



SOLIDProof
Bring trust into your projects

Blockchain Security | Smart Contract Audits | KYC

MADE IN GERMANY

Audit

Security Assessment
09. September, 2021

For



Man Utd Fan Token

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Version	Date	Description
1.0	09. September 2021	<ul style="list-style-type: none">• Layout project• Automated- /Manual-Security Testing• Summary

Network

Binance Smart Chain (BEP20)

Website

<https://manutdfantoken.app/>

Twitter

<https://twitter.com/ManUtdFanToken>



Description

MUFT is the world's first reflection + utility football fan token, and it strives to become the official utility token of FC Manchester United. MUFT allows its holders to achieve sustainable passive income while supporting their favourite club.

All features of MUFT are:

Hyper-Deflationary Mechanics (2.5% = "Devil's Burn" [1.25%] + Automatic BuyBack [1.25%])

Hyper-Deflationary token (Max Supply)

Automatic Liquidity Provision (1.5%)

High Static Rewards distributed to Holders (4%)

Anti-Whale System;

(8% Transaction Fee in total – distributed to holders + burned + sent to liquidity wallet + used to buyback);

MUFT is starting with 100B Initial Total Supply (Max Supply), but ultimately, we are aiming to get down to 1B, or perhaps even 100M (in the best possible scenario). Additional 30B will be locked on UniCrypt.network at the start. The tokens will be unlocked and utilised once we become the official fan token of FCMU.

Project Engagement

During the 6th of September 2021, **MUFT Team** engaged Solidproof.io to audit smart contracts that they created. The engagement was technical in nature and focused on identifying security flaws in the design and implementation of the contracts. They provided Solidproof.io with access to their code repository and whitepaper.

Logo



Man Utd Fan Token

Contract Link

v1.0

<https://bscscan.com/address/0x1d4a26a9d980afc2287dca15eb896a26384bac7c#code>

Vulnerability & Risk Level

Risk represents the probability that a certain source-threat will exploit vulnerability, and the impact of that event on the organization or system. Risk Level is computed based on CVSS version 3.0.

Level	Value	Vulnerability	Risk (Required Action)
Critical	9 - 10	A vulnerability that can disrupt the contract functioning in a number of scenarios, or creates a risk that the contract may be broken.	Immediate action to reduce risk level.
High	7 – 8.9	A vulnerability that affects the desired outcome when using a contract, or provides the opportunity to use a contract in an unintended way.	Implementation of corrective actions as soon as possible.
Medium	4 – 6.9	A vulnerability that could affect the desired outcome of executing the contract in a specific scenario.	Implementation of corrective actions in a certain period.
Low	2 – 3.9	A vulnerability that does not have a significant impact on possible scenarios for the use of the contract and is probably subjective.	Implementation of certain corrective actions or accepting the risk.
Informational	0 – 1.9	A vulnerability that have informational character but is not effecting any of the code.	An observation that does not determine a level of risk

Auditing Strategy and Techniques Applied

Throughout the review process, care was taken to evaluate the repository for security-related issues, code quality, and adherence to specification and best practices. To do so, reviewed line-by-line by our team of expert pentesters and smart contract developers, documenting any issues as there were discovered.

Methodology

The auditing process follows a routine series of steps:

1. Code review that includes the following:
 - i) Review of the specifications, sources, and instructions provided to SolidProof to make sure we understand the size, scope, and functionality of the smart contract.
 - ii) Manual review of code, which is the process of reading source code line-by-line in an attempt to identify potential vulnerabilities.
 - iii) Comparison to specification, which is the process of checking whether the code does what the specifications, sources, and instructions provided to SolidProof describe.
2. Testing and automated analysis that includes the following:
 - i) Test coverage analysis, which is the process of determining whether the test cases are actually covering the code and how much code is exercised when we run those test cases.
 - ii) Symbolic execution, which is analysing a program to determine what inputs causes each part of a program to execute.
3. Best practices review, which is a review of the smart contracts to improve efficiency, effectiveness, clarify, maintainability, security, and control based on the established industry and academic practices, recommendations, and research.
4. Specific, itemized, actionable recommendations to help you take steps to secure your smart contracts.

Used Code from other Frameworks/Smart Contracts (direct imports)

Imported packages:

- OpenZeppelin
 - Address
 - Ownable
 - SafeMath
 - Context
 - IERC20
 - SafeERC20
- Uniswap
 - UniswapV2Factory
 - UniswapV2Router01
 - UniswapV2Router02



Tested Contract Files

This audit covered the following files listed below with a SHA-1 Hash.

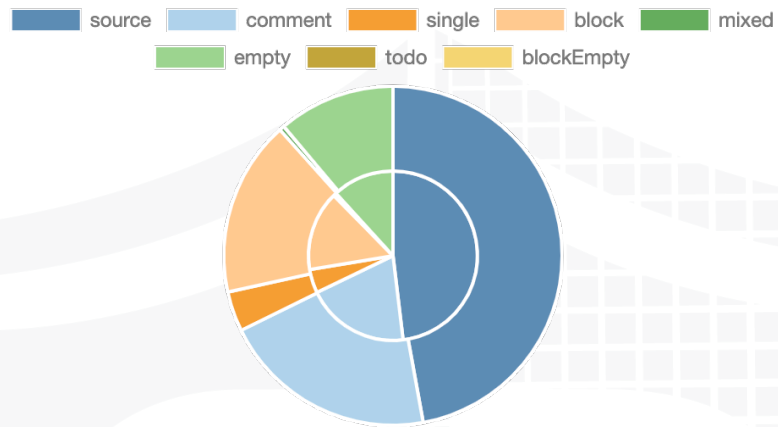
A file with a different Hash has been modified, intentionally or otherwise, after the security review. A different Hash could be (but not necessarily) an indication of a changed condition or potential vulnerability that was not within the scope of this review.

v1.0

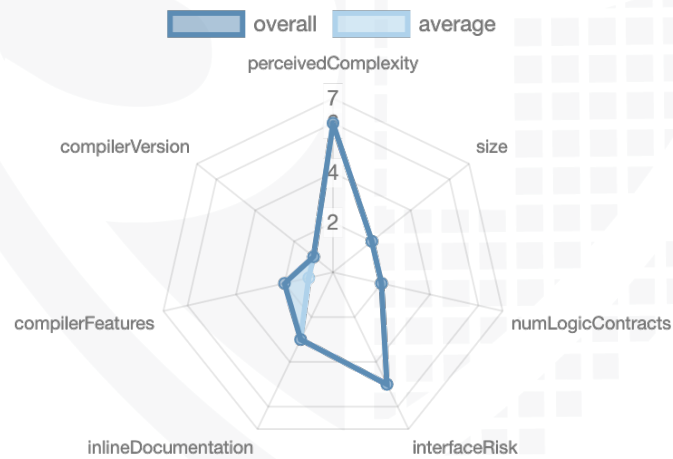
File Name	SHA-1 Hash
contracts/manutd_fantoken.sol	f158dc4c2cc8b4958636fadb74233c125f8e65e0

Metrics

Source Lines v1.0



Risk Level v1.0



Capabilities

Components

Version	Contracts	Libraries	Interfaces	Abstract
1.0	1	3	4	2

Exposed Functions

This section lists functions that are explicitly declared public or payable. Please note that getter methods for public stateVars are not included.

Version	Public	Payable
1.0	74	5

Version	External	Internal	Private	Pure	View
1.0	45	92	26	14	33

State Variables

Version	Total	Public
1.0	45	24

Capabilities

Version	Solidity Versions observed	Experimental Features	Can Receive Funds	Uses Assembly	Has Destroyable Contracts
1.0	0.8.6		yes	yes (2 asm blocks)	

Version	Transfers ETH	Low-Level Calls	Delegated Call	Uses Hash Functions	ECRecover	New/ Create/ Create2
1.0	yes					



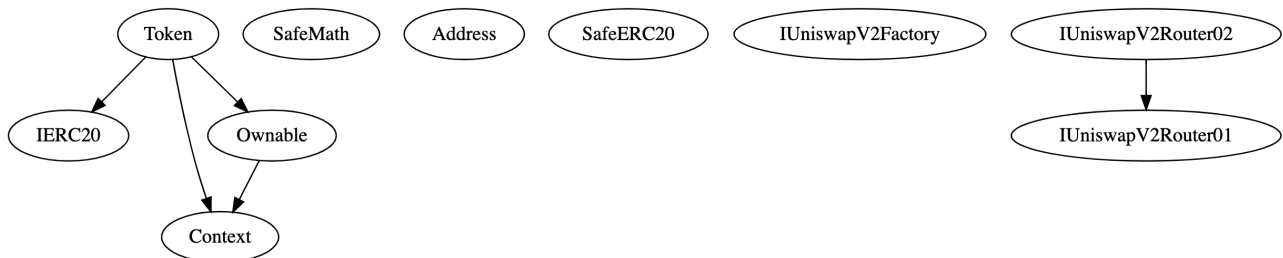
Scope of Work

The above token Team provided us with the files that needs to be tested (Github, Bscscan, Etherscan, files, etc.). The scope of the audit is the main contract (usual the same name as team appended with .sol).

We will verify the following claims:

1. Correct implementation of Token standard
2. Deployer cannot mint any new tokens
3. Deployer cannot burn or lock user funds
4. Deployer cannot pause the contract
5. Overall checkup (Smart Contract Security)

Inheritance Graph v1.0



Verify Claims

Correct implementation of Token standard

Tested	Verified
✓	✓

Function	Description	Exist	Tested	Verified
TotalSupply	provides information about the total token supply	✓	✓	✓
BalanceOf	provides account balance of the owner's account	✓	✓	✓
Transfer	executes transfers of a specified number of tokens to a specified address	✓	✓	✓
TransferFrom	executes transfers of a specified number of tokens from a specified address	✓	✓	✓
Approve	allow a spender to withdraw a set number of tokens from a specified account	✓	✓	✓
Allowance	returns a set number of tokens from a spender to the owner	✓	✓	✓

Optional implementations

Function	Description	Exist	Tested	Verified
renounceOwnership	Owner renounce ownership for more trust	✓	✓	✗

Deployer cannot mint any new tokens

Name	Exist	Tested	Verified	File
Deployer cannot mint	✓	✓	✓	Main
Comment	Line: -			

Max / Total Supply: 100.000.000.000

1. approve	→
2. decreaseAllowance	→
3. deliver	→
4. excludeFromFee	→
5. excludeFromReward	→
6. includeInFee	→
7. includeInReward	→
8. increaseAllowance	→
9. lock	→
10. recoverBEP20	→
11. renounceOwnership	→
12. setAllFeePercent	→
13. setBuybackUpperLimit	→
14. setFeeWallet	→
15. setMaxTxPercent	→
16. setMaxWalletPercent	→
17. setSwapAndLiquifyEnabled	→
18. transfer	→
19. transferFrom	→
20. transferOwnership	→
21. unlock	→

Deployer cannot burn or lock user funds

Name	Exist	Tested	Verified
Deployer cannot lock	✓	✓	✗
Deployer cannot burn	✓	✓	🚩

Comments:

v1.0

- Deployer cannot burn but tokens are burned in swapAndLiquify function (See image below)

1. approve	→
2. decreaseAllowance	→
3. deliver	→
4. excludeFromFee	→
5. excludeFromReward	→
6. includeInFee	→
7. includeInReward	→
8. increaseAllowance	→
9. lock	→
10. recoverBEP20	→
11. renounceOwnership	→
12. setAllFeePercent	→
13. setBuybackUpperLimit	→
14. setFeeWallet	→
15. setMaxTxPercent	→
16. setMaxWalletPercent	→
17. setSwapAndLiquifyEnabled	→
18. transfer	→
19. transferFrom	→
20. transferOwnership	→
21. unlock	→

_transfer function

```
uint8 totFee = _burnFee + _walletFee + _liquidityFee + _buybackFee;
uint256 spentAmount = 0;
uint256 totSpentAmount = 0;
if(_burnFee != 0){
    spentAmount = contractTokenBalance↑.div(totFee).mul(_burnFee);
    _tokenTransferNoFee(address(this), dead, spentAmount);
    totSpentAmount = spentAmount;
}
```

Burn tokens in swapAndLiquify function

_transfer function: maximum wallet amount

```
if(from↑ != owner() && to↑ != owner() && to↑ != address(0) && to↑ != dead && to↑ != pcsV2Pair){
    uint256 contractBalanceReceipient = balanceOf(to↑);
    require(contractBalanceReceipient + amount↑ <= _maxWalletAmount, "Exceeds maximum wallet amount");
}
```

Deployer can set _maxWalletAmount to $1 \leq 100$



_transfer function

```
if (
    !inSwapAndLiquify &&
    to == pcsV2Pair &&
    swapAndLiquifyEnabled
) {
    if(overMinTokenBalance){
        contractTokenBalance = numTokensSellToAddToLiquidity;
        //add liquidity
        swapAndLiquify(contractTokenBalance);
    }
    if(_buybackFee !=0){
        uint256 balance = address(this).balance;
        if (balance > uint256(1 * 10**18)) {
            if (balance > buyBackUpperLimit)
                balance = buyBackUpperLimit;

            buyBackTokens(balance.div(100));
        }
    }
}
```

- swapAndLiquifyEnabled can set by deployer
- buyBack is disabled when _buybackFee is zero

Deployer cannot pause the contract

Name	Exist	Tested	Verified
Deployer cannot pause	✓	✓	✓

1. approve	→
2. decreaseAllowance	→
3. deliver	→
4. excludeFromFee	→
5. excludeFromReward	→
6. includeInFee	→
7. includeInReward	→
8. increaseAllowance	→
9. lock	→
10. recoverBEP20	→
11. renounceOwnership	→
12. setAllFeePercent	→
13. setBuybackUpperLimit	→
14. setFeeWallet	→
15. setMaxTxPercent	→
16. setMaxWalletPercent	→
17. setSwapAndLiquifyEnabled	→
18. transfer	→
19. transferFrom	→
20. transferOwnership	→
21. unlock	→

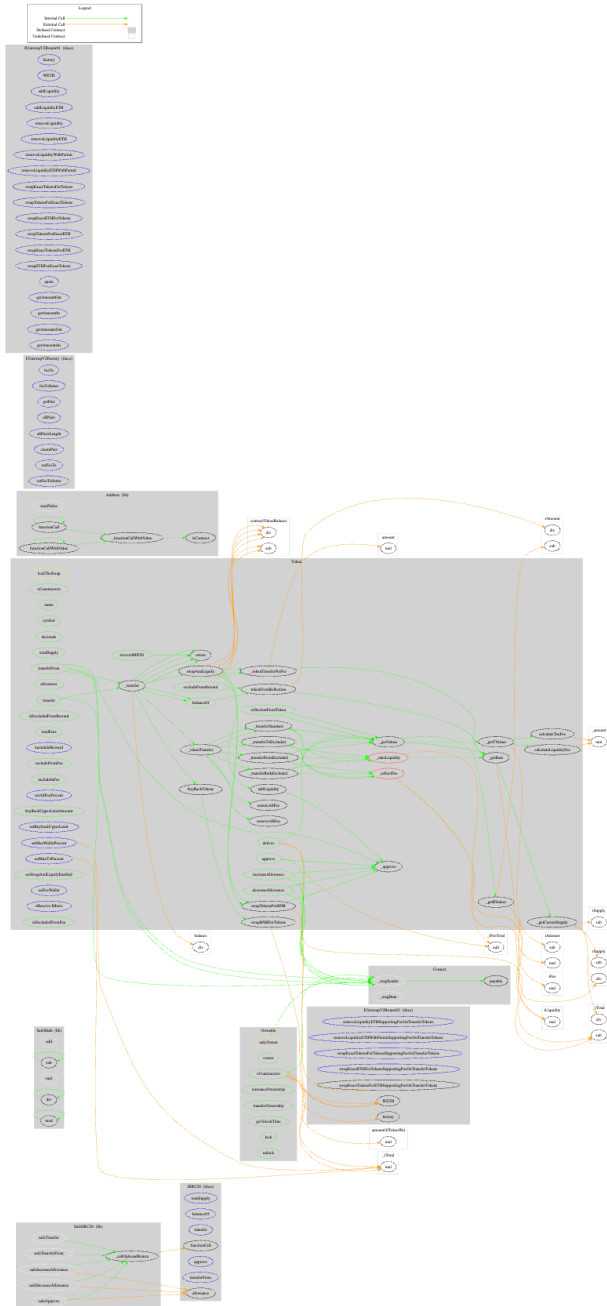
Overall checkup (Smart Contract Security)

Tested	Verified
✓	✓

Legend





Attribute	Symbol
Verified / Checked	✓
Partly Verified	🚩
Unverified / Not checked	✗
Not available	—

CallGraph



Source Units in Scope

v1.0

Type	File	Logic Contracts	Interfaces	Lines	nLines	nSLOC	Comment Lines	Complex. Score	Capabilities
	contracts/manutd_fantoken.sol	6	4	1333	1100	669	350	602	
	Totals	6	4	1333	1100	669	350	602	

Legend

Attribute	Description
Lines	total lines of the source unit
nLines	normalized lines of the source unit (e.g. normalizes functions spanning multiple lines)
nSLOC	normalized source lines of code (only source-code lines; no comments, no blank lines)
Comment Lines	lines containing single or block comments
Complexity Score	a custom complexity score derived from code statements that are known to introduce code complexity (branches, loops, calls, external interfaces, ...)

Audit Results

AUDIT PASSED

Critical issues

- no critical issues found -

High issues

- no high issues found -

Medium issues

Issue	File	Type	Line	Description
#1	Main	Tautology or contradiction (tautology)	935-946	Fix the incorrect comparison by changing the value type or the comparison

Low issues

Issue	File	Type	Line	Description
#1	Main	Contract doesn't import npm packages from source (like OpenZeppelin etc.)	-	We recommend to import all packages from npm directly without flatten the contract. Functions could be modified or can be susceptible to vulnerabilities
#2	Main	Missing Zero Address Validation (missing-zero-check)	793	Check that the address is not zero
#3	Main	State variable visibility is not set	706, 758	It is best practice to set the visibility of state variables explicitly

Informational issues

Issue	File	Type	Line	Description
#1	Main	State variables that could be declared constant (constable-states)	706, 710, 712, 708, 709, 711, 713, 714, 733, 725	Add the `constant` attributes to state variables that never change

Audit Comments

09. September 2021:

- There is still an owner (Owner still has not renounced ownership)
- Developer can
 - set buy back upper limit
 - Enable/disable swap and liquify
 - When it's disabled you are not allowed to swap tokens or use buy back functions
- mintedByMudra variable is never used

SWC Attacks

ID	Title	Relationships	Status
SW C-13 6	Unencrypted Private Data On-Chain	CWE-767: Access to Critical Private Variable via Public Method	PASSED
SW C-13 5	Code With No Effects	CWE-1164: Irrelevant Code	PASSED
SW C-13 4	Message call with hardcoded gas amount	CWE-655: Improper Initialization	PASSED
SW C-13 3	Hash Collisions With Multiple Variable Length Arguments	CWE-294: Authentication Bypass by Capture-replay	PASSED
SW C-13 2	Unexpected Ether balance	CWE-667: Improper Locking	PASSED
SW C-13 1	Presence of unused variables	CWE-1164: Irrelevant Code	PASSED
SW C-13 0	Right-To-Left-Override control character (U+202E)	CWE-451: User Interface (UI) Misrepresentation of Critical Information	PASSED
SW C-12 9	Typographical Error	CWE-480: Use of Incorrect Operator	PASSED
SW C-12 8	DoS With Block Gas Limit	CWE-400: Uncontrolled Resource Consumption	PASSED

SW C-12 7	Arbitrary Jump with Function Type Variable	CWE-695: Use of Low-Level Functionality	PASSED
SW C-12 5	Incorrect Inheritance Order	CWE-696: Incorrect Behavior Order	PASSED
SW C-12 4	Write to Arbitrary Storage Location	CWE-123: Write-what-where Condition	PASSED
SW C-12 3	Requirement Violation	CWE-573: Improper Following of Specification by Caller	PASSED
SW C-12 2	Lack of Proper Signature Verification	CWE-345: Insufficient Verification of Data Authenticity	PASSED
SW C-12 1	Missing Protection against Signature Replay Attacks	CWE-347: Improper Verification of Cryptographic Signature	PASSED
SW C-12 0	Weak Sources of Randomness from Chain Attributes	CWE-330: Use of Insufficiently Random Values	PASSED
SW C-11 9	Shadowing State Variables	CWE-710: Improper Adherence to Coding Standards	PASSED
SW C-11 8	Incorrect Constructor Name	CWE-665: Improper Initialization	PASSED
SW C-11 7	Signature Malleability	CWE-347: Improper Verification of Cryptographic Signature	PASSED

SW C-11 6	Timestamp Dependence	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SW C-11 5	Authorization through tx.origin	CWE-477: Use of Obsolete Function	PASSED
SW C-11 4	Transaction Order Dependence	CWE-362: Concurrent Execution using Shared Resource with Improper Synchronization ('Race Condition')	PASSED
SW C-11 3	DoS with Failed Call	CWE-703: Improper Check or Handling of Exceptional Conditions	PASSED
SW C-11 2	Delegatecall to Untrusted Callee	CWE-829: Inclusion of Functionality from Untrusted Control Sphere	PASSED
SW C-111	Use of Deprecated Solidity Functions	CWE-477: Use of Obsolete Function	PASSED
SW C-11 0	Assert Violation	CWE-670: Always-Incorrect Control Flow Implementation	PASSED
SW C-10 9	Uninitialized Storage Pointer	CWE-824: Access of Uninitialized Pointer	PASSED
SW C-10 8	State Variable Default Visibility	CWE-710: Improper Adherence to Coding Standards	NOT PASSED
SW C-10 7	Reentrancy	CWE-841: Improper Enforcement of Behavioral Workflow	PASSED
SW C-10 6	Unprotected SELFDESTRUCT Instruction	CWE-284: Improper Access Control	PASSED

SW C-10 5	Unprotected Ether Withdrawal	CWE-284: Improper Access Control	PASSED
SW C-10 4	Unchecked Call Return Value	CWE-252: Unchecked Return Value	PASSED
SW C-10 3	Floating Pragma	CWE-664: Improper Control of a Resource Through its Lifetime	PASSED
SW C-10 2	Outdated Compiler Version	CWE-937: Using Components with Known Vulnerabilities	PASSED
SW C-10 1	Integer Overflow and Underflow	CWE-682: Incorrect Calculation	PASSED
SW C-10 0	Function Default Visibility	CWE-710: Improper Adherence to Coding Standards	PASSED

The logo features the words "Solid Proofed" in a white, elegant script font. The word "Solid" is positioned above "Proofed". Behind the text is a faint, stylized shield emblem with a grid-like pattern, rendered in a darker shade of blue. The entire composition is set against a solid blue background.

Solid
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A small horizontal bar representing the German flag, with black, red, and gold stripes.

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