

Ethertower

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Abstract

We propose Ethertower, a decentralized reserve asset protocol built on Ethereum. The Ethertower protocol creates and manages ETHTW, a decentralized reserve asset fully backed by ether. Participants can mint ETHTW by depositing ETH into the protocol at an initial 1:1 ratio. At the core of Ethertower protocol is a fee-based redemption mechanism. When ETH is redeemed, the protocol captures redemption fees and compounds them back into the collateral pool while burning ETHTW. This increases the amount of ETH collateral relative to the ETHTW supply in circulation. As redemptions occur, (i) more fees are collected and (ii) the ratio of ETH collateral to ETHTW in circulation increases, driving a positive flywheel effect. By using ETH – not USD – as the unit of account, Ethertower ensures that ETHTW always maintains or increases its ETH-backed collateral value per unit, not falling below. This upholds the core principle of a reserve asset: preserving or increasing its underlying value over time.

1 Introduction

The evolution of blockchain technology has catalyzed the creation of innovative financial instruments, among which decentralized reserve assets stand out. Reserve assets are aimed at providing stability and trust in a decentralized financial system. Historically, several projects have laid the groundwork for building reserve assets that are decentralized and fully collateralized (or “backed”) by ETH.

SAI, a precursor to DAI, introduced the concept of a stablecoin backed by ETH – an early step toward decentralized financial stability. Building on this foundation, Reflexer’s RAI advanced the concept by implementing a more adaptive mechanism for maintaining price stability, adjusting its collateral requirements dynamically in response to market conditions. Liquity’s LUSD further innovated by prioritizing capital efficiency while preserving full ETH collateralization, allowing users to mint LUSD by depositing ETH into a collateralized debt position (CDP), without facing liquidation under normal conditions.

These developments underscore the ongoing quest to create a contemporary reserve asset that is not only decentralized but also fundamentally backed by ETH. Leveraging Ethereum’s inherent strengths – security, decentralization, and financial efficiency – these protocols have paved the way for the next generation of decentralized reserve assets.

The creation of such assets reflects the broader vision of a decentralized financial ecosystem: one that operates autonomously, ensuring stability, transparency, security, and trust – without relying on traditional financial intermediaries or fiat-based units of account like the U.S. dollar.

In this paper, we propose Ethertower, a permissionless protocol on Ethereum that issues and maintains ETHTW, a decentralized reserve asset fully ether-backed. Key features of Ethertower protocol include (1) full ether collateralization; (2) the use of ETH as the unit of account; (3) a fee-based redemption mechanism, and (4) a self-reinforcing, mathematically deterministic flywheel mechanism that enhances the backed value of ETHTW over time.

The Ethertower protocol operates through a set of clearly defined mechanisms. Users can mint ETHTW by depositing ETH, initially at a 1:1 ratio. When ETHTW is redeemed for ETH, a redemption fee is applied. The redeemed ETHTW is burned, and the collected fee is compounded back into the protocol's collateral pool. This process continuously increases the amount of ETH collateralizing each unit of ETHTW position, thereby increasing the net asset value (NAV) per ETHTW.

Bootstrapped at a 1:1 ratio between ETH and ETHTW, the Ethertower protocol is designed such that the ETH backing per ETHTW can only increase – e.g., from 1 ETHTW = 1 ETH, to 1 ETHTW = 1.1 ETH, to 1 ETHTW = 2 ETH, and so on.

Ethertower addresses several core challenges in the design of reserve assets, including stability, fungibility, liquidity, and value appreciation. By enabling a continuously increasing collateral ratio for ETHTW – and by leveraging ETH both as the collateral asset and the unit of account – Ethertower introduces a reserve asset that is inherently resistant to depreciation and volatility.

2 Protocol

The Ethertower protocol is a decentralized reserve asset system running on Ethereum, engineered to the issuance and management of ETHTW, a fully ether-backed digital asset. The protocol enables participants to mint ETHTW by depositing ETH into a non-custodial smart contract, initialized at a 1:1 issuance ratio between ETHTW and ETH.

Redemptions are executed through a fee-based mechanism: when ETHTW is redeemed for ETH, a redemption fee is applied. The redeemed ETHTW tokens are permanently burned, while the collected fees are programmatically compounded back into the protocol's collateral pool. This mechanism ensures that the total ETH collateral increases relative to the circulating ETHTW supply. As more redemptions occur, the protocol dynamically amplifies the backing per unit of ETHTW, generating a self-reinforcing, deterministic flywheel mechanism that strengthens the NAV of the ETHTW tokens in circulation over time.

The Ethertower protocol is intentionally denominated in ETH as both the collateral asset and the unit of account, diverging from fiat-pegged paradigms. This design choice materially distinguishes ETHTW from traditional digital assets that rely on USD-denominated collateral (e.g., stablecoins).

Through a collateral compounding mechanism, Ethertower introduces a structurally appreciating reserve asset that aligns with the principles of monetary soundness and decentralization. As an end result, Ethertower proposes a novel framework for reserve assets: a systemically coherent, ether-denominated model with a deterministic value appreciation mechanism.

3 Functionality

The Ethertower protocol functions within a simple, robust, clearly defined market structure, designed to promote the stability, liquidity, and collateral integrity of its native asset, ETHTW.

The Ethertower’s market structure is centered on two primary user interactions: minting ETHTW and redeeming ETH.

3.1 Minting ETHTW

The minting process forms the foundational entry point for users into the Ethertower system. Participants can mint ETHTW by depositing ETH into the protocol’s monolithic smart contract. Upon deposit, the protocol issues ETHTW at the current ratio, which is initialized at 1:1 (i.e., 1 ETH deposited results in the issuance of 1 ETHTW).

This deterministic issuance model ensures that ETHTW is fully and transparently collateralized from inception. By requiring hard ether collateral, the protocol establishes a direct, auditable reflection between each unit of ETHTW in circulation and a corresponding reserve of ETH.

3.2 Redeeming ETH

Redemption is the inverse mechanism whereby holders of ETHTW can convert their tokens back into ETH. During redemption, the protocol applies a redemption fee. The proceeds of which are retained and compounded into the system’s ETH collateral pool. Simultaneously, the ETHTW tokens being redeemed are permanently burned.

This process increases the collateral-to-supply ratio: as redemptions occur, the total ETH backing per ETHTW unit increases, resulting in a structurally appreciating NAV for the remaining ETHTW tokens – powered by redemption fees. Over time, this creates a persistent delta between the ETHTW supply and the cumulative ETH collateral.

While the system is initialized at a 1:1 collateral ratio, subsequent redemptions will increase this ratio, at some point, to 1.1 ETH per ETHTW, 2 ETH per ETHTW, and so on, contingent on the volume of redemptions and fee accumulation.

3.2.1 Redemption Fees

The redemption fee mechanism serves as a core economic feature within the Ethertower protocol, serving as a “collateral accrual engine”. Every redemption increases the total ETH reserves, thereby amplifying the collateral-to-supply ratio.

This self-reinforcing flywheel effect ensures that as redemption activity increases:

- More fees are accrued, which are reinvested into the collateral pool;
- The NAV per ETHTW increases.

4 Flywheel

We propose a mathematically deterministic flywheel mechanism as a central feature of the Ethertower protocol, designed to progressively enhance the value, stability, and collateral strength of ETHTW over time.

Ethertower’s flywheel operates through a cyclical process whereby redemption fees are systematically reinvested into the protocol’s collateral pool, creating a compounding effect that increases the NAV per ETHTW.

4.1 Mechanism

4.1.1 Redemption Process

When stakeholders redeem ETHTW for ETH, a redemption fee – calculated as a percentage of the ETH being withdrawn – is applied. The redeemed ETHTW units are burned; the collected fee is retained within the protocol and added to the remaining ETH collateral.

This process reinforces a positive-sum cycle: as more redemptions occur (1), the ETH reserve proportionally grows, and (2) the collateral backing per ETHTW increases. Over time, this compounding effect drives continual NAV appreciation.

Below is the formula to calculate the redemption fee (q) by dividing the amount of ETHTW being redeemed (x) by the product of the total amount of ETH in the pool (y) and the amount of ETH collateralizing 1 ETHTW (z), and then multiplying by the fee percentage (p):

$$q = \frac{x}{y \times z} \times p$$

Where q is the Redemption Fee, x is the amount of ETHTW being redeemed, p is the fee percentage (expressed as a decimal), y is the amount of ETH in the pool, z is the amount of ETH collateralizing 1 ETHTW.

Example

$$x = 100 \text{ ETHTW}$$

$$p = 0.05$$

$$y = 1000$$

$$z = 1.2$$

1. Calculate the amount of ETH that 100 ETHTW (h) represents:

$$h = x \times z = 100 \text{ ETHTW} \times 1.2 \text{ ETH/ETHTW} = 120 \text{ ETH}$$

2. Calculate the redemption fee on the ETH side (F_{ETH}):

$$F_{\text{ETH}} = h \times p = 120 \text{ ETH} \times 0.05 = 6 \text{ ETH}$$

3. Calculate the net amount of ETH received after the fee is deducted (R_{net}):

$$R_{\text{net}} = h - F_{\text{ETH}} = 120 \text{ ETH} - 6 \text{ ETH} = 114 \text{ ETH}$$

Using the equation:

$$q = \frac{100 \text{ ETHTW}}{1000 \text{ ETH} \times 1.2} \times 0.05$$

The calculation would be:

$$q = \frac{100}{1200} \times 0.05 = \frac{1}{12} \times 0.05 = 6 \text{ ETH}$$

The redemption fee (q) is 6 ETH. This means that if you redeem 100 ETHTW, and the pool contains 1000 ETH, with 1.2 ETH collateralizing each ETHTW, the protocol participant will be charged a fee of 6 ETH, and will receive 114 ETH after the fee is deducted.

4.2 Fee Compounding

Redemption fees collected in ETH are directly compounded into the protocol's collateral reserve. This mechanism incrementally increases the total ETH backing the ETHTW supply in circulation, thereby increasing the system's collateral-to-supply ratio.

Over time, this compounding effect strengthens the asset's underlying value by ensuring that each ETHTW position is backed by an ever-growing amount of ETH. This dynamic is fundamental to the protocol's structural design, reinforcing value preservation, capital efficiency, and systemic resilience without reliance on external monetary anchors.

Example

1. Calculate the new collateral balance:

$$C_{\text{new}} = C_{\text{initial}} + F_{\text{ETH}}$$

2. Calculate the new collateral ratio:

$$CR_{\text{new}} = \frac{C_{\text{new}}}{S}$$

Where F_{ETH} is the total redemption fees collected in ETH, C_{initial} is the initial collateral balance in ETH, C_{new} is the new collateral balance after compounding the fees, S is the total supply of ETHTW, CR_{initial} is the initial collateral ratio, and CR_{new} is the new collateral ratio after compounding the fees.

Example values

$$C_{\text{initial}} = 5000 \text{ ETH}$$

$$F_{\text{ETH}} = 100 \text{ ETH}$$

$$S = 1000 \text{ ETHTW}$$

1. Calculate the new collateral balance:

$$C_{\text{new}} = 5000 \text{ ETH} + 100 \text{ ETH} = 5100 \text{ ETH}$$

2. Calculate the new collateral ratio:

$$CR_{\text{new}} = \frac{5100 \text{ ETH}}{1000 \text{ ETHTW}} = 5.1 \text{ ETH/ETHTW}$$

4.3 Delta

A key fundamental of the Ethertower protocol is the progressive increase in the delta between the total ETHTW supply in circulation and the ETH collateral backing it. This delta reflects the surplus collateral per unit of ETHTW generated through redemption fees, which can only maintain or increase over time.

From an initial issuance ratio of 1 ETH per 1 ETHTW, the collateral ratio may rise to 1.1 ETH per ETHTW, 1.2 ETH per ETHTW, and beyond – based on the volume of redemptions and the associated fee inflows.

Unlike conventional systems where fees are extracted or passively stored, Ethertower recirculates redemption fees directly into its collateral pool. This ensures that each redemption event actively strengthens the protocol's NAVt, increasing the ETH backing of remaining ETHTW units.

Over time, as more ETHTW is redeemed and fees are continually compounded, the ETH collateral per ETHTW unit monotonically increases. This structural design guarantees that the NAV per ETHTW share is always preserved or enhanced – never falling below – thereby establishing ETHTW as a uniquely appreciating, ether-denominated reserve asset.

Example

1. Assume a current collateral ratio of 1:1.1:
 - 1 ETHTW is backed by 1.1 ETH
 - Supply of ETHTW: 1000
 - Collateral balance: 1100 ETH
 - Redemption fee: 5%
2. 100 ETHTW are redeemed, valued at 110 ETH, and a 5% fee is collected and compounded back into the collateral balance:
 - New supply of ETHTW: 900 ETHTW (1000 initial - 100 redeemed)
 - Fee collected in ETH: 5.5 ETH
 - New collateral balance: 1100 ETH (initial) - 110 ETH (redeemed) + 5.5 ETH (redemption fee) = 995.5 ETH
 - New collateral ratio: $995.5 \text{ ETH} / 900 \text{ ETHTW} = 1.1061 \text{ ETH per ETHTW}$
3. In this example, the collateral ratio has increased from 1:1.1 to approximately 1:1.1061 – an increase of 0.55%.

From the current collateral ratio, it can fundamentally only increase, never going below the current collateral ratio and delta collateral between the ETHTW and ETH:

- 1:1.1 = 1.1 ETH per ETHTW
- 1:1.106 = 1.106 ETH per ETHTW
- 1:1.5 = 1.5 ETH per ETHTW
- 1:2 = 2 ETH per ETHTW
- 1:2.5 = 2.5 ETH per ETHTW
- 1:3 = 3 ETH per ETHTW
- And so on

As an end result, the delta between the total ETHTW supply and the collateral backing it grows progressively. This ensures that each ETHTW unit is backed by an increasing amount of ETH over time, always maintaining or increasing the current ratio.

5 Key Features

ETHTW is engineered with adherence to the principles of decentralization, transparency, and monetary soundness. The protocol design reflects a commitment to technical and economic finality, ensuring ETHTW remains a credibly neutral, censorship-resistant, and fully ether-collateralized financial instrument.

5.1 Permissionless

The Ethertower protocol is entirely permissionless, allowing any participant to interact with the system without the need for authorization, KYC procedures, or third-party intermediaries.

Users can mint or redeem ETHTW by directly interacting with a neutral smart contract deployed on Ethereum. This ensures global inclusivity and open access. There are no gatekeepers or centralized entities – every transaction and interaction is governed purely by code.

5.2 Decentralized

ETHTW inherits the decentralization characteristics of Ethereum. There is no single point of control or administration. All operations – minting, redemption, and collateral accounting – are executed via an autonomous smart contract. The absence of centralized actors or governance ensures that ETHTW functions as a credibly neutral reserve asset, incapable of being altered or influenced by any entity. This fully decentralized architecture provides unparalleled resilience, security, and trust minimization.

5.3 Ether-Backed

Each unit of ETHTW is backed by a specific amount of ETH, held in a non-custodial smart contract. Unlike fiat-pegged stablecoins or synthetics, ETHTW does not rely on external instruments or market pegs; its value is deterministically derived from its ETH reserves (i.e., ETHTW supply in circulation divided by the amount of ETH held as collateral). The intersection between ETHTW supply and ETH vault collateral is transparently auditable at all times on-chain – by anyone, at any time.

5.4 Non-Upgradable

The ETHTW smart contract is non-upgradable by design. Once deployed and battle-tested, it becomes a fixed and permanent structure, immune to changes in logic, parameters, or operational permissions. This ensures long-term integrity and eliminates the governance risk associated with upgradeable smart contracts. Users can interact with ETHTW with full confidence that the protocol will never be unilaterally modified, backdoored, or subject to changing rules.

5.5 Immutable and Ossified

The ETHTW smart contract is immutable and ultimately ossified – meaning it is final, unchangeable, and resistant to any form of protocol mutation. Once deployed and battle-tested, no additional parameters, upgrades, or administrative interventions can occur.

This ossification serves as a cryptographic guarantee that the system rules will always remain constant over time, eliminating governance risk and protecting participants from future systemic tampering – a monetary primitive similar in spirit to ether and bitcoin.

5.6 Censorship-Resistant

Based on the fact that Ethertower is fully decentralized, immutable, and non-custodial, ETHTW is inherently censorship-resistant. No centralized authority or off-chain actor can freeze, blacklist, reverse, or prevent any operation – including minting, redemption, or asset transfers. The system operates entirely via Ethereum’s consensus layer, making it resistant to censorship or coercion from external entities.

5.7 Monolithic

ETHTW is implemented through a monolithic smart contract architecture, wherein all core functionalities – including ETH deposits, ETHTW minting, redemptions, fee collection, and collateral accounting – reside within a single contract. There are no external dependencies, proxy contracts, or modular inter-contract interactions that introduce complexity or risk. This

monolithic approach enhances system robustness, mitigates potential attack surfaces, and improves formal verifiability of protocol behavior.

5.8 Deterministic

The Ethertower protocol is governed by deterministic mathematics, with no reliance on price feeds, off-chain data, or human input. The net asset value (NAV) of ETHTW in ETH terms is computed as a function of two on-chain variables: the total ETH held in the collateral vault, and the total ETHTW token supply.

As redemptions occur and fees are compounded into the reserve, this calculation ensures that the backing per unit of ETHTW either remains constant or increases. The ETHTW system is therefore both transparent and economically predictable.

5.9 ETH-Denominated

Unlike traditional reserve assets that are pegged to fiat currencies, ETHTW is denominated in ETH. This design choice liberates ETHTW from the limitations and risks associated with fiat pegs, including central bank monetary policy, inflation, and regulatory exposure. By using ETH as both the unit of account and the collateral asset, Ethertower proposes a structurally sound reserve asset that is natively aligned with Ethereum's principles.

5.10 Governance-Free

ETHTW operates with zero governance. There are no governance actors, multisig signers, or DAO-controlled parameters. All protocol logic is hardcoded and immutable, ensuring that no entity can influence or alter the behavior of the system, allowing ETHTW to function as a trustless monetary primitive in perpetuity.

5.11 Oracle-Free

The Ethertower protocol does not rely on external oracles to function. All value calculations and collateral assessments are performed natively within the smart contract using on-chain data. This removes a major vector of systemic risk found in digital assets, where compromised or delayed oracles can result in insolvency or mispricing. ETHTW's oracle-free design enhances reliability, determinism, and decentralization.

5.12 Trustless

All interactions with the Ethertower protocol are trustless. There are no intermediaries or custodians required to perform any operation. Users retain full control over their positions at all

times. Trust is placed in open-source code, not human actors, ensuring a resilient and user-sovereign financial system.

5.13 Fully On-Chain

ETHTW operates entirely on-chain. All logic, data, and assets reside within Ethereum. This ensures total transparency, fully auditable by any participant. No off-chain computation, storage, or coordination is required.

5.14 Liquid

ETHTW is designed to be highly liquid. At any point, any ETHTW holder may redeem their position for ETH directly via the protocol. The redemption process is automated, deterministic, and executed without third-party approval.

5.15 Neutral

ETHTW is constructed to be monetarily neutral, embodying characteristics similar to ether itself. It does not carry policy goals, peg enforcement mechanisms, or monetary expansion targets. As such, ETHTW can serve as a neutral, decentralized reserve asset.

6 Conclusion

This initial draft of the Ethertower whitepaper is meant to establish a conceptual understanding of the high-level design and architecture of the proposed protocol. It should not be considered complete or final. The version 1.0 of this paper will be published for public review and community input on <https://github.com/elevadoxyz>.