

Course II:

DeFi Primitives

4. Joining the World of DeFi

(i) MetaMask Wallet

Setup

- MetaMask is a cryptocurrency wallet that is used to interface with the Ethereum-based Apps
- We will be setting up this Wallet on your mobile device (iOS or Android only)
 - If you are unable to use a mobile device, I also discuss a web browser tutorial
 - If you already have MetaMask on your browser, I show how to link your Web Account to the Mobile App

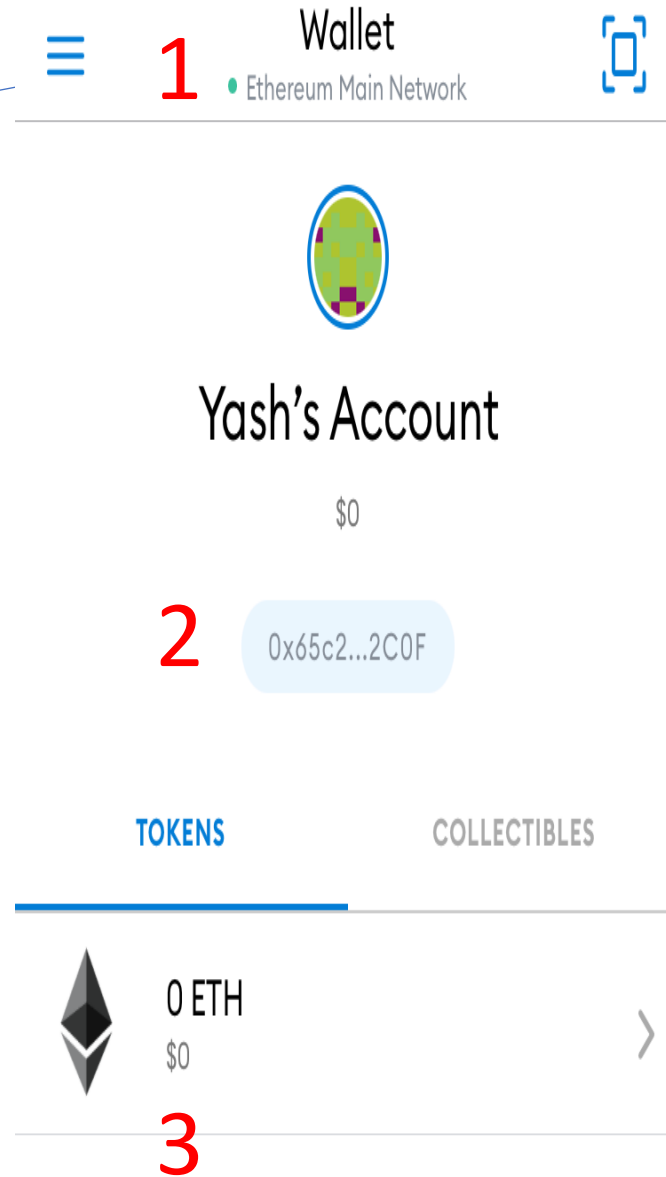
Setup

- Download the Metamask app from the App Store or Google Play Store
- Click Get Started
- Click Create a new wallet
- Create a new account by typing in a password of your choosing and pressing “Create”
- Go through the prompts to secure your wallet
- Store Secret Backup Phrase in a secure location, ideally paper or a password manager – not on your phone or computer.
- Type in secret backup phrase

Using MetaMask

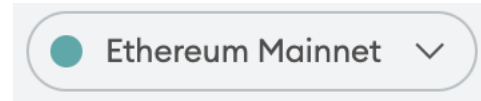
1. Network

- This determines which Ethereum Network you are using. Click on this to see all network options in a dropdown. For this class we will only discuss or use the *Main Ethereum Network* and the *Ropsten Test Network*.

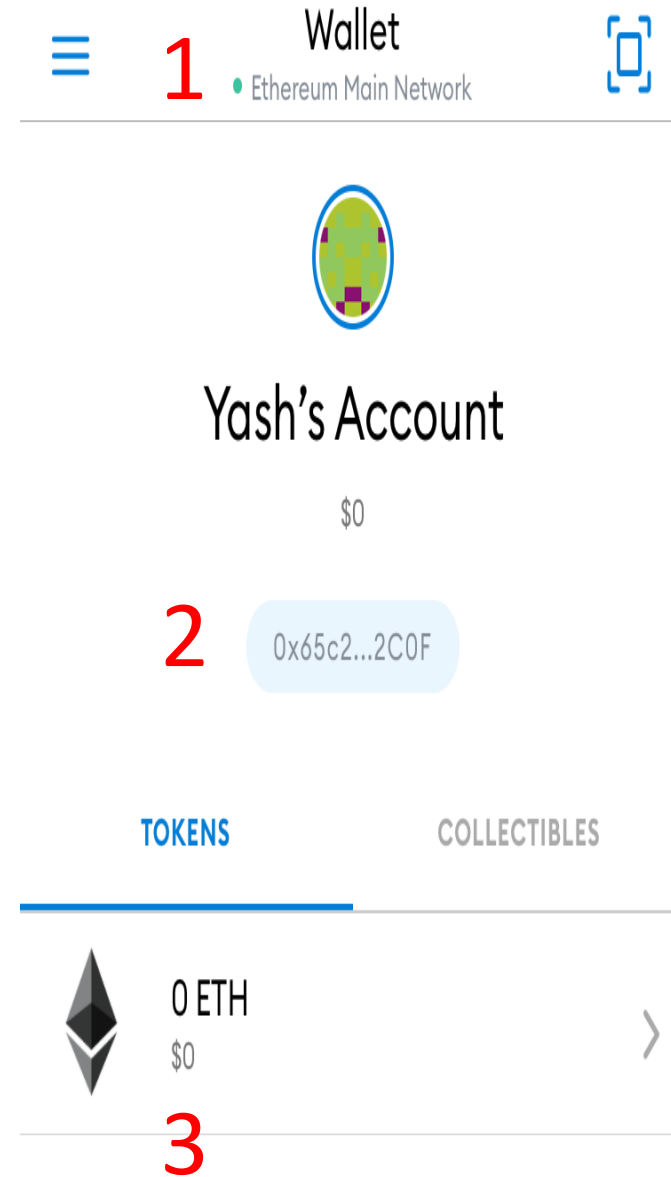


Using MetaMask

1. Network

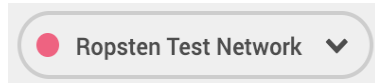


- The *Ethereum Mainnet* is where live ether (ETH) with real value exists and is used for payment and applications. I will refer to this as the “main network” or the “mainnet”

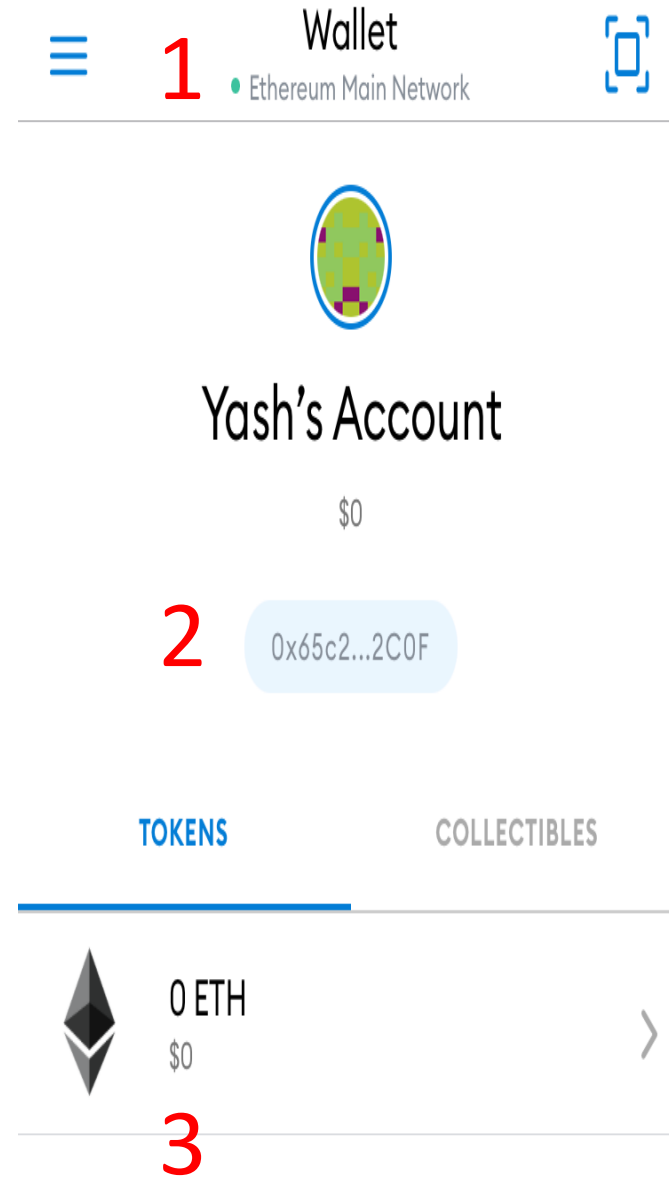


Using MetaMask

1. Network



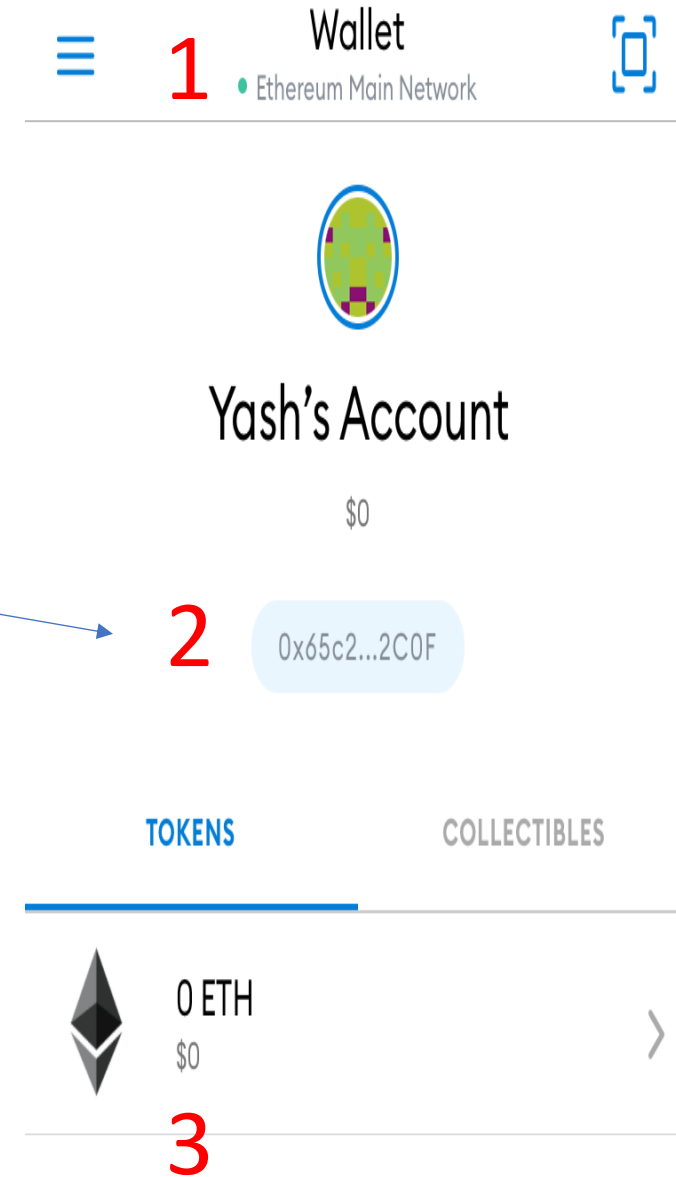
- The *Ropsten Test Network* is a fully functioning copy of the main network. The ETH on any Test Network has no economic value and can be obtained for free from a “faucet.” We will get some Ropsten Test ETH in your MetaMask the section on Test ETH below. I will refer to this as the “test network” or “testnet”



Using MetaMask

2. Account

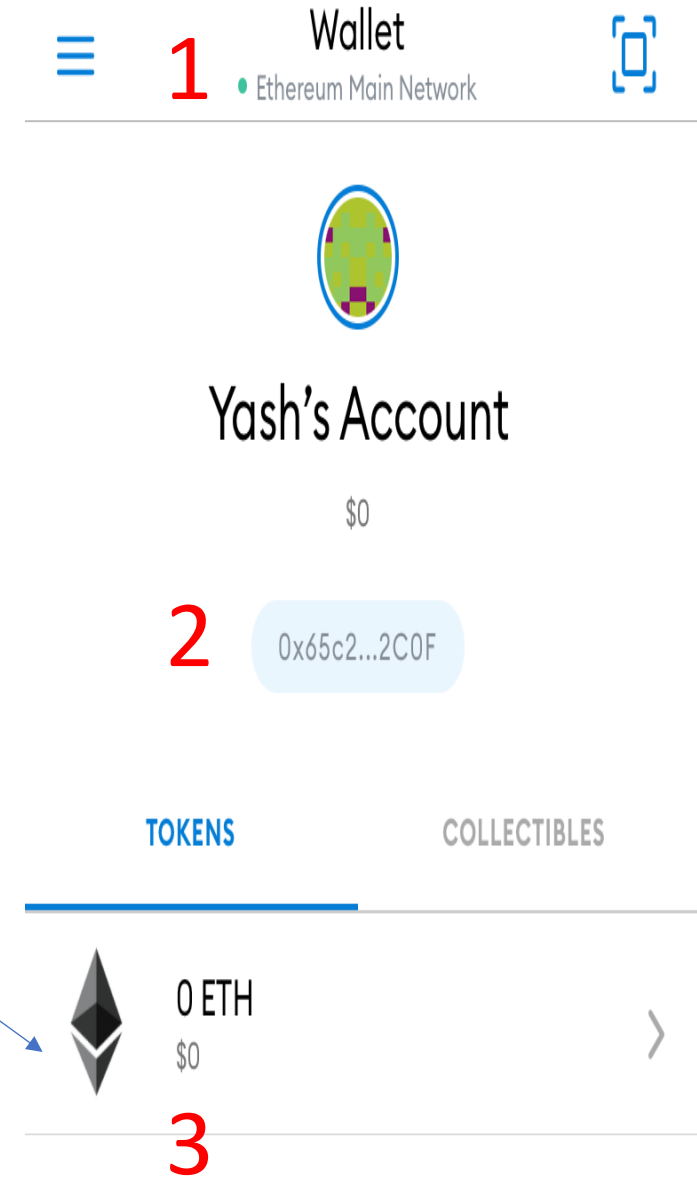
- This is your unique account number used for transferring ETH. It is the same for every network. If you ever need to copy the address exactly to the clipboard, simply click on this portion of MetaMask



Using MetaMask

3. Balance and Transfer

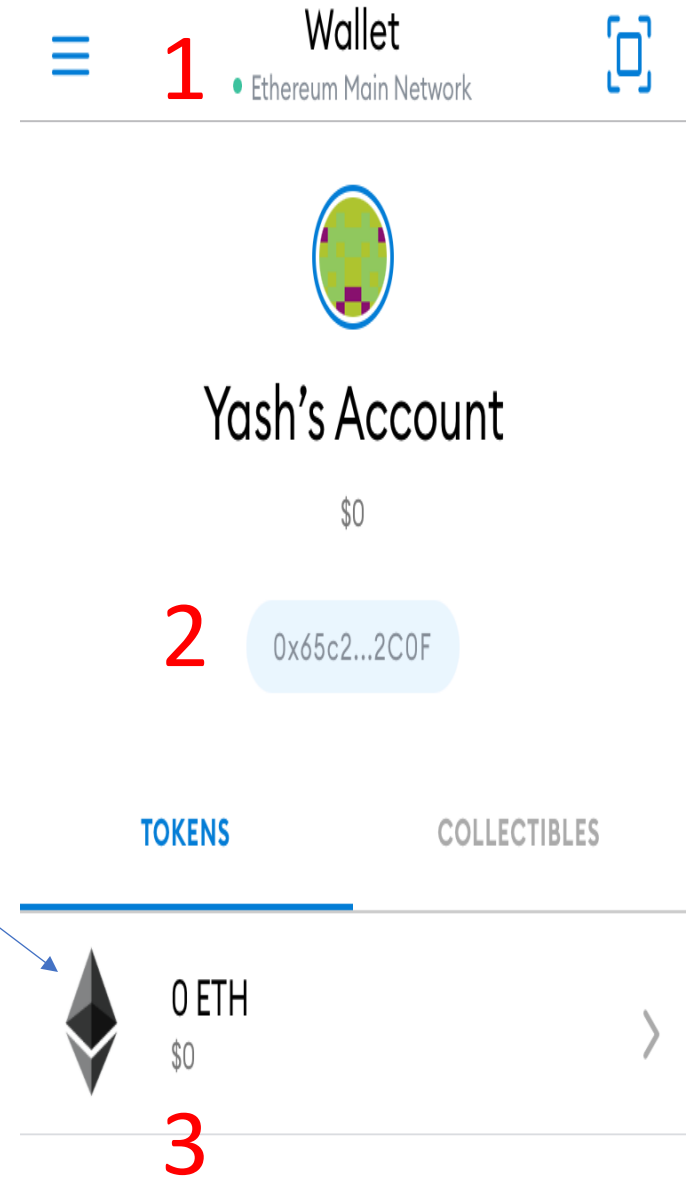
- This tells you your ETH balance and USD value based on the current exchange rate. It is different for the main and test networks unless you had identical ETH balances on each. The testnet ETH will show you a balance of more than \$0 if you have any test ETH but don't be fooled, this ETH is not redeemable for USD in the same way mainnet ETH is.



Using MetaMask

3. Balance and Transfer

- Click “0 ETH” on the main screen



Using MetaMask

3. Balance and Transfer [Supplementary – only if you want to deposit some real ETH]

- To deposit ETH, simply copy your account number (recommend directly to the clipboard to avoid typing mistakes) and input this into the corresponding “send” ETH of wherever you are depositing from (i.e., Coinbase). Clicking the “Receive” button will direct you to one of:
 - a QR scanner you can use as an alternative to copying the address
 - a location to buy ETH (on the mainnet)
- To send ETH, simply click the send button and input the counterparty’s Ethereum account and a transaction fee.



0 ETH

\$0



SEND



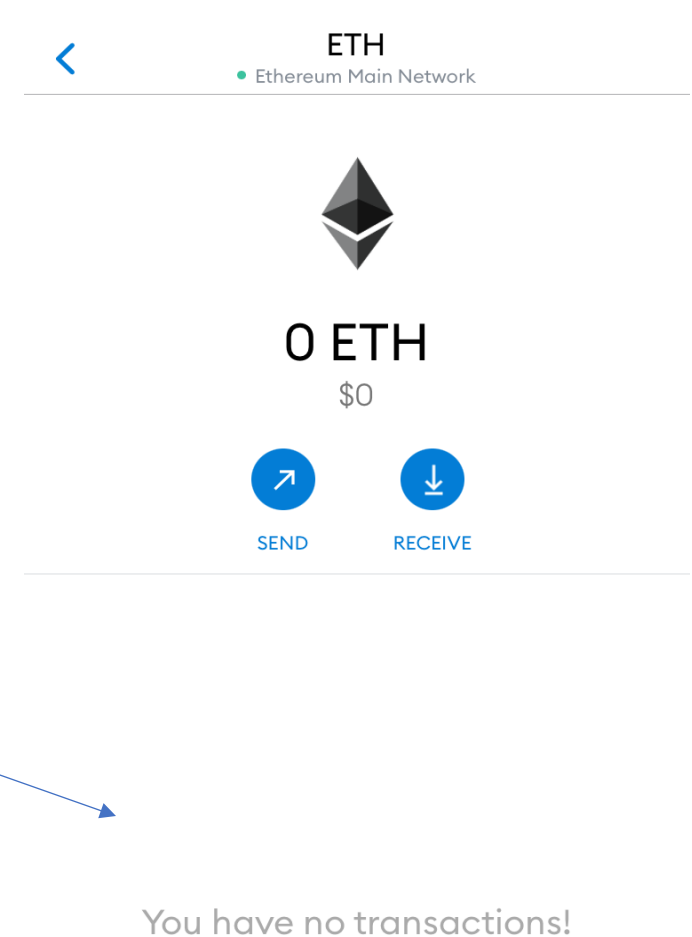
RECEIVE

You have no transactions!

Using MetaMask

4. Transaction History

- Here you can view pending and completed transactions. We will use this to check the status of the attendance logger transactions.



Using MetaMask

4. Transactions with MetaMask

- All MetaMask transactions look like this: whether you send ETH when you interact with an Ethereum application (like the attendance logger).
- You should always check the following before pressing “Confirm” otherwise “Reject” the transaction:
 1. The Network is appropriate for what we are doing in class)
 2. The “To” account matches where you want to send it
 3. The ETH amount is what you intended

The screenshot shows a MetaMask transaction confirmation interface. At the top, there is a network selection bar with a red dot and the text "Ropsten Test Network". Below this, the "From" account is "Yash's Acco..." with a red circle icon, and the "To" account is "0x65c2...2C0F" with a blue circle icon. A red arrow labeled "1" points to the network bar, and a red arrow labeled "2" points to the "To" account. The transaction type is "SENT ETHER" with an amount of "0.5" ETH, indicated by a red "3". The "GAS FEE" is "0.003549" ETH. The "Gas Price (GWEI)" is "169" and the "Gas Limit" is "21000". The "TOTAL" amount is "0.503549" ETH. At the bottom, there are "Reject" and "Confirm" buttons.

< Edit

Ropsten Test Network

Yash's Acco... → 0x65c2...2C0F

SENT ETHER

0.5

GAS FEE 0.003549

No Conversion Rate Available

Gas Price (GWEI) 169 Gas Limit 21000

AMOUNT + GAS FEE

TOTAL 0.503549

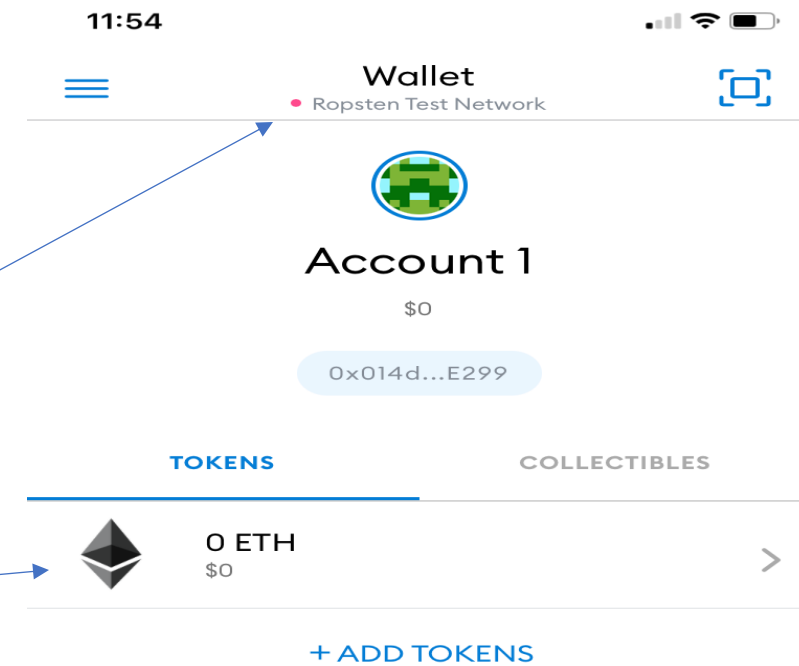
No Conversion Rate Available

Reject Confirm

Getting Test ETH

Getting Ropsten Test ETH

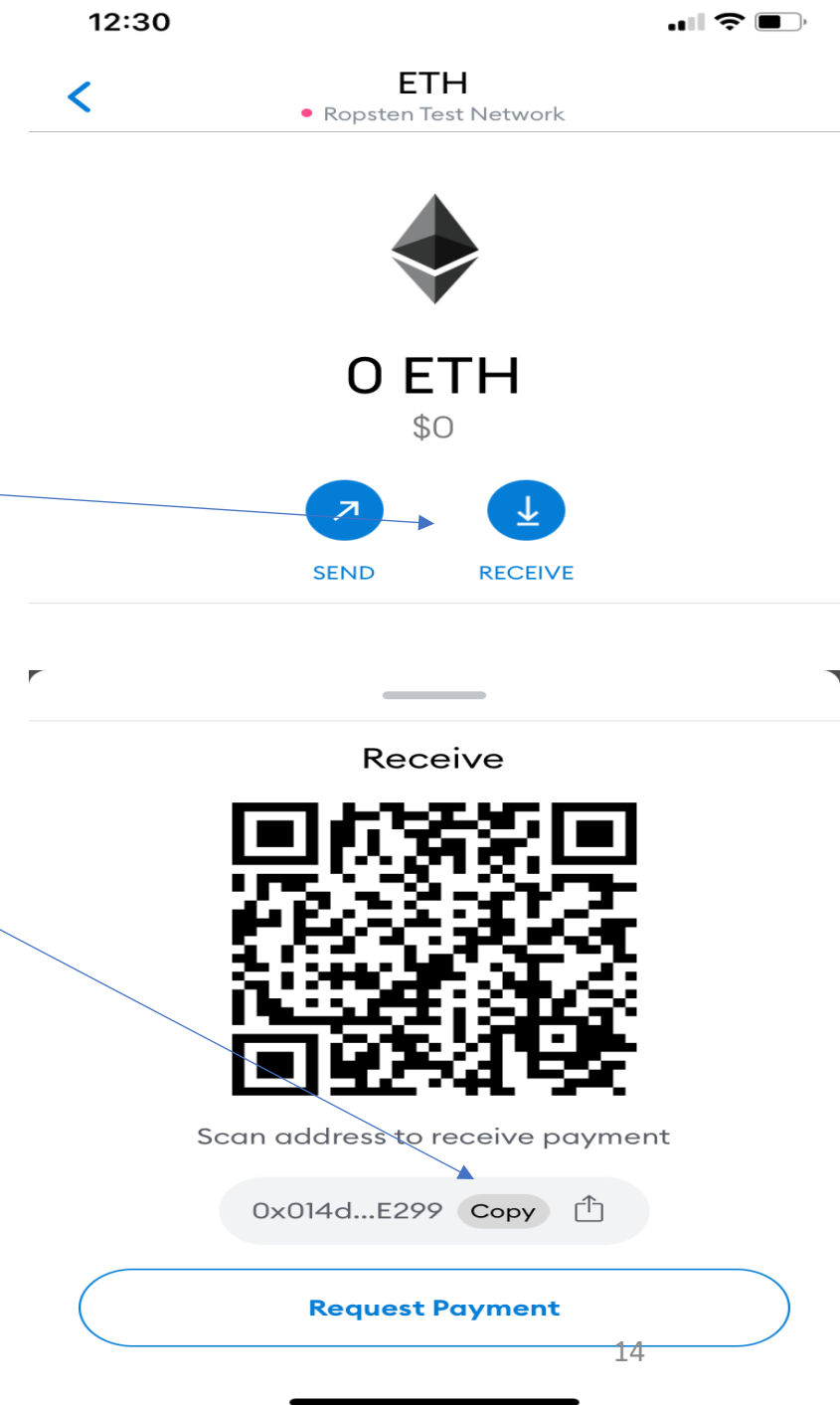
1. Open MetaMask
2. Switch to “Ropsten Test Network”
3. Click on the amount of ETH you have (displayed at 0 ETH)



Getting Test ETH

Getting Ropsten Test ETH

4. Click Receive
5. Copy your public address



Getting Test ETH

Ropsten Ethereum Faucet

Getting Ropsten Test ETH

6. Visit faucet.ropsten.be. Paste your address and press “Send me test Ether”. DO NOT repeatedly request - you will be blocked for 24 hours
7. Once completed, click on the transaction hash at the bottom of the page to send you to EtherScan

Enter your testnet account address

0xa78a8CFDC58fd2AC6F35697f0357AD77B5C44f05

Send me test Ether

Test ETH sent to

0x65c29b6469053593b28e9664910b5ef2d2702c0f.

Transaction hash


0x8d2606ef972443556a66bca31e5526deaf13c8222012be

NOTE: TestETH can be obtained from many other sources. Here are two: <https://faucet.egorfine.com/> or <https://faucet.dimensions.network/> and paste in your address.

Getting Test ETH



Getting Ropsten Test ETH

8. The transaction status will likely be “Pending” but will eventually turn to “Success”
 - Notice the “To” and “From”. If you click “To” you will see your account details.
9. Go back to MetaMask and your balance should be updated

 Etherscan

Ropsten Testnet Network





Transaction Details

Sponsored:  Arweave: Earn ETH to help build Web3.0  [Learn more](#) ⓘ

Overview

State Changes

[This is a Ropsten **Testnet** transaction only]

| | |
|-------------------|--|
| Transaction Hash: | 0xd047d0e7f9679fd7934a38c491ef959a0352b3eca27d4f9cd43cd993a9e075f0  |
| Status: |  Success |
| Block: | 7041337 <div>1 Block Confirmation</div> |
| Timestamp: | ⌚ 14 secs ago (Dec-27-2019 07:06:57 PM +UTC) |
| From: | 0x81b7e08f65bdf5648606c89998a9cc8164397647  |
| To: | 0xff65f352156d2c69f9abbf1aef18e6d85314ecce  |
| Value: | 1 Ether (\$0.00) |
| Transaction Fee: | 0.000021 Ether (\$0.000000) |

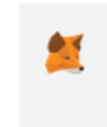
Click to see More ↓

MetaMask FAQ

Troubleshooting MetaMask:

Q: I downloaded the Chrome Extension but it is not showing up in the top right of my browser

A: You likely have more extensions than can be displayed or it is hidden. Click the icon the top right and MetaMask should be in the top of the pop-up menu



Q: I forgot my password

A: Click “Import using account seed phrase” at the bottom. Type in the seed words you saved when you created the account separated by spaces.

MetaMask FAQ

Troubleshooting MetaMask:

Q: I forgot my password and lost my seed phrase

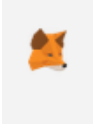
A: There is no recovery here. Make a new account and get new Test ETH. Hopefully you didn't have any real ETH on your account. This is the importance of securing your seed phrase.

Q: Can I use both the Mobile App and Browser Extension?

A: You can link your mobile app to the browser extension, but not vice versa. In other words, create a MetaMask web account and then open the mobile app to link the account. You cannot create a mobile account first and then sync it with the browser extension.

Setup (Web)

- Go to <https://metamask.io/>
- Download extension for either Chrome, Firefox, or Opera
 - Alternatively, download Brave Browser and use Chrome extension
 - If you already have the extension, ensure it is updated to the latest version
- Icon should appear in the top right corner of your browser. Click on it
- Click Get Started
- Click Create a Wallet and either opt-in or opt-out of the data usage
- Create a new account by typing in a password of your choosing and pressing “Create”
- Click next



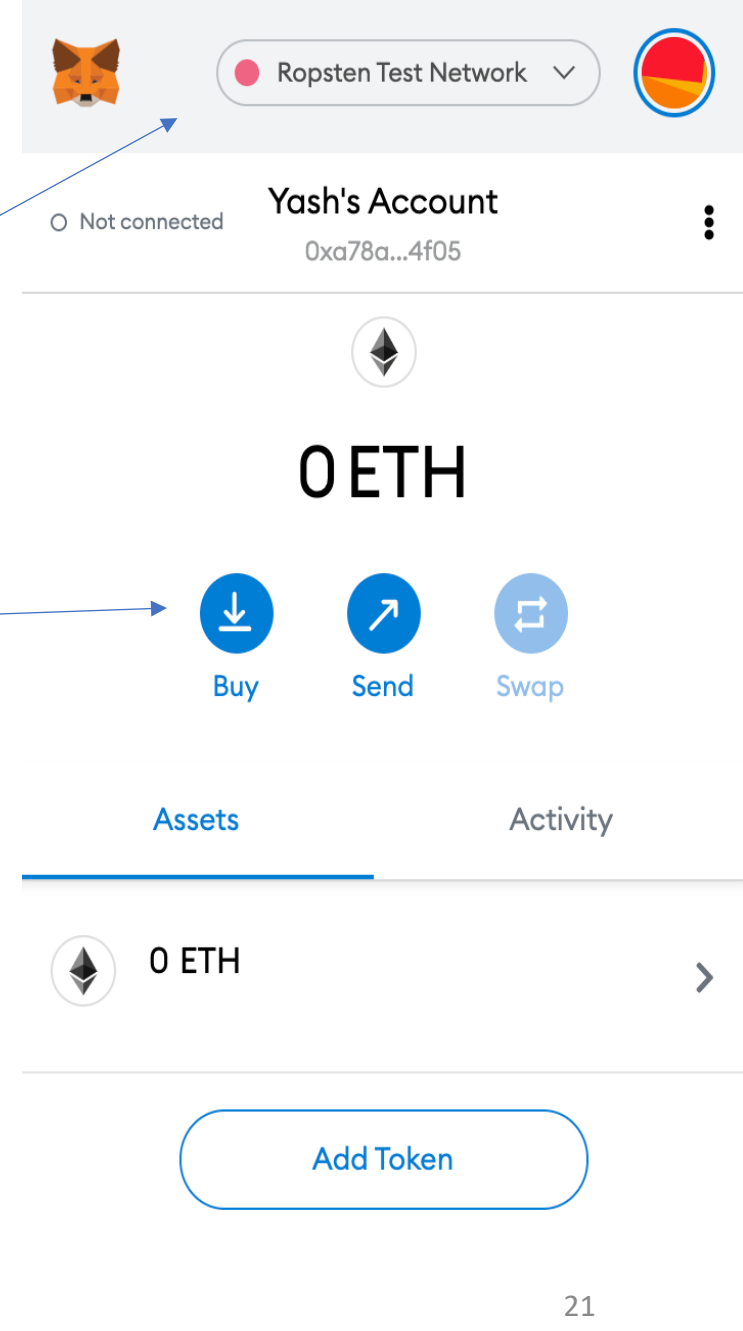
Setup (Web)

- Store Secret Backup Phrase in a secure location, ideally paper or a password manager – not on your computer or phone.
- Type in secret backup phrase
- Skip depositing Ether unless you want to deposit some Ether that you already own. (Skip the next slide unless you want to setup a Mobile account)

Getting Test ETH (Web)

Getting Ropsten Test ETH (Web)

1. Open MetaMask
2. Switch to “Ropsten Test Network”
3. Click “Buy”



Getting Test ETH (Web)

Getting Ropsten Test ETH (Web)

4. Scroll down to “Test faucet” (ignore the “Direct Deposit”) at the bottom and click “Get Ether”

Deposit Ether



To interact with decentralized applications using MetaMask, you'll need Ether in your wallet.



Directly Deposit Ether

If you already have some Ether, the quickest way to get Ether in your new wallet by direct deposit.

[View Account](#)



Test Faucet

Get Ether from a faucet for the Ropsten

[Get Ether](#)

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Getting Test ETH (Web)

Getting Ropsten Test ETH (Web)

5. A new window should open, simply click “Request 1 ether from faucet” at the top in the green button. DO NOT repeatedly request – you will be blocked for 24 hours
- The address is the public address of the “faucet” and balance is the number of test Ether in the account
- User represents your account (I am ff65f35... and notice I have 1.90 ether)

faucet

address: 0x81b7e08f65bdf5648606c89998a9cc8164397647
balance: 93610626.05 ether

request 1 ether from faucet

user

address: 0xff65f352156d2c69f9abbf1aef18e6d85314ecce
balance: 1.90 ether
donate to faucet:

1 ether

10 ether

100 ether

transactions

Getting Test ETH (Web)

Getting Ropsten Test ETH (Web)

6. A new window will open up. Allow Test Faucet to “connect” to your account
7. You will see a new item show up “Transactions”. Click on the new item to take you to Etherscan.

faucet

address: 0x81b7e08f65bdf5648606c89998a9cc8164397647
balance: 93610239.04 ether

request 1 ether from faucet

user

address: 0xff65f352156d2c69f9abbf1aef18e6d85314ecce
balance: 4.90 ether
donate to faucet:

1 ether

10 ether

100 ether

transactions

0xd047d0e7f9679fd7934a38c491ef959a0352b3eca27d4f9cd43cd993a9e075f0

Setup (Linking Browser Account to Mobile App)

- *Note: You must have already set up an account on the Web MetaMask to link with your mobile app, you cannot set up an account via mobile and link to the browser account*
- Download the MetaMask app from the App Store or Google Play Store
- Click “Sync With MetaMask extension” on your mobile device
- Open the browser extension
- Click the account icon in the top right

