



TechRate
AUDIT COMPANY

Blackswan

Smart Contract Security Audit

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 Blackswan to perform an audit of smart contracts:

<https://github.com/Crypto-Advisor/Blackswan-Token>

Commit: e1b2a9a1e2185c9b4f4c574511b088f47bb590f8

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.

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.	Medium Issue
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.	Passed
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

1. Economy issue

Issue:

- Functions `_transfer()` in LakeBase and BasePool contracts have burning logic(decreasing total supply) but anyway transfer tokens to zero address.

Recommendation:

Prevent transferring to zero address.

✓ Low Severity Issues

1. Variable updates

Issue:

- The BlackSwanERC20 contract has the function `claimFounderDividend()` that updates `founderOneLastClaim` or `founderTwoLastClaim` variables only when minting them tokens more or equal to `founderOneMonthlyClaim` value.

Recommendation:

Update these variables in any minting case.

2. Out of gas

Issue:

- The function `getData()` uses the loop for calculations. Function will be aborted with `OUT_OF_GAS` exception if there will be a long `todayDatas` list.

Recommendation:

Check that the `todayDatas` array length is not too big.

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

BlackSwanERC20:

- FUND_ADDRESS can mint tokens to FUND_ADDRESS.
- POLICY can call rebalance function and mint to SWAN_LAKE tokens. the maximum transaction amount.
- FOUNDER_ONE and FOUNDER_TWO can claim dividends.

BlackSwanFund:

- Owner can swap SWAN to USDC.
- Owner can provide liquidity.

BlackSwanPolicy:

- ORCHESTRATOR can initiate rebalance.
- Owner can change liquidity target.
- Owner can change liquidity fund percentage.

Migrations:

- Owner can change last completed migration.

RewardPool:

- Owner can transfer token on any address.

BasePool:

- Owner can change rewards per block value.

DistributionPool:

- Owner can withdraw all fees to owner address.

Conclusion

Smart contracts contain medium and 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.