HACKEN

SMART CONTRACT CODE REVIEW AND SECURITY ANALYSIS REPORT

Customer: DAC Portal
Date: October 5th, 2022

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This report may contain confidential information about IT systems and the intellectual property of the Customer, as well as information about potential vulnerabilities and methods of their exploitation.

The report can be disclosed publicly after prior consent by another Party. Any subsequent publication of this report shall be without mandatory consent.

Document

Name	Smart Contract Code Review and Security Analysis Report for DAC Portal
Approved By	Evgeniy Bezuglyi | SC Audits Department Head at Hacken OU Noah Jelich | Senior Solidity SC Auditor at Hacken OU
Type	Staking, ERC20, Multiple Purpose System
Platform	EVM
Network	Metis
Language	Solidity
Methods	Manual Review, Automated Review, Architecture review
Website	https://www.metis.io/
Timeline	30.06.2022 - 05.10.2022
Changelog	14.07.2022 - Initial Review 29.07.2022 - Second Review 26.08.2022 - Third Review 21.09.2022 - Fourth Review 05.10.2022 - Fifth Review

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Introduction

Hacken OÜ (Consultant) was contracted by DAC Portal (Customer) to conduct a Smart Contract Code Review and Security Analysis. This report presents the findings of the security assessment of the Customer's smart contracts.

Scope

The scope of the project is smart contracts in the repository:

Initial review scope
Repository:
https://github.com/metisdac/Metis-DAC-contracts
Commit:
1ec034fef5f8c3f40b844b5f0bed115a4c22730f
Technical Documentation:
Type: Whitepaper (partial functional requirements provided)
Link

Integration and Unit Tests: No
Deployed Contracts Addresses: No
Contracts:
File: ./contracts/AddressList.sol
SHA3: 786133bb4fd786d61a62b11c3356b2be177c99b7cfa877115d821c509c5b06c3

File: ./contracts/Configuration.sol
SHA3: 97a2f16591abf3fc39dd71e27451835714ced95618b47affd829cd3785b93297

File: ./contracts/constants.sol
SHA3: 5b352008978df3a74fa4b90f5490f9b3c32827b8d2fea52b5a678bcf58c87c92

File: ./contracts/Controller.sol
SHA3: 562cde38c2fe1b7577c06b6c77e3939fbe1ac0bef9cd0f5bdf4c501b370b7167

File: ./contracts/DAC.sol
SHA3: 14b56438062846aac0443ca53cc9a4e855c2ab30567edac8b89ec0cd27963ff6

File: ./contracts/DACFactory.sol
SHA3: 6b05979548c032d8f59692f08132171bfeca194de3dff03ebcb7a8948a984aff

File: ./contracts/DACHelper.sol
SHA3: e0ae57b6b07d7a6bb23435156f84df255ff0fbe3a49ce1df02029f8b9786da78

File: ./contracts/EcoNode.sol
SHA3: 770437016ef39632d28347c207eb160adf8c5dc3584d9c53c43ac2dfc617b819

File: ./contracts/interfaces/IController.sol
SHA3: af021b3861e8f7268fb25dd1b0716b2868e21a67dd5d645fdaa476a002f50c3a

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File: ./contracts/interfaces/IDACFactory.sol
SHA3: 419412af4570f506ddd84e6077e8209215da633c5875e5210f585329ea21a53f

File: ./contracts/interfaces/IDACHelper.sol
SHA3: 19d46055a76f76809c913dd671861b28dfd492b6d3e716db985458de347df956

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File: ./contracts/interfaces/IEcoNode.sol
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SHA3: e555501c43989fe6aa93ea631edb26dadff826edc25df8a5090cf93d19761593

File: ./contracts/interfaces/IMetisNFTBadgeMetadata.sol
SHA3: 7f93bcc6bf69c4ea4ba2a577aeed1eb632c8b8c1fa2df90c79043dfd8c873e87

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SHA3: 69d08b1ba12c41c35b876afaf17c3be134ce859687362efa6af666d592e11662

File: ./contracts/interfaces/ISingletonManager.sol
SHA3: 1f24856fa5f0b0ec9f9971fbcb09adf991b70796fac6dce70604db76ec4c9949

File: ./contracts/interfaces/safe.sol
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File: ./contracts/Proxy.sol
SHA3: d83dc2520da768c674211ae7383ea6ff4faace788d533e13d698722b4f7c8846

File: ./contracts/ProxyFactory.sol
SHA3: 1a907c30630719683f084437996d0c151e8364f7272537b0ca55e7c02fbe5a02

File: ./contracts/Reward.sol
SHA3: dac401e1a65ccf269956be8013f7cf2fe409810540a246c7ef96636223b5614e

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SHA3: b904d14050a9462bcb0512218be082dbb62fc5afda6f69a02a4fbb06df108e72

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File: ./contracts/util.sol
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Second review scope

Repository:
https://github.com/metisdac/Metis-DAC-contracts

Commit:
cab2df387ea7d9b8219e7056890b1bf967a7e3ae

Technical Documentation:
Type: Whitepaper (partial functional requirements provided)
Link

Integration and Unit Tests: Yes
Deployed Contracts Addresses: No
Contracts:

File: ./contracts/AddressList.sol
SHA3: 8b40e4fae1b94c31f5d6398ff89fed1dcb7b7b711ce77123545b35110a5a808f

File: ./contracts/ConfigKeys.sol
SHA3: 5475e2cee1eee905a6e37f7dc377eb3b039925b418cc93876799cbbe8301b7f3

File: ./contracts/Configuration.sol
SHA3: 61a0238cc7f846de0316c92dd8b74dc56691f0624cbe2fc15fff51951ce446b3

File: ./contracts/constants.sol
SHA3: 3aa139212193e48f7fa6e3b73edf841bbd9f43278c2e7a535d6ea51fd3341cc4

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SHA3: 6889b8f37d01ad5ade3a603bed06f1bced03e216329394cdc20b19696ee4849c

File: ./contracts/DAC.sol
SHA3: 1fd4e68d6dbb2719ca8393433fa5a29fcbd267148e1b1fd92c682b8581da6ed4

File: ./contracts/DACFactory.sol
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File: ./contracts/EcoNode.sol
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SHA3: 83833321a5f5e267de3830efc35d9b68c8eb199d54a098d0d2f975b9fe97f59a

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File: ./contracts/interfaces/IMetisNFTBadgeMetadata.sol
SHA3: 4144c44e324cb0cf75ba30cba6b88f20113a357af577a763b4cfff4054c82bd6

File: ./contracts/interfaces/IProposalFactory.sol
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File: ./contracts/interfaces/IProxyFactory.sol
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File: ./contracts/interfaces/ISimpleProposal.sol
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File: ./contracts/ProposalFactory.sol
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File: ./contracts/Proxy.sol
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File: ./contracts/ProxyFactory.sol
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File: ./contracts/Reward.sol
SHA3: ce8800a86d6a4edacf50e42293a3b3e6470cbc3b8c4f5e8da6130743d3871ba9

File: ./contracts/RP.sol
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File: ./contracts/SimpleProposal.sol
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File: ./contracts/Singleton.sol
SHA3: 9946a7a769fb8246f8843e53008c9e0a5e9559525fe27dbb8bcdad2a3ee16c7f

File: ./contracts/SingletonManager.sol
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File: ./contracts/test/MockBadge.sol
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File: ./contracts/test/MockBadgeManager.sol
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File: ./contracts/util.sol
SHA3: c173ed9a7208724a07b560ad9309d52db98e7b90f1be701209b5cf99cae33aec

File: ./contracts/VeMetis.sol
SHA3: 12591b1f7844aa73a850267aed84fde59b0405c2cb2fb2a549c286c69892eb95

Third review scope

Repository:
https://github.com/metisdac/Metis-DAC-contracts

Commit:
ae3c7b017f3469b3affdcc92ad9fbec7c8ca7ce7

Technical Documentation:
Type: Whitepaper (partial functional requirements provided)
Link

Integration and Unit Tests: Yes
Deployed Contracts Addresses: No
Contracts:

File: ./contracts/AddressList.sol
SHA3: 8b40e4fae1b94c31f5d6398ff89fed1dcb7b7b711ce77123545b35110a5a808f

File: ./contracts/ConfigKeys.sol
SHA3: 5475e2cee1eee905a6e37f7dc377eb3b039925b418cc93876799cbbe8301b7f3

File: ./contracts/Configuration.sol
SHA3: 0ffd25e8221c7ceca879c5f774ee634c36f5bf6b9b476a1500f68c1e50473dea

File: ./contracts/constants.sol
SHA3: 3aa139212193e48f7fa6e3b73edf841bbd9f43278c2e7a535d6ea51fd3341cc4

File: ./contracts/Controller.sol
SHA3: 6889b8f37d01ad5ade3a603bed06f1bced03e216329394cdc20b19696ee4849c

File: ./contracts/DAC.sol
SHA3: 72ca4261ad7745c85247f7fce348484dc817f8127760902116804e66e8f8c82f

File: ./contracts/DACFactory.sol
SHA3: 3f07f5e96723a62772a271e49ae8b56f9a2d3b2b101f943b671d725758f9a5d6

File: ./contracts/DACHelper.sol
SHA3: 81a442c975577756bc86f5535a8978347f605e5a5b939ac19ef75441ed9a6c88

File: ./contracts/EcoNode.sol
SHA3: d7627df970c35db18a8b6a712d31214e9fa6ff0b3a6c94ca0647061e9a8e5e14

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SHA3: 3cebbde3261b9c8cd53f5d4628106f02566b90760188d374fd87b4c00b2396de

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File: ./contracts/interfaces/IEcoNode.sol
SHA3: 83833321a5f5e267de3830efc35d9b68c8eb199d54a098d0d2f975b9fe97f59a

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File: ./contracts/interfaces/IProxyFactory.sol
SHA3: 68d72c14b86104f956f1f2064df11c0986129ce8791e6a954e0943b6b8e47b40

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File: ./contracts/interfaces/ISimpleProposal.sol
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SHA3: ed5aec341853cea7e3d3a717518a1a08b470095bd6b27d387051a4aa744f6e77

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File: ./contracts/MasterCopyNames.sol
SHA3: 3165c5146208d349a295fffb4a86472fd803c3aabecb4cd542cb672cea4a98bc

File: ./contracts/MemberManager.sol
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File: ./contracts/ProxyFactory.sol
SHA3: 5201ab81128ed17b0ef83f043f6bb1f48c8b55fbd6d36a9fe6a4cac76022010b

File: ./contracts/Reward.sol
SHA3: ce8800a86d6a4edacf50e42293a3b3e6470cbc3b8c4f5e8da6130743d3871ba9
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File: ./contracts/RP.sol
SHA3: 736bdc92c7e5c19f90ff1ce8ecbb1578e20dfa3f737f7500aefc9b6defdf28fc

File: ./contracts/SimpleProposal.sol
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File: ./contracts/Singleton.sol
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File: ./contracts/test/MockBadge.sol
SHA3: bc3ee466d58d23c6a7bab9dcdebe392583d169ee80424ba0f2f0fe09c8ff5803

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SHA3: cc042d0eaac4ae806cc0acd97f62a7343be335bdd148675f2fe36e040080739c

File: ./contracts/test/MockToken.sol
SHA3: a4644672430ea7810aa2d3a4fd290a0eb59f17ee599e8cd8f83cf5c0c0cf86a4

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SHA3: c173ed9a7208724a07b560ad9309d52db98e7b90f1be701209b5cf99cae33aec

File: ./contracts/VeMetis.sol
SHA3: 12591b1f7844aa73a850267aed84fde59b0405c2cb2fb2a549c286c69892eb95

Fourth review scope

Repository:
https://github.com/metisdac/Metis-DAC-contracts
Commit:
37d1fbd19c87f0b197fe774761a1ea42bd345d3b
Technical Documentation:
Type: Whitepaper (partial functional requirements provided)
Link

Integration and Unit Tests: Yes
Deployed Contracts Addresses: No
Contracts:
https://github.com/hknio/Metis-DAC-contracts-478814710/tree/37d1fbd19c87f0b197fe774761a1ea42bd345d3b

File: ./contracts/AddressList.sol
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SHA3: 03f39623f41a7fe33e423e37b074b0e42155e400c7216f8e38e731b0a23e9370

File: ./contracts/Controller.sol
SHA3: 753091045b3333b9e54b75ad57ac9b7af5321a69fcfb1391bd66ef89416b50fa

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File: ./contracts/DACFactory.sol
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File: ./contracts/DACHelper.sol
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File: ./contracts/EcoNode.sol
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File: ./contracts/MasterCopyNames.sol
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File: ./contracts/MemberManager.sol
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File: ./contracts/ProposalFactory.sol
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File: ./contracts/VeMetis.sol
SHA3: 8ac4d409214fe7c7eb4a9b634e1afa15a08dd2d9d85e9abb33d137c91e01566f

Fifth review scope

Repository:
https://github.com/metisdac/Metis-DAC-contracts

Commit:
678222c842704ccddf9f29db7a7330f8f127b490

Technical Documentation:
Type: Whitepaper (partial functional requirements provided)
Link

Integration and Unit Tests: Yes
Deployed Contracts Addresses: No

Contracts:

File: ./contracts/AddressList.sol
SHA3: d8275d519e16813fe7d82e7c0159a674818af697bf5e0dd6a57890020882826f

File: ./contracts/ConfigKeys.sol
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File: ./contracts/interfaces/IRP.sol
SHA3: 380e96c6ef878ded61b9391bb224b73e4f40849519d86464ec3d664227f7ed66

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File: ./contracts/MemberManager.sol
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File: ./contracts/ProxyFactory.sol
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File: ./contracts/Reward.sol
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File: ./contracts/RP.sol
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File: ./contracts/SimpleProposal.sol
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SHA3: 4ffb3aed9e90723e27bacc4d7664a2ee333d85c77cb1509fb6c48acb009add96

File: ./contracts/util.sol
SHA3: 9f1f65c04f23e97a63192acc57b0add64f70ef117a5aceb8593f1aaef5fa6cff
```

```
File: ./contracts/VeMetis.sol
SHA3: 8ac4d409214fe7c7eb4a9b634e1afa15a08dd2d9d85e9abb33d137c91e01566f
```

Severity Definitions

Risk Level	Description
Critical	Critical vulnerabilities are usually straightforward to exploit and can lead to assets loss or data manipulations.
High	High-level vulnerabilities are difficult to exploit; however, they also have a significant impact on smart contract execution, e.g., public access to crucial functions.
Medium	Medium-level vulnerabilities are important to fix; however, they cannot lead to assets loss or data manipulations.
Low	Low-level vulnerabilities are mostly related to outdated, unused, etc. code snippets that cannot have a significant impact on execution.

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support@hacken.io

Executive Summary

The score measurement details can be found in the corresponding section of the methodology.

Documentation quality

The total Documentation Quality score is **7** out of **10**. Functional requirements are partially missed. A technical description that demonstrates the function explanations was not provided. A public whitepaper is provided.

Code quality

The total CodeQuality score is **7** out of **10**. Unit tests were provided, but some of them failed. Style guide violation is detected. NatSpec format was mostly followed. **Test coverage is 86.87%**.

All found issues are displayed in the “Findings” section.

Architecture quality

The architecture quality score is **7** out of **10**. Hardhat is used as a development environment and deployment was successful. Instructions were provided in readme. Some unused template file was detected in the project.

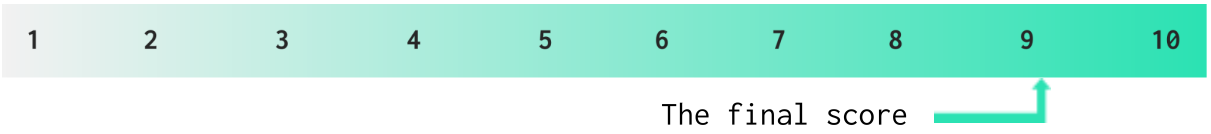
Security score

As a result of the audit, the code contains **1** low severity issue. The security score is **10** out of **10**.

All found issues are displayed in the “Findings” section.

Summary

According to the assessment, the Customer's smart contract has the following score: **9.1**.



Checked Items

We have audited provided smart contracts for commonly known and more specific vulnerabilities. Here are some of the items that are considered:

Item	Type	Description	Status
Default Visibility	SWC-100 SWC-108	Functions and state variables visibility should be set explicitly. Visibility levels should be specified consciously.	Passed
Integer Overflow and Underflow	SWC-101	If unchecked math is used, all math operations should be safe from overflows and underflows.	Passed
Outdated Compiler Version	SWC-102	It is recommended to use a recent version of the Solidity compiler.	Passed
Floating Pragma	SWC-103	Contracts should be deployed with the same compiler version and flags that they have been tested thoroughly.	Passed
Unchecked Call Return Value	SWC-104	The return value of a message call should be checked.	Passed
Access Control & Authorization	CWE-284	Ownership takeover should not be possible. All crucial functions should be protected. Users could not affect data that belongs to other users.	Passed
SELFDESTRUCT Instruction	SWC-106	The contract should not be self-destructible while it has funds belonging to users.	Passed
Check-Effect-Interaction	SWC-107	Check-Effect-Interaction pattern should be followed if the code performs ANY external call.	Passed
Assert Violation	SWC-110	Properly functioning code should never reach a failing assert statement.	Passed
Deprecated Solidity Functions	SWC-111	Deprecated built-in functions should never be used.	Passed
Delegatecall to Untrusted Callee	SWC-112	Delegatecalls should only be allowed to trusted addresses.	Passed
DoS (Denial of Service)	SWC-113 SWC-128	Execution of the code should never be blocked by a specific contract state unless it is required.	Passed
Race Conditions	SWC-114	Race Conditions and Transactions Order Dependency should not be possible.	Passed
Authorization	SWC-115	tx.origin should not be used for	Passed

through tx.origin		authorization.	
Block values as a proxy for time	SWC-116	Block numbers should not be used for time calculations.	Passed
Signature Unique Id	SWC-117 SWC-121 SWC-122 EIP-155	Signed messages should always have a unique id. A transaction hash should not be used as a unique id. Chain identifier should always be used. All parameters from the signature should be used in signer recovery	Passed
Shadowing State Variable	SWC-119	State variables should not be shadowed.	Passed
Weak Sources of Randomness	SWC-120	Random values should never be generated from Chain Attributes or be predictable.	Not Relevant
Incorrect Inheritance Order	SWC-125	When inheriting multiple contracts, especially if they have identical functions, a developer should carefully specify inheritance in the correct order.	Passed
Calls Only to Trusted Addresses	EEA-Level-2 SWC-126	All external calls should be performed only to trusted addresses.	Passed
Presence of unused variables	SWC-131	The code should not contain unused variables if this is not justified by design.	Passed
EIP standards violation	EIP	EIP standards should not be violated.	Passed
Assets integrity	**Custom**	Funds are protected and cannot be withdrawn without proper permissions.	Passed
User Balances manipulation	**Custom**	Contract owners or any other third party should not be able to access funds belonging to users.	Passed
Data Consistency	**Custom**	Smart contract data should be consistent all over the data flow.	Passed
Flashloan Attack	**Custom**	When working with exchange rates, they should be received from a trusted source and not be vulnerable to short-term rate changes that can be achieved by using flash loans. Oracles should be used.	Not Relevant
Token Supply manipulation	**Custom**	Tokens can be minted only according to rules specified in a whitepaper or any other documentation provided by the customer.	Passed
Gas Limit and Loops	**Custom**	Transaction execution costs should not depend dramatically on the amount of	Passed

		data stored on the contract. There should not be any cases when execution fails due to the block Gas limit.	
Style guide violation	**Custom**	Style guides and best practices should be followed.	Failed
Requirements Compliance	**Custom**	The code should be compliant with the requirements provided by the Customer.	Passed
Environment Consistency	**Custom**	The project should contain a configured development environment with a comprehensive description of how to compile, build and deploy the code.	Passed
Secure Oracles Usage	**Custom**	The code should have the ability to pause specific data feeds that it relies on. This should be done to protect a contract from compromised oracles.	Not Relevant
Tests Coverage	**Custom**	The code should be covered with unit tests. Test coverage should be 100%, with both negative and positive cases covered. Usage of contracts by multiple users should be tested.	Failed
Stable Imports	**Custom**	The code should not reference draft contracts, that may be changed in the future.	Passed

System Overview

DAC Portal is a Decentralized Autonomous Company(DAO/DAC) that allows users to create their DACs or join an existing DAC. The project has different feature than the EVM compatible networks; the project's main tokens, Metis ERC20 and native token act simultaneously and they can be considered as same tokens. The system consists of the following contracts:

- *AddressList* – a library contract that helps store and manage addresses of DAC members and owners.
- *Configuration* – a simple contract that sets the gnosisSingleton, gnosisSafeProxyFactory, ecoNodeToken, endorseCoolDown addresses by the owner.
- *constants* – a Solidity file that keeps all the constant values for the project.
- *Controller* – a simple contract that sets the controller proxy(such as DAC Factory or Member Manager) keys with values as their addresses.
- *DAC* – a contract that is used to create a DAC(Decentralized Autonomous Company or used by users to join an existing DAC or to leave from a subscripted DAO.
- DACFactory – an upgradable contract that generates a new deployed DAC contract for each user with the given admin addresses or allows the DAC owner to dismiss its DAC contract and sends the user's balance to the admin's address.
- DACHelper – a contract that helps to view DAC properties, members, membership fee, staked users, and the amounts.
- EcoNode – an upgradable contract that allows users to stake Metis or native tokens and allows them to unstake tokens and claim rewards.
- MemberManager – a contract that manages members of DACs while adding or removing, and creates invitation schema.
- Proxy – a contract that helps to deal with the storages for upgradable contracts.
- ProxyFactory – a contract that generates(deploys) a new ControllerProxy within the given lookup name.
- ProposalFactory – a factory contract that generates a new deployed SimpleProposal contract
- Reward – an ownable contract that manages staking, unstaking and allows the owner to set the reward amount and the duration.
- RP – an upgradable contract that allows users to endorse DACs with NFTs.
- SimpleProposal – a contract that allows DAC members to vote for a proposal in direct proportion to their contributions.
- Singleton – a simple abstract contract that sets the Singleton Manager address.
- SingletonManager – an upgradable contract that manages proxy factory and the singletons.

- util – a library contract that converts uppercase characters into lowercase characters to prevent users from having the same DAC names.
- VeMetis – a burnable and mintable ERC20 token contract that cannot be transferred by users.
  It has the following properties:
  Name: veMetis
  Symbol: veMetis

Privileged roles

- The admin of the *DAC* contract can:
  - specify DAC's managers and properties
  - set a membership fee, fee type, and Badge membership address.
- The owner of the EcoNode contract can:
  - change the reward amount
  - change the reward duration
  - withdraw any ERC20 token balance of the contract
- The owner of the Configuration contract can:
  - set the Gnosis Singleton address
  - set the Gnosis Safe Proxy address
  - set the EcoNode token address
  - set the EndorseCoolDown address
- The owner of the DACFactory contract can:
  - update the contract

Risks

- The given contracts can work properly only on Metis network and cannot be used on EVM or EVM compatible networks since it has a different working mechanism. In Metis network, ERC20 tokens and native tokens of Metis can be considered the same. Therefore, when transferring any amount of ERC20 tokens to an address, the network sends the same amount of native tokens to the same address and vice versa.

Findings

■■■■ Critical

1. Incorrect Function Logic

err is assigned as a result of the *checkDismiss* function execution, and the value is always equal to the *DISERR_UNKNOWN* constant. However, to call the dismiss function, *err* must be equal to the *DISERR_SUCCESS* constant.

dismiss function could not be executed.

File: ./contracts/DAC.sol

Contract: DAC

Function: dismiss

Recommendation: Replace the require statement with a meaningful condition.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

2. Insufficient Balance

Whether Metis token is staked or native token is staked, the amounts are recorded in the same mapping by making an external call to the Reward contract (Lines 64-65). The *unstake* function withdraws only Metis token, regardless of what a user actually staked.

The possibility to withdraw native tokens is missing.

File: ./contracts/EcoNode.sol

Contract: EcoNode

Function: unstake

Recommendation: Treat native coin and token transfers differently.

Status: Mitigated (with Customer notice) (Revised commit: ae3c7b017f3469b3affdcc92ad9fbec7c8ca7ce7)

3. Unauthorized Access

The function does not have proper authorization and can be called by anyone.

The contract state can become inconsistent.

File: ./contracts/MasterDeployer.sol

Contract: MasterDeployer

Function: upgrade

Recommendation: Implement authorization control functionality.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

4. **Denial of Service**

`_beforeTokenTransfer` function has a condition on lines 40-43 that blocks token transfers.

Making `from address` or `to address` zero address means only burning and minting are allowed.

File: ./contracts/VeMetis.sol

Contract: VeMetis

Function: _beforeTokenTransfer

Recommendation: Remove the *require* statement.

Status: Mitigated (with Customer notice) (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

High

1. **Insufficient Balance**

When a reward is claimed, the `_claim` function distributes Metis tokens without checking if the contract has more balance than the total staked tokens.

If the contract's Metis token balance becomes less than the total staked amount of the users, the staked funds can be lost.

File: ./contracts/EcoNode.sol

Contract: EcoNode

Function: _claim

Recommendation: Check the contract balance before sending the rewards.

Status: Fixed (Revised commit: ae3c7b017f3469b3affdcc92ad9fbec7c8ca7ce7)

2. **Highly Permissive Role Access**

In `recoverERC20` function, every token can be withdrawn by the owner, including the stake token.

This may lead users to lose their staked tokens.

File: ./contracts/EcoNode.sol

Contract: EcoNode

Function: recoverERC20

Recommendation: During executing recoverERC20, check if the token is Metis. For this case, allow withdrawing only excess from staking tokens.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

3. Denial of Service Vulnerability

updateEndorsements function always queries endorsement list between 0 and 999 index. Moreover, it is impossible to view beyond the 999th index of the list.

Large iterations may cause failed transaction due to exceeding Gas.

File: ./contracts/RP.sol

Contract: RP

Function: updateEndorsements

Recommendation: Make the start address and the limit mutable instead of giving default values.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

4. Denial of Service Vulnerability

memberList functions always start from the zero index to query list elements.

Therefore, when the array is large enough, it will be impossible to view it due to exceeding Gas.

File: ./contracts/MemberManager.sol

Contract: MemberManager

Function: memberList

Recommendation: Make the start address mutable and allow querying in batches.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

5. Data Consistency

There is no check for the token addresses parameter in *endorse_* function. Users can endorse with any NFT address they want. Moreover, they can deploy the same contract and endorse unlimitedly.

This may lead to data inconsistency and manipulation.

File: ./contracts/RP.sol

Contract: RP

Function: endorse_

Recommendation: Validate the token address.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

6. **Funds Lock**

   Contract DAC and EcoNode have payable functions but do not have a function to withdraw the Ether.

   Files: ./contracts/DAC.sol, ./contracts/EcoNode.sol

   Contracts: DAC, EcoNode

   Functions: -

   Recommendation: Write functions to withdraw the locked Ether.

   Status: Mitigated (with Customer notice) (Revised commit: ae3c7b017f3469b3affdcc92ad9fbec7c8ca7ce7)

7. **Highly Permissive Role Access**

   The existing implementation of the VeMetis token allows the owner to burn tokens from any address. This behavior violates the rule that owner should not have access to funds that belongs to users.

   File: ./contracts/VeMetis.sol

   Contract: VeMetis

   Function: burnFrom

   Recommendation: Check allowance before tokens burning.

   Status: Mitigated (with Customer notice) (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

Medium

1. **Data Consistency**

   After dismissing a DAC, the IDs and the names in *dacById* and *dacNames* mappings are not updated as mapping to zero address.

   Therefore, IDs and names will always be occupied, although their DACs are destroyed.

   File: ./contracts/DACFactory.sol

   Contract: DACFactory

   Function: dismissDAC

   Recommendation: Update the related mappings after a dismiss.

   Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

2. **Violated Checks-Effects-Interactions Pattern**

State is updated on lines 64-65 before the stake amount is received.

File: ./contracts/EcoNode.sol

Contract: EcoNode

Function: _stake

Recommendation: Ensure all internal state changes are performed before an external call execution.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

3. **Unchecked Transfer**

The return value of an external *transfer*/*transferFrom* call is not checked. Several tokens do not revert in case of failure and return false. If one of these tokens is used in audited contracts, the withdrawal will not revert if the transfer fails, and an attacker can call the withdrawal for free.

File: ./contracts/EcoNode.sol

Contract: EcoNode

Functions: _stake, unstake, _claim,

Recommendation: Check the result of the transfer if it is true or not.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

4. **Overcomplicated Implementation**

The function fetches all owners and iterates over this list.

This process can be simplified, and Gas consumption will be decreased.

File: ./contracts/DAC.sol

Contract: DAC

Function: isOneOfAdmins

Recommendation: Use *isOwner* function of the GnosisSafe contract

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

5. **Redundant Import**

hardhat/console.sol must not be in the deployment version of the contract.

Contract: veSeaNFTV2.sol

Function: -

Recommendation: Remove *console.sol* imports and usages before the deployment.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

6. Incorrect Function Logic

stake function allows staking with Metis token, and *stakePay* function does it with the native token.
Require statement on line 56 should have been used in the *stake* function because it is the one that manages the Metis tokens for staking.

File: ./contracts/EcoNode.sol

Contract: EcoNode

Functions: stake, stakePay

Recommendation: Move the require statement in the *stake* function.

Status: Mitigated (with Customer notice) (Revised commit: ae3c7b017f3469b3affdcc92ad9fbec7c8ca7ce7)

Low

1. Redundant Code Line

Although there is already a function implementation to check if an address exists, the same code implementation is re-written on line 15.

Using the existing implementation increases the code readability.

File: ./contracts/AddressList.sol

Contract: AddressList

Function: add

Recommendation: Use the internal *exists* function instead of re-writing the same lines.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

2. Public Functions Instead of External

Some of the functions are declared as public, although they are not called internally in the related contract.

Public function visibility consumes more Gas than external visibility.

Files: ./contracts/Controller.sol, ./contracts/DAC.sol, ./contracts/DACFactory.sol

Contracts: Controller, DAC, DACFactory

Functions: Controller.setValue, DAC.logo, DAC.desc, DACFactory.createDAC

Recommendation: Change public visibility with external.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

3. **Style Guide Violation**

Contracts do not follow the Solidity code style guide.

Files: all

Contracts: all

Recommendation: Follow the official Solidity code style guide.

Status: Reported (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

4. **Redundant Function Usage**

isMember and *joined* functions are doing the same thing.

Redundant usages cost more Gas and decrease the code readability.

File: ./contracts/DAC.sol

Contract: DAC

Functions: isMember, joined

Recommendation: Remove *joined* function.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

5. **Duplicated Functions**

isOneOfAdmins function and *_isOneOfAdmins* function have exactly the same implementation.

Unnecessary code implementation costs more Gas and decreases the code readability.

File: ./contracts/DAC.sol

Contract: DAC

Functions: isOneOfAdmins, _isOneOfAdmins

Recommendation: Remove one of the functions.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

6. **Confusing Function Name**

allDACs function can be understood as viewing all DAC addresses, which can confuse users.

File: ./contracts/DACFactory.sol

Contract: DACFactory

Function: allDACs

Recommendation: Change the function name with an appropriate one, such as *viewDAC/viewDACById*.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

7. Unused Modifier

Despite the modifier *checkOrigin* being declared, it is not used anywhere.

Redundant code lines cost more Gas and decrease the code readability.

File: ./contracts/DACHelper.sol

Contract: DACHelper

Function: -

Recommendation: Remove the *checkOrigin* modifier.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

8. Unused Variable

Local *logoKey* variable is declared but never used.

Redundant declarations cost more Gas and decrease the code readability.

File: ./contracts/DACHelper.sol

Contract: DACHelper

Function: userJoinedList

Recommendation: Remove the *logoKey* variable declaration.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

9. Empty Functions

dacInfo and *stakedMembers* functions do not have any implementation.

Redundant declarations cost more Gas and decrease the code readability.

File: ./contracts/Reward.sol

Contract: Reward

Functions: dacInfo, stakedMembers

Recommendation: Remove the functions or write the necessary implementation.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

10. Redundant Function

Internal *time* function is declared but never used anywhere.

File: ./contracts/util.sol

Contract: util

Function: time

Recommendation: Remove the unused function.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

11. Redundant Use of SafeMath

Since Solidity v0.8.0, the overflow/underflow check is implemented via ABIEncoderV2 on the language level - it adds the validation to the bytecode during compilation.

There is no need to use the SafeMath library.

Files: ./contracts/EcoNode.sol, ./contracts/Reward.sol

Contracts: EcoNode, Reward

Function: -

Recommendation: Remove SafeMath.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

12. Floating Pragma

Locking the pragma helps ensure that contracts do not accidentally get deployed using, for example, an outdated compiler version that might introduce bugs that affect the contract system negatively.

Files: all

Contracts: all

Function: -

Recommendation: Consider locking the pragma version to the latest one and avoid using a floating pragma in the final deployment.

Status: Fixed (Revised commit: cab2df387ea7d9b8219e7056890b1bf967a7e3ae)

13. Missing Zero Address Validation

The specified functions do not check if the given parameter is a zero address, which could be sent as a default value.

Files: ./contracts/Configuration.sol, ./contracts/SingletonManager.sol, ./contracts/Singleton.sol, ./contracts/EcoNode.sol, ./contracts/RP.sol, ./contracts/DACFactory.sol

Contracts: Configuration, SingletonManager, EcoNode, RP, DACFactory

Functions: Configuration.setGnosisSingleton, Configuration.setGnosisSafeProxyFactory, Configuration.setEcoNodeToken, Configuration.setEndorseCoolDown, SingletonManager.initialize, SingletonManager.setProxyFactory, Singleton.initialize, EcoNode.initialize, RP.initialize, DACFactory.createDAC

Recommendation: Add a statement for the address parameters to check if it is zero address.

Status: Fixed (Revised commit: ae3c7b017f3469b3affdcc92ad9fbec7c8ca7ce7)

14. Redundant Hardcoded Value

In `_checkQuit` function, `true` boolean value is assigned to `result[0]` and it is hardcoded. So, this value will not affect anything when a member wants to quit.
Redundant code causes consumption of more Gas and decreases the code readability.

File: ./contracts/DAC.sol

Contract: DAC

Function: _checkQuit

Recommendation: Remove the redundant value.

Status: Reported (Revised commit: 1ec034fef5f8c3f40b844b5f0bed115a4c22730f)

15. Redundant Comparison

`CFG_MS_FEE_LIMIT` is already checked in `addContribution` function. Therefore, there is no need to check it again on line 185.
Redundant code causes consumption of more Gas and decreases the code readability.

File: ./contracts/DAC.sol

Contract: DAC

Function: _join

Recommendation: Delete the redundant comparison.

Status: Fixed (Revised commit: 678222c842704ccddf9f29db7a7330f8f127b490)

Disclaimers

Hacken Disclaimer

The smart contracts given for audit have been analyzed by the best industry practices at the date of this report, with cybersecurity vulnerabilities and issues in smart contract source code, the details of which are disclosed in this report (Source Code); the Source Code compilation, deployment, and functionality (performing the intended functions).

The report contains no statements or warranties on the identification of all vulnerabilities and security of the code. The report covers the code submitted to and reviewed, so it may not be relevant after any modifications. Do not consider this report as a final and sufficient assessment regarding the utility and safety of the code, bug-free status, or any other contract statements.

While we have done our best in conducting the analysis and producing this report, it is important to note that you should not rely on this report only — we recommend proceeding with several independent audits and a public bug bounty program to ensure the security of smart contracts.

English is the original language of the report. The Consultant is not responsible for the correctness of the translated versions.

Technical Disclaimer

Smart contracts are deployed and executed on a blockchain platform. The platform, its programming language, and other software related to the smart contract can have vulnerabilities that can lead to hacks. Thus, Consultant cannot guarantee the explicit security of the audited smart contracts.