



School: Campus:

Academic Year: Subject Name: Subject Code:

Semester: Program: Branch: Specialization:

Date:

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiment : Layer 2 Bridge – Explore OptimismzkSync

Objective/Aim:

To explore Layer 2 scaling solutions (Optimism and zkSync) and demonstrate how to bridge assets from Ethereum mainnet to Layer 2 networks using official bridges.

Apparatus/Software Used:

- Laptop/PC
- MetaMask
- Internet for research

Theory/Concept:

What is Layer 2?

Layer 2 (L2) is a **secondary framework or protocol** built on top of a Layer 1 blockchain (like Ethereum) to increase **transaction throughput** and **reduce gas fees**, while still inheriting the security of the base layer.

Why Layer 2?

- High gas fees on Ethereum mainnet.
- Limited transaction speed (~15 TPS).
- Layer 2 provides **scalability**, **lower cost**, and **faster transactions**.

Feature	Optimism	zkSync
Technology	Optimistic Rollups	Zero-Knowledge Rollups
Security Model	Fraud proofs	Validity proofs
Confirmation Speed	Slower (7-day withdrawal)	Fast (instant proof validation)
Advantages	Simple, EVM compatible	Faster, cheaper, highly secure
Use Cases	dApp scaling, DeFi	NFT, micropayments, faster bridges

Procedure:

Step 1: Setup

- Install **MetaMask** and fund it with test ETH (Goerli or Sepolia).
- Add Optimism and zkSync test networks manually or via bridge UI.

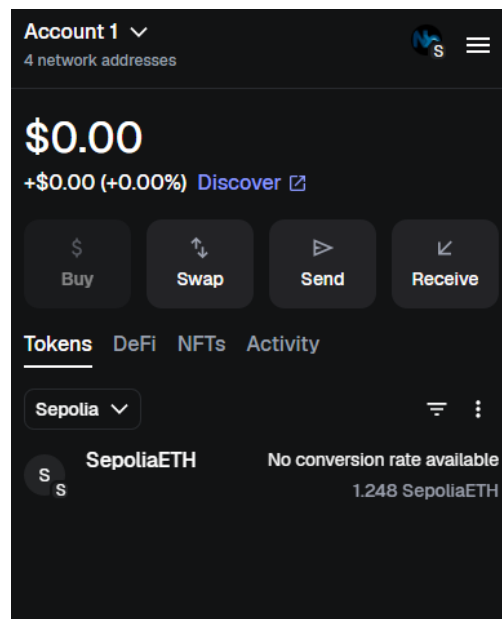
Step 2: Bridging to Optimism

- Go to: <https://app.optimism.io/bridge>
- Connect wallet and select amount of ETH to bridge.
- Confirm transaction in MetaMask.
- Wait for completion (usually a few minutes).

Step 3: Bridging to zkSync

- Go to: <https://portal.zksync.io/bridge>
- Connect wallet, select ETH or tokens.
- Confirm transaction to bridge funds.
- zkSync uses ZK proofs → transactions complete quickly.

Step 4: Verify Transaction Optimism Explorer or zkSync Explorer to verify the bridged transaction hash.



Observation:

Parameter	Ethereum (L1)	Optimism (L2)	zkSync (L2)
Avg Gas Fee	High (~\$2–\$10)	Low (~\$0.05–\$0.2)	Very Low (~\$0.01–\$0.1)
Confirmation Time	~15–30s	~2–3s	~1–2s
Withdrawal Time	Immediate	~7 days	Instant

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	50		