



# **Myshell Testnet Smart Contract Initial Test Report**

Version 0.1

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### **Table of contents**

See table

- 1. 合约部署与测试
- 1.1 ERC-20 合约测试
- 1.2 ERC-20 测试分析报告
- 1.3 ERC-721 合约测试
- 1.4 ERC-721 测试分析报告

### **Environment settings**

- Hardhat
- Solidity
- Openzeppelin
- ERC-20, ERC-721
- Javascript
- Myshell Testnet
- Chain ID: 202402181658

## 1. 合约部署与测试

### 1.1 ERC-20合约测试

- 合约介绍: 本智能合约名为 `TestToken`, 代币符号为“TT”。它是基于以太坊的ERC-20标准实现的一种代币合约。合约部署时, 构造函数接受一个`initialSupply`参数, 即初始供应量, 代表首次铸造代币的数量。合约使用`_mint`函数在部署时向部署者(`msg.sender`)的地址铸造初始供应量的代币。
- 部署步骤:

#### 00-deploy-token.js

```
const { network } = require("hardhat")
const { INITIAL_SUPPLY } =
require("../helper-hardhat-config")

module.exports = async ({ getNamedAccounts, deployments })
  => {
  const { deploy, log } = deployments
  const { deployer } = await getNamedAccounts()
  const chainId = network.config.chainId

  log("Deploying TestToken On Myshell", chainId)

  const token = await deploy("TestToken", {
    from: deployer,
    log: true,
    args: [INITIAL_SUPPLY],
  })

  log("TestToken Deployed!")
  log("TestToken Address is:", token.address)

  log("-----")
}

module.exports.tags = ["all", "token"]
```

- 部署结果：

- 测试用例:[F-1] transfer功能

## [F-1] TestToken::transfer

Script Code: [Github](#)

测试结果：

## Transaction details

- 测试用例:[F-2] approve & transferFrom功能

## [F-2] TestToken::approve & transferFrom

Script Code: [Github](#)

测试结果：

Transaction details	
Details	Token transfers
This is a testnet transaction only	
Transaction hash	0x1c4f6d938575dd31dccaf630f9f041a792fc5e6ba711cfef0d4b183deb40796 ⓘ
Status and method	<span>Success</span> 0x23b872dd
Block	33555   4 Block confirmations
Timestamp	⌚ 32s ago   Feb 21 2024 18:20:24 PM (+07:00 UTC)   Confirmed within <= 8 secs
From	 0xA5b71068da164ECafAB295838f775Fe90764f786 ⓘ
Interacted with contract	 TestToken ⓘ <span>✓</span>
Tokens transferred	0xeb...A367 ⓘ → 0xA5...f786 ⓘ For: 25 ⓘ TestToken (TT)

## 1.2 ERC-20 测试分析报告

- **TestToken**合约的部署：
    - TestToken(TT) ERC-20智能合约已成功部署在Myshell测试网上。
    - 该交易在 8 秒内被挖掘并确认，表明网络健康且延迟低。
    - 总共使用了 966.013 个天然气单位，这对于合同部署来说是合理的数量。

- 代币Transfer测试：

- 从一个账户向另一个账户进行了 10 TT 的代币转账, 成功。
  - 该交易使用了 35,110 个 Gas 单位, 这是 ERC-20 代币转移的典型值。
  - 传输很快就得到了确认, 不到8秒, 表明网络状况保持稳定。

- **approve和transferFrom测试:**

- 25 TT 已获得批准，并且 TransferFrom 函数已成功调用。
- 该交易使用的gas为36,573，比简单的转账略多，这是由于transferFrom函数的额外复杂性而预计的。
- 同样，交易在 8 秒内得到确认，保持了一致的性能。

总体而言，Myshell 测试网运行可靠，交易确认快速且 Gas 使用合理。这些交易为 TestToken 智能合约的部署和功能提供了信心，表明它的行为符合测试网上传输和批准等基本操作的预期。建议在任何主网部署之前进行进一步的测试，包括边缘情况和故障模式，以进行全面评估。

### 1.3 ERC-721合约测试

- 合约介绍:本智能合约名为 TestNFT，非同质化代币符号为“DOG”。它是基于以太坊的ERC-721标准实现的一种非同质化代币合约。合约使用mint函数为用户提供NFT铸造，NFT存储在去中心化存储服务IPFS网络。
- 部署步骤:

#### 01-deploy-nft.js

```
const { network } = require("hardhat")
module.exports = async ({ getNamedAccounts, deployments })
=> {
  const { deploy, log } = deployments
  const { deployer } = await getNamedAccounts()
  const chainId = network.config.chainId

  log("Deploying TestNFT On Myshell", chainId)

  const nft = await deploy("TestNFT", {
    from: deployer,
    log: true,
    args: [],
  })

  log("TestNFT Deployed!")
  log("TestNFT Address is:", nft.address)
```

```
    log("-----")
}
module.exports.tags = ["all", "nft"]
```

- 部署结果：

```
The default interactive shell is now zsh.  
To update your account to use zsh, please run `chsh -s /bin/zsh`.  
For more details, please visit https://support.apple.com/kb/HT208050.  
● HOSANNAdeMacBook-Air:Myshell-Test hosanna$ yarn hardhat deploy --network myshell --tags nft  
yarn run v1.22.19  
warning package.json: No license field  
$ /Users/hosanna/Myshell-Test/node_modules/.bin/hardhat deploy --network myshell --tags nft  
Nothing to compile  
Deploying TestNFT On Myshell 202402181658  
deploying "TestNFT" (tx: 0x5804f16a846453fd697f076929e4ce801a96127dda8ead826156626e3ffdef08)...: deployed at 0x62D1b1D72D83c1caC7AD  
6C59FcD05A6990f5ea59 with 1745536 gas  
TestNFT Deployed!  
TestNFT Address is: 0x62D1b1D72D83c1caC7AD6C59FcD05A6990f5ea59  
-----  
'❯ Done in 16.78s.
```

- 测试用例:[F-1] mint功能

### [F-1] TestToken::mint

Script Code: [Github](#)

测试结果:

Transaction details

Details Token transfers Internal txns Logs State Raw trace

This is a testnet transaction only

Transaction hash	0x38d22fd96ac0868e7aa46df78f4204f79999688e901d1cf911dbb99986254dde
Status and method	Success 0xc2229fea
Block	34257   6 Block confirmations
Timestamp	41s ago   Feb 21 2024 19:54:00 PM (+07:00 UTC)   Confirmed within <= 8 secs
From	0xeb23E1a2784931A65D671DaA1235c8ae6435A367
Interacted with contract	Dogie
Tokens minted	0x00...0000 → 0xeb...A367 For token ID: 0 Dogie (DOG)

<input type="checkbox"/> Value	0 ETH (\$0)
<input type="checkbox"/> Transaction fee	0.00000011324866215 ETH (\$0.000331832169938958)
<input type="checkbox"/> Gas price	0.000000000000100005 ETH (0.00100005 Gwei)
<input type="checkbox"/> Gas usage & limit by txn	113,243   113,243 <span style="color: green;">100%</span>
<input type="checkbox"/> Gas fees (Gwei)	Base: 0.00000005   Max: 0.001000063   Max priority: 0.001
<input type="checkbox"/> Burnt fees	0.00000000000566215 ETH (\$0.00000016590778958)
<a href="#">Hide details</a>	
<input type="checkbox"/> Other	Txn type: 2 (EIP-1559)  Nonce: 19  Position: 1
<input type="checkbox"/> Raw input	<div style="border: 1px solid #ccc; padding: 5px; display: inline-block;"> <span>Hex</span> <span style="margin-left: 10px;">RAW</span> </div> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px; height: 100px; overflow-y: scroll;"> <pre>0xc2229fea</pre> </div>

```
● HOSANNAd MacBook-Air:Myshell-Test hosanna$ yarn hardhat run scripts/mint.js --network myshell
yarn run v1.22.19
warning package.json: No license field
$ /Users/hosanna/Myshell-Test/node_modules/.bin/hardhat run scripts/mint.js --network myshell
Minting...
Waiting for transactions to be mined...
Transaction successfully...
Transaction Hash: 0x38d22fd96ac0868e7aa46df78f4204f79999688e901d1cf911dbb99986254dde
Transaction Details: {
  hash: '0x38d22fd96ac0868e7aa46df78f4204f79999688e901d1cf911dbb99986254dde',
  type: 2,
  accessList: [],
  blockHash: '0x244be95f324ea701c0004eb5e7fb16b1becb2143061d7ee92a62a7fb04608b1c',
  blockNumber: 34257,
  transactionIndex: 1,
  confirmations: 1,
  from: '0xeb23E1a2784931A65D671DaA1235c8ae6435A367',
  gasPrice: BigNumber { _hex: '0x0f4272', _isBigNumber: true },
  maxPriorityFeePerGas: BigNumber { _hex: '0x0f4240', _isBigNumber: true },
  maxFeePerGas: BigNumber { _hex: '0x0f427f', _isBigNumber: true },
  gasLimit: BigNumber { _hex: '0x1ba5b', _isBigNumber: true },
  to: '0x6201b10720831caC7AD6C59FcD05AG690f5f5ea59',
  value: BigNumber { _hex: '0x00', _isBigNumber: true },
  nonce: 19,
  data: '0xc2229fea',
  r: '0x1d757a29d9d6ce829daa4c3f821045cb7032f4c16e1c5022f4ffdd7fdca52814',
  s: '0x594b0fa85176c5020eb12a53a4971d33e9b33401b91cd105d73162c3503455bb',
  v: 1
  creates: null,
  chainId: 202402181658,
  wait: [Function (anonymous)]
}
Block Timestamp: 2024-02-21T12:54:00.000Z
Current Token ID: 0
Token ID 0 exists: true
Token ID 0 URI: ipfs://bafybeig37ioir76s7mg5oobetncojcm3c3hxasyd4rvid4jqhy4gkaheg4/?filename=0-PUG.json
+ Done in 14.26s.
○ HOSANNAd MacBook-Air:Myshell-Test hosanna$
```

- 测试用例:[F-2] approve & safeTransferFrom功能

[F-2] TestToken::approve & safeTransferFrom

Script Code: [Github](#)

测试结果:

## Transaction details

**Details**    **Token transfers**    **Internal txns**    **Logs**    **State**    **Raw trace**

 Status and method  Success 0x23b873dd

Block 34348 | 3 Block confirmations

🕒 20s ago | Feb 21 2024 20:06:08 PM (+07:00 UTC) | Confirmed within <= 8 secs

From 0xA5b71068da164ECafAB295838f775Fe90764f786

 Interacted with contract

Tokens transferred 0xeb...A367 → 0xA5...f786 For token ID: 0 T Dogie (DOG)

 Value 0 ETH (\$0)

 Transaction fee 0.0000005628981435 ETH (\$0.000164935910823222)

 Gas price 0.00000000000100005 ETH (0.00100005 Gwei)

 Gas usage & limit by txn 56,287 | 65,887  85.43%

 Gas fees (Gwei) Base: 0.00000005 | Max: 0.001000063 | Max priority: 0.001

 0.00000000000281435 ETH (\$0.0000000008246383222)

[Hide details](#)

ⓘ Other Txn type: 2 (EIP-1559) | Nonce: 1 | Position: 1

## Raw Input

Hex ▾

5

## 1.4 ERC-721 测试分析报告

- **TestNFT**合约的部署：
    - TestNFT(DOG)ERC-721智能合约已成功部署在Myshell测试网上。
    - 该部署消耗了大量的 Gas(1,745,536 个 Gas 单位), 这对于 ERC-721 等更复杂的合约类型来说是预计的。
  - NFT 的**mint**测试：
    - 如“代币铸造”部分所示, NFT 已成功铸造。
    - 交易在8秒内得到确认, 显示了网络效率。
    - 用于铸造的天然气用量为 113,243 单位, 在此类操作的预期范围内。
  - NFT **safeTransferFrom**测试：
    - NFT 已成功从原所有者转移到另一个用户。
    - 此次转账使用了 56,287 个气体单位, 也在 8 秒内得到确认。
    - 这些交易的成功执行表明智能合约正在按照铸造和转移代币的预期运行。

Myshell 测试网的整体性能看起来稳定高效，所有交易都处理得很快。Gas 使用量与 ERC-721 操作的预期成本一致。该测试阶段并未表明智能合约的部署、铸造和转移功能存在任何问题。