Decentralized Application Marketplace for Limited Edition Artworks
Detailed Setup Instructions

Introduction & Software Prerequisites

For the APS1050: Blockchain Technologies & Cryptocurrencies Final Project, we have created a Decentralized Application Marketplace called OFF-GRID MARKERPLACE for limited edition artworks. The purpose of this instruction document is to aid in the setup and navigation through our DApp Marketplace. Please completely review this document prior to accessing the DApp. This project was last tested on MacOS Monterey on August 22nd, 2022, with the following software dependencies and their associated versions for consistency (All titles are hyperlinks to location of download or for more information on the web):

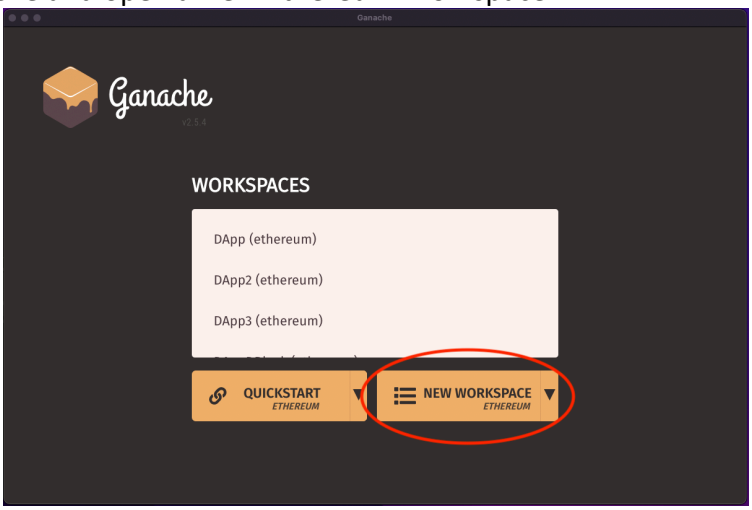
- **Node v16.16.0**
    - An open-source JavaScript runtime environment.
    - Link in title for download.
- **Truffle v5.5.26 (core: 5.5.26)**
    - A development environment, testing framework & asset pipeline for blockchains using the Ethereum Virtual Machine with built-in smart contract compilation, linking and deploying.
    - Requirements:
        - NodeJS v12 or later
        - Windows, Linux or Mac OS X
    - Install Truffle globally on your machine via the following command (MacOS):
        - npm install -g truffle
    - Confirming your Truffle version using the following command (MacOS):
        - truffle version
- **Ganache v7.4.0**
    - A personal Ethereum blockchain distributed application environment used to develop, test and execute commands for DApps in a safe manner.
    - Link in title for download.
- **Solidity - 0.8.16 (solc-js)**
    - An object-orientated programming language for implementing smart contracts on Ethereum Virtual Machine.
    - Install Solidity globally on your machine via the following command (MacOS):
        - npm install -g solc
- **Web3.js v1.7.4**
    - A collection of libraries for interacting with a local or remote Ethereum node.
    - Install Web3 on your machine via the following command (MacOS):
        - npm install web3
- **lite-server v2.6.1**
    - A development only node server for web applications in a browser. It refreshes when html or javascript change and shows CSS changes.
- **Metamask**
    - A cryptocurrency wallet used to interact the Ethereum blockchain. Available in the form of a browser extension for usage with our decentralized application.

Navigating the Decentralized Application

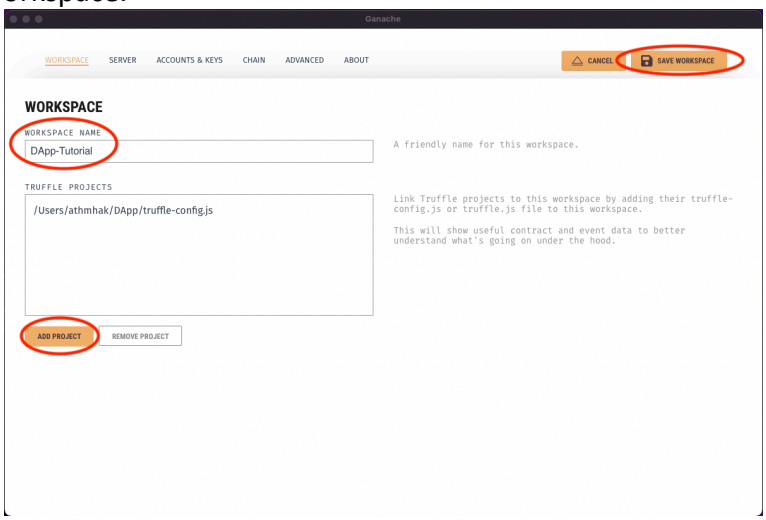
Once all software prerequisites are successfully installed, you are ready to run the DApp. Please follow the step-by-step instructions below for successful navigation. This instruction will be broken into three subcategories: Ganache, Metamask & the DApp.

Ganache

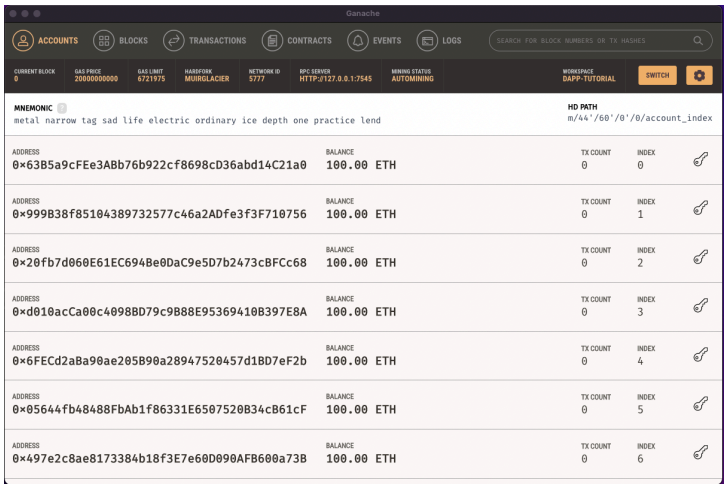
1) Open Ganache and open a New Ethereum Workspace.



2) Name the Workspace.
3) Add and link the Truffle Project Configuration File ("truffle-config.js") stored in your project folder on your machine.
4) Save the Workspace.

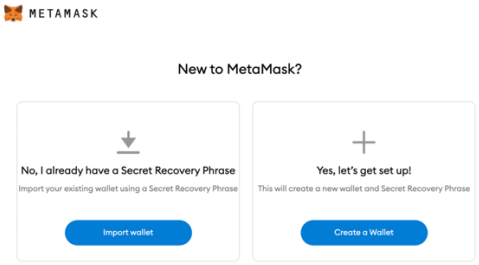


5) Under Accounts, you will see 10 Ethereum Accounts each populated with a balance of 100 ETH. The private key of each account can be accessed by clicking the Key symbol on the right side of each account. You will also find the RPC Server and MNEMONIC key under the Accounts tab (needed later for Metamask wallet setup).

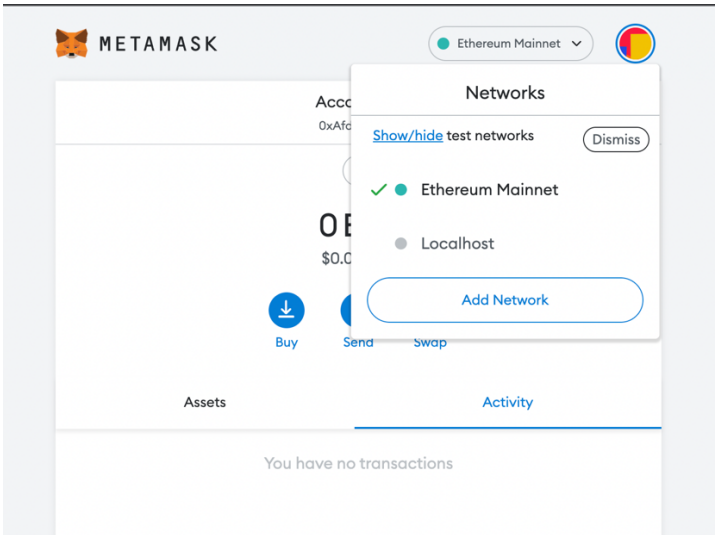


MetaMask

1) Open Google Chrome web browser and click the Metamask icon under extensions.
2) Choose to Import your own wallet under the “No, I already have a seed phrase” option and enter the MNEMONIC under “Accounts” in Ganache.



3) Change the network to the local network on Ganache by selecting the drop down next to “Ethereum Mainnet” and “Add Network”.



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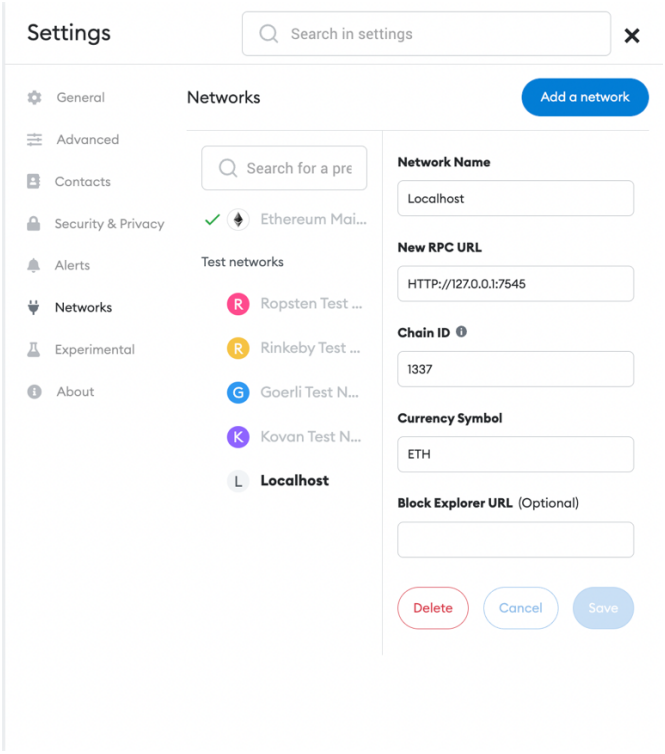
4) Enter the following information directly from Ganache Accounts:
    - Network Name: Localhost
    - New RPC URL: *copy from Ganache*
    - Chain ID: 1337



DApp

1) Download and unzip the DApp project file in a location of your choice.
2) We recommend using Visual Studio Code to open the full package from the directory which you have saved the file.
3) Before running any code to initiate the DApp, add a wallet to the Metamask account by clicking the blue outlined circle for “My Account” and select “Import Account”. Input a private key from any of the 10 accounts on Ganache with sufficient Ethereum to use for the DApp.

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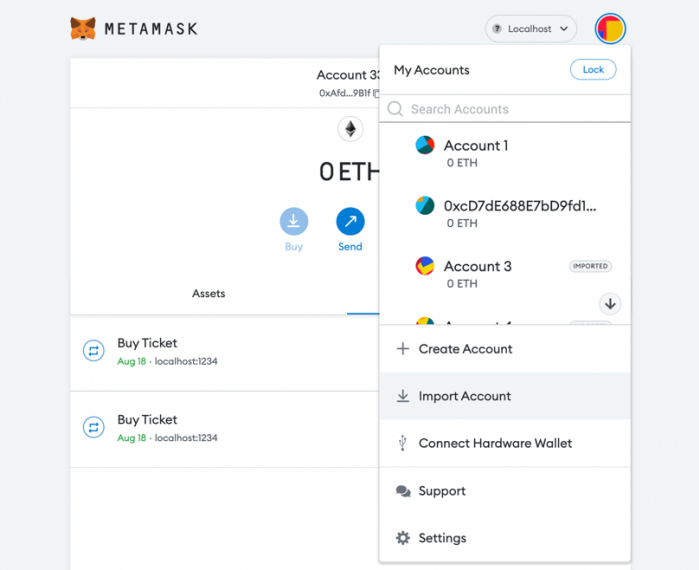
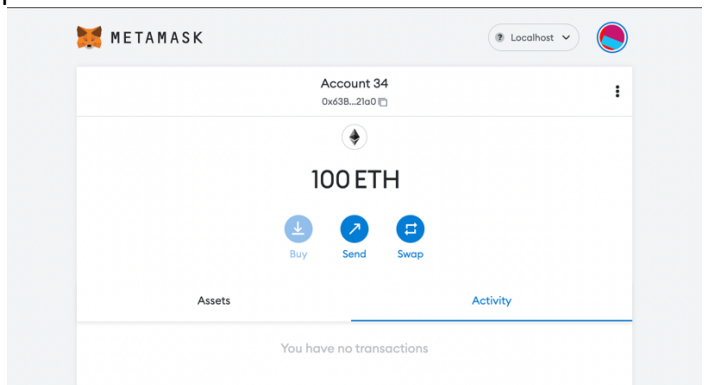
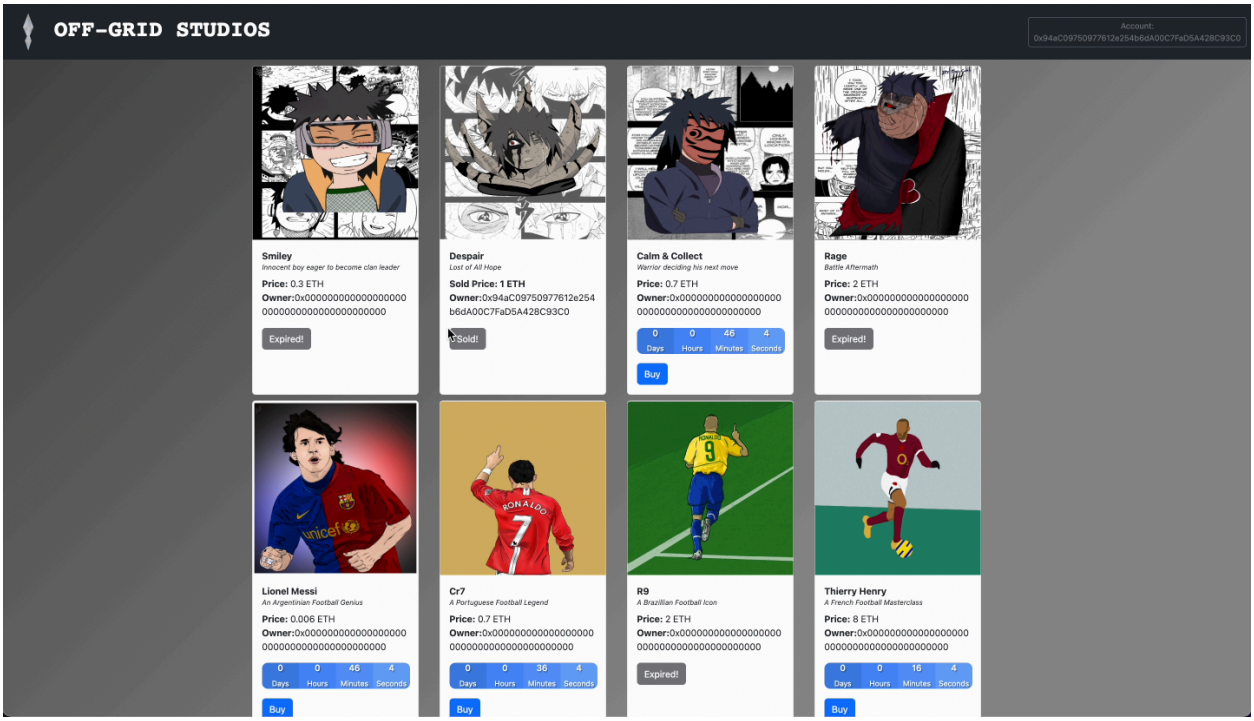


4) If successfully selected, your total balance will show some Ethereum for spending on the DApp Marketplace.

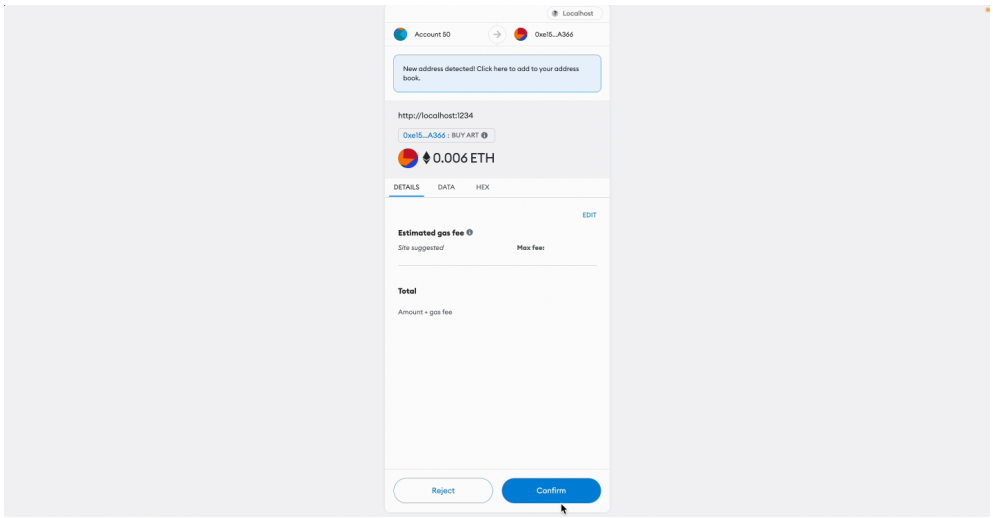


5) Open Terminal in VSCode by selecting “Terminal” from the menu bar and “New Terminal”.
6) Enter the following code in the terminal:
    - **truffle compile** (to compile all contracts)
    - **truffle migrate** (to migrate all contracts to the local server)
    - **cd client** (to change the directory to the client folder)
    - **npm run start** (to launch the local web server with the provided localhost URL)
7) Metamask should pop up, make sure to connect the newly added account (in steps 3 and 4) to the localhost network and it should show as “Connected”.
8) Now you will be able to confirm your Ganache account address and Metamask account address with the top right of the marketplace (on the header).
9) Now you are ready to configure with OFF-GRID STUDIOS marketplace. There are several postings available on the marketplace. Each posting has several parameters including:
    a. Posting Name
    b. Posting Description
    c. Price

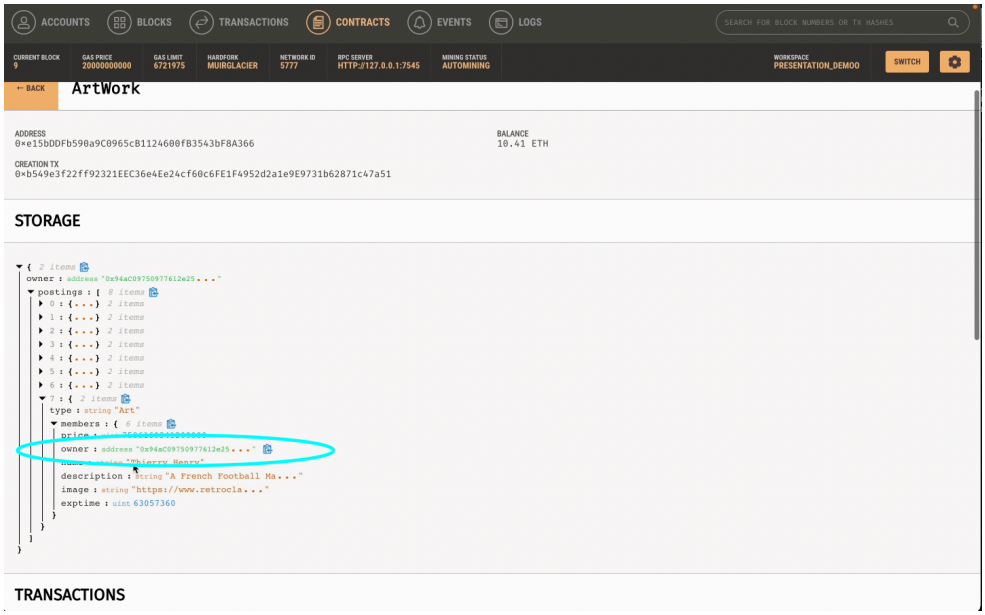
d. Owner
e. Countdown Timer till Expiry
f. Buy Option



10) You have the option to purchase any piece of artwork using the “Buy” button, given that it has not already been purchased (in which it will show as “Sold!” and no buy option) or if it has not already expired (in which case it will show as “Expired!” and no buy option). Please note these requirements have also been set in the backend therefore the smart contract will not initiate under the following conditions:
    - The user does not have sufficient funds greater than the price of the artwork
    - The owner is anything besides 0x0, meaning that if its already owned by somebody the smart contract will not process
    - The expiry time has been succeeded.
11) To purchase, click “Buy”, Metamask will automatically open and request your approval for the transaction for the amount listed under the price of the respected posting plus some gas fees for the transaction.



12) Click “Confirm” and now the posting will update as “Sold!” and the owner will not be the same Address as the one you used to purchase the Artwork. You can confirm this transaction on Ganache under ‘Contracts’ and the updated account balance under ‘Accounts’.



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