CO-LaN Activities Report 2021

AGM of CO-LaN 2021
Online Meeting
October 28, 2021

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CO-LaN Activities Report 2020/2021

❏ **CO-LaN Overview**

- ➲ Membership and Management
- ➲ Operations

❏ **Usage and awareness**

- ➲ Website, forum, publications

❏ **Special Interest Groups**

- ❏ Summary reports

❏ **Strategic activities**

- ➲ CAPE-OPEN distribution (TLB/PIA)
- ➲ CAPE-OPEN middleware (COBIA)
- ➲ CAPE-OPEN certification
- ➲ CAPE-OPEN 2.0

CO-LaN Overview: membership

❑ **As of September 2021 almost one hundred Members**

- ⮞ 6 Full Members
- ⮞ 64 Corporate Associate Members (-14)
  - • 12 have left as a result of new funding model put in place
- ⮞ 24 Individual Associate Members

❑ **New Associate Members 2020/2021**

- ⮞ Politecnico di Milano (Andrea GALEAZZI)
- ⮞ University of Oslo (David CAMERON)
- ⮞ 3DS (Frank ECKERT)

It is vital that each Member assists CO-LaN in its missions and contributes to its life

CO-LaN Funding Model

❑ **Scheme outline**

    ❑ Full Members: 10k Euros/year

    ❑ Commercial providers of CAPE software
              Group A (> 20 employees): 2000 Euros/year
              Group B ($\leq$ 20 employees):   100 Euros/year

    ❑ Remaining Associate Members are free of charge

❑ **Success of new funding model**

    ❑ 12 Corporate Associate Members in Group A

    ❑ 8 Corporate Associate Members in Group B

❑ **No change expected to the scheme till end of 2025**

CO-LaN Overview: Management Board

❑ **Control & decision making**

❑ **Composed only of representatives of Full Members**

❑ **Management Board (current)**

- ➲ Shell Global Solutions   Richard Baur (President)
- ➲ Air Liquide   Philippe Arpentinier (Treasurer)
- ➲ BP   Kathryn Yearsley (Secretary)
- ➲ BASF   Norbert Asprion
- ➲ Dow   Michael Berger
- ➲ Linde   Oliver Koch

❑ **Monthly conference calls of 1½ h, plus twice yearly physical meetings and additional meetings on specific topics**

- ➲ Only virtual meetings in 2020-2021

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CO-LaN Overview

Daily Operations: annual contracts awarded by CO-LaN

❑ **Michel Pons Technologie, CTO**
  Responsible for day to day running of CO-LaN
  Invoicing, contract management, membership management, digital
  communication channels, SIG management, software distribution, etc…

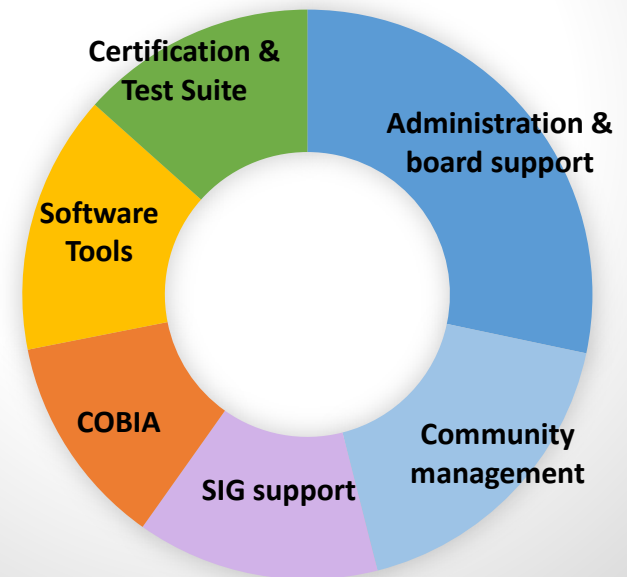❑ **Michael Halloran (till May 2021)**
  COLTT & Type Libraries/PIA

❑ **Stenhouse Simulations Ltd**
  Secretarial support

❑ **MRW Consulting**
  Project lead for certification & Test Suite

Certification & Test Suite · Administration & board support · Software Tools · COBIA · SIG support · Community management

Using data for 12 months to October 2021

Michael Halloran

Michael HALLORAN has decided to not renew his contractual arrangements with CO-LaN which ended on May 31, 2021.

❑ Michael has been involved with CAPE-OPEN since the early days of the project and remains an Individual Associate Member.

❑ Michael will continue to provide occasional advice to CO-LaN based on his vast experience of software development and CAPE-OPEN.

Michael is a major part of the CAPE-OPEN story. His insight and experience, his vast knowledge of software development and his powers of analysis, have served CO-LaN well for approximately 20 years and his contributions in support of CO-LaN activities will be sorely missed.

CO-LaN Overview

Project related contracts awarded for software services delivered to CO-LaN:
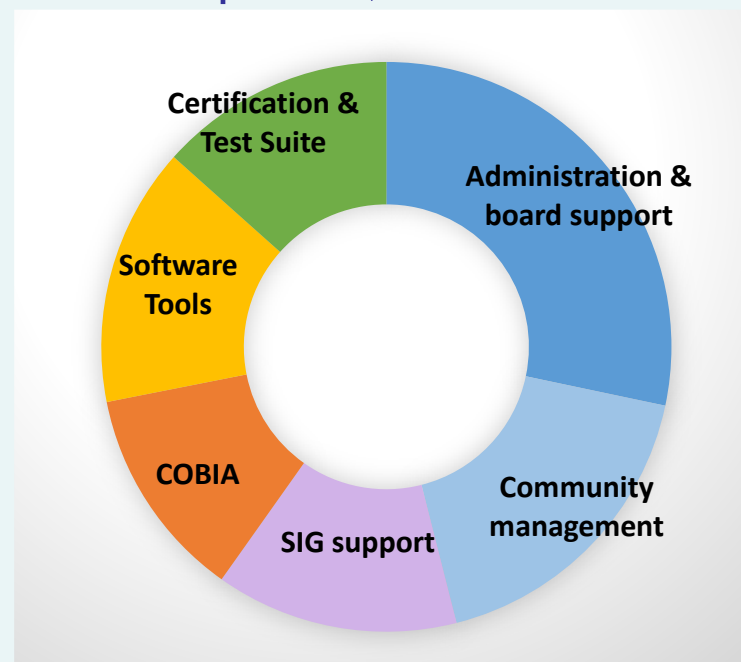
❑ **AmsterCHEM**

COBIA Phase II maintenance, COBIA Phase III development, software services, Test Suite design & development

❑ **Loïc d'Anterroches**

Software services & Test Suite development

Using data for 12 months to October 2021

❑ **Marcus Bruno Fernandes Silva**

Software services & Test Suite development

These contracts are managed via dedicated work orders

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CAPE-OPEN usage and awareness

Numerous articles refer to, or use CAPE-OPEN, *e.g.*

- David Krone, Erik Esche, Norbert Asprion, Mirko Skiborowski, Jens-Uwe Repke, Conceptual Design Based on Superstructure Optimization in GAMS with Accurate Thermodynamic Models, Editor(s): Sauro Pierucci, Flavio Manenti, Giulia Luisa Bozzano, Davide Manca, Computer Aided Chemical Engineering, Elsevier, Volume 48, 2020, Pages 15-20, ISSN 1570-7946, ISBN 9780128233771

- Licianne P.S. Rosa, Karen V. Pontes, Glória M.N. Costa, Alberto T. Penteado, Erik Esche, Jens-Uwe Repke, An equation-oriented novel approach for modeling the falling film absorber using rigorous thermodynamic and transport description, Chemical Engineering Research and Design, Volume 159, 2020, Pages 179-194, ISSN 0263-8762

- Poort, J.P., Ramdin, M., van Kranendonk, J., Vlugt, T.J.H., Solving vapor-liquid flash problems using artificial neural networks, Fluid Phase Equilibria 490 (2019) 39-47

see http://www.colan.org/category/techpapers/

Please make CO-LaN aware of publications & mention CAPE-OPEN technology when using it.

CAPE-OPEN usage and awareness

CO-LaN Repositories

❑ **Used for:**

➲ Managing software development

- COLTT, COBIA, TLB/PIA, Test Suite
- Symbol server for COBIA

➲ Delivering software and documentation

- COLTT, TLB/PIA, COBIA distributions
- Examples, complete specification sets
- Available free to all

➲ Storing working documents of SIGs & MB

❑ **Members, please check you have access to the repositories**

This set of repositories is dedicated to the CAPE-OPEN industry standard for process si authenticated user of any of the public projects contained in this set.

Projects (4)

Filter:

CAPE-OPEN Projects

CAPE-OPEN IDL
coidl / svn / 94.2 MB / Last Commit: 05 Jul 2016 21:35
Project related to managing and delivering the CAPE-OPEN IDL and Type Libraries

CAPE-OPEN Logging and Testing Tool
coltt / svn / 61.4 MB / Last Commit: 18 Jul 2016 22:35
Project to maintain and distribute the CAPE-OPEN Logging and Testing Tool.

CAPE-OPEN Tester Suite
cotester / svn / 8.6 MB / Last Commit: 14 Aug 2016 20:49
The CAPE-OPEN Tester Suite permits the test of COM software components implementing interface specifications of the CAPE-OPEN standard.

Examples
examples / svn / 23.1 MB / Last Commit: 08 Mar 2016 21:20
Project for the source and distribution of CAPE-OPEN example software developed by CO-LaN.

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MEMBER LOGIN   FORUM   Search

CAPE-OPEN usage and awareness

❑ **CO-LaN Website**

➲ SSL certificate renewed (https://www.colan.org)

➲ **Sign up for the CAPE-OPEN Newsletter**
for news and updates once per month

➲ Over 1550 Posts (~175 in a year)

➲ Subscribe via RSS

➲ Get continuous updates on SIG activities

➲ Check posts/entries about your
PMEs and PMCs and contact CTO for
updates

❑ **CAPE-OPEN Wikipedia**

➲ Last updated: May 2020

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CAPE-OPEN usage and awareness: <u>forum</u>

❑ **Objective: to allow CAPE-OPEN experts to answer queries**

- ➪ Use of COCO, development of PMCs such as Unit Operations and Property Packages.

- ➪ Target audience: end-users of process simulation, developers

- ➪ In active use for support queries

  - Number of users: 297 (254 as of October 2020)
  - Number of topics: 462 (423)
  - Number of posts: 2318 (2137), approx. one post per business day

Special Interest Groups (SIGs)

Overview

❑ **Responsible for maintenance and development of the CAPE-OPEN interface standards**

❑ **Representatives of both Full and Associate Members**

➲ Interoperability

- Leader: Malcolm Woodman

➲ Methods & Tools

- Leader: Bill Barrett (USA EPA)

➲ Thermodynamics

- Leader: Sergej Blagov (BASF), Jasper van Baten (AmsterCHEM)

➲ Unit

- Leader: Krishna Murthy Penukonda (AVEVA)

❑ **If you wish to participate, please contact Michel (CTO)**

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Special Interest Groups - Interoperability

Activities 2020-2021

❑ **TLB/PIA Installer**

- ➲ v2.1.1 release: flowsheet monitoring and custom data included
- ➲ V2.1.2 release: Corrections to specification and improved behaviour

❑ **Support to Test Suite development**

Outlook 2021-2022

❑ **Continued support to Test Suite development**

❑ **COLTT v2.5 release**

- ➲ logging on energy/info streams and ports, flowsheet monitoring

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Special Interest Groups – Methods and Tools

Activities 2020/2021

❑ Coordinate COBIA Phase II Maintenance

❑ Scoping of COBIA Phase III: done

❑ Launching of COBIA Phase III: done

  ▪ Supervision of work delivered so far in COBIA Phase III

❑ CAPE-OPEN interface specifications

  ▪ COBIA Phase II implements version 1.2 specifications

    ▪ Errors, Parameters, Persistence, Reporting, Material Manager

  ▪ Update of Reporting interface specification to handle pixel size issues

  ▪ Persistence Transitioning – support for implementation by KBC

❑ Support of Interop SIG

Anticipated 2021/2022 Activities

❑ Oversee COBIA Phase III Development

- Complete Development of Work Package 1 (Generic Marshalling)

- Launch Work Package 2 (Language bindings)

❑ Releases of COBIA

- Maintenance Releases

- Publish COBIA Phase III Work Package Products

❑ Initiate COBIA Documentation (Phase IV)

- Developer's Guide (Update of Integration Guidelines)

❑ Publish CAPE-OPEN v 1.2 Textual Specifications

Thermo SIG progress report

Activities 2020-2021

❑ **Custom Data interface specification**
- ➲ Published (Jul 31, 2021) in TLB/PIA
- ➲ A PME reference implementation is available (COCO/COFE)
- ➲ Logging is implemented in the next release of COLTT (v2.5)
- ➲ PMC developers can use these implementations for testing

❑ **Chemical Reaction interface specification**
- ➲ Textual specification polished
- ➲ Document is out for Request For Comments
  Your feedback is expected by December 1

Thermo SIG progress report

Outlook 2021-2022

❑ **Support:**

⤵ Certification support: define tests

⤵ Maintain and manage existing interface specifications

❑ **Manager Common Interface proposal**

⤵ Draft initial proposal

⤵ Hand over to M&T SIG for finalization

❑ **Publish Chemical Reaction Specification interface**

⤵ Act on Request For Comments, publish IDL, disseminate

❑ **Reminder:** Thermo 1.0 is deprecated!

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UNIT SIG progress report

❑ **Petroleum Fractions specification**

➲ Move forward after ability to distribute extensions to standard

➲ Request For Comments issued to membership

➲ Comments expected for December 1, 2021

➲ UNIT SIG will resume its meetings in December 2021

Outlook 2021-2022

➲ Act on comments on Petroleum Fractions RFC

➲ Certification support: define tests

➲ Maintain and manage existing interface specifications

❑ **CAPE-OPEN Type Libraries / Primary Interop Assemblies**

➥ Automated build process

➥ Internal guideline for maintenance developed

➥ Solution for controlled roll out of TLP/PIA installers in place

- Extensions to CAPE-OPEN 1.1
- New versions of CAPE-OPEN

Strategic Activities: CAPE-OPEN middleware – COBIA

❑ **COBIA Phase II completed (October 2020)**

➲ HTRI & KBC have successfully implemented their software with COBIA interfaces

- No issue reported since respective releases in July/September 2021

➲ COBIA runtime & software development kit
released on October 22, 2021 (v 1.2.0.8)

- \> 200 downloads
- please contact CTO for free download

❑ **COBIA Phase III underway: 1ˢᵗ WP out of 4**

➲ Marshaller Work Package: marshaling functionality that generalizes interoperability between COBIA-based objects and allows them to interact indirectly through proxies.

❑ **Test Suite design completed**

❑ **Prototype with essential functionality developed**

❑ **Work on commercial aspects of certification**

  ➲ Test Suite free to CO-LaN members

  ➲ Certification free for members

Strategic Activities: Ideas for CAPE-OPEN v2.0

❑ **Software engineering:**

CAPE-OPEN in the cloud /multithreading → COBIA ⚙

❑ **Ideas future developments of the specifications:**

❑ **Unit Operations:**

Equation oriented (dynamic) units / Blackbox modelling support

❑ **Thermodynamics:**

Chemical reaction / Common Manager ⚙

❑ **Flowsheets:**

Manipulating flowsheets by add/removing units/streams etc.

Sensitivities/ error propagation

❑ **Ideas to support Industry 4.0; manufacturing digitization**

Process control domain (OTS) / synergies with DEXPI & CFIHOS ⚙

please let us know your ideas

prioritization / business cases needed to develop roadmap.

- ✓ **Operate new funding model**
    - ✓ Funding increased above expectation
- ✓ **CAPE-OPEN certification**
    - ✓ Start to develop test suite: prototype developed as planned
- ✓ **COBIA**
    - ✓ Scoping of Phase III: done
    - ✓ Start Phase III: generic marshalling achieved as planned
- ❑ **Towards CAPE-OPEN 2.0 and beyond**
    - ✓ Finalise and publish versioning scheme
        - Proof of concept made with new TLB/PIA distribution end of July
    - ✗ Develop roadmap for CAPE-OPEN v2.0

Milestones for 2022

❑ **Start succession planning for CTO**

❑ **CAPE-OPEN certification**

  ➲ Release 1st version of test-suite

  ➲ Progress certification process and policy

  ➲ Nominate Certification Officer

❑ **COBIA**

  ➲ Finalize work-package 1 (generic marshaller)

  ➲ Consolidate inter-machine marshalling

  ➲ Offer language bindings

❑ **Develop roadmap for CAPE-OPEN v2.0**

How you can help

❑ **Contribute to the CAPE-OPEN certification process**

❑ **Contribute solutions for CAPE-OPEN self-test suite**

❑ **Evaluate and feedback on COBIA**

❑ **Participate in SIGs**

❑ **Feedback on website and CAPE-OPEN wiki page**

❑ **Promote CAPE-OPEN to your colleagues & customers**

Comments, Questions?

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