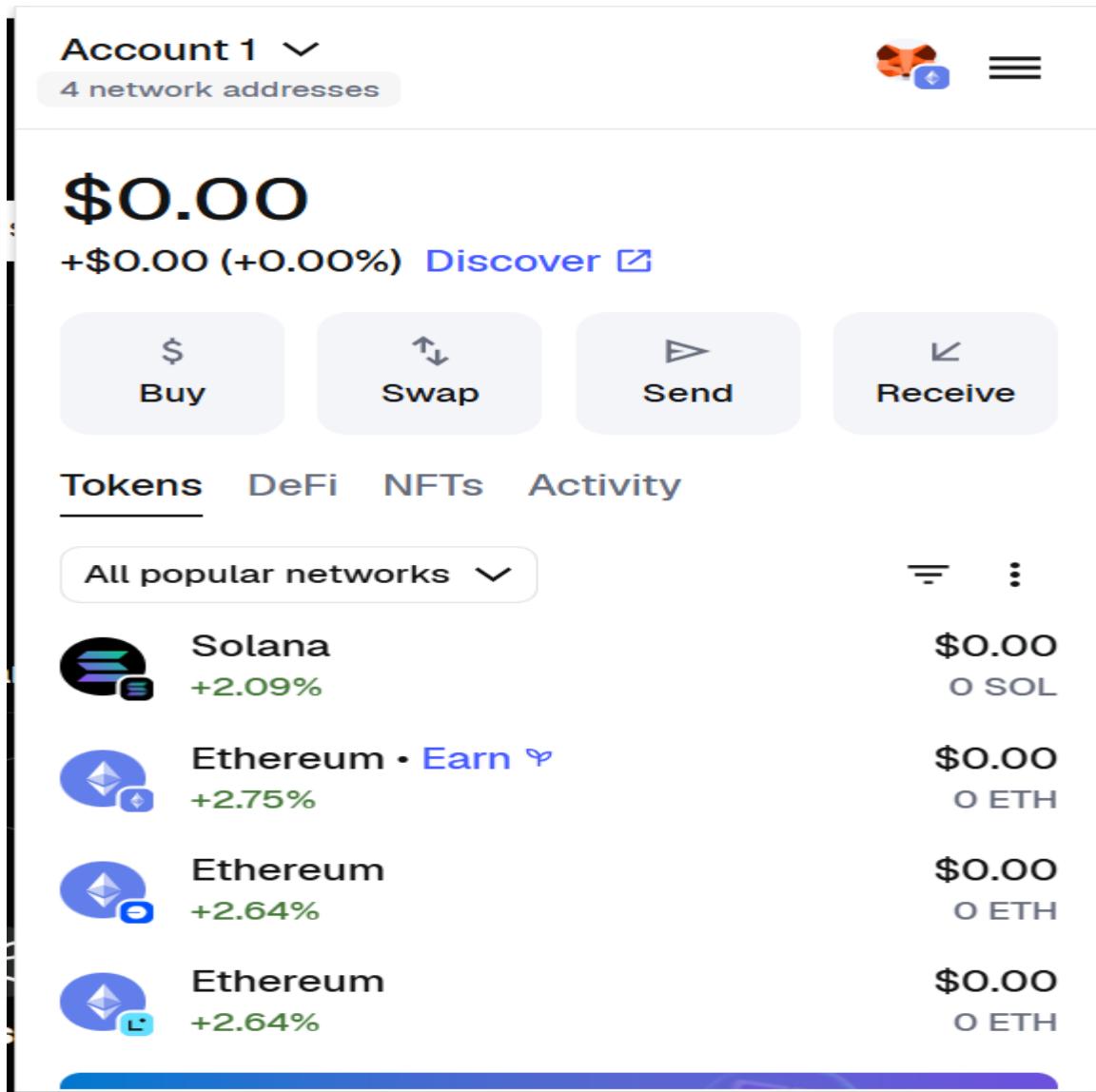


Web3 and Blockchain Basics: Setup Wallet and Explore Dapps

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

The screenshot shows the 'Advanced' settings screen of MetaMask. At the top center is the title 'Advanced'. To the left is a back arrow icon, and to the right is a close 'X' icon. Below the title is a search bar with a magnifying glass icon and the placeholder text 'Search'. The main content area contains several configuration options:

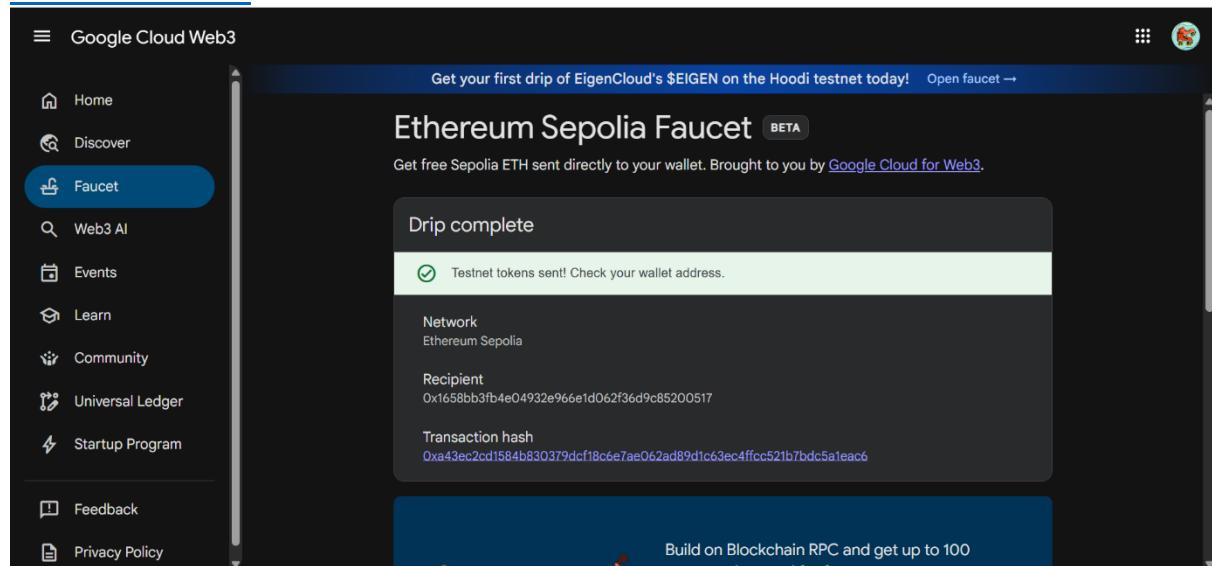
- screen**: A toggle switch labeled 'OFF'.
- Show conversion on test networks**: A description followed by a toggle switch labeled 'OFF'.
- Show test networks**: A description followed by a toggle switch labeled 'ON'.
- Manage Institutional Wallets**: A description followed by a toggle switch labeled 'OFF'.
- Show extension in full-size view**: A description followed by a toggle switch labeled 'OFF'.
- Auto-lock timer (minutes)**: A description followed by a dropdown menu indicator (a small downward arrow).

- 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

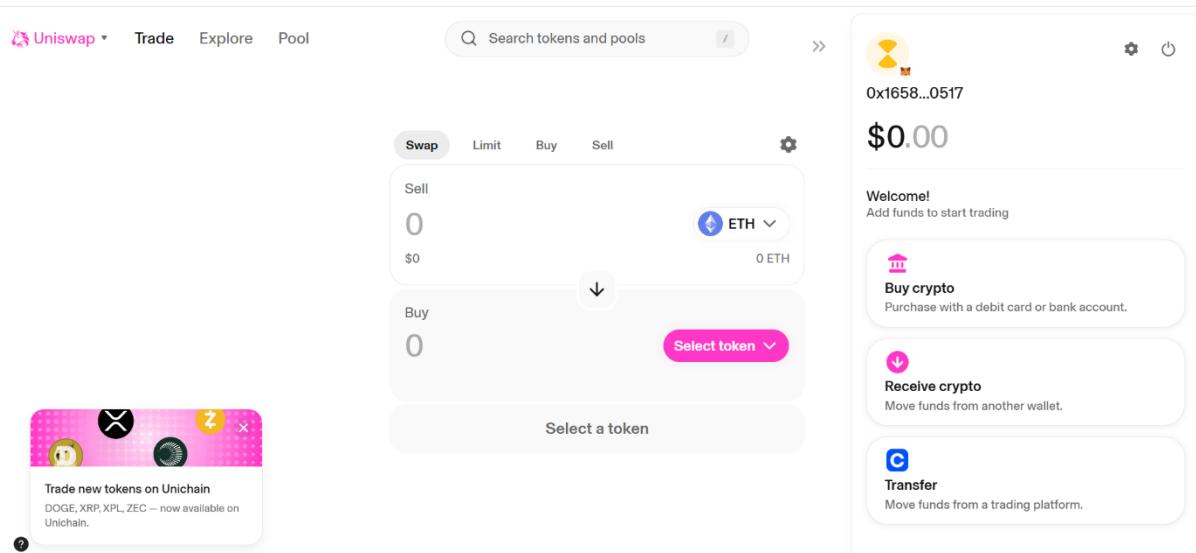
- Accessed Sepolia Faucet and requested testnet ETH.
- Verified the transaction in Etherscan using my wallet address:
0x1658bb3fb4e04932e966e1d062f36d9c85200517
- Transaction Hash:**
0x93a30e2227ffe59e5053a2c9f9546990a8fd5b49b69c534b9b46119210bc83a2
- Etherscan Link:**

<https://sepolia.etherscan.io/tx/0x93a30e2227ffe59e5053a2c9f9546990a8fd5b49b69c534b9b46119210bc83a2>



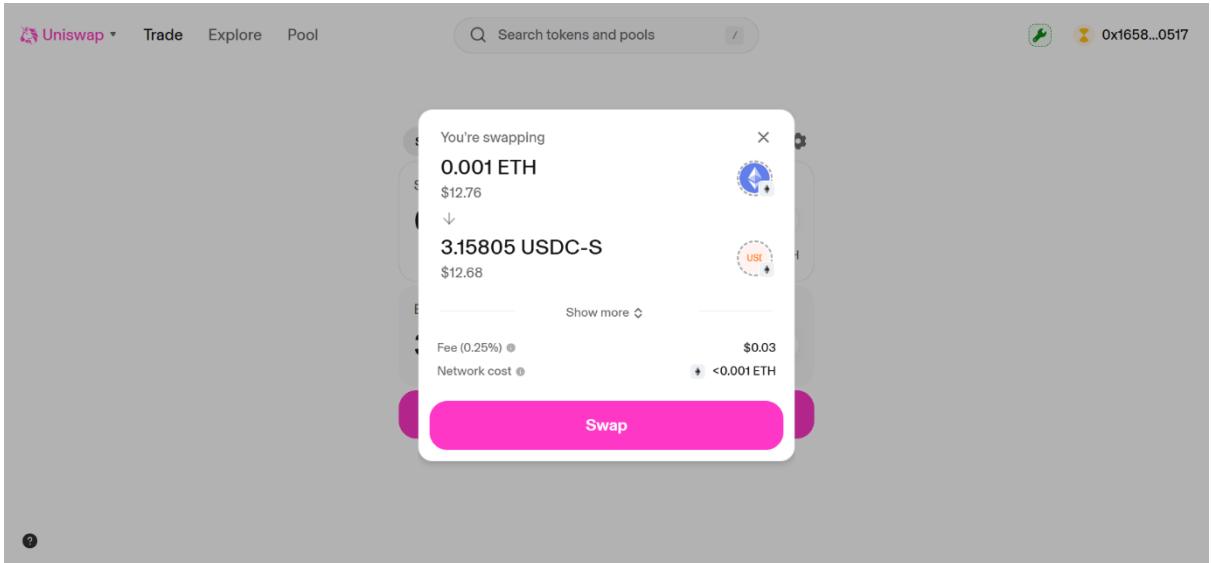
The screenshot shows the Ethereum Sepolia Faucet interface. On the left, there's a sidebar with options like Home, Discover, Faucet (which is selected), Web3 AI, Events, Learn, Community, Universal Ledger, Startup Program, Feedback, and Privacy Policy. The main area has a dark background with white text. It says "Get your first drip of EigenCloud's \$EIGEN on the Hoodi testnet today! Open faucet →". Below that is the title "Ethereum Sepolia Faucet" with a "BETA" badge. It says "Get free Sepolia ETH sent directly to your wallet. Brought to you by Google Cloud for Web3.". A central box displays a green checkmark icon and the text "Testnet tokens sent! Check your wallet address." It shows the "Network: Ethereum Sepolia", "Recipient: 0x1658bb3fb4e04932e966e1d062f36d9c85200517", and the "Transaction hash: 0xa43ec2cd1584b830379dcf18c6e7ae062ad89d1c63ec4ffcc521b7bdc5a1eac6". At the bottom, it says "Build on Blockchain RPC and get up to 100".

1.3 DApp Interaction



The screenshot shows the Uniswap DApp interface. At the top, there are tabs for "Uniswap", "Trade", "Explore", and "Pool". There's also a search bar with placeholder text "Search tokens and pools". The main area has a light blue background. It features a "Swap" button and four other buttons: "Limit", "Buy", and "Sell". Below these are two input fields: "Sell" (with value 0) and "Buy" (with value 0). To the right of the "Sell" field is a dropdown menu set to "ETH". Below the "Buy" field is a "Select token" button. A pink banner at the bottom left says "Trade new tokens on Unichain DOGE, XRP, XPL, ZEC — now available on Unichain." On the right side, there's a sidebar with a yellow profile picture and the address "0x1658...0517". It shows a balance of "\$0.00". Below the balance, it says "Welcome! Add funds to start trading". There are three buttons: "Buy crypto" (Purchase with a debit card or bank account), "Receive crypto" (Move funds from another wallet), and "Transfer" (Move funds from a trading platform).

- 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

The screenshot shows a MetaMask transaction confirmation screen. The transaction is confirmed and details the transfer of -0.001 SepoliaETH from address OX1658b...00517 to address OX3A9D4...dF98b. The transaction fees include a base fee of 0.000000009 SepoliaETH, priority fees of 1.5 GWEI, and a total gas fee of 0.000225 SepoliaETH. The total transaction cost is 0.00122504 SepoliaETH.

Field	Value
Status	Confirmed
From	OX1658b...00517
To	OX3A9D4...dF98b
Amount	-0.001 SepoliaETH
Gas Limit (Units)	285259
Gas Used (Units)	150030
Base fee (GWEI)	0.000000009
Priority fee (GWEI)	1.5
Total gas fee	0.000225 SepoliaETH
Max fee per gas	0.000000002 SepoliaETH
Total	0.00122504 SepoliaETH

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:

The screenshot shows the Etherscan Sepolia Testnet interface. At the top, there's a search bar and navigation icons. Below it, a message says "FUNDDED BY 0x42645cE4...Ea670f9b2 | 29 mins ago". The main area has tabs for "Transactions" (which is selected) and "Token Transfers (ERC-20)". A table lists the latest transaction: "0xa43ec2cd15..." (Method: Transfer, Block: 9531154, Age: 28 mins ago, From: 0x42645cE4...Ea670f9b2, To: 0x1658bB3F...c85200517, Amount: 0.05 ETH, Txn Fee: 0.00000002). There are download options for "Download Page Data" and "CSV Export". A note at the bottom explains that a wallet address is publicly available. The footer includes "Powered by Ethereum", copyright information, and a cookie policy.

Figure 1 shows the details of a successful transaction

Figure 2: Transaction History on Sepolia Testnet:

The screenshot shows the Etherscan.io interface for the Sepolia Testnet. At the top, the URL is sepolia.etherscan.io/address/0x1658bb3fb4e04932e966e1d062f36d9c85200517. The page header includes "Sepolia Testnet" and a search bar. On the left, there's a "TOKEN HOLDINGS" section showing "\$0.00 (1 Tokens)". In the center, it says "FUNDED BY" with the address "0x42645cE4...Ea670f9b2" and a timestamp "1 hr ago". Below this, there are two tabs: "Transactions" (which is selected) and "Token Transfers (ERC-20)". The main content area displays a table of transactions. The table has columns: Transaction Hash, Method, Block, Age, From, To, Amount, and Txn Fee. There are two entries:

Transaction Hash	Method	Block	Age	From	To	Amount	Txn Fee
0x93a30e2227f...	Execute	9531352	1 min ago	0x1658bb3fb4e04932e966e1d062f36d9c85200517	0x3A9D48AB...4e4BdF98b	0.001 ETH	0.00022504
0xa43ec2cd15...	Transfer	9531154	40 mins ago	0x42645cE4...Ea670f9b2	0x1658bb3fb4e04932e966e1d062f36d9c85200517	0.05 ETH	0.00000002

At the bottom of the table, there's a link "[Download: CSV Export]". A small note at the bottom left explains what a wallet address is. The footer includes "Powered by Ethereum" and "Back to Top".

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.