



# Protocol Audit Report

Version 1.0

*Cyfrin.io*

August 25, 2024

# Protocol Audit Report

Swarnim

March 7, 2023

Prepared by: Swarnim Lead Auditors: - xxxxxxxx

## Table of Contents

- Table of Contents
- Protocol Summary
- Disclaimer
- Risk Classification
- Audit Details
  - Scope
  - Roles
- Executive Summary
  - Issues
- Findings
  - High
    - \* [H-1] Storing the password on-chain makes it visible to anyone, and no longer private
    - \* [H-2] `PasswordStore::SetPassword` has no access controls, meaning a non-owner could change the password
  - Informational
    - \* [I-1] The `PasswordStore::getPassword` natspec indicates a parameter that doesn't exist, causing the natspec to be incorrect
  - Gas

## 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 access and store this password.

## Disclaimer

The Swarnim Sec 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
Likelihood	High	H	H/M	M
	Medium	H/M	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

### Commmit Hash

```
1 2e8f81e263b3a9d18fab4fb5c46805ffc10a9990
```

## Scope

```
1 ./src/  
2 #-- PasswordStore.sol
```

## Roles

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

## Executive Summary

### Issues

Severity	Number of issues found
High	2
Medium	0
Low	0
Info	1
Gas Optimizations	0
Total	3

## Findings

### High

#### [H-1] Storing the password on-chain makes it visible 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, severely 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

```
1 anvil
```

2. Deploy the contract to the chain `make deploy`
3. Run the storage tool

We use 1 because that's the storage slot of `s_password` in the contract.

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

You'll get an output that looks like this: `0x6d7950617373776f726400`

You can then parse that hex into a string with :

```
1 cast parse-bytes32-string 0
   x6d7950617373776f72640000000000000000000000000000000000000000000014
```

And get an output of:

```
1 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'd 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`

```
1 function setPassword(string memory newPassword) external {
2   @> // @audit - There are no access controls
3     s_password = newPassword;
4     emit SetNetPassword();
5 }
```

**Impact:** Anyone can set/change the password of the contract severely breaking the contract intended functionality

**Proof of Concept:** Added the following to the `PasswordStore.t.sol` test file

Code

```
1
2     function test_anyone_can_set_password(address randomAddress) public{
3         vm.assume(randomAddress != owner);
4         vm.prank(randomAddress);
5         string memory expectedPassword = "myNewPassword";
6         passwordStore.setPassword(expectedPassword);
7
8         vm.prank(owner);
9         string memory actualPassword = passwordStore.getPassword();
10        assertEq(actualPassword,expectedPassword);
11
12    }
```

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

```
1  if(msg.sender != s_owner){
2      revert PasswordStore_NotOwner();
3  }
```

## Informational

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

## Gas