FinTech Project 3

Modern Distributed Application Development

Building a Web3 application using modern tools & techniques

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Project Overview:

https://github.com/pmm09c/auction-house

Created a Marketplace for ERC tokens.

- While learning and building, how to **setup, build, deploy and interact with a web3** application using modern development techniques.
- Using **Solidity, ERC-20, ERC-721**, and **ERC-1155 contracts** were authored and deployed to the **rinkeby** testnet.
- A **marketplace contract** was further deployed. **Tokens (Fungible and Non Fungible)** were **minted**, and items were **listed for sale** on the marketplace

Technology :

Used to build, deploy, interact

- **Solidity** — For writing Smart Contracts for Minting ERC 20, ERC 721 & ERC 1155 Tokens and Marketplace to List the Tokens
- **Hardhat** — Development environment for compilation, testing, deployment and verifying contracts
- **Alchemy** — For hosting deployed app on testnet
- **Rinkeby** — An ethereum test network
- **Pinata/ NFT.storage** — To generate URI for tokens and for hosting images of minted tokens/nfts
- **React** — For authoring Web view/ UI
- **Typescript** — Language for authoring deploy, test, view/interactive scripts
- **ethers.js** — Library for use in scripts/web to interact with contracts programatically
- **node.js** — Famework for managing local environment, and runtime for typescript/javascript

ERC Standards for Tokens
ERC20 vs. ERC 721 vs. ERC1155

- **ERC-20** introduces the token standard for creating fungible tokens on the Ethereum blockchain.
  ERC-20 consists of properties that support the development of identical tokens.

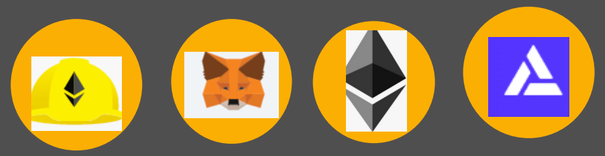
- **ERC-721** tokens are the standards for non-fungible tokens (NFTs).

- **ERC-1155** is a smart contract interface representing fungible, semi-fungible, and non-fungible tokens.
  ERC-1155 can perform the function of ERC-20 and ERC-721 and even both simultaneously.

Development Workflow:

Smart contracts authored for Minting tokens (FT & NFTs) with ERC 20, ERC 721 and ERC 1155 standards along with smart contract for Market place using **Solidity(Language) and Visual Studio (Editor)**

Design/Build



Contracts compiled, tested and deployed with harhdhat on Rinkeby test Network using Metamask wallet and Alchemy as a Node provider for listening to on chain events

Compile/Test

NFTs point to data on IPFS for images and token metadata offchain. Pinata makes it easy to "pin" stored data and information for nft access.

Stage Assets/ Deploy

Contracts are validated on etherscan for easy interaction and transparency of the contract

Validate

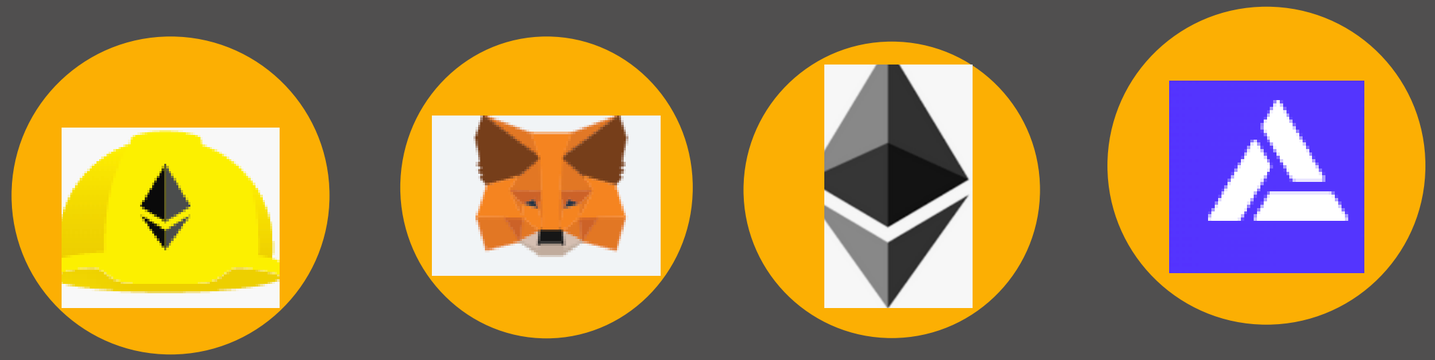
Alternatively, a webpage in react using ethers.js and deployed with node.js can be used to interact with contract - Mint/Trade/etc

Interact

DEMO

Remaining...?

- Enhancing the auction contract .. fixing bugs
- Building on the UI for a good user experience



THANK YOU