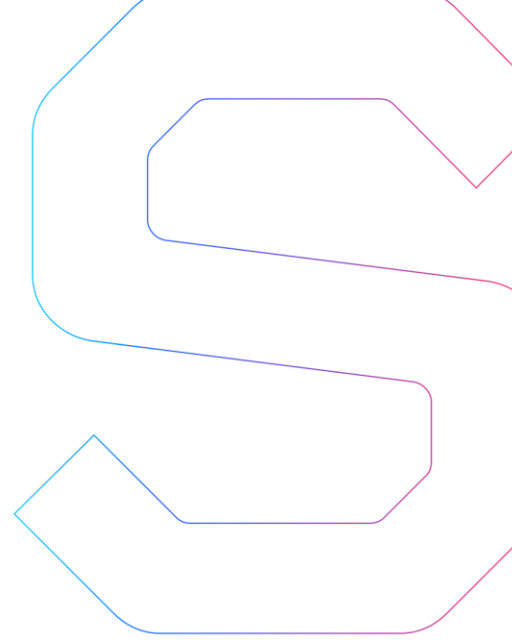


SmartDec



PumaPay Security Analysis

This report is private.

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| | |
|--|---|
| Abstract..... | 2 |
| Disclaimer | 2 |
| Summary | 2 |
| General recommendations | 2 |
| Procedure | 3 |
| Project overview..... | 4 |
| Project description | 4 |
| Project architecture..... | 4 |
| Manual analysis | 5 |
| Critical issues | 5 |
| Medium severity issues | 5 |
| Discrepancy with the documentation | 5 |
| Low severity issues | 6 |
| Code style..... | 6 |
| Tests..... | 6 |

Abstract

In this report, we consider the security of the [PumaPay](#) project. Our task is to find and describe security issues in the smart contracts of the platform.

Disclaimer

The audit does not give any warranties on the security of the code. One audit cannot be considered enough. We always recommend proceeding with several independent audits and a public bug bounty program to ensure the security of smart contracts. Besides, security audit is not an investment advice.

Summary

In this report, we considered the security of PumaPay smart contracts. We performed our audit according to the [procedure](#) described below.

The audit showed a discrepancy with the documentation (medium-severity issue) and two issues of low severity.

General recommendations

We recommend updating the code to match the documentation and fixing the issues.

Procedure

In our audit, we consider the following crucial features of the code:

1. Whether the code is secure.
2. Whether the code corresponds to the documentation (including whitepaper).
3. Whether the code meets best practices.

We perform our audit according to the following procedure:

- automated analysis
 - we scan project's code base with [SmartDec Scanner](#)
 - we manually verify (reject or confirm) all the issues found by tools
- manual audit
 - we manually analyze code base for security vulnerabilities
 - we assess overall project structure and quality
- report
 - we reflect all the gathered information in the report

Project overview

Project description

In our analysis we consider [smart contracts](#) of [PumaPay](#) project on Git repository, commit [edd92c0f5367a5e1859975b88855293a9e98b8e3](#).

Project architecture

For the audit, we were provided with a git repository. The project has tests and documentation.

The scope of the audit included only [MultiVesting.sol](#) file.

The total LOC of audited sources is 106.

Manual analysis

The contracts were completely manually analyzed, their logic was checked. Besides, the results of the automated analysis were manually verified. All the confirmed issues are described below.

Critical issues

Critical issues seriously endanger smart contracts security. We highly recommend fixing them.

The audit showed no critical issues.

Medium severity issues

Medium issues can influence project operation in current implementation. We highly recommend addressing them.

Discrepancy with the documentation

`addVesting()` function at line 56 has no check if `_startedAt` moment is in the future or now. In the documentation, it is declared:

```
It's also possible to start vesting from some date in the future by calling  
address user, uint256 amount, uint256 startedAt
```

We recommend adding a proper check to `addVesting()` function.

Low severity issues

Low severity issues can influence project operation in future versions of code. We recommend taking them into account.

Code style

- At line 21, time interval is given in seconds: `SECONDS_IN_30_DAYS = 2592000`. We recommend using `30 days` instead to improve code readability.
- At lines 95 and 143, consider using `getAvailableAmount()`.
- Function `getAvailableAmountAtTimestamp()` at line 160 is often used with a particular `Vesting` entry.
Consider using local variable to improve readability and optimize gas consumption:
`Vesting memory vesting = vestingMap[_beneficiary][_vestingId];`

Tests

- scripts for running tests/coverage depend on globally installed packages.
- `npm i -g solcjs` fails (see [documentation](#))

This analysis was performed by [SmartDec](https://smartdec.com).

Evgeny Marchenko, Lead Developer

Boris Nikashin, Analyst

Alexander Seleznev, Chief Business Development Officer

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