SDG BLOCKCHAIN ACCELERATOR

Debugging and Testing Report – Template

1. Project Information

- **Project Name:** Thallo
- **Challenge & UNDP Office:** Tanzania
- **Report Version:** 1.01

2. Testing Approach

Unit tests were constructed for each of 3 validators (project registry, vintage registry, and carbon credit management)

Project registry and vintage registry were tested for the happy path and the path of invalid signers (not the protocol owner)

Carbon credit minting and retirement was tested for happy path, invalid signatures, as well as making sure credits cannot be retired that do not exist. Minting was also tested to make sure the utxo output matches the amount provided in the *datum* in the input for minting.

3. Error Logs

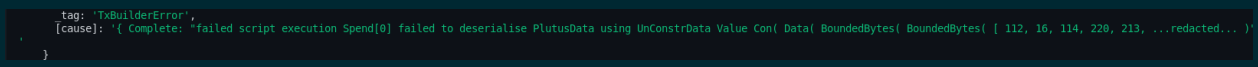
```
 Compiling thallo/carbon_credit_sc 0.0.0 (.)
 Compiling aiken-lang/stdlib v2.2.0 (./build/packages/aiken-lang-stdlib)
Collecting all tests scenarios across all modules
   Testing ...

  ┍━ credits/tests ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
  │ PASS [mem: 106.01 K, cpu:  31.85 M] mint_credits
  │ PASS [mem:  73.80 K, cpu:  21.30 M] mint_credits_fail
  │ PASS [mem:  75.03 K, cpu:  21.82 M] mint_credits_fail_wrong_amount
  │ PASS [mem: 124.33 K, cpu:  35.06 M] retire_credits
  │ PASS [mem: 120.60 K, cpu:  33.59 M] retire_credits_fail
  │ PASS [mem:  75.63 K, cpu:  22.02 M] retire_credits_fail_wrong_amount
  ┕━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 6 tests | 6 passed | 0 failed


  ┍━ registry/tests ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
  │ PASS [mem:  51.93 K, cpu:  15.44 M] create_project
  │ PASS [mem:  51.24 K, cpu:  14.86 M] create_project_fail
  │ PASS [mem:  60.32 K, cpu:  18.04 M] update_project
  │ PASS [mem:  61.88 K, cpu:  18.49 M] update_project_fail
  │ PASS [mem:  50.08 K, cpu:  14.52 M] deactivate_project
  │ PASS [mem:  51.64 K, cpu:  14.98 M] deactivate_project_fail
  ┕━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 6 tests | 6 passed | 0 failed


  ┍━ vintage/tests ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━
  │ PASS [mem:  47.68 K, cpu:  13.78 M] create_vintage
  │ PASS [mem:  49.24 K, cpu:  14.23 M] create_vintage_fail
  │ PASS [mem:  59.08 K, cpu:  17.87 M] update_vintage
  │ PASS [mem:  60.64 K, cpu:  18.32 M] update_vintage_fail
  ┕━━━━━━━━━━━━━━━━━━━━━━━━━━ 4 tests | 4 passed | 0 failed
```

- **Error 2:**
  Lucid scripting deserialization is still under investigation. The *datum* does not decode properly.



4. Resolved Issues

1. Enforcing protocol owner signature was done by parametrizing the validators to take the protocol owner address
2. Lucid scripting deserialization is still under investigation. The *datum* does not decode properly.

Issue #2 was resolved by understanding that created UTXOs must have a matching datum format. Once that was corrected, transactions were successful.

Testnet address: addr_test1vpcpquku64qz3ltmhjfn8ya3p2pykfp0cnk95vfh85aet4qe9drpy

https://preprod.cardanoscan.io/address/addr_test1vpcpquku64qz3ltmhjfn8ya3p2pykfp0cnk95vfh85aet4qe9drpy

5. Optimization Notes

No direct optimization attempts have been made, but all validators were trimmed to be the cleanest/most efficient possible during development. *Datums* were intentionally slimmed to contain only the most necessary information onchain.

6. Tools and Environments Used

(List all tools, versions, and environments used in debugging and testing.)

- Aiken CLI v1.1.9 (`aiken check`, `aiken build`, `aiken test`)
- Blockfrost for rpc calls and Cardano preprod
- Lucid-Evolution 0.4.29
- Lucid-Evolution utils 0.1.66

7. Remaining Issues / Next Steps

- More data could be added to the datum for onchain storage (IFPS)
- Contracts require a security audit and further security testing