

Weave

A Protocol for Composable Risk and Funded Exits

Abstract

We present Weave, a proposed protocol for constructing asset baskets, issuing claims of different seniority, and trading independently funded rights to exit those claims. The protocol separates three decisions that are commonly bundled together: which assets to hold, how their gains and losses are allocated, and under what conditions a position can be sold. Creators specify a portfolio and its governing rules; investors select an exposure; market makers and exit providers supply distinct forms of liquidity.

A basket is represented by an isolated vault and a published mandate. Its tranches divide the value available to investors according to a deterministic payment waterfall. An exit right is a physically settled option whose purchase obligation is reserved in a separate escrow. Exercise transfers eligible tranche tokens to the provider and settlement assets to the holder without withdrawing capital from the basket.

We describe a reference model with senior and junior claims, fully collateralized exit contracts, Uniswap v4 trading pools, and an authoritative accounting domain for cross-chain distribution. We derive the accounting conditions required to prevent double allocation of assets and distinguish contractual exit capacity from market liquidity.

Document scope

This paper specifies the proposed economic objects, accounting rules, and settlement architecture of Weave. It describes a protocol design rather than an operating or audited system. Examples illustrate mechanics; they are not forecasts or quoted market terms.

Reading guide

Sections 1 and 2 introduce the design. Sections 3 and 4 define basket accounting and exit contracts. Sections 5 and 6 describe trading and cross-chain access. Sections 7 and 8 examine security, incentives, and implementation. Section 9 concludes.

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1 Introduction

A token can make ownership transferable without making the underlying claim liquid. A portfolio can generate income while exposing all its investors to the same sequence of losses. An investor may therefore agree with a portfolio's asset selection but reject either its loss profile or its withdrawal conditions. These are separate economic preferences, and they need not be served by the same counterparty.

Weave proposes a common framework for expressing those preferences. A creator assembles assets into a basket and specifies how the basket is managed. Tranche contracts allocate its value between claims with different priorities. Trading venues provide current exchange prices. Independent providers may additionally commit settlement capital against an investor's right to sell a defined position at a specified price before expiry.

The central design choice is to keep these obligations separate. Junior capital supports the basket's senior claims. Market-making inventory supports current quotes. Exit collateral supports issued purchase commitments. None of these balances is treated as a substitute for the others. This separation makes it possible to combine products without obscuring which participant bears each risk.

The intended application is a financial creation marketplace. Users can publish portfolios, choose supported tranche structures, and organize markets around the resulting claims. Others can acquire those exposures, provide trading inventory, or quote exit commitments. A new basket may be a remix of an existing strategy, but it has its own identity, assets, and obligations. Creating a product does not establish its quality or ensure demand for its tokens.

The components have precedents. Tokenized vault interfaces standardize access to managed assets [1, 2]; Uniswap v4 allows pool-specific trading logic [3]; Centrifuge supports multichain pools and share classes [4]; Royco describes senior, junior, and liquidity-provider tranches [5]; and Pendle separates principal and yield [6]. Weave's proposed contribution is a shared lifecycle for creator-defined baskets, prioritized claims, and independently funded exit options. It does not claim that these underlying mechanisms are new.

2 Economic objects

2.1 Baskets and mandates

A basket is an isolated portfolio governed by a mandate. The mandate specifies its denomination asset, admissible holdings, allocation limits, valuation procedure, fees, management authority, and settlement rules. It also identifies the contracts through which assets are held and the external parties on which their rights depend. A single-asset product is a basket with one holding.

The asset interface must distinguish quantities held, reported value, and immediately realizable value. A lending position, a staking receipt, and a tokenized credit claim can have different redemption processes even if all implement a familiar token interface. Adapters expose these differences to the basket rather than hiding them behind a single balance figure.

A fixed basket has no discretionary reallocation beyond stated maintenance operations. A managed basket permits changes within published limits. Those limits should capture shared

issuers, borrowers, collateral, and settlement dependencies as well as individual token weights. Holding several tokens does not necessarily diversify the underlying exposure.

2.2 Tranches and ownership

A tranche is a claim on basket value with a defined priority. In the reference construction, senior holders receive value up to an accrued claim ceiling before junior holders receive the residual. Junior investors consequently absorb initial shortfalls and retain the remaining upside. Seniority changes the allocation of outcomes; it does not establish that the underlying portfolio is low risk.

Tranche units identify both the basket and its issuance series. Their supply and ownership are tracked independently of the assets held by the vault. A secondary transfer changes the owner of a claim. A primary redemption extinguishes a claim and removes value from the basket. This distinction is fundamental to both capital protection and cross-chain accounting.

2.3 Exit rights and market liquidity

An exit right gives its holder an option to deliver eligible tranche units and receive a specified amount of a settlement asset. The provider reserves the purchase funds when the right is issued. The contract does not require proof of a hack, depeg, or other adverse event. Its trigger is valid exercise by the holder within the agreed window.

An automated market maker instead provides an executable quote from its current inventory and pricing rules. That quote may change or disappear as inventory is withdrawn. An exit commitment is limited by its remaining quantity and expiry, but cannot be cancelled unilaterally after issuance. The two mechanisms serve different purposes and can operate alongside each other.

3 Basket accounting

3.1 Valuation and available capital

All accounting is expressed in the basket's denomination asset. Let $h_i(t)$ be the recognized quantity of holding i , $p_i(t)$ its approved unit valuation, and $L(t)$ the liabilities and expenses ranked ahead of tranche holders. Before allocations, the distributable accounting value is

$$V(t) = \max \{ \sum_i h_i(t)p_i(t) - L(t), 0 \}. \quad (1)$$

The zero floor expresses the limited value distributable to investors; it does not discharge liabilities or authorize continued operation of an insolvent portfolio. Such a basket enters its specified wind-down procedure. At final settlement, reported marks are replaced by realized net proceeds, or by an explicitly permitted in-kind distribution valued under the mandate.

For each valuation source, the mandate defines freshness, update authority, dispute handling, and impairment treatment. If an acceptable value is unavailable, affected issuance and redemption pricing must stop. A trading discount alone does not establish an impairment, and an unchanged reported value does not establish that an asset remains sound. Accounting value and executable market price must be displayed separately.

3.2 The reference waterfall

Consider a term series with initial senior capital S_0 , initial junior capital J_0 , a non-negative annual simple senior accrual rate r , and maturity T . Time t is measured in years from activation. The reference series accumulates returns rather than paying interim distributions. Before any claim retirement, its senior ceiling is

$$C(t) = S_0 (1 + r \min \{t, T\}). \quad (2)$$

The allocations to senior and junior holders are respectively

$$A_S(t) = \min \{V(t), C(t)\}, A_J(t) = \max \{V(t) - C(t), 0\}. \quad (3)$$

Thus $A_S(t) + A_J(t) = V(t)$. Value is allocated once. The senior ceiling is a priority rule, not a promise that the basket can pay it. If available value falls below the ceiling, the junior allocation is zero and senior holders bear the remaining shortfall. Subsequent recoveries restore senior value up to the ceiling before producing a junior residual.

Before maturity, these allocations are book values. They are not a valuation model for tradable securities: market prices may reflect discounting, expected recoveries, future management decisions, and liquidity. The protocol must not force an automated market maker to trade at the reported book value.

A general template can extend the waterfall to several ordered claims. For claim ceilings C_1 through C_n , allocation k is the smaller of its ceiling and the positive value remaining after higher-priority allocations. Any residual belongs to an explicitly identified equity claim. The reference implementation uses two tranches to make the initial accounting and settlement rules tractable.

3.3 Issuance and withdrawal

The reference series collects subscriptions in escrow and activates only when its funding conditions are met. Capital that has not settled cannot support issuance. If activation fails by the subscription deadline, participants can reclaim their contributions. Once active, the series is closed to new subscriptions; fresh capital enters a separate series. This avoids introducing unspecified dilution or recovery rules into an existing waterfall.

Primary redemptions occur only at windows authorized by the mandate. Requests remain economic claims on the basket until they are priced and fulfilled; submitting a request does not fix a stale withdrawal price. Each processing epoch first updates valuation, then calculates eligible amounts under common rules, allocates available liquidity, and finally burns fulfilled units as assets are paid. Unfilled quantities remain exposed to the basket.

A senior redemption retires its share of the senior claim ceiling and future accrual. A junior redemption removes residual capital and must pass a post-payment coverage check. One monitoring measure is the ratio of the junior allocation to positive basket value, $A_J(t)/V(t)$. Required thresholds must be calibrated to concentration, stress losses, and redemption costs; there is no universal safe ratio. Invalid or stale marks cannot justify a withdrawal merely because this ratio appears satisfactory.

The zero-value junior tranche retains any recovery rights defined by its series. Recapitalization requires an explicit mechanism that respects those rights. Cross-basket guarantees, recursive tranching, and borrowing against the same protection capital are outside the reference model.

3.4 A worked example

Suppose a one-year basket receives 1,000,000 USDC, with 700,000 senior units and 300,000 junior units initially subscribed at one USDC each. A 5% senior accrual rate produces a final ceiling of 735,000 USDC. With no interim flows, the following allocations result. Values are net of basket expenses and denominated in USDC; no dollar peg is assumed.

Net basket value	Senior allocation	Junior allocation
1,120,000	735,000	385,000
1,000,000	735,000	265,000
800,000	735,000	65,000
600,000	600,000	0

An unchanged basket value still reduces junior capital from 300,000 to 265,000 USDC because the senior claim has accrued. Junior exposure therefore finances the contractual priority of senior investors, including when asset income is insufficient to meet the accrual. This effect must be visible in product simulations.

4 Funded exit contracts

4.1 Terms and collateral

An exit contract identifies the eligible delivery token, its basket and series, a settlement token, remaining quantity q , strike K , expiry τ , and any transfer restrictions. Quantity is measured in delivery-token units and strike in settlement-token units per delivery unit. The provider's premium is agreed at issuance; it is separate from the funds reserved for exercise.

Ignoring token precision for the moment, a live commitment requires reserved collateral R satisfying

$$R \geq qK. \quad (4)$$

For a pool of commitments, this requirement applies to the sum of all unexercised obligations, not an estimate of how many holders will exercise. The reference design does not net unrelated rights or lend reserved collateral. A single balance cannot simultaneously back basket claims, trading inventory, and exit obligations.

A quote is not a funded right. Acceptance atomically validates the offer, receives or reserves the provider's collateral, transfers the premium, and creates the holder's entitlement. Offers contain nonces, chain and contract identifiers, quantity limits, and deadlines to prevent replay or overfilling. An unaccepted offer may be withdrawn; an issued commitment cannot be cancelled by its provider.

4.2 Exercise and expiry

The reference right is exercisable from issuance until the settlement chain's timestamp reaches τ . The holder specifies an exercise quantity x no greater than the remaining q . Settlement verifies ownership and eligibility, takes the delivery asset, transfers xK settlement units, and consumes x units of the right. If any required step fails, the entire transaction reverts. The basket vault is not redeemed by this operation.

$$(q, R) \rightarrow (q - x, R - xK), 0 < x \leq q, t < \tau. \quad (5)$$

An implementation uses integer token units with an explicit strike scale. Reservations round up and individual payouts round down. The remaining reserve must still cover the worst valid exercise of all remaining units; any rounding surplus is released only when it cannot secure a further obligation. Balance-delta checks and restricted adapters are required for tokens whose transfer behaviour differs from the nominal amount.

At or after expiry, exercise is rejected and unneeded reserved capital is released. The reference contract does not extend expiry automatically after a chain outage: it cannot reliably distinguish an outage from a holder's failure to submit. This exposes holders to execution availability risk and providers to a precisely bounded commitment. Any alternative grace-period design requires a separate contract template.

A right can transfer to another eligible holder if its terms permit. Continuous ownership of the delivery token is unnecessary, but the exercising holder must supply it. The contract is therefore an option rather than indemnity for a demonstrated personal loss. Acquiring the same exposure elsewhere does not change the quantity that can be exercised.

4.3 Interaction with tranche ownership

Exercise transfers ownership of the tranche units to the provider. It does not create new units, replenish junior coverage, or withdraw assets from the basket. A provider receiving junior units inherits their losses and recovery rights. This is why exit collateral must remain external to the portfolio whose exposure it supports.

The reference delivery instrument accumulates returns and does not rebase. Its units continue to represent the same series until retirement. Distributions, migrations, token splits, or early termination require predetermined adjustments or must be excluded while associated rights remain outstanding. A normal maturity schedule places exit expiry before the delivery instrument is retired. A basket manager cannot change the delivery asset unilaterally.

Ownership restrictions must be compatible with the full exercise path, including the escrow and receiving provider. A frozen token may be undeliverable even when purchase funds exist. Fully funded settlement removes a need to find fresh purchase capital; it does not remove token controls, contract vulnerabilities, or chain availability assumptions.

4.4 Holder and provider economics

A holder of 10,000 junior units could purchase an exit strike of 0.80 USDC per unit for an illustrative 400 USDC premium. The provider reserves 8,000 USDC. If an executable market quote falls to 0.50 USDC while exercise is available, the holder can deliver the units for 8,000 USDC. Against a 10,000 USDC subscription and the premium, the net loss is 2,400 USDC before transaction costs. The provider receives the units and bears their later outcome.

If the right expires unused and the basket realizes the first outcome in the preceding example, those units receive approximately 12,833 USDC. Net of the premium and subscription, the holder gains approximately 2,433 USDC. The provider retains the premium and recovers its reserved funds. If instead delivered units become worthless, the provider's asset loss is the 8,000 USDC payment, offset by the premium.

These figures illustrate transfers, not a sustainable quoted price. Premiums must compensate for capital costs, expected losses, adverse selection, and uncertainty about liquidation or redemption. For an immediately observable asset price p at exercise, intrinsic value is $\max(K - p, 0)$; a transferable right may also have time value. Tranche income and exit payments come from different balance sheets, and protection does not create additional portfolio return.

5 Trading and execution

5.1 Pool behaviour

Weave can use Uniswap v4 pools to trade tranche tokens against a settlement asset. Hooks allow custom logic around pool operations [3]. Proposed applications include bounded dynamic fees, participant eligibility checks, and trading controls when reference information becomes stale. Each pool's hook and administrative powers form part of its disclosed risk profile.

Hooks do not custody the basket's portfolio or borrow the exit escrow's reserves in the reference architecture. A hook can restrict a pool operation, but cannot alone enforce eligibility across every transfer route; restrictions must also be respected by token and settlement contracts. Integration with v4 does not guarantee routing by third-party interfaces or capital from external liquidity providers.

The pool's market price can differ from accounting value for legitimate reasons. A rule that blocks every discounted trade can make an instrument impossible to sell during stress. Pricing controls must therefore specify whether they bound trade size, modify fees, or suspend activity, and under what observable conditions. A stale valuation should not automatically invalidate an otherwise executable fixed-strike exit.

5.2 Routing and market formation

The router compares market quotations with rights the user can actually exercise. It presents proceeds after fees and slippage, the quantity of protection consumed, and any executable resale quote for the right. Maximizing immediate cash alone can destroy remaining option value; exercise must be an authorized economic choice.

A transaction may split a sale between a pool and an exit contract, provided each leg satisfies the user's limits and settles atomically within its domain. A quote obtained on another chain is not treated as local available inventory. Routes that depend on unfinished transfers must disclose that dependency rather than display an unconditional immediate exit.

Market formation benefits from common subscription series, expiry dates, and strike conventions. Permission to create a basket does not imply that every bespoke tranche can sustain a continuous pool. Auctions and request-for-quote markets remain appropriate where

liquidity is sparse. The interface should report executable size and price impact alongside deposited inventory, with incentive spending separated from organic fees.

6 Cross chain architecture

6.1 Authoritative accounting

Each basket has one authoritative accounting domain. The vault, recognized holdings, waterfall, and canonical tranche supply are reconciled there. Distribution contracts on other networks may represent those claims, but do not create an independent entitlement to the same assets. Valuation and liability updates must retain a single order of application.

The principal modules are a template factory, basket vault, asset adapters, valuation service, waterfall accounting, tranche contracts, exit escrows, and routers. Their interfaces should expose the state needed for independent reconciliation. ERC-4626 may be used where its single-underlying-token semantics fit an adapter or entry point [1]. ERC-7540 provides relevant asynchronous request interfaces [2]. Neither standard alone supplies multi-asset accounting or a loss waterfall.

Moving a claim between networks requires an explicit supply invariant. Under a lock-and-mint design, each outstanding remote representation is backed by an equal amount of canonical units held in the corresponding escrow. Under a burn-and-mint design, finalized messages retire supply before replacement supply is recognized. The implementation must choose and verify one accounting model rather than combine incompatible assumptions.

6.2 Settlement boundaries

Cross-chain messages are authenticated, domain-separated, replay-protected, and applied only after the required finality condition. Message identifiers and state transitions must prevent duplicate minting or release. In-flight claims cannot be counted as spendable inventory on both networks. A delayed message changes availability, not the amount of value the protocol is entitled to issue.

The reference exit contract settles on the network containing its collateral and eligible delivery token. A holder on another chain must complete delivery before expiry. Cross-chain access therefore does not imply cross-chain atomic exercise. Interfaces should show the settlement domain and the time needed to reach it, with no guarantee that a transfer begun near expiry will finish in time.

Locally funded rights against remote representations are a possible extension. Their providers would acquire the representation, including its bridge and recovery risks. Supporting such rights requires explicit treatment of representation divergence, frozen routes, and claims that cannot be redeemed on the accounting domain. These risks cannot be removed by presenting all networks through one interface.

7 Security and control

7.1 Accounting invariants

The reference construction depends on four independently testable properties. First, tranche allocations sum to available basket value after specified senior expenses. Second, outstanding representations reconcile to the canonical ownership model. Third, every live exit obligation is fully reserved in its settlement asset. Fourth, exercise, redemption, or transfer cannot consume the same claim twice.

For exact arithmetic, the exercise transition preserves full funding: $R \geq qK$ implies $R - xK \geq (q - x)K$. This is a local accounting observation, not a proof of implementation security. Token precision, fees, reentrancy, abnormal transfers, and administrative paths can violate the assumptions. Property tests and independent review must examine those paths as well as the nominal formulas.

Adversarial scenarios should include all exit rights exercised together, stale or manipulated valuations, correlated portfolio losses, exhausted junior coverage, delayed redemption, duplicate cross-chain messages, and interruption at expiry. A successful stress test cannot rely on new deposits or discretionary rescue capital unless those dependencies are explicit contractual commitments.

7.2 Management and amendments

A basket manager may rebalance only within the mandate. Changes that alter asset eligibility, claim priority, fee limits, or permitted leverage are material. The reference approach deploys a new series for changed economic terms. Where a template permits amendments, notice and consent requirements must reflect actual redemption times rather than assume that every investor can leave immediately.

Governance can approve templates and adapters, manage discovery, and set prospective fees within published bounds. It must not redirect assets reserved for issued exit rights or overwrite their strike and expiry. Emergency permissions should be scoped by module. Stopping new deposits or new rights is distinct from disabling existing holders' settlement paths.

An immutable exit contract cannot be repaired in place if its code is defective. An upgradeable one introduces administrator risk. The reference design favours minimal, independently reviewed exit logic and new deployments for changed terms. This trade-off must be visible to users; a governance label is not a substitute for specifying control over assets.

7.3 External assets and residual risk

Real-world assets require a documented chain of custody and enforceable ownership or claim rights, together with issuer permissions, valuation procedures, and default treatment. A transfer-capable token is insufficient if the receiving contract cannot legally or operationally redeem it. Product availability and derivative classification require assessment for the intended jurisdictions and participants before a market is offered.

Residual risks include loss of the denomination asset's purchasing power, permanent impairment of holdings, compromised administrators, oracle failure, and network unavailability. Junior capital can be exhausted and exit reserves can become inaccessible

through a technical failure. The useful guarantee is a precisely defined and funded obligation under stated assumptions, not universal protection against loss.

8 Implementation and economic viability

8.1 Reference deployment

The initial reference implementation should demonstrate one complete lifecycle: subscription, activation, valuation, secondary transfer, issuance and exercise of an exit right, expiry, and basket settlement. A two-tranche term series provides a concrete baseline without limiting the longer-term creation model. Separate implementations can later support additional waterfalls, distributions, or rolling subscriptions.

Before accepting capital, the contracts require a complete interface specification, invariant testing, economic simulations, and independent security review. Deployment limits should increase only after actual settlement behaviour has been observed. This paper reports no completed implementation, audit, simulation result, or committed launch schedule.

8.2 Incentives and unresolved questions

Creators may charge disclosed management or performance fees; pools earn trading fees; exit providers receive premiums. Protocol charges can apply to administration or settlement, but their base, priority, and recipient must be explicit. Performance fees need defined treatment of prior losses and recoveries. The reference mechanism does not depend on a new protocol token or recurring token subsidies.

Commercial viability requires compatible prices on both sides of each market. Senior returns must remain attractive after the cost of their priority; junior returns must justify residual risk; exit premiums must compensate providers without making protection uneconomic for holders. Collateral cannot be both fully reserved and freely deployed elsewhere, so capital efficiency has a real cost.

Open questions include the pricing of rights against actively managed baskets, the calibration of coverage limits under correlated losses, and the extent to which common terms can concentrate liquidity across creator-defined products. Other extensions require formal treatment of default recovery, early basket termination, and recapitalization. Lending against exit rights or recursively tranching existing claims would introduce feedback effects beyond the present model.

Evaluation should focus on repeat participation, executable depth, redemption completion, provider returns after losses and capital costs, and fees net of incentives. High deposited value alone does not establish a functioning market. A useful result would be sustained demand for both the exposures creators issue and the independently priced commitments surrounding them.

9 Conclusion

Weave proposes a composable market for asset selection, claim priority, and funded exit rights. Its organizing principle is the separation of obligations: baskets hold portfolio assets, tranches allocate their value, trading pools quote exchanges, and exit escrows fund contractual purchases. The reference model shows how these components can interact without counting the same capital more than once.

This architecture gives creators room to construct distinct products while preserving a common language for ownership and settlement. The remaining challenge is to demonstrate that the resulting exposures attract capital at prices that are sustainable for investors, market makers, and exit providers. That requires implementation and evidence, not additional layers of financial promises.

References

- [1] ERC-4626: Tokenized Vaults. <https://eips.ethereum.org/EIPS/eip-4626>
- [2] ERC-7540: Asynchronous ERC-4626 Tokenized Vaults. <https://eips.ethereum.org/EIPS/eip-7540>
- [3] Uniswap. Uniswap v4 Hooks. <https://developers.uniswap.org/docs/protocols/v4/concepts/hooks>
- [4] Centrifuge. Create a pool. <https://docs.centrifuge.io/developer/protocol/guides/create-a-pool/>
- [5] Royco. Royco Day protocol repository. <https://github.com/roycoprotocol/royco-day>
- [6] Pendle. Introduction. <https://docs.pendle.finance/>