

Better Plumbing for Crypto Derivatives

Atomic Settlement and
On-Chain Collateral



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Executive Summary

Crypto derivatives have scaled on narrow product sets and brittle post-trade processes. As a result, perpetuals now dominate activity, while options continue to grow, but overall these remain concentrated as liquidity thins during stress.

The ultimate challenge to this growth lies in the plumbing, with unsecured exposure between trade and settlement, slow collateral movements, and limited portability across venues all creating shaky foundations. Atomic settlement attempts to tackle these weaknesses by removing unsecured windows, tying position creation and margin transfer to a single, deterministic outcome. On-chain collateral management codifies eligibility, haircuts, and substitutions so collateral can move at the speed of price with auditability and selective disclosure.

Canton is an attractive environment to test and scale these mechanics because it already carries tokenized collateral workflows in production, with permissioned privacy and deterministic execution. This presents the opportunity to compress exposure windows, lower fail rates, increase collateral velocity, and reduce funding drag. If those metrics move, spreads tighten, depth improves, and more products can come to market.

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ABOUT  **Kaiko** Research

As an independent and trusted voice in the cryptocurrency market, Kaiko Research offers critical insight into the world of digital assets. Powered by proprietary industry-leading Kaiko data, our analysts offer unique, deep, and considered responses to market trends and events. By interrogating accurate, real-time data and contextualising market developments as they happen, we decode the complexities of the industry, offering nuanced, data-led analysis that goes beyond simple news reporting, and helps you stay one step ahead.

Introduction

Crypto derivatives grew by optimizing the front end and tolerating frictions at the back end. In this narrative, perpetuals won because they aligned with 24/7 trading and hid settlement behind funding rate mechanics. Options then followed on a few venues and select key underliers. This worked until volatility hit. Then we saw order books thin, liquidations stack, and collateral arrive late. The same pattern shows up in every shock you've covered: pricing gaps widen, top-of-book size shrinks, and the market sells what it can fund, not what it wants to hold.

The challenge here is the capital stuck in transit. With margins updating fast, and collateral remaining static. Stablecoins act like cash until the market tests them or redemption frictions appear as they did during the U.S. regional banking crisis in March 2023. Custody and deposits are safe and slow. While prime brokerage and custody models help, they batch and coordinate by message. When windows are short, that shows up in wider spreads, smaller size at 1% depth. Market makers run lighter. Basis trades de-risk. Options wings go thin because funding the book is the hard part, not the pricing.

The fix is upgrading the plumbing. With atomic settlement position creation tied to margin posting, unsecured windows close. In this scenario, on-chain collateral turns eligibility, haircuts, and substitutions into code, so collateral then moves at the speed of price with an audit trail and selective disclosure. To trial this approach, a permissioned network that already runs tokenized collateral at scale offers the best opportunity, and this is where Canton fits perfectly. The test is simple, measurable and can be quantified in a few key questions:

- Do exposure windows shrink?
- Do fail rates fall?
- Does collateral velocity rise?
- Does funding drag drop for a representative book?

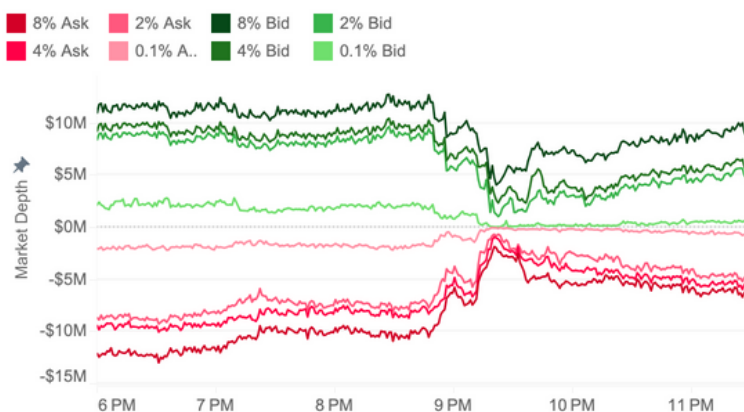
If the numbers associated with these answers move, then depth should hold longer in stress, spreads should tighten, and more products can list beyond perpetuals.

The Problem

We see the pattern repeat in every shock. As venue pauses turn into forced liquidations, collateral sits in the wrong place, and margin calls arrive before the rails can move. Below we take a look at where the system breaks and why it matters for spreads, depth, and product breadth.

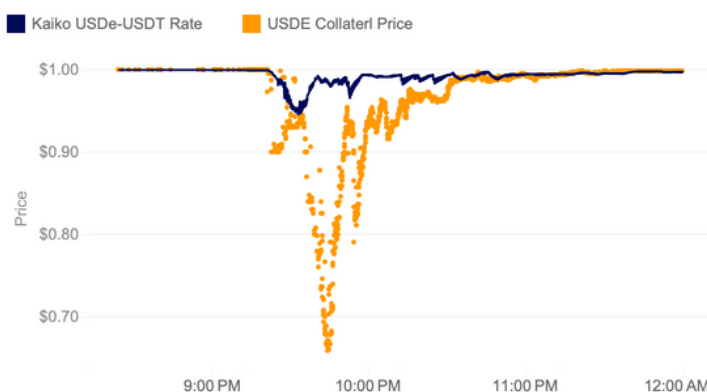
Crypto derivatives suffer from repeatable points of failure. Centralized venues often pause when risk controls trip, or liquidity providers simply step back as they did on October 10, which prevents traders from opening or closing positions at the moments they most need to act. Therefore collateral ends up stuck in silos, and while assets held with custodians are safe, these are slow to mobilize. While margin processes compute frequently, they rely on wires and messages to settle, which forces traders to hold buffers and primes to extend credit. As a result, cross-venue offsets are rare because contract specifications and risk engines are siloed. During stress this is particularly notable, as order books thin and liquidations cascade, not only because prices move, but because collateral cannot move fast enough to keep portfolios balanced.

Crypto's Liquidity Problem Exposed on October 10



Market Makers stepped back during the crash on October 10, exacerbating the market move. This liquidity vacuum began with blue-chip assets and later affected the whole market, causing issues with derivatives on certain venues.

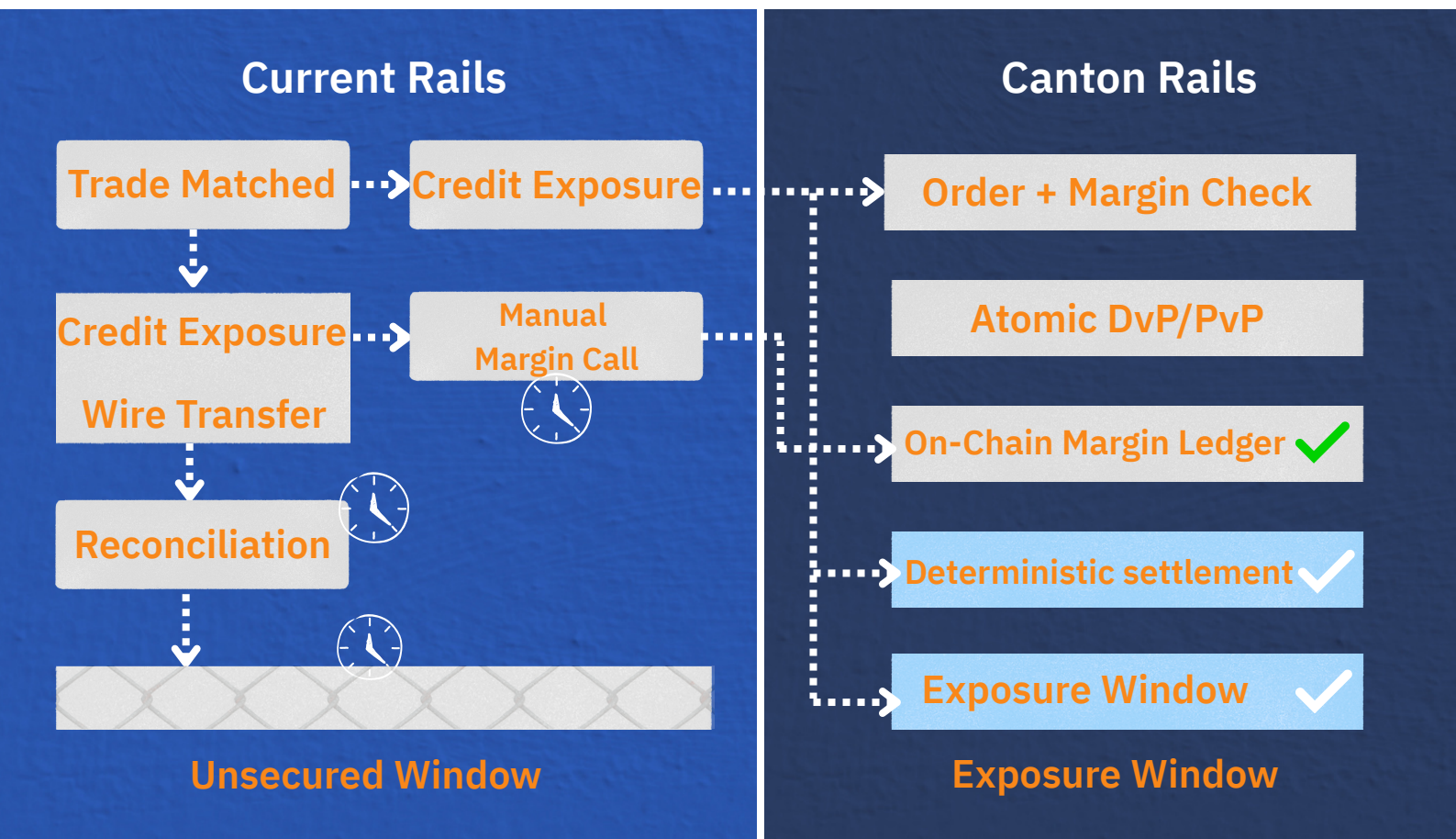
Collateral Mispricing Exacerbated Market Tumult



Ethena's USDe was being used as collateral on Binance, and prices on its own market. As the price of USDe on this venue dislocated to around \$0.64 the value of collateral posted for perpetual futures positions led to forced liquidations. But the broader market never declined below \$0.95 cents, based on Kaiko Indices rates.

How Atomic Settlement Fits In

Atomic settlement synchronizes delivery and payment so that either all legs settle together, or none do. In derivatives, that means a matched trade becomes a position only if the margin claim that trade creates is satisfied, and variation margin movements occur alongside the state update that reflects receipt. This removes unsecured exposure between the moment of agreement and the moment of collateralization, and prevents one-sided payments that the system fails to reflect. Achieving this across institutions requires a coordination layer that encodes rights and obligations, supports selective disclosure, and guarantees deterministic outcomes. Canton provides this using Daml contracts and synchronizers that coordinate state updates across applications while minimizing data leakage.



What On-Chain Collateral Management Changes

Collateral management consists of rules and actions. Rules define eligibility, haircuts, concentration limits, and triggers. Actions include pledges, releases, substitutions, and recalls. By moving both on-chain, margin becomes programmable and auditable. But, in practice, how does this work? A price change or position update creates a margin claim as an enforceable object. The claim is satisfied by pledging eligible collateral. If a pledge is late or insufficient, the system enforces consequences without manual intervention. In this ecosystem, substitutions become routine, allowing desks to swap between stablecoins or move into tokenized cash quickly when risk shifts. Selective disclosure lets venues verify that calls are met and regulators audit timeliness without exposing full portfolios.

Sizing the Opportunity

The opportunity should be quantified with operational metrics that link to capital and liquidity. Time from trade to margin claim, and from claim, to pledge, expands during stress and drives potential future exposure. By compressing that window, initial margin add-ons and variation margin slippage are reduced, while fail rates on transfers lower costs and disputes, for example repo markets on tokenized rails show fail reductions when obligations are explicit and settlement is atomic. Collateral velocity measures how often eligible assets are cycled through process. When there's higher velocity this increases the amount of trading that a pool can support. Funding drag reflects buffers held to ensure margin calls can be met in time. Faster, predictable claims shrink buffers and enable great capital mobility, allowing it to return to quoting and inventory. Product breadth, such as longer-dated futures and deeper options wings, should then rise as post-trade reliability improves.

Stablecoins, Eligibility, and Substitution

Stablecoins are the near-cash leg for margin and settlement. They are not interchangeable. Reserve quality, redemption mechanics, and policy choices create differences that notably show up in stress. A credible margin system must set explicit eligibility lists, apply haircuts that reflect observable conditions, and adjust those haircuts when market signals move. It should also support tokenized deposits and other settlement cash as they mature. The critical feature that all this requires is fast substitution, so a desk can move out of a weakening instrument without delay. This is not about endorsing one coin, but turning risk management into code that executes when needed.

Cross-Margining as a Sequenced Path

Successful cross margin requires shared risk models and governance. The path to this goal is incremental. First of all, to make first progress, offsets within a venue must be made explicit in the same contracts that manage margin and settlement, in order to get clean audit trails. Next, collateral must be made portable across venues that accept the same tokens, aligning on eligibility and identity. Only then can pilot cross-venue margin offsets be trialled, typically for a narrow product set with clear relationships, such as BTC perpetuals and monthly futures. From here, outcomes must be measured and programmes expand based on the data. The ultimate goal is to remove artificial barriers without relaxing true risk controls.

Case Studies and Counterparties

- Copper's ClearLoop reduces exchange credit risk by segregating custody and enabling off-exchange settlement. This represents a step forward. For derivatives, the question is whether batch netting and delayed collateral updates scale during stress. By expressing custody-net exposures as on-chain claims for initial and variation, margins shorten unsecured windows and enable rapid substitutions under shared eligibility rules.
- Hidden Road and similar primes net exposures and fund margin across venues. Atomic payment versus payment (PvP) and enforceable claims reduce unsecured exposure during venue transfers and increase intraday collateral recycling.
- Cleartoken's clearinghouse ambitions align with a permissioned network that encodes novation, default waterfalls, and porting with selective disclosure. This should improve speed and certainty during member defaults, when fast collateral transfer matters most.
- AsiaNext's focus on capital efficiency fits the thesis. The near-term win is to bridge prime-held assets and eligible stablecoins into venue-grade margin systems that move with trades, not to tokenize everything at once. Market makers like DRW only stand to benefit from fills that become positions when margin posts, and from real-time substitutions, which supports tighter spreads and larger displayed size during stress.

Going from Pilots to Production

Risk, Capital, and Measurement

For regulated firms, the benefits map to SA-CCR and SIMM through shorter unsecured windows and stronger settlement finality. The right way to make the case is with before and after exposure profiles for representative portfolios along identical price paths, where the only change is the speed and determinism of margin claims and pledges. If potential future exposure shrinks, risk-weighted assets and funding costs follow. Operational risk capital also falls with lower fail rates and better audit trails. These are empirical claims that require data, not assumptions.

Implementation and Governance

Escrow contracts for margin should ensure that positions are created only when claims and pledges match. Oracles that trigger claims must be governed and redundant. Synchronizers that manage updates need resilience so coordination does not become a new single point of failure. Documentation should align with ISDA standards and the Common Domain Model so legal certainty matches operational behavior. Governance must be clear on eligibility, haircut adjustments, and dispute resolution. None of this requires public broadcasts of sensitive data, just a verifiable state shared only with those who need to see it.

Next Steps and Tests

Start with a narrow pilot. Select BTC and ETH derivatives across two or three venues and a prime. Encode margin rules and eligibility for two stablecoins and one tokenized cash instrument. Measure time from trade to claim, and from claim to pledge under normal and high volatility. Track fail rates, collateral velocity, and the effect on funding costs for a test book. Publish methodology and results. If exposure windows compress and funding drag falls, expand scope. If bottlenecks appear, address whether they are technical, operational, or governance issues and iterate.

Conclusion

Crypto derivatives have outgrown their post-trade rails. The market has patched gaps with custody-net models and primes, but unsecured exposure, slow collateral, and siloed risk engines still dictate how deep order books are and which products can launch. Atomic settlement and on-chain collateral management provide a practical way to cut unsecured windows, mobilize collateral at the speed of price, and give institutions verifiable settlement without sacrificing privacy.

Canton is a credible network to run these programmes because it already supports tokenized collateral workflows with deterministic execution and selective disclosure. The case is not about promises. It is about whether measurable metrics move.

If time to pledge falls, if fail rates decline, if collateral velocity rises, spreads should tighten and depth should hold during stress. That is the path to a broader, more resilient derivatives market.

Disclosure

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