatic rent distribution parameters. - Algorithmic Rent Distribution: rental income is automatically distributed among REBL holders, excluding the tokens used by tenants to reduce their rent. - Management: the DAO LLC is governed under a “limited delegation” model—the asset does not require active intervention but is represented externally by a manager. This manager typically oversees operational matters related to the property’s service and compliance. - Property Revaluation: the network mandates regular asset reappraisal through decentralized appraisers and oracles, influencing the internal REBL economy.

Network Participants

Once a real estate object is activated in the network, it becomes a space for interaction among various roles: Participant: Function within the network Tenant: Gains the ability to pay rent based on their REBL token balance (enabling the possibility of zero rent); may initiate a buyout after renting the object for a period defined by the protocol (right of buyout without obligation). Token Purchaser: Acquires REBL and receives a share in the network’s economy, including participation in rent distribution. DAO LLC Manager: Represents the DAO LLC in external affairs (banks, taxes, tenants) without interfering in protocol governance. Service Companies: Provide property services in accordance with the parameters recorded in the NFT. Validators: Verify data, participate in the decentralized trust structure, and receive rewards in REBL tokens.

5. Exit: Liquidity and Change of Asset Status

Once launched, the object operates within the network according to one of three scenarios: 1. Continued Renting: the asset generates rent, remains titled to the DAO LLC, and its status remains unchanged. 2. Tenant Buyout: if the protocol conditions are met (ownership of a sufficient volume of REBL tokens and a rental period defined by the protocol), a buyout is initiated. The NFT is unlocked and transferred to the tenant, while the REBL tokens are burned. 3. Re-Activation: after the buyout and exit from the network, the asset can be returned to the network on general terms, with a new valuation and a new REBL token issuance.

6. What Does the Network Do?

The ReebLink network serves as a decentralized infrastructure layer for managing ownership rights and circulation of real assets. It: - Accepts real estate objects into protocol governance, - Legally formalizes them through DAO LLCs, - Connects them to a digital interface (NFT), - Evaluates and activates liquidity through REBL issuance, - Makes the asset available for rent, ownership, and buyout without intermediaries, - Maintains economic and legal transparency through smart contracts and validator oversight. In this way, the network does not simply ‘tokenize’ an asset—it integrates it into a distributed legal and economic model in which the concept of ownership becomes programmable and scalable.

7. Analytical Discussion

7.1 The Network Protocol as a Source of Trust

Traditionally, trust in real estate transactions is ensured through institutional mechanisms: government registries, notaries, and courts. In ReebLink, trust is formed differently—through trusted automation implemented in smart contracts, validated by a decentralized network of actors, and accompanied by public transparency of actions.

7.2 Going Beyond Tokenization

Most projects in the Web3 real estate space are limited to the digital representation of fractional ownership and the subsequent trading of such tokens, without guaranteeing their liquidity. Reeblink, by contrast, eliminates the need for multi-series tokenization, focusing instead on a single network token (REBL), which reflects participation in distributed ownership across all network assets rather than in a specific property.

7.3 Scalability and Legal Legitimacy

A key challenge for any decentralized network working with physical assets is ensuring legal compatibility with regulatory regimes of various jurisdictions. In the Reeblink architecture, this challenge is addressed through the use of the DAO LLC format, registered in jurisdictions that recognize digital forms of entity governance (in particular, Wyoming and Delaware in the United States). However, the architecture is not limited to individual DAO LLCs. The use of the DAO Series LLC model, where a single master structure can generate independent legal “series,” each of which holds title to a separate asset, enables two types of scalability: - Vertical scalability: through multiple series within a single DAO Series LLC, each serving a specific real estate object under a common jurisdiction. - Horizontal scalability: through parallel DAO Series LLCs operating in different countries, regions, or cities, yet integrated into the unified Reeblink protocol with shared rules for issuance, distribution, and governance. This architecture provides structural flexibility, allowing legal wrappers to be adapted to local regulatory features without violating the integrity of the network’s protocol logic. This makes decentralized deployment of Reeblink possible on a global scale—while preserving legal legitimacy, modularity, and protocol compatibility.

8. Limitations of the Model and Ethical Considerations

Despite the architectural goal—to create a transparent, scalable, and autonomous system of ownership of physical assets—the proposed model of a decentralized ownership network faces several limitations that require further theoretical reflection, regulatory clarification, and careful implementation.

8.1 Digital Inequality

One structural risk remains the digital divide: access to digital mechanisms of property ownership may be limited for population groups with low digital literacy, lack of internet infrastructure, or limited ability to store digital assets. This poses a threat of replicating existing inequality instead of overcoming it. However, the Reeblink architecture proposes an integrated Reeblink Academy—an educational platform in game format, where users go through training and receive rewards for mastering basic skills. This model, primarily targeting a younger audience, potentially lowers the entry threshold and not only helps reduce the digital divide but also facilitates viral user engagement in the network.

8.2 Regulatory Conflicts

DAOs and their associated forms of digital ownership remain outside full legal codification in many jurisdictions. The use of DAO LLCs and NFTs as interfaces for asset management requires recognition under both private and public law. There is a risk of conflict between digital structures and local registration systems, especially in countries with traditionalist approaches to property. The Reeblink model utilizes DAO LLCs—legally recognized structures in the state of Wyoming (USA)—as title holders of assets. This ensures legal stability at the point of network deployment. Additionally, the architecture considers that most target jurisdictions recognize foreign ownership rights in real estate. Thus, the model is pre-adapted for transnational legitimacy.

8.3 Legal Protection and Enforcement of Rights

Mechanisms for legal protection and enforcement of rights within the network are still in a state of normative uncertainty. In cases of disputes between tenants, token holders, and the DAO LLC manager, it may be necessary to resort to traditional legal protections, particularly in cross-border situations. The Reeblink model minimizes these risks by relying on familiar legal forms of contractual relationships and obligations between parties. Simultaneously, the protocol architecture provides irreversible digital recording of all key legal and economic events—from title transfers to algorithmic income distribution.

8.4 Algorithmic Distortions

Decisions within the DAO, token issuance, and asset management depend on algorithms, which may be subject to distortions—at the

level of input data, asset valuation, oracle functioning, or smart contract execution. This creates risks of inaccurate asset capitalization, uneven income distribution, or even potential manipulation. 8.5 Ethical Aspects of Automation Delegating key decisions—about ownership, management, and income—to automated protocols calls for ethical reflection. Questions arise concerning algorithmic transparency, accountability, human participation in decision-making processes, and the admissibility of fully removing intermediaries from legal relationships.

The identified limitations do not reduce the significance of the Reeblink architecture; on the contrary—they underscore the need for its inclusive, modular, and multi-layered development. In the process of implementing the model, deeper research is required on mechanisms for: - mitigating digital inequality; - harmonizing with local legal regimes; - integrating mechanisms of digital and traditional legal protection. This ensures not only the functional applicability of the protocol but also its resilience in conditions of legal and social diversity.

9. References

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