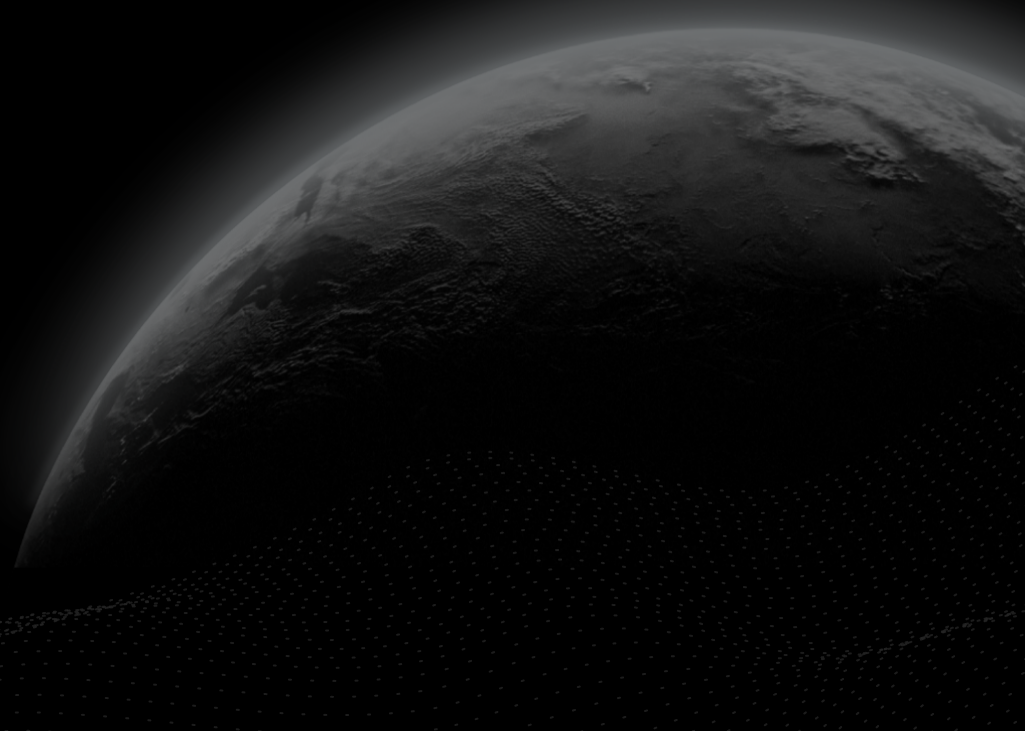
CERTIK

Security Assessment

TIP

CertiK Verified on Nov 18th, 2022



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The security assessment was prepared by CertiK, the leader in Web3.0 security.

Executive Summary

TYPES	ECOSYSTEM	METHODS
DeFi	Mixin Network	Manual Review, Static Analysis

LANGUAGE	TIMELINE	KEY COMPONENTS
Golang	Delivered on 11/18/2022	N/A

CODEBASE
https://github.com/MixinNetwork/tip/
...View All

COMMITS
fb379237ec89a5a96bd934f6256e2e6a18b2ad97
...View All

Vulnerability Summary

5	1	0	0	4	0	0
Total Findings	Resolved	Mitigated	Partially Resolved	Acknowledged	Declined	Unresolved

0	Critical		Critical risks are those that impact the safe functioning of a platform and must be addressed before launch. Users should not invest in any project with outstanding critical risks.
1	Major	1 Resolved	Major risks can include centralization issues and logical errors. Under specific circumstances, these major risks can lead to loss of funds and/or control of the project.
1	Medium	1 Acknowledged	Medium risks may not pose a direct risk to users' funds, but they can affect the overall functioning of a platform.
0	Minor		Minor risks can be any of the above, but on a smaller scale. They generally do not compromise the overall integrity of the project, but they may be less efficient than other solutions.
3	Informational	3 Acknowledged	Informational errors are often recommendations to improve the style of the code or certain operations to fall within industry best practices. They usually do not affect the overall functioning of the code.

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CODEBASE | TIP

Repository

https://github.com/MixinNetwork/tip/

Commit

fb379237ec89a5a96bd934f6256e2e6a18b2ad97

AUDIT SCOPE | TIP

16 files audited ● 2 files with Acknowledged findings ● 1 file with Resolved findings ● 13 files without findings

ID	File	SHA256 Checksum
MNT	messenger/mixin.go	eb27a1d45106a85ab6124ffe12099d6d1419e082f495a723cc98fc60540d5451
MNO	logger/log.go	22f440abaee308ed167f43fd6d01ede1b1cb3d56a9f6a59a862316271d92cbe9
MNU	store/badger.go	92e21633adeeb9e65453de923413b7d7972d2f04eef6e9437e92e0a338a0a90d
MNB	main.go	ef03dfd1ae5087228685027027e055970c9fa37a045555d76f1f5d1e3ed8a041
MNH	store/interface.go	8febd86725bcb9768882b31084f4341cd2a75f68fffc763e4d63004d72235a71
MNI	messenger/interface.go	fa0fd3e81127d3f126de7f0aaf9f9a93d79e2d1ea6ce8438bc1c252e34a34068
MNG	messenger/errors.go	4ce1662a212a4aa112c6bfcbe2a0744d1f8b52fe0375b1262fa2d7296b3c0244
MNW	keeper/guard.go	a364aaaa79308e5aed0041b53b42b5c59cb895f062d23f4c0ce78904c5fd12f8
MNE	crypto/bls.go	2ab3956025f34699acab95f26e776e7884c8e77566ce8027407298d8ab78d0a3
MBU	crypto/aes.go	d574153ecc71779d3225611b27074c1e48fa1dc06e739fd1222dd286e414c96f
MBT	config/example.json	bce14552cf1d9be345f9e30d3eceff65370cb2965ec32dc01b946d8409bb9992
MBI	config/example.toml	585f21d8fa5826402c803a6134a2d70ae90be1f0b61512f3eed6e9ee7bb19cbb
MBG	config/reader.go	d4311792a9ae5faaaa254ae3c1a84f394c6912a568f7501d7513209ededcef6e
MBR	api/errors.go	9749e1b2c23c06dae2f31874a13109aeeda3bd20db2c2486f702db3682436827
MBO	api/http.go	9cb176c277a3c206bd7dde6a6fcf4240b2cf52673d62c45d05d1d6bbf8c91c86
MBW	api/json.go	e7149e837e04b2adf7f020f34f99a9716ecbcdb9ec4e9e8f572e3bbd5861ced4

APPROACH & METHODS | TIP

This report has been prepared for MixinNetwork to discover issues and vulnerabilities in the source code of the TIP project as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Manual Review and Static Analysis techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Testing the smart contracts against both common and uncommon attack vectors;
- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases;
- Provide more comments per each function for readability, especially contracts that are verified in public;
- Provide more transparency on privileged activities once the protocol is live.

FINDINGS | TIP

5	0	1	1	0	3
Total Findings	Critical	Major	Medium	Minor	Informational

This report has been prepared to discover issues and vulnerabilities for TIP. Through this audit, we have uncovered 5 issues ranging from different severity levels. Utilizing the techniques of Manual Review & Static Analysis to complement rigorous manual code reviews, we discovered the following findings:

ID	Title	Category	Severity	Status
GLOBAL-01	Third Party Dependencies	Volatile Code	Medium	Acknowledged
MNU-01	Potential Incorrect Logic	Logical Issue	Major	Resolved
MNO-01	Unused Function	Volatile Code	Informational	Acknowledged
MNT-01	Unused Parameters	Coding Style	Informational	Acknowledged
MNT-02	Unimplemented Functions	Logical Issue	Informational	Acknowledged

GLOBAL-01 | THIRD PARTY DEPENDENCIES

Category	Severity	Location	Status
Volatile Code	Medium		Acknowledged

Description

The contract is serving as the underlying entity to interact with third party **drand/kyber**, **fox-one/mixin-sdk-go**, **badger** protocols. The scope of the audit treats 3rd party entities as black boxes and assumes their functional correctness. However, in the real world, 3rd parties can be compromised and this may lead to lost or stolen assets. Additionally, upgrades of 3rd parties can possibly create severe impacts, such as increasing fees of 3rd parties, migrating to new LP pools, etc.

Recommendation

We understand that the business logic of this protocol requires interaction with **drand/kyber**, **fox-one/mixin-sdk-go**, **badger**, etc. We encourage the team to constantly monitor the statuses of 3rd parties to mitigate the side effects when unexpected activities are observed.

Alleviation

The team acknowledged the finding.

MNU-01 | POTENTIAL INCORRECT LOGIC

Category	Severity	Location	Status
Logical Issue	Major	store/badger.go: 285~287	Resolved

Description

```
282     cb, err := readKey(txn, badgerKeyPrefixCounter, assignor)
283     if err != nil {
284         return err
285     } else if cb != nil {
286         counter = int(binary.BigEndian.Uint64(cb))
287     } else {
288         counter = 1
289     }
```

The `counter` is the data stored in the badger whose prefix is `badgerKeyPrefixCounter`.

In our opinion, in code `badger.go` #L232, the `counter` of `assignor` is increased every time the function `WriteAssignee()` is called.

However, in the function `writeSignRequest()` (`badger.go` #L286-L288), this part of the code we understand is to initialize a counter if the counter corresponding to the assignor does not exist in the badger. But why assign 1 to the counter? If the logic of this part of the code requires an incremental operation on the counter why don't line 286 add 1 to the counter?

Recommendation

Please review the logic to ensure it meets design intent.

Alleviation

[Mixin]: Counter means the number of key an identity has used in the node, thus the first counter returned is 1 after an identity assignor created. counter is only increased whenever a new key created, i.e. WriteAssignee some new comments from https://github.com/MixinNetwork/tip/blob/main/store/badger.go#L294

MNO-01 | UNUSED FUNCTION

Category	Severity	Location	Status
Volatile Code	Informational	logger/log.go: 19~21, 39~41, 47~49	Acknowledged

Description

These functions are not used but implemented.

Recommendation

We advise removing it if there is no plan for further usage.

Alleviation

The team acknowledged the finding.

MNT-01 | UNUSED PARAMETERS

Category	Severity	Location	Status
Coding Style	Informational	messenger/mixin.go: 85	Acknowledged

Description

The linked parameters are never used.

Recommendation

We recommend the client to remove them if there is no plan for further usage.

Alleviation

The team acknowledged the finding.

MNT-02 | UNIMPLEMENTED FUNCTIONS

Category	Severity	Location	Status
Logical Issue	Informational	messenger/mixin.go: 112~114	Acknowledged

Description

The function `onAckReceipt()` is used but not implemented.

Recommendation

Please implement these functions before deploying.

Alleviation

The team acknowledged the finding.

APPENDIX | TIP

Finding Categories

Categories	Description
Logical Issue	Logical Issue findings detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.
Volatile Code	Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.
Coding Style	Coding Style findings usually do not affect the generated byte-code but rather comment on how to make the codebase more legible and, as a result, easily maintainable.

Checksum Calculation Method

The "Checksum" field in the "Audit Scope" section is calculated as the SHA-256 (Secure Hash Algorithm 2 with digest size of 256 bits) digest of the content of each file hosted in the listed source repository under the specified commit.

The result is hexadecimal encoded and is the same as the output of the Linux "sha256sum" command against the target file.

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