# Web3 and Blockchain Basics

## Setup Wallet and Explore DApps

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# Blockchain DApp Implementation Report (Sepolia Test Network)

## Step 1: MetaMask Installation

To begin the implementation, MetaMask was installed as a browser extension. The installation was done from the official MetaMask website by selecting **“Add To Chrome”** and adding it the extension. Once added, MetaMask automatically appeared in the browser’s extensions bar, ready for setup.

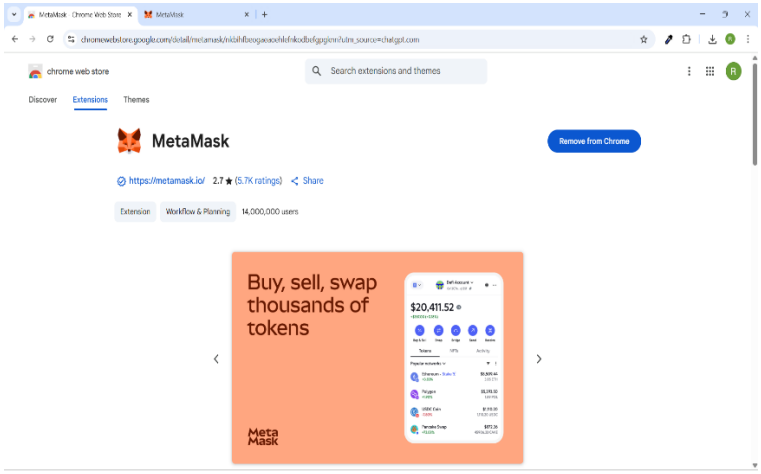


Fig 1.Meta Mask Installation

## Step 2: Crypto Wallet Creation

After installing MetaMask, a new crypto wallet was created. The process included setting a strong password and securely storing the 12-word seed phrase offline. This phrase acts as a recovery key for wallet access. Once setup was complete, the main account titled **Account 1** was displayed with a default Ethereum address.

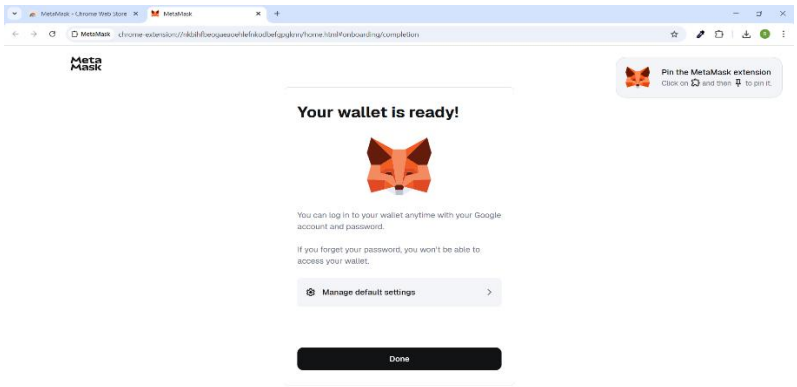


Fig 2.Wallet Setup

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## Step 3: Test Network Configuration

To enable interaction with test networks, the MetaMask settings were configured. Under **Settings → Advanced**, the **Show Test Networks** option was turned ON. Then, the **Sepolia Test Network** was selected from the network dropdown. This configuration allowed the wallet to operate on the Ethereum Sepolia Testnet environment for safe, no-cost transactions which is learner-friendly.

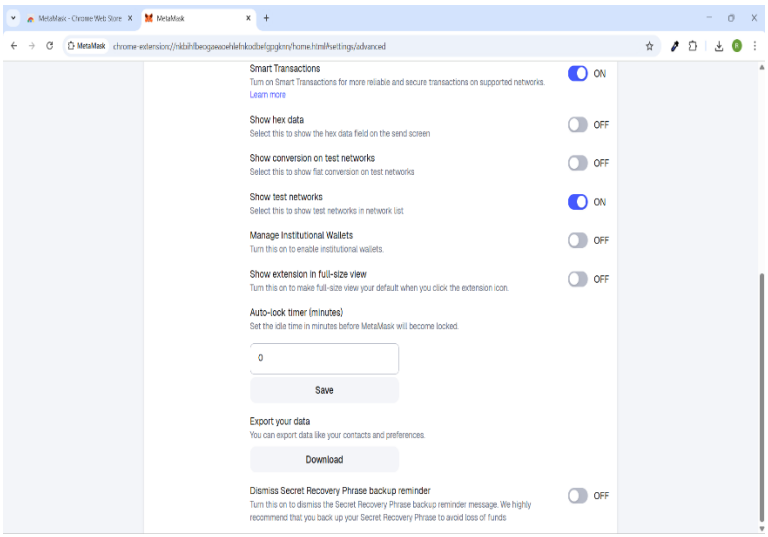


Fig 3.Network Configuration

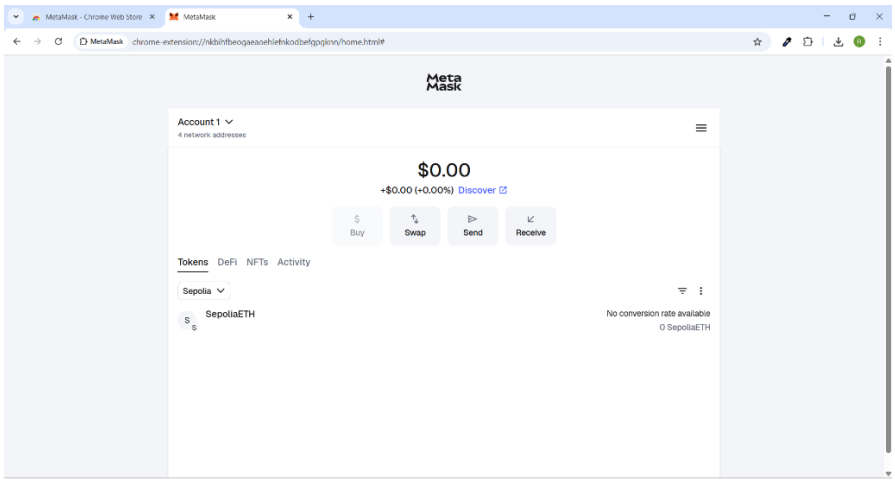


Fig 4.Testnet Configuration Sepolia TestNetwork

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## Step 4: Faucet Interaction

To obtain test ETH, a Sepolia faucet (Google Cloud's Ethereum Sepolia faucet) was accessed. The wallet address was copied from MetaMask and pasted into the faucet website. After requesting funds, a transaction was initiated on the test network, and the wallet balance was updated with the received test ETH. The transaction details were also verified on **Etherscan**, confirming successful delivery of SepoliaETH to the wallet.

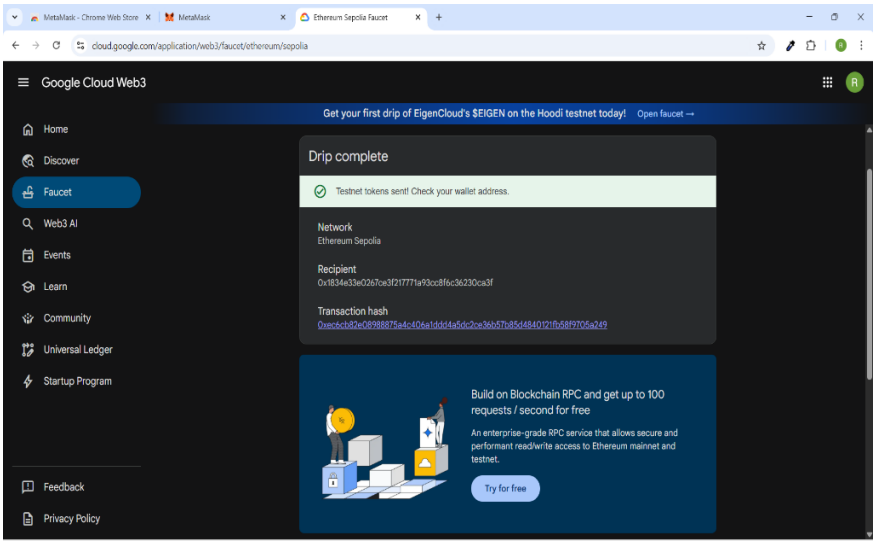

Fig 5.Faucet Transaction - Faucet Page Confirming ETH sent

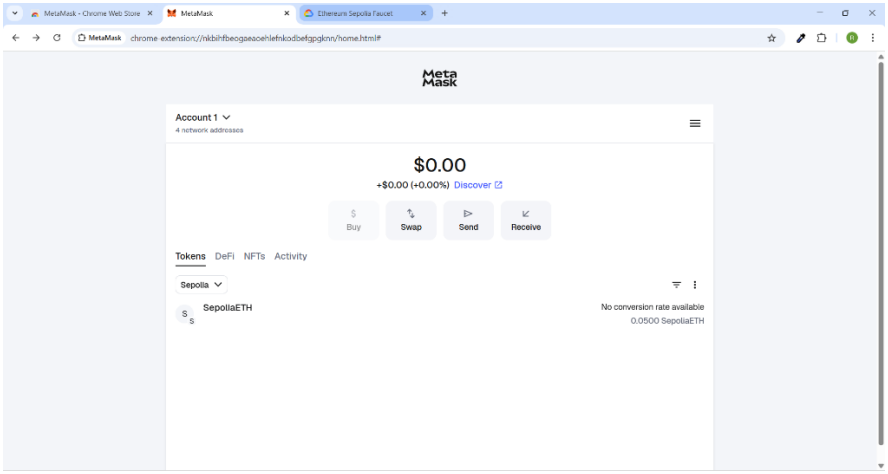


Fig 6.Testnet Balance Wallet With Received Test ETH

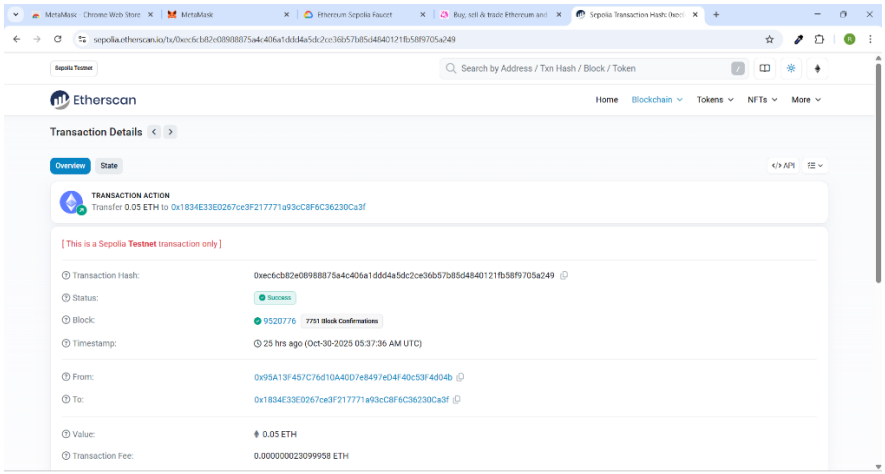


Fig 7.Faucet Transaction - Etherscan Transaction Details

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# Step 5: DApp Interaction

## App 1: Uniswap

The first DApp explored was **Uniswap (https://app.uniswap.org)**. MetaMask was connected to the DApp using the **“Connect Wallet”** option, ensuring that the testnet mode was active. A swap transaction was simulated by

selecting **Sell = ETH** and **Buy = USDC-S** with a small test amount of 0.05 ETH. The transaction request was confirmed via MetaMask, and once processed, the transaction was recorded on the testnet blockchain and viewable in Etherscan.

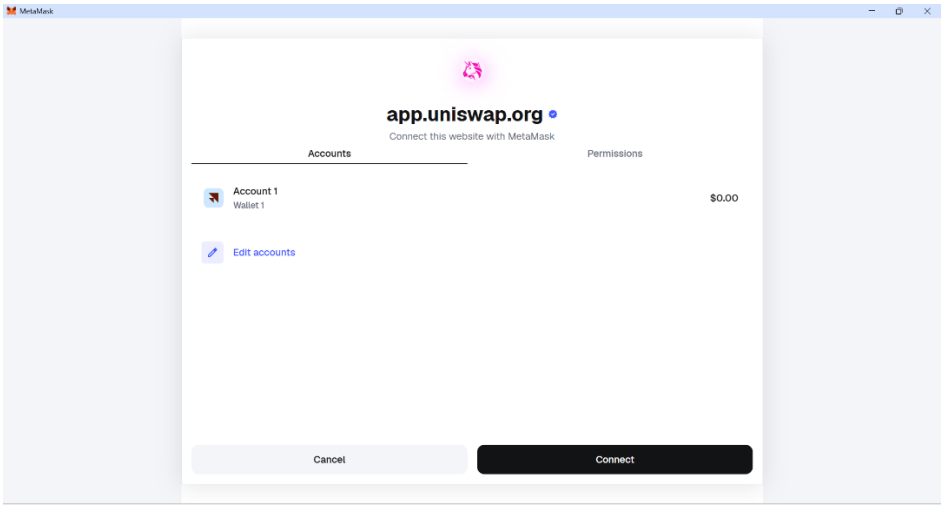


Fig 8. Dapp Connection – Uniswap Connected to Wallet

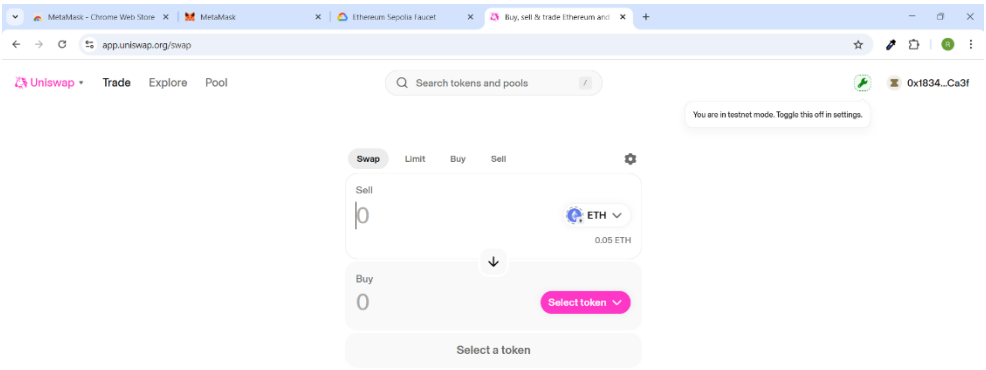


Fig 9.Dapp Connection – Uniswap Connection Testnet Mode On

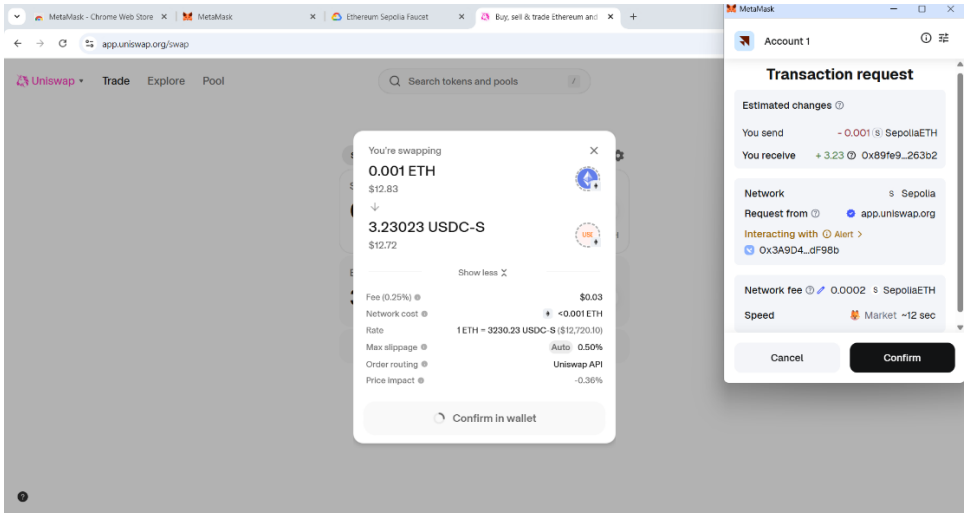


Fig 10.Dapp Interaction - Before Confirming The Transaction

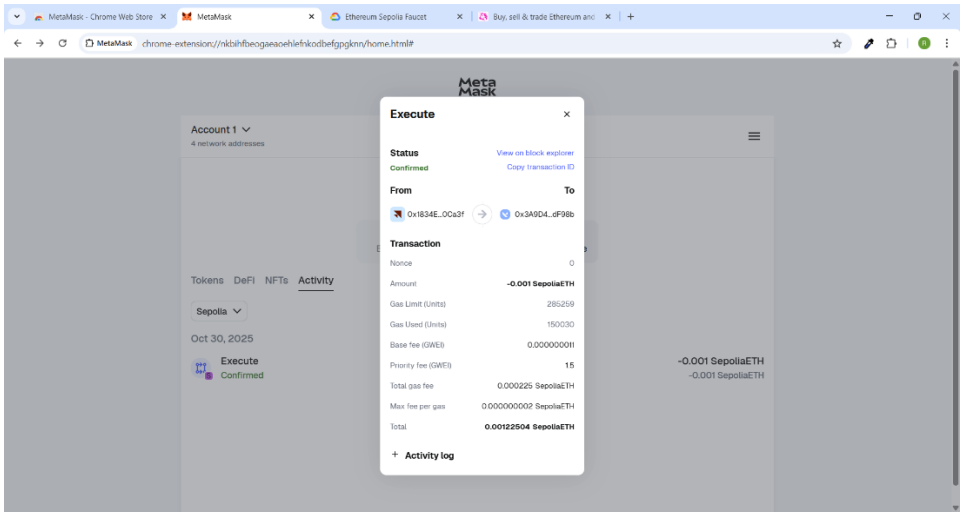


Fig 11.Meta Mask – Completed Transaction

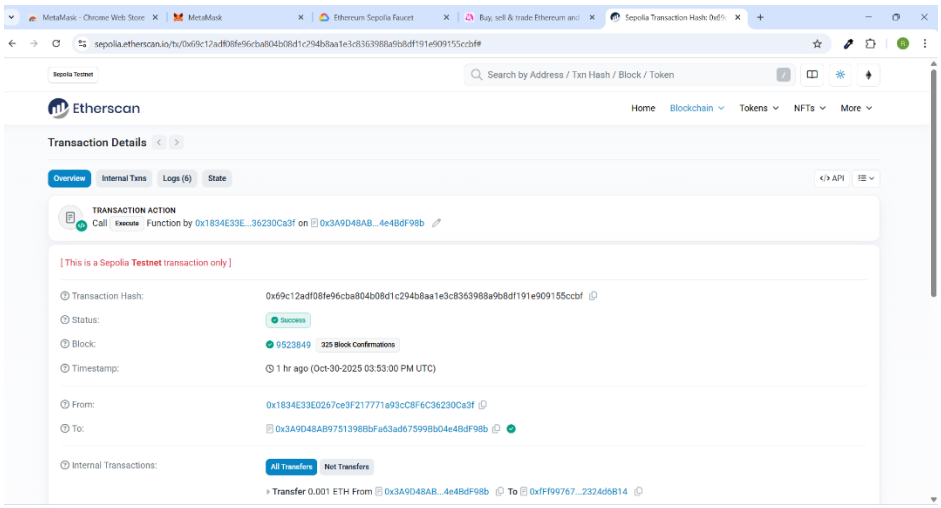


Fig 12.Dapp Uniswap – Etherscan Transaction Details

## App 2: OpenSea

Next, the **OpenSea Testnet (https://testnets.opensea.io)** was visited for NFT-related interaction. However, since OpenSea no longer supports most Ethereum testnets like Sepolia, it displayed a message indicating that testnet operations are unavailable. This confirmed the connection attempt but clarified the limitation of testnet use on OpenSea.

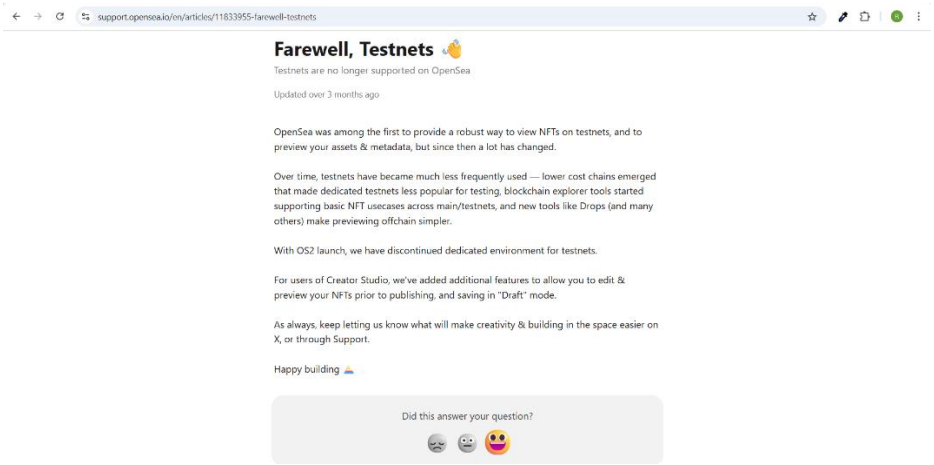


Fig 13.Opensea Not Supporting Testnets

## Step 6: Etherscan Transaction View

All transactions, including faucet and Uniswap interactions, were verified on **Sepolia Etherscan**. Each transaction hash was opened to review sender and receiver addresses, gas fees, and transaction status. This verification confirmed that both faucet and DApp transactions were successfully processed and recorded on the blockchain.

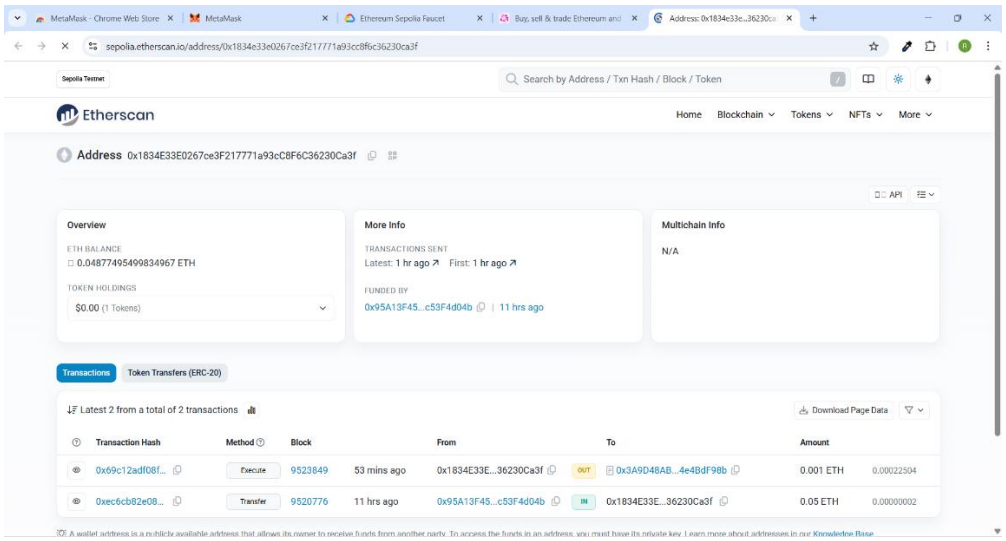


Fig14.Etherscan Transaction View

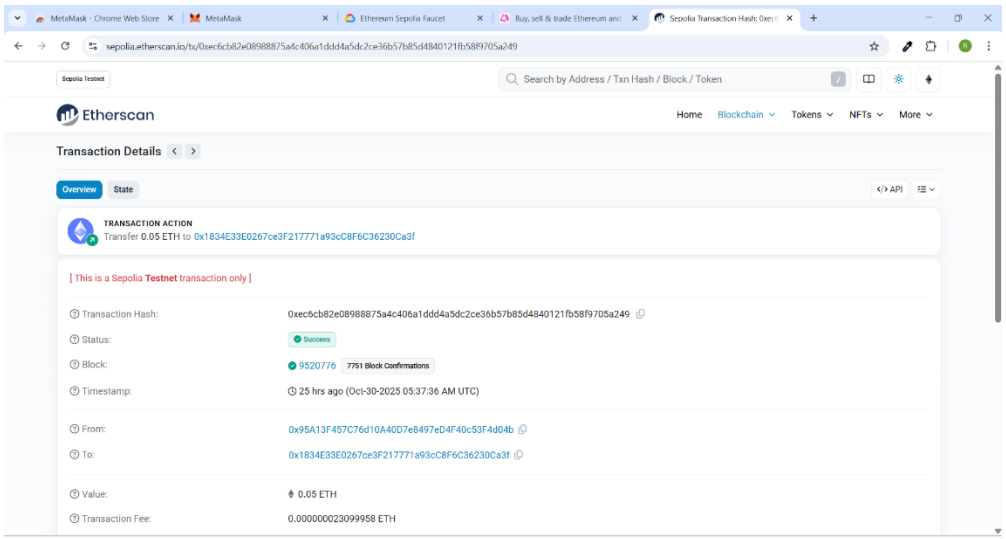


Fig15.Faucet Transaction – Etherscan Transaction Details

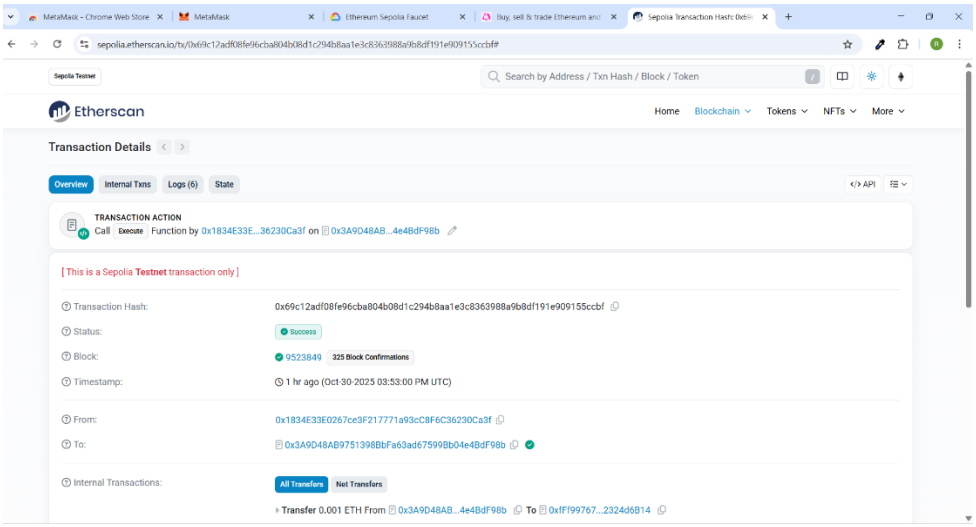


Fig17.Dapp Uniswap-Etherscan Transaction Details

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# Wallet and Transaction Details

### 1. Crypto wallet's public address:

0x1834e33e0267ce3f217771a93cc8f6c36230ca3f

### 2. Transaction hash(es) from the DApp interactions:

0x69c12adf08fe96cba804b08d1c294b8aa1e3c8363988a9b8df191e909155ccbf

0xec6cb82e08988875a4c406a1ddd4a5dc2ce36b57b85d4840121fb58f9705a249

### 3. Link(s) to the transaction(s) on the Etherscan testnet explorer:

https://sepolia.etherscan.io/tx/0x69c12adf08fe96cba804b08d1c294b8aa1e3c8363988a9b8df191e909155ccbf

https://sepolia.etherscan.io/tx/0xec6cb82e08988875a4c406a1ddd4a5dc2ce36b57b85d4840121fb58f9705a249

# Written Reflection Of Blockchain and Dapp :

## Key Blockchain Concepts I Learned

While learning about blockchain, I understood that it is like a digital record book that is shared across many computers instead of being stored in one place. This means no single person controls it, and everyone can see and verify what's happening. This makes the system more **secure, open, and trustworthy**.

I learned that every transaction on the blockchain is checked and confirmed by many users before it is added to the chain. This process is called **consensus**, and there are different ways to do it. Two main ones are **Proof of Work (PoW)** and **Proof of Stake (PoS)**. In Proof of Work, computers solve hard puzzles to confirm transactions, but it uses a lot of electricity. Proof of Stake is faster and saves energy because it selects people who already hold some coins to confirm transactions.

I also learned about **cryptography**, which is the method used to keep data safe on the blockchain. It hides personal information and makes sure no one can change a transaction once it is added. This is done using special codes called **hashes** and **digital signatures**.

Another interesting thing I learned is about **smart contracts**. These are small programs that automatically do things when certain conditions are met. For example, if two people agree to a deal, the contract will complete the transaction automatically without needing any middle person.

Overall, I learned that blockchain is not just about cryptocurrency. It's a new kind of technology that helps people make safe, transparent, and fair digital transactions without depending on a central authority.

During this blockchain DApp activity, I learned how blockchain works and how we can use it to build and interact with decentralized applications. I understood that a blockchain is a shared digital ledger where all transactions are recorded permanently and cannot be changed. Every transaction is verified by multiple computers (nodes), which makes it secure and transparent. This helped me realize how blockchain ensures trust without needing any central authority.

I acquired knowledge about the difference between centralized and decentralized applications. In centralized systems, one organization or server controls the whole application and data, like how banks or social media platforms work. But in decentralized applications (DApps), data and control are shared across the network, so no single person or company can alter the information. This makes DApps more open and secure but sometimes slower and more complex.

Through using MetaMask and Uniswap, I learned about smart contracts — small programs that run on the blockchain and carry out actions automatically when conditions are met. For example, when I swapped ETH to USDC-S on Uniswap, a smart contract handled the entire process safely without needing a middleman. This showed me how blockchain can automate digital agreements.

I also learned about the importance of wallet security. MetaMask gives each user a private key and a recovery seed phrase, which must be stored safely because anyone with that information can access the wallet. I understood how transactions are signed using MetaMask, and how users must confirm every action before it goes to the blockchain.

One challenge I faced was with faucet websites, which sometimes showed invalid balance errors. I overcame this by trying other working faucets and rechecking my test network settings. Another challenge was understanding gas fees and confirmation times — gas is the cost paid to process transactions, and confirmation times depend on network activity. Observing these helped me understand how blockchain prioritizes transactions.

Finally, I learned how blockchain is different from normal databases. Traditional databases are controlled by one central authority and can be changed easily, but blockchain is distributed, transparent, and permanent. Overall, this activity gave me a strong basic understanding of how Dapps , wallets, transactions, and smart contracts work together in a decentralized environment.

## Technical Summary

1. **Testnet Used:** Sepolia Test Network

**2. DApp(s) Interacted With:** Uniswap (for token swap simulation) and OpenSea (for NFT exploration - not supporting testnets)

**3. Types of Transactions Performed:** Faucet funding, token swap (ETH → USDC-S), and transaction verification on Etherscan

**4. Errors Encountered and Troubleshooting:** Faced faucet errors showing invalid balances, resolved by switching to a working faucet and verifying Sepolia network configuration in MetaMask and Uniswap.