



Campie

Security Audit Report

April 5, 2024

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1 | Introduction

1.1 About Campie

Developed by `Magpie`, `Campie` is a DeFi platform developed atop Camelot DEX, which emerges as a pioneering SubDAO initiative, thoughtfully designed to bolster Camelot DEX and the Arbitrum kingdom.

1.2 Source Code

The following source code was reviewed during the audit:

- <https://github.com/magpiexyz/Campie/tree/grailRush2>
- Commit ID: 118fa2e

And this is the final version representing all fixes implemented for the issues identified in the audit:

- <https://github.com/magpiexyz/Campie/tree/grailRush2>
- Commit ID: 7d6ba8e

Note this audit only covers the `CamelotStaking.sol`, `mGrailConvertor.sol`, and `MasterCampie.sol` contracts.

2 | Overall Assessment

This report has been compiled to identify issues and vulnerabilities within the `Campie` project. Throughout this audit, we identified a total of 3 issues spanning various severity levels. By employing auxiliary tool techniques to supplement our thorough manual code review, we have discovered the following findings.

Severity	Count	Acknowledged	Won't Do	Addressed
Critical	-	-	-	-
High	1	-	-	1
Medium	-	-	-	-
Low	1	1	-	-
Informational	1	-	-	1
Undetermined	-	-	-	-

3 | Vulnerability Summary

3.1 Overview

Click on an issue to jump to it, or scroll down to see them all.

-  [Improper Logic of mGrailConvertor::convert\(\)](#)
-  [Potential Risks Associated with Centralization](#)
-  [Meaningful Events for Key Operations](#)

3.2 Security Level Reference

In web3 smart contract audits, vulnerabilities are typically classified into different severity levels based on the potential impact they can have on the security and functionality of the contract. Here are the definitions for critical-severity, high-severity, medium-severity, and low-severity vulnerabilities:

Severity	Description
C-X (Critical)	A severe security flaw with immediate and significant negative consequences. It poses high risks, such as unauthorized access, financial losses, or complete disruption of functionality. Requires immediate attention and remediation.
H-X (High)	Significant security issues that can lead to substantial risks. Although not as severe as critical vulnerabilities, they can still result in unauthorized access, manipulation of contract state, or financial losses. Prompt remediation is necessary.
M-X (Medium)	Moderately impactful security weaknesses that require attention and remediation. They may lead to limited unauthorized access, minor financial losses, or potential disruptions to functionality.
L-X (Low)	Minor security issues with limited impact. While they may not pose significant risks, it is still recommended to address them to maintain a robust and secure smart contract.
I-X (Informational)	Warnings and things to keep in mind when operating the protocol. No immediate action required.
U-X (Undetermined)	Identified security flaw requiring further investigation. Severity and impact need to be determined. Additional assessment and analysis are necessary.

3.3 Vulnerability Details

[H-1] Improper Logic of mGrailConvertor::convert()

Target	Category	IMPACT	LIKELIHOOD	STATUS
mGrailConvertor.sol	Business Logic	High	Medium	Addressed

The mGrailConvertor::convert() function is designed to process the deposits of the grail token and mint the mGrail token simultaneously. When the input parameter _mode is set to stakeMode, it will deposit the minted mGrail token to the masterCampie contract on behalf of the user. While examining the staking logic, we notice the mGrail token is directly minted to the masterCampie contract (line 80). At the same time, we observe the MasterCampie::depositFor() function attempts to extract the mGrail token again from msg.sender (line 329), which will cause the transaction to revert.

mGrailConvertor::convert()

```
68 function convert(  
69     address _for,  
70     uint256 _amount,  
71     uint256 _mode  
72 ) external whenNotPaused nonReentrant {  
73     if (_amount == 0) revert ZeroNotAllowed();  
  
75     IERC20(grail).safeTransferFrom(msg.sender, address(this), _amount);  
76     _convert(_amount);  
  
78     if (_mode == stakeMode) {  
79         if (masterCampie == address(0)) revert MasterCampieNotSet();  
80         IMintableERC20(mGrail).mint(address(masterCampie), _amount);  
81         IMasterCampie(masterCampie).depositFor(  
82             mGrail,  
83             _for,  
84             _amount  
85         );  
86     } else {  
87         IMintableERC20(mGrail).mint(_for, _amount);  
88     }  
89     emit mGrailConverted(_for, _amount, _mode);  
90 }
```

MasterCampie::depositFor()

```
321 function depositFor(  
322     address _stakingToken,  
323     address _for,
```

```

324     uint256 _amount
325 ) external whenNotPaused nonReentrant {
326     PoolInfo storage pool = tokenToPoolInfo[_stakingToken];
327     IMintableERC20(pool.receiptToken).mint(_for, _amount);

329     IERC20(pool.stakingToken).safeTransferFrom(address(msg.sender), address(this
    ), _amount);
330     emit Deposit(_for, _stakingToken, pool.receiptToken, _amount);
331 }

```

Remediation Properly improve the implementation of the convert() function.

[L-1] Potential Risks Associated with Centralization

Target	Category	IMPACT	LIKELIHOOD	STATUS
Multiple Contracts	Security	Low	Low	Acknowledged

In the Campie protocol, the existence of a series of privileged accounts introduces centralization risks, as they hold significant control and authority over critical operations governing the protocol. In the following, we show the representative function potentially affected by the privileges associated with the privileged accounts.

Example Privileged Operations in Campie

```

686 function setPoolManagerStatus(address _account, bool _allowedManager) external
    onlyOwner {
687     PoolManagers[_account] = _allowedManager;

689     emit PoolManagerStatus(_account, PoolManagers[_account]);
690 }

692 function setCampie(address _campie) external onlyOwner {
693     if (address(campie) != address(0)) revert CampieSetAlready();

695     if (!Address.isContract(_campie)) revert MustBeContract();

697     campie = IERC20(_campie);
698     emit CampieSet(_campie);
699 }

701 function setVlCampie(address _vlCampie) external onlyOwner {
702     address oldvlCampie = address(vlCampie);
703     vlCampie = IVLCampie(_vlCampie);
704     emit VlCampieUpdated(address(vlCampie), oldvlCampie);
705 }

```

Remediation To mitigate the identified issue, it is recommended to introduce multi-sig mechanism to undertake the role of the privileged accounts. Moreover, it is advisable to implement timelocks to govern all modifications to the privileged operations.

Response By Team This issue has been confirmed by the team.

[I-1] Meaningful Events for Key Operations

Target	Category	IMPACT	LIKELIHOOD	STATUS
MasterCampie.sol	Coding Practices	N/A	N/A	Addressed

The [event](#) feature is vital for capturing runtime dynamics in a contract. Upon emission, `events` store transaction arguments in logs, supplying external analytics and reporting tools with crucial information. They play a pivotal role in scenarios like modifying system-wide parameters or handling token operations.

However, in our examination of protocol dynamics, we observed that certain key operations lack meaningful events to document their changes. We highlight the representative routines below.

```
MasterCampie::updateWhitelistedAllocManager()

835 function updateWhitelistedAllocManager(
836     address _account,
837     bool _allowed
838 ) external onlyOwner {
839     AllocationManagers[_account] = _allowed;
840 }
```

Remediation Ensure the proper emission of meaningful events containing accurate information to promptly reflect state changes.

4 | Appendix

4.1 About AstraSec

AstraSec is a blockchain security company that serves to provide high-quality auditing services for blockchain-based protocols. With a team of blockchain specialists, AstraSec maintains a strong commitment to excellence and client satisfaction. The audit team members have extensive audit experience for various famous DeFi projects. AstraSec's comprehensive approach and deep blockchain understanding make it a trusted partner for the clients.

4.2 Disclaimer

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4.3 Contact

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