

I. Introduction

EtherID is a decentralized application (dApp) that provides DNS-like services for Ethereum wallets. It allows users to register human-readable domain names that map to Ethereum addresses, making it easier to send and receive cryptocurrency without dealing with long, complex addresses.

II. Related Works

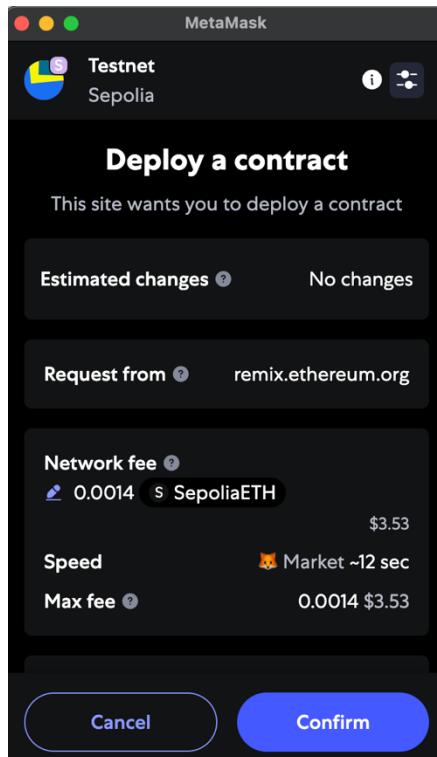
EtherID is similar to Ethereum Name Service (ENS), providing readable domain names for Ethereum addresses. Both systems map complex blockchain addresses to memorable names, but EtherID offers a simpler, more focused implementation with direct payment capabilities using web3.0 approach.

III. Core Features

1. Domain Registration & Management System
 - By borrowing the concept of Domain Name System into blockchain applications, users can register domain names as they desire.
 - Once the domain is mapped to a wallet address, the domain will be locked to the corresponding wallet address until the domain is available again.
 - Easy administration can be done on the Admin Panel.
 - The register domain can be used to provide a shortcut for payment transfer.
2. Registration Fee Collection
 - As each domain require certain amount of registration fees to register, all accumulated registration fees can be collected by the contract owner.
3. Intuitive User Interface
 - Simple and introduction UI leading user to use the dApp.
 - Users can connect MetaMask wallet to use the dApp.
 - The dApp is dynamically updating, i.e. real time registration fee, sensitive to wallet changing and contract owner only Admin Panel.
4. Level of Protection
 - The functions defined in the smart contract is prohibited to different level of permissions to increase security level.
 - Functions will be only called by the contract owner (a.k.a admin)
 - Protection in terms of accessibility is also introduced, before entering functions body, several check will be performed to avoid redundant contract calling.

IV. Testing

Test #1 – Deploy contract on Sepolia testnet with Remix.



1. Contract Owner: 0xb56d84038e4ad05081a08874c950599d51e553f2
2. Contract Address: 0xB1bCadA08aD3C30de7c89201Ac82fA786175d265
<https://sepolia.etherscan.io/address/0xB1bCadA08aD3C30de7c89201Ac82fA786175d265>
3. The contract owner will be denoted by **OWNER** for later.

Test #2 – Before and after wallet connection.

(before)

EtherID

Choose domain name
mydomain.eid

Link wallet address
0x...wallet

Registration Fee
0.001 ether

To
wallet address or EtherID domain.eid

Transfer amount
ether

Transfer

Connect Wallet

(after)

EtherID

Choose domain name
mydomain.eid

Link wallet address
0x...wallet

Registration Fee
0.001 ether

To
wallet address or EtherID domain.eid

Transfer amount
ether

Transfer

0xF9A2...13D7

1. Using another account (**TEST**) for testing purpose.
2. **TEST** Address : 0xF9A2b75bA09FdD8d39F2f1f392a96297588013D7
3. **TEST** implies normal users as they are not the contract owner.
4. Note that the “Connect Wallet” button already represented by the user wallet address.
5. Note that the registration fee is dynamically get from the smart contract, i.e. 0.001 ether registration fee.

Test #3 – Register a domain for TEST.

A. The copy wallet button helps users to load their connected wallet address.

(before)

Choose domain name
mydomain .eid

Link wallet address
0x [wallet](#)

Registration Fee 0.001 ether

Register Domain

(after)

Choose domain name
mydomain .eid

Link wallet address
0xf9a2b75ba09fdd8d39f2f1f392a96297588013d7 [wallet](#)

Registration Fee 0.001 ether

Register Domain

B. Domain name will be constrained to lowercase letters only.
(included numbers)

The screenshot shows the EtherID interface for registering a domain. A modal window at the top center displays the error message: "Domain name must contain only lowercase letters." The registration form includes fields for "Choose domain name" (containing "12345678"), "Link wallet address" (containing "0xf9a2b75ba09fdd8d39f2f1f392a96297588013d7"), and "Registration Fee" (containing "0.001 ether"). The "Transfer" button is visible on the right.

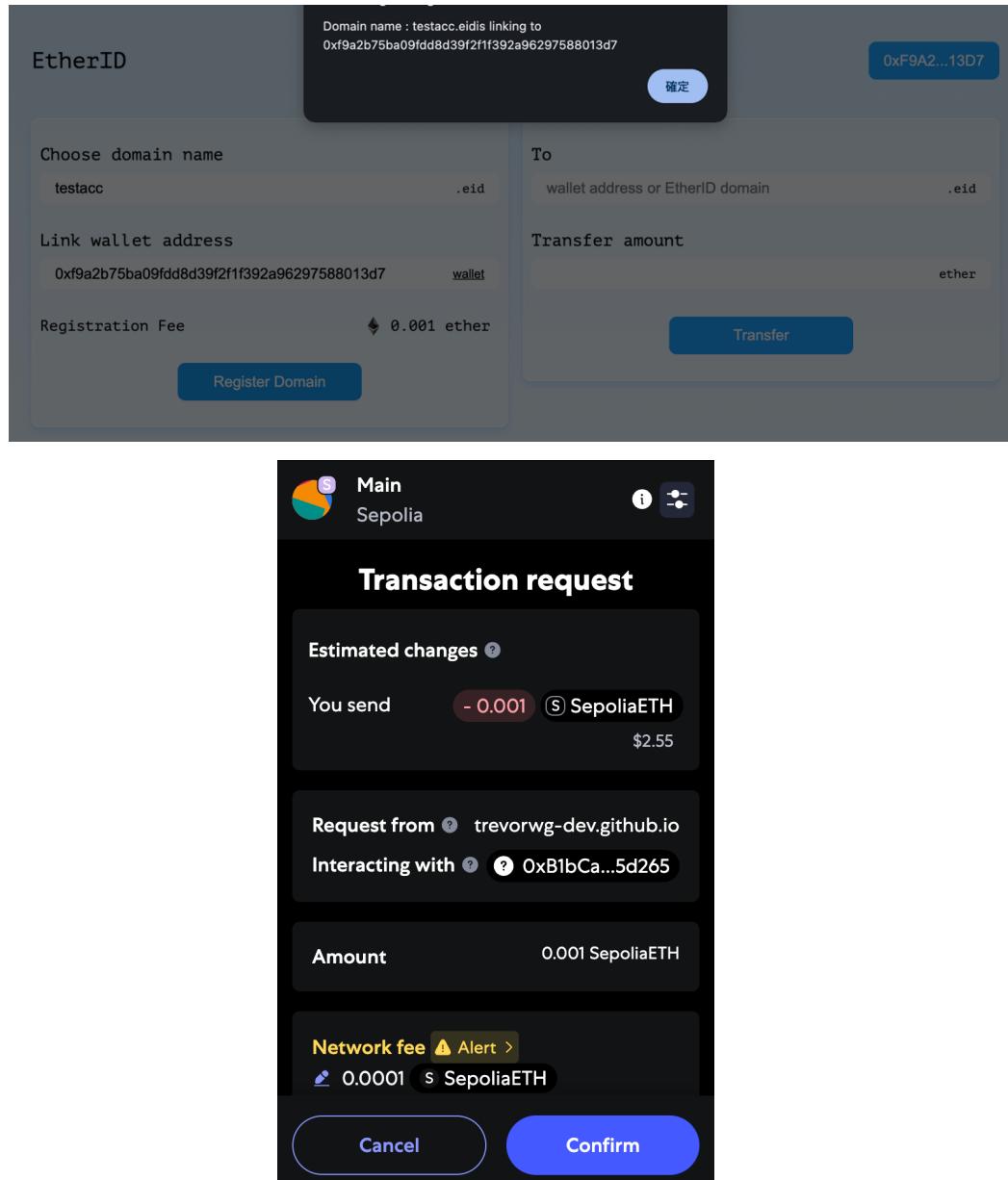
(less than 5 letters)

The screenshot shows the EtherID interface for registering a domain. A modal window at the top center displays the error message: "Domain name must be at least 5 letters long." The registration form includes fields for "Choose domain name" (containing "abc"), "Link wallet address" (containing "0xf9a2b75ba09fdd8d39f2f1f392a96297588013d7"), and "Registration Fee" (containing "0.001 ether"). The "Transfer" button is visible on the right.

(included invalid characters)

The screenshot shows the EtherID interface for registering a domain. A modal window at the top center displays the error message: "Domain name must contain only lowercase letters." The registration form includes fields for "Choose domain name" (containing "abc_def"), "Link wallet address" (containing "0xf9a2b75ba09fdd8d39f2f1f392a96297588013d7"), and "Registration Fee" (containing "0.001 ether"). The "Transfer" button is visible on the right.

(acceptable domain name)



1. The registration transaction:

0x782b00b8fbb16bcaa3e8076afb423a2a10b5808ef0972dc7a98937f1ac38d47c

<https://sepolia.etherscan.io/tx/0x782b00b8fbb16bcaa3e8076afb423a2a10b5808ef0972dc7a98937f1ac38d47c>

2. Exactly the required registration fee is paid to the smart contract.

Test #4 – Update the front-end when wallet address is changed.

The screenshot displays two main components of the EtherID application:

- Edit accounts modal:** A dark-themed modal window titled "Edit accounts". It shows two accounts: "Main" (selected) and "Testnet".
 - Main:** Address OxF9A2b...013D7, \$76.50 USD, 0.03 SepoliaETH
 - Testnet:** Address OxB56D8...553F2, \$241.62 USD, 0.094 SepoliaETHA blue "Update" button is at the bottom.
- EtherID main interface:** The main page has a header "EtherID" and a wallet address "0xB56D...53F2".
 - Left sidebar:** "Choose domain name" field containing "mydomain.eid", "Link wallet address" field containing "0x.wallet", "Registration Fee" field showing "0.001 ether". A "Register Domain" button is present.
 - Right sidebar:** "To" field for entering a wallet address or domain, "Transfer amount" field for entering ether, and a "Transfer" button.
 - Bottom section:** "Admin Panel" with "Withdraw Registration Fees" and "Withdraw Fees" buttons, and "Delete Domain" buttons for "deleteDomain" and "Delete Domain".

Transaction Hash	Method	Block	Age	From	To
0xbdd361d0245a3115305b46901b5d927b8c9b24586d6a1f765f5afdda6f6580c4	Register Dom...	8375545	1 min ago	0xB56D8403...D51E553F2	0xB1bCad
0x782b00b8fb...	Register Dom...	8375473	16 mins ago	0xF9A2b75b...7588013D7	0xB1bCad

[Download: CSV Export]

ⓘ A contract address hosts a smart contract, which is a set of code stored on the blockchain that runs when predetermined conditions are met. Learn more about addresses in our [Knowledge Base](#).

1. When the wallet changed (from **TEST** to **OWNER**) both the right-corner button changed to represent the **OWNER** address.
2. Since this address is the contract owner, the admin panel is rendered.
3. Register domain for **OWNER** for later testing, such that **TEST** is using “testacc.eid” as domain name, while **OWNER** is using “admin.eid”.
4. The **OWNER** domain name is register to the contract:
`0xbdd361d0245a3115305b46901b5d927b8c9b24586d6a1f765f5afdda6f6580c4`
<https://sepolia.etherscan.io/tx/0xbdd361d0245a3115305b46901b5d927b8c9b24586d6a1f765f5afdda6f6580c4>
5. The contract balance is 0.002 ETH as expected.

Test #5 – Transfer 0.000123 ETH from **OWNER** to **TEST** though domain

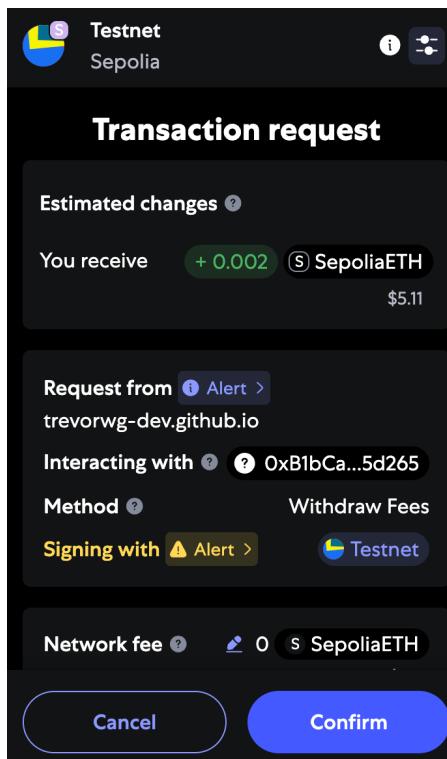
The top screenshot shows a user interface for sending a transaction. It has two main sections: "To" and "Transfer amount". In the "To" section, the recipient address is "testacc" followed by ".eid". In the "Transfer amount" section, the amount is "0.000123" and the unit is "ether". A large blue "Transfer" button is at the bottom. The bottom screenshot shows the MetaMask wallet's "Transaction request" screen. It displays the transaction details: "You send - 0.000123 SepoliaETH \$0.31". It also shows the "Request from" and "Interacting with" addresses, and the "Signing with" method (Testnet). The "Amount" field shows "0.000123 SepoliaETH". At the bottom are "Cancel" and "Confirm" buttons.

1. The **OWNER** to contract transaction:
<https://sepolia.etherscan.io/tx/0x6cbacfdd3ffb7ab81ce8a06f8037e58f77dea562979c8a42763e4ea24015c959>
2. The exact value of 0.000123 ETH will be sent to the contract, then the contract will further transfer to target user.

3. The contract to **TEST *internal*** transaction:

Type	Trace	Address	Method ⓘ	From	To	Value	Gas Limit
call_0_1	Transfer	0xB1bCadA0...86175d265			0xF9A2b75b...7588013D7	0.000123 ETH	2,3

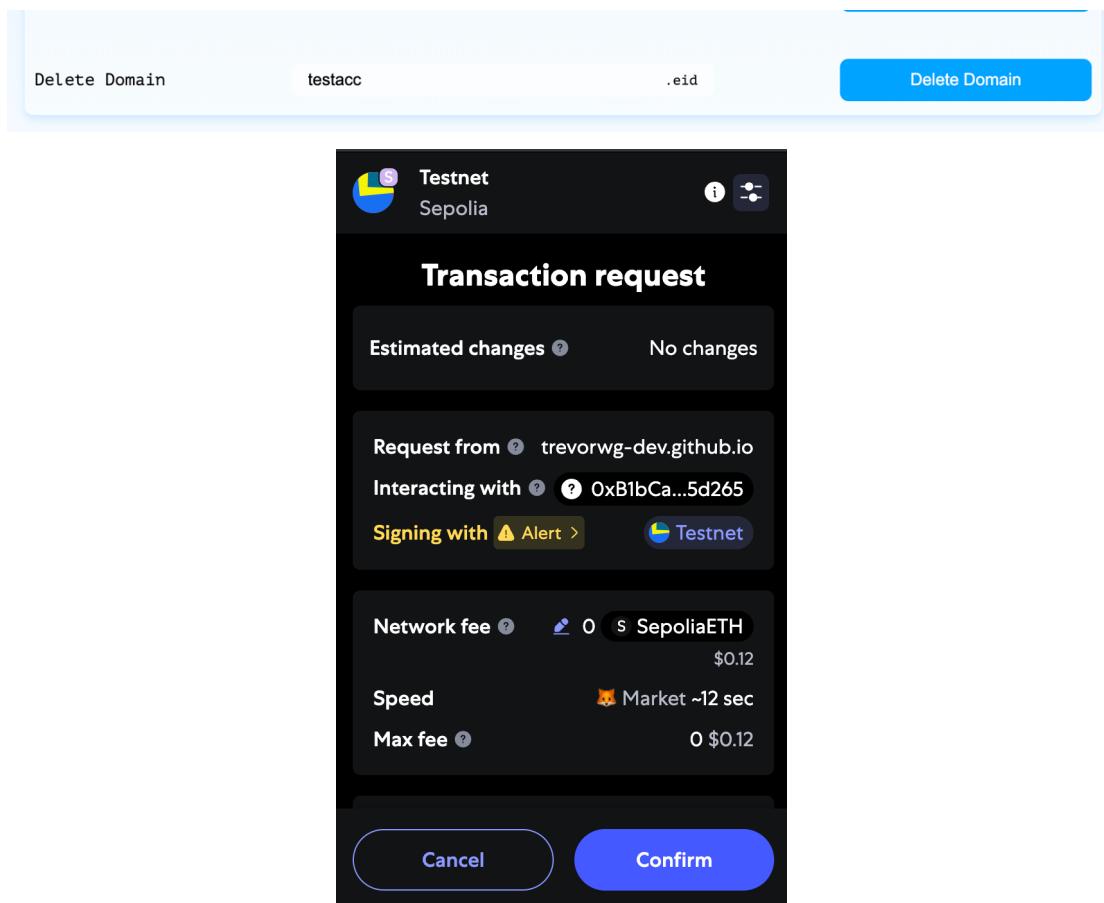
Test #6 – OWNER Withdraw registration fees



Type	Trace	Address	Method ⓘ	From	To	Value	Gas Limit
call_0_1	Transfer	0xB1bCadA0...86175d265			0xB56D8403...D51E553F2	0.002 ETH	2,300

- As expected, we register 2 domain names, so the contract will have 0.002 ETH, and now we are collecting back using the UI in admin panel.
- The transaction address:
<https://sepolia.etherscan.io/tx/0xd9d9bc40cc8ed87ed3b0beae7ce204eb9a9176e4c661f40d099e36673d52ccb9>

Test #7 – OWNER delete existing domain name



1. The mapping for “testacc.eid” to the **TEST** address will be replaced by 0s, thus the mapping is deleted.
2. The transaction address:
<https://sepolia.etherscan.io/tx/0x60f60aeddc05120bcc4d8294a3d0acf6e42bc8964d4b3ddcb1edfb7ae15c6aed>

V. Beyond Development

1. Better UI / Notification system to notice user to wait for next action.
2. Introduce user-side domain management system, i.e. they can manage how long they want to “rent” the domain name and perhaps can renew or drop the domain name when they desire.
3. Although, this is a small project using dApp and blockchain concept, backend server to handle user responsive will be better, rather than let the smart contract or front-end logic handling.