

An update on Certification & the CO-LaN Test Suite

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Overview

Test Suite

- Work done
- Work planned in next 6 months
- Longer term plans

Certification

- Current status
- Future plans

Q&A and Developer Feedback

CO-LaN Test Suite – V0.1.1

- ❑ **V0.1.0 was demonstrated at the CAPE-OPEN 2021 Annual Meeting**
- ❑ **V0.1.1 was released February 2022**
 - **33 open tickets addressed and closed**
 - **Feedback from CAPE-OPEN 2021 Annual Meeting incorporated**
 - **Additional tests added for Property Package**

- ❑ **Tests based on first pass analysis of requirements**
 - **Not exhaustive or approved**
 - **Not documented**
 - **Covered in more detail later in this presentation**

CO-LaN Test Suite – Review

V0.1.1 released to reviewers

- **Volunteers from CAPE-OPEN 2021 Annual Meeting**
 - ChemSep
 - HTRI
 - Linde
 - ProSim
 - SINTEF

Reviewer 1

- **Usability feedback**
- **Captured as tickets**
 - All currently open

CO-LaN Test Suite – Review (2)

☐ Reviewer 2

- Defect in the Test Suite caused a failure
- Test Suite defect was fixed and new version made available
- Property Package tested successfully and passed all tests

☐ Reviewer 3

- (different) Defect in the Test Suite caused a failure
- Test Suite defect was fixed and new version made available
- Property Package failed at least one test
 - Vendor addressed issue
 - New version of Property Package released by vendor

CO-LaN Test Suite – Review Summary

- Review was successful
- Critical defects in Test Suite identified and fixed
- Future improvements identified
- A non-compliance to the standard was identified and fixed

Documentation of Tests

- ❑ The CO-LaN Test Suite will only be as good as the tests it contains
- ❑ Documentation of the tests for each interface is the responsibility of the SIG which “owns” the interface
- ❑ M&T SIG have developed a template for documenting tests
 - With review by Interoperability SIG
- ❑ Uses the Identification interface as an example
- ❑ Covers:
 - Compliancy
 - Some best practice
- ❑ Some areas still under debate within M&T
- ❑ Questions:
 - Is an RFC required for the test documentation?
 - Should the final version of the document for each interface be available to CO-LaN Members?
 - Should they be made public?

Development of Tests for Property Packages

- ❑ **First step would normally be done by relevant SIG**
 - **Preliminary list of tests**
 - **With background & other relevant information**
 - **Michel Pons**
 - **Reviewed of preliminary list**
 - **Jasper van Baten**
- ❑ **Detailed documentation of a sub-set of tests**
 - **To gain experience of how long it takes**
 - **Marcus Bruno (Software Development contractor)**
- ❑ **Review of detailed documentation**
 - **Jasper van Baten (in lieu of SIG)**
- ❑ **Implementation of all Identification and documented Property Package tests**
 - **Marcus Bruno**
- ❑ **Review of implemented tests**
 - **Jasper van Baten (in lieu of SIG)**

Statistics

- 42 tests defined for Property Package
- 13 tests fully documented for Property Package
- 22 tests implemented
 - Identification & Property Package
- Time (approx.)
 - Michel Pons 40 hours
 - Marcus Bruno 20 hours
 - Jasper van Baten 2 hours
- Between 1 and 2 hours required per test
- A significant effort!
- Work required from SIG is large
 - Effect on delivery of Test Suite for certification?

Learnings

- ❑ **Quote:**
 - **“Specifications not written to enable testing”**
 - **But then are they written to enable implementation either?**
- ❑ **Current specifications are not always clear**
 - **it is difficult to get a full understanding of the specifications**
 - **hence difficult to implement properly**
- ❑ **There are some instances where the specifications are incomplete and open to interpretation**
- ❑ **Updates are required by the SIGs to Errata & Clarifications documents**
- ❑ **One outcome from producing the Test Suite may be improved Specification documents**

Structure of Tests

❑ Test Library

- One Test Library per component type (e.g. Property Package)
- Formally known as “Compliance Tests”
- But includes tests for both compliancy and best practice

❑ Test Category

- Collection of tests per interface
- Separate categories for compliancy and best practice (if applicable) for each interface
- Reused where an interface is applicable to multiple objects

❑ Tests

- Individual tests

Demo

☐ CO-LaN Test Suite v0.2.0

Short Term Plans for Test Suite

- ❑ **Action ALL open tickets**
 - **Create V0.2.1**
 - **Q4 2022**
- ❑ **Release V0.2.1 to vendors willing to review**
 - **Gather feedback**
 - **Note: no additional tests over V0.2.0**
- ❑ **Fully document & implement compliancy and best practice tests for Property Package**
 - **Significant input required from Thermo SIG**
 - **Documentation & review**
 - **Q1 2023**

Long Term Plans for Test Suite

- ❑ **Document & implement compliancy and best practice tests for Unit Operations**
 - **Significant input will be required from Unit SIG**
 - **End 2023**
- ❑ **Extend Test Suite to Process Modelling Environments**
 - **Vendor input required**
 - **Scope of PME's that need testing?**
 - **Traditional Process Simulators**
 - **Applications that act as either a PME or a PMC depending on context**
 - **Level of automation required?**
 - **End 2024**

Proposed Methodology for Testing PME

❑ Each PME is unique

- CO-LaN cannot provide automated test software
- Up to each vendor to automate as appropriate

❑ CO-LaN Test Suite will consist of:

- One or more reference PMCs, acting as either a UNIT or a THERMO PMC
 - Creates a time-stamped test report, documenting
 - The order in which the various interfaces are executed
 - The results from the execution of each interface
- A test scenario, which
 - Documents the series of steps that need to be carried out within the PME user interface
 - Software tool that allows tracking of successful completion of each step in the scenario?
 - The PME vendor can then follow using their user interface

Certification – Current Status

- No progress since CAPE-OPEN 2021 Annual Meeting
- Focus has been on developing the CO-LaN Test Suite
- Recap of proposal.....

Certification – Process (1)

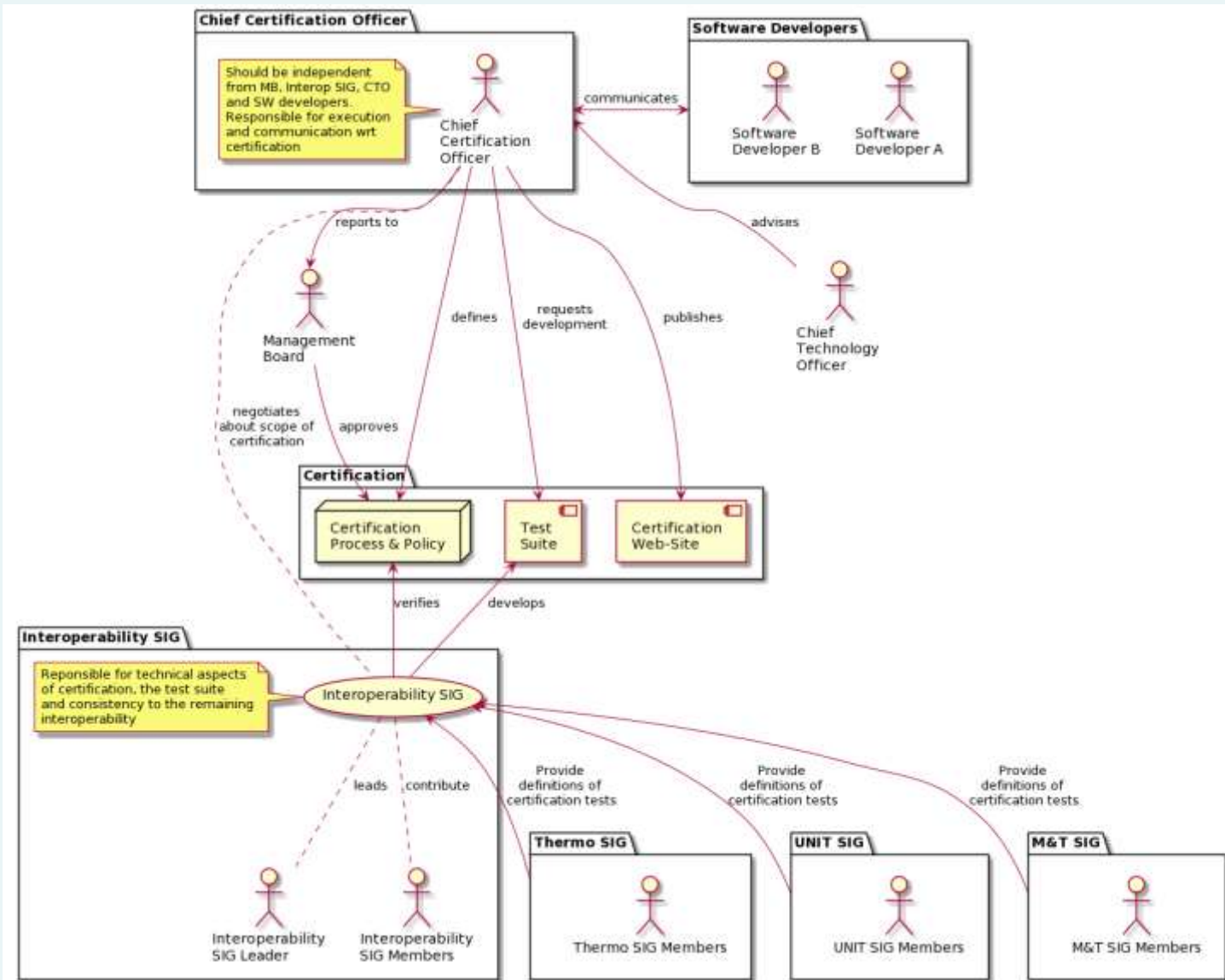
- ❑ **Software Developer implementing CAPE-OPEN interfaces**
 - **Downloads CO-LAN Test Suite**
 - **[Optional] Tests their implementation during development cycle using the Test Suite, running both:**
 - **CO-LaN provided tests (mandatory certification & optional)**
 - **[Optional] Tests implemented by developers**
 - **Runs Test Suite using standard CO-LaN provided certification tests**
 - **On final release candidate of new version of software**
 - **Submits test report to CO-LaN Chief Certification Officer**

Certification – Process (2)

☐ Chief Certification Officer (CCO)

- **Reviews test report submitted by Software Developer**
 - CCO will not re-run the tests routinely
- **Requests additional information / clarification if required**
- **When compliance is established**
 - Certificate is granted for version of software tested
 - Notifies Software Developer
 - Publishes result on Certification website
- **Feedback loop if compliance is not established**
 - If changes are required to vendor's software to ensure compliance
 - If changes are required to Test Suite
 - Note that CCO may grant Compliance Certification if Test Suite is the cause of the non-compliance, before the Test Suite is updated

Certification – Actors & Interactions



Funding Proposal – Test Suite

- ❑ Available to all CO-LaN members
 - Of any category
 - For use on software owned by a CO-LaN member only
- ❑ NOT available to non-members
 - Non-members can join CO-LaN to obtain access
- ❑ Will need to be reviewed in 2025
 - At the latest
 - When current membership fee arrangements are reviewed

Funding Proposal – Request for Certification

- ❑ Unlimited requests by any CO-LaN member initially allowed
- ❑ Subject to annual review, depending on experience and cost to CO-LaN of providing certification
 - Future possible option to limit number of requests per organisation per year?
- ❑ Organisations that are not members of CO-LaN cannot request certification in this way, as do not have access to Test Suite to produce certification report

Certification – Next Steps

- Finalise proposals based on feedback from CO-LaN Members
 - By CO-LAN Certification Project lead
- Management Board approval
- In 2023

- MB appoints Chief Certification Officer
- In 2023 - but only if prerequisites are in place and there is a necessity to make the appointment

Q&A and Developer Feedback (1)

Open questions

Documentation of Tests

- Are the SIGs able to take on the task?
- Is an RFC required for the test documentation?
- Should the final version of the document for each interface be available to CO-LaN Members?
- Should they be made public?

Test Suite for PMEs

- Scope of PMEs that need testing?
 - Traditional Process Simulators
 - Applications that act as either a PME or a PMC depending on context
- Level of automation required?

Q&A and Developer Feedback (2)

☐ Certification

- **Is the process and/or funding model appropriate?**
- **Will universities be requesting Certification?**
 - **Has an implication on cost of certification to CO-LAN**
- **If universities sell CAPE-OPEN compliant software, do they need to switch Associate membership category?**
 - **Group C to Group A or B**