

CO-LaN Activities Report 2015/2016

**CAPE-OPEN 2016 Annual Meeting
Linde Engineering, Pullach,
October 6, 2016**

CO-LaN Activities Report 2015/2016

- ◆ **CO-LaN Overview**
 - ⇒ **CO-LaN Renewal**
 - ⇒ **Current Members & Management Board**
 - ⇒ **Contracts and Software Licences**
- ◆ **Dissemination & awareness**
 - ⇒ **New website, forum, publications, Wiki entries & training**
- ◆ **Special Interest Groups: overview and deliverables**
- ◆ **Strategic activities:**
 - ⇒ **Quality assurance of standards (versioning, review process)**
 - ⇒ **CAPE-OPEN certification**
 - ⇒ **Consultancy Service Scheme**
 - ⇒ **CAPE-OPEN middleware (COBIA)**

CO-LaN Renewal

- ◆ **Extraordinary General Meeting called on December 10, 2015**
- ◆ **Duration of CO-LaN unanimously extended for 5 years**
 - ⇒ **Till December 31, 2020**
 - ⇒ **Full Members committed to pursue CO-LaN**
- ◆ **CO-LaN address changed to:**
 - Centre de Recherche Paris Saclay, Direction Scientifique**
 - Les Loges en Josas – BP 126**
 - 78354 JOUY-EN-JOSAS Cedex**
 - France**

CO-LaN Overview – Membership

- ◆ **As of October 2016 more than one hundred Members**
 - ⇒ **7 Full Members**
 - ⇒ **77 Corporate Associate Members**
 - 47 Suppliers
 - 26 Academics
 - 3 Public & Federal Agencies
 - ⇒ **22 Individual Associate Members**

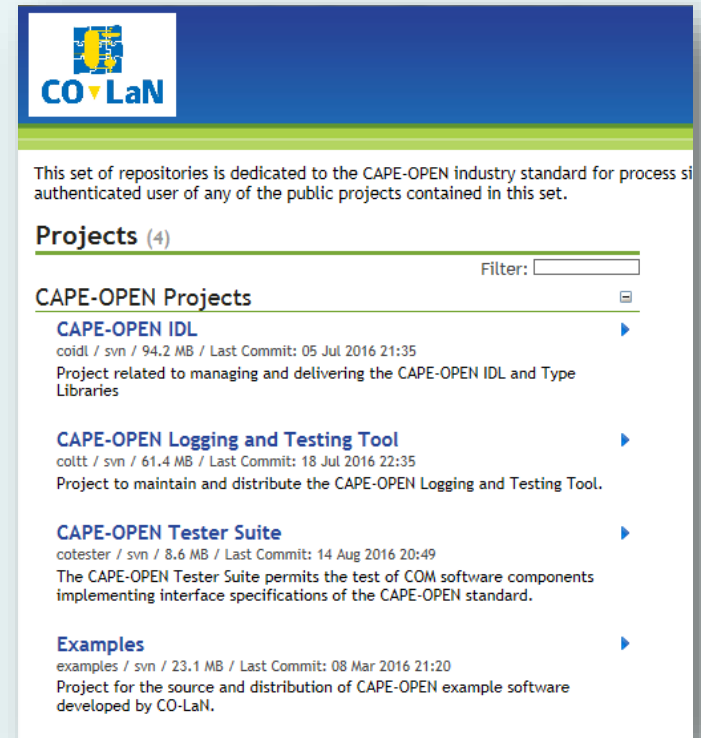
- ◆ **Linde AG joined as Full Member as of January 1, 2016**

- ◆ **Increase in Associate Members since last year: ADAKOM, Intelligen, Zhongyuan Li, Leo Bency, Malcolm Woodman, Hafnium Labs**

CO-LaN Overview – Membership

CO-LaN uses repositories for

- Storing working documents of SIGs
- Delivering CO-LaN software and documentation
 - Tools such as COLTT or TLB/PIA installers
 - Examples, complete documentation sets
- Managing software development
 - COBIA
 - COLTT
 - TLB/PIA installers...



The screenshot displays the CO-LaN website interface. At the top left is the CO-LaN logo. Below the header, a paragraph states: "This set of repositories is dedicated to the CAPE-OPEN industry standard for process simulation software. It is available to any authenticated user of any of the public projects contained in this set." Below this is a section titled "Projects (4)" with a "Filter:" input field. The projects listed are:

- 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.

CO-LaN Overview – Membership

Representative(s) of each Member have access to repositories with various rights

- SIG members have additional rights related to SIG activities



CO-LaN Overview - Management Board

- ◆ Responsible for day to day running of CO-LaN
- ◆ Composed only of representatives of Full Members
- ◆ Management Board (current)
 - ⇒ Shell Global Solutions Richard Baur President and Secretary
 - ⇒ Air Liquide Philippe Arpentinier Treasurer
 - ⇒ BASF Peter Mauer
 - ⇒ BP Mick Lee
 - ⇒ Dow Isaiah Huang
 - ⇒ Linde Oliver Koch
 - ⇒ Total Francis Luck
- ◆ Monthly conference calls, plus twice yearly physical meetings

CO-LaN Overview - Contracts & Licenses

On-going contracts awarded by CO-LaN

◆ Michel Pons Technologie, CTO

- Oversees and participates in SIG activities
- Reports to Management Board on SIG work progress
- Provides editorial content to website
- Administers the repositories, the forum and the website
- Writes and distributes the CAPE-OPEN newsletter
- Maintains contact with membership
- Organizes CAPE-OPEN Annual Meetings
- Conducts interoperability testing and reports to parties involved
- Responds to inquiries about CO-LaN and CAPE-OPEN
- Advises Management Board on administrative issues

CO-LaN Overview - Contracts & Licenses

On-going contracts awarded by CO-LaN

◆ Michael Halloran

- ⇒ COLTT & Type Libraries/Primary Interop Assemblies
 - Active within Interoperability SIG

◆ Stenhouse Simulations Ltd

- ⇒ Secretarial support
- ⇒ Versioning
- ⇒ Dissemination (CAPE-OPEN Wiki page)

CO-LaN Overview - Contracts & Licenses

◆ Licenses for testing & demonstration

- ⇒ *All major vendors have continued to provide licenses to CO-LaN*
 - *For testing & demonstration purposes*

Results of the testing are kept confidential to the vendor, the CO-LaN contractors and the Management Board

CAPE-OPEN usage and awareness

- ⇒ Among recently published work focusing on CAPE-OPEN
 - *On a systems approach to support novelty in bioreactor design*, National Technical University of Athens, Computer Aided Chemical Engineering, vol. 38, 2016, pp. 385-390.
 - *Taylor-Made Modeling and Solution of Novel Process Units by Modular CAPE-OPEN-based Flowsheeting*, Technische Universität Berlin/AmsterCHEM, Computer Aided Chemical Engineering, vol. 38, 2016, pp. 787-792.
 - *Dynamic modeling and control of an intercooled absorber for post-combustion CO₂ capture*, The University of Texas at Austin, Chemical Engineering and Processing 107, 2016, pp. 1–10.
 - *Computer-Aided Process and Plant Development. A Review of Common Software Tools and Methods and Comparison against an Integrated Collaborative Approach*, Technische Universität Berlin, Chemie Ingenieur Technik, 2016, vol. 88, issue 1-2, pp. 50-69.

Wiki entries for CAPE-OPEN & CO-LaN

◆ CAPE-OPEN Wikipedia Article Submitted

⇒ Under review by Wikipedia

- Expected to be live within 2-3 weeks

⇒ Scope

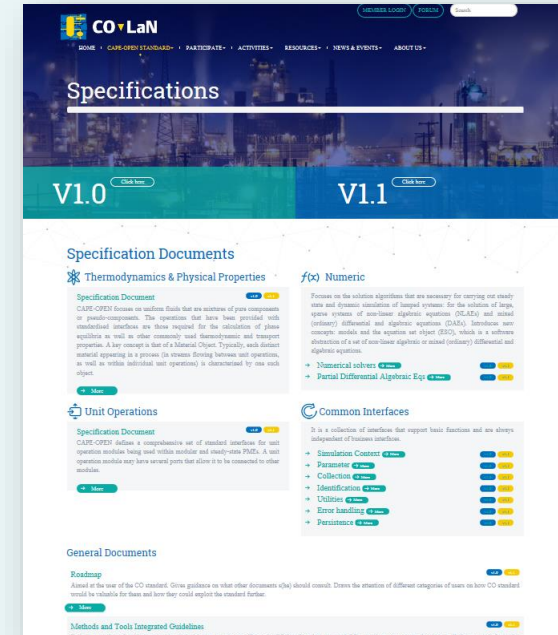
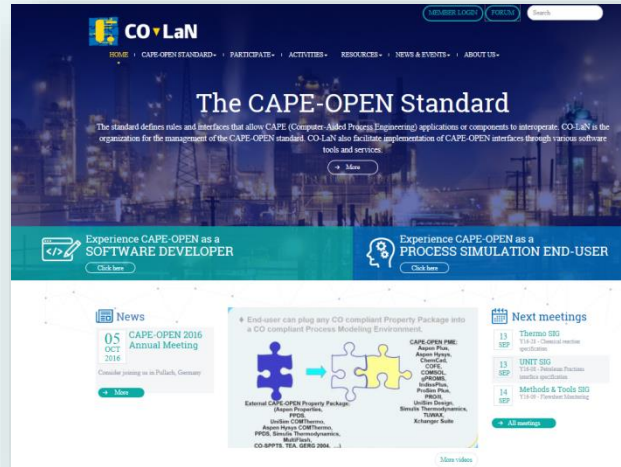
- **Origins:** Historical development of CAPE-OPEN projects
- **Purpose:** Sustainable interoperability, Business benefits
- **Concepts:** Environments, components, plug and play
- **Support:** CO-LaN
- **Specifications:** Released CAPE-OPEN interfaces
- **Software Tools:** Wizards, Testing Environments, Logger
- **Future Developments:** New specifications
- **References and External Links**

⇒ Communication to members when live

⇒ Member edits encouraged

CO-LaN website

- ◆ New version went live on June 2, 2016 and got updated ever since



- ◆ Please browse and comment
 - ⇒ Continuous update on SIG activities
 - Will hopefully induce more participation in SIGs
 - ⇒ Check posts on your PME and PMCs: need updating
 - ⇒ Search engine available

CAPE-OPEN forum

- ◆ **Need to register in order to post on forum**
- ◆ **Visitors do not need to register**

- ◆ **In active use for support queries**
 - ⇒ **Number of users: 135 (114 last October)**
 - ⇒ **Number of topics: 241 (222)**
 - ⇒ **Number of posts: 1420 (> 1200)**
 - ⇒ **One post per business day**

- ◆ **Targeted mostly at developers**
 - ⇒ **A different community to mix with**

Training

- ◆ **Training course organized on October 7, 2016**
 - ⇒ **CAPE-OPEN basic concepts**
 - Objective is to provide a first insight on how to implement CAPE-OPEN

 - ⇒ **Thanks to ProSim SA for use of presentation material**

 - ⇒ **Instructor: Bill BARRETT (U.S. EPA)**

 - ⇒ **Number of participants: 7**

Overview - SIGs

- ◆ **Responsible for maintenance and development of CAPE-OPEN interface standards**
- ◆ **Representatives of both Full and Associate Members**
 - ⇒ **Interoperability**
 - Malcolm Woodman
 - ⇒ **Methods & Tools**
 - Bill Barrett (USA EPA)
 - ⇒ **Thermodynamics**
 - Sergej Blagov (BASF), Jasper van Baten (AmsterCHEM)
 - ⇒ **Unit**
 - Krishna Murthy PENUKONDA (Schneider Electric)
 - Includes Refinery Reactors

Overview - SIGs

- ◆ Involvement in SIG meetings represents:
 - ⇒ Thermo: 8 man-hours per month
 - ⇒ UNIT: 1 man-hour per month (moving to 2)
 - ⇒ Methods & Tools: 4 man-hours per month
 - ⇒ Interoperability SIG: 1 man-hour per month
- ◆ Plus whatever is done outside meetings.

SIGs reactivation

- ◆ **Who is using the CAPE-OPEN numerical interfaces?**
 - ⇒ Related to COBIA activities up to a point
 - ⇒ Call of interest?

- ◆ **Hydrodynamics on hold due to lack of industry demand**
 - ⇒ Interface specification draft and prototype exist
 - ⇒ Review and approval missing
 - ⇒ Call of interest?

SIG deliverables

- ◆ **Thermo SIG (see report made by Sergej BLAGOV)**
 - ⇒ **Chemical Reaction specification redesign**

- ◆ **UNIT SIG (see report to be made by Krishna Murthy PENUKONDA)**
 - ⇒ **Petroleum Fractions**
 - Implementation in PRO/II and Shell
 - Progress description
 - Need to work with Thermo SIG for thermo requirements (lower priority)
 - ⇒ **Dynamic Sequential Modular Unit interface specification**
 - No progress since last year

- ◆ **Interoperability SIG (see report made by Malcolm WOODMAN)**
 - ⇒ **New version of COLTT**
 - ⇒ **New version of TLB/PIA installers**

SIG Reports

- ◆ **Methods & Tools SIG (see report made by Bill BARRETT)**
 - ⇒ **Common interfaces**
 - Systematic documentation of Errata and Clarifications
 - Please contribute to documentation quality through reviews
 - ⇒ **Flowsheet Monitoring**
 - Modifications brought to the original design
 - ⇒ **CAPE-OPEN Object Model**
 - Phase I funded and delivered (separate presentation)

- ◆ **All SIGs are delivering technical progress**
 - ⇒ **Very regular conference calls (weekly for Thermo, monthly for UNIT and Interop, three times/month for M&T)**

Consultancy Service Scheme

◆ Vortech

⇒ The goal of the project was to develop a Modelica - CAPE-OPEN coupling. The project was for the European CleanSky joint undertaking, under supervision of the German DLR.

⇒ Completed to Vortech's satisfaction

- Maarten BOSMANS, Scientific software engineer

“We sent a first version of our software to Jasper and got a quick response with lots of good feedback. It was primarily a lot of low hanging fruit to avoid the most common pitfalls when implementing CO. I think we acted on all of his suggestions (or at least the vast majority of them). This effort was enough to produce a viable proof-of-concept. From my point of view the action was successful.”

Consultancy Service Scheme

◆ AspenTech

⇒ Testing on Aspen Properties interface for Thermo 1.1

⇒ Matthias POGODDA, Director, Technology

- “Thanks again for all your thorough testing of the V1.1 interfaces!”
- Further testing to be conducted on official release

◆ Virtual Materials Group

⇒ Development of CAPE-OPEN Unit socket in VMGSIM

⇒ Raoul COTA, V.P. of Research & Development

“I am pleased to inform you that Jasper has completed the work for the CAPE-OPEN unit operation inside of VMGSim. We now have a stable product and we are switching gears to polish things on our end and producing examples... Thanks again for your support through this process and look forward to success stories with this new offering within VMGSim.”

Consultancy Service Scheme (2016)

- ◆ **Intelligen (under further consideration)**
 - ⇒ **Sample code for developing a CAPE-OPEN Unit socket in SuperPro Designer**
- ◆ **Request received about link between PME and CFD model**
 - ⇒ **No obvious business case for CO-LaN**
 - ⇒ **Is anyone else interested?**

Quality assurance of specifications

◆ Management Board intends to:

- unify the labelling of textual CAPE-OPEN specifications
- maintain only the most recent version
- make it easier for newcomers to adopt CAPE-OPEN
- increase traceability of changes through versioning

◆ Actions:

- Asks all SIGs to evaluate consequences of unification around 1.1 on textual documents, TLBs, developers and end-users
- Asks M&T SIG to develop a proposal on versioning
- Based on SIGs feedback, will request comments from CO-LaN members (especially vendors and end-users) on deprecation of CAPE-OPEN 1.0 at end of 2017

CAPE-OPEN Certification

- ◆ **The Management Board has committed to introduce a CAPE-OPEN certificate provided a semi-automatic testing suite can be realized by CO-LaN.**
- ◆ **Workshop discussed the requirements for a CAPE-OPEN certificate & testing suite. We will proceed based on the feedback of the CAPE-OPEN community.**
- ◆ **Call for proposals how CAPE-OPEN testing can be automated.**

COBIA

- ◆ Objectives and benefits of CAPE-OPEN new middleware:
 - ⇒ Platform independent middleware
 - New technology by CO-LaN
 - Will replace old-fashioned COM
 - ⇒ Facilitates implementations in C++ and other languages
 - More accessible to developers
 - ⇒ Faster interface speed
 - ⇒ Open source
 - Non proprietary technology

COBIA

- ◆ **Phase I completed: demonstrates feasibility**
- ◆ **Phase II delivers beta version and documentation**
- ◆ **Board will decide on starting phase II**
 - ⇒ after formal recommendation of the M&T SIG
 - ⇒ looking for more feedback from vendors/developers

Conclusions & Perspectives

◆ Milestones

- ⇒ **Versioning and deprecating version 1.0 (Q4 Y17)**
 - Pending feedback from software vendors
- ⇒ **Decision on 2017 Consultancy Scheme (Q1 2017)**
 - Prepare already your requests for consultancy
- ⇒ **Roadmap for CAPE-OPEN certificate & test suite (Q1 Y17)**
 - Input from SIGs and stakeholders required
- ⇒ **COBIA phase II completed by AGM 2017**
 - Provided board approval is granted & contractor is available.
 - Evaluate Phase I: analyse, prototype, implement

◆ Your participation is needed!

How you can help

- ◆ **Share your point of view on versioning and deprecating 1.0**
- ◆ **Develop your requests for consultancy scheme 2017**
- ◆ **Provide input on CAPE-OPEN certification process**
- ◆ **Contribute solutions for CAPE-OPEN Tester suite**
- ◆ **Evaluate and feedback COBIA Phase I**
- ◆ **Participate in SIGs**
- ◆ **Feedback on website and CAPE-OPEN wiki page**

Comments, Questions?

Vote on status report for 2015/2016

The General Members' Meeting, pursuant to the quorum and majority requirements applicable to ordinary members' meetings and after reviewing the President's report, approves the CO-LaN status report as presented for the period October 2015 – September 2016.