Morph

Dive in L2 Architecture

1. General Layer 2 Architecture & Modules
2. Existing Problems & Solutions
3. Intro to Morph

Developer Relations Engineer at Morph
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What does Layer 2 do?

Scale Ethereum :

Move the execution off-Ethereum but submit the data to Ethereum.

Relief the execution pressure of Ethereum while not losing the decentralization and security of Ethereum.

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Layer 2 Modules

- Execution: execution transactions and update L2 states.
- Consensus: decentralize execution
- Settlement: Make sure Layer 2 states by sequencer is valid
- Data Availability: Provide evidence for settlement when necessary

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Layer 2 Modules

- Execution (EVM, VM, SVM, Move VM)
- Consensus (not yet)
- Settlement (ZK Proof, Fraud Proof)
- Data Availability (Ethereum, EigenDA, DAC)

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Morph Architecture

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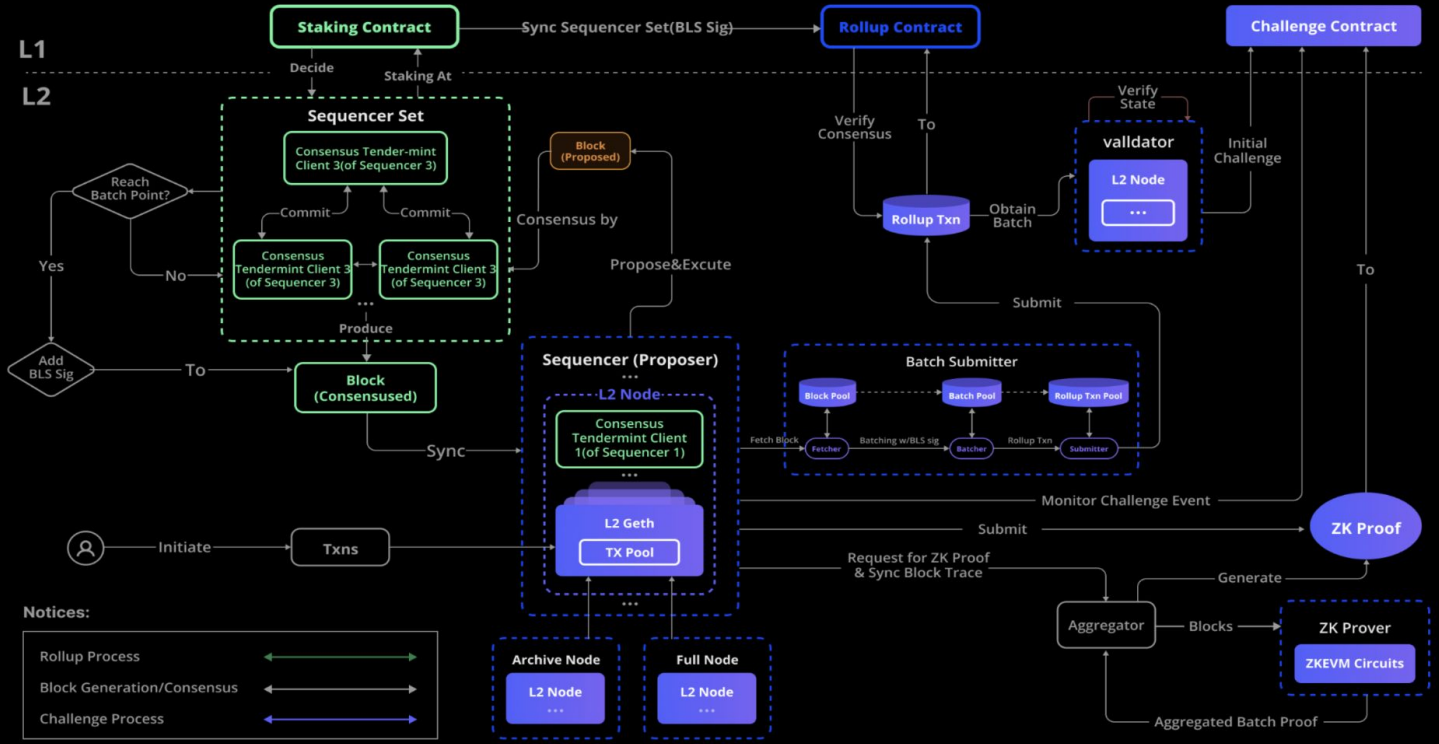

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Execution Layer

- Optimistic EVM(Optimism,Arbitrum)
- zkEVM (Type 1 - Type 4)
- Move VM (Aptos, Sui)
- zkVM (Starknet)
- SolanaVM (Eclipse)

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Data Availability Layer

- Ethereum as DA (Calldata -> Blob)
- Eigen DA (Not launched yet)
- Celestia DA (Manta, Aevo)
- DAC or Personalize DA (Mantle, ZKFair, Metis)

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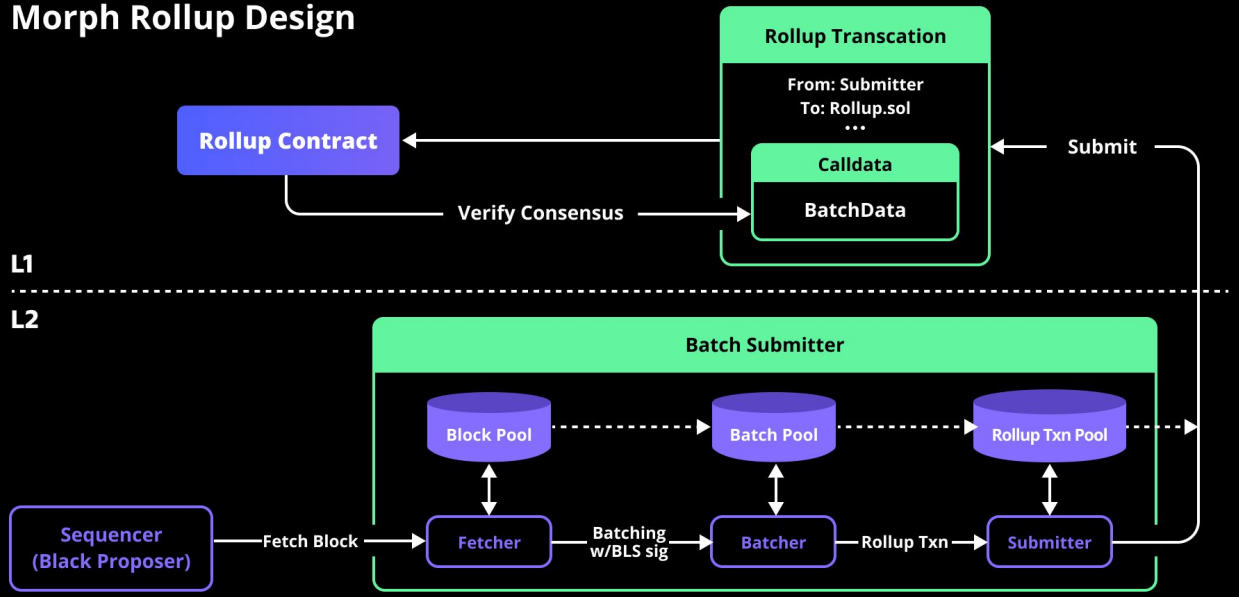
Rollup

L1⇔L2 interaction(Rollup&Bridge)

Morph Rollup Design



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Settlement Layer

Make sure sequencer submitted valid L2 states to L1

- Fraud Proof (Arbitrum)
- Validity Proof (ZK-Rollups)
- No Proof ! (Most of the “OP” Rollups)

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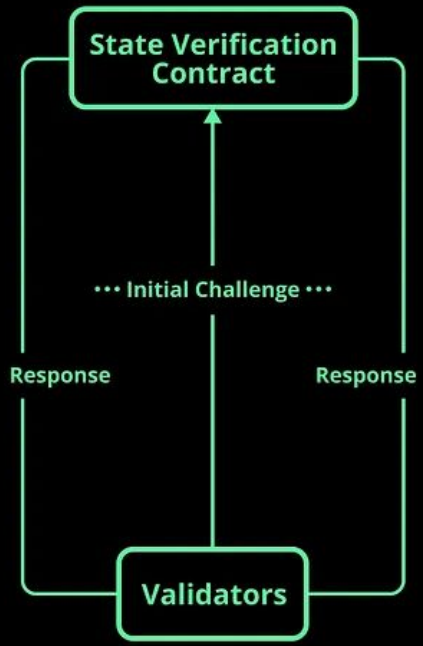
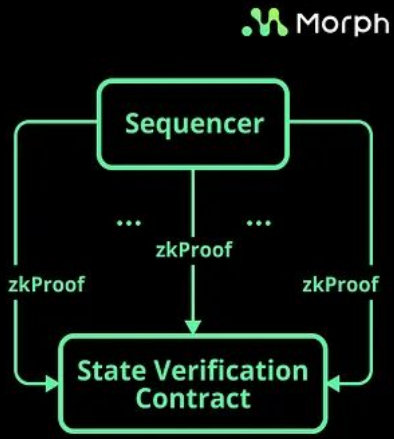
Fraud Proof & Validity Proof



Interactive Fraud Proof



zk Validity Proof

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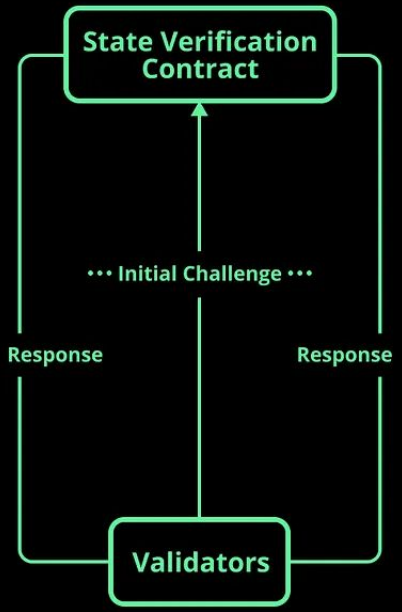
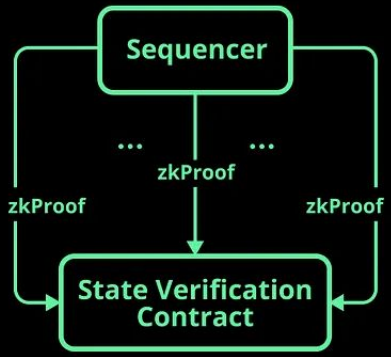
What if i combine Fraud Proof & ZK Proof?



Interactive Fraud Proof

Responsive Validity Proof



zk Validity Proof

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OPR vs ZKR vs Morph

Property	Optimistic Rollup	ZK Rollups	Morph
Finality Time	7 days	Various from 2-24H	1-2 days
Per Transaction Cost	High	Low(part of the txn data)	Low(part of the txn data)
Batch Cost	Low	High(proof+verification)	Low
Scaling Potential	High	Medium to Super high	Medium to Super high
Compatibility	High	Based on different solution	Based on the best zkEVM solution

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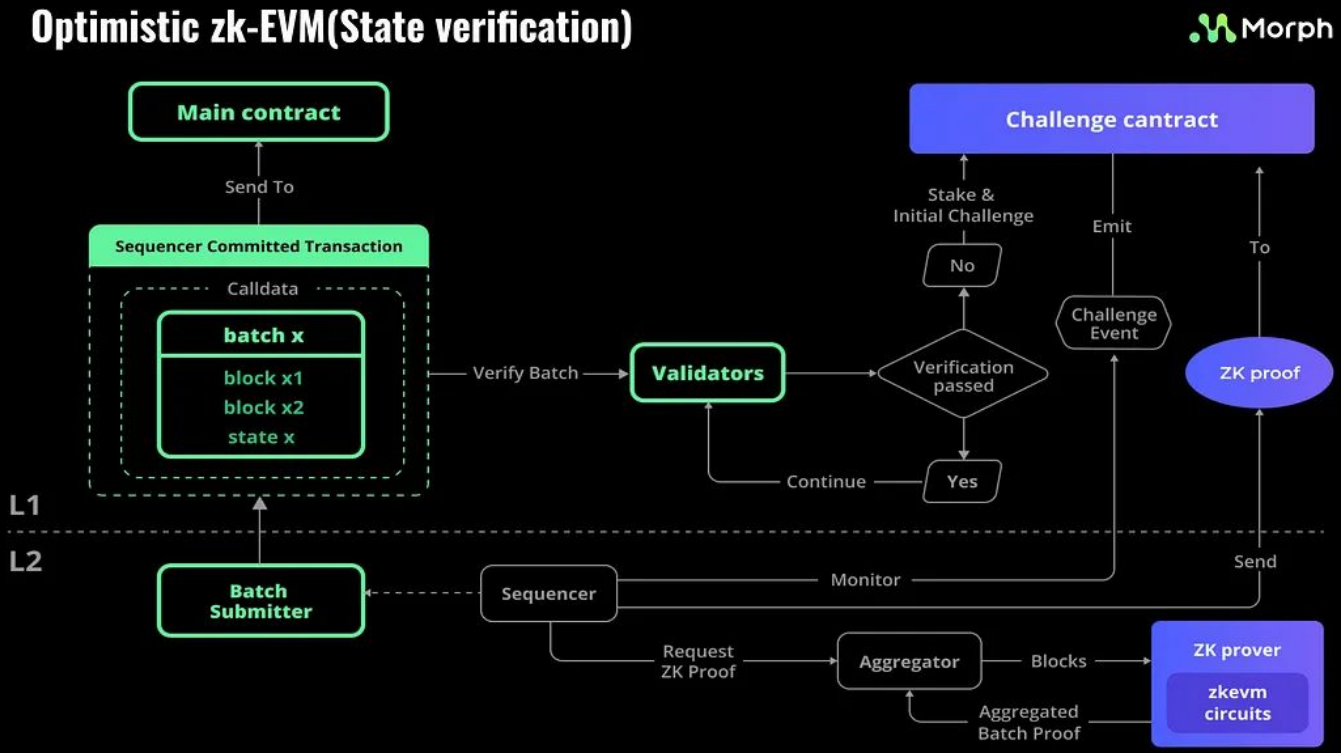
Optimize Settlement



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Consensus Layer

Decentralize execution on Layer 2

Why Though?

- Single Point of Failure
- Transaction Censorship
- MEV Monopoly

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Consensus Layer

What we do? We decentralize the sequencers!

Why Though?

- Single Point of Failure
- Transaction Censorship
- MEV Monopoly

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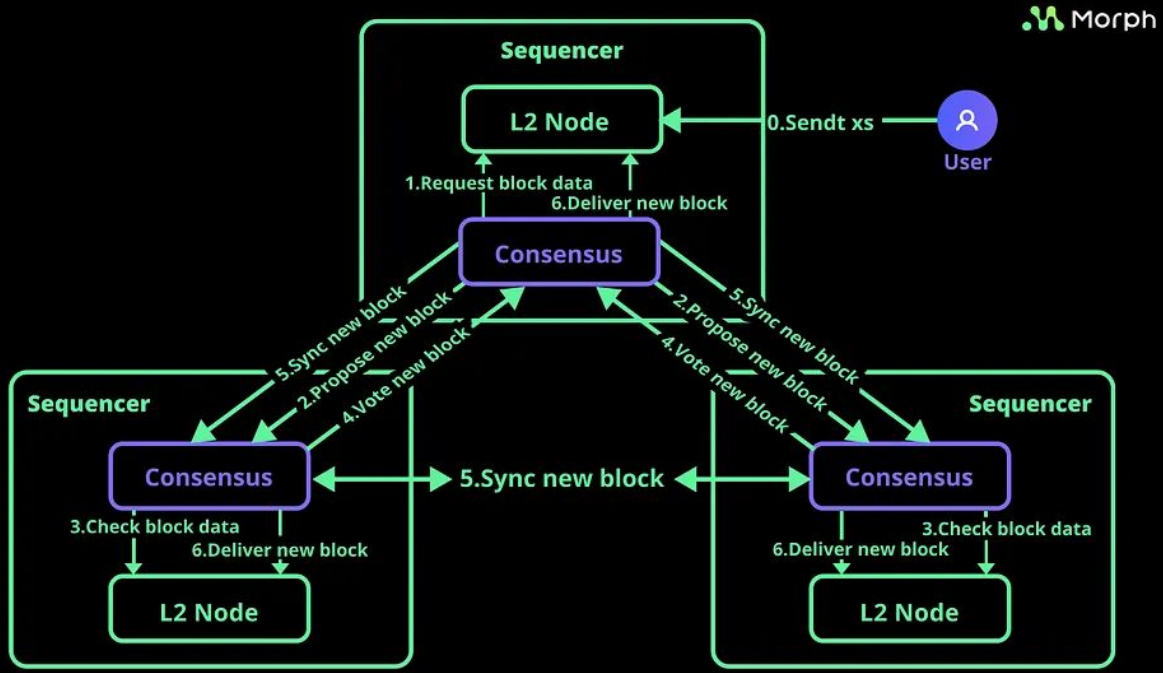
Layer 2 Block Generation



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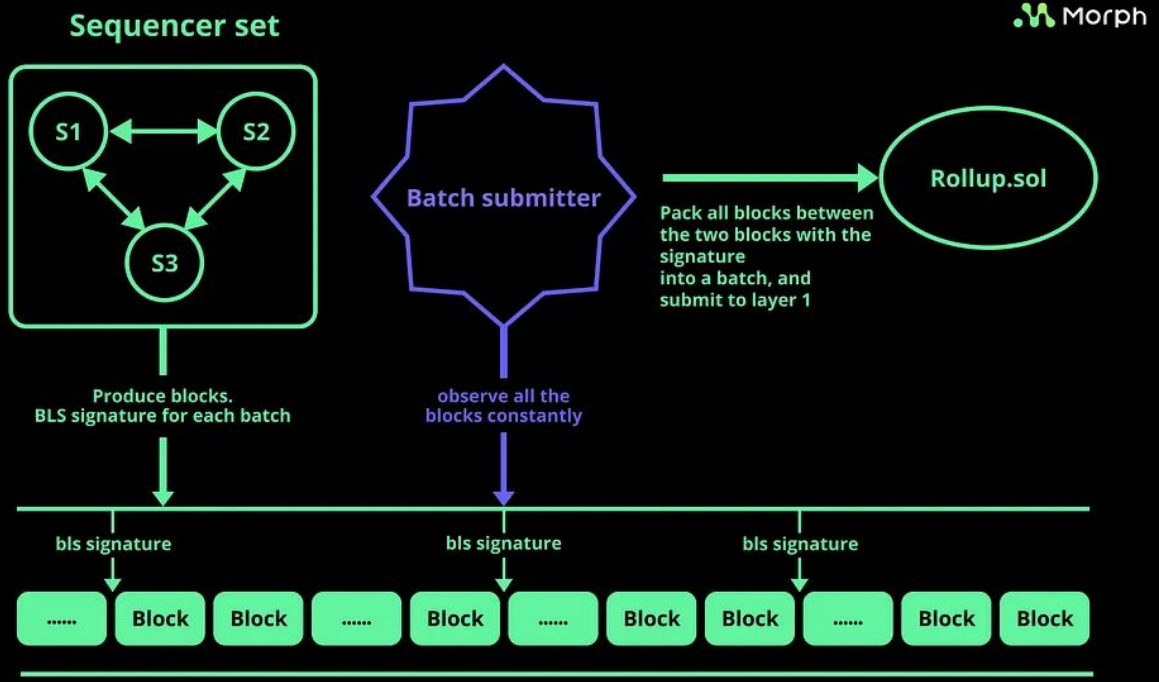
Optimize Consensus & Execution



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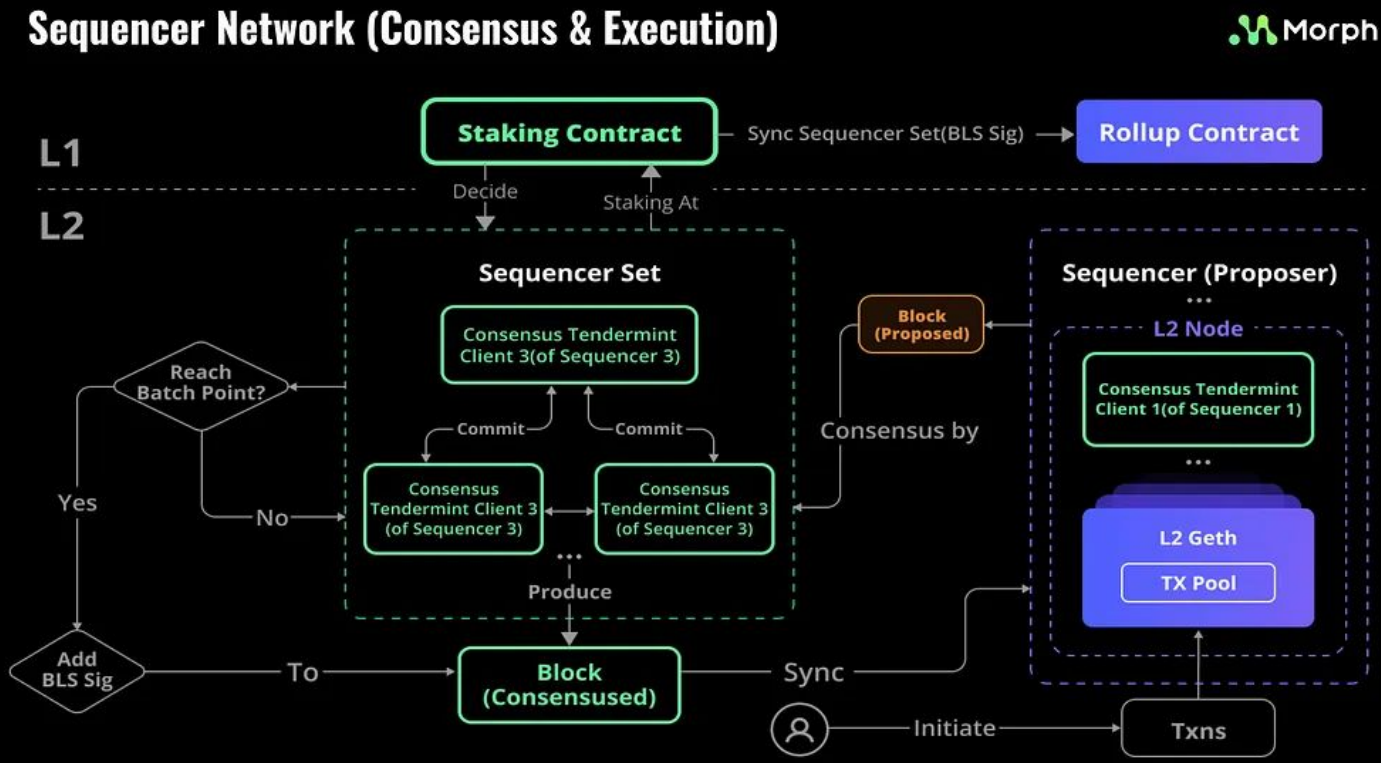
Optimize Consensus & Execution



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Morph's Vision

An Ethereum Layer 2 scaling solution harnessing the power of an optimistic zkEVM.

Vision

Redefine the blockchain landscape with a clear focus on the consumer.

We Prioritize:

1. Consumer-Centric Innovation: Focusing on the needs and experiences of users, ensuring that our platform is intuitive, efficient, and beneficial for everyday use.
2. Transparency and Trust: Building a community grounded in openness and mutual trust, where every step we take is communicated clearly and honestly.
3. Collaborative Ecosystem: Encouraging active participation and feedback from our community, ensuring that Morph evolves in alignment with the needs and aspirations of its users.

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Morph’s Roadmap

Sepolia Testnet

- EVM Equivalence
- Decentralized Sequencers

2nd Testnet & Mainnet

- Optimistic zkEVM
- EIP-4844 Integration

Mainnet

- Native Account Abstraction
- Layer 2 Staking

Mainnet Upgrade

- Fully Decentralized Stack
- Layer 3 Support

Developer Resources

Start Deploying Contracts + Building dApps

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Thanks

www.morphl2.io

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