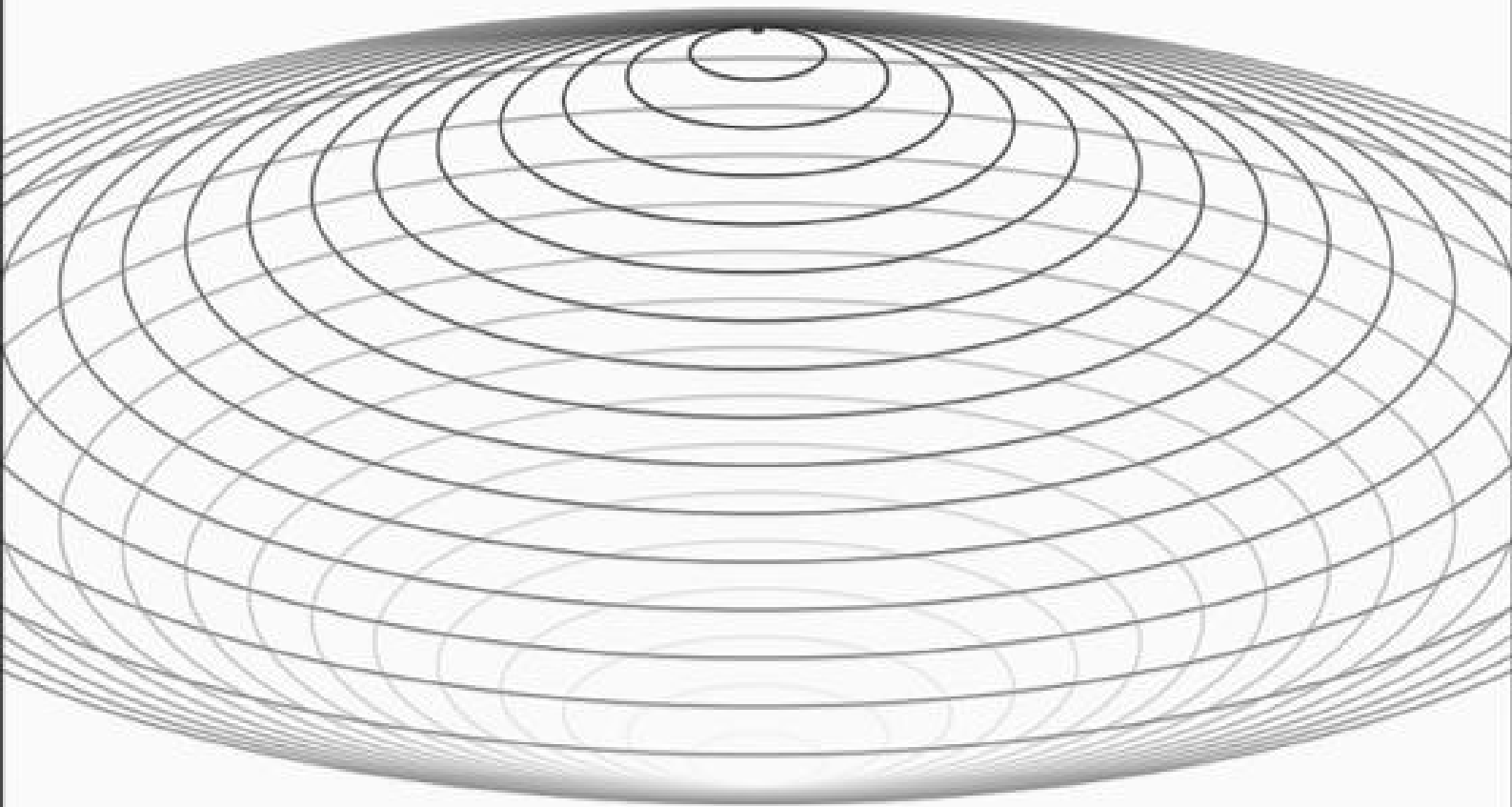




May 19th, 2021

(NO:SM-01051933)



AUDIT RESULTS

SMARS

Smart contract audit

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Disclaimer

About

Summary

This report has been prepared for SMARS smart contracts, to discover issues and vulnerabilities in the source code of their Smart Contract as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Static Analysis and Manual Review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.

Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases given they are currently missing in the repository;
Provide more comments per each function for readability, especially contracts are verified in public;
Provide more transparency on privileged activities once the protocol is live.

Overview

Project Summary

| | |
|--------------|---|
| Project Name | SMARS |
| Platform | BSC |
| Language | Solidity |
| Codebase | https://bscscan.com/address/0xC0366a104b429f0806BfA98d0008DAA9555b2BEd#code |
| Commits | Deployed contract address: 0xC0366a104b429f0806BfA98d0008DAA9555b2BEd |

Audit Summary

| | |
|-------------------|--------------------------------|
| Delivery Date | May 19, 2021 |
| Audit Methodology | Static Analysis, Manual Review |

Key Components

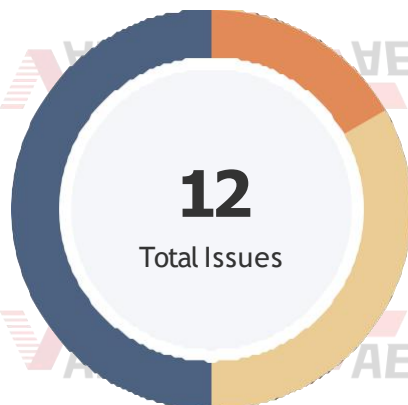
Vulnerability Summary

| | |
|---------------------------|----|
| Total Issues | 12 |
| <div></div> Critical | 0 |
| <div></div> Major | 2 |
| <div></div> Medium | 0 |
| <div></div> Minor | 4 |
| <div></div> Informational | 6 |
| <div></div> Discussion | 0 |

Audit Scope

| ID | file | SHA256 Checksum |
|-----|--------------|--|
| SMC | SafeMars.sol | f90164092172ae6aea6d665923a4e897933c8258739e0ac604be73e5eb9afd1e |

Findings



| | |
|---|------------|
| ■ Critical | 0 (0.00%) |
| ■ Major | 2 (16.67%) |
| ■ Medium | 0 (0.00%) |
| ■ Minor | 4 (33.33%) |
| ■ Informational | 6 (50.00%) |
| ■ Discussion | 0 (0.00%) |

| ID | Title | Category | Severity | Status |
|--------|--|--|---|---------|
| SMC-01 | Typos in the contract | Coding Style | ● Informational ⓘ | Pending |
| SMC-02 | Incorrect error message | Logical Issue | ● Minor ⓘ | Pending |
| SMC-03 | Contract gains non-withdrawable BNB via the <code>swapAndLiquify</code> function | Logical Issue | ● Major ⓘ | Pending |
| SMC-04 | Return value not handled | Volatile Code | ● Informational ⓘ | Pending |
| SMC-05 | Centralized risk in <code>addLiquidity</code> | Centralization /Privilege | ● Major ⓘ | Pending |
| SMC-06 | Redundant code | Logical Issue | ● Informational ⓘ | Pending |
| SMC-07 | Variable could be declared as <code>constant</code> | Gas Optimization | ● Informational ⓘ | Pending |
| SMC-08 | 3rd party dependencies | Control Flow | ● Minor ⓘ | Pending |
| SMC-09 | Missing event emitting | Coding Style | ● Informational ⓘ | Pending |
| SMC-10 | Privileged ownership | Centralization /Privilege | ● Minor ⓘ | Pending |
| SMC-11 | The purpose of function <code>deliver</code> | Control Flow | ● Informational ⓘ | Pending |
| SMC-12 | Possible to gain ownership after renouncing the contract ownership | Logical Issue, Centralization /Privilege | ● Minor ⓘ | Pending |

SMC-01 |Typos in the contract

| Category | Severity | Location | Status |
|--------------|-----------------|-------------------------|-----------|
| Coding Style | ● Informational | SafeMars.sol: 937, 1177 | ⓘ Pending |

Description

There are several typos in the code and comments.

1. In the following code snippet, `tokensIntoLiquidity` should be `tokensIntoLiquidity`.

```
1 event SwapAndLiquify(
2     uint256 tokensSwapped,
3     uint256 ethReceived,
4     uint256 tokensIntoLiquidity
5 );
```

2. `recieve` should be `receive` and `swaping` should be `swapping` in the line of comment `//to recieve ETH from uniswapV2Router when swaping.`

Recommendation

We recommend correcting all typos in the contract.

SMC-02 |Incorrect error message

| Category | Severity | Location | Status |
|---------------|----------|--------------------|---------|
| Logical Issue | Minor | SafeMars.sol: 1118 | Pending |

Description

The error message in `require(!_isExcluded[account], "Account is already excluded")` does not describe the error correctly.

Recommendation

The message "Account is already excluded" can be changed to "Account is not excluded" .

SMC-03 | Contract gains non-withdrawable BNB via the `swapAndLiquify` function

| Category | Severity | Location | Status |
|---------------|----------|--------------------|-----------|
| Logical Issue | ● Major | SafeMars.sol: 1367 | ⓘ Pending |

Description

The `swapAndLiquify` function converts half of the `contractTokenBalance` SMARS tokens to BNB. The other half of SMARS tokens and part of the converted BNB are deposited into the SMARS-BNB pool on pancakeswap as liquidity. For every `swapAndLiquify` function call, a small amount of BNB leftover in the contract. This is because the price of SMARS drops after swapping the first half of SMARS tokens into BNBs, and the other half of SMARS tokens require less than the converted BNB to be paired with it when adding liquidity. The contract doesn't appear to provide a way to withdraw those BNB, and they will be locked in the contract forever.

Recommendation

It's not ideal that more and more BNB are locked into the contract over time. The simplest solution is to add a `withdraw` function in the contract to withdraw BNB. Other approaches that benefit the SMARS token holders can be:

- Distribute BNB to SMARS token holders proportional to the amount of token they hold.
- Use leftover BNB to buy back SMARS tokens from the market to increase the price of SMARS.

SMC-04 | Return value not handled

Category

Volatile Code


Severity

 Informational

Location

SafeMars.sol: 1413-1420

Status

 Pending

Description

The return values of function `addLiquidityETH` are not properly handled.

```
1      uniswapV2Router.addLiquidityETH{value: ethAmount}(  
2          address(this),  
3          tokenAmount,  
4          0, // slippage is unavoidable  
5          0, // slippage is unavoidable  
6          owner(),  
7          block.timestamp  
8      );
```

Recommendation

We recommend using variables to receive the return value of the functions mentioned above and handle both success and failure cases if needed by the business logic.

SMC-05 | Centralized risk in `addLiquidity`

| Category | Severity | Location | Status |
|----------------------------|----------|-------------------------|-----------|
| Centralization / Privilege | ● Major | SafeMars.sol: 1413-1420 | ⚠ Pending |

Description

```

1 // add the liquidity
2 uniswapV2Router.addLiquidityETH(value: ethAmount){
3     address(this),
4     tokenAmount,
5     0, // slippage is unavoidable
6     0, // slippage is unavoidable
7     owner(),
8 block.timestamp 9 );

```

The `addLiquidity` function calls the `uniswapV2Router.addLiquidityETH` function with the `to` address specified as `owner()` for acquiring the generated LP tokens from the SMARS-BNB pool. As a result, over time the `_owner` address will accumulate a significant portion of LP tokens. If the `_owner` is an EOA (Externally Owned Account), mishandling of its private key can have devastating consequences to the project as a whole.

Recommendation

We advise the `to` address of the `uniswapV2Router.addLiquidityETH` function call to be replaced by the contract itself, i.e. `address(this)`, and to restrict the management of the LP tokens within the scope of the contract's business logic. This will also protect the LP tokens from being stolen if the `_owner` account is compromised. In general, we strongly recommend centralized privileges or roles in the protocol to be improved via a decentralized mechanism or via smart-contract based accounts with enhanced security practices, f.e. Multisignature wallets.

Indicatively, here are some feasible solutions that would also mitigate the potential risk:

- Time-lock with reasonable latency, i.e. 48 hours, for awareness on privileged operations;
- Assignment of privileged roles to multi-signature wallets to prevent single point of failure due to the private key;
- Introduction of a DAO /governance /voting module to increase transparency and user involvement.

SMC-06 |Redundant code

| Category | Severity | Location | Status |
|---------------|-------------------------------------|--------------------|-------------------------------|
| Logical Issue | <div><div></div>Informational</div> | SafeMars.sol: 1437 | <div><div></div>Pending</div> |

Description

The condition `!_isExcluded[sender] && !_isExcluded[recipient]` can be included in `else`.

Recommendation

The following code can be removed:

```
1 ... else if (!_isExcluded[sender] && !_isExcluded[recipient]) {
2 _transferStandard(sender, recipient, amount);
3 } ...
```

SMC-07 | Variable could be declared as `constant`

Category

Severity

Location

Status

Gas Optimization

● Informational

SafeMars.sol

ⓘ Pending

Description

Variables `_tTotal`, `numTokensSellToAddToLiquidity`, `_name`, `_symbol` and `_decimals` could be declared as `constant` since these state variables are never to be changed.

Recommendation

We recommend declaring those variables as `constant`.

SMC-08 | 3rd party dependencies

Category

Severity

Location

Status

Control Flow

Minor

SafeMars.sol

⚠ Pending

Description

The contract is serving as the underlying entity to interact with third party PancakeSwap protocols. The scope of the audit would treat those 3rd party entities as black boxes and assume its functional correctness. However in the real world, 3rd parties may be compromised that led to assets lost or stolen.

Recommendation

We understand that the business logic of the SafeMars protocol requires the interaction PancakeSwap protocol for adding liquidity to SMARS-BNB pool and swap tokens. We encourage the team to constantly monitor the statuses of those 3rd parties to mitigate the side effects when unexpected activities are observed.

SMC-09 | Missing event emitting

Category

Severity

Location

Status

Coding Style

● Informational

SafeMars.sol

ⓘ Pending

Description

In contract `SafeMars`, there are a bunch of functions can change state variables. However, these function do not emit event to pass the changes out of chain.

Recommendation

Recommend emitting events, for all the essential state variables that are possible to be changed during runtime.

SMC-10 | Privileged ownership

| Category | Severity | Location | Status |
|----------|----------|----------|--------|
|----------|----------|----------|--------|

Centralization /Privilege

● Minor

SafeMars.sol

⚠ Pending

Description

The owner of contract `SafeMars` has the permission to:

1. change the address that can receive LP tokens,
2. lock the contract,
3. exclude/include addresses from rewards/fees,
4. set `taxFee`, `liquidityFee` and `_maxTxAmount`,
5. enable `swapAndLiquifyEnabled`

without obtaining the consensus of the community.

Recommendation

Renounce ownership when it is the right timing, or gradually migrate to a timelock plus multisig governing procedure and let the community monitor in respect of transparency considerations.

SMC-11 |The purpose of function `deliver`

Category

Severity

Location

Status

Control Flow

● Informational

SafeMars.sol

ⓘ Pending

Description

The function `deliver` can be called by anyone. It accepts an uint256 number parameter `tAmount`. The function reduces the SMARS token balance of the caller by `rAmount`, which is `tAmount` reduces the transaction fee. Then, the function adds `tAmount` to variable `_tFeeTotal`, which represents the contract's total transaction fee. We wish the team could explain more on the purpose of having such functionality.

SMC-12 | Possible to gain ownership after renouncing the contract ownership

Category

Logical Issue, Centralization / Privilege

Severity

● Minor

Location

SafeMars.sol

Status

⚠ Pending

Description

An owner is possible to gain ownership of the contract even if he calls function `renounceOwnership` to renounce the ownership. This can be achieved by performing the following operations:

1. Call `lock` to lock the contract. The variable `_previousOwner` is set to the current owner.
2. Call `unlock` to unlock the contract.
3. Call `renounceOwnership` to leave the contract without an owner.
4. Call `unlock` to regain ownership.

Recommendation

We advise updating/removing `lock` and `unlock` functions in the contract; or removing the `renounceOwnership` if such a privilege retains at the protocol level. If timelock functionality could be introduced, we recommend using the implementation of Compound finance as reference. Reference: <https://github.com/compound-finance/compound-protocol/blob/master/contracts/Timelock.sol>

Appendix

Finding Categories

Centralization / Privilege

Centralization /Privilege findings refer to either feature logic or implementation of components that act against the nature of decentralization, such as explicit ownership or specialized access roles in combination with a mechanism to relocate funds.

Gas Optimization

Gas Optimization findings do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

Logical Issue

Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Control Flow

Control Flow findings concern the access control imposed on functions, such as owner-only functions being invoke-able by anyone under certain circumstances.

Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

Coding Style

Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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