

# Interoperability tests and CAPE-OPEN Logging and Testing Tool (COLTT)

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# Interoperability tests

**A systematic action from CO-LaN**

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# Background

- ◆ **Within development of PMCs and PMEs, unitary tests are necessary but not sufficient:**
  - ⇒ **Need for integrated tests**
  
- ◆ **Integrated tests:**
  - ⇒ **CAPE-OPEN Tester Suite**
    - **Systematic exercising of CAPE-OPEN methods**
    - **Needs maintenance (specification under review)**
  - ⇒ **3rd party PMCs and PMEs**
    - **Difficult to obtain / use by other commercial parties**

# Background

- ◆ **Many CO-LaN Associate Members have awarded CO-LaN with licenses of their software products**
  - ⇒ **For interoperability testing**
  - ⇒ **For demonstration purposes**
- ◆ **Provides an opportunity for systematic testing of all possible combinations**
  - ⇒ **Many combinations already tried in phase 2 of COLTT development**

# Available PME and PMC

<b>PME</b>	<b>Unit PMC</b>	<b>Thermo PMC</b>
Aspen Plus	Xchanger Suite (HTRI)	MultiFlash
Aspen HYSYS	ChemSep	PPDS
PRO/II	AixCAPE ShortCut Toolbox	Aspen Properties
gPROMS	APECS (Fluent)	COM Thermo
UniSim Design	COUSCOUS UOs	UniSim Thermo
SolidSim	IFP/TOTAL PIPE	SIMULIS Thermodynamics
ChemCad	HYP/PFR	GERG (Bochum)
INDISS	gO:CAPE-OPEN UOs	CPA Property Package
COFE (COCO)		TEA (COCO)
ProSim Plus		VMGThermo
VALI		Cosmotherm
MFP2T (US EPA)		
SIMULIS Thermodynamics		

# Interoperability tests

- ◆ **More than 250 one-to-one combinations possible**
- ◆ **Several levels of testing defined**
  - ⇒ **With thermodynamic components**
    - **Basic test (scenario 1)**
      - **Involves one material stream with a flash**
    - **Intermediate test (scenario 2)**
      - **Exercises with one UO most/all properties provided by PMC**
    - **Advanced test (scenario 3)**
      - **Exercises PMC in complete process model**
  - ⇒ **With unit operation components**
    - **Basic test (scenario 1): single unit considered**
    - **Advanced test (scenario 2): within a process model**

# Interoperability tests

- ◆ **Documentation: a crucial deliverable**
  - ⇒ Each test result and each issue raised have to be shared with parties involved
- ◆ **Major CO-LaN effort**
  - ⇒ Costly in man-hours
  - ⇒ CO-LaN has devoted 700 man-hours in 2008 for these tests from 1<sup>st</sup> January till 30<sup>th</sup> June



# Where do we stand?

- ◆ **75 combinations already tested**
  - ⇒ **130 tests performed**
    - **Several scenarios and software versions**
- ◆ **60 reports issued with log files made with COLTT**
- ◆ **Results obtained:**
  - ⇒ **A number of implementation issues have been reported**
  - ⇒ **Some have been formally considered as bugs by developers**
  - ⇒ **Some have already been resolved**

# What lies ahead?

- ◆ **100+ combinations more till end of June 2008**
- ◆ **Testing process**
  - ⇒ **Raises awareness on issues but does not resolve bugs**
  - ⇒ **Needs support from parties behind software tested**
- ◆ **Is this an action to be sustained by CO-LaN together with interoperability support tools development?**

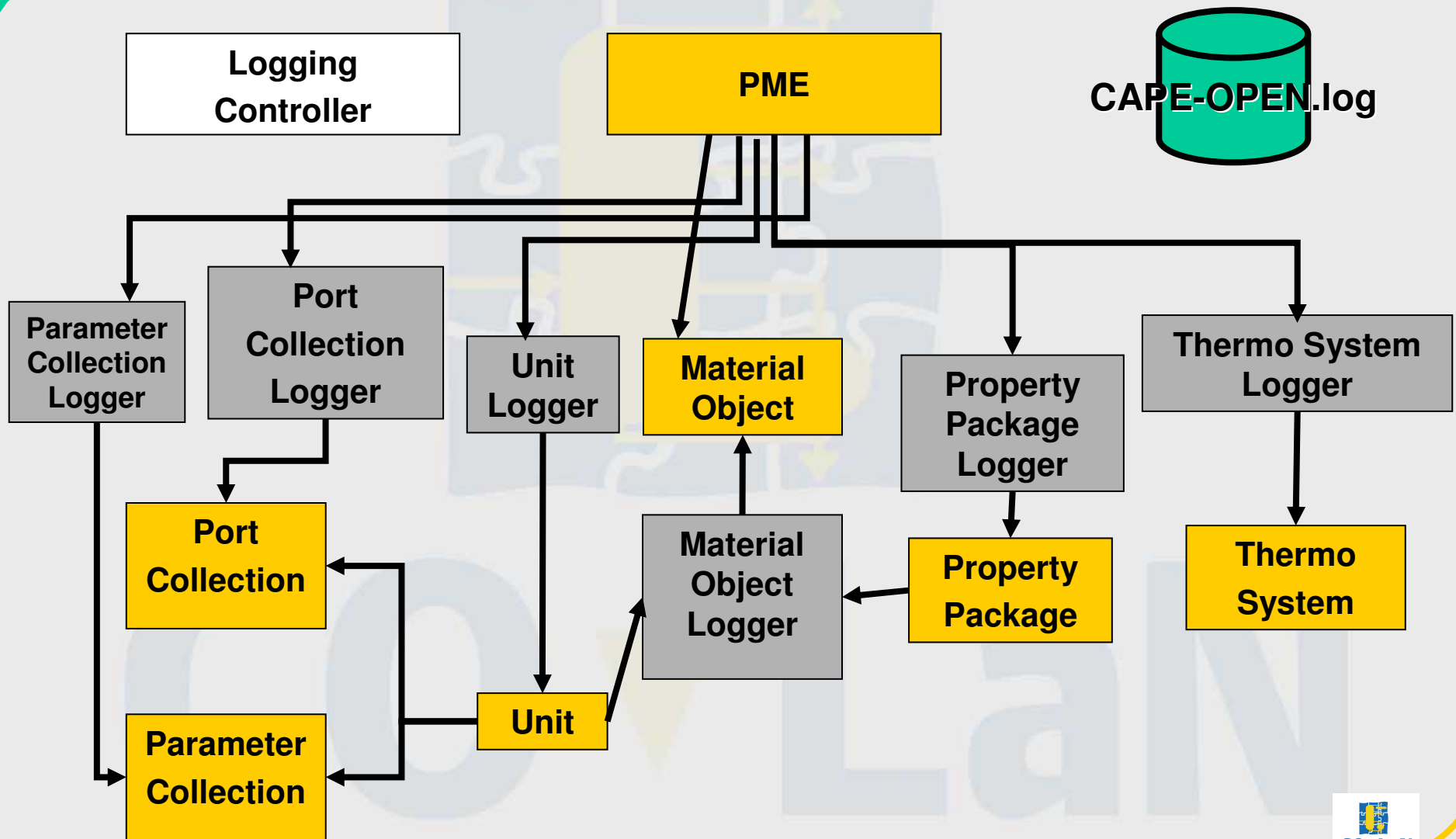
# CAPE-OPEN Logging and Testing Tool (COLTT)

**A companion to the interoperability tests**

**Michel Pons  
Michel Pons Technologie for CO-LaN**



# CAPE-OPEN Logger/Tester Communication



# COLTT

## COLTT development steps:

- ◆ Phase 1 – concept development
- ◆ Phase 2 – systematic testing and analysis by SHMA & CTO
- ◆ Phase 3 – problem resolution
- ◆ Phase 4 – maintenance and extension
  - ⇒ Started with production release on 8<sup>th</sup> March 2007
  - ⇒ Maintenance contract in place with SHMA in Pakistan

# Scope

## ◆ Logging controller

- ⇒ Allows selection of logged PMCs
- ⇒ Sets required registry entries
- ⇒ Allows choice of destination for logging output

## ◆ Loggers

- ⇒ Partial but wide implementation

- **Version 1.0**

- Unit, Material Object, Property Package, Port, Collection, Thermo System, Calculation Routine, Simulation context, Error Handling, Parameter

- **Version 1.1**

- Property Package Manager, Property Package, Property Routine

# Continuous maintenance process in place

- ◆ **SHMA (Pakistan) contracted for maintenance**
  - ⇒ Issues found documented by CO-LaN
  - ⇒ Debugging performed by SHMA on CO-LaN laptop
- ◆ **SHMA contracted for COLTT extensions**
  - ⇒ Proprietary interface calls logging
  - ⇒ Parameter logger
  - ⇒ Thermo 1.1 loggers
- ◆ **Michael Halloran contracted for**
  - ⇒ Audit of COLTT code
  - ⇒ Evaluation of issues raised and of solution proposed

# Versioning history

- ◆ **March 8<sup>th</sup> 2007: version 1.0**
- ◆ **March 20<sup>th</sup> 2007: version 1.01**
  - ⇒ **Installation bugs resolved**
- ◆ **April 6<sup>th</sup> 2007: version 1.02**
- ◆ **May 10<sup>th</sup> 2007: version 1.03**
  - ⇒ **Several cases of debug assertion resolved**
- ◆ **July 12<sup>th</sup> 2007: version 1.04**
  - ⇒ **Logging of 1.1 Thermo interfaces**
- ◆ **November 2<sup>nd</sup> 2007: version 1.05**
  - ⇒ **Logging of calls to proprietary interfaces**
- ◆ **February 22<sup>nd</sup> 2008: version 1.06**
  - ⇒ **ICapeParameter method calls logged**

# Progress within version 1.0 (1 year)

## ◆ Usability

- ⇒ Unique log file name
- ⇒ Real time logging available

## ◆ CAPE-OPEN 1.0 and 1.1 coverage

- ⇒ See previous slide

## ◆ Audit performed by Michael Halloran

- ⇒ Refactoring defined for reduced size of code and easier maintenance
- ⇒ Bugs / modifications listed (100+)

# Perspectives

- ◆ **Refactoring and listed modifications to proceed ASAP**
- ◆ **Basic tests incorporated in COLTT**
  - ⇒ **Reporting on the spot implementation issues**
- ◆ **Easier management of output needed**
  - ⇒ **Log output can be very large for somewhat complex simulations**
  - ⇒ **Difficult to browse through flat files without structure**
  - ⇒ **XML based structure considered**



Thank you  
Questions?

CO  LaN

