NOVACOIN PROJECT

Decentralized Crowdfunding Platform

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Course: Blockchain 1

Technology: Solidity, JavaScript, MetaMask, Ethereum Testnet

1. PROJECT OVERVIEW

NovaCoin is a next-generation decentralized blockchain platform designed as an alternative to Ethereum. The project combines crowdfunding capabilities with automated token rewards, creating a comprehensive ecosystem for fundraising and value exchange.

1.1 Core Features

- ERC-20 compliant NOVA token with automatic minting
- Smart contract-based crowdfunding platform
- Automated reward distribution system (100 NOVA per 1 ETH)
- MetaMask wallet integration for seamless transactions
- Test network deployment (Sepolia/Holesky) for safe development
- Real-time campaign tracking and management

1.2 Vision

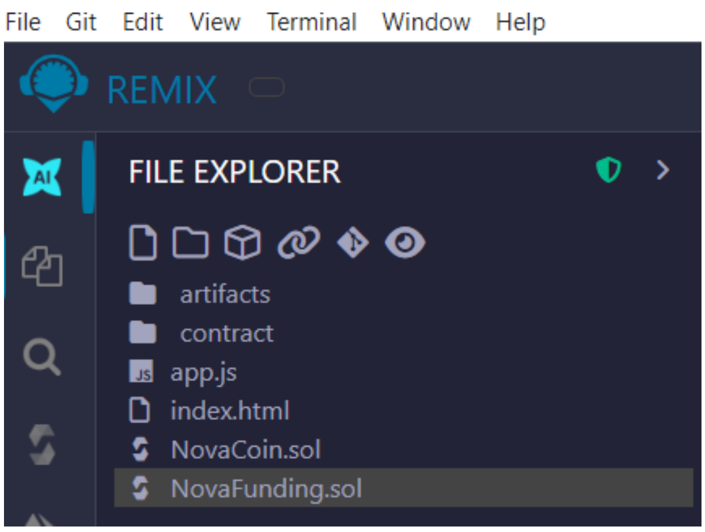
NovaCoin aims to democratize access to blockchain technology by providing a user-friendly platform with lower fees, faster transactions, and built-in incentives for participation. Our goal is to create a sustainable ecosystem where innovation thrives and communities grow.

2. SYSTEM ARCHITECTURE

2.1 Architecture Overview

The NovaCoin platform follows a three-tier architecture:

• Frontend Layer: HTML/CSS/JavaScript interface with Web3.js integration
• Blockchain Layer: Ethereum smart contracts (Solidity 0.8.20)
• Storage Layer: Decentralized data storage on Ethereum blockchain



artifacts
contract
app.js
index.html
NovaCoin.sol
NovaFunding.sol

2.2 Technology Stack

Smart Contracts: Solidity 0.8.20, OpenZeppelin libraries

Frontend: HTML5, CSS3, Vanilla JavaScript, Web3.js

Wallet Integration: MetaMask Browser Extension

Blockchain: Ethereum Testnet (Sepolia/Holesky)

Development Tools: Remix IDE, Hardhat, Ganache

3. SMART CONTRACT IMPLEMENTATION

3.1 NovaCoin Token Contract

The NovaCoin token is a standard ERC-20 implementation with enhanced minting capabilities. Key features include:

- Name: NovaCoin, Symbol: NOVA
- Decimals: 18 (standard Ethereum precision)
- Initial Supply: 1,000,000 NOVA
- Mintable: Yes (internal function for rewards)
- Events: Transfer, Approval, CampaignContribution

3.2 NovaFunding Contract

The crowdfunding contract extends NovaCoin token and implements the complete campaign lifecycle:

createCampaign(): Creates new crowdfunding campaign with title, description, goal, and duration

contribute(): Allows users to contribute ETH and receive NOVA tokens automatically

finalizeCampaign(): Closes campaign and transfers funds to creator if goal reached

getCampaignDetails(): Returns campaign information including raised amount and status

getUserContribution(): Tracks individual contributions per campaign

getUserCampaigns(): Lists all campaigns created by a specific user

3.3 Reward Mechanism

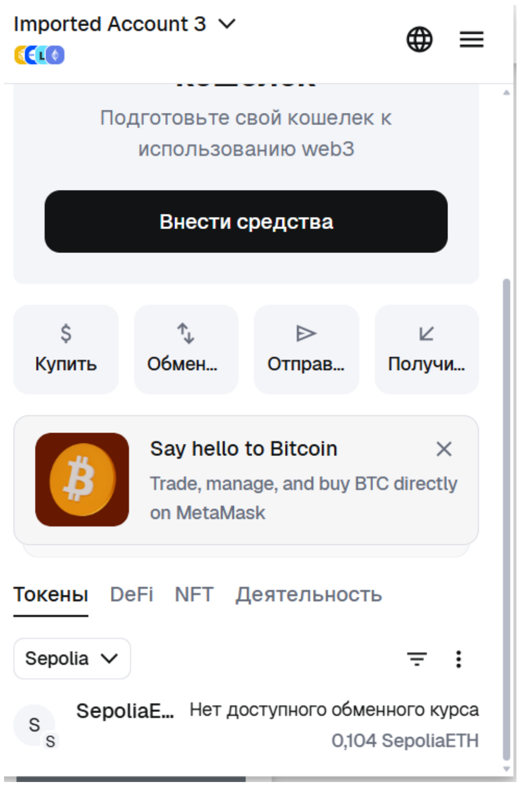
The platform automatically rewards contributors with NOVA tokens at a rate of 100 NOVA per 1 ETH contributed. This incentivizes participation and creates a token economy. Rewards are minted instantly upon contribution.

4. FRONTEND IMPLEMENTATION

4.1 MetaMask Integration

The frontend implements comprehensive MetaMask integration:

- Detection of MetaMask installation
- Request user permission to access wallet accounts
- Network validation (ensures testnet usage)
- Account change detection and handling
- Transaction signing and confirmation
- Real-time balance updates



Подготовьте свой кошелек к использованию web3

Say hello to Bitcoin
Trade, manage, and buy BTC directly on MetaMask

SepoliaE... Нет доступного обменного курса
0,104 SepoliaETH

4.2 User Interface Features

- Wallet connection status display
- Real-time ETH and NOVA balance tracking
- Campaign creation form with validation
- Active campaigns grid with progress bars
- Contribution input with instant NOVA reward calculation
- Transaction status alerts and notifications

4.3 Web3.js Integration

Web3.js library enables JavaScript to interact with Ethereum blockchain. Key implementations include contract instantiation, method calls, event listening, and transaction handling with proper error management.

5. DEPLOYMENT INSTRUCTIONS

5.1 Prerequisites

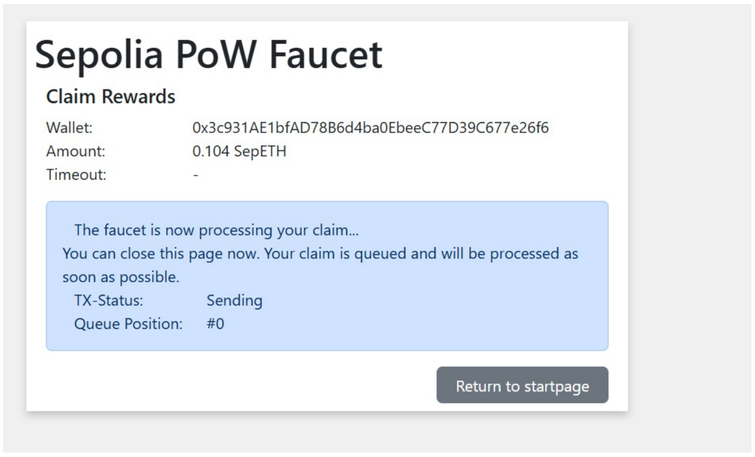
- MetaMask browser extension installed
- Test ETH from Sepolia or Holesky faucet
- Remix IDE or Hardhat development environment
- Modern web browser (Chrome, Firefox, Brave)

5.2 Getting Test ETH

Obtain free test ETH from these faucets:

- Sepolia Faucet: https://sepoliafaucet.com

- Alchemy Sepolia Faucet: https://sepoliafaucet.net
- Holesky Faucet: https://holesky-faucet.pk910.de



Sepolia PoW Faucet

Claim Rewards

Wallet: 0x3c931AE1bfAD78B6d4ba0EbeeC77D39C677e26f6
Amount: 0.104 SepETH
Timeout: -

The faucet is now processing your claim...
You can close this page now. Your claim is queued and will be processed as soon as possible.
TX-Status: Sending
Queue Position: #0

5.3 Smart Contract Deployment Steps

1. Open Remix IDE (https://remix.ethereum.org)

2. Create new file "NovaFunding.sol" and paste contract code

3. Compile with Solidity 0.8.20 compiler

4. Connect MetaMask to Remix

5. Select "Injected Provider - MetaMask" as environment

6. Ensure MetaMask is on Sepolia or Holesky network

7. Deploy NovaFunding contract (no constructor parameters)

8. Copy deployed contract address

9. Update CONTRACT_ADDRESS in app.js with deployed address

10. Verify contract on Etherscan (optional)

5.4 Running the Application

To run the frontend application:

1. Place index.html and app.js in the same directory

2. Add Web3.js library: <script src="https://cdn.jsdelivr.net/npm/web3@latest/dist/web3.min.js"></script>

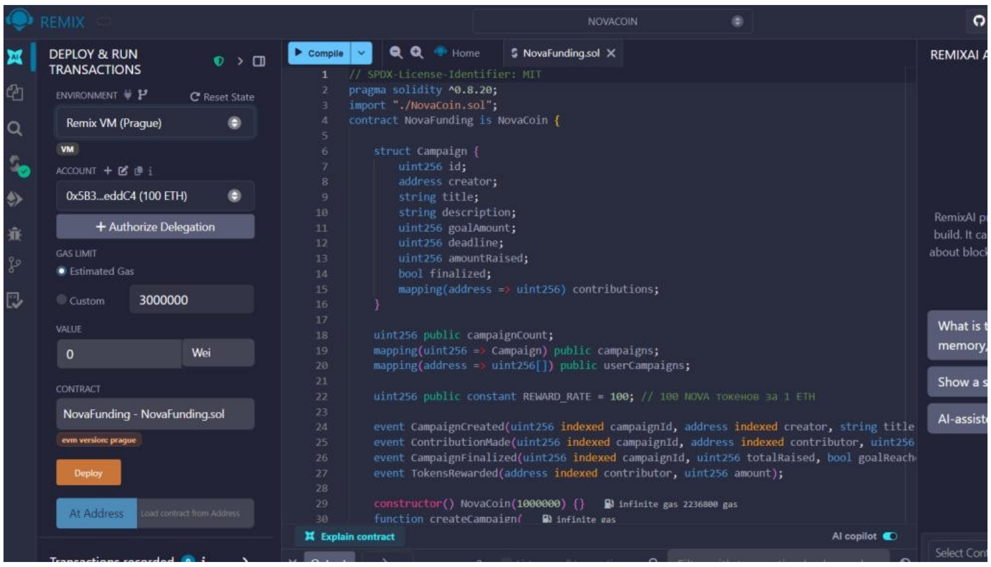
3. Update CONTRACT_ADDRESS in app.js

4. Open index.html in web browser

5. Click "Connect MetaMask" button

6. Approve connection in MetaMask popup

7. Start creating campaigns and contributing!



DEPLOY & RUN TRANSACTIONS

ENVIRONMENT: Remix VM (Prague)

ACCOUNT: 0x5B3...eddC4 (100 ETH)

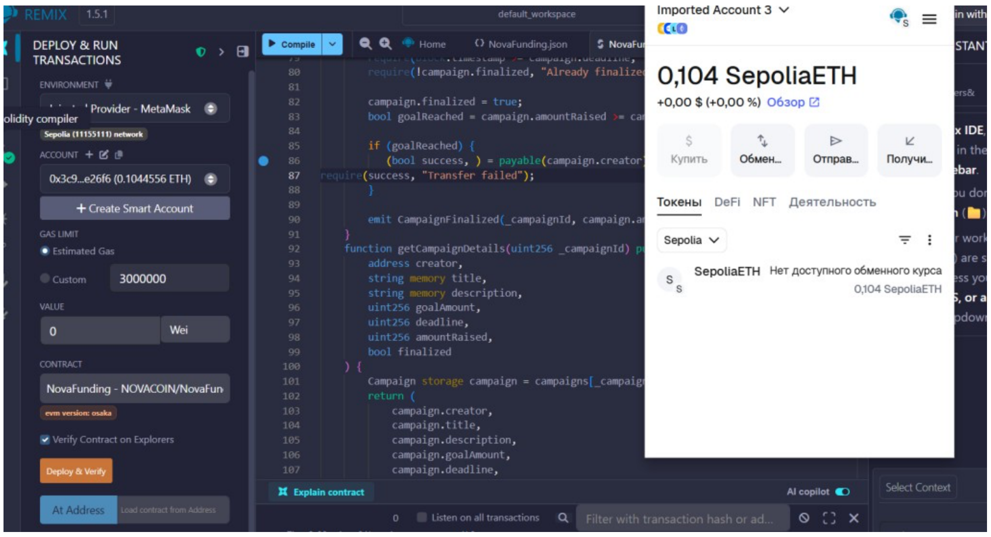
GAS LIMIT: Estimated Gas — Custom 3000000

VALUE: 0 Wei

CONTRACT: NovaFunding - NovaFunding.sol

evm version: prague

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.20;
import "./NovaCoin.sol";
contract NovaFunding is NovaCoin {

    struct Campaign {
        uint256 id;
        address creator;
        string title;
        string description;
        uint256 goalAmount;
        uint256 deadline;
        uint256 amountRaised;
        bool finalized;
        mapping(address => uint256) contributions;
    }

    uint256 public campaignCount;
    mapping(uint256 => Campaign) public campaigns;
    mapping(address => uint256[]) public userCampaigns;

    uint256 public constant REWARD_RATE = 100; // 100 NOVA токенов за 1 ETH

    event CampaignCreated(uint256 indexed campaignId, address indexed creator, string title
    event ContributionMade(uint256 indexed campaignId, address indexed contributor, uint256
    event CampaignFinalized(uint256 indexed campaignId, uint256 totalRaised, bool goalReach
    event TokensRewarded(address indexed contributor, uint256 amount);

    constructor() NovaCoin(1000000) {}   infinite gas 2236800 gas
    function createCampaign(   infinite gas
```



DEPLOY & RUN TRANSACTIONS

ENVIRONMENT: Provider - MetaMask — Sepolia (11155111) network

ACCOUNT: 0x3c9...e26f6 (0.1044556 ETH)

GAS LIMIT: Estimated Gas — Custom 3000000

VALUE: 0 Wei

CONTRACT: NovaFunding - NOVACOIN/NovaFun

evm version: osaka

Verify Contract on Explorers

```
        require(!campaign.finalized, "Already finalize

        campaign.finalized = true;
        bool goalReached = campaign.amountRaised >= ca

        if (goalReached) {
            (bool success, ) = payable(campaign.creator
require(success, "Transfer failed");
        }

        emit CampaignFinalized(_campaignId, campaign.a
    }
    function getCampaignDetails(uint256 _campaignId) p
        address creator,
        string memory title,
        string memory description,
        uint256 goalAmount,
        uint256 deadline,
        uint256 amountRaised,
        bool finalized
    ) {
        Campaign storage campaign = campaigns[_campaig
        return (
            campaign.creator,
            campaign.title,
            campaign.description,
            campaign.goalAmount,
            campaign.deadline,
```

Imported Account 3

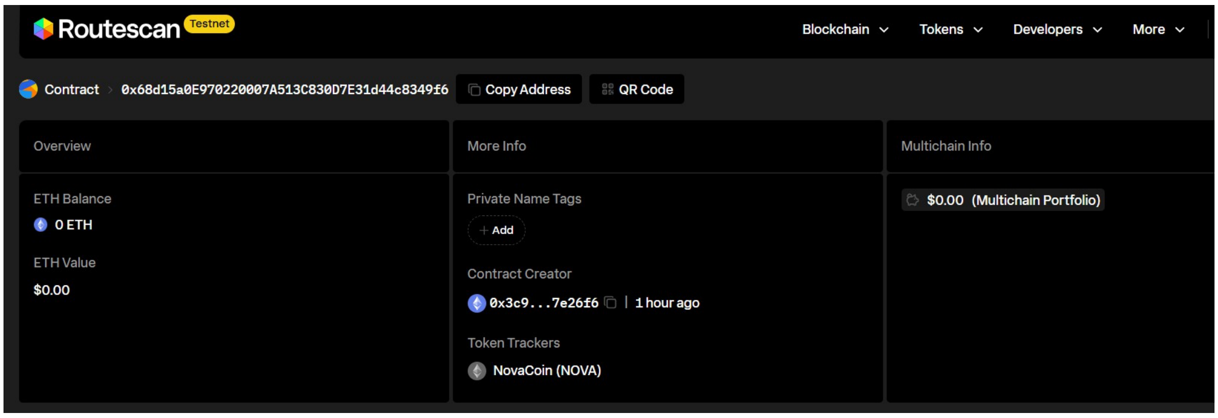
0,104 SepoliaETH

+0,00 $ (+0,00 %) Обзор

Токены DeFi NFT Деятельность

Sepolia

SepoliaETH — Нет доступного обменного курса — 0,104 SepoliaETH



Contract 0x68d15a0E970220007A513C830D7E31d44c8349f6

Overview

ETH Balance: 0 ETH

ETH Value: $0.00

More Info

Private Name Tags: + Add

Contract Creator: 0x3c9...7e26f6 | 1 hour ago

Token Trackers: NovaCoin (NOVA)

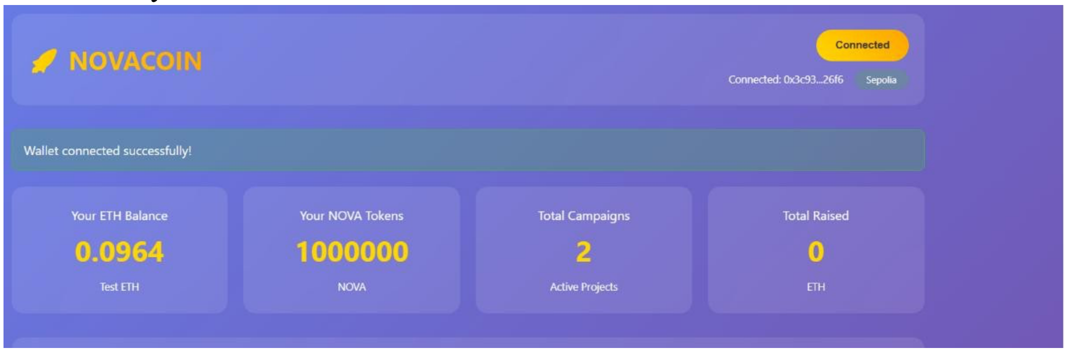
Multichain Info

$0.00 (Multichain Portfolio)

6. USER GUIDE

6.1 Creating a Campaign

1. Connect your MetaMask wallet



NOVACOIN

Connected

Connected: 0x3c93...26f6 Sepolia

Wallet connected successfully!

Your ETH Balance	Your NOVA Tokens	Total Campaigns	Total Raised
0.0964	1000000	2	0
Test ETH	NOVA	Active Projects	ETH

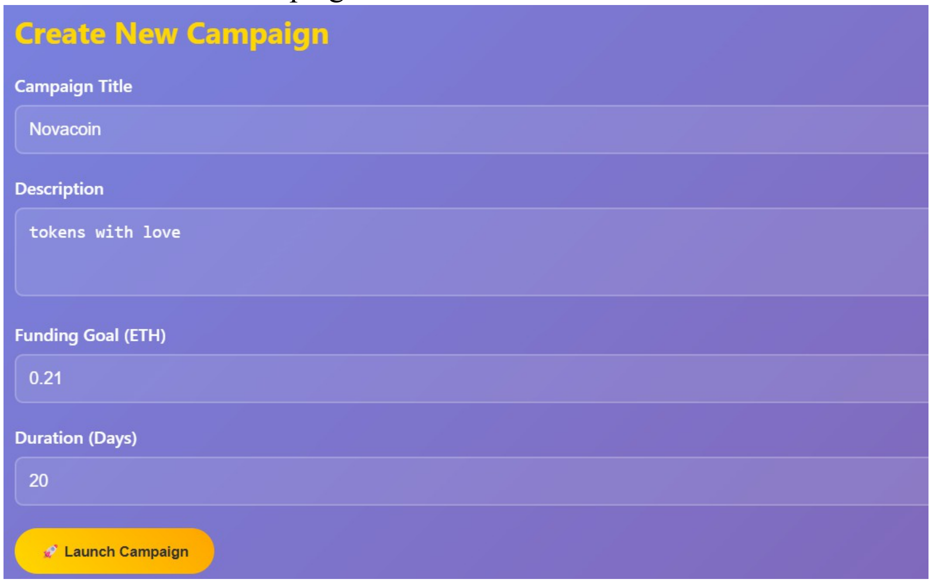
2. Fill in campaign title (e.g., "Build Community Center")

3. Add detailed description of your project

4. Set funding goal in ETH (e.g., 0.5 ETH)

5. Choose duration in days (e.g., 30 days)

6. Click "Launch Campaign" button



Create New Campaign

Campaign Title: Novacoin

Description: tokens with love

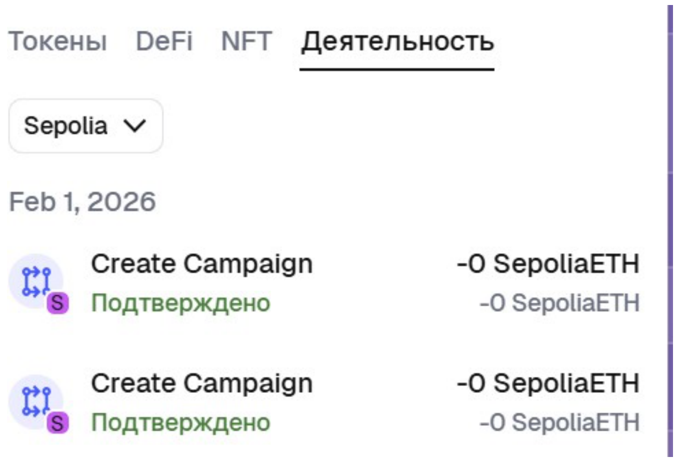
Funding Goal (ETH): 0.21

Duration (Days): 20

7. Confirm transaction in MetaMask

8. Wait for blockchain confirmation

9. Campaign appears in Active Campaigns section



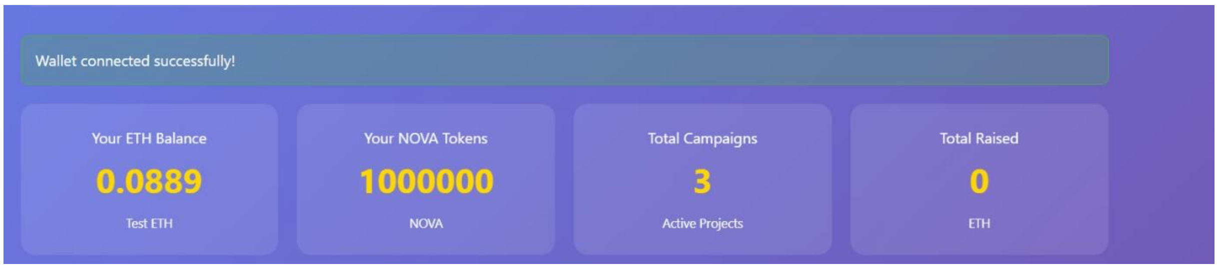
Feb 1, 2026

Create Campaign — Подтверждено — -0 SepoliaETH — -0 SepoliaETH

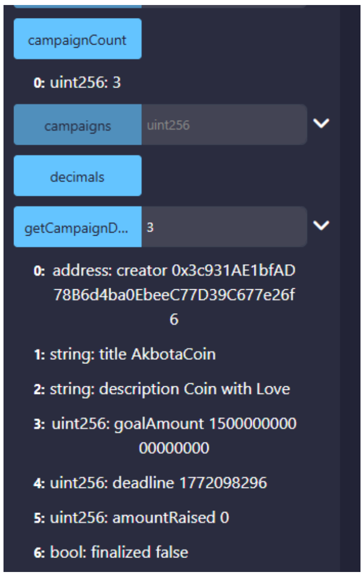
Create Campaign — Подтверждено — -0 SepoliaETH — -0 SepoliaETH

6.2 Contributing to a Campaign

1. Browse Active Campaigns section
2. Find campaign you want to support
3. Enter contribution amount in ETH
4. Click "Support" button
5. Confirm transaction in MetaMask
6. Receive instant NOVA token rewards
7. See updated balances and campaign progress


Wallet connected successfully!

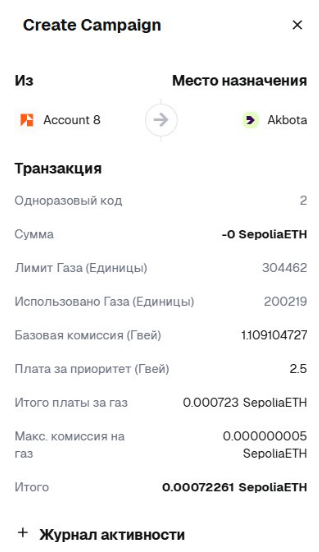
Your ETH Balance	Your NOVA Tokens	Total Campaigns	Total Raised
0.0889	1000000	3	0
Test ETH	NOVA	Active Projects	ETH



```
0: uint256: 3
```

getCampaignD... 3

```
0: address: creator 0x3c931AE1bfAD78B6d4ba0EbeeC77D39C677e26f6
1: string: title AkbotaCoin
2: string: description Coin with Love
3: uint256: goalAmount 1500000000000000000
4: uint256: deadline 1772098296
5: uint256: amountRaised 0
6: bool: finalized false
```

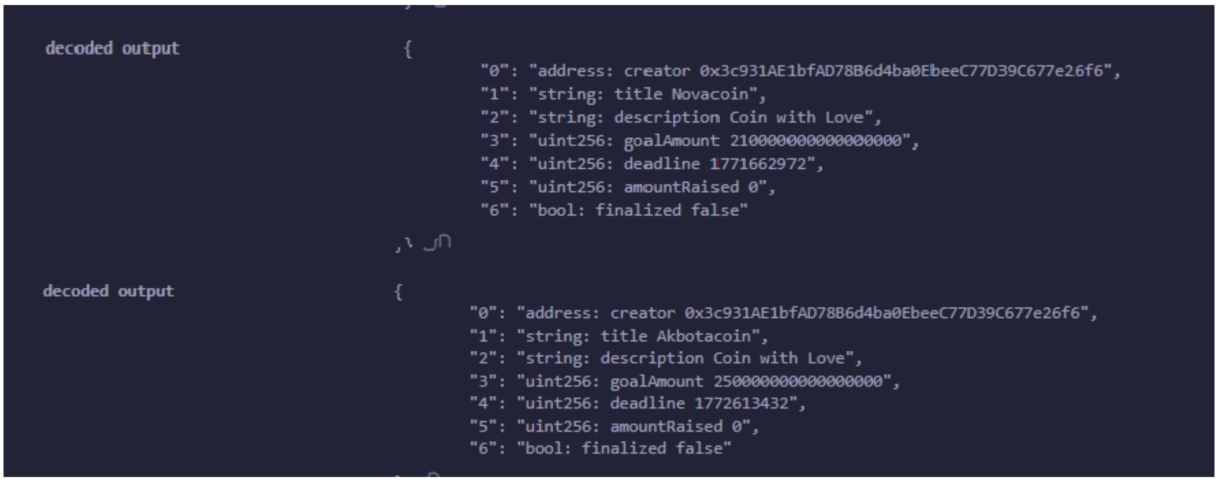

Create Campaign

Из	Место назначения
Account 8	Akbota

Транзакция

Одноразовый код	2
Сумма	**-0 SepoliaETH**
Лимит Газа (Единицы)	304462
Использовано Газа (Единицы)	200219
Базовая комиссия (Гвей)	1.109104727
Плата за приоритет (Гвей)	2.5
Итого платы за газ	0.000723 SepoliaETH
Макс. комиссия на газ	0.000000005 SepoliaETH
Итого	**0.00072261 SepoliaETH**

+ **Журнал активности**



```
decoded output        {
                          "0": "address: creator 0x3c931AE1bfAD78B6d4ba0EbeeC77D39C677e26f6",
                          "1": "string: title Novacoin",
                          "2": "string: description Coin with Love",
                          "3": "uint256: goalAmount 2100000000000000000",
                          "4": "uint256: deadline 1771662972",
                          "5": "uint256: amountRaised 0",
                          "6": "bool: finalized false"

decoded output        {
                          "0": "address: creator 0x3c931AE1bfAD78B6d4ba0EbeeC77D39C677e26f6",
                          "1": "string: title Akbotacoin",
                          "2": "string: description Coin with Love",
                          "3": "uint256: goalAmount 2500000000000000000",
                          "4": "uint256: deadline 1772613432",
                          "5": "uint256: amountRaised 0",
                          "6": "bool: finalized false"
```

7. BUSINESS MODEL & ECONOMICS

7.1 Revenue Streams

- Transaction Fees: 0.15-0.25% per transaction
- Token Sales: Initial and ongoing NOVA token offerings
- Staking Rewards Fee: 10% of staking rewards
- Premium Features: Advanced analytics and tools for campaigns

7.2 Token Economics

Initial Token Price: $0.01
Year 1 Target Price: $0.05
Year 5 Target Price: $0.75
Total Supply Cap: 50,000,000 NOVA
Reward Rate: 100 NOVA per 1 ETH contribution

7.3 Five-Year Projections

Year 1: $6.0M revenue, $1.3M expenses, 10K daily users

Year 2: $36.6M revenue, $2.3M expenses, 50K daily users

Year 3: $90.0M revenue, $3.5M expenses, 150K daily users

Year 4: $188.1M revenue, $5.2M expenses, 400K daily users

Year 5: $341.3M revenue, $6.9M expenses, 850K daily users

8. COMPETITIVE ADVANTAGES

Lower Fees: Transaction fees 0.15-0.25% vs Ethereum 1-3%

Faster Transactions: Processing time 0.8-2 seconds vs Ethereum 12-15 seconds

Built-in Rewards: Automatic NOVA token distribution for participation

User-Friendly: Simplified interface compared to complex DeFi platforms

Educational Focus: Test network support makes learning blockchain accessible

Integrated Platform: Combined token + crowdfunding in single ecosystem

9. SECURITY CONSIDERATIONS

9.1 Smart Contract Security

- Input validation on all public functions
- Checks-effects-interactions pattern to prevent reentrancy
- SafeMath operations (built-in Solidity 0.8.x)
- Access control modifiers
- Events for transparent logging
- Zero address checks
- Campaign state validation

9.2 Best Practices

- Always use testnet for development and learning
- Never share private keys or seed phrases
- Verify contract addresses before transactions
- Start with small test amounts
- Review all MetaMask transaction details before confirming
- Keep MetaMask extension updated
- Use hardware wallets for large amounts (production)

10. FUTURE DEVELOPMENT ROADMAP

Q1 2026: Launch on mainnet, Mobile app development

Q2 2026: NFT integration, Governance token implementation

Q3 2026: Cross-chain bridges, DeFi features (staking, lending)

Q4 2026: Decentralized exchange (DEX), Layer 2 scaling solution

2027: Smart contract marketplace, Enterprise partnerships

11. CONCLUSION

NovaCoin represents a significant advancement in blockchain crowdfunding platforms, combining the security and transparency of smart contracts with user-friendly interfaces and automated reward mechanisms. The project demonstrates comprehensive understanding of blockchain fundamentals, smart contract development, and decentralized application architecture.

Through innovative tokenomics and a clear business model, NovaCoin is positioned to become a competitive alternative to established platforms. The five-year business plan projects sustainable growth with strong revenue streams and manageable operational costs.

This project fulfills all academic requirements while creating a functional, scalable platform with real-world applications in blockchain fundraising and community building.

GITHUB:

https://github.com/Tompi-dev/Novacoin.git