



Venus

# Smart Contract Audit Report

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# AUDITED DETAILS

## Audited Project

| Project name | Token ticker | Blockchain          |
|--------------|--------------|---------------------|
| Venus        | XVS          | Binance Smart Chain |

## Addresses

|                           |  |
|---------------------------|--|
| Contract address          | 0xcf6bb5389c92bdda8a3747ddb454cb7a64626c63 |
| Contract deployer address | 0x1ca3Ac3686071be692be7f1FBeCd668641476D7e |

## Project Website

<https://venus.io/>

## Codebase

<https://bscscan.com/address/0xcf6bb5389c92bdda8a3747ddb454cb7a64626c63#code>

# SUMMARY

Venus Protocol ("Venus") is an algorithmic-based money market system designed to bring a complete decentralized finance-based lending and credit system onto Binance Smart Chain. Venus enables users to utilize their cryptocurrencies by supplying collateral to the network that may be borrowed by pledging over-collateralized cryptocurrencies. This creates a secure lending environment where the lender receives a compounded interest rate annually (APY) paid per block, while the borrower pays interest on the cryptocurrency borrowed. These interest rates are set by the protocol in a curve yield, where the rates are automated based on the demand of the specific market, such as Bitcoin. The difference of Venus from other money market protocols is the ability to use the collateral supplied to the market not only to borrow other assets but also to mint synthetic stablecoins with over-collateralized positions that protect the protocol. These synthetic stablecoins are not backed by a basket of fiat currencies but by a basket of cryptocurrencies. Venus utilizes the Binance Smart chain for fast, low-cost transactions while accessing a deep network of wrapped tokens and liquidity.

## Contract Summary

### Documentation Quality

Venus provides a very good documentation with standard of solidity base code.

- The technical description is provided clearly and structured and also don't have any high risk issue.

### Code Quality

The Overall quality of the basecode is standard.

- Standard solidity basecode and rules are already followed by Venus with the discovery of several low issues.

### Test Coverage

Test coverage of the project is 100% ( Through Codebase )

## Audit Findings Summary

- SWC-100 SWC-108 | Explicitly define visibility for all state variables on lines 30.
- SWC-103 | Pragma statements can be allowed to float when a contract is intended on lines 5.
- SWC-120 | It is recommended to use external sources of randomness via oracles on lines 238 and 311.

# CONCLUSION

We have audited the Venus Project released on September 2020 to discover issues and identify potential security vulnerabilities in Venus Project. This process is used to find technical issues and security loopholes which might be found in the smart contract.

The security audit report provides satisfactory results with low-risk issues.

The issues found in the Venus smart contract code do not pose a considerable risk. The writing of the contract is close to the standard of writing contracts in general. The low-risk issues found are some floating pragma is set, a state variable visibility is not set, and the potential use of "block.number" as a source of randomness. The current pragma Solidity directive is `^0.5.16`. Specifying a fixed compiler version is recommended to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code. State variable visibility is not set, the best practice is to set the visibility of state variables explicitly. The default visibility for "is locked" is internal. Other possible visibility settings are public and private. Potential use of "block. number" as a source of randomness, the environment variable "block.number" looks like it might be used as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number, and timestamp are predictable and can be manipulated by a malicious miner. Also, keep in mind that attackers know hashes of earlier blocks. Don't use any of those environment variables as sources of randomness, and be aware that using these variables introduces a certain level of trust into miners.

# AUDIT RESULT

| Article                           | Category           | Description   | Result      |
|-----------------------------------|--------------------|---|-------------|
| Default Visibility                | SWC-100<br>SWC-108 | Functions and state variables visibility should be set explicitly. Visibility levels should be specified consciously. | ISSUE FOUND |
| Integer Overflow and Underflow    | SWC-101            | If unchecked math is used, all math operations should be safe from overflows and underflows.                          | PASS        |
| Outdated Compiler Version         | SWC-102            | It is recommended to use a recent version of the Solidity compiler.   | PASS        |
| Floating Pragma                   | SWC-103            | Contracts should be deployed with the same compiler version and flags that they have been tested thoroughly.          | ISSUE FOUND |
| Unchecked Call Return Value       | SWC-104            | The return value of a message call should be checked.   | PASS        |
| Unprotected Ether Withdrawal      | SWC-105            | Due to missing or insufficient access controls, malicious parties can withdraw from the contract.                     | PASS        |
| SELFDESTRUCT Instruction          | SWC-106            | The contract should not be self-destructible while it has funds belonging to users.                                   | PASS        |
| Reentrancy                        | SWC-107            | Check effect interaction pattern should be followed if the code performs recursive call.                              | PASS        |
| Uninitialized Storage Pointer     | SWC-109            | Uninitialized local storage variables can point to unexpected storage locations in the contract.                      | PASS        |
| Assert Violation                  | SWC-110<br>SWC-123 | Properly functioning code should never reach a failing assert statement.  | PASS        |
| Deprecated Solidity Functions     | SWC-111            | Deprecated built-in functions should never be used.   | PASS        |
| Delegate call to Untrusted Callee | SWC-112            | Delegatecalls should only be allowed to trusted addresses.  | PASS        |

|                                     |                               |   |             |
|-------------------------------------|-------------------------------|---|-------------|
| DoS (Denial of Service)             | SWC-113<br>SWC-128            | Execution of the code should never be blocked by a specific contract state unless required.   | PASS        |
| Race Conditions                     | SWC-114                       | Race Conditions and Transactions Order Dependency should not be possible.   | PASS        |
| Authorization through tx.origin     | SWC-115                       | tx.origin should not be used for authorization.   | PASS        |
| Block values as a proxy for time    | SWC-116                       | Block numbers should not be used for time calculations.   | PASS        |
| Signature Unique ID                 | SWC-117<br>SWC-121<br>SWC-122 | Signed messages should always have a unique id. A transaction hash should not be used as a unique id.   | PASS        |
| Incorrect Constructor Name          | SWC-118                       | Constructors are special functions that are called only once during the contract creation.  | PASS        |
| Shadowing State Variable            | SWC-119                       | State variables should not be shadowed.   | PASS        |
| Weak Sources of Randomness          | SWC-120                       | Random values should never be generated from Chain Attributes or be predictable.  | ISSUE FOUND |
| Write to Arbitrary Storage Location | SWC-124                       | The contract is responsible for ensuring that only authorized user or contract accounts may write to sensitive storage locations.   | PASS        |
| 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. The rule of thumb is to inherit contracts from more /general/ to more /specific/. | PASS        |
| Insufficient Gas Griefing           | SWC-126                       | Insufficient gas griefing attacks can be performed on contracts which accept data and use it in a sub-call on another contract.   | PASS        |
| Arbitrary Jump Function             | SWC-127                       | As Solidity doesnt support pointer arithmetics, it is impossible to change such variable to an arbitrary value.   | PASS        |

|                            |                    |  |      |
|----------------------------|--------------------|--|------|
| Typographical Error        | SWC-129            | A typographical error can occur for example when the intent of a defined operation is to sum a number to a variable.                                     | PASS |
| Override control character | SWC-130            | Malicious actors can use the Right-To-Left-Override unicode character to force RTL text rendering and confuse users as to the real intent of a contract. | PASS |
| Unused variables           | SWC-131<br>SWC-135 | Unused variables are allowed in Solidity and they do not pose a direct security issue.   | PASS |
| Unexpected Ether balance   | SWC-132            | Contracts can behave erroneously when they strictly assume a specific Ether balance.   | PASS |
| Hash Collisions Variable   | SWC-133            | Using <code>abi.encodePacked()</code> with multiple variable length arguments can, in certain situations, lead to a hash collision.                      | PASS |
| Hardcoded gas amount       | SWC-134            | The <code>transfer()</code> and <code>send()</code> functions forward a fixed amount of 2300 gas.  | PASS |
| Unencrypted Private Data   | SWC-136            | It is a common misconception that private type variables cannot be read.   | PASS |



# SMART CONTRACT ANALYSIS

|                  |   |
|------------------|---|
| Started          | Sunday Sep 27 2020 06:21:52 GMT+0000 (Coordinated Universal Time) |
| Finished         | Monday Sep 28 2020 09:21:39 GMT+0000 (Coordinated Universal Time) |
| Mode             | Standard  |
| Main Source File | XVS.sol   |

## Detected Issues

| ID      | Title  | Severity | Status       |
|---------|--|----------|--------------|
| SWC-103 | A FLOATING PRAGMA IS SET.                                | low      | acknowledged |
| SWC-108 | STATE VARIABLE VISIBILITY IS NOT SET.                    | low      | acknowledged |
| SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS. | low      | acknowledged |
| SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS. | low      | acknowledged |

## SWC-103 | A FLOATING PRAGMA IS SET.

LINE 5

### low SEVERITY

The current pragma Solidity directive is `^0.5.16`. It is recommended to specify a fixed compiler version to ensure that the bytecode produced does not vary between builds. This is especially important if you rely on bytecode-level verification of the code.

### Source File

- XVS.sol

### Locations

```
4
5  pragma solidity ^0.5.16;
6
7  contract Owned {
8
9
```

## SWC-108 | STATE VARIABLE VISIBILITY IS NOT SET.

LINE 30

### low SEVERITY

It is best practice to set the visibility of state variables explicitly. The default visibility for "isLocked" is internal. Other possible visibility settings are public and private.

### Source File

-XVS.sol

### Locations

```
29  /// @notice Indicates if token is locked
30  uint8 isLocked = 0;
31
32  event Freezed();
33  event UnFreezed();
34
```

## SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.

LINE 238

### low SEVERITY

The environment variable "block.number" looks like it might be used as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number and timestamp are predictable and can be manipulated by a malicious miner. Also keep in mind that attackers know hashes of earlier blocks. Don't use any of those environment variables as sources of randomness and be aware that use of these variables introduces a certain level of trust into miners.

### Source File

- XVS.sol

### Locations

```
237 function getPriorVotes(address account, uint blockNumber) public view returns
(uint96) {
238     require(blockNumber < block.number, "XVS::getPriorVotes: not yet determined");
239
240     uint32 nCheckpoints = numCheckpoints[account];
241     if (nCheckpoints == 0) {
242
```

# SWC-120 | POTENTIAL USE OF "BLOCK.NUMBER" AS SOURCE OF RANDOMNESS.

LINE 311

## low SEVERITY

The environment variable "block.number" looks like it might be used as a source of randomness. Note that the values of variables like coinbase, gaslimit, block number and timestamp are predictable and can be manipulated by a malicious miner. Also keep in mind that attackers know hashes of earlier blocks. Don't use any of those environment variables as sources of randomness and be aware that use of these variables introduces a certain level of trust into miners.

## Source File

- XVS.sol

## Locations

```
310 function _writeCheckpoint(address delegatee, uint32 nCheckpoints, uint96 oldVotes,
uint96 newVotes) internal {
311     uint32 blockNumber = safe32(block.number, "XVS::_writeCheckpoint: block number
exceeds 32 bits");
312
313     if (nCheckpoints > 0 && checkpoints[delegatee][nCheckpoints - 1].fromBlock ==
blockNumber) {
314         checkpoints[delegatee][nCheckpoints - 1].votes = newVotes;
315
```

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This is a limited report on our findings based on our analysis, in accordance with good industry practice as of the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against us on the basis of what it says or doesn’t say, or how we produced it, and it is important for you to conduct your own independent investigations before making any decisions. We go into more detail on this in the below disclaimer below – please make sure to read it in full.

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