



TechRate

AUDIT COMPANY

Xend Finance

Smart Contract Security Audit

TechRate

November, 2021

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 Xend Finance to perform an audit of smart contracts:

<https://github.com/xendfinance/x-vault/commit/c1c4fa29df1aeb3f71244e2763786cc91ce68f4>

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.	Passed
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.	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

No medium severity issues found.

✓ Low Severity Issues

No low severity issues found.

Notes:

- `liquidatePosition()` function is internal and unused.
- `setProtectedTokens()` function is internal and unused.

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

- **StrategyAlpacaAutofarm:**
 - Governance address can enable/disable forceMigrate.
 - Management address can change minAutoToSell.
 - Management address can change path.
- **XVault:**
 - Governance address can change treasury address.
 - Governance and Guardian addresses can change treasury address.
 - Governance address can change management address.
 - Governance address can change Governance address.
 - Governance address can change depositLimit.
 - Governance address can change performance and management fees.
 - Governance and Guardian addresses can enable/disable emergencyShutdown.
 - Governance address can add/remove strategy.
 - Governance and Guardian addresses can revoke strategies.
- **BaseStrategy:**
 - Authorized address can change strategist and keeper addresses.
 - Strategist address can change rewards address.
 - Authorized address can allow emergency exit.
 - Authorized address can change profitFactor, debtThreshold and maxReportDelay.
 - Governance address can withdraw ERC20 tokens.
- **Strategy:**
 - Governance and Strategist addresses can enable/disable flashLoanActive.
 - Governance and Strategist addresses can change minXvsToSell and minWant values.
 - Governance and Strategist addresses can change collateralTarget.
 - Governance address can enable/disable forceMigrate.

Conclusion

Smart contracts do not contain high severity issues! Contracts contain imports that is not audited due to out of scope. Works of some functions may differ. The further transfers and operations with the funds raise are not related to this particular contract.

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.



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