



AUDITS

*MH SWIFTSCAN REVIEW*  
**BATTLEVERSE**  
*JULY 18<sup>TH</sup> 2022*



# TABLE OF CONTENTS

---

**1** LEGAL DISCLAIMER

**2** MH AUDITS INTRO

**3** PROJECT SUMMARY

**4** AUDIT SCORES

**5** AUDIT SCOPE

**6** METHODOLOGY

**7** KEY FINDINGS

**8** VULNERABILITIES

**9** SOURCE CODE

**10** APPENDIX

# LEGAL DISCLAIMER

---

MH Audits are not, nor should be considered, an “endorsement” or “disapproval” of any particular project or team. These reports are not, nor should be considered, an indication of the economics or value of any “product” or “asset” created by any team or project that contracts MH Audits to perform a security review.

**MH Audits does not provide any warranty or guarantee regarding the absolute bug-free nature of the technology analyzed, nor do they provide any indication of the technologies proprietors, business, business model or legal compliance.**

MH Audits should not be used in any way to make decisions around investment or involvement with any particular project. These reports in no way provide investment advice, nor should be leveraged as investment advice of any sort.

The report is provided only for the contract(s) mentioned in the report and does not include any other potential additions and/or contracts deployed by Owner. The report does not provide a review for contract(s), applications and/or operations, that are out of this report scope.

MH Audits’ goal is to help reduce the attack vectors and the high level of variance associated with utilizing new and consistently changing technologies, and in no way claims any guarantee of security or functionality of the technology we agree to analyze.

MH Audits represents an extensive auditing 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.

Blockchain technology and cryptographic assets present a high level of ongoing risk. MH Audits’ position is that each company and individual are responsible for their own due diligence and continuous security.

The security audit is not meant to replace functional testing done before a software release. As one audit-based assessment cannot be considered comprehensive, we always recommend proceeding with several independent manual audits and a public bug bounty program to ensure the security of the smart contracts.

# MH AUDITS INTRODUCTION

---

MH Audits is a leading blockchain security company that serves to verify the security and correctness of smart contracts and blockchain-based protocols. Through the utilization of our world-class technical expertise, alongside our proprietary, innovative tech, we're able to support the success of our clients with best-in-class security, all whilst realizing our overarching vision; provable trust for all throughout all facets of blockchain.

## Secure your project with MH Audits

We offer field-proven audits with in-depth reporting and a range of suggestions to improve and avoid contract vulnerabilities.

Industry-leading comprehensive and transparent smart contract auditing on all public and private blockchains.

## Vulnerability checking

A crucial manual inspection carried out to eliminate any code flaws and security loopholes. This is vital to avoid vulnerabilities and exposures incurring costly errors at a later stage.

## Contract verification

A thorough and comprehensive review in order to verify the safety of a smart contract and ensure it is ready for launch and built to protect the end-user.

## Risk assessment

Analyse the architecture of the blockchain system to evaluate, assess and eliminate probable security breaches. This includes a full assessment of risk and a list of expert suggestions.

## In-depth reporting

A truly custom exhaustive report that is transparent and depicts details of any identified threats and vulnerabilities and classifies those by severity.

## Fast turnaround

We know that your time is valuable and therefore provide you with the fastest turnaround times in the industry to ensure that both your project and community are at ease.

## Best-of-class blockchain engineers

Our engineers combine both experience and knowledge stemming from a large pool of developers at our disposal. We work with some of the brightest minds that have audited countless smart contracts over the last 4 years.

# PROJECT SUMMARY

## PROJECT INTRODUCTION

BattleVerse.io is a multichain play-to-earn metaverse online game powered by DeFi x NFT and blockchain technology. Binance Smart Chain GameFi Hackathon prize winner.

BattleVerse main goal is to give an opportunity to earn through fun gameplay, even if you are not an experienced player in the world of Play-to-Earn (P2E) games. Your every action in the huge game world, be it a battle, resource extraction, or completing missions and quests, will generate income.

**Project Name** *BattleVerse*

**Contract Name** *BVC Token*

**Contract Address** *0x9bee0c15676a65ef3c8cdb38cb3dd31c675bbd12*

**Contract Chain** *Mainnet*

**Contract Type** *Smart Contract*

**Platform** *EVM*

**Language** *Solidity*

**Codebase** *<https://bscscan.com/address/0x9bee0c15676a65ef3c8cdb38cb3dd31c675bbd12#code>*

## INFO & SOCIALS

**Network** *BNB Chain (BEP20)*

**Max Token Supply** *1.000.000.000*

**Website** *<https://battleverse.io/>*

**Twitter** *[https://twitter.com/BattleVerse\\_io](https://twitter.com/BattleVerse_io)*

**Telegram Chat** *[https://t.me/battleverse\\_io](https://t.me/battleverse_io)*

**Telegram Ann** *[https://t.me/battleverse\\_news](https://t.me/battleverse_news)*

**Discord** *<https://discord.gg/HFVAnBS9qA>*

**Medium** *<https://battleverse.medium.com/>*

**YouTube** *<https://www.youtube.com/c/BattleVerse>*

**LinkedIn** *<https://www.linkedin.com/company/battleverse-io/>*

**BSCScan** *<https://bscscan.com/token/0x9bee0c15676a65ef3c8cdb38cb3dd31c675bbd12>*

# AUDIT SCORES



Issues	6
◆ Critical	0
◆ Major	0
◆ Medium	1
◆ Minor	3
◆ Informational	2
◆ Discussion	0

All issues are described in further detail on the following pages.

\* Note that if no manual in-depth expert review has been performed a score multiplier of .9 will apply to the final result.

# AUDIT SCOPE

---

## FILE

BattleVerseCoin.sol

## LOCATION

*BNB Chain Deployment:*  
*/address/0x9bee0c15676a65ef3c8cdb38cb3dd31c675bbd12#code*



# REVIEW METHODOLOGY

## TECHNIQUES

This report has been prepared for BattleVerse to discover issues and vulnerabilities in the source code of the BattleVerse project as well as any contract dependencies that were not part of an officially recognized library. An examination has been performed, utilizing Static Analysis and MH SwiftScan review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.

The security assessment resulted in findings that ranged from major to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective in the comments below.

## TIMESTAMP

Version	v1.0
Date	2022/07/18
Description	Layout project Automated / Static security testing Summary

# KEY FINDINGS

TITLE	SEVERITY	STATUS
BEP20 Approve Front-Running Attack	◆ Medium	Pending
Outdated Compiler Version	◆ Minor	Pending
Cheaper Inequalities In Require()	◆ Minor	Pending
Use Of Floating Pragma	◆ Minor	Pending
In-Line Assembly Detected	◆ Informational	Pending
Private Modifier Does Not Hide Data	◆ Informational	Pending

# IN-DEPTH VULNERABILITIES

## Description:

The `approve()` method overrides current allowance regardless of whether the spender already used it or not, so there is no way to increase or decrease allowance by a certain value atomically unless the token owner is a smart contract, not an account.

This can be abused by a token receiver when they try to withdraw certain tokens from the sender's account.

Meanwhile, if the sender decides to change the amount and sends another `approve` transaction, the receiver can notice this transaction before it's mined and can extract tokens from both the transactions, therefore, ending up with tokens from both the transactions. This is a front-running attack affecting the BEP20 `Approve` function.

**Location:** `BattleVerseCoin.sol` L84; L278-L281

**Issue:** BEP20 Approve Front-Running Attack

**Level:** **Medium**

**Recommendation:** Only use the approve function of the BEP-20 standard to change the allowed amount to 0 or from 0 (wait till transaction is mined and approved).

Token owner just needs to make sure that the first transaction actually changed allowance from N to 0, i.e., that the spender didn't manage to transfer some of N allowed tokens before the first transaction was mined. Such checking is possible using advanced blockchain explorers such as [bscscan.io] (<https://bscscan.io/>)

Another way to mitigate the threat is to approve token transfers only to smart contracts with verified source code that does not contain logic for performing attacks like described above, and to accounts owned by the people you may trust.

**Alleviation:**

# IN-DEPTH VULNERABILITIES

---

## **Description:**

*Using an outdated compiler version can be problematic especially if there are publicly disclosed bugs and issues that affect the current compiler version.*

**Location:** *BattleVerseCoin.sol L09; L36; L121; L151; L509; L552*

**Issue:** *Outdated Compiler Version*

**Level:** *Minor*

**Recommendation:** *It is recommended to use a recent version of the Solidity compiler that should not be the most recent version, and it should not be an outdated version as well. Using very old versions of Solidity prevents the benefits of bug fixes and newer security checks. Consider using the solidity version 0.8.7, which patches most solidity vulnerabilities.*

**Alleviation:**

# IN-DEPTH VULNERABILITIES

---

## **Description:**

The contract was found to be doing comparisons using inequalities inside the require statement. When inside the require statements, non-strict inequalities ( $\geq$ ,  $\leq$ ) are usually costlier than the strict equalities ( $>$ ,  $<$ ).

**Location:** BattleVerseCoin.sol L304; L345; L378; L427; L541

**Issue:** Cheaper Inequalities In Require()

**Level:** Minor

**Recommendation:** It is recommended to go through the code logic, and, if possible, modify the non-strict inequalities with the strict ones to save  $\sim 3$  gas as long as the logic of the code is not affected.

**Alleviation:**

# IN-DEPTH VULNERABILITIES

## **Description:**

*Solidity source files indicate the versions of the compiler they can be compiled with using a pragma directive at the top of the solidity file. This can either be a floating pragma or a specific compiler version.*

*The contract was found to be using a floating pragma which is not considered safe as it can be compiled with all the versions described.*

**Location:** *BattleVerseCoin.sol L09*

## **Issue:** *Use Of Floating Pragma*

**Level:** *Minor*

**Recommendation:** *It is recommended to follow the latter example, as future compiler versions may handle certain language constructions in a way the developer did not foresee. The developers should always use the exact Solidity compiler version when designing their contracts as it may break the changes in the future.*

*pragma solidity ^0.4.17; not recommended -> compiles with 0.4.17 and above*

*pragma solidity 0.8.4; recommended -> compiles with 0.8.4 only*

**Alleviation:**

# IN-DEPTH VULNERABILITIES

---

## **Description:**

*Inline assembly is a way to access the Ethereum Virtual Machine at a low level. This bypasses several important safety features and checks of Solidity. This should only be used for tasks that need it and if there is confidence in using it.*

*Multiple vulnerabilities have been detected previously when the assembly is not properly used within the Solidity code; therefore, caution should be exercised while using them.*

**Location:** *BattleVerseCoin.sol L26-L28*

**Issue:** *In-Line Assembly Detected*

**Level:** *Informational*

**Recommendation:** *Avoid using inline assembly instructions if possible because it might introduce certain issues in the code if not dealt with properly because it bypasses several safety features that are already implemented in Solidity.*

**Alleviation:**

# IN-DEPTH VULNERABILITIES

---

## **Description:**

*Everything that is inside a contract is visible to all observers external to the blockchain. Making something `private` only prevents other contracts from reading or modifying the information, but it will still be visible to the whole world and observers of the blockchain.*

*Miners have access to all contracts' code and data. Developers must account for the lack of privacy in EVM.*

**Location:** *BattleVerseCoin.sol L182-L189*

**Issue:** *Private Modifier Does Not Hide Data*

**Level:** *Informational*

**Recommendation:** *Keep in mind that the `private` modifier does not make a variable invisible and should not keep sensitive contents within the modifier.*

*It is a best practice to use `private` when you really want to protect your state variables and functions because you hide them behind logic executed through internal or public functions.*

**Alleviation:**



<https://bscscan.com/address/0x9bee0c15676a65ef3c8cdb38cb3dd31c675bbd12#code>

## FINDING CATEGORIES

The assessment process will utilize a mixture of static analysis, swift scan and other security techniques.

This report has been prepared for BattleVerse project using MH SwiftScan to examine and discover vulnerabilities and safe coding practices in Supernova's smart contract including the libraries used by the contract that are not officially recognized.

The scan runs a comprehensive static analysis on the solidity code and finds vulnerabilities ranging from minor gas optimizations to major vulnerabilities leading to the loss of funds. The coverage scope pays attention to all the informational and critical vulnerabilities with over (110+) modules. The scanning and auditing process covers the following areas:

Various common and uncommon attack vectors will be investigated to ensure that the smart contracts are secure from malicious actors. The scanner modules find and flag issues related to gas optimizations that help in reducing the overall gas cost. It scans and evaluates the codebase against industry best practices and standards to ensure compliance. It makes sure that the officially recognized libraries used in the code are secure and up to date.

## AUDIT SCORES

MH Audits AuditScores is not a live dynamic score. It is a fixed value determined at the time of the report issuance date.

\*Note that if no manual in-depth expert review has been performed a score multiplier of .9 will apply to the final result.

**MH Audits AuditScores are not, nor should be considered, an “endorsement” or “disapproval” of any particular project or team. These reports and scores are not, nor should be considered, an indication of the economics or value of any “product” or “asset” created by any team or project that contracts MH Audits to perform a security review.**



AUDITS

WEBSITE  
**MHAUDITS.IO**

TWITTER  
**@MHAUDITS**