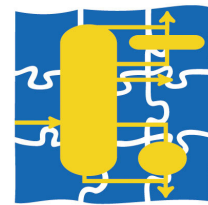


CAPE-OPEN Logging and Testing Tool supports CAPE-OPEN thermodynamic interfaces 1.1



CO ▼ LaN

**Malcolm WOODMAN and Peter BANKS (BP Exploration
Operating Company Ltd), Michel PONS (CO-LaN)**

***4th CAPE-OPEN US Conference
November 7, 2007 – Salt Lake City***



[Interface Specifications](#)

www.colan.org

[Software Download](#)

Needs for Interoperability Support Tools

- ◆ **Users' need: delivery of reliable, seamless interoperability**
 - ⇒ **Facilitate relationship with support teams if problems arise**
- ◆ **Developers' need: reduce learning curve**
 - ⇒ **Lessen cost of adopting CAPE-OPEN**
- ◆ **CO-LaN's goal: accelerate adoption**
 - ⇒ **Get more components and environments available with CAPE-OPEN interfaces**

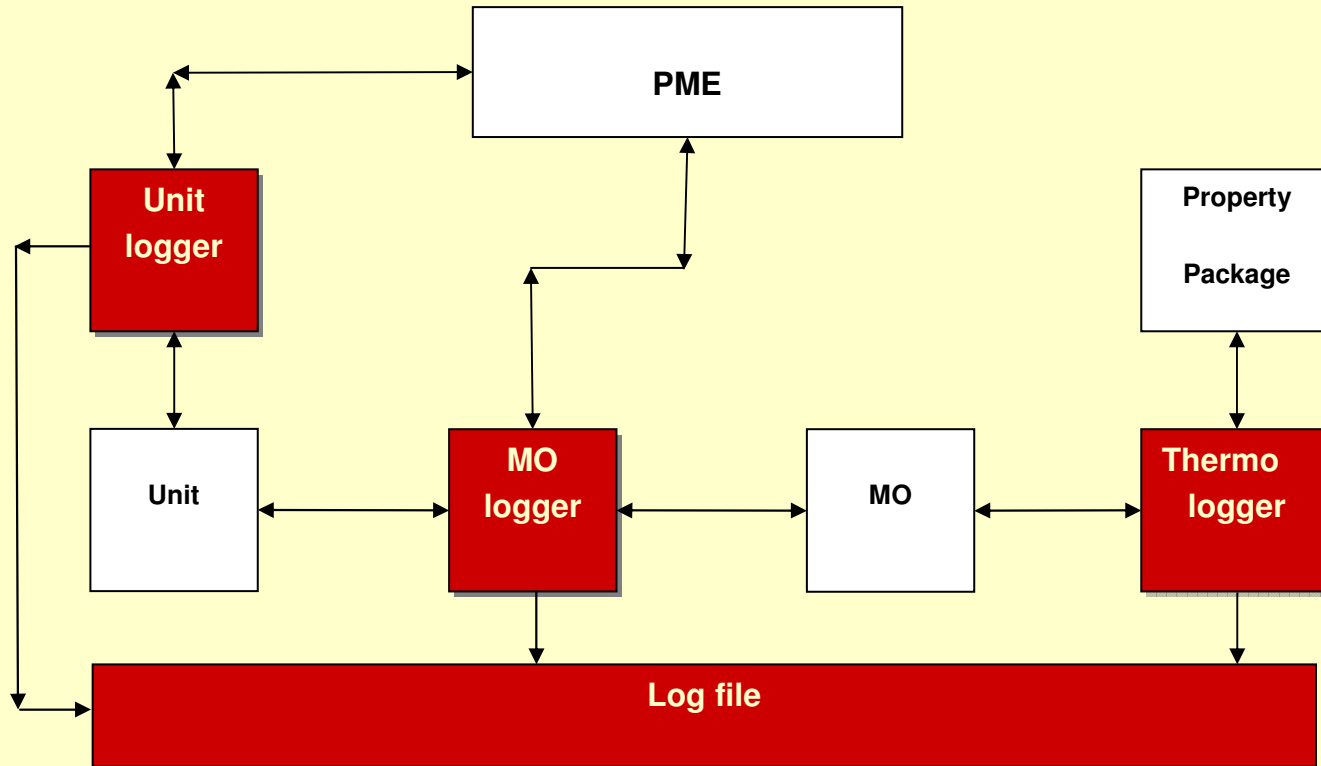
CO-LaN aims at simplifying processes

- ◆ of developing a CAPE-OPEN compliant component
 - ⇒ Wizards develop most of the code needed around a CAPE-OPEN component automatically
- ◆ of testing compliance with CO standards
 - ⇒ A Tester Suite analyzes the CAPE-OPEN interfaces displayed by a component
- ◆ of analyzing communication between a PMC and a PME
 - ⇒ A CAPE-OPEN Logging and Testing Tool (COLTT) reports on whatever transactions take place between a PME and a PMC

A major commitment from CO-LaN

- ◆ **Unit Wizards: ~25 K\$ development cost for CO-LaN**
 - ⇒ Provides wrappers for Unit Operation components quickly
- ◆ **Tester suite: ~ 90 K\$ development cost for CO-LaN**
 - ⇒ Checks CO compliance of software components
- ◆ **Logging Tool: ~ 50 K\$ development cost for CO-LaN**
 - ⇒ Analyzes communication

CO Logging and Testing Tool concept



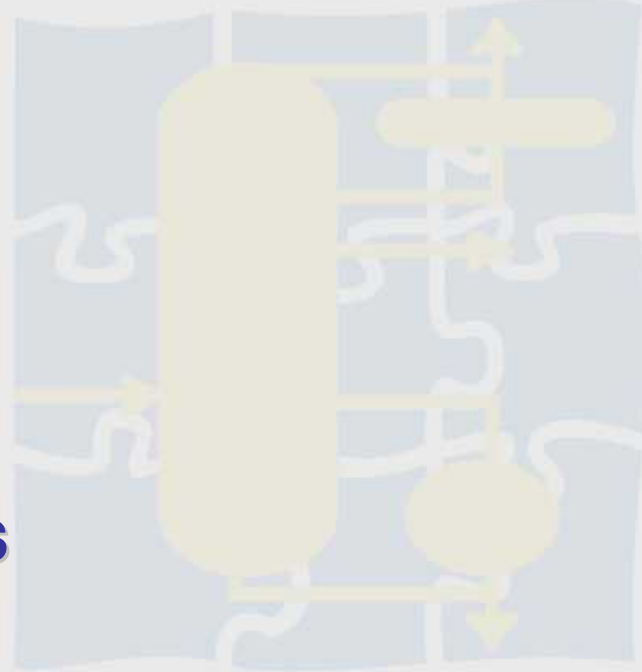
**COLTT components inserted in
between actual components and PME**

COLTT: from concept to production

- ◆ **Phase 1 – concept development**
 - ⇒ No coding changes needed by user?
 - ⇒ No interference with the PMC or PME?
 - ⇒ Prototype shown in March 2006 – some productive use, but also a number of problems
- ◆ **Phase 2 – systematic testing and analysis**
 - ⇒ 6 PMEs and 11 PMCs involved in combinations
- ◆ **Phase 3 – problem resolution**
 - ⇒ Solution developed by SHMA in Pakistan
 - ⇒ Production version available on March 8, 2007
- ◆ **Phase 4 – maintenance and enhancements**
 - ⇒ V1.05 released on Nov 1, 2007

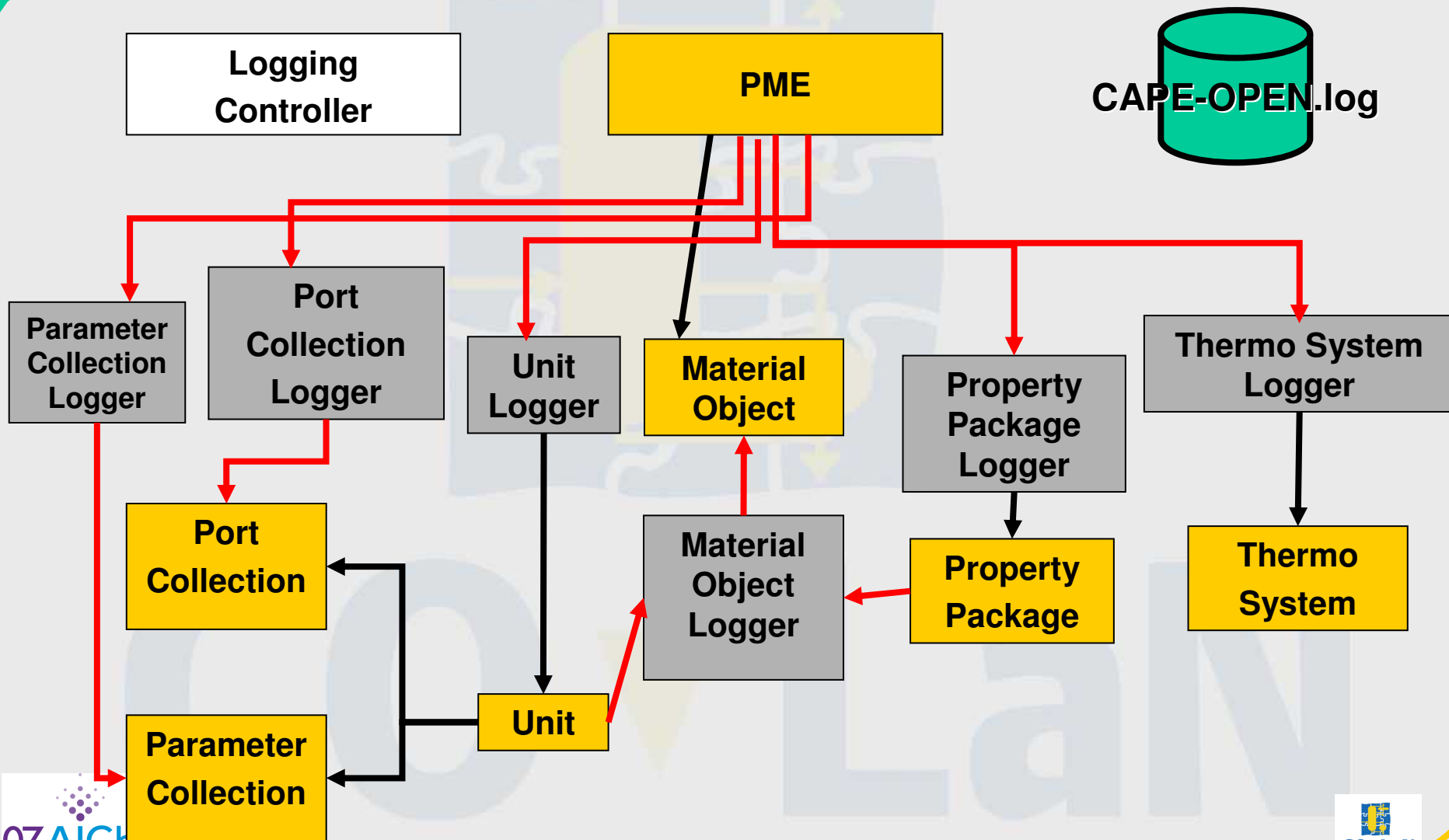
Continuous progress

- ◆ Usability
- ◆ Coverage
- ◆ Robustness
- ◆ Maintainability



CO LaN

CAPE-OPEN Logger/Tester Communication



CAPE-OPEN.log content

- ◆ COLTT logs all calls made in both directions, via CAPE-OPEN interfaces between a PME and a PMC.
- ◆ Each call to any method from any interface generates a log entry showing:
 - ⇒ Which object made the call
 - ⇒ Which call was made
 - ⇒ Values for the input arguments that were passed
 - ⇒ Return values that were passed back
 - ⇒ Whether the call generated an error and what the error was
 - error codes are explained by a message where possible, or at least translated to a Windows or CAPE-OPEN error name such as E_FAIL or ECapeLimitedImpl.

Logging controller

- ◆ **Displays information on each PMC**
- ◆ **Allows selection of PMCs to be logged**
- ◆ **Sets registry entries as required**
- ◆ **Allows choice of destination for logging output**

Logging controller

CAPE-OPEN Logging and Testing Tool

Components | Log Files | Real Time Logging

Search
Category : All Components [v] Go
Component Name :
Show Components : Logged Unlogged All

All System

- Thermo Systems
- Standalone Property Packages 1.0
- Unit Operations
- Property Package Managers
 - Multiflash CO 1.1 Property package Manag
 - VMG Thermo Property Package Manager 1
 - TEA (CAPE-OPEN 1.1)
- Standalone Property Packages 1.1
 - Thrm11PPack
 - SolidSim PPP 1.0 Connector
 - SolidSim Physical Property Package
 - Multiflash CO 1.1 Package
 - Thrm11PCalc
 - SolidSim PPP 1.0 Connector
 - SolidSim Physical Property Package

Component Detail

Name
Description
About
Vendor
CAPE-OPEN Version
Component Version

Version 1.05 developed for CO-LaN by
SHMA (Pvt) Ltd
Anjum Raheel
+92-345-5088-000
Anjum.Raheel@sidathyder.com.pk
Copyright (C) 2004-2007 CO-LaN

Contact for Support:
technologyofficer@colan.org

Clear all logs | Close | Help

Loggers

◆ CO standards 1.0

- ⇒ Unit
- ⇒ Material Object
- ⇒ Port
- ⇒ Collection
- ⇒ Thermo System
- ⇒ Simulation Context
- ⇒ Error Handling

◆ CO standards 1.1

- ⇒ Property Package Manager
- ⇒ Property Calculator / Property Package

Support for 1.1 thermo interfaces

- ◆ **Tested by CO-LaN with**
 - ⇒ **COFE PME (AmsterCHEM)**
 - ⇒ **TEA PMC (AmsterCHEM)**
 - ⇒ **SolidSim PME (TUHH)**
 - ⇒ **SolidSim Property Package (TUHH)**
 - ⇒ **Executable calling Thermo Wrapper library (ProSim)**
 - ⇒ **TUWAX PMC (University of Tulsa)**
 - ⇒ **MultiFlash PMC (Infochem)**
 - ⇒ **Property Calculator and Property Package examples (SHMA/Infochem)**

◆ **Released with COLTT 1.04**

Issue

- ◆ **Calls made by UO using 1.1 thermo interfaces not logged**
 - ⇒ **Need for automatic recognition of which thermo version is used by UO**
 - **Logging Controller does not know which MO version to supply**
 - ⇒ **Solution being developed by SIGs**
 - **Specific category for UOs using 1.1 thermo?**

Expanding Process Modeling Capability through Software Interoperability Standards

Conclusion and perspectives

Conclusions and perspectives

- ◆ **Logging communication through 1.1 thermodynamic interfaces**
- ◆ **Widely tested implementation**
- ◆ **Considered enhancements related to 1.1:**
 - ⇒ **Reorganization of PMCs list**
 - ⇒ **Equilibrium servers added**
 - ⇒ **UO 1.1 when specified**

Use it!