

Security Assessment Ai Hey

Vital Block Verified On March 26th, 2023











INTRODUCTION

Auditing Company	VITAL BLOCK SECURITY
Client Project	Ai Hey
Methodology	Automated Analysis, Manual Code Review
Verified	YES
Compiler version	v0.8.18+commit.87f61d96
Contract Address	0x614eAE32079Ab8E2c62643A8c47cfe4bE42a1D48
Network	HASHBIT CHAIN
Optimization	200 RUNS
Token Type	HBC-20
Website	https://www.Aihey.co
Telegram	https://telegram.me/aihey_bot
Twitter	https://twitter.com/AiHey_co
Discord	https://discord.com/invite/JYjQGRMuC8
Prelim Report Date	March 25, 2023
Final Report Date	March 26, 2023









EXECUTIVE SUMMARY

Vital Block 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	2	0	
Acknowledged	0	0	1	2	0	
Resolved	0	0	0	0	0	
Noteworty OnlyOwner Privileges Set Taxes and Ratios, Airdrop, Set Protection Settings, Set Reward Properties Set Reflector Settings, Set Swap Settings, Set Pair and Router						

Al HEY 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.





SCOPE OF WORK

Vital Block was consulted by AI HEY to conduct the smart contract audit of its .Sol source code. <u>The audit scope of work is strictly limited to mentioned HBC-20 file only:</u>

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.

0x614eAE32079Ab8E2c62643A8c47cfe4bE42a1D48

Contract Name	AI HEY
Token Symbol	AHE
Total Supply	1,000,000,000
Decimals	18
Blockchain	Hashbit Blockchain





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
- o 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:

	 Token Supply Manipulation
	 Access Control and Authorization
	 Assets Manipulation
Centralized Exploits	Ownership Control
ocitianzed Explois	o Liquidity Access
	○ Stop and Pause Trading
	Ownable Library Verification





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

Common Contract Vulnerabilities

- The auditing team provides a preliminary report specifying all the checks which have been performed and the findings thereof.
- o 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

o 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 reentrancy-related vulnerabilities should be fixed to deterexploits.
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 riskuncertainty.

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:

- o 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.

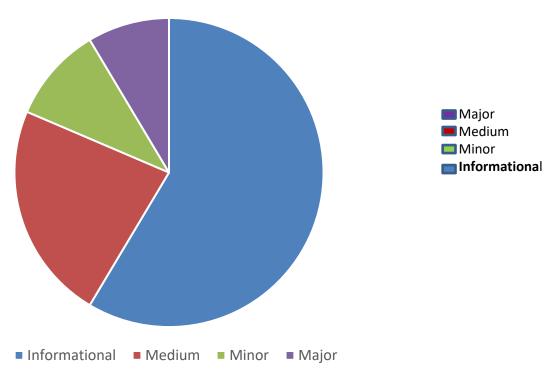
- o The client can lower centralization-related risks by implementing below mentioned practices:
- o Privileged role's private key must be carefully secured to avoid any potential hack.
- Privileged role should be shared by multi-signature (multi-sig) wallets.
- Authorized privilege can be locked in 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.









Status Icon Definitions

▽	Resolved	44	In Progress		Ignored (pro)
×	Not Resolved		Incorrect	0	Ignored (con)





Contract Ownership

Ox960402fEaAA1e0A17cF63DF0Ff0EBe2B9Fb65D2D Is The Owner Of The Contracts.

Summary

- Owner is not able to change or set taxes (0% tax)
- Owner is not able to set a max amount for buys/sells/transfer
- **M** Owner is not able to pause trades
- **30** Owner is not able to mint new tokens
- Owner is not able to blacklist an arbitrary address

Issues Found

Vital Block Security found that the **AIHEY** contracts contain no critical issue, no major issues, and 1 minor issue, in addition to 3 informational notes.

We recommend all issues are amended, while the notes are up to the team's discretion, as it refers to best practices.





AUTOMATED ANALYSIS

Symbol	Definition
•	Function modifies state
#	Function is payable
Ş	Function is internal
93	Function is private
	Function is important

```
| **<mark>Ai Hey</mark> ** | Interface |         ||| | | | | | | | | | | |
| L | totalSupply | External [ | NO[ |
| L | decimals | External | | | NO | |
| L | symbol | External 🎚 | | NO 🖟 |
| L | name | External [ | ! | NO[ |
| L | getOwner | External | | | | | | | | | | | | | |
| L | balanceOf | External | |
                                   INO I
| L | transfer | External | | "
                                ■ INOI I
| L | allowance | External [ |
                                   INO[ ]
| L | approve | External [ | "
                                   INO] I
| L | transferFrom | External | | " | NO | |
111111
| **IFactoryV2** | Interface | |||
| L | getPair | External | |
                                 [NO]
| L | createPair | External [ | "
                                      INOI
ШШ
| **IV2Pair** | Interface | | | | | | | | | |
| L | factory | External [ | NO[ |
| L | getReserves | External [ | | | | | | | | |
| L | sync | External | | " | NO | |
```





```
\Pi\Pi\Pi\Pi
| **IRouter01** | Interface | | | | | | | | | | | | |
| L | factory | External | | NO | |
| L | HBIT | External [ | | | | | | | | | | | |
| L | addLiquidityHBIT | External | | # |NO|| |
I L | addLiquidity | External | | " | NO| |
| L | swapExactAPTForTokens | External | | # |NO|| | | | | | | | |
| L | getAmountsOut | External | | | | | | | | | | | | |
| L | getAmountsIn | External | | NO| |
\Pi\Pi\Pi\Pi
| **IRouter02** | Interface | IRouter01 |||
L | swapExactTokensForHBITSupportingFeeOnTransferTokens | External | | | "
                                                                                  INO] I
L | swapExactHBITForTokensSupportingFeeOnTransferTokens | External [ | # |NO] |
| L | swapExactTokensForTokensSupportingFeeOnTransferTokens | External | | "
                                                                                 ■ INOI I
| L | swapExactTokensForTokens | External | | " | NO | |
\Pi\Pi\Pi\Pi
| **Protections** | Interface | | | |
| L | checkUser | External | | "
      | L | setLaunch | External | | " | NO | |
| L | setLpPair
                     | External | | " | | | | | | | | |
| L | AEH
                      | External | | " | NO | |
| L | removeSniper | External | | " | NO | |
\Pi\Pi\Pi\Pi
| **Cashier** | Interface | | | |
| L | setRewardsProperties | External | | "
                                                 INOI
| L | tally
            | External | | " | NO | |
| L | load
           | External | | # |NO|| | |
| L | cashout | External | | " | NO | |
| L | giveMeWelfarePlease | External | | " | NO | |
| L | getTotalDistributed | External | | NO | |
| L | getUserInfo | External | | NO | |
| L | getUserRealizedRewards | External | |
                                                  INOI
```





```
| L | getPendingRewards | External | | NO | |
| L | initialize | External [ | " | NO[ |
| L | getCurrentReward | External | | NO| |
\Pi\Pi\Pi\Pi
| **SOL** | Implementation | SafeMath ||| | |
| L | <Constructor> | Public | | # |NO| |
| L | transferOwner | External | | " | onlyOwner |
| L | renounceOwnership | External | | " | NO!
| L | setOperator | Public [ | " | NO[ |
| L | renounceOriginalDeployer | External | | "
                                              INOI
| L | <Receive Ether> | External [ | # |NO[ | |
| L | totalSupply | External [ | | NO[ |
| L | decimals | External | | NO| |
| L | name | External | | NO | |
                              INO] I
| L | getOwner | External ] |
                             INOI
| L | balanceOf | Public | |
                               INO] I
| L | allowance | External | |
                              INOI
| L | approve | External | | "
| L | approve | Internal $ | " | | | |
| L | transfer | External | | " | NO | |
| L | transferFrom | External [ | " | NO[ |
| L | setNewRouter | External [ | " | onlyOwner |
| L | setLpPair | External | | " | onlyOwner |
| L | setInitializers | External | | " | onlyOwner |
| L | isExcludedFromFees | External | | NO| |
| L | isExcludedFromDividends | External | | NO | |
| L | isExcludedFromProtection | External | | NO | |
| L | setDividendExcluded
                        | Public | | " | onlyOwner |
| L | setExcludedFromFees
                        | Public 🛛 | "
                                      | onlyOwner |
```



Vulnerability Run check

risk detection

Ontract source code verified

This token contract is open source, see the contract code for details. Token contracts that do not provide source code are likely to have malicious functions to defraud users of assets.

No bonus issue

Additional issuance functions are transparent or non-existent. Hidden minting may increase the number of tokens in circulation and affect the price of tokens.

Owner cannot change balance

The contract owner does not have the right to modify the token balance of other addresses.

Pixiu risk

This doesn't seem to be Pixiu

We did not find any code preventing the token sale.

o no anti whale

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

o no whitelist feature

Discover whitelist functions

o no agency

There is no proxy in the contract. A proxy contract means that the contract owner can modify the functionality of the token and possibly affect the price.

Ontract permissions cannot be regained (false abandonment)

If this function exists, it is possible for the project owner to regain ownership even if they abandon it.

No whitelist function

Whitelist function found

The token contract does not have a transaction cooling function. If there is a transaction cooling function, users will not be able to sell tokens within a certain period of time or generate blocks after purchase.

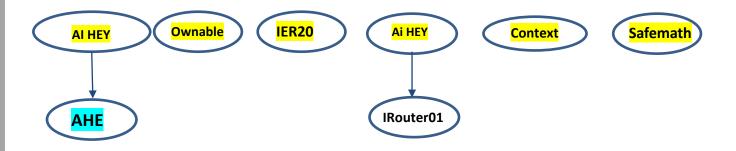
o no blacklist function

Does not include whitelist functionality.





INHERITANCE GRAPH



Identifier	Definition	Severity
CEN-12	Centralization privileges of AI HEY	Medium # 🛑

Vulnerability 0 : No important security issue detected.

Threat level: Low

```
| A compared to the compared t
```





STV-03 POSSIBLE OVERFLOW

Category	Severity •	Location	Status
Status Mathematical Operations	Minor	AiHey.sol#723	INFORMATION AL

Description

State variables can be declared as constant using the constant keyword. This means that the value of the state variable cannot be changed after it has been set. Additionally, the constant variables decrease gas consumption of the corresponding transaction.

```
function _cast(address account, uint256 amount) internal virtual {
    require(account != address(0), "ERC20: cast to the zero address");
    _beforeTokenTransfer(address(0), account, amount);
```

Recommendation

Constant state variables can be useful when the contract wants to ensure that the value of a state variable cannot be changed by any function in the contract. This can be useful for storing values that are important to the contract's behavior, such as the contract's address or the maximum number of times a certain function can be called. The team is advised to add the constant keyword to state variables that never change.





General Detectors

Incorrect Solidity Version

This contract uses an unconventional or very old version of Solidity.

Public Functions Should be Declared External

Some functions in this contract should be declared as external in order to save gas.

State Variables Should be Declared Constant

Some state variables in this contract should be declared as constant





Attention Required



Attention Required

- No vulnerable withdrawal functions found
- No reentrancy risk found
- No locks detected
- Verified source code found
- No mintable risks found
- Users can always transfer their tokens
- Contract cannot be upgraded
- Wallets cannot be blacklisted from transfering the token
- No transfer fees found
- Token can be sold through regular AMMs
- No transfer limits found
- No ERC20 approval vulnerability found
- Contract owner cannot abuse ERC20 approvals
- No ERC20 interface errors found
- No blocking loops found
- No centralized balance controls found
- No transfer cooldown times found
- No approval restrictions found
- No external calls detected

- No dumping risks found
- No compiler version inconsistencies found
- No unchecked call responses found
- No vulnerable self-destruct functions found
- No assertion vulnerabilities found
- No old solidity code found
- No external delegated calls found
- No external call dependency found
- No vulnerable authentication calls found
- No invalid character typos found
- No RTL characters found
- No dead code found
- No risky data allocation found
- No uninitialized state variables found
- ✓ No uninitialized storage variables found
- No vulnerable initialization functions found
- ✓ No risky data handling found
- No number accuracy bug found
- No out-of-range number vulnerability found





MANUAL REVIEW

AIHEY: Ai Hey is the next social ai that combines HeyGenerator, ai image art generator and HeyChat, ai privacy friend to talk to !

Ai Hey is a unique AI experience! This cutting-edge chat system combines the best of AI image generator and Ai Chat technology to bring you the ultimate virtual experience! Imagine being able to have your very own AI companion who you can talk to, share your thoughts with, and have fun with 24/7! And the best part? You can use your own native token to enhance your experience and make it even more personalized!

ARBISHIELD: AI HEY

Ticker: AHE Decimals: 18

Chain/Standard: Hashbit Network



Outstanding Features of AI HEY Launching On Hashbit Network









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



Identifier	Definition	Severity
TEN-02	Transfers User's Tokens	Minor 🏐

Alleviation:

Any user has the authority to transfer the balance of a user's address if the user has granted allowance. The contract does not subtract the allowance in the mstore(add) method, as a result, the transfer can be repeated until the user's balance go to zero.

RECOMMENDATION

The team is advised to modify the allowance in the mstore(add) method





RECOMMENDATION

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

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

ALLEVIATION

AIHEY project team understands the centralization risk. Some functions are provided privileged access to ensure a good runtime behaviour in the project





Identifier	Definition	Severity
TOB-12	Third Party Dependencies	Minor 🌑

A smart contract is interacting with third-party protocols e.g., Uniswap, Pancakeswap router, cashier contract,

And 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.





CERTIFICATE BY VITAL BLOCK SECURITY









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Vital Block Security 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, Ul experts, and blockchain enthusiasts. Our team currently consists of 5 core members, and 4+ casual contributors.

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