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MetaMask

How to Install MetaMask

- Find your browser's MetaMask [via MetaMask's website](#).
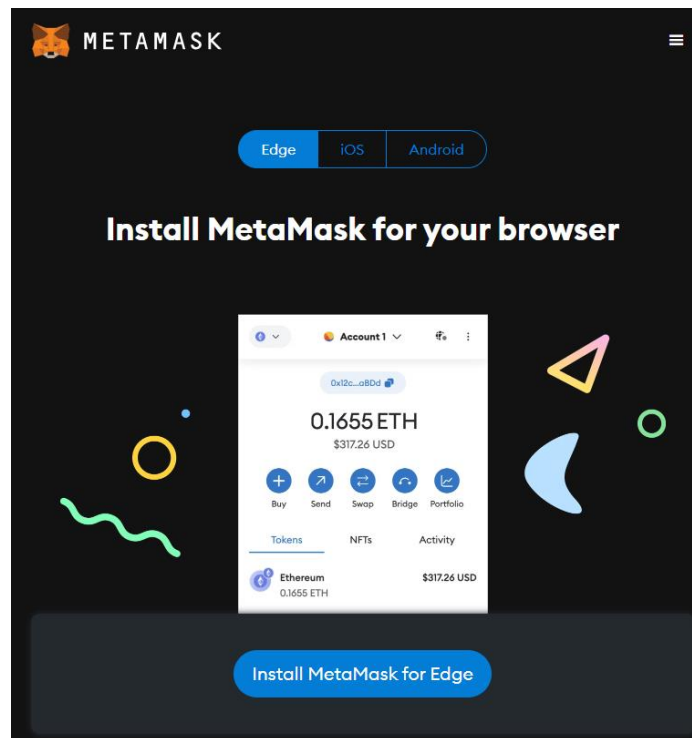
- Select the "Install MetaMask" button, if it has correctly read your browser.
    - If it has not, navigate to your browser's add-on/extension store and search "MetaMask".
        - If you use a more niche browser, check which engine it uses – for example, Opera uses the Chromium engine, which means that it can download Chrome extensions. If you can't find MetaMask on your browser's normal store and it uses a common engine, try searching "MetaMask" on that extension's store.
- From your browser's add-on/extension store, download the MetaMask extension.
- Congratulations! MetaMask is installed.

Setting Up MetaMask

- After installing, MetaMask should pop up in your browser with a "Let's get started" page. If it does not, try opening the extension.
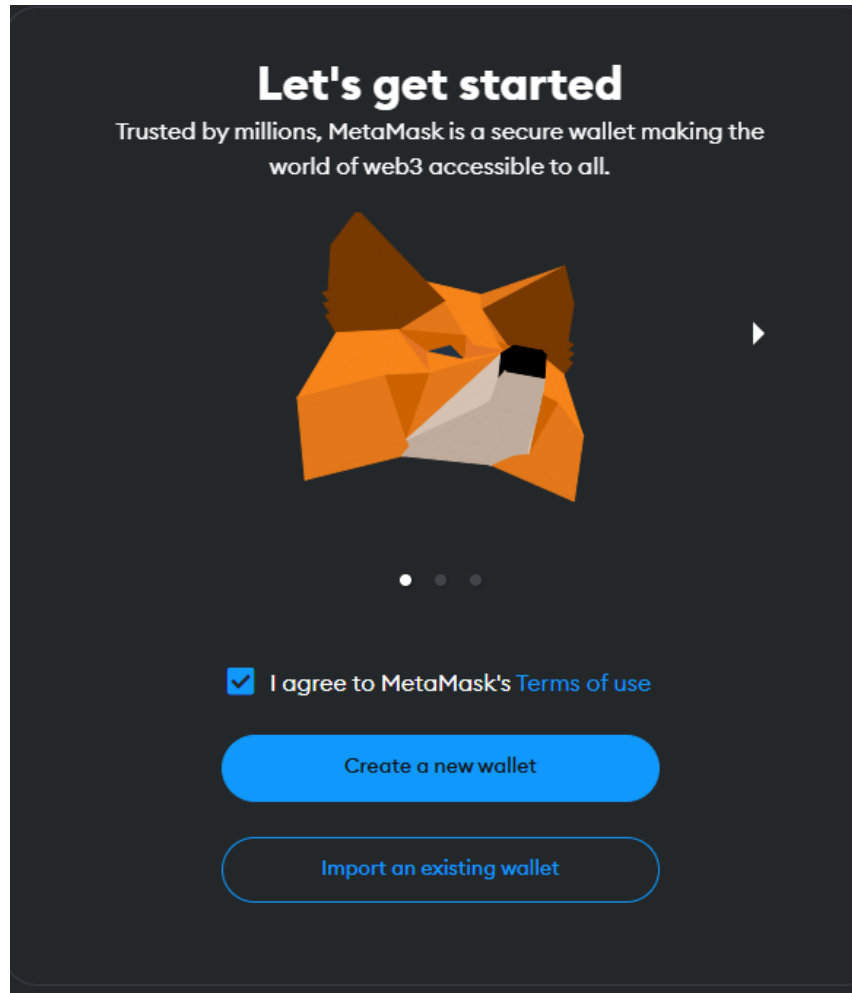
- Read through and agree to MetaMask's terms of use.
- Select "Create a new wallet".

Help us improve MetaMask

We'd like to gather basic usage and diagnostics data to improve MetaMask. Know that we never sell the data you provide here.

When we gather metrics, it will always be...

✓ **Private:** clicks and views on the app are stored, but other details (like your public address) are not.

✓ **General:** we temporarily use your IP address to detect a general location (like your country or region), but it's never stored.

✓ **Optional:** you decide if you want to share or delete your usage data via settings any time.

☐ We'll use this data to learn how you interact with our marketing communications. We may share relevant news (like product features).

We'll let you know if we decide to use this data for other purposes. You can review our Privacy Policy for more information. Remember, you can go to settings and opt out at any time.

[I agree]

[No thanks]

- If you would like to opt into sharing data with MetaMask for marketing purposes, select the "We'll use this data..." checkmark.
- If you would like to submit usage and diagnostic data to MetaMask, select "I agree". Otherwise, select "No thanks".

- Create a password for your MetaMask account. Make sure you write it down! It is non-recoverable because it is local to your device.
- Check the "I understand that MetaMask cannot recover this password" box.
- Select "Create a new wallet".
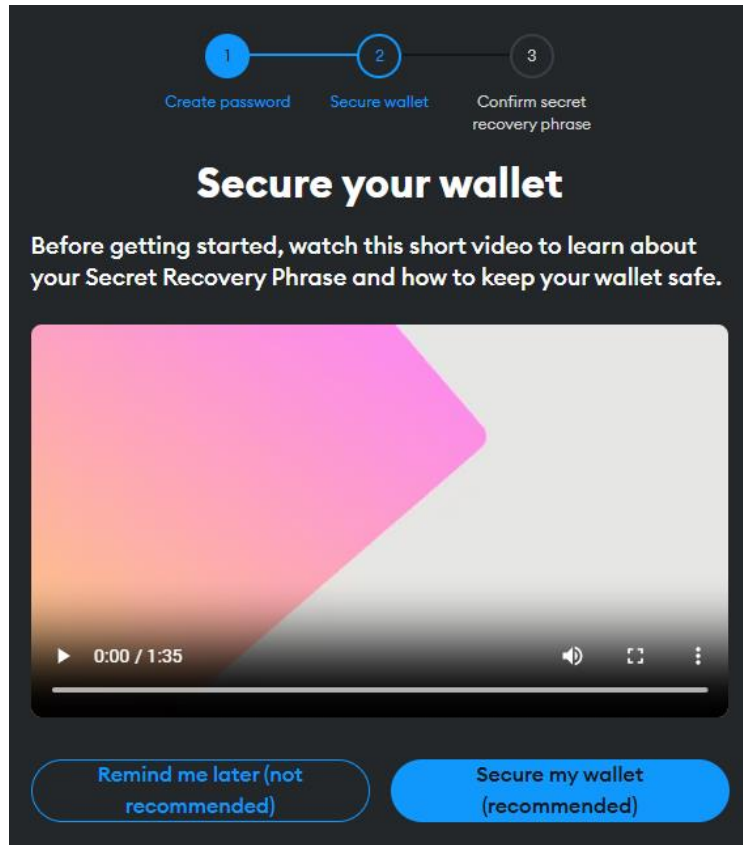
- If you would like to use your MetaMask wallet for purposes outside simply testing this project (i.e. using it as an actual wallet with actual funds), select "Secure my wallet (recommended)" and follow the indented steps below. Otherwise, select "Remind me later (not recommended)", check the pop-up box to show you understand, and skip to the next in-line step.
  - o Get a notepad, phone, screenshotting method, and/or other form of recording ready.
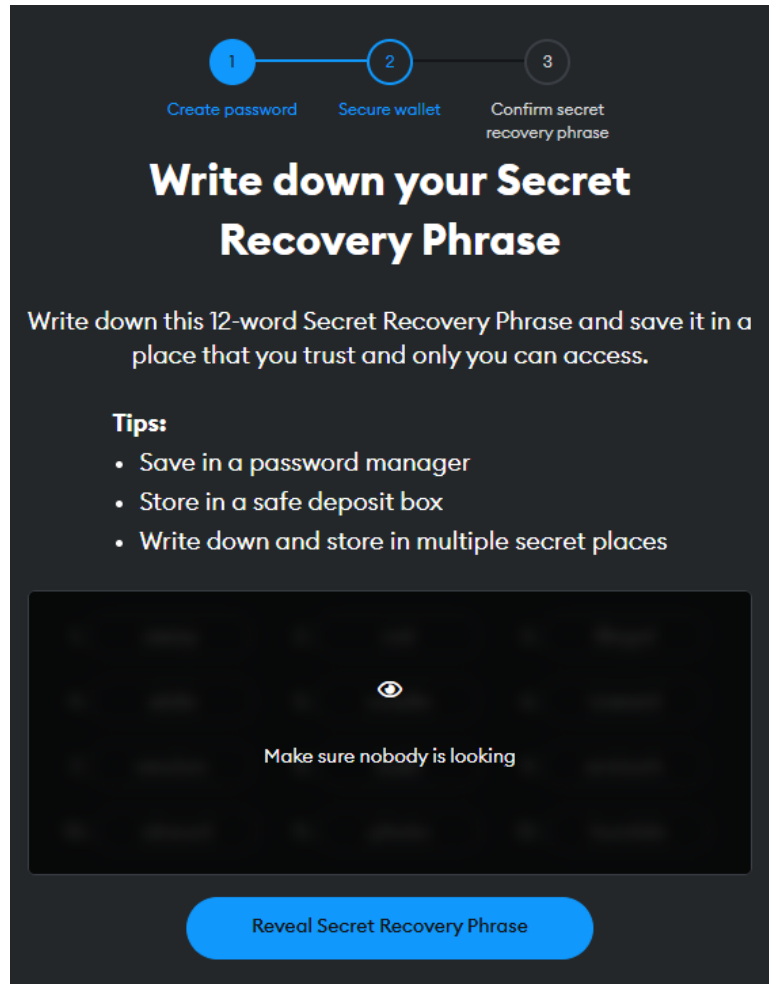
- o Select "Reveal Secret Recovery Phrase".
- o Copy your seed phrase down.
- o Select "Next".

- o Fill in the missing words. If you can't fill it in correctly, going back to the previous page should allow you to view your Secret Recovery Phrase again.
- o Select "Confirm".

- MetaMask will tell you your wallet is successfully created – congratulations!

Using MetaMask

- MetaMask is an extension in your browser. This means it can potentially run on every site you visit, or it can run specifically when you ask it to – where it will run depends on your browser and your personal confirmations.
- To change its settings, select your extensions list in your browser, then navigate to MetaMask. Most browsers allow you to switch updates and privacy settings here.
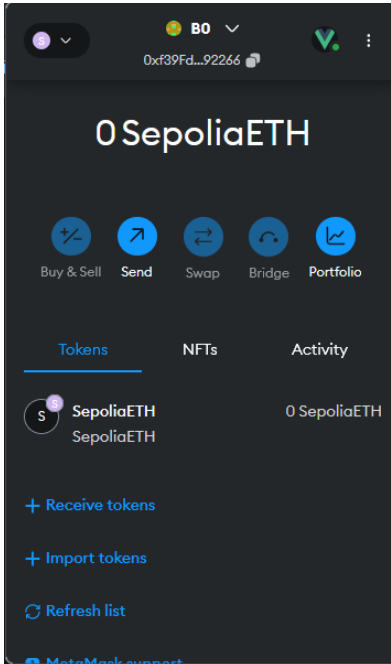
Unlocking MetaMask
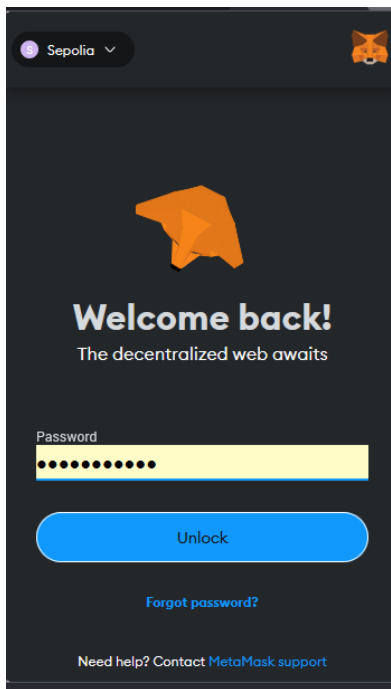
- Every time you close your browser, you'll have to unlock MetaMask again. This is easily doable if you remember or saved your password.
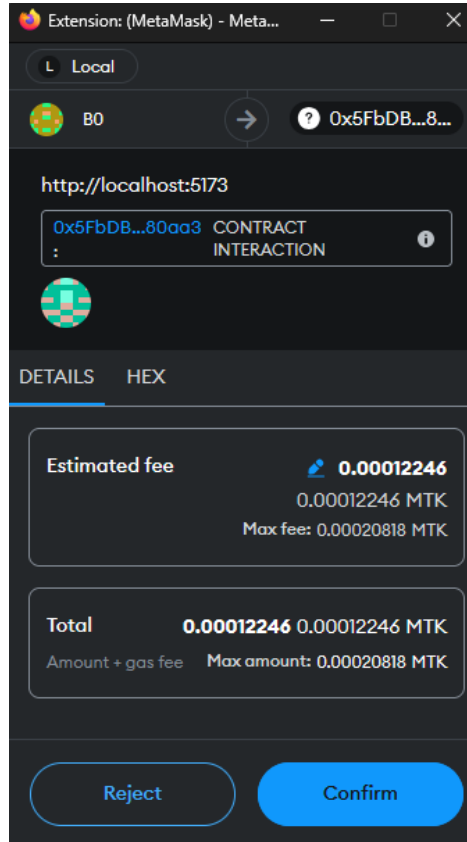
User Manual

Account Page

- When you're connected to a blockchain network, your account will display a balance. In the screenshot above, the account B0 (with a wallet address beginning with 0xf38Fd) has 0 Sepolia ETH in it.
  - o If you aren't connected to a network, you'll just see a loading symbol in the middle instead of a currency.

Transactions

- When you go to use the wallet (via transfers, input, or anything else), anything that would cost you a fee gives a pop-up like this. You'll have to confirm each transaction, if you'd like the transaction to be successful. If there's an issue with the transaction, there will usually be an extra confirmation step to inform you that the gas fees are estimates and not exact.

Adding New Accounts

- You can add new accounts to the wallet via generating a new account or by adding a private key.
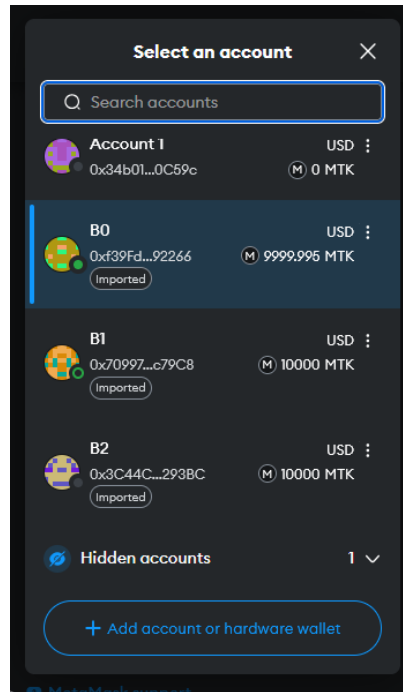
- Select the dropdown in the center at the top to switch accounts, then select "+ Add account or hardware wallet".
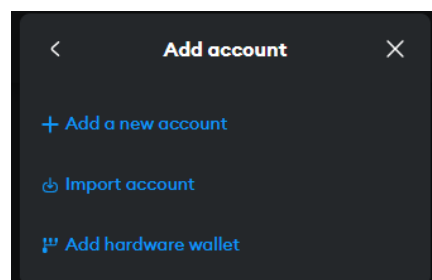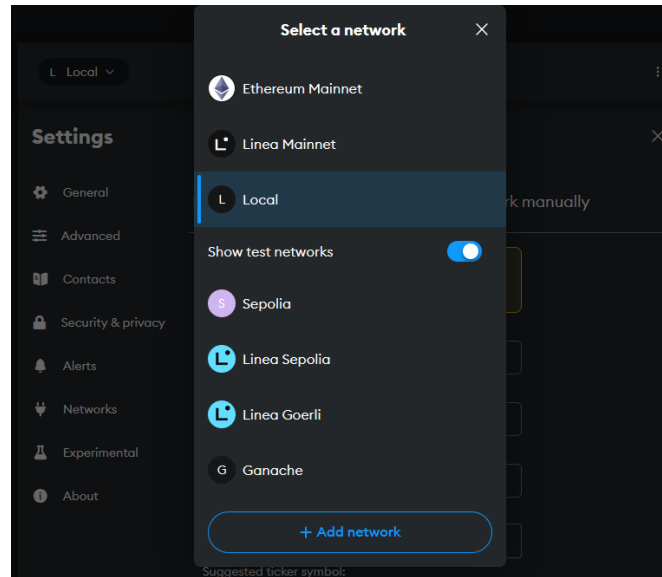

- Then select your choice: "+ Add a new account" if you want to generate a new account, and "Import account" if you have the private key of the account you'd like to add.
- Follow the directions on screen as appropriate, and the new account should be added to the list.
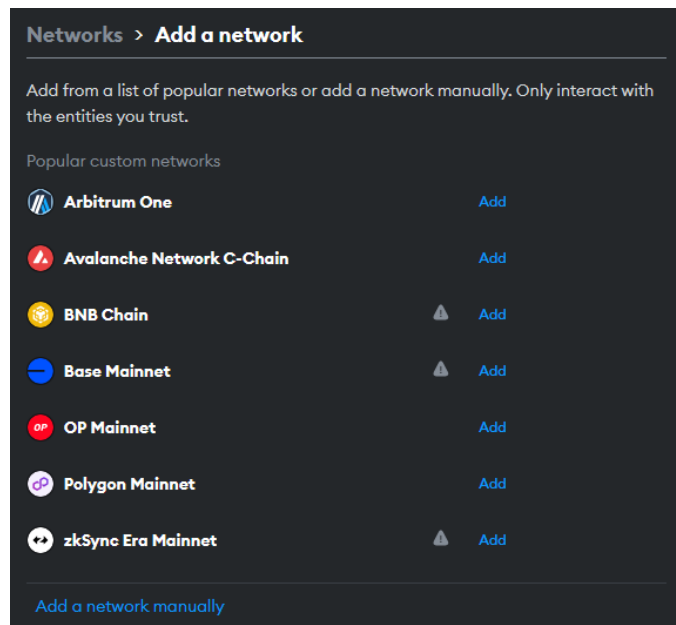
Interacting with DApp

- You'll have to unlock MetaMask first, before it can be used for this project.

- The next step is to connect MetaMask to the blockchain network. This can be done by selecting the network dropdown in the top left corner of the extension, then hitting "+ Add network".

- Click the option at the bottom of the list that reads "Add a network manually".

- Fill out the form.
  - o Network name: Type an identifying network name ("local" works or "farm_iot", or anything that you'll be able to distinguish later).
  - o New RPC URL: This should match your blockchain. At the top of the terminal where the blockchain was run should be a green line about a server starting at a URL. Copy that URL into this entry.
    - ▪ You do need a Node network running to add this.
  - o Chain ID: For Hardhat projects, this is 31337 unless otherwise specified in the project. For this project, it is 31337.
    - ▪ If your blockchain network is not running, the form will inform you that it could not fetch the chain ID.
    - ▪ If your chain ID is wrong, MetaMask will suggest the correct chain ID.
  - o Currency symbol: Type "CT" here.
  - o Select "Save".
- If adding the network did not automatically switch to that network, switch to your new network using the dropdown in the top left corner.
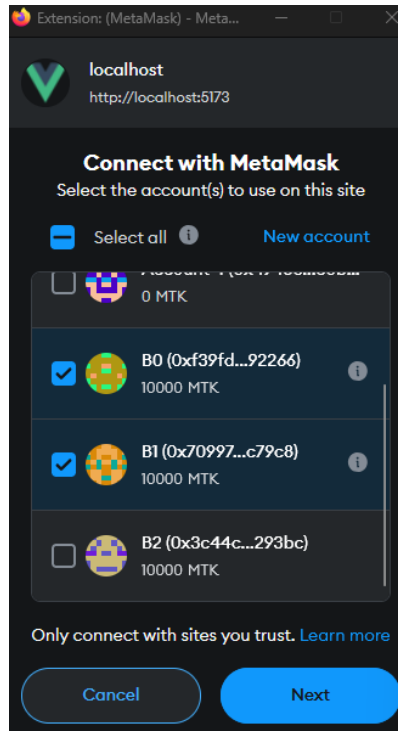
- Then navigate to the running frontend in your browser. By default, this is located at http://localhost:5173. Remember to specify the port number.
- You'll have to connect any accounts you'd like to use on the page to the frontend Vue network. This allows for the Web3 package to pull your account information.
  - ○ Select accounts, then hit "Next" and "Confirm".
  - ○ If MetaMask gets stuck, simply refresh the page and reconnect the accounts.
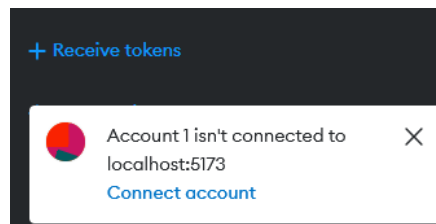
- If you miss an account, it's easy to add it to the list. Swap to the account you'd like to add. There should be a box at the bottom of your account page that says your current account isn't connected to the localhost. Click "Connect account". That account can then be used on the current page.

Unaffiliated User
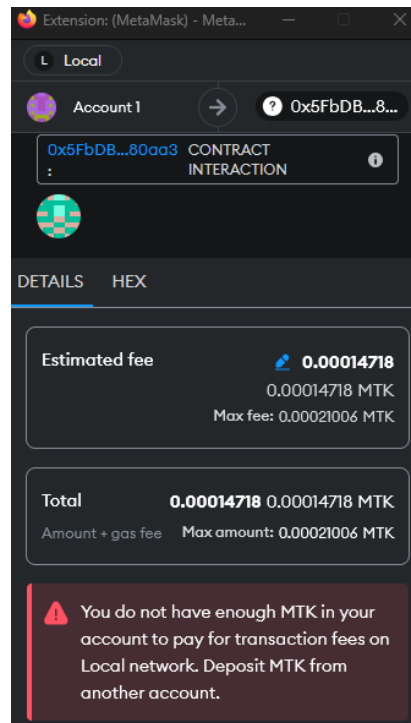
- As an unaffiliated user (as in, someone outside of the blockchain network), you will not be able to add to the network. Any attempt to add data will flag because you don't have any of the currency required and cannot afford the gas fees.
  - o The deployer must also set your limits, if you have the currency – if the deployer hasn't set your account's chemical values, you can't push to the blockchain.
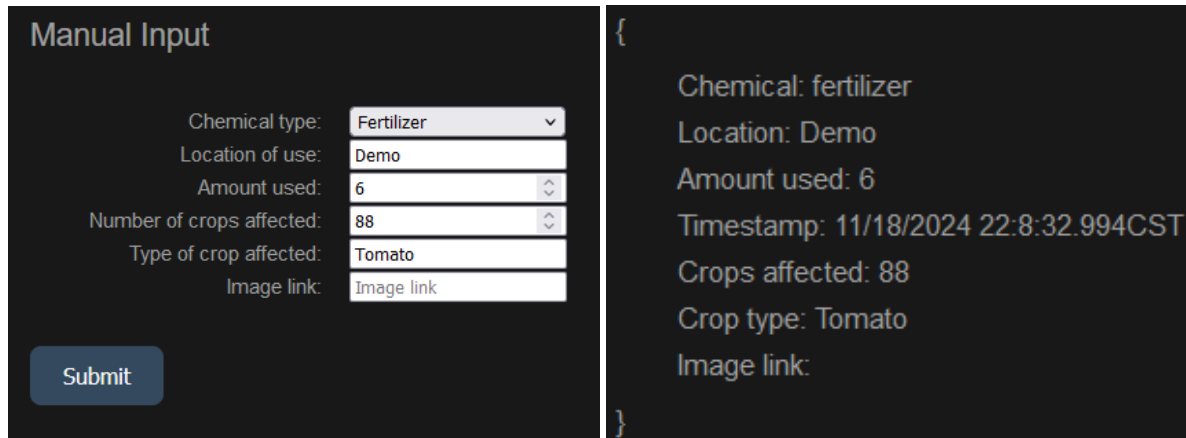
- You will, however, be able to view anything occurring on the network in the "History" sections of either the "Manual Addition" or the "Automated IoT" tab. A farmer adding the use of a fertilizer in Field F would show there, for example.

Farmer (Authorized Account)

- With an authorized farmer's account, you'll be able to view your transaction/chemical limits, manually input data, and automate the use of data.
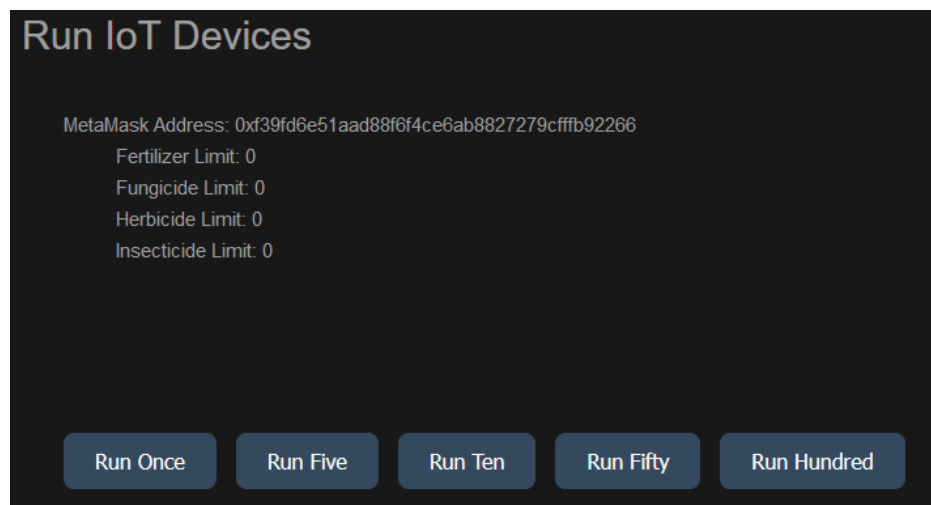

- Above is the "Manual Addition" page.
- You can see your connected account address at the top, under "MetaMask Address". Underneath are the limits for each type of chemical that are associated to your address.
  - o Data can still be pushed to the blockchain even with negative limit values. This is because an IoT device out in the field, which this project is set to simulate, would keep working; it would not wait for confirmation that the blockchain has confirmed its transaction, if it even knows that the transaction is sent to the blockchain to begin with. This project simply records. A negative limit just shows more pesticides than the deployer allocated to your account were used.
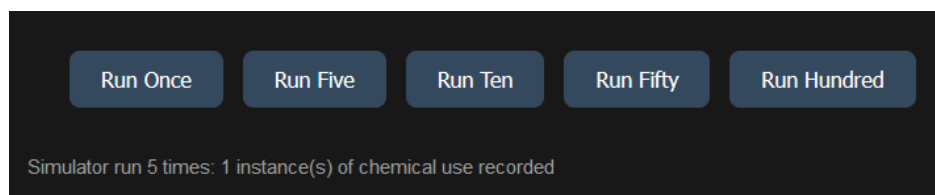
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- The "Manual Input" section requires all fields except "Image link" to be filled out before it will submit. This can be seen in the left image above.
- After you successfully submit the page, the input will be added to the blockchain and displayed in the history. The right image above shows this.
    - You may have to refresh the page to get the history to display correctly.

- Above is the "Automated IoT" page. You can click any of the buttons, submit any MetaMask popups that occur, and add to the history via this automated process.

- After clicking a button, a MetaMask transaction (or several) will pop up. Accept all of them to add them to the blockchain. Rejecting some or all additions is also an option – they will not be added to the blockchain that way.

- A line displaying the number of chemical uses recorded will also be added on the page. The number of uses recorded may be much higher than the total number of MetaMask pop-ups. This is because some data filtering occurs before the transactions are sent to MetaMask, reducing the gas fees.

Deployer (Admin)

- As the deployer, you can set chemical limits for other connected accounts (including your own) and do anything a farmer's account (authorized account) can do.

- Your "Manual Addition" page can be seen above.
- The "Set Chemical Limit" section is the only new content.
  - o You can specify a wallet address and the amounts of each type of chemical you'd like that wallet to have. Important to note is that this does not add to the current limit; it simply replaces it.