

How permissionless blockchains are evolving for regulated finance

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Aligning transparency, governance and compliance

Public blockchains like Ethereum, XRP Ledger and Solana are increasingly being considered as foundational infrastructure for the future of financial services, from modernising payments to asset management and settlement. Permissionless blockchains – open networks where anyone can validate transactions or build applications – offer important advantages [for financial institutions](#). They are borderless, provide greater liquidity and transparency, and can foster innovation with a more diverse range of developers compared to private ledgers.

Yet, their open nature has attracted regulatory scrutiny. Concerns around anonymous validators, unclear governance, probabilistic settlement and high energy consumption threaten their integration into the regulated financial system. While these concerns apply to certain networks, permissionless ledgers vary considerably in their design, and some are evolving specifically to meet institutional requirements and regulatory expectations. This article examines the XRPL as a case study, since this ledger is purpose-built for use by financial institutions.

Validator transparency and choice

A key regulatory concern is the use of unknown validators, which can introduce issues with security and trust. On blockchains where the validators are entirely unknown and earn fees on transactions, there is no way of preventing malicious or sanctioned entities – North Korean ransomware hackers, for example – from setting up nodes, joining the validator community and earning fees. Regulated financial institutions in particular may not be able to rely on unknown validators due to compliance requirements.

Some permissionless blockchains do not have this problem. On the XRPL for example, users choose their validators from a recommended [unique node list](#), which prioritises a track record of reliable performance and to achieve a diversity of users, including universities, developers and industry.

The identities of these validators are known, and unlike other blockchains, they do not receive fees or other rewards for validation, so validators' incentives are aligned with the integrity of the blockchain.

Another potential issue with some permissionless blockchains is the problem of '[maximal extractable value](#)', where miners can make profit by reordering transactions in a block. This can allow validators to front-run transactions and worsen the outcomes for end users. This problem only occurs on blockchains where validators can reorder transactions.

Clear governance and transparency

The decentralised nature of governance at many public blockchains is another issue for regulators. More precisely, regulators are concerned that decision-making processes covering, for example, code changes or addressing problems, may not be robust or clear enough, which could make their oversight more difficult. Regulators often express the concern that their usual handles of accountability do not exist for permissionless blockchains, where boards and executives do not have the same level of control as at traditional companies.

But this is not applicable to every blockchain. Some blockchains have a governance structure anchored in legal recognition. XRPL, for example, is governed by an independent foundation operating under French law. In this setup, while the ledger's decentralised nature is maintained, there is a clear process for decisions to be reached by participants and full transparency about how those decisions are reached.

This offers regulatory oversight bodies a clearer framework for understanding how decisions are made – a critical consideration for institutional adoption.

Settlement finality

The point at which a transaction cannot be reversed or unwound is referred to as settlement finality. Some public chains rely on probabilistic settlement, where

transactions are only considered ‘final’ after multiple block confirmations and even then, may be reversed in exceptional circumstances.

Regulated financial systems may prefer a different approach, where transactions can be settled finally and are not subject to reversal in case a blockchain forks. This is known as deterministic settlement. Technical finality, which is supported by XRPL’s consensus mechanism, provides stronger assurances for financial institutions. Note that legal finality still depends on national laws recognising transactions on decentralised ledgers.

Low energy usage

Public, permissionless blockchains are often condemned for the energy-intensive process of mining. This is a consequence of certain consensus mechanisms, especially the proof-of-work model used for cryptocurrencies like Bitcoin and Dogecoin. However, some blockchains, including XRPL, make use of consensus mechanisms that do not require mining, making them significantly [less energy-intensive](#). XRPL uses a unique consensus protocol that depends on a majority of validators to record and verify transactions. XRPL’s carbon footprint is minimal and further offset through the EW Zero initiative, which enables blockchain networks to match their energy use with verified renewable energy sources.

Permissioning features to support compliance

Regulators tend to worry that permissionless networks will mean a lack of control for participants which is incompatible with the standards of regulated finance. This is a misunderstanding. Some permissionless networks incorporate permissioned elements that enable compliance features required for institutional use cases.

In the case of XRPL, there are token-level controls where token issuers can set up an [authorised trust line](#), restricting token transfers to approved or ‘whitelisted’ accounts. Another feature includes account-level permissioning, where the account owner can control which other accounts can interact with them. For instance, features like [deposit authorisation](#) enables users to block unwanted transactions from strangers. There are also protocol-level controls, such as [permissioned domains](#) which limit access to accounts that meet predefined criteria – for example, based on a verifiable credential issued after know-your-customer onboarding.

A blockchain perfectly suited for institutional use

A host of other features make XRPL well suited to institutional use. Users can establish verifiable identities without relying on centralised intermediaries due to the ledger's [decentralised identifiers](#). It also allows token issuers to [freeze](#) or [claw back](#) tokens where legally necessary, and there are tools (known as [escrow](#) and [check](#)) which make transactions conditional on given requirements.

These features enable secure, compliant use of decentralised infrastructure while preserving the benefits of public networks. Still, XRPL continues to evolve new functionalities to support institutional use cases – as set out in a recent [update](#).

As public blockchains develop, they have a growing role in regulated financial activity – provided their design supports transparency, governance and security. The XRL Ledger demonstrates how a permissionless network can align with these institutional requirements, offering a credible foundation for scaling tokenised assets, real-time payments and digital asset innovation – today and into the future.

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