

LayerCover

Protocol Litepaper

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Abstract

LayerCover is a fully on-chain parametric cover protocol inspired by the Lloyd's of London marketplace. Professional underwriters (Syndicates) post fixed-rate quotes to a competitive orderbook; policyholders match them atomically. For vault and stablecoin risks, claims settle instantly via deterministic asset swaps. For parametric markets, claims resolve through UMA V3 optimistic oracles. A multi-layer payout waterfall—pool capital, third-party reinsurance, backstop pool, and protocol treasury—ensures claim settlement even under extreme conditions. Capital efficiency is maximised through non-custodial snapshots for yield-bearing vaults and tradeable salvage rights on claimed assets.

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1 Introduction

The global insurance industry has, for centuries, operated as a central marketplace where risk is underwritten, capital is pooled, and claims are settled according to mutually agreed terms. Lloyd's of London, founded in 1688, remains the archetype of such a marketplace: a network of syndicates and underwriters, each providing capital to cover specific risks, coordinated through a central governance framework. In decentralised finance (DeFi), the need for an equivalent mechanism is both clear and urgent. Protocol hacks, smart contract failures, oracle malfunctions, governance exploits, and other tail events have caused over \$8 billion in losses since 2020. Unlike traditional finance, DeFi has no central clearinghouse or government-backed safety net. When failures occur, users are typically left with few options: absorb the loss, hope for a socialised bailout, or pursue unenforceable legal remedies.

1.1 Why Now

Decentralised finance (DeFi) has matured from experimental protocols to an ecosystem securing hundreds of billions of dollars in total value locked (TVL). Institutional investors, professional market makers, and on-chain treasuries are now active participants, bringing with them higher expectations for risk management and capital protection. Yet despite this growth, the overwhelming majority of DeFi capital remains uninsured.

A purpose-built, on-chain insurance primitive is required: parametric triggers, deterministic settlement, and composable capital. LayerCover addresses this gap with a marketplace for specialised underwriting and predictable, rule-based payouts.

1.2 The Syndicate Model

At the heart of LayerCover is the **Syndicate**—a professionally managed underwriting vault that aggregates capital from passive depositors. Inspired by Lloyd's of London, Syndicates allow experienced risk managers to deploy pooled capital across multiple coverage pools while handling allocation decisions, risk assessment, and portfolio optimisation on behalf of their depositors. This structure separates passive liquidity provision (depositors earn yield) from active risk management (managers earn performance fees), creating a scalable, institutional-grade underwriting layer.

1.3 Limitations of Current Models

Today, the on-chain cover market is dominated by **mutualised risk pool** models. In these systems, large, undifferentiated capital pools are used to cover many protocols simultaneously. While aggregation offers certain efficiencies, these models suffer from several structural drawbacks:

- **Slow, subjective claims:** Claims decisions often rely on governance votes, introducing delays, uncertainty, and the risk of politicised outcomes eroding trust in the system.
- **Capital denomination risk:** In mutualised risk pools, underwriters must contribute to a shared pool whose assets are often volatile or denominated in the protocol's governance token. The inability to provide single-sided liquidity in a preferred stable or blue-chip asset exposes underwriters to unwanted market risk, reducing institutional appeal.
- **Opaque pricing:** Premiums are set by utilisation curves—algorithmic functions that adjust rates based on pool capacity. These curves are difficult for policyholders to predict and for underwriters to reason about, creating pricing inefficiency.

- **No underwriter specialisation:** All capital in a mutualised pool bears the same risk profile. There is no mechanism for experienced risk managers to differentiate their exposure, charge bespoke rates, or build a track record.
- **No reinsurance integration:** Existing protocols lack hooks for external capital to backstop extreme events. When catastrophic losses exceed pool capacity, policyholders receive partial or no payouts with no systematic recovery path.

These structural limitations have prevented mutual-based cover models from achieving meaningful market penetration. Despite hundreds of billions of dollars locked in stablecoins and DeFi protocols, active on-chain cover accounts for only a fraction of one percent of the total addressable market.

1.4 Competitive Landscape

Feature	LayerCover	Nexus Mutual	Polymarket	Lloyd's of London
Claim Settlement	Instant parametric; USDC payout	Governance vote; ETH/DAI	Market resolution; USDC	Manual assessment; fiat
Pricing Model	Fixed-rate orderbook	Utilisation curve	AMM/CLOB speculation	Broker-negotiated
Transparency	Fully on-chain, non-custodial	Partially on-chain, pooled	Fully on-chain, order-based	Off-chain, paper-based
Underwriter Control	Per-pool allocation	Shared pool exposure	Position-based	Syndicate-specific
Coverage Guarantee	Instant settlement; pro-rata fallback	Capital-dependent	None (speculation only)	Contractual obligation
Salvage Rights	Tradeable on-chain tokens	None	N/A	Complex legal process
Reinsurance	Third-party integration	None (single pool)	None	External reinsurers

Table 1: Competitive comparison: LayerCover combines the professional syndicate model of Lloyd's with the trustless execution of DeFi.

2. Key Benefits

LayerCover improves upon traditional mutuals by separating capital efficiency for underwriters from price certainty for policyholders.

2.1 Underwriter Advantages

- **Single-Sided Liquidity:** Underwriters pledge capital in their preferred asset (e.g. USDC) without exposure to governance tokens or volatile pool compositions.
- **Dual-Revenue Efficiency:** Earn premiums from coverage sold *and* yield from idle capital deployed via yield adapters.
- **Salvage Rights:** When claims are paid, underwriters receive the insured assets as tradeable salvage, converting potential total losses into partial recoveries.

2.2 Policyholder Advantages

- **Fixed-Rate Coverage:** Premiums are locked at purchase via a competitive orderbook. Full budget certainty for the policy term.
- **Instant, Rules-Based Settlement:** Claims settle automatically the moment a policyholder swaps valid insured assets. A small claim fee deters frivolous submissions.
- **Multi-Layer Protection:** A four-layer payout waterfall—pool capital, third-party reinsurance, backstop pool, and protocol treasury—ensures claim settlement even during extreme liquidity events. If all capacity is exhausted, claims settle pro-rata.

2.3 Partner Advantages

- **Referral Programme:** Frontend operators (DeFi protocols, aggregators, wallets) earn a percentage of premiums when cover is purchased through their referral codes. Rewards are distributed automatically on-chain.
- **Aligned Incentives:** Protection for users, revenue for referrers, and ecosystem growth for the protocol—a positive feedback loop across all participants.

3. User Operations

LayerCover supports three primary participant roles: Underwriters (who manage risk directly), Syndicate Depositors (who delegate to professional managers), and Policyholders (who buy cover).

3.1 Underwriter Operations

Underwriting in LayerCover is designed for capital efficiency. Unlike traditional models where liquidity is fragmented, underwriters deposit into a single main vault and virtually allocate that capital to multiple risk pools.

1. **Deposit** USDC into the CapitalPool (an ERC-4626 vault) and receive shares.
2. **Allocate** shares to risk pools via the UnderwriterManager. No token movement occurs—allocation is a bookkeeping operation.
3. **Earn** premiums from matched policies plus yield from idle capital deployed via yield adapters.
4. **Withdraw** after the fixed-duration lock expires. Pledges auto-scale proportionally on withdrawal.

Allocations are constrained by the underwriter’s **Risk Points Budget** and **Mutex Groups**, which prevent exposure to correlated risks.

3.2 Managed Underwriting (Syndicates)

To accommodate passive capital, LayerCover supports **Syndicates**—specialised, manager-led vaults that aggregate user capital.

- **Passive Participation:** Users deposit capital into a Syndicate (ERC-4626 vault) and receive shares representing pro-rata ownership. They do not need to manage individual pool allocations.
- **Professional Management:** The Syndicate Manager retains exclusive authority to allocate pooled capital to specific underwriting pools, actively adjusting risk exposure and diversification.
- **Fee Mechanics:** Managers may charge performance fees (high-watermark based) and management fees (streaming rate on AUM), both capped at the factory level to protect depositors.
- **Registry & Security:** Syndicates are deployed via a `SyndicateFactory` which automatically registers them within the protocol, ensuring only valid contracts can allocate capital.

3.3 Policyholder Operations

Policyholders obtain coverage by purchasing a transferable **Policy NFT** from their chosen pool.

- **Fixed-Term Coverage:** Policies are purchased for a specific term (e.g. 30, 60, or 90 days) with the premium paid upfront at a locked rate.
- **Cooldown Period:** While the Policy NFT is minted immediately, coverage does not begin until a governance-defined cooldown has elapsed, preventing opportunistic post-exploit purchases.
- **Policy Management:** Coverage increases enter a pending queue subject to their own cooldown. Reductions and cancellations take effect immediately with unused premium refunded.
- **Vault Cover:** For yield-bearing vaults (ERC-4626), the coverage value is “snapshotted” in USDC at purchase. Users retain full custody of their shares and continue earning yield until a claim is filed.

4. Coverage Types & Settlement

LayerCover supports three coverage categories, each with a distinct settlement mechanism:

Coverage Type	Example Risks	Settlement Method	Salvage Required
Vault Cover	Yield vault exploits, lending protocol hacks	Deterministic (Asset Swap)	Yes
Stablecoin Depeg	USDC, DAI, FRAX de-peg events	Deterministic (Asset Swap)	Yes
Parametric Markets	Earthquakes, weather events, protocol incidents	Optimistic Oracle (UMA V3)	No

Table 2: Three product categories with distinct settlement mechanisms.

4.1 Deterministic Settlement (Vault & Stablecoin Cover)

For vault cover and stablecoin depeg protection, claims settle via direct asset transfer:

- **Direct Swap (Liquid Assets):** The claim functions as a perpetual American-style Put Option. The policyholder transfers the distressed asset to the protocol and instantly receives the USDC payout.
- **Vault Cover (Snapshot & Transfer):** For yield-bearing vaults, the coverage value is “snapshotted” in USDC at purchase. Users retain full custody of their shares. In the event of a claim, they transfer the shares to the protocol (which holds them as salvage) and receive the pre-fixed USDC payout.
- **No Oracle Dependency:** The system does not query external price oracles to determine payout amounts, eliminating oracle manipulation vectors.

4.2 Optimistic Oracle Settlement (Parametric Markets)

For parametric risk markets—including earthquake cover, weather events, and protocol incidents—LayerCover integrates with **UMA Optimistic Oracle V3** for trustless, objective resolution.

1. **Market Definition:** Each parametric pool is configured with an `oracleQuestionCID`—an IPFS-pinned assertion question defining the exact conditions for a valid claim.
2. **Claim Initiation:** The policyholder submits an assertion to UMA’s Optimistic Oracle.
3. **Challenge Period:** The assertion enters a dispute window (typically 2 hours). If unchallenged, it resolves as true.
4. **Dispute Resolution:** If disputed, UMA’s decentralised Data Verification Mechanism (DVM) votes on the outcome.
5. **Automatic Settlement:** Upon positive resolution, the protocol automatically processes payouts to valid policyholders.

Parametric claims do not require policyholders to surrender assets—payouts are triggered purely by event verification. Resolution criteria are immutably stored on IPFS, preventing post-hoc modification.

4.3 Intent-Based Premium Pricing

LayerCover operates a **100% fixed-rate** pricing model. There is no algorithmic or utilisation-based pricing. Syndicate Managers post binding, cryptographically signed quotes (“Intents”) to a transparent on-chain

orderbook. Policyholders select the best available rate and execute atomically—locking capital, transferring the premium, and minting the Policy NFT in a single transaction.

5. Multi-Layer Payout Waterfall

When a valid claim is processed, the protocol draws capital through an ordered sequence of funding layers. Each layer absorbs as much of the claim as it can before the next layer activates:

1. **Layer 1 — Pool Capital:** The primary source. Capital pledged by syndicates to the specific risk pool is used first. Losses are allocated pro-rata to underwriters based on their active pledge at the time of the event.
2. **Layer 2 — Third-Party Reinsurance:** If syndicate capital is insufficient, the protocol draws from registered external reinsurers in order of their attachment points (excess-of-loss basis).
3. **Layer 3 — Backstop Pool:** A protocol-wide reserve funded by a percentage of all premiums. Provides a safety net independent of any single pool's capitalisation.
4. **Layer 4 — Protocol Treasury:** Last resort. The protocol treasury absorbs any remaining deficit.

If all four layers are exhausted, the claim is **partially paid**: the claimant receives whatever capital was gathered and the remainder is forfeited.

5.1 Third-Party Reinsurance

The protocol's smart contracts include extensible hooks for third-party reinsurance integration. Professional reinsurance entities can register as approved reinsurers, committing capital to backstop syndicate pools during tail-risk scenarios. Each reinsurer defines their coverage scope, attachment points, exposure limits, and required premium share. Reinsurers who fund claim payouts receive salvage rights proportional to their contribution.

5.2 Backstop Pool

A fixed percentage (default: 20%) of all gross premiums is routed to the Backstop Pool automatically. This creates a continuously growing, protocol-wide reserve that activates when primary pool capital and third-party reinsurance are insufficient.

6. Governance and Risk Management

LayerCover minimises discretionary governance by enforcing risk parameters through on-chain logic and quantitative budgets.

6.1 Risk Points System

To prevent reckless over-leveraging, the protocol enforces a “Risk Points” budget. Each pool is assigned a risk cost (e.g., Stablecoin Pool = 2 pts, Emerging Protocol = 10 pts). Underwriters are capped by a global budget, mathematically forcing them to diversify if they wish to utilise their full capital efficiency.

6.2 Mutex Groups (Correlation Protection)

Governance defines “Mutual Exclusion Groups” for correlated assets. For example, if Pool A and Pool B share a critical dependency (e.g., both rely on the same Oracle), they are placed in a Mutex Group. The protocol strictly prevents an underwriter from pledging the same collateral to both pools simultaneously, eliminating the risk of a “double spend” on solvency during a cascading failure.

6.3 Upgradeability & Trust Model

- **Proxy Architecture:** All core contracts use the ERC-1967 transparent proxy pattern, allowing security patches without capital migration.
- **Timelock Protection:** All upgrade operations are routed through a `TimelockController`, enforcing a mandatory delay between proposal and execution.
- **Role-Based Access Control:** Administrative functions are gated by `OpenZeppelin AccessControl` roles, preventing single-key compromise.
- **Emergency Pause:** A dedicated `CoverCircuitBreaker` can pause new policy issuance for specific pools during active incidents, while preserving existing policyholders’ ability to file claims and withdraw.
- **Path to Immutability:** As the protocol matures, governance may renounce upgrade rights on individual contracts, rendering them fully immutable.

6.4 Institutional Framework Alignment

Although DeFi-native, LayerCover’s risk architecture maps directly to traditional regulatory frameworks, aiding institutional adoption:

- **Solvency II (Insurance):** Pool Ratings and Risk Points function as an on-chain Solvency Capital Requirement (SCR). Mutex Groups replicate correlation constraints in SCR aggregation.
- **Basel III (Banking):** Pledge leverage ratios mirror the non-risk-based leverage cap. Pool buffers and backstops emulate Liquidity Coverage Ratio (LCR)-style requirements.

Disclaimer

Certain technical details and implementation specifics have been intentionally omitted or generalised to protect intellectual property prior to public deployment. Readers should not rely on this document as a complete technical specification.

For the full technical whitepaper, please contact: tim@layercover.com.