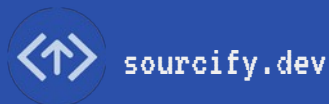


The State of Source-Code Verification: Closed, Painful, and Ready for Change

Kaan Uzdoğan



ARGOT



Unable to understand the ERC-1155 standard

Smart Contracts erc1155

Log In



(2)

EIP-1155:

"A standard interface for contracts that manage multiple token types. A single deployed contract may include any combination of fungible tokens, non-fungible tokens or other configurations (e.g. semi-fungible tokens)."

a contract deployed based on eip-1155 allows us to manage multiple token types -- (a) fungible token(s) "without a decimal" along with (a) non-fungible token(s) -- within one contract.

i created a "simple" ERC1155-based nft collection deployed at goerli as an illustration:



Ethereum (ETH) Blockchain Explorer



Simple1155 | Address

0x3ae337C693a9a0888998e475076e4eB964cc5b81 | Etherscan ¹¹

The Contract Address

0x3ae337C693a9a0888998e475076e4eB964cc5b81 page allows users to view the source code, transactions, balances, and analytics for the contract address. Users can also interact and make transactions to the contract directly on...

on the second txn i called `mintBatch` method on the contract:



Ethereum (ETH) Blockchain Explorer



Goerli Transaction Hash (Txhash) Details | Etherscan ⁴

Goerli (GTH) detailed transaction info for txhash

Nov 2022

9 / 15

Nov 2022

Nov 2022



sourcify.dev

Web server is down

Error code 521

Visit cloudflare.com for more information.

2025-11-15 19:53:41 UTC



You

Browser
Working



Buenos Aires

Cloudflare
Working



goerli.etherscan.io

Host
Error

What happened?

The web server is not returning a connection. As a result, the web page is not displaying.

What can I do?

If you are a visitor of this website:

Please try again in a few minutes.

If you are the owner of this website:

Contact your hosting provider letting them know your web server is not responding. [Additional troubleshooting information.](#)



sourcify.dev

Web server is down

Error code 521

Visit cloudflare.com for more information.

2025-11-15 19:53:41 UTC



Where are the contracts?

If you are the owner of this website:

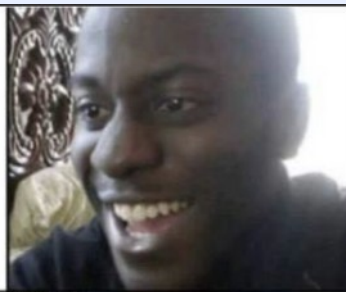
Contact your hosting provider letting them know your web server is not responding. [Additional troubleshooting information.](#)



sourcify.dev

Ethereum has good verification culture

Ethereum
contracts are
open-sourced...



Ethereum
contracts are
open-sourced...



...through
close
source verifiers



Ethereum
contracts are
open-sourced...



...through
close
source verifiers



...and
closed
datasets



Problems

- **Open-source**

- Largest verifier is close-source. Verification process is a **black box**.

- **Closed data**

- EVM data is onchain and public, anyone can build a block explorer
- Verified contracts are **offchain and siloed**, you depend on whose database it's on.

- **Centralized**

- If it's gone, it's gone
- <http://goerli.etherscan.io/address/0x7a250d5630B4cF539739dF2C5dAcb4c659F2488D>
- <https://rinkeby.etherscan.io/address/0x74FbCcEB9a11821cF7098494d887881C2f0e479a>

- **Stagnated tooling and suboptimal devX**

- Why did the verification fail?
- API keys
- Lacking rich compilation data
 - sourceMaps, bytecodes, storageLayout, immutables, full std-JSON input/output



Problems

- Current players not incentivized to open-up themselves.
- Requires active pushing and raising awareness
- Not a “sexy” thing to build





sourcify.dev

 **Verifier Alliance**



sourcify.dev



sourcify.dev

- Solidity side project, within EF
- Spun out w/Solidity to argot.org
- Non-profit, **no revenue**
- 3 person team



ethereum
foundation

ARGOT



@manuelwedler



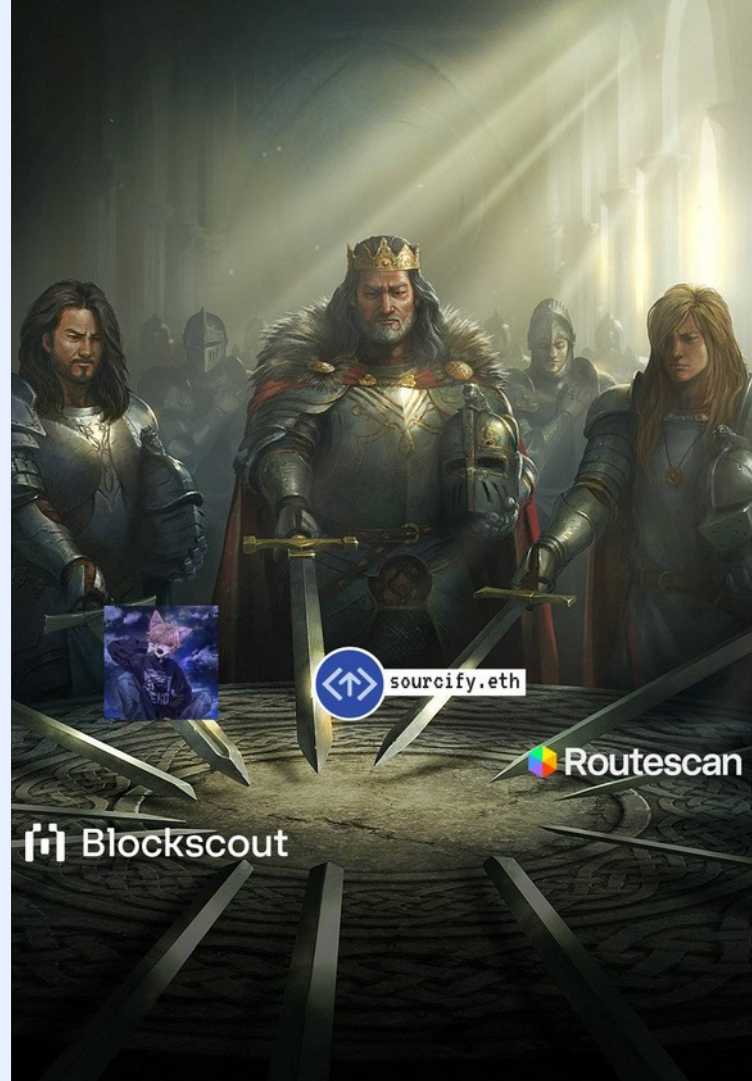
@kuzdogan



@marcocastignoli



sourcify.dev



Verifier Alliance

- Easy, unified, and open access to the source-code of EVM smart contracts.
- Public shared Postgres database of verified contracts.
- Exported daily in Parquet format

 Blockscout

 Routescan



verifieralliance.org

Solutions

Solutions

- Open Source **EVERYTHING**



Solutions

- **Open Source EVERYTHING**

- Verification logic @ethereum-sourcify/lib-sourcify

Solutions

- **Open Source EVERYTHING**

- Verification logic `@ethereum-sourcify/lib-sourcify`
 - *Browser friendly*
 - Example: Local verification on **Otterscan**





Address 0x66a9893cC07D91D95644AEDD05D03f95e1dBA8Af



Overview

ERC20 Transfers

ERC721 Transfers

Token Balances

Withdrawals

Blocks Rewarded

Contract

Read Contract

Name:

UniversalRouter

Match:

Match

1

Fetching Sources

Downloading from Sourcify (2.34s)

2

Compiling Contract

Compiling locally in the browser (0.00s)

3

Verifying Contract

Executing verification logic in the browser (73.11s)

4

Reporting Verification

Local verification result:

✓ Match



runtime bytecode



creation bytecode



Solutions

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Solutions

- **Open Source EVERYTHING**

- Verification logic @ethereum-sourcify/lib-sourcify
- Sourcify server: <https://sourcify.dev/server>



Solutions

- **Open Source EVERYTHING**

- Verification logic @ethereum-sourcify/lib-sourcify
- Sourcify server: <https://sourcify.dev/server>
- Repository UI: <https://repo.sourcify.dev>



Solutions

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- Verification logic @ethereum-sourcify/lib-sourcify
- Sourcify server: <https://sourcify.dev/server>
- Repository UI: <https://repo.sourcify.dev>
- 4byte signature database: <https://4byte.sourcify.dev>
 - api.openchain.xyz → api.4byte.sourcify.dev



4byte.sourcify.dev

Created from Sourcify verified contracts and follows the [openchain.xyz](#) 's API. See [Sourcify API docs](#).

Stats updated: 15 November 2025 at 23:00

Found in a Verified Contract ABI 

2.294.391 function signatures

480.282 event signatures

191.530 error signatures

Public Submissions 

4.452.805

Total Signatures

7.412.204

e.g. 'balanceOf(address)' or '0xa9059cbb'

Search

Try Some Examples 

`0xa9059cbb`

4-byte function selector

`transfer*`

Wildcard text search for signatures starting with 'transfer'

`*Supply*`

Signatures containing 'Supply'

`?all()`

Single char wildcard - matches 'call()', 'wall()', etc.

`transferFrom(address,address,uint256)`

Full function signature

`0xbb757047c2b5f3974fe26b7c10f732e7bce710b0952a71082702781e62ae0595`

32-byte event hash

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- 4byte signature database: <https://4byte.sourcify.dev>
 - api.openchain.xyz → api.4byte.sourcify.dev
- Self hosted Sourcify instances:
 - <https://server-verify.hashscan.io>
 - <https://sourcify-api-monad.blockvision.org>
 - <https://sourcify.roninchain.com/server>
 - <https://sourcify.parsec.finance>
 - <https://verify-api.vechainstats.com>
 - <https://sourcify.walnut.dev>



Solutions

- Open Source **EVERYTHING**



Solutions

- Open Source **EVERYTHING**
- Verify **EVERYWHERE**



Solutions

- **Open Source EVERYTHING**
- **Verify EVERYWHERE**
 - Sourcify backend: Verified on Sourcify → Call other verifiers
 - Etherscan limitation: Max. 250 verif./day regardless of tier



Solu

- O
- V

Match ID
3

Verification on other verifiers

Statuses refresh every 3 seconds.

Etherscan

Already Verified

Verification ID: hjgaylzazirjwu9zwlzn1wujmymrhe4pfimnqri99l5ym1s2fg

[View on explorer](#) 

Verification successful

Routescan

NOTOK

Verification ID: 34c7a9bf-5e71-5dfa-97d5-c8313ad62b5d

[View on explorer](#) 

Verification successful

Blockscout

Pass - Verified

Verification ID: 291884f184027d195d62627862f75337986fe27369146267

[View on explorer](#) 

Verification successful



Solutions

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 - Remix Plugin



CONTRACT VERIFICATION

Verify Receipts Lookup Settings

Verify compiled contracts on different verification services

Chain

Ethereum Mainnet (1)

Contract Address

0x2738d13E81e...

Contract Name

Storage - contracts/1_Storage.sol

☐ The deployed contract is behind a proxy

Verify on:

☒ Sourcify

<https://sourcify.dev/server>

☒ Etherscan

<https://api.etherscan.io/v2>

☒ Blockscout

<https://eth.blockscout.com>

☒ Routerscan

<https://api.routerscan.io/v2/network/mai...>

Verify

✓ Compiled

🔍

🏠 Home

1_Storage.sol

```
1 // SPDX-License-Identifier: GPL-3.0
2
3 pragma solidity >=0.8.2 <0.9.0;
4
5 /**
6  * @title Storage
7  * @dev Store & retrieve value in a variable
8  * @custom:dev-run-script ./scripts/deploy_with_ethers.ts
9  */
10 contract Storage {
11
12     uint256 number;
13
14     /**
15      * @dev Store value in variable
16      * @param num value to store
17      */
18     function store(uint256 num) public { 22514 gas
19         number = num;
20     }
21
22     /**
23      * @dev Return value
24      * @return value of 'number'
25      */
26     function retrieve() public view returns (uint256){ 2409 gas
27         return number;
28     }
29 }
```

✖ Explain contract

AI cop

≡

• web3.js
• ethers.js

0

☐ Listen on all transactions

🔍

Filter with transaction hash or a

Type the library name to see available commands.

>

Solutions

- **Open Source EVERYTHING**
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 - Remix Plugin



Solutions

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- **Verify EVERYWHERE**
 - Sourcify backend: Verified on Sourcify → Call other verifiers
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 - Remix Plugin
 - Hardhat v3
 - Foundry (TBD)



Solutions

- Open Source **EVERYTHING**
- Verify **EVERYWHERE**

Solutions

- Open Source **EVERYTHING**
- Verify **EVERYWHERE**
- Open data



Solutions

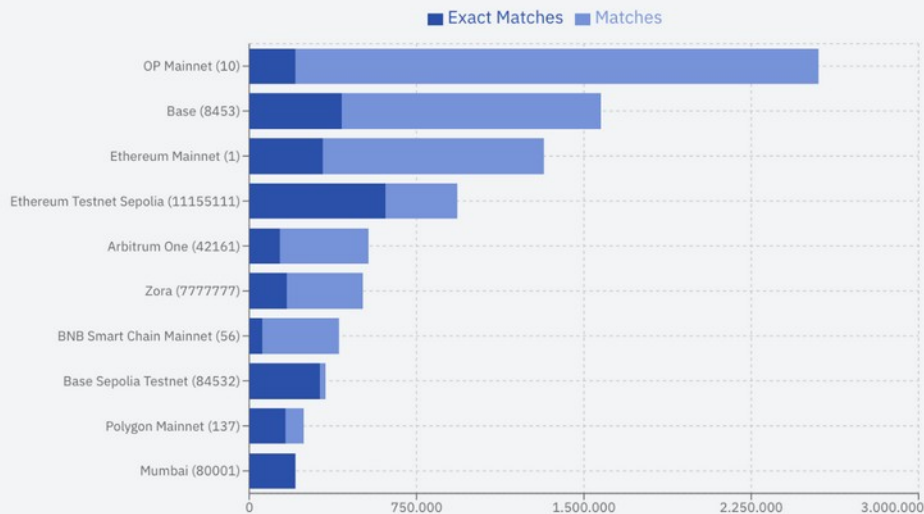
- **Open Source EVERYTHING**
- **Verify EVERYWHERE**
- **Open data**
 - Share whole dataset daily in Parquet format: export.sourcify.dev & export.verifieralliance.org

10.131.157

contracts verified

 Download
all verified contracts

1.321.008 contracts on Ethereum Mainnet (1) 



Solutions

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Google Cloud

PersonalMisc

Search (/) for resources, docs, products and more

Search

Search BigQuery resources

Show starred only

personalmisc-467810

▼

sourcify-project

►

Connections

►

sourcify

►

sourcify_staging

sourcify-project / Datasets / sourcify

sourcify

Create table

Share

Copy

Delete

Refresh

Overview

Details

Tables

Models

Routines

Filter

Enter property name or value

Table ID	Type	Create time	Expiry time	Label
public_code	Table	11 September 2025	None	None
public_compiled_contracts	Table	11 September 2025	None	None
public_compiled_contracts_signatures	Table	18 September 2025	None	None
public_compiled_contracts_sources	Table	11 September 2025	None	None
public_contract_deployments	Table	11 September 2025	None	None
public_contracts	Table	11 September 2025	None	None
public_signatures	Table	18 September 2025	None	None
public_sources	Table	11 September 2025	None	None
public_sourcify_matches	Table	11 September 2025	None	None
public_verified_contracts	Table	11 September 2025	None	None

Rows per page: 50 1 – 10 of 10



Distribution of verified contracts across chainIds

[]

```
sql = """
-- StandardSQL
SELECT
  cd.chain_id,
  COUNT(*) AS verified_count
FROM `sourcify-project.sourcify.public_verified_contracts` AS vc
JOIN `sourcify-project.sourcify.public_contract_deployments` AS cd
  ON vc.deployment_id = cd.id
GROUP BY cd.chain_id
ORDER BY verified_count DESC
"""

df_chain_stats = run(sql)
df_chain_stats
```

v

...	chain_id	verified_count
0	10	2490831
1	8453	1367680
2	1	1291444
3	11155111	843612
4	42161	539653
...
202	383414847825	1
203	2021	1
204	103090	1
205	7078815900	1
206	957	1

207 rows x 2 columns

Solutions

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 - AI Playground

Dataset Playground

Write a SQL query and execute it against the Sourcify dataset in BigQuery.

< > AI query generator

Examples:

Give me contracts with Solidity version 0.4.26

Give me deployments of GnosisSafeProxy on Base

Which contract is the most popular contract?

Which contract is the most popular contract by contract name?

Model  tngtech/deepseek-r1t2-chimera:free

Valid

OpenRouter key

.....

Using your OpenRouter key, all models supported

GENERATE SQL



SQL Editor Playground with limits. For full capabilities, query the dataset on [BigQuery](#) or open the [Colab notebook](#).

EXECUTE

```
1 SELECT
2   cc.name AS contract_name,
3   COUNT(*) AS deployment_count
4 FROM
5   sourcify.public_verified_contracts vc
6 JOIN
7   sourcify.public_compiled_contracts cc ON vc.compilation_id = cc.id
8 JOIN
9   sourcify.public_contract_deployments cd ON vc.deployment_id = cd.id
10  GROUP BY
```

Results

Rows: 1 Show: 10 per page

Showing 1-1 of 1

Previous

Next

contract_name

deployment_count

GnosisSafeProxy

2668524



SQL Editor Playground with limits. For full capabilities, query the dataset on [BigQuery](#) or open the [Colab notebook](#).

EXECUTE

```
1 SELECT
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```

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Rows: 1 Show: 10 ▾ per page

Showing 1-1 of 1

Previous

Next

contract_name	deployment_count
GnosisSafeProxy	2668524



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Solutions

- **Open Source EVERYTHING**
- **Verify EVERYWHERE**
- **Open data**
 - EVM Tooling testing in bulk
 - Data analysis
 - Feed an AI model
 - Build better decompiler
 - Find vulnerability patterns
 - **Use this valuable dataset to move EVM tooling forward!**





Thank you



<https://x.com/sourcifyeth>



<https://x.com/verifalliance>

Matrix: @kuzdogan:matrix.org

Telegram: @kuzdogan



sourcify.dev

What is source code verification?



What is source code verification?

- Ethereum contracts are stored on the blockchain in **bytecode**



What is source code verification?

- Ethereum contracts are stored on the blockchain in **bytecode**

[illegible]

What is source code verification?

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[illegible]

What does it do?

What is source code verification?

- Ethereum contracts are stored on the blockchain in **bytecode**

[illegible][illegible]

What is source code verification?

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What is source code verification?

- Ethereum contracts are stored on the blockchain in **bytecode**
- Humans can't read/write bytecode



What is source code verification?

- Ethereum contracts are stored on the blockchain in **bytecode**
- Humans can't read/write bytecode
- Humans read/write in prog. languages (Solidity, Vyper...)



```

64 contract DepositContract is IDepositContract, ERC165 {
65     uint constant DEPOSIT_CONTRACT_TREE_DEPTH = 32;
66     // NOTE: this also ensures `deposit_count` will fit into 64-bits
67     uint constant MAX_DEPOSIT_COUNT = 2**DEPOSIT_CONTRACT_TREE_DEPTH - 1;
68
69     bytes32[DEPOSIT_CONTRACT_TREE_DEPTH] branch;
70     uint256 deposit_count;
71
72     bytes32[DEPOSIT_CONTRACT_TREE_DEPTH] zero_hashes;
73
74     constructor() public {
75         // Compute hashes in empty sparse Merkle tree
76         for (uint height = 0; height < DEPOSIT_CONTRACT_TREE_DEPTH - 1; height++)
77             zero_hashes[height + 1] = sha256(abi.encodePacked(zero_hashes[height], zero_hashes
              [height]));
78     }
79
80     function get_deposit_root() override external view returns (bytes32) {
81         bytes32 node;
82         uint size = deposit_count;
83         for (uint height = 0; height < DEPOSIT_CONTRACT_TREE_DEPTH; height++) {
84             if ((size & 1) == 1)
85                 node = sha256(abi.encodePacked(branch[height], node));
86             else
87                 node = sha256(abi.encodePacked(node, zero_hashes[height]));
88             size /= 2;
89         }
90         return sha256(abi.encodePacked(

```



```

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```

???



What is source code verification?

- Ethereum contracts are stored on the blockchain in **bytecode**
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What is source code verification?

- Ethereum contracts are stored on the blockchain in **bytecode**
- Humans can't read/write bytecode
- Humans read/write in prog. languages (Solidity, Vyper...)
- Source code → Bytecode



Source Code Verification

▣ **MyContract.sol**

▣ Ownable.sol

▣ ERC20.sol

...

Source Code Verification

□ MyContract.sol

□ Ownable.sol

□ ERC20.sol

...

Compilation Settings

```
· version: "0.8.7+commit.e28d00a7",  
· optimizer: {  
  · enabled: true,  
  · runs: 200  
· },  
· ...
```

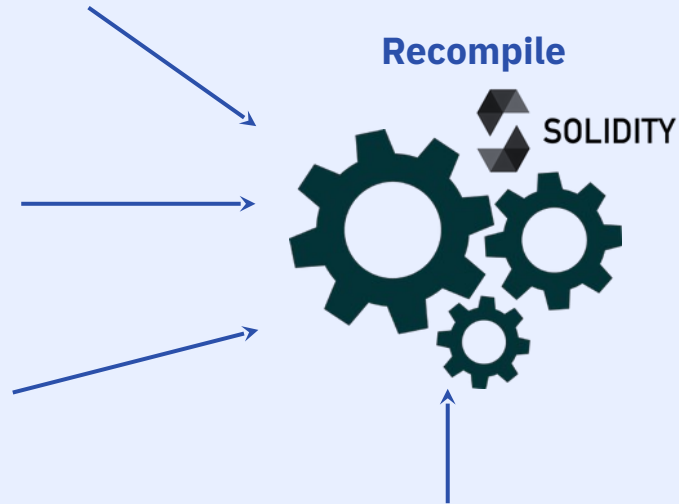
Source Code Verification

□ MyContract.sol

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□ ERC20.sol

...



Compilation Settings

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· optimizer: {  
·   · enabled: true,  
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· },  
· ...
```

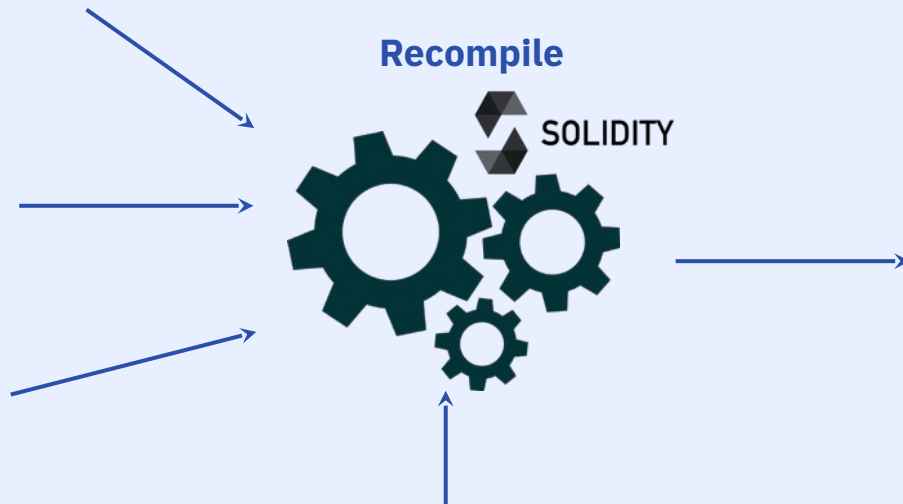
Source Code Verification

□ MyContract.sol

□ Ownable.sol

□ ERC20.sol

...



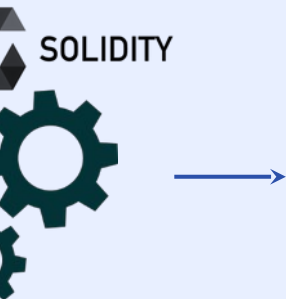
Compilation Settings

```
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· optimizer: {  
·   · enabled: true,  
·   · runs: 200  
· },  
· ...
```

bytecode

```
0x60806040526004361062  
00010b5760003560e01c80  
6379ba5097116200009b57  
8063addd50991162000069  
578063addd509914620002  
d1578063d0e30db0146200  
0113578063d4ee1d901462  
000305578063dce0b4e414  
62000327578063f2...
```

Source Code Verification



bytecode

```
0x60806040526004361062
00010b5760003560e01c80
6379ba5097116200009b57
8063add50991162000069
578063add509914620002
d1578063d0e30db0146200
0113578063d4ee1d901462
000305578063dce0b4e414
62000327578063f2...
```

Settings

```
...it.e28d00a7",
```

Source Code Verification



bytecode

`eth_getCode("0x011fDBf...64cc90BB26D0C")`



```
0x60806040526004361062
00010b5760003560e01c80
6379ba5097116200009b57
8063add50991162000069
578063add509914620002
d1578063d0e30db0146200
0113578063d4ee1d901462
000305578063dce0b4e414
62000327578063f2...
```

Settings

```
...it.e28d00a7",
```

Source Code Verification



Settings

...it.e28d00a7",

bytecode

```
0x60806040526004361062
00010b5760003560e01c80
6379ba5097116200009b57
8063add50991162000069
578063add509914620002
d1578063d0e30db0146200
0113578063d4ee1d901462
000305578063dce0b4e414
62000327578063f2...
```



eth_getCode("0x011fDBf...64cc90BB26D0C")



```
0x60806040526004361062
00010b5760003560e01c80
6379ba5097116200009b57
8063add50991162000069
578063add509914620002
d1578063d0e30db0146200
0113578063d4ee1d901462
000305578063dce0b4e414
62000327578063f2...
```

Source Code Verification



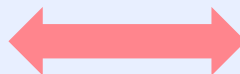
bytecode

eth_getCode("0x011fDBf...64cc90BB26D0C")



```
0x60806040526004361062
00010b5760003560e01c80
6379ba5097116200009b57
8063add50991162000069
578063add509914620002
d1578063d0e30db0146200
0113578063d4ee1d901462
000305578063dce0b4e414
62000327578063f2...
```

match?



```
0x60806040526004361062
00010b5760003560e01c80
6379ba5097116200009b57
8063add50991162000069
578063add509914620002
d1578063d0e30db0146200
0113578063d4ee1d901462
000305578063dce0b4e414
62000327578063f2...
```

Settings

...it.e28d00a7",

Ethereum has good verification culture

- Community demands contracts to be verified



Ethereum has good verification culture

- Community demands contracts to be verified
- **DO NOT INTERACT WITH UNVERIFIED CONTRACTS**
 - It's basically arbitrary black box code

