Blockchain final project

InvoiceFund -Decentralized workin capital financing

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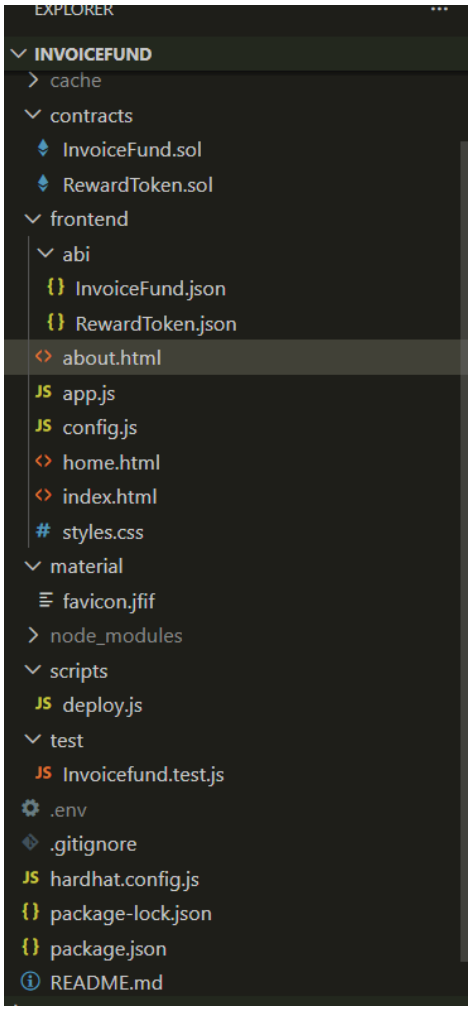
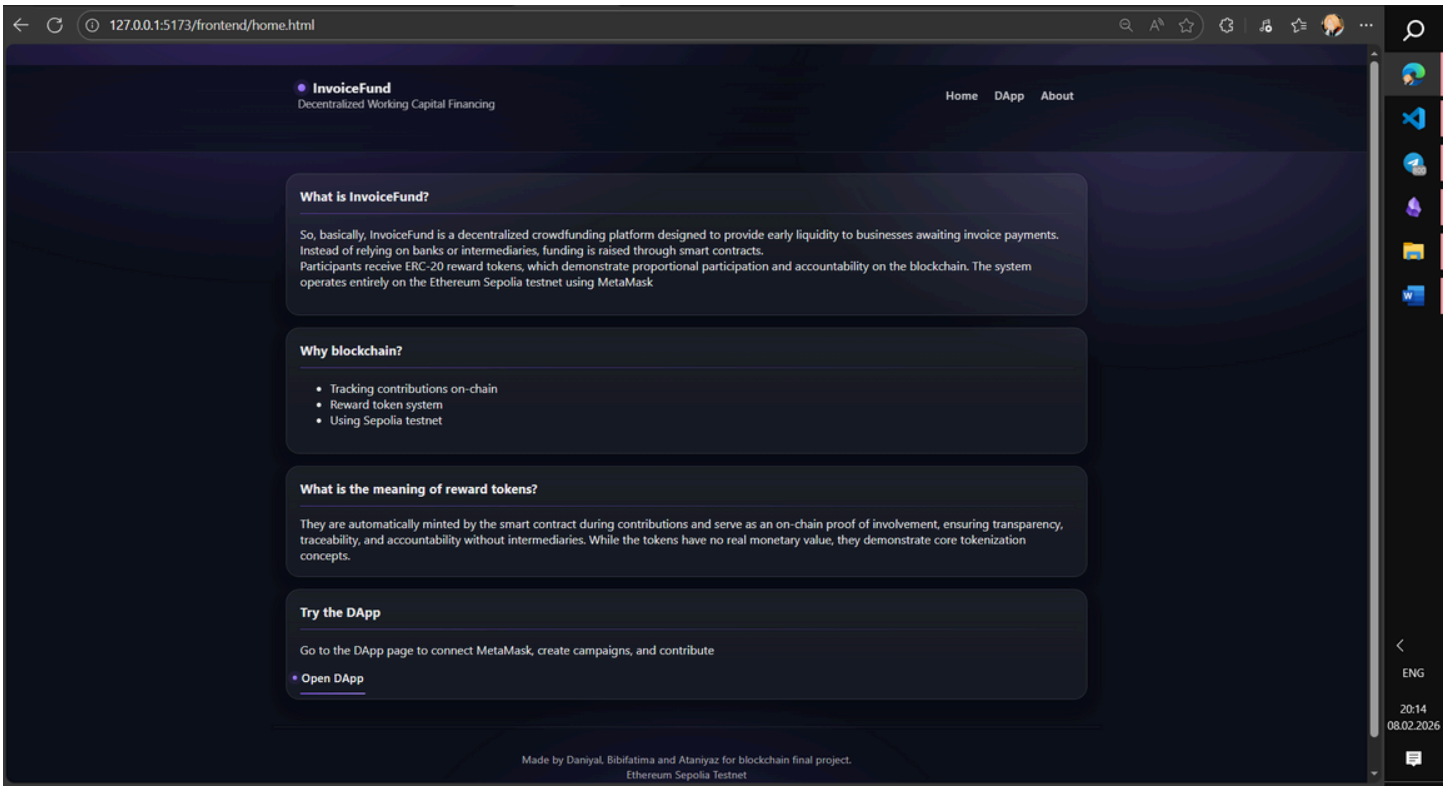
Project Overview

So, basically, InvoiceFund is a decentralized crowdfunding platform designed to provide early liquidity to businesses awaiting invoice payments. Instead of relying on banks or intermediaries, funding is raised through smart contracts. Participants receive ERC-20 reward tokens, which demonstrate proportional participation and accountability on the blockchain. The system operates entirely on the Ethereum Sepolia testnet using MetaMask.
Aand This project was developed as a final project and operates exclusively on an Ethereum test network using free test tokens.
This project was developed as a blockchain final project

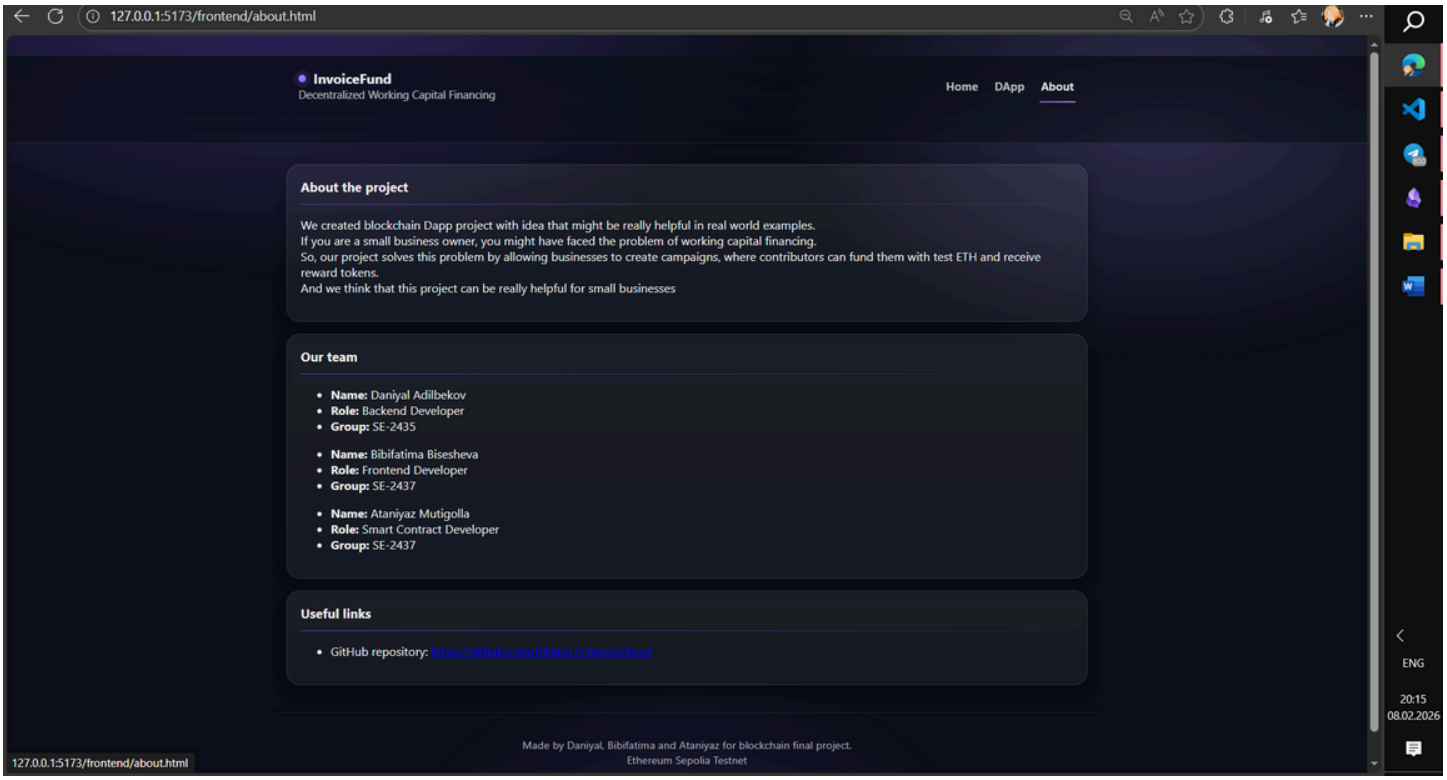
Project architecture



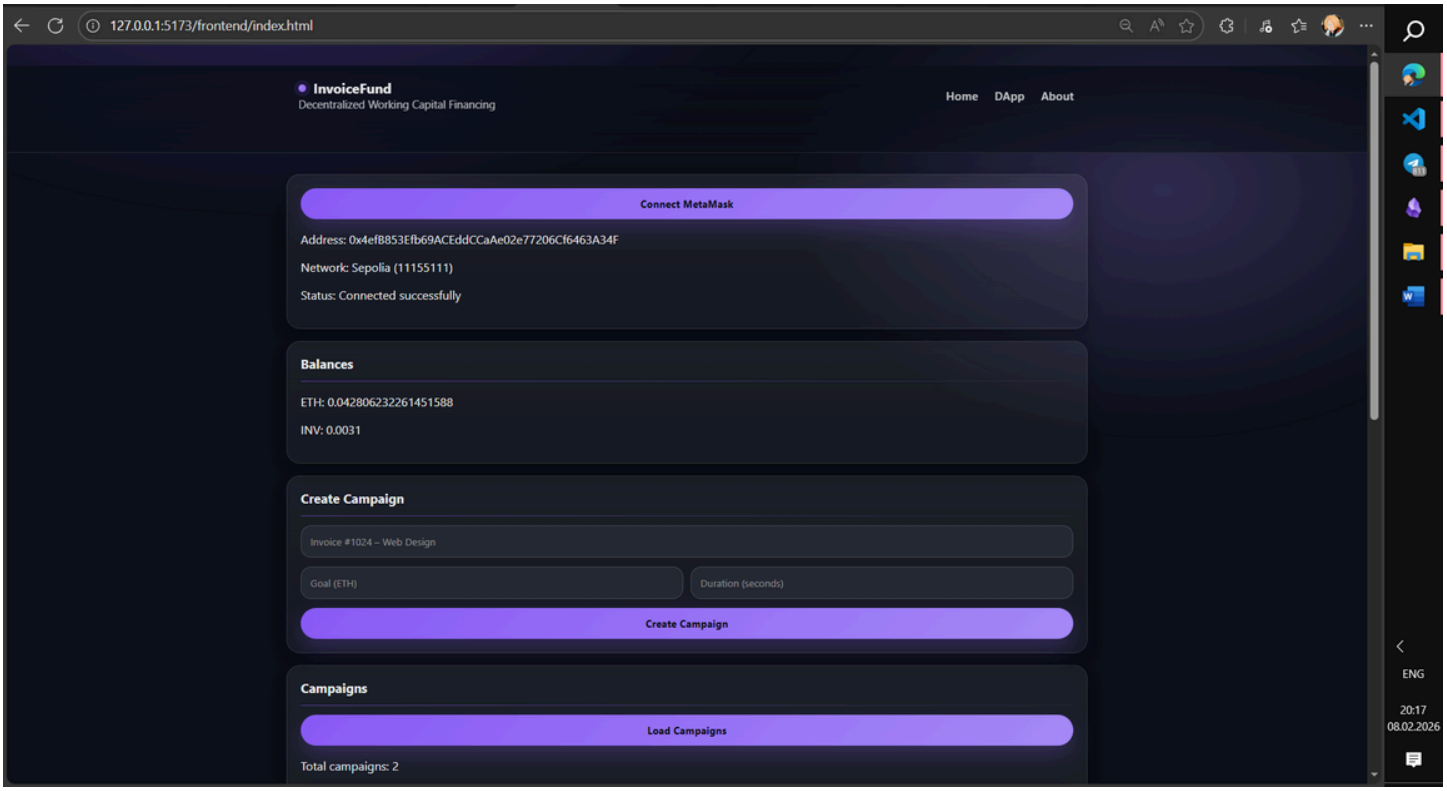
Home.html where is main information about project

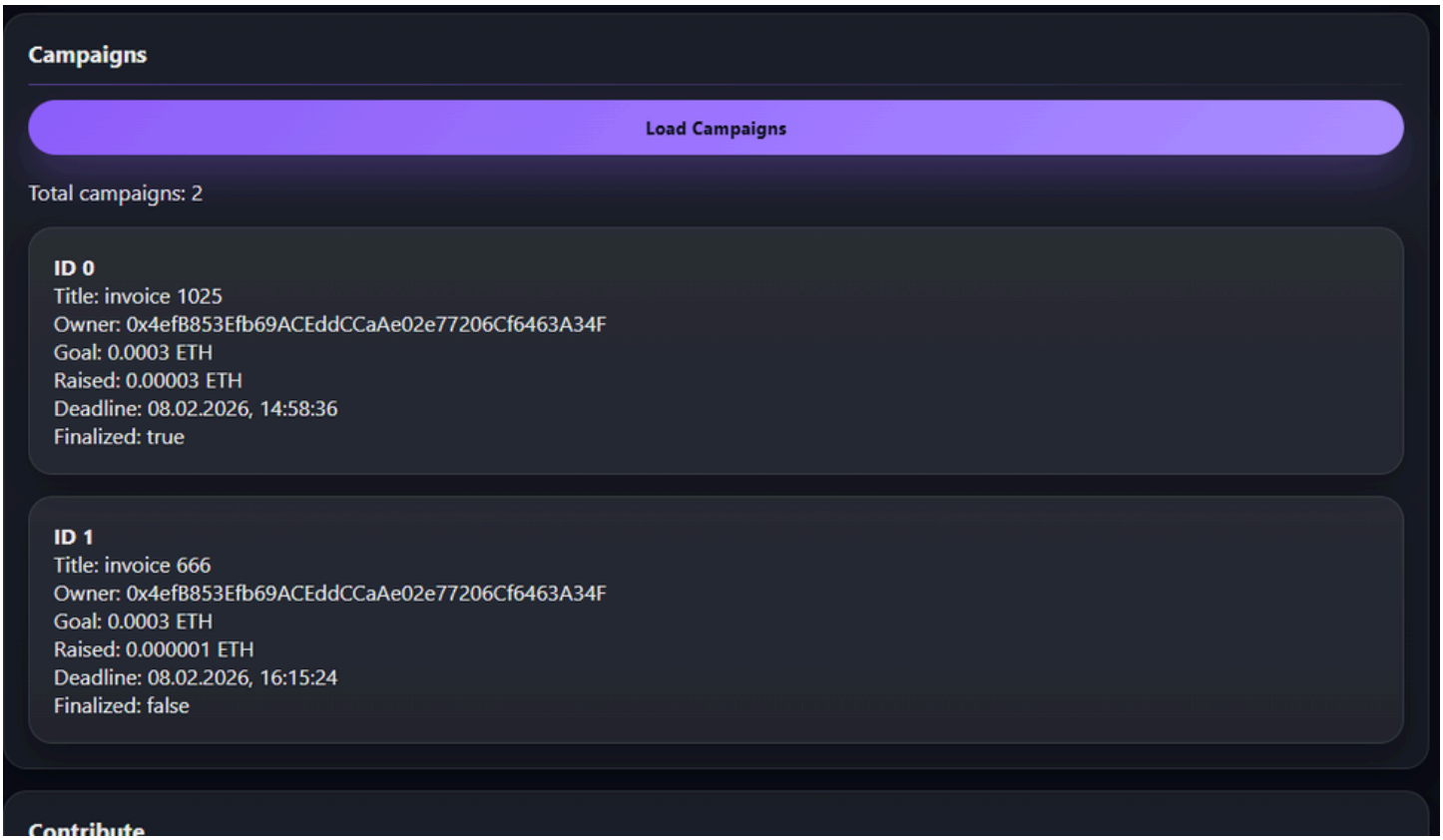


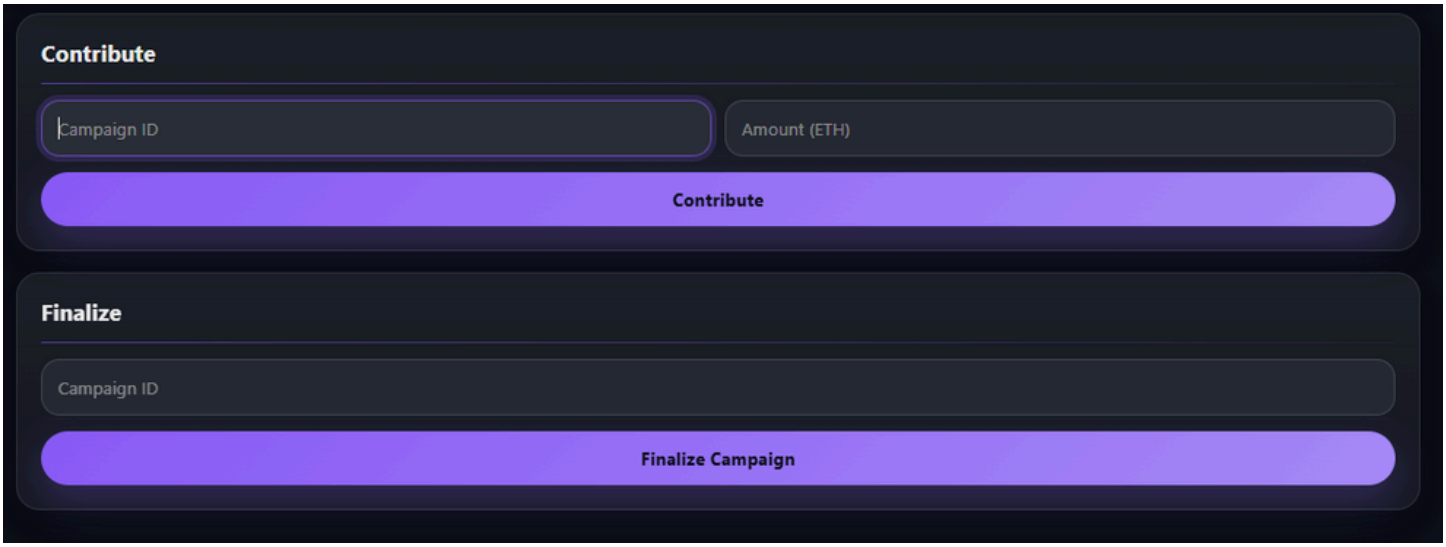
About.html where you can see information about creators and links



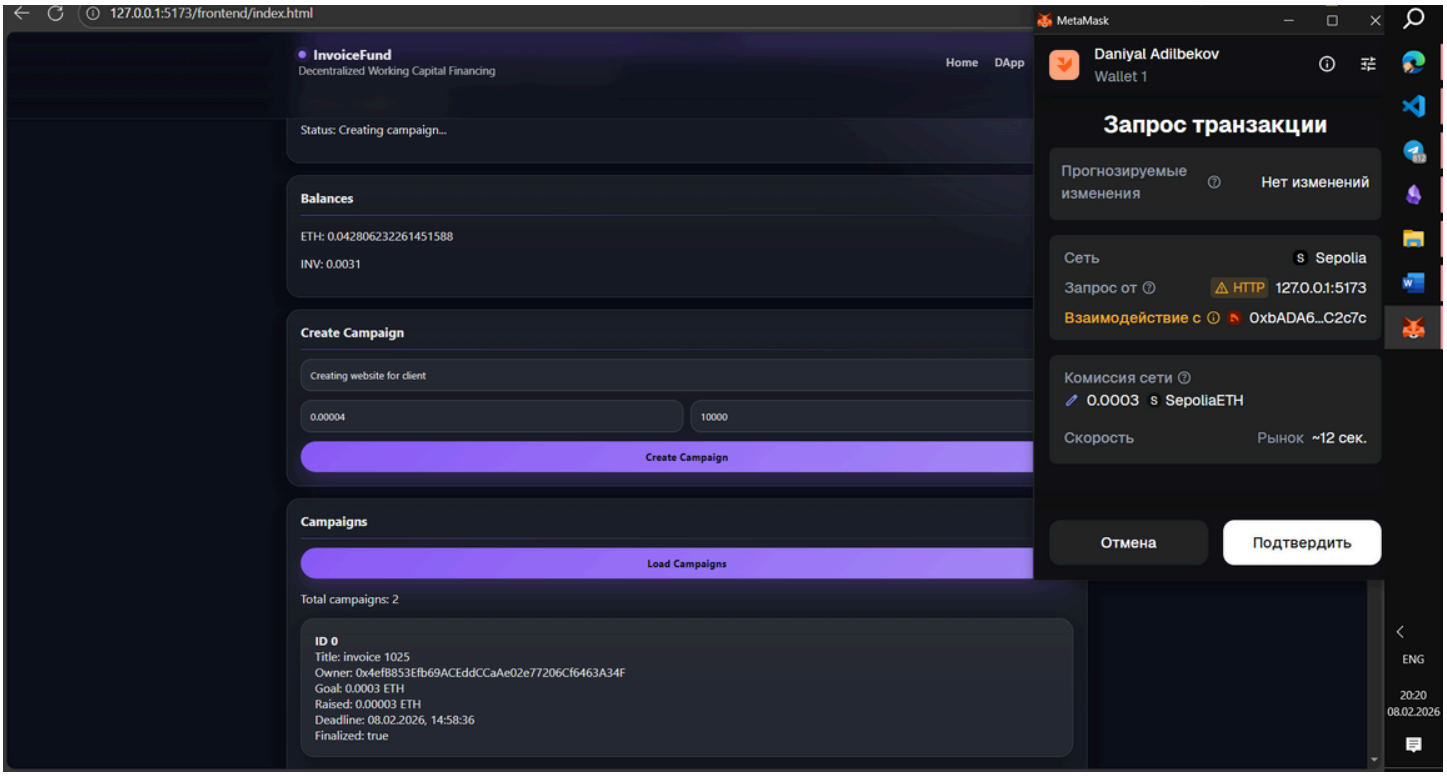
And there is main file index.html where are functions like create campaign, list of campaigns, contribute function, and finalizing any campaign.



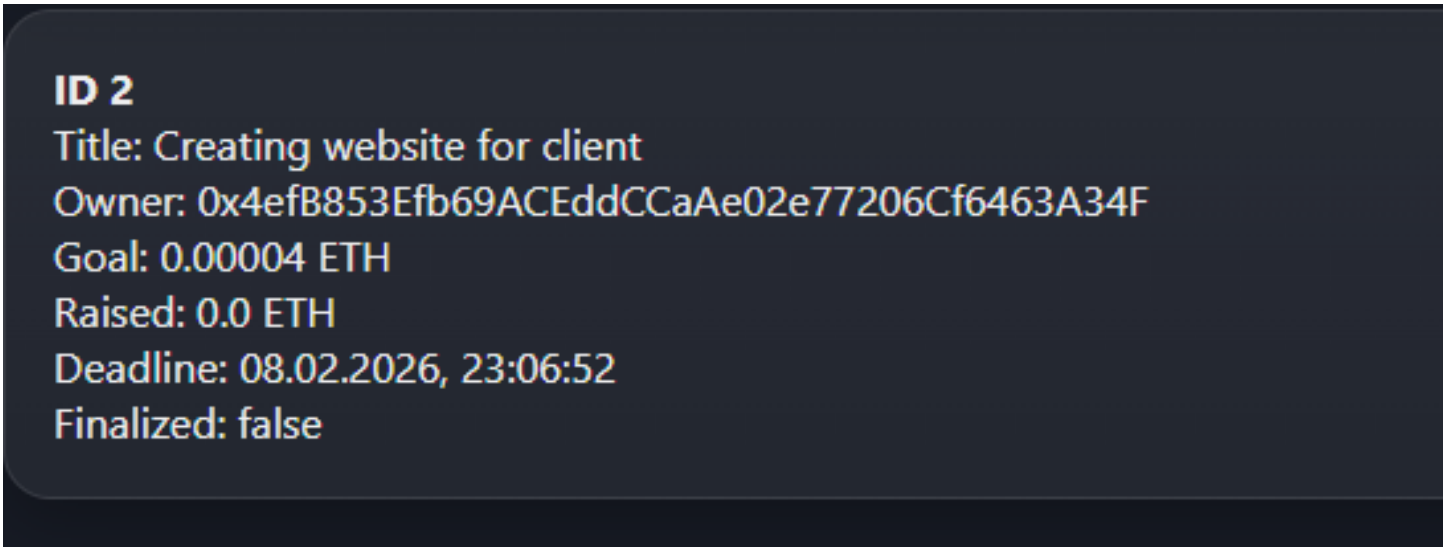

Campaigns
Load Campaigns
Total campaigns: 2
ID 0
Title: invoice 1025
Owner: 0x4efB853Efb69ACEddCCaAe02e77206Cf6463A34F
Goal: 0.0003 ETH
Raised: 0.00003 ETH
Deadline: 08.02.2026, 14:58:36
Finalized: true
ID 1
Title: invoice 666
Owner: 0x4efB853Efb69ACEddCCaAe02e77206Cf6463A34F
Goal: 0.0003 ETH
Raised: 0.000001 ETH
Deadline: 08.02.2026, 16:15:24
Finalized: false
Contribute


Contribute
Campaign ID
Amount (ETH)
Contribute
Finalize
Campaign ID
Finalize Campaign

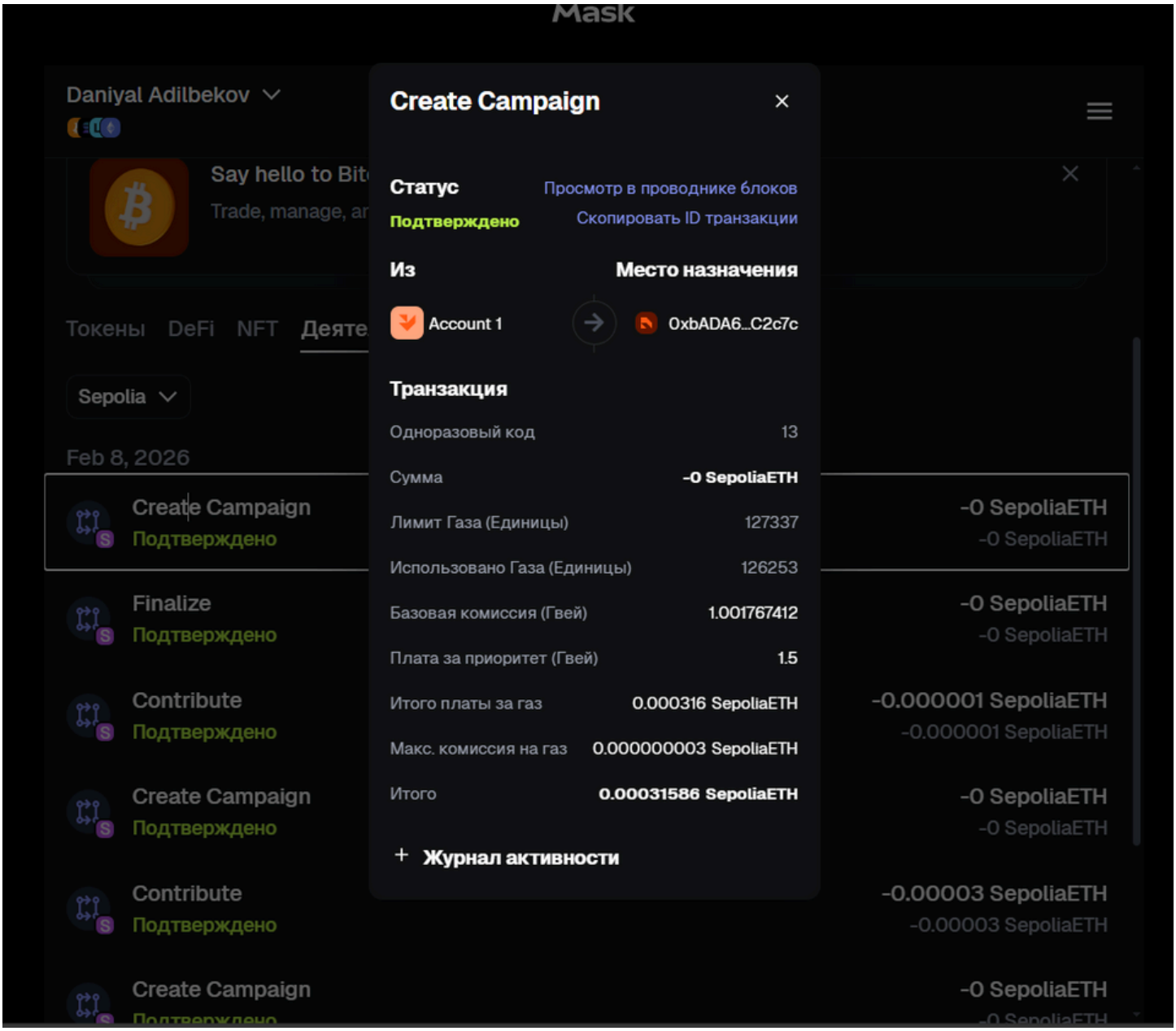
How it works



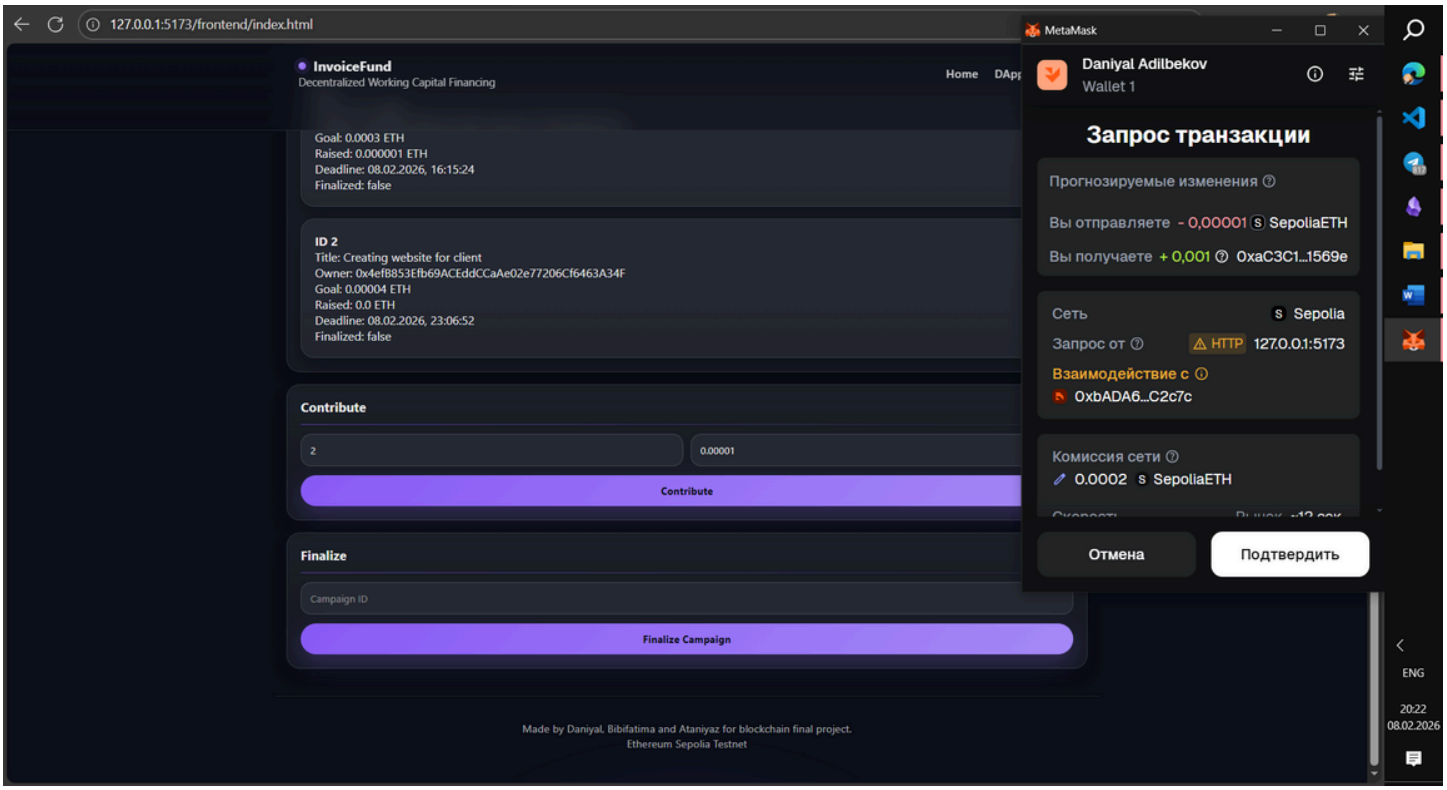
There is created campaign with full information



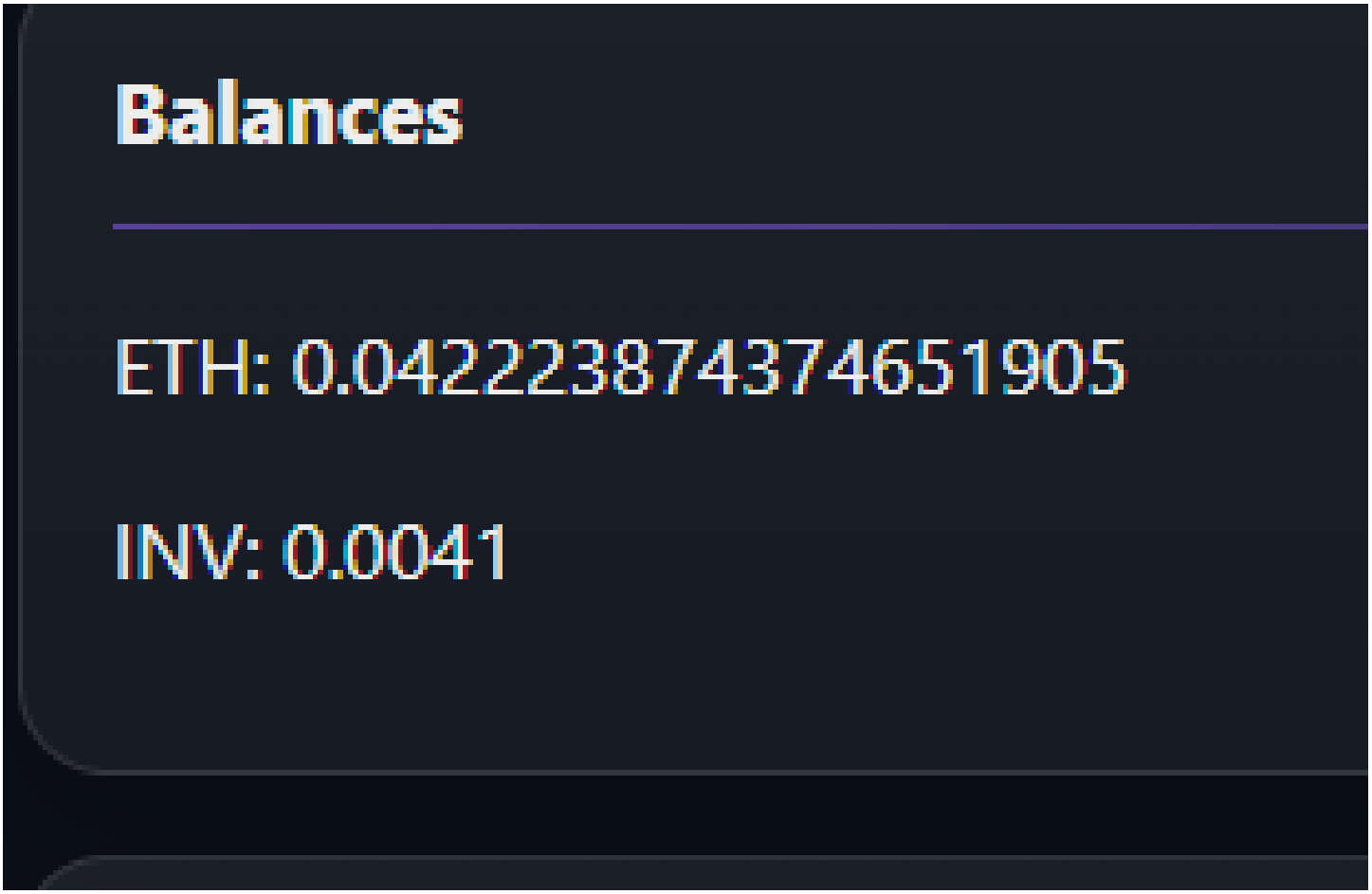
There is creating campaing in metamask



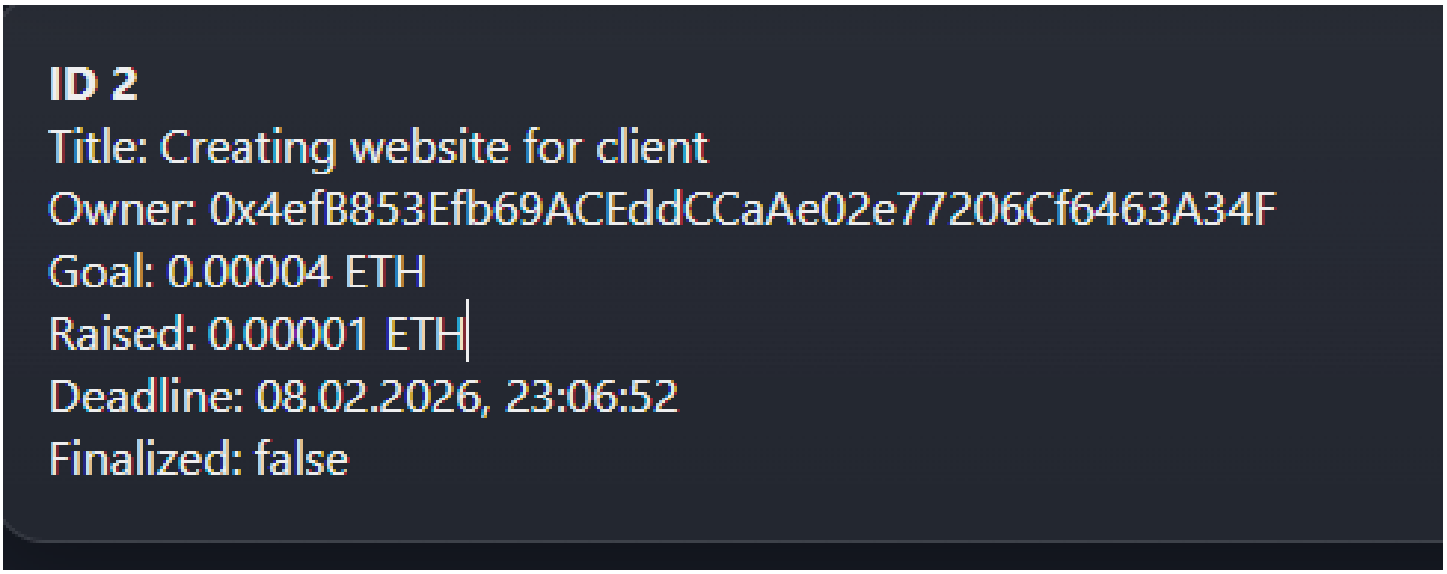
Now if people want to contribute to this campaign



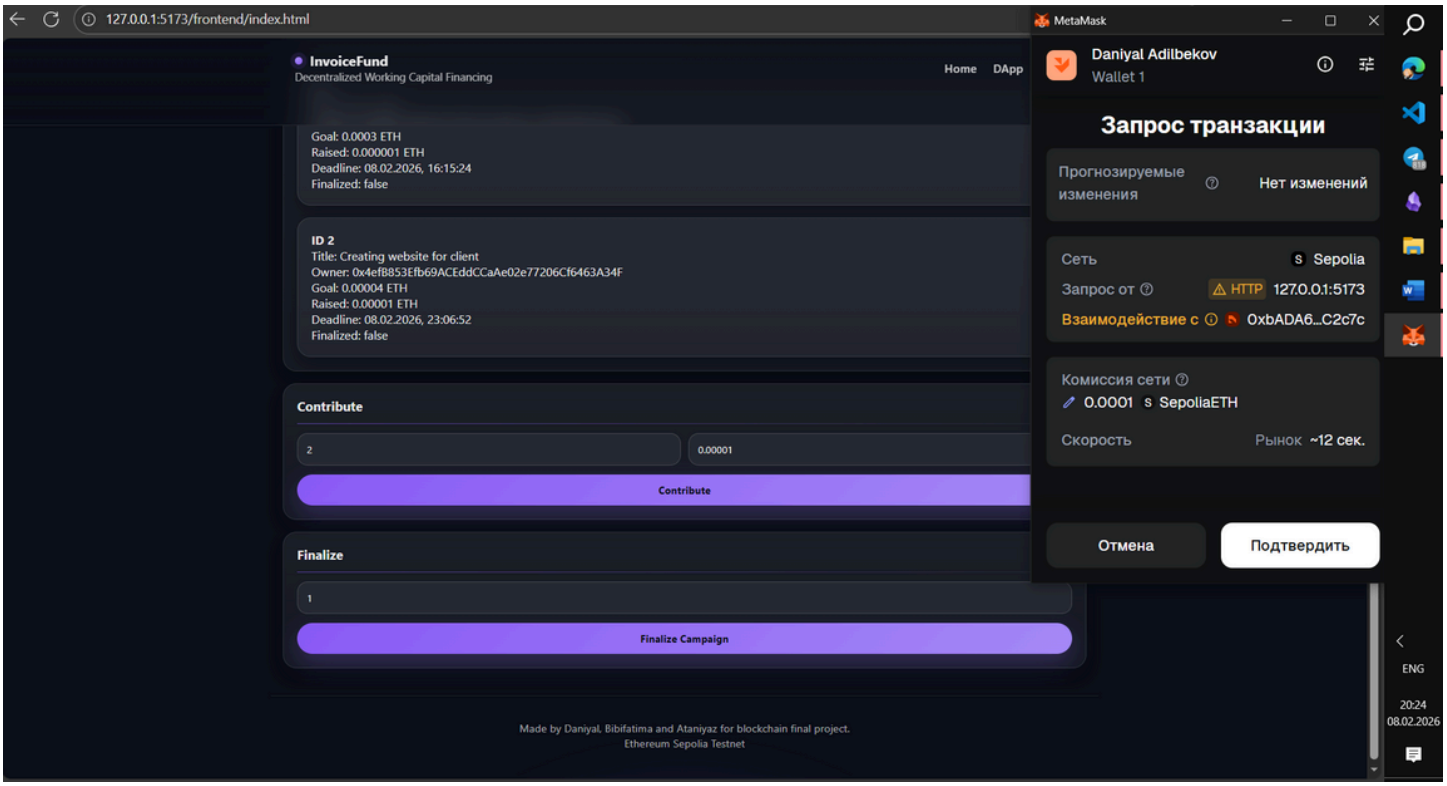
Changes total of INV



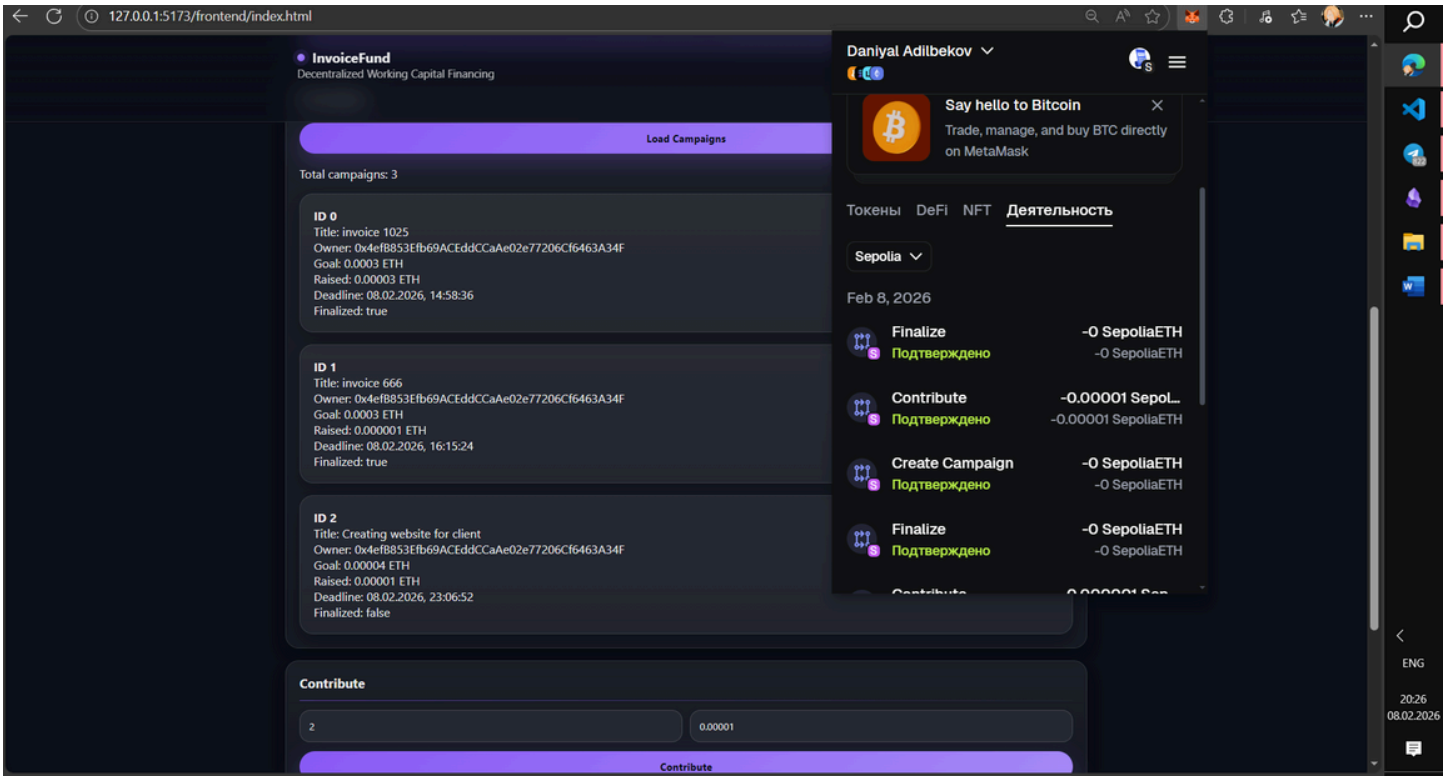
And in campaign itself shows how much raised



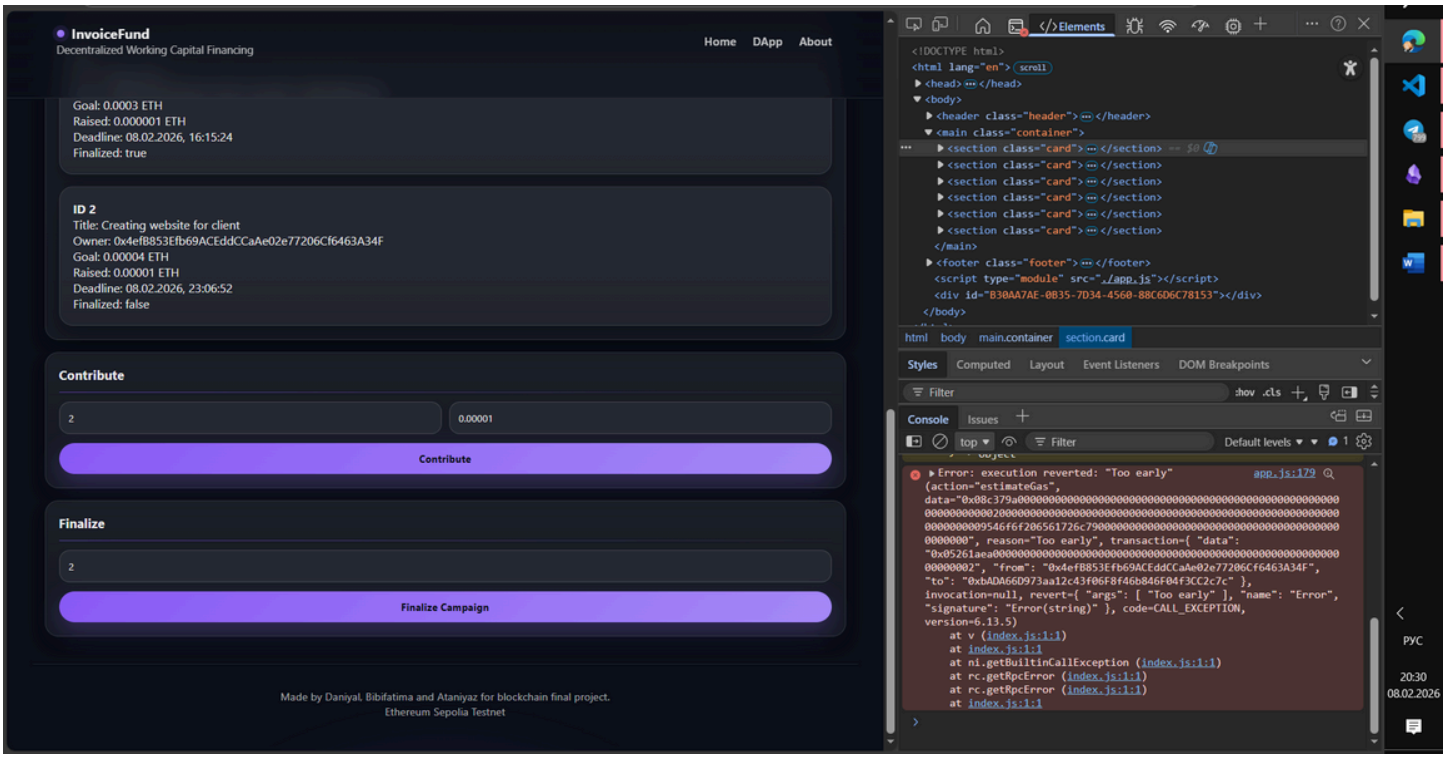
About finalizing. I can finalize the campaign only after deadline



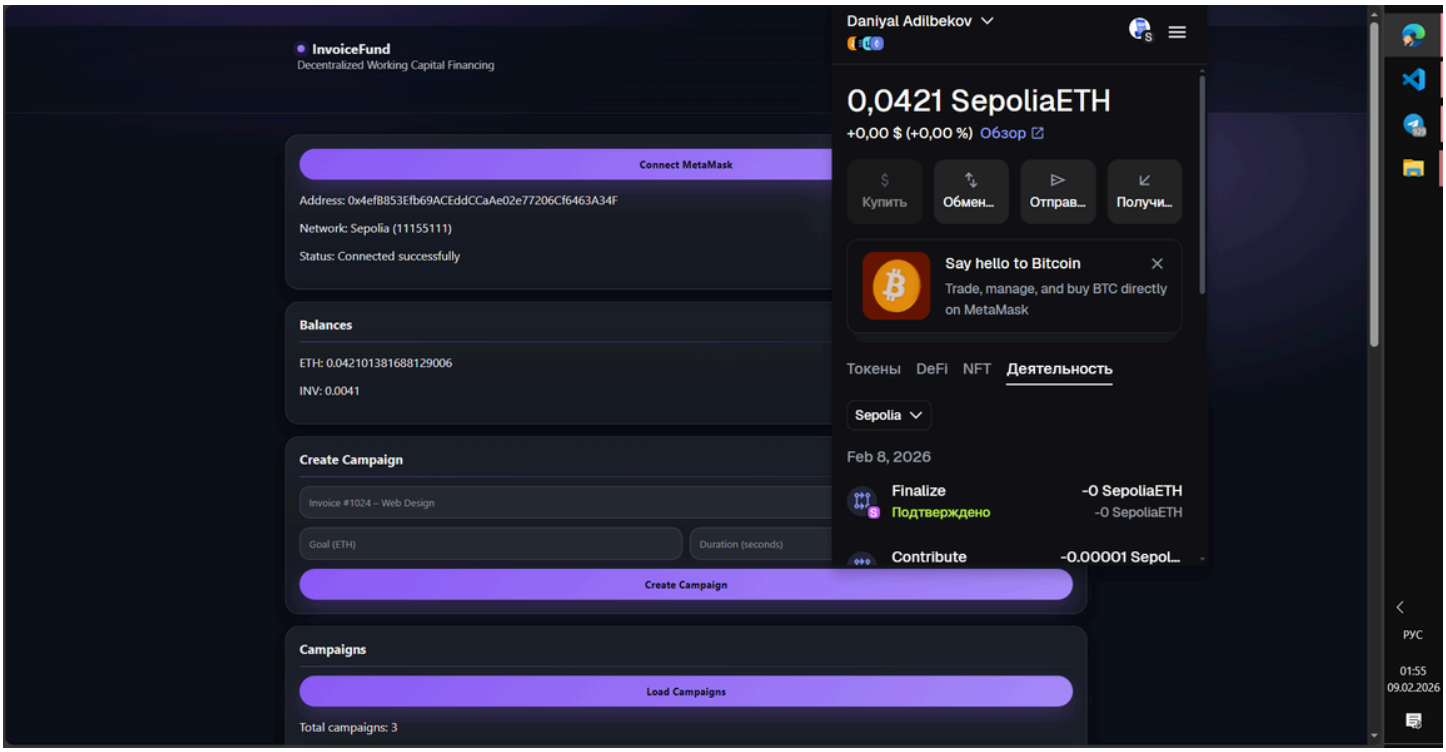
There it shows in metamask and campaign with id finalized changes to true



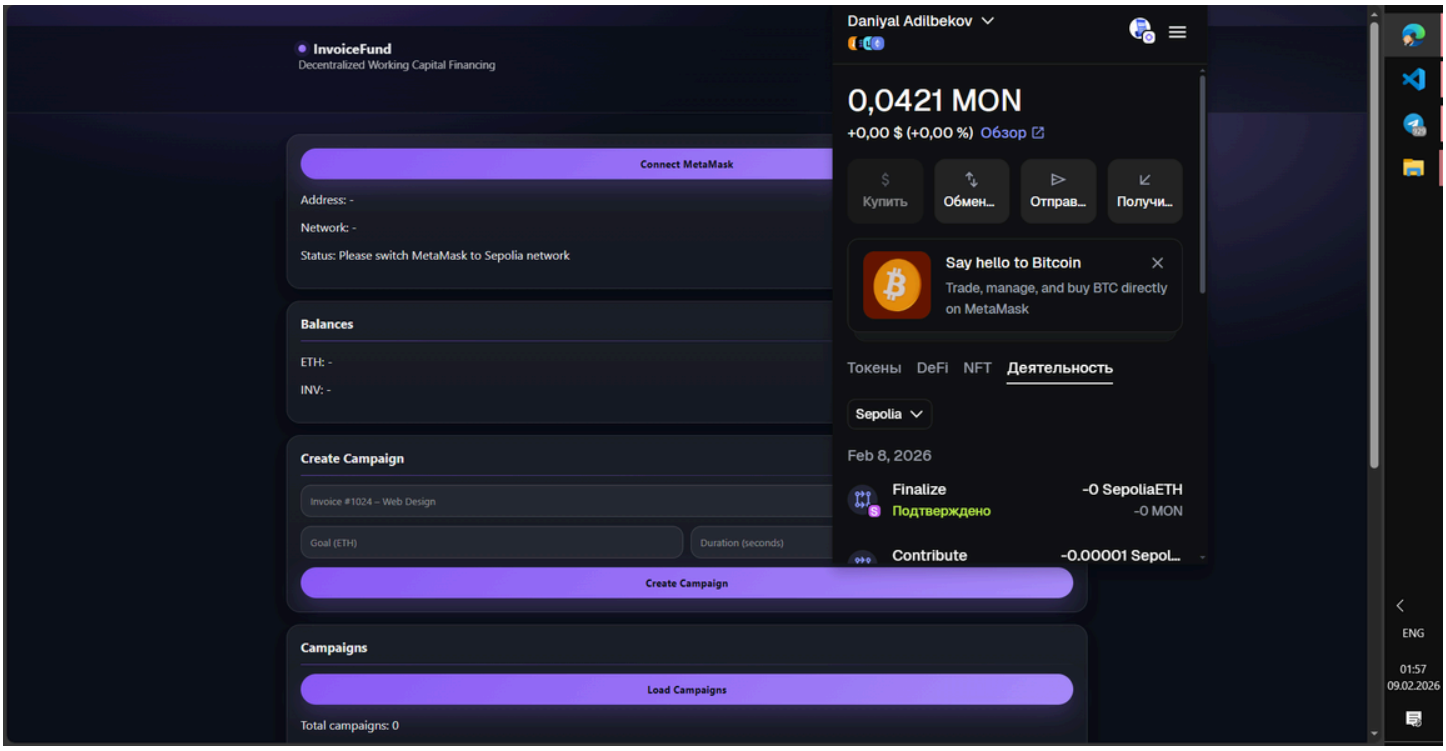
if i try to finalize befofe deadline, it will show as error



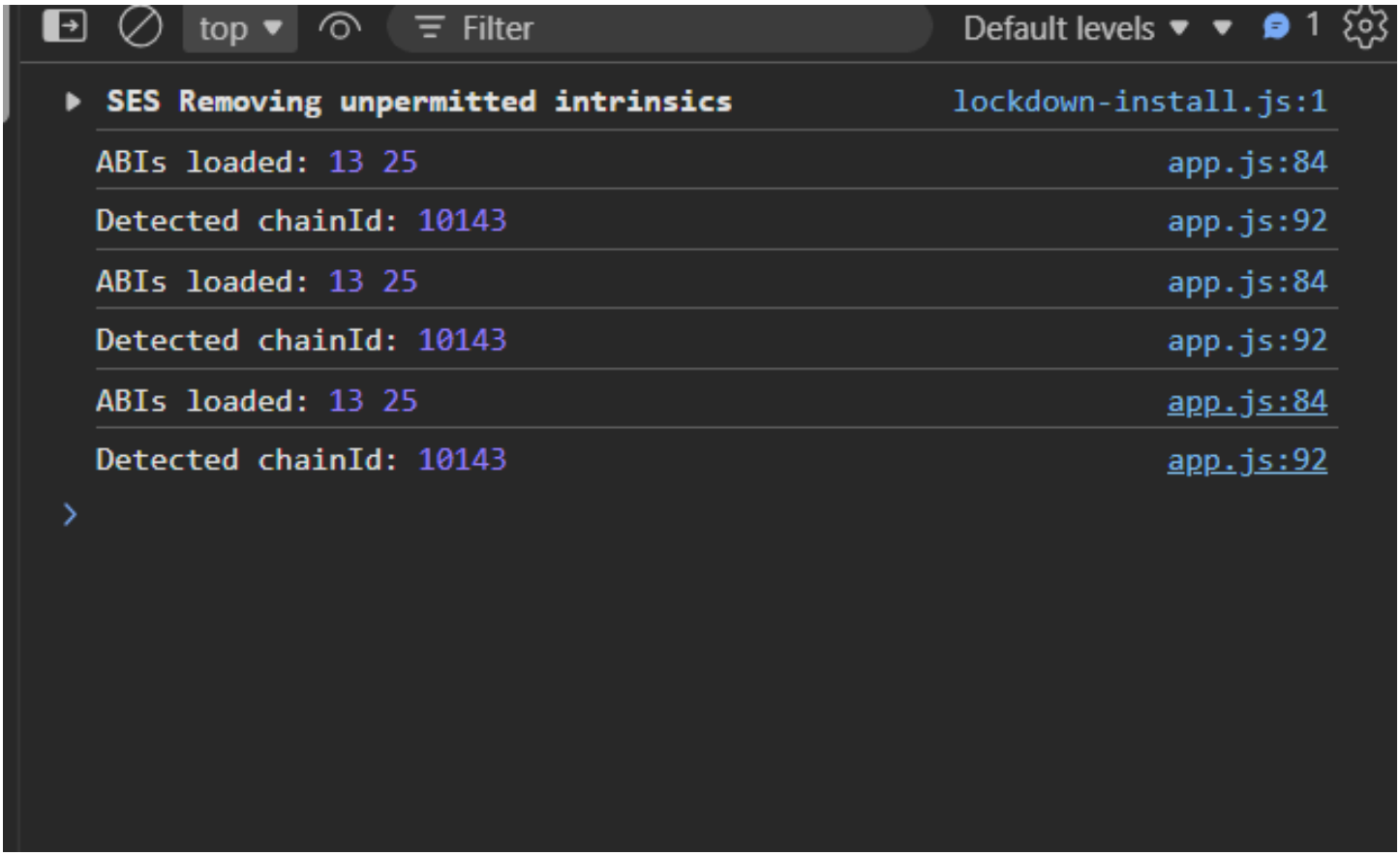
also about changing network, if user will change the network to something different, it will be shown in frontend. There is active connection to sepoliaETH



Now if user will change to different one, it will show the message “Please switch metamsk to sepolia network”



and it also shows in console, that chainId of what user chosed is different. ChainId of sepolia is 11155111



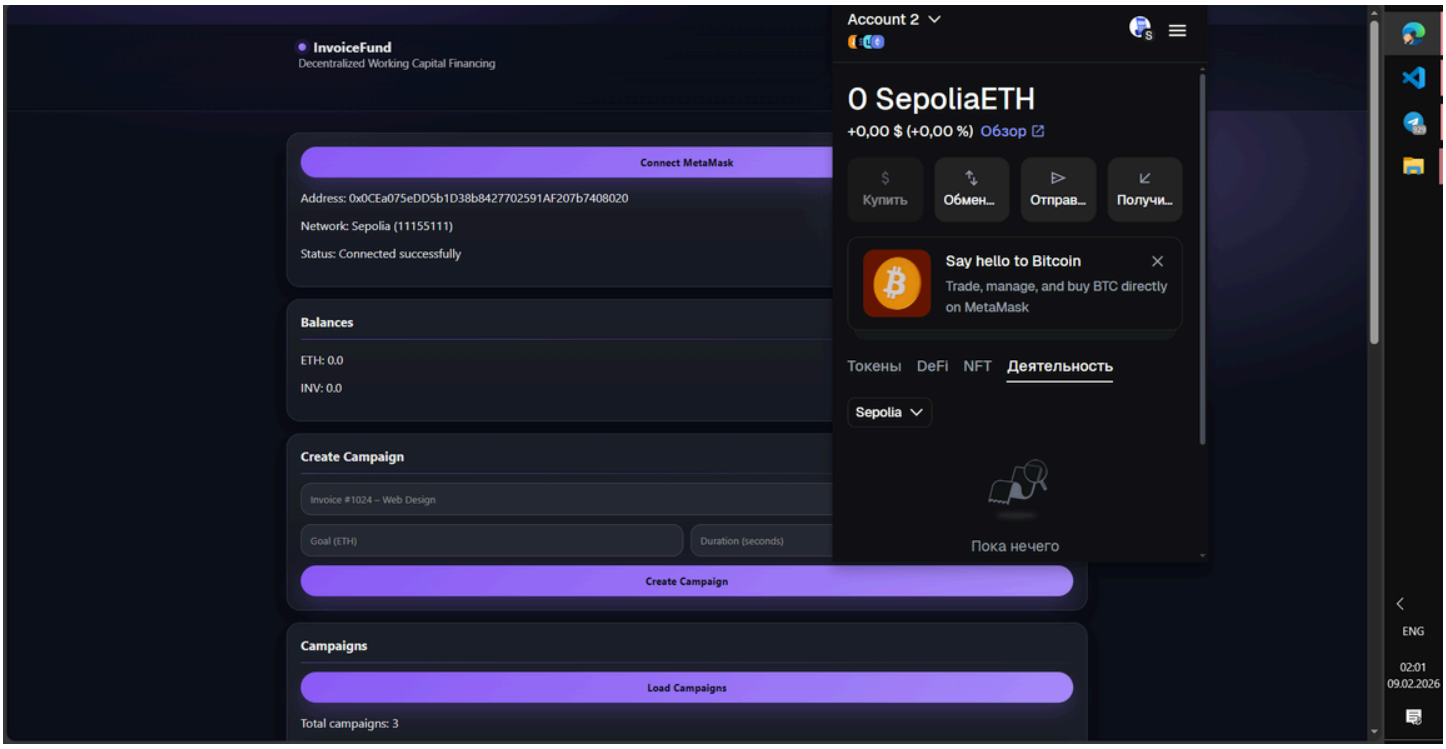
There is code condition

```
const network = await provider.getNetwork();
const chainId = Number(network.chainId);
console.log("Detected chainId:", chainId);

if (chainId !== SEPOLIA_CHAIN_ID) {
  setStatus("Please switch MetaMask to Sepolia network");
  return;
}
```

Also if accounts changes then the page will be reloaded

```
window.ethereum.on("accountsChanged", () => window.location.reload());
window.ethereum.on("chainChanged", () => window.location.reload());
```

and successfully connected to the website



Purpose of the Project

The main objective of this project is to demonstrate practical knowledge of:
Using Solidity for smart contracts
ERC-20 tokens integration
Client-side blockchain interaction using JavaScript
MetaMask wallet integration
Interaction with sepolia test networks
Basic dapp architecture
The application addresses the problem of delayed invoice payments by simulating decentralized invoice crowdfunding.

Technology Stack Solidity

Solidity
Hardhat Ethereum Sepolia Test Network
ERC-20 Token Standard
JavaScript
MetaMask
HTML & CSS

Smart Contracts

The project consists of two smart contracts:

1. InvoiceFund

Responsible for:

Creating crowdfunding campaigns
Accepting ETH contributions
Tracking individual and total contributions
Finalizing campaigns after the deadline
Minting reward tokens for contributors

2. RewardToken (ERC-20)

Custom ERC-20 token(inv)
Minted automatically during campaign participation
Has no real monetary value
Used strictly for educational demonstration

Reward formula

Reward = contributionWei × REWARD_RATE / 1e18

Frontend Features

The client-side application allows users to:

Connect a MetaMask wallet
Validate the active blockchain network (Sepolia)
View wallet address and balances (ETH & INV)
Create crowdfunding campaigns
Browse existing campaigns
Contribute test ETH to campaigns
Automatically receive ERC-20 reward tokens
Finalizing campaigns
All blockchain transactions are executed securely through MetaMask.

Frontend to blockchain interaction

The frontend interacts with the Ethereum Sepolia test network using app.js and the MetaMask wallet. MetaMask provides the connection between the web application and the blockchain.

After the user connects MetaMask, the application initializes an app BrowserProvider and obtains a signer representing the active wallet account. Smart contracts are accessed using their deployed addresses and ABI files.

Read-only operations (loading campaigns, checking balances) are performed via the provider, while state-changing operations (creating campaigns, contributing ETH, finalizing campaigns) are executed as blockchain transactions and require user confirmation through MetaMask.

The frontend validates that the user is connected to the Sepolia test network and listens for MetaMask account or network changes to keep the application state consistent.

How to Run the Project

Steps
1)Navigate to the frontend directory:

cd frontend

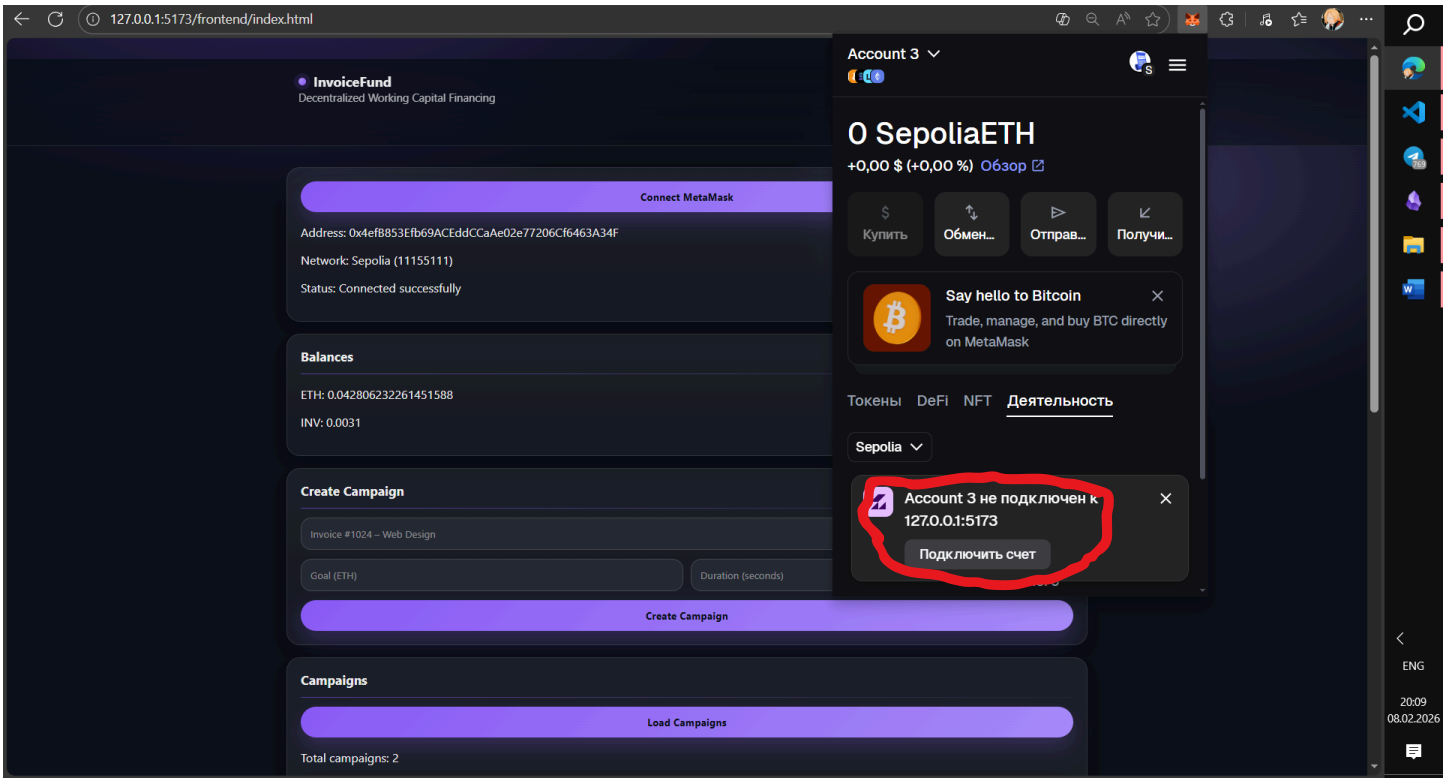
```
PS D:\invoicefund> cd frontend
PS D:\invoicefund\frontend>
```

2)Start a local static server:
http-server -p 5173 -c-1

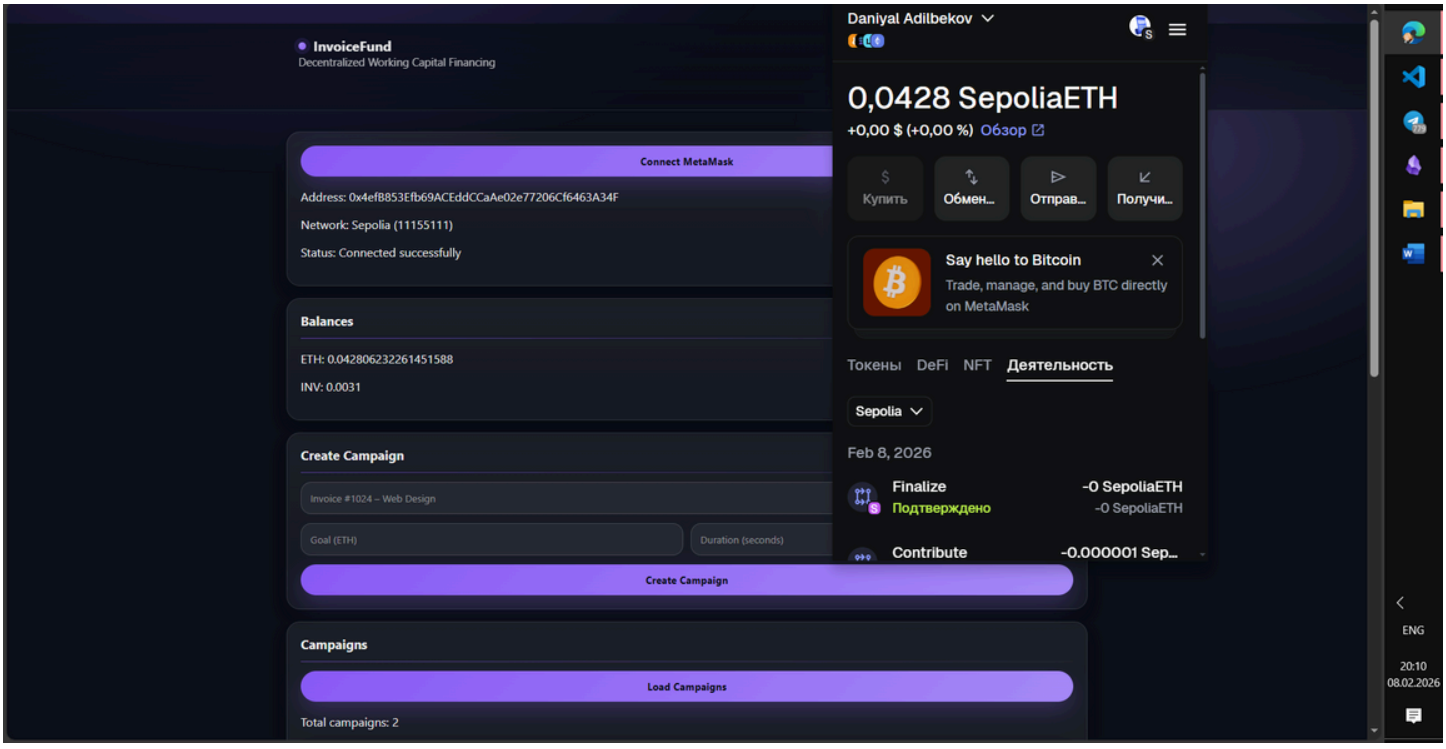
```
RewardToken ownership transferred to InvoiceFund succes
PS D:\invoicefund> http-server -p 5173 -c-1
>>
Starting up http-server, serving ./

http-server version: 14.1.1

http-server settings:
CORS: disabled
Cache: -1 seconds
Connection Timeout: 120 seconds
Directory Listings: visible
AutoIndex: visible
Serve GZIP Files: false
Serve Brotli Files: false
Default File Extension: none

Available on:
  http://26.0.74.107:5173
  http://192.168.56.1:5173
  http://192.168.8.4:5173
  http://127.0.0.1:5173
Hit CTRL-C to stop the server
```

3)Open the application in a browser:
http://127.0.0.1:5173

4)Switch MetaMask to the Sepolia Test Network



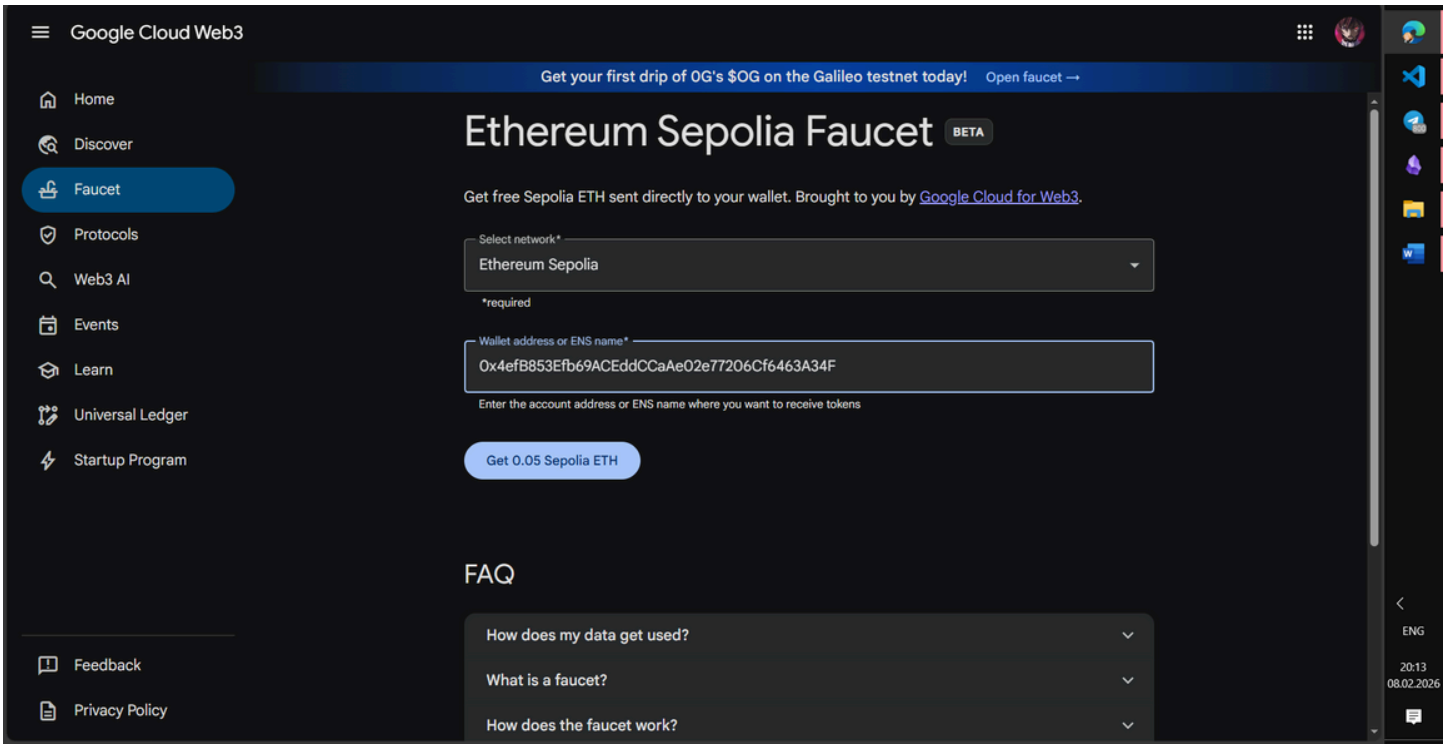
5)Connect MetaMask and interact with the DApp



How to get Sepolia test ethereum

Firstly u need to get your account adress, then go to websites where you can get test sepoliaETH

For example: https://cloud.google.com/application/web3/faucet/ethereum/sepolia deploy to sepolia



Testing

Automated unit tests are implemented using Hardhat to verify contract deployment, creating commpaigns, contribution logic, reward token minting and etc. To run it write in terminal:
npx hardhat test

```
PS D:\invoicefund> npx hardhat test
[dotenv@17.2.3] injecting env (2) from .env -- tip: ✅ audit secrets and track compliance: https://dotenvx.com/ops


  InvoiceFund DApp
    ✓ Should deploy and transfer RewardToken ownership to InvoiceFund (2575ms)
    ✓ Should create a campaign with correct parameters (62ms)
    ✓ Should accept contributions and track raised amount (46ms)
    ✓ Should mint reward tokens proportional to contribution (49ms)
    ✓ Should not allow contribute to non-existing campaign (213ms)
    ✓ Should not allow finalize before deadline (54ms)
    ✓ Should allow finalize after deadline (52ms)
    ✓ Should not allow finalize twice
    ✓ Should not allow contribute after finalize (45ms)


  9 passing (3s)

PS D:\invoicefund>
```

Conclusion

InvoiceFund demonstrates a complete decentralized crowdfunding workflow using Ethereum smart contracts, MetaMask integration, and a client-side DApp interface. The project highlights key blockchain concepts such as decentralization, transparency, tokenization, and secure user interaction on a test network.