



SMART CONTRACT AUDIT

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PREPARED FOR:
METAPLANETARY



INTRODUCTION

Auditing Firm	 VITAL BLOCK SECURITY
Client Firm	 NAVIERN TOKEN
Methodology	Automated Analysis, Manual Code Review
Language	Solidity
Contract	0x0c4e5b36071b5019225934cffa5f7834936790d4
Blockchain	Binance Smart Chain
Centralization	Active ownership
Website	https://naviern.io
Telegram	https://t.me/linknaviernofficial
Twitter	https://twitter.com/NaviernOfficial
GitHub	https://naviern.gitbook.io/naviern-whitepaper/
Prelim Report Date	February 22, 2023
Final Report Date	February 23, 2023

 Verify the authenticity of this report on our GitHub Repo: <https://www.github.com/vital-block>

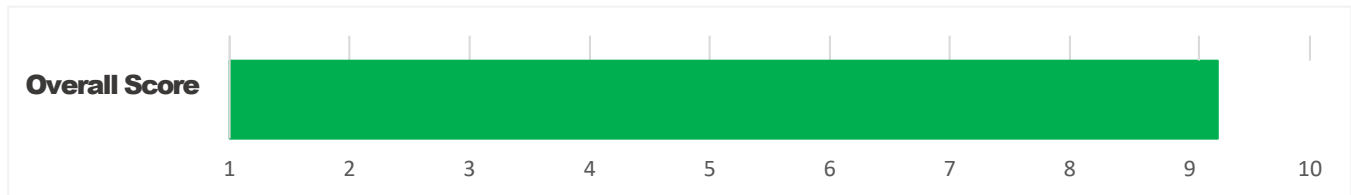


EXECUTIVE SUMMARY

NAVIERN has performed the automated and manual analysis of the Sol code. The code was reviewed for common contract vulnerabilities and centralized exploits. Here's a quick audit summary:

Status	Critical ! 🔴	Major " 🟡	Medium # 🟡	Minor \$ 🟢	Unknown % 🟤
Open	0	0	0	3	0
Acknowledged	0	0	1	2	0
Resolved	0	0	0	0	0
Noteworthy onlyOwner Privileges	Set Taxes and Ratios, Airdrop, Set Protection Settings, Set Reward Properties, Set Reflector Settings, Set Swap Settings, Set Pair and Router				

NAVIERN Smart contract has achieved the following score: **90.2**



ⓘ Please note that smart contracts deployed on blockchains aren't resistant to exploits, vulnerabilities and/or hacks. Blockchain and cryptography assets utilize new and emerging technologies. These technologies present a high level of ongoing risks. For a detailed understanding of risk severity, source code vulnerability, and audit limitations, kindly review the audit report thoroughly.

ⓘ Please note that centralization privileges regardless of their inherited risk status - constitute an elevated impact on smart contract safety and security.



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SCOPE OF WORK

Vital Block was consulted by NAVIERN to conduct the smart contract audit of its .Sol source code. The audit scope of work is strictly limited to mentioned .SOL file only:

- NAVIERN.Sol

 External contracts and/or interfaces dependencies are not checked due to being out of scope.

Verify audited contract's contract address and deployed link below:

Public Contract Link	
0x0c4e5b36071b5019225934cfa5f7834936790d4	
Contract Name	NAVIERN
Token Symbol	NVRN
Total Supply	1,000,000,000



AUDIT METHODOLOGY

Smart contract audits are conducted using a set of standards and procedures. Mutual collaboration is essential to performing an effective smart contract audit. Here's a brief overview of Vital Block auditing process and methodology:

CONNECT

- The onboarding team gathers source codes, and specifications to make sure we understand the size, and scope of the smart contract audit.

AUDIT

- Automated analysis is performed to identify common contract vulnerabilities. We may use the following third-party frameworks and dependencies to perform the automated analysis:
 - Remix IDE Developer Tool
 - Open Zeppelin Code Analyzer
 - SWC Vulnerabilities Registry
 - DEX Dependencies, e.g., Pancakeswap, Uniswap
- Simulations are performed to identify centralized exploits causing contract and/or trade locks.
- A manual line-by-line analysis is performed to identify contract issues and centralized privileges.

We may inspect below mentioned common contract vulnerabilities, and centralized exploits:

Centralized Exploits	<ul style="list-style-type: none">○ Token Supply Manipulation○ Access Control and Authorization○ Assets Manipulation○ Ownership Control○ Liquidity Access○ Stop and Pause Trading○ Ownable Library Verification
----------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



Common Contract Vulnerabilities

- **Integer Overflow**
- **Lack of Arbitrary limits**
- **Incorrect Inheritance Order**
- **Typographical Errors**
- **Requirement Violation**
- **Gas Optimization**
- **Coding Style Violations**
- **Re-entrancy**
- **Third-Party Dependencies**
- **Potential Sandwich Attacks**
- **Irrelevant Codes**
- **Divide before multiply**
- **Conformance to Solidity Naming Guides**
- **Compiler Specific Warnings**
- **Language Specific Warnings**

REPORT

- **The auditing team provides a preliminary report specifying all the checks which have been performed and the findings thereof.**
- **The client's development team reviews the report and makes amendments to the codes.**
- **The auditing team provides the final comprehensive report with open and unresolved issues.**

PUBLISH






- **The client may use the audit report internally or disclose it publicly.**

 **It is important to note that there is no pass or fail in the audit, it is recommended to view the audit as an unbiased assessment of the safety of solidity codes.**



RISK CATEGORIES

Smart contracts are generally designed to hold, approve, and transfer tokens. This makes them very tempting attack targets. A successful external attack may allow the external attacker to directly exploit. A successful centralization-related exploit may allow the privileged role to directly exploit. All risks which are identified in the audit report are categorized here for the reader to review:

Risk Type	Definition
Critical ! 	These risks could be exploited easily and can lead to asset loss, data loss, asset, or data manipulation. They should be fixed right away.
Major " 	These risks are hard to exploit but very important to fix, they carry an elevated risk of smart contract manipulation, which can lead to high-risk severity.
Medium # 	These risks should be fixed, as they carry an inherent risk of future exploits, and hacks which may or may not impact the smart contract execution. Low-risk re-entrancy-related vulnerabilities should be fixed to deter exploits.
Minor \$ 	These risks do not pose a considerable risk to the contract or those who interact with it. They are code-style violations and deviations from standard practices. They should be highlighted and fixed nonetheless.
Unknown % 	These risks pose uncertain severity to the contract or those who interact with it. They should be fixed immediately to mitigate the risk uncertainty.

All statuses which are identified in the audit report are categorized here for the reader to review:

Status Type	Definition
Open	Risks are open.
Acknowledged	Risks are acknowledged, but not fixed.
Resolved	Risks are acknowledged and fixed.



CENTRALIZED PRIVILEGES

Centralization risk is the most common cause of cryptography asset loss. When a smart contract has a privileged role, the risk related to centralization is elevated.

There are some well-intended reasons have privileged roles, such as:

- **Privileged roles can be granted the power to `pause()` the contract in case of an external attack.**
- **Privileged roles can use functions like, `include()`, and `exclude()` to add or remove wallets from fees, swap checks, and transaction limits. This is useful to run a presale and to list on an exchange.**

Authorizing privileged roles to externally-owned-account (EOA) is dangerous. Lately, centralization-related losses are increasing in frequency and magnitude.

- **The client can lower centralization-related risks by implementing below mentioned practices:**
- **Privileged role's private key must be carefully secured to avoid any potential hack.**
- **Privileged role should be shared by multi-signature (multi-sig) wallets.**
- **Authorized privilege can be locked in a contract, user voting, or community DAO can be introduced to unlock the privilege.**
- **Renouncing the contract ownership, and privileged roles.**
- **Remove functions with elevated centralization risk.**

 **Understand the project's initial asset distribution. Assets in the liquidity pair should be locked. Assets outside the liquidity pair should be locked with a release schedule.**



AUTOMATED ANALYSIS

Symbol	Definition
	Function modifies state
	Function is payable
	Function is internal
	Function is private
	Function is important

```

| **NAVIERN** | Interface |   ||| |
|  | totalSupply | External |   |   | NO |
|  | decimals | External |   |   | NO |
|  | symbol | External |   |   | NO |
|  | name | External |   |   | NO |
|  | getOwner | External |   |   | NO |
|  | balanceOf | External |   |   | NO |
|  | transfer | External | " |   | NO |
|  | allowance | External |   |   | NO |
|  | approve | External | " |   | NO |
|  | transferFrom | External | " |   | NO |
|||||
| **IFactoryV2** | Interface |   |||
|  | getPair | External |   |   | NO |
|  | createPair | External | " |   | NO |
|||||
| **IV2Pair** | Interface |   |||
|  | factory | External |   |   | NO |
|  | getReserves | External |   |   | NO |
|  | sync | External | " |   | NO |

```



|||||

```

| **IRouter01** | Interface |      ||| |
|  ^ | factory | External | |      !      |NO! |
|  ^ | BNB | External | |      !      |NO! |
|  ^ | addLiquidityBNB | External | |      !      #s |NO! |
|  ^ | addLiquidity | External | | "      !      |NO! |
|  ^ | swapExactAPTForTokens | External | |      !      #s |NO! |
|  ^ | getAmountsOut | External | |      !      |NO! |
|  ^ | getAmountsIn | External | |      !      |NO! |

```

|||||

```

| **IRouter02** | Interface | IRouter01 ||| |
|  ^ | swapExactTokensForAPTSupportingFeeOnTransferTokens | External | | "      !      |NO! |
|  ^ | swapExactBNBForTokensSupportingFeeOnTransferTokens | External | |      !      #s |NO! |
|  ^ | swapExactTokensForTokensSupportingFeeOnTransferTokens | External | | "      !      |NO! |
|  ^ | swapExactTokensForTokens | External | | "      !      |NO! |

```

|||||

```

| **Protections** | Interface |      ||| | |
|  ^ | checkUser | External | | "      !      |NO! |
|    |  ^ | setLaunch | External | |      !      |NO! |
|  ^ | setLpPair | External | |      !      |NO! |
|  ^ | NVRN | External | |      !      |NO! |
|  ^ | removeSniper | External | |      !      |NO! |

```

|||||

```

| **Cashier** | Interface |      ||| |
|  ^ | setRewardsProperties | External | | "      !      |NO! |
|  ^ | tally | External | |      !      |NO! |
|  ^ | load | External | |      !      #s |NO! |
|  ^ | cashout | External | | "      !      |NO! |
|  ^ | giveMeWelfarePlease | External | | "      !      |NO! |
|  ^ | getTotalDistributed | External | |      !      |NO! |
|  ^ | getUserInfo | External | |      !      |NO! |
|  ^ | getUserRealizedRewards | External | |      !      |NO! |

```

```

|  | getPendingRewards | External |  |  | NO |
|  | initialize | External |  | "  | NO |
|  | getCurrentReward | External |  |  | NO |
|||||
| **SOL** | Implementation | SafeMath |||
|  | <Constructor> | Public |  |  | NO |
|  | transferOwner | External |  | "  | onlyOwner |
|  | renounceOwnership | External |  | "  | NO |
|  | setOperator | Public |  | "  | NO |
|  | renounceOriginalDeployer | External |  | "  | NO |
|  | <Receive Ether> | External |  |  | NO |
|  | totalSupply | External |  |  | NO |
|  | decimals | External |  |  | NO |
|  | symbol | External |  |  | NO |
|  | name | External |  |  | NO |
|  | getOwner | External |  |  | NO |
|  | balanceOf | Public |  |  | NO |
|  | allowance | External |  |  | NO |
|  | approve | External |  | "  | NO |
|  | _approve | Internal $ |  |  |
|  | approveContractContingency | Public |  | "  | onlyOwner |
|  | transfer | External |  | "  | NO |
|  | transferFrom | External |  | "  | NO |
|  | setNewRouter | External |  | "  | onlyOwner |
|  | setLpPair | External |  | "  | onlyOwner |
|  | setInitializers | External |  | "  | onlyOwner |
|  | isExcludedFromFees | External |  |  | NO |
|  | isExcludedFromDividends | External |  |  | NO |
|  | isExcludedFromProtection | External |  |  | NO |
|  | setDividendExcluded | Public |  |  | onlyOwner |
|  | setExcludedFromFees | Public |  |  | onlyOwner |

```



REENTRANCY

Major

Certain

This may lead to loss of funds, improper value updates, token loss, etc.

```
function transferOwnership(address newOwner) public onlyOwner {
    _transferOwnership(newOwner);
}

/**
 * @dev Transfers ownership of the contract to a new account (`newOwner`).
 */
function _transferOwnership(address newowner) internal {
    require(newOwner != address(0), "Ownable: new owner is the zero address");
    emit OwnershipTransferred(_owner, newOwner);
    _owner = newOwner;
}
```

[illegible]

Vulnerability Run check

Risk Analysis

✔ Contract source code verified

This token contract is open source. You can check the contract code for details. Unsourced token contracts are likely to have malicious functions to defraud their users of their assets.

✔ No mint function

Mint function is transparent or non-existent. Hidden mint functions may increase the amount of tokens in circulation and effect the price of the token.

✔ Owner cant change balance

The contract owner does not have the authority to modify the balance of tokens at other addresses.

✔ No Proxy

There is no proxy in the contract. The proxy contract means contract owner can modify the function of the token and possibly effect the price.

✔ No function to retrieve ownership

If this function exists, it is possible for the project owner to regain ownership even after relinquishing it.

Honeypot Risk

✔ This does not appear to be a honeypot

We are not aware of any code that prevents the sale of tokens.

✔ No Anti Whale

There is no limit to the number of token transactions. The number of scam token transactions may be limited (honeypot risk).

✔ No whitelist function

Whitelist function found

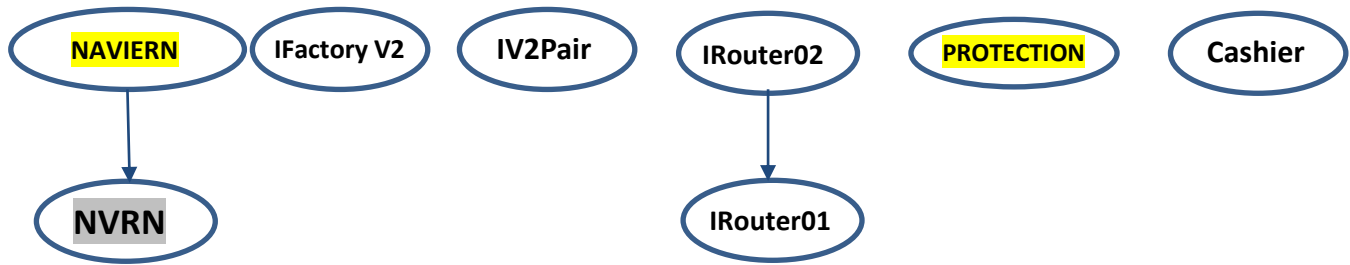
✔ No trading cooldown

The token contract has no trading cooldown function. If there is a trading cooldown function, the user will not be able to sell the token within a certain time or block after buying.

✔ No blacklist function

No blacklist function is included.

INHERITANCE GRAPH



Identifier	Definition	Severity
CEN-12	Centralization privileges of NAVIERN	Medium # 🟡

Vulnerability 0 : No important security issue detected.

Threat level: Low

```

330     _transferOwnership(newOwner);
331 }
332
333 /**
334  * @dev Transfers ownership of the contract to a new account ('newOwner').
335  */
336 function _transferOwnership(address newOwner) internal {
337     require(newOwner != address(0), "Ownable: new owner is the zero address");
338     emit OwnershipTransferred(_owner, newOwner);
339     _owner = newOwner;
340 }
341 }
342
343 contract BEP20Token is Context, IBEP20, Ownable {
344     using SafeMath for uint256;
345
346     mapping (address => uint256) private _balances;
347
348     mapping (address => mapping (address => uint256)) private _allowances;
349
350     uint256 private _totalSupply;
351     uint8 private _decimals;
352     string private _symbol;
353     string private _name;
354
  
```

MANUAL REVIEW

NAVIERN: Naviern is a Web 3.0 navigation & Ride share application that enables users to be rewarded through their daily commute. Like conventional navigation apps, Naviern will give directions to your desired destination and determine the most convenient route to your destination while passively earning NST. Navigation is an essential part of everyone's daily lives. While conventional navigation apps only serve the function of providing the user directions to their desired destination, Naviern allows users to earn crypto during this process.

TOKEN NAME: NAVIERN

Ticker: NVRN

Chain/Standard: Binance Smart Chain

Total Supply: 1,000,000,000



Outstanding features of NAVIERN Launching On Binance Smart Chain

BENEFITS

Whether it would be ✨
driving, walking, or
public transport; Naviern
is open to all modes of
travel



The Naviern app is your one stop shop for passively earning crypto with a wide range of in app utility & features.

In app Naviern Wallet

Tokens and rewards earned from users' journeys will be stored in the in-app wallet.

In App Marketplace

The Naviern marketplace will be an in app feature which allows you to buy & sell Naviern NFTs from the same app you use them

Award Center

Award Center is where you can view your daily challenges, rewards earned, and check other detailed information about optimizing your earnings.



ISSUES CHECKING STATUS

Issue Description

Checking Status


1.	Compiler errors.	PASSED
2.	Race Conditions and reentrancy. Cross-Function Race Conditions.	PASSED
3.	Possible Delay In Data Delivery.	PASSED
4.	Oracle calls.	PASSED
5.	Front Running.	PASSED
6.	Sol Dependency.	PASSED
7.	Integer Overflow And Underflow.	PASSED
8.	DoS with Revert.	PASSED
9.	Dos With Block Gas Limit.	PASSED
10.	Methods execution permissions.	PASSED
11.	Economy Model of the contract.	PASSED
12.	The Impact Of Exchange Rate On the solidity Logic.	PASSED
13.	Private use data leaks.	PASSED
14.	Malicious Event log.	PASSED
15.	Scoping and Declarations.	PASSED
16.	Uninitialized storage pointers.	PASSED
17.	Arithmetic accuracy.	PASSED
18.	Design Logic.	PASSED
19.	Cross-Function race Conditions	PASSED
20.	Save Upon solidity contract Implementation and Usage.	PASSED
21.	Fallback Function Security	PASSED



AUDIT RESULT

PASSED

SMART CONTRACT AUDIT OF NAVIERN

Identifier	Definition	Severity
CEN-02	Initial asset distribution	Minor 

All of the initially minted assets are sent to the contract deployer when deploying the contract. This can be an issue as the deployer and/or contract owner can distribute tokens without consulting the community.

```
*
* Requirements:
* - The divisor cannot be zero.
*/
function mod(uint256 a, uint256 b, string memory errorMessage) internal pure returns (uint256) {
    require(b != 0, errorMessage);
}
```

RECOMMENDATION

Project stakeholders should be consulted during the initial asset distribution process.



RECOMMENDATION


Deployer and/or contract owner private keys are secured carefully.

Please refer to PAGE-09 CENTRALIZED PRIVILEGES for a detailed understanding.

ALLEVIATION

The NAVIERN project team understands the centralization risk. Some functions are provided privileged access to ensure a good runtime behavior in the project



Identifier	Definition	Severity
COD-10	Third Party Dependencies	Minor 

Smart contract is interacting with third party protocols e.g., Pancakeswap router, cashier contract, protections contract. The scope of the audit treats third party entities as black boxes and assumes their functional correctness. However, in the real world, third parties can be compromised, and exploited. Moreover, upgrades in third parties can create severe impacts, e.g., increased transactional fees, deprecation of previous routers, etc.

RECOMMENDATION

Inspect and validate third party dependencies regularly, and mitigate severe impacts whenever necessary.



DISCLAIMERS

Vital Block provides the easy-to-understand audit of Solidity, Move and Raw source codes (commonly known as smart contracts).

The smart contract for this particular audit was analyzed for common contract vulnerabilities, and centralization exploits. This audit report makes no statements or warranties on the security of the code. This audit report does not provide any warranty or guarantee regarding the absolute bug-free nature of the smart contract analyzed, nor do they provide any indication of the client's business, business model or legal compliance. This audit report does not extend to the compiler layer, any other areas beyond the programming language, or other programming aspects that could present security risks. Cryptographic tokens are emergent technologies, they carry high levels of technical risks and uncertainty. You agree that your access and/or use, including but not limited to any services, reports, and materials, will be at your sole risk on an as-is, where-is, and as-available basis. This audit report could include false positives, false negatives, and other unpredictable results.

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Vital Block is Dedicated to Making Defi & Web3 A Safer Place. We are Powered by Security engineers, developers, UI experts, and blockchain enthusiasts. Our team currently consists of 5 core members, and 4+ casual contributors.

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