Deterministic Forced-Sale NFTs as a Primitive for Time-Bound Ownership

Cameron R. Liljedahl

Independent Research

December 2025

Problem

Most digital asset ownership relies on negotiated transfers. Even when ownership is clearly defined, the current holder can refuse a sale. That refusal introduces discretion, delay, and strategic behavior. For systems where timing matters, this ambiguity introduces market failures.

Blockchains reduce discretion around ownership verification but often leave transfer rules incomplete. Pricing, timing, and transfer conditions are frequently left to off-chain coordination. When real economic value is introduced, this discretion creates inconsistent enforcement and unclear outcomes.

Mechanism

This demo implements a forced-sale NFT mechanism with deterministic pricing and a fixed activity window. During the active period, ownership can change at any time, but only under explicit on-chain rules.

At any moment, there is exactly one required takeover price. Any party may acquire the asset by paying that price. The current holder cannot refuse the transfer. Pricing follows a predefined, step-based schedule fixed at deployment, which guarantees that the exact takeover price is known in advance at every point in time. All payments and ownership changes are enforced directly by the smart contract.

Once the activity window expires, the contract freezes. User-initiated transfers revert permanently, preventing ownership from being renegotiated or reinterpreted after the window closes.

Guarantees

The mechanism provides guarantees that hold regardless of participant behavior:

- Ownership transfers cannot be blocked by the current holder.
- The exact takeover price at any moment is determined by on-chain rules.
- Pricing and timing rules are fixed at deployment and not subject to discretion.
- ETH payments and ownership transitions are fully observable on-chain.
- After expiry, ownership state is permanently frozen.

These guarantees are properties of the system itself, not assumptions about trust or incentives.

Why It Matters

This mechanism treats ownership as a rule-governed process rather than a negotiated one. That distinction matters for assets where access or control is intended to change over time.

By enforcing transfer conditions mechanically, the system removes ambiguity around when ownership can change and at what cost. This makes it possible to design assets where timing, rotation, or limited access are central to how value is created and used.