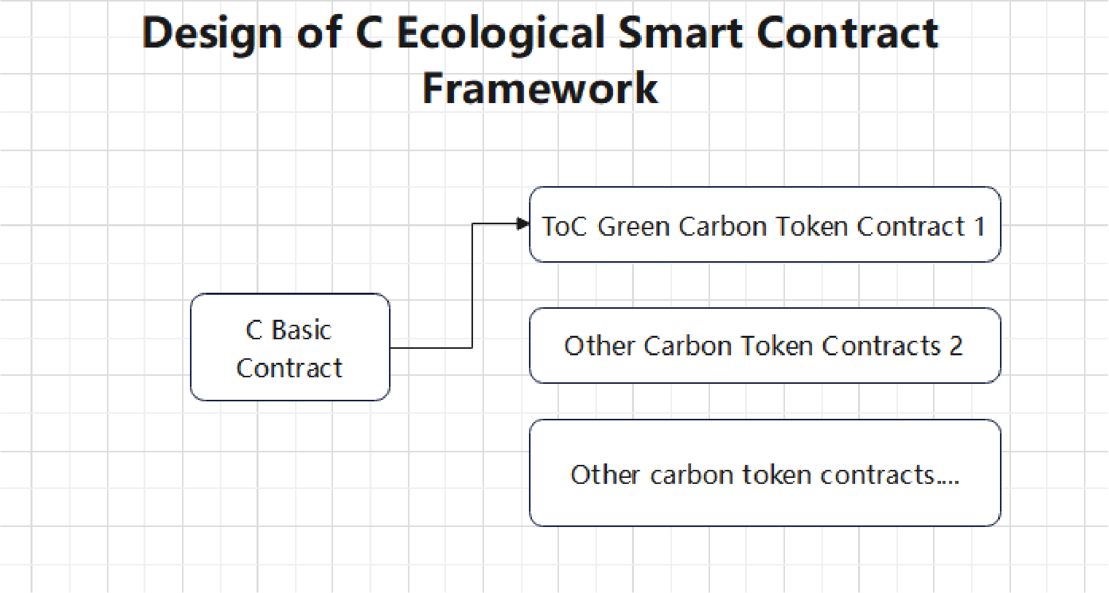
directory

Smart contract design on the carbon ecological chain

1. Overview

In order to ensure that the number of tokens on the chain matches the actual carbon rights, it is required that each minting must have a complete minting source in the smart contract, providing query and total traceability, and the carbon ecology is managed by different contracts according to different carbon types, and all carbon token contracts are controlled and managed by the basic contract deployer.

二、Carbon ecological architecture design


Design of C Ecological Smart Contract Framework
C Basic Contract
ToC Green Carbon Token Contract 1
Other Carbon Token Contracts 2
Other carbon token contracts....

Base Contract:

1、Realize the management and operation of the entire carbon ecology

2、Control the number of token types in the carbon ecosystem

3、Provide permission management authorization for various carbon ecological tokens

Different entities will have their own on-chain carbon ecology and have their own independent and controllable C-based contracts, through which they can freely develop various types of carbon credit assets

三、Environmental description

Programming language: solidity

Compile Version: 0.8.1

Test Environment: T-chain development network (see the T-link port document for deployment test methods)

Formal Operating Environment: T-chain

四、**Definition of the underlying contract**

1、Specify the management pool address

The contract publisher only has one chance to operate, and once the management pool address is specified, it will lose the interface operation permission

```
/*
addrs manages address pools
*/
function    InitManger(address[] memory addrs)public returns (bool)
```

Processing logic: 1. The sender must be the contract deployer, 2. The management pool is not initialized

2、Increase managers

To increase the number of managers, it needs to be unanimously approved to actually join

```
/*
    address addrs new admin
*/
function    AddManger(address    addrs)public returns (bool)
```

Processing logic: It is necessary to check whether the sender is the administrator, not to return directly, if so, record the votes of the current manager on the address, and if all pass, add the address to the management pool

3、Delete the manager

To delete a manager, you need to vote unanimously (except for the destination address) to actually delete the manager

```
/*
    address    addrs    Pending Deletion Manager
*/
function    RemoveManger(address    addrs)public returns (bool)
```

Processing logic: It is necessary to check whether the sender is the administrator, not to return directly, if so, record the votes of the current manager of the address, and if all pass, delete the address from the management pool

4、Query the list of management pools

Returns a list of addresses for the management pool that is currently valid

```
function    ShowManager() public returns(bool,address[])
```

5、Deploy carbon-type tokens

To increase the carbon type token, it needs to be unanimously approved to actually join

```
/*
    address    addrs    Carbon Token Contract Address
```

```
        Bytes32 named    Carbon Token Name
        Uint         type      Carbon Token Type
    */
    function    AddToken(address    addrs,bytes32  name,uint  token_type)public  returns
(bool)
```

Processing logic: It is necessary to check whether the sender is the manager, not to return directly, if so, record the vote of the current manager on the token, and if the vote is unanimously passed, the token address corresponding to the type will be updated

6、Upgrade the carbon-type token contract

To upgrade a carbon-type token, it needs to be unanimously approved to be truly upgraded

```
    /*
        address    addrs    Carbon Token Contract Address
        Bytes32 named Carbon Token Name
        Uint         type      Carbon Token Type
    */
    function    UpdateToken(address    addrs,bytes32  name,uint  token_type)public  returns
(bool)
```

Processing logic: It is necessary to check whether the sender is the manager, not to return directly, if so, record the vote of the current manager on the token, and if the vote is unanimously passed, the token address corresponding to the type will be updated

7、Inquire about the list of tokens

```
    function    ShowToken() public returns(bool,address[],bytes32[],uint[])
```

Processing logic: Returns the list of existing tokens (including contract address, name, and type, returned as an array)

8、Configure the minting address

When the minting address is minted on the carbon credit chain, a security check will be carried out, and only the legal address has the minting authority on the type of carbon coin, this interface is to add the legal minting address, and the submission address needs to be unanimously approved by the management pool in order to add the minting address on the corresponding token.

```
    /*
        address addrs:                    New Convict
        address subcontractaddr       Carbon-type contract address
    */
    function    SetCoinage(address addrs,address subcontractaddr)public returns (bool)
```

Processing logic: To detect whether the sender is the address of the management pool, otherwise it will fail, if so, record the vote of the current manager on the carbon type contract address, if the vote is unanimously passed, the address becomes the minting address of the carbon type contract address.

9、Delete the minting address

```
/*
      address addrs:                New Convict
      address subcontractaddr       Carbon-type contract address
*/
function RemoveCoinage(address addrs,address subcontractaddr)public returns (bool)
```

Processing logic: to check whether the sender is a management pool address, otherwise it will fail, if so, record the vote of the current manager on the carbon contract address, and if it is unanimously approved, the address will be cleared from the minting address pool of the carbon contract address.

10、Minting address inquiry

```
function ShowCoinage()public returns(bool,address[],uint[])
```

Processing logic: Returns the corresponding minting address pool for each carbon type token

五、toC Green Carbon Token Contract Definition

The token is compatible with all interfaces of ERC20 tokens, and is controlled by the constraints of the underlying contract, and the ToC carbon token is initially set to zero.

1、Compatible with all interfaces of ERC20 tokens

2、Minting interface

This is the only source of the toC token token

```
        /*
        Bytes32 Business          Merchant code
        bytes32 place             Venue code
        bytes32 dev               Device encoding
        bytes32 targetCode                The name of the item
        bytes32 targetName        Item code
        bytes32 targetMode        The model number of the item
        bytes32 targetType        Item type
        uint  targetNums          The amount of carbon in the item
        address businessAddr      Business address
        address targetAddr        Carbon source address
        */
function    Coinage(bytes32 business,bytes32 place,bytes32 dev,bytes32 targetCode,
                    bytes32 targetName,bytes32 targetMOde,bytes32 targetType,uint
                    targetNums,address businessAddr,address targetAddr)public returns (bool)
```

Processing logic: first through the basic contract, verify whether the sender is the legitimate minter of the token, if it is not directly return failure, otherwise, record the source of the coin, and the corresponding merchant address and carbon source address, and increase the number of corresponding tokens according to the carbon amount of 5% and 95% respectively

3、Minting source query

function　ShowCoinage(uint begintime,uint endtime)public returns()

Processing logic: The return result form is to be determined

4、Minting source statistics

function　StatsCoinage(uint begintime,uint endtime)public returns()

Processing logic: The return result form is to be determined

六、**Deploy contract tests**

For details about how to use APIs, see

T-Chain - Development Interface 5.0 (Deployment Contract and Contract Execution Chapter)

Development Network API submission address: http://13816813962.gnway.cc:80