VIBRANIUM AUDITS

Security Assessment

TechTrees

Vibranium Audits Verified on Oct 22nd, 2022

Vibranium Audits Verified on Oct 22nd, 2022

Techtrees

The security assessment was prepared by Vibranium Audits, the leader in Web 3.0 security.

Executive Summary

TYPES	ECOSYSTEM	METHODS
DeFi	BSC	Manual Review, Static Analysis

LANGUAGE	TIMELINE	KEY COMPONENTS
Solidity	Delivered on 10/22/2022	N/A

CODEBASE

Private Repository

https://bscscan.com/address/0x6a684b3578f5b07c0aa02fafc33ed248ae0c2db2

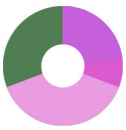
...View All

COMMITS

aab075ed32a93586e1dea5da17acff47dbb12aec68c723ad1172f4770aaef06860ae540f02945a01

...View All

Vulnerability Summary



13	2	1	1	9	0	0
Total Findings	Resolved	Mitigated	Partially Resolved	Acknowledged	Declined	Unresolved

0	Critical		Critical risks are those that impact the safe functioning of a platform and must be addressed before launch. Users should not invest in any project with outstanding critical risks.
3	Major	1 Mitigated, 2 Acknowledged	Major risks can include centralization issues and logical errors. Under specific circumstances, these major risks can lead to loss of funds and/or control of the project.
1	Medium	1 Partially Resolved	Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.
5	Minor	1 Resolved, 4 Acknowledged	Minor risks can be any of the above, but on a smaller scale. They generally do not compromise the overall integrity of the project, but they may be less efficient than other solutions.
4	Informational	1 Resolved, 3 Acknowledged	Informational errors are often recommendations to improve the style of the code or certain operations to fall within industry best practices. They usually do not affect the overall functioning of the code.

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Disclaimer

CODEBASE | TECHTREES

Repository

Private Repository

https://bscscan.com/address/0x6a684b3578f5b07c0aa02fafc33ed248ae0c2db2

https://github.com/TechTreeCoin/staking

Commit

aab075ed32a93586e1dea5da17acff47dbb12aec

68c723ad1172f4770aaef06860ae540f02945a01

AUDIT SCOPE | TECHTREES

3 files audited ● 2 files with Acknowledged findings ● 1 file without findings

ID	File	SHA256 Checksum
TTC	staking/TechTreesCoinStaking.sol	82f0412b9f98247d46db328443b6472e2e967fa5a02e6698185e82b4338a874c
TTT	TechTreesCoin.sol	c406798c770020609c0a6ca74554c3a3c9e17e6433a57c051714d0959c96b11c
IPT	interfaces/IPoint.sol	5093451f38e6833203264e636d4f92ca1f97abd5f7e53def3111a61a6513c533

APPROACH & METHODS | TECHTREES

This report has been prepared for Techtrees to discover issues and vulnerabilities in the source code of the Techtrees project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Manual Review and Static Analysis techniques.

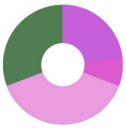
The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Testing the smart contracts against both common and uncommon attack vectors;
- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.

FINDINGS | TECHTREES



13	0	3	1	5	4
Total Findings	Critical	Major	Medium	Minor	Informational

This report has been prepared to discover issues and vulnerabilities for Techtrees. Through this audit, we have uncovered 13 issues ranging from different severity levels. Utilizing the techniques of Manual Review & Static Analysis to complement rigorous manual code reviews, we discovered the following findings:

ID	Title	Category	Severity	Status
TTC-01	**Initial Token Distribution**	**Centralization / Privilege**	**Major**	**Mitigated**
TTC-02	**Centralization Risks In TechTreesCoin.Sol**	**Centralization / Privilege**	**Major**	**Acknowledged**
TTC-03	**Centralization Risks In TechTreesCoinStaking.Sol**	**Centralization / Privilege**	**Major**	**Acknowledged**
TTC-04	Inconsistent Logic	Logical Issue, Volatile Code	Medium	Partially Resolved
TTC-05	Missing Zero Address Validation	Volatile Code	Minor	Acknowledged
TTC-06	Usage Of `transfer` / `send` For Sending Ether	Volatile Code	Minor	Acknowledged
TTC-07	Unchecked ERC-20 `transfer()` / `transferFrom()` Call	Volatile Code	Minor	Acknowledged
TTC-08	`initTokens()` Can Be Called Multiple Times	Volatile Code, Logical Issue	Minor	Resolved
TTT-01	Lack Of Reasonable Boundary	Volatile Code	Minor	Acknowledged
TCK-01	Missing Emit Events (Arithmetic Parameter)	Language Specific	Informational	Resolved
TCK-02	Lack Of Documentation	Coding Style	Informational	Acknowledged

ID	Title	Category	Severity	Status
TTT-02	Too Many Digits	Coding Style	Informational	Acknowledged
TTT-03	Whitelist Privileges Kept When Transferring Ownership	Logical Issue	Informational	Acknowledged

TTC-01 | INITIAL TOKEN DISTRIBUTION

Category	Severity	Location	Status
Centralization / Privilege	**Major**	**0×6a684b3578f5b07c0aa02fafc33ed248ae0c2db2 (address): 1252**	**Mitigated**

Description

Tokens are sent to the deployer when deploying the contract. This could be a centralization risk as the deployer can distribute tokens without obtaining the consensus of the community.

Recommendation

We recommend the team to be transparent regarding the initial token distribution process, and the team shall make enough efforts to restrict the access of the private key.

Alleviation

[Vibranium Audits]: The initial token distribution has been documented in commit68c723ad1172f4770aaef06860ae540f02945a01.

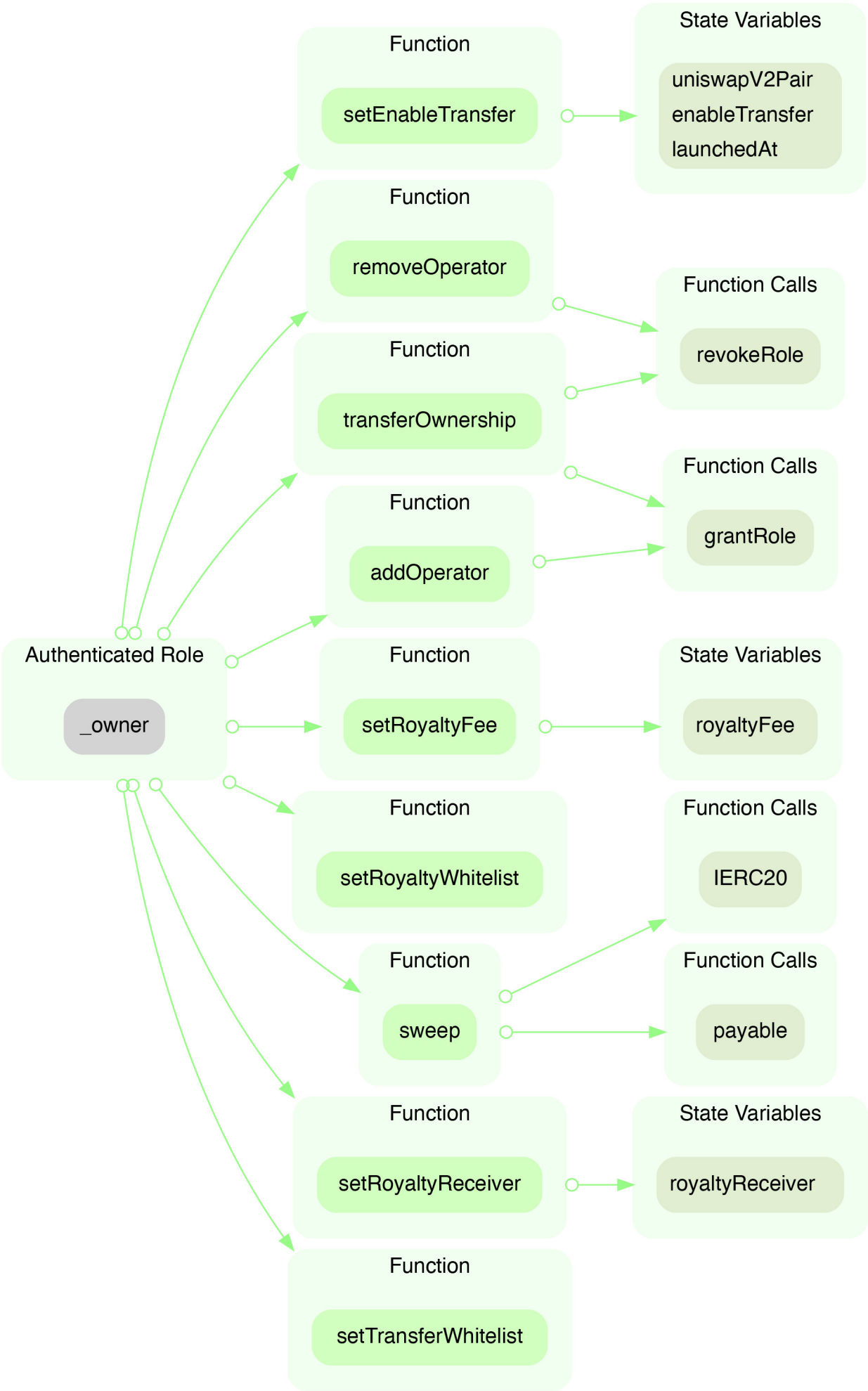
TTC-02 | CENTRALIZATION RISKS IN TECHTREESCOIN.SOL

Category	Severity	Location	Status
Centralization / Privilege	**Major**	**0×6a684b3578f5b07c0aa02fafc33ed248ae0c2db2 (address): 647, 655, 937, 1323, 1327, 1331, 1337, 1344, 1351, 1355, 1359, 1370**	**Acknowledged**

Description

In the contract `TechTreesCoin` the role `_owner` has authority over the functions shown in the diagram below. Any compromise to the `_owner` account may allow the hacker to take advantage of this authority, allowing them to receive all future tokens by:

1. removing all users in the royalty whitelist;
2. setting themselves as the royalty receiver;
3. setting the royalty fee to 100%.


Function
setEnableTransfer
State Variables
uniswapV2Pair
enableTransfer
launchedAt
Function
removeOperator
Function Calls
revokeRole
Function
transferOwnership
Function Calls
grantRole
Function
addOperator
Authenticated Role
_owner
Function
setRoyaltyFee
State Variables
royaltyFee
Function
setRoyaltyWhitelist
Function Calls
IERC20
Function
sweep
Function Calls
payable
Function
setRoyaltyReceiver
State Variables
royaltyReceiver
Function
setTransferWhitelist

The risk describes the current project design and potentially makes iterations to improve in the security operation and level of decentralization, which in most cases cannot be resolved entirely at the present stage. We advise the client to carefully manage the privileged account's private key to avoid any potential risks of being hacked. In general, we strongly recommend centralized privileges or roles in the protocol be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices, e.g., multisignature wallets. Indicatively, here are some feasible suggestions that would also mitigate the potential risk at a different level in terms of short-term, long-term and permanent:

Short Term:

Timelock and Multi sign (⅔, ⅗) combination *mitigate* by delaying the sensitive operation and avoiding a single point of key management failure.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
  AND
- Assignment of privileged roles to multi-signature wallets to prevent a single point of failure due to the private key compromised;
  AND
- A medium/blog link for sharing the timelock contract and multi-signers addresses information with the public audience.

Long Term:

Timelock and DAO, the combination, *mitigate* by applying decentralization and transparency.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
  AND
- Introduction of a DAO/governance/voting module to increase transparency and user involvement.
  AND
- A medium/blog link for sharing the timelock contract, multi-signers addresses, and DAO information with the public audience.

Permanent:

Renouncing the ownership or removing the function can be considered *fully resolved*.

- Renounce the ownership and never claim back the privileged roles.
  OR
- Remove the risky functionality.

Alleviation

`[TechTrees]`: Issue acknowledged. I will fix the issue in the future, which will not be included in this audit engagement. We plan to renounce the ownership, and it is mentioned in the whitepaper available publicly.

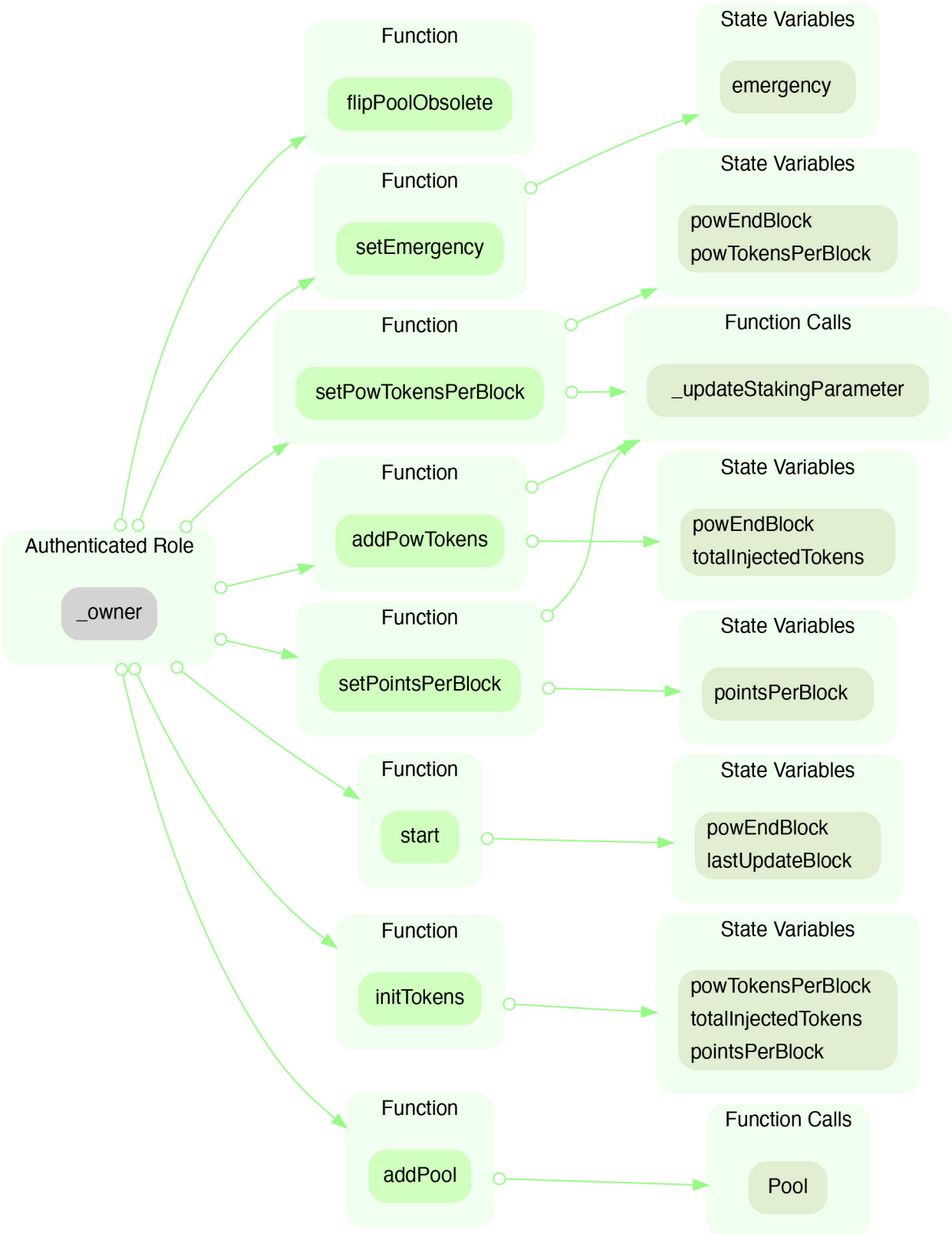
TTC-03 | CENTRALIZATION RISKS IN TECHTREESCOINSTAKING.SOL

Category	Severity	Location	Status
Centralization / Privilege	**Major**	**TechTreesCoinStaking.sol#L73-L73--:-73;-TechTreesCoinStaking.sol#L85-L85--:85;-TechTreesCoinStaking.sol#L97-L97):-97;-TechTreesCoinStaking.sol#L104-L104--CertiKP-roject):-104;-TechTreesCoinStaking.sol#L113-L113--C-ertiKProject):-113;-TechTreesCoinStaking.sol#L120-L120--):-120;-TechTreesCoinStaking.sol#L134-L134--):-134;-TechTreesCoinStakin-g.sol#L138-L138--):-138**	**Acknowledged**

Description

In the contract `TechTreesCoinStaking` the role `_owner` has authority over the functions shown in the diagram below. Any compromise to the `_owner` account may allow the hacker to take advantage of this authority and:

- mark every existing pool as obsolete;
- set a state of emergency, allowing all users to immediately withdraw all their staked tokens;
- set state variables, affecting the pool logic on withdraws and deposits.



Recommendation

The risk describes the current project design and potentially makes iterations to improve in the security operation and level of decentralization, which in most cases cannot be resolved entirely at the present stage. We advise the client to carefully manage the privileged account's private key to avoid any potential risks of being hacked. In

general, we strongly recommend centralized privileges or roles in the protocol be improved via a decentralized mechanism or smart-contract-based accounts with enhanced security practices, e.g., multisignature wallets. Indicatively, here are some feasible suggestions that would also mitigate the potential risk at a different level in terms of short-term, long-term and permanent:

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Timelock and Multi sign (⅔, ⅗) combination *mitigate* by delaying the sensitive operation and avoiding a single point of key management failure.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
  AND
- Assignment of privileged roles to multi-signature wallets to prevent a single point of failure due to the private key compromised;
  AND
- A medium/blog link for sharing the timelock contract and multi-signers addresses information with the public audience.

Long Term:

Timelock and DAO, the combination, *mitigate* by applying decentralization and transparency.

- Time-lock with reasonable latency, e.g., 48 hours, for awareness on privileged operations;
  AND
- Introduction of a DAO/governance/voting module to increase transparency and user involvement.
  AND
- A medium/blog link for sharing the timelock contract, multi-signers addresses, and DAO information with the public audience.

Permanent:

Renouncing the ownership or removing the function can be considered *fully resolved*.

- Renounce the ownership and never claim back the privileged roles.
  OR
- Remove the risky functionality.

Alleviation

[Vibranium Audits] : The team acknowledged the finding and decided to remain unchanged.

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