

## Use of CAPE-OPEN standards in the interoperability between modelling tools (MoT) and process simulators (ProSim)

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### 1. Summary

CAPE-OPEN organization is an association promoting open interface standards in process simulation software. In this work is shown the advantages of the use of CAPE-OPEN for the interoperability between MoT-Simulis Thermodynamics and MoT-ProSimPlus for thermodynamic calculations and unit operation calculation, respectively.

Keywords: CAPE-OPEN, interface, ICAS-MoT, Simulis, ProSimPlus

### 2. Extended Abstract

Up to now, it is well known that computer-aided tools play a vital role in the modelling/design/analysis/control of chemical processes and products thus manufacture. As these tools may come from different sources and disciplines, *how can they be used efficiently for the design/analysis of specific process-product?* The CAPE-OPEN interfaces, in this case, make the possible integration of the needed computational tools.

The objective of this presentation is to highlight the application of computer-aided modelling tools for generation and use of modelling objects in CAPE-OPEN compliant process simulators. This presentation will highlight the use of external modelling objects for unit operation models as well as thermodynamic property models. What we need are the following:

- A process simulator with a CAPE-OPEN socket (e.g. ProSimPlus).
- A CAPE-OPEN unit/property methods wrapper (link) that is able to receive an external model object from an external source.

- The model object representing any model (unit operation or thermo) generated for a computer-aided modelling tool for model translation, analysis and solution (ICAS-MoT).

The advantage of using ICAS-MoT (Sales-Cruz, M. and Gani, R., 2003) is that it is possible to transfer the model equations representing any new unit operation/thermo into a COM-object that can be used in some simulation engines (Icassim and Dynsim available within ICAS software), external software (i.e. EXCEL) or external simulators (ProSimPlus, etc) with a well defined interface without the user having to write any programming code. ICAS-MoT also carries out the analysis of degrees of freedom, determination of the structure of the equation system, index analysis, partitioning and ordering of the model equations and numerical analysis; and the solution of the model analyzed in the previous step, and thereby, producing customized simulators for a particular process.

The presentation will highlight the application of CAPE-OPEN interfaces for a model generated and tested in ICAS-MoT and then its equivalent COM-object is created. This COM-object is then wrapped by a generic unit-wrapper and plugged into the CAPE-OPEN socket of ProSimPlus (CAPE-OPEN compliant process simulator). It will also highlight the synergy between ICAS-MoT and Simulis Thermodynamics (from ProSim) through established generic CAPE-OPEN link.

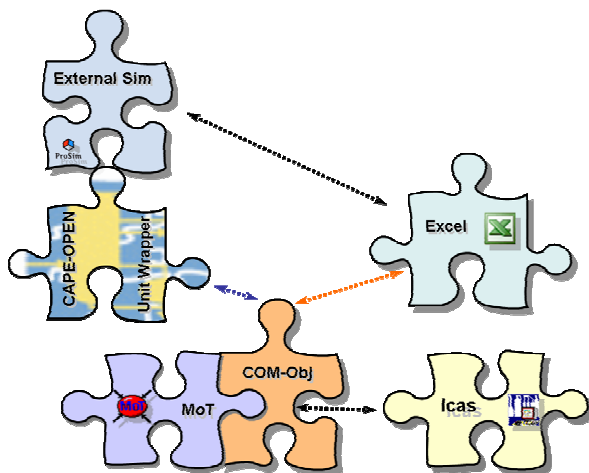


Figure 1. Software integration among MoT, external simulators, external software and modelling engines.

## References

Sales-Cruz, M. and Gani, R., (2003) *A modelling Tools for Different Stages of the Process Life*, Asprey S.P. and S. Machieto, Eds., Computer-Aided Chem Eng., Vol 16, Elsevier, Amsterdam.