

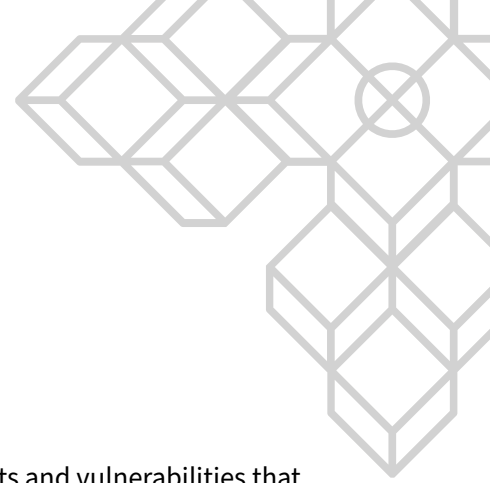


Alpha Homora V2 Report

Prepared for Alpha Venture DAO, 2 May 2022

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Introduction

SCV was engaged by Alpha Venture DAO to assist in identifying security threats and vulnerabilities that have the potential to affect their security posture. Additionally, SCV will assist the team in understanding the risks and identifying potential mitigations.

Scope

SCV performed the security assessment on the following codebase:

- <https://github.com/spectrumprotocol/alpha-contracts> `e6f0d850cec624a6b20649cdcb175c9d8737ea94`

Vulnerabilities were remediated by Alpha Venture DAO in several commits hashes.

Additional information details can be found in each findings technical notes section.

Methodologies

SCV performs a combination of automated and manual security testing based on the scope of testing. The testing performed is based on the extensive experience and knowledge of the auditor to provide the greatest coverage and value to Alpha Venture DAO. Testing includes, but is not limited to, the following:

- Understanding the application and its code base purpose;
- Deploying SCV in-house tooling to automate dependency analysis and static code review;
- Analyse each line of the code base and inspect application security perimeter;
- Review underlying infrastructure technologies and supply chain security posture;

Code Criteria and Test Coverage

SCV used a scale from **0** to **10** that represents how **SUFFICIENT(6-10)** or **NOT SUFFICIENT(0-5)** each code criteria was during the assessment:

Criteria	Status	Scale Range	Notes
Provided Documentation	Sufficient	6-7	N\A
Code Coverage Test	Sufficient	8-9	N\A
Code Readability	Sufficient	7-8	N\A
Code Complexity	Sufficient	6-7	N\A

Vulnerabilities Summary

	Title and Summary	Risk	Status
1	Spot price feed allows potential manipulation and inconsistent results for low liquidity pairs	Medium	Remediated
2	Extra funds sent are lost	Low	Remediated
3	execute_liquidate will panic if liquidator pays in excess of debt amount	Low	Remediated
4	Use of common variable name may impact maintainability and readability	Informational	Remediated
5	UserPositionResponse contains misleading health_status field	Informational	Remediated



Detailed Vulnerabilities

1. Spot price feed allows potential manipulation and inconsistent results for low liquidity pairs

Likelihood	Impact	Risk
Unlikely	Moderate	Medium

Notes

Feature was removed. Remediation was applied in the `4f4bbd162253717bb84088a6ce06ce93788ab3d4` git commit. Alpha Venture DAO team advises that Spot Price would only be used for testing and consequentially, this issue were downgrade from *Severe* to *Moderate*.

Description

Low liquidity assets with spot price sources may be subject to manipulation and/or miscalculations. The spot price feed uses a Terraswap simulation to determine the spot price. This is problematic because some Terraswap assets have low liquidity and are subject to manipulation. An attacker could cause an imbalance in the pool either with a flash loan or a large sum of funds.

In addition, the use of a `DEFAULT_PROBE_AMOUNT` is problematic. The probe amount is 1,000,000 which may introduce a large spread into the terraswap `SimulationResponse` depending on the amount of assets in the pool. The spread amount is not checked before returning the spot price result. This would result in a lower `return_amount` that does not correctly represent the asset's true spot price.

Recommendations

We recommend removing the spot price feed or restricting it's use to very specific pairs with deep liquidity.

2. Extra funds sent are lost

Likelihood	Impact	Risk
Possible	Low	Low

Notes

Remediation was applied in the `856b59ae552a0940904ba358fc74888a4da3dab4` git commit hash.

Description

The function `get_denom_amount_from_coins` in `alpha-contracts-master/contracts/lending-bank/src/contract.rs:1262` does not properly handle the case where a user may send multiple funds which may lead to a loss of additional fund that are not the specified denom. `info.funds` is a vector of `Coin`, but the current implementation only accounts for the specific denom used by the contract. It is best practice to provide an error if funds are sent that the contract does not handle. This function is called for both `DepositNative` and `RepayNative` messages, both of which should explicitly accept one native token.

Recommendations

We recommend updating the previously mentioned occurrences to ensure that the length of `info.funds` is equal to one and returning an error if this condition is not true.

3. `execute_liquidate` will panic if liquidator pays in excess of debt amount

Likelihood	Impact	Risk
Possible	Low	Low

Notes

Remediation was applied in the `3a55d249628963e23bd80d107c9fcd95d28b5978` git commit and severity downgraded to *Low*.

Description

The `execute_liquidate` function in `alpha-contracts-master/contracts/leveraged-farm/src/health.rs:192` does not properly handle liquidation events where the liquidator sends funds in excess of the debt position they are attempting to liquidate. More importantly, excess repayment will actually result in an underflow due to an unchecked subtraction when deducting excess debt share.

It is important to note that while compiling in release mode, rust does not include checks for integer overflow/underflow. However, the Alpha team has explicitly added overflow-checks to the release profile which will result in a panic rather than a wrapping integer overflow/underflow. Excess payment is a relatively common occurrence, so this will ultimately provide poor user experience.

While the this issue currently results in a panic, if the release profile were to be updated and overflow-checks was removed, it would result in state inconsistencies pertaining to the user's debt share.

Recommendations

We recommend including functionality to calculate the excess liquidation amount and refunding that amount to the liquidator. This can be accomplished in a similar manner to how excess repayment is handled in the lending-bank.

4. Use of common variable name may impact maintainability and readability

Likelihood	Impact	Risk
Possible	Informational	Informational

Notes

Remediation was applied in the `2ec1cc38ac4c2eedd01cb254f1da3a87b96108f1` git commit.

Description

In Homora-bank, there are multiple occasions where the variable name `state` is used to represent `ASSET_STATE`. While this is valid, it is best practice to reserve the use of `state` to only be used to represent contract state. This may impact the maintainability and readability of the contract.

Recommendations

We recommend using a more descriptive variable name to represent `ASSET_STATE`.

5. UserPositionResponse contains misleading health_status field

Likelihood	Impact	Risk
Possible	Informational	Informational

Notes

Remediation was applied in the `df4ccb8ee7da3cfb92fde8e7de1c1145bf4861d6` git commit.

Description

The UserPositionResponse contains a misleading `health_status` field. If the user has debt positions the UserHealthStatus will always return `Borrowing(Decimal: :one())`. While this does not impact the functionality of the lending bank, in the future the caller may inadvertently mistake this health status value for a true health status value. It seems as though this field could be more accurately labeled as `debt_status` or something similar.

Recommendations

We recommend updating the UserHealthStatus, UserPosition, UserPositionResponse in the Lending Bank to a more accurate name to describe the position's debt/borrowing status rather than using the word health which is not entirely accurate and mislead users.

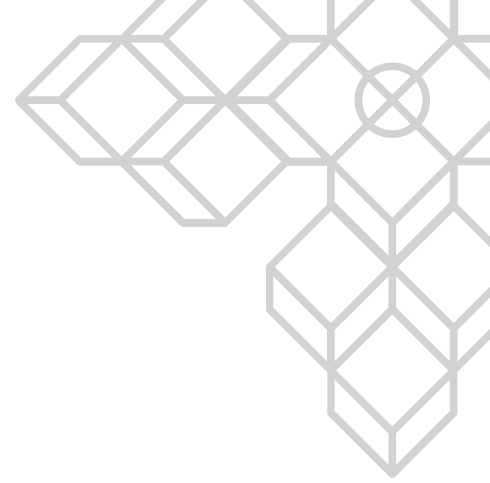
Document control

Document changes

Version	Date	Name	Changes
0.1	2022-04-18	Vinicius Marino	Initial report
0.2	2022-04-19	Vinicius Marino	Team communication and Pre-Release
1.0	2022-05-02	Vinicius Marino	Final Report Release

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Appendices

Appendix A: Report Disclaimer

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The author and their employer disclaim any liability for damage arising out of, or in connection with, this audit report.

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Appendix B: Risk assessment methodology

A qualitative risk assessment is performed on each vulnerability to determine the impact and likelihood of each.

Risk rate will be calculated on a scale. As per criteria Likelihood vs Impact table below:

Likelihood	Rare	Unlikely	Possible	Likely
Impact				
Critical	Medium	High	Critical	Critical
Severe	Low	Medium	High	High
Moderate	Low	Medium	Medium	High
Low	Low	Low	Low	Medium
Informational	Informational	Informational	Informational	Informational

LIKELIHOOD:

- **Likely:** likely a security incident will occur;
- **Possible:** It is possible a security incident can occur;
- **Unlikely:** Low probability a security incident will occur;
- **Rare:** In rare situations, a security incident can occur;

IMPACT:

- **Critical:** May cause a significant and critical impact;
- **Severe:** May cause a severe impact;
- **Moderate:** May cause a moderated impact;
- **Low:** May cause low or none impact;
- **Informational:** May cause very low impact or none.

