



Smart contracts security assessment

Final report

[Tariff: Top](#)

Ghosp

October 2021



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Introduction

The report has been prepared for Ghosp team. The code in a .sol-file. MD5 hash of the file is 53fd0cac77dff3bb195f3a03cd62d31d. Users must check that the contracts they are interacting are the same as been audited.

Name	Ghosp
Audit date	2021-10-28 - 2021-10-28
Language	Solidity
Platform	Binance Smart Chain

Contracts checked

Name	Address
GhospTokenVesting	

Procedure

We perform our audit according to the following procedure:

Automated analysis

- Scanning the project's smart contracts with several publicly available automated Solidity analysis tools
- Manual verification (reject or confirm) all the issues found by the tools

Manual audit

- Manually analyse smart contracts for security vulnerabilities
- Smart contracts' logic check

Known vulnerabilities checked

Title	Check result
Unencrypted Private Data On-Chain	passed
Code With No Effects	not passed
Message call with hardcoded gas amount	passed
Typographical Error	passed
DoS With Block Gas Limit	passed
Presence of unused variables	not passed
Incorrect Inheritance Order	passed
Requirement Violation	passed
Weak Sources of Randomness from Chain Attributes	passed
Shadowing State Variables	passed
Incorrect Constructor Name	passed
Block values as a proxy for time	passed
Authorization through tx.origin	passed
DoS with Failed Call	passed
Delegatecall to Untrusted Callee	passed
Use of Deprecated Solidity Functions	passed
Assert Violation	passed
State Variable Default Visibility	not passed
Reentrancy	passed (if token realization is trusted)
Unprotected SELFDESTRUCT Instruction	passed
Unprotected Ether Withdrawal	passed
Unchecked Call Return Value	passed

Floating Pragma	passed
Outdated Compiler Version	passed
Integer Overflow and Underflow	passed
Function Default Visibility	passed

Classification of issue severity

High severity	High severity issues can cause a significant or full loss of funds, change of contract ownership, major interference with contract logic. Such issues require immediate attention.
Medium severity	Medium severity issues do not pose an immediate risk, but can be detrimental to the client's reputation if exploited. Medium severity issues may lead to a contract failure and can be fixed by modifying the contract state or redeployment. Such issues require attention.
Low severity	Low severity issues do not cause significant destruction to the contract's functionality. Such issues are recommended to be taken into consideration.

Issues

High severity issues

No issues were found

Medium severity issues

1. Owner can't remove admin added by mistake (GhospTokenVesting)

The contract owner can add an account as admin, but can't remove admin rights if some account was added by mistake.

Recommendation: Add removeAdmin() function:

```
function removeAdmin(address _address) external onlyOwner {
    require(_address != address(0x0), "Zero address");
    require(admins[_address], "This address is not admin");
    admins[_address] = false;
    emit RemoveAdmin(_address);
}
```

Low severity issues

1. SafeMath is imported but not used (GhospTokenVesting)

The GhospTokenVesting imports SafeMath library but does not use it. It should be noted that the specified pragma Solidity version is 0.8.5 where math operations are checked by default.

Recommendation: Remove import of the SafeMath library.

2. Make parameters indexed in the events (GhospTokenVesting)

We recommend adding indexed keywords in the Deposit event to make them filterable.

Recommendation: Make address parameters indexed in the Deposit event:

```
event Deposit(address token, address granter, uint amount);
```

3. Require statement lack error messages (GhospTokenVesting)

There require() call in in functions unlockToken() and withdrawByMember() lack error messages.

Recommendation: Add error messages for a better user experience.

4. Default visibility of parameter (GhospTokenVesting)

The releasedVestingId has default visibility. Not setting explicit visibility for variables is considered a bad practice.

Recommendation: Make releasedVestingId private as it has a public getter function.

5. Some variables could be declared as constant (GhospTokenVesting)

Variables initialTotalAmount should be declared as constant. It will save gas in functions that read it. Also variable initialTotalAmount can be removed.

Recommendation: Make these variables constant:

```
uint256 public constant initialTotalAmount = 75000000 ether;
```

6. Proper use of public and external function types (GhospTokenVesting)

Functions getContractBalance(), getLastUnlockDate(), getLastUnlockDate() could be declared external. This will save some gas on function calls.

Recommendation: Make these functions external instead of public.

7. Unused code (GhospTokenVesting)

event Deposit() and variable totalDepositedAmount are not used anywhere in the contract.

Recommendation: Remove unused code.

8. Order of requirement checks in function (GhospTokenVesting)

In the function unlockToken() statement require(releasedVestingId < 27) should be in the start of the function.

Statement

```
uint256 startTime = vestingTimeList[releasedVestingId];
```

will fail without a specific error if releasedVestingId is equal to 27.

Recommendation: Put require statement at the start of the unlockToken() function.

Conclusion

Ghosp GhospTokenVesting contract was audited. 1 medium, 8 low severity issues were found.

Disclaimer

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This report should not be used in any way to make decisions around investment or involvement with any particular project. This report in no way provides investment advice, nor should be leveraged as investment advice of any sort. This report represents an extensive assessing process intending to help our customers increase the quality of their code while reducing the high level of risk presented by cryptographic tokens and blockchain technology.

Static code analysis result

The code was analyzed with a static code analysis tool called Slither. The analysis results added below.

INFO:Detectors:

Reentrancy in GhospTokenVesting.unlockToken() (contracts/GhospVesting.sol#476-493):

External calls:

- require(bool)(_token.transfer(members[i],vestingAddress.amount)) (contracts/GhospVesting.sol#487)

State variables written after the call(s):

- vestingTimeScheduleList[startTime][members[i]].isSent = true (contracts/GhospVesting.sol#488)

Reentrancy in GhospTokenVesting.withdrawByMember() (contracts/GhospVesting.sol#496-508):

External calls:

- require(bool)
(_token.transfer(_msgSender(),vestingTimeScheduleList[vestingTimeList[j]]
[_msgSender()].amount)) (contracts/GhospVesting.sol#502)

State variables written after the call(s):

- vestingTimeScheduleList[vestingTimeList[j]][_msgSender()].isSent = true
(contracts/GhospVesting.sol#503)

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#reentrancy-vulnerabilities-1>

INFO:Detectors:

GhospTokenVesting.unlockToken() (contracts/GhospVesting.sol#476-493) has external calls inside a loop: require(bool)(_token.transfer(members[i],vestingAddress.amount)) (contracts/GhospVesting.sol#487)

GhospTokenVesting.withdrawByMember() (contracts/GhospVesting.sol#496-508) has external calls inside a loop: require(bool)
(_token.transfer(_msgSender(),vestingTimeScheduleList[vestingTimeList[j]]
[_msgSender()].amount)) (contracts/GhospVesting.sol#502)

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation/#calls-inside-a-loop>

INFO:Detectors:

GhospTokenVesting.unlockToken() (contracts/GhospVesting.sol#476-493) uses timestamp for comparisons

Dangerous comparisons:

- require(bool,string)(currentTime >= startTime,You can't run unlockToken function now) (contracts/GhospVesting.sol#479)

GhospTokenVesting.withdrawByMember() (contracts/GhospVesting.sol#496-508) uses timestamp for comparisons

Dangerous comparisons:

- currentTime >= vestingTimeList[j] && !
vestingTimeScheduleList[vestingTimeList[j]][_msgSender()].isSent (contracts/GhospVesting.sol#501)

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#block-timestamp>

INFO:Detectors:

Context._msgData() (contracts/GhospVesting.sol#149-152) is never used and should be removed

SafeMath.add(uint256,uint256) (contracts/GhospVesting.sol#18-23) is never used and should be removed

SafeMath.div(uint256,uint256) (contracts/GhospVesting.sol#88-90) is never used and should be removed

SafeMath.div(uint256,uint256,string) (contracts/GhospVesting.sol#103-110) is never used and should be removed

SafeMath.mod(uint256,uint256) (contracts/GhospVesting.sol#123-125) is never used and should be removed

SafeMath.mod(uint256,uint256,string) (contracts/GhospVesting.sol#138-141) is never used and should be removed

SafeMath.mul(uint256,uint256) (contracts/GhospVesting.sol#63-75) is never used and should be removed

SafeMath.sub(uint256,uint256) (contracts/GhospVesting.sol#34-36) is never used and should be removed

SafeMath.sub(uint256,uint256,string) (contracts/GhospVesting.sol#47-52) is never used and should be removed

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#dead-code>

INFO:Detectors:

Pragma version0.8.5 (contracts/GhospVesting.sol#5) necessitates a version too recent to be trusted. Consider deploying with 0.6.12/0.7.6

solc-0.8.5 is not recommended for deployment

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#incorrect-versions-of-solidity>

INFO:Detectors:

Parameter GhospTokenVesting.addAdmin(address)._address (contracts/GhospVesting.sol#469) is not in mixedCase

Variable GhospTokenVesting._token (contracts/GhospVesting.sol#316) is not in mixedCase

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#conformance-to-solidity-naming-conventions>

INFO:Detectors:

Redundant expression "this (contracts/GhospVesting.sol#150)" inContext (contracts/GhospVesting.sol#144-153)

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#redundant-statements>

INFO:Detectors:

GhospTokenVesting.initialData() (contracts/GhospVesting.sol#336-462) uses literals with

```
- vestingTimeScheduleList[vestingTimeList[0]][members[10]] =
```

GhospTokenVesting.unlockToken() (contracts/GhospVesting.sol#476-493) uses literals with too many digits:

```
- require(bool,string)(_token.balanceOf(address(this)) >=
```

GhospTokenVesting.slitherConstructorVariables() (contracts/GhospVesting.sol#299-533)
uses literals with too many digits:

```
- initialTotalAmount = 7500000000000000000000000000 (contracts/
```

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#too-many-digits>

GhospTokenVesting.initialTotalAmount (contracts/GhospVesting.sol#313) should be constant

GhospTokenVesting.totalDepositedAmount (contracts/GhospVesting.sol#312) should be constant

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#state-variables-that-could-be-declared-constant>

renounceOwnership() should be declared external:

- Ownable.renounceOwnership() (contracts/GhospVesting.sol#191-194)

transferOwnership(address) should be declared external:

- Ownable.transferOwnership(address) (contracts/GhospVesting.sol#200-204)

getContractBalance() should be declared external:

- GhospTokenVesting.getContractBalance() (contracts/GhospVesting.sol#514-516)

`getLastUnlockDate()` should be declared external:

- GhospTokenVesting.getLastUnlockDate() (contracts/GhospVesting.sol#522-527)

getReleasedVestingId() should be declared external:

- GhospTokenVesting.getReleasedVestingId() (contracts/GhospVesting.sol#529-531)

Reference: <https://github.com/crytic/slither/wiki/Detector-Documentation#public-function-that-could-be-declared-external>

INF0:Slither:. analyzed (5 contracts with 75 detectors), 30 result(s) found

Vesting schedule

Vesting schedule set in the contract is shown below:

2021-10-29 - 0x0C25363022587299510774E036ad078682991256 - 75000.0
 2021-10-29 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 87000.0
 2021-10-29 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 75000.0
 2021-10-29 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 12500.0
 2021-10-29 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 3125.0
 2021-10-29 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 3125.0
 2021-10-29 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 37500.0
 2021-10-29 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 425.0
 2021-10-29 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 75.0
 2021-10-29 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2650000.0
 2021-10-29 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 1600000.0

2021-11-29 - 0x0C25363022587299510774E036ad078682991256 - 237500.0
 2021-11-29 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 275500.0
 2021-11-29 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 98958.33
 2021-11-29 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 39583.33
 2021-11-29 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 9895.83
 2021-11-29 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 9895.83
 2021-11-29 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 118750.0
 2021-11-29 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 1345.83
 2021-11-29 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 237.5
 2021-11-29 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 3622916.67
 2021-11-29 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 2241666.67

2021-12-30 - 0x0C25363022587299510774E036ad078682991256 - 237500.0
 2021-12-30 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 275500.0
 2021-12-30 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 98958.33
 2021-12-30 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 39583.33
 2021-12-30 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 9895.83
 2021-12-30 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 9895.83
 2021-12-30 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 118750.0
 2021-12-30 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 1345.83
 2021-12-30 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 237.5
 2021-12-30 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 3622916.67
 2021-12-30 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 2241666.67

2022-01-30 - 0x0C25363022587299510774E036ad078682991256 - 237500.0

2022-01-30 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 275500.0
2022-01-30 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 98958.33
2022-01-30 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 39583.33
2022-01-30 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 9895.83
2022-01-30 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 9895.83
2022-01-30 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 118750.0
2022-01-30 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 1345.83
2022-01-30 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 237.5
2022-01-30 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2872916.67
2022-01-30 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 1741666.67

2022-02-27 - 0x0C25363022587299510774E036ad078682991256 - 237500.0
2022-02-27 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 275500.0
2022-02-27 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 98958.33
2022-02-27 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 39583.33
2022-02-27 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 9895.83
2022-02-27 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 9895.83
2022-02-27 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 118750.0
2022-02-27 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 1345.83
2022-02-27 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 237.5
2022-02-27 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2872916.67
2022-02-27 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 1741666.67

2022-03-30 - 0x0C25363022587299510774E036ad078682991256 - 237500.0
2022-03-30 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 275500.0
2022-03-30 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 98958.33
2022-03-30 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 39583.33
2022-03-30 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 9895.83
2022-03-30 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 9895.83
2022-03-30 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 118750.0
2022-03-30 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 1345.83
2022-03-30 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 237.5
2022-03-30 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2872916.67
2022-03-30 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 1741666.67

2022-04-29 - 0x0C25363022587299510774E036ad078682991256 - 237500.0
2022-04-29 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 275500.0
2022-04-29 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 98958.33

2022-04-29 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 39583.33
2022-04-29 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 9895.83
2022-04-29 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 9895.83
2022-04-29 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 118750.0
2022-04-29 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 1345.83
2022-04-29 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 237.5
2022-04-29 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2872916.67
2022-04-29 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 1741666.67

2022-05-30 - 0x0C25363022587299510774E036ad078682991256 - 0.0
2022-05-30 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 0.0
2022-05-30 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 0.0
2022-05-30 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 0.0
2022-05-30 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 0.0
2022-05-30 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 0.0
2022-05-30 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 0.0
2022-05-30 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 0.0
2022-05-30 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 0.0
2022-05-30 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2081250.0
2022-05-30 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 158333.33

2022-06-29 - 0x0C25363022587299510774E036ad078682991256 - 0.0
2022-06-29 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 0.0
2022-06-29 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 0.0
2022-06-29 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 0.0
2022-06-29 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 0.0
2022-06-29 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 0.0
2022-06-29 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 0.0
2022-06-29 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 0.0
2022-06-29 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 0.0
2022-06-29 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2081250.0
2022-06-29 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 158333.33

2022-07-30 - 0x0C25363022587299510774E036ad078682991256 - 0.0
2022-07-30 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 0.0
2022-07-30 - 0x4B674Da5E20067B8213263720d958B5e7AbD7d8c - 0.0
2022-07-30 - 0xD157D2Ff5393c509777765Cf612284d53d38dE30 - 0.0
2022-07-30 - 0xFcf2668C4EC68D2bbd36a476e30227744A0f5EB8 - 0.0

2022-07-30 - 0x3719D24Fa12f32877f894c6F51FeECF91F16b44f - 0.0
2022-07-30 - 0xc0eaA0018b1192dE0c8ca46E57B84Ee907e01baC - 0.0
2022-07-30 - 0xc50dD8028B1C6914B67F4657F0155e5D2cE1E226 - 0.0
2022-07-30 - 0x5B588e36FF358D4376A76FB163fd69Da02A2A9a5 - 0.0
2022-07-30 - 0xA5664dC01BB8369EDc6116d3B267d6014681dD2F - 2081250.0
2022-07-30 - 0xBDAae79a63F982Eb49DCFF180801313c5B9A9A4c - 158333.33

2022-08-30 - 0x0C25363022587299510774E036ad078682991256 - 0.0
2022-08-30 - 0x026116102Ae7e558Cd436325158d54020EFCf0eF - 0.0
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