

Protocol Audit Report

Version 1.0

https://github.com/segonse

Protocol Audit Report

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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 visible to anyone, and no longer private
 - * [H-2] PasswordStore::setPassword is callable by anyone
 - Informational
 - * [I-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 passwords. 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 Segon 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	Н	H/M	М
	Medium	H/M	М	M/L
	Low	М	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:

```
1 2e8f81e263b3a9d18fab4fb5c46805ffc10a9990
```

Scope

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

Roles

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

Executive Summary

Issues found

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, serverly breaking the functionally of the protocol.

Protocol Audit Report

Proof of Concept: (Proof of code)

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

1. Create a locally running chain

```
1 make anvil
```

2. Deploy the contract on the chain

```
1 make deploy
```

3. Run the storage tool

We use 1 because that's the storage slot of PasswordStore::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:

You can parse the hex to string with:

And get the output:

```
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 is callable by anyone

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.

```
function setPassword(string memory newPassword) external {
    // @audit - There are no access controls here
    s_password = newPassword;
```

```
4    emit SetNetPassword();
5  }
```

Impact: Anyone can set/change the password of the contract.

Proof of Concept: (Proof of code)

Add the following to the PasswordStore.t.sol test suite.

```
function testAnyoneCanSetPassword(address anyone) public {
    vm.prank(anyone);
    string memory expectedPassword = "myNewPassword";
    passwordStore.setPassword(expectedPassword);
    vm.prank(owner);
    string memory actualPassword = passwordStore.getPassword();
    assertEq(actualPassword, expectedPassword);
}
```

Recommended Mitigation: Add an access control modifier 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

Description:

```
1  /*
2  * @notice This allows only the owner to retrieve the password.
3 @> * @param newPassword The new password to set.
4  */
5  function getPassword() external view returns (string memory) {
```

The natspec for the function PasswordStore::getPassword indicates it should have a parameter with the signature getPassword(string). However, the actual function signature is getPassword().

Impact: The natspec is incorrect.

Recommended Mitigation: Remove the incorrect natspec line.

```
1 - * @param newPassword The new password to set.
```