METATRUST

Draft
Security Assessment for

123-2022-05-aura (1Positive-FD) (1Positive-WOI)

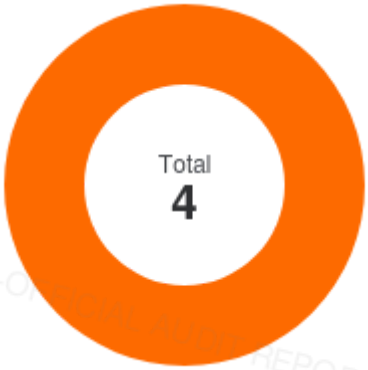
July 23, 2023

Executive Summary

Overview	
Project Name	123-2022-05-aura (1Positive-FD) (1Positive-WOI)
Codebase URL	https://github.com/code-423n4/2022-05-aura
Scan Engine	AI Analyzer
Scan Time	2023/07/23 16:48:34
Commit Id	bd34ecb

Total	
Critical Issues	0
High risk Issues	4
Medium risk Issues	0
Low risk Issues	0
Informational Issues	0

Critical Issues	The issue can cause large economic losses, large-scale data disorder, loss of control of authority management, failure of key functions, or indirectly affect the correct operation of other smart contracts interacting with it.
High Risk Issues	The issue puts a large number of users' sensitive information at risk or is reasonably likely to lead to catastrophic impacts on clients' reputations or serious financial implications for clients and users.
Medium Risk Issues	The issue puts a subset of users' sensitive information at risk, would be detrimental to the client's reputation if exploited, or is reasonably likely to lead to moderate financial impact.
Low Risk Issues	The risk is relatively small and could not be exploited on a recurring basis, or is a risk that the client has indicated is low-impact in view of the client's business circumstances.
Informational Issue	The issue does not pose an immediate risk but is relevant to security best practices or Defence in Depth.



Critical Issues	0%	0
High risk Issues	100%	4
Medium risk Issues	0%	0
Low risk Issues	0%	0
Informational Issues	0%	0

Summary of Findings

MetaScan security assessment was performed on **July 23, 2023 16:48:34** on project **123-2022-05-aura (1Positive-FD) (1Positive-WOI)** with the repository **https://github.com/code-423n4/2022-05-aura** on branch **default branch**. The assessment was carried out by scanning the project's codebase using the scan engine **AI Analyzer**. There are in total **4** vulnerabilities / security risks discovered during the scanning session, among which **0** critical vulnerabilities, **4** high risk vulnerabilities, **0** medium risk vulnerabilities, **0** low risk vulnerabilities, **0** informational issues.

ID	Description	Severity
MSA-001	MWE-209: Wrong Order for Interest or ExchangeRate	High risk
MSA-002	MWE-209: Wrong Order for Interest or ExchangeRate	High risk
MSA-003	MWE-209: Wrong Order for Interest or ExchangeRate	High risk
MSA-004	MWE-204: Unsafe First Deposit	High risk

Findings

Critical (0)

No Critical vulnerabilities found here

High risk (4)

1. MWE-209: Wrong Order for Interest or ExchangeRate

High risk Security Analyzer

Update of interest or exchange rate should be executed before calculating new balance, share, stake, loan or fee.

File(s) Affected

convex-platform/contracts/contracts/VirtualBalanceRewardPool.sol #236-253

```
236     function notifyRewardAmount(uint256 reward)
237         internal
238         updateReward(address(0))
239     {
240         historicalRewards = historicalRewards.add(reward);
241         if (block.timestamp >= periodFinish) {
242             rewardRate = reward.div(duration);
243         } else {
244             uint256 remaining = periodFinish.sub(block.timestamp);
245             uint256 leftover = remaining.mul(rewardRate);
246             reward = reward.add(leftover);
247             rewardRate = reward.div(duration);
248         }
249         currentRewards = reward;
250         lastUpdateTime = block.timestamp;
251         periodFinish = block.timestamp.add(duration);
252         emit RewardAdded(reward);
253     }
```

Recommendation

Check the business logic and move the statements about updating exchange rate or interest forward.

2. MWE-209: Wrong Order for Interest or ExchangeRate

High risk Security Analyzer

Update of interest or exchange rate should be executed before calculating new balance, share, stake, loan or fee.

File(s) Affected

convex-platform/contracts/contracts/BaseRewardPool.sol #362-379

```
362     function notifyRewardAmount(uint256 reward)
363         internal
364         updateReward(address(0))
365     {
366         historicalRewards = historicalRewards.add(reward);
367         if (block.timestamp >= periodFinish) {
368             rewardRate = reward.div(duration);
369         } else {
370             uint256 remaining = periodFinish.sub(block.timestamp);
371             uint256 leftover = remaining.mul(rewardRate);
372             reward = reward.add(leftover);
373             rewardRate = reward.div(duration);
374         }
375         currentRewards = reward;
376         lastUpdateTime = block.timestamp;
377         periodFinish = block.timestamp.add(duration);
378         emit RewardAdded(reward);
379     }
```

Recommendation

Check the business logic and move the statements about updating exchange rate or interest forward.

3. MWE-209: Wrong Order for Interest or ExchangeRate

High risk Security Analyzer

Update of interest or exchange rate should be executed before calculating new balance, share, stake, loan or fee.

File(s) Affected

contracts/AuraLocker.sol #820-846

```
820     function queueNewRewards(uint256 _rewards) external nonReentrant {
821         require(rewardDistributors[cvxCrv][msg.sender], "!authorized");
822         require(_rewards > 0, "No reward");
823 
824         RewardData storage rdata = rewardData[cvxCrv];
825 
826         IERC20(cvxCrv).safeTransferFrom(msg.sender, address(this), _rewards);
827 
828         _rewards = _rewards.add(queuedCvxCrvRewards);
829         if (block.timestamp >= rdata.periodFinish) {
830             _notifyReward(cvxCrv, _rewards);
831             queuedCvxCrvRewards = 0;
832             return;
833         }
834 
835         //et = now - (finish-duration)
836         uint256 elapsedTime = block.timestamp.sub(rdata.periodFinish.sub(rewardsDuration.to32()));
837         //current at now: rewardRate * elapsedTime
838         uint256 currentAtNow = rdata.rewardRate * elapsedTime;
839         uint256 queuedRatio = currentAtNow.mul(1000).div(_rewards);
840         if (queuedRatio < newRewardRatio) {
841             _notifyReward(cvxCrv, _rewards);
842             queuedCvxCrvRewards = 0;
843         } else {
844             queuedCvxCrvRewards = _rewards;
845         }
846     }
```

Recommendation

Check the business logic and move the statements about updating exchange rate or interest forward.

4. MWE-204: Unsafe First Deposit

High risk Security Analyzer

First depositor can break minting of shares or drain the liquidity of all users.

File(s) Affected

contracts/Aura.sol #61-77

```
61      function init(
62          address _to,
63          uint256 _amount,
64          address _minter
65      ) external {
66          require(msg.sender == operator, "Only operator");
67          require(totalSupply() == 0, "Only once");
68          require(_amount > 0, "Must mint something");
69          require(_minter != address(0), "Invalid minter");
70
71          _mint(_to, _amount);
72          updateOperator();
73          minter = _minter;
74          minterMinted = 0;
75
76          emit Initialised();
77      }
```

Recommendation

When totalSupply() == 0, send the first min liquidity LP tokens to the zero address to enable share dilution.

Medium risk (0)

No Medium risk vulnerabilities found here

Low risk (0)

No Low risk vulnerabilities found here

Informational (0)

No Informational vulnerabilities found here

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