

ETHEREUM



Blockchain, DApp, DAO

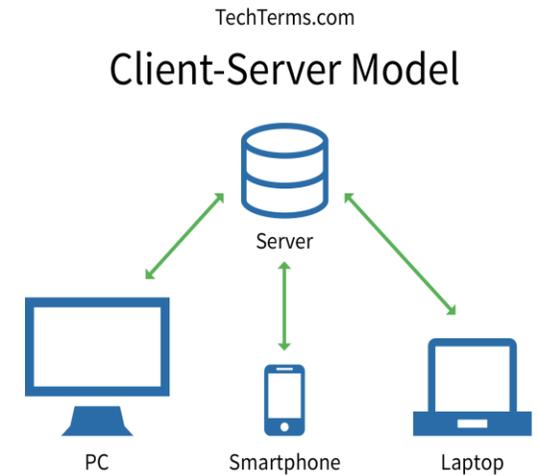
Ethereum Network

Ethereum is a network of computers these networks are used to transfer money and store data. We can form a network using one or more nodes.

What is a node?

It is a machine (any type of computer) running in Ethereum client. All the computers are connected to form the actual network.

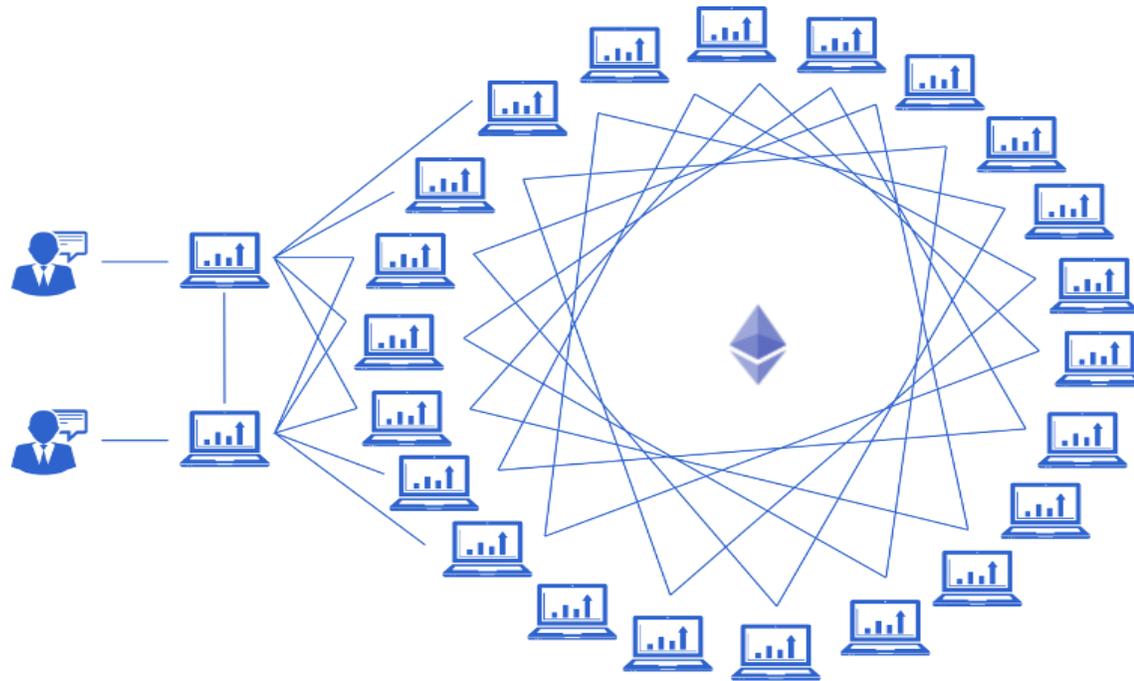
*anyone can run a node all what you need is to download the client software application. Where each node has a separate copy of the blockchain.



There is two group of technology that can connect to the network:

Developers: technology used to create the actual network through code. Like using web3.js library.

Consumers: Metamask browser extension allow people to interact with Ethereum network.





Account 1

0x29d...1752 



0.3 ETH



Buy



Send



Swap

Assets



0.3 ETH

Don't see your token?

[Import tokens](#)

Networks

[Show/hide](#) test networks

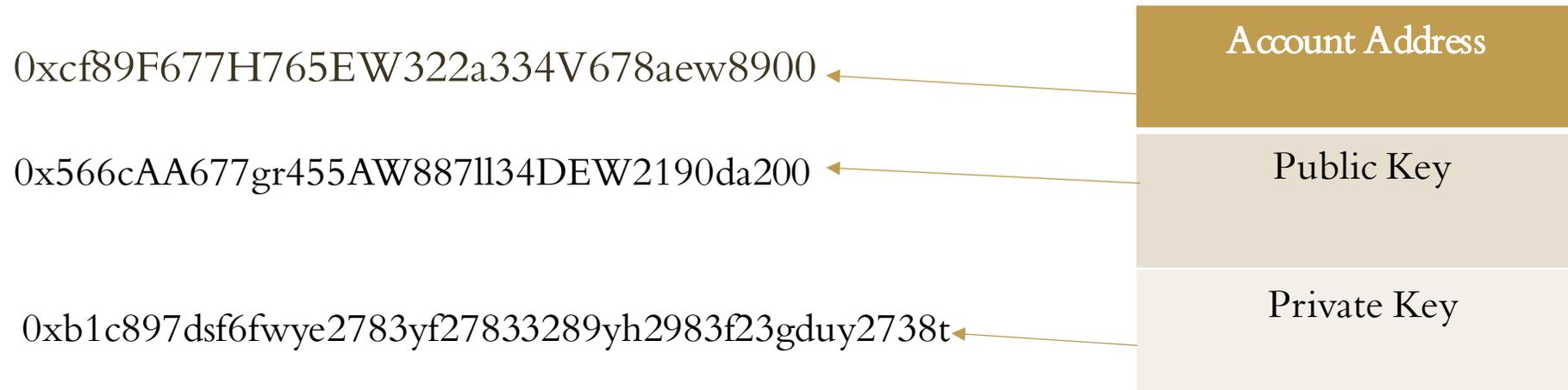
Dismiss

-  Ethereum Mainnet
-  Ropsten Test Network
-  Kovan Test Network
-   Rinkeby Test Network
-  Goerli Test Network
-  Localhost 8545

[Add Network](#)

What means to have MetaMask Account?

When MetaMask create an account for us, it created an account that has three distinct pieces of information.



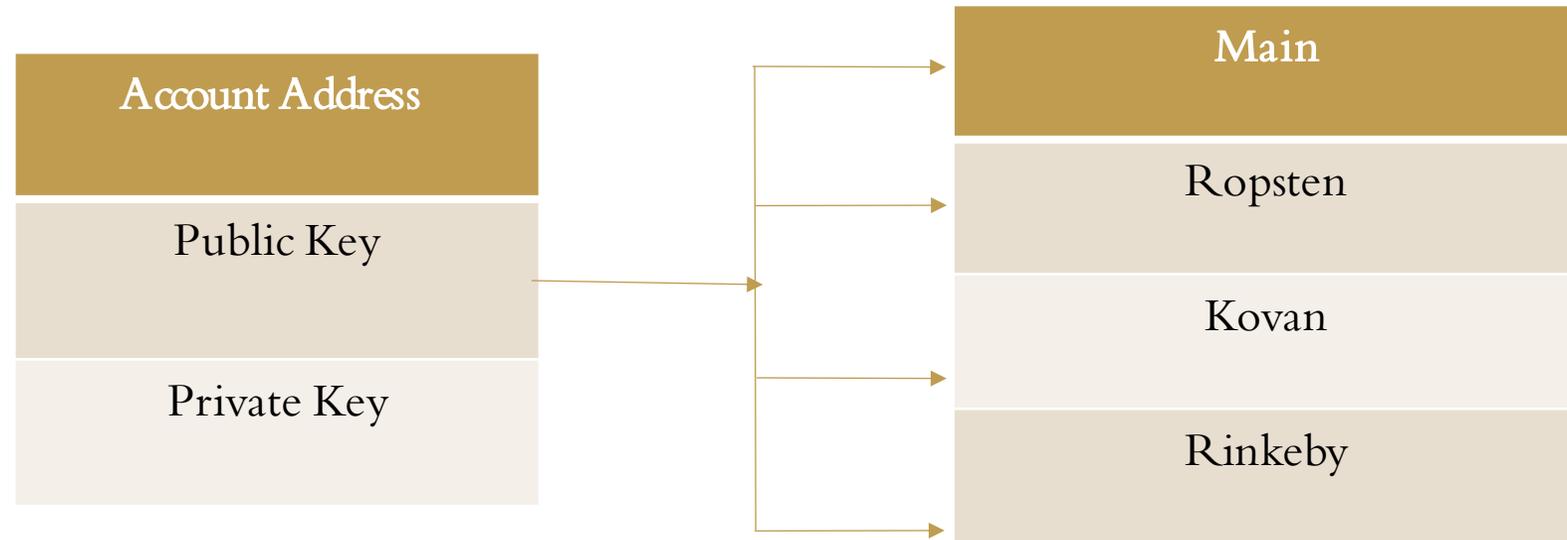
Account Address:

It can be thought about like an email address or username. It is a unique identifier can be shared with anyone in the world, and it tells other people who you are. **Identify the account.**

Public key and Private key:

These two pieces of information combined to essentially form a password of sorts. They are used to authorize the sending of funds from your account to another. Therefore, if the private key is unknown no one have the true access to the funds that are assigned to that account.

Account Address, Private Key and Public Key are stored as a hexadecimal.



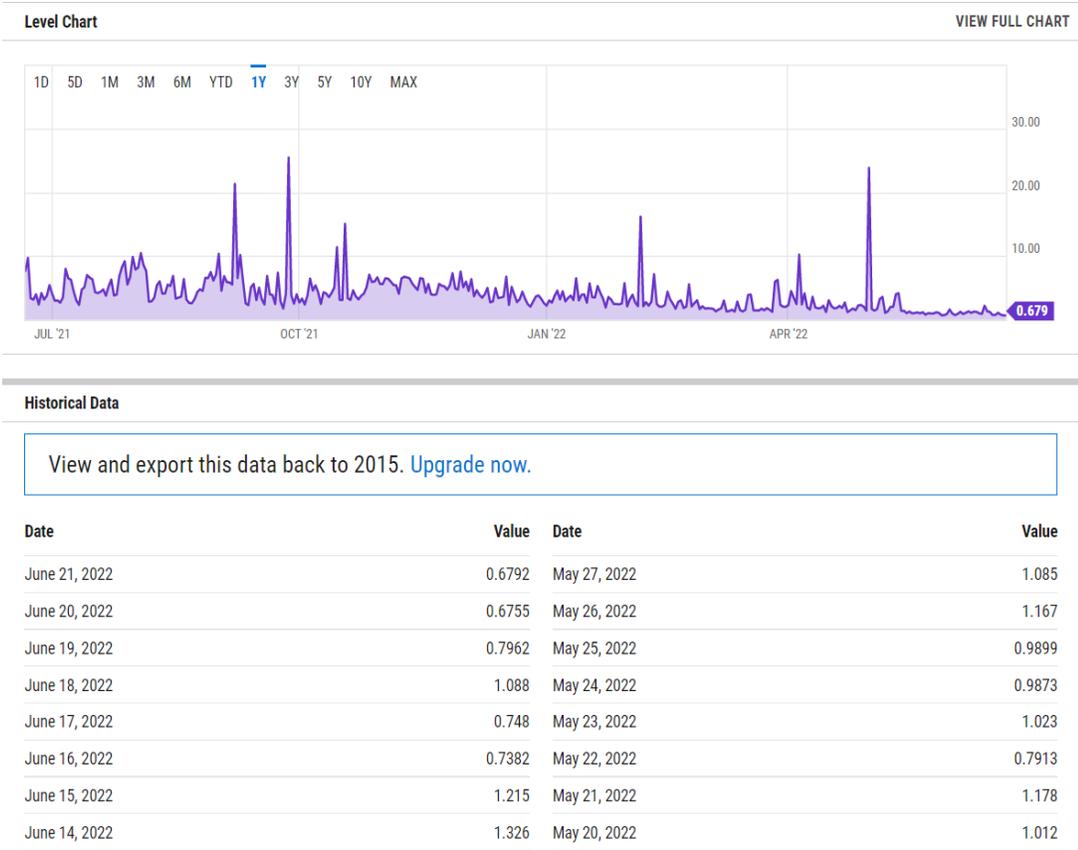
The account that we created is used across all different networks.

Transaction

It is a record describes one account attempting to send money to another account. It created anytime two accounts exchanged some amount of money.

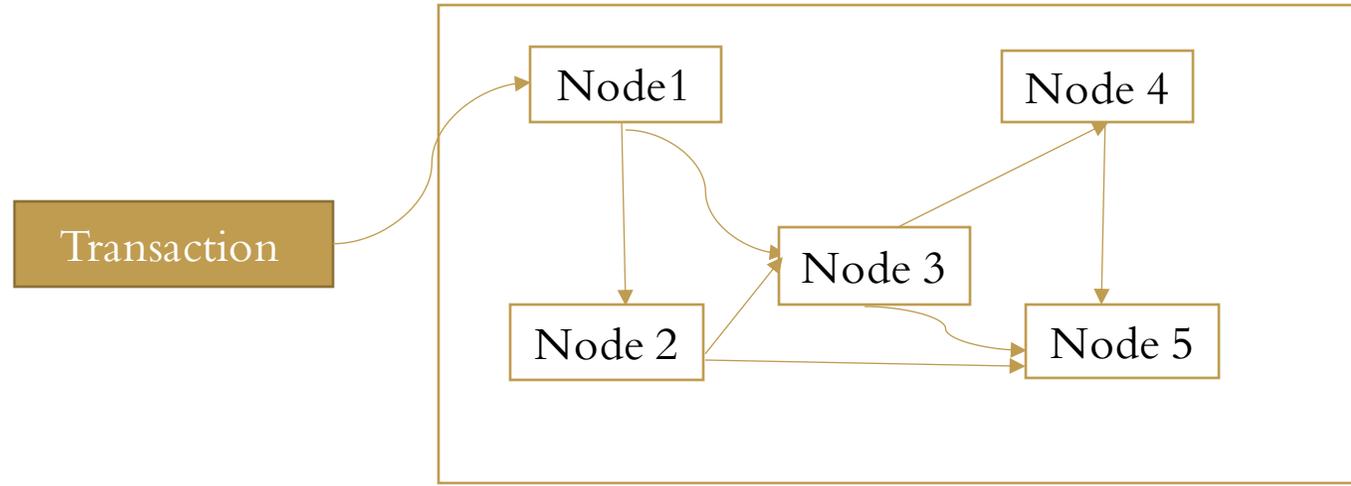
Whenever we make a transaction, we create an object and then submitted to Ethereum network to process it.

This object has a variety of different properties assigned to it.



Nonce	How many times the sender has sent a transaction
To	Address of account this money is going to
Value	The amount of ether to send to the target address
gasPrice	Amount of ether the sender is willing to pay per unit gas to get this transaction processed
startGas/gasLimit	Unit of gas that this transaction can consume
V	Cryptographic pieces of data that can be used to generate the senders account address. Generated from the sender's private key.
R	Cryptographic pieces of data that can be used to generate the senders account address. Generated from the sender's private key.
S	Cryptographic pieces of data that can be used to generate the senders account address. Generated from the sender's private key.

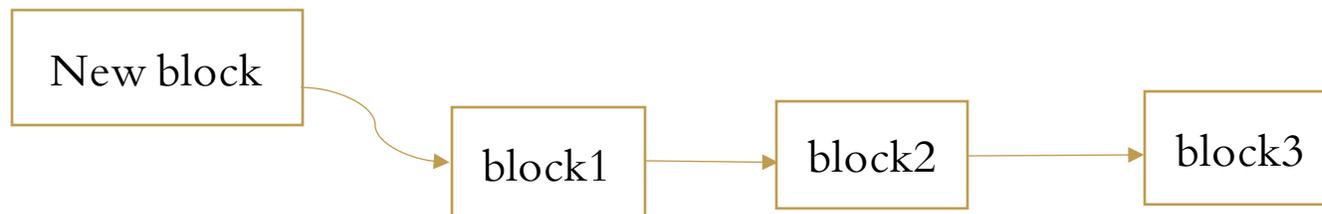
Mining basics



When we send the transaction out, it goes to one very particular node. The application interfacing with one node and that node will be communicating with the rest of the network later until each node receives the transaction. Each node will gather the transactions to create the block. For each node to validate the transaction it needs to solve a puzzle by using high computing power. After validating the transaction, which means the data in the transaction and the fees are enough to proceed with the transaction.

Blochchain

After validating the transaction, the node will add the block to the blockchain. It will also send it out to all connected nodes to the network. The network nodes will validate the new block for ex if the solution is correct. The faster node to solve the puzzle they will be rewarded by ether and these nodes called miners. blocks themselves are bounded in size. Each block has a target size of 15 million gas but the size of blocks will increase or decrease in accordance with network demands, up until the block limit of 30 million gas (2x target block size). The total amount of gas expended by all transactions in the block must be less than the block gas limit. This is important because it ensures that blocks can't be arbitrarily large. If blocks could be arbitrarily large, then less performant full nodes would gradually stop being able to keep up with the network due to space and speed requirements



Block Structure

timestamp	the time when the block was mined
blockNumber	the length of the blockchain in blocks
baseFeePerGas	the minimum fee per gas required for a transaction to be included in the block
difficulty	the effort required to mine the block.
mixHash	a unique identifier for that block
parentHash	the unique identifier for the block that came before (this is how blocks are linked in a chain).
transactions	the transactions included in the block
stateRoot	the entire state of the system: account balances, contract storage, contract code and account nonces are inside.
nonce	a hash that, when combined with the mixHash, proves that the block has gone through proof-of-work .

 METAMASK

Rinkeby Test Network

< Account 1 / ETH

0.3 ETH

Buy Send Swap

Receive
Jun 20 · From: 0xa7a...24a8

Receive
Jun 7 · From: 0xa7a...24a8

Receive
Jun 7 · From: 0xa7a...24a8

0.1 ETH
0.1 ETH

Networks

Show/hide test networks Dismiss

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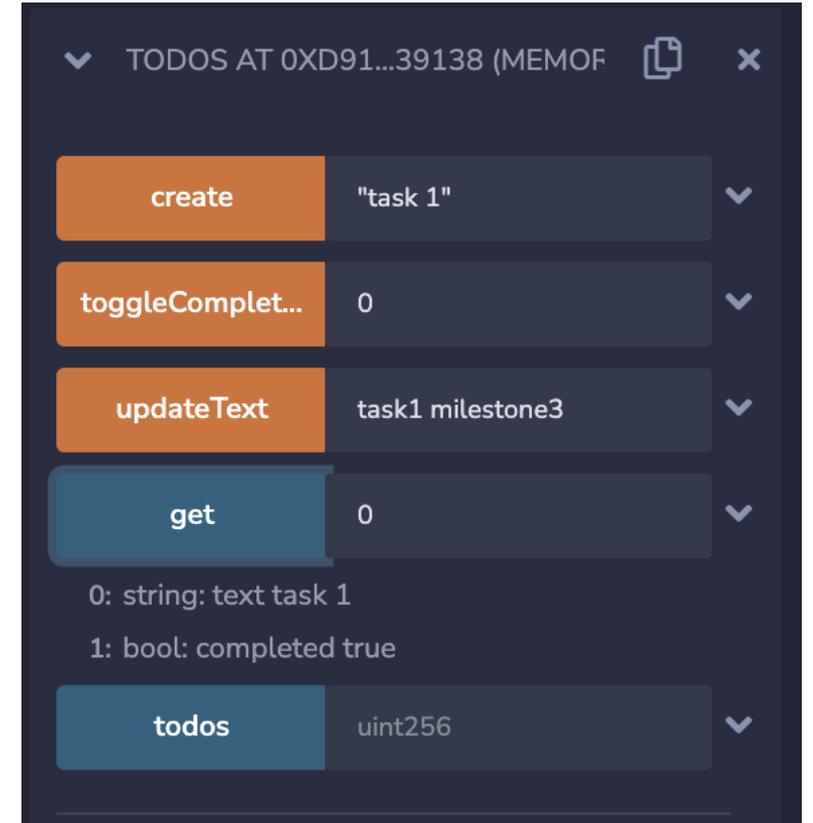
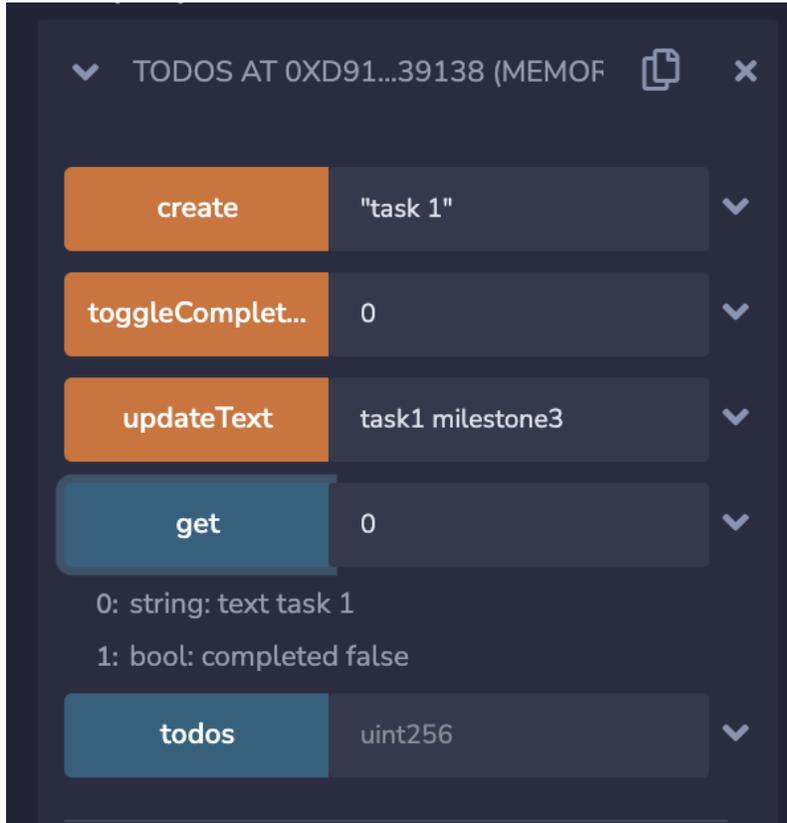
Add Network



Milestone 3

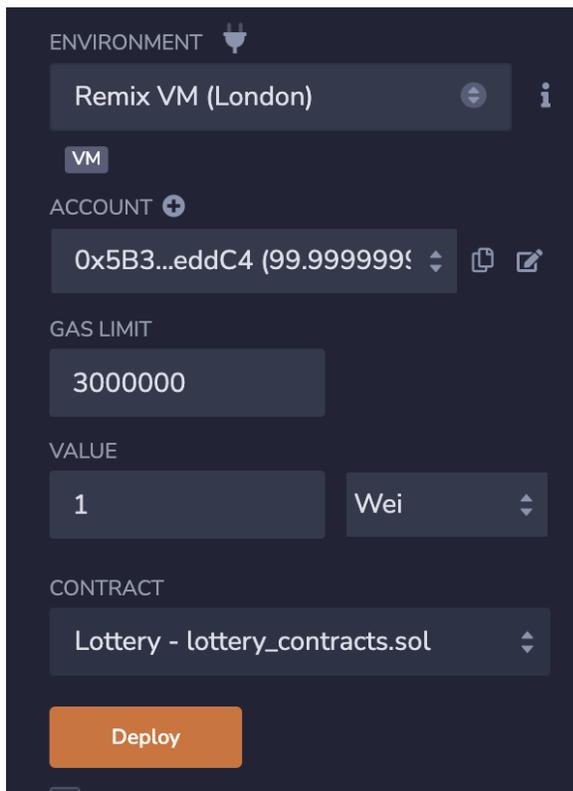
To Do List

Here we create the task using create function then I use get function to see what to do list we have and that save it in Todo list

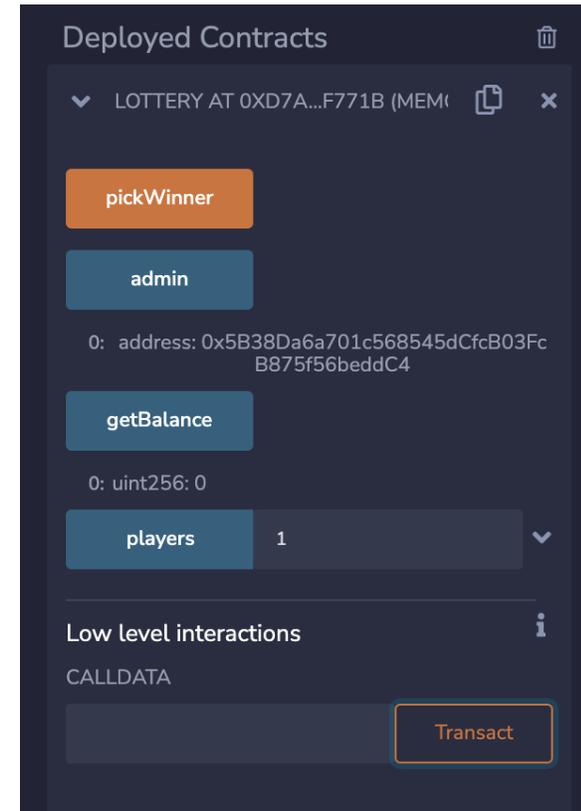


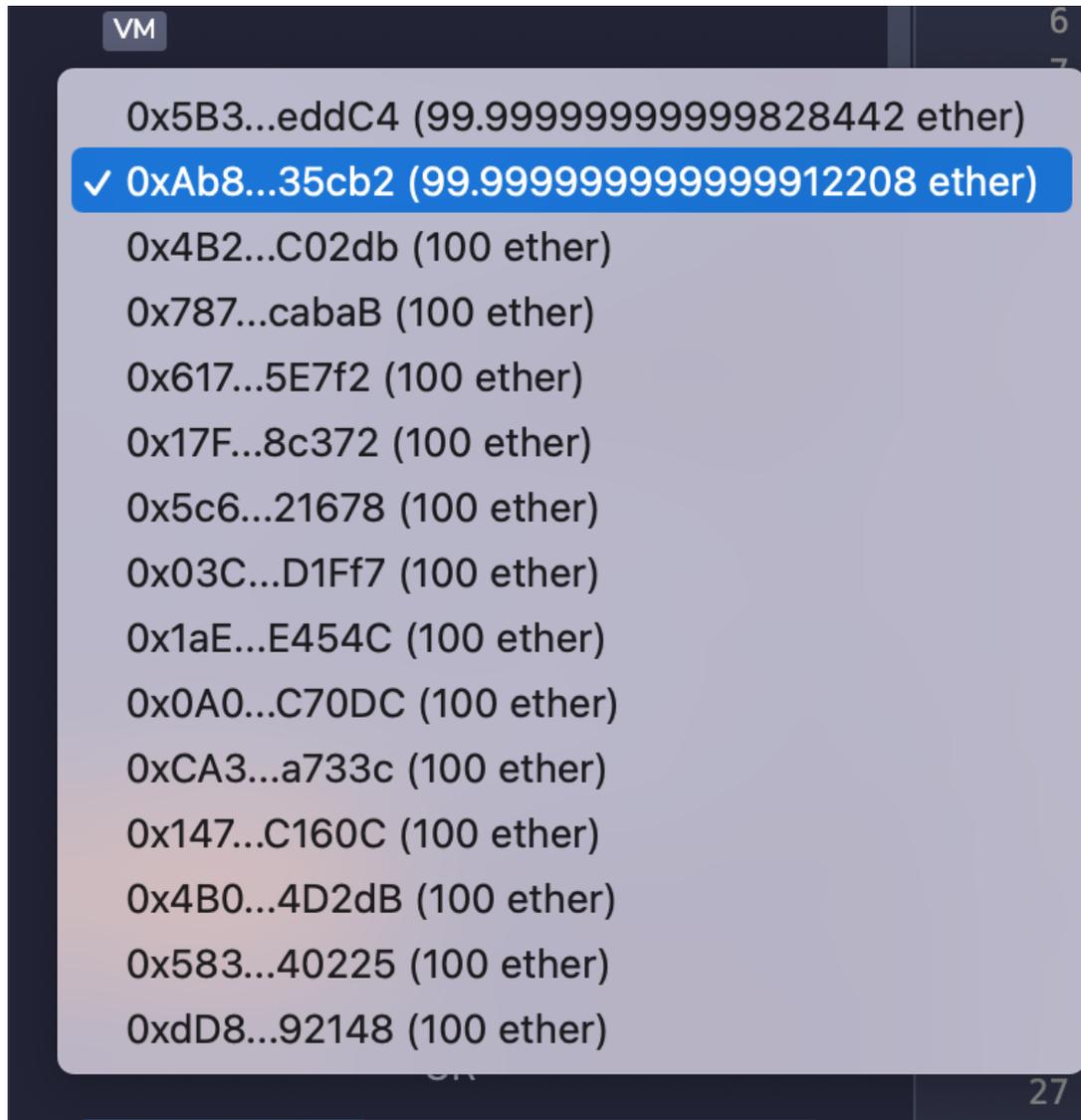
Lottery Contract:

First we add an admin account



Second keep adding players should be 3 or more





We add three accounts the admin and two players each account have at least 0.1 ether and the winner account will have 0.1 more.

Transfer Ether Contract

Three methods to send Ether. All of them used to send Ether as a sender to another receiver account.

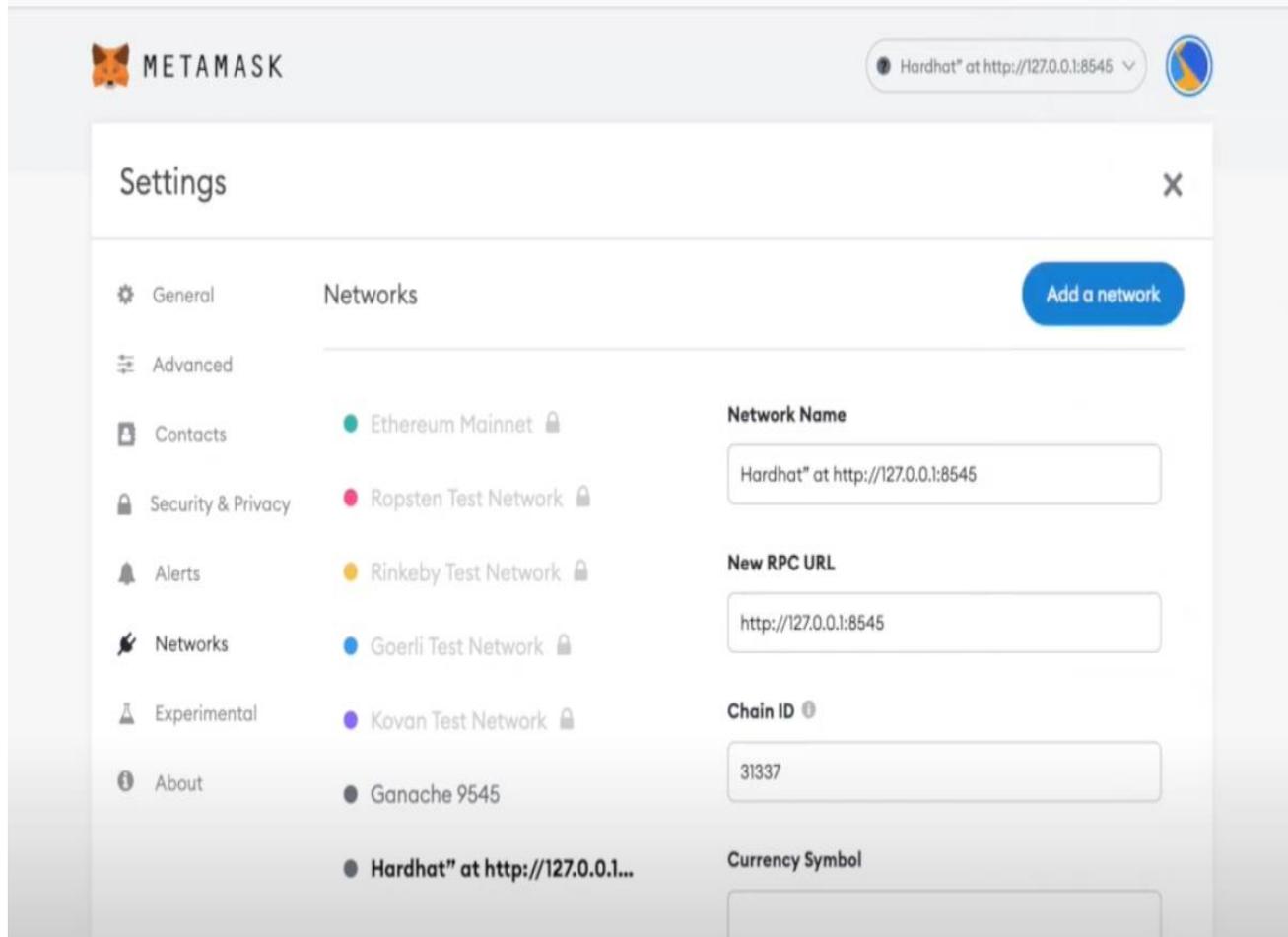
The screenshot displays a dark-themed interface for interacting with a contract. At the top, a dropdown menu is open for 'SENDEETHER AT 0X87A...987F2 (ME)'. It lists three methods: 'sendViaCall' with address 'A3273Db70076A794CD0', 'sendViaSend' with address '0x14A919590E83B987aF', and 'sendViaTransfer' with address '0x14A919590E83B987aF'. Below this, a section titled 'Low level interactions' shows a 'CALLDATA' field and a 'Transact' button. A second dropdown menu is open for 'RECEIVEETHER AT 0X14A...94CD0', showing a 'getBalance' button and a result '0: uint256: 10000000000000000000'. This section also includes a 'CALLDATA' field and a 'Transact' button.

Milestone 4

Fullstack Banking Dapp

Deposit & Withdraw ETH & ERC20 Tokens with
MetaMask

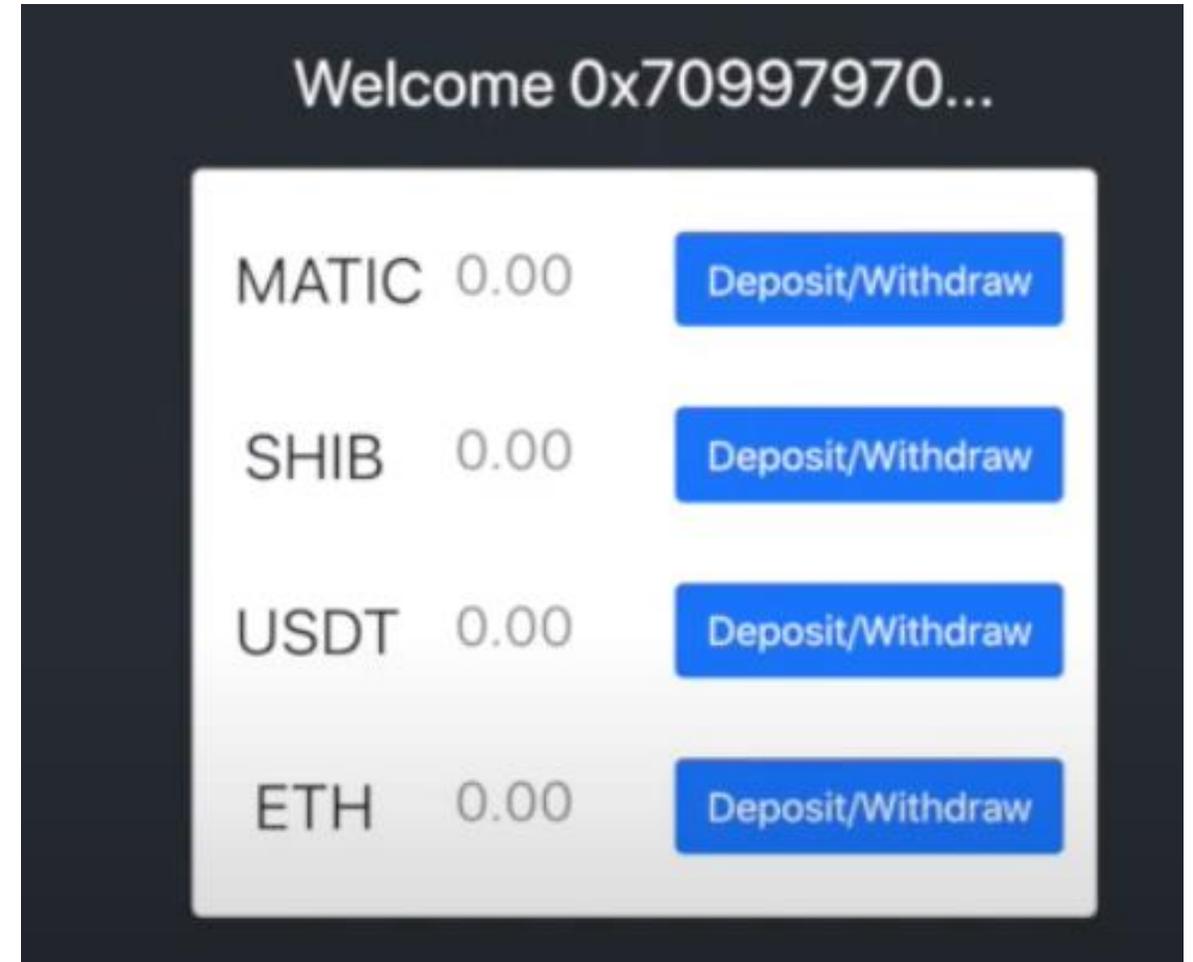


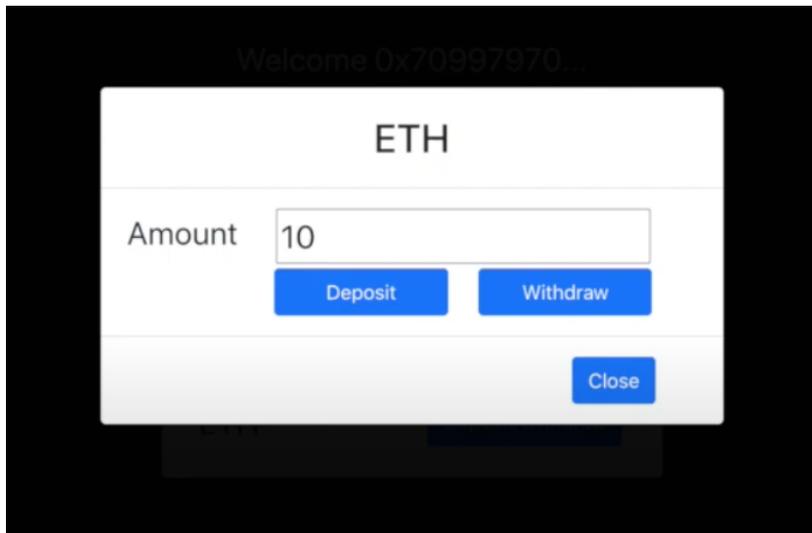
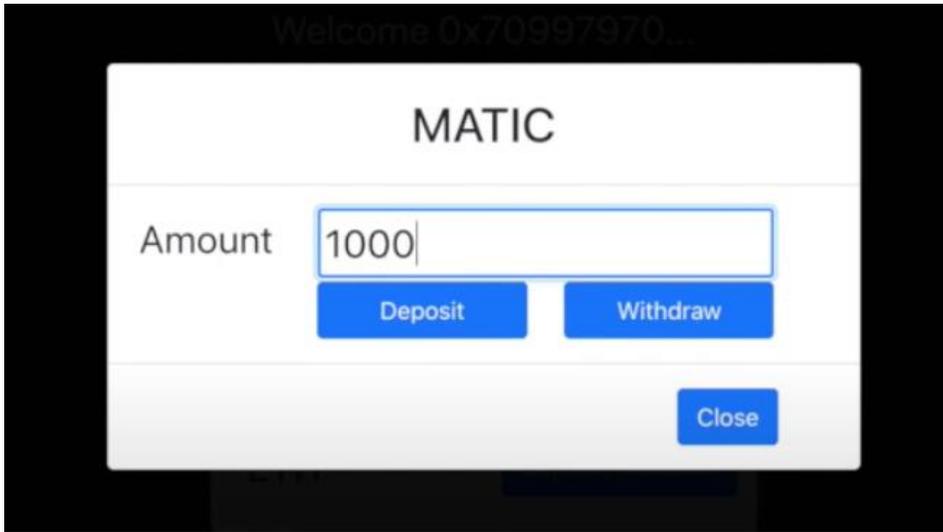


—◇—

Add a hardhat "local host" network
to import tokens

This is our wallet with all the tokens that we imported to metamask wallet





Here we want to deposit some Matic and ETH to each account.



Welcome 0x70997970...

MATIC	1000.00	Deposit/Withdraw
SHIB	0.00	Deposit/Withdraw
USDT	0.00	Deposit/Withdraw
ETH	10.00	Deposit/Withdraw

By this our wallet balance for MATIC and ETHER will change to 1000 and 100 accordingly.

