DET Protocol

A Decentralized Thing Protocol

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DET Labs

1 Introduction

Decentralized Thing (DET) protocol is a fully decentralized device communication protocol on Ethereum. Users can manage DET devices through dapps and share DET devices to earn DET tokens. By staking DET tokens, users can receive more DET tokens from airdrops and vote on the DET device design.

1.1 DET Protocol

DET protocol is a fully decentralized device communication protocol on Ethereum. Users can manage DET devices through DET dapps and share DET devices to earn DET tokens.

1.2 DET Network

DET network includes decentralized blockchain network (Ethereum) and decentralized storage network (IPFS or Swarm).

1.3 DET Token

A DET token is an ERC-20 token on Ethereum.

1.4 DET Device

A DET device can be represented as an ERC-721 (Non-Fungible) token on Ethereum and can communicate with DET dapps wirelessly.

1.5 DET Dapps

DET dapps are decentralized apps for DET users to connect to the DET network and manage DET devices.

1.6 DET Owner

A DET owner is a DET user who initializes a DET device using the DET dapps. A DET owner can authorize/share DET devices on DET Network.

1.7 DET Authorizer

A DET authorizer is a DET user who gains access to DET devices.

1.8 DET Guest

A DET guest is a DET user who requests access to DET devices.

2. The Decentralized Thing Protocol

2.1 DET Device

2.1.1 Initialize Device

Initialize a DET device to the DET network.

2.1.1 Get User Information

Retrieve information of DET owner and DET authorizer.

2.2 DET Owner

2.2.1 Register Device

Initialize a DET device to the DET network.

2.2.2 Get Device Status

Retrieve DET device status.

2.2.3 Control Device

Control DET device state.

2.2.4 Authorize Device

Authorize a DET device for a DET guest.

2.2.5 Share Device

Share a DET device to the DET network.

2.3 DET User

2.3.1 Pre-order Device

Pre-order a DET device with DET tokens.

2.3.2 Cancel a Device Pre-order

Cancel a DET device pre-order.

2.3.3 Receive Tokens from Airdrops

Stake DET tokens to receive more DET tokens from airdrops.

2.3.4 Stake Tokens to Vote

Stake DET tokens to vote on the DET device design.

2.3.5 Gain Access to DET device

Gain access to DET devices.

2.3.6 List Device

List all available DET devices.

2.3.7 Filter Device with Geolocation

Filter available DET devices with geolocation.

3. Implementation

3.1 DET Protocol

DETProtocol is an Ethereum smart contract for decentralized things.

3.2 DET Order

DETOrder is an Ethereum smart contract for DET device order.

3.3 DET Device Ownership

DETOwnership is an Ethereum smart contract for DET device ownership management.

3.4 DET Voting

DETVoting is an Ethereum smart contract for DET voting.

3.5 DET Token

DETToken is an ERC-20 smart contract and supports features such as burning, pause, and snapshot.

3.6 DET Device

DETDevice is an ERC-721 smart contract and supports features such as burning, pause, and on-chain enumeration.

3.7 DET MQTT Proxy Server

DET MQTT Proxy Server forward/receive Ethereum JSON-RPC data to/from DET Device Client through lightweight MQTT protocol.

3.8 DET Device Client

DET device client provides source code to help microprocessor-based devices connect to the DET network via public node services (Alchemy or Infura). It only supports view/pure functions and won't create any transaction on the blockchain.

3.9 DET Dapp Samples

DET dapp samples provide platform-specific source code to help developers to build mobile apps. These samples support most functions of the DET protocol and can create transactions on the blockchain.

4. DET-compatible device

DET Hub

DET hub is a DET-compatible device that uses ESP32 as MCU integrates 2.4G Wi-Fi and BLE connectivity. It can connect to the DET network through Wi-Fi and sync with DET dapps through BLE.

Owners control and share DET hub resources such as power and Wi-Fi connection; Guests gain access to DET hub with DET tokens.

Reference

[1] Ethereum https://ethereum.org/
[2] IPFS Powers the Distributed Web https://ipfs.io/
[3] OpenZeppelin https://openzeppelin.com/
[4] ESP32 https://www.espressif.com/en/products/socs/esp32