Tutorials

Conflux

:

- https://developer.confluxnetwork.org
- https://docs.confluxnetwork.org/go-conflux-sdk sdk
- https://zhuanlan.zhihu.com/p/400583419 https://zhuanlan.zhihu.com/p/393935101 NFT

Image not found or type unknown

, , IoTA (DAG) , .

CFX

CFX conflux token, Ether. conflux , Drip GDrip, uCFX, CFX. :

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CFX

1. -> CFX ,
2. : ,
3. (staking mechanism):

CFX

1. : .
    1. 2CFX
    2.
    3. 4% (PoS)
2. : , . 4%
3. :

ChainID NetworkID

 ,

- ChainID 1029, 1
- ChainID (transaction replay attacks)
- NetworkID ChainID

conflux base32 , cip317(,)

 :

```
16   0x1386b4185a223ef49592233b69291bbe5a80c527

base32  cfx: aak2rra2njvd77ezwjvx04kkds9fzagfe6ku8scz91
```

`common. Address` 16 `GetHexString` , , conflux

 , -> `nonce`/`balance`/`codeHash`( ) :

CONFLUX `stakingBalance`, `storageCollateral`, `accumulatedInterestReturn`, `admin`, `sponsorInfo`
 (https://developer.confluxnetwork.org/introduction/en/conflux_basics)

fie `from` , `to` , `nonce` , `gasPrice` , `gas` , `value` , `chainId` , `data` , `v, r, s` field

conflux `epochHeight` `storageLimit` , , conflux epoch

1.
2. , encode(keccak256), (ECDSA), rlp encode -> hexString -> rawtransa
3. rpc , rawtransaction
4.
5. 5 epoch -> executed, ( )
6. 50 epoch -> confirmed, (,) , epoch
7. -> Finalized, ( )

ETH

https://developer.confluxnetwork.org/sending-tx/en/transaction_explain#:~:text=no%20details%20provided.-,Differences%20between%20Conflux%20and%20Ethereum,-%23

, storage token, token ;

```
X B/64 *(1/16)
# 64    storage entry
```

, token , token , (,)

`AdminControl contract` , `SponsorWhitelistControl contract` , `Staking Contract`

AdminControl contract

admin, destroy, , admin

:

1. A B, C -> C admin
2. A B, B C, C D admin. -> admin , A C , B
3. 2 , D , , C admin

SponsorWhitelistControl contract

, sponsor . :

1. sponsor (sponsor)
2. (admin , sponsor)
3. sponsor

Staking Contract

token , storage

: , , 1CFX, 2CFX . (token)

Linux OSX ·, Windows vs

, https://developer.confluxnetwork.org/conflux-doc/docs/installation

`run`

```
cd run
```

toml toml

```
cp hydra.toml develpoment.toml
```

development.toml

```
mode = "dev"
genesis_secrets = "key.txt" ##
dev_block_interval_ms = 250
jsonrpc_http_port=12537 ## jsonrpc_local_http_port=12539   ,    localhost 12537
```

keystore, github keystore

```
https://github.com/conflux-fans/conflux-abigen-example/tree/main/keystore
https://wallet.confluxscan.io/login
```

go-sdk

```
go get github.com/Conflux-Chain/go-conflux-sdk
```

sdk keystore ,

```
func createAcc(client *conflux.Client){
	client, err := conflux.NewClient(local_url, conflux.ClientOption{
	    KeystorePath: ".keystore"}) //local_url = "http://127.0.0.1:12537"
	    if err != nil {
	        panic(err)
	    }
	    defer client.Close()
	acc1,err := client.AccountManager.Create("test")
	if err != nil {
		log.Fatalln(err)
	}
	fmt.Println(acc1.String())

	acc2,err := client.AccountManager.Create("test")
	if err != nil {
		log.Fatalln(err)
	}
	fmt.Println(acc2.String())
}

func exportPriKeys(client *conflux.Client){
   list := client.GetAccountManager().List()
   priv1, err := client.GetAccountManager().Export(list[0], "test")
   if err != nil {
```

```
    panic(err)
    }
    priv2, err := client.GetAccountManager().Export(list[1], "test")
    if err != nil {
    panic(err)
    }
    fmt.Println(priv2)
    fmt.Println(priv1)
}
```

run key.txt, , 1000cfx

```
vim key.txt
```

,

```
sh clear_state.sh

sh test.sh
```

```
test.sh :
export RUST_BACKTRACE=1
export RUST_BACKTRACE=full
../target/release/conflux --config development.toml
```

sdk

```
func sendTx(client *conflux.Client){
	list := client.GetAccountManager().List()

	var utx types.UnsignedTransaction
	utx.From = &list[0] //use default account if not set
	utx.To = &list[1]

	// unlock account
	err = client.AccountManager.Unlock(acc1, "test")
```

```
    if err != nil {
        log.Fatal(err)
    }
    txhash, err := client.SendTransaction(utx)
    if err != nil {
        log.Fatal(err)
    }
    fmt.Println(txhash)
}
```

cfxabigen, https://docs.confluxnetwork.org/go-conflux-sdk/cfxabigen

```
git clone https://github.com/Conflux-Chain/go-conflux-sdk.git
```

```
go install ./cmd/cfxabigen
```

ERC20

go

```
cfxabigen --sol token.sol --pkg main --out token.go >> token.go
```

https://github.com/conflux-fans/conflux-abigen-example/blob/main/token/main.go

ERC721

ERC20 , https://zhuanlan.zhihu.com/p/400583419 https://zhuanlan.zhihu.com/p/393935

, Openzeppelin

npm

```
sudo apt install npm
```

Openzeppelin

```
npm install @openzeppelin/contracts
```

remix abi, nft.bin nft.abi (: ipfs url ,)

cfxabigen

```
cfxabigen --abi nft.abi --bin nft.bin --pkg main --out nft.go >> nft.go
```

nft.go sdk

```
func deployNFT(client *conflux.Client){
    err := client.AccountManager.UnlockDefault("test1")
    if err != nil {
        log.Fatal(err)
    }

    //tx, hash, t, err := DeployMain(nil, client)

    tx, hash, _, err := DeployMain(nil, client)
    if err != nil {
        panic(err)
    }
    fmt.Println(tx)
    fmt.Println(hash)

    receipt, err := client.WaitForTransationReceipt(*hash, time.Second)
    if err != nil {
        panic(err)
    }

    logrus.WithFields(logrus.Fields{
        "tx":               tx,
```

```
    "hash":             hash,
    "contract address": receipt.ContractCreated,
  }).Info("deploy token done")
}
```

NFT

```
func mintNFT(client *conflux.Client) {
  acc, _ := client.GetAccountManager().GetDefault()
  err := client.AccountManager.UnlockDefault("test")
  if err != nil {
    panic(err)
  }

  contractAddr := cfxaddress.MustNew("cfx:acdujjy8mrjm3913cnztf0zbgpx5h3fbby7jcwp2pc")

  instance, err := NewMain(contractAddr, client)
  if err != nil {
    panic(err)
  }

  err = client.AccountManager.UnlockDefault("test")
  if err != nil {
    panic(err)
  }

  //to := cfxaddress.MustNew("cfx:aap05tb7b9bsxdn5rn365y3peta8pr6mxefp7m682a")

  comacc, _, _ := acc.ToCommon()
  tx, hash, err := instance.Mint(nil, comacc)
  if err != nil {
    panic(err)
  }

  logrus.WithField("tx", tx).WithField("hash", hash).Info("transfer")
  receipt, err := client.WaitForTransationReceipt(*hash, time.Second)
  if err != nil {
    panic(err)
```

```
}

logrus.WithField("transfer receipt", receipt).Info()
}
```

nft

```
func queryNFT(client *conflux.Client){
acc, _ := client.GetAccountManager().GetDefault()
err := client.AccountManager.UnlockDefault("test1")
if err != nil {
panic(err)
}

contractAddr := cfxaddress.MustNew("cfx:acdujjy8mrjm3913cnztf0zbgpx5h3fbby7jcwp2pc")

instance, err := NewMain(contractAddr, client)
if err != nil {
panic(err)
}

comacc, _, _ := acc.ToCommon()
res, err := instance.MainCaller.BalanceOf(nil, comacc)
if err != nil {
panic(err)
}
res1, _ := instance.MainCaller.Symbol(nil)
fmt.Println(res)
fmt.Println(res1)
}
```

nft nft symbol

nft

```
func transferNFT(client *conflux.Client){
    acc, _ := client.GetAccountManager().GetDefault()
    err := client.AccountManager.UnlockDefault("test1")
    if err != nil {
        panic(err)
    }

    contractAddr := cfxaddress.MustNew("cfx:acdujjy8mrjm3913cnztf0zbgpx5h3fbby7jcwp2pc")

    instance, err := NewMain(contractAddr, client)
    if err != nil {
        panic(err)
    }

    comacc, _, _ := acc.ToCommon()
    list := client.GetAccountManager().List()
    toacc, _, _ := list[len(list)-1].ToCommon()

    err = client.AccountManager.Unlock(list[len(list)-1], "test")
    if err != nil {
        panic(err)
    }

    id := big.NewInt(0)

    tx, hash, err := instance.TransferFrom(nil, comacc, toacc, id)
    if err != nil {
        panic(err)
    }

    receipt, err := client.WaitForTransationReceipt(*hash, time.Second)
    if err != nil {
        panic(err)
    }

    logrus.WithFields(logrus.Fields{
        "tx":               tx,
        "hash":             hash,
        "contract address": receipt.ContractCreated,
    }).Info("deploy token done")
```

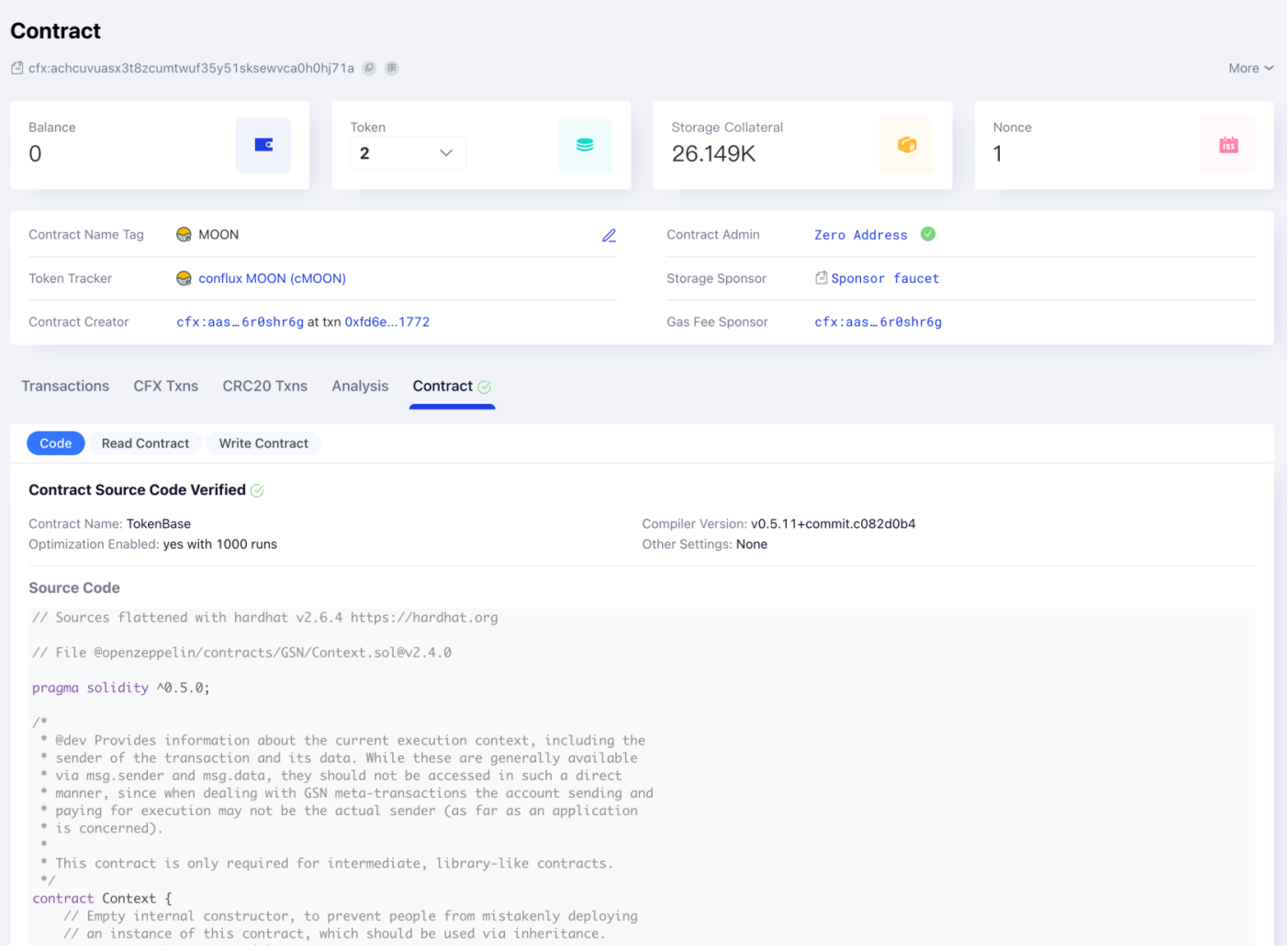
```
    res, err := instance.MainCaller.BalanceOf(nil, comacc)
    if err != nil {
        panic(err)
    }

    res1, err := instance.MainCaller.BalanceOf(nil, toacc)
    if err != nil {
        panic(err)
    }

    fmt.Println(res)
    fmt.Println(res1)
}
```

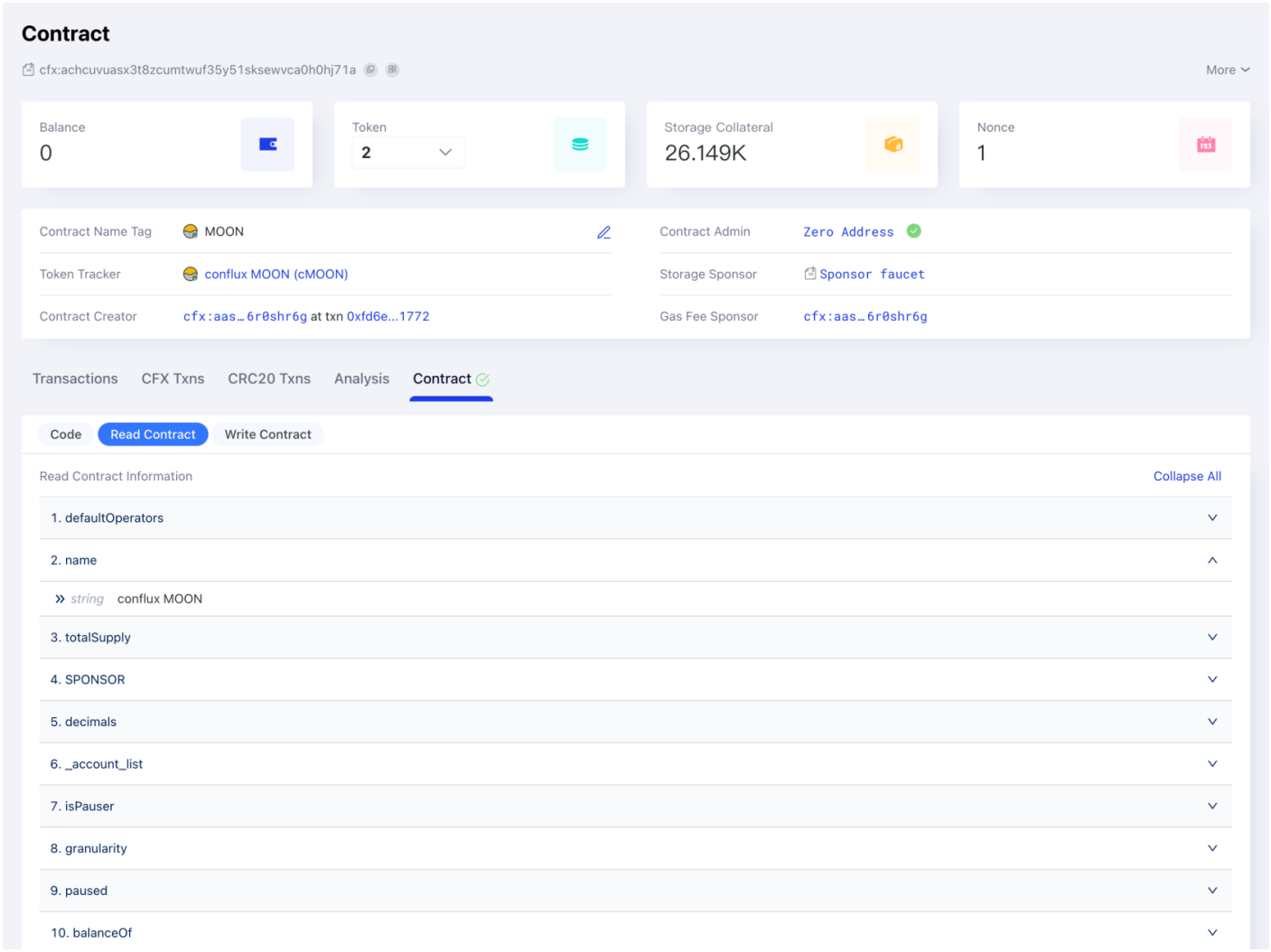
0, 1,

ConfluxScan

ConfluxScan Scan

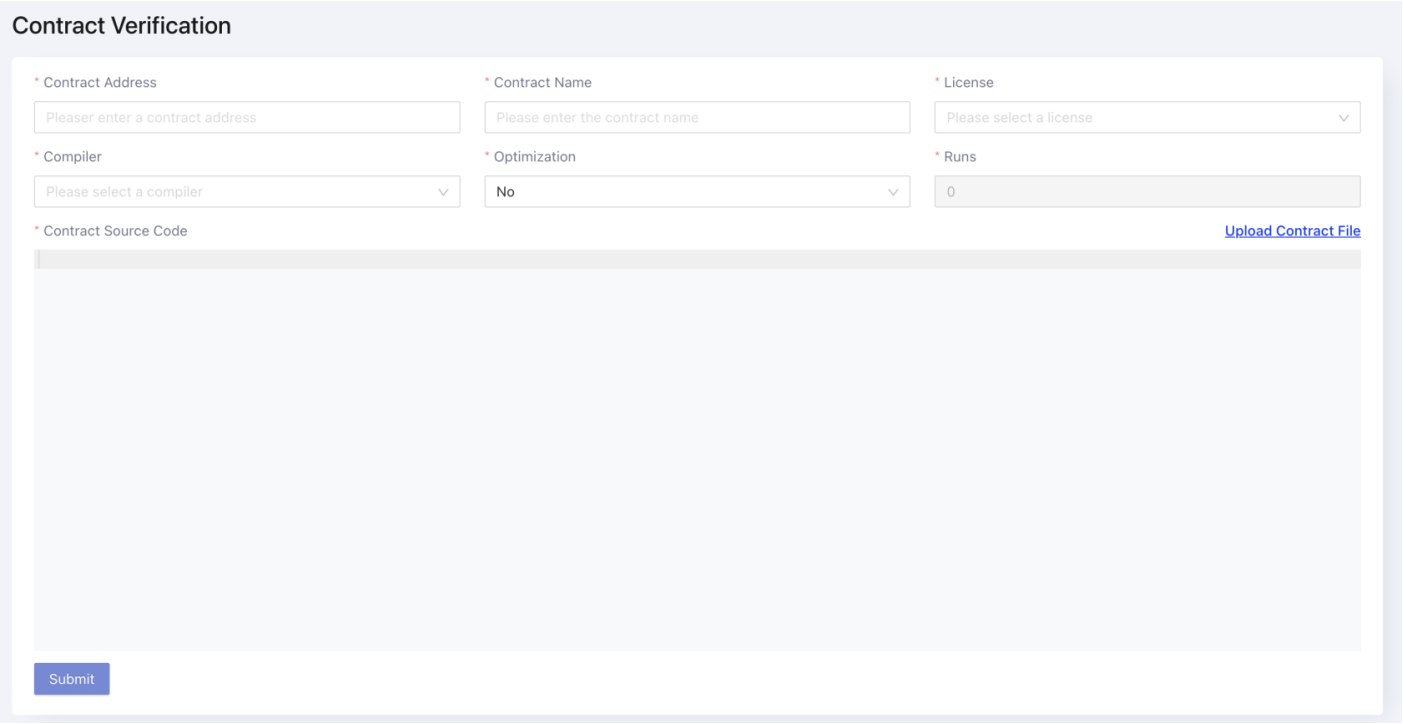
1. Scan Solidity ABI
2. Scan Fluent
3. Scan





Scan

Contract Tab



Scan

- : Base32
- :
- License:
- Solidity
- :
- : flatten

Flatten Solidity

ConfluxScan flatten Solidity flatten :

- truffle-flattener
- npx hardhat flatten
- chainIDE flatten

npx hardhat flatten

hardhat merge .

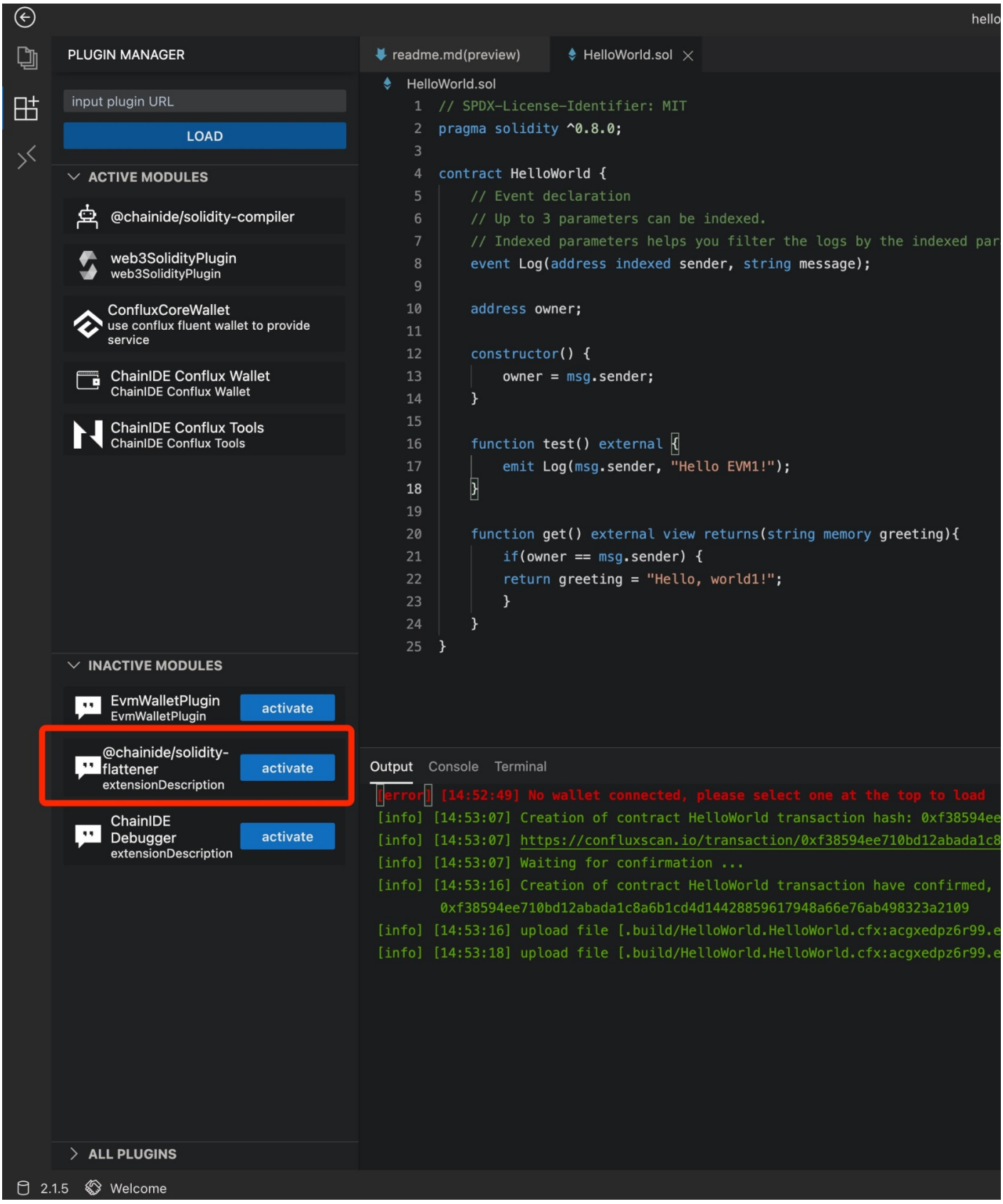
```
$ npx hardhat flatten ./contracts/ERC20Token.sol > ERC20TokenMerged.sol
```

ERC20TokenMerged.sol ConfluxScan

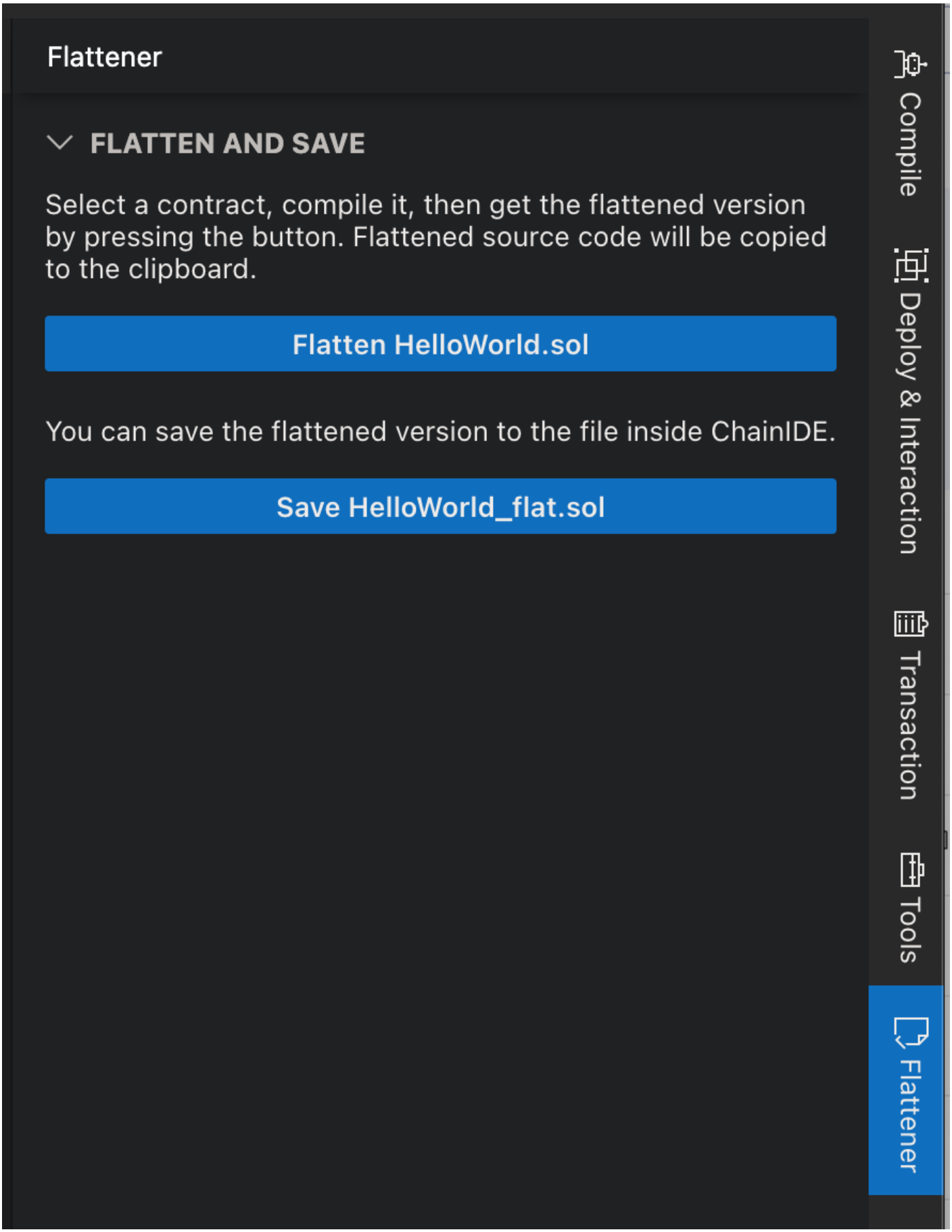
`npx hardhat flatten` How to Flatten a Solidity file using Hardhat.

chainIDE flatten

ChainIDE Soli `@chainide/solidity-flattener` Flattener



Flatten Flatten



hardhat-conflux

EtherScan ConfluxScan Ope`hardhat-etherscan` EtherScan

hardhat-conflux Hardhat Conflux `verifyCfxContract` hat.config.js

```
# npx hardhat verifyCfxContract CONTRACT_NAME DEPLOYED_CONTRACT_ADDRESS
$ npx hardhat verifyCfxContract Greeter cfxtest:acba7cvb1k6bhctzsfshybg5zgch39gnpuc8teem53
```

FAQs

Conflux eSpace

hardhat-etherscan OpenAPI

Conflux

RPC

Conflux Ethereum Conflux onfura

Target

latest mined epoch latest state epoch latest confirmed epoch
reorg latest confirmed epoch

RPC epoch RPC :

- epoch < target , catch-up mode,
- target 1s

epoch RPC

a. epoch block hash

cfx_getBlocksByEpoch epoch block hash pivot block hash

b. block hash block/transaction

cfx_getBlockByHashWithPivotAssumption reorg pivot block h

* block epoch block hash

c. epoch transaction receipts

transaction receipts:

- block tx hash cfx_getTransactionReceipt receipts

- pivot block hash cfx_getEpochReceipts epoch receipts, rpc fullnode debug `public_rpc_apis` pivot block hash pivot chain switch hash txn hash

d.

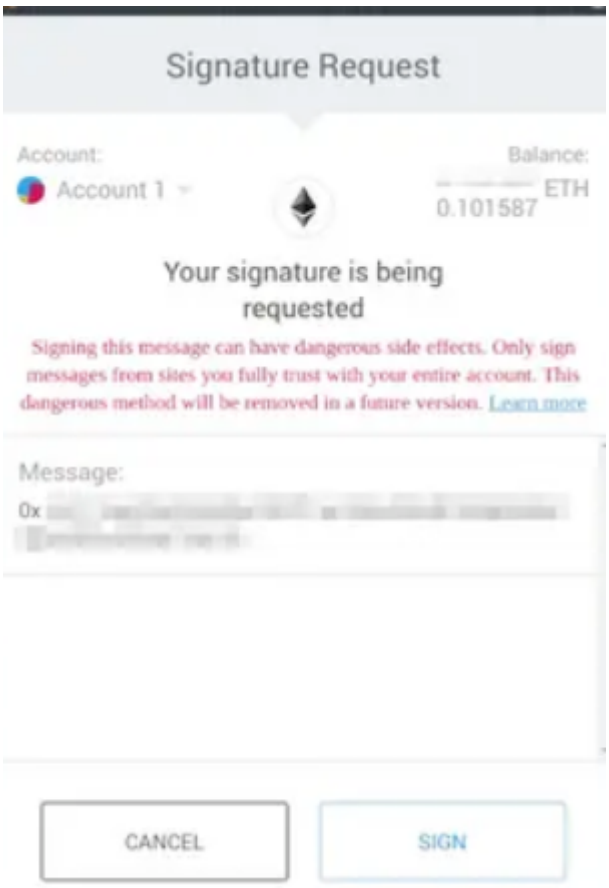
Reorg

pivot chain switch reorg epoch epoch pi

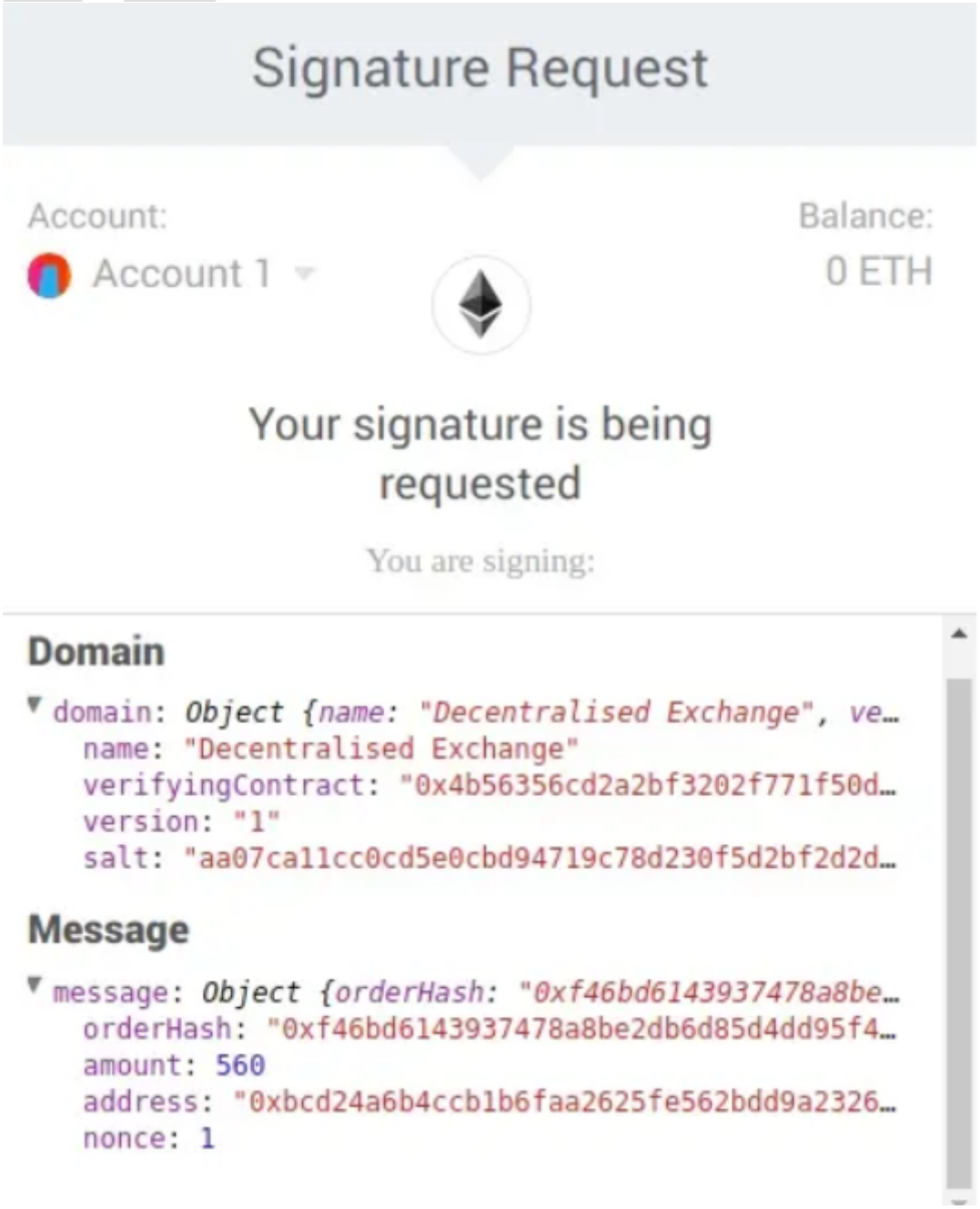
- Pubsub epochs latest state epoch epoch epoch epoch
- epoch parent hash epoch pivot hash epoch number

PersonalMessage & CIP23

conflux-sdk fluen`EIP712` `CIP23` `CIP23` `CIP23` (typedData)



`CIP23` `EIP712` metamask 1-2



`CIP23` `java-conflux-sdk` `CIP23`

`CIP23` `EIP712` https://github.com/Conflux-Chain/CIPs/blob/master/CIPs/cip-23.md

`CIP23` `personal_sign` `cfx_signTypedData_v4` "v0G9u7huK4mJb2K1",

```
{
  "types": {
```

```
    "CIP23Domain": [
      {
        "name": "name",
        "type": "string"
      },
      {
        "name": "version",
        "type": "string"
      },
      {
        "name": "chainId",
        "type": "uint256"
      },
      {
        "name": "verifyingContract",
        "type": "address"
      }
    ],
    "Person": [
      {
        "name": "name",
        "type": "string"
      },
      {
        "name": "wallet",
        "type": "address"
      }
    ],
    "Mail": [
      {
        "name": "from",
        "type": "Person"
      },
      {
        "name": "to",
        "type": "Person"
      },
      {
        "name": "contents",
        "type": "string"
```

```
      }
    ]
  },
  "primaryType": "Mail",
  "domain": {
    "name": "Ether Mail",
    "version": "1",
    "chainId": 1,
    "verifyingContract": "0xCcCCccccCCCCcCCCCCCcCcCccCcCCCcCcccccccC"
  },
  "message": {
    "from": {
      "name": "Cow",
      "wallet": "0xCD2a3d9F938E13CD947Ec05AbC7FE734Df8DD826"
    },
    "to": {
      "name": "Bob",
      "wallet": "0xbBbBBBBbbBBBbbbBbbBbbbbBBbBbbbbBbBbbBBbB"
    },
    "contents": "Hello, Bob!"
  }
}
```

typed

https://github.com/Conflux-Chain/CIPs/blob/master/CIPs/cip-23.md#:~:text=include%20chainId%20field.-,Encoding%20method,-The%20set%20of

`msg` `\x19Conflux Signed Message:\n` hash

fluent

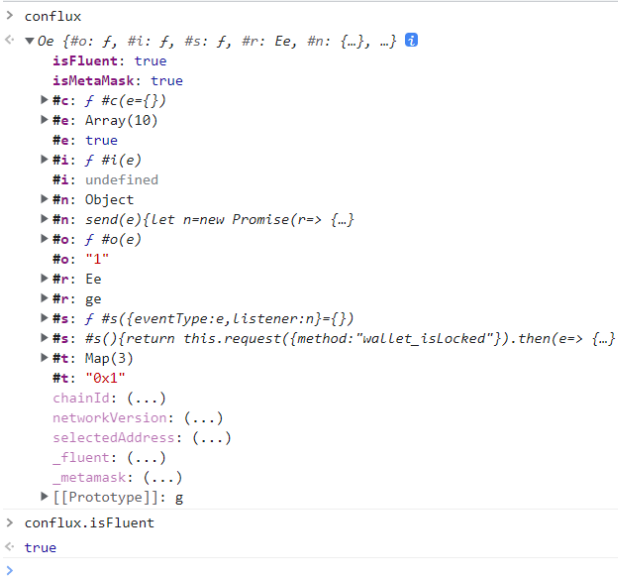
fluent web3 https://confluxrpc.github.io/fluent-wallet-doc/docs/provider-rpc/

fluent https://fluentwallet.zendesk.com/hc/zh-cn fluent

`console`

```
> conflux

> conflux.isFluent
```

fluent js



fluent

personal_sign

console

```
conflux
  .request({
    method: 'personal_sign',
    params: [
 'v0G9u7huK4mJb2K1', '<your_address>']})
```

fluent


```
> conflux
    .request({
      method: 'personal_sign',
      params: [
  'v0G9u7huK4mJb2K1', 'cfxtest:aajb342mw5kzad6pjjkdz0wxx0tr54nfwpbu6yaj49']})
◂ ▾Promise {<pending>}
    ▸[[Prototype]]: Promise
     [[PromiseState]]: "fulfilled"
     [[PromiseResult]]: "0x7e4216720b40f8d7f2cda70433d4a94f3926635517cd5691c778e38eaed87236759ddf7c53ec55c5463f8e966ebd5a32c2dbe1061e95afcbe64ef3a8187badcb00"
>
```

cfx_signTypedData_v4

console

```
conflux
  .request({
    method: 'cfx_signTypedData_v4',
    params: [
 '<your_address>',
        `{
    "types": {
        "CIP23Domain": [
            {
                "name": "name",
                "type": "string"
            },
            {
                "name": "version",
                "type": "string"
            },
            {
                "name": "chainId",
                "type": "uint256"
            },
            {
                "name": "verifyingContract",
                "type": "address"
            }
        ],
        "Person": [
            {
                "name": "name",
                "type": "string"
            },
            {
                "name": "wallet",
                "type": "address"
            }
        ],
```

```
        "Mail": [
            {
                "name": "from",
                "type": "Person"
            },
            {
                "name": "to",
                "type": "Person"
            },
            {
                "name": "contents",
                "type": "string"
            }
        ]
    },
    "primaryType": "Mail",
    "domain": {
        "name": "Ether Mail",
        "version": "1",
        "chainId": 1,
        "verifyingContract": "0xCcCCccccCCCCcCCCCCCcCcCccCcCCCcCccccccccC"
    },
    "message": {
        "from": {
            "name": "Cow",
            "wallet": "0xCD2a3d9F938E13CD947Ec05AbC7FE734Df8DD826"
        },
        "to": {
            "name": "Bob",
            "wallet": "0xbBbBBBBbbBBBbbbBbbBbbbbBBbBbbbbBbBbbBBbB"
        },
        "contents": "Hello, Bob!"
    }
}`]
  })
```

签署这个信息?

Ether Mail

信息

from:

name: Cow

wallet: 0xCD2a3d9F938E13CD947Ec05AbC7FE734Df8DD826

to:

name: Bob

wallet: 0xbBbBBBBbbBBBbbbBbbBbbbbBBbBbbbBbBbbBBbB

contents: Hello, Bob!

取消

签名

```
            `
                "name": "contents",
                "type": "string"
            }
        ]
    },
    "primaryType": "Mail",
    "domain": {
        "name": "Ether Mail",
        "version": "1",
        "chainId": 1,
        "verifyingContract": "0xCcCCccccCCCCcCCCCCCcCcCccCcCCCcCcccccccC"
    },
    "message": {
        "from": {
            "name": "Cow",
            "wallet": "0xCD2a3d9F938E13CD947Ec05AbC7FE734Df8DD826"
        },
        "to": {
            "name": "Bob",
            "wallet": "0xbBbBBBBbbBBBbbbBbbBbbbbBBbBbbbbBbBbbBBbB"
        },
        "contents": "Hello, Bob!"
    }
}`]
  })
```

```
Promise {<pending>}
  [[Prototype]]: Promise
  [[PromiseState]]: "fulfilled"
  [[PromiseResult]]: "0x7f28d98e75cdcaee68354d6ad0b9a2e8c4a3d365fb10fb70a1bc03a72bdb70de5b6d6587c7af57994c494ca3a1672e17d3f8f013e20641a7299f0d427a39a39001"
```

Java-conflux-sdk

`java-conflux-sdk` `personal_sign` `cfx_signTypedData_v4`

```
package conflux.web3j.crypto;

import org.junit.jupiter.api.Test;
import org.web3j.utils.Numeric;

import java.io.IOException;

import static org.junit.jupiter.api.Assertions.assertEquals;

public class SignDataTests {

    //cfx_signTypedData_v4
    @Test
    public void testSignValidStructure() throws IOException {
        StructuredDataTests t = new StructuredDataTests();
```

```
      //  TypedData
        String msg = t.getResource(
                "build/resources/test/"
                        + "structured_data_json_files/ValidStructuredData.json");
      //  msg
        StructuredDataEncoder dataEncoder = new StructuredDataEncoder(msg);
      //        msghash
        org.web3j.crypto.Sign.SignatureData sign =
org.web3j.crypto.Sign.signMessage(dataEncoder.hashStructuredData(), SampleKeys.KEY_PAIR,
false);
        assertEquals(

"0x371ef48d63082d3875fee13b392c5b6a7449aa638921cb9f3d419f5b6a817ba754d085965fb3a041c3b178d3ae3
798ea322ae74cb687dd699b5f6045c7fe47a91c",
                Numeric.toHexString(sign.getR()) + Numeric.toHexStringNoPrefix(sign.getS()) +
Numeric.toHexStringNoPrefix(sign.getV()));
    }

    //personal_sign
    @Test
    public void testSignAnyMessage() throws IOException {
        String message = "v0G9u7huK4mJb2K1";
      // msg          msghash
        org.web3j.crypto.Sign.SignatureData sign =
Sign.signPrefixedMessage(message.getBytes(), SampleKeys.KEY_PAIR);
        assertEquals(

"0xbb0ee8492623f2ef6ed461ea638f8b5060b191a1c8830c93d84245f3fb27e20a755e24ff60fe76482dd4377a0ae
f036937ef88537b2d0fdd834a54e76ecafadc1c",
                Numeric.toHexString(sign.getR()) + Numeric.toHexStringNoPrefix(sign.getS()) +
Numeric.toHexStringNoPrefix(sign.getV()));
    }
}
```

sdk

java-conflux-sdk ecrecover

```
package conflux.web3j.crypto;

import org.junit.jupiter.api.Test;
import org.web3j.crypto.*;
import org.web3j.crypto.Sign;
import org.web3j.utils.Numeric;

import java.io.IOException;
import java.util.Arrays;

import static org.junit.jupiter.api.Assertions.assertEquals;

public class ECRecoverTest {
    private String getAddress() {
        return Numeric.prependHexPrefix(Keys.getAddress(getPubKey()));
    }

    private String getPubKey() {
        return SampleKeys.KEY_PAIR.getPublicKey().toString();
    }



    @Test
    public void testSignAndRecoverMessage() {
        String message = "v0G9u7huK4mJb2K1";

        byte[] msgHash = conflux.web3j.crypto.Sign.getConfluxMessageHash(message.getBytes());

        Sign.SignatureData sign =
conflux.web3j.crypto.Sign.signPrefixedMessage(message.getBytes(), SampleKeys.KEY_PAIR);
□□□//        recover,
        String recoverAddress = conflux.web3j.crypto.Sign.recoverSignature(sign, msgHash,
getAddress());
        assertEquals(recoverAddress, getAddress());
    }

  // fluent                   recover
    @Test
```

```
    public void testRecoverTyped() throws IOException {
        StructuredDataTests t = new StructuredDataTests();
        String msg = t.getResource(
                "build/resources/test/"
                        + "structured_data_json_files/ValidStructuredData.json");
        StructuredDataEncoder dataEncoder = new StructuredDataEncoder(msg);

        //           fluent
        String signature =

"0x371ef48d63082d3875fee13b392c5b6a7449aa638921cb9f3d419f5b6a817ba754d085965fb3a041c3b178d3ae3
798ea322ae74cb687dd699b5f6045c7fe47a91c";

      □ //
        byte[] signatureBytes = Numeric.hexStringToByteArray(signature);
        byte v = signatureBytes[64];
        if (v < 27) {
            v += 27;
        }

        Sign.SignatureData sd =
                new Sign.SignatureData(
                        v,
                        (byte[]) Arrays.copyOfRange(signatureBytes, 0, 32),
                        (byte[]) Arrays.copyOfRange(signatureBytes, 32, 64));
□□□//getAddress()       fluent
        String recoverAddress = conflux.web3j.crypto.Sign.recoverSignature(sd,
dataEncoder.hashStructuredData(), getAddress());
        assertEquals(recoverAddress, getAddress());
    }

  //    testSignAndRecoverMessage()
    @Test
    public void testSignAndRecoverTyped() throws IOException {
        StructuredDataTests t = new StructuredDataTests();
        String msg = t.getResource(
                "build/resources/test/"
                        + "structured_data_json_files/ValidStructuredData.json");
        StructuredDataEncoder dataEncoder = new StructuredDataEncoder(msg);
```

```
        Sign.SignatureData sign = Sign.signMessage(dataEncoder.hashStructuredData(),
SampleKeys.KEY_PAIR, false);

        String recoverAddress = conflux.web3j.crypto.Sign.recoverSignature(sign,
dataEncoder.hashStructuredData(), getAddress());
        assertEquals(recoverAddress, getAddress());
    }
}
```

```
// file: CIP23DomainExample.sol
pragma solidity ^0.4.24;

contract Example {
    struct Person {
        string name;
        address wallet;
    }

    struct Mail {
        Person from;
        Person to;
        string contents;
    }

    bytes32 constant PERSON_TYPEHASH = keccak256(
        "Person(string name,address wallet)"
    );

    bytes32 constant MAIL_TYPEHASH = keccak256(
        "Mail(Person from,Person to,string contents)Person(string name,address wallet)"
    );

    struct CIP23Domain {
        string  name;
        string  version;
```

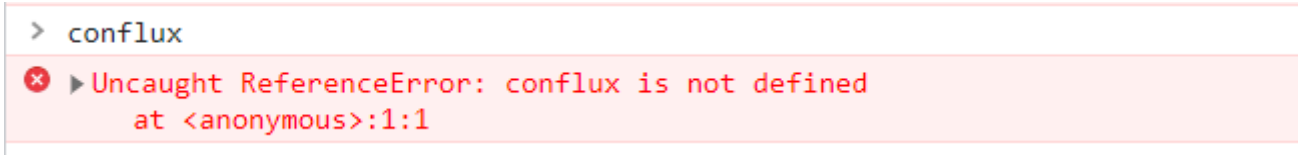
```
    uint256 chainId;
}

struct VerifyClaim{
    address userAddress;
    uint256 randNo;
    uint256 amount;
}

bytes32 constant CIP23DOMAIN_TYPEHASH = keccak256(
    "CIP23Domain(string name,string version,uint256 chainId)"
);

bytes32 constant VERIFYCLAIM_TYPEHASH = keccak256(
    "VerifyClaim(address userAddress,uint256 randNo,uint256 amount)"
);

bytes32 DOMAIN_SEPARATOR;

constructor () public {
    DOMAIN_SEPARATOR = hash(CIP23Domain({
        name: "VerifyClaim",
        version: '1',
        chainId: 97
    }));
}

function hash(Person person) internal pure returns (bytes32) {
    return keccak256(abi.encode(
        PERSON_TYPEHASH,
        keccak256(bytes(person.name)),
        person.wallet
    ));
}

function hash(Mail mail) internal pure returns (bytes32) {
    return keccak256(abi.encode(
        MAIL_TYPEHASH,
        hash(mail.from),
        hash(mail.to),
```

```
            keccak256(bytes(mail.contents))
        ));
    }

    function hash(CIP23Domain cip23Domain) internal pure returns (bytes32) {
        return keccak256(abi.encode(
            CIP23DOMAIN_TYPEHASH,
            keccak256(bytes(cip23Domain.name)),
            keccak256(bytes(cip23Domain.version)),
            cip23Domain.chainId
        ));
    }

    function hash(VerifyClaim verifyclaim) internal pure returns (bytes32) {
        return keccak256(abi.encode(
            VERIFYCLAIM_TYPEHASH,
            verifyclaim.userAddress,
            verifyclaim.randNo,
            verifyclaim.amount
        ));
    }

    function verify(VerifyClaim verifyclaim, uint8 v, bytes32 r, bytes32 s) internal view
returns (bool) {
        // Note: we need to use `encodePacked` here instead of `encode`.
        bytes32 digest = keccak256(abi.encodePacked(
            "\x19\x01",
            DOMAIN_SEPARATOR,
            hash(verifyclaim)
        ));
        return ecrecover(digest, v, r, s) == 0x53dE6A872435F5286BEFd0b6fB3bC06742aF8C8F;
    }

    function test(address _userAddress, uint256 _randNO, uint256 _amount, uint8 _v, bytes32
_r, bytes32 _s) public view returns (bool) {
        // Example signed message
        VerifyClaim memory verifyclaim = VerifyClaim({
            userAddress: _userAddress,
            randNo: _randNO,
            amount: _amount
```

```
        });
        assert(verify(verifyclaim, _v, _r, _s));
        return true;
    }
}
```

sdk sdk

1. fluent



:

2. fluent

fluent

https://fluent-wallet.zendesk.com/hc/zh-cn,

java-conflux-sdk-tests

MetaMask Conflux eSpac

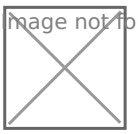
Conflux eSpace Conflux eSpace Metamask eSpace

Conflux Core FluentWallet

MetaMask

MetaMask eSpace :

1. MetaMask
2.



3.

eSpace

- Network Name: Conflux eSpace
- New RPC URL: https://evm.confluxrpc.com
- Chain ID: 1030
- Currency Symbol: CFX
- Block Explorer URL: https://evm.confluxscan.net
- For the eSpace testnet, please use the following configuration values:

eSpace

- Network Name: Conflux eSpace (Testnet)
- New RPC URL: https://evmtestnet.confluxrpc.com
- Chain ID: 71
- Currency Symbol: CFX
- Block Explorer URL: https://evmtestnet.confluxscan.net

eSpace https://efaucet.confluxnetwork.org/

chainlist MetaMaskeSpace

chainlist :

- https://chainlist.org.
- "Conflux eSpace".
- "Conflux eSpace" "Connect Wallet" MetaMask
- "Conflux eSpace" "Add to Metamask" .
- MetaMask "Allow this site to add a network?" "Approve".
- MetaMask "Allow this site to switch the network?" "Approve".

MetaMask Conflux eSpace

TokenPocket

Conflux v2.1.0

Conflux `v2.1.0` kFor – English check here

CIP CIP94, CIP99 bug .

CIP-94

CIP-94 Conflux DAO CFX

- PoW base reward
- PoS interest rate

Conflux

CIP

DAO Dapp Fluent DAO

CIP-99

CIP-99 PoS CIP-99 1

PoS CIP99

- down
- 7 1
- PoS unlock 7 1 7 13

FullState

v2.1.0 FullState FullState balance no

Conflux-Rust snapshot FullState snapshot G sna

FullState FullState FullState

- `enable_single_mpt_storage`
- `single_mpt_space = "evm"` eSpace

eSpace fullstate eSpace hardfork

FullState `21-25G` FullState

Conflux Core

Conflux

Conflux

Conflux

- Compatibility with the EVM

Conflux

1. `0x` `0x0888000000000000000000000000000000000000`
2. `cfx:` `cfxtest:` Base `cfx:aaejuaaaaaaaaaaaaaaaaaaaaaaaaaaaa2mhjju8k`

Base `cfx:...` `cfxtest:`

1. `.sol`
2. Base32 `.sol`

Conflux

1. EOA
2.

`.sol`

Conflux EOA EOA Conflux

```
from cfx_address.utils import eth_eoa_address_to_cfx_hex
eth_address = "0xcfffde169afbd51f081d2e82acca0f19cadcbbe1"
print(eth_eoa_address_to_cfx_hex(eth_address))
```

Conflux ERC777 ERC1820

> Conflux 1820 `0x88887eD889e776bCBe2f0f9932EcFaBcDfCd1820`

ConfluxScan

`Create2` `Clone` conflux contract conflux

opcode(`NUMBER` `BLOCKHASH`)

Conflux Opcode

NUMBER

Conflux `NUMBER` opcode epoch number block number

BLOCKHASH

`BLOCKHASH` opcode `BLOCKHASH` opcode `BLOCK-1` `BLOCK-256`) Conflu `BLOCKHASH` `NUMBER-1`

EIP-712

EIP-712: Typed structured data hashing and signing Conflux CIP-23 CIP-23 EIP-712

- `\x19Ethereum Signed Message:\n` `\x19Conflux Signed Message:\n`
- typed structured data `EIP712domain` `CIP23domain`
- `CIP23domain` `chainId`