HACKEN

SMART CONTRACT CODE REVIEW AND SECURITY ANALYSIS REPORT

Customer: Acta Finance/P2P Solutions LTD
Date: May 13th, 2022

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Document

Name	Smart Contract Code Review and Security Analysis Report for Acta Finance/P2P Solutions LTD.
Approved By	Evgeniy Bezuglyi | SC Department Head at Hacken OU
Type	ERC721 token; Staking
Platform	EVM
Language	Solidity
Methods	Architecture Review, Functional Testing, Computer-Aided Verification, Manual Review
Website	https://actafi.org/
Timeline	12.04.2022 - 13.05.2022
Changelog	15.04.2022 - Initial Review 29.04.2022 - Second Review 13.05.2022 - Third Review

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Table of contents

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Introduction

Hacken OÜ (Consultant) was contracted by Acta Finance/P2P Solutions LTD (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/P2P-Finance/nft-wrapped-staking.git
Commit:
3570670c9ada20ed7f502414c40274711698bbf7
Technical Documentation: Yes
JS tests: Yes
Contracts:
./contracts/WrappedNftStakingPool.sol

Second review scope

Repository:
https://github.com/P2P-Finance/nft-wrapped-staking.git
Commit:
fe1e2b808e84a5ed5128f1cc241bedeb575d74cd
Technical Documentation: Yes
JS tests: Yes
Contracts:
./contracts/WrappedNftStakingPool.sol

Third review scope

Repository:
https://github.com/ActaFi/avalanche-wrapped-nft-staking
Commit:
fc7890d2bb1f7315c77be81a3bcbacd9bebf5fd9
Technical Documentation: Yes
JS tests: Yes
Contracts:
./contracts/WrappedNftStakingPool.sol

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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Low	Low-level vulnerabilities are mostly related to outdated, unused, etc.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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Executive Summary

The Score measurements details can be found in the corresponding section of the methodology.

Documentation quality

The Customer provided a whitepaper with functional requirements. The whitepaper does not contain any information about NFTs. The total Documentation Quality score is **5** out of **10**.

Code quality

The total CodeQuality score is **10** out of **10**. The code is well commented and well covered with unit tests.

Architecture quality

The architecture quality score is **10** out of **10**. The project has clear and clean architecture.

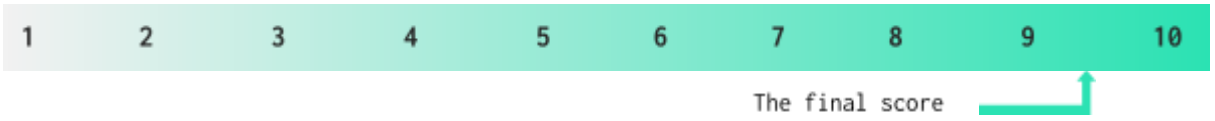
Security score

As a result of the audit, the code contains **no** issues. The security score is **10** out of **10**.

All found issues are displayed in the “Issues overview” section.

Summary

According to the assessment, the Customer's smart contract has the following score: **9.5**



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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.	Not Relevant
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.	Not Relevant
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 destroyed until it has funds belonging to users.	Not Relevant
Check-Effect-Interaction	SWC-107	Check-Effect-Interaction pattern should be followed if the code performs ANY external call.	Passed
Uninitialized Storage Pointer	SWC-109	Storage type should be set explicitly if the compiler version is < 0.5.0.	Not Relevant
Assert Violation	SWC-110	Properly functioning code should never reach a failing assert statement.	Not Relevant
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 through tx.origin	SWC-115	tx.origin should not be used for authorization.	Passed
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	Signed messages should always have a unique id. A transaction hash should not be used as a unique id.	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.	Passed
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.	Not Relevant
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 data stored on the contract. There should not be any cases when execution fails due to the block gas limit.	Passed
Style guide violation	**Custom**	Style guides and best practices should be followed.	Passed
Requirements Compliance	**Custom**	The code should be compliant with requirements provided by the Customer,	Passed
Repository Consistency	**Custom**	The repository should contain a configured development environment with a comprehensive description of how to compile, build and deploy the code.	Passed
Tests Coverage	**Custom**	The code should be covered with unit tests. Tests coverage should be 100%, with both negative and positive cases covered. Usage of contracts by multiple users should be tested.	Passed

System Overview

Acta Finance is a DeFi ecosystem that brings innovation to the DeFi industry by motivating users to build a referral network that rewards user network, and user activity, through the referral system and address milestones. ActaFi Swap is a cross-chain liquidity aggregator that offers margin trading that receives the margin from peer-to-peer lending offers, introducing a new investment opportunity for the users.

- WrappedNftStakingPool — a contract that rewards users for staking their ACTA tokens. APY is defined during the contract creation and does not change during the lifetime. After token staking user will receive an Acta NFT as proof of staking. The staking lock period is defined during the creation. The staking poll is limited to the amount of tokens defined during contract creation.

Privileged roles

- The owner of the WrappedNftStakingPool can withdraw excessive tokens from the rewards pool

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Findings

Critical

No critical severity issues were found.

High

1. **Insufficient rewards balance.**

   The ‘withdraw’ function returns staked amount of tokens plus a reward. The original design of the contract highly relies on reward funds added by the contract owner. Without these funds, there is a potential risk that the user would not be able to withdraw the staked funds.

   Contracts: WrappedNftStakingPool.sol

   Function: withdraw

   Recommendation: Consider implementing `emergencyWithdraw` function to return staked funds without rewards.

   Status: Acknowledged. The Customer will fullfill rewards right after the contract deployment, so it would not be possible to reproduce the issue. Verification of those actions is out of the audit scope.

Medium

1. **Replace transferFrom with transfer.**

   TransferFrom requires to *approve* method to be called before execution, while *transfer* does not require *approve*. *Transfer* usage is recommended for this case to save gas and simplify the code.

   Contracts: WrappedNftStakingPool.sol

   Function: withdraw

   Recommendation: Use *transfer* instead of *transferFrom*. Remove *approve* after this change.

   Status: Fixed (fe1e2b808e84a5ed5128f1cc241bedeb575d74cd)

Low

1. **Unused variable.**

   Field `_tokenIds` is never used. Unused variables are allowed in Solidity, and they do not pose a direct security issue. It is best practice to avoid them as they can cause an increase in computations (and unnecessary gas consumption), indicate bugs or malformed data structures and they are generally a sign of poor code quality or cause code noise and decrease the readability of the code.

   Contracts: WrappedNftStakingPool.sol

   Recommendation: remove unused variable.

Status: Fixed (fe1e2b808e84a5ed5128f1cc241bedeb575d74cd)

2. **Floating Pragma.**

   Contracts should be deployed with the same compiler version and flags that they have been tested with thoroughly. Locking the pragma helps to 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.

   Contracts: WrappedNftStakingPool.sol

   Recommendation: Use a fixed version of the compiler (^ symbol should be removed from Pragma)

   Status: Fixed (fe1e2b808e84a5ed5128f1cc241bedeb575d74cd)

3. **Public function that could be declared external.**

   Public functions that are never called by the contract should be declared external to save gas.

   Contracts: WrappedNftStakingPool.sol

   Function: withdraw

   Recommendation: Use the external attribute for functions never called from the contract.

   Status: Fixed (fe1e2b808e84a5ed5128f1cc241bedeb575d74cd)

4. **Deposit function allows using any NTF image URI.**

   The deposit function will be available to be executed from anywhere, so users can pass any image URI as an NFT image.
   For operation with such data from blockchain input validation technique should be applied for checking potentially dangerous inputs to ensure that the inputs are safe for processing within the code or when communicating with other components. When software does not validate input properly, an attacker can craft the input in a form that is not expected by the rest of the application. This will lead to parts of the system receiving unintended input, which may result in altered control flow, arbitrary control of a resource, or arbitrary code execution.

   Contracts: WrappedNftStakingPool.sol

   Function: deposit

   Recommendation: Confirm that public access to the function is expected behavior, and input validation technique would be applied in case of operation with this data on back-end.

   Status: Reported

5. **Remove the nonReentrant modifier to save gas.**

Withdraw function is well-designed and reentrancy-safe because the external call is done at the end of the function after all state changes are done. In this case, *nonReentrant* modifier could be removed to save gas and simplify the code.

Contracts: WrappedNftStakingPool.sol

Function: withdraw

Recommendation: Remove nonReentrant modifier on withdraw function.

Status: Fixed (fe1e2b808e84a5ed5128f1cc241bedeb575d74cd)

6. **Redundant using.**

   `using Counters for Counters.Counter;` is redundant. They do not pose a direct security issue, but it is best practice to avoid them as they cause code noise and decrease the readability of the code.

   Contracts: WrappedNftStakingPool.sol

   Recommendation: remove unused using.

   Status: Fixed (fc7890d2bb1f7315c77be81a3bcbacd9bebf5fd9)

7. **Code organization proposal.**

   The `deposit` function validates the `_tokenURI` by length. From an architectural perspective, it's better to move this check to ActaNftToken `mintToken` function, as the mint function could be called not only from the WrappedNftStakingPool contract.

   Contracts: WrappedNftStakingPool.sol

   Function: deposit

   Recommendation: Move `_tokenURI` length verification to the `mintToken` function of ActaNftToken contract.

   Status: Fixed (fc7890d2bb1f7315c77be81a3bcbacd9bebf5fd9)

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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 audit makes no statements or warranties on the security of the code. It also cannot be considered a 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.

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, the audit cannot guarantee the explicit security of the audited smart contracts.