Security Assessment

WBGL Token

Apr 22nd, 2021
Summary

This report has been prepared for WBGLToken smart contracts, to discover issues and vulnerabilities in the source code of their Smart Contract as well as any contract dependencies that were not part of an officially recognized library. A comprehensive examination has been performed, utilizing Dynamic Analysis, Static Analysis, and Manual Review techniques.

The auditing process pays special attention to the following considerations:

- Testing the smart contracts against both common and uncommon attack vectors.
- Assessing the codebase to ensure compliance with current best practices and industry standards.
- Ensuring contract logic meets the specifications and intentions of the client.
- Cross referencing contract structure and implementation against similar smart contracts produced by industry leaders.
- Thorough line-by-line manual review of the entire codebase by industry experts.

The security assessment resulted in findings that ranged from critical to informational. We recommend addressing these findings to ensure a high level of security standards and industry practices. We suggest recommendations that could better serve the project from the security perspective:

- Enhance general coding practices for better structures of source codes;
- Add enough unit tests to cover the possible use cases given they are currently missing in the repository;
- Provide more comments per each function for readability, especially contracts are verified in public;
- Provide more transparency on privileged activities once the protocol is live.
### Overview

#### Project Summary

<table>
<thead>
<tr>
<th>Project Name</th>
<th>WBGL Token</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>A typical ERC-20 implementation with enhanced features.</td>
</tr>
<tr>
<td>Platform</td>
<td>Ethereum, BSC</td>
</tr>
<tr>
<td>Language</td>
<td>Solidity</td>
</tr>
</tbody>
</table>
| Codebase     | 1. https://etherscan.io/address/0xbaa1f3257d808c5078f25e8405da4a703485eb3e#code  
               2. https://bscscan.com/address/0xbaa1f3257d808c5078f25e8405da4a703485eb3e#code |
| Commits      | a65c3e18e941ed18111aabcdd2582dea8fbe0c38 |

#### Audit Summary

<table>
<thead>
<tr>
<th>Delivery Date</th>
<th>Apr 22, 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Methodology</td>
<td>Static Analysis, Manual Review</td>
</tr>
<tr>
<td>Key Components</td>
<td>ERC-20 Token</td>
</tr>
</tbody>
</table>

#### Vulnerability Summary

<table>
<thead>
<tr>
<th>Total Issues</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>0</td>
</tr>
<tr>
<td>Major</td>
<td>0</td>
</tr>
<tr>
<td>Minor</td>
<td>0</td>
</tr>
<tr>
<td>Informational</td>
<td>2</td>
</tr>
<tr>
<td>Discussion</td>
<td>0</td>
</tr>
</tbody>
</table>
## Audit Scope

<table>
<thead>
<tr>
<th>ID</th>
<th>file</th>
<th>SHA256 Checksum</th>
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<tbody>
<tr>
<td>WBG</td>
<td>WBGLToken.sol</td>
<td>9f1e5fa8b74008830aa33fbfc153639f8fe5265481dac5d61914e63ca112b4bc</td>
</tr>
</tbody>
</table>
## Findings

### Total Issues

- **Critical**: 0 (0.00%)
- **Major**: 0 (0.00%)
- **Minor**: 0 (0.00%)
- **Informational**: 2 (100.00%)
- **Discussion**: 0 (0.00%)

<table>
<thead>
<tr>
<th>ID</th>
<th>Title</th>
<th>Category</th>
<th>Severity</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBG-01</td>
<td>Unlocked Compiler Version</td>
<td>Language Specific</td>
<td>Informational</td>
<td>Acknowledged</td>
</tr>
<tr>
<td>WBG-02</td>
<td>Ambiguous Use of the <code>virtual</code> Keyword</td>
<td>Language Specific</td>
<td>Informational</td>
<td>Acknowledged</td>
</tr>
</tbody>
</table>
**WBG-01 | Unlocked Compiler Version**

<table>
<thead>
<tr>
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<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Specific</td>
<td>Informational</td>
<td>WBGLToken.sol: 12</td>
<td>Acknowledged</td>
</tr>
</tbody>
</table>

**Description**

The contract has unlocked compiler version. An unlocked compiler version in the source code of the contract permits the user to compile it at or above a particular version. This, in turn, leads to differences in the generated bytecode between compilations due to differing compiler version numbers. This can lead to an ambiguity when debugging as compiler specific bugs may occur in the codebase that would be hard to identify over a span of multiple compiler versions rather than a specific one.

**Recommendation**

We advise that the compiler version is instead locked at the lowest version possible that the contract can be compiled at. For example, for version `v0.6.2` the contract should contain the following line:

```solidity
pragma solidity 0.6.2;
```

**Alleviation**

The development team has acknowledged this exhibit but decided to not apply its remediation in the current version of the codebase.
WBG-02 | Ambiguous Use of the `virtual` Keyword

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<tr>
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<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Specific</td>
<td>Informational</td>
<td>WBGLToken.sol: 1498, 1515, 1530</td>
<td>Acknowledged</td>
</tr>
</tbody>
</table>

**Description**

The linked function are not expected to be overridden, hence the use of `virtual` seems redundant.

**Recommendation**

We advise to remove the `virtual` attribute from the linked functions.

**Alleviation**

The development team has acknowledged this exhibit but decided to not apply its remediation in the current version of the codebase.
Appendix

Finding Categories

Gas Optimization

Gas Optimization findings refer to exhibits that do not affect the functionality of the code but generate different, more optimal EVM opcodes resulting in a reduction on the total gas cost of a transaction.

Mathematical Operations

Mathematical Operation exhibits entail findings that relate to mishandling of math formulas, such as overflows, incorrect operations etc.

Logical Issue

Logical Issue findings are exhibits that detail a fault in the logic of the linked code, such as an incorrect notion on how block.timestamp works.

Control Flow

Control Flow findings concern the access control imposed on functions, such as owner-only functions being invoke-able by anyone under certain circumstances.

Volatile Code

Volatile Code findings refer to segments of code that behave unexpectedly on certain edge cases that may result in a vulnerability.

Data Flow

Data Flow findings describe faults in the way data is handled at rest and in memory, such as the result of a struct assignment operation affecting an in-memory struct rather than an in storage one.

Language Specific

Language Specific findings are issues that would only arise within Solidity, i.e. incorrect usage of private or delete .

Coding Style
Coding Style findings usually do not affect the generated byte-code and comment on how to make the codebase more legible and as a result easily maintainable.

**Inconsistency**

Inconsistency findings refer to functions that should seemingly behave similarly yet contain different code, such as a constructor assignment imposing different require statements on the input variables than a setter function.

**Magic Numbers**

Magic Number findings refer to numeric literals that are expressed in the codebase in their raw format and should otherwise be specified as constant contract variables aiding in their legibility and maintainability.

**Compiler Error**

Compiler Error findings refer to an error in the structure of the code that renders it impossible to compile using the specified version of the project.
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