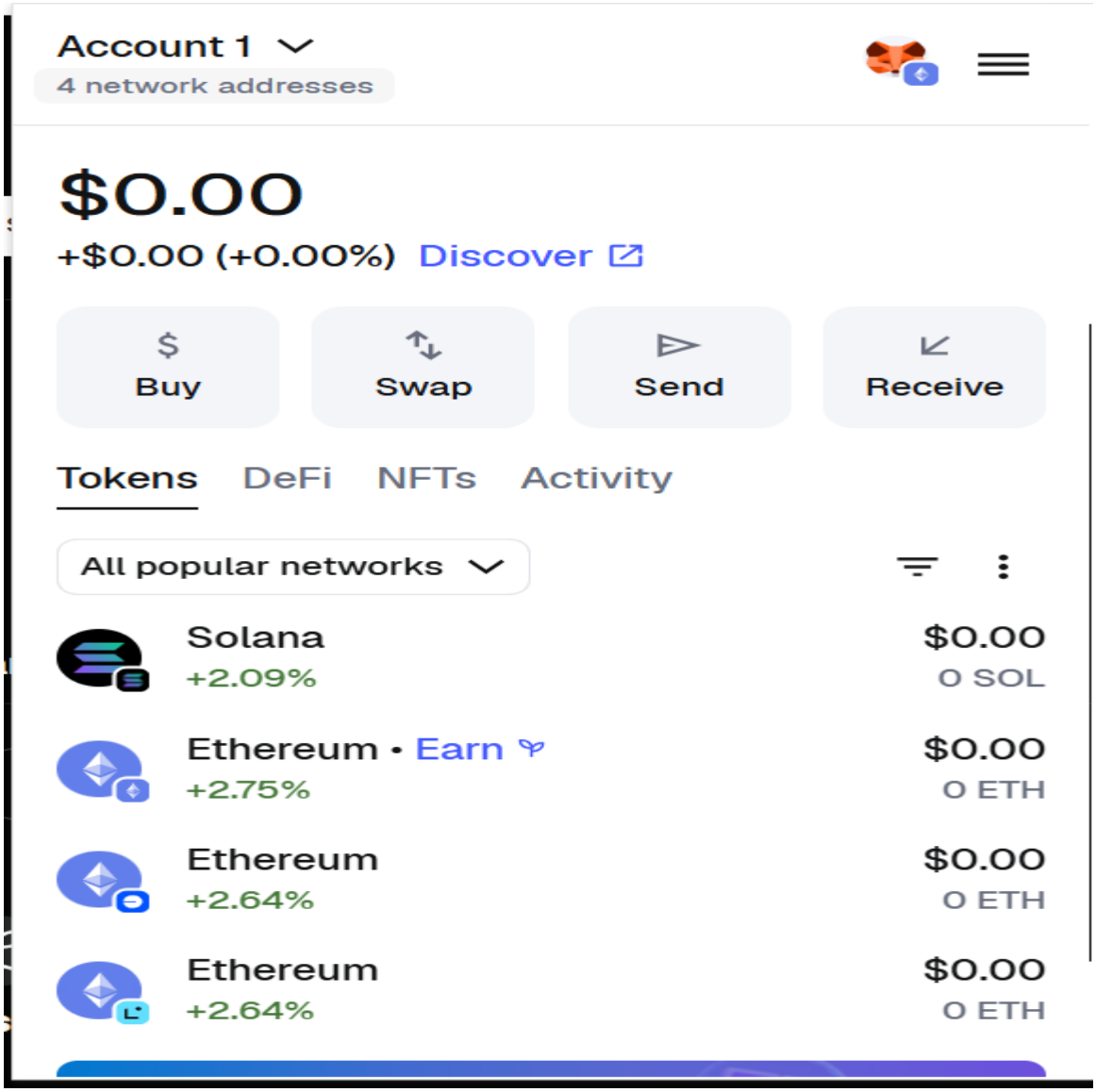
Web3 and Blockchain Basics: Setup Wallet and Explore Dapps

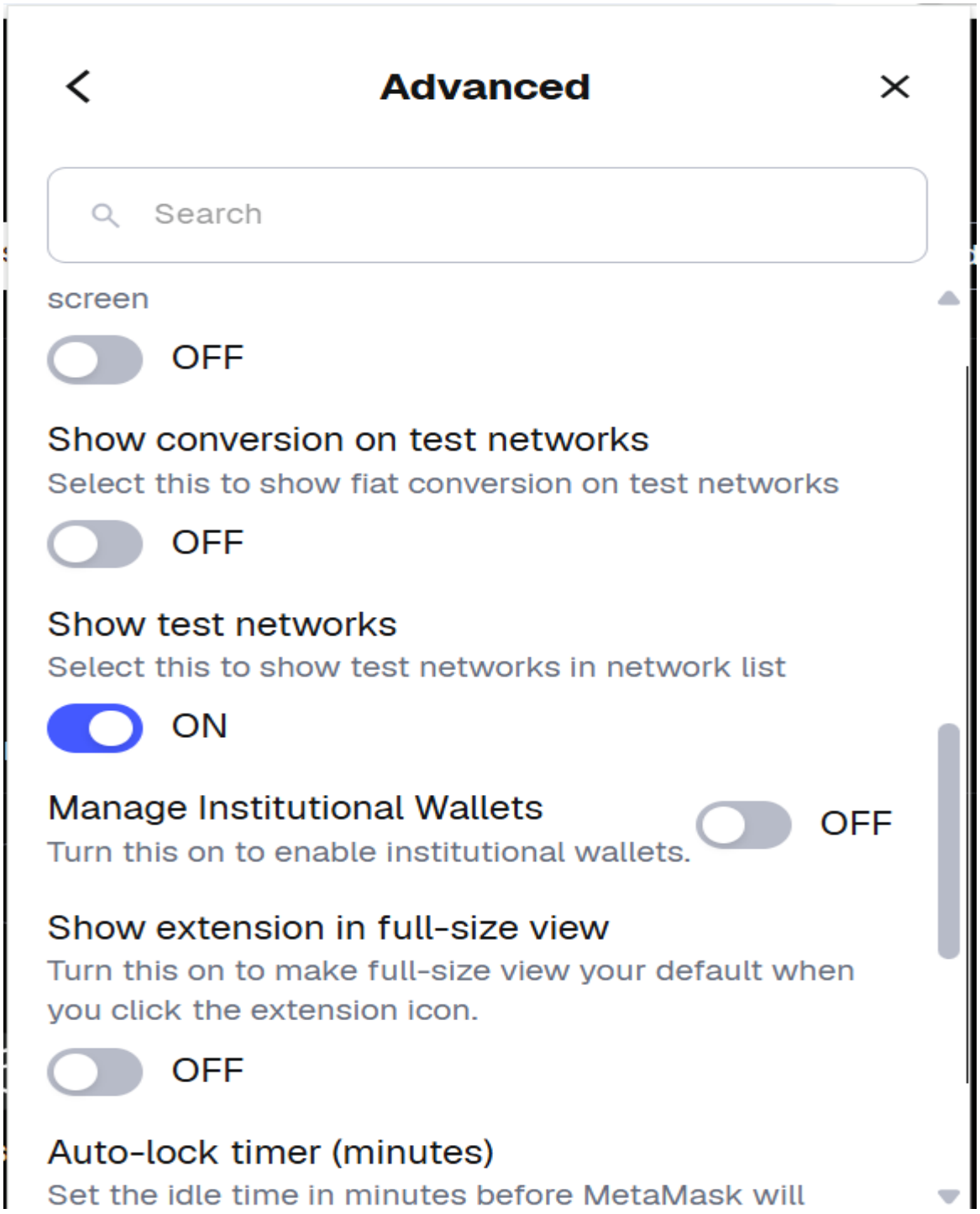
1. Documentation

1.1 MetaMask Installation



-Installed MetaMask browser extension from the official website.
-Created a new wallet and securely stored the seed phrase offline.
-Verified that the wallet was successfully created.

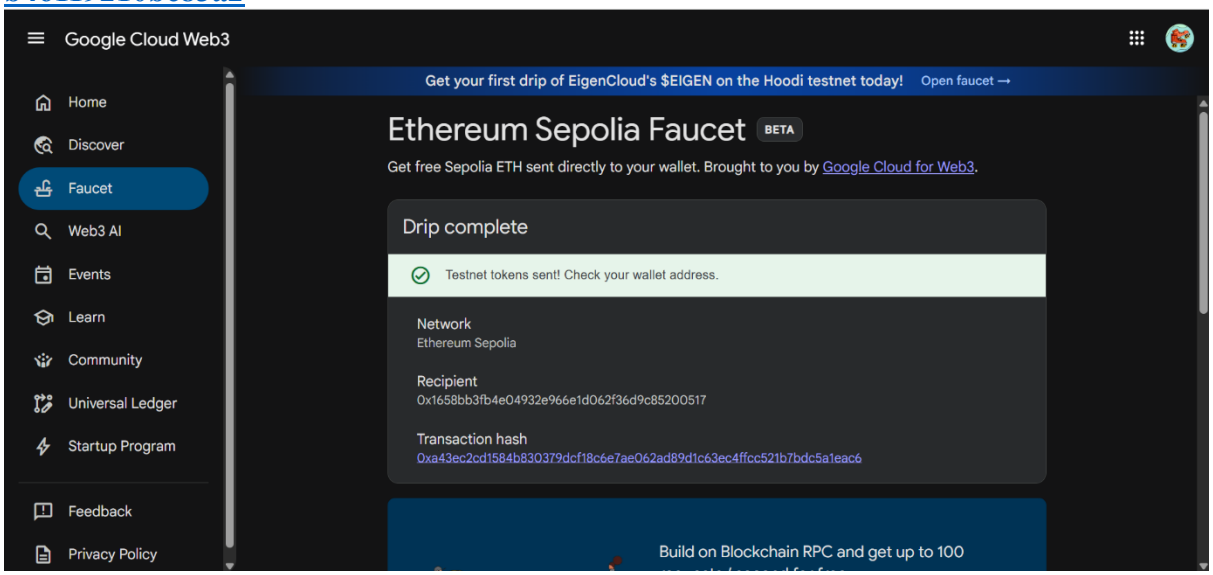
1.2 Testnet Configuration



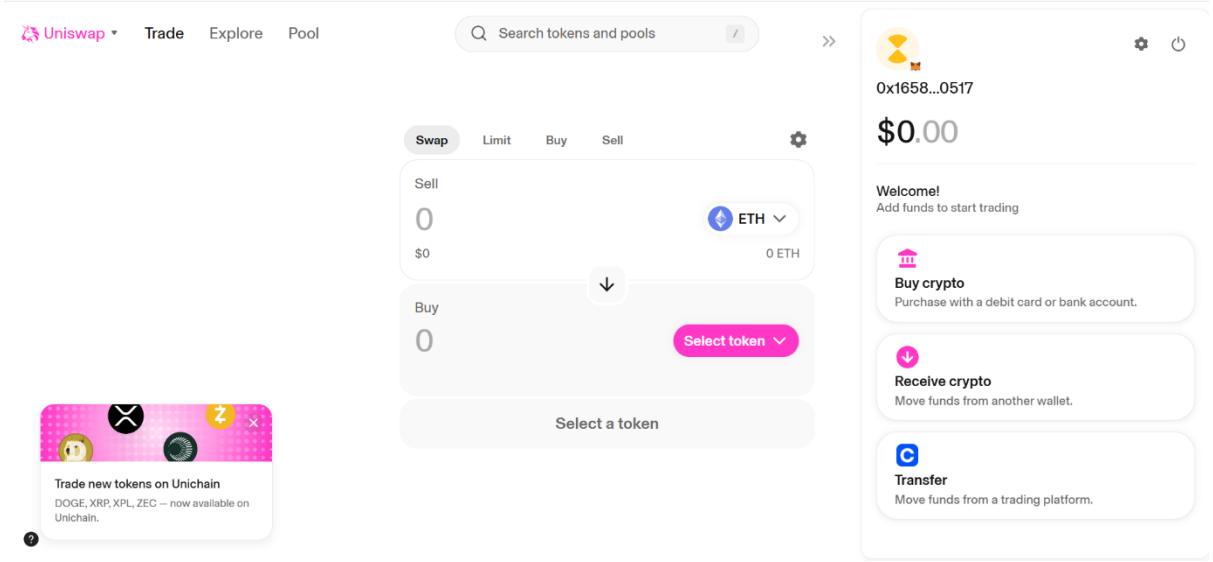
-Configured MetaMask to connect to Ethereum Sepolia Test Network.
-Ensured correct RPC URL and chain ID.
-Checked “Connected” status in the wallet interface.

1.2 Obtaining Testnet ETH

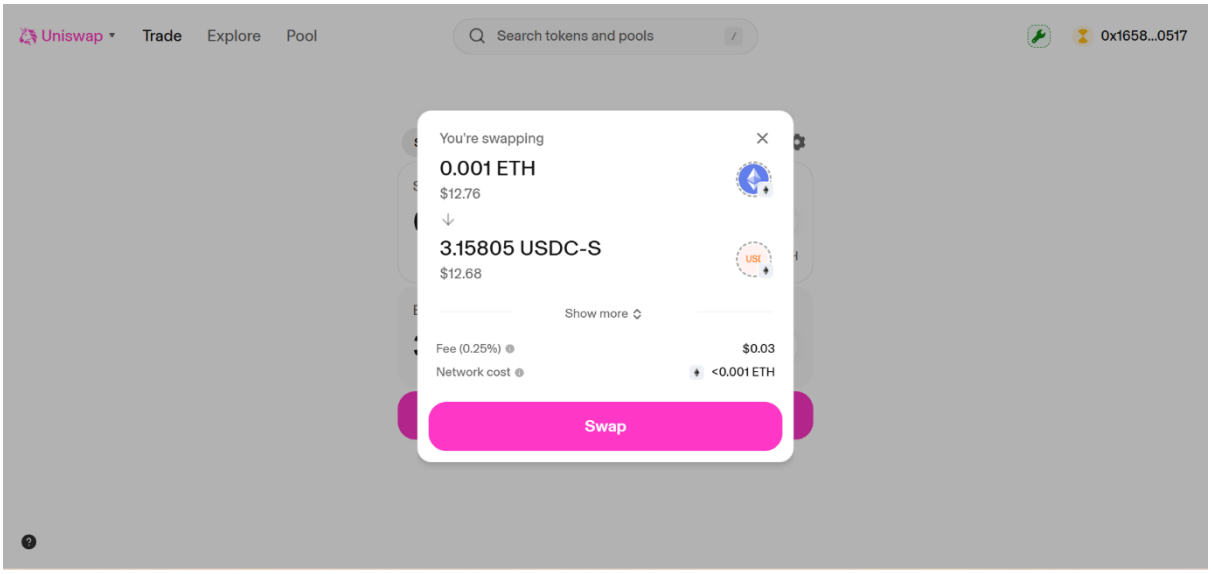
-Accessed Sepolia Faucet and requested testnet ETH.
-Verified the transaction in Etherscan using my wallet address:
0x1658bb3fb4e04932e966e1d062f36d9c85200517
-Transaction Hash:
0x93a30e2227ffe59e5053a2c9f9546990a8fd5b49b69c534b9b46119210bc83a2
-Etherscan Link:
https://sepolia.etherscan.io/tx/0x93a30e2227ffe59e5053a2c9f9546990a8fd5b49b69c534b9b46119210bc83a2



1.3 DApp Interaction

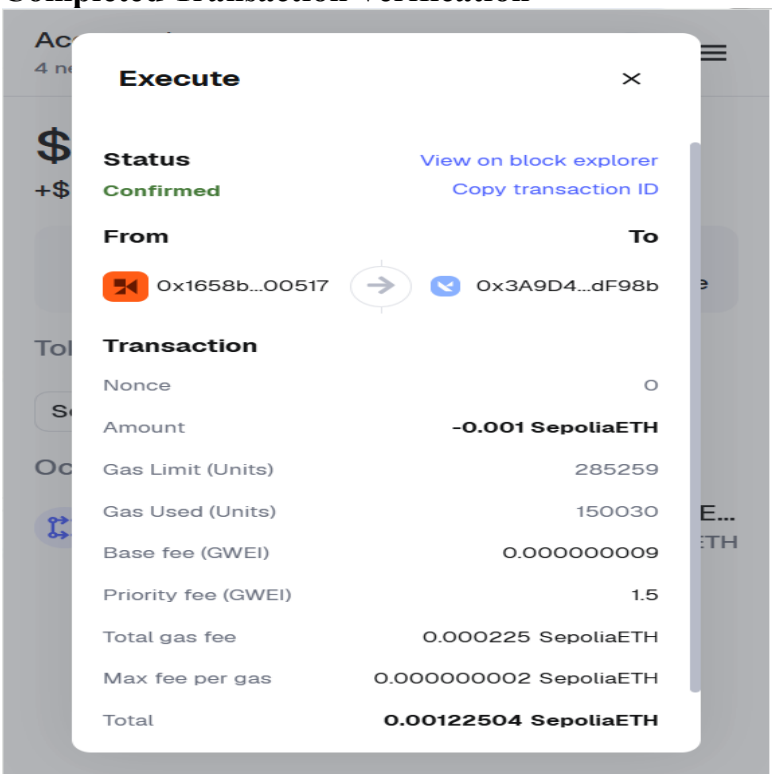


-Opened app.uniswap.org for Dapp Interaction.
-Connected MetaMask wallet to the DApp.
-Verified updates on the blockchain.



- Swapping from ETH – USDC-S
- Converted 0.001 ETH to 3.15805 USDC-S
- **Transaction Hash:**
0xa43ec2cd1584b830379dcf18c6e7ae062ad89d1c63ec4ffcc521b7bdc5a1eac6
Etherscan Link:
https://sepolia.etherscan.io/tx/0xa43ec2cd1584b830379dcf18c6e7ae062ad89d1c63ec4ffcc521b7bdc5a1eac6

1.4 Completed Transaction Verification



2. Written Reflection

2.1 Key Blockchain Concepts Learned:

During this project, I gained a deep understanding of the foundational concepts of blockchain technology, including decentralization, transparency, and immutability. Blockchain functions as a distributed ledger that records transactions securely across multiple nodes. Each transaction is verified by the network, ensuring that data cannot be altered or deleted. I also learned about consensus mechanisms such as Proof of Work and Proof of Stake, which enable trust and validation without any central authority. These principles highlight why blockchain is a revolutionary innovation for creating secure, transparent, and tamper-proof systems.

2.2 Differences Between Centralized and Decentralized Applications:

A major takeaway from this learning experience was understanding the contrast between centralized and decentralized systems.
In centralized applications, all control and data storage lie with a single authority, which can lead to privacy risks and single points of failure.
On the other hand, decentralized applications (DApps) run on blockchain networks where data and control are distributed among users. This architecture provides greater transparency, security, and reliability. Even if one node fails, the system continues to function seamlessly. This difference helped me appreciate how decentralization empowers users and eliminates the need for intermediaries.

2.3 Understanding Smart Contracts and Their Role in Dapps:

I also learned the importance of smart contracts, which are self-executing programs deployed on a blockchain. They automatically perform predefined actions when certain conditions are met, removing the need for third parties. In my project, I deployed and interacted with a simple smart contract that allowed me to set and retrieve messages on the blockchain. Through this, I understood how DApps communicate with the blockchain via smart contracts, ensuring trustless and automated execution of transactions.

2.4 Security Considerations When Using Crypto Wallets:

Security plays a crucial role in blockchain operations. I explored how crypto wallets like MetaMask securely manage private and public keys to authorize blockchain transactions. I learned that safeguarding the private key and recovery phrase is essential to prevent unauthorized access. I also gained experience selecting correct networks such as the Sepolia testnet and verifying transactions using Etherscan. Understanding these practices helped me handle wallets safely and avoid potential losses or network errors.

2.5 Challenges Faced and How I Overcame Them:

While completing this project, I encountered several challenges such as faucet delays, transaction failures, and incorrect network connections. Initially, my transactions didn't reflect on Etherscan due to network mismatches. I resolved this issue by verifying the active test network and ensuring the correct wallet configuration. I also faced issues while deploying smart contracts but overcame them by revisiting the deployment steps and using reliable blockchain tools. These challenges enhanced my practical knowledge and strengthened my problem-solving skills in blockchain development.

3. Technical Summary

3.1 Testnet Used:

I used the Sepolia Testnet, a safe Ethereum test network that allows testing transactions without real ETH. MetaMask was configured to connect to Sepolia, and I received test ETH from the Sepolia Faucet to perform smart contract interactions.

3.2 DApp Interacted With:

I worked with a custom HelloWorld DApp that stores and updates a message on the blockchain.
Contract Address: 0x9D5A1e7884c0BfC9301c4c03d08A7cC20F147d23
Wallet Used: 0xf22E58944B9daa461b01F6364371b312de2E3E4B
This helped me understand how DApps connect to MetaMask and communicate with smart contracts through Web3.

3.3 Transactions Performed:

I executed several Set Message transactions to update text data on-chain.
Transaction Hash:
0x5dd175b80a8c0a8d0f0405a3a862f08274e7c52dfcf372a235b490deb820f7a4
Etherscan Link:
https://sepolia.etherscan.io/tx/0x5dd175b80a8c0a8d0f0405a3a862f08274e7c52dfcf372a235b490deb820f7a4
These transactions showed how gas fees and confirmations work on Ethereum.

3.4 Errors & Troubleshooting:

Network mismatch: MetaMask wasn't on Sepolia → switched network.
Faucet delay: Waited and retried to receive test ETH.
Transaction failure: Adjusted gas limit in MetaMask to complete successfully.

4. Proof of Work / Results:

To validate my practical understanding of Web3 concepts, I successfully interacted with a decentralized application (DApp) using the Sepolia Testnet. The following screenshots demonstrate the real-time execution and confirmation of blockchain transactions.

Figure 1: Transaction Details on Sepolia Testnet:

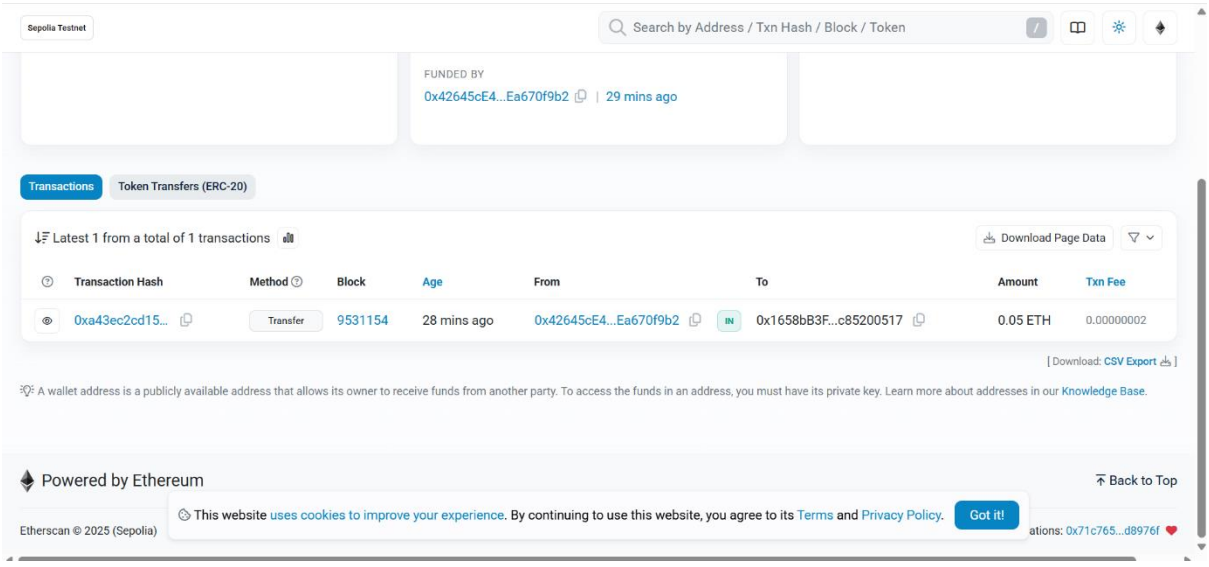


Figure 1 shows the details of a successful transaction

Figure 2: Transaction History on Sepolia Testnet:

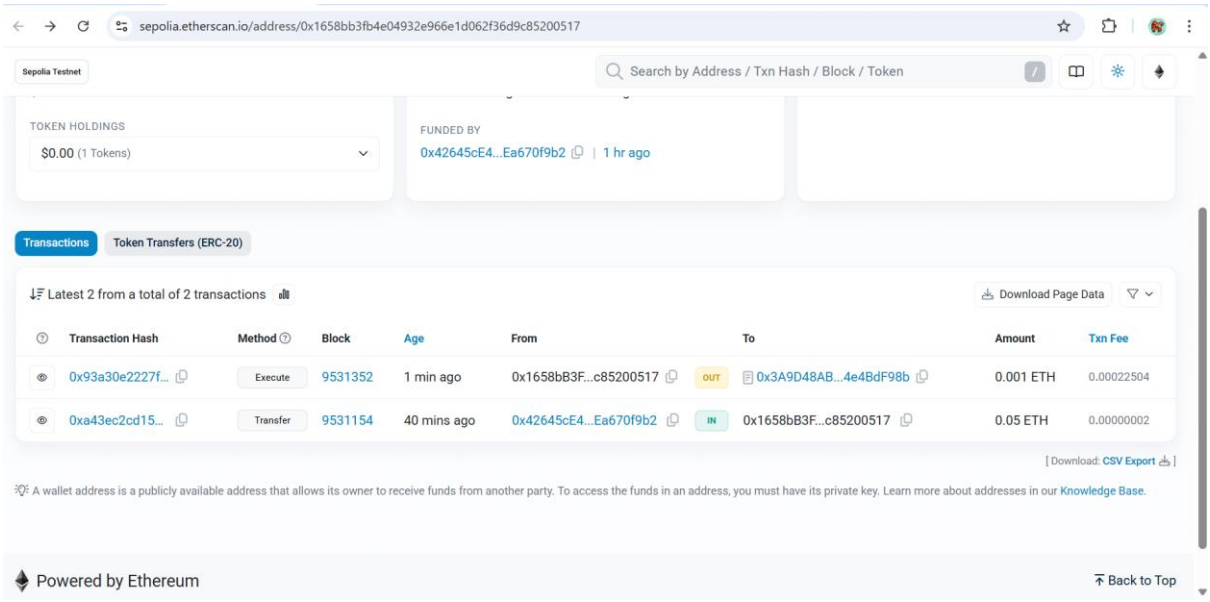


Figure 2 displays the list of recent transactions made

5.Conclusion:

This Web3 Basics exercise provided hands-on experience in interacting with blockchain networks, deploying smart contracts, and understanding decentralized systems. Through this task, I developed a clear understanding of DApps, crypto wallet security, and testnet transactions.