QuillAudits

Audit Report
July, 2022

For

NUGEN COIN

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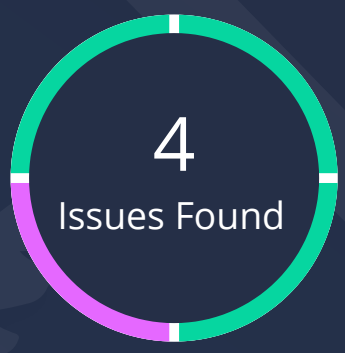
Executive Summary

Project Name	Nugen Token Airdrop
Overview	NUGEN is the indigenous coin of the NUGEN platform. It is a BEP-20 standard token built on the robust Binance Smart Chain network. NUGEN will serve as a collateralized token that facilitates cryptocurrency payments on the network.
Timeline	4 July, 2022 - 8 July, 2022
Method	Manual Review, Functional Testing, Automated Testing etc.
Scope of Audit	*https://testnet.bscscan.com/address/0x7b00eCc038E9c5F6a967dd079F98c41adb51e1C0#code*
Fixed in	*https://gitlab.com/stsblockchain/neugen-smart-contract/-/blob/main/airdrop.sol*
Commit Hash	f23e58fe8b860b0f33218ac5ef79dc70265e491b
BSC Mainnet Address	0x55d8Bf309079CBf6bdF0753283Dbe57e58EbE116



High
Medium
Low
Informational

	High	Medium	Low	Informational
Open Issues	0	0	0	0
Acknowledged Issues	0	0	0	0
Partially Resolved Issues	0	0	0	0
Resolved Issues	0	0	**3**	**1**

Types of Severities

High

A high severity issue or vulnerability means that your smart contract can be exploited. Issues on this level are critical to the smart contract's performance or functionality, and we recommend these issues be fixed before moving to a live environment.

Medium

The issues marked as medium severity usually arise because of errors and deficiencies in the smart contract code. Issues on this level could potentially bring problems, and they should still be fixed.

Low

Low-level severity issues can cause minor impact and or are just warnings that can remain unfixed for now. It would be better to fix these issues at some point in the future.

Informational

These are severity issues that indicate an improvement request, a general question, a cosmetic or documentation error, or a request for information. There is low-to-no impact.

Types of Issues

Open

Security vulnerabilities identified that must be resolved and are currently unresolved.

Resolved

These are the issues identified in the initial audit and have been successfully fixed.

Acknowledged

Vulnerabilities which have been acknowledged but are yet to be resolved.

Partially Resolved

Considerable efforts have been invested to reduce the risk/impact of the security issue, but are not completely resolved.

Checked Vulnerabilities

- Re-entrancy
- Timestamp Dependence
- Gas Limit and Loops
- DoS with Block Gas Limit
- Transaction-Ordering Dependence
- Use of tx.origin
- Exception disorder
- Gasless send
- Balance equality
- Byte array
- Transfer forwards all gas
- BEP20 API violation
- Malicious libraries
- Compiler version not fixed
- Redundant fallback function
- Send instead of transfer
- Style guide violation
- Unchecked external call
- Unchecked math
- Unsafe type inference
- Implicit visibility leve

Techniques and Methods

Throughout the audit of smart contract, care was taken to ensure:

- The overall quality of code.
- Use of best practices.
- Code documentation and comments match logic and expected behaviour.
- Token distribution and calculations are as per the intended behaviour mentioned in the whitepaper.
- Implementation of BEP-20 token standards.
- Efficient use of gas.
- Code is safe from re-entrancy and other vulnerabilities.

The following techniques, methods and tools were used to review all the smart contracts.

Structural Analysis

In this step, we have analysed the design patterns and structure of smart contracts. A thorough check was done to ensure the smart contract is structured in a way that will not result in future problems.

Static Analysis

Static analysis of smart contracts was done to identify contract vulnerabilities. In this step, a series of automated tools are used to test the security of smart contracts.

Code Review / Manual Analysis

Manual analysis or review of code was done to identify new vulnerabilities or verify the vulnerabilities found during the static analysis. Contracts were completely manually analysed, their logic was checked and compared with the one described in the whitepaper. Besides, the results of the automated analysis were manually verified.

Gas Consumption

In this step, we have checked the behaviour of smart contracts in production. Checks were done to know how much gas gets consumed and the possibilities of optimization of code to reduce gas consumption.

Tools and Platforms used for Audit

Remix IDE, Truffle, Truffle Team, Solhint, Mythril, Slither, Solidity statistic analysis.

Manual Testing

A. Contract - Nugen Token

High Severity Issues

No issues were found

Medium Severity Issues

No issues were found

Low Severity Issues

A.1 Missing event

Description

Missing events don't pose any security risk. However, it makes it difficult to track on chain events especially in decentralized environments of airdrops and other operations that revolve around communities. It is advisable to emit an event whenever a significant action takes place on a contract.

Remediation

Consider adding events to the following function:
- revokeDistributionWallet

Status

Resolved

A.2 Missing zero check

Function - addDistributionWallet()

Description

There should be a zero address check in this function because there will be a large number of accounts being passed as the parameters. Although it's an onlyOwner function, in this case there is an array of addresses is involved which poses more risk of passing a zero address as a distribution wallet, and the process will end up burning the tokens allocated.
If this is the intended behavior then please comment below.

Remediation

Consider adding a zero check in the function

Status

Resolved

A.3 No constructor in the contract

Description

There is no constructor in the contract that poses a risk of initializing the state variables many times. Although it has the access control of onlyOwner, the risk is very high because the contract can be initialized multiple times.

Hence, there will be very less immutability and technically this smart contract can be used to airdrop any other token rather than the "Nugen Token".

Thus, this scenario could lead to a situation where the users will find it difficult to trust the contract's state as it won't be immutable due to lack of a constructor.

Remediation

Consider using a constructor or make sure that the initializer function is only called once.

Status

Resolved

Informational Issues

A.4 Use of old libraries

Description

There is an old library being used by Openzeppelin named “Initializable.sol” which specifies the pragma version as “>=0.4.24 <0.7.0” which is outdated. It is not recommended to use libraries/ contracts intended for old versions of solidity because they may pose a security risk.

Remediation

Consider using the latest initializable

Status

Resolved

General Recommendation

In our audit we have concluded that the ownership is crucial in the airdrop so we would still recommend using a two way process to transfer the ownership.

We would also like to point out that the error messages described in the contract are not very clear or explanatory if seen from the user’s point of view. Hence, they are rather technical. We would recommend to put more clear and explanatory error messages so that the users will be informed well about the problem with their claim of the airdrop.

There should be a zero check for the amount passed in the “addDistributionWallet” function so the address won’t get allocated 0 tokens by mistake and takes up the space in the array for no reason.

Note: The Nugen team has acknowledged the risk of frontrunning. However, Implementing a two-step process will increase gas cost and that's why the Nugen team decided to move ahead with the existing mechanism for adding distributions, looking at the low possibility of this scenario.

Functional Testing

Some of the tests performed are mentioned below

- Owner Should be able to initialize the contract
- Owner should be able to allocate a distribution wallet
- Owner should be able to revoke any wallet
- Owner should be able to call failcase whenever necessary
- Users should be able to call the claim function for the token airdrops
- Should revert if the claim function is called before the start time of the airdrop
- Should revert if the accounts and the amount array's lengths don't match
- Should revert if the balance of the contract is less than the amount requested
- Should revert if the transfer fails in case of failcase

Automated Tests

No major issues were found. Some false positive errors were reported by the tools. All the other issues have been categorized above according to their level of severity.

Closing Summary

In this report, we have considered the security of the Nugen Token Airdrop. We performed our audit according to the procedure described above.

Some issues of Low and Informational severity were found, Some suggestions and best practices are also provided in order to improve the code quality and security posture. In the end, the Nugen team Resolved all Issues.

Disclaimer

QuillAudits smart contract audit is not a security warranty, investment advice, or an endorsement of the Nugen Platform. This audit does not provide a security or correctness guarantee of the audited smart contracts.

The statements made in this document should not be interpreted as investment or legal advice, nor should its authors be held accountable for decisions made based on them.
Securing smart contracts is a multistep process. One audit cannot be considered enough. We recommend that the Nugen Team put in place a bug bounty program to encourage further analysis of the smart contract by other third parties.

About QuillAudits

QuillAudits is a secure smart contracts audit platform designed by QuillHash Technologies. We are a team of dedicated blockchain security experts and smart contract auditors determined to ensure that Smart Contract-based Web3 projects can avail the latest and best security solutions to operate in a trustworthy and risk-free ecosystem.

500+
Audits Completed

$15B
Secured

500K
Lines of Code Audited

Follow Our Journey

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For

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