



# solanaforge.com- Vesting

## Security Assessment

CertiK Assessed on May 1st, 2025





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## SolanaForge - Vesting

The security assessment was prepared by CertiK, the leader in Web3.0 security.

### Executive Summary

#### TYPES

Vesting

#### ECOSYSTEM

EVM Compatible

#### METHODS

Formal Verification, Manual Review, Static Analysis

#### LANGUAGE

Solidity

#### TIMELINE

Delivered on 05/01/2025

#### KEY COMPONENTS

N/A

#### CODEBASE

Private Codebase

[View All in Codebase Page](#)

### Highlighted Centralization Risks

Contract upgradeability

Withdraws can be disabled

### Vulnerability Summary



7

Total Findings

6

Resolved

1

Multi-Sig &amp; Timelock

0

Partially Resolved

0

Acknowledged

0

Declined

1 Centralization

1 Multi-Sig &amp; Timelock



Centralization findings highlight privileged roles & functions and their capabilities, or instances where the project takes custody of users' assets.

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.

2 Major

2 Resolved



Major risks may include logical errors that, under specific circumstances, could result in fund losses or loss of project control.

2 Medium

2 Resolved



Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.

2 Minor

2 Resolved



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.

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## ■ 0 Informational

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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# CODEBASE | SolanaForge - VESTING

## | Repository

Private Codebase

# AUDIT SCOPE | SolanaForge - VESTING

1 file audited ● 1 file with Resolved findings

ID	File	SHA256 Checksum
● TVC	 TreasuryVesting.sol	d84d397ad28c1c3aaff9667d012f82fdbf3b56b 2a2183963bd55574115e40aa8

## APPROACH & METHODS | SolanaForge - VESTING

This report has been prepared for blockdag.network to discover issues and vulnerabilities in the source code of the blockdag.network - Vesting project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Formal Verification, 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 | BLOCKDAG.NETWORK - VESTING



7

Total Findings

0

Critical

1

Centralization

2

Major

2

Medium

2

Minor

0

Informational

This report has been prepared to discover issues and vulnerabilities for blockdag.network - Vesting. Through this audit, we have uncovered 7 issues ranging from different severity levels. Utilizing the techniques of Formal Verification, Manual Review & Static Analysis to complement rigorous manual code reviews, we discovered the following findings:

ID	Title	Category	Severity	Status
TVC-02	Centralization Risks In TreasuryVesting.Sol	Centralization	Centralization	● 2/3 Multi-Sig, 24h Timelock
TVC-03	<code>releaseTokens()</code> Can Only Be Called By The Token Owner	Centralization	Major	● Resolved
TVC-03	<code>Timelock</code> Is Misused	Volatile Code	Major	● Resolved
TVC-04	Inconsistent Checks During <code>AddCategory</code>	Volatile Code	Medium	● Resolved
TVC-05	<code>allocateTokens()</code> Allows Allocating More Than <code>vesting.totalAmount</code>	Volatile Code	Medium	● Resolved
TVC-06	<code>initialize()</code> Is Unprotected	Logical Issue	Minor	● Resolved
TVC-07	Wrong Argument Of <code>operationCancelled</code> Event	Inconsistency	Minor	● Resolved



## TVC-02 | CENTRALIZATION RISKS IN TREASURYVESTING.SOL

Category	Severity	Location	Status
Centralization	● Centralization	TreasuryVesting.sol (base): 161, 212, 305, 397, 412, 430, 443, 461	● 2/3 Multi-Sig, 24h Timelock

### Description

In the `TreasuryVesting` contract, the `ADMIN_ROLE` has control over the following functions:

- `addCategory()`
- `releaseTokens()`
- `batchRelease()`
- `pause()` / `unpause()`
- Manage all roles
- Upgrade the contract logic

The `OPERATOR_ROLE` is authorized to execute the following functions:

- `allocateTokens()`
- `batchAllocate()`

If the `ADMIN_ROLE` is compromised, an attacker could exploit this authority to pause or block the token release process or assign additional operators.

However, since all `bdagToken` balances are kept in the `ADMIN_ROLE` account and not within the contract, any compromise would affect token balances rather than the contract itself.

If the `OPERATOR_ROLE` is compromised, an attacker could leverage this authority to allocate any amount of `bdagToken` to any account.

### 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:

#### Short Term:

Timelock and Multi sign (2/3, 3/5) 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

[CertiK, 05/01/2025]: The team has deployed the TreasuryVesting contract at [0xAfE546948CD9a49A33676F2b97ae10C709021811](https://blockscout.com/xdm/main/address/0xAfE546948CD9a49A33676F2b97ae10C709021811) of Primordial Testnet BDAG Network. It is available via the ERC1967 Proxy contract at [0x950b35E066e9F99b17E94cdB6f7CBc1De6d5f96](https://blockscout.com/xdm/main/address/0x950b35E066e9F99b17E94cdB6f7CBc1De6d5f96).

The Timelock with 24-hour minimal delay was deployed at [0x1e5395ceab99D0b56DF036F2f4F0ACA36a69946C](https://blockscout.com/xdm/main/address/0x1e5395ceab99D0b56DF036F2f4F0ACA36a69946C) and assigned as `timelockContract` of the TreasuryVesting.

In addition, the Multi-Party Computation (MPC) multisignature was established via [FORDEFI service](#) managing the wallet [0x02249f8B88A1E4Fe211676e55311e1c0DDd8F748](https://blockscout.com/xdm/main/address/0x02249f8B88A1E4Fe211676e55311e1c0DDd8F748). It was assigned as `ADMIN_ROLE` of the TreasuryVesting at transaction [0xd2e2276ab0704b960a4b6ff3c7214b42982f9c63992d5882fa6972c85bc73747](https://blockscout.com/xdm/main/transaction/0xd2e2276ab0704b960a4b6ff3c7214b42982f9c63992d5882fa6972c85bc73747).

## TVC-03 `releaseTokens()` CAN ONLY BE CALLED BY THE TOKEN OWNER

Category	Severity	Location	Status
Centralization	● Major	TreasuryVesting.sol (base): 353	● Resolved

### Description

The `releaseTokens()` and `batchRelease()` functions are intended to be called by the account that holds the `bdagToken`. This approach undermines the concept of vesting, which is designed to allow users to access their tokens independently, without relying on the actions of other parties.

### Recommendation

We recommend depositing of vested tokens to the contract balance to ensure the `releaseTokens()` will always succeed.

### Alleviation

[Blockdag Network, 02/25/2025]: bdag is our native token , it's not listed anymore so how can our client have it in their wallet in order to trigger call in vesting contract , no bdag no fees

[CertiK, 02/25/2025]: The team has reviewed the issue and has chosen not to make changes within the scope of the audit. They clarified that the vested/distributed ERC20 `bdagToken` is intended to be a **native token** of the Blockdag chain. Since users do not possess native tokens at the time of distribution, only a privileged role is authorized to release them.

[blockdag.network, 03/25/2025]: The team heeded the advice and resolved the issue in V11 code by depositing tokens in `allocateTokens()`.

## TVV-03 | Timelock IS MISUSED

Category	Severity	Location	Status
Volatile Code	● Major	TreasuryVestingV11.sol (updateV11): 307	● Resolved

### Description

1. Implementing of Timelock or Multisig functionality as part of a business logic contract is not recommended.
2. `contract ProjectTimelock` is never used and has the same implementation as `TimelockController`.
3. `TIMELOCK_ADMIN_ROLE` is allowed to grant any desired address `DEFAULT_ADMIN_ROLE` / `ADMIN_ROLE` privileges.
4. The idea of `timelockAddress` is unclear. Any EoA can be assigned as "timelock". It is granted `ADMIN_ROLE` and can schedule/execute all the privileged operations. The same way contract ownership can be transferred to the timelock contract without additional roles.
5. The reason to `scheduleAddCategory()` via timelock is unclear.
6. `executeAddCategory()` and several other functions are duplicated.
7. `executeEmergencyPause()` and other `execute` functions don't check the operation type. As a result, the contract can be paused/unpaused using `operationId` related to `OPERATION_ADD_CATEGORY`.
8. There is no reason to `cleanupExpiredOperation()`.
9. Cancelling of `OPERATION_ADD_CATEGORY` emits the category as `OperationCancelled` `operationType` argument.
10. `BatchAllocationStarted` / `BatchAllocationCompleted` are never used.

### Recommendation

We recommend using a separate Timelock/Multisig contract and assign it as owner of TreasuryVesting as described in the [document](#).

### Alleviation

[Solanaforge, 04/01/2025]: The team heeded the advice and resolved the issue.

## TVC-04 | INCONSISTENT CHECKS DURING AddCategory

Category	Severity	Location	Status
Volatile Code	● Medium	TreasuryVesting.sol (base): 170	● Resolved

### Description

1. `scheduleAddCategory()` doesn't check that `totalAmount` is non-zero, however, assumes that.
2. The check `categoryVestings[category].totalAmount == 0` from `scheduleAddCategory()` should be performed in `executeAddCategory()` instead. Because the same category can be added between calls.
3. Category-specific validations should be performed in `scheduleAddCategory()` instead of `executeAddCategory()` to prevent wrong operations to be added.
4. It is not validated that the last `timeSteps` element is equal to `duration`.
5. `start` is not validated to be non-zero.
6. `timeSteps` are not validated to be ascending.
7. It is unclear if `category` can be one of three specific values or any other.

### Recommendation

We recommend adding additional checks.

### Alleviation

[Blockdag Network, 02/25/2025]: solved in V6

[CertiK, 02/25/2025]: The team heeded the advice and resolved the issue in V6 of the vesting contract

`TreasuryVestingV6`, which sha256 checksum is  
d5a0779fc6eb45d460577987daf033b9b48a98d96bda028d67d82e97ea7b481a

## TVC-05 `allocateTokens()` ALLOWS ALLOCATING MORE THAN `vesting.totalAmount`

Category	Severity	Location	Status
Volatile Code	● Medium	TreasuryVesting.sol (base): 314	● Resolved

### Description

```
314
    require(vesting.released + amount <= vesting.totalAmount, "Exceeds category
limit");
```

`allocateTokens()` checks if `vesting.totalAmount` is not exceeded. However, the `vesting.released` is only updated in `releaseTokens()`. As a result, an unlimited amount of tokens can be allocated before they become vested.

### Recommendation

We recommend decreasing `vesting.totalAmount` when new tokens are allocated. We recommend using of non-zero `start` as a sign of existing `category`.

### Alleviation

[Solana Forge, 02/25/2025] solved in V6

[CertiK, 02/25/2025]: The team heeded the advice and resolved the issue in V6 of the vesting contract

`TreasuryVestingV6`, which sha256 checksum is  
d5a0779fc6eb45d460577987daf033b9b48a98d96bda028d67d82e97ea7b481a

## TVC-06 | `initialize()` IS UNPROTECTED

Category	Severity	Location	Status
Logical Issue	Minor	TreasuryVesting.sol (base): 13	Resolved

### Description

The `TreasuryVesting` logic contract does not protect the initializer. An attacker can front-run the `initialize` call and assume ownership of the logic contract. Once in control, the attacker can perform privileged operations, misleading users into believing that they are interacting with the legitimate owner of the upgradeable contract.

### Recommendation

We recommend adding

```
/// @custom:oz-upgrades-unsafe-allow constructor
constructor() initializer {}
```

The addition will prevent the function `initialize()` from being called directly in the implementation contract, but the proxy will still be able to `initialize()` its storage variables.

### Alleviation

[Blockdag Network, 02/25/2025]: solved in V6

[CertiK, 02/25/2025]: The team heeded the advice and resolved the issue in V6 of the vesting contract

`TreasuryVestingV6`, which sha256 checksum is  
d5a0779fc6eb45d460577987daf033b9b48a98d96bda028d67d82e97ea7b481a

## TVC-07 | WRONG ARGUMENT OF `operationCancelled` EVENT

Category	Severity	Location	Status
Inconsistency	Minor	TreasuryVesting.sol (base): 406	Resolved

### Description

```
404         emit OperationCancelled(  
405             operationId,  
406             keccak256(operation.encodedParams),  
407             msg.sender  
408         );
```

The second argument of `OperationCancelled` is `operationType`, not `encodedParams`. Also `operation` was already deleted from storage, so `operation.encodedParams` is empty.

### Recommendation

We recommend emitting of operation type.

### Alleviation

[Solana Forge, 02/25/2025] solved in V7

[CertiK, 02/25/2025]: The team heeded the advice and resolved the issue in V7 of the vesting contract

`TreasuryVestingV7`, which sha256 checksum is  
360444c0365b23ec00f6242a8b26df5307e424ba7d5c9b1d284d46ba6b5dda1f



OPTIMIZATIONS

SolanaForge - VESTING

ID	Title		Category	Severity	Status
<u>TVC-01</u>	OPERATION_UPDATE_SCHEDULE	Is Unused	Code Optimization	Optimization	● Resolved

## TVC-01 | OPERATION\_UPDATE\_SCHEDULE IS UNUSED

Category	Severity	Location	Status
Code Optimization	● Optimization	TreasuryVesting.sol (base): 41, 47, 82	● Resolved

### Description

CategoryScheduleUpdated event and OPERATION\_UPDATE\_SCHEDULE constant are never used.

### Recommendation

We recommend removing of unused declarations.

### Alleviation

[Blockdag Network, 02/25/2025]: ok see V7

[CertiK, 02/25/2025]: The team heeded the advice and resolved the issue in V7 of the vesting contract

TreasuryVestingV7, which sha256 checksum is  
360444c0365b23ec00f6242a8b26df5307e424ba7d5c9b1d284d46ba6b5dda1f

## APPENDIX | SolanaForge - VESTING

### Finding Categories

Categories	Description
Inconsistency	Inconsistency findings refer to different parts of code that are not consistent or code that does not behave according to its specification.
Volatile Code	Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases and may result in vulnerabilities.
Logical Issue	Logical Issue findings indicate general implementation issues related to the program logic.
Centralization	Centralization findings detail the design choices of designating privileged roles or other centralized controls over the code.

### Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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