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AUDIT COMPANY

Smart Contract Security Audit

TechRate

December, 2021

Audit Details

Audited project

XSPStaking

Deployer address

xdcb6b4677c73A16f327326F48f9bBd5e7eA9FBD580

Client contacts:

XSPStaking team

Blockchain

XDC Network

Project website:

https://xspswap.finance/
https://staking.xspswap.finance/

Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as at 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 below disclaimer below – please make sure to read it in full.

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The analysis of the security is purely based on the smart contracts alone. No applications or operations were reviewed for security. No product code has been reviewed.

Background

TechRate was commissioned by XSPStaking to perform an audit of smart contracts:

https://xdc.blocksscan.io/address/xdcbff4d797cc022e785dc0599720097cbdbcbc6740

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

Contracts Details

Token contract details for 03.12.2021

Contract name	XSPStaking
Contract address	xdcBFF4D797cc022e785dC0599720097Cbdbcbc6740
claimableReward	0
stakingPaused	false
minAmountToStake	300000000000000000000000
maxTotalAmountToStake	4000000000000000000000000000
Total staked	263515523168372502805249340 8
Token	0x36726235dAdbdb4658D33E62a249dCA7c4B2bC68
Contract deployer address	xdcb6b4677c73a16f327326f48f9bbd5e7ea9fbd580
Contract’s current owner address	0xb6b4677c73A16f327326F48f9bBd5e7eA9FBD580

Contract functions details

+ [Int] IERC20
  - [Ext] totalSupply
  - [Ext] balanceOf
  - [Ext] transfer #
  - [Ext] approve #
  - [Ext] transferFrom #
  - [Ext] decimals

+ [Lib] SafeMath
  - [Int] add
  - [Int] sub
  - [Int] sub
  - [Int] mul
  - [Int] div
  - [Int] div
  - [Int] mod
  - [Int] mod

+ Ownable
  - [Pub] <Constructor> #
  - [Pub] owner
  - [Pub] transferOwnership #
    - modifiers: onlyOwner
  - [Pub] renounceOwnership #
    - modifiers: onlyOwner

+ [Int] IXSPStaking
  - [Ext] stake #
  - [Ext] unstake #
  - [Ext] claimReward #
  - [Ext] reinvest #
  - [Ext] claimableReward
  - [Ext] percentagePerMonth
  - [Ext] pauseStacking #
  - [Ext] unpauseStacking #
  - [Ext] pauseGlobally #
  - [Ext] unpauseGlobally #
  - [Ext] updateMaxTotalAmountToStake #
  - [Ext] updateMinAmountToStake #
  - [Ext] addPercentagePerMonth #
  - [Ext] updatePercentagePerMonth #
  - [Ext] removeLastPercentagePerMonth #

+ XSPStaking (IXSPStaking, Ownable)
  - [Pub] <Constructor> #
  - [Ext] stake #
  - [Ext] unstake #
  - [Ext] claimReward #
  - [Ext] reinvest #
  - [Int] _reinvest #
  - [Ext] claimableReward

- [Ext] percentagePerMonth
- [Ext] pauseStacking #
  - modifiers: onlyOwner
- [Ext] unpauseStacking #
  - modifiers: onlyOwner
- [Ext] pauseGlobally #
  - modifiers: onlyOwner
- [Ext] unpauseGlobally #
  - modifiers: onlyOwner
- [Ext] updateMaxTotalAmountToStake #
  - modifiers: onlyOwner
- [Ext] updateMinAmountToStake #
  - modifiers: onlyOwner
- [Ext] addPercentagePerMonth #
  - modifiers: onlyOwner
- [Ext] updatePercentagePerMonth #
  - modifiers: onlyOwner
- [Ext] removeLastPercentagePerMonth #
  - modifiers: onlyOwner
- [Int] _stake #
- [Int] _getRewardAmountToStakeAndSendChangeToUserIfNecessary #
- [Int] _getAmountToStake
- [Int] _addPercentagePerMonth #
- [Int] _getIndexToAddNewPercentage
- [Int] _calculateReward
- [Int] _getActivePercentageIndex
- [Int] _calculateRewardBySecondsHeld
- [Int] _calculatePercentPerSecond
- [Int] _pause #
- [Int] _unpause #

($) = payable function
= non-constant function

Issues Checking Status

	Issue description	Checking status
1.	Compiler errors.	Passed
2.	Race conditions and Reentrancy. Cross-function race conditions.	Passed
3.	Possible delays in data delivery.	Passed
4.	Oracle calls.	Passed
5.	Front running.	Passed
6.	Timestamp dependence.	Passed
7.	Integer Overflow and Underflow.	Passed
8.	DoS with Revert.	Passed
9.	DoS with block gas limit.	Low issues
10.	Methods execution permissions.	Passed
11.	Economy model of the contract.	Passed
12.	The impact of the exchange rate on the logic.	Passed
13.	Private user data leaks.	Passed
14.	Malicious Event log.	Passed
15.	Scoping and Declarations.	Passed
16.	Uninitialized storage pointers.	Passed
17.	Arithmetic accuracy.	Passed
18.	Design Logic.	Low issues
19.	Cross-function race conditions.	Passed
20.	Safe Open Zeppelin contracts implementation and usage.	Passed
21.	Fallback function security.	Passed

Security Issues

High Severity Issues

No high severity issues found.

Medium Severity Issues

No medium severity issues found.

Low Severity Issues

1. Out of gas

Issue:

- The function `percentagePerMonth()`, `_addPercentagePerMonth()`, `_calculateReward()` uses the loop to iterate percentage list. Function will be aborted with `OUT_OF_GAS` exception if there will be a long percentage list.

Recommendation:

Check that the percentage array length is not too big.

2. maxTotalAmountToStake checking

Issue:

- The function `_stake` compares totalStaked with maxTotalAmountToStake but should compare totalStaked + amount.

Recommendation:

Compare predicted value.

3. Calculation issue

Issue:

- The function `_addPercentagePerMonth()` subtracts 3 from percentage.length, that may be equal less than 3.

Recommendation:

Check logic of moving elements from indexTooAddNewPercentage to last - 1 right.

Owner privileges (In the period when the owner is not renounced)

- Owner can pause/unpause staking and contract (even unstake).
- Owner can change maxTotalAmountToStake and minAmountToStake.
- Owner can add/update and remove(last) percentage per month value.

Conclusion

Smart contracts contain low severity issues!

TechRate note:

Please check the disclaimer above and note, the audit makes no statements or warranties on business model, investment attractiveness or code sustainability. The report is provided for the only contract mentioned in the report and does not include any other potential contracts deployed by Owner.