

# WickGuard: Problem & Solution Brief

Pre-Emptive Liquidation Protection via Ephemeral Rollups

## 1 Problem Statement: The L1 Adversarial Trap

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On high-throughput blockchains like Solana, DeFi borrowers operate in a hostile environment where maintaining solvency is a probabilistic race against sophisticated actors.

- 1. The Latency Asymmetry:** Liquidators utilize co-located infrastructure (Geyser plugins) and block-building privileges (Jito bundles) to detect health factor decay and execute liquidations in the same block. A standard user attempting to rescue their position is strictly slower than these actors.
- 2. The Failure of Reactive Control:** Automated defense systems on Layer 1 (L1) often employ Proportional-Integral (PI) controllers to manage debt. However, they are forced to disable the **Derivative (D)** term due to L1 network jitter and congestion. Without the *D* term, these controllers cannot predictively react to the *rate of change* of a crash, leaving positions vulnerable to volatility.
- 3. The MEV Constraint:** Even if a user's rescue transaction is broadcast, it enters a public mempool (or public state processing pipeline). This exposes the transaction to front-running, sandwich attacks, and censorship by profit-seeking validators.

## 2 Solution: The Safety Zone

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WickGuard decouples position management from L1 volatility by migrating the user's state to an isolated execution environment.

- 1. Ephemeral Delegation (The "Visa" Logic):** WickGuard utilizes MagicBlock Ephemeral Rollups to bridge the user's account to a temporary Layer 2 (L2).
  - **Mechanism:** The L1 account ownership is transferred to the Delegation Program.
  - **Result:** The L1 account becomes legally "locked." Existing L1 liquidator smart contracts revert immediately because they no longer possess the authority to interact with the delegated account.
- 2. Full PID Control via Low Latency:** The Ephemeral Rollup provides a stable execution environment with  $\sim 10\text{ms}$  latency. This stability allows WickGuard to reintroduce the **Derivative (D)** term into the control loop. The system can now calculate the *velocity* of health decay and execute corrective actions in the "Yellow Zone"—pre-emptively restoring health before the "Red Zone" (liquidation threshold) is ever reached.
- 3. Atomic Rescue & Isolation:** The L2 environment hosts a passive liquidity vault. The rescue operation is a cryptographically signed atomic swap: *Move SOL from User  $\rightarrow$  Vault AND move USDC from Vault  $\rightarrow$  User*. Because the L2 has no public mempool and acts as a private execution shard, external liquidators cannot front-run the trade. To intervene, they would need to bridge assets from L1, a process taking  $> 400\text{ms}$ —orders of magnitude slower than the WickGuard rescue ( $\sim 10\text{ms}$ ).