Layer 2 Scaling Solutions: Course Preview

INTRO Preview

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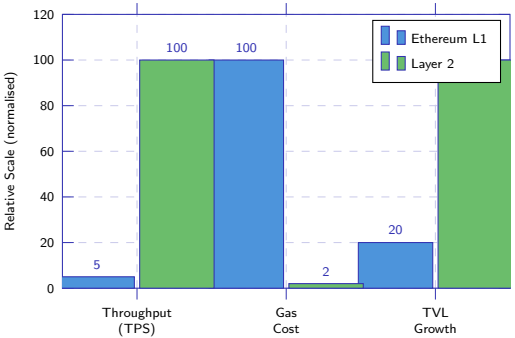
Why Layer 2 Scaling Matters

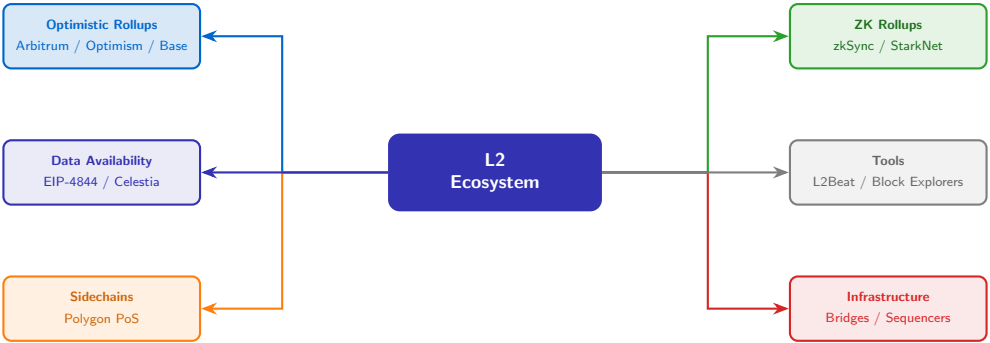


Key Metrics

- ✓ **$30B+** TVL across L2s
- ✓ **50x** cheaper transactions
- ✓ **100x+** throughput improvement
- ✓ **10+** major L2s live today

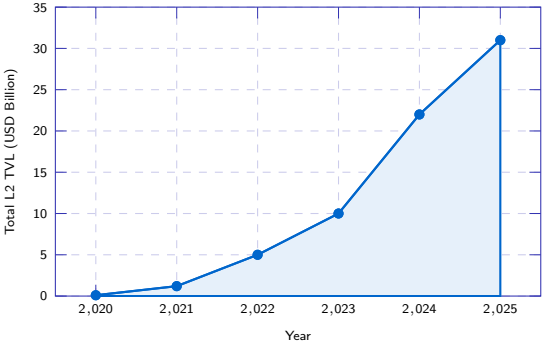
Layer 2 solutions resolve Ethereum's scalability trilemma: higher throughput and lower fees while inheriting L1 security guarantees.

L2 Ecosystem at a Glance



The L2 ecosystem spans rollup technologies, sidechain solutions, data availability layers, and the infrastructure connecting them to Ethereum.

L2 TVL Growth Trajectory



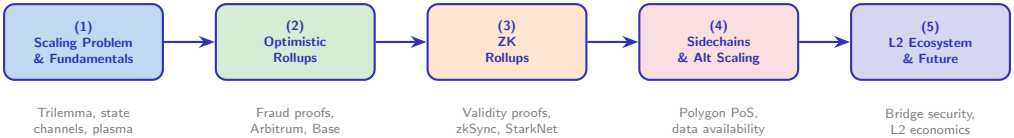
Growth Drivers

- ✓ **DeFi migration** to cheaper L2 rails
- ✓ **EIP-4844** blob fee reduction in 2024
- ✓ **Institutional** adoption of rollup chains
- ✓ **Gaming and NFTs** shifting on-chain activity

L2

TVL grew from under $100M in 2020 to over $30B by 2025, accelerating sharply after EIP-4844 reduced blob fees by up to 90%.

Course Coverage



Prerequisites

- ✓ Basic blockchain and Ethereum knowledge
- ✓ Introductory smart contract concepts

Outcomes

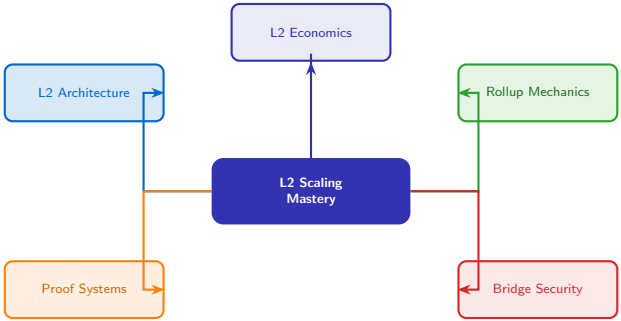
- ✓ Evaluate rollup designs and trade-offs
- ✓ Assess bridge security and L2 economics

Five modules progress from foundational scaling theory to hands-on analysis of live rollup ecosystems and their economic models.

What You Will Learn

Learning Outcomes

- ✓ **L2 architecture** — rollup design, sequencers, settlement layers
- ✓ **Rollup mechanics** — fraud proofs, validity proofs, challenge windows
- ✓ **Proof systems** — ZK-SNARKs, ZK-STARKs, recursive proving
- ✓ **Bridge security** — cross-chain messaging risks, exit mechanisms
- ✓ **L2 economics** — fee models, sequencer incentives, MEV on L2



By the end you will be able to design, compare, and audit Layer 2 solutions with deep knowledge of rollup proofs, bridges, and economic models.