EtherAuthority

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# SMART CONTRACT

## Security Audit Report

Project: Charity Token
Website: charitytoken.online
Platform: Polygon Network
Language: Solidity
Date: June 14th, 2022

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# Introduction

EtherAuthority was contracted by Charity Token to perform the Security audit of the Charity Token Protocol smart contracts code. The audit has been performed using manual analysis as well as using automated software tools. This report presents all the findings regarding the audit performed on June 14th, 2022.

**The purpose of this audit was to address the following:**

- Ensure that all claimed functions exist and function correctly.
- Identify any security vulnerabilities that may be present in the smart contract.

# Project Background

Charity Token is a simple ERC20 token which is used for donations to organizations. Organizations are managed by CharityFactory. The owner of the CharityFactory can create organizations and then the received MATIC and Charity Tokens by the factory get equally distributed to all organizations. Organizations can collect charity tokens and MATIC allocated to them by the factory. The Charity Token contract inherits the SafeMathUpgradeable, ContextUpgradeable, OwnableUpgradeable, Initializable, SafeMath, Address, Context, Ownable standard smart contracts from the OpenZeppelin library. These OpenZeppelin contracts are considered community-audited and time-tested, and hence are not part of the audit scope.

# Audit scope

| **Name** | **Code Review and Security Analysis Report for Charity Token Protocol Smart Contracts** |
|---|---|
| **Platform** | **Polygon / Solidity** |
| **File 1** | CharityFactory.sol |
| **File 1 MD5 Hash** | 3099B9672CE9AA7B80A348194BED7E65 |
| **File 2** | CharityToken.sol |
| **File 2 MD5 Hash** | 5D5F79DDF49822D8185E22959CF00835 |
| **Audit Date** | June 14th,2022 |

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## Claimed Smart Contract Features

| Claimed Feature Detail | Our Observation |
|---|---|
| **File 1 CharityToken.sol**<br>• Name: CharityToken<br>• Symbol: CHAT<br>• Decimals: 18<br>• Maximum Transaction Amount: 1 Trillion<br>• Number Of Tokens To Exchange For Charity: 1 Million<br>• Total supply: 8100 million | **YES, This is valid.** |
| **File 2 CharityFactory.sol**<br>• CharityFactory has functions like: createOrganization, allOrganizationsLength, etc. | **YES, This is valid.** |

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# Audit Summary

According to the standard audit assessment, Customer`s solidity smart contracts are **"Secured"**. Also, these contracts do contain owner control, which does not make them fully decentralized.

| Insecure | Poor secured | Secure | Well-secured |
|---|---|---|---|

You are here

We used various tools like Slither, Solhint and Remix IDE. At the same time this finding is based on critical analysis of the manual audit.
All issues found during automated analysis were manually reviewed and applicable vulnerabilities are presented in the Audit overview section. General overview is presented in AS-IS section and all identified issues can be found in the Audit overview section.

**We found 0 critical, 0 high, 0 medium and 3 low and some very low level issues.**

**Investors Advice:** Technical audit of the smart contract does not guarantee the ethical nature of the project. Any owner controlled functions should be executed by the owner with responsibility. All investors/users are advised to do their due diligence before investing in the project.

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## Technical Quick Stats

| Main Category | Subcategory | Result |
|---|---|---|
| Contract Programming | Solidity version not specified | Passed |
| | Solidity version too old | Passed |
| | Integer overflow/underflow | Passed |
| | Function input parameters lack of check | Passed |
| | Function input parameters check bypass | Passed |
| | Function access control lacks management | Passed |
| | Critical operation lacks event log | Passed |
| | Human/contract checks bypass | Passed |
| | Random number generation/use vulnerability | N/A |
| | Fallback function misuse | Passed |
| | Race condition | Passed |
| | Logical vulnerability | Passed |
| | Features claimed | Passed |
| | Other programming issues | Moderated |
| Code Specification | Function visibility not explicitly declared | Passed |
| | Var. storage location not explicitly declared | Passed |
| | Use keywords/functions to be deprecated | Passed |
| | Unused code | Passed |
| Gas Optimization | “Out of Gas” Issue | Passed |
| | High consumption ‘for/while’ loop | Passed |
| | High consumption ‘storage’ storage | Passed |
| | Assert() misuse | Passed |
| Business Risk | The maximum limit for mintage not set | Passed |
| | “Short Address” Attack | Passed |
| | “Double Spend” Attack | Passed |

**Overall Audit Result:** **PASSED**

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## Code Quality

This audit scope has 2 smart contract files. Smart contracts contain Libraries, Smart contracts, inherits and Interfaces. This is a compact and well written smart contract.

The libraries in the Charity Token Protocol are part of its logical algorithm. A library is a different type of smart contract that contains reusable code. Once deployed on the blockchain (only once), it is assigned a specific address and its properties / methods can be reused many times by other contracts in the Charity Token Protocol.

The Charity Token team has not provided unit test scripts, which would have helped to determine the integrity of the code in an automated way.

Some code parts are well commented on smart contracts. We suggest using Ethereum's NatSpec style for the commenting.

## Documentation

We were given a Charity Token Protocol smart contract code in the form of a file. The hash of that code is mentioned above in the table.

As mentioned above, code parts are well commented. So it is easy to quickly understand the programming flow as well as complex code logic. Comments are very helpful in understanding the overall architecture of the protocol.

Another source of information was its official website https://charitytoken.online which provided rich information about the project architecture.

## Use of Dependencies

As per our observation, the libraries are used in this smart contracts infrastructure that are based on well known industry standard open source projects.

Apart from libraries, its functions are used in external smart contract calls.

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# AS-IS overview

## CharityToken.sol

### Functions

| Sl. | Functions | Type | Observation | Conclusion |
|---|---|---|---|---|
| 1 | constructor | write | Passed | No Issue |
| 2 | owner | read | Passed | No Issue |
| 3 | onlyOwner | modifier | Passed | No Issue |
| 4 | renounceOwnership | write | access only Owner | No Issue |
| 5 | transferOwnership | write | access only Owner | No Issue |
| 6 | _transferOwnership | internal | Passed | No Issue |
| 7 | lockTheSwap | modifier | Passed | No Issue |
| 8 | name | read | Passed | No Issue |
| 9 | symbol | read | Passed | No Issue |
| 10 | decimals | read | Passed | No Issue |
| 11 | totalSupply | read | Passed | No Issue |
| 12 | rate | read | Passed | No Issue |
| 13 | balanceOf | read | Passed | No Issue |
| 14 | transfer | write | Passed | No Issue |
| 15 | allowance | read | Passed | No Issue |
| 16 | approve | write | Passed | No Issue |
| 17 | transferFrom | write | Passed | No Issue |
| 18 | increaseAllowance | write | Passed | No Issue |
| 19 | decreaseAllowance | write | Passed | No Issue |
| 20 | isExcluded | read | Passed | No Issue |
| 21 | totalFees | read | Passed | No Issue |
| 22 | deliver | write | Passed | No Issue |
| 23 | reflectionFromToken | read | Passed | No Issue |
| 24 | tokenFromReflection | read | Passed | No Issue |
| 25 | excludeAccount | external | access only Owner | No Issue |
| 26 | includeAccount | external | access only Owner | No Issue |
| 27 | removeAllFee | write | Passed | No Issue |
| 28 | restoreAllFee | write | Passed | No Issue |
| 29 | isExcludedFromFee | read | Passed | No Issue |
| 30 | _approve | write | Passed | No Issue |
| 31 | _transfer | write | Passed | No Issue |
| 32 | swapTokensForEth | write | lockTheSwap | No Issue |
| 33 | sendETHToCharity | write | charityFactory variable check | Refer Audit Findings |
| 34 | manualSwap | external | access only Owner | No Issue |

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| | | | | |
|---|---|---|---|---|
| **35** | manualSend | external | access only Owner | No Issue |
| **36** | burnTokens | external | access only Owner | No Issue |
| **37** | _tokenTransfer | write | Unnecessary condition check | Refer Audit Findings |
| **38** | _transferStandard | write | Passed | No Issue |
| **39** | _transferToExcluded | write | Passed | No Issue |
| **40** | _transferFromExcluded | write | Passed | No Issue |
| **41** | _transferBothExcluded | write | Passed | No Issue |
| **42** | _takeCharity | write | Passed | No Issue |
| **43** | _reflectFee | write | Passed | No Issue |
| **44** | _getValues | read | Passed | No Issue |
| **45** | _getTValues | write | Passed | No Issue |
| **46** | _getRValues | write | Passed | No Issue |
| **47** | _getRate | read | Passed | No Issue |
| **48** | _getCurrentSupply | read | Passed | No Issue |
| **49** | _getTaxFee | read | Passed | No Issue |
| **50** | _getMaxTxAmount | read | Passed | No Issue |
| **51** | _getETHBalance | read | Passed | No Issue |
| **52** | _setTaxFee | external | access only Owner | No Issue |
| **53** | _setCharityFee | external | access only Owner | No Issue |
| **54** | _setCharityFactory | external | access only Owner | No Issue |
| **55** | _setMaxTxAmount | external | access only Owner | No Issue |
| **56** | _setUniswapV2Router | external | access only Owner | No Issue |
| **57** | _setUniswapV2Pair | external | access only Owner | No Issue |

## CharityFactory.sol

**Functions**

| Sl. | Functions | Type | Observation | Conclusion |
|---|---|---|---|---|
| **1** | constructor | write | Passed | No Issue |
| **2** | initializer | modifier | Passed | No Issue |
| **3** | reinitializer | modifier | Passed | No Issue |
| **4** | onlyInitializing | modifier | Passed | No Issue |
| **5** | _disableInitializers | internal | Passed | No Issue |
| **6** | __Context_init | internal | access only Initializing | No Issue |
| **7** | __Context_init_unchained | internal | access only Initializing | No Issue |

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| | | | | |
|---|---|---|---|---|
| **8** | _msgSender | internal | Passed | No Issue |
| **9** | _msgData | internal | Passed | No Issue |
| **10** | __Ownable_init | internal | access only Initializing | No Issue |
| **11** | __Ownable_init_unchained | internal | access only Initializing | No Issue |
| **12** | onlyOwner | modifier | Passed | No Issue |
| **13** | owner | read | Passed | No Issue |
| **14** | _checkOwner | internal | Passed | No Issue |
| **15** | renounceOwnership | write | access only Owner | No Issue |
| **16** | transferOwnership | write | access only Owner | No Issue |
| **17** | _transferOwnership | internal | Passed | No Issue |
| **18** | validateSymbol | modifier | Passed | No Issue |
| **19** | validateEthAmount | modifier | Passed | No Issue |
| **20** | validateAmount | modifier | Passed | No Issue |
| **21** | validateOrganization | modifier | Passed | No Issue |
| **22** | initialize | write | Passed | No Issue |
| **23** | createOrganization | external | access only Owner | No Issue |
| **24** | allOrganizationsLength | external | Passed | No Issue |
| **25** | donateTokens | external | totalEthDonations not increased by donateTokens | Refer Audit Findings |
| **26** | _updateEthBalances | internal | Passed | No Issue |
| **27** | _updateTokenBalances | internal | Passed | No Issue |
| **28** | ethBalance | external | access only Owner | No Issue |
| **29** | tokenBalance | external | access only Owner | No Issue |
| **30** | withdrawEth | external | Passed | No Issue |
| **31** | withdrawTokens | external | Passed | No Issue |

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## Severity Definitions

| Risk Level | Description |
|---|---|
| Critical | Critical vulnerabilities are usually straightforward to exploit and can lead to token loss etc. |
| High | High-level vulnerabilities are difficult to exploit; however, they also have significant impact on smart contract execution, e.g. public access to crucial |
| Medium | Medium-level vulnerabilities are important to fix; however, they can't lead to tokens lose |
| Low | Low-level vulnerabilities are mostly related to outdated, unused etc. code snippets, that can't have significant impact on execution |
| Lowest / Code Style / Best Practice | Lowest-level vulnerabilities, code style violations and info statements can't affect smart contract execution and can be ignored. |

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# Audit Findings

## Critical Severity

No Critical severity vulnerabilities were found.

## High Severity

No High severity vulnerabilities were found.

## Medium

No Medium severity vulnerabilities were found.

## Low

(1) charityFactory variable check : **CharityToken.sol**

```
function sendETHToCharity(uint256 amount) private {
    charityFactory.transfer(amount);
}
```

charityFactory variable is set to address(0) by default. sendETHToCharity function is used to send contract balance to charityFactory without checking if it is set to some address or not.

**Resolution**: We recommend that check the charityFactory variable inside the sendETHToCharity method to ensure that the contract balance does not flow to the address (0).

(2) Unnecessary condition check: **CharityToken.sol**

```
function _tokenTransfer(
    address sender,
    address recipient,
    uint256 amount,
    bool takeFee
) private {
    if (!takeFee) removeAllFee();

    if (_isExcluded[sender] && !_isExcluded[recipient]) {
        _transferFromExcluded(sender, recipient, amount);
    } else if (!_isExcluded[sender] && _isExcluded[recipient]) {
        _transferToExcluded(sender, recipient, amount);
    } else if (!_isExcluded[sender] && !_isExcluded[recipient]) {
        _transferStandard(sender, recipient, amount);
    } else if (_isExcluded[sender] && _isExcluded[recipient]) {
        _transferBothExcluded(sender, recipient, amount);
    } else {
        _transferStandard(sender, recipient, amount);
```

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In the transfer function, the else will execute the same functionality.

**Resolution**: We suggest removing extra else if to reduce the gas fee.

(3) totalEthDonations not increased by donateTokens: **CharityFactory.sol**

```
function donateTokens(string calldata _symbol, uint256 _amount)
    external
    payable
    validateSymbol(_symbol)
    validateAmount(_amount)
{
    charityToken.transferFrom(msg.sender, address(this), _amount);
    totalTokenDonations += _amount;
    _updateTokenBalances(_amount);
    emit Donation(msg.sender, _amount, charityToken.symbol(), address(this));
}
```

donateTokens is a payable function, but its msg.value is not added into totalEthDonations. Hence the organizations won't get distribution of the MATIC received by donateTokens.

**Resolution**: Confirm the logic.

## Very Low / Informational / Best practices:

(1) Unused events / variable / interface: **CharityToken.sol**

```
bool inSwap = false;
bool public swapEnabled = false;

uint256 private _maxTxAmount = 1000000000000 * 10**18;
uint256 private _numOfTokensToExchangeForCharity = 1 * 10**6 * 10**18;

event MinTokensBeforeSwapUpdated(uint256 minTokensBeforeSwap);
event SwapEnabledUpdated(bool enabled);
```

```
import "./interfaces/IUniswapV2Factory.sol";
import "./interfaces/IUniswapV2Pair.sol";
import "./interfaces/IUniswapV2Router01.sol";
import "./interfaces/IUniswapV2Router02.sol";
```

MinTokensBeforeSwapUpdated, SwapEnabledUpdated events are defined but not used in code.

swapEnabled variable has been defined and used but it does not change to true ever.

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So the use of this variable is meaningless.

IUniswapV2Router02.sol contains IUniswapV2Router01.sol. So no need to import that file in CharityToken.sol.

**Resolution**: We suggest either removing all these unused variables and events or use them in code.

(2) Empty function: **CharityToken.sol**

```
// Exposing a burn method for burning events
function burnTokens(uint256 percentage) external onlyOwner {}
```

burnTokens function has been defined with empty code.

**Resolution**: We suggest either removing the empty function.

(3) All functions which are not called internally, must be declared as external. It is more efficient as sometimes it saves some gas.
https://ethereum.stackexchange.com/questions/19380/external-vs-public-best-practices

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## Centralization

This smart contract has some functions which can be executed by the Admin (Owner) only. If the admin wallet private key would be compromised, then it would create trouble. Following are Admin functions:

- createOrganization: CharityFactory owners can create new organizations.
- _setUniswapV2Pair: CharityToken owners can set uniswapV2PairAddress.
- _setUniswapV2Router: CharityToken owners can set uniswapV2RouterAddress.
- _setMaxTxAmount: CharityToken owners can set max transaction amount.
- _setCharityFactory: CharityToken owners can set charityFactoryAddress.
- _setCharityFee: CharityToken owners can set charity fees.
- _setTaxFee: CharityToken owners can set tax fees.
- manualSend: CharityToken owners can send manual tokens.
- manualSwap: CharityToken owners can manual swap and send tokens.
- includeAccount: CharityToken owners can include accounts.
- excludeAccount: CharityToken owners can exclude accounts.

To make the smart contract 100% decentralized, we suggest renouncing ownership in the smart contract once its function is completed.

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# Conclusion

We were given a contract code in the form of a file. And we have used all possible tests based on given objects as files. We have not observed any major issues in the smart contracts. **So, smart contracts are ready for the mainnet deployment**.

Since possible test cases can be unlimited for such smart contracts protocol, we provide no such guarantee of future outcomes. We have used all the latest static tools and manual observations to cover maximum possible test cases to scan everything.

Smart contracts within the scope were manually reviewed and analyzed with static analysis tools. Smart Contract's high-level description of functionality was presented in the As-is overview section of the report.

The audit report contains all found security vulnerabilities and other issues in the reviewed code.

The security state of the reviewed contract, based on standard audit procedure scope, is **"Secured"**.

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# Our Methodology

We like to work with a transparent process and make our reviews a collaborative effort. The goals of our security audits are to improve the quality of systems we review and aim for sufficient remediation to help protect users. The following is the methodology we use in our security audit process.

**Manual Code Review:**

In manually reviewing all of the code, we look for any potential issues with code logic, error handling, protocol and header parsing, cryptographic errors, and random number generators. We also watch for areas where more defensive programming could reduce the risk of future mistakes and speed up future audits. Although our primary focus is on the in-scope code, we examine dependency code and behavior when it is relevant to a particular line of investigation.

**Vulnerability Analysis:**

Our audit techniques included manual code analysis, user interface interaction, and whitebox penetration testing. We look at the project's web site to get a high level understanding of what functionality the software under review provides. We then meet with the developers to gain an appreciation of their vision of the software. We install and use the relevant software, exploring the user interactions and roles. While we do this, we brainstorm threat models and attack surfaces. We read design documentation, review other audit results, search for similar projects, examine source code dependencies, skim open issue tickets, and generally investigate details other than the implementation.

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**Documenting Results:**

We follow a conservative, transparent process for analyzing potential security vulnerabilities and seeing them through successful remediation. Whenever a potential issue is discovered, we immediately create an Issue entry for it in this document, even though we have not yet verified the feasibility and impact of the issue. This process is conservative because we document our suspicions early even if they are later shown to not represent exploitable vulnerabilities. We generally follow a process of first documenting the suspicion with unresolved questions, then confirming the issue through code analysis, live experimentation, or automated tests. Code analysis is the most tentative, and we strive to provide test code, log captures, or screenshots demonstrating our confirmation. After this we analyze the feasibility of an attack in a live system.

**Suggested Solutions:**

We search for immediate mitigations that live deployments can take, and finally we suggest the requirements for remediation engineering for future releases. The mitigation and remediation recommendations should be scrutinized by the developers and deployment engineers, and successful mitigation and remediation is an ongoing collaborative process after we deliver our report, and before the details are made public.

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# Disclaimers

## EtherAuthority.io Disclaimer

EtherAuthority team has analyzed this smart contract in accordance with the best industry practices at the date of this report, in relation to: cybersecurity vulnerabilities and issues in smart contract source code, the details of which are disclosed in this report, (Source Code); the Source Code compilation, deployment and functionality (performing the intended functions).

Due to the fact that the total number of test cases are unlimited, the audit makes no statements or warranties on security of the code. It also cannot be considered as a sufficient assessment regarding the utility and safety of the code, bugfree status or any other statements of the contract. While we have done our best in conducting the analysis and producing this report, it is important to note that you should not rely on this report only. We also suggest conducting a bug bounty program to confirm the high level of security of this smart contract.

## Technical Disclaimer

Smart contracts are deployed and executed on the blockchain platform. The platform, its programming language, and other software related to the smart contract can have their own vulnerabilities that can lead to hacks. Thus, the audit can’t guarantee explicit security of the audited smart contracts.

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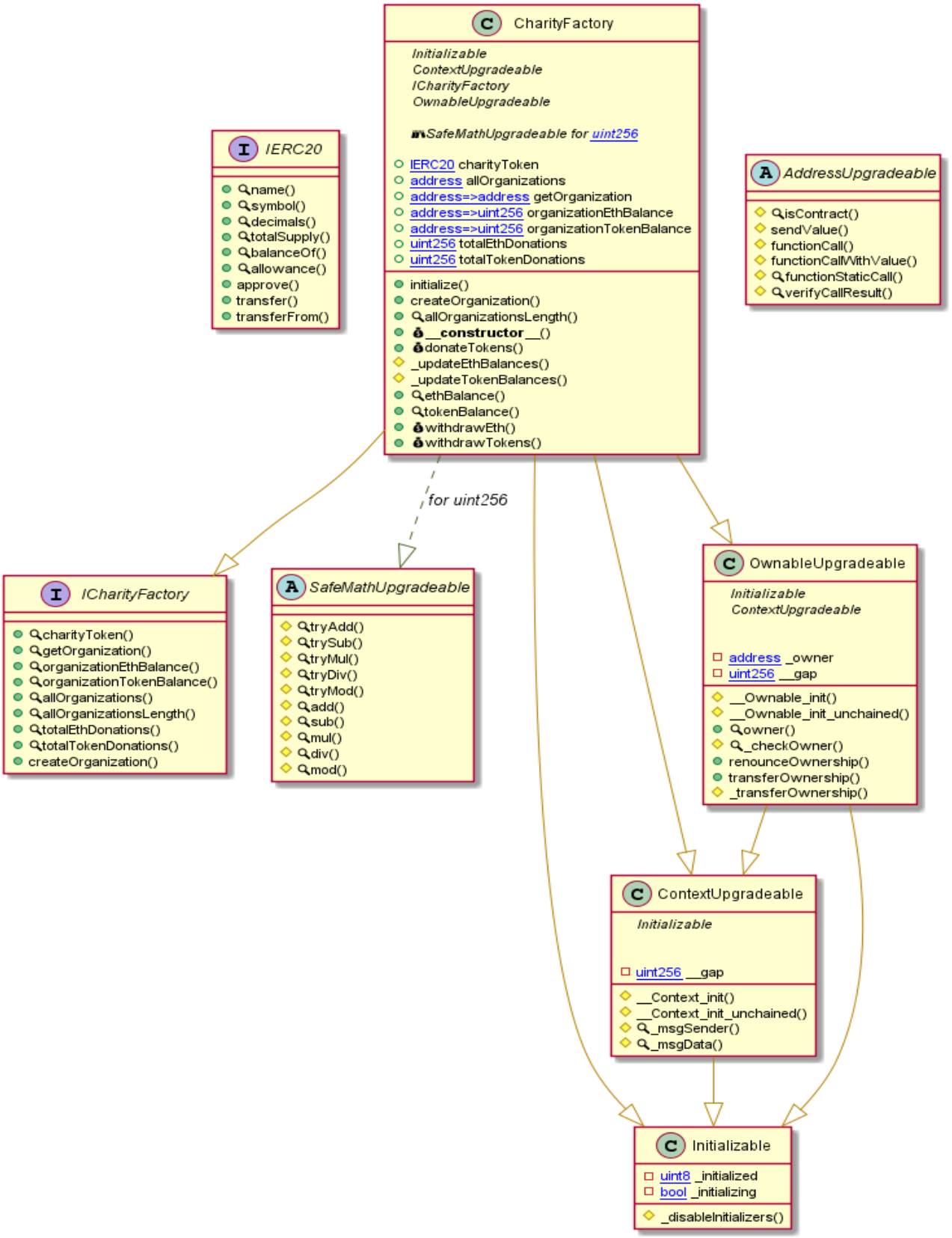
# Appendix

## Code Flow Diagram - Charity Token Protocol

## CharityFactory Diagram

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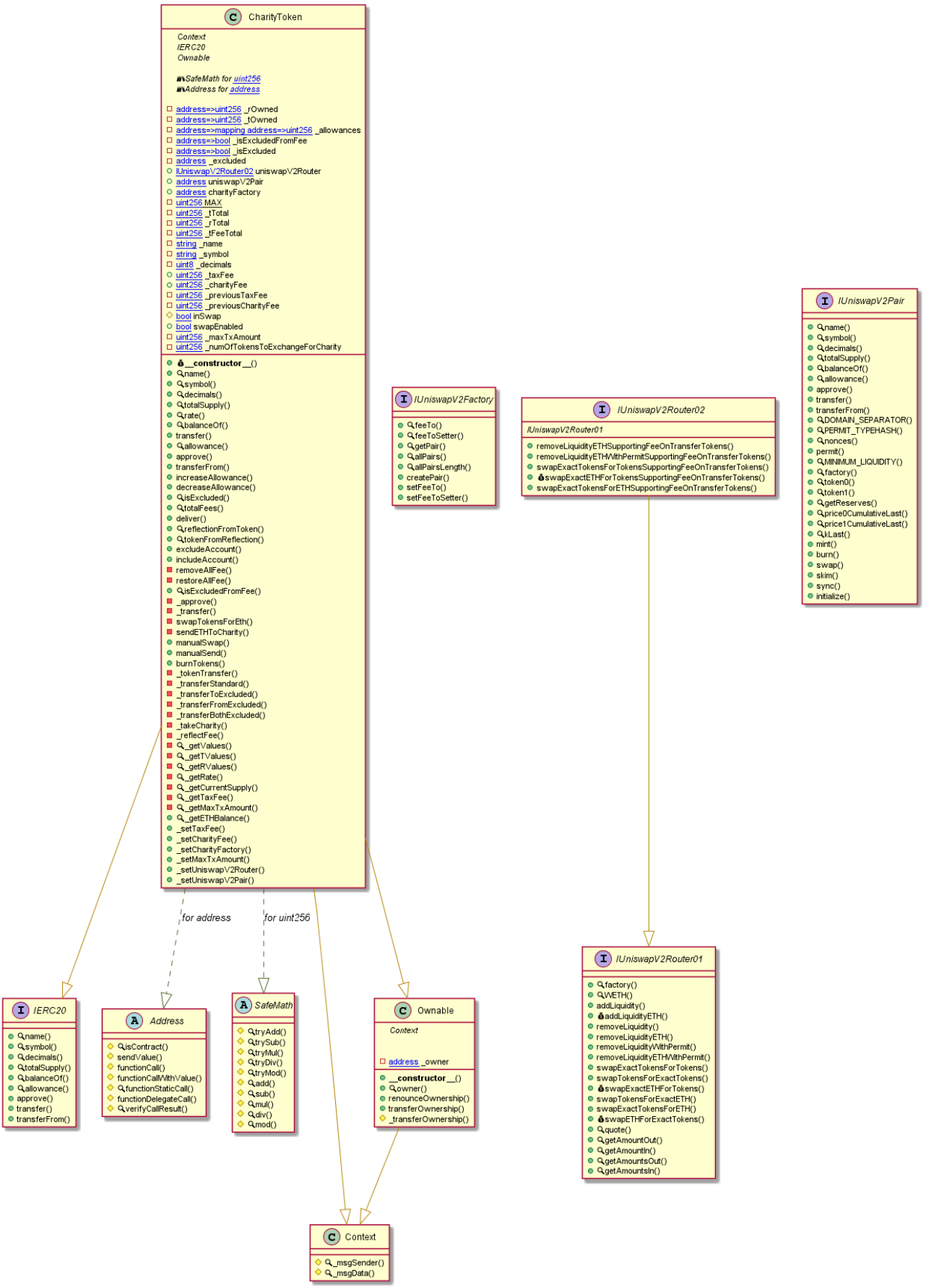
# CharityToken Diagram

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# Slither Results Log

## Slither log >> CharityFactory.sol

```
INFO:Detectors:
Reentrancy in CharityFactory.donateTokens(string,uint256) (CharityFactory.sol#710-720):
        External calls:
        - charityToken.transferFrom(msg.sender,address(this),_amount) (CharityFactory.sol#716)
        State variables written after the call(s):
        - _updateTokenBalances(_amount) (CharityFactory.sol#718)
                - organizationTokenBalance[allOrganizations[i]] += _organizationAmount (CharityFactory.sol#732)
        - totalTokenDonations += _amount (CharityFactory.sol#717)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-2
INFO:Detectors:
Reentrancy in CharityFactory.donateTokens(string,uint256) (CharityFactory.sol#710-720):
        External calls:
        - charityToken.transferFrom(msg.sender,address(this),_amount) (CharityFactory.sol#716)
        Event emitted after the call(s):
        - Donation(msg.sender,_amount,charityToken.symbol(),address(this)) (CharityFactory.sol#719)
Reentrancy in CharityFactory.withdrawTokens(string,uint256) (CharityFactory.sol#755-770):
        External calls:
        - charityToken.transfer(_msgSender(),_amount) (CharityFactory.sol#768)
        Event emitted after the call(s):
        - Withdraw(_msgSender(),_amount,charityToken.symbol(),address(this)) (CharityFactory.sol#769)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-3
INFO:Detectors:
AddressUpgradeable.verifyCallResult(bool,bytes,string) (CharityFactory.sol#438-458) uses assembly
        - INLINE ASM (CharityFactory.sol#450-453)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#assembly-usage
INFO:Detectors:
AddressUpgradeable.functionCall(address,bytes) (CharityFactory.sol#349-351) is never used and should be removed
AddressUpgradeable.functionCall(address,bytes,string) (CharityFactory.sol#359-365) is never used and should be removed
AddressUpgradeable.functionCallWithValue(address,bytes,uint256) (CharityFactory.sol#378-384) is never used and should be remove
AddressUpgradeable.functionCallWithValue(address,bytes,uint256,string) (CharityFactory.sol#392-403) is never used and should be
emoved
```

```
SafeMathUpgradeable.tryMod(uint256,uint256) (CharityFactory.sol#120-125) is never used and should be removed
SafeMathUpgradeable.tryMul(uint256,uint256) (CharityFactory.sol#91-101) is never used and should be removed
SafeMathUpgradeable.trySub(uint256,uint256) (CharityFactory.sol#79-84) is never used and should be removed
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#dead-code
INFO:Detectors:
Pragma version^0.8.4 (CharityFactory.sol#3) necessitates a version too recent to be trusted. Consider deploying with 0.6.12/0.7
solc-0.8.4 is not recommended for deployment
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Detectors:
Low level call in AddressUpgradeable.sendValue(address,uint256) (CharityFactory.sol#324-329):
        - (success) = recipient.call{value: amount}() (CharityFactory.sol#327)
Low level call in AddressUpgradeable.functionCallWithValue(address,bytes,uint256,string) (CharityFactory.sol#392-403):
        - (success,returndata) = target.call{value: value}(data) (CharityFactory.sol#401)
Low level call in AddressUpgradeable.functionStaticCall(address,bytes,string) (CharityFactory.sol#421-430):
        - (success,returndata) = target.staticcall(data) (CharityFactory.sol#428)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#low-level-calls
INFO:Detectors:
Function ContextUpgradeable.__Context_init() (CharityFactory.sol#545-546) is not in mixedCase
Function ContextUpgradeable.__Context_init_unchained() (CharityFactory.sol#548-549) is not in mixedCase
Variable ContextUpgradeable.__gap (CharityFactory.sol#563) is not in mixedCase
Function OwnableUpgradeable.__Ownable_init() (CharityFactory.sol#574-576) is not in mixedCase
Function OwnableUpgradeable.__Ownable_init_unchained() (CharityFactory.sol#578-580) is not in mixedCase
Variable OwnableUpgradeable.__gap (CharityFactory.sol#639) is not in mixedCase
Parameter CharityFactory.initialize(IERC20)._charityToken (CharityFactory.sol#678) is not in mixedCase
```

```
Function OwnableUpgradeable.__Ownable_init_unchained() (CharityFactory.sol#578-580) is not in mixedCase
Variable OwnableUpgradeable.__gap (CharityFactory.sol#639) is not in mixedCase
Parameter CharityFactory.initialize(IERC20)._charityToken (CharityFactory.sol#678) is not in mixedCase
Parameter CharityFactory.donateTokens(string,uint256)._symbol (CharityFactory.sol#710) is not in mixedCase
Parameter CharityFactory.donateTokens(string,uint256)._amount (CharityFactory.sol#710) is not in mixedCase
Parameter CharityFactory.tokenBalance(string)._symbol (CharityFactory.sol#740) is not in mixedCase
Parameter CharityFactory.withdrawEth(uint256)._amount (CharityFactory.sol#744) is not in mixedCase
Parameter CharityFactory.withdrawTokens(string,uint256)._symbol (CharityFactory.sol#755) is not in mixedCase
Parameter CharityFactory.withdrawTokens(string,uint256)._amount (CharityFactory.sol#755) is not in mixedCase
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#conformance-to-solidity-naming-conventions
INFO:Detectors:
Reentrancy in CharityFactory.withdrawEth(uint256) (CharityFactory.sol#744-753):
        External calls:
        - address(_msgSender()).transfer(_amount) (CharityFactory.sol#751)
        Event emitted after the call(s):
        - Withdraw(_msgSender(),_amount,MATIC,address(this)) (CharityFactory.sol#752)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-4
INFO:Detectors:
CharityFactory (CharityFactory.sol#642-771) does not implement functions:
        - ICharityFactory.createOrganization(address,string,string) (CharityFactory.sol#53-57)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#unimplemented-functions
INFO:Detectors:
OwnableUpgradeable.__gap (CharityFactory.sol#639) is never used in CharityFactory (CharityFactory.sol#642-771)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#unused-state-variables
INFO:Detectors:
renounceOwnership() should be declared external:
        - OwnableUpgradeable.renounceOwnership() (CharityFactory.sol#611-613)
transferOwnership(address) should be declared external:
        - OwnableUpgradeable.transferOwnership(address) (CharityFactory.sol#619-622)
initialize(IERC20) should be declared external:
        - CharityFactory.initialize(IERC20) (CharityFactory.sol#678-681)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#public-function-that-could-be-declared-external
INFO:Slither:CharityFactory.sol analyzed (8 contracts with 75 detectors), 57 result(s) found
INFO:Slither:Use https://crytic.io/ to get access to additional detectors and Github integration
```

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## Slither log >> CharityToken.sol

```
INFO:Detectors:
CharityToken._setCharityFactory(address).charityFactoryAddress (CharityToken.sol#1348) lacks a zero-check on :
                - charityFactory = charityFactoryAddress (CharityToken.sol#1349)
CharityToken._setUniswapV2Pair(address).uniswapV2PairAddress (CharityToken.sol#1361) lacks a zero-check on :
                - uniswapV2Pair = uniswapV2PairAddress (CharityToken.sol#1362)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#missing-zero-address-validation
INFO:Detectors:
Reentrancy in CharityToken._transfer(address,address,uint256) (CharityToken.sol#1049-1092):
        External calls:
        - swapTokensForEth(contractTokenBalance) (CharityToken.sol#1074)
                - uniswapV2Router.swapExactTokensForETHSupportingFeeOnTransferTokens(tokenAmount,0,path,address(this),block.tim
estamp) (CharityToken.sol#1103-1109)
        External calls sending eth:
        - sendETHToCharity(address(this).balance) (CharityToken.sol#1078)
                - charityFactory.transfer(amount) (CharityToken.sol#1113)
        State variables written after the call(s):
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _charityFee = _previousCharityFee (CharityToken.sol#1030)
                - _charityFee = 0 (CharityToken.sol#1025)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _previousCharityFee = _charityFee (CharityToken.sol#1022)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _previousTaxFee = _taxFee (CharityToken.sol#1021)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _tFeeTotal = _tFeeTotal.add(tFee) (CharityToken.sol#1247)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _taxFee = _previousTaxFee (CharityToken.sol#1029)
                - _taxFee = 0 (CharityToken.sol#1024)
Reentrancy in CharityToken.transferFrom(address,address,uint256) (CharityToken.sol#933-945):
        External calls:
        - _transfer(sender,recipient,amount) (CharityToken.sol#938)
                - uniswapV2Router.swapExactTokensForETHSupportingFeeOnTransferTokens(tokenAmount,0,path,address(this),block.tim
estamp) (CharityToken.sol#1103-1109)
```

```
        - _approve(sender,_msgSender(),_allowances[sender][_msgSender()].sub(amount,ERC20: transfer amount exceeds allowance))
(CharityToken.sol#939-943)
                - _allowances[owner_][spender] = amount (CharityToken.sol#1045)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-2
INFO:Detectors:
Reentrancy in CharityToken._transfer(address,address,uint256) (CharityToken.sol#1049-1092):
        External calls:
        - swapTokensForEth(contractTokenBalance) (CharityToken.sol#1074)
                - uniswapV2Router.swapExactTokensForETHSupportingFeeOnTransferTokens(tokenAmount,0,path,address(this),block.tim
estamp) (CharityToken.sol#1103-1109)
        External calls sending eth:
        - sendETHToCharity(address(this).balance) (CharityToken.sol#1078)
                - charityFactory.transfer(amount) (CharityToken.sol#1113)
        Event emitted after the call(s):
        - Transfer(sender,recipient,tTransferAmount) (CharityToken.sol#1171)
                - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
        - Transfer(sender,recipient,tTransferAmount) (CharityToken.sol#1192)
                - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
        - Transfer(sender,recipient,tTransferAmount) (CharityToken.sol#1213)
                - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
        - Transfer(sender,recipient,tTransferAmount) (CharityToken.sol#1235)
                - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
Reentrancy in CharityToken.transferFrom(address,address,uint256) (CharityToken.sol#933-945):
        External calls:
        - _transfer(sender,recipient,amount) (CharityToken.sol#938)
                - uniswapV2Router.swapExactTokensForETHSupportingFeeOnTransferTokens(tokenAmount,0,path,address(this),block.tim
estamp) (CharityToken.sol#1103-1109)
        External calls sending eth:
        - _transfer(sender,recipient,amount) (CharityToken.sol#938)
                - charityFactory.transfer(amount) (CharityToken.sol#1113)
        Event emitted after the call(s):
        - Approval(owner_,spender,amount) (CharityToken.sol#1046)
                - _approve(sender,_msgSender(),_allowances[sender][_msgSender()].sub(amount,ERC20: transfer amount exceeds allo
wance)) (CharityToken.sol#939-943)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-3
```

```
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#dead-code
INFO:Detectors:
CharityToken._rTotal (CharityToken.sol#860) is set pre-construction with a non-constant function or state variable:
        - (MAX - (MAX % _tTotal))
CharityToken._previousTaxFee (CharityToken.sol#867) is set pre-construction with a non-constant function or state variable:
        - _taxFee
CharityToken._previousCharityFee (CharityToken.sol#868) is set pre-construction with a non-constant function or state variable:
        - _charityFee
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#function-initializing-state-variables
INFO:Detectors:
Pragma version^0.8.4 (CharityToken.sol#3) necessitates a version too recent to be trusted. Consider deploying with 0.6.12/0.7.6
solc-0.8.4 is not recommended for deployment
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity
INFO:Detectors:
Low level call in Address.sendValue(address,uint256) (CharityToken.sol#398-403):
        - (success) = recipient.call{value: amount}() (CharityToken.sol#401)
Low level call in Address.functionCallWithValue(address,bytes,uint256,string) (CharityToken.sol#466-477):
        - (success,returndata) = target.call{value: value}(data) (CharityToken.sol#475)
Low level call in Address.functionStaticCall(address,bytes,string) (CharityToken.sol#495-504):
        - (success,returndata) = target.staticcall(data) (CharityToken.sol#502)
Low level call in Address.functionDelegateCall(address,bytes,string) (CharityToken.sol#522-531):
        - (success,returndata) = target.delegatecall(data) (CharityToken.sol#529)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#low-level-calls
INFO:Detectors:
Function IUniswapV2Router01.WETH() (CharityToken.sol#55) is not in mixedCase
Function IUniswapV2Pair.DOMAIN_SEPARATOR() (CharityToken.sol#278) is not in mixedCase
Function IUniswapV2Pair.PERMIT_TYPEHASH() (CharityToken.sol#280) is not in mixedCase
Function IUniswapV2Pair.MINIMUM_LIQUIDITY() (CharityToken.sol#306) is not in mixedCase
Function CharityToken._getETHBalance() (CharityToken.sol#1334-1336) is not in mixedCase
Function CharityToken._setTaxFee(uint256) (CharityToken.sol#1338-1341) is not in mixedCase
Function CharityToken._setCharityFee(uint256) (CharityToken.sol#1343-1346) is not in mixedCase
Function CharityToken._setCharityFactory(address) (CharityToken.sol#1348-1350) is not in mixedCase
Function CharityToken._setMaxTxAmount(uint256) (CharityToken.sol#1352-1355) is not in mixedCase
```

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```
Variable CharityToken._charityFee (CharityToken.sol#866) is not in mixedCase
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#conformance-to-solidity-naming-conventions
INFO:Detectors:
Reentrancy in CharityToken._transfer(address,address,uint256) (CharityToken.sol#1049-1092):
        External calls:
        - sendETHToCharity(address(this).balance) (CharityToken.sol#1078)
                - charityFactory.transfer(amount) (CharityToken.sol#1113)
        State variables written after the call(s):
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _charityFee = _previousCharityFee (CharityToken.sol#1030)
                - _charityFee = 0 (CharityToken.sol#1025)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _previousCharityFee = _charityFee (CharityToken.sol#1022)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _previousTaxFee = _taxFee (CharityToken.sol#1021)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _rOwned[address(this)] = _rOwned[address(this)].add(rCharity) (CharityToken.sol#1241)
                - _rOwned[sender] = _rOwned[sender].sub(rAmount) (CharityToken.sol#1187)
                - _rOwned[sender] = _rOwned[sender].sub(rAmount) (CharityToken.sol#1167)
                - _rOwned[sender] = _rOwned[sender].sub(rAmount) (CharityToken.sol#1209)
                - _rOwned[sender] = _rOwned[sender].sub(rAmount) (CharityToken.sol#1230)
                - _rOwned[recipient] = _rOwned[recipient].add(rTransferAmount) (CharityToken.sol#1168)
                - _rOwned[recipient] = _rOwned[recipient].add(rTransferAmount) (CharityToken.sol#1210)
                - _rOwned[recipient] = _rOwned[recipient].add(rTransferAmount) (CharityToken.sol#1189)
                - _rOwned[recipient] = _rOwned[recipient].add(rTransferAmount) (CharityToken.sol#1232)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _rTotal = _rTotal.sub(rFee) (CharityToken.sol#1246)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _tFeeTotal = _tFeeTotal.add(tFee) (CharityToken.sol#1247)
        - _tokenTransfer(sender,recipient,amount,takeFee) (CharityToken.sol#1091)
                - _tOwned[address(this)] = _tOwned[address(this)].add(tCharity) (CharityToken.sol#1242)
                - _tOwned[sender] = _tOwned[sender].sub(tAmount) (CharityToken.sol#1229)
                - _tOwned[sender] = _tOwned[sender].sub(tAmount) (CharityToken.sol#1208)
                - _tOwned[recipient] = _tOwned[recipient].add(tTransferAmount) (CharityToken.sol#1188)
                - _tOwned[recipient] = _tOwned[recipient].add(tTransferAmount) (CharityToken.sol#1231)
```

```
                - charityFactory.transfer(amount) (CharityToken.sol#1113)
        State variables written after the call(s):
        - _approve(sender,_msgSender(),_allowances[sender][_msgSender()].sub(amount,ERC20: transfer amount exceeds allowance))
(CharityToken.sol#939-943)
                - _allowances[owner_][spender] = amount (CharityToken.sol#1045)
        Event emitted after the call(s):
        - Approval(owner_,spender,amount) (CharityToken.sol#1046)
                - _approve(sender,_msgSender(),_allowances[sender][_msgSender()].sub(amount,ERC20: transfer amount exceeds allo
wance)) (CharityToken.sol#939-943)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-4
INFO:Detectors:
Variable IUniswapV2Router01.addLiquidity(address,address,uint256,uint256,uint256,uint256,address,uint256).amountADesired (Chari
tyToken.sol#60) is too similar to IUniswapV2Router01.addLiquidity(address,address,uint256,uint256,uint256,uint256,address,uint2
56).amountBDesired (CharityToken.sol#61)
Variable CharityToken._transferFromExcluded(address,address,uint256).rTransferAmount (CharityToken.sol#1202) is too similar to
CharityToken._transferToExcluded(address,address,uint256).tTransferAmount (CharityToken.sol#1183)
Variable CharityToken._getRValues(uint256,uint256,uint256).rTransferAmount (CharityToken.sol#1305) is too similar to CharityTok
en._transferFromExcluded(address,address,uint256).tTransferAmount (CharityToken.sol#1204)
Variable CharityToken._transferFromExcluded(address,address,uint256).rTransferAmount (CharityToken.sol#1202) is too similar to
CharityToken._getValues(uint256).tTransferAmount (CharityToken.sol#1265)
```

```
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#too-many-digits
INFO:Detectors:
CharityToken._decimals (CharityToken.sol#864) should be constant
CharityToken._name (CharityToken.sol#862) should be constant
CharityToken._numOfTokensToExchangeForCharity (CharityToken.sol#874) should be constant
CharityToken._symbol (CharityToken.sol#863) should be constant
CharityToken._tTotal (CharityToken.sol#859) should be constant
CharityToken.swapEnabled (CharityToken.sol#871) should be constant
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-constant
INFO:Detectors:
renounceOwnership() should be declared external:
        - Ownable.renounceOwnership() (CharityToken.sol#819-821)
transferOwnership(address) should be declared external:
        - Ownable.transferOwnership(address) (CharityToken.sol#827-830)
name() should be declared external:
        - CharityToken.name() (CharityToken.sol#894-896)
symbol() should be declared external:
        - CharityToken.symbol() (CharityToken.sol#898-900)
decimals() should be declared external:
        - CharityToken.decimals() (CharityToken.sol#902-904)
totalSupply() should be declared external:
        - CharityToken.totalSupply() (CharityToken.sol#906-908)
rate() should be declared external:
        - CharityToken.rate() (CharityToken.sol#910-912)
transfer(address,uint256) should be declared external:
        - CharityToken.transfer(address,uint256) (CharityToken.sol#919-922)
allowance(address,address) should be declared external:
        - CharityToken.allowance(address,address) (CharityToken.sol#924-926)
approve(address,uint256) should be declared external:
        - CharityToken.approve(address,uint256) (CharityToken.sol#928-931)
transferFrom(address,address,uint256) should be declared external:
        - CharityToken.transferFrom(address,address,uint256) (CharityToken.sol#933-945)
increaseAllowance(address,uint256) should be declared external:
        - CharityToken.increaseAllowance(address,uint256) (CharityToken.sol#947-950)
decreaseAllowance(address,uint256) should be declared external:
        - CharityToken.decreaseAllowance(address,uint256) (CharityToken.sol#952-959)
```

```
decreaseAllowance(address,uint256) should be declared external:
        - CharityToken.decreaseAllowance(address,uint256) (CharityToken.sol#952-959)
isExcluded(address) should be declared external:
        - CharityToken.isExcluded(address) (CharityToken.sol#961-963)
totalFees() should be declared external:
        - CharityToken.totalFees() (CharityToken.sol#965-967)
deliver(uint256) should be declared external:
        - CharityToken.deliver(uint256) (CharityToken.sol#969-976)
reflectionFromToken(uint256,bool) should be declared external:
        - CharityToken.reflectionFromToken(uint256,bool) (CharityToken.sol#978-987)
isExcludedFromFee(address) should be declared external:
        - CharityToken.isExcludedFromFee(address) (CharityToken.sol#1033-1035)
_getETHBalance() should be declared external:
        - CharityToken._getETHBalance() (CharityToken.sol#1334-1336)
Reference: https://github.com/crytic/slither/wiki/Detector-Documentation#public-function-that-could-be-declared-external
INFO:Slither:CharityToken.sol analyzed (10 contracts with 75 detectors), 125 result(s) found
INFO:Slither:Use https://crytic.io/ to get access to additional detectors and Github integration
```

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# Solidity Static Analysis

**CharityFactory.sol**

## Security

### Check-effects-interaction:

Potential violation of Checks-Effects-Interaction pattern in CharityFactory.withdrawTokens(string,uint256): Could potentially lead to re-entrancy vulnerability. Note: Modifiers are currently not considered by this static analysis.

more

Pos: 755:4:

### Low level calls:

Use of "call": should be avoided whenever possible. It can lead to unexpected behavior if return value is not handled properly. Please use Direct Calls via specifying the called contract's interface.

more

Pos: 401:50:

## Gas & Economy

### For loop over dynamic array:

Loops that do not have a fixed number of iterations, for example, loops that depend on storage values, have to be used carefully. Due to the block gas limit, transactions can only consume a certain amount of gas. The number of iterations in a loop can grow beyond the block gas limit which can cause the complete contract to be stalled at a certain point. Additionally, using unbounded loops incurs in a lot of avoidable gas costs. Carefully test how many items at maximum you can pass to such functions to make it successful.

more

Pos: 724:8:

## ERC

### ERC20:

ERC20 contract's "decimals" function should have "uint8" as return type

more

Pos: 13:4:

## Miscellaneous

### Constant/View/Pure functions:

CharityFactory.createOrganization() : Potentially should be constant/view/pure but is not. Note: Modifiers are currently not considered by this static analysis.

more

Pos: 683:4:

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### No return:

CharityFactory.createOrganization(): Defines a return type but never explicitly returns a value.
Pos: 683:4:

### Guard conditions:

Use "assert(x)" if you never ever want x to be false, not in any circumstance (apart from a bug in your code). Use "require(x)" if x can be false, due to e.g. invalid input or a failing external component.
more
Pos: 765:8:

### Data truncated:

Division of integer values yields an integer value again. That means e.g. 10 / 100 = 0 instead of 0.1 since the result is an integer again. This does not hold for division of (only) literal values since those yield rational constants.
Pos: 242:19:

## CharityToken.sol

Security

### Check-effects-interaction:

Potential violation of Checks-Effects-Interaction pattern in CharityToken.swapTokensForEth(uint256): Could potentially lead to re-entrancy vulnerability. Note: Modifiers are currently not considered by this static analysis.
more
Pos: 1094:4:

### Block timestamp:

Use of "block.timestamp": "block.timestamp" can be influenced by miners to a certain degree. That means that a miner can "choose" the block.timestamp, to a certain degree, to change the outcome of a transaction in the mined block.
more
Pos: 1108:12:

Gas & Economy

### Gas costs:

Gas requirement of function CharityToken.name is infinite: If the gas requirement of a function is higher than the block gas limit, it cannot be executed. Please avoid loops in your functions or actions that modify large areas of storage (this includes clearing or copying arrays in storage)
Pos: 894:4:

### Gas costs:

Gas requirement of function CharityToken.includeAccount is infinite: If the gas requirement of a function is higher than the block gas limit, it cannot be executed. Please avoid loops in your functions or actions that modify large areas of storage (this includes clearing or copying arrays in storage)
Pos: 1005:4:

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### For loop over dynamic array:

Loops that do not have a fixed number of iterations, for example, loops that depend on storage values, have to be used carefully. Due to the block gas limit, transactions can only consume a certain amount of gas. The number of iterations in a loop can grow beyond the block gas limit which can cause the complete contract to be stalled at a certain point. Additionally, using unbounded loops incurs in a lot of avoidable gas costs. Carefully test how many items at maximum you can pass to such functions to make it successful.

more

Pos: 1317:8:

## ERC

### ERC20:

ERC20 contract's "decimals" function should have "uint8" as return type

more

Pos: 13:4:

## Miscellaneous

### Constant/View/Pure functions:

CharityToken.burnTokens(uint256) : Potentially should be constant/view/pure but is not. Note: Modifiers are currently not considered by this static analysis.

more

Pos: 1129:4:

### Similar variable names:

CharityToken._transferToExcluded(address,address,uint256) : Variables have very similar names "rTransferAmount" and "tTransferAmount". Note: Modifiers are currently not considered by this static analysis.

Pos: 1181:12:

### Similar variable names:

CharityToken._transferToExcluded(address,address,uint256) : Variables have very similar names "rTransferAmount" and "tTransferAmount". Note: Modifiers are currently not considered by this static analysis.

Pos: 1183:12:

### Guard conditions:

Use "assert(x)" if you never ever want x to be false, not in any circumstance (apart from a bug in your code). Use "require(x)" if x can be false, due to e.g. invalid input or a failing external component.

more

Pos: 1344:8:

### Guard conditions:

Use "assert(x)" if you never ever want x to be false, not in any circumstance (apart from a bug in your code). Use "require(x)" if x can be false, due to e.g. invalid input or a failing external component.

more

Pos: 1353:8:

### Data truncated:

Division of integer values yields an integer value again. That means e.g. 10 / 100 = 0 instead of 0.1 since the result is an integer again. This does not hold for division of (only) literal values since those yield rational constants.

Pos: 744:19:

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# Solhint Linter

### CharityFactory.sol

```
CharityFactory.sol:67:18: Error: Parse error: missing ';' at '{'
CharityFactory.sol:80:18: Error: Parse error: missing ';' at '{'
CharityFactory.sol:92:18: Error: Parse error: missing ';' at '{'
CharityFactory.sol:109:18: Error: Parse error: missing ';' at '{'
CharityFactory.sol:121:18: Error: Parse error: missing ';' at '{'
CharityFactory.sol:217:18: Error: Parse error: missing ';' at '{'
CharityFactory.sol:240:18: Error: Parse error: missing ';' at '{'
CharityFactory.sol:266:18: Error: Parse error: missing ';' at '{'
```

### CharityToken.sol

```
CharityToken.sol:569:18: Error: Parse error: missing ';' at '{'
CharityToken.sol:582:18: Error: Parse error: missing ';' at '{'
CharityToken.sol:594:18: Error: Parse error: missing ';' at '{'
CharityToken.sol:611:18: Error: Parse error: missing ';' at '{'
CharityToken.sol:623:18: Error: Parse error: missing ';' at '{'
CharityToken.sol:719:18: Error: Parse error: missing ';' at '{'
CharityToken.sol:742:18: Error: Parse error: missing ';' at '{'
CharityToken.sol:768:18: Error: Parse error: missing ';' at '{'
```

**Software analysis result:**

These software reported many false positive results and some are informational issues. So, those issues can be safely ignored.

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