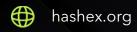
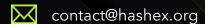


Node.sys Presale

smart contracts final audit report

April 2024





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1. Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice at the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn't say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the disclaimer below – please make sure to read it in full.

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2. Overview

HashEx was commissioned by the Node.sys team to perform an audit of their smart contracts. The audit was conducted between 01/04/2024 and 03/04/2024.

The purpose of this audit was to achieve the following:

- Identify potential security issues with smart contracts
- Formally check the logic behind given smart contracts.

Information in this report should be used for understanding the risk exposure of smart contracts, and as a guide to improving the security posture of smart contracts by remediating the issues that were identified.

The code is available in @sokol/nodesys.presale Gitlab repository and was audited after the commit d9fd0a8c.

Update. The Node.sys team has responded to this report. The updated contracts are available in the Binance Smart Chain testnet at 0x9034a12Ed1dCe4C59BD6b700ED498383cbf65B8B.

2.1 Summary

Project name	Node.sys Presale
URL	https://nodesys.io
Platform	Binance Smart Chain
Language	Solidity
Centralization level	High
Centralization risk	Medium

2.2 Contracts

Name	Address
Consensus	
PresaleNodesys	

3. Project centralization risks

The presale parameters and collected payments are managed by a consensus decision with a threshold of confirmations from consensus' owners.

Cc7CR16 Removing owners from decision making process

Any **seeMinCofReq()** number of owners can exclude other owners from consensus mechanism.

Cc8CR17 Authorized functions

The collected funds can be transferred out by a consensus transaction.

The contract manager can add 99% discount code to reduce the sale price.

4. Found issues



Cc7. Consensus

ID	Severity	Title	Status
Cc7l18	• Low	Default visibility of state variables	
Cc7l16	Info	Lack of documentation (NatSpec)	
Cc7l17	Info	Typographical error	Ø Resolved

Cc8. PresaleNodesys

ID	Severity	Title	Status
Cc8l1e	Medium	Discount codes are publicly available	Acknowledged
Cc8I1d	Low	Gas optimizations	Partially fixed
Cc8l1c	Low	Default visibility of state variables	
Cc8l1f	Low	Result of token transfer is not checked	Partially fixed

Cc8l19	Info	Max purchase per transaction constraint can be circumvented	Acknowledged
Cc8l1a	Info	Lack of documentation (NatSpec)	Ø Acknowledged
Cc8I1b	Info	Typographical error	Ø Acknowledged

5. Contracts

Cc7. Consensus

Overview

Governance contract to authorize access to certain functions with threshold confirmations.

Issues

Cc7l18 Default visibility of state variables

Low

Acknowledged

Several state variables have been declared without explicit visibility. In Solidity, the default visibility for state variables is **internal**. However, relying on default visibility can lead to misunderstandings and potential security vulnerabilities if not carefully considered and documented.

- confirmationsRequired (uint256)
- **GRASE PERIOD** (uint256)
- queue (mapping from bytes32 to bool)
- isOwner (mapping from address to bool)

Cc7l16 Lack of documentation (NatSpec)

Info

Acknowledged

We recommend writing documentation using <u>NatSpec Format</u>. This would help in development, as well as simplify user interaction with the contract (including using the block explorer).

Cc7l17 Typographical error

Info



The term "GRASE_PERIOD" is used in the contract, which is presumably a typographical error. The correct term should be "GRACE_PERIOD". Misnaming variables can lead to confusion for

developers, maintainers, and auditors, potentially obscuring the intent and functionality of the code.

Cc8. PresaleNodesys

Overview

A simple sale of NYS ERC-20 tokens for USDT ERC-20 payment tokens with an adjustable price. Additionally, a discount up to 99% can be applied to individual purchases by using special string codes. The sale can be stopped by a consensus decision of the owners at any moment by withdrawing sale tokens, half of which will be burnt.

Issues

Cc8l1e Discount codes are publicly available



Acknowledged

A discount up to 99% can be applied to the purchases by using one of the stored codes. The codes and their discount amounts are governed by the manager() account. Those stored codes are reusable and can be obtained from the transaction history. If the codes were meant to be a single-use-only, they could still be front-run.

Cc8l1d Gas optimizations





- 1. Multiple reads from storage in the withdrawNYS() function: balance of the NYS token.
- 2. Visibility modifier for functions buyNYS(), changeManager(), changeMaximalAmount() changeMinimalAmount(), priceChange() could be changed to external from public.
- 3. There is no need to explicitly store a timestamp in the event, as timestamp information is inherently included in the event metadata by default.

Cc8l1c Default visibility of state variables

Low

Resolved

Several state variables have been declared without explicit visibility. In Solidity, the default visibility for state variables is **internal**. However, relying on default visibility can lead to misunderstandings and potential security vulnerabilities if not carefully considered and documented.

- minimalAmount (uint256)
- _maximalAmount (mapping from address to bool)
- _priceNYS (uint256)
- _manager (address)

Cc8l1f Result of token transfer is not checked

low

Partially fixed

The contract does not check the returned results of the ERC20 transfer function.

```
function withdrawNYS(address _owner) external onlyConsensus{
    require(isOwnerAdrress(_owner), "Not an owner");
    uint256 amount = NYS.balanceOf(address(this)) / 2;
    NYS.transfer(_owner, amount);

    uint256 amountBurn = NYS.balanceOf(address(this));
    NYS.transfer(address(1), amountBurn);

    emit WithdrawNYS(_owner, amount, amountBurn, block.timestamp);
}
```

The ERC20 token standard mandates that the token transfer function should return a boolean value indicating the success or failure of the token transfer. Typically, tokens are designed to always return true, with the transaction failing if the transfer is unsuccessful. However, it is considered best practice to robustly handle the return values to ensure reliability.

Additionally, it is important to note that some implementations of the ERC20 token do not adhere strictly to the ERC20 standard and might not return a boolean upon transfer.

Consequently, to accommodate all scenarios, it is advisable to utilize a library that addresses these variations, such as OpenZeppelin's SafeERC20, which provides a more secure and standardized approach to handling ERC20 token transfers.

Recommendation

Use OpenZeppelin's SafeERC20 library to handle token transfers.

Cc8l19 Max purchase per transaction constraint can be circumvented

InfoAcknowledged

The maximum purchase constraint sets the maximum purchase value only for a single transaction. The same address can make several purchases, exceeding the limit. Alternatively, a contract may make several purchases in one transaction.

Cc8l1a Lack of documentation (NatSpec)

Info

Acknowledged

We recommend writing documentation using <u>NatSpec Format</u>. This would help in development, as well as simplify user interaction with the contract (including using the block explorer).

Cc8l1b Typographical error

Info

Acknowledged

The term "isOwnerAdrress" is used in the contract, which is presumably a typographical error. The correct term should be "isOwnerAddress". Misnaming variables can lead to confusion for developers, maintainers, and auditors, potentially obscuring the intent and functionality of the code.

6. Conclusion

1 medium, 4 low severity issues were found during the audit. 1 low issue was resolved in the update. The reviewed contracts are highly dependent on the owner's account. See the centralization risks chapter.

This audit includes recommendations on code improvement and the prevention of potential attacks.

Appendix A. Issues' severity classification

• **Critical.** Issues that may cause an unlimited loss of funds or entirely break the contract workflow. Malicious code (including malicious modification of libraries) is also treated as a critical severity issue. These issues must be fixed before deployments or fixed in already running projects as soon as possible.

- **High.** Issues that may lead to a limited loss of funds, break interaction with users, or other contracts under specific conditions. Also, issues in a smart contract, that allow a privileged account the ability to steal or block other users' funds.
- **Medium.** Issues that do not lead to a loss of funds directly, but break the contract logic. May lead to failures in contracts operation.
- **Low.** Issues that are of a non-optimal code character, for instance, gas optimization tips, unused variables, errors in messages.
- **Informational.** Issues that do not impact the contract operation. Usually, informational severity issues are related to code best practices, e.g. style guide.

Appendix B. Issue status description

- **Partially fixed.** Parts of the issue have been fixed but the issue is not completely resolved.
- Acknowledged. The team has been notified of the issue, no action has been taken.
- ② Open. The issue remains unresolved.

Appendix C. List of examined issue types

- Business logic overview
- Functionality checks
- Following best practices
- Access control and authorization
- Reentrancy attacks
- Front-run attacks
- DoS with (unexpected) revert
- DoS with block gas limit
- Transaction-ordering dependence
- ERC/BEP and other standards violation
- Unchecked math
- Implicit visibility levels
- Excessive gas usage
- Timestamp dependence
- Forcibly sending ether to a contract
- Weak sources of randomness
- Shadowing state variables
- Usage of deprecated code

Appendix D. Centralization risks classification

Centralization level

- **High.** The project owners can manipulate user's funds, lock user's funds on their will (reversible or irreversible), or maliciously update contracts parameters or bytecode.
- **Medium.** The project owners can modify contract's parameters to break some functions of the project contract or contracts, but user's funds remain withdrawable.
- **Low.** The contract is trustless or its governance functions are safe against a malicious owner.

Centralization risk

- **High.** Lost ownership over the project contract or contracts may result in user's losses. Contract's ownership belongs to EOA or EOAs, and their security model is unknown or out of scope.
- **Medium.** Contract's ownership is transferred to a contract with not industry-accepted parameters, or to a contract without an audit. Also includes EOA with a documented security model, which is out of scope.
- **Low.** Contract's ownership is transferred to a well-known or audited contract with industry-accepted parameters.

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