0xCommit

Security Assessment Report

Biconomy

Biconomy ABI Session Validation Module

Version: Final

Date: 12 Feb 2024

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Introduction

Purpose of this report

0xCommit has been engaged by **Biconomy** to perform a security audit of several Smart Account components.

The objectives of the audit are as follows:

1. Determine the correct functioning of the protocol, in accordance with the project specification.
2. Determine possible vulnerabilities, which could be exploited by an attacker.
3. Determine smart contract bugs, which might lead to unexpected behaviour.
4. Analyze whether best practices have been applied during development.
5. Make recommendations to improve code safety and readability.

This report represents a summary of the findings.

As with any code audit, there is a limit to which vulnerabilities can be found, and unexpected execution paths may still be possible. The author of this report does not guarantee complete coverage (see disclaimer).

Codebases Submitted for the Audit

The audit has been performed on the following commits:

Github Link:

https://github.com/bcnmy/scw-contracts

Version	Commit hash
Initial	21185756a3e3e9ac0c60b2c7a3daee641cfc093f
Final	

How to Read This Report

This report classifies the issues found into the following severity categories:

Severity	Description
Critical	A serious and exploitable vulnerability that can lead to loss of funds, unrecoverable locked funds, or catastrophic denial of service.
High	An attacker can successfully execute an attack that clearly results in operational issues for the service. This also includes any value loss of unclaimed funds permanently or temporary.
Medium	The service may be susceptible to an attacker carrying out an unintentional action, which could potentially disrupt its operation. Nonetheless, certain limitations exist that make it difficult for the attack to be successful.
Low	The service may be vulnerable to an attacker executing an unintended action, but the impact of the action is negligible or the likelihood of the attack succeeding is very low and there is no loss of value.
Informational	Comments and recommendations of design decisions or potential optimizations, that are not relevant to security. Their application may improve aspects, such as user experience or readability, but is not strictly necessary

The status of an issue can be one of the following: **Pending**, **Acknowledged**, or **Resolved**.

Note that audits are an important step to improving the security of smart contracts and can find many issues. However, auditing complex codebases has its limits and a remaining risk is present (see disclaimer).

Users of the system should exercise caution. In order to help with the evaluation of the remaining risk, we provide a measure of the following key indicators: **code complexity**, **code readability**, **level of documentation**, and **test coverage**. We include a table with these criteria below.

Note that high complexity or low test coverage does not necessarily equate to a higher risk, although certain bugs are more easily detected in unit testing than in a security audit and vice versa.

Overview

Methodology

The audit has been performed in the following steps:

1. Gaining an understanding of the code base's intended purpose by reading the available documentation.
2. Automated source code and dependency analysis.
3. Manual line by line analysis of the source code for security vulnerabilities and use of best practice guidelines, including but not limited to:
    a. Race condition analysis
    b. Under-/overflow issues
    c. Key management vulnerabilities
    d. Access Control Issues
    e. Boundary Analysis
4. Report preparation

Functionality Overview

It is a module to be used with SessionValidationModule, which allows more granular validation. It limits the calldata to specific contract, functions and parameter limits.

Summary of Findings

Sr. No.	Description	Severity	Status
1	Overflow during assembly conversion	Low	Resolved
2	Incorrect NatSpec comment in validateSessionUserOp function	Informatio...	Resolved

Detailed Findings

1. Overflow during assembly conversion

Severity: Low

Description

In the ABI session validation process, within the 'validateSessionUserOp' function, there is a step involving the conversion of 'callData' bytes to data intended for 'destContract.' During this conversion, 'calldataload' is employed to retrieve the first element stored in the 'abi.encodedWithSelector' data. It's important to note that 'destContract' is expected to be of the 'address' data type. However, during the conversion to an address, the size is not appropriately accounted for, potentially leading to overflow-related issues and erroneous address computation. It's crucial to recognize that the storage slot associated with this operation is limited to 32 bytes.

Remediation

To address the aforementioned issue, it is recommended to ensure that 'destContract' is consistently converted to 'uint160' when used outside the context of 'validateSessionUserOp.' Subsequently, it should be typecast to the 'address' data type to guarantee proper handling and prevent potential overflow-related problems. Following is the sample solution -

```
function TestFz( bytes calldata callData ) external pure returns ( address
){

      uint160 _addr;
      Assembly{
            _addr := calldataload( add(callData.offset, SELECTOR_LENGTH ))
      }
      return address(_addr);
}
```

Status

Resolved

2. Incorrect NatSpec comment in validateSessionUserOp function

Severity: Informational

Description

In modues/ISessionValidatonModule, `validateSessionUserOp` has an incorrect NatSpec comment. The description for callSpecificData and return variable is missing.

Remediation

Ensure NatSpec comment for all functions is as per its functionality.

Status

Resolved