



Versatile Finance

Smart Contract Security Audit



BSC: SquidGrow Staking

27 November 2022



Summary

Project Name: SquidGrowStaking

Contract Address: 0x0eC5A84a18ae2bDCcE4E01853ea45c77957cB2C5

Client contact: Squid Grow Team

Blockchain: Binance smart chain

Language: Solidity

Project website: <https://squidgrow.wtf/>

Referral: 0xdb79debda30f876bf57c616e275b01ab7c212c9e

Fee address: 0x1cddea8931ecf9499296863d949aecdd23b41a47

Squid Grow: 0x88479186bac914e4313389a64881f5ed0153c765

Contract owner address: 0x502be06628b472a54760f7000e40b169bf51a645

Contract deployer address: 0x502be06628b472a54760F7000E40B169BF51A645

Background

Versatile Finance was commissioned by Squid Grow Team to perform an audit of the smart contract.

<https://bscscan.com/address/0x0ec5a84a18ae2bdcce4e01853ea45c77957cb2c5>

The purpose of this audit was to achieve the following:

- Identify potential security issues with smart contracts
- Formally check the logic behind given smart contracts.

Information in this report should be used for understanding the risk exposure of smart contracts, and as a guide to improving the security posture of smart contracts by remediating the issues that were identified.

What is an audit

A smart contract audit is a comprehensive review process designed to discover logical errors, security vulnerabilities, and optimization opportunities within code. The Versatile Finance manages this a step further by verifying economic logic to ensure the stability of smart contracts and highlighting privileged functionality to create a report that is easy to understand for developers and community members.

Techniques and Methods

- The code quality
- Use of best practices
- Implementation of ERC-20 token standards.
- Efficient use of gas.
- Code is safe from re-entrancy and other vulnerabilities.
- Code risk issue analysis and recommendations
- Ownership privileges
- Code documentation and comments match logic and expected behavior.
- Token distribution and calculations are as per the intended behavior mentioned in the whitepaper.

The following techniques, methods, and tools were used to review all the smart contracts.

Structural Analysis

We analyze the design patterns and structure of smart contracts. A thorough check is done to ensure the smart contract is structured in a way that will not have any issues.

Static Analysis

A static Analysis of Smart Contracts is done to identify contract vulnerabilities. In this step, a series of automated tools and manual testing are used to test the security of smart contracts.

Code Review / Manual Analysis

Manual Analysis or review of code is done to identify new vulnerabilities or verify the vulnerabilities found during the static analysis. Contracts is completely manually analyzed line by line, and the logic is checked and compared with what's mentioned in the whitepaper to make sure everything's functioned as intended.

Gas Consumption

We check the behavior of smart contracts in production. Manual testings are done in DEXs to know how much gas gets consumed and the possibilities of optimization of code to reduce gas consumption.

Issue Categories

Every issue in this report has been assigned a severity level. There are four levels of severity and each of them has been explained below.

High severity issues

No High Severity Issues Found

A high severity issue or vulnerability means that your smart contract can be exploited. Issues on this level are critical to the smart contract's performance or functionality and we recommend these issues be fixed before moving to a live environment.

Medium-level severity issues

No Medium Severity Issues Found

The issues marked as medium severity usually arise because of errors and deficiencies in the smart contract code. Issues on this level could potentially bring problems and they can still be fixed. This can put users' funds at risk and has a medium to the high probability of exploitation.

Low-level severity issues

No Low Severity Issues Found

Low-level severity issues can cause minor impact and or are just warnings that can remain unfixed for now. It would be better to fix these issues at some point in the future. These issues have a low probability of occurring or may have a minimal impact.

Informational
















No Informational Issues Found






























These are severity four issues that indicate an improvement request, a general question, a cosmetic or documentation error, or a request for information. There is low-to-no impact.

















Centralization



















No Centralisation Issues Found





Contracts Description Table

| Contract | Type | Bases | | |
|----------|-------------------|--|---|--|
| L | Function Name | Visibility | Mutability | Modifiers |
| | | | | |
| Context | Implementation | | | |
| L | _msgSender | Internal  | | |
| L | _msgData | Internal  | | |
| | | | | |
| Ownable | Implementation | Context | | |
| L | | Public  |  | NO  |
| L | owner | Public  | | NO  |
| L | renounceOwnership | Public  |  | onlyOwner |
| L | transferOwnership | Public  |  | onlyOwner |
| | | | | |
| SafeMath | Library | | | |
| L | add | Internal  | | |
| L | sub | Internal  | | |
| L | sub | Internal  | | |
| L | mul | Internal  | | |



| | | | | |
|---------|------------------------|--|---|--|
| L | div | Internal  | | |
| L | div | Internal  | | |
| L | mod | Internal  | | |
| L | mod | Internal  | | |
| | | | | |
| Address | Library | | | |
| L | isContract | Internal  | | |
| L | sendValue | Internal  |  | |
| L | functionCall | Internal  |  | |
| L | functionCall | Internal  |  | |
| L | functionCallWithValue | Internal  |  | |
| L | functionCallWithValue | Internal  |  | |
| L | _functionCallWithValue | Private  |  | |
| | | | | |
| IERC20 | Interface | | | |
| L | totalSupply | External  | | NO  |
| L | balanceOf | External  | | NO  |
| L | transfer | External  |  | NO  |
| L | allowance | External  | | NO  |
| L | approve | External  |  | NO  |

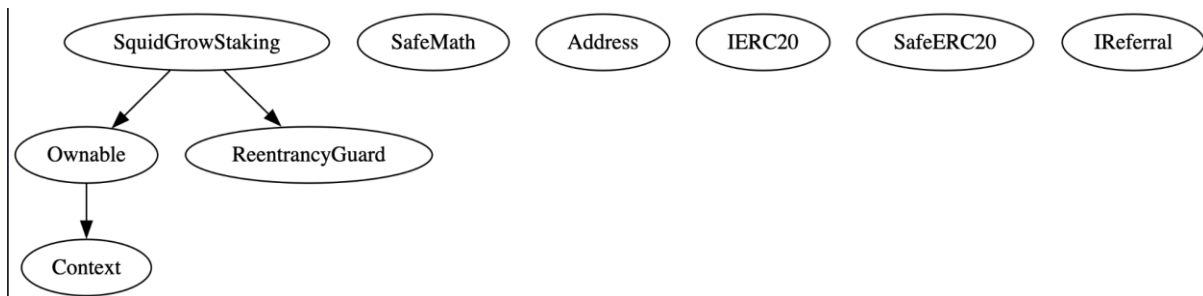
| | | | | |
|------------------|-----------------------|--|---|------|
| L | transferFrom | External ! |  | NO ! |
| | | | | |
| SafeERC20 | Library | | | |
| L | safeTransfer | Internal  |  | |
| L | safeTransferFrom | Internal  |  | |
| L | safeApprove | Internal  |  | |
| L | safeIncreaseAllowance | Internal  |  | |
| L | safeDecreaseAllowance | Internal  |  | |
| L | _callOptionalReturn | Private  |  | |
| | | | | |
| ReentrancyGuard | Implementation | | | |
| L | | Public ! |  | NO ! |
| | | | | |
| IReferral | Interface | | | |
| L | recordReferral | External ! |  | NO ! |
| L | getReferrer | External ! | | NO ! |
| | | | | |
| SquidGrowStaking | Implementation | Ownable, ReentrancyGuard | | |
| L | | Public ! |  | NO ! |

| | | | | |
|---|----------------------------|--|---|--------------|
| L | add | External ! |  | onlyOwner |
| L | set | External ! |  | onlyOwner |
| L | getMultiplier | Public ! | | NO ! |
| L | pendingSquidgrow | External ! | | NO ! |
| L | massUpdatePools | Public ! |  | NO ! |
| L | updatePool | Public ! |  | NO ! |
| L | deposit | Public ! |  | nonReentrant |
| L | withdraw | Public ! |  | nonReentrant |
| L | emergencyWithdraw | Public ! |  | nonReentrant |
| L | safeSquidgrowTransfer | Internal  |  | |
| L | recoverUnsupportedToken | External ! |  | onlyOwner |
| L | setFeeAddress | External ! |  | onlyOwner |
| L | updateEmissionRate | External ! |  | onlyOwner |
| L | whiteList | External ! |  | onlyOwner |
| L | removeWhiteList | External ! |  | onlyOwner |
| L | whiteListForWithdraw | External ! |  | onlyOwner |
| L | removeWhiteListForWithdraw | External ! |  | onlyOwner |
| L | blackList | External ! |  | onlyOwner |
| L | removeBlackList | External ! |  | onlyOwner |

| | | | | |
|---|---------------------------|--|---|-----------|
| L | poolLength | External ! | | NO ! |
| L | setReferralCommissionRate | External ! |  | onlyOwner |
| L | setWithdrawFeeRate | External ! |  | onlyOwner |
| L | payReferralCommission | Internal  |  | |

Legend

| Symbol | Meaning |
|---|---------------------------|
|  | Function can modify state |
|  | Function is payable |



Owner privileges

The owner can add new pools to the contract

```
ftrace | funcSig
function add(
    IERC20 _lpToken↑,
    uint256 _allocPoint↑,
    uint16 _depositFeeBP↑
) external onlyOwner {
    require(
        _depositFeeBP↑ <= MAXIMUM_FEE_RATE,
        "depositFee mustn't be greater than 25%"
    );
    _lpToken↑.balanceOf(address(this));
    uint256 lastRewardBlock = block.number;
    totalAllocPoint = totalAllocPoint.add(_allocPoint↑);
    poolInfo.push(
        PoolInfo({
            lpToken: _lpToken↑,
            allocPoint: _allocPoint↑,
            lastRewardBlock: lastRewardBlock,
            accSquidgrowPerShare: 0,
            depositFeeBP: _depositFeeBP↑,
            lpSupply: 0
        })
    );
}
```

The owner can change pool details

```
ftrace | funcSig
function set(
    uint256 _pid↑,
    uint256 _allocPoint↑,
    uint16 _depositFeeBP↑
) external onlyOwner {
    require(
        _depositFeeBP↑ <= MAXIMUM_FEE_RATE,
        "depositFee mustn't be greater than 25%"
    );
    totalAllocPoint = totalAllocPoint.sub(poolInfo[_pid↑].allocPoint).add(
        _allocPoint↑
    );
    if (poolInfo[_pid↑].allocPoint != 0) {
        poolInfo[_pid↑].allocPoint = _allocPoint↑;
    }
    poolInfo[_pid↑].depositFeeBP = _depositFeeBP↑;
}
```

The owner can get any BEP20 tokens from the contract

```
// Recover unsupported tokens that are sent accidentally
ftrace | funcSig
function recoverUnsupportedToken(address _addr↑, uint256 _amount↑)
    external
    onlyOwner
{
    require(_addr↑ != address(0), "non-zero address");
    IERC20(_addr↑).safeApprove(msg.sender, _amount↑);
    uint256 balance = IERC20(_addr↑).balanceOf(address(this));
    if (_amount↑ > 0 && _amount↑ <= balance) {
        IERC20(_addr↑).safeTransfer(msg.sender, _amount↑);
    }
}
```

The owner can change the fee address

```
// set fee address
ftrace | funcSig
function setFeeAddress(address _feeAddress↑) external onlyOwner {
    require(_feeAddress↑ != address(0), "non-zero");
    feeAddress = _feeAddress↑;
}
```

The owner can change per block reward rate

```
// update reward per block
ftrace | funcSig
function updateEmissionRate(uint256 _SquidgrowPerBlock↑) external onlyOwner {
    massUpdatePools();
    SquidgrowPerBlock = _SquidgrowPerBlock↑;
}
```

The owner can whitelist and blacklist wallets, (whitelisted wallets can stake without any fees and blacklisted wallets cannot get any rewards)

```
// add people to whitelist for deposit fee
ftrace | funcSig
function whiteList(address _addr↑) external onlyOwner {
    isWhiteListed[_addr↑] = true;
}

// remove people from whitelist for deposit fee
ftrace | funcSig
function removeWhiteList(address _addr↑) external onlyOwner {
    isWhiteListed[_addr↑] = false;
}
```

The owner can change referral commission maximum up to 5%

```
// Update referral commission rate by the owner
ftrace | funcSig
function setReferralCommissionRate(uint16 _referralCommissionRate↑)
    external
    onlyOwner
{
    require(
        _referralCommissionRate↑ <= MAXIMUM_REFERRAL_COMMISSION_RATE,
        "setReferralCommissionRate: invalid referral commission rate basis points"
    );
    referralCommissionRate = _referralCommissionRate↑;
}
```

The owner can add/remove wallets from blacklist

```
// add people to blacklist for reward
ftrace | funcSig
function blacklist(address _addr↑) external onlyOwner {
    | isBlackListed[_addr↑] = true;
}

// remove people from blacklist
ftrace | funcSig
function removeBlackList(address _addr↑) external onlyOwner {
    | isBlackListed[_addr↑] = false;
}
```

The owner can change withdrawal fee up to 25%

```
// Update referral commission rate by the owner
ftrace | funcSig
function setWithdrawFeeRate(uint16 _withdrawFeeRate↑) external onlyOwner {
    | require(
    |     | _withdrawFeeRate↑ <= MAXIMUM_FEE_RATE,
    |     | "WithdrawFeeRate mustn't be greater than 25%"
    | );
    | withdrawFeeRate = _withdrawFeeRate↑;
}
```

The owner can whitelist and remove wallets from withdrawal fee

```
// add people to whitelist for withdraw fee
ftrace | funcSig
function whiteListForWithdraw(address _addr↑) external onlyOwner {
    | isWhiteListedForWithdraw[_addr↑] = true;
}

// remove people from whitelist for withdraw fee
ftrace | funcSig
function removeWhiteListForWithdraw(address _addr↑) external onlyOwner {
    | isWhiteListedForWithdraw[_addr↑] = false;
}
```

Audit Results

| Vulnerability Category | Status |
|--|--------|
| Arbitrary Jump/Storage Write | pass |
| BRC20 Token standards | pass |
| Compiler errors | pass |
| Latest compiler version | pass |
| Authorization of function call to untrusted contract | pass |
| Dependence on Predictable Variables | pass |
| Ether/Token Theft | pass |
| Gas consumption | pass |
| Safemath features | pass |
| Fallback usage | pass |
| Deprecated items | pass |
| Redundant code | pass |
| Overriding variables | pass |
| Flash Loans | pass |
| Front Running | pass |
| Improper Events | pass |
| Improper Authorization Scheme | pass |
| Integer Over/Underflow | pass |
| Business logic issues | pass |

| | |
|---------------------------------------|------|
| Oracle issues | pass |
| Race Conditions | pass |
| Reentrancy | pass |
| Signature Issues | pass |
| Unbounded Loops | pass |
| Unused Code | pass |
| Pseudo random number generator (PRNG) | pass |
| Fake deposit | pass |

Audit conclusion

Versatile Finance team has performed in-depth testings, line by line manual code review, and automated audit of the smart contract. The smart contract was analyzed mainly for common smart contract vulnerabilities, exploits, manipulations, and hacks. According to the smart contract audit.

Smart contract functional Status:

Number of risk issues: **PASS**

Solidity code functional issue level: **PASS**

Number of owner privileges: **10**

Centralization risk correlated to the active owner: **LOW**

Smart contract active ownership: **ACTIVE**

Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as of the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the disclaimer below – please make sure to read it in full.

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