read.md



Protocol Audit Report

Greater Heights

December 18, 2023

Prepared by: Greater Heights Computer

Lead Security Research:

• Adebara Khadijat

Table of Contents

- Table of Contents
- Protocol Summary
- Disclaimer

- Risk Classification
- Audit Details
 - Scope
 - Roles
- Executive Summary
 - Issues found
- Findings
 - High
 - * [H-1] Storing the password on-chain makes it visable to anyone, and no longer private.
 - * [H-2] PasswordStore::setPassword has no access controls, meaning a non-owner could change the password
 - Informational
 - * [1-1] The PasswordStore::getPassword natspec indicates a parameter that doesn't exist, causing the natspec to be incorrect

Protocol Summary

PasswordStore is a protocol dedicated to storage and retrieval of a user's password. The protocol is designed to be used by a single user, and is not designed to be used by multiple users. Only the owner should be able to set and access this password.

Disclaimer

The Greater Heights Computer team makes all effort to find as many vulnerabilities in the code in the given time period, but holds no responsibilities for the findings provided in this document. A security audit by the team is not an endorsement of the underlying business or product. The audit was time-boxed and the review of the code was solely on the security aspects of the Solidity implementation of the contracts.

Risk Classification

		Impact		
		High	Medium	Low
	High	H	H/M	Μ
Likelihood	Medium	H/M	\mathbf{M}	M/L
	Low	M	M/L	L

We use the CodeHawks severity matrix to determine severity. See the documentation for more details.

Audit Details

The findings described in this document correspond the following commit hash:

7d55682ddc4301a7b13ae9413095feffd9924566

Scope

```
./src/
|__ PasswordStore.sol
```

Roles

- Owner: The user who can set the password and read the password.
- Outsiders: No one else should be able to set or read the password.

Executive Summary

_Review this protocol was not too easy, we found state variables *password deploy onto chain which enable anybody to view the data on-chain, missing access control vulnerability and wrong natspec which indicate pass a parameter onto getPassword function. _We spent 5 hours with Khadijat and Abimbola auditors using CLoc and Solidity Metrics tools.

Issues found

Severity	Number of issuses found
High	2
Medium	0
Low	0
Info	1
Total	3

Findings

High

[H-1] Storing the password on-chain makes it visable to anyone, and no longer private.

Description: All data stored on-chain is visible to anyone, and can be read directly from the blockchain. The PasswordStore::s_password variable is intended to be a private variable and only accessed through the

PasswordStore::getPassword function, which is intended to be only called by the owner of the contract.

We show one such method of reading any data off chain below.

Impact: Anyone can read the private password, severly breaking the functionality of the protocol.

Proof of Concept: (Proof of Code)

The below test case shows how anyone can read the password directly from the blockchain.

1. Create a locally running chain

make anvil

2. Deploy the contract to the chain

make deploy

3. Run the storage tool We use 1 because that is the storage slot of s_password in the contract.

```
cast storage <ADDRESS_HERE> 1 --rpc-url http://127.0.0.1:8545
```

myPassword

Recommended Mitigation: Due to this, the overall architecture of the contract should be rethought. One could encrypt the password off-chain, and then store the encrypted password on-chain. This would require the user to remember another password off-chain to decrypt the password. However, you will also likely want to remove the view function as you wouldn't want the user to accidentally send a transaction with the password that decrypts your password.

[H-2] PasswordStore::setPassword has no access controls, meaning a non-owner could change the password

Description: The PasswordStore::setPassword function is set to be an external function, however, the natspec of the function and overall purpose of the smart contract is that This function allows only the owner to set a new password.

}

Impact: Anyone can set/change the password of the contract, severly breaking the contract intended functionality.

Proof of Concept: Add the following to the PasswordStore.t.sol test file.

Code

```
function test_anyone_can_set_password(address randomAddress) public {
    vm.assume(randomAddress != owner);
    vm.prank(randomAddress);
    string memory expectedPassword = "myNewPassword";
    passwordStore.setPassword(expectedPassword);

    vm.prank(owner);
    string memory actualPassword = passwordStore.getPassword();
    assertEq(actualPassword, expectedPassword);
}
```

Recommended Mitigation: Add an access control conditional to setPassword function.

```
if(msg.sender != s_owner){
    revert PasswordStore__NotOwner();
}
```

Informational

[1-1] The PasswordStore::getPassword natspec indicates a parameter that doesn't exist, causing the natspec to be incorrect

Description:

```
/*
 * @notice This allows only the owner to retrieve the password.
 * @param newPassword The new password to set.
 */
function getPassword() external view returns (string memory) {}
```

The PasswordStore::getPassword function signature is getPassword() which the natspec say it should be getPassword(string).

Impact: The natspec is incorrect.

Recommended Mitigation: Remove the incorrect natspec line.

* @param newPassword The new password to set.