

Integration of Vendor Components in Simulation Environments Using the CAPE-OPEN Standard

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Chief Technology Officer
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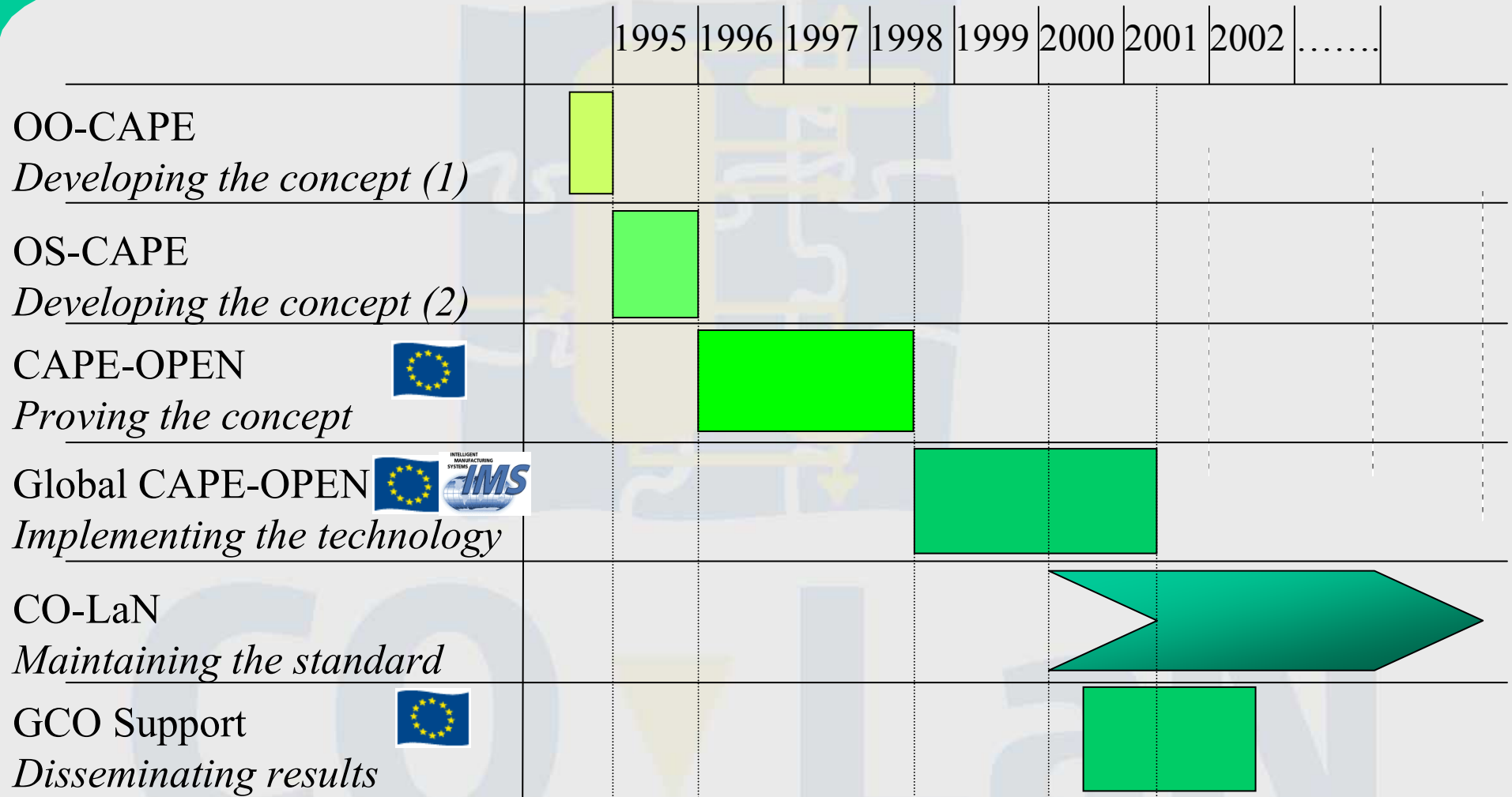


CAPE-OPEN: a technology for integration

- ◆ A freely available industry standard for interfaces between software components making up process simulation tools
- ◆ The success of a collaboration between software vendors, end-users and academics
- ◆ A proven IT technology implemented in most process simulation tools
- ◆ A growing adhesion by process simulation market leaders



Making a visionary idea a reality

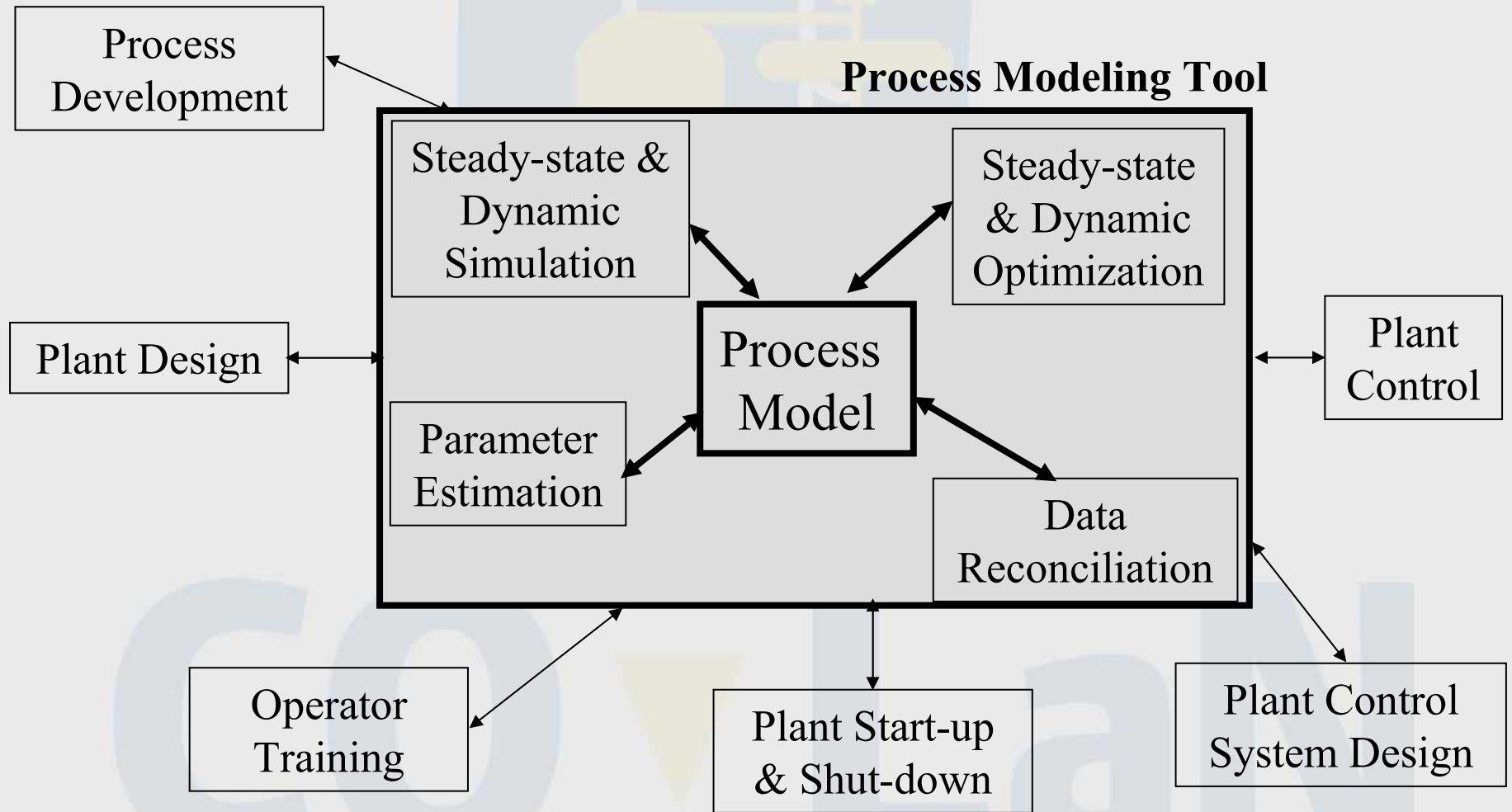


The CAPE community behind CAPE-OPEN



And quite a few more

Process modeling and simulation tools



Process modeling: components & environments

◆ Process Modeling Components (PMCs)

- ⇒ Well-defined pieces of software, relatively narrow function
- ⇒ Wide range of applications
 - Physical properties
 - Unit operation modules
 - Numerical solvers
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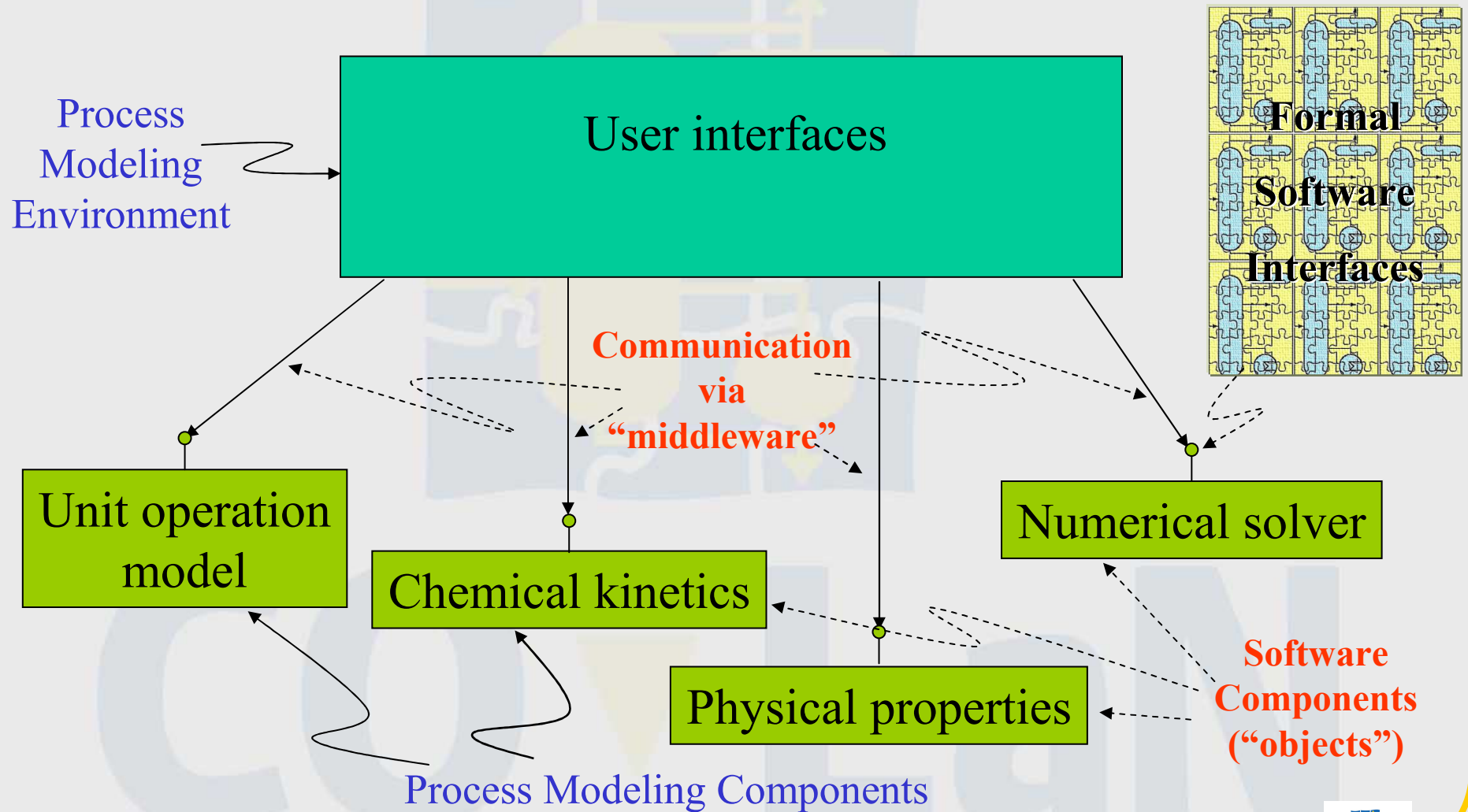


Process modeling: components & environments

- ◆ **Process Modeling Components (PMCs)**
- ◆ **Process Modeling Environments (PMEs)**
 - ⇒ **Support construction of process model**
 - **From first-principles and/or library of unit operation models**
 - ⇒ **Support a number of model-based applications**
 - **Simulation, optimization, ...**
 - ⇒ **May make use of one or more PMCs**



CAPE-OPEN in between PME & PMCs



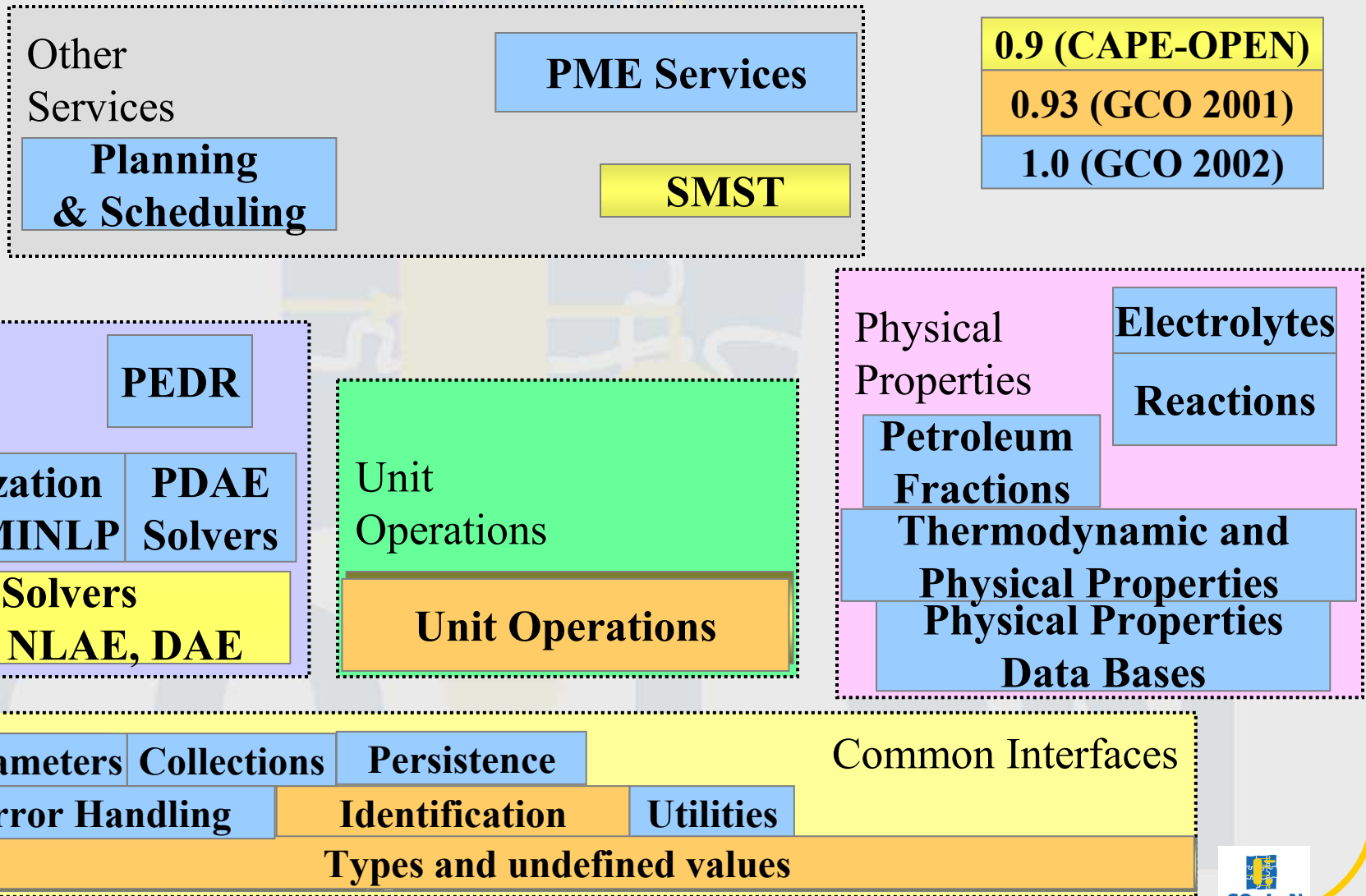
CAPE-OPEN Documentation Set

- ◆ **Abstract CO Interface specification**
 - ⇒ Textual requirements
 - ⇒ Use cases
 - ⇒ UML diagrams
 - ⇒ List of interfaces/methods/arguments

- ◆ **COM/CORBA implementations**
 - ⇒ Interface Definition Language files
 - ⇒ Type library

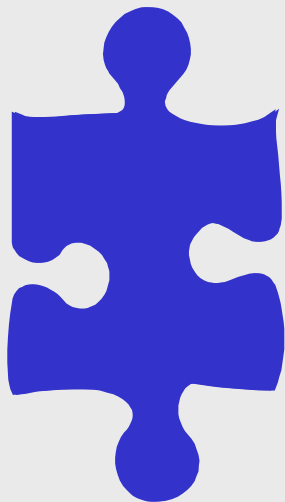


CO interfaces releases

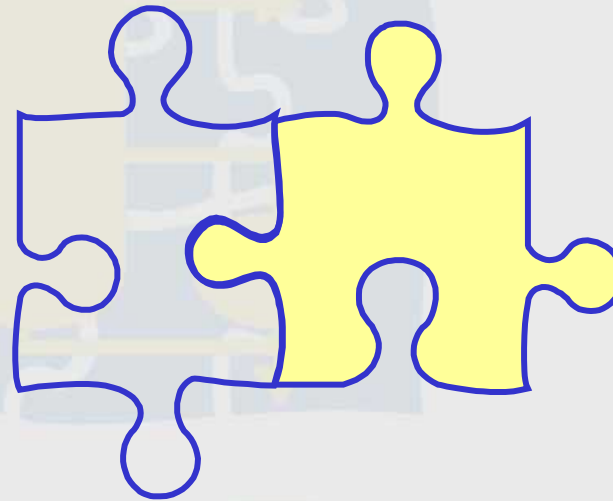


CAPE-OPEN Thermodynamic socket

- ◆ End-user can plug any CO compliant Property Package into a CO compliant Process Modeling Environment.



External CO Property Package:
(Aspen Properties,
PPDS,
UniSim COMThermo,
Aspen Hysys COMThermo,
Simulis Thermodynamics,
MultiFlash,
CO-SPPTS, ...)



CAPE-OPEN PME:
Aspen Plus,
Aspen Hysys,
UniSim Design,
INDISS,
ProSim Plus,
gPROMS,
PRO/II,
COFE,
Xchanger Suite

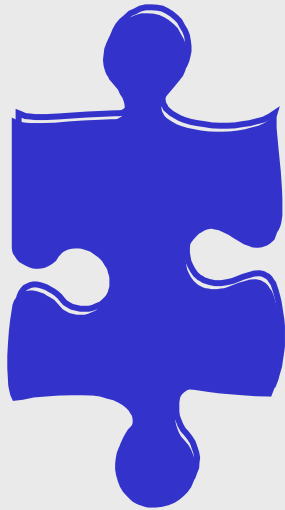


Workflow

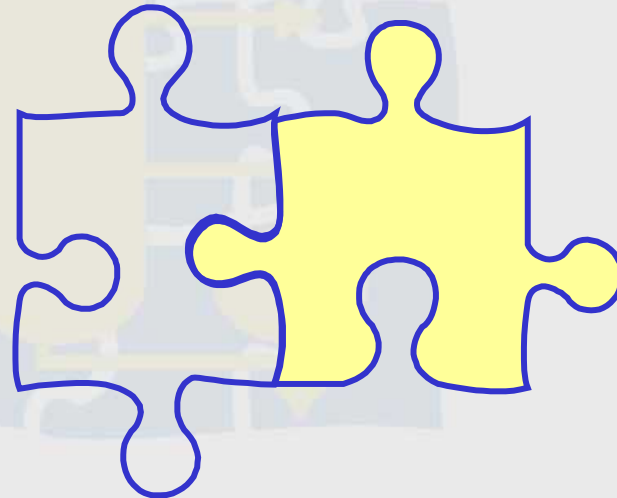
- ◆ End-user develops a Property Package in a third-party application (ex. : Aspen Plus, Simulis, etc...).
- ◆ End-user saves Property Package (PP) configuration to make PP available as a CAPE-OPEN component.
- ◆ End-user opens a PME and selects the external Property Package to be used.
- ◆ The PME asks for physical properties and phase equilibrium calculations to the external Property package through CAPE-OPEN interfaces.

CAPE-OPEN Unit Operation socket

- ◆ End-user can plug any CO compliant Unit Operation into a CO compliant Process Modeling Environment.



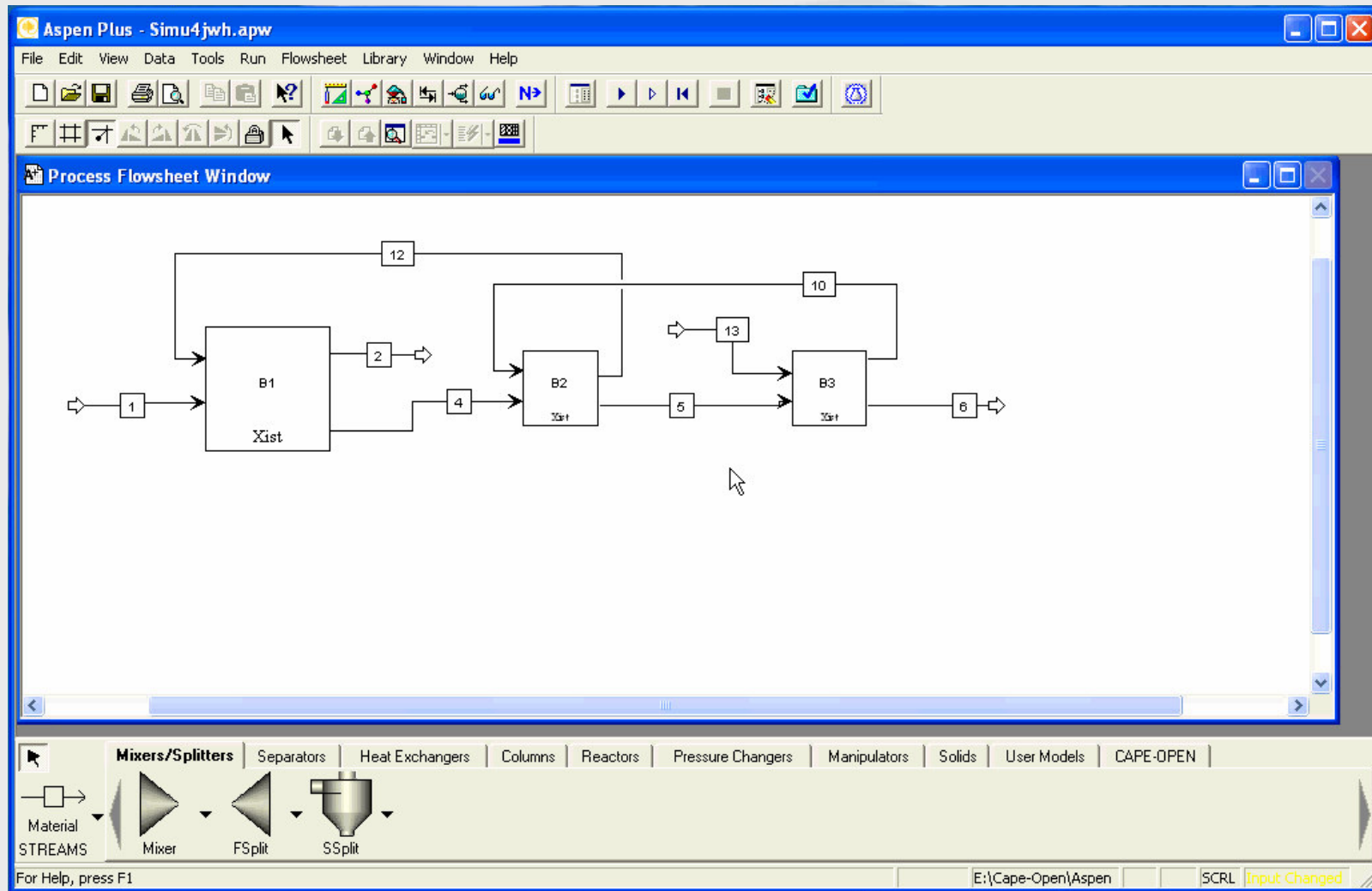
External CO Unit Operations:
(XChanger Suite,
Fluent models,
gO:CAPE-OPEN models,...)



CAPE-OPEN PME:
Aspen Plus,
Aspen Hysys,
UniSim Design,
INDISS,
ProSim Plus,
PRO/II,
COFE



Xist component in Aspen Plus



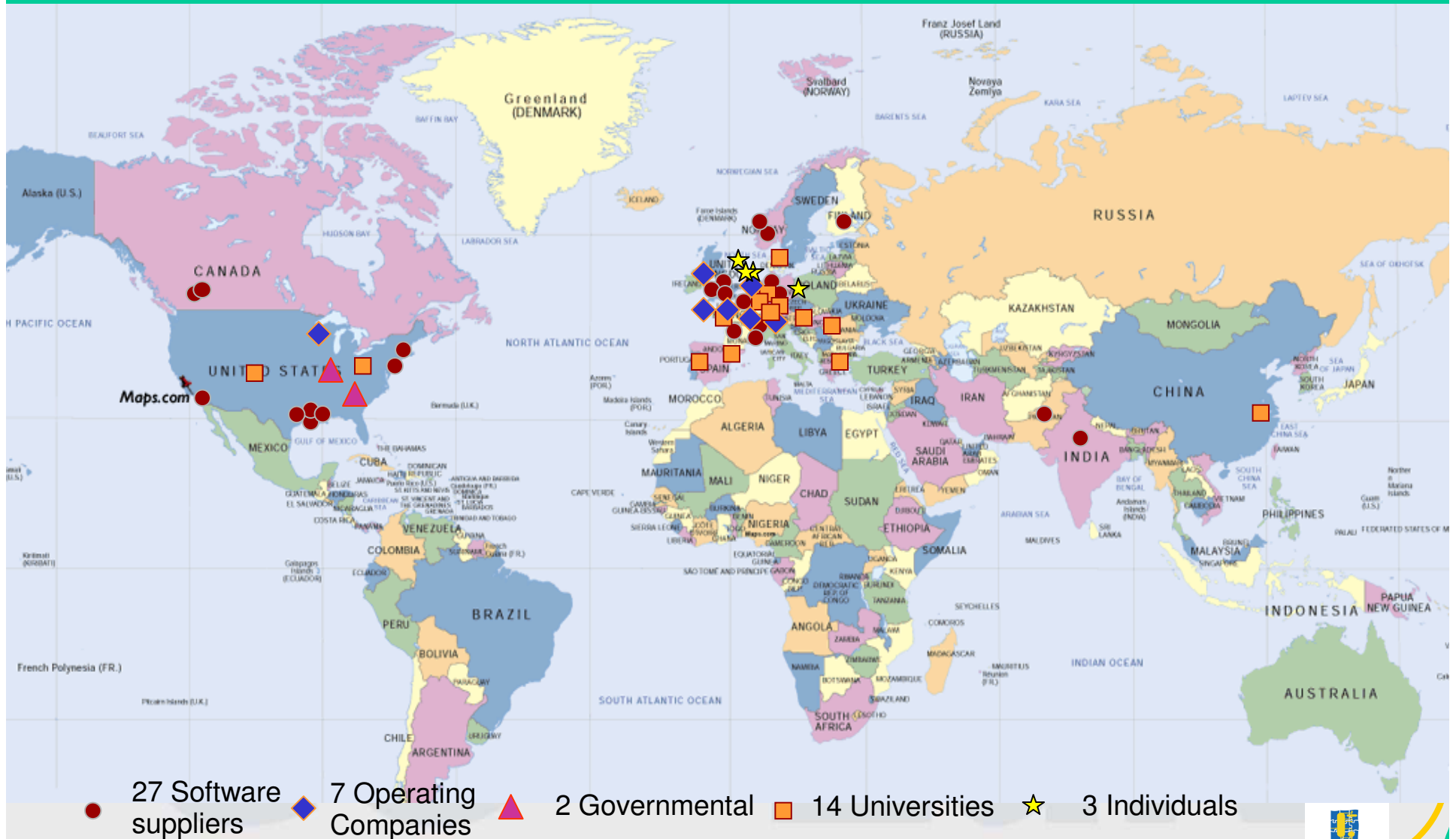
***Expanding Process Modeling Capability
through Software Interoperability
Standards***

**CO-LaN
CAPE-OPEN Laboratories Network**

**A group of end users taking responsibility
for putting resources together to support
ongoing work on the standard**



53 members as of August 2006



Activities

- ◆ **Disseminate**
 - ⇒ Web site, documents, CO Update Newsletter.
 - ⇒ « CAPE-OPEN Tour » days.
- ◆ **Develop independent testers and support tools**
 - ⇒ CO-LaN Tester suite, wizards, logger.
- ◆ **Facilitate interoperability**
 - ⇒ Use software made available in any combination.
 - ⇒ Sponsor consultancy by CAPE-OPEN experts.
- ◆ **Organize targeted Special Interest Groups on standards**
 - ⇒ Trigger projects.
 - ⇒ Open to all members.



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Thank you!

