

Eloin

Smart Contract Security Audit

Prepared by ShellBoxes

Jan 25th, 2024 - Jan 26th, 2024

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Document Properties

Client	Eloin
Version	1.0
Classification	Public

Scope

Contract Name	Contract Address
Eloin	0xdaaa1cdb729eeedda33d03ce89f11fdab307fc43

Re-Audit

Contract Name	Contract Address
Eloin	0x9d4282b4B6Dc457F44F15e39Ebffd4621C6dF246

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1 Introduction

Eloin engaged ShellBoxes to conduct a security assessment on the Eloin beginning on Jan 25th, 2024 and ending Jan 26th, 2024. In this report, we detail our methodical approach to evaluate potential security issues associated with the implementation of smart contracts, by exposing possible semantic discrepancies between the smart contract code and design document, and by recommending additional ideas to optimize the existing code. Our findings indicate that the current version of smart contracts can still be enhanced further due to the presence of many security and performance concerns.

This document summarizes the findings of our audit.

1.1 About Eloin

Eloin is a part of booming meme coin era with a vision of Utility as well as Community. Therefore, Eloin is both Utility and Community-driven token. The duo of these two would act as a catalyst for the overall ecosystem and token growth.

Issuer	Eloin
Website	https://www.eloin.tech
Туре	Solidity Smart Contracts
Whitepaper	LION PAPER
Audit Method	Whitebox

1.2 Approach & Methodology

ShellBoxes used a combination of manual and automated security testing to achieve a balance between efficiency, timeliness, practicability, and correctness within the audit's scope. While manual testing is advised for identifying problems in logic, procedure, and implementation, automated testing techniques help to expand the coverage of smart contracts and can quickly detect code that does not comply with security best practices.

1.2.1 Risk Methodology

Vulnerabilities or bugs identified by ShellBoxes are ranked using a risk assessment technique that considers both the LIKELIHOOD and IMPACT of a security incident. This framework is effective at conveying the features and consequences of technological vulnerabilities.

Its quantitative paradigm enables repeatable and precise measurement, while also revealing the underlying susceptibility characteristics that were used to calculate the Risk scores. A risk level will be assigned to each vulnerability on a scale of 5 to 1, with 5 indicating the greatest possibility or impact.

- Likelihood quantifies the probability of a certain vulnerability being discovered and exploited in the untamed.
- Impact quantifies the technical and economic costs of a successful attack.
- Severity indicates the risk's overall criticality.

Probability and impact are classified into three categories: H, M, and L, which correspond to high, medium, and low, respectively. Severity is determined by probability and impact and is categorized into four levels, namely Critical, High, Medium, and Low.



Likelihood

2 Findings Overview

2.1 Summary

The following is a synopsis of our conclusions from our analysis of the Eloin implementation. During the first part of our audit, we examine the smart contract source code and run the codebase via a static code analyzer. The objective here is to find known coding problems statically and then manually check (reject or confirm) issues highlighted by the tool. Additionally, we check business logics, system processes, and DeFi-related components manually to identify potential hazards and/or defects.

2.2 Key Findings

In general, these smart contracts are well-designed and constructed, but their implementation might be improved by addressing the discovered flaws, which include 2 critical-severity, 1 high-severity, 3 medium-severity, 3 low-severity vulnerabilities.

Vulnerabilities	Severity	Status
SHB.1. Inconsistencies in Total Supply and Tax Fee Structure	CRITICAL	Fixed
SHB.2. Inadequate Handling of Fees in _update Func-tion	CRITICAL	Fixed
SHB.3. Loss of Precision Can Lead To Fee Bypass	HIGH	Fixed
SHB.4. Owner Can Renounce Ownership	MEDIUM	Fixed
SHB.5. Centralized Ownership Control	MEDIUM	Acknowledged
SHB.6. Front-Run Attack	MEDIUM	Acknowledged
SHB.7. Floating Pragma	LOW	Fixed
SHB.8. Missing Value Verification	LOW	Fixed
SHB.9. Missing Address Verification	LOW	Fixed

3 Finding Details

SHB.1 Inconsistencies in Total Supply and Tax Fee Structure

- Severity: CRITICAL - Likelihood: 3

Status: FixedImpact: 3

Description:

There's a significant disparity in the token total supply, with both the website and contract implementation asserting 1 trillion tokens, while the whitepaper specifies 100 trillion. Additionally, the tax fee percentage is inconsistently communicated across project documents, further complicating the understanding of the project's financial structure.

Files Affected:

SHB.1.1: Eloin.sol

```
uint256 public c = 6
uint256 public burnFee = 1;
```

SHB.1.2: Eloin.sol

Recommendation:

To address these concerns and bolster community trust, it's crucial to align and maintain uniformity in token total supply, and tax fee percentages across all project documentation and the contract implementation. Consider conducting a thorough review and adjusting the

Eloin contract to adhere to the intended total supply and tax fee percentages outlined in project documentation.

Updates

The Eloin team has addressed the issue by adjusting the values according to the project pitch deck (EloinPaper). The total supply is now set to 1 trillion, and the fee structure has been updated as follows: sellFee = 90, buyFee = 60, burnFee = 10, with division = 1000.

SHB.1.3: Eloin.sol 338 uint256 public sellFee = 90; 339 uint256 public buyFee = 60; 340 341 uint256 public burnFee = 10; 342 343 uint16 immutable DIVISOR = 1000; SHB.1.4: Eloin.sol

SHB.2 Inadequate Handling of Fees in _update Function

mint(owner(), 1000000000000 * 10 ** decimals());

- Severity: CRITICAL - Likelihood: 3

Status: FixedImpact: 3

Description:

In the _update function of the Eloin contract, the fee logic poses a critical issue where the taxFee is not transferred to the designated taxWallet account, and the burnAmount is not burned as intended. This implementation allows fees to accumulate in the contract, creating a vulnerability. Moreover, the contract exposes the withdrawToken function that permits the owner to withdraw all token balances, including the accumulated fees, which deviates from the intended business logic.

Files Affected:

SHB.2.1: Eloin.sol

```
if(takeFee){
412
              uint256 burnAmount = value * burnFee / 100; //@audit-issue
413
                 \hookrightarrow potential loss of precision
              if(_isSell(from , to) _isBuy(from) ){
414
                  uint256 tax = value * taxFee / 100; //@audit-issue didnt
415
                     value = value - tax;
416
              }
              value = value - burnAmount; //@audit-issue didnt burn this
                 \hookrightarrow amount
          }
419
```

SHB.2.2: Eloin.sol

Recommendation:

To address this issue, it is imperative to enhance the fee-handling logic within the _update function. Ensure that the taxFee is appropriately transferred to the designated taxWallet account, and the burnAmount is effectively burned. Additionally, reconsider the design of the withdrawToken function to align with the intended business logic, preventing the owner from withdrawing accumulated fees.

Updates

The Eloin team has fixed the issue by transferring the buy and sell fees to the taxWallet and burning the burnAmount using the super._update function.

SHB.2.3: Eloin.sol

```
if (tax > 0) {
                   value = value - tax;
417
                   super. update(from, taxWallet, tax);
418
               }
419
420
               value = value - burnAmount;
421
               super._update(from, address(0), burnAmount);
422
           }
423
           super._update(from, to, value);
424
```

SHB.3 Loss of Precision Can Lead To Fee Bypass

- Severity: HIGH - Likelihood: 2

Status: FixedImpact: 3

Description:

The _update function calculates two values: the burn amount and the tax amount, using the burnFee and taxFee respectively. The calculation involves multiplying the transfer amount by these fee values and then dividing by 100. However, when processing a small transfer amount, such as 10, with a tax fee of 6%, the result is 60/100, which Solidity rounds down to 0. Consequently, no amount is deducted in such cases.

Files Affected:

SHB.3.1: Eloin.sol

```
uint256 tax = value * taxFee / 100; //@audit-issue didnt
415
                     value = value - tax;
416
              }
417
              value = value - burnAmount; //@audit-issue didnt burn this
418
                 \hookrightarrow amount
          }
419
          super. update(from, to, value);
420
       }
421
```

Recommendation:

It is recommended to either implement a minimum transfer value requirement of 100 or to enhance the precision of the tax and burn fee calculations to accommodate smaller transfer amounts.

Updates

The Eloin team has fixed the issue by increasing the precision of the fees. They changed the divisor from 100 to 1000 and added one extra point of precision in fees.

SHB.4 Owner Can Renounce Ownership

Severity: MEDIUM Likelihood:1

Status: FixedImpact: 3

Description:

The contract inherits from the Ownable OpenZeppelin contract, enabling the owner to renounce ownership. Renouncing ownership leads to the contract being left without an owner, effectively disabling any functionality exclusively available to the owner.

Files Affected

SHB.4.1: Eloin.sol

6 import "@openzeppelin/contracts/access/Ownable.sol";

SHB.4.2: Eloin.sol

```
contract Eloin is ERC20, ERC20Burnable, Ownable { //@audit-issue owner can renance ownership
```

Recommendation:

It is recommended to prevent the owner from invoking the renounceOwnership function and to disable its functionality by overriding it.

Updates

The Eloin team resolved the issue by disabling the renounceOwnership functionality.

SHB.5 Centralized Ownership Control

- Severity: MEDIUM - Likelihood: 2

Status: Acknowledged
 Impact: 2

Description:

The Eloin contract introduces a centralization risk since several critical functions utilize the onlyOwner modifier, consolidating exclusive control under the contract owner. This centralization extends to functions related to fee management, blacklisting, limit updates, withdrawal of Ether and tokens, and other key functionalities. Relying solely on the owner's authority for these operations may compromise the decentralized nature of the contract.

Files Affected:

SHB.5.1: Eloin.sol

```
function excludeFromFee(address account) public onlyOwner { //@audit
          \hookrightarrow -issue centralization risk
           isExcludedFromFee[account] = true;
480
       }
481
482
       function includeInFee(address account) public onlyOwner {
483
           isExcludedFromFee[account] = false;
484
       }
485
       function addToBlacklist(address account) public onlyOwner {
487
           isBlacklisted[account] = true;
       }
489
490
       function removeFromBlacklist(address account) public onlyOwner {
491
           isBlacklisted[account] = false;
492
       }
493
494
       function setBurnFeePercent(uint256 fee) external onlyOwner {
495
           burnFee = fee;//@audit-issue missing fee verif
496
       }
497
498
       function setTaxFeePercent(uint256 fee) external onlyOwner {
499
           taxFee = fee;//@audit-issue missing fee verif
500
       }
501
502
       function changeTaxWallet(address account) public onlyOwner {
503
           taxWallet = account; //@audit-issue missing address verif
       }
505
506
       function updateBuyLimit(uint256 limit) external onlyOwner {
507
           buyLimit = limit;//@audit-issue missing limit verif
รกล
```

```
}
509
510
       function updateSellLimit(uint256 limit) external onlyOwner {
511
           sellLimit = limit;//@audit-issue missing value verif
512
       }
513
514
       function updateTimelimit(bool status) external onlyOwner {
515
           timeLimit = status; //@audit-issue missing value verif
516
       }
517
518
       function withdrawEth() external onlyOwner { //@audit-issue owner can
519

→ withdraw all contract balance

          payable(owner()).transfer(address(this).balance);
520
       }
521
522
       function withdrawToken(IERC20 token) external onlyOwner {
523
           token.safeTransfer(owner(), token.balanceOf(address(this))); //
              ← @audit-issue owner can withdraw all contract balance token
       }
525
```

Recommendation:

To address the centralization risk, consider implementing a multi-signature or governance mechanism that involves multiple authorized parties in decision-making processes. This approach distributes control and reduces reliance on a single owner.

Updates

The Eloin team has acknowledged the issue, stating that they will work with a multi-signature wallet for contract ownership control.

SHB.6 Front-Run Attack

- Severity: MEDIUM - Likelihood:1

Status: AcknowledgedImpact: 3

Description:

The Eloin contract exhibits a vulnerability where the owner can front-run user transfer transactions, potentially manipulating fees in their favor. This vulnerability allows the owner to preemptively adjust fees during user transactions, compromising the fairness and transparency of the fee structure.

Files Affected:

SHB.6.1: Eloin.sol

```
function setBurnFeePercent(uint256 fee) external onlyOwner {
   burnFee = fee;//@audit-issue missing fee verif
}

function setTaxFeePercent(uint256 fee) external onlyOwner {
   taxFee = fee;//@audit-issue missing fee verif
}
```

Recommendation:

To mitigate this risk, it is crucial to implement measures that prevent the owner from adjusting fees opportunistically during user transfer transactions. Consider incorporating safeguards such as time-lock functionalities, access control mechanisms, or utilizing multi-signature verification.

Updates

The Eloin team has acknowledged the issue, stating that they will work with a multi-signature wallet for the owner, which will reduce the front-run risk.

SHB.7 Floating Pragma

- Severity: LOW - Likelihood:1

Status: FixedImpact: 2

Description:

The Eloin contract uses a floating Solidity pragma of 0.8.22, indicating compatibility with any compiler version from 0.8.19 (inclusive) up to, but not including, version 0.9.0. This flexibility could potentially introduce unexpected behavior if the contracts are compiled with a newer compiler version that includes breaking changes.

Files Affected:

SHB.7.1: Eloin.sol

pragma solidity ^0.8.22; //@audit-issue floating pragma

Recommendation:

It is generally recommended to lock the pragma statement to a specific Solidity compiler version to ensure consistent behavior across different compiler versions. To achieve this, consider removing the caret (^) from the pragma statement and specifying a fixed version, such as pragma solidity 0.8.22.

Updates

The Eloin team has resolved this issue by fixing the pragma version and locking it to 0.8.22.

SHB.8 Missing Value Verification

Severity: LOW
 Likelihood:1

Status: FixedImpact: 2

Description:

Certain functions in the Eloin contract lack necessary value safety checks on their arguments. Therefore, the contract fails to ensure that all values provided are greater than 0. Additionally, there is no validation in place to verify that fee values for both tax and burn fall within the valid percentage range of 0 to 100. This absence of value verification poses a potential risk to the contract's integrity and security.

Files Affected:

SHB.8.1: Eloin.sol

```
function setBurnFeePercent(uint256 fee) external onlyOwner {
   burnFee = fee;//@audit-issue missing fee verif
}

function setTaxFeePercent(uint256 fee) external onlyOwner {
   taxFee = fee;//@audit-issue missing fee verif
}
```

SHB.8.2: Eloin.sol

```
function updateBuyLimit(uint256 limit) external onlyOwner {
   buyLimit = limit;//@audit-issue missing limit verif
}

function updateSellLimit(uint256 limit) external onlyOwner {
   sellLimit = limit;//@audit-issue missing value verif
}
```

Recommendation:

To address this issue, we recommend implementing thorough value verification checks for the arguments in the affected functions. Use require statements to ensure that all input values are greater than 0, and validate that fee values for tax and burn are within the acceptable percentage range of 0 to 100.

Updates

The Eloin team has fixed the issue by adding value checks for all setter functions, using require statements to ensure proper validation.

SHB.9 Missing Address Verification

Severity: LOW
 Likelihood:1

Status: FixedImpact: 2

Description:

The changeTaxWallet function in the Eloin contract lacks a critical address verification check. Currently, it allows the taxWallet to be set to any address, including address(0). This absence of address validation poses a potential risk, as setting the taxWallet to address(0) may result in unintended consequences or vulnerabilities. Additionally, it's important to note that the contract constructor initializes the contract with an initialOwner address. This initialization process could introduce similar vulnerabilities if the provided initial owner address is address(0).

Files Affected:

SHB.9.1: Eloin.sol

```
constructor(
address initialOwner
```

SHB.9.2: Eloin.sol

```
function changeTaxWallet(address account) public onlyOwner {
    taxWallet = account; //@audit-issue missing address verif
}
```

Recommendation:

To mitigate this issue, it is essential to incorporate a check in the changeTaxWallet function to ensure that the provided account address is not equal to address(0). Similarly, consider adding a check in the constructor to validate that the initialOwner address is not address(0).

Updates

The Eloin team resolved the issue by implementing our recommendation and incorporating zero address checks

4 Best Practices

BP.1 Remove Dead Code

Description:

Enhance code cleanliness and maintainability in the Eloin contract by conducting a thorough review and removal of any dead or commented code snippets. This practice promotes improved readability, reduces confusion, and ensures a streamlined and more maintainable smart contract.

Files Affected:

BP.1.1: Eloin.sol

, // pragma solidity >=0.5.0; //@audit-issue BP : remove dead code

BP.1.2: Eloin.sol

42 // pragma solidity >=0.5.0;

BP.1.3: Eloin.sol

143 // pragma solidity >=0.6.2;

BP.1.4: Eloin.sol

294 // pragma solidity >=0.6.2;

BP.1.5: Eloin.sol

// IUniswapV2Router02 _uniswapV2Router = IUniswapV2Router02(0 \hookrightarrow x10ED43C718714eb63d5aA57B78B54704E256024E); // mainnet

Status - Fixed

BP.2 Optimize Fee-Related Validation Logic

Description:

Streamline the codebase in the Eloin contract by optimizing the fee-related validation logic. The private functions _validateTransfer and _validateTime are currently conditioned on the takeFee variable. To improve efficiency, consider moving this conditional check into the _update function. By doing so, you can eliminate redundant checks in the individual functions, reducing overhead and enhancing overall contract performance.

Files Affected:

BP.2.1: Eloin.sol

```
bool takeFee = true;
           //if any account belongs to isExcludedFromFee account then remove
               \hookrightarrow the fee
           if (isExcludedFromFee[from] || isExcludedFromFee[to]) {
403
               takeFee = false;
404
           }
405
406
           _validateTransfer(from, to, value, takeFee);
407
           if (timeLimit) {
               validateTime(from, to, takeFee);
409
           }
```

BP.2.2: Eloin.sol

```
function _validateTransfer(

address sender,

address recipient,

uint256 amount,

bool takeFee

bool takeFee

in private view {
```

```
// Excluded addresses don't have limits

if (takeFee) { //@audit-issue BP : if takeFee call the fct this

cond should be before call fct

if (_isBuy(sender) && buyLimit != 0) { //@audit-issue}

buyLimit not initialized first
```

BP.2.3: Eloin.sol

```
function validateTime(
423
           address sender,
424
           address recipient,
425
           bool takeFee
426
       ) private { //@audit-issue BP : here for takeFee cond can be before
           \hookrightarrow fct call
           // Excluded addresses don't have time limits
428
           if (takeFee) {
429
               if (_isBuy(sender)) {
430
```

Status - Fixed

BP.3 Remove Unnecessary ETH Handling Functions

Description:

Enhance the simplicity and clarity of the Eloin contract by removing unnecessary Ethereum (ETH) handling functions. The contract does not anticipate receiving funds, so the receive function and the withdrawEth function, which facilitates fund withdrawal, are redundant. Eliminating these functions streamlines the contract, reducing unnecessary complexity and ensuring that the codebase aligns more closely with the intended functionality of the Eloin project.

Files Affected:

Status - Fixed

}

BP.4 Optimization In Code

Description:

- In the contract's constructor, the uniswapV2 router object is initially assigned to the
 _uniswapV2Router variable, followed by a redundant assignment to the
 uniswapV2Router variable. It would be more efficient to directly assign the value of
 the uniswapV2 router to the uniswapV2Router variable from the outset, thereby
 eliminating the need for the initial assignment to _uniswapV2Router.
- The excludeFromFee and includeInFee functions have the potential to be consolidated into a single function. This unified function would accept a boolean state (true or false) and directly apply this state to the relevant variable. Similarly, the addToBlacklist and removeFromBlacklist functions could be merged in the same manner, streamlining the process of managing blacklist statuses.

Files Affected:

BP.4.2: Eloin.sol

BP.4.3: Eloin.sol

```
function addToBlacklist(address account) public onlyOwner {
   isBlacklisted[account] = true;
}

function removeFromBlacklist(address account) public onlyOwner {
   isBlacklisted[account] = false;
}
```

Status - Partially Fixed

5 Conclusion

In this audit, we examined the design and implementation of Eloin contract and discovered several issues of varying severity. Eloin team addressed 7 issues raised in the initial report and implemented the necessary fixes, while classifying the rest as a risk with low-probability of occurrence. Shellboxes' auditors advised Eloin Team to maintain a high level of vigilance and to keep those findings in mind in order to avoid any future complications.

6 Scope Files

6.1 Audit

Files	MD5 Hash
Eloin.sol	b79c23ae84dc883bc655f5af6ddb29cd

6.2 Re-Audit

Files	MD5 Hash
Eloin.sol	bc8d78ce98c946c8c515e92863bca267

7 Disclaimer

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