



AUDIT REPORT

August 2025



For



MONWU

Wallet ERC-4337

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Executive Summary

Project Name	MONWU Wallet ERC-4337
Protocol Type	Wallet
Project URL	https://monwu.com/smart-wallet
Overview	Monwu's ERC 4337 wallets are standard account abstraction wallets coupled with paymasters. It uses ZK SNARKS as proof for authentication and only allow sponsored account to interact with Paymaster.
Audit Scope	The scope of this Audit was to analyze the Monwu ERC-4337 Smart Contracts for quality, security, and correctness.
Source Code link	https://github.com/BlackH3art/monwu-erc4337-v2
Contracts in Scope	MonwuAccountV1.sol, MonwuPaymaster.sol MonwuAccountFactory.sol, Administrable.sol
Branch	main
Commit Hash	37679b223e93ab48d0313fe90a1aff332175fff9
Language	Solidity
Blockchain	EVM
Method	Manual Analysis, Functional Testing, Automated Testing
Review 1	28th July 2025 - 4th August 2025
Updated Code Received	5th August 2025
Review 2	5th August 2025
Fixed In	326afd1ea4f78a9a123768925023285e0d059baf

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Number of Issues per Severity



Critical	0 (0.0%)
High	0 (0.0%)
Medium	0 (0.0%)
Low	1 (50%)
Informational	1 (50%)

		Severity				
		Critical	High	Medium	Low	Informational
Issues	Open	0	0	0	0	0
	Acknowledged	0	0	0	0	0
	Partially Resolved	0	0	0	0	0
	Resolved	0	0	0	1	1



Summary of Issues

Issue No.	Issue Title	Severity	Status
1	Use Ownable2Step instead of Ownable	Low	Resolved
2	Consider using _disableInitializer in the constructor	Informational	Resolved



Checked Vulnerabilities

✓ Access Management

✓ Arbitrary write to storage

✓ Centralization of control

✓ Ether theft

✓ Improper or missing events

✓ Logical issues and flaws

✓ Arithmetic Computations
Correctness

✓ Race conditions/front running

✓ SWC Registry

✓ Re-entrancy

✓ Timestamp Dependence

✓ Gas Limit and Loops

✓ Exception Disorder

✓ Gasless Send

✓ Use of tx.origin

✓ Malicious libraries

✓ Compiler version not fixed

✓ Address hardcoded

✓ Divide before multiply

✓ Integer overflow/underflow

✓ ERC's conformance

✓ Dangerous strict equalities

✓ Tautology or contradiction

✓ Return values of low-level calls



✓ Missing Zero Address Validation

✓ Private modifier

✓ Revert/require functions

✓ Multiple Sends

✓ Using suicide

✓ Using delegatecall

✓ Upgradeable safety

✓ Using throw

✓ Using inline assembly

✓ Style guide violation

✓ Unsafe type inference

✓ Implicit visibility level



Techniques and Methods

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

- The overall quality of code
- Use of best practices
- Code documentation and comments, match logic and expected behavior
- Token distribution and calculations are as per the intended behavior mentioned in the whitepaper
- Implementation of ERC 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 analyzed 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

A 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 analyzed, 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 behavior 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, Foundry, Solhint, Mythril, Slither, Solidity Static Analysis.



Types of Severity

Every issue in this report has been assigned to a severity level. There are five levels of severity, and each of them has been explained below.

■ **Critical: Immediate and Catastrophic Impact**

Critical issues are the ones that an attacker could exploit with relative ease, potentially leading to an immediate and complete loss of user funds, a total takeover of the protocol's functionality, or other catastrophic failures. Critical vulnerabilities are non-negotiable; they absolutely must be fixed.

■ **High (H): Significant Risk of Major Loss or Compromise**

High-severity issues represent serious weaknesses that could result in significant financial losses for users, major malfunctions within the protocol, or substantial compromise of its intended operations. While exploiting these vulnerabilities might require specific conditions to be met or a moderate level of technical skill, the potential damage is considerable. These findings are critical and should be addressed and resolved thoroughly before the contract is put into the Mainnet.

■ **Medium (M): Potential for Moderate Harm Under Specific Circumstances**

Medium-severity bugs are loopholes in the protocol that could lead to moderate financial losses or partial disruptions of the protocol's intended behavior. However, exploiting these vulnerabilities typically requires more specific and less common conditions to occur, and the overall impact is generally lower compared to high or critical issues. While not as immediately threatening, it's still highly recommended to address these findings to enhance the contract's robustness and prevent potential problems down the line.

■ **Low (L): Minor Imperfections with Limited Repercussions**

Low-severity issues are essentially minor imperfections in the smart contract that have a limited impact on user funds or the core functionality of the protocol. Exploiting these would usually require very specific and unlikely scenarios and would yield minimal gain for an attacker. While these findings don't pose an immediate threat, addressing them when feasible can contribute to a more polished and well-maintained codebase.

■ **Informational (I): Opportunities for Improvement, Not Immediate Risks**

Informational findings aren't security vulnerabilities in the traditional sense. Instead, they highlight areas related to the clarity and efficiency of the code, gas optimization, the quality of documentation, or adherence to best development practices. These findings don't represent any immediate risk to the security or functionality of the contract but offer valuable insights for improving its overall quality and maintainability. Addressing these is optional but often beneficial for long-term health and clarity.



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.

Severity Matrix

		Impact		
		High	Medium	Low
Likelihood	High	Critical	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

Impact

- **High** - leads to a significant material loss of assets in the protocol or significantly harms a group of users.
- **Medium** - only a small amount of funds can be lost (such as leakage of value) or a core functionality of the protocol is affected.
- **Low** - can lead to any kind of unexpected behavior with some of the protocol's functionalities that's not so critical.

Likelihood

- **High** - attack path is possible with reasonable assumptions that mimic on-chain conditions, and the cost of the attack is relatively low compared to the amount of funds that can be stolen or lost.
- **Medium** - only a conditionally incentivized attack vector, but still relatively likely.
- **Low** - has too many or too unlikely assumptions or requires a significant stake by the attacker with little or no incentive.



Low Severity Issues

Use Ownable2Step instead of Ownable

Resolved

Path

Administrable.sol

Description

The contract inherits from OpenZeppelin's Ownable.sol that allows immediate ownership transfer. It is recommended to use Ownable2Step instead which will allow a 2-step ownership transfer process. This will prevent unintended ownership transfer to an address.

Recommendation

Consider using Ownable2Step instead



Informational Issues

Consider using `_disableInitializer` in the constructor

Resolved

Path

MonwuAccountV1, MonwuAccountV2

Description

The account contract is upgradeable but does not call `_disableInitializer()` in the constructor. Although the current implementation where the factory contract initializes the contract immediately, it is still best practice to use this in constructor.

Recommendation

It is recommended to use `_disableInitializer()` in the constructor.



Functional Tests

Some of the tests performed are mentioned below:

- ✓ Should return account if it's already deployed
- ✓ Should correctly determine address via CREATE2
- ✓ Should revert if non-sponsored contract calls validatePaymasterUserOp
- ✓ Should only allow admin to add stake
- ✓ Should only allow EntryPoint to execute account operations

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 MONWU Wallet ERC-4337. We performed our audit according to the procedure described above.

issues of Low and Informational severity were found. MONWU team resolved all the issues mentioned

Disclaimer

At QuillAudits, we have spent years helping projects strengthen their smart contract security. However, security is not a one-time event—threats evolve, and so do attack vectors. Our audit provides a security assessment based on the best industry practices at the time of review, identifying known vulnerabilities in the received smart contract source code.

This report does not serve as a security guarantee, investment advice, or an endorsement of any platform. It reflects our findings based on the provided code at the time of analysis and may no longer be relevant after any modifications. The presence of an audit does not imply that the contract is free of vulnerabilities or fully secure.

While we have conducted a thorough review, security is an ongoing process. We strongly recommend multiple independent audits, continuous monitoring, and a public bug bounty program to enhance resilience against emerging threats.

Stay proactive. Stay secure.



About QuillAudits

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