

BLOCKCHAIN APPLICATIONS: CSE 598

PROJECT 1: ERC-721 Token Smart Contract on Ethereum (Polygon Mumbai Testnet)

This project focuses on designing, deploying, and testing an ERC-721 Token Standard Smart Contract on the Polygon Mumbai Testnet using the Solidity programming language. It serves as an introduction to creating Ethereum Virtual Machine (EVM)-based Web3 applications with non-fungible token (NFT) mechanisms.

Key Features

- **Token Standard:** Implements the ERC-721 Token Standard, widely used for non-fungible tokens on the Ethereum network.
- **Deployment Network:** Utilizes the Polygon Mumbai Testnet for cost-effective testing and deployment.
- **Tools Used:**
 - **Solidity:** Smart contract programming language.
 - **Remix IDE:** Browser-based development environment.
 - **MetaMask:** Ethereum wallet for interacting with testnet and managing gas fees.

Objectives

1. Develop a smart contract that adheres to the ERC-721 Token Standard.
2. Deploy the contract on the Polygon Mumbai Testnet.
3. Implement essential functions, including:
 - `name()` for token name retrieval.
 - `symbol()` for token symbol retrieval.
 - `Custom message()` function for additional metadata.

Process

1. **Setup:**
 - Configured MetaMask wallet for the Polygon Mumbai Testnet.
 - Obtained test MATIC tokens using a faucet for transaction fees.
2. **Development:**
 - Used Remix IDE to write and test the ERC-721 smart contract.
 - Integrated essential ERC-721 methods and customized metadata functionality.
3. **Deployment:**
 - Deployed the smart contract to the Polygon Mumbai Testnet via MetaMask.

- Verified functionality using test cases for the required methods.

Learning Outcomes

- Gained hands-on experience with the EVM ecosystem and Solidity programming.
- Explored the ERC-721 token standard and its real-world applications.
- Successfully deployed and interacted with a live smart contract on a testnet.