

yAcademy Temple DAO Origami Recheck Review

Review Resources:

- Some internal docs and visuals were provided

Residents:

- pandadefi
- spalen

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Review Summary

Temple DAO Origami

The goal of Temple DAO's Origami product is to offer auto-compounded yield offerings on underlying strategies, maximising returns without sacrificing liquidity. The first strategy being offered is on [GLP and GMX](#). Origami will be deployed on Arbitrum and Avalanche, the two chains where GMX is deployed, even though the current [Temple core contracts](#) are deployed on Ethereum.

The contracts of the Temple DAO Origami [Repo](#) were reviewed over 5 days. The code review was performed by 2 residents between February 21 and February 26, 2023. The repository was under active development during the review, but the review was limited to the latest commit at the start of the review. This was commit [5ddb424ca1cba8698a51fc21510c1891598a7f09](#) for the Temple DAO repo.

This was the second review of the Temple DAO Origami [Repo](#).

Temple DAO fixed the issues from the first report so yAcademy did a review of these mitigations by comparing changes made from commit [a31d192ab54ca7d21f2dee30c630a6ec1843b646](#), which was the commit of

the first review, to commit [5ddb424ca1cba8698a51fc21510c1891598a7f09](#), which was the commit that included the mitigations.

Scope

The scope of the review consisted of the files in the following directories at the specific commit:

- `contracts/investments/*`
- `contracts/common/*`

After the findings were presented to the Temple DAO team, fixes were made and included in several PRs.

This review is a code review to identify potential vulnerabilities in the code. The reviewers did not investigate security practices or operational security and assumed that privileged accounts could be trusted. The reviewers did not evaluate the security of the code relative to a standard or specification. The review may not have identified all potential attack vectors or areas of vulnerability.

yAcademy and the residents make no warranties regarding the security of the code and do not warrant that the code is free from defects. yAcademy and the residents do not represent nor imply to third parties that the code has been audited nor that the code is free from defects. By deploying or using the code, Temple DAO and users of the contracts agree to use the code at their own risk.

Code Evaluation Matrix

Category	Mark	Description
Access Control	Average	Main functions are limited to Governable contract. Protocol flow is guarded using Operators. Additionally, protocol pausing is enabled to pausers.
Mathematics	Good	No complex math is performed in the contracts. Only basic accounting and value management is done.

Category	Mark	Description
Complexity	Average	The complexity of the Temple Origami contracts were on par with a typical DeFi project. Some of the key functionalities included integration with a yield source (GMX), compounding of rewards, and custom tokens to track value.
Libraries	Good	The only external dependencies are OpenZeppelin libraries.
Decentralization	Average	The Governable role has significant privileges in the Temple Origami contracts. The Operator and _minters are also privileged roles that may reduce the decentralization of the system.
Code stability	Good	The latest changes are addressing only issues from the prior report.
Documentation	Good	Visuals were created to show the main user flows. Clear NatSpec comments existed throughout the contracts.
Monitoring	Good	Events were emitted by all key functions that perform state variable changes.
Testing and verification	Good	All tests are passing with 100% code coverage.

Findings Explanation

Findings are broken down into sections by their respective impact:

- Critical, High, Medium, Low impact
 - These are findings that range from attacks that may cause loss of funds, impact control/ownership of the contracts, or cause any unintended consequences/actions that are outside the scope of the requirements
- Gas savings

- Findings that can improve the gas efficiency of the contracts
 - Informational
 - Findings including recommendations and best practices
-

Critical Findings

None.

High Findings

1. High - Incorrect transfer of funds on token exit

When exiting the vault token, the user can define the recipient address to get the funds, but this address is ignored, and all funds are sent to the message sender instead.

Technical Details

Calling `exitToToken(ExitQuoteData calldata quoteData, address recipient)` user can define address recipient to receive the funds but this address is ignored and all funds are sent to the message sender instead.

Impact

High. This can lead to loss of funds.

Recommendation

Use defined recipient address instead of `msg.sender` at [L325](#).

```
- toTokenAmount = _redeemReservesFromShares(  
-     quoteData.investmentTokenAmount,  
-     msg.sender,  
-     quoteData.minToTokenAmount,  
-     msg.sender  
- );  
+ toTokenAmount = _redeemReservesFromShares(  
+     quoteData.investmentTokenAmount,  
+     msg.sender,  
+     quoteData.minToTokenAmount,  
+     recipient
```

```
+ );
```

Add the test to cover the case when the recipient is different from message sender: <https://gist.github.com/spalen0/1bfc6379f00a9d73a1285367e8ccd669>.

Developer Response

@frontier159: Fixed in [commit ab2a428](#)

Medium Findings

None.

Low Findings

None.

Gas Savings Findings

1. Gas - Avoid double checking

Removing double-checking of the same condition will save gas.

Technical Details

At [L222](#) there is a check for condition `reserveTokenAmount != 0`, which already checked at [L213](#).

Impact

Gas savings.

Recommendation

Change condition at [L222](#):

```
- if (receiver != address(this) && reserveTokenAmount != 0) {  
+ if (receiver != address(this)) {
```

Developer Response

@frontier159: Fixed in [commit d26ca15](#)

Informational Findings

1. Informational - Incorrect comment

The comment about function accessibility is incorrect.

Technical Details

File MintableToken has a [comment](#) with an incorrect function accessibility.

Impact

Informational.

Recommendation

Update comment with governance accessibility.

Developer Response

@frontier159: Fixed in [commit 3ab71c8](#)

2. Informational - Governable and GovernableUpgradeable should abstract common code into a common contract

The two contracts are sharing the same code. `Governable.sol`
`GovernableUpgradeable.sol` can inherit a GovernableBase contract.

Impact

Informational.

Technical Details

By reducing code duplication, the codebase will be easier to maintain and less error-prone. Both contracts can inherit from a common contract that contains the common code.

[https://github.com/TempleDAO/origami
/blob/5ddb424ca1cba8698a51fc21510c1891598a7f09/apps/protocol
/contracts/common/access/Governable.sol](https://github.com/TempleDAO/origami/blob/5ddb424ca1cba8698a51fc21510c1891598a7f09/apps/protocol/contracts/common/access/Governable.sol) [https://github.com/TempleDAO
/origami/blob/5ddb424ca1cba8698a51fc21510c1891598a7f09/apps/protocol
/contracts/common/access/GovernableUpgradeable.sol](https://github.com/TempleDAO/origami/blob/5ddb424ca1cba8698a51fc21510c1891598a7f09/apps/protocol/contracts/common/access/GovernableUpgradeable.sol)

Recommendation

Add a GovernableBase contract that contains the common code and make Governable and GovernableUpgradeable inherited from it.

Developer Response

@frontier159: Fixed in [commit ebeedc1](#)

Final remarks

All the changes correctly address the issues in the prior report. Adding operators is limited to governance which is a good base for protocol decentralization. This is important because, with the current flow, operators have the ability to extract value from the protocol, as stated in the previous report. The code base is well prepared with all tests passing and maximum code coverage.

About yAcademy

[yAcademy](#) is an ecosystem initiative started by Yearn Finance and its ecosystem partners to bootstrap sustainable and collaborative blockchain security reviews and to nurture aspiring security talent. yAcademy includes [a fellowship program](#), a residents program, and [a guest auditor program](#). In the fellowship program, fellows perform a series of periodic security reviews and presentations during the program. Residents are past fellows who continue to gain experience by performing security reviews of contracts submitted to yAcademy for review (such as this contract). Guest auditors are experts with a track record in the security space who temporarily assist with the review efforts.
