■ SHERLOCK

Security Review For SYMMIO



Public Audit Contest Prepared For: SYMMIO

Lead Security Expert:

Date Audited: **Final Commit:**

0x73696d616f

March 7 - March 10, 2025

cfe1920

Introduction

Symmio is a permissionless OTC derivatives protocol and clearing layer. This contest focuses on peripheral contracts for our governance token.

Scope

Repository: SYMM-IO/token

Audited Commit: 1d014156b1d9f0ab3259026127b9220eb2da3292

Final Commit: cfe192090c339cffb07d2a50f6ba646299fbcfe0

Files:

contracts/staking/SymmStaking.sol

contracts/vesting/SymmVesting.sol

contracts/vesting/Vesting.sol

• contracts/vesting/interfaces/IMintableERC20.sol

• contracts/vesting/interfaces/IPermit2.sol

• contracts/vesting/interfaces/IPool.sol

• contracts/vesting/interfaces/IRouter.sol

• contracts/vesting/libraries/LibVestingPlan.sol

Final Commit Hash

cfe192090c339cffb07d2a50f6ba646299fbcfe0

Findings

Each issue has an assigned severity:

- Medium issues are security vulnerabilities that may not be directly exploitable or may require certain conditions in order to be exploited. All major issues should be addressed.
- High issues are directly exploitable security vulnerabilities that need to be fixed.

Issues Found

High	Medium
1	5

Issues Not Fixed and Not Acknowledged

High	Medium
0	0

Security experts who found valid issues

0day CL001 Ragnarok 0x23r0 ChaosSR Ryonen 0x73696d616f Cybrid SUPERMAN_I4G **OxAristos** DenTonylifer SarveshLimaye **OxBecket** DharkArtz Schnilch 0xCNX Drynooo Silvermist 0xDarko Edoscoba SlayerSecurity 0xDemon ElmInNyc99 The_Rezolvers 0xc0ffEE Uddercover **EmanHerawy** 0xgremlincat555 Victor_TheOracle **Flare Oxhammadghazi** Fortis Audits Wavdou X0sauce 0xkmg Frontrunner 0xlucky Greed X12 **Oxmechanic** Hackoor Yaneca_b ZoA 0xpiken HaidutiSec A_Failures_True_Power KlosMitSoss anchabadze Abhan1041 Kyosi arman Afriaudit LSH.F.GJ aslanbek Akhuemokhan.ETH Limbooo aswinraj94 LonWof-Demon Anirruth auditism auditmasterchef Arav **MSK** Artur Matin bladeee **MysteryAuditor** Audinarey braltd BAdal-Sharma-09 OpaBatyo buggsy Beejay Opeyemi copperscrewer Boy2000 Pablo dimah7 Breeje Pelz dobrevaleri BusinessShotgun Pro_King duckee032

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moray5554 nlikhll

newspacexyz novaman33

octopus_testjjj
omega
onthehunt
oot2k
osuolale
oxwhite

phoenixv110 redbeans redtrama roccomania santiellena

shui

silver_eth slavina spdream

stuart_the_minion

t.aksoy t0x1c turvec udo vladi319 wickie

x0lohaclohell

y4y yaioxy ydlee zraxx

Issue H-1: USDC rewards will not be distributed if _-updateRewardsStates is triggered too often

Source:

https://github.com/sherlock-audit/2025-03-symm-io-stacking-judging/issues/575

Found by

OxBecket, OxCNX, A_Failures_True_Power, Artur, Audinarey, Breeje, CL001, Fortis_Audits, Kyosi, Pablo, SlayerSecurity, The_Rezolvers, Victor_TheOracle, X12, aslanbek, bladeee, durov, farismaulana, godwinudo, lls, newspacexyz, onthehunt, stuart_the_minion, wickie, zraxx

Summary

https://github.com/sherlock-audit/2025-03-symm-io-stacking/blob/main/token/contracts/staking/SymmStaking.sol#L402-L423

_updateRewardsStates can be triggered as often as each block (2 seconds) via deposit/withdraw/claim/notifyRewardAmount

e.g. if there's 1209.6e6 USDC rewards for one week (604800 seconds)

https://github.com/sherlock-audit/2025-03-symm-io-stacking/blob/main/token/contracts/staking/SymmStaking.sol#L374

rate = 1209_600000 / 604800 = 2000 "usdc units" per second

https://github.com/sherlock-audit/2025-03-symm-io-stacking/blob/main/token/contracts/staking/SymmStaking.sol#L194-L202

if SYMM total staked supply is 1_000_000e18 (~26560 usd), and we call deposit each block, then perTokenStored will be increased by:

2 * 2000 * le18 / 1_000_000e18 = 4_000 / 1_000_000 = 0

Therefore, perTokenStored will not increase, but <u>lastUpdated</u> will be increased, therefore users will not receive any USDC rewards for staking.

In this particular example, triggering _updateRewardsStates once in 249 blocks would be sufficient, as it would still result in rewards rounding down to zero.

Root Cause

Lack of upscaling for tokens with less than 18 decimals for reward calculations.

Attack Path

1. Attacker calls deposit/withdraw/notifyRewardAmount with any non-zero amount every block (or less often as long as the calculation will still round down to zero)

Impact

High: stakers do not receive rewards in tokens with low decimals (e.g. USDC, USDT).

PoC

- 1. SYMM total staked supply = 1_000_000e18
- 2. notifyRewardAmount is called with 1209.6 USDC
- 3. griefer calls deposit/withdraw I wei of SYMM each 249 blocks for I week
- 4. USDC rewards are stuck in the contract, instead of being distributed to stakers (but can be rescued by admin)

Mitigation

Introduce 1e12 multiplier for reward calculation, and divide the accumulated rewards by 1e12 when they are being claimed.

Discussion

sherlock-admin2

The protocol team fixed this issue in the following PRs/commits: https://github.com/SYMM-IO/token/pull/6

Issue M-1: Incorrect initializer modifier in Vesting contract prevents proper initialization

Source:

https://github.com/sherlock-audit/2025-03-symm-io-stacking-judging/issues/86

Found by

0xBecket, 0xDemon, ChaosSR, Drynooo, Greed, Hackoor, LonWof-Demon, Ragnarok, The_Rezolvers, Uddercover, ZoA, anchabadze, durov, edger, justAWanderKid, nlikhll, octopus_testjjj, t0xlc

Description:

In the Symmio protocol, the Vesting contract is designed to be inherited by SymmVesting. However, the __vesting_init() function in Vesting uses the initializer modifier instead of the onlyInitializing modifier:

https://github.com/sherlock-audit/2025-03-symm-io-stacking/blob/main/token/contracts/vesting/Vesting.sol#L76

Meanwhile, in the inheriting contract: https://github.com/sherlock-audit/2025-03-sym m-io-stacking/blob/main/token/contracts/vesting/SymmVesting.sol#L55

```
// SymmVesting.sol
function initialize(
   address admin,
   address _lockedClaimPenaltyReceiver,
   address _pool,
   // ...other parameters...
) public initializer {
   // ...checks...
   __vesting_init(admin, 5000000000000000, _lockedClaimPenaltyReceiver);
```

```
// ...additional initialization...
}
```

According to OpenZeppelin's documentation and best practices, the initializer modifier should only be used in the final initialization function of an inheritance chain, while initialization functions of parent contracts should use the onlyInitializing modifier. This ensures proper initialization when using inheritance. When both parent and child contracts use the initializer modifier, only one of them can actually complete initialization, as the modifier sets a flag that prevents any subsequent calls to functions with the initializer modifier.

Impact:

The vulnerability causes a significant operational issue, preventing inheriting contracts from completing initialization. This could lead to a failure in the deployment of critical protocol components, affecting the overall system functionality.

Recommended Mitigation:

Change the initializer modifier to only Initializing in the parent contract:

Discussion

sherlock-admin2

The protocol team fixed this issue in the following PRs/commits: https://github.com/SYMM-IO/token/pull/2/files

Issue M-2: Readding the reward token causes user-RewardPerTokenPaid to be incorrect for some users, resulting in them receiving too many rewards.

Source:

https://github.com/sherlock-audit/2025-03-symm-io-stacking-judging/issues/124

Found by

0x23r0, Schnilch, silver_eth

Summary

New users who deposit during the time when the reward token is not added do not get their userRewardPerTokenPaid updated for this token, so it remains 0. When the token is re-added, however, perTokenStored for this token is not 0 because it retains the previous state. This leads to a situation where users who joined in the meantime when the reward token was not added, can receive all the previous rewards of the token when new rewards are notified, effectively taking them away from other users.

Root Cause

https://github.com/sherlock-audit/2025-03-symm-io-stacking/blob/main/token/contracts/staking/SymmStaking.sol#L319-L328 Here you can see that when removing a reward token, the token is only removed from the rewardTokens list without resetting the other state. That means if the token is added again, it takes over the previous state. The problem is that if perTokenStored for the reward token is not 0 when it is removed, it will also not be 0 when the token is re-added. If new users make a deposit while the token is not added, they do not get userRewardPerTokenPaid updated for this token because the token is no longer in the rewardTokens list. Normally userRewardPerTokenPaid is always updated before a deposit through _updateRewardsState to ensure that a user does not receive rewards that existed before the deposit for the deposited amount: https://github.com/sherlock-audit/2025-03-symm-io-stacking/blob/main/token/contracts/staking/SymmStaking.sol#L406-L418

Internal Pre-conditions

- 1. There must be a token that is re-added by an authorized address
- 2. There must be users who start staking during the time when the token is removed and has not yet been re-added

External Pre-conditions

None

Attack Path

- 1. A new reward token is added
- 2. Userl deposits
- 3. Rewards for the token are notified
- 4. One week passes, and Userl claims his rewards
- 5. The reward token is removed
- 6. User2 deposits
- 7. The reward token is added again
- 8. Rewards for the token are notified
- 9. One week passes, and User2 claims his rewards, but he received too many because he also received rewards from the time when the token was first added
- 10. User2 can no longer claim because there are not enough rewards left in the contract.

Impact

It is very likely that the staking contract will no longer function properly if a reward token is re-added, as some users would receive too many rewards, while others would no longer be able to claim anything due to the lack of rewards. For the users who have too few rewards available, they will also not be able to claim any other reward tokens, as the entire claimRewards function would be reverted.

PoC

The POC can be added to the file token/tests/symmStaking.behavior.ts and run with npx hardhat test --grep "readding token":

```
it("readding token", async () => {
    //Reward token is added for the first time
    await symmStaking.connect(admin).configureRewardToken(await
    usdcToken.getAddress(), true)

    //User1 stakes 100 SYMM
    await stakingToken.connect(user1).approve(await symmStaking.getAddress(),
    e("100"))
    await symmStaking.connect(user1).deposit(e("100"), user1.address)
```

```
//604.8 USDC are notified as rewards
   await usdcToken.approve(await symmStaking.getAddress(), 604800*1000)
   await symmStaking.notifyRewardAmount([await usdcToken.getAddress()],
time.increaseTo(await time.latest() + 2*30*24*60*60) //Wait 2 months
   await symmStaking.connect(user1).claimRewards() //User1 claims his rewards
   await symmStaking.connect(admin).configureRewardToken(await
  usdcToken.getAddress(), false) //The reward token gets removed
   time.increaseTo(await time.latest() + 24*60*60) //Wait 1 day
   //User2 stakes 100 SYMM
   await stakingToken.connect(user2).approve(await symmStaking.getAddress(),

    e("100"))

   await symmStaking.connect(user2).deposit(e("100"), user2.address)
   time.increaseTo(await time.latest() + 24*60*60) //Wait 3 months
   await symmStaking.connect(admin).configureRewardToken(await
→ usdcToken.getAddress(), true) //Reward token is added for the second time
   //1209.6 USDC are notified as rewards
   await usdcToken.approve(await symmStaking.getAddress(), 604800*1000*2)
   await symmStaking.notifyRewardAmount([await usdcToken.getAddress()],
time.increaseTo(await time.latest() + 2*7*24*60*60) //Wait 2 weeks
   //Shows that user2 gets all pending rewards and there is nothing left for user1
   console.log("symmStaking pendingRewards before: ", await
await symmStaking.connect(user2).claimRewards()
   console.log("symmStaking pendingRewards after: ", await
   symmStaking.pendingRewards(await usdcToken.getAddress()))
})
```

Mitigation

No response

Discussion

sherlock-admin2

The protocol team fixed this issue in the following PRs/commits: https://github.com/SYMM-IO/token/pull/5

Issue M-3: Bad check in Vesting.sol::_resetVesting Plans will prevent users from adding additional liquidity in SymmVesting.sol

Source:

https://github.com/sherlock-audit/2025-03-symm-io-stacking-judging/issues/509

Found by

0x73696d616f, 0xBecket, 0xgremlincat555, 0xpiken, Afriaudit, Arav, Beejay, BusinessShotgun, Cybrid, Drynooo, OpaBatyo, Ragnarok, Ryonen, Uddercover, X0sauce, aslanbek, copperscrewer, duckee032, farismaulana, future2_22, hildingr, moray5554, onthehunt, oot2k, silver_eth, slavina, t0xlc, zraxx

Summary

The _resetVestingPlans check makes it impossible to increase a user's locked tokens if the increase does not push the new amount above the total unlocked tokens. This is problematic as it will prevent users from adding additional liquidity to the SymmVesting.sol after a certain number of their lp tokens have been unlocked.

Root Cause

In <u>Vesting.sol:231</u>, the check will cause a revert when a user tries to add additional liquidity

Internal Pre-conditions

The user must already have some vested Ip tokens

External Pre-conditions

NIL

Attack Path

NIL

Impact

Users are unable to add additional liquidity

PoC

Follow the guide <u>here</u> to integrate foundry into this codebase. Then add the following test into a new file:

```
// SPDX-License-Identifier: MIT
pragma solidity >=0.8.18;
import {SymmStaking} from "../../contracts/staking/SymmStaking.sol";
import {Symmio} from "../../contracts/token/symm.sol";
import {MockERC20} from "../../contracts/mock/MockERC20.sol";
import {TransparentUpgradeableProxy} from
import {SymmVesting} from "../../contracts/vesting/SymmVesting.sol";
import {Test, console} from "forge-std/Test.sol";
contract TestSuite is Test {
   SymmStaking symmStaking;
   Symmio symm;
   SymmStaking implementation;
   SymmVesting symmVesting;
   SymmVesting vestingImplementation;
   address rewardToken;
   address admin;
   address lockedClaimPenaltyReceiver;
   address pool;
   address router;
   address permit2;
   address vault;
    address usdc;
   address symm_lp;
    function setUp() public {
       admin = makeAddr("admin");
       lockedClaimPenaltyReceiver = makeAddr("lockedClaimPenaltyReceiver");
       pool = 0x94Bf449AB92be226109f2Ed3CE2b297Db94bD995;
       router = 0x76578ecf9a141296Ec657847fb45B0585bCDa3a6;
       permit2 = 0x000000000022D473030F116dDEE9F6B43aC78BA3;
       vault = 0xbA13333333333331BA1108E8412f11850A5C319bA9;
       usdc = 0x833589fCD6eDb6E08f4c7C32D4f71b54bdA02913;
       symm_lp = 0x94Bf449AB92be226109f2Ed3CE2b297Db94bD995;
       symm = Symmio(0x800822d361335b4d5F352Dac293cA4128b5B605f);
       implementation = new SymmStaking();
       vestingImplementation = new SymmVesting();
       TransparentUpgradeableProxy proxy = new
   TransparentUpgradeableProxy(address(implementation), admin, "");
       TransparentUpgradeableProxy vestingProxy =
           new TransparentUpgradeableProxy(address(vestingImplementation), admin,
```

```
symmStaking = SymmStaking(address(proxy));
       symmVesting = SymmVesting(address(vestingProxy));
       vm.startPrank(admin);
       symmStaking.initialize(admin, address(symm));
       symmVesting.initialize(
           admin, lockedClaimPenaltyReceiver, pool, router, permit2, vault,
   address(symm), usdc, symm_lp
       rewardToken = address(new MockERC20("Token", "TOK"));
       vm.stopPrank();
  function
→ testUsersWillBeUnableToProvideLiquidityAfterACertainNumberOfUnlockedTokens()
 public {
       //admin creates user vest with symm
       address user = makeAddr("user");
       uint256 userVestAmount = 10e18;
       uint256 totalVestedSymmAmount = 100e18;
       uint256 startTime = block.timestamp;
       uint256 endTime = block.timestamp + 10 days;
       deal(usdc, user, 1000e18);
       address[] memory users = new address[](1);
       users[0] = user;
       uint256[] memory amounts = new uint256[](1);
       amounts[0] = userVestAmount;
       vm.startPrank(admin);
       deal(address(symm), address(symmVesting), totalVestedSymmAmount);
       symmVesting.setupVestingPlans(address(symm), startTime, endTime, users,
   amounts);
       vm.stopPrank();
       //user adds half their vested tokens as liquidity
       vm.startPrank(user);
       MockERC20(usdc).approve(address(symmVesting), type(uint256).max);
       symmVesting.addLiquidity(userVestAmount / 2, 0, 0);
       vm.stopPrank();
       //move time so more than half of created symm lp vesting tokens are unlocked
       vm.warp(block.timestamp + 7 days);
       uint256 secondLiquidityAmount = symmVesting.getLockedAmountsForToken(user,
   address(symm));
       //second addLiquidity call will revert with "AlreadyClaimedMoreThanThis"
   error
```

```
vm.startPrank(user);
    MockERC20(usdc).approve(address(symmVesting), type(uint256).max);
    vm.expectRevert();
    symmVesting.addLiquidity(secondLiquidityAmount, 0, 0);
    vm.stopPrank();
}
```

Mitigation

Remove the check:

```
function _resetVestingPlans(address token, address[] memory users, uint256[] memory
    amounts) internal {
        if (users.length != amounts.length) revert MismatchArrays();
        uint256 len = users.length;
        for (uint256 i = 0; i < len; i++) {
            address user = users[i];
            uint256 amount = amounts[i];
            _claimUnlockedToken(token, user);
            VestingPlan storage vestingPlan = vestingPlans[token][user];
            if (amount < vestingPlan.unlockedAmount()) revert

            AlreadyClaimedMoreThanThis();
            uint256 oldTotal = vestingPlan.lockedAmount();
            vestingPlan.resetAmount(amount);
            totalVested[token] = totalVested[token] - oldTotal + amount;
            emit VestingPlanReset(token, user, amount);
        }
    }
}</pre>
```

Discussion

sherlock-admin2

The protocol team fixed this issue in the following PRs/commits: https://github.com/SYMM-IO/token/pull/3

Issue M-4: Malicious User can dilute staking Rewards to a longer timeframe

Source:

https://github.com/sherlock-audit/2025-03-symm-io-stacking-judging/issues/595

Found by

Oday, 0xAristos, 0xBecket, 0xDarko, 0xcOffEE, 0xhammadghazi, 0xkmg, 0xlucky, 0xmechanic, 0xpiken, AbhanlO4l, Akhuemokhan.ETH, Anirruth, Arav, Artur, Audinarey, BAdal-Sharma-09, Boy2000, Breeje, BusinessShotgun, DenTonylifer, DharkArtz, Drynooo, Edoscoba, ElmInNyc99, EmanHerawy, Flare, Fortis_Audits, Frontrunner, HaidutiSec, KlosMitSoss, LSH.F.GJ, Limbooo, LonWof-Demon, MSK, Matin, MysteryAuditor, OpaBatyo, Opeyemi, Pablo, Pelz, Pro_King, Ryonen, SUPERMAN_I4G, SarveshLimaye, Silvermist, SlayerSecurity, Waydou, X0sauce, X12, Yaneca_b, ZoA, arman, aslanbek, aswinraj94, auditism, auditmasterchef, brgltd, buggsy, copperscrewer, dimah7, dobrevaleri, durov, eta, farismaulana, future2_22, ggbond, gkrastenov, hildingr, ihtishamsudo, ilyadruzh, jol3, komane007, korok, krot-0025, moray5554, newspacexyz, novaman33, omega, onthehunt, osuolale, oxwhite, phoenixv110, redbeans, redtrama, roccomania, santiellena, shui, silver_eth, spdream, stuart_the_minion, t.aksoy, t0x1c, turvec, udo, vladi319, x0lohaclohell, y4y, yaioxy, ydlee

Summary

The SymmStaking contract allows anyone to add new rewards using the notifyRewardAmount function. However, if new rewards are continuously added while existing rewards are still active, the total rewards get spread over a longer period. A malicious actor can exploit this by repeatedly adding tiny amounts, effectively delaying stakers from receiving their full rewards.

Root Cause

- notifyRewardAmount function can be called by anyone, with any reward amount.
- Each time it's called, the reward rate is recalculated as:
 - amount / state.duration (if the previous reward period has ended).
 - (amount + leftover) / state.duration (if the previous reward period is still ongoing).

The issue arises when an attacker keeps adding tiny amounts (e.g., 1 wei) repeatedly. While the total rewards (amount + leftover) barely change, the duration (state.duration) remains fixed at 1 week, causing the reward rate to drop significantly over time.

Example:

- 1. Alice is the only staker, and 100 USDC is added as a reward.
- 2. Halfway through, Alice has earned 50 USDC.
- 3. A malicious user then adds just 1 wei USDC as a new reward.
- 4. This recalculates the reward rate, cutting it in half:
 - From 100e6 / 1 week \rightarrow 50e6 / 1 week.
- 5. The attacker can repeat this process multiple times, continuously lowering the rate.

This DoS-like attack prevents stakers from claiming their rewards in a reasonable timeframe.

Internal Pre-conditions

None.

External Pre-conditions

None.

Attack Path

- 1. Users stakes in SymmStaking.
- 2. A new reward is notified via notifyRewardAmount for the stakers.
- 3. A malicious user calls notifyRewardAmount multiple times with dust values to dilute the reward rate.
- 4. User get rewards slower than what they were supposed to get.

Impact

Time to gain the intended reward can be arbitrarily increased by malicious users.

PoC

No response

Mitigation

Consider adding restrictions on who can add new reward. Alternatively, implement a minimum amount of reward tokens that can be added to ensure that the total reward amount is meaningfully increased.

Discussion

sherlock-admin2

The protocol team fixed this issue in the following PRs/commits: https://github.com/SYMM-IO/token/pull/4

Issue M-5: Double spending attack in the Vesting contract

Source:

https://github.com/sherlock-audit/2025-03-symm-io-stacking-judging/issues/650

The protocol has acknowledged this issue.

Found by

0x73696d616f, ge6a

Summary

The function resetVestingPlans() is called by an administrator account and resets vesting plans for a list of users, with the corresponding amount provided as input. The function calls _resetVestingPlans(), where it checks whether the given amount is greater than or equal to the claimed amount for the user. After that, it calls resetAmount() from LibVestingPlan. In this function, the state is updated, the new amount is recorded, and claimedAmount is set to 0.

Root Cause

The issue here is that this can lead to double spending. Even though the user executing the request is trusted, they cannot know whether another transaction has been executed before theirs, in which the user whose vesting plan is being reset has withdrawn their locked amount by paying a penalty fee. If this happens, the user will be able to claim the same amount again after the reset, which would harm other users who might not be able to claim their rewards.

https://github.com/sherlock-audit/2025-03-symm-io-stacking/blob/main/token/contracts/vesting/Vesting.sol#L222-L237

Internal Pre-conditions

None

External Pre-conditions

None

Attack Path

- 1. Trusted user sends a transaction for executes resetVestingPlans()
- 2. Regular user subject of this reset sends a transaction that is executed before the first one and claim their locked tokens as they pay a penalty
- 3. After the reset the user is able to claim the tokens up to amount again

Impact

Loss of funds for the protocol and for the users

PoC

No response

Mitigation

No response

Disclaimers

Sherlock does not provide guarantees nor warranties relating to the security of the project.

Usage of all smart contract software is at the respective users' sole risk and is the users' responsibility.