

Neurobtc Whitepaper

A GPU-Driven Bitcoin Fork with Dual-Layer Proof of Work

1. Abstract

Neurobtc forks Bitcoin to replace ASICs with GPUs, merging Layer 1 (L1) settlement and Layer 2 (L2) transaction clearing into a single Proof of Work (PoW) process. Miners solve puzzles that secure L1 while validating L2 batches, enabling 10,000 TPS, decentralization, and energy efficiency. This whitepaper details the technical design, economics, sustainability, and roadmap for a blockchain that democratizes mining and repurposes energy.

2. Introduction and Vision

Bitcoin's 2009 launch enabled decentralized finance, but ASICs and low throughput limit inclusivity and scale. Neurobtc envisions a blockchain where anyone with a GPU—gamers, developers, entrepreneurs—secures a global network. By making PoW *useful*, validating transactions alongside settlements, we address energy waste and enable microtransactions, remittances, and DeFi. Our mission is to democratize access, scale, and align energy with value.

3. Problem Statement

Bitcoin faces:

1. **Mining Centralization:** ASICs concentrate hashrate (>60% in top pools, 2025), risking censorship.
2. **Energy Inefficiency:** PoW consumes ~150 TWh/year for abstract puzzles.
3. **Scalability Limits:** L1's 7 TPS forces complex L2 solutions.

We need decentralization, useful energy, and scalability with security.

4. Proposed Solution

Neurobtc offers:

- **GPU-Based Mining:** GPU-optimized PoW for participation.
- **Dual-Layer Architecture:** L1 for settlements, L2 for clearing.

- **Useful PoW:** L1 puzzles validate L2 batches.
- **Parallel Validation:** GPUs process L1 and L2 concurrently.

This blends trustlessness, scalability, and inclusivity.

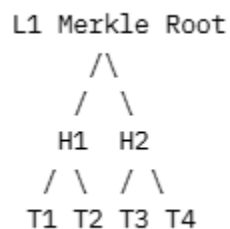
5. Technical Design

5.1 Layer 1: Settlement Layer

L1 handles settlements:

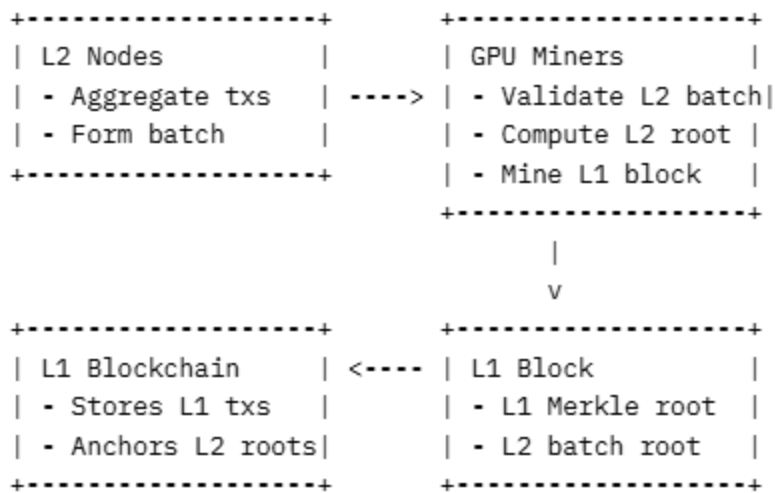
- **Block Time:** 10 minutes.
- **Block Size:** 2 MB, adjustable.
- **Consensus:** GPU-friendly PoW.
- **Purpose:** High-value transfers, L2 commitments.

Diagram: L1 Merkle Tree



Explanation: L1 transactions (T1–T4, e.g., transfers) are hashed pairwise ($H1 = \text{hash}(T1, T2)$, $H2 = \text{hash}(T3, T4)$) into the L1 Merkle root, included in the block header.

Diagram: L1/L2 Workflow



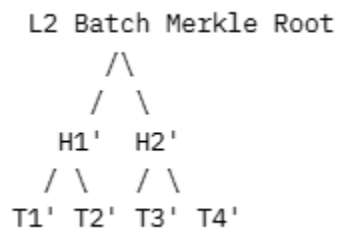
Explanation: L2 nodes batch transactions. GPUs validate, compute the L2 Merkle root, and include it with the L1 Merkle root in the block. PoW secures both.

5.2 Layer 2: Clearing Layer

L2 scales:

- **Structure:** Sidechain-like, batches anchored to L1.
- **Batch Size:** 1,000–10,000 transactions (~1–10 MB).
- **Block Time:** 10 seconds; commits to L1 every 10 minutes.
- **Two-Way Peg:** Funds lock on L1 for L2, unlock on settlement.
- **State Submission:** L2 nodes reference L1 state (e.g., UTXOs or balances) in batches to ensure validity. Batches include a commitment to the L1 state hash at batch creation, broadcast to miners for validation and inclusion in L1 blocks.
- **Purpose:** Microtransactions, remittances, DeFi.

Diagram: L2 Merkle Tree



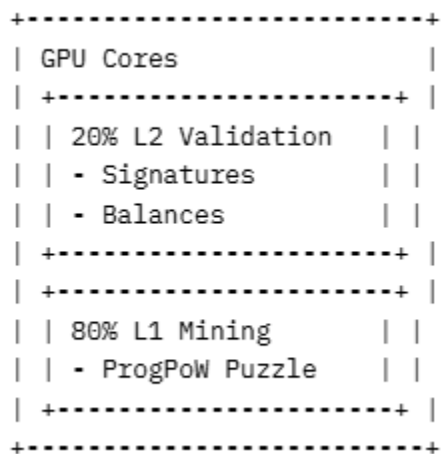
Explanation: L2 transactions (T1'–T4', e.g., microtransactions) are hashed pairwise ($H1' = \text{hash}(T1', T2')$, $H2' = \text{hash}(T3', T4')$) into the L2 batch Merkle root, validated by GPUs and anchored in L1.

5.3 GPU-Optimized Proof of Work

We use **ProgPoW**:

- **Design:** Leverages GPU's thousands of cores (e.g., CUDA, Stream Processors) and high memory bandwidth. Its Single Instruction, Multiple Data (SIMD) architecture enables parallel execution of compute-intensive tasks like hashing and lightweight tasks like signature verification, ideal for L1 mining and L2 validation.
- **Performance:** ~1 GH/s on mid-range GPUs (e.g., RTX 3060).
- **Parallelization:** GPUs handle L1 PoW (hashing L1 header, L2 root, nonce) and L2 validation (checking signatures, balances) concurrently, splitting cores to maximize throughput.

Diagram: GPU Core Allocation



Explanation: GPUs allocate ~20% of cores to L2 validation (lightweight tasks), ~80% to L1 mining (compute-heavy). Percentages adjust dynamically based on batch size and network load.

5.4 Dual-Layer Validation

The PoW puzzle merges layers:

- **Puzzle:**

```
hash = ProgPoW(L1_header || L1_merkle_root || L2_batch_root || nonce)
if hash < difficulty_target: block is valid
```

-
- **Validation Process:**
 - GPUs verify L1 transactions (via L1 Merkle root) and L2 batches (via L2 batch root).
 - L2 validation checks signatures, balances, and L1 state consistency (e.g., UTXO availability), ensuring no double-spends.
- **GPU Allocation Rationale:** L2 validation is lightweight (~10 ms for 1,000 txs on an RTX 3060), requiring fewer cores than L1 mining (~1 GH/s ProgPoW). The 20%/80% split optimizes hashrate while ensuring fast batch processing, adjustable if L2 load increases.
- **Outcome:** Each block secures L1 and clears ~10,000 L2 transactions.

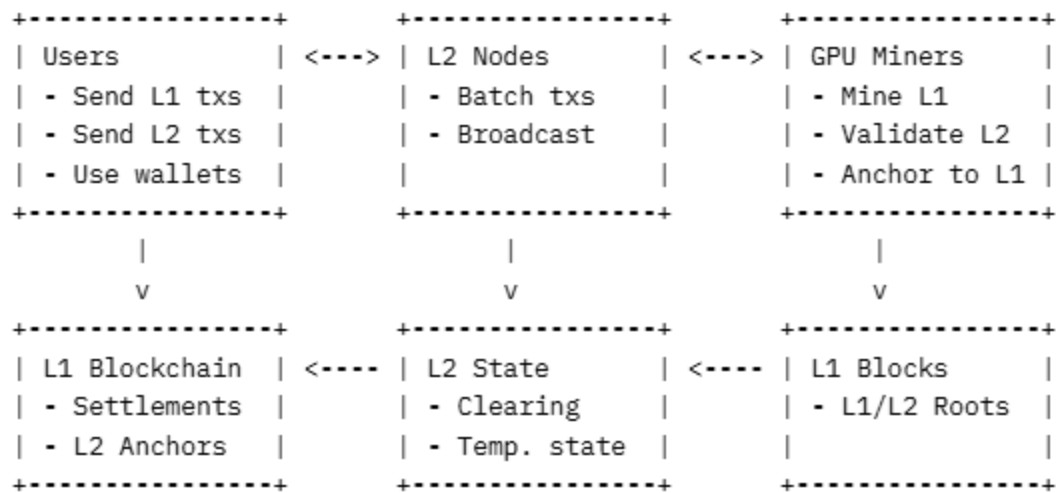
5.5 Governance

- **Process:** Miner signaling, community input.
- **Parameters:** Block size, PoW tweaks over 3 months.
- **Goal:** Stability, adaptability.

5.6 Architecture Overview

- **Miners:** Mine L1, validate L2.
- **L2 Nodes:** Batch transactions, reference L1 state.
- **Users:** Send payments.

Diagram: Network Architecture



6. Comparison to Existing Blockchains

Feature	Neurobtc	Bitcoin	Ethereum	Ravencoin
Mining Hardware	GPUs	ASICs	PoS (no mining)	GPUs
PoW Utility	L1 + L2 Validation	L1 Only	None	L1 Only
Scalability	L1: 7 TPS, L2: 10,000 TPS	7 TPS	~15 TPS	10 TPS
Decentralization	High (GPU access)	Moderate (ASIC pools)	High (PoS)	High (GPU access)

Neurobtc excels in scalability, inclusivity, utility.

7. Use Cases and Applications

L2 enables:

- **Microtransactions:** Sub-cent fees for tipping, gaming.
- **Remittances:** Low-cost cross-border payments.
- **DeFi:** Future smart contracts.
- **IoT Payments:** Machine-to-machine.

- **AI agents**

L2's 10,000 TPS rivals centralized systems.

8. Economic Model

- **Total Supply:** 21 million coins.
- **Block Rewards:**
 - Subsidy: 6.25 coins (halving every 4 years, 2025).
 - L1 fees.
 - L2 batch fees (0.1%, 50% miners, 50% burned).
- **L2 Fees:** ~\$0.01 per transaction.
- **No Pre-Mine:** Fairness.

L2 batch inclusion required for full rewards.

9. Security and Sustainability Analysis

9.1 51% Attacks

GPU access disperses hashrate.

9.2 L2 Double-Spending

L2 references L1 state; invalid batches rejected.

9.3 ASIC Creep

ProgPoW deters ASICs, governance adjusts.

9.4 Environmental Impact

Blocks clear ~\$10,000–\$100,000 L2 value, tying energy to utility.

9.5 Risk Mitigation

- **Low Adoption:** Rewards, subsidies.
- **GPU Botnets:** Stake requirements.
- **L2 Congestion:** Dynamic batches, L3.

- **ASIC Emergence:** PoW tweaks.

L1 matches Bitcoin; L2 scales to 10,000 TPS.

10. Implementation Roadmap

- **Q2 2025:** Testnet.
- **Q3 2025:** Mining software, L2 client.
- **Q4 2025:** Mainnet.
- **2026:** L2 ecosystem.
- **2027:** Block size review.

Join at <https://github.com/neurobtc/neurobtc-whitepaper>

11. Conclusion

Neurobtc makes PoW inclusive, scalable, useful. GPUs democratize mining, dual-layer validation scales, energy produces value. Build with us.

12. References

- Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System.
- Ethereum Foundation. (2018). ProgPoW Specification.
- Buterin, V. (2014). On Bitcoin Scalability and Layer 2 Solutions.
- Poon, J., & Dryja, T. (2016). The Bitcoin Lightning Network.